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**ECF**

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The paper used in this manual  
is elemental chlorine free.

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# SAFETY INSTRUCTIONS

The operator and installer must read the applicable safety instructions before attempting to install or operate the equipment.



## 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, can result in minor or moderate injury.



Warning, Caution



Prohibitive Action



Mandatory Action



## DANGER



**Wear a safety belt and hard hat when working on the antenna unit.**

Serious injury or death can result if someone falls from the radar antenna mast.



## WARNING



### Radio Frequency Radiation Hazard

The radar antenna emits electromagnetic radio frequency (RF) energy which can be harmful, particularly to your eyes. Never look directly into the antenna aperture from a close distance while the radar is in operation or expose yourself to the transmitting antenna at a close distance.

Distances at which RF radiation levels of 100, 50 and 10 W/m<sup>2</sup> are given in the table below.

**Note:** If the antenna unit is installed at a close distance in front of the wheel house, your administration may require halt of transmission within a certain sector of antenna revolution. This is possible. Ask your FURUNO representative or dealer to provide this feature.

Model	Transceiver	Magnetron	Antenna *	100W/m <sup>2</sup>	50W/m <sup>2</sup>	10W/m <sup>2</sup>
FAR-2827W	RTR-081A (X-25 kw)	MG5436	XN-20AF	0.4 m	1.0 m	5.6 m
			XN-24AF	0.2 m	0.5 m	3.4 m
FAR-2837SW	RTR-082 (S-30 kw)	MG5223F	SN-36AF	--	0.2 m	1.9 m

\*XN20AF: 6.5 ft

XN24AF: 8 ft

SN36AF: 12 ft



## WARNING



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

**ELECTRICAL  
SHOCK  
HAZARD**

Only qualified personnel should work inside the equipment.

**Construct a suitable service platform from which to install the antenna unit.**

Serious injury or death can result if someone falls from the radar antenna mast.

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

Fire, electrical shock or serious injury can result if the power is left on or is applied while the equipment is being installed.

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

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

**Use only the specified power cable.**

Fire or damage to the equipment can result if a different cable is used.

**Do not install the monitor unit, processor unit or control unit where they may get wet from rain or water splash.**

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



**Attach securely protective earth to the ship's body.**

The protective earth (grounding) is required to the AC power supply to prevent electrical shock.



## CAUTION

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

	Standard compass	Steering compass
Antenna Unit (RSB-103, 25 kw, X-band, TR-down)	1.15 m	0.70 m
Antenna Unit (RSB-104/105, 30 kw, S-band, TR-down)	1.35 m	0.85 m
Monitor Unit (MU-231CR)	1.85 m	1.20 m
Processor Unit (RPU-013)	1.35 m	0.85 m
Control Unit (RCU-014)	0.30 m	0.30 m
Control Unit (RCU-015)	0.95 m	0.60 m
Control Unit (RCU-016)	0.65 m	0.45 m
Transceiver Unit (RTR-081A)	2.00 m	1.30 m
Transceiver Unit (RTR-082)	4.25 m	2.75 m
RJB-001	1.10 m	0.70 m
Switching HUB	1.00 m	0.60 m
CU-200-FAR	0.90 m	0.60 m
Power Supply Unit (PSU-011)	0.30 m	0.30 m
Monitor Unit (MU-231)	0.85 m	0.55 m

# EQUIPMENT LISTS

## Standard Supply (For FAR-2827W)

Name	Type	Code No.	Qty	Remarks	
Antenna Unit	XN20AF-RSB103	-	1	24 rpm, 2000 mm w/CP03-19101	
	XN24AF-RSB103	-		24 rpm, 2400 mm w/CP03-19101	
Transceiver Unit	RTR-081A	-	1	25 kW, X-band	
Monitor Unit	MU-231CR		1		
	MU-231				
Processor Unit	RPU-013	-	1		
Power Supply Unit	PSU-011		1	Russian flag vessel only	
Control Unit	RCU-014	-	1	Standard type	
	RCU-015			Trackball type	
Installation Materials	CP03-25700	000-080-435	1	For 15 m signal cable, RW-9600	
	CP03-25710	000-080-436		For 30 m signal cable, RW-9600	
	CP03-25730	000-082-191		For 40 m signal cable, RW-9600	
	CP03-25720	000-080-437		For 50 m signal cable, RW-9600	
	CP03-27502	008-540-140	1	For antenna unit	
	CP03-25800	000-080-434	1	For monitor unit	
	CP03-27501	008-540-200	1	For transceiver unit	
	CP03-25602	008-535-940	1	For processor unit (AC set)	
Rectangular waveguide installation materials	CP03-16400	000-086-743	1		
Rectangular guide installation materials	CP03-16410	000-086-744	1	20 m, w/CP03-16411	For flexible waveguide
	CP03-16420	000-086-745		30 m, w/CP03-16411	
	CP03-16430	000-086-746		50 m, w/CP03-16411	
Accessories	FP03-09810	008-536-010	1	For monitor unit	
	FP03-09850	008-535-610	1	For RCU-014	
	FP03-09860	008-535-690		For RCU-015	
Spare Parts	SP03-12501	008-485-360	1	For antenna unit	
	SP03-14401	008-536-990		For monitor unit (AC spec)	
	SP03-14404	008-535-910		For processor unit 100 VAC set	
	SP03-14405	008-535-920		For processor unit 220 VAC set	

## Standard Supply (FAR-2837SW)

Name	Type	Code No.	Qty	Remarks
Antenna Unit	SN30AF-RSB104	-	1	21 rpm, 3000 mm
	SN30AF-RSB105	-		26 rpm, 3000 mm
	SN36AF-RSB104	-		21 rpm, 3600 mm
	SN36AF-RSB105	-		26 rpm, 3600 mm
Transceiver Unit	RTR-082	-	1	30 kW, S-band
Monitor Unit	MU-231CR		1	AC spec only
	MU-231			
Processor Unit	RPU-013	-	1	
Power Supply Unit	PSU-011		1	Russian flag vessel only
Control Unit	RCU-014	-	1	Standard type
	RCU-015			Trackball type
Installation Materials	CP03-25800	000-080-434	1	For monitor unit
	CP03-25602	008-535-940	1	For processor unit, AC set
	CP03-27601	008-540-570	1	For transceiver unit
	CP03-25700	000-080-435	1	For 15 m signal cable, RW-9600
	CP03-25710	000-080-436		For 30 m signal cable, RW-9600
	CP03-25730	000-082-191		For 40 m signal cable, RW-9600
	CP03-25720	000-080-437		For 50 m signal cable, RW-9600
CP03-27602	008-540-520	1	For antenna unit	
Coaxial Cable Installation materials	CP03-14900	000-086-325	1	Coax. Cable LHPX-20DASSY (L=20) (20 m), Converter PA-5600, CP03-13948
	CP03-14910	000-086-326		Coax. Cable LHPX-20DASSY (L=30) (30 m), Converter PA-5600, CP03-13948
Accessories	FP03-09810	008-536-010	1	For monitor unit
	FP03-09850	008-535-610	1	For RCU-014
	FP03-09860	008-535-690		For RCU-015
	FP03-10101	008-538-730	1	For antenna unit
Spare Parts	SP03-14404	008-535-910	1	For processor unit 100 VAC set
	SP03-14405	008-535-920		For processor unit 220 VAC set
	SP03-14401	008-536-990	1	For monitor unit (AC spec)

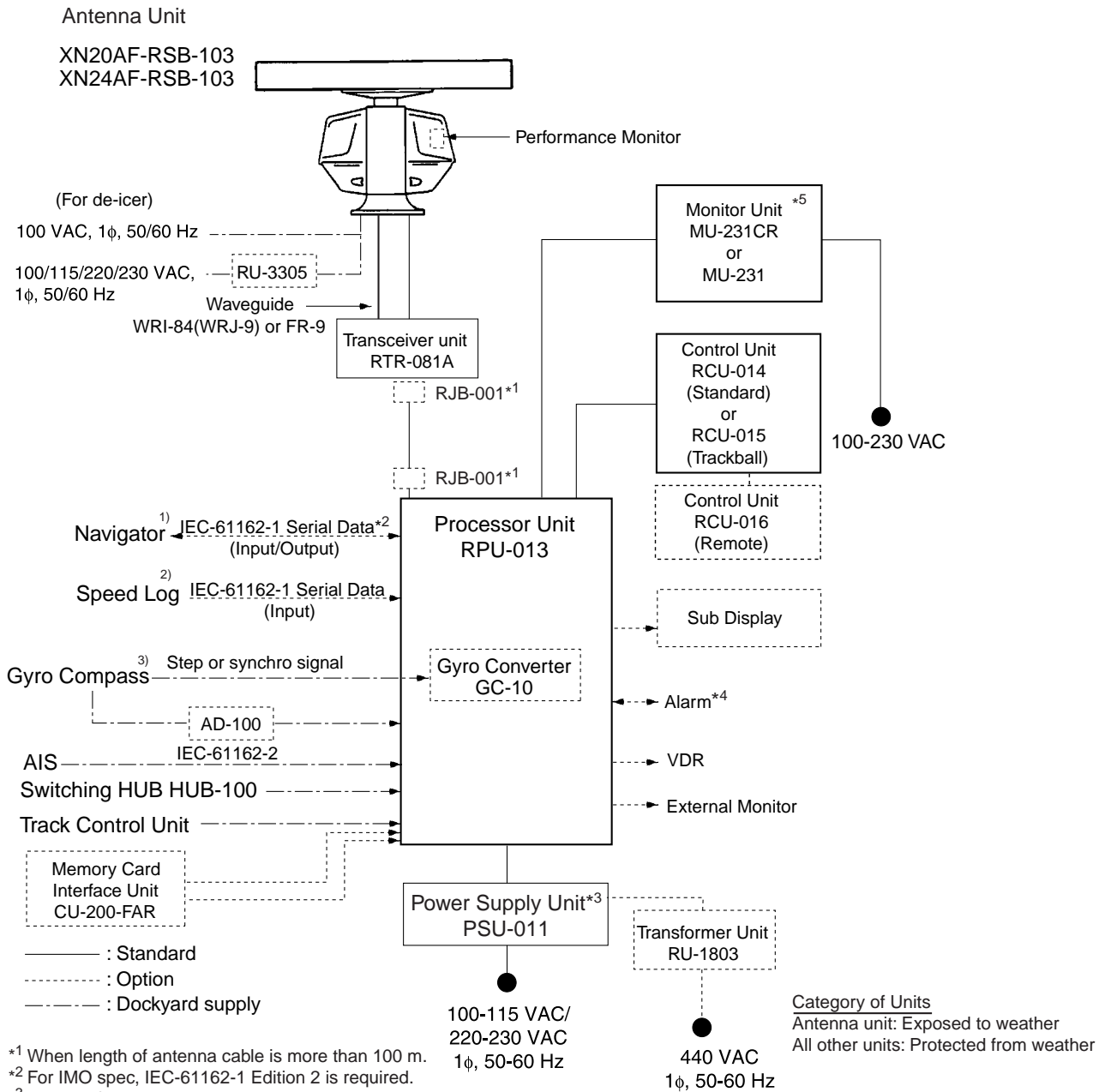
## Optional Equipment

Name	Type	Code No.	Remarks
Gyro Converter	GC-10-2	000-080-440	See chapter 4.
Performance Monitor	PM-31	-	Mandatory for IMO radar (2827W)
	PM-51	-	Mandatory for IMO radar (2837SW)
Transformer Unit	RU-1803	000-030-420	Converts 440 VAC to 100 VAC, For processor unit
	RU-3305	000-030-448	Converts 110/115/220/230 VAC to 100 VAC, de-icer
	RU-5693	000-030-456	Converts 110 VAC to 220 VAC, 2837SW only
	RU-6522	000-030-410	Converts 220 VAC to 200 VAC, 2837SW only
	RU-5466-1	000-030-453	Converts 440 VAC to 220 VAC, 2837SW only

Memory Card Interface Unit	CU-200-FAR	000-081-568	w/CP03-27430
External Buzzer	OP03-21	000-030-097	
Control Unit	RCU-016	000-080-299	Remote type, w/FP03-09860
RAM Card	00RAM08MC-005	004-376-740	8 MB
DVI-RGB Converter Kit	OP03-180-1	008-545-590	Assembled in factory.
	OP03-180-2	008-536-070	Assembled in field, see CH 4.
	OP03-180-3	008-545-610	For console, assembled in factory.
	OP03-180-4	008-545-600	For console, assembled in field.
Cable Assy.	XH10P-W-6P L=20M	000-149-748	For control unit, 20 m
	XH10P-W-6P L=30M	000-149-749	For control unit, 30 m
	S03-9-5	008-206-640	For external radar, 5 m, 8-8P
	S03-9-10	008-206-650	For external radar, 10 m, 8-8P
	S03-9-15	008-209-160	For external radar, 15 m, 8-8P
	XH10P-W-5P-A L=10M	000-149-050	For remote control, 10 m
	XH10P-W-5P-A L=20M	000-149-051	For remote control, 20 m
	XH10P-W-5P-A L=30M	000-149-052	For remote control, 30 m
LAN Cable Kit	CP03-28900	000-082-658	FR-FTPC-CY 10 m, connector
	CP03-28910	000-082-659	FR-FTPC-CY 20 m, connector
	CP03-28920	000-082-660	FR-FTPC-CY 30 m, connector
Accessories	FP03-09830	008-536-020	Hanger assy. for MU-231CR
Hand Grip	FP03-09840	008-535-570	For monitor unit
Dust Cover	03-163-2101	100-307-270	For MU-231CR
Hood	FP03-11000	008-571-680	For MU-231CR
Clamp Plate	OP03-182	008-535-620	For RCU-014
Flush Mount Kit	FP03-09870	008-535-630	For control unit RCU-014/015/016
	OP03-198	001-008-050	
BNC Connector Converter	DSUB-BNC-1	000-148-528	For VDR
Junction Box	RJB-001	-	For more 100 m antenna cable
Switching Hub	HUB-100	-	
Coupling Pedestal	OP03-184	008-535-650	For RCU-014 and MU-231CR
	OP03-185	008-535-660	For RCU-014
Desktop Mount Kit	FP03-10201	008-539-530	For CU-200
Console Mount Kit	FP03-10202	008-539-540	For CU-200
H-type Waveguide Clamp	CP03-00600-W	008-198-420	For FAR-2827W
Waveguide Drain	03-009-0360	300-903-600	For FAR-2827W
E-bend Waveguide	RWA-1030 B-107	310-100-140-10	For FAR-2827W
Waveguide Twist	RWA-1050 C-109	310-100-180-10	For FAR-2827W
Rectangular Guide Clamp	OP03-148	008-477-540	For FAR-2827W
FR-9 Rectangular Guide Tool	OP03-123	008-448-870	For FAR-2827W
FR-9 Electric Tool	03S9199	000-805-737	For FAR-2827W
FR-9 Termination	FR-9000	000-805-741	
Thru-Deck Cable Gland	000X5-01	000-879-234	
	000X6-01	000-879-235	
	000X7-01	000-879-236	
Deck-Thru Cable Gland	CP03-00702	008-197-350	For FAR-2837SW
Waveguide clamp	03-011-3228	100-049-620	For FAR-2837SW
Slim Hood	FP03-11010	001-033-140	For MU-231CR display unit

# SYSTEM CONFIGURATION

## FAR-2827W

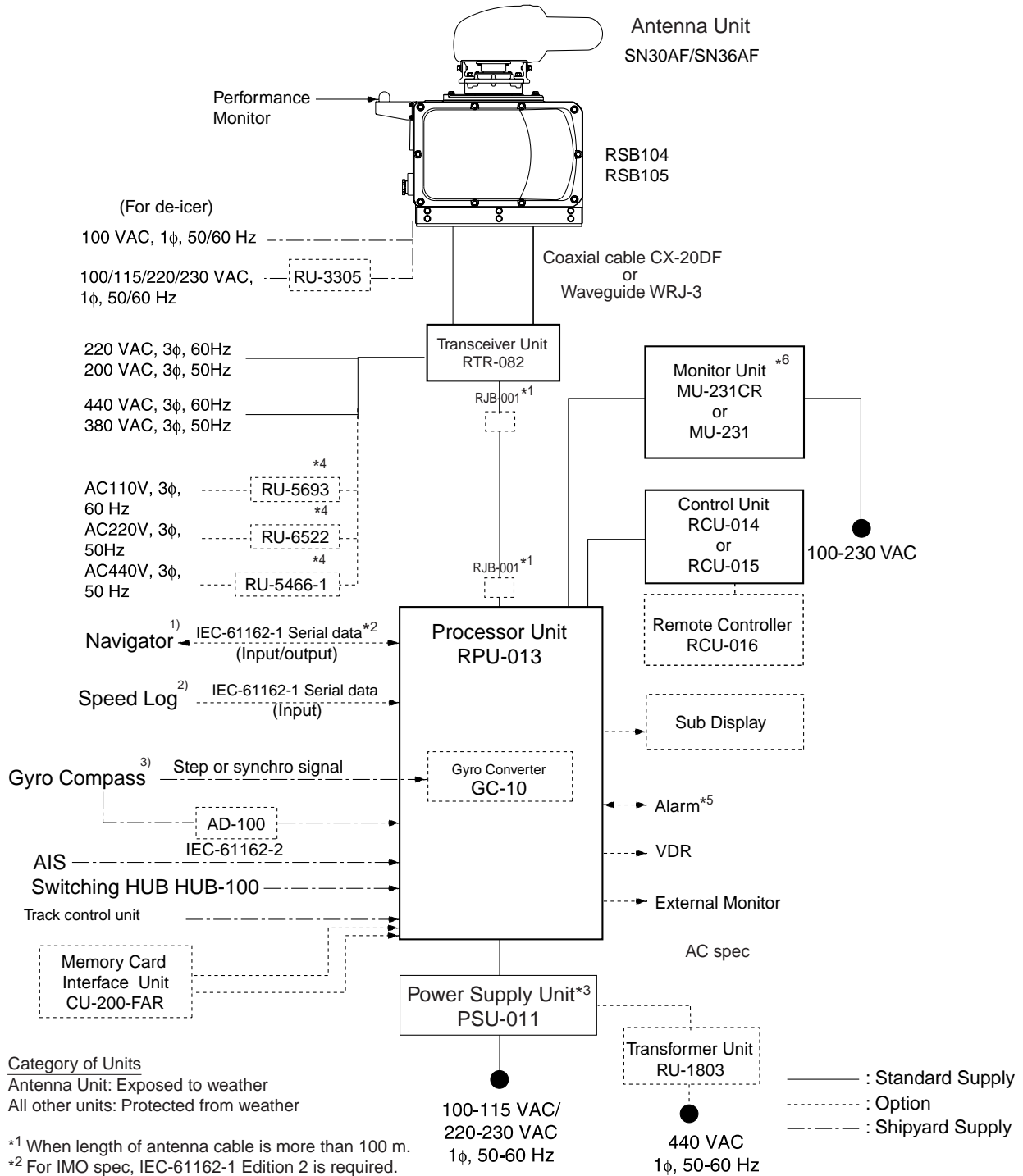


\*1 When length of antenna cable is more than 100 m.  
 \*2 For IMO spec, IEC-61162-1 Edition 2 is required.  
 \*3 Russian flag vessels only.  
 \*4 Contact output for Alarm  
 (Load current) 120 mA, (Polarity) No.1/2: Normally Close, No.3/4: Normally Open  
 Serial I/O for alarm is also possible, which complies with IEC 61162-1.  
 \*5 This monitor has been approved by the IMO (CAT1). If a different monitor is to be used, its effective diameter must meet the applicable Category requirements (effective diameter 320 mm or higher). Refer to its operator's manual for details.

- 1) Connect the EPFS which is approved in accordance with the requirements of the IMO in resolution MSC.112(73) is used.
- 2) Connect the SDME which is approved in accordance with the requirements of the IMO in resolution MSC.96(72) is used.
- 3) Use the gyrocompass having an update rate that is adequate for the ship's rate of turn.



# FAR-2837SW



**Category of Units**  
 Antenna Unit: Exposed to weather  
 All other units: Protected from weather

\*1 When length of antenna cable is more than 100 m.  
 \*2 For IMO spec, IEC-61162-1 Edition 2 is required.  
 \*3 Russian flag vessels only.  
 \*4 Not available with HSC spec.  
 \*5 Contact output for Alarm  
 (Load current) 120 mA, (Polarity) No.1/2: Normally Close, No.3/4: Normally Open  
 Serial I/O for alarm is also possible, which complies with IEC 61162-1.  
 \*6 This monitor has been approved by the IMO (CAT 1). If a different monitor is to be used,  
 its effective diameter must meet the applicable Category requirements (effective diameter  
 320 mm or higher). Refer to its operator's manual for details.

100-115 VAC/  
 220-230 VAC  
 1φ, 50-60 Hz

440 VAC  
 1φ, 50-60 Hz

— : Standard Supply  
 - - - : Option  
 - · - · : Shipyard Supply

- 1) Connect the EPFS which is approved in accordance with the requirements of the IMO in resolution MSC.112(73) is used.
- 2) Connect the SDME which is approved in accordance with the requirements of the IMO in resolution MSC.96(72) is used.
- 3) Use the gyrocompass having an update rate that is adequate for the ship's rate of turn.

**About the category sticker**

This radar meets the requirements in IEC62388 (Marine navigation and radio communication equipment and systems – Shipborne radar – Performance requirements, method of testing and required test results).

Check the appropriate box on the sticker which is pre-attached on the processor unit., according to your radar’s specification. Refer to the table shown below to confirm your category.

Category	Radar type	Antenna rotation speed
CAT 1	FAR-2817, FAR-2827, FAR-2837S, FAR-2827W, FAR-2837SW	Normal speed
CAT 1H	FAR-2817, FAR-2827, FAR-2837S	HSC
CAT 2	FR-2117, FAR-2117-BB, FAR-2127, FAR-2127-BB, FAR-2137S, FAR-2137S-BB	Normal speed
CAT 2H	FAR-2117, FAR-2117-BB, FAR-2127, FAR-2127-BB, FAR-2137S, FAR-2137S-BB	HSC

Comply with MSC.192(79)	
<input type="checkbox"/> CAT 1	<input type="checkbox"/> CAT 1H
<input type="checkbox"/> CAT 2	<input type="checkbox"/> CAT 2H
USCG APPROVAL NO.	
165.120/EC0735/4340784	
165.111/EC0735/4340784	

Sticker for Category

# 1. MOUNTING

## NOTICE

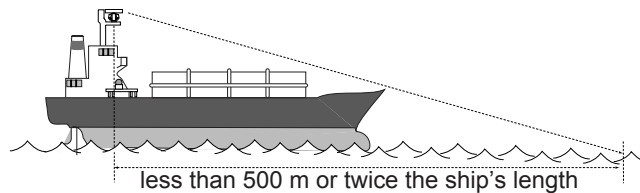
Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts of the equipment.

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

## 1.1 Antenna Unit

### Mounting considerations

- The antenna unit is generally installed either on top of the wheelhouse or on the radar mast, on a suitable platform. Locate the antenna unit in an elevated position to permit maximum target visibility.
- A line of sight from the antenna unit to the bow of the ship should hit the surface of the sea in not more than 500 m or twice the ship's length, depending which value is smaller, for all load and trim conditions.



- Mount the antenna unit so that any blind sectors caused by objects (mast, etc.) are kept to a minimum. No blind sector should exist in arc of the horizon from right ahead to 22.5° aft of the beam to either side (see Figure 1 below). Also, individual blind sectors of more than 5°, or the total arc of both blind sectors of more than 20°, should not occur in the remaining arc (Figure 2). Note that any two blind sectors separated by 3° or less are regarded as one sector.

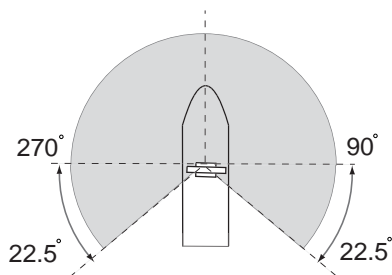


Figure 1

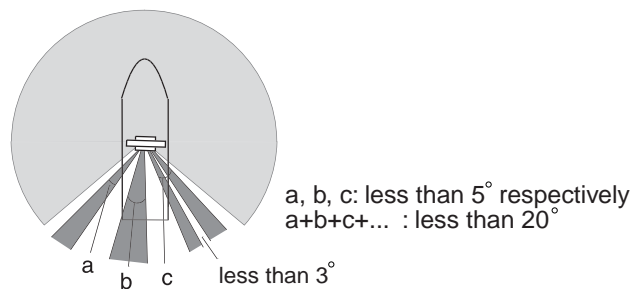
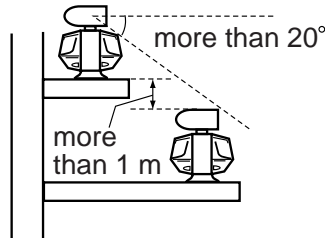


Figure 2

## 1. MOUNTING

- Install the antenna unit safely away from interfering high-power energy sources and other transmitting radio antenna.
- Keep the lower edge of the antenna unit (antenna radiator) above the safety rail by 500 mm or more.
- Two antenna units should be mounted as below:



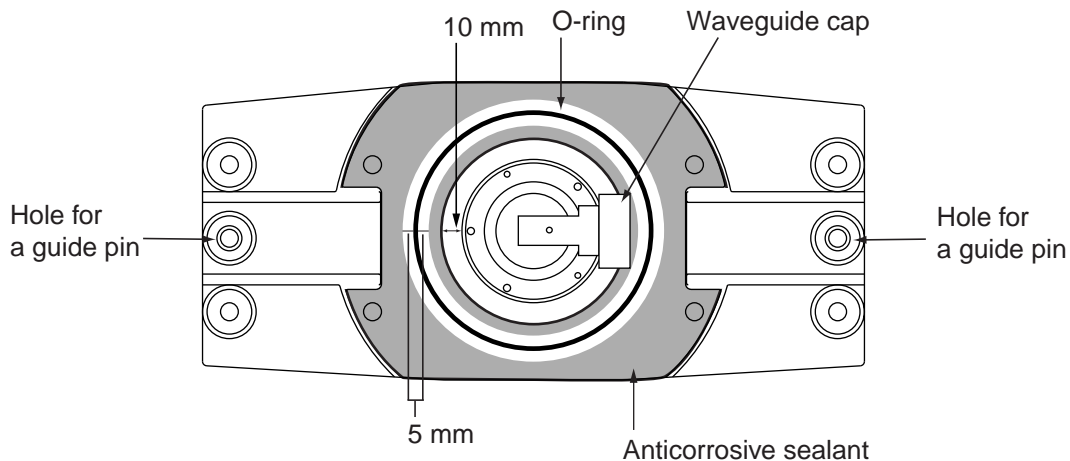
- No funnel, mast or derrick should be within the vertical beamwidth of the antenna unit in the bow direction, especially zero degrees  $\pm 5^\circ$ , to prevent blind sectors and false echoes on the radar picture.
- It is rarely possible to place the antenna unit where a completely clear view in all directions is available. Thus, you should determine the angular width and relative bearing of any shadow sectors for their influence on the radar at the first opportunity after fitting.
- Locate a direction finder antenna clear of the antenna unit to prevent interference to the direction finder. A separation of more than two meters is recommended.
- A magnetic compass will be affected if the antenna unit is placed too close to the magnetic compass. Observe the compass safe distances on page ii to prevent deviation of the magnetic compass.
- Do not paint the radiator aperture, to ensure proper emission of the radar waves.
- The antenna base is made of cast aluminum. To prevent electrolytic corrosion of the antenna base, use the seal washers and corrosion-proof rubber mat and ground the unit with the ground wire (supplied).
- Deposits and fumes from a funnel or other exhaust vent can adversely affect the aerial performance and hot gases may distort the radiator portion. The antenna unit must not be mounted where the temperature is more than 70°C.
- Leave sufficient space around the unit for maintenance and servicing. See the antenna unit outline drawing for recommended maintenance space.

### 1.1.1 FAR-2827W antenna unit

#### Assembling the antenna unit

The antenna unit consists of the antenna radiator and the antenna unit chassis, and they are packed separately. Fasten the antenna radiator to the antenna unit chassis as follows:

1. Attach two guide pins (supplied as installation) materials to the underside of the antenna radiator.
2. Remove the waveguide cap from the radiator bracket. The cap may be discarded.
3. Coat the waveguide flange with anticorrosive sealant as shown below.



*Coating the waveguide flange with anticorrosive sealant*

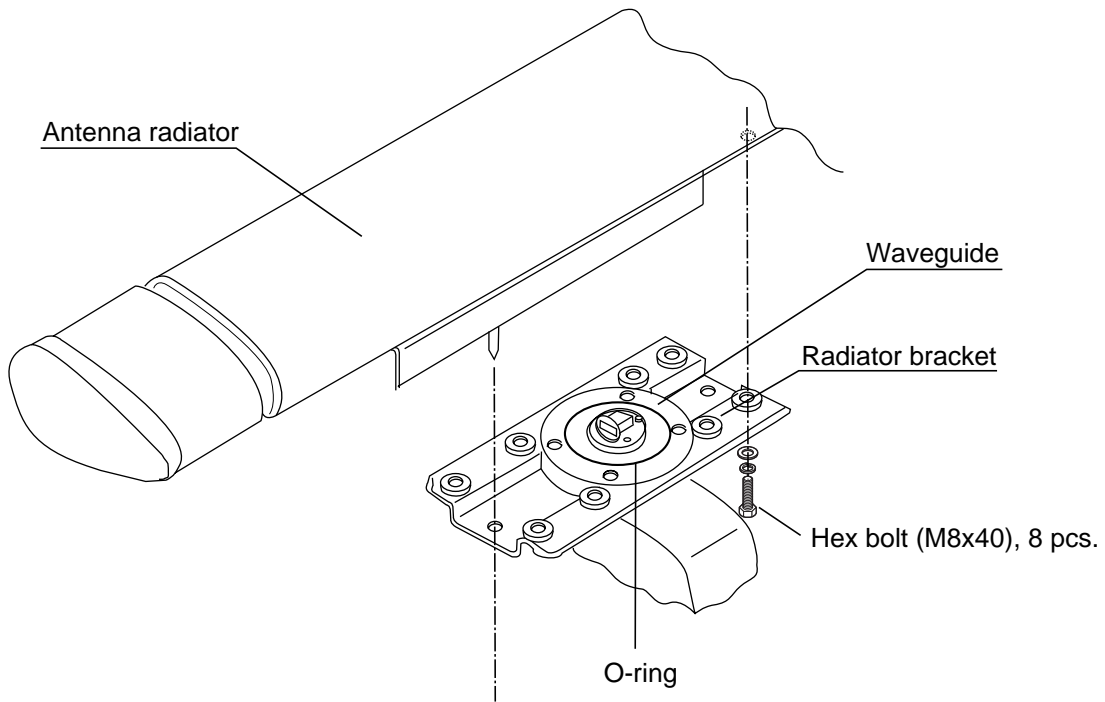
4. Coat fixing holes for the antenna radiator with anticorrosive sealant.
5. Grease the O-ring and set it to the O-ring groove of the radiator flange.
6. Set the antenna radiator to the radiator bracket.
7. Coat hex bolts M8 x 40 with anticorrosive sealant and use them to loosely fasten the antenna radiator to the antenna unit chassis.
8. Remove two guide pins (inserted at step 1), and then tighten fixing bolts.

#### **⚠ CAUTION**

**Be sure to remove the guide pins.**

Injury may result if the guide pins loosen and fall.

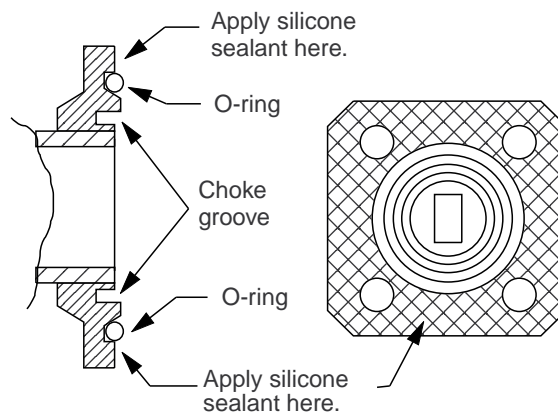
## 1. MOUNTING



*Fastening the radiator to the radiator bracket*

### **Coating the waveguide flange with silicone sealant**

1. Do not coat O-ring with silicone sealant; use grease.
2. Clean the surface of the waveguide flange, if necessary. Evenly coat the waveguide flange with silicone sealant as shown in the illustration below.

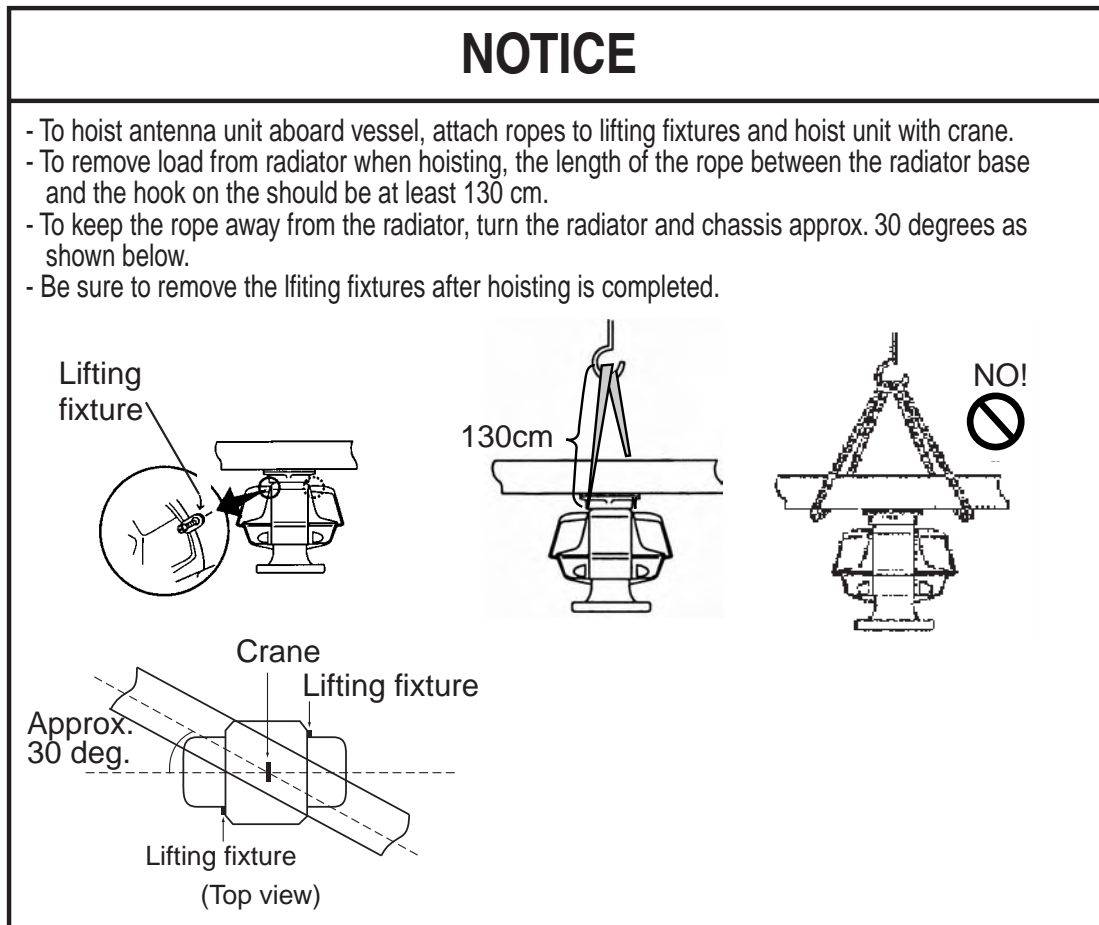


Evenly coat the waveguide flange with silicone sealant. Apply sealant sparingly; it leaks out slightly when the fixing bolts are tightened. Be sure no sealant contacts the choke groove and waveguide.

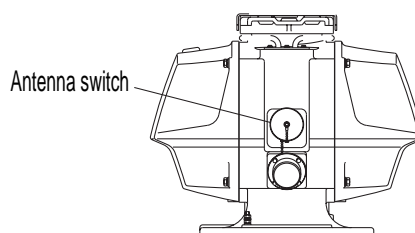
*Coating the waveguide flange with silicone sealant*

### Fastening the antenna unit to the mounting platform

The antenna unit may be assembled before hoisting it to the mounting platform. However, do not lift the antenna unit by the radiator. Always hold the unit by its housing. When using a crane or hoist, lift the unit by the hoist rings which should be fastened to the bolt fixing covers of the antenna housing.



1. Construct a suitable mounting platform referring to the outline drawing at the end of this manual.
2. Drill four mounting holes of 15 mm diameter and one cable entry hole of about 50 mm diameter in the mounting platform.
3. Lay the rubber mat (supplied) on the mounting platform.
4. Place the antenna unit on the rubber mat, orienting the unit so the antenna switch on it is facing the ship's bow.

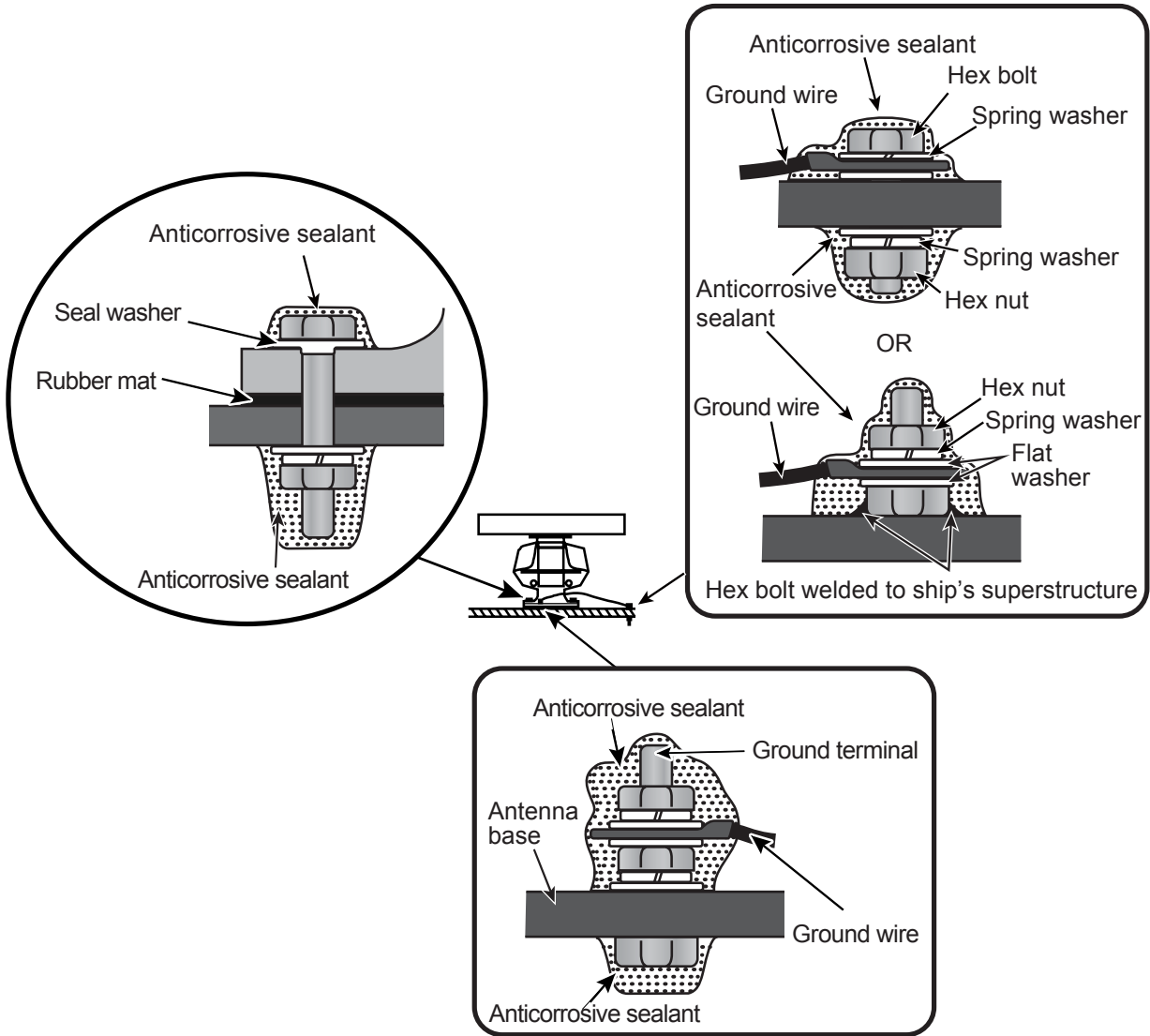


*Antenna unit, front view*

5. Fasten the antenna unit to the mounting platform with M12x60 hex bolts, nuts, flat washers and seal washers.

# 1. MOUNTING

- Using hex bolt (M6x25), nut (M6) and flat washer (M6), establish the ground system on the mounting platform as shown below. The location should be within 340 mm of the ground terminal on the antenna unit. Connect the ground wire (RW-4747, 340 mm, supplied) between the grounding point and ground terminal on the antenna unit. Coat the entire ground system with silicone sealant (supplied).



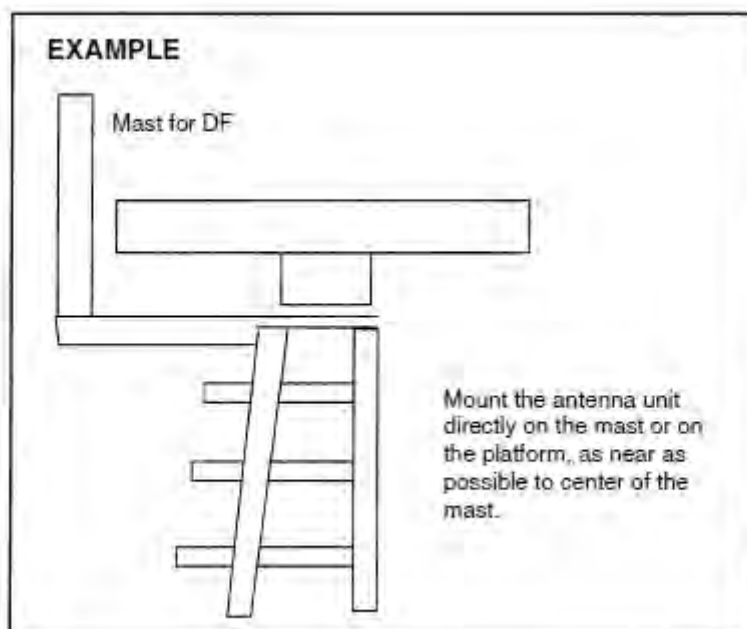
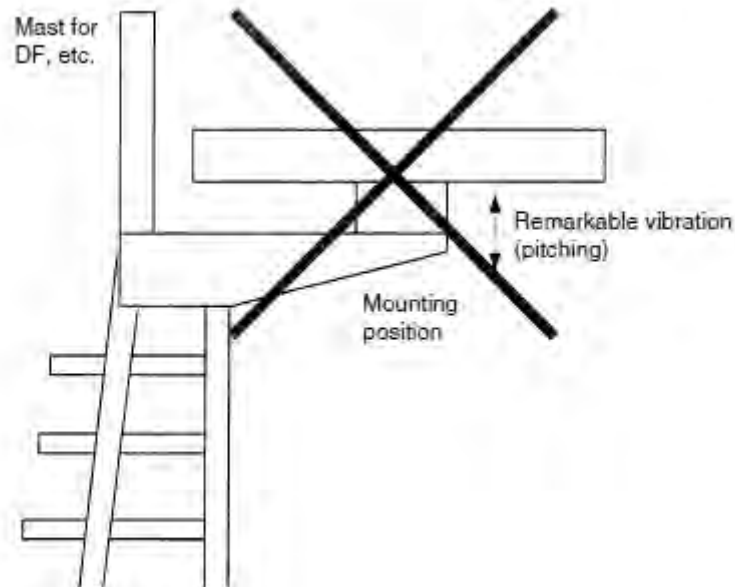
*How to mount the antenna unit*



### 1.1.2 FAR-2837SW antenna unit

#### Installation precaution for S-band antenna unit

If an S-band antenna unit is mounted near the end of a platform to provide sufficient rotation clearance for the radiator, the antenna unit, because of its weight, swings up and down by ship's vibration and rolling, exerting excessive levels of stress at the base of the radiator, which can damage the radiator. To prevent this, relocate the antenna unit, or if relocation is not possible, reinforce the platform.



*Mounting of S-band antenna unit*

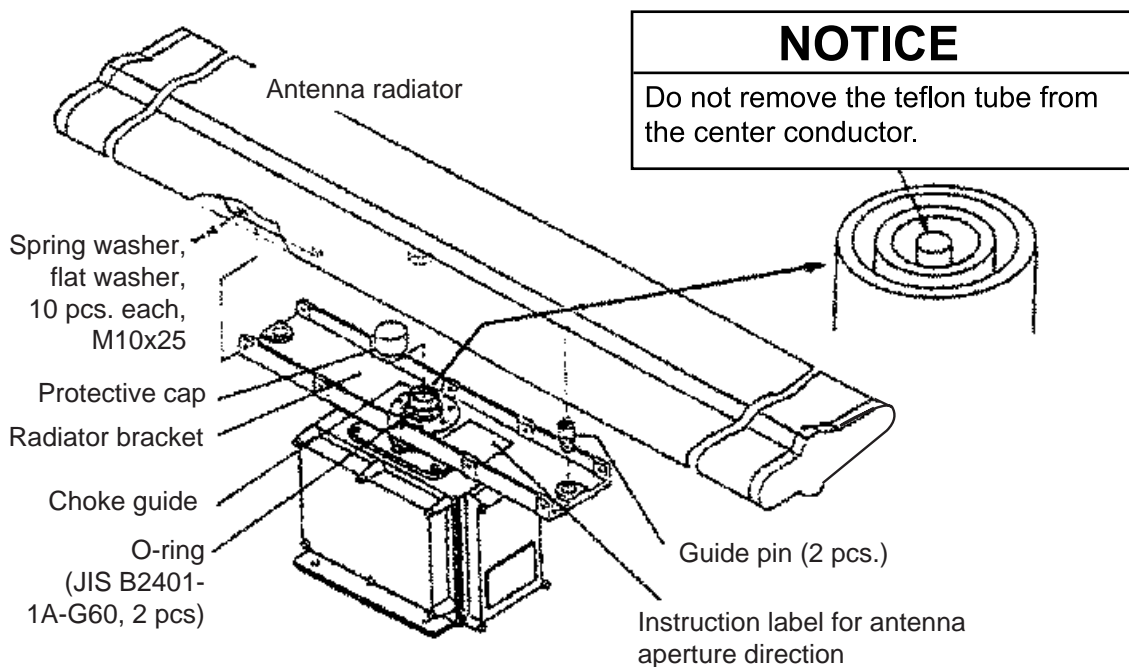
## 1. MOUNTING

### **Antenna unit assembling**

The antenna radiator and the antenna housing are shipped in separate packages. Assemble them as below. The antenna unit may be assembled before hoisting it to the mounting platform. However, do not lift the antenna unit by the radiator.

#### **Antenna unit assembling procedure**

1. Screw the guide pins (2 pcs.) in the radiator.
2. Remove the protective cap from the choke guide.
3. Grease O-ring and set it to the groove of the choke guide.
4. Place the radiator on the radiator bracket. (Radiator direction is shown by the logo on the bracket. If reversely oriented the radiator cannot be set to the bracket.)
5. Loosely fix the radiator to the radiator bracket with hex. bolts (M10x25), spring washers and flat washers.
6. Remove the guides pins and tighten hex. bolts.



#### *Assembling the radiator bracket*

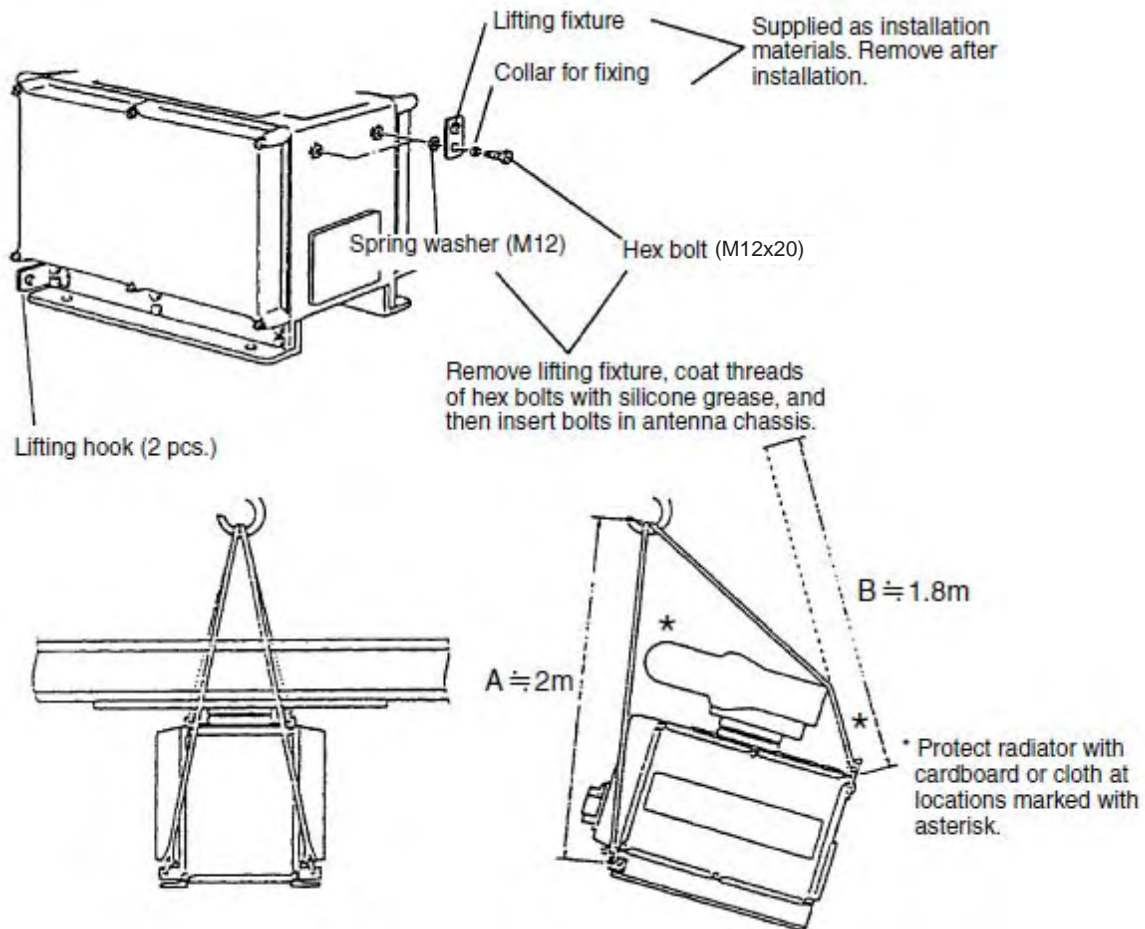
### **⚠ CAUTION**

**Be sure to remove the guide pins.**

Injury may result if the guide pins loosen and fall.

**How to lift antenna unit**

1. Fix the antenna radiator to the antenna unit chassis.
2. Attach the lifting fixtures and collars as shown in figures in below.
3. Position the radiator as shown in figure below and arrange the ropes A  $\approx$  2.0 m and B  $\approx$  1.8 m.



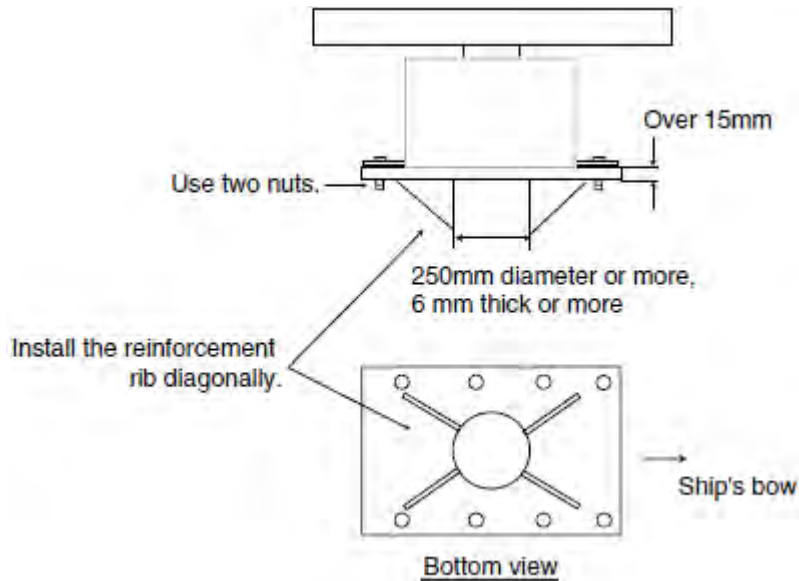
*Attachment of lifting fixtures, collar and lopes*

## 1. MOUNTING

### **Fastening the antenna unit to the mounting platform**

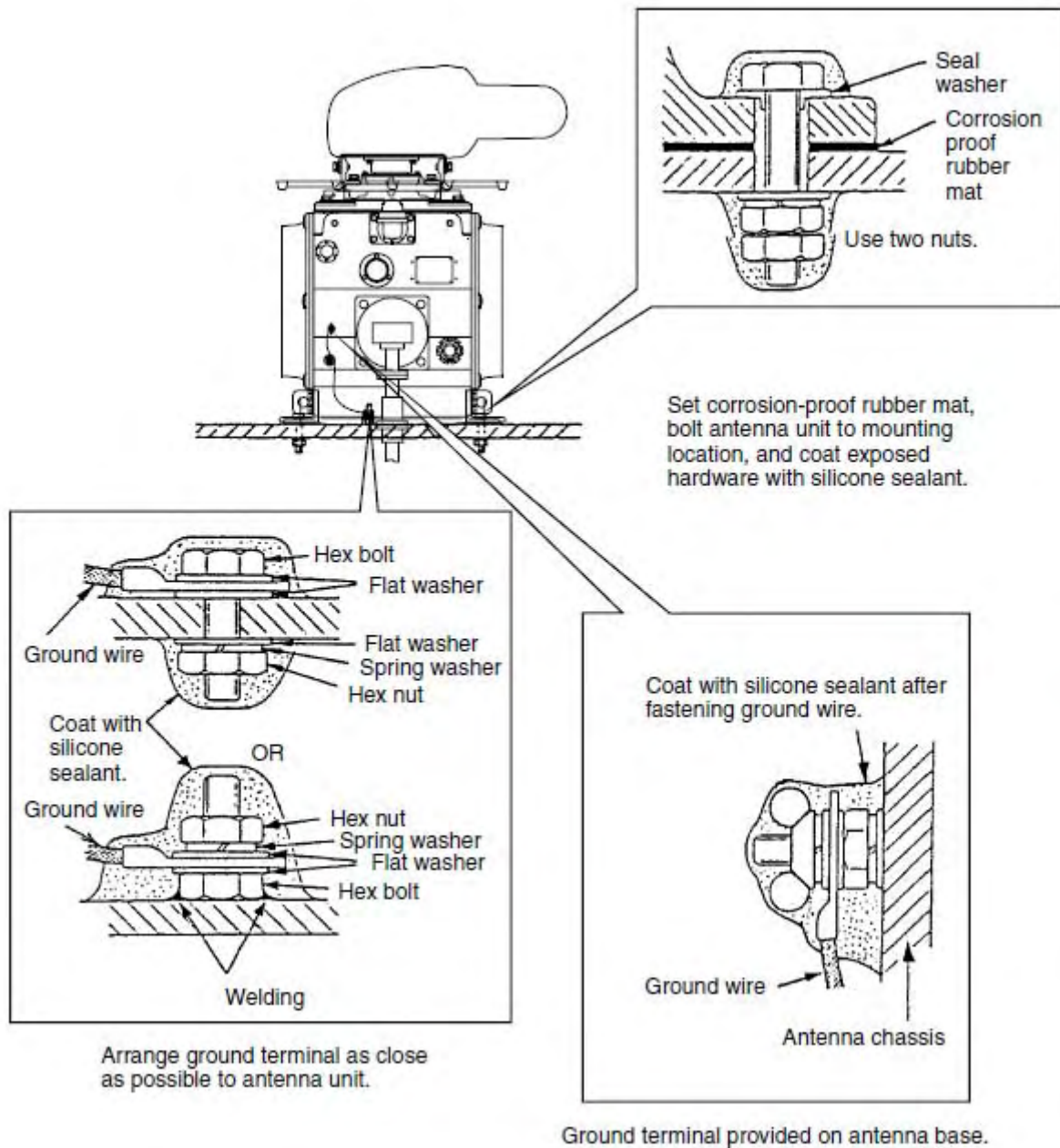
See the figure on the next page for antenna unit mounting.

1. Referring to the antenna outline drawing, drill four bolt holes (15 mm diameter) in the radar mast platform or the deck.
  - a) The diameter of the mast for fixing the antenna unit platform must be over 15 mm.
  - b) The thickness of the antenna unit platform must be over 15 mm.
  - c) The reinforcement rib must be installed diagonally as shown below.



*Installation of reinforcement ribs*

2. Place the corrosion-proof rubber mat (supplied) on the mounting platform.
3. Hoist the antenna unit as shown on page 1-9 and place it on the rubber mat. Orient the cable gland toward the ship's stern (or port, starboard). Remove the lifting fixtures and collars.
4. Fix the antenna base to the mounting platform with four M12x70 hex. bolts, nuts, washers and seal washers (supplied).
5. Arrange the grounding terminal at the nearest grounding spot with the M6x25 hex. bolt, nut and washers (supplied). Then, fix a ground wire (RW-4747, 340 mm) to the terminal.
6. Connect the other end of the ground wire to the earth terminal of the antenna unit.
7. Coat earth terminal and fixing bolts on the antenna unit with silicone sealant (supplied).



*Mounting of antenna unit*

## 1.2 Monitor Unit

The monitor unit can be flush mounted in a console panel, or mounted on a desktop using the optional accessories. The optimal viewing distances for the radar display units are: MU-170C: 920 mm, MU-201CR: 1080 mm, MU-231CR: 1200 mm.

For MU-231, see its Operator's Manual.

### Mounting considerations

When selecting a mounting location, keep in mind the following points:

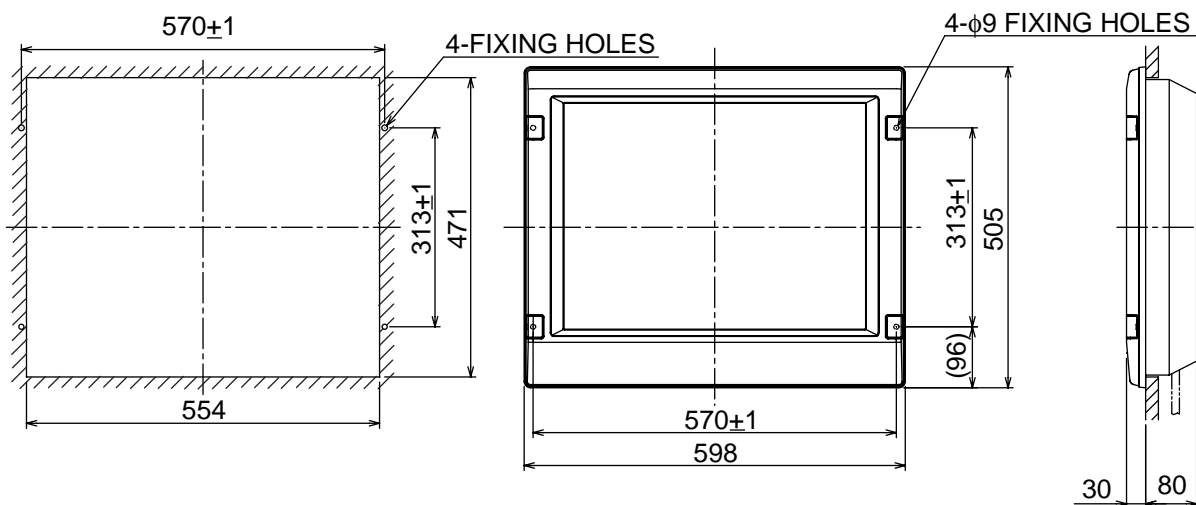
- Select a location where the display unit can be viewed conveniently and where the screen can be viewed while facing towards the bow.
- Locate the unit out of direct sunlight and away from heat sources because of heat that can build up inside the cabinet.
- Locate the equipment away from places subject to water splash and rain.
- Leave sufficient space on the sides and rear of the unit to facilitate maintenance.
- A magnetic compass will be affected if the monitor unit is placed too close to the magnetic compass. Observe the compass safe distances on page ii to prevent deviation of a magnetic compass.

### Mounting procedure

#### Flush mounting

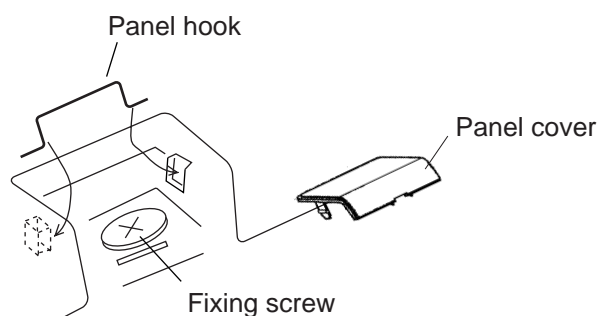
Follow the procedure below to mount the monitor unit in a console panel.

1. Make cutout in mounting location referring to the outline drawing shown below.
2. Insert the monitor unit to the hole and fix it by four tapping screws (6x30).
3. Attach panel hooks near the fixing holes. These are used to pull out the monitor unit from a console panel for servicing.
4. Attach four panel covers to the fixing holes.



Monitor unit MU-231CR

*Flush mounting of monitor unit*



*Attaching panel hook and panel cover*

**Note:** If you need to remove the monitor unit from the panel, remove the four panel covers with your fingernail and use two panel hooks supplied as accessories to lift the monitor unit.

### **Desktop mounting**

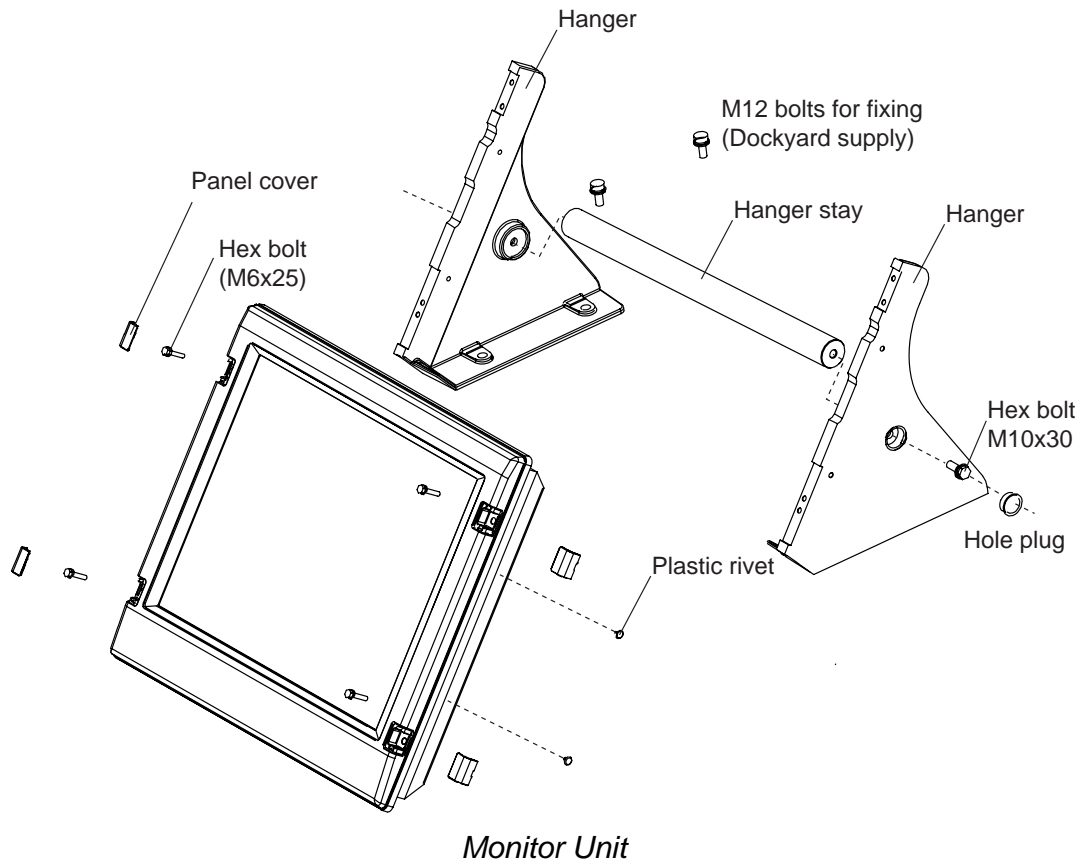
Use the optional accessories to mount the monitor unit on a desktop.

- Necessary parts: FP03-09830 (Code No.: 008-536-020)

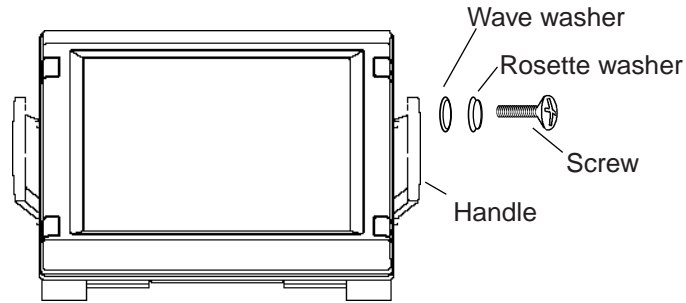
Name	Type	Code No.	Qty	Remarks
Hanger L	03-163-1111-0	100-305-141	1	
Hanger R	03-163-1112-0	100-305-181	1	
Hanger stay	03-163-2071-0	100-305-371	1	
Hole plug	CP-30-HP-13	000-160-074-10	2	
Plastic rivet	KB-13 Rivet Black	000-570-276-10	4	
Hex. bolt	M6x25	000-162-949-10	4	
Hex. bolt	M10x30	000-162-884-10	2	
Spring washer	M10	000-864-261	2	
Flat washer	M10	000-864-131	2	

1. Assemble two hangers and hanger stay with two hex bolts (M10x30), flat washers and spring washers and cover each hex bolt with hole plug.
2. Fix the above assembly to the mounting location with four hex bolts (M12, dockyard supply).
3. Fasten the monitor unit to the mounting hanger assembly with four hex bolt (M6x25, supplied).
4. Cover each hex bolts with panel cover.
5. Cover each holes for hand grip on the hangers with plastic rivet (4 pcs).

# 1. MOUNTING



The hand grip is optionally available for the desktop mounting.



*Monitor unit, attaching hand grip*



**Hood (option)**

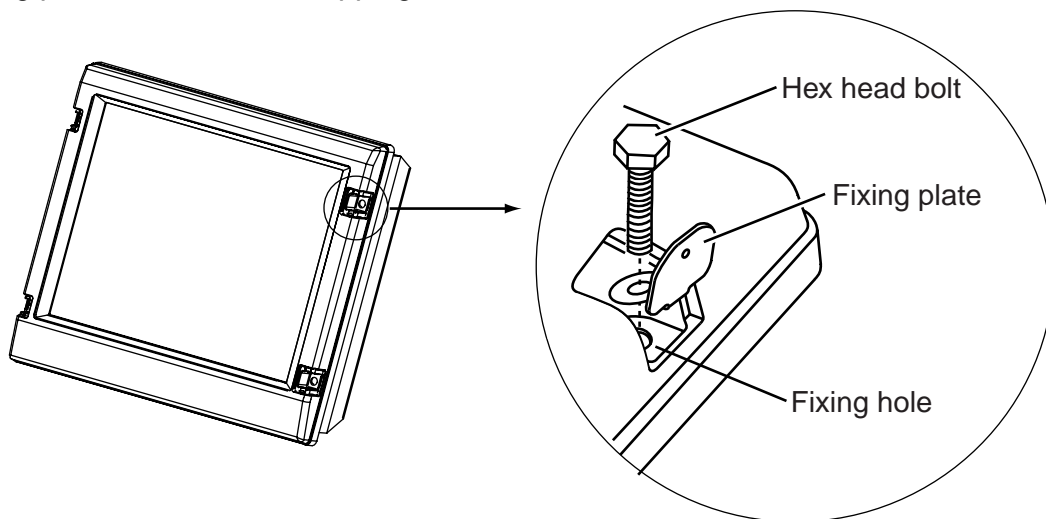
When it is too bright in the daytime, use the optional hood (Type: FP03-11000, Code No.: 008-571-680) to shade the screen.

*Contents of hood*

Name	Type	Code No.	Qty.
Hood	FP03-11001	008-571-700	1
Fixing plate	03-163-2202-0	100-335-560-10	4
Screw	M4x10 D=13 SUS304	000-862-543	4

1. **Desktop mounting:** Fasten the fixing plates to the fixing holes with the hex head bolts (supplied).

**Flush mounting:** Fasten the display unit to the mounting location, and then attach the fixing plates with four self-tapping screws.



2. Attach the hood to the display unit (the hood is outside of the fixing plates).
3. Fasten the hood to the fixing plates with four screws supplied (M4x10).

## 1.3 Control Unit

The control unit may be mounted on a tabletop, with or without the KB fixing metal (supplied), which mounts the control unit at an angle.

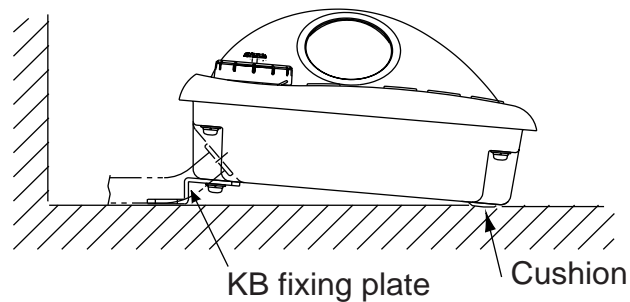
### Mounting considerations

When selecting a mounting location, keep in mind the following points:

- Select a location where the control unit can be operated conveniently.
- Locate the unit away from heat sources because of heat that can build up inside the cabinet.
- Locate the equipment away from places subject to water splash and rain.
- Determine the mounting location considering the length of the signal cable between the control unit and the processor unit. (The signal cable comes in lengths of 10 m).
- A magnetic compass will be affected if the control unit is placed too close to the magnetic compass. Observe the compass safe distances on page ii to prevent deviation of a magnetic compass.

### Fixing without KB fixing plate

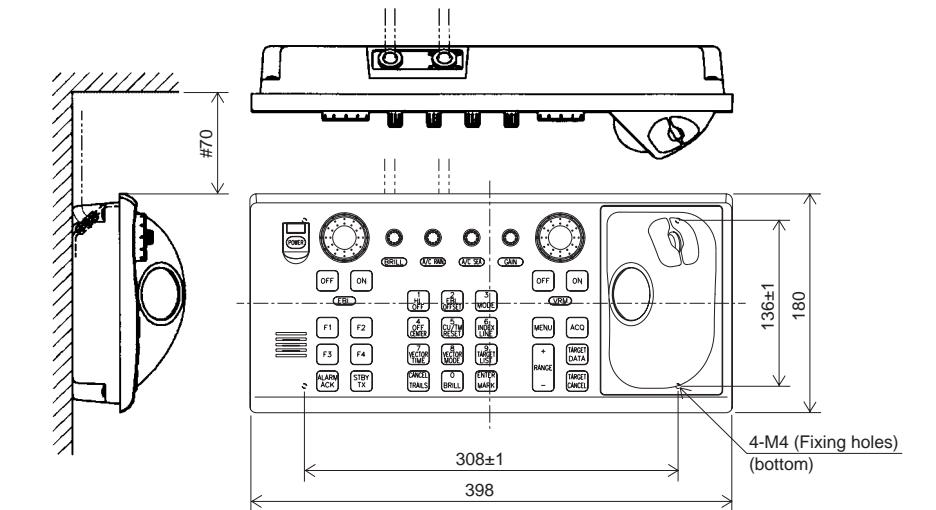
1. Fix the KB fixing plate to the rear panel of the control unit.
2. Attach cushions (three for RCU-014, two for RCU-015/016) to the bottom of the control unit as shown below.
3. Fix it to a desired location with tapping screws.



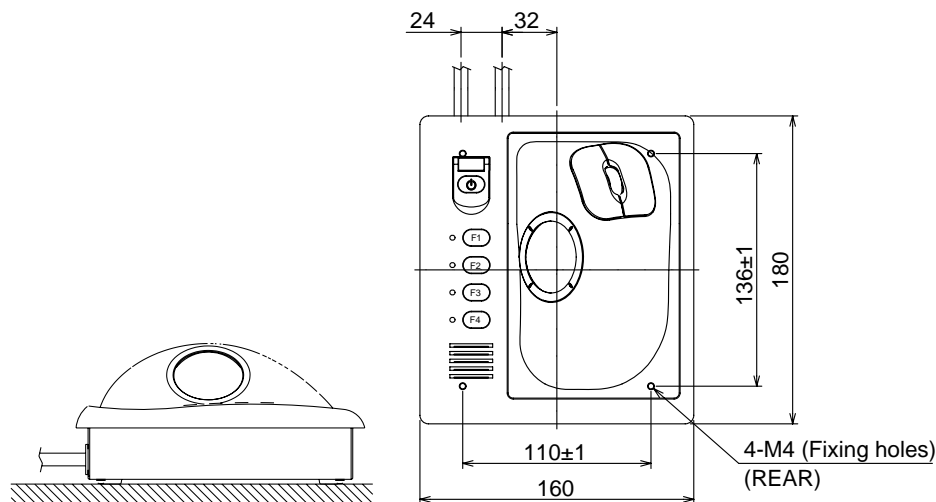
*RCU-014/015/016, side view*

**Fixing without KB fixing metal**

1. Drill four mounting holes of 5 mm diameter referring to the outline drawing at the back of this manual.
2. Fix the control unit with four screws (M4) from under side of the tabletop. (The M4 screws with a sufficient length for the thickness of the tabletop should be provided locally.)



*Control Unit*



*RCU-015/016*

**Flush mounting**

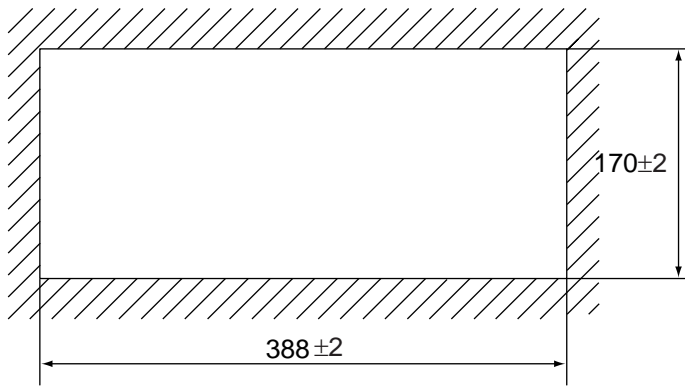
Use the optional flush mount kit FP03-09870 to mount the control unit RCU-014, RCU-015 and/or RCU-016 to a console panel. For detail, see the outline drawing at the back of this manual

Name: Flush mount kit, Type: FP03-09870, Code No.: 008-535-630

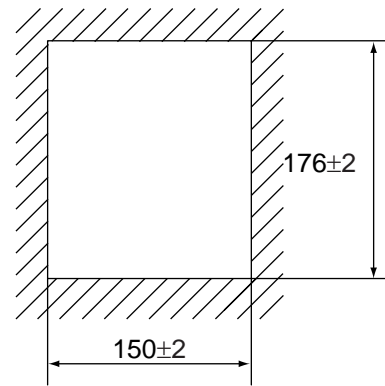
Name	Type	Code No.	Qty
Flush Mount Fixture	03-163-7531	100-306-261	4
Hex Nut	M5	000-863-108	4
Wing Bolt	M5x40	000-162-682-010	4
Pan Head Screw	M4x12	000-163-192-10	4

## 1. MOUNTING

1. Prepare a cutout in the mounting location as shown in the figure below.

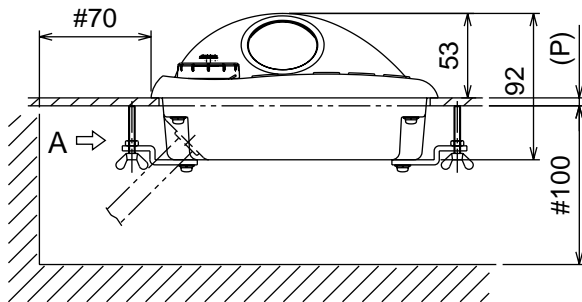


*For RCU-014*

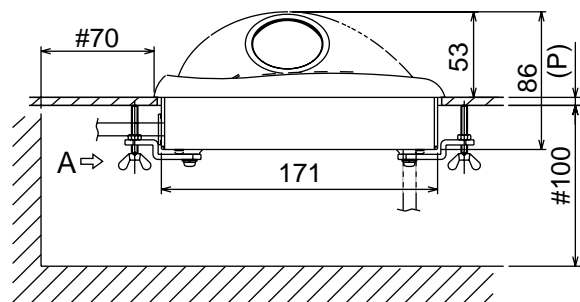


*For RCU-015 and RCU-016*

2. Set the control unit to the cutout.
3. Screw four wing bolts into hex. nuts.
4. Screw the above wing bolts into mounting plates.
5. Attach the mounting plate to the control unit with four screws (M4x12, supplied with the control unit) from the bottom side.
6. Fasten four wing screws, and then fasten hex. nuts to fix four wing screws.



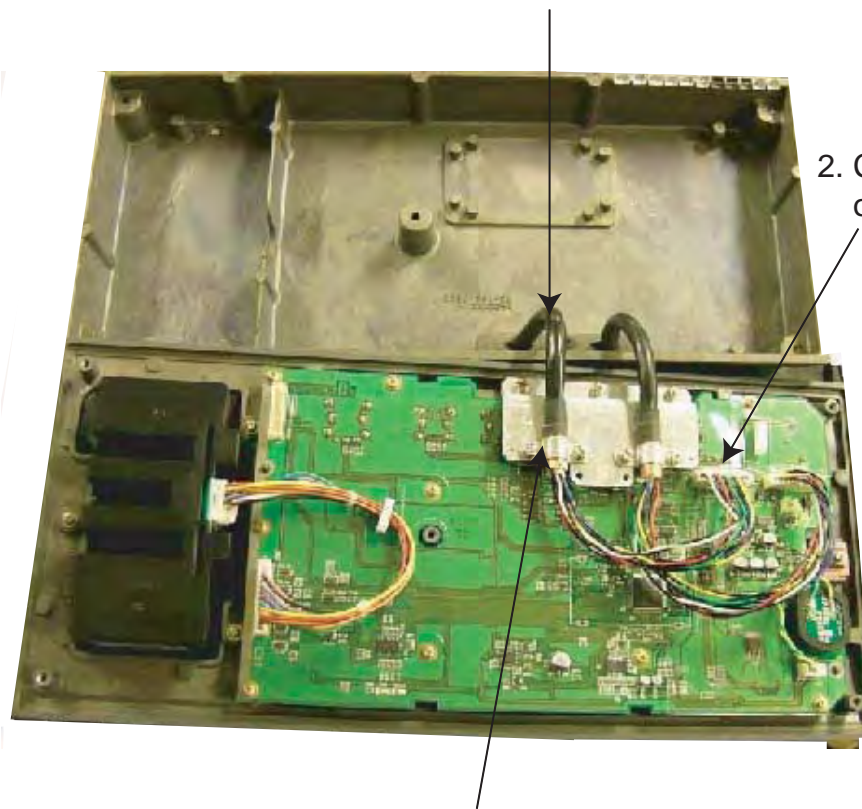
*RCU-014*



*P: Thickness (Max. 10 mm)*  
*RCU-015/016*

**To connect RCU-016 in series with RCU-014**

1. Pass the cable derived from RCU-016.



2. Connect the connector of the cable to J502.

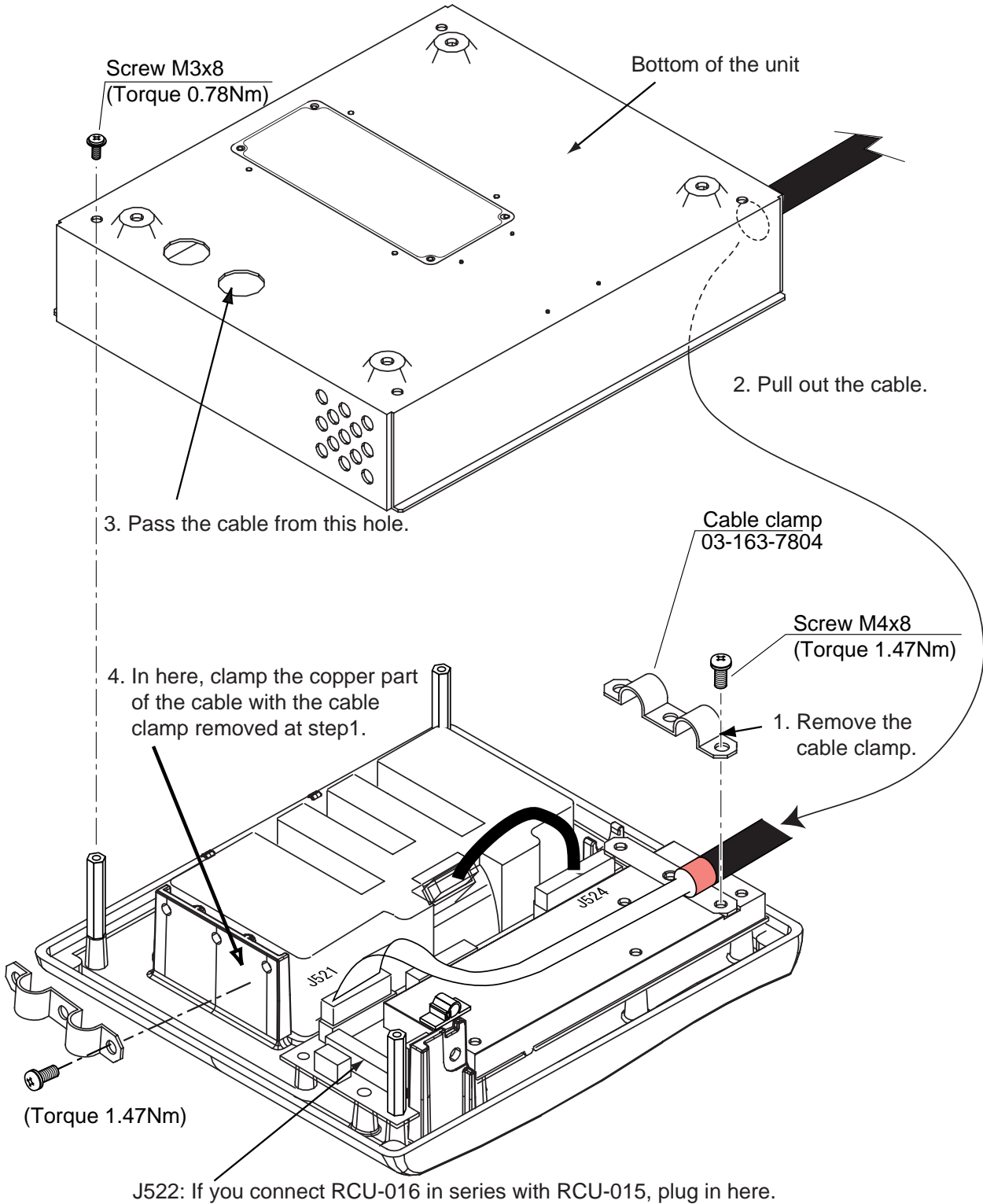
3. Clamp the copper part of the cable with the cable clamp.

*Inside of RCU-014*

# 1. MOUNTING

## To change the cable entry

To change the cable entry from the side (default) to the bottom, modify the unit as shown below.



*RCU-015/016; Changing cable entry*

## 1.4 Processor Unit

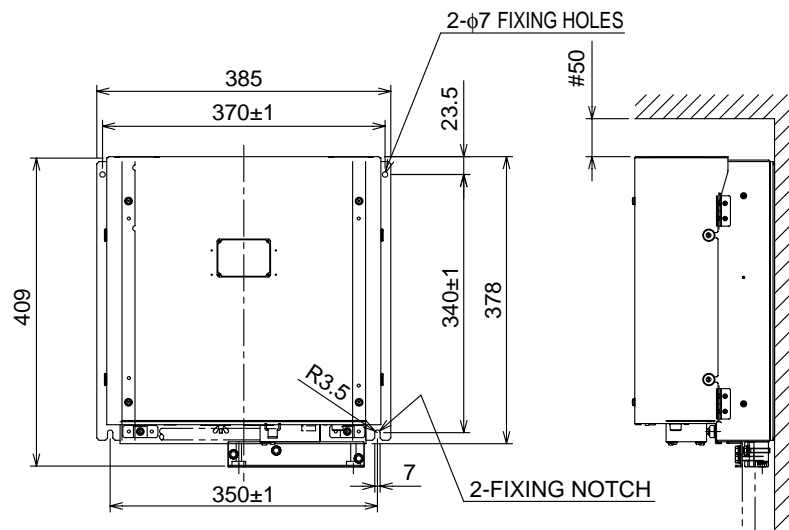
### Mounting considerations

When selecting a mounting location, keep in mind the following points:

- Locate the processor unit away from heat sources because of heat that can build up inside the cabinet.
- Locate the equipment away from places subject to water splash and rain.
- Leave sufficient space at the sides and rear of the unit to facilitate maintenance.
- A magnetic compass will be affected if the processor unit is placed too close to the magnetic compass. Observe the compass safe distances on page ii to prevent deviation of a magnetic compass.

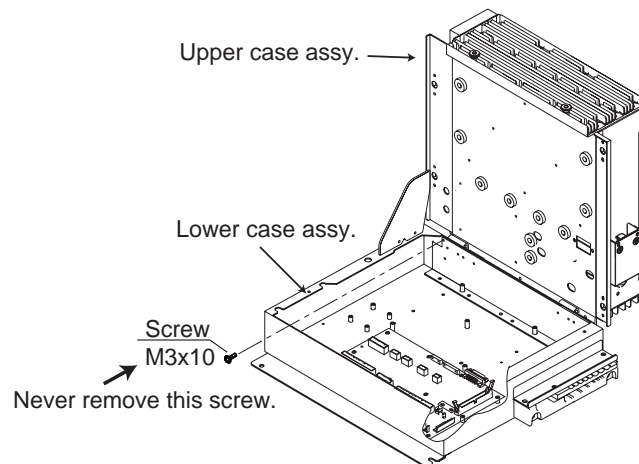
### Mounting procedure

1. Fix the unit with four M6 bolts, or tapping screws.



#### *Floor mounting or bulkhead mounting*

**Note:** If you fix the unit, cable entry upside, never remove the screw M3x10 that joints the upper case assy. and lower case assy. of the processor unit.

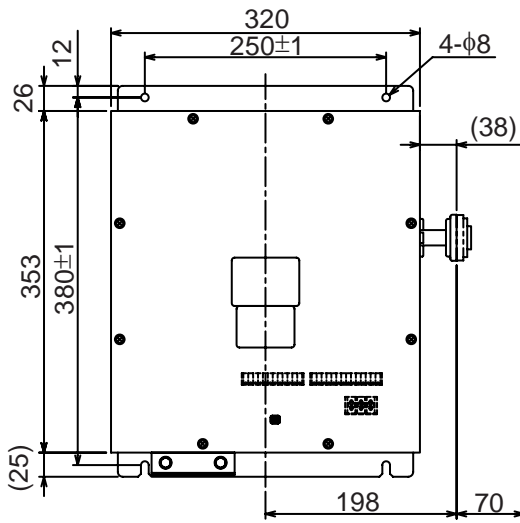


#### *Processor unit*

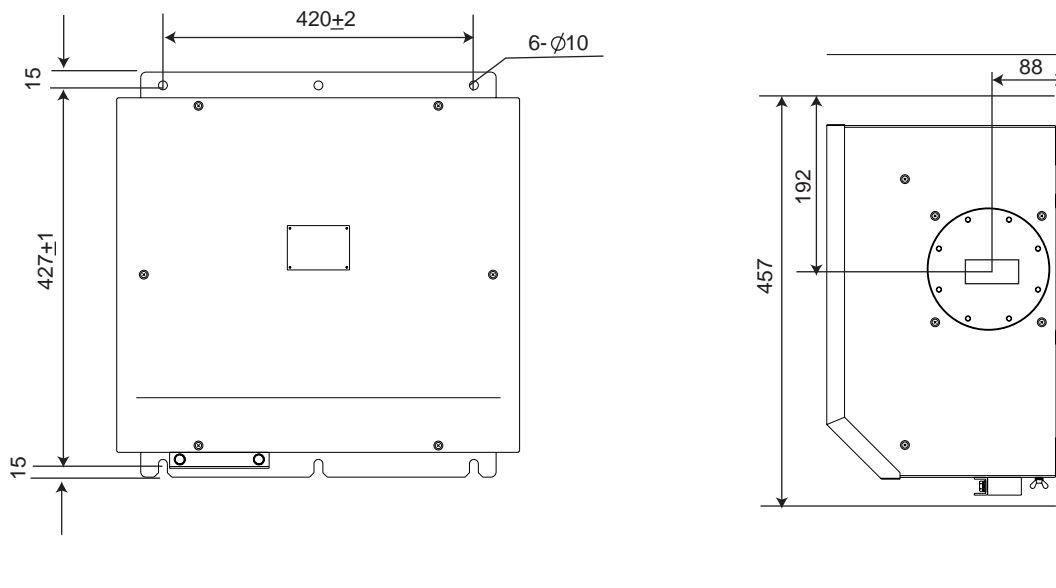
## 1.5 Transceiver Unit

The transceiver unit is designed for bulkhead mounting, and may be mounted in any dry, well-ventilated place. Ensure the mounting location is strong enough to support the weight of the unit under the continued shock and vibration normally encountered onboard. The transceiver must not be installed in close proximity of a magnetic compass; observe the compass safe distances.

Fix the unit to bulkhead with bolts (RTR-081A: M6, 4 pcs., RTR-082: M8, 6 pcs.). Run a ground wire (8 mm<sup>2</sup>) between the ship's body and the transceiver unit, using the lug supplied to make the connection at the earth stud on the transceiver unit. Keep the length of the ground wire as short as possible.



*Transceiver unit RTR-081A (for FAR-2827W)*



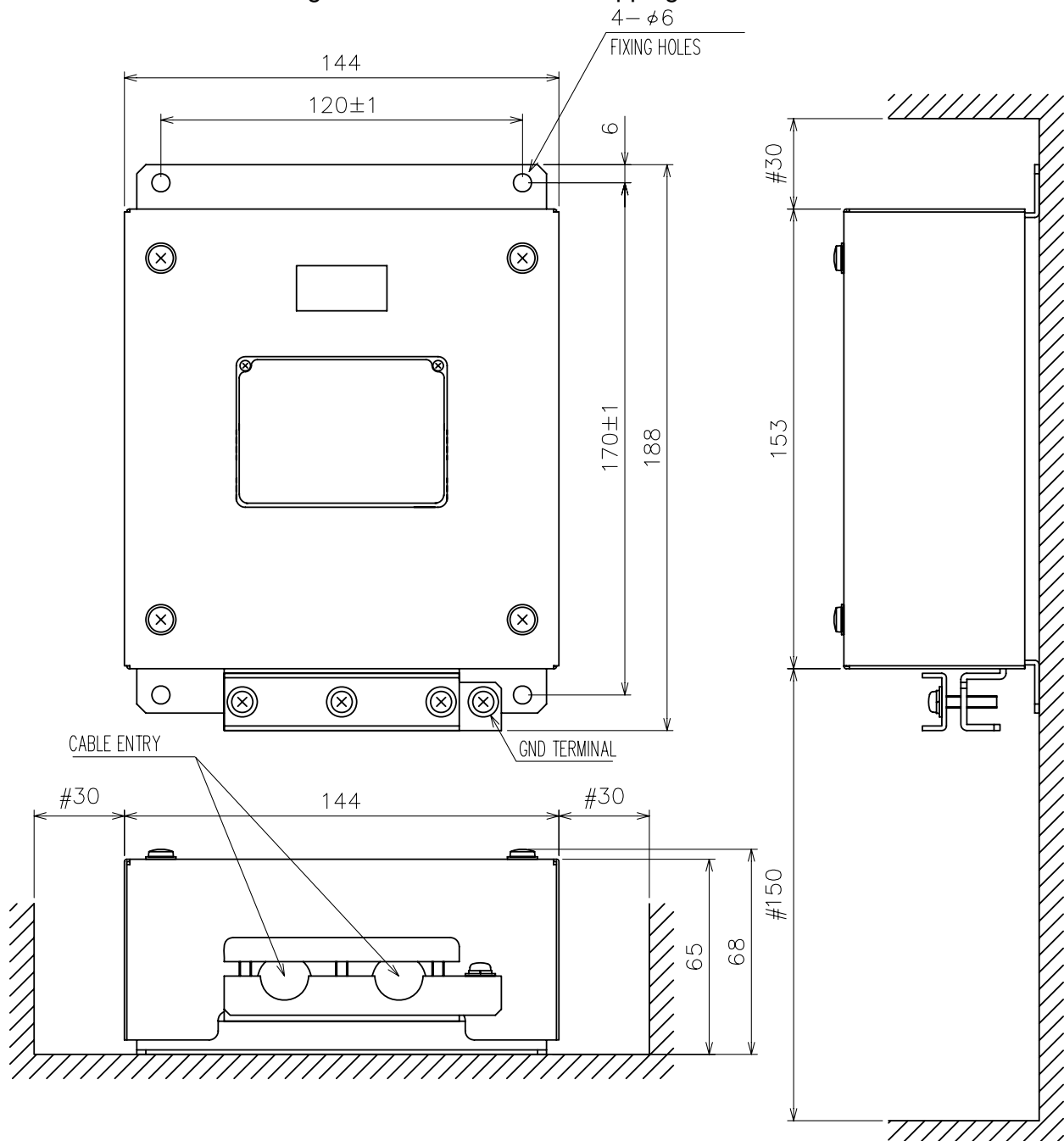
*Transceiver unit RTR-082 (for FAR-2837SW)*



## 1.6 Power Supply Unit

The Power Supply Unit PSU-011 is required for Russian flag vessels. The unit can be installed almost anywhere. The location should be dry and well-ventilated, provide sufficient maintenance space, and satisfy the compass safe distances mentioned on page ii.

Fix the unit to the mounting location with 5×20 self-tapping screws.



## 1. MOUNTING

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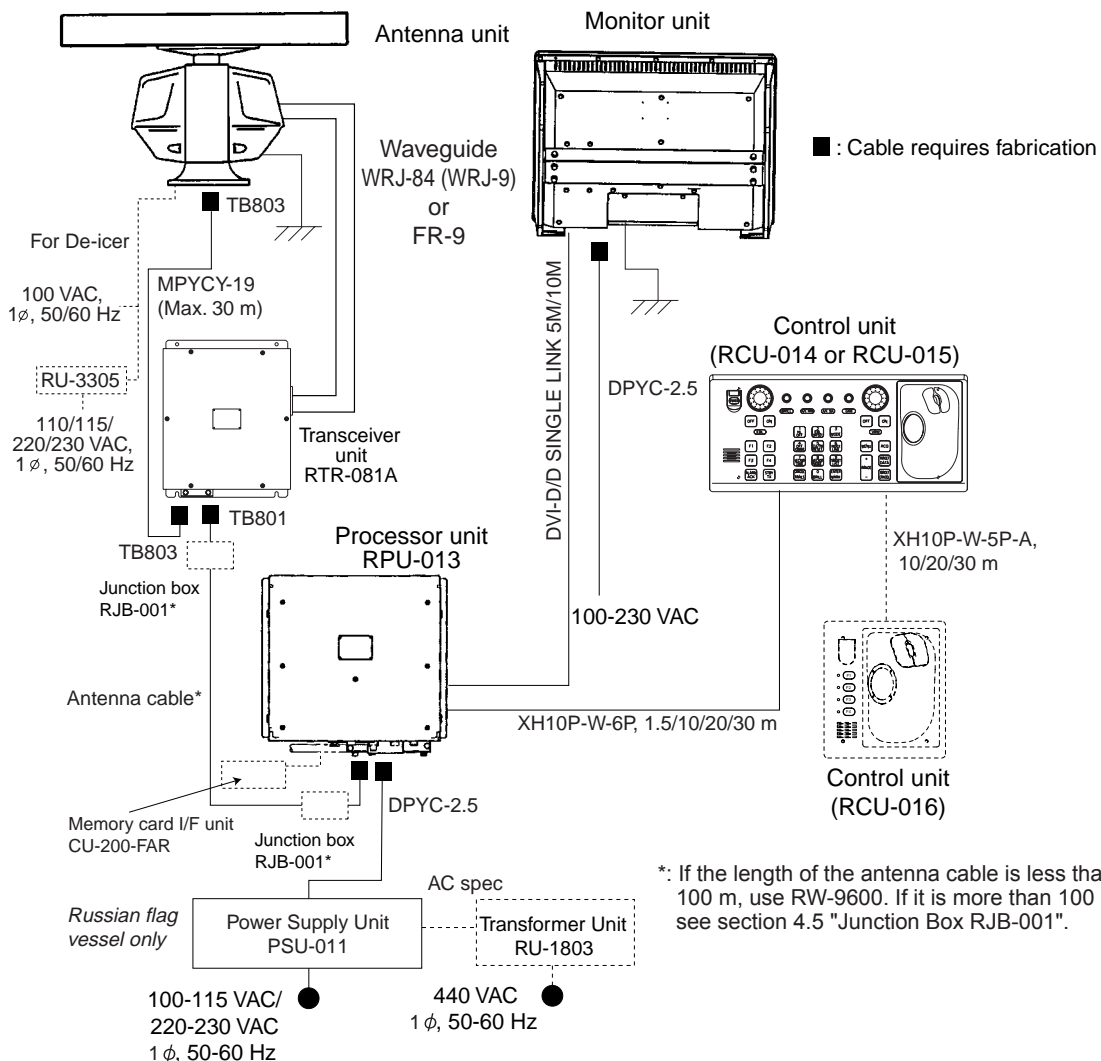
# 2. WIRING

## Wiring consideration

- To lessen the chance of picking up electrical interference, avoid where possible routing the signal cable near other onboard electrical equipment (radars, transmitting radio antennas, etc.) Also avoid running the cable in parallel with power cables. When crossing with other cable, the angle should be 90° to minimize the magnetic field coupling.
- The signal cable run between the antenna and processor units is available in lengths of 15 m (standard), 30 m, 40 m and 50 m. Whatever length is used it must be unbroken; namely, no splicing allowed. Use the signal cable as short as possible to minimize attenuation of the signal.
- The radar should be connected to an emergency power source, as required by SOLAS II-1.

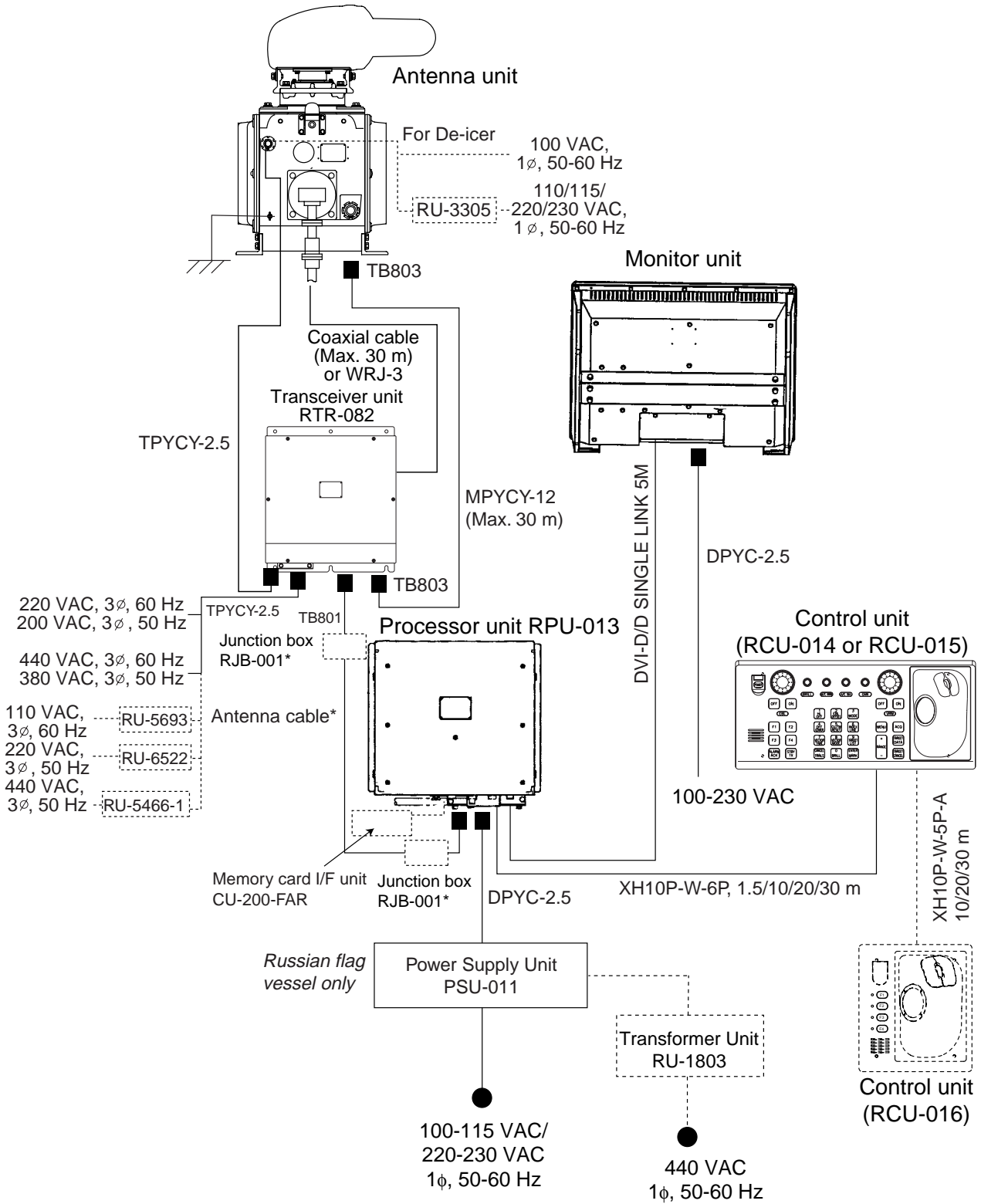
## 2.1 Interconnection

### FAR-2827W



2. WIRING

**FAR- 2837SW**



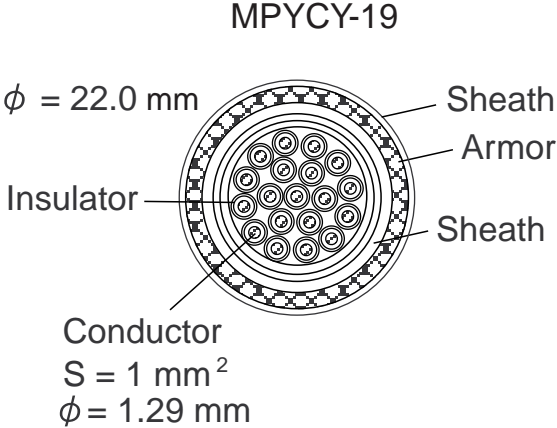
\*: If the length of the antenna cable is less than 100m, use RW-9600.  
If it is more than 100 mm, see section 4.5 "Junction Box RJB-001".

■ : Cable requires fabrication

# 2.2 Antenna Unit

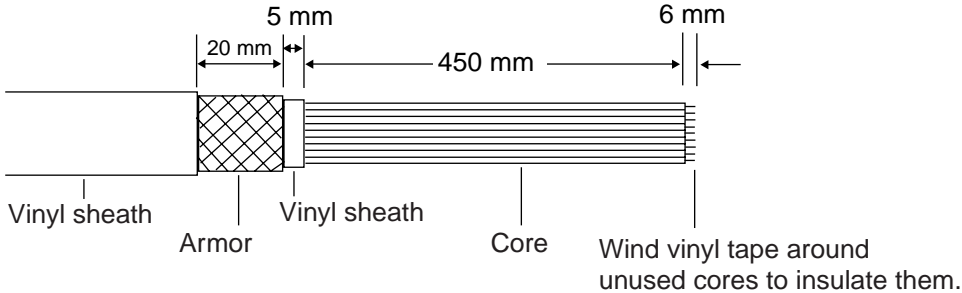
## 2.2.1 FAR-2827W (RSB-103)

The antenna unit requires the MPYCY-19 (Japan Industrial Standard cable) or equivalent to connect to the transceiver unit RTR-081A.



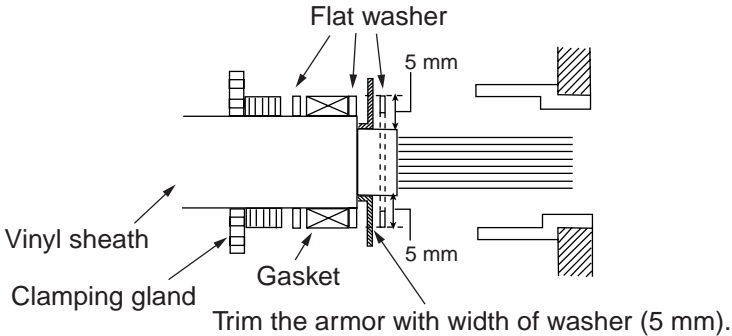
*MPYCY-19 cable, sectional view*

1. Remove the antenna covers.
2. Unscrew the clamping gland and take out the washers, rubber packing and cover.
3. Fabricate the cable as below.



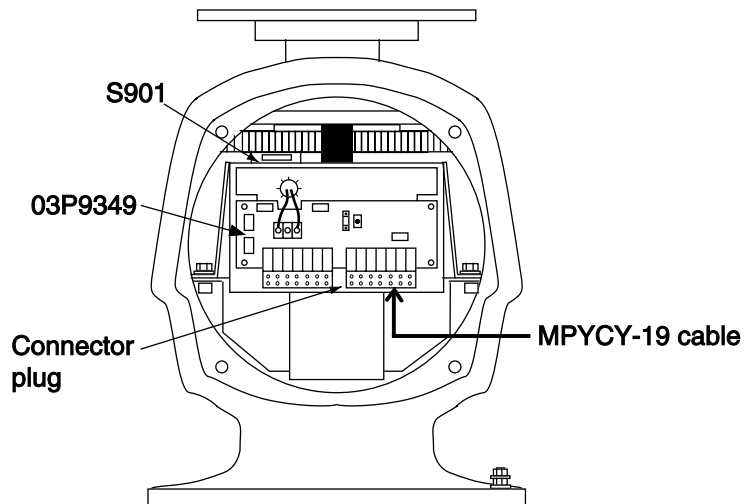
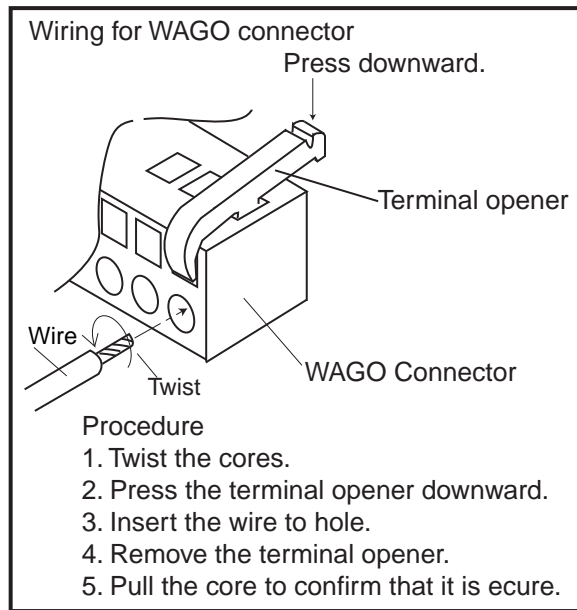
For not used cores, wind the vinyl tape around them to prevent the short circuit.

4. Slide the clamping gland, washer, gasket and washer in that order on to the cable as shown below.
5. Fold back the armor by 5 mm, then put it between washers.



6. Tighten the cable gland, and then cover the junction with putty for waterproofing.
7. Connect the cores to the connector plug TB803 by referring to the interconnection diagram. Leave "slack" in the coaxial wire to prevent breakage. Use the terminal opener to insert each core.

## 2. WIRING



*Antenna unit, internal view*

8. Confirm that all screws are tightened and all wiring is properly made. Confirm that waterproofing gasket, bolts and tapping holes of antenna unit are coated with silicone grease.
9. Attach the antenna covers (torque: 10 N·m).

**Waveguide connection at antenna unit**

The signal cable entrance (cable gland) is located directly below the waveguide outlet. If the waveguide is installed downward from the waveguide outlet position using an E-bend waveguide, you may not be able to insert the signal cable into the cable gland. To avoid this inconvenience, shift the waveguide run left or right using an H-bend waveguide as shown below.

The E-band and H-band waveguides are contained in the waveguide materials set 22X-CW or 52X-CW.

E-bend type RWA-1030 B-107, Code No. 310-100-140-10

H-bend type RWA-1050 C-109, Code No. 310-100-180-10

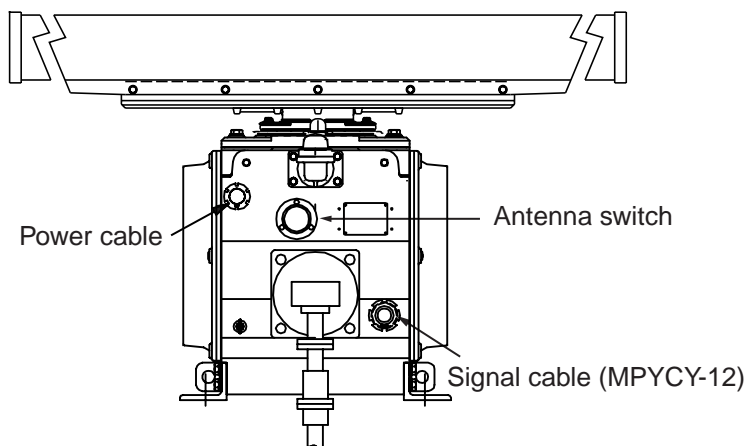
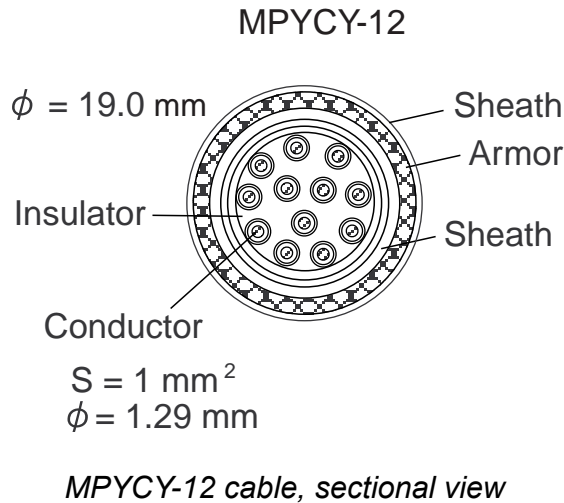
**When the de-icer is installed**

- Before beginning any work on the antenna unit, turn off the breaker for the de-icer line at the main switchboard to remove the power (100 VAC, 1 $\Phi$ ) to the de-icer. (Turning off the power to the display unit has no effect.)
- The neck of the antenna unit becomes VERY HOT when the de-icer is working. (The de-icer turns on when ambient temperature is below 0°C.)

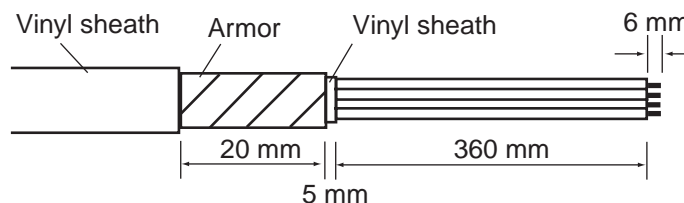
### 2.2.2 FAR-2837SW (RSB-104/105)

The signal cable MPYCY-12 (Japan Industrial Standard cable or equivalent), power cable TPYCY-2.5 (Japan Industrial Standard cable or equivalent) and microwave coaxial cable (LHPX-20-ASSY) are used between the antenna unit and transceiver unit.

#### MPYCY-12 single cable

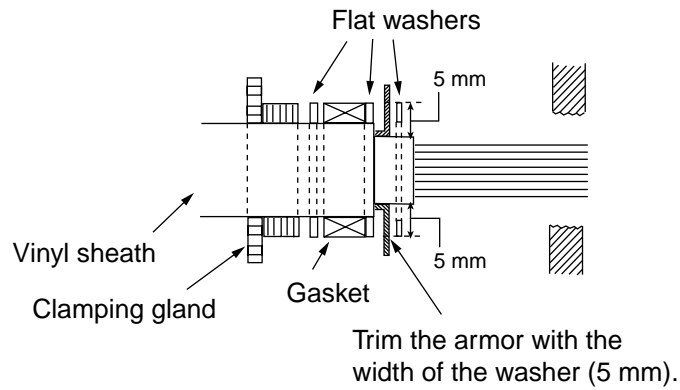


1. Remove the right-hand side cover from the antenna unit by unscrew ten bolts (13 mm).
2. Unfasten the clamping gland (for signal cable), and remove the gasket, flat washers and cover.
3. Fabricate MPYCY-12 cable as below.



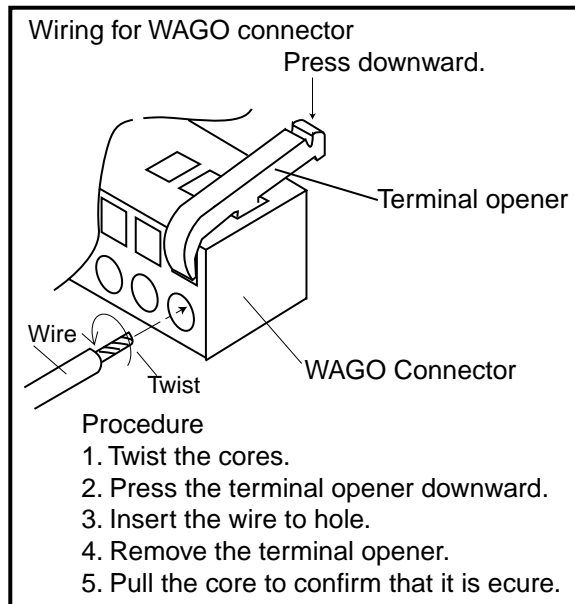
4. Slide the clamping gland, flat washer, gasket and flat washer in that order on to the cable. (See the figure on the next page.)
5. Fold back the armor by 5 mm, then put it between washers.



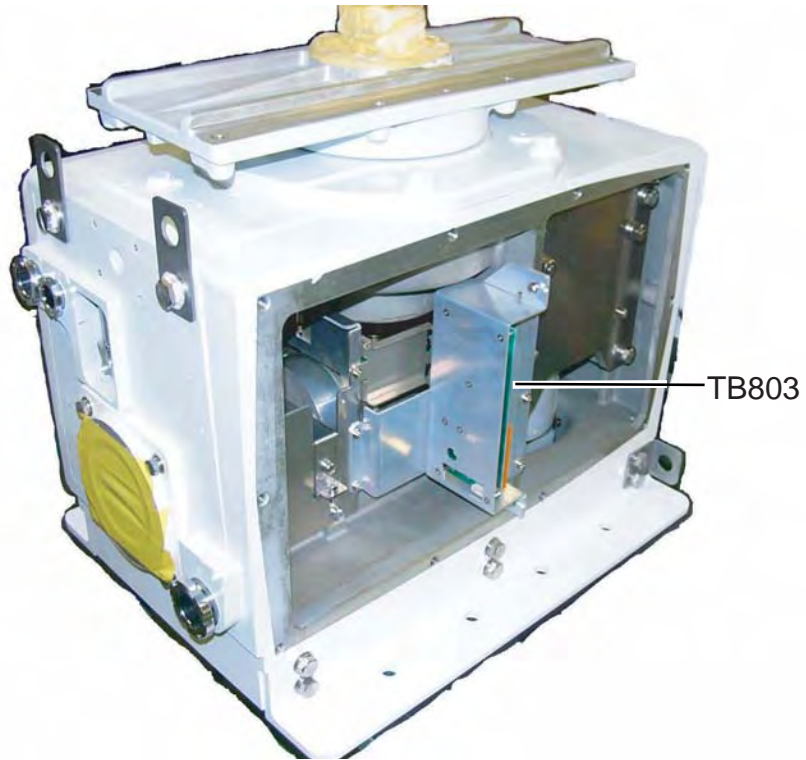


*Passing clamping gland, washers and gasket on the signal cable*

6. Catch the armor between two flat washers for grounding.
7. Apply sealant 1211 (supplied as installation material) to threads of the clamping gland, and then fasten it tightly.
8. Determine the length of the cores considering their location on the terminal board TB803, and then connect cores to TB803 by using the terminal opener.



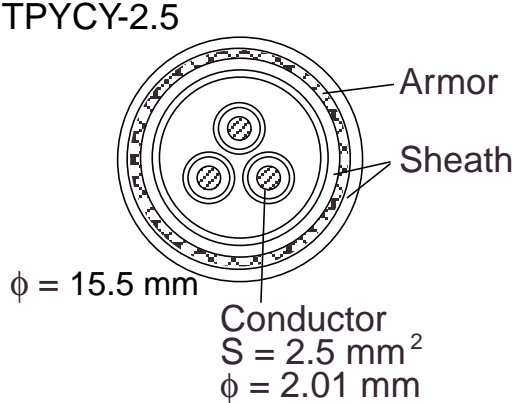
## 2. WIRING



*Antenna unit, cover removed*

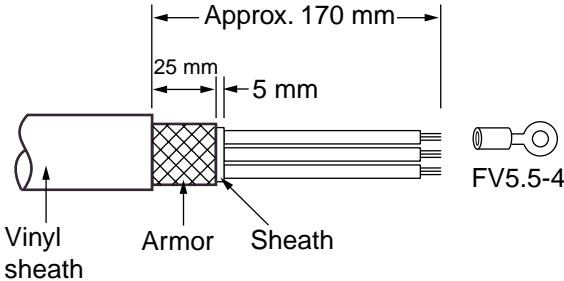
9. Reattach the antenna cover (torque: 7.65 N·m), and then cover the gland junction with putty for waterproofing.

**TPYCY-2.5 power cable**



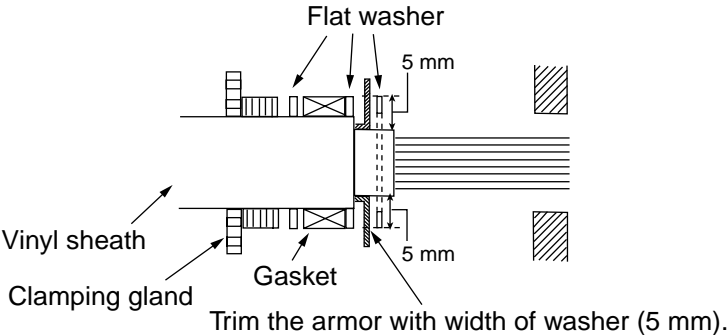
*TPYCY-2.5 cable, sectional view*

1. Remove the left-hand side cover from the antenna unit by unscrew ten bolts (13 mm).
2. Fabricate the cable as below.



*Fabricating of TPYCY-2.5*

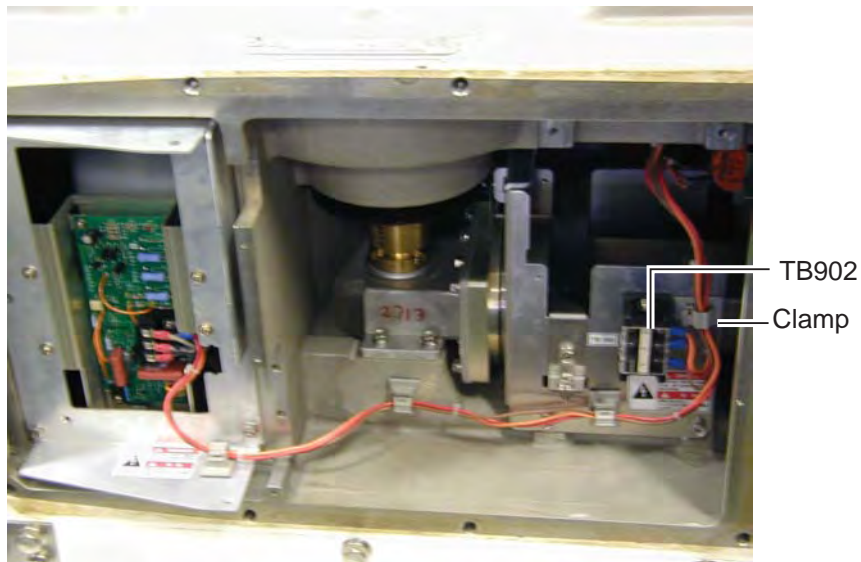
3. Unfasten the clamping gland (for power cable) to remove the gasket, flat washers and cover.
4. Slide the clamping gland, flat washer, gasket and flat washer in that order on to the cable. (See the figure in below.)
5. Fold back the armor by 5 mm, then put it between washers.



*Clamping gland (for power cable)*

6. Run the power cable behind of the terminal board, and then fix it with the clamp.

## 2. WIRING



*Antenna unit, cover removed (left-hand side)*

7. Determine the length of the cores considering their location on the terminal board TB902, and then connect cores to TB902 by using the terminal opener.
8. Reattach the antenna cover (torque: 7.65 N·m).
9. Cover the gland junction with putty for waterproofing.

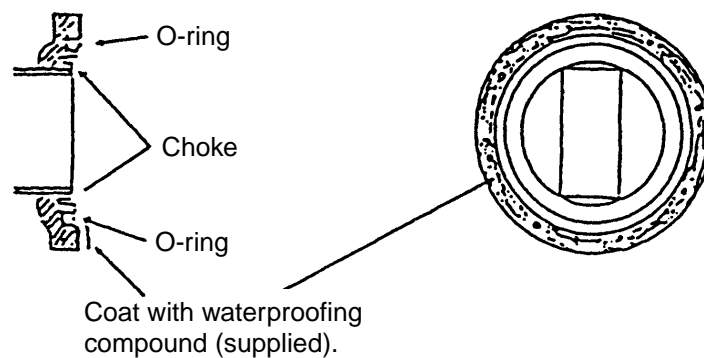
**When the De-icer is installed:**

1. Before beginning any work on the antenna unit, turn off the breaker for the de-icer line at the main switchboard to remove the power (100 VAC, 1 $\emptyset$ ) to the de-icer. (turning off the power to the display unit has no effect.)
2. The neck of the antenna unit becomes **VERY HOT** when the de-icer is working. (The de-icer turns on when ambient temperature is below 0°C.)

**2.2.3 Coaxial cable**

When connecting the coaxial cable to the antenna unit, do the followings.

1. Unfasten eight bolts (M6x20) to remove the flange cover from the antenna unit.
2. Apply grease to the O-ring located in the flange.
3. Coat between mating surfaces of the coupler at the end of the coaxial cable and waveguide flange as below with waterproofing compound (supplied with installation materials). Do not coat the O-ring.

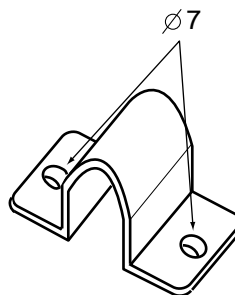


4. Screw eight bolt unfastened at step 1 to fix the coupler to the flange.

**Lying of microwave coaxial cable**

Secure the cable with fixing bands (supplied) or clamping metal (option, type: 03-011-3228, code no.: 100-049-620) to the mast and to the wheelhouse structure.

For the optional deck-thru cable gland, see the outline drawing at the back of this manual.



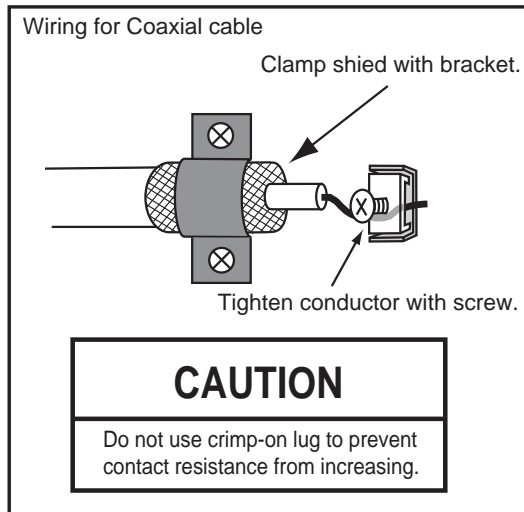
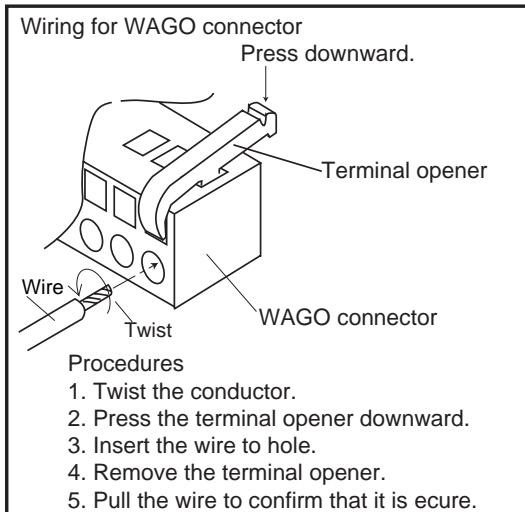
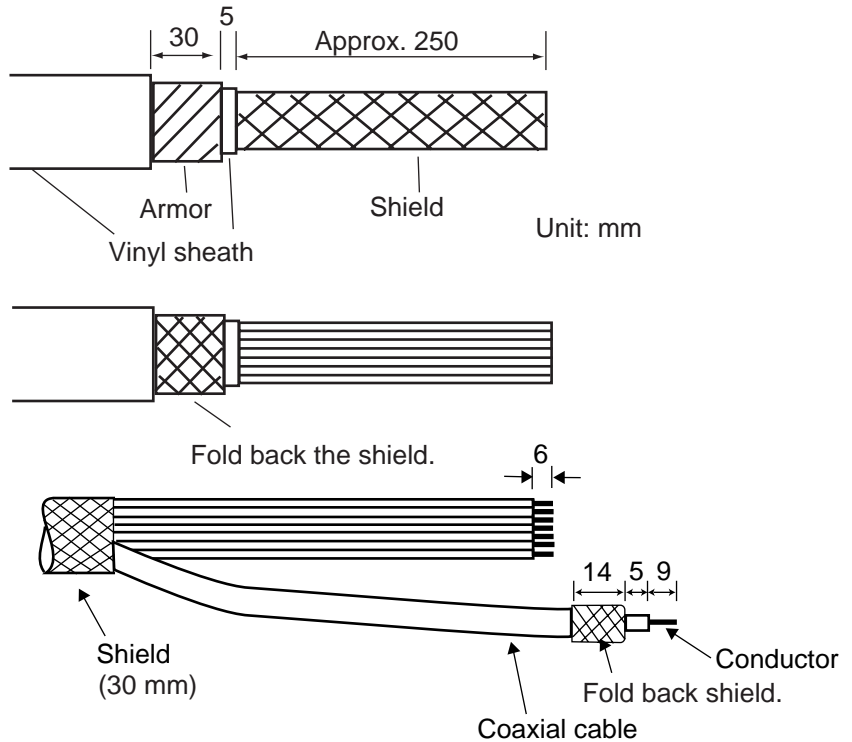
*Clamping metal (option)*

## 2.3 Transceiver Unit

### For FAR-2827W

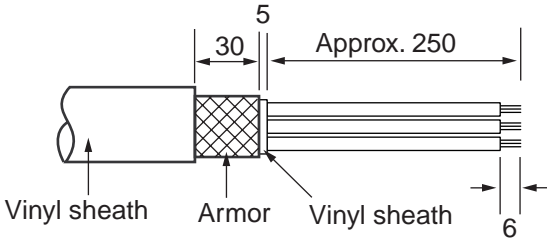
#### Fabricating of RW-9600

1. Fabricate the RW-9600 cable as shown right.
2. Trim each wire (except coaxial wire) considering its location on the terminal board.
3. Trim the shield leaving 30 mm and then fold back it.
4. Remove insulation of each wire by about 6 mm.
5. Using the terminal opener, insert each core (except coaxial cable) to appropriate connector plug.
6. Insert the coaxial cable to the TB802 on TB Board and fix the shield with cable clamp.



**Fabricating of MPYCY-19**

1. Fabricate the cable as below.

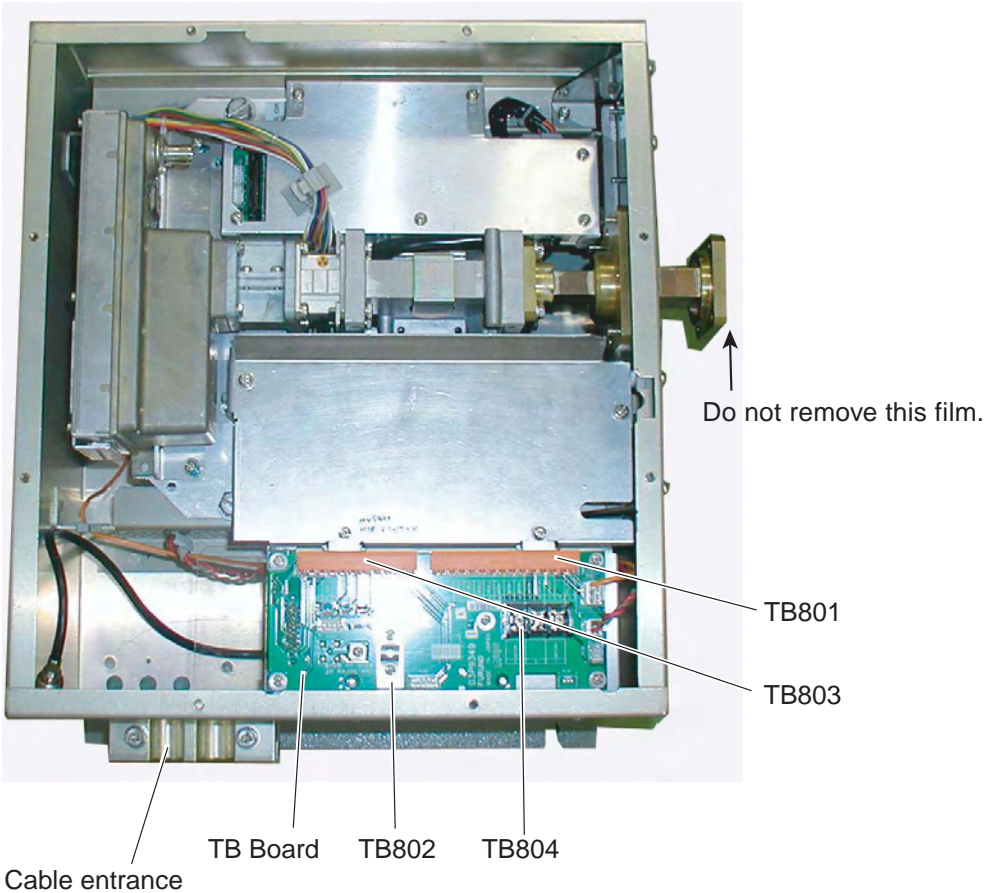


Unit: mm

2. For not used cores, wind the vinyl tape around them to prevent the short circuit.

**Wiring**

1. Remove the cover from the RTR-081A.
2. Pass the cables through the cable entrance of the RTR-081A, and then fix the armors with the cable clamp.



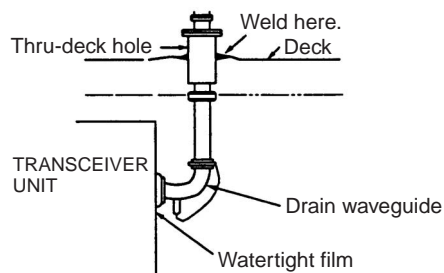
*Transceiver unit RTR-081A, internal view*

3. Connect each cores to TB801, TB802, TB803 and TB804 referring to the interconnection diagram.
4. Connect the grounding wire (shipyard supply) between the ground terminal (behind of the cable clamp) and the grounding point.

## Installing the Rectangular Waveguide WRI-84 (WRJ-9)

The RF interconnection between the antenna unit and the transceiver can be made with a rectangular waveguide WRI-84 (WRJ-9) or flexible (FR-9). If the rectangular waveguide is used, observe the following installation guidelines.

- Correctly installed waveguide runs ensure the most efficient transmission of electrical energy at high frequencies. Electrical losses, however, occur in the waveguide runs. To minimize them the following factors are of great importance: minimum length, airtightness and electrical continuity.
- Another consideration required is that of frequency disturbance. The transmitting valve, a magnetron, is the primary oscillator in the radar. This is different from the oscillation system at lower frequencies in which conventional radio valves are used. In the latter case, the primary oscillator is always protected from the effects of load impedance by a buffer stage so that frequency and waveform are left unobstructed. With a waveguide and magnetron, however, mismatch of impedance causes "frequency pulling." For this reason, the number of possible mismatches in a waveguide run, i.e., joins and bends, must be kept minimum.
- Each pair of flanges should be coupled with one O-ring, four bolts and spring washers and the choke flange must be in the upper position. The bolts and O-ring must be greased before insertion to facilitate removal if required at a later date.
- The transceiver unit output flange is a plain type and the antenna unit output flange is a choke type, and it is important to maintain this relationship throughout the waveguide run.



### *Flange connection*

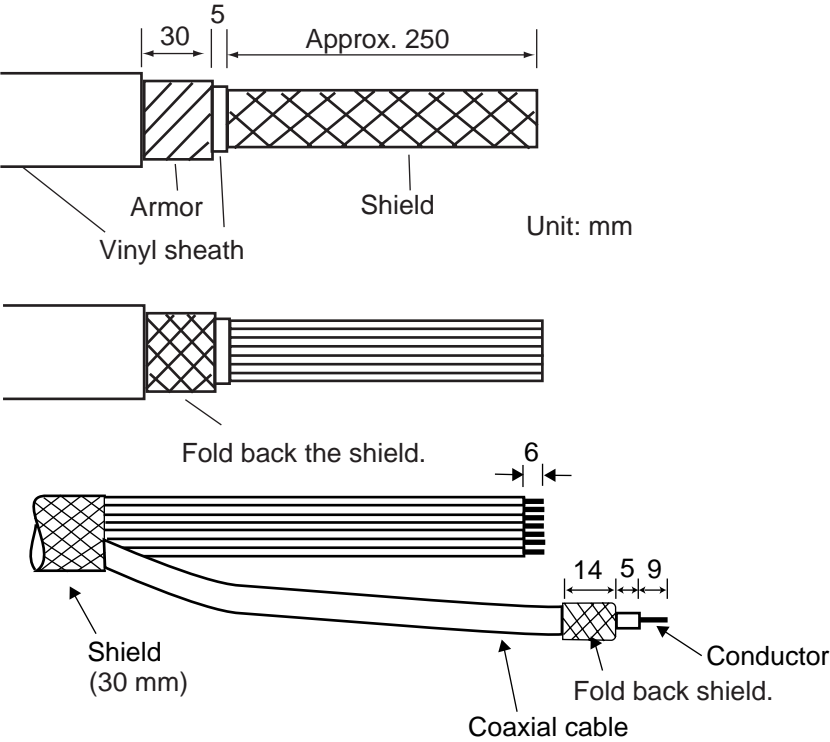
- After installation of the waveguide is completed, the coupling portions must be sealed by using the adhesive supplied.
- In a very short time the surface of the waveguide becomes green with verdigris. Therefore, paint both the surface of the waveguide and flanges to avoid corrosion and water penetration. Paint must not be allowed to reach the inner surface of the waveguide or the mating surface of any flange.



### For FAR-2837SW

#### Fabricating of RW-9600

1. Fabricate the signal cable RW-9600 as shown right.
2. Unravel the shield to expose the wires in the inner layer.
3. Shorten each core considering its location on the terminal board.
4. Trim each wire (except coaxial wire) considering its location on the terminal board.
5. Trim the shield leaving 30 mm and fold back it.
6. Remove insulation of each wire by about 6 mm.
7. Insert each wire into the connector using the terminal opener.
8. Connect the coaxial wire to TB802 on the TB Board, and then fix its shield to the cable clamp.



Wiring for WAGO connector

Press downward.

Terminal opener

Wire

Twist

WAGO connector

Procedures

1. Twist the conductor.
2. Press the terminal opener downward.
3. Insert the wire to hole.
4. Remove the terminal opener.
5. Pull the wire to confirm that it is secure.

Wiring for Coaxial cable

Clamp shield with bracket.

Tighten conductor with screw.

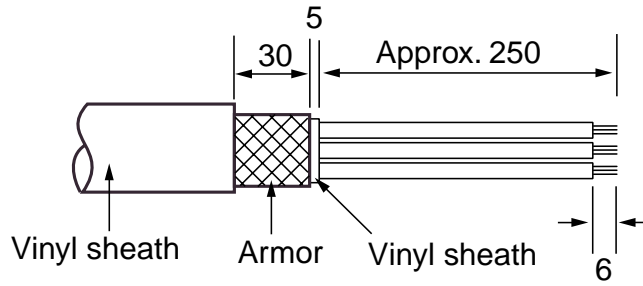
**CAUTION**

Do not use crimp-on lug to prevent contact resistance from increasing.

## 2. WIRING

### **Fabricating of MPYCY-12**

1. Fabricate the cable as below.

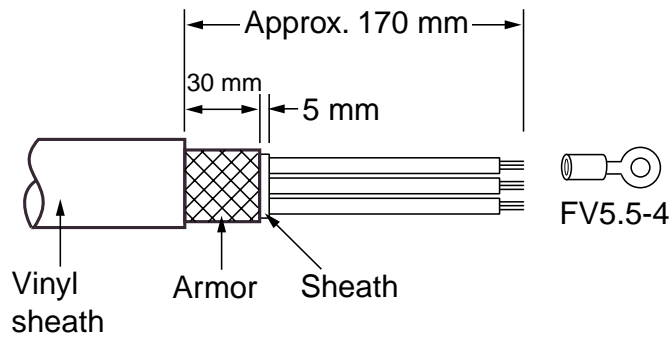


Unit: mm

2. For not used wires, wind vinyl tape around the core to prevent short circuit.

### **Fabricating of TPYCY-2.5**

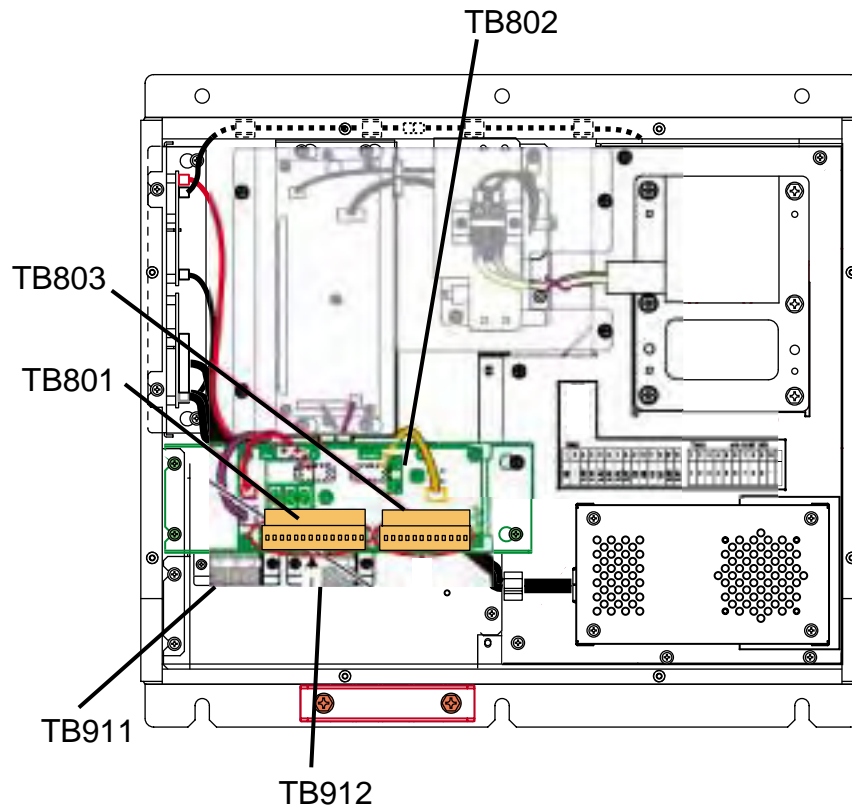
1. Fabricate the cable as below.



2. Fix the crimp-on lug (FV5.5-4, yellow) to each conductor.

**Wiring**

1. Remove the cover from the RTR-082.
2. Pass the cables through the cable entrance, and then fix the armor with the cable clamp.
3. Connect each wires to TB801, TB802, TB803, TB911 and TB912 referring to the interconnection diagram.



*Transceiver unit RTR-082, internal view*

4. Connect the grounding wire (shipyard supply) between the grounding terminal (behind the cable clamp) and grounding point.

## 2. WIRING

### **How to fit microwave coaxial plug**

The tool kit KZ-0244B (Code No. 000-830-258) is optionally available for fitting the coaxial plug to the microwave coaxial cable. The contents of the kit are listed below.

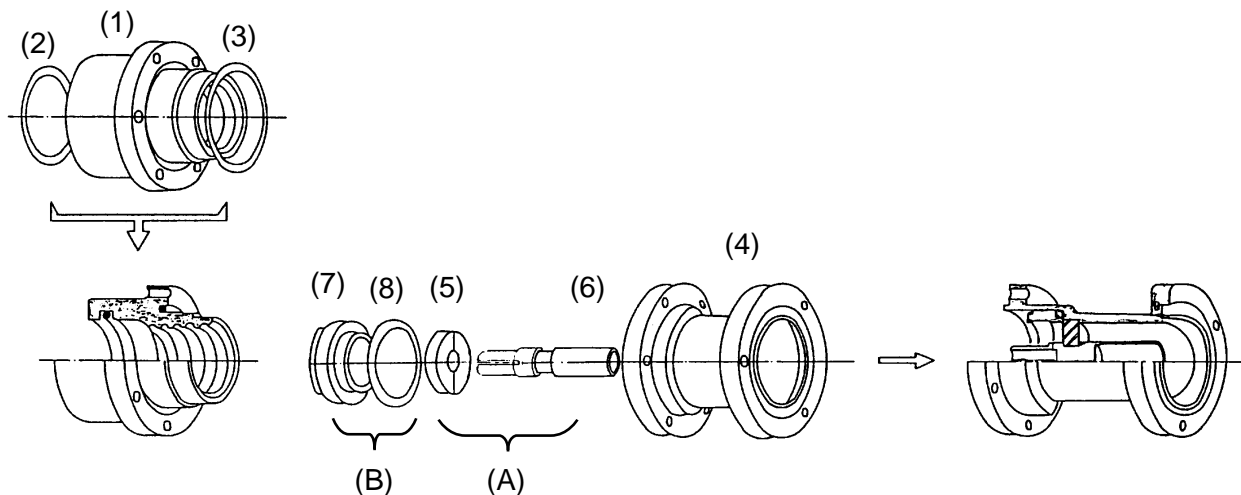
Name	Code No.	Qty
Hacksaw	000-830-260	1
Tubing Cutter	000-830-261	1
Ruler	000-830-263	1
Diagonal cutting Pliers	000-830-264	1
Knife	000-830-265	1
Bendix Brake Pliers	000-830-266	1
Ball Peen Hammer	000-830-267	1
Metal Rod	000-830-268	1
Gauge	000-830-270	1
Flat file	000-830-270	1
Cutting Off Tool	000-830-274	1
Brush	000-830-274	1
Pliers	000-830-275	1
C-spanners	000-830-278	1
Copper Tape	000-830-279	1
Tool Box	000-830-257	2

### **Necessary materials**

- Gasoline
- Clean cloths
- Burner

### Outline

A coaxial plug is made up of the following parts:

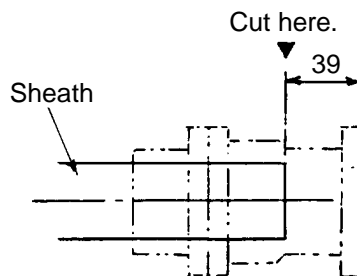


**Note 1:** When sawing or filing the cable, keep it horizontal to keep shavings out of the cable. To remove shavings which may have fallen into the cable, hold the cable end downward and tap the cable lightly.

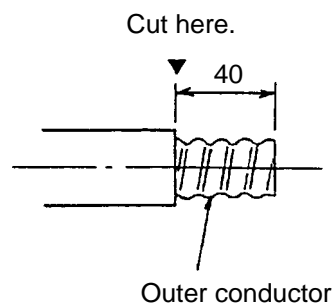
**Note 2:** A minimum cable bend radius of 150 mm must be observed at the cable run. If it is necessary to bend the cable twice or more in a tight area, the bending radius should be more than 250 mm.

### How to fit the coaxial plug

1. Cut the cable with a hacksaw for the length desired, taking into account that the length of the outer body of the coaxial plug is 77 mm.

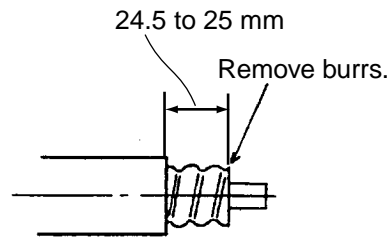


2. Remove any shavings from the cable. Using the tubing cutter, cut the vinyl jacket, the outer conductor and the insulator to expose the inner conductor by 40 mm. Be careful not to damage the inner conductor.

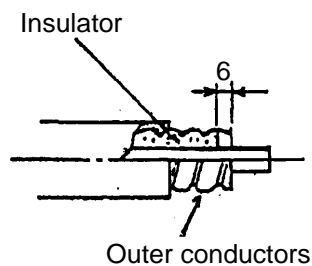


## 2. WIRING

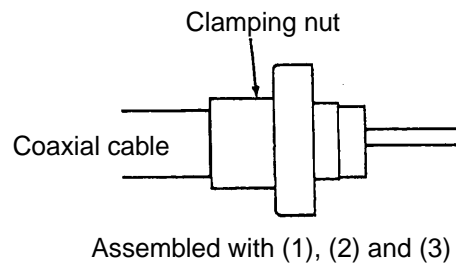
3. Taking care not to scratch the outer conductor, remove the jacket: Cut the jacket circularly first with a tubing cutter, cut in a straight line with a knife, then remove the jacket with a cutting pliers.



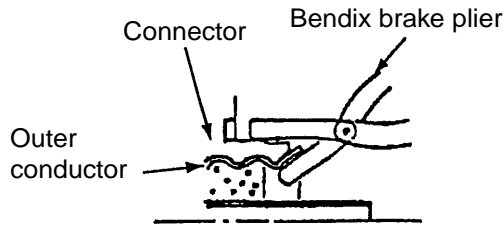
4. Clean the outer conductor with a gasoline and cloth.
5. Heat the cutting off tool (or hacksaw and cutter) with the burner. Then, remove with the cutting off tool the insulator between the inner and outer conductors by the depth of 6 mm.



6. Clean the outer and inner conductor with gasoline and cloth. Slip the clamping nut, spacer, gasket and outer clamp on the cable in that order. (Parts No. 1, 2 and 3 in the figure shown in page 2-19)

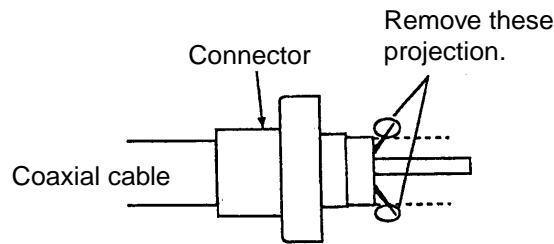


7. Flare the outer conductor against the edge of the outer clamp coarsely with the Bendix brake pliers. (Wind copper tape over the outer clamp to protect its surface.)

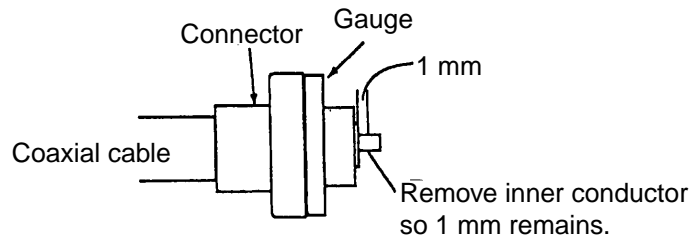


8. Trim and file any portion of the outer conductor that protrudes beyond the diameter of the outer clamp.

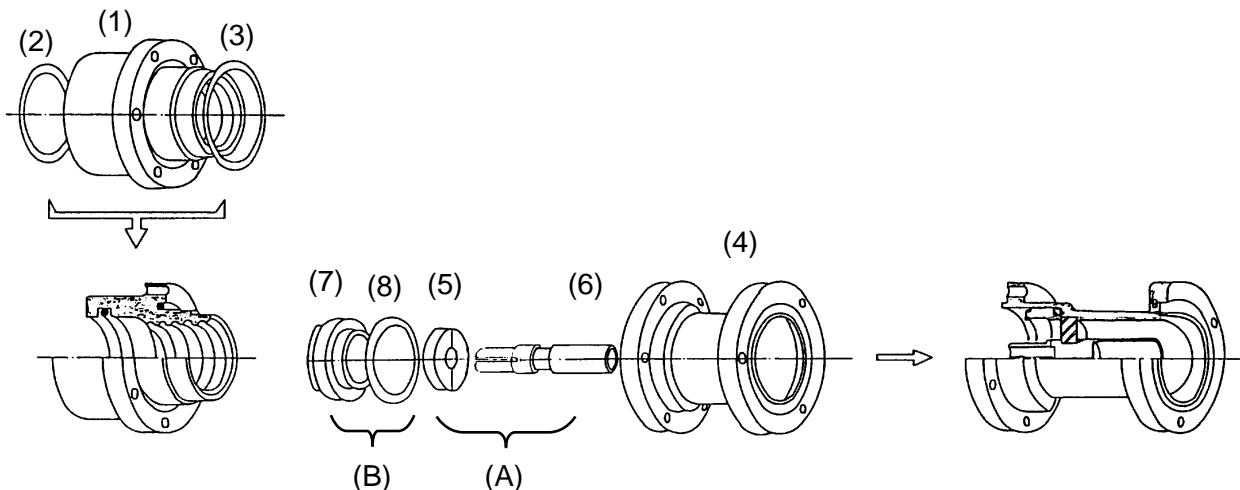
**Note:** Put a piece of cloth into the conductors temporarily so as not to let any particles in the conductors.



9. Insert the gauge through the inner conductor until it is covered by the outer clamp. Then, tap the gauge gently with the hammer to position it.
10. Cut the inner conductor along the gauge and file its end.



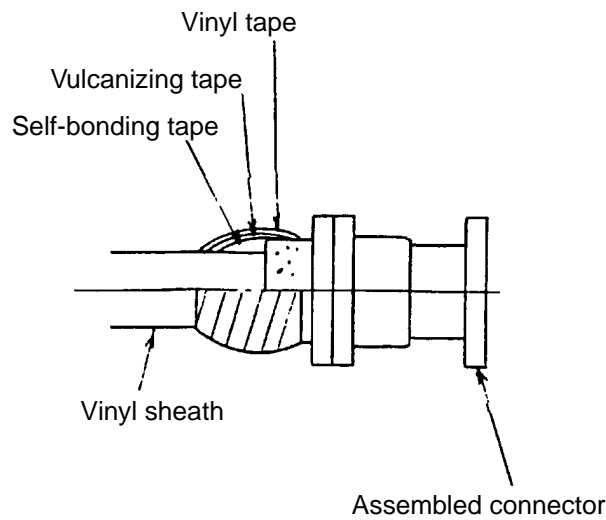
11. Remove the gauge. Remove any burrs with a knife.
12. Assemble (4) through (8) as below.
  - a) Screw (5) into (6).
  - b) Attach (8) to (7).
  - c) Attach (A) to (B), and then screw it into (4).



## 2. WIRING

13. If the coaxial cable connector is installed outdoors, follow the steps in below.

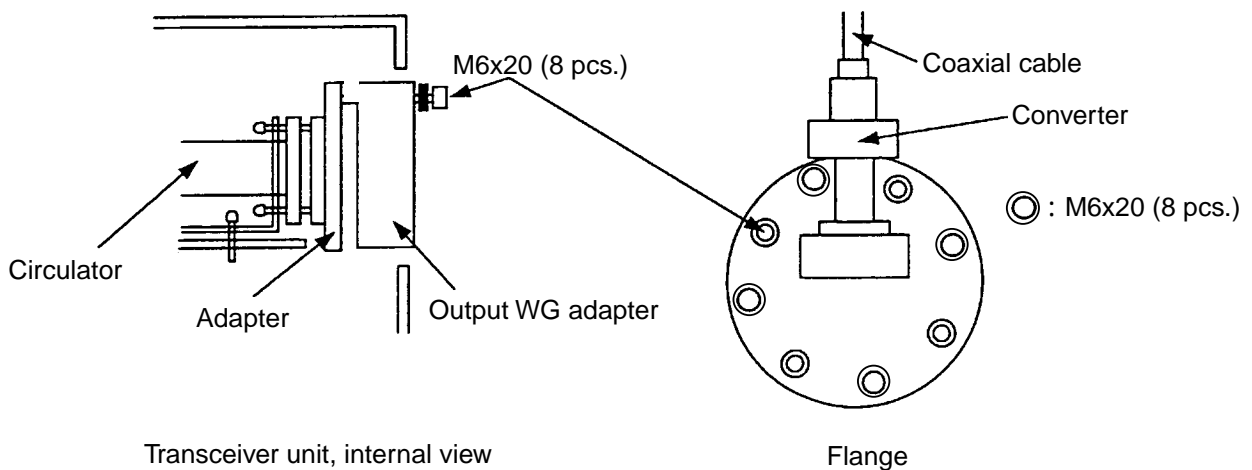
- a) Tape the junction with self-bonding tape.
- b) Wind vulcanizing tape around the self-bonding tape.
- c) Finally, wrap vinyl tape over the vulcanizing tape.



### Connecting the coaxial cable

Connect the coaxial cable to the transceiver unit as below.

1. Loosen eight bolts (M6x20) to remove the dust cover from the output WG adapter.
2. Fasten eight bolts (removed at step 1) to attach the flange to the transceiver unit.
3. Attach the coaxial cable to the converter of the flange.



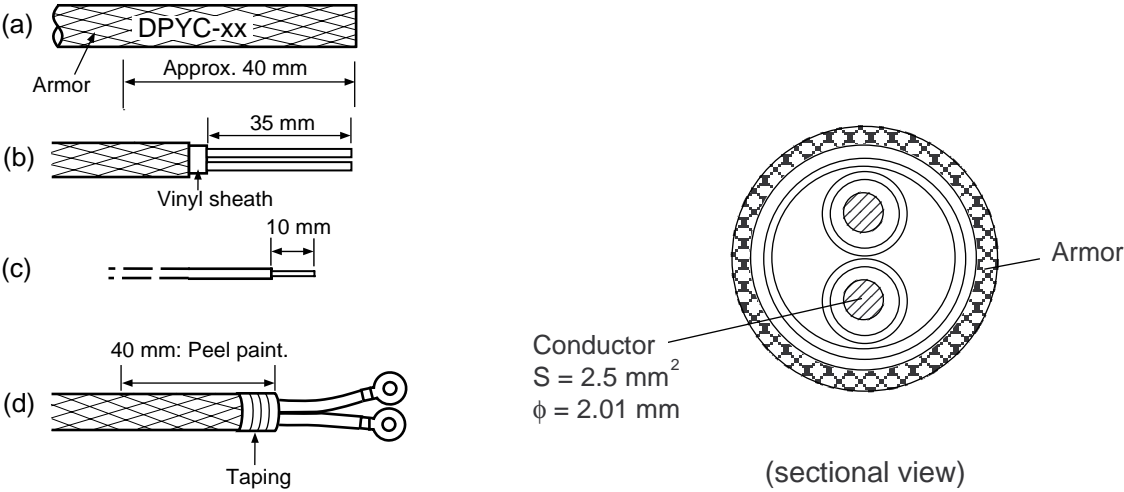


# 2.4 Monitor Unit

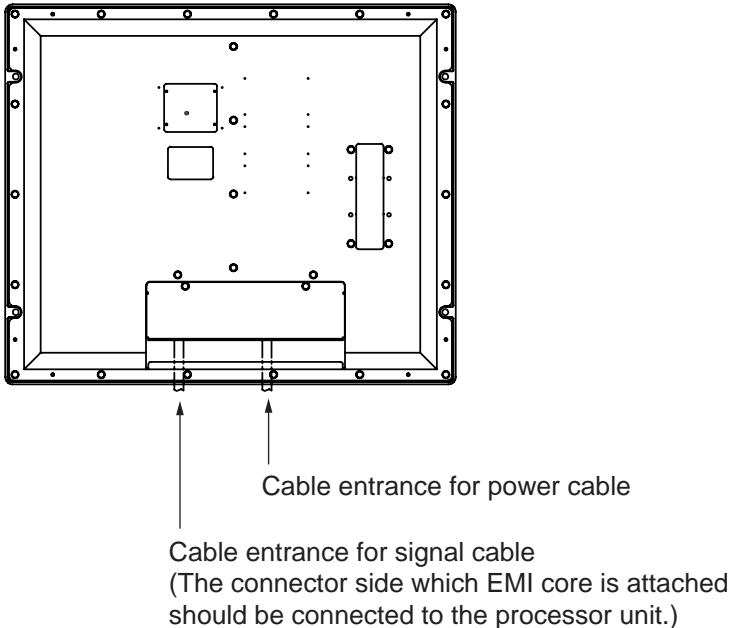
Two cables are terminated at the monitor unit: the signal cable from the processor unit and the power cable from the ship's mains. The signal cable comes with a connector preattached to it for connection to the monitor unit. Fabricate the power cable as below. Use DPYC-2.5 (Japan Industry Standard) cable or the equivalent. For MU-231, see its Operator's Manual.

## Fabricating the power cable

1. Cut armor of the cable by 40 mm.
2. Cut vinyl sheath by 35 mm.
3. Remove insulation of wires by about 10 mm. Fix crimp-on lugs to the cores.
4. Peel point of the armor by 40 mm.
5. Cover the end of armor with vinyl tape.



Fabricating power cable DPYC-2.5



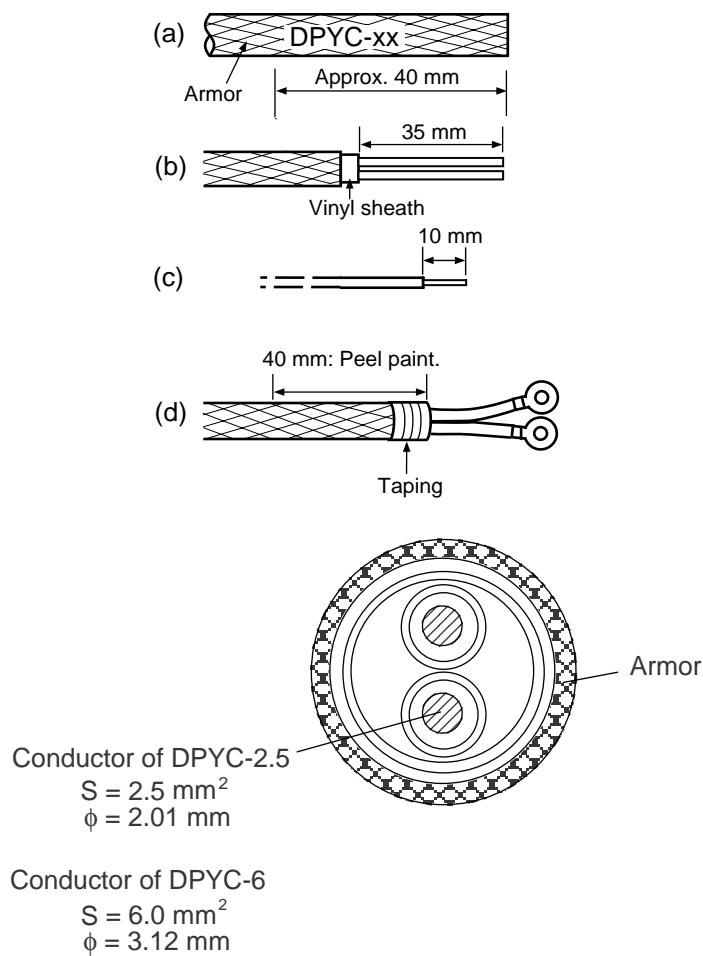
Monitor unit (rear panel)

## 2.5 Processor Unit

Four cables are terminated at the processor unit: the antenna unit cable, display unit cable, control unit cable and the power cable. Cables other than the power cable come with a connector preattached to them for connection to the processor unit. Fabricate the power cable as below. For the power cable, use DPYC-2.5 (Japan Industry Standard) cable for DC unit or DPYC-6 for AC unit, or the equivalent.

### Fabricating the power cable

1. Cut armor of the cable by 40 mm.
2. Cut vinyl sheath by 35 mm.
3. Remove insulation of wires by about 10 mm. Fix crimp-on lugs to the cores.
4. Peel point of the armor by 40 mm.
5. Cover the end of armor with vinyl tape.

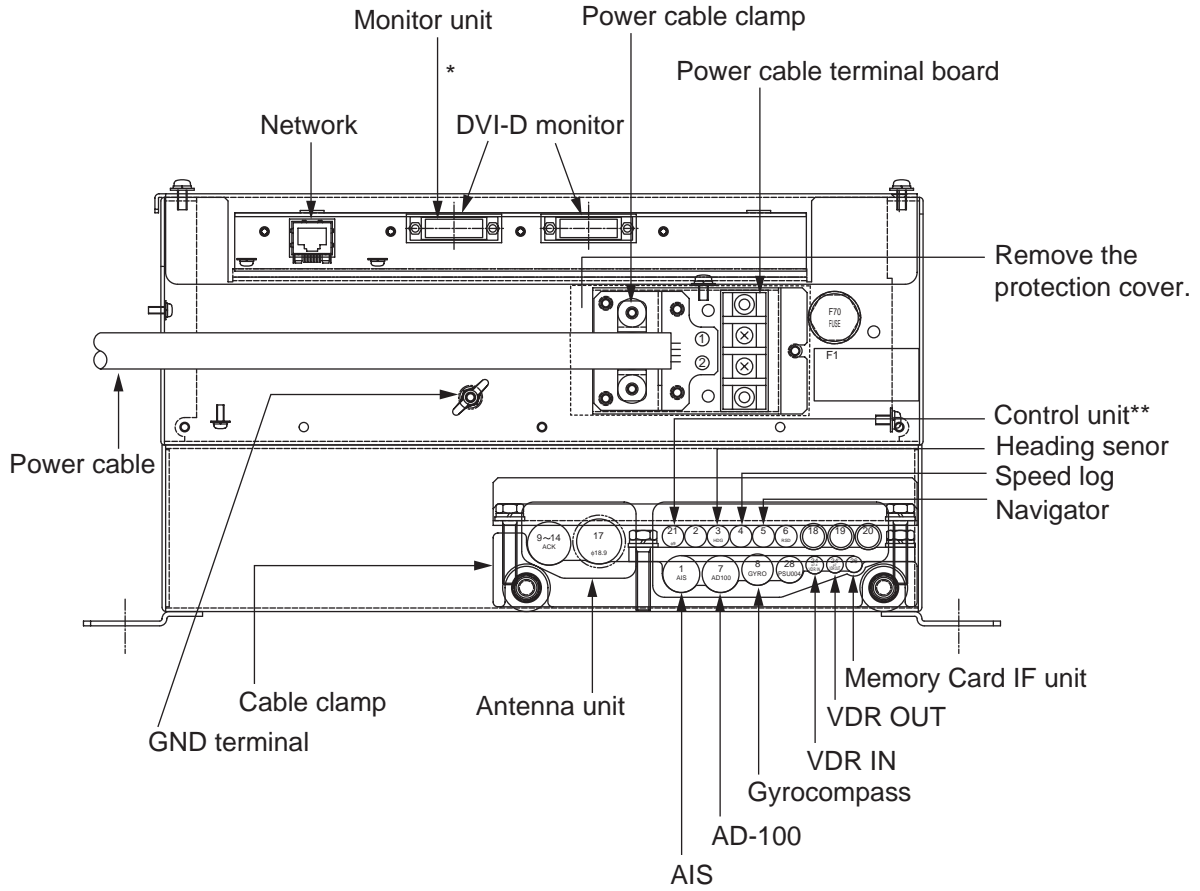


(sectional view)

*Fabricating power cable DPYC*

### Connection of cables

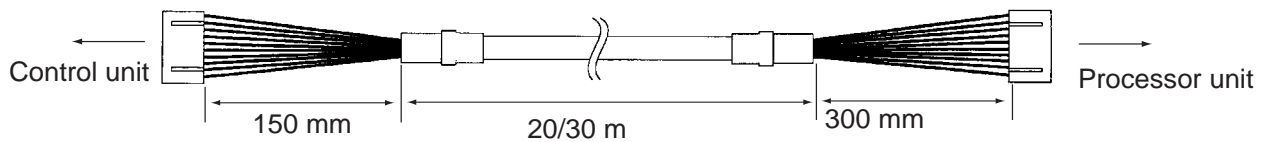
The power cable is connected to the terminal board on the rear panel and the signal cable from the display unit is connected to the DVI-D connector. Other cables are connected to the printed circuit board 03P9342.



Processor unit (rear panel)

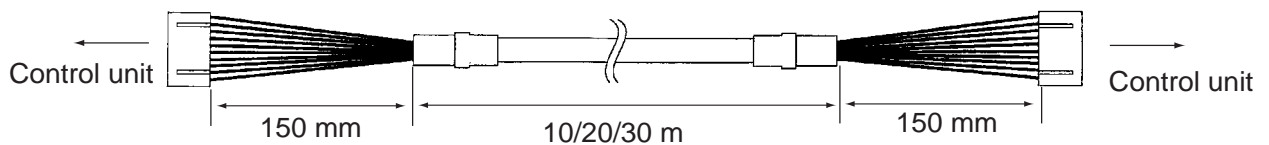
\*: The connector side which EMI core is attached should be connected to the processor unit.

\*\* : The configuration of optional cables between the processor unit and the control unit is as follows. Note that the cable fabrication for each end is different.



Cable XH10P-W-6P L=20/30M

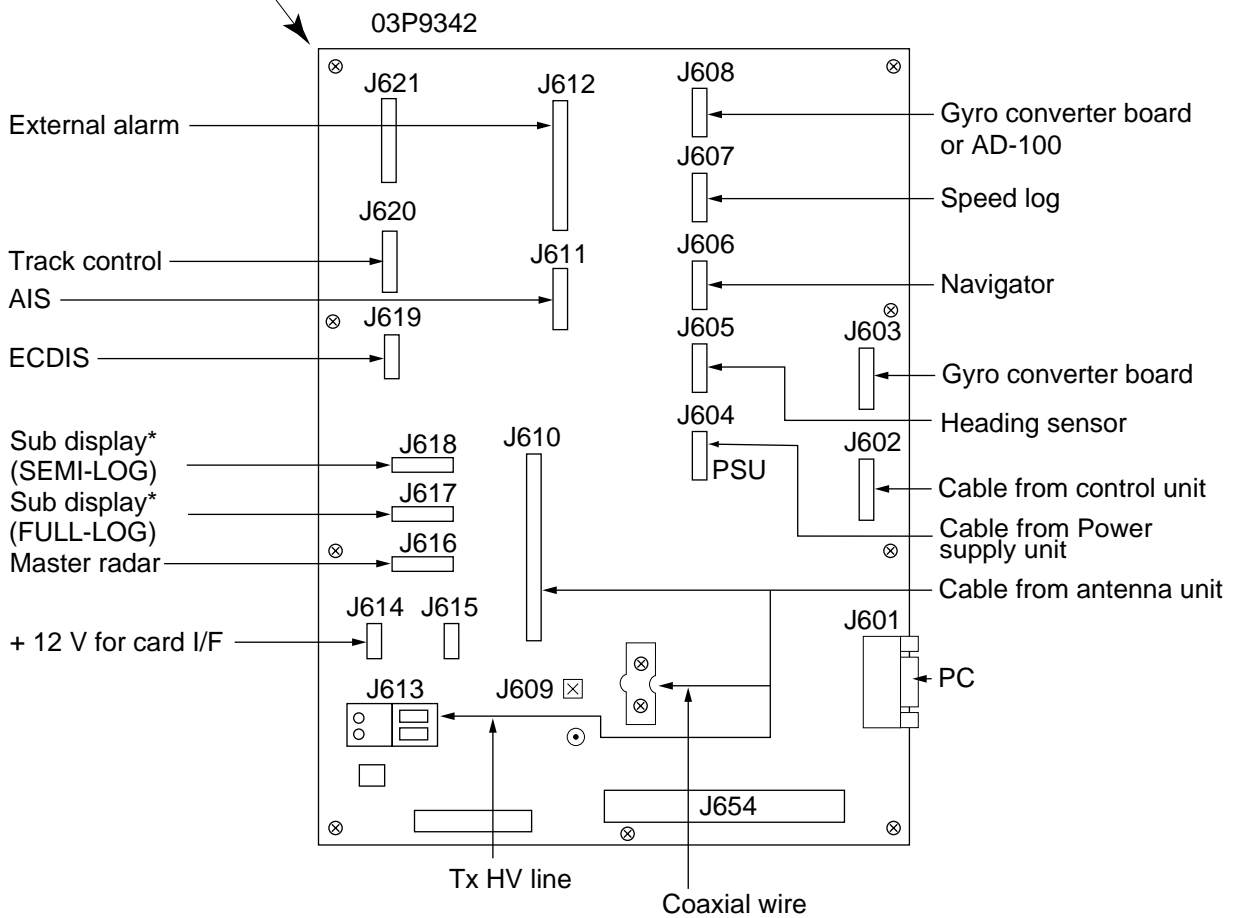
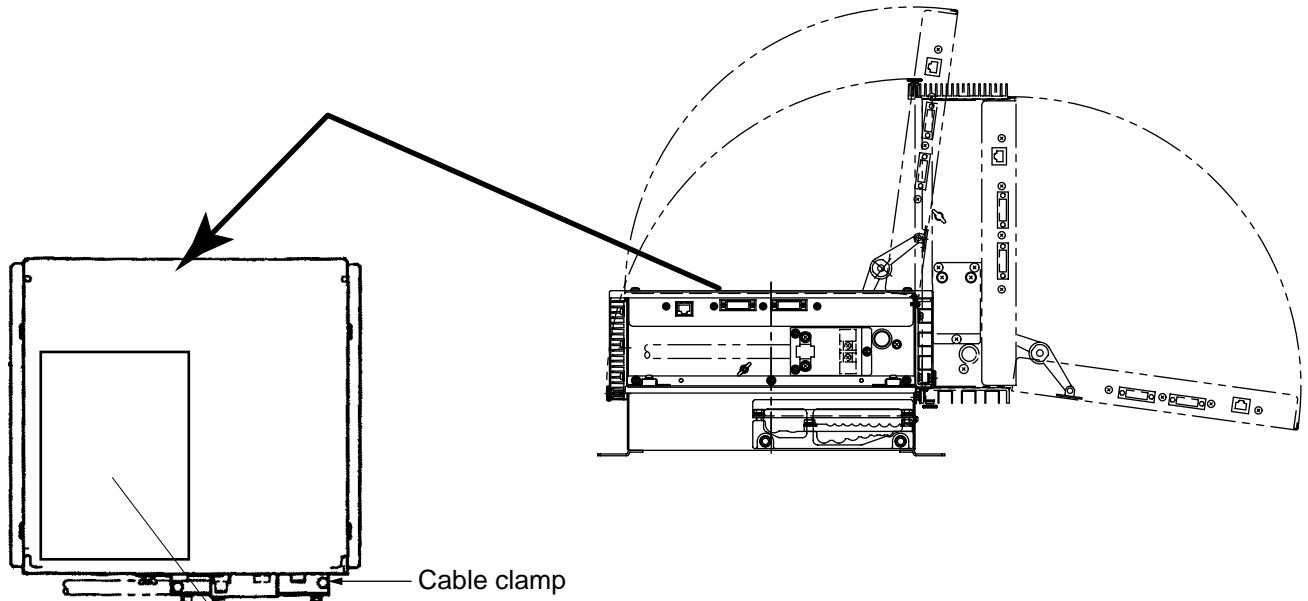
When the RCU-016 is installed, optional cable (XH10P-W-5P-A, L=10/20/30M) is required. Cable fabrication for each end is the same.



XH10P-W-5P-A L=10/20/30M

### Location of connectors

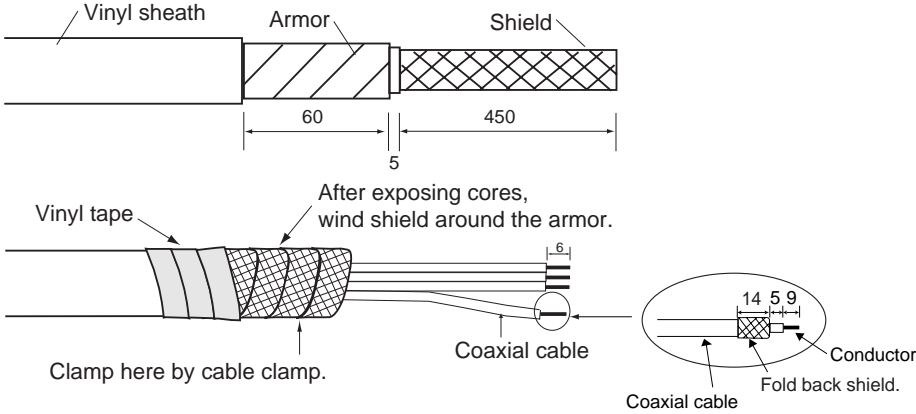
Open appear part of the processor unit.



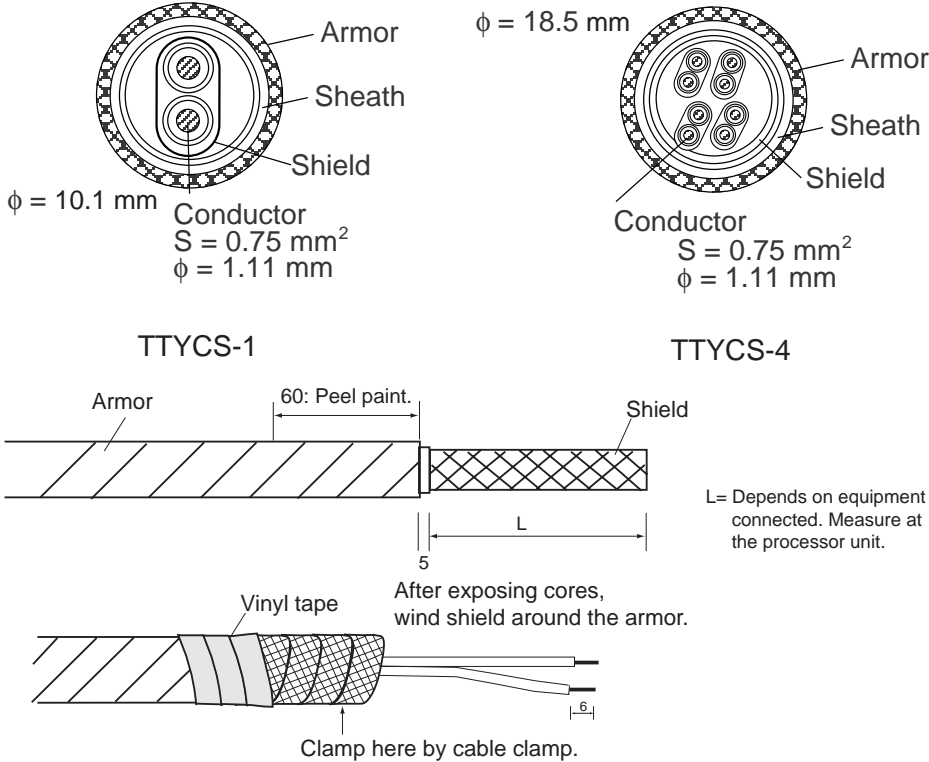
\*: For details, see page 2-28.

**Cable fabrication for the cables connected to the 03P9342 board**

- Signal cable RW-9600 (Between antenna unit and processor unit)



- Other cables for optional units  
Use TTYCS-1 or TTYCS-4 (Japan standard cable) or equivalent.



Wiring for WAGO connector

Press downward.  
Terminal opener  
Wire  
Twist  
WAGO connector

Procedures

1. Twist the conductor.
2. Press the terminal opener downward.
3. Insert the wire to hole.
4. Remove the terminal opener.
5. Pull the wire to confirm that it is secure.

Wiring for Coaxial cable

Clamp shield with bracket.  
Tighten conductor with screw.

**CAUTION**

Do not use crimp-on lug to prevent contact resistance from increasing.

## Connection of Sub-display

A conventional remote display and/or FAR-2107 series radar can be connected to J617 and J618 in the processor unit as a sub-display. However, the control for GAIN and STC are different depending on J617 and J618. Refer to the table to connect sub-displays.

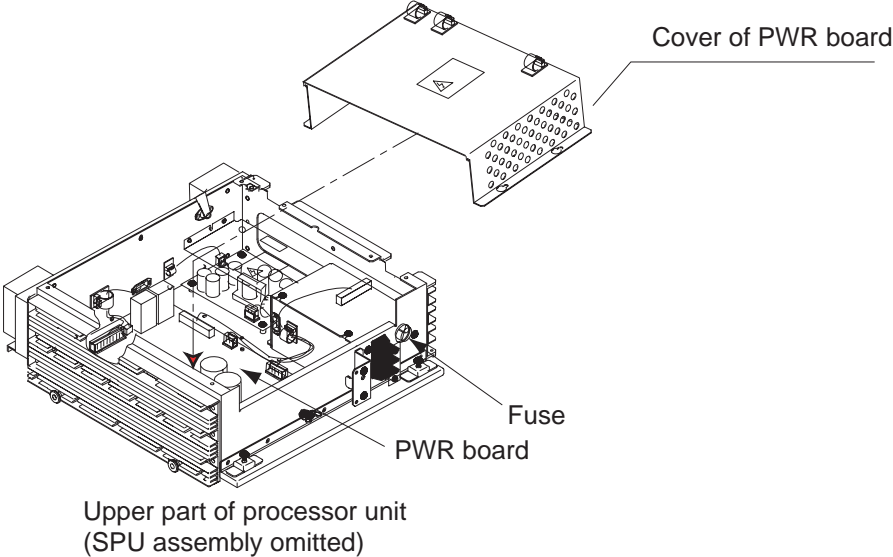
Port		Conventional remote display	FAR-2107 series radar
J617 (FULL-LOG)	Overall gain	Even if input video level is adjusted to 4 Vp-p, the gain is 8 db lower than that on the master radar.	The gain is 8 dB lower than that on the master radar.
	GAIN control	The GAIN control is effective.	The GAIN control has no effect.
	STC control	The STC control is effective.	The STC control has no effect.
J618 (SEMI-LOG)	Overall gain	When input video level is adjusted to 4 Vp-p, the gain becomes the same as that on the master radar.	The gain is almost same as that on the master radar.
	GAIN control	The GAIN control is effective.	The GAIN control has no effect.
	STC control	The STC control is effective, however this control is added on the signal adjusted by the master radar. So this port is not recommended to use .	The STC control has no effect.

## 2.6 Changing AC Power Specification of Processor Unit

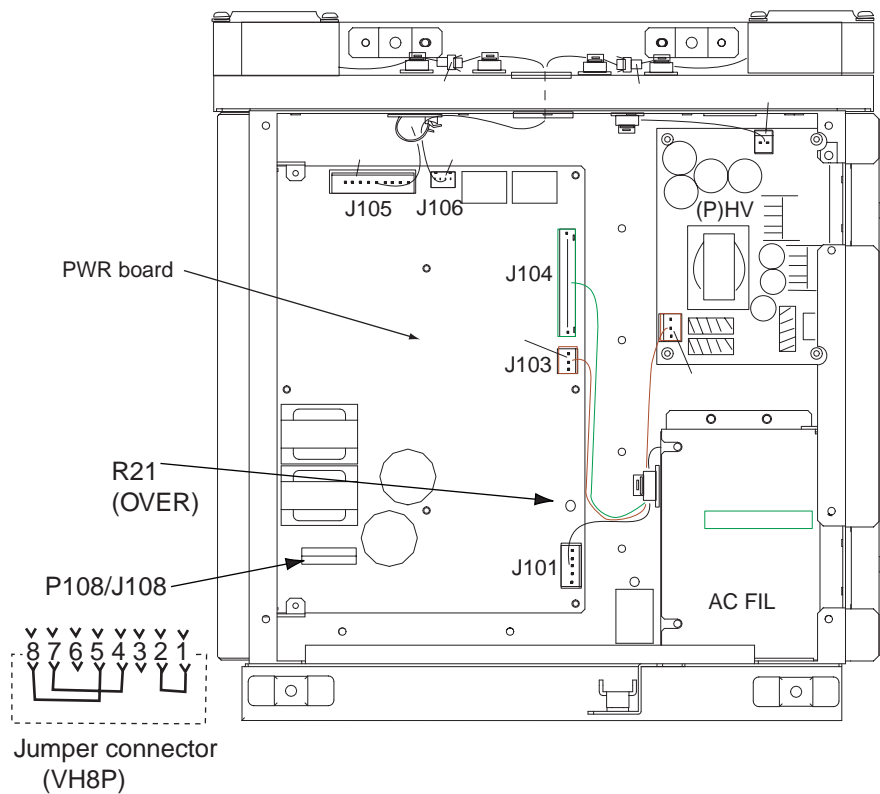
To change AC power specification between 100 VAC and 220 VAC, add or remove jumper connector P108 on the PWR board 03P9339 and change the fuse on the processor unit according to ship's mains as shown in the table below. The figure on the next page shows the location of the fuse and the jumper connector on the PWR board. Also, adjustment of the overvoltage detection circuit is required.

Note: To change from 220VAC to 100VAC, locally prepare the jumper connector, referring to the figure on the next page (VH8P connector housing is fitted at J108).

Power supply	Fuse	Jumper connector P108
100 VAC	10A	Added
220 VAC	5A	Removed



## 2. WIRING



### How to adjust the overvoltage detection circuit:

1. Add or remove the jumper connector P108 and change the fuse.
2. Rotate R21 fully clockwise on the PWR board.
3. Connect a variable transformer between ship's mains and the input power terminal board TB-1 of the processor unit.
4. Adjust the variable transformer output (i.e., input voltage to the processor unit) as follows.  
For 100 VAC set: 144 VAC  
For 220 VAC set: 288 VAC
5. Turn on the radar and rotate the R21 counterclockwise gradually until the overvoltage detection circuit functions (i.e., power supply cuts off).
6. Lower the output voltage of the variable transformer and confirm that the radar automatically turn on with a voltage lower than 142VAC or 284VAC.
7. Gradually increase the output voltage of the variable transformer and confirm that the overvoltage detection circuit functions at 144V or 288VAC of the variable transformer output.
8. Assemble and connect the processor unit.

## 2.7 Power Supply Unit

Refer to the interconnection diagrams for wiring details.

1. Unfasten the cable clamp.
2. Open the cover.
3. Connect the power cable (DPYC-2.5) between the PSU-011 and TB1 on the processor unit. (See page 2-4 for how to fabricate the cable.)
4. Connect the power cable (DPYC-2.5) between the PSU-011 and power source.
5. Fasten the cable clamp and close the cover.

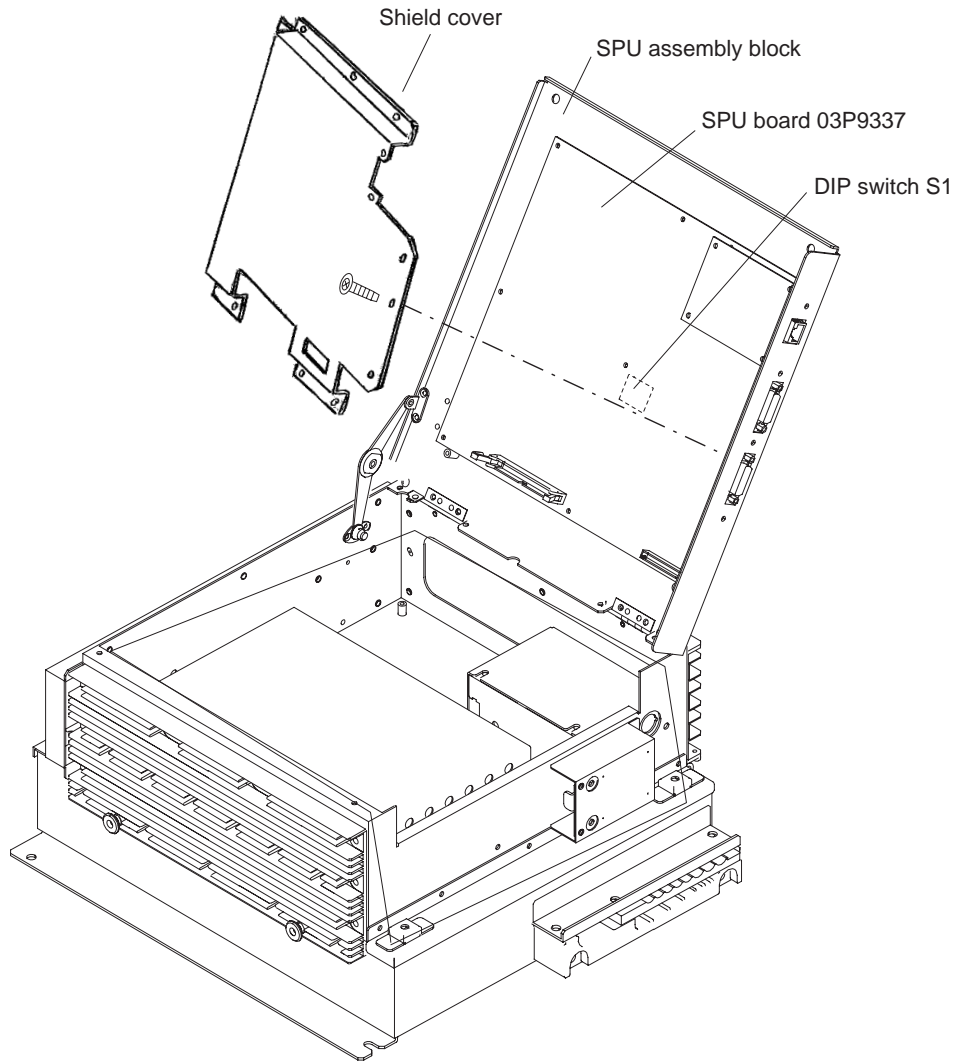


# 3. SETTING AND ADJUSTMENT

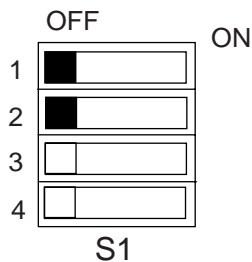
## 3.1 DIP Switch Setting

The DIP switch setting as follows.

1. Remove the top cover of the processor unit.
2. Open the SPU assembly block.



3. Set the DIP switch S1 as follows.

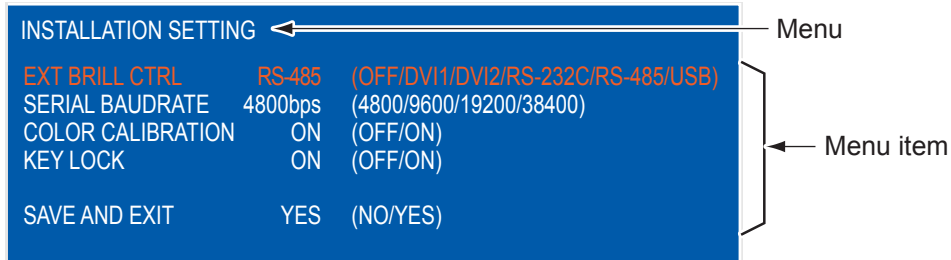


S1	Monitor SXGA (1024x1280, Default)	Monitor UXGA (1024x1360)
1	OFF	ON
2	OFF	OFF
3	Not used.	
4		

**Note:** Set #1 and #2 of S1 to OFF for MU-231CR S. No. 0268 and earlier.

## 3.2 Monitor Unit (MU-231) Setting

The [INSTALLATION SETTING] menu appears only when the power is turned on for the first time after installation of the monitor unit.



Adjust the settings referring to the following table.

EXT BRILL CTRL	SERIAL BAUDRATE	COLOR CALIBRATION	KEY LOCK	DVI PWR SYNC*2
DVI*1	-	OFF	ON	ON

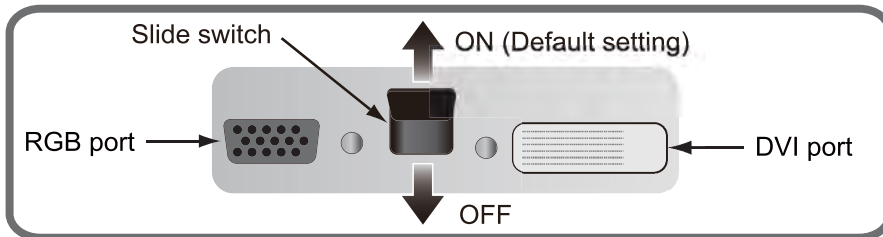
\*1: To connect to the processor unit of a radar, connect the video signal cable to the DVI-D1 port. Then, select DVI1 to display the radar picture.

\*2: "DVI PWR SYNC" is the slide switch at the bottom rear of the monitor unit. Confirm that this switch is set to "ON" (default setting). See "Slide switch" below for details.

### Slide switch

Set the slide switch to "ON" (default setting). This setting automatically powers the monitor unit on or off according to the DVI signal input. The power switch of the monitor unit is inoperative.

**Note:** The OFF position provides control of the monitor unit power with the power switch of the monitor unit.



### How to open the [INSTALLATION SETTING] menu

Turn off the monitor unit. While you hold the [DISP] key, press the [⏻/BRILL] key to turn on the monitor unit. Press and hold the [DISP] key for more than five seconds.

**Note:** When the "DVI PWR SYNC" slide switch is ON, turn on the connected external equipment while you press the [DISP] key to turn on the monitor unit.

### 3.3 Initializing Tuning

1. Transmit the radar on 48 nm range and rotate the GAIN knob to show 70-80 of the gain bar.
2. Roll the trackball to choose the MENU box at the right side of the screen and then push the left button.
3. Roll the wheel to choose 1 ECHO and then push the wheel.

[ECHO]
1 BACK
2 2 <sup>ND</sup> ECHO REJ
<b>OFF/ON</b>
3 TUNE INITIALIZE
4 PM
<b>OFF/ON</b>
5 SART
<b>OFF/ON</b>
6 WIPER
<b>OFF/1/2</b>
7 ECHO AREA*
CIRCLE/WIDE/ALL
8 [PICTURE SELECT]
9 STC RANGE
+00

Bold: Default settings  
(Same for all menu illustrations)

\*: non IMO-type only.

*ECHO menu*

4. Roll the wheel to choose 3 TUNE INITIALIZE.
5. Push the wheel to initialize automatic tuning.

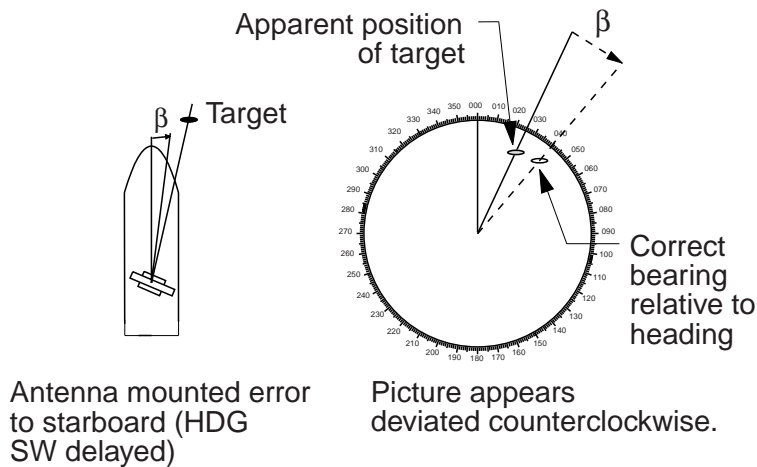
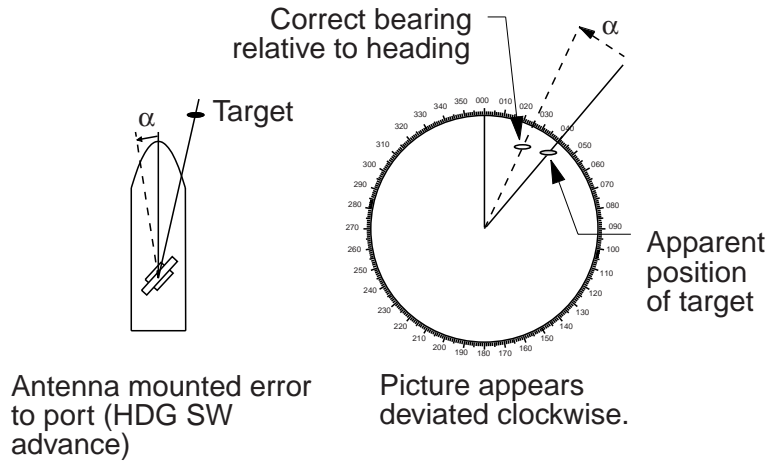
After a while, echoes appear on the screen. The message "TUNE INITIALIZE" appears in red during automatic tuning. When this message disappears, the tuning is completed. If necessary adjust the GAIN to show echoes clearly.

6. Push the right button twice to close the menu.

### 3.4 Heading Alignment

You have mounted the antenna unit facing straight ahead in the direction of the bow. Therefore, a small but conspicuous target dead ahead visually should appear on the heading line (zero degrees).

In practice, you will probably observe some small bearing error on the display because of the difficulty in achieving accurate initial positioning of the antenna unit. The following adjustment will compensate for this error.



#### Heading alignment

1. Select a stationary target echo at a range between 0.125 and 0.25 nm, preferably near the heading line.
2. Operate the EBL control to bisect the target echo.

3. Read the target bearing.
4. Measure the bearing of the stationary target on the navigation chart and calculate the difference between actual bearing and apparent bearing on the radar screen.
5. Press the [MENU] key to show the main menu.
6. While pressing and holding down the [HL OFF] key, press the [MENU] key five times.
7. Press the [0] key to show the [INITIALIZE] menu.

[INITIALIZE]
1 BACK
2 [ECHO ADJ]
3 [SCANNER]
4 [INSTALLATION]
5 [OWN SHIP INFO]
6 [TT PRESET]
7 [NETWORK]
8 [OTHER]
9 [FACTORY]

**Note:** See next page to access the INITIALIZE menu with the trackball style control unit RCU-015.

8. Press the [2] key to open the [ECHO ADJ] menu.

[ECHO ADJ]
1 BACK
2 CABLE ATT ADJ AUTO/MANUAL 30
3 HD ALIGN 000.0°
4 TIMING ADJ 0
5 MBS 0
6 DEFAULT ANT HEIGHT 5/7.5/10/15/20/ 25/30/35/40/45/ more 50 m
7 NEAR STC CURVE 2/2.5/3/3.5/4.2
8 MID STC CURVE 3/4/5/6
9 FAR STC CURVE 6/7/8
0 RING SUPPRESSION 0

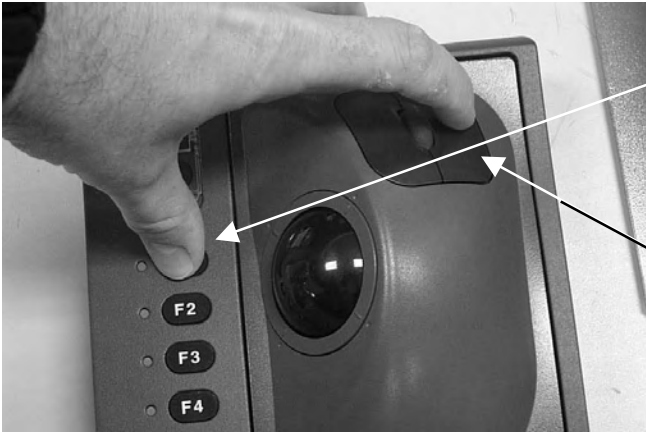
*ECHO ADJ menu*

9. Press the [3] key to choose the HD ALIGN option.
10. Key in the bearing difference. The setting range is 0 to 359.9°.
11. Confirm that the target echo is displayed at correct bearing on the screen.
12. Press the [MENU] key to finish.

### How to Access the Installation Mode with the RCU-015 Trackball Style Controller

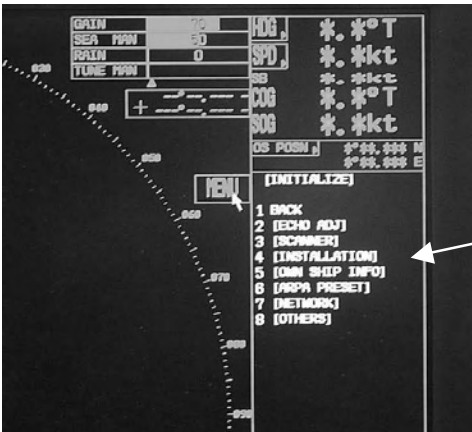


1. By using the trackball, move the pointer until it highlights the MENU box as shown. **DO NOT CLICK** the menu box, just leave the arrow over the menu.



2. Press and hold down the F1 key. Keep it held down during the next step.

3. Then, click on the right controller button 5 times. You should hear a “triple Beep” on the fifth press.

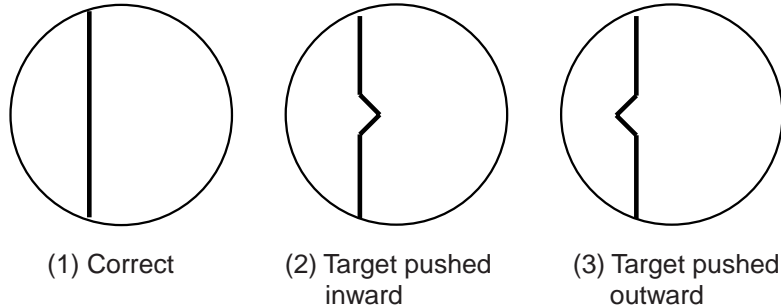


The INITIALIZE menu will appear. Click on INSTALLATION to access the installation menus.

### 3.5 Adjustment Sweep Timing

Sweep timing differs with respect to the length of the signal cable between the antenna unit and the processor unit. Adjust sweep timing at installation to prevent the following symptoms:

- The echo of a “straight” target (for example, pier), on the 0.25 m range, will appear on the display as being pulled inward or pushed outward. See Figure below.
- The range of target echoes will also be incorrectly shown.



*Examples of correct and incorrect sweep timings*

1. Transmit on the 0.25 nm range.
2. Adjust radar picture controls to display picture properly.
3. Select a target echo which should be displayed straightly.
4. Press the [4] key to choose the [TIMING ADJ] on the [ECHO ADJ] menu.

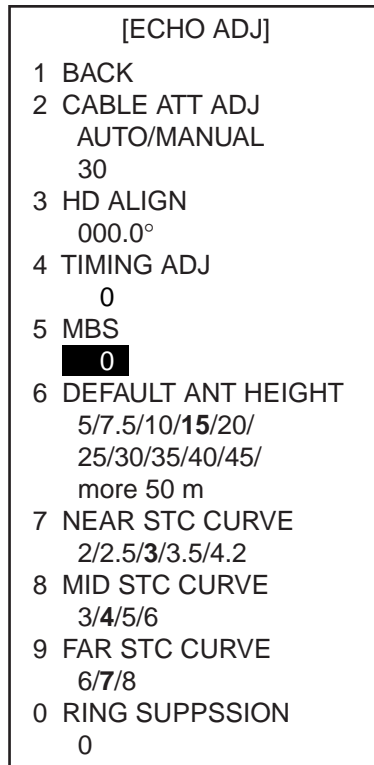
[ECHO ADJ]	
1	BACK
2	CABLE ATT ADJ AUTO/MANUAL
	30
3	HD ALIGN 000.0°
4	TIMING ADJ <b>0</b>
5	MBS 0
6	DEFAULT ANT HEIGHT 5/7.5/10/15/20/ 25/30/35/40/45/ more 50 m
7	NEAR STC CURVE 2/2.5/3/3.5/4.2
8	MID STC CURVE 3/4/5/6
9	FAR STC CURVE 6/7/8
0	RING SUPPRESSION 0

5. Rotate the wheel to set a suitable value which causes the target to be displayed straightly. The setting range is 0 to 4095.
6. Press the [MENU] key to finish.

## 3.6 Suppressing Main Bang

If main bang appears at the screen center, suppress it as follows.

1. Transmit the radar on a long range and then wait ten minutes.
2. Adjust gain to show a slight amount of noise on the display.
3. Select the 0.25 nm range. Adjust sea clutter control to suppress sea clutter.
4. Press [5] key to choose the MBS on the [ECHO ADJ] menu.



5. Rotate the wheel to set a suitable value so that the main bang disappears.  
The setting range is 0 to 255.
6. Press the [MENU] key to finish.



## 3.7 Other Settings

### ECHO menu setting

Open the ECHO ADJ menu as described on pages 3-4 and 3-5.

[ECHO ADJ]	
1	BACK
2	CABLE ATT ADJ
	AUTO/MANUAL
	30
3	HD ALIGN
	000.0°
4	TIMING ADJ
	0
5	MBS
	0
6	DEFAULT ANT HEIGHT
	5/7.5/10/15/20/
	25/30/35/40/45/
	more 50 m
7	NEAR STC CURVE
	2/2.5/3/3.5/4.2
8	MID STC CURVE
	3/4/5/6
9	FAR STC CURVE
	6/7/8
0	RING SUPPRESSION
	0

To close the menu, press the [MENU] key.

#### **CABLE ATT ADJ**

Before adjusting, set the radar as follows:

IR: 2, ES: off, EAV: off, 24nm range, long pulse

(Same as default setting of PICTURE1)

To adjust the cable attenuation manually, choose MANUAL by pressing [2] and the [ENTER] key, and then rotate the wheel so that noise just appears on the screen when the gain is set to 80. Default setting is 30 for the antenna cable length of 15m. The setting range is 0 to 73. To adjust automatically, choose AUTO and press the [ENTER] key. The message "CABLE ATT ADJ" appears in red at the bottom of the screen. It takes about five minutes to complete the adjustment, after which the radar goes into stand-by.

#### **DEFAULT ANT HEIGHT**

Select height (m) of the radar antenna unit from the sea surface among 5, 7.5, 10, 15, 20, 25, 30, 35, 40, 45 and "more 50 m".

#### **NEAR STC CURVE, MID STC CURVE AND FAR STC CURVE**

Use the default setting. Change the setting if desired according to sea condition.

#### **RING SUPPRESSION**

This is mainly used to remove "ring" noise which appears in the waveguide-type radar. Adjust so the rings disappear at the range of 0.125 nm. The setting range is 0 to 255.

### 3. SETTING AND ADJUSTMENT

## Scanner setting

1. Open the INITIALIZE menu described on page 3-3.
2. Press [3] key to open the SCANNER menu.

[SCANNER]	
1	BACK
2	BLIND SECTOR 1 START 000° ANGLE 000°
3	BLIND SECTOR 2 START 000° ANGLE 000°
4	ANT REVOLUTION LO/HI/AUTO
5	ANT SW OFF/ON/EXT
6	ANT STOPPED STBY/TX
7	M SPEC OFF/ON
8	BB TYPE NORMAL/BB
9	[DUAL RADAR]*

**Note 1:** Set the blind sector as minimum as possible.  
**Note 2:** Do not set the blind sector in the bow direction.

\*non IMO-type only

To close the menu, press the [MENU] key.

### **BLIND SECTOR 1 and BLIND SECTOR 2**

Set area (up to 2) where no radar pulses will be transmitted, and heading should be adjusted before setting any blind sector. For example, set the area where an interfering object at the rear of the scanner would produce a dead sector (area where no echoes appear) on the display. To enter an area, enter start bearing relative the heading and dead sector angle. To erase the area, enter 0 for both the START and ANGLE sections. The setting range of START is 0 to 359° and ANGLE is 0 to 180°.

### **ANT REVOLUTION**

This menu item is used for 42 rpm antenna unit. The default is AUTO, where antenna revolution speed is high for short range setting and low speed for long range setting. When LO is selected, the antenna always rotate in 36 rpm, and HI, 42 rpm.

### **ANT SW and ANT STOPPED**

This is used for antenna maintenance by serviceman.

**Note:** Choose OFF at ANT SW to prevent the antenna rotation. As for ANT STOPPED, choose STBY to prevent transmission while the antenna is stopped.

### **M SPEC and BB TYPE**

Not used.

### **DUAL RADAR**

See section 3.8.

## INSTALLATION menu setting

Open the INSTALLATION menu by pressing [4] key on the INITIALIZE menu.

[INSTALLATION]	
1 BACK	
2 RADAR*	*: Cannot be selected.
<b>MAIN/SUB</b>	
3 RANGE UNIT **	** : non IMO-type only.
<b>NM/SM/km/kyd</b>	
4 RADAR NO***	***: No.1-4: with antenna unit No.5-8: without antenna unit
1/2/3/4/5/6/7/8	
5 RADAR POSN	
FORE/ <b>MAIN TOP</b> /	
MAIN 2ND/MAIN 3RD/	
AFT/PORT/	
STAR BOARD	
6 MODEL	
6/ <b>12</b> /25 UP/25 DOWN/	
50/30 UP/30 DOWN/60	
7 TYPE	
<b>IMO/A/B/C/W</b>	
8 ON TIME	
XXXXXXXX.X H	
9 TX TIME	
XXXXXXXX.X H	
0 PM GAIN ADJ	
0	

### RADAR

Choose main radar or sub radar.

### RANGE UNIT

Choose NM, SM, km or kyd (kilo yard) as appropriate, however-IMO type radar is "NM" only.

### RADAR NO and RADAR POSN

For multiple radar system using the network hub, set number (name) and antenna position for each system to easily distinguish the radar configuration.

### MODEL

Confirm the model of your radar. If the setting of this item is different from your model (combination of the antenna unit), the radar functions abnormally.

25 DOWN: for FAR-2827W

30 DOWN: for FAR-2837SW

### TYPE

Choose type of radar: IMO, A, B, C, or W.

### 3. SETTING AND ADJUSTMENT

#### **ON TIME and TX TIME**

These items show number of hours the radar has been turned on and transmitted, respectively. Value can be changed; for example, after replacing magnetron TX Time can be reset to 0.

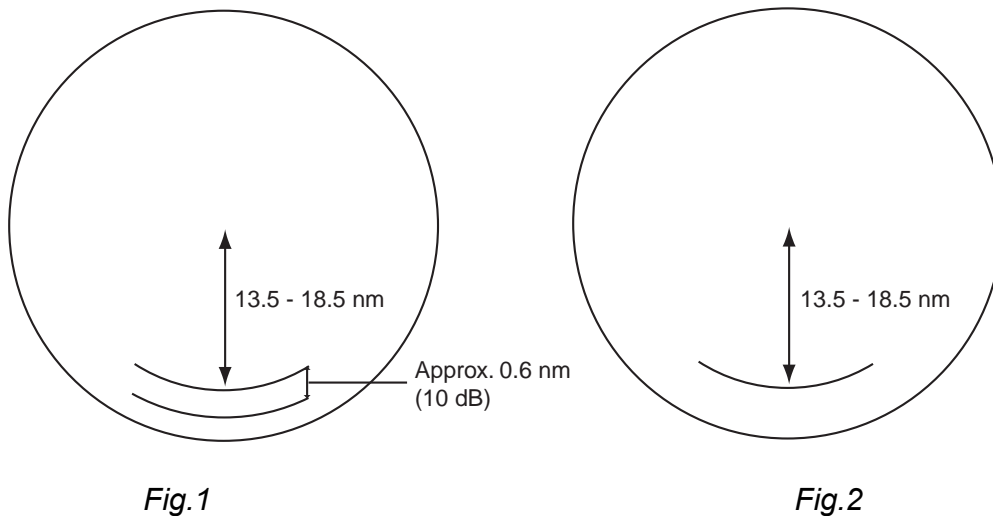
#### **PM GAIN ADJ**

Note: If you install the Performance Monitor PM-31 at field, see section 4.4 on page 4-16.

When you choose this item, the radar setting changes as follows.

RANGE: 24 NM  
PULSE: LONG  
BLIND SECTOR: OFF  
STC: OFF by Manual  
RAIN: OFF by Manual  
ECHO AVERAGE: OFF  
VIDEO CONTRAST: 2-B  
TUNE: AUTO

1. Adjust the GAIN control so that a slight amount of white noise appears on the screen. Arcs for performance monitor appear on the screen (Fig.1).
2. Adjust PM GAIN ADJ so that outer arc just disappears (Fig.2). The setting range is 0 to 255.



## OWN SHIP INFO menu setting

Open the OWN SHIP INFO menu by pressing the [5] key on the INITIALIZE menu.

[OWN SHIP INFO]	
1	BACK
2	LENGTH/WIDTH
	LENGTH 100 m
	WIDTH 50 m
3	SCANNER POSN
	BOW 0 m
	PORT 0 m
4	GPS1 ANT POSN
	BOW 0 m
	PORT 0 m
5	GPS2 ANT POSN
	BOW 0 m
	PORT 0 m
6	CONNING POSN
	BOW 0 m
	PORT 0 m

### LENGTH/WIDTH and SCANNER POSN

To inscribe own ship shape on the screen when you choose it on the menu, enter length and width of the ship and antenna position from the bow and left sides.

The setting ranges are as follows.

LENGTH: 0 to 999 m

WIDTH: 0 to 999 m

BOW: 0 to 999 m

LEFT: 0 to 999 m

### GPS 1 ANT POSN and GPS 2 ANT POSN

These items are needed for AIS information. Enter the GPS antenna position from the bow and left sides. The setting ranges are the same as above.

### CONNING POSN

Enter the conning position in the wheelhouse, from the bow and left sides. The setting ranges are the same as above.

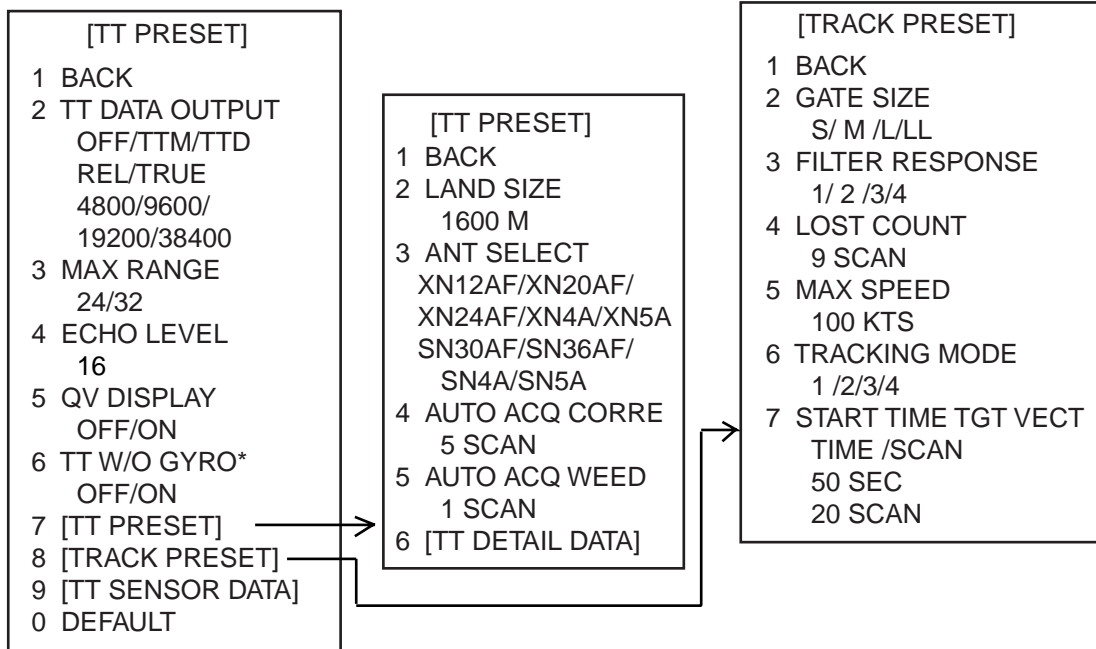
When you set the display reference point to the conning position, these values are used to correct the radar antenna position.

**Note:** If two or more radars are installed, items other than 3 SCANNER should be the same on each radar.

### 3. SETTING AND ADJUSTMENT

## TT PRESET menu setting

Open the TT PRESET menu by pressing [6] key on the INITIALIZE menu.



\*: Not on IMO radar

## TT DATA OUTPUT

Set the output format from J691 port (sentence, bearing and baud rate) of tracked targets.

Sentence: (OFF: No output, TTM: Tracked target information, TTD: Tracked target data)

Bearing: REL: Target bearing from own ship, degree relative,  
target course, degree relative.

TRUE: Target bearing, degree true, target course, degree true.

Baud rate: (4800, 9600, 19200 or 38400 bps)

**NOTE:** The TT OUTPUT port changes according to the setting for INS as described on page 3-16.

INS-OFF: Output from J619 port only

INS-SERIAL: Output from J619 and J620 (TTM only) ports

INS-LAN: Output from J619 and NETWORK (TTM only) ports

## MAX RANGE

Choose the target tracking range, 24 or 32 nm.

## ECHO LEVEL

Set the detection level of echoes. The setting range is 1 to 31.

## QV DISPLAY

OFF: Normal picture

ON: Quantized picture; always off at power on

**TT W/O GYRO (Not on IMO radar)**

If a gyrocompass is not connected, choose the TT function, ON(working) or OFF (no working).

**LAND SIZE**

Set the land size in units of 100 m. The setting range is 100 to 3000 m.

**ANT SELECT**

Set the antenna radiator type of your radar.

**AUTO ACQ CORRE**

Set the correlation count of automatic acquisition. The setting range is 3 to 10.

**AUTO ACQ WEED**

Set the cancel count of automatic acquisition. The setting range is 1 to 5.

**GATE SIZE**

Set the gate size among S, M, L, or LL.

**FILTER RESPONSE**

Set the filter response function. The setting range is 1 to 4.

**LOST COUNT**

Set the lost count. The setting range is 1 to 20.

**MAX SPEED**

Set the maximum tracking speed. The setting range is 40 to 150.

**TRACKING MODE**

Set the tracking mode among 1 to 4.

**START TIME TGT VECT**

Choose time which a vector appears after acquisition, TIME or SCAN and set seconds or scan counts.

### 3. SETTING AND ADJUSTMENT

#### **OTHER menu setting**

Open the OTHER menu by pressing [8] key on the INITIALIZE menu.

[OTHERS]	
1	BACK
2	DEMO ECHO OFF/EG/TT-TEST/PC
3	EAV W/O GYRO OFF/ON
4	TT CATEGORY SELECT CAT1/CAT2 3
5	INS OFF/SERIAL/LAN
6	ALERT DATA OUTPUT ALR/ALF
7	AIS ALERT IF LEGACY/ALERTIF1/OFF

#### **EAV w/o GYRO**

If a gyrocompass is not connected, choose the echo average function, ON (working) or OFF (no working).

#### **TT CATEGORY SELECT**

Choose CAT1 or CAT2•3 depending on your ship's size.

CAT1: All ships over than 10,000 GT

CAT2: All ships between 500 and 10,000 GT

CAT3: All ships less than 500 GT

#### **INS**

Choose appropriate item according to the ECDIS connected.

OFF: No connection

SERIAL: When connecting FEA-2105 series ECDIS.

LAN: When connecting FEA-2107 series ECDIS.

#### **ALERT DATA OUTPUT**

Set the alert handling format from J620.

ALR: ALR (output), ACK (input)

ALF: ALF, ALC, ARC, HBT (output), ACM, HBT (input)

#### **AIS ALERT IF**

Set the alert handling protocol with AIS.

LEGACY: For connection to FA-100, or connection to FA-150 where AIS Mode=LEGACY.

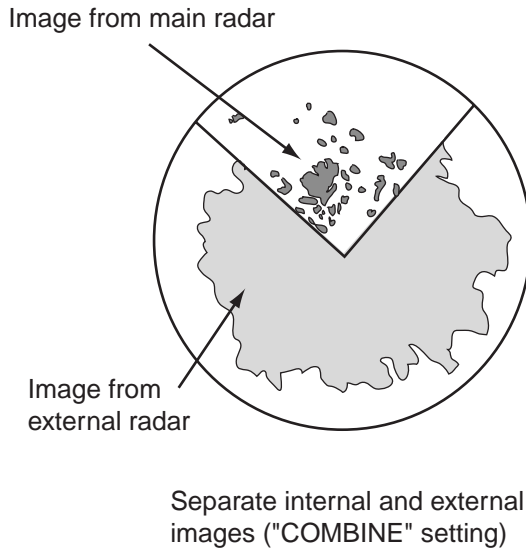
ALERTIF1: For connection to FA-150 where AMS Mode=AlertIF1.

OFF: Don't output AIS alert to FAR-2xx7 series display.



### 3.8 Dual Radar Display (non IMO-type only)

The image from two or more radars may be shown together on one radar display. This allows you to take advantage of the best characteristics radars has to offer.



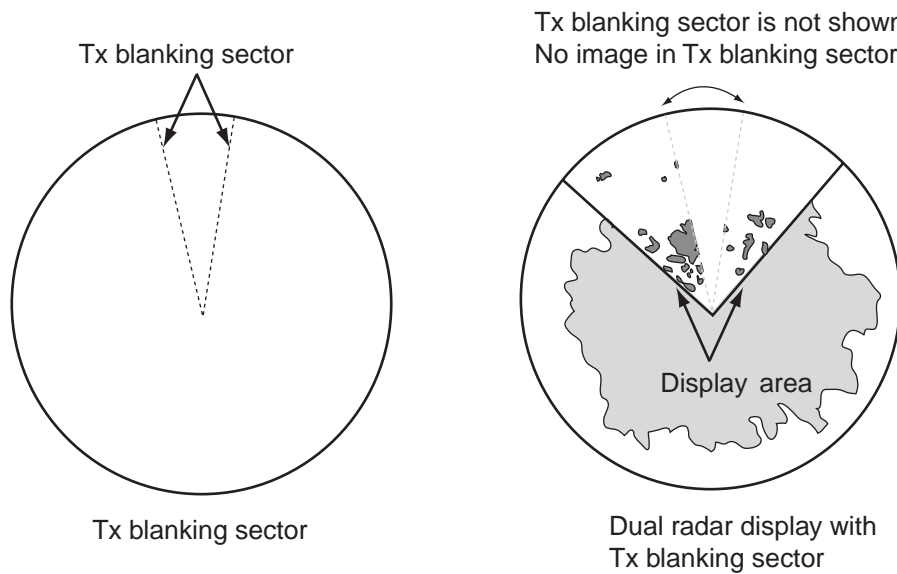
The following should be done in order to enable the dual radar display:

- Set antenna position correctly on both the main radar and the external radar.
- Select external radar to use, from the DUAL RADAR menu. (See paragraph 3.8.3.)

#### 3.8.1 Enabling/Disabling the Dual Radar Display

Enable or disable the dual radar display as shown in this section.

**Note 1:** The Tx blanking sector boundary lines are not shown when the dual radar display is active. Further, neither the internal or external image is shown in the Tx blanking sector.



### 3. SETTING AND ADJUSTMENT

**Note 2:** In the dual radar display, a guard zone set on the main radar is also accommodated on the external radar. When the position of the antennas for the main and external radars is different and the No. 2 guard zone is set on a close-in range, the on-screen guard zone may be shifted slightly from both the main radar antenna reference and external radar antenna reference. Accordingly, on the dual radar display, the actual guard zone area may be shifted slightly. For example, the guard alarm sounds against a target which has almost entered the guard zone. The further the range the smaller the shift; however, there is little shift with the No.1 guard zone (3-6 mile range, fixed). Further, do not set a guard zone such that it straddles a boundary line of the dual radar sector.

A guard zone cannot be set while the dual radar display is active. Set a zone before activating the dual radar display.

1. Open the INITIALIZE menu. See page 3-5.
2. Press the [3] key to show the SCANNER menu.
3. Select 9 [DUAL RADAR] and push the left button.

[DUAL RADAR]
1 BACK
2 DUAL RADAR OFF/ COMBINE
3 COMBINE MODE OWN/EXT
4 COMBINE SECTOR START 000° ANGLE 000°
5 COMBINE RANGE START 00.00NM LENGTH 00.00NM
6 EXT RADAR 1/2/3/4

4. Select 2 [DUAL RADAR] and push the left button.
5. Select OFF or COMBINE as appropriate and push the left button. For COMBINE, the ANTENNA box at the top left-hand side becomes gray.  
OFF: Turn off the dual radar display.  
COMBINE: Display a part of the external radar image in the window on the main radar.

Push the right button four times to close the menu.

**Note 1:** The dual radar function becomes inoperative when the external radar is turned off, set to stand-by, or set as sub display. When this happens, the buzzer sounds and the message "EXT RADAR STBY" (power off, stand-by only) appears.

**Note 2:** The dual radar display is inoperative on the stern-up and shuttle ferry modes.

**Note 3:** Some functions of the external radar image, listed below, may be adjusted from the main radar.

1) Left-click the radar selection indication "CTRL OWN" at the top-left side of the screen to switch control to the external radar. The indication then shows "CTRL EXT". Each click of the indication switches control between the main and external radar alternately.

2) The external image may be adjusted from the main radar. The following functions may be adjusted:

- Transmit/stand-by switching
- PICTURE box setting
- GAIN
- A/C SEA
- A/C RAIN
- Tuning
- ECHO menu setting (2nd trace echo rejector, performance monitor)
- Range scale
- TT functions.
- CPA/TCPA box settings

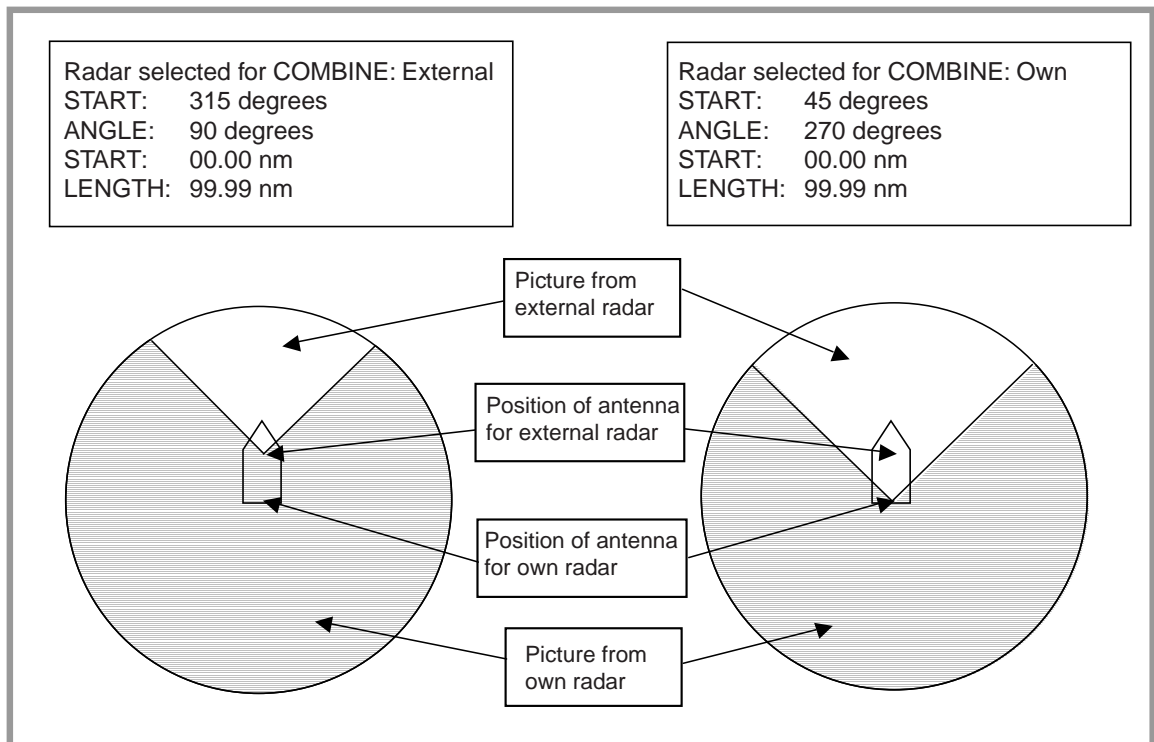
### 3.8.2 Specifying Sector Width and Length

When 2 DUAL RADAR in the DUAL RADAR menu is set for "COMBINE", specify the width and length of the sector from the external radar to display on own radar.

1. Open the INITIALIZE menu.
2. Press the [3] key to show the SCANNER menu.
3. Select 9 [DUAL RADAR] and push the left button.
4. Select 3 COMBINE MODE and push the left button.
5. Select OWN or EXT and push the left button.

**OWN:** Set own radar's antenna as reference point and set display area of own radar. The area outside that set here is where the image from the external radar will be displayed.

**EXT:** Set external radar's antenna as reference point and set display area of external radar. The area outside that set here is where the image from own radar will be displayed.



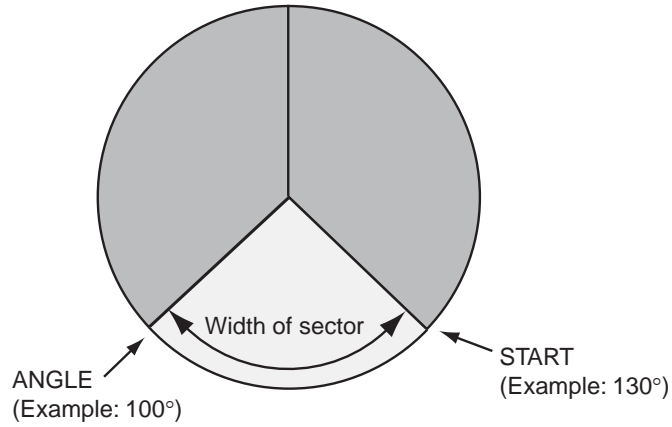
6. Select 4 COMBINE SECTOR and push the left button.

7. Use the scrollwheel to set START and ANGLE, referring to the description and example below. Spin the scrollwheel to set and push it to confirm.

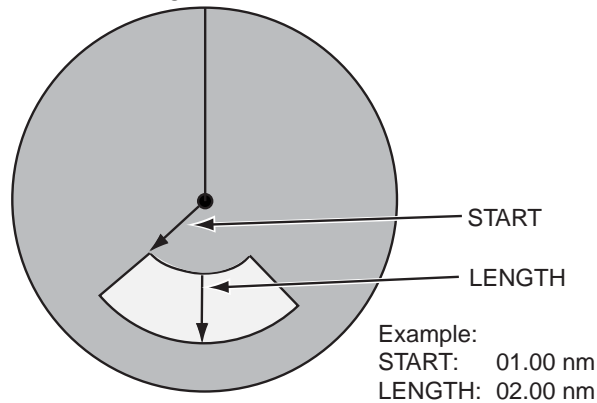
A solid green line marks the dual radar display area.

- START: Start point of the sector (in degrees, 000-359)
- ANGLE: Width of the sector (in degrees, 000-359)

In the example below, START is 130° and ANGLE is 100°.



8. Select 5 COMBINE RANGE and push the left button.
9. Use the scrollwheel to set START and LENGTH, referring to the example below. Spin the scrollwheel to set and push it to confirm.
  - START: Set range start point.
  - LENGTH: Set length of sector.



Push the right button four times to close the menu.

### 3. SETTING AND ADJUSTMENT

#### 3.8.3 Choosing External Radar (image source)

Select the external radar to use in the dual radar display.

1. Open the INITIALIZE menu.
2. Press the [3] key to show the SCANNER menu.
3. Select 9 [DUAL RADAR] and push the left button.

[DUAL RADAR]

1 BACK

2 DUAL RADAR  
OFF/ COMBINE

3 COMBINE MODE  
OWN/EXT

4 COMBINE SECTOR  
START 000°  
ANGLE 000°

5 COMBINE RANGE  
START 00.00NM  
LENGTH 00.00NM

6 EXT RADAR  
1/2/3/4

4. Select 6 EXT RADAR and push the left button.
5. Select desired radar no. and push the left button.  
Only the numbers of connected radars are valid. Radar no. is set on the Installation Setting menu.
6. Press the [MENU] key to close the menu.

# 4. INSTALLING OPTIONAL EQUIPMENT

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## 4.1 Gyro Converter GC-10

The Gyro Converter GC-10, incorporated inside the processor unit, converts analog gyrocompass reading into digital coded bearing data for display on the radar screen.

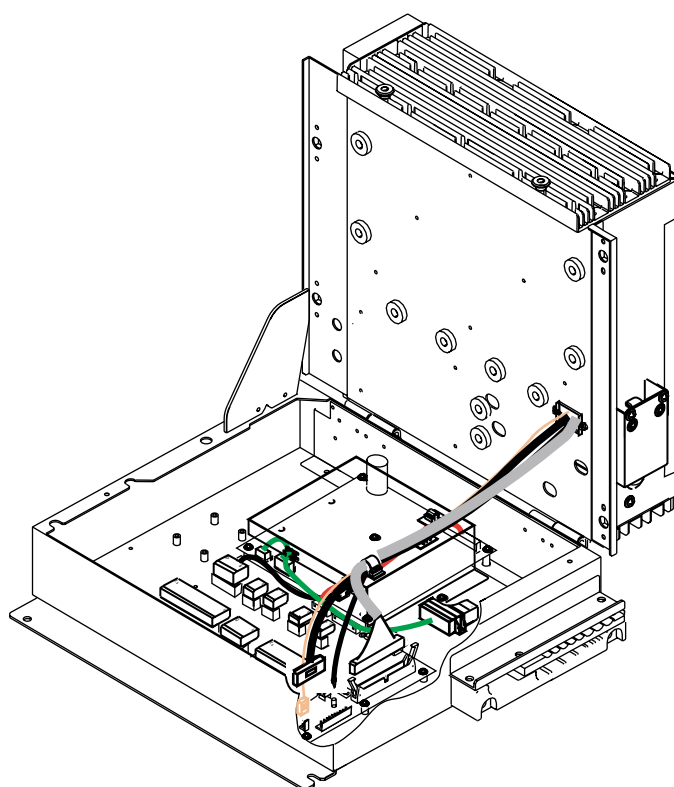
This section explains how to install the GC-10 (mainly consisting of the GYRO CONVERTER board) and set it up according to gyrocompass connected.

### Installing the GYRO CONVERTER board

Necessary Parts: GC-10-2 (Code number 000-080-440)

See packing list for details at the back of this manual.

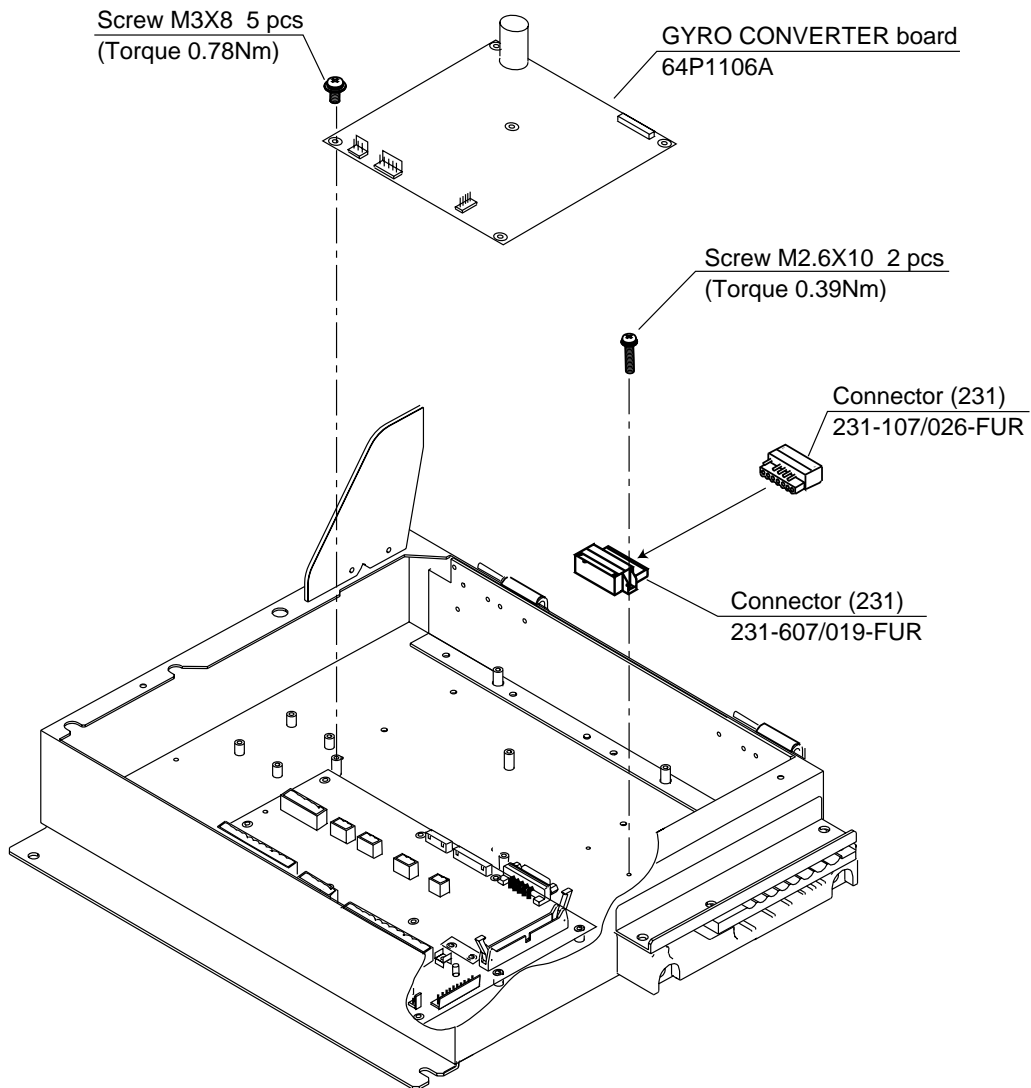
1. Open the processor unit.



*Processor unit (Opened)*

#### 4. INSTALLING OPTIONAL EQUIPMENT

2. Fasten the GYRO CONVERTER board in the processor unit with five washer head screws and male connector 231-607/019-FUR (called J602) with two screws.

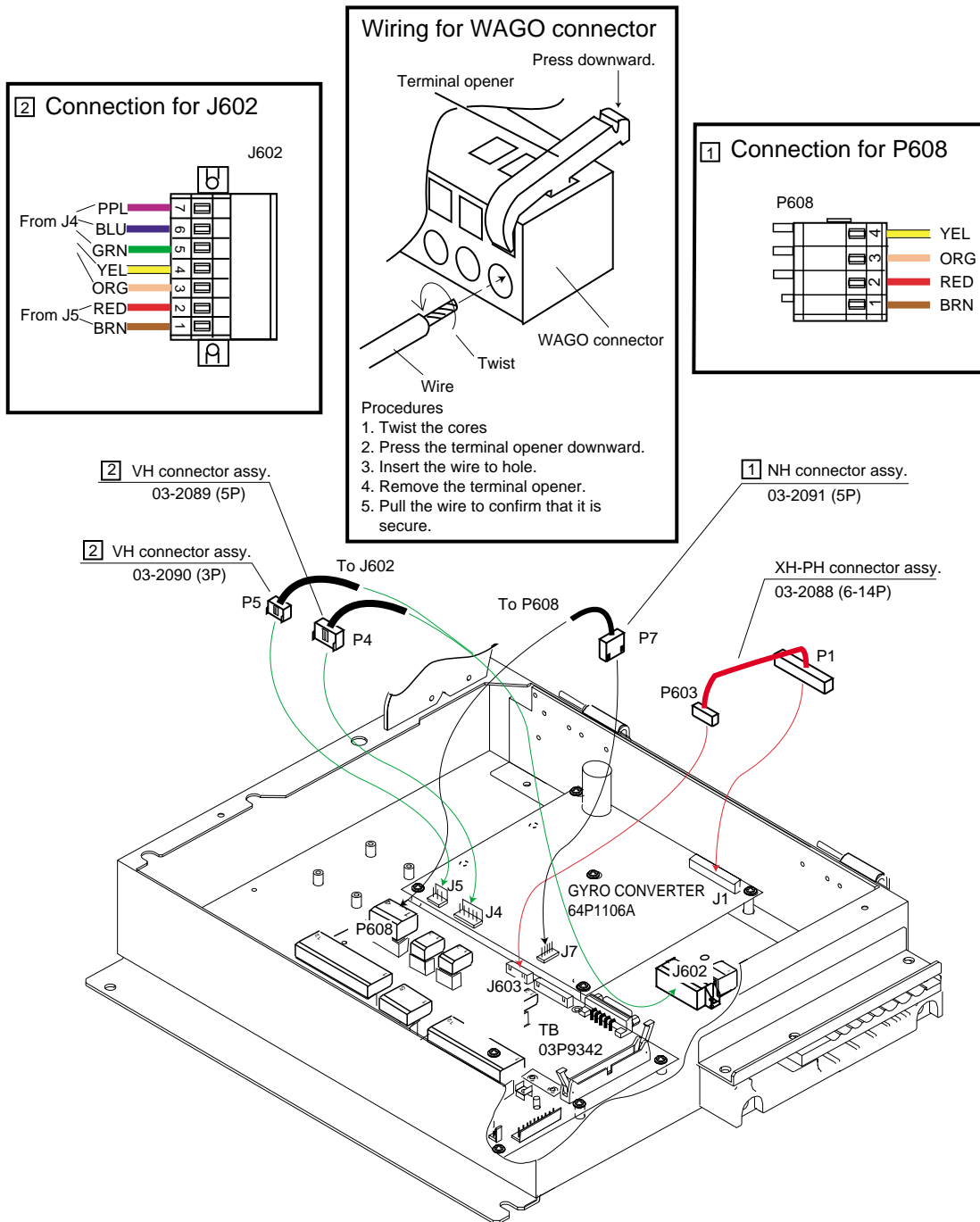


*Attaching GYRO CONVERTER board in the processor unit*

3. Connect the GYRO CONVERTER board and the 03P9342 board with connector assemblies 03-2088 and 03-2091.



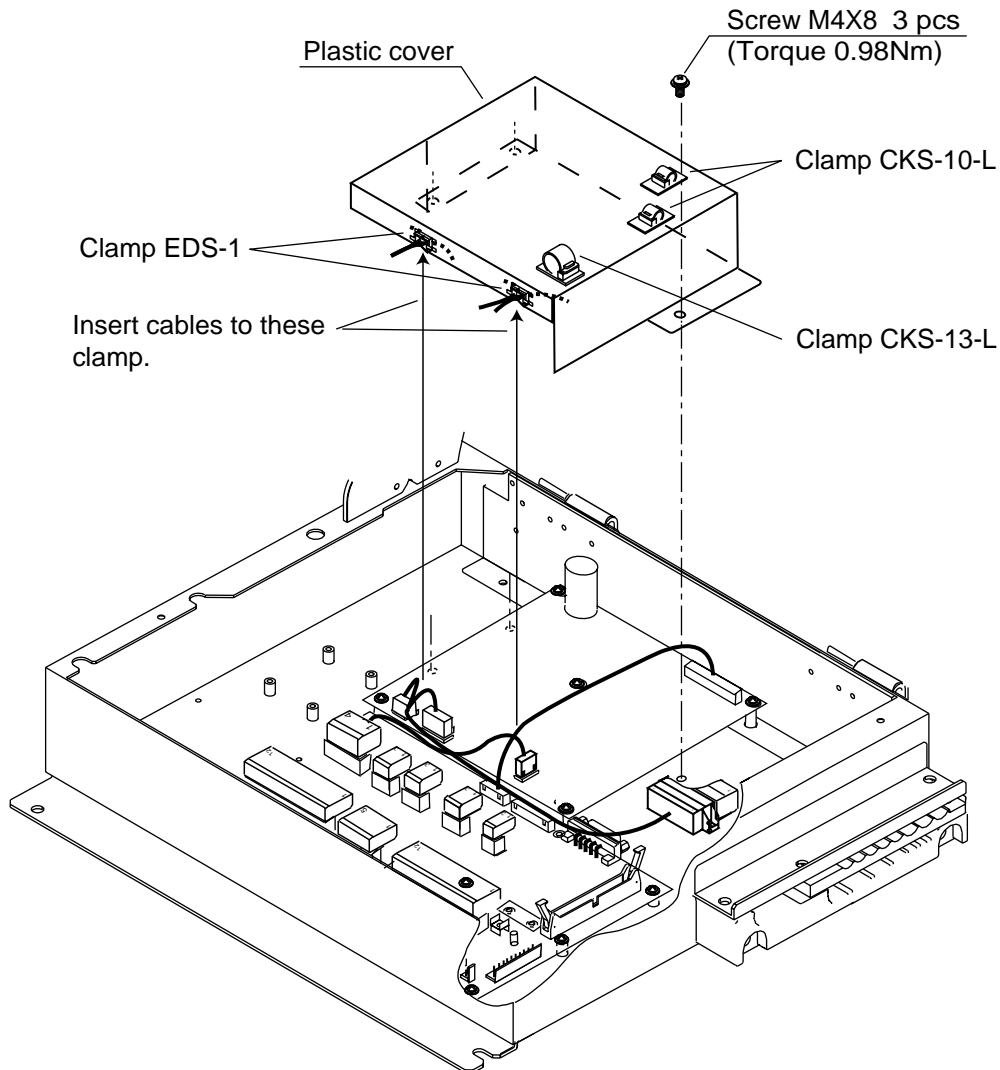
4. Connect the GYRO CONVERTER board and J602 with two connector assemblies 03-2089 and 03-2090.



Connecting connector assemblies

#### 4. INSTALLING OPTIONAL EQUIPMENT

5. Confirm gyrocompass specifications and set up the DIP switches and jumper wires on the GYRO CONVERTER board according to gyrocompass connected:
  - Setting jumper wires and DIP switches by gyrocompass specifications: page 4-5
  - Setting jumper wires and DIP switches by make and model of gyrocompass: page 4-7
  - Location of jumper wires and DIP switches: page 4-8
6. Pass gyrocompass cable through the cable clamp and connect it to connector J602 as shown in the figure on page 4-3.
7. Attach the clamps on the plastic cover and then attach the cover to the chassis as shown in the figure below. Insert cables to the clamp ED-1, respectively.



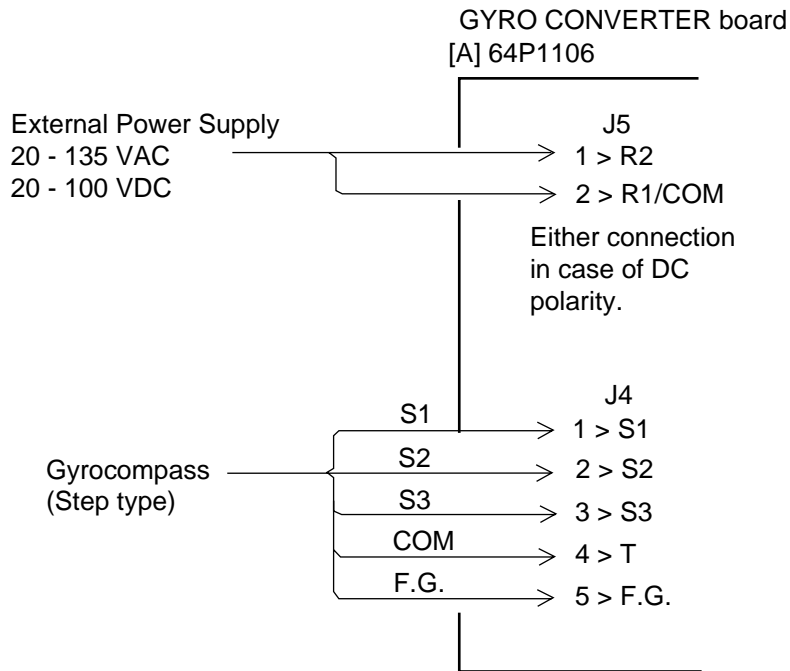
*Attaching plastic cover for GYRO CONVERTER board*

8. Close the processor unit.

## Connection of external power supply

An external power supply is necessary when the repeater signal is step-by-step type and the step voltage is below 20 V or output voltage is less than 5 W.

1. Cut jumper wire JP1 on the GYRO CONVERTER board when an external power supply is used.
2. Connect gyro cable and power cable as shown below.



*Connection of external power supply to GYRO CONVERTER board*

## DIP switch, jumper wire settings

### Default setting

The gyro converter GC-10 is set at the factory for connection with the gyrocompass specifications below.

- AC synchronous signal: 50/60 Hz
- Rotor voltage: 60 V to 135 V AC
- Stator voltage: 60 V to 135 V AC
- Gear ratio: 360x
- Supply voltage: 30 V to 135 V AC

If the specifications of the gyrocompass differ from those mentioned above, change jumper wire and DIP switch settings on the GYRO CONVERTER board. Settings may be changed according to gyrocompass specifications (see page 4-6) or make and model of gyrocompass (see page 4-7). For the location of DIP switches and jumper wires, see page 4-8.

Note: If you change the setting with power supplied, set #8 of SW2 from OFF to ON, then OFF again.

#### 4. INSTALLING OPTIONAL EQUIPMENT

### Setting method 1: DIP switch settings and gyrocompass specifications

#### 1) Gyrocompass type

Gyrocompass type	SW 1-4	SW 1-5	SW 1-6	JP1
AC synchronous	OFF	OFF	OFF	#1, #2, #3
DC synchronous	OFF	OFF	OFF	#2, #3, #4
DC step	ON	OFF	OFF	#4, #5, #6
Full-wave pulsating current	OFF	ON	OFF	#4, #5, #6
Half-wave pulsating current	ON	ON	OFF	#4, #5, #6

#### 2) Frequency

Frequency	SW 1-7	SW 1-8	Remarks
50/60 Hz	OFF	OFF	AC synchronous pulsating current
400 Hz	ON	OFF	AC synchronous pulsating current
500 Hz	OFF	ON	AC synchronous pulsating current
DC	ON	ON	DC synchronous DC step

#### 3) Rotor Voltage (between R1 & R2)

Rotor Voltage	SW 2-1	JP3
20 to 45 VAC	ON	#2
30 to 70 VAC	OFF	#2
40 to 90 VAC	ON	#1
60 to 135 VAC	OFF	#1

#### 4) Stator Voltage (between S1 & S2)

Stator Voltage	SW 2-2	SW 2-3	JP2
20 to 45 VAC, or 20 to 60 VDC	ON	OFF	#2
30 to 70 VAC, or 40 to 100 VDC	OFF	OFF	#2
40 to 90 VAC	ON	OFF	#1
60 to 135 VAC	OFF	OFF	#1

#### 5) Ratio

Ratio	SW 1-1	SW 1-2	SW 1-3
360X	OFF	OFF	OFF
180X	ON	OFF	OFF
90X	OFF	ON	OFF
36X	ON	ON	OFF

#### 6) Supply Voltage

Stator Voltage	JP4	JP5
20 to 45 VAC, or 20 to 60 VDC	#2	#2
30 to 70 VAC, or 40 to 100 VDC	#1	#1

#### 7) AD-10 format data

##### Tx interval

Select data transmitting interval for ports 1 to 6 with jumper wires JP6 and JP7.

**Note:** The Tx interval is available in 25 msec or 200 msec.  
Use 25 msec is for radar:

#### 8) NMEA-0183

##### Tx interval and Output sentence

Tx interval	SW 2-5	SW 2-6	Output sentence
1 s	OFF	OFF	HDT+VHW
200 ms	ON	OFF	HDT
100 ms	OFF	ON	HDT
25 ms	ON	ON	HDT

#### 9) NMEA-0183 Version no.

Version no.	SW3-1
1.5	OFF
2.0	ON

#### 10) NMEA-0183 Baud rate

Baud rate	SW3-2
4860bps	OFF
38400bps	ON

#### 11) NMEA-0183 Talker

Talker	SW3-3
AG	OFF
HE	ON

Use OFF for radar.

#### 12) Stator signal breaking detection

Detection	SW2-7
Execute	OFF
No execute	ON

SW2-4: factory use only  
SW3-4: not used

**Setting method 2: by make and model of gyrocompass**

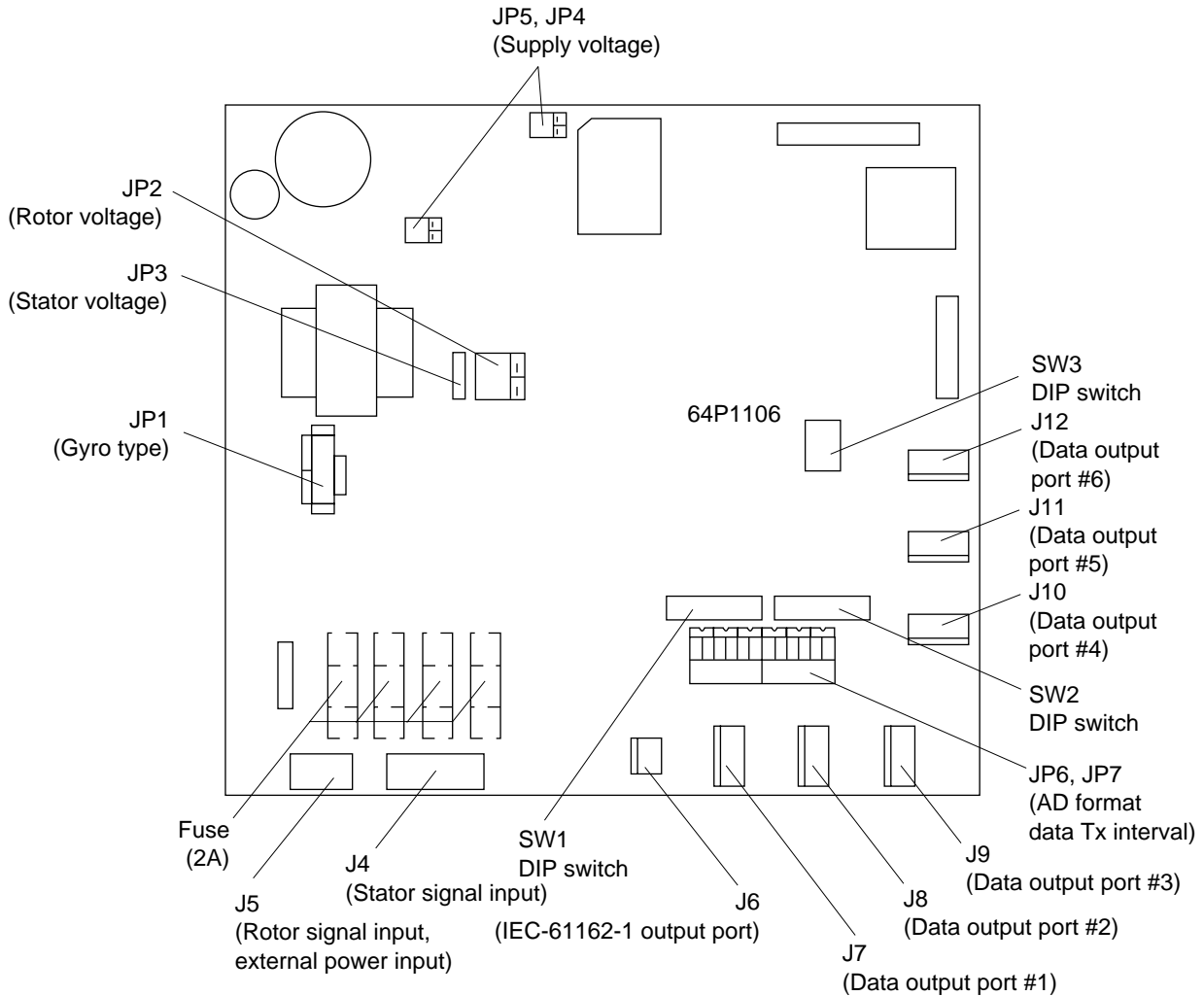
Maker	Models	Specification	SW 1-1	SW 1-2	SW 1-3	SW 1-4	SW 1-5	SW 1-6	SW 1-7	SW 1-8	SW 2-1	SW 2-2	SW 2-3	JP1	JP2	JP3	JP4	JP5	
Anschutz	Standard 2,3	AC synchronous 50/60Hz Rotor voltage: 50/60V Stator voltage: 22V 360x	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	#1, #2,#3	#2	#2	#1	#	
	Standard 4,6	AC synchronous 50/60Hz Rotor voltage: 50/60V Stator voltage: 90V 360x	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#2	#1	#1	#	
	Standard 20	DC step 35V 180x COM(-), 3-wire(+)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	#4, #5,#6	#2	-	#2	#	
Yokogawa Navtec (Plath type)	C-1/1 A/2/3 A-55, B-55	AC synchronous 50/60Hz Rotor voltage: 50/60V Stator voltage: 22V 360x	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	#1, #2,#3	#2	#2	#1	#	
	CMZ-700	DC step 24V 180x COM(+), 3-wire(-)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	Remo- ve	#2	-	*	*	
	CMZ-250X/ 300X/500	DC synchronous 360x	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	-	ON	OFF	Remo- ve	#2	-	*	*	
		DC step 35V 180x COM(+),3-wire(-)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	#4, #5,#6	#2	-	#2	#2	
	CMZ-100/200/ 300 C-1Jr,D-1Z/1/3 IPS-2/3	AC synchronous 50/60Hz Rotor voltage: 100V Stator voltage: 90V 360x	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#1	#1	#1	#1
CMZ-50 See note below.	step 35V 180x COM(+),3-wire(-)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	Remo- ve	#2	-	*	*		
Plath	NAVIGAT IIIII	AC synchronous 50/60Hz Rotor voltage: 50/60V Stator voltage: 68V 360x	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#2	#2	#1	#1	
Tokimec (Sperry type)	ES-1/2/11 GLT-101/102/ 103/106K/107	AC synchronous 50/60Hz Rotor voltage: 100/110V Stator voltage: 90V 36x	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#1	#1	#1	#1	
	ES-11A/110 TG-200 PR222R/2000 PR237L/H GM 21	AC synchronous 50/60Hz Rotor voltage: 100/110V Stator voltage: 22V 90x	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#1	#1	#1	#1
	MK-14 MOD-1/2/T NK-EN,NK-EI	DC step 70V 180x COM(-), 3-wire(+)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	OFF	OFF	#4, #5,#6	#2	-	#1	#1	
	SR-130/140	DC step 70V 180x 5-wire, open collector	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	-	OFF	OFF	#4, #5,#6	#2	-	#1	#1	
	TG-100/5000 PR-357/130/ 140, ES-17 GLT-201/202 /203	DC step 70V 180x COM(+), 3-wire(-)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	OFF	OFF	#4, #5,#6	#2	-	#1	#1	
	TG-6000	DC step 24V 180x	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	#4, #5,#6	#2	-	#2	#2	
	GM-11	AC synchronous 50/60Hz Rotor voltage: 100V Stator voltage: 90V 90x	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#1	#1	#1	#1
	SR-120,ES-16 MK-10/20/30	DC step 35V 180x	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	#4, #5,#6	#2	-	#2	#2	
Kawasaki	GX-81	AC synchronous 50/60Hz Rotor voltage: 100/110V Stator voltage: 90V 90x	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#1	#1	#1	#1	
Armabrown	MK-10,MKL-1 SERIES1351, MOD-4	DC step 50V 180x COM(+), 3-wire(-)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	OFF	OFF	#4, #5,#6	#2	-	#1	#1	
Robertson	SKR-80	DC step 35V 180x COM(-), 3-wire(+)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	#4, #5,#6	#2	-	#2	#2	

\*: Set JP4 and JP5 according to the voltage of the external power supply.

**Note:** If CMZ-50 has 35VDC, set JP1 to #4, #5, #6.

## 4. INSTALLING OPTIONAL EQUIPMENT

### Location of DIP switches, jumper wires on the GYRO CONVERTER board

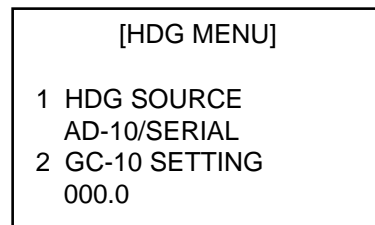


*GYRO CONVERTER board*

### **Setting the heading readout on the radar display**

Confirm that the gyrocompass is giving a reliable readout. Then, set the heading readout on the radar display with the gyrocompass readout as follows:

1. Roll the trackball to place the arrow in the HDG box at the top right corner of the screen.
2. Push the right button on the trackball module to open the HDG menu.



*HDG menu*

3. Press the [1] key to choose the HDG SOURCE and choose AD-10.
4. Press the [2] key to choose the GC-10 SETTING option.
5. Roll the wheel to set gyrocompass reading.
6. Press the [MENU] key to close the menu.

## 4.2 Memory Card Interface Unit

### Mounting considerations

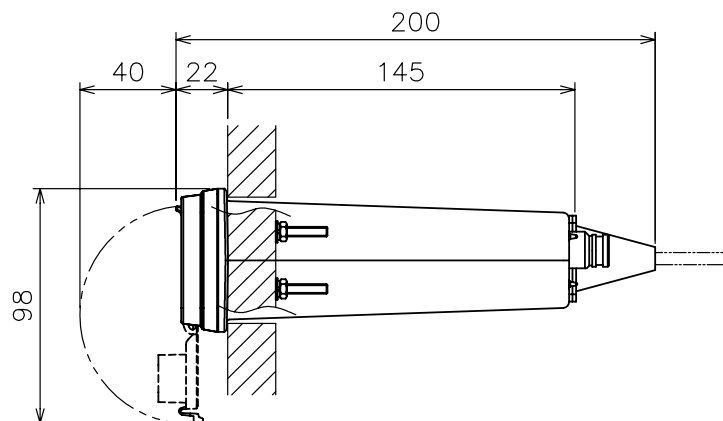
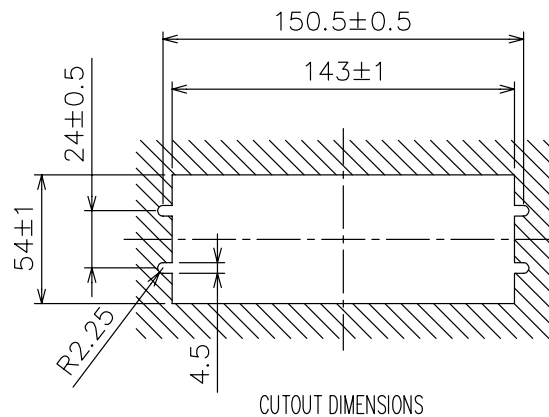
When selecting a mounting location, keep in mind the following points:

- Locate the memory card interface unit away from heat sources because of heat that can build up inside the cabinet.
- Locate the unit away from places subject to water splash and rain.
- Leave sufficient space at the sides and rear of the unit to facilitate maintenance.
- A magnetic compass will be affected if the unit is placed too close to the magnetic compass. Observe the compass safe distances on page ii to prevent deviation of a magnetic compass.

### Flush mounting

This unit can be flush-mounted in a panel with the standard installation materials.

1. Prepare a cutout in the mounting location, referring to the outline drawing at the end of this manual.
2. Screw in the threaded rods to the flange of the front panel of the unit securely by hands.
3. Set the unit to the cutout.
4. Insert the flat washer, spring washer and nut in that order for each rod and fasten the nuts.



Flush mounting

## 4. INSTALLING OPTIONAL EQUIPMENT

### **Desktop mount**

For desktop mount, the optional desktop mount kit FP03-10201 is required. Refer to the end of this manual.

1. Fix the mounting bracket 19-023-3081 on the unit with four screws.
2. Mount the above assembly on a desktop with four tapping screws.

### **Console mount**

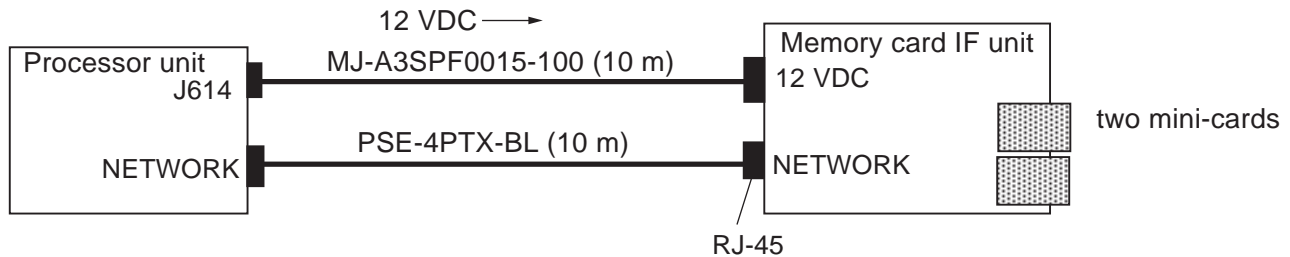
For console mount, the optional console mount kit FP03-10202 is required. Refer to the end of this manual.

1. Fix the mounting bracket 19-023-3091 on the unit with four screws.
2. Mount the above assembly to the console with four sets of nut, spring washer and flat washer.

## **Connection**

### **1) Connection between one processor unit and one memory card IF unit**

Connect as shown in the figure below.



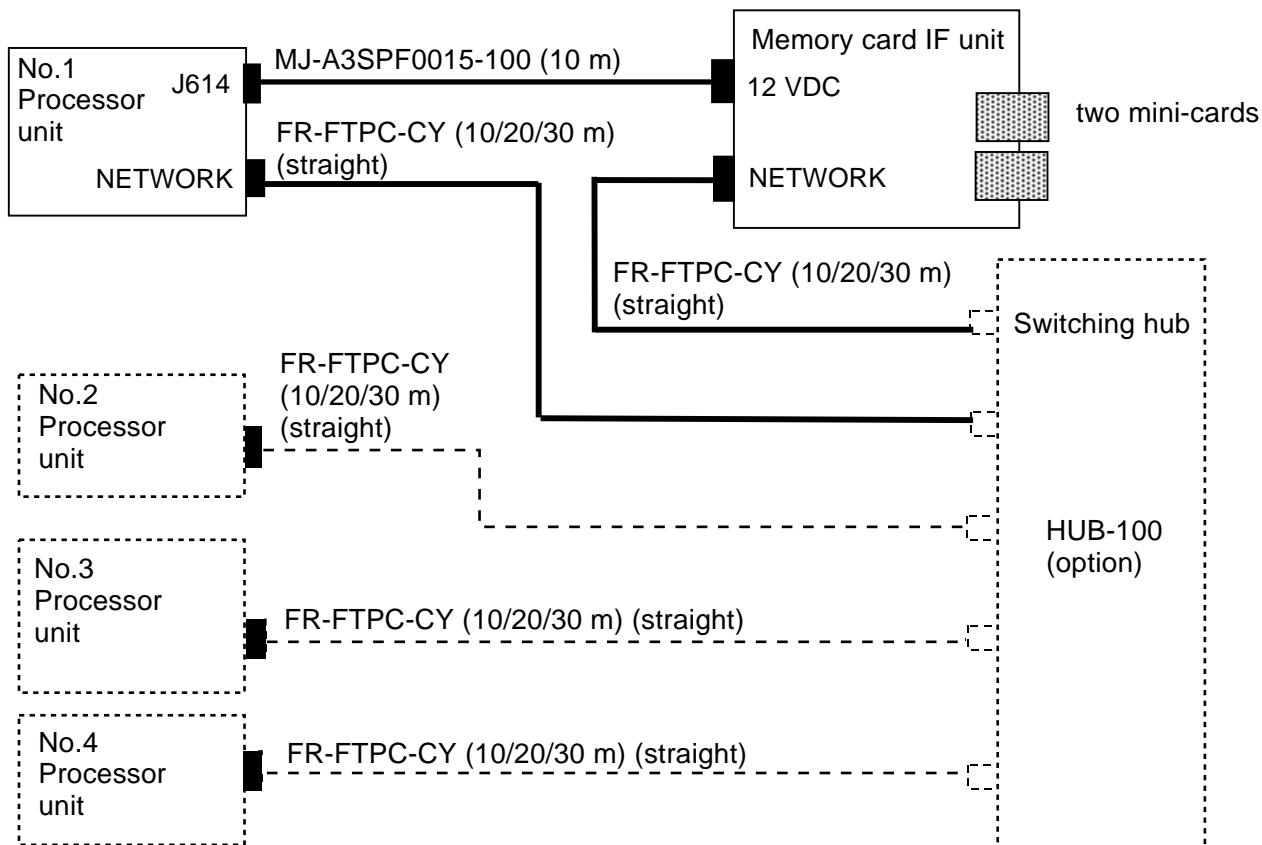
### **2) Connection between one memory card IF unit and multiple processor units**

Prepare optional cable FR-FTPC-CY (10, 20 or 30 m), and HUB-100 (option). Connect as shown in the next page. Set the radar number on the INSTALLATION menu (see page 3-11), and then turn the power off and on.

#### LAN cable

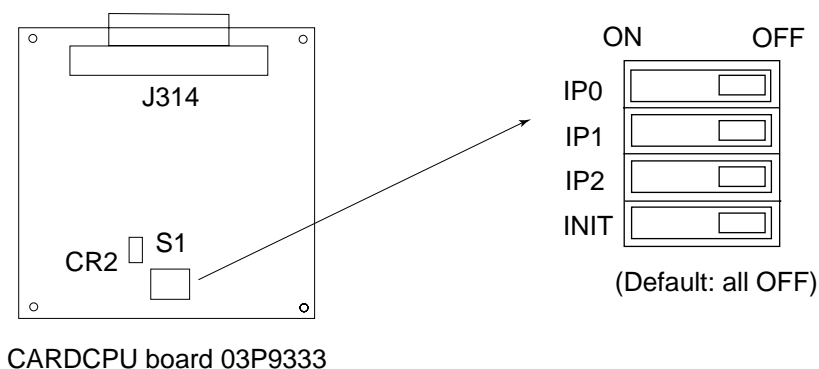
Type	Length	Code number
OP03-28900	000-082-658	Cable FR-FTPC-CY (10 m), Modular connector 2 pcs.
OP03-28910	000-082-689	Cable FR-FTPC-CY (20 m), Modular connector 2 pcs.
OP03-28920	000-082-660	Cable FR-FTPC-CY (30 m), Modular connector 2 pcs.





**Note:** When two memory card interface units are connected via network, change ID code for the second unit.

1. Remove the cover and set IP0 bit of the DIP switch S1 to ON on the CARDCPU board 03P9333.
2. Set INIT bit of S1 to ON and turn on the power of the radar. Wait till CR2 starts blinking. Never turn off the power until CR2 starts blinking.
3. Turn off the power and set INIT bit to OFF.



### 4.3 DVI-RGB Conversion Kit (for VDR connection)

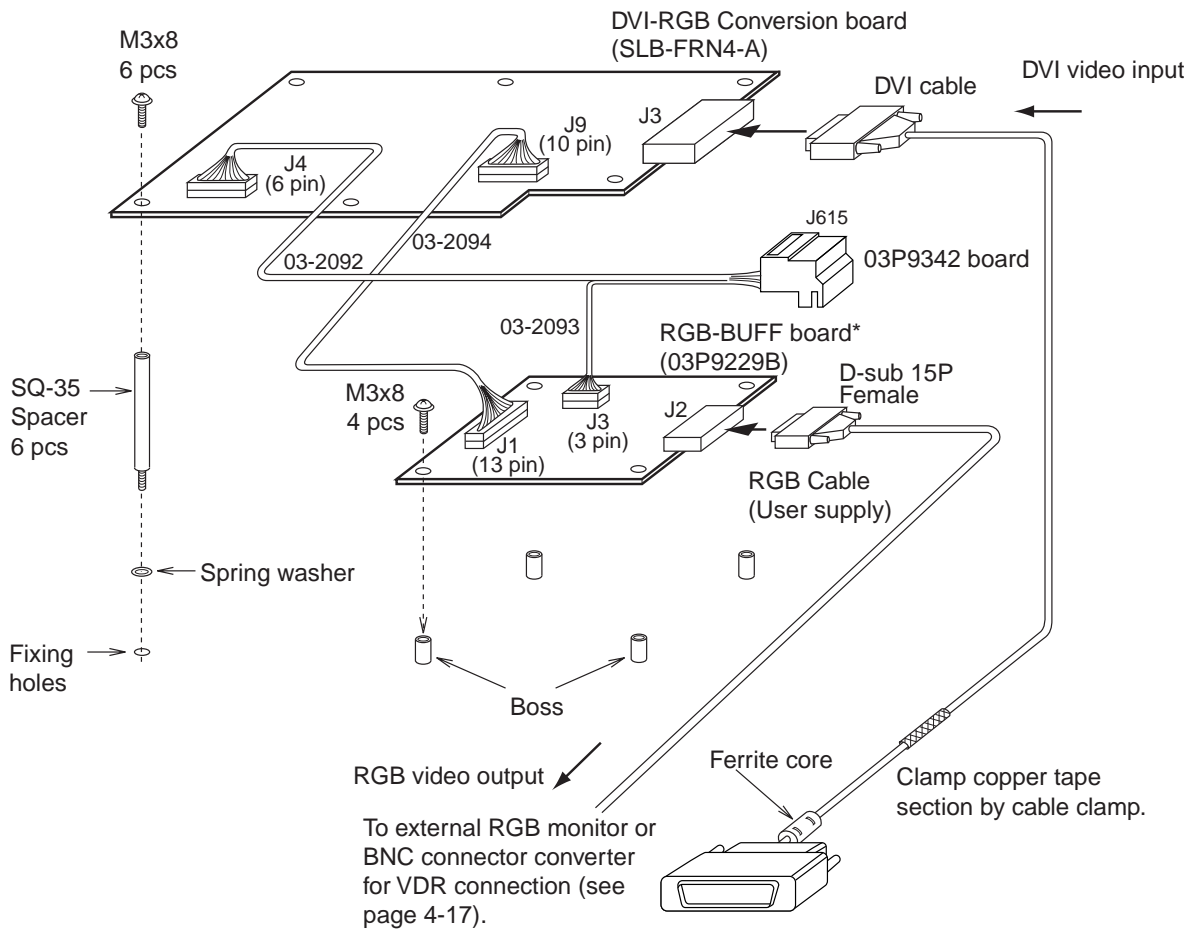
This information provides the procedure necessary for the installation of the DVI-RGB conversion kit. This kit is installed in the processor unit to enable connection of a VDR (Voyage Data Recorder) or RGB monitor to record radar pictures into a VDR. When changing the D-sub 15P of the RGB cable to the BNC connector, use the BNC connector converter described on page 4-15. This RGB output complies with the image test defined in the VDR test standard, IEC 61996.

- Name: DVI-RGB conversion kit
- Type: OP03-180-2
- Code no.: 008-536-070
- Resolution: Outputs RGB with the resolution of DVI input.

Display unit	Resolution	DIP switch setting (S-1#1)
MU-201CR	1024x1280	OFF
MU-231CR	1024x1365	ON

Output signal specification: Video; 0.7Vp-p, 75Ω termination, positive polarity  
 Horizontal sync signal; TTL level, negative polarity  
 Vertical sync signal; TTL level, negative polarity

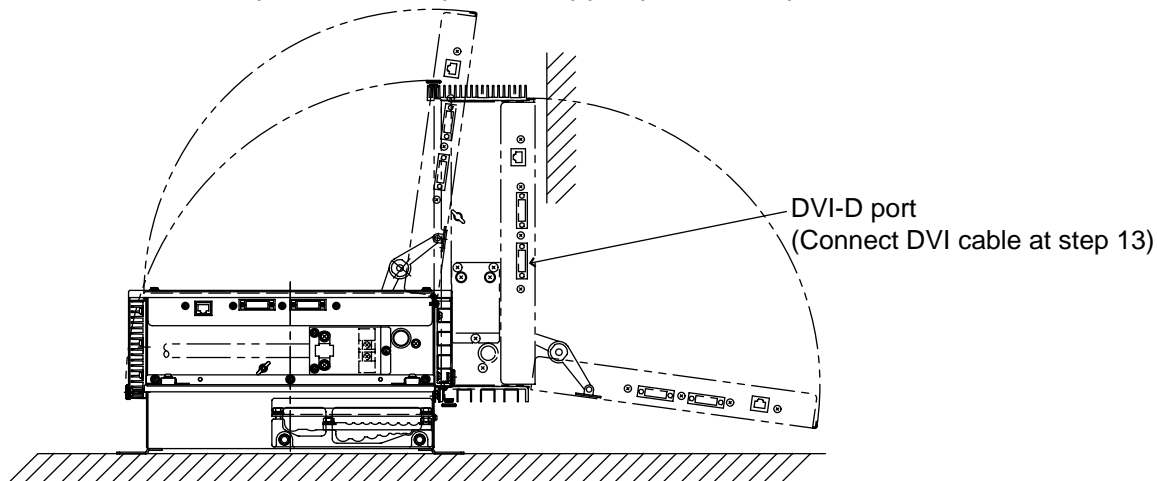
See packing list for contents. Refer to the figure below for modification.



Ferrite core side: Connect to DVI-D port on the upper part of the processor unit.

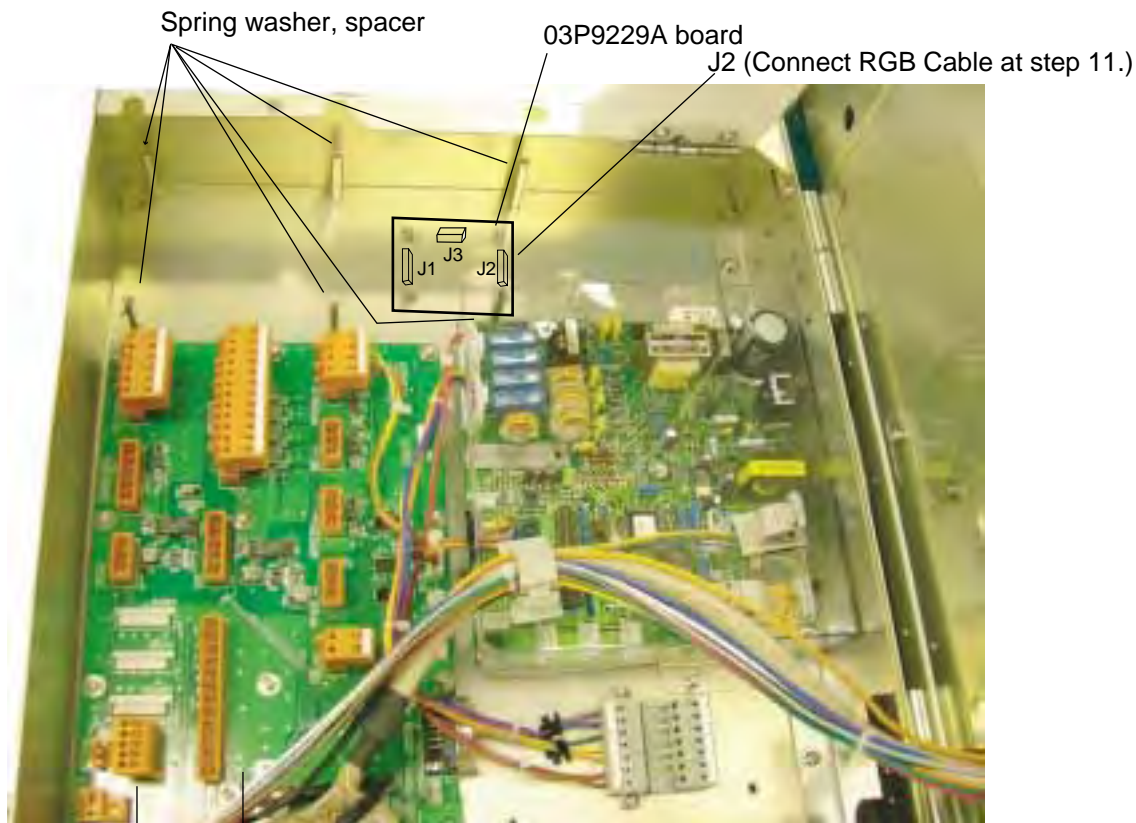
\*Independent of the MAIN board.

1. Remove the top cover and open the upper part of the processor unit.



Processor unit

2. Fix the 03P9229A board (RGB-BUFF) with four screws. (See the figure below.)
3. Attach the connector assemblies to J1 and J3 on the 03P9229A board as follows.
  - J1 : 13-pin connector of the connector assembly 03-2094
  - J3 : 3-pin connector of the connector assembly 03-2093
4. Attach six sets of spring washers and spacers to the positions shown below.

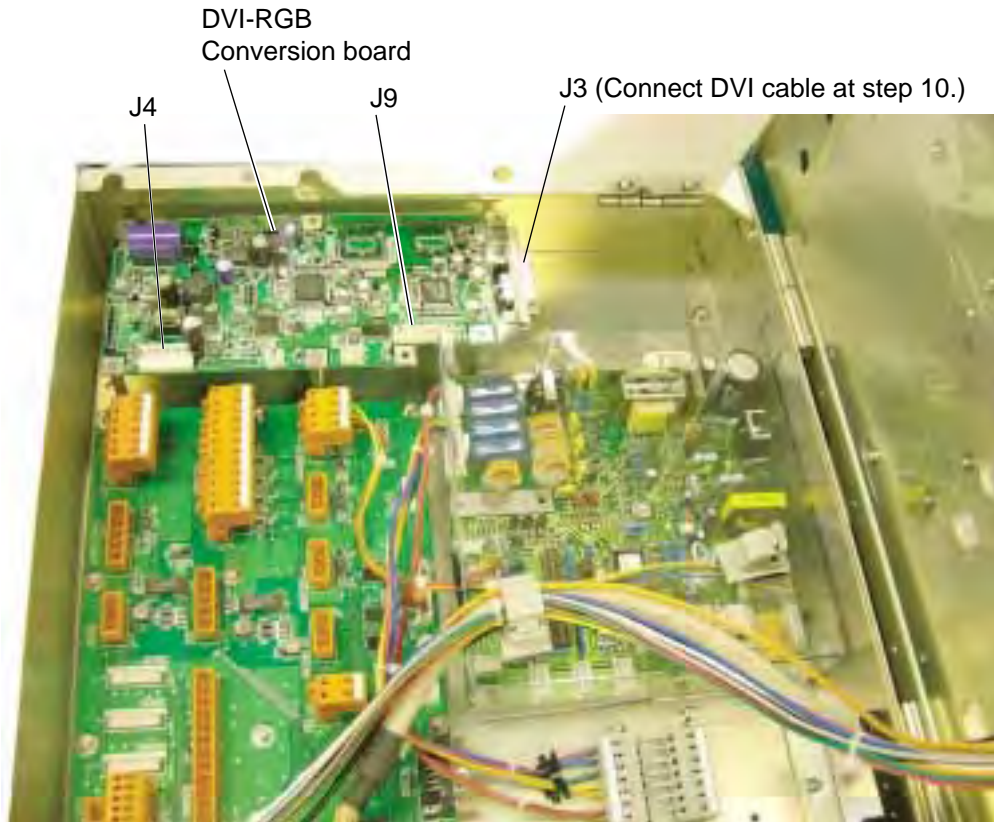


03P9342 board  
J615 (Connect connector assemblies at step 9.)

Processor unit (Lower part)

5. Attach the DVI-RGB conversion board to the location shown in the figure on the next page.

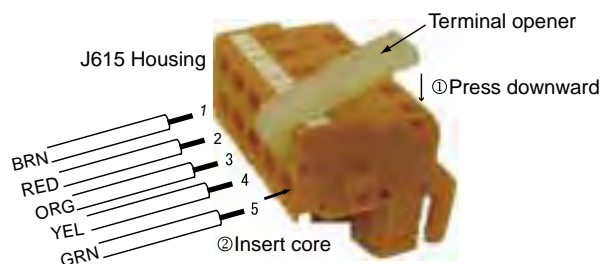
## 4. INSTALLING OPTIONAL EQUIPMENT



### *Fixing the DVI-RGB conversion board*

6. Attach the 10-pin connector from J1 on the 03P9229A board to J9 on the DVI-RGB board.
7. Attach the connector assembly 03-2092 to J4 on the DVI-RGB conversion board.
8. Remove connector housing J615 from the 03P9342 board. Connect the cable from J3 on the 03P9229A board and the cable from J4 on the DVI-RGB conversion board to J615. After connection, attach J615 to the 03P9342 board.

To connect wires to the connector housing, use the terminal opener (supplied as installation materials) as shown below.

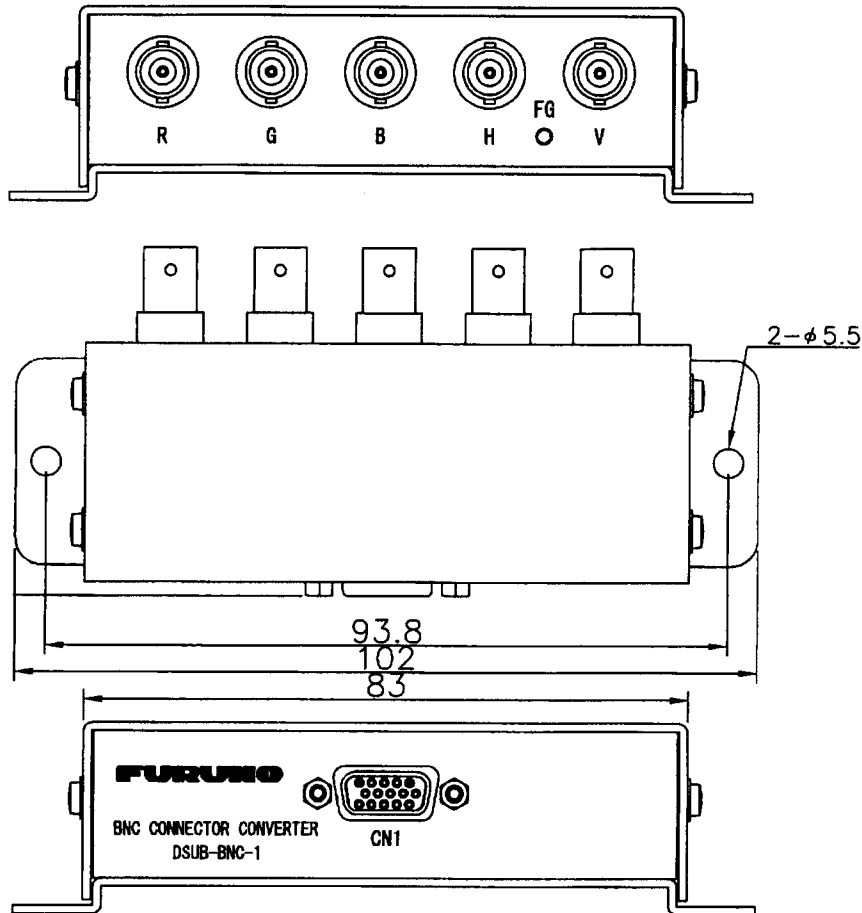
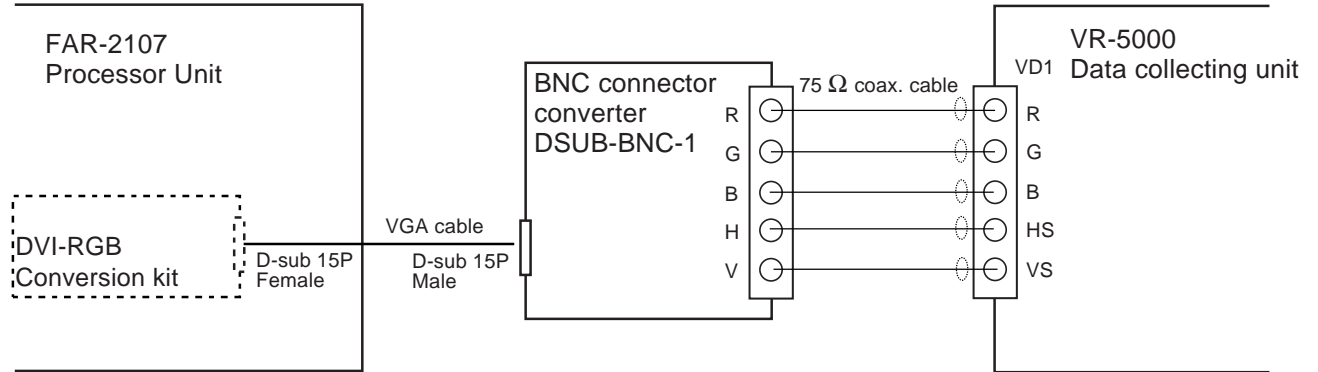


### *Connecting wires to the housing*

9. Connect the DVI cable to J3 on the DVI-RGB conversion board. Connect the end which does not have the ferrite core.
10. Pass an RGB cable (local supply) through the cable clamp and connect it to J2 on the 03P9229A board.
11. Pass the DVI cable through the cable clamp, laying the section with copper tape in the cable clamp.
12. Assemble the processor unit and connect the other end of the DVI cable to DVI-D port.

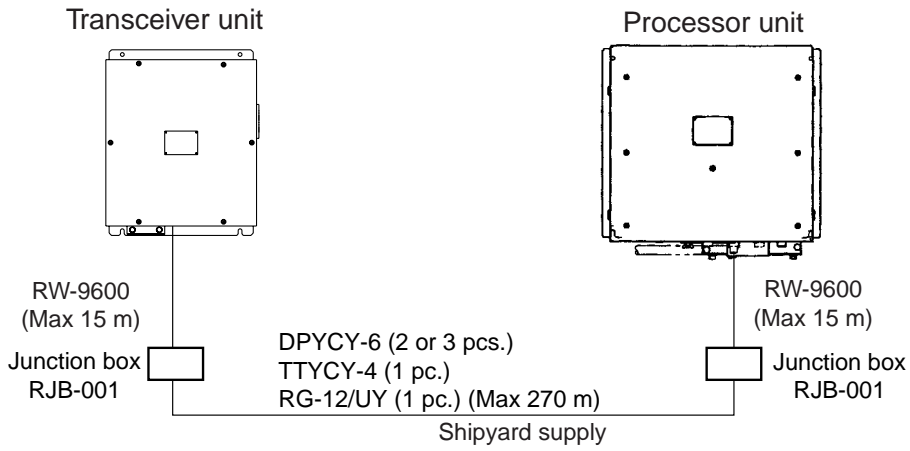
## 4.4 BNC Connector Converter

To connect the VR-5000 (FURUNO Voyage Data Recorder) to this radar, the DVI-RGB conversion kit (mentioned at previous paragraph) and the BNC connector converter are required. Also VGA cable (between the processor unit and the BNC connector converter) and five 75 ohms coaxial cables (between the BNC connector converter and VR-5000) are required.



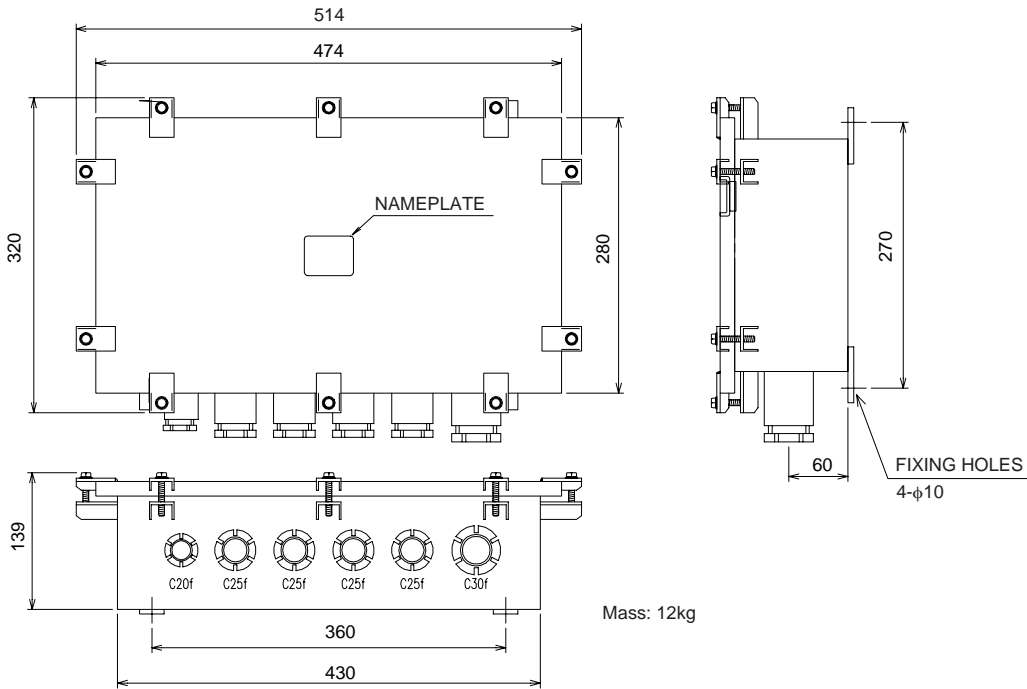
## 4.5 Junction Box RJB-001

If the length of the antenna cable is more than 100 m, the optional junction boxes are required. These boxes should be mounted at the location protected because its waterproofing is IPX3.



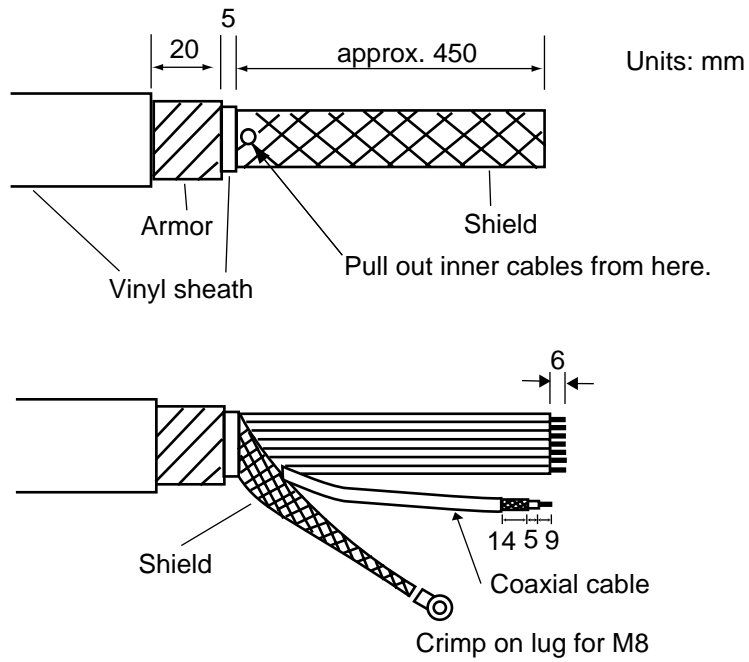
### Mounting

Fasten the junction box to the mounting location with four self-tapping screws (M8, local supply).

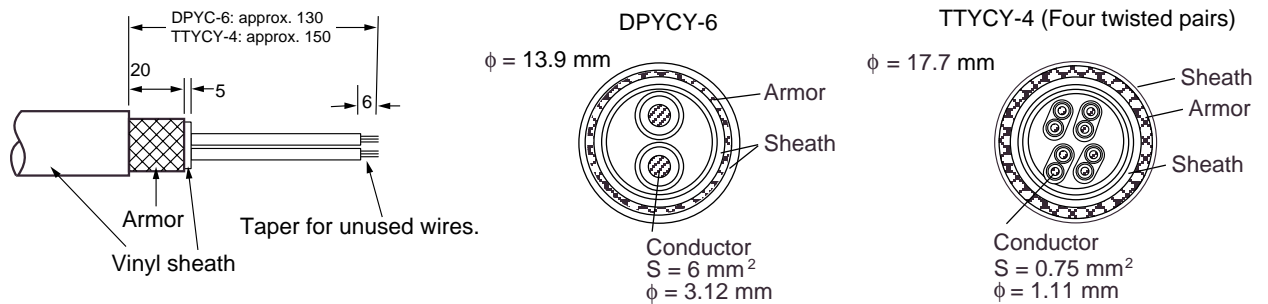


## Cable Fabrication

### RW-9600



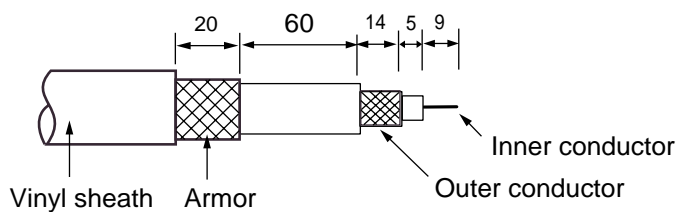
### DPYCY-6 and TTYCY-4



Sectional view of DPYCY-6

Fabrication of DPYCY-6

### RG-12/U

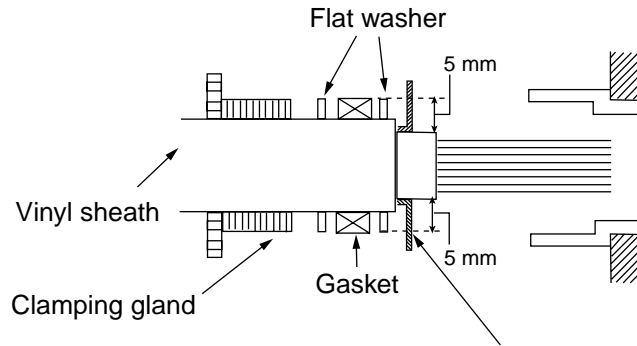


Sectional view of TTYCY-4

#### 4. INSTALLING OPTIONAL EQUIPMENT

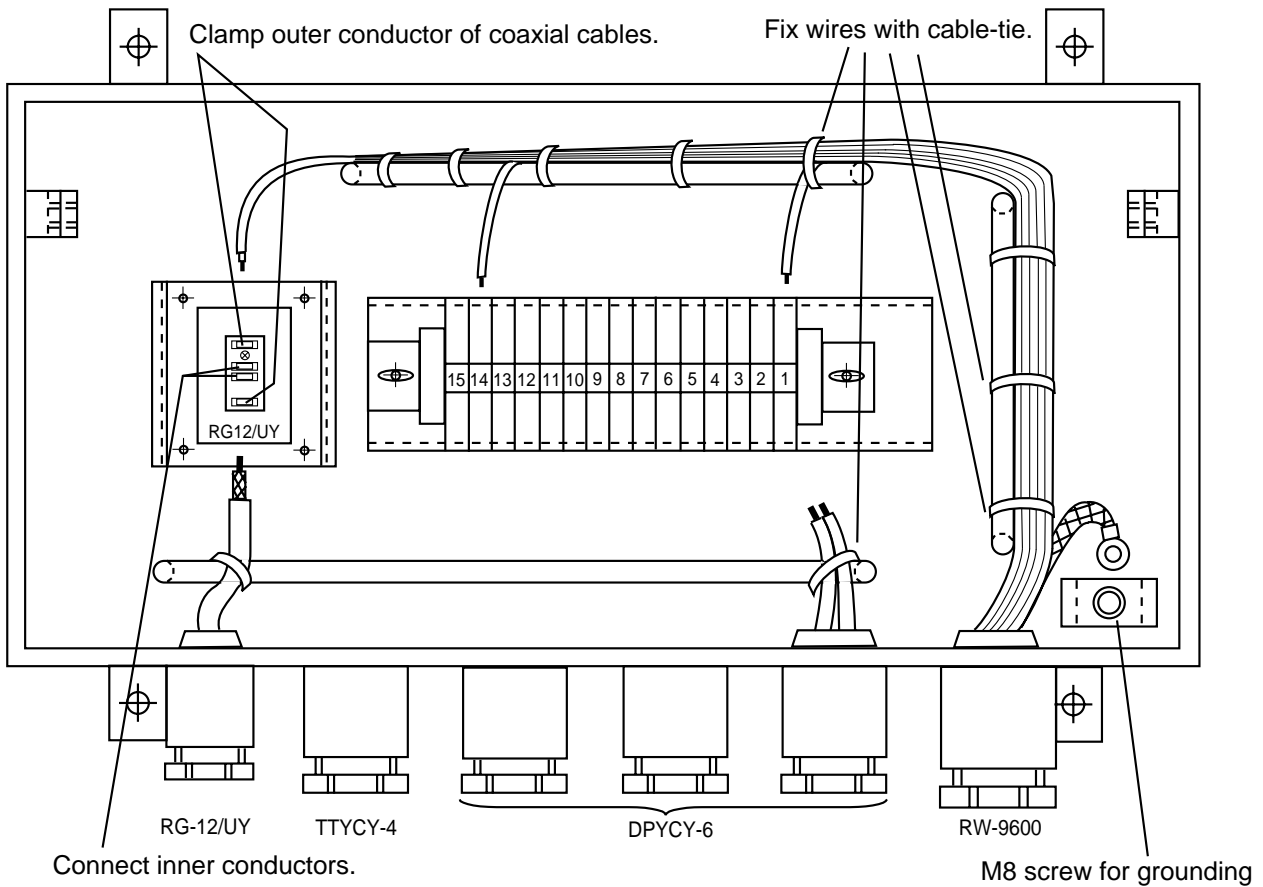
### Connection

Insert each cable to the cable gland as follows.



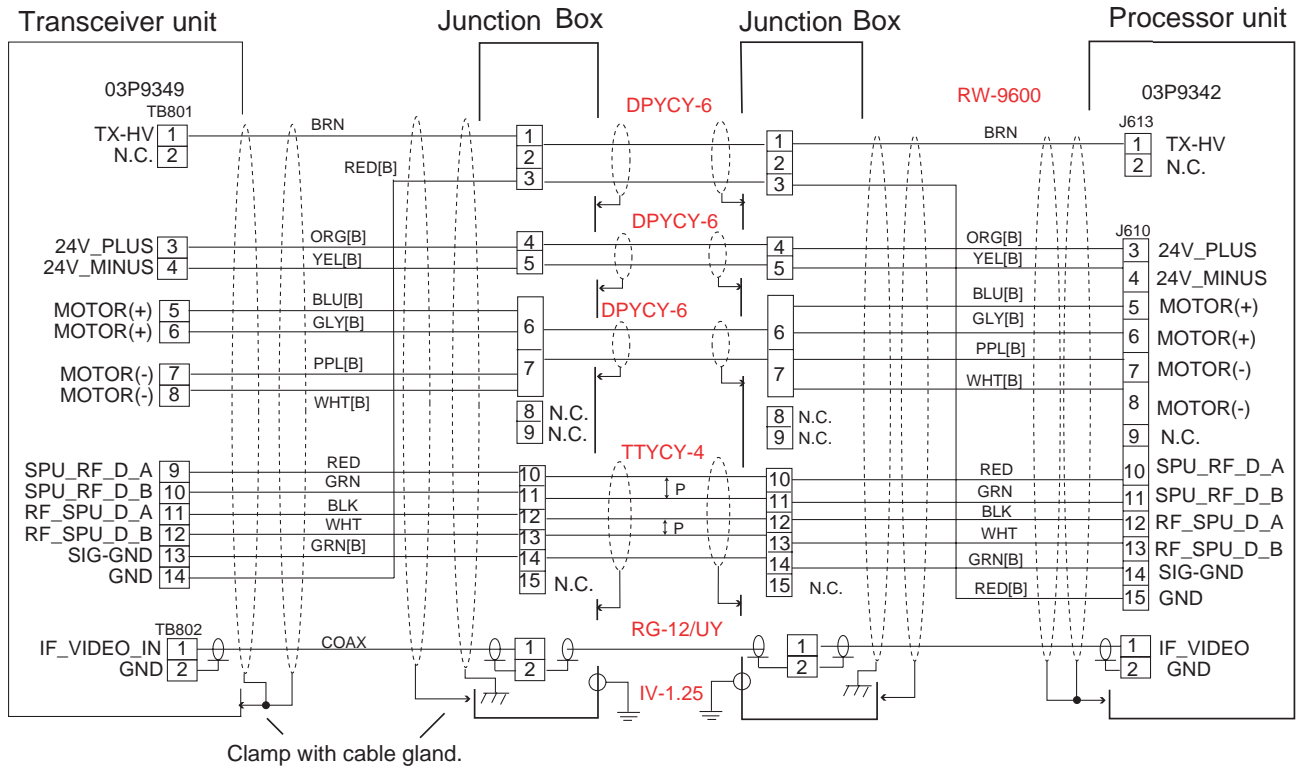
Trim the armor with width of washer (5 mm).

Connect each cable cores to the terminal board, referring to the interconnection diagram on next page.

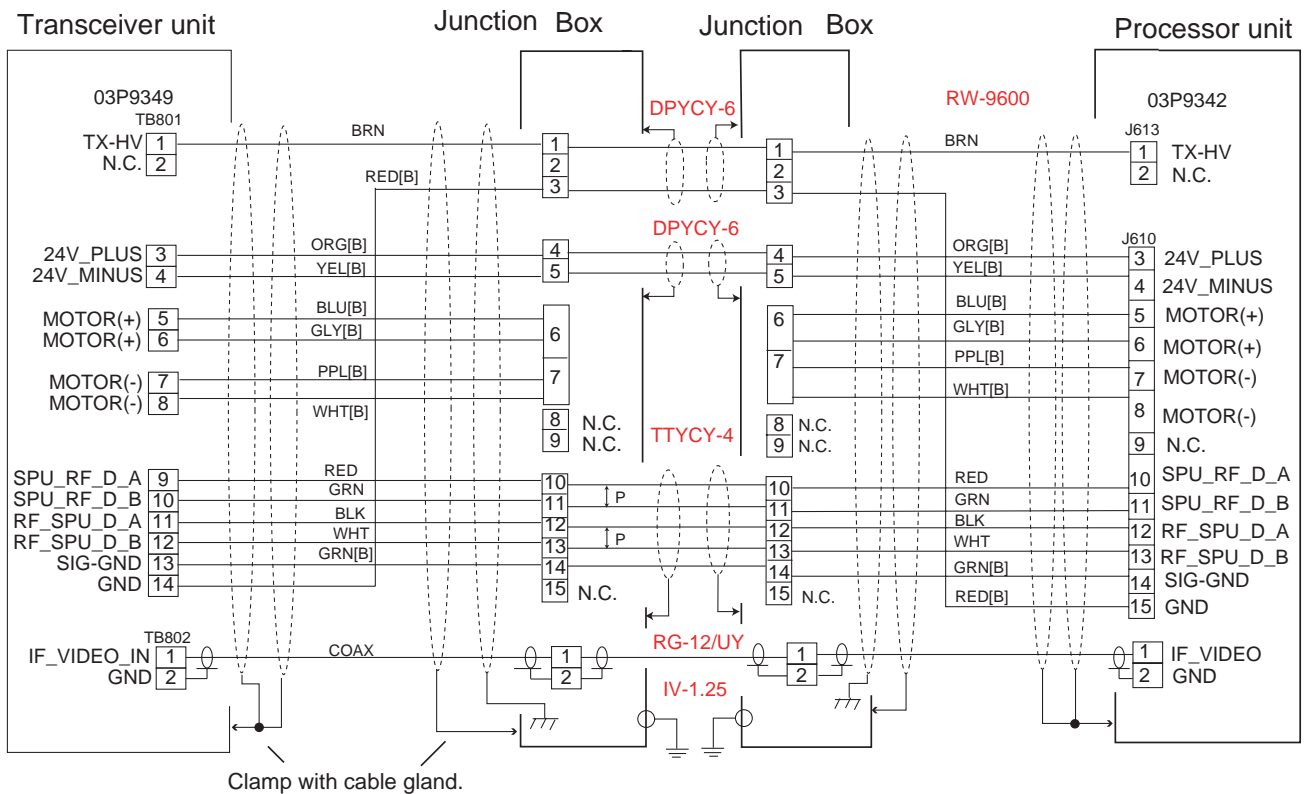




FAR-2827W



FAR-2837SW



Interconnection for FAR-2827W/2837SW

#### 4. INSTALLING OPTIONAL EQUIPMENT

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# 5. INPUT/OUTPUT DATA

Input and output data are shown in the table below.

**Note:** This radar accepts position data fixed by WGS-84 geodetic datum only. Set the datum to WGS-84 on the EPFS (GPS, etc.) connected to this radar. If other type of datum is input, the error message "DATUM" appears and the AIS feature is inoperative. Baud rate for the serial input is automatically set to 4800, 9600, 19200 or 38400 as appropriate.

## Input

Data	Specifications	Contents	Remarks
Heading signal	synchro or step	GC-10 required	AD-10 and IEC 61162 are switched by menu setting.
	AD-10 format	External AD-100	
	IEC 61162-2**		
Speed signal	IEC 61162-1		
Navaid data	IEC 61162-1	Position, course, speed, waypoint, route, time, wind data, current data, depth, temperature, roll, pitch	For IMO spec, IEC-61162-1 Edition 4 is required.
External radar signal	Heading, Bearing, Trigger, Video	No STC control	Operate as remote display
Alert handling signal	Contact closure		Input from bridge alert management system (BAMS)
	IEC 61162-1, IEC 61924-2	ACK, ACM, HBT	Input from BAMS ACK and ACM are switched by menu setting.
AIS data	IEC 61162-2		

## Output

Radar system data	IEC 61162-1, RS-232C	RSD, OSD, TLL,	For ECDIS, PC plotter
TT data*	IEC 61162-1	TTD, TTM, TLB	For ECDIS
Alert handling signal	IEC 61162-1, IEC 61924-2	ALR, ALF, ALC, ARC, HBT, EVE	For BAMS ALR and ALF are switched by menu setting.
Remote display signal	HD, BP Trigger, Video		2 ports
External LCD monitor signal	DVI	Same as main display unit	2 systems in total
External CRT monitor signal	R, G, B, H, V	Same as main display unit	Option
Alert signal	Contact closure	Output to alarm system by using photo-relay	4 systems, Output contents are selected by menu.

\*The output sentence, mode and baud rate can be set at the TT Preset menu.

\*\*Data cycle should be input with more than 40 Hz (HSC) or 20 Hz (normal speed)

**IEC 61162 input sentence and priority**

<b>Contents</b>	<b>Sentence and priority</b>
Speed (STW)	VBW>VHW
Speed (SOG)	VBW
Speed (position)	VTG>RMC
Heading (True)	THS*>HDT*
Position	GNS>GGA>RMC>GLL
Datum	DTM
Waypoint	BWR, BWC, RMB
Route	WPL, RTE
Date, Time	ZDA
Depth	DPT >DBT>DBS>DBK
Temperature	MTW
Wind	MWV>VWT>VWR
Set and Drift	VDR
ALARM ACK	ACK

\*: THS and HDT are IEC61162-2  
Others: IEC61162-1 ed2.

**IEC 61162 output sentence**

<b>Contents</b>	<b>Sentence</b>
Target L/L	TLL *
Radar system data	RSD
Own ship data	OSD
TT target data	TTD, TLB, TTM
ALARM data	ALR




\*non IMO-type only.

# PACKING LIST

03GN-X-9852 -0 1/1

RSB-103\*\*

A-1

NAME	OUTLINE	DESCRIPTION/CODE No.	QTY
<b>ユニット</b>			
空中線本体部 ANTENNA UNIT		RSB-103-NS 000-081-580**	1
<b>予備品</b>			
予備品 SPARE PARTS		SP03-12501 008-485-360	1
<b>工事材料</b>			
工事材料 INSTALLATION MATERIALS		CP03-27502 008-540-140	1




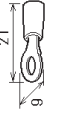






1.コード番号末尾の(\*\*)は、選用品の代表型式コードを表します。  
CODE NUMBER ENDED BY "\*\*" INDICATES THE NUMBER OF TYPICAL MATERIAL

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

C3527-701-A

# FURUNO

A-2a

CODE NO.	008-551-470-00	03GN-X-9401-9			
TYPE	CP03-27502	1/2			
<b>工事材料表</b>					
<b>INSTALLATION MATERIALS</b>					
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	備考 REMARKS
1	防錆ゴム, I. CORROSION-PROOF RUBBER		03-401-3001-0 R0MS CODE NO. 300-130-010-10	1	
2	シーリングワッシャー SEAL WASHER		03-401-3002-0 R0MS CODE NO. 300-130-020-10	4	
3	操作バネ TERMINAL OPENER		231-131 231-131 CODE NO. 000-165-800-11 000-165-800-10	1	
4	圧着端子 CRIMP-ON LUG		FVZ-3 CODE NO. 000-167-246-10	2	
5	ハネ座金 SPRING WASHER		M12 SUS304 CODE NO. 000-167-397-10	4	
6	ミカネ平座金 FLAT WASHER		M12 SUS304 CODE NO. 000-167-446-10	4	
7	六角ナット HEXAGONAL NUT		M12 SUS304 CODE NO. 000-167-491-10	4	
8	六角ヘッドネジ HEXAGON HEAD SCREW		M12X60 SUS304 CODE NO. 000-162-813-10	4	
9	ハネ座金 SPRING WASHER		M6 SUS304 CODE NO. 000-168-855-10	1	
10	ミカネ平座金 FLAT WASHER		M6 SUS304 CODE NO. 000-168-854-10	3	


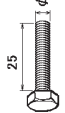

型式/コード番号が2枚の場合、下段より上段に代わる選用品であり、どちらが入っています。なお、品質は変わりません。  
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.  
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO., LTD.

C3527-M01-K(1)

CODE NO.	008-551-470-00	036M-X-9401-9	2/2
TYPE	CP03-27502		



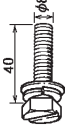

**工事材料表**

INSTALLATION MATERIALS					
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
11	六角ナット 1/2 HEXAGONAL NUT		M6 SUS304 CODE NO. 000-155-355-10	1	
12	六角ヘッド HEXAGONAL HEAD BOLT		M6X25 SUS304 CODE NO. 000-162-371-10	1	
13	ケーブル組品 CABLE ASSY.		RW-4747 RW-4747-1 CODE NO. 000-566-000-12 000-566-000-01	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、どちらかが入っています。なお、品質は変わりません。  
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CODE NO.	008-487-130-00	03FS-X-9403-7	1/1
TYPE	CP03-19101		

**工事材料表**

INSTALLATION MATERIALS					
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	ピン PIN		03-141-0301-2 R0MS CODE NO. 100-266-382-10	2	
2	Oリング O-RING		JBP-135 CODE NO. 000-171-309-10	1	
3	六角スリット HEX-HEAD SLOT BOLT-B WASHER		M6X40 SUS304 CODE NO. 000-162-353-10	8	
4	シリコン SILICON RUBBER		S-8400M 7M3P3-7 50G CODE NO. 000-156-483-11	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、どちらかが入っています。なお、品質は変わりません。  
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CODE NO.	1008-470-020-00	0300-X-9420-5
TYPE	CP03-16411	1/1

MARINE RADAR		FOR FR-9 RECTGUIDE (FLEXIBLE WAVEGUIDE)			
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	防水フィルム WATERTIGHT FILM		03-009-0368-0 ROHS CODE NO. 300-303-680-10	1	
2	ケーブル本体 TRUK-DECK CABLE GLAND		03-009-0521-1 ROHS CODE NO. 100-207-551-10	1	
3	座金 WASHER		03-009-0522-0 ROHS CODE NO. 100-207-560-10	2	
4	パッキン (1) RUBBER PACKING		03-009-0523-0 ROHS CODE NO. 100-207-570-10	2	
5	パッキン (2) RUBBER PACKING (2)		03-009-0524-0 ROHS CODE NO. 100-207-580-10	2	
6	Oリング O-RING		AS568-128 CODE NO. 000-172-180-10	3	
7	ケーブル用締付 CABLE GLAND NIPPLE		JIS F8801 45# CODE NO. 000-171-869-10	1	
8	六角ナリ 皿洗 HEX HEAD SLOT BOLT-B WASHER		MAXI6 SUSS304 CODE NO. 000-162-940-10	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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(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

☆ FURUNO ELECTRIC CO., LTD.

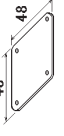




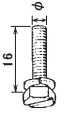
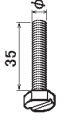



CODE NO.	0300-X-9414-2
TYPE	1/1

RADAR RECTGUIDE		レーザークラウド (FR-9)			
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	FR-9の付いた WAVEGUIDE		FR-9-20 CODE NO. 000-305-739-01	1	選択 TO BE SELECTED
2	FR-9の付いた WAVEGUIDE		FR-9-30 CODE NO. 000-305-739-01	1	選択 TO BE SELECTED
3	FR-9の付いた WAVEGUIDE		FR-9-50 CODE NO. 000-305-740-01	1	選択 TO BE SELECTED

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.)



☆ FURUNO ELECTRIC CO., LTD.

CODE NO.	008-470-010-00	03EP-X-9423-8
TYPE	CP03-16401	1/2

工事材料表		INSTALLATION MATERIALS	
番号 NO.	名称 NAME	略図 OUTLINE	数量 QTY
1	防水フィルム WATERTIGHT FILM		1
2	Oリング O-RING		20
3	バネ盤金 SPRING WASHER		35
4	六角ナット 1/2 HEX NUT		35
5	シキキ平皿 FLAT WASHER		65
6	六角ボルト M2x4 HEX BOLT (SLOTTED WASHER HEAD)		80
7	六角ボルト ボルト HEXAGONAL HEAD SLOT BOLT		35
8	薄波管押え .3 E型 WAVEGUIDE CLAMP (3) E-TYPE		15
9	薄波管保護ゴム RUBBEW CUSHION		15
10	工事用 90° ハンド WAVEGUIDE H-BEND		2

型式/コード番号が2枚の場合、下段より上段に代わる通達類品であり、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.)

CODE NO.	008-470-010-00	03EP-X-9423-8
TYPE	CP03-16401	2/2

工事材料表		INSTALLATION MATERIALS	
番号 NO.	名称 NAME	略図 OUTLINE	数量 QTY
11	カバーフランジ FLANGE		7
12	チヨウフランジ WAVEGUIDE FLANGE		7

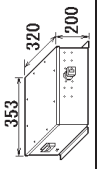

型式/コード番号が2枚の場合、下段より上段に代わる通達類品であり、どちらかが入っています。なお、品質は変わりません。  
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PACKING LIST  
RTR-081-HK1/S

030H-X-9853 -1 1/1

A-8


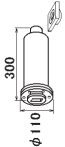
NAME	UNIT	OUTLINE	DESCRIPTION/CODE No.	Q'TY
<b>ユニット</b>				
送受信部			RTR-081-HK1/S	1
TRANSCEIVER UNIT			000-081-598-00	**
<b>工事材料</b>				
INSTALLATION MATERIALS				
工事材料			CP03-27501	1
INSTALLATION MATERIALS			008-540-200-00	

1.コード番号末尾の[\*\*]は、選取品の代表型式/コードを表します。  
CODE NUMBER ENDED BY "\*\*" INDICATES THE NUMBER OF TYPICAL MATERIAL.

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

C3527-Z02-B

A-7




CODE NO.		038F-X-9403-6		1/1	
TYPE		22XGW			
<b>工事材料表</b>					
INSTALLATION MATERIALS					
番号	名称	略図	型名/規格	数量	用途/備考
NO.	NAME	OUTLINE	DESCRIPTIONS	Q'TY	REMARKS
1	導波管 WAVEGUIDE STRAIGHT		RIM-1020 A-107A CODE NO. 310C-100-420-00	4	
2	WG貫通金物組立 THRU-DECK WAVEGUIDE		RIG-1000-0 CODE NO. 310C-710-000-00	1	

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらが入っています。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.)

C3006-M17-A

FURUNO ELECTRIC CO., LTD.

☆

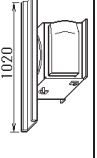


CODE NO.		008-540-200-00		036H-X-9402-3	
TYPE		CP03-27501		1/1	
工事材料表	略図	型名/規格	数量	用途/備考	
番号	名称	DESCRIPTIONS	QTY	REMARKS	
1	操作レバー TERMINAL OPENER	 231-131 231-131 CODE NO. 000-165-800-11 000-165-800-10	1		
2	圧着端子 CRIMP-ON LUG	 FVI.25-4(LF) FVI.25-4 CODE NO. 000-166-666-10 000-538-114-20	4		
3	圧着端子 CRIMP-ON LUG	 FV6.5-4(LF) YEL. CODE NO. 000-166-744-10	1		

型式/コード番号が2枚の増点、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.)

## PACKING LIST

RSB-104-\*\*-\*/RSB-105-\*\*-\*\*

036P-X-9851 -0 1/1

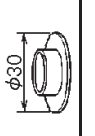


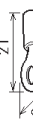
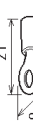
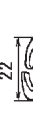


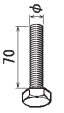

UNIT	DESCRIPTION/UNIT	QTY
ユニット		
空中線本体部 ANTENNA UNIT	 RSB-104-N-S 000-081-712-**-**	1
付属品 ACCESSORIES		
付属品 ACCESSORIES	 FP03-10101 008-538-730	1
工事材料 INSTALLATION MATERIALS		
工事材料 INSTALLATION MATERIALS	 CP03-27602 008-540-520	1

1.コード番号末尾の(\*\*)は、選用品の代表型式/コードを表します。  
 CODE NUMBER ENDED BY "\*\*" INDICATES THE NUMBER OF TYPICAL MATERIAL.

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

CODE NO.	008-551-460-00	03GP-X-9401-9	1/2
TYPE	CP03-27602		

## 工事材料表

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	シーリングワッシャー SEAL WASHER		03-001-3002-0 R0HS CODE NO. 300-130-020-10	8	
2	防錆コート CORROSION-PROOF RUBBER		03-100-3041-0 CODE NO. 100-370-070-10	2	
3	操作レバー TERMINAL OPENER		231-131 CODE NO. 000-165-800-11 000-165-800-10	1	
4	圧着端子 CRIMP-ON LUG		FV2-3 CODE NO. 000-157-246-10	2	
5	圧着端子 CRIMP-ON LUG		FV2-4 BLU CODE NO. 000-157-247-10	3	
6	バネ壁金 SPRING WASHER		M12 SUS304 CODE NO. 000-167-397-10	8	
7	シキリ平壁金 FLAT WASHER		M12 SUS304 CODE NO. 000-167-446-10	8	
8	六角ナット 1/2 HEXAGONAL NUT		M12 SUS304 CODE NO. 000-167-491-10	16	
9	六角ナット 全長 HEXAGON HEAD SCREW		M12X70 SUS304 CODE NO. 000-162-814-10	8	
10	バネ壁金 SPRING WASHER		M6 SUS304 CODE NO. 000-155-355-10	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、どちらかが入っています。なお、品質は変わりません。





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

FURUNO ELECTRIC CO., LTD.

C3528-M01-K(1)

CODE NO.	008-551-460-00	03GP-X-9401-9	2/2
TYPE	CP03-27602		

## 工事材料表

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
11	シキリ平壁金 FLAT WASHER		M6 SUS304 CODE NO. 000-155-354-10	3	
12	六角ナット 1/2 HEXAGONAL NUT		M6 SUS304 CODE NO. 000-155-355-10	1	
13	六角ナット HEXAGONAL HEAD BOLT		M6X25 SUS304 CODE NO. 000-162-877-10	1	
14	ケーブル組品 CABLE ASSY.		RW-4747 RW-4747-1 CODE NO. 000-566-000-12 000-566-000-01	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、どちらかが入っています。なお、品質は変わりません。

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

FURUNO ELECTRIC CO., LTD.



C3528-M01-K(2)

**FURUNO**

CODE NO.	008-538-730-00	0360-X-9501-1	1/1
TYPE	FP03-10101		

**付属品表**

## ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	吊り上げ器具 LIFTING FIXTURE		03-015-3233-0 RHMS CODE NO. 100-080-720-10	2	
2	取付用カラー COLLAR FOR LIFTING FIXTURE		03-015-3234-0 RHMS CODE NO. 100-080-730-10	2	

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

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

FURUNO ELECTRIC CO., LTD.

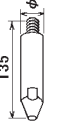



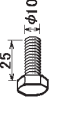

C3521-F01-B

**FURUNO**

CODE NO.	008-254-500-00	0300-X-9421-6	1/1
TYPE			

**工事材料表**

SMBAF/7AF/7AF-MSA/30AF/36AF

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	ガイドピン GUIDE PIN		03-006-4081-0 RHMS CODE NO. 300-640-810-10	2	
2	Oリング O-RING		JB1AG-60 CODE NO. 000-351-309-30	2	
3	ミカ平皿 FLAT WASHER		M10 SUS304 CODE NO. 000-167-232-10	10	
4	ハネ座金 SPRING WASHER		M10 SUS304 CODE NO. 000-167-232-10	10	
5	六角ボルト HEXAGONAL HEAD BOLT		M10X25 SUS304 CODE NO. 000-162-780-10	10	
6	シリコン SILICON RUBBER		S-8400W 7AF/7AF-7 500 CODE NO. 000-158-483-11	1	

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

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

FURUNO ELECTRIC CO., LTD.

C3311-013-H

CODE NO. 1008-254-590-00  
TYPE  
0300-X-9421-5  
1/1

FURUNO		SNEAF/7AF/7AF-MSA/30AF/36AF		INSTALLATION MATERIALS		0300-X-9421-5		1/1	
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS				
1	ガイドピン GUIDE PIN		03-006-4081-O RHMS CODE NO. 300-640-810-10	2					
2	Oリング O-RING		JB1AC-60 CODE NO. 000-851-309-00	2					
3	ミカキ平座金 FLAT WASHER		M10 SUS304 CODE NO. 000-167-232-10	10					
4	バネ座金 SPRING WASHER		M10 SUS304 CODE NO. 000-167-233-10	10					
5	六角ヘッド HEXAGONAL HEAD BOLT		M10X25 SUS304 CODE NO. 000-162-780-10	10					
6	シリコン SILICON RUBBER		S-8400W 7AFシリコン CODE NO. 000-168-483-10	1					


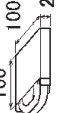
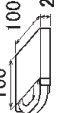
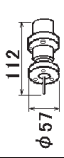
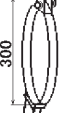
型式/ヘッド番号が2段の場合、下段より上段に代わる標準部品であり、どちらが入っています。なお、品質は変わりません。  
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.  
(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

CODE NO. 1008-198-600-00  
TYPE  
03BF-X-9417-8  
1/1

FURUNO		03BF-X-9417-8		INSTALLATION MATERIALS		1008-198-600-00		1/1	
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS				
1	変換器結品 COUPLER		03-012-5600-1 CODE NO. 301-256-001-30	2					
2	Oリング O-RING		ARP568-345 A305 CODE NO. 000-851-891-30	1					
3	六角ナット HEX NUT		M6 SUS304 CODE NO. 000-158-856-10	6					
4	ミカキ平座金 FLAT WASHER		M6 SUS304 CODE NO. 000-158-854-10	22					
5	バネ座金 SPRING WASHER		M6 SUS304 CODE NO. 000-158-855-10	6					
6	六角入りワシ HEX.BOLT (SLOTTED HEAD)		M6X20 SUS304 CODE NO. 000-162-836-10	16					
7	六角ボルトリボ付 HEX.BOLT (SLOTTED HEAD)		M6X25 SUS304 CODE NO. 000-162-902-10	6					



型式/ヘッド番号が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。  
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(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

# FURUNO

CODE NO.		008-452-970-00		03EP-X-9425-5	
TYPE		CP03-13948			
同軸ケーブル工事用 FOR RADAR COAX CABLE INSTALLATION					
MARINE RADAR					
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	加工ケーブル GAUGE		03-009-50311-0 CODE NO. 100-281-070-00	1	
2	7芯ケーブル PLASTIC S TAPE		19MMX10M CODE NO. 000-160-466-10	1	
3	7芯ケーブル PLASTIC N TAPE		19MMX10M CODE NO. 000-160-466-10	1	
4	ケーブル用コネクタ CABLE CONNECTOR		20D-200H-WF(A) CODE NO. 000-142-280-00	1	
5	ケーブル用バンド CABLE BAND		H76-004-A CODE NO. 000-564-756-10	20	

型式/コード番号が2段の場合、下段より上段に代わる選定部品であり、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

CODE NO.		03GP-X-9403-0	
TYPE			
FAR-2837SW			
工事材料表 INSTALLATION MATERIALS			
番号 NO.	名称 NAME	略図 OUTLINE	用途/備考 REMARKS
1	ケーブル組品 CABLE ASSY.		LHPX-20D-ASSY(20M) CODE NO. 000-142-291
2	ケーブル組品 CABLE ASSY.		LHPX-20D-ASSY(30M) CODE NO. 000-142-292

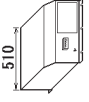

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

# PACKING LIST

03GP-X-9852 -0 1/1

A-18

RTR-082\*\*

NAME	OUTLINE	DESCRIPTION/CODE No.	QTY
<b>ユニット</b>			
送受信部 TRANSCIVER UNIT		RTR-082-104S	1
<b>工事材料</b>			
工事材料 INSTALLATION MATERIALS		CP03-27601 008-540-570	1

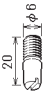



1.コード番号末尾の[\*]\*\*は、選用品の代表型式/コードを表します。  
CODE NUMBER ENDED BY " \*" " \*\* " INDICATES THE NUMBER OF TYPICAL MATERIAL

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

C3528-702-A

# FURUNO

A-19

CODE NO.	008-540-570-00	03GP-X-9402-4			
TYPE	CP03-27601	1/1			
<b>工事材料表</b>					
<b>INSTALLATION MATERIALS</b>					
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	位置決めピン(C) PIN		03-163-3514-1 ROHS 03-163-3514-1 CODE NO. 100-315-801-10 100-315-801-30	2	
2	操作レバー TERMINAL OPENER		231-131 231-131 CODE NO. 000-165-800-11 000-165-800-10	1	
3	圧着端子 CRIMP-ON LUG		FVZ-4 BLU CODE NO. 000-167-247-10	6	
4	圧着端子 CRIMP-ON LUG		FV5.5-4 (LP) YEL CODE NO. 000-166-744-10	1	

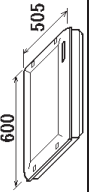



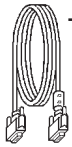
型式/コード番号が2段の場合、下段より上段に代わる選用品であり、どちらが入っています。なお、品質は変わりません。  
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QUALITY IS THE SAME.  
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY. )

FURUNO ELECTRIC CO., LTD.

C3528-M03-E

PACKING LIST

MU-231CR-\*





NAME	UNIT	OUTLINE	DESCRIPTION/CODE No.	Q'TY
<b>ユニット</b>				
表示部			MU-231CR-*S/*HK-AR 000-080-430-00**	1
<b>予備品</b>				
予備品			SP03-14401 008-535-990-00	1 AC用
予備品			SP03-14402 008-536-000-00	1 DC用
<b>付属品</b>				
付属品			FP03-09810 008-536-010-00	1
<b>工事材料</b>				
ケーブル組品			DVI-D/D S-LINK 5M 001-132-960-10	1

1.コード末尾に[\*\*]の付いたユニットは代表の型式/コードを表示しています。  
DOUBLE ASTERISK DENOTES COMMONLY USED EQUIPMENT.  
2.予備品は、AC/DCで選択願います。  
CHOOSE SPARE PARTS DEPENDING ON AC OR DC POWER.

型式/コード番号が空段の場合、下段より上段に代わる過渡用品であり、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.  
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FURUNO




CODE NO. 03GL-X-9401-6  
TYPE 1/1

番号	名称	略図	型名/規格	数量	用途/備考
FAR-21**/28**、FOR-21**/28**					
<b>工事材料表</b>					
1	ケーブル(14C) 14-CORE CABLE		RM-9600 *15M* CODE NO. 001-078-400-10	1	選択 TO BE SELECTED 番号/コード SIGNAL CABLE
2	ケーブル(14C) 14-CORE CABLE		RM-9600 *30M* CODE NO. 001-078-410-10	1	選択 TO BE SELECTED 番号/コード SIGNAL CABLE
3	ケーブル(14C) 14-CORE CABLE		RM-9600 *40M* CODE NO. 001-078-420-10	1	選択 TO BE SELECTED 番号/コード SIGNAL CABLE
4	ケーブル(14C) 14-CORE CABLE		RM-9600 *50M* CODE NO. 001-078-430-10	1	選択 TO BE SELECTED 番号/コード SIGNAL CABLE

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









FURUNO ELECTRIC CO., LTD.






CODE NO.		008-535-940-00		03GL-X-9405-3	
TYPE		CP03-25602		1/1	
AC用					
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	操作用 TERMINAL OPENER				
2	操作用 TERMINAL OPENER				
3	圧着端子 OR IMP-ON LUG				

型式/コード番号が異なる場合、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.)

**PACKING LIST RPU-013**

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
<b>ユニット UNIT</b>			
制御部 PROCESSOR UNIT		RPU-013* 000-081-381-00 **	1
<b>予備品 SPARE PARTS</b>			
予備品 SPARE PARTS		SP03-14404 *AC100* 000-175-920-00 **	1 (*1)
予備品 SPARE PARTS		SP03-14405 000-535-920-00 **	1 (*1)
予備品 SPARE PARTS		SP03-14406 000-535-920-00 **	1 (*1)
<b>工事材料 INSTALLATION MATERIALS</b>			
工事材料 INSTALLATION MATERIALS		CP03-25602 000-535-940-00 **	1 (*2)
工事材料 INSTALLATION MATERIALS		CP03-25603 000-535-950-00 **	1 (*2)
<b>図書 DOCUMENT</b>			
取扱説明書 OPERATOR'S MANUAL		OM-35190-* 000-175-536-1* **	1 (*3)
取扱説明書 OPERATOR'S MANUAL		OM-35220-* 000-170-395-1* **	1 (*3)

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
取扱説明書 OPERATOR'S MANUAL		OM-35221-* 000-164-289-1* **	1 (*3)
装備要領書 INSTALLATION MANUAL		IM-35190-* 000-175-564-1* **	1 (*3)
装備要領書 INSTALLATION MANUAL		IM-35210-* 000-148-687-1* **	1 (*3)
装備要領書 INSTALLATION MANUAL		IM-35220-* 000-148-681-1* **	1 (*3)
装備要領書 INSTALLATION MANUAL		IM-35222-* 000-176-947-1* **	1 (*3)
装備要領書 INSTALLATION MANUAL		IM-35230-* 000-148-690-1* **	1 (*3)
装備要領書 INSTALLATION MANUAL		IM-35270-* 000-148-693-1* **	1 (*3)
操作要領書 OPERATOR'S GUIDE		OS-35190-* 000-153-046-1* **	1 (*3)
操作要領書 OPERATOR'S GUIDE		OS-35220-* 000-170-398-1* **	1 (*3)

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.  
 2.(\*)1)(\*)2)(\*)3)は、それぞれ仕様選択品を表します。  
 (\*1)(\*)2)(\*)3)INDICATE SPECIFICATION SELECTIVE ITEM.

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

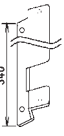

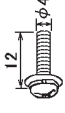

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。  
 TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

**FURUNO**

CODE NO.	008-535-610-00	03GL-X-9505-7	1/1
TYPE	FP03-09850		

**付属品表**

## ACCESSORIES

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直付金具 KB FIXING METAL		03-103-7521-1 R0MS CODE NO. 100-306-291-10	1	操作部用 FOR CONTROL UNIT
2	クロケット GROMMET		G-39 CODE NO. 000-166-401-10	1	操作部用 FOR CONTROL UNIT
3	ナット、ワッシャー WASHER HEAD SDREW *B*		MAX12 C2700M M8N12 CODE NO. 000-163-192-10	2	操作部用 FOR CONTROL UNIT
4	クッション CUSHION		TM-180-302 CODE NO. 000-166-468-10	3	操作部用 FOR CONTROL UNIT

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

FURUNO ELECTRIC CO., LTD.




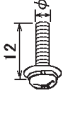

C3519-F04-G

**FURUNO**

CODE NO.	008-535-690-00	03GL-X-9506-7	1/1
TYPE	FP03-09860		

**付属品表**

## ACCESSORIES

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直付金具(T) KEYBOARD FIXTURE		03-103-7821-1 R0MS CODE NO. 100-306-291-10	1	操作部用 FOR CONTROL UNIT
2	ブラインドシール BLIND SEAL		22-020-1005-1 R0MS CODE NO. 100-173-591-10	3	操作部用 FOR CONTROL UNIT
3	クロケット GROMMET		G-49 CODE NO. 000-166-406-10	1	操作部用 FOR CONTROL UNIT
4	ナット、ワッシャー WASHER HEAD SDREW *B*		MAX12 C2700M M8N12 CODE NO. 000-163-192-10	2	操作部用 FOR CONTROL UNIT
5	クッション RUBBER FOOT		TM-180-302 CODE NO. 000-166-468-10	2	操作部用 FOR CONTROL UNIT

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。  
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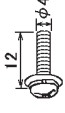

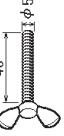
FURUNO ELECTRIC CO., LTD.

C3519-F05-G

CODE NO.	008-535-630-00	03GL-X-9503-6
TYPE	FP03-09870	1/1

付属品表

ACCESSORIES








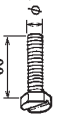
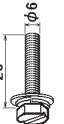
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	フラッシュマウント金具 FLUSH MOUNTING PLATE		03-103-7531-1 RHMS CODE NO. 100-306-261-10	4	
2	ワッシャーヘッドSDREW *B* WASHER HEAD SDREW *B*		M4X12 C2700M M8N12 CODE NO. 000-163-192-10	4	
3	六角ナット 1種 HEX NUT		M5 SUS304 CODE NO. 000-165-921-10	4	
4	蝶ボルト WING SCREW		M5X40 SUS304 CODE NO. 000-162-682-10	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、どちらかが入っています。なお、品質は変わりません。  
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CODE NO.	008-535-560-00	03GL-X-9501-5
TYPE	FP03-09820	1/1

付属品表

ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	ハッカ-L (20) HANGER L		03-163-1111-1 RHMS CODE NO. 100-305-141-10	1	
2	ハッカ-R (20) HANGER R		03-163-1112-1 RHMS CODE NO. 100-305-181-10	1	
3	ハッカ-伸ば (20) HANGER STAY		03-163-1113-1 RHMS CODE NO. 100-305-191-10	1	
4	ホーリング HOLE PLUG		OP-30-HP-13 CODE NO. 000-160-074-10	2	
5	スナップボタン SNAP BUTTON		KB-1337 ボタン CODE NO. 000-570-276-10	4	
6	ミカキ平座金 FLAT WASHER		M10 SUS304 CODE NO. 000-167-232-10	2	
7	ハコ座金 SPRING WASHER		M10 SUS304 CODE NO. 000-167-233-10	2	
8	六角入りワッシャー HEX BOLT		M10X30 SUS304 CODE NO. 000-162-384-10	2	
9	六角入りワッシャー HEX BOLT (SLOTTED WASHER HEAD)		M6X25 SUS304 CODE NO. 000-162-949-10	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、どちらかが入っています。なお、品質は変わりません。  
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CODE NO.	008-536-020-00	036H-X-9501-5
TYPE	FP03-09830	1/1

付属品表

ACCESSORIES		ACCESSORIES		ACCESSORIES	
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	吊钩 L HANGER L		03-163-1111-1 ROHS 03-163-1111-1 CODE NO. 100-305-141-10 100-305-141-00	1	
2	吊钩 R HANGER R		03-163-1112-1 ROHS 03-163-1112-1 CODE NO. 100-305-181-10 100-305-181-00	1	
3	吊钩 中柱 (23) HANGER STAY		03-163-2071-1 ROHS CODE NO. 100-305-371-10	1	
4	ホールの栓 HOLE PLUG		03-30-HP-13 CODE NO. 000-160-074-10	2	
5	スイッチボタン SWAP BUTTON		16-137P ホット CODE NO. 000-570-276-10	4	
6	フラット平皿 FLAT WASHER		M10 SUS304 CODE NO. 000-167-232-10	2	
7	バネ皿 SPRING WASHER		M10 SUS304 CODE NO. 000-167-233-10	2	
8	六角ナット HEX BOLT		M10X30 SUS304 CODE NO. 000-162-884-10	2	
9	六角ナット 皿付 HEX BOLT (SLOTTED, WASHER HEAD)		M6X25 SUS304 CODE NO. 000-162-949-10	4	

型式/コード番号が2段の場合、下段より上段に代わる通達部品であり、どちらが入っています。なお、品質は変わりません。  
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CODE NO.	008-535-570-00	036L-X-9502-3
TYPE	FP03-09840	1/1

付属品表

ACCESSORIES		ACCESSORIES		ACCESSORIES	
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	取手 HANDLE		14-002-1125-2 ROHS CODE NO. 340-211-252-10	2	
2	ローレット皿 ROSETTE WASHER		M6 C2700W ホット M6 C2700W ホット CODE NO. 000-165-694-10 000-364-910-30	4	
3	丸皿小ネジ OVAL HEAD SCREW		M6X20 C2700W ホット CODE NO. 000-163-677-10	4	
4	波皿 WAVE WASHER		MW-6 SUS CODE NO. 000-167-384-10	4	

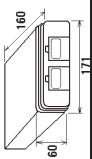



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# PACKING LIST

CU-200-FAR

0360-X-9855 -4

1/1

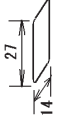





NAME	UNIT	OUTLINE	DESCRIPTION/CODE No.	QTY
メモリーカード・インターフェイス			CU-200	1
MEMORY CARD INTERFACE			000-081-569-00	
<b>工事材料</b>				
工事材料			CP03-27431	1
INSTALLATION MATERIALS			008-544-400-00	
<b>その他工材</b>				
ケーブル組品			PSE-4PTX-BL	1
CABLE ASSY.		L=10M	PSE-4PTX-BL	
			000-164-637-10	
			000-147-510-00	
ケーブル組品MJ			MJ-A3SPF0015-100C	1
CABLE ASSY.		L=10M		

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。  
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C3521-Z04-D

A-31

# FURUNO

CODE NO.	008-544-400-00	0360-X-9404-6			
TYPE	CP03-27431	1/1			
<b>工事材料表</b>					
番号	名称	略図	型名/規格	数量	用途/備考
1	舵輪貼りマフ (BSH) STEERING WHEEL LABEL		03-401-0661-4 CODE NO. 100-277-724-10	1	
2	ハネ座金 SPRING WASHER		M4 SUS304 CODE NO. 000-167-405-10	4	
3	ミカネ丸平座金 FLAT WASHER		M4 SUS304 CODE NO. 000-167-455-10	4	
4	六角ナット HEX NUT		M4 SUS304 CODE NO. 000-167-488-10	4	
5	寸切棒 THREADED ROD		M4X50 SUS304 CODE NO. 000-162-679-10	4	
6	舵輪マフ貼付要領 LABEL ATTACHING PROCEDURE		C32-00407-* 7/14 CODE NO. 000-160-918-1*	1	

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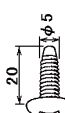
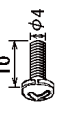
FURUNO ELECTRIC CO., LTD.

C3521-M05-E

**FURUNO**

CODE NO.	008-539-530-00	0360-X-9502-3	1/1
TYPE	FP03-10201		

## 付属品表

ACCESSORIES		数量		用途/備考
番号	名称	略図	DESCRIPTIONS	REMARKS
NO.	NAME	OUTLINE		
1	マウント MOUNTING BRACKET		19-023-3081-0 CODE NO. 100-316-260-10	1
2	セルフタッピングネジ SELF-TAPPING SCREW		5X20 SUS304 CODE NO. 000-162-606-10	4
3	ワッシャー WASHER HEAD SCREW		M4X10 C2700M MBN12 CODE NO. 000-163-167-10	4

型式/コード番号が2図の場合、下段より上段に代わる通称部品であり、どちらが入っています。なお、品質は変わりません。  
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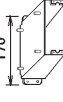


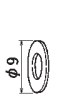

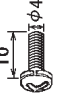
FURUNO ELECTRIC CO., LTD.

C3521-F02-C

**FURUNO**

CODE NO.	008-539-540-00	0360-X-9503-6	1/1
TYPE	FP03-10202		

## 付属品表

ACCESSORIES		数量		用途/備考
番号	名称	略図	DESCRIPTIONS	REMARKS
NO.	NAME	OUTLINE		
1	コンリキ取付材 MOUNTING BRACKET		19-023-3081-0 ROMS CODE NO. 100-316-260-10	1
2	ゴムパッキン GROMMET		C-30-16-79-0-EP-UL CODE NO. 000-173-346-10	1
3	バネ金 SPRING WASHER		M4 SUS304 CODE NO. 000-167-406-10	4
4	ミカ平丸平座金 FLAT WASHER		M4 SUS304 CODE NO. 000-167-456-10	4
5	六角ナット HEX NUT		M4 SUS304 CODE NO. 000-167-488-10	4
6	ワッシャーヘッドネジ WASHER HEAD SCREW		M4X10 C2700M MBN12 CODE NO. 000-163-167-10	4

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FURUNO ELECTRIC CO., LTD.

C3521-F03-G

CODE NO.		008-535-650-00		03GL-X-9409-6		1/1	
TYPE		0P03-184					
工事材料表 INSTALLATION MATERIALS							
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS		
1	ナット せんB WASHER HEAD SCREW *B*		M4X12 C2700W MBN12 CODE NO. 000-163-192-10	4			
2	連結台 (23)組品 COUPLING PLATE ASSY.		0P03-184-1 CODE NO. 008-536-990-30	1			

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**PACKING LIST GC-10-2**

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
<b>予備品 SPARE PARTS</b>			
予備品 SPARE PARTS		SP03-13300 008-419-280-00	1
<b>その他部品 OTHER PARTS</b>			
ナット せんA WASHER HEAD SCREW		M2.6X10 C2700W MBN12 000-163-477-10	2
ナット せんB WASHER HEAD SCREW *B*		M3X8 C2700W MBN12 000-163-190-10	5
ナット せんB WASHER HEAD SCREW (B)		M4X8 C2700W MBN12 000-163-200-10	3
GCカバー組品 GC COVER ASSY.		80-0665 008-537-030-00	1
NHコネクタ NH CONNECTOR ASSY.		03-2091 (5P) 008-534-670-00	1
VHコネクタ VH CONNECTOR ASSY.		03-2089 (5P) 008-534-650-00	1
VHコネクタ VH CONNECTOR ASSY.		03-2090 (3P) 008-534-660-00	1

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
XH-PHコネクタ XH-PH CONNECTOR ASSY.		03-2088 (6-14P) 008-534-640-00	1
コネクタ (231) CONNECTOR		231-107/026-FUR 000-147-413-12	1
コネクタ (231) CONNECTOR		231-607/019-FUR 000-147-414-12	1
演算プリント PROCESSOR BOARD		64P1106A (LF) 004-655-920-00	1

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# PACKING LIST

0P03-180-2

036L-X-9861 -10 1/1

A-36

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
<b>その他部品</b>			
WASHER HEAD SCREW *B*		M3X8 CZ700W MBN12 000-163-190-10	10
DVI-RGB組品		SLE-FRM4-A 008-537-660-00	1
DVI-RGB ASSY.		03P9Z98(LF) 008-554-940-00	1
RGB-BUFF* リット		03-2092 (6P)	1
RGB-BUFF BOARD		03-2093 (3P) 008-534-700-00	1
VHコネクタ		03-2094 (13-10P)	1
VH CONNECTOR		008-534-710-00	1
XHコネクタ		DVI-D S-LINK 0.85M 000-148-644-12	1
XH CONNECTOR		SQ-35 000-159-310-10	6
ケーブル組品		000-168-187-10	6
CABLE ASSEMBLY			
スペーサ			
SPACER			
ハシガネ			
SPRING WASHER			

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C3519-Z10-K

# FURUNO

A-37

CODE NO.	008-542-460-00	036L-X-9407-4			
TYPE	CP03-28901	1/1			
<b>工事材料表</b>					
INSTALLATION MATERIALS					
番号	名称	略図	型名/規格	数量	用途/備考
NO.	NAME	OUTLINE	DESCRIPTIONS	QTY	REMARKS
1	モジュール(モジュール) MODULAR CONNECTOR		MFSS608-C 000-166-044-10	2	

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、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.)

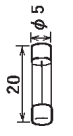
FURUNO ELECTRIC CO., LTD.

C3519-M07-E



CODE NO. 008-535-990 038L-X-9303 -1 1/1  
TYPE SPO3-14401 BOX NO. P

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

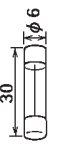
ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY		REMARKS/CODE NO.
				WORKING PER SET	SPARE PER VES	
1	E <sub>T</sub> -X <sup>1</sup> FUSE		FGMB 250V 2A PBF FGMB 2A 250V		2	表示用 FOR DISPLAY UNIT 000-157-497-10 000-122-000-00

MFR'S NAME FURUNO ELECTRIC CO.,LTD. DWG NO. C3519-P02-B 1/1

(縮図の寸法は、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過渡部品であり、どちらかが入っています。 なお、品質は変わりません。  
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

CODE NO. 001-175-920-00 038L-X-9305-2 1/1  
TYPE SPO3-14404 BOX NO. P

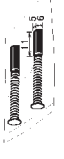
SHIP NO. SPARE PARTS LIST FOR U S E SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY		REMARKS/CODE NO.
				WORKING PER SET	SPARE PER VES	
1	E <sub>T</sub> -X <sup>1</sup> GLASS TUBE FUSE		FG80 125V 10A PBF		4	AC100FH FOR PROCESSOR UNIT 000-155-826-10

MFR'S NAME FURUNO ELECTRIC CO.,LTD. DWG NO. C3519-P04-B 1/1

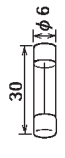
(縮図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)  
型式/コード番号が2段の場合、下段より上段に代わる過渡部品であり、どちらかが入っています。 なお、品質は変わりません。  
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

# FURUNO

SHIP NO.	SPARE PARTS LIST FOR	CODE NO.		U S E	REMARKS/CODE NO.
		TYPE	BOX NO.		
		008-485-360-00			
		SP03-12501			
		03FS-X-9301-6		1/1	
		P			
ITEM NO.	NAME OF PART	DWG. NO. OR TYPE NO.	QUANTITY	WORKING PER SET	SPARE PER VES
1	カーボンブラシ CARBON BRUSH	 S885028-1A-61	2		000-190-125-10
MFR'S NAME			FURUNO ELECTRIC CO., LTD.	DWG NO.	G3464-P01-E
					1/1

(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取の場合、下段より上段に代わる過渡部品であり、どちらかが入っています。 なお、品質は変わりません。  
 TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

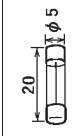
# FURUNO

SHIP NO.	SPARE PARTS LIST FOR	CODE NO.		U S E	REMARKS/CODE NO.
		TYPE	BOX NO.		
		008-535-920-00			
		SP03-14405			
		03GL-X-9306-1		1/1	
		P			
ITEM NO.	NAME OF PART	DWG. NO. OR TYPE NO.	QUANTITY	WORKING PER SET	SPARE PER VES
1	ヒューズ FUSE	 AG220用 FOR PROCESSOR UNIT FG80 250V 5A PBF 000-155-840-10	4		
MFR'S NAME			FURUNO ELECTRIC CO., LTD.	DWG NO.	C3519-P05-B
					1/1

(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取の場合、下段より上段に代わる過渡部品であり、どちらかが入っています。 なお、品質は変わりません。  
 TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

# FURUNO

A42

SHIP NO.	SPARE PARTS LIST FOR	U S E		SEIS PER VESSEL			
		CODE NO.	BOX NO.				
		008-419-280-00 SP03-13300	03GL-X-9302-2 1/1 P				
ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY		REMARKS/CODE NO.	
				WORKING PER SET	SPARE PER VES		
1	Et-X <sup>*</sup> FUSE		FIGMB 250V 2A PBF ..... FIGMB 2A 250V		8	000-157-497-10 000-122-000-00	
MFR'S NAME	FURUNO ELECTRIC CO., LTD.			DWG NO.	C3519-P01-C		1/1

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)  
 番式/コード番号が2取の場合、下取より上取に代わる通称商品であり、どちらかが入っています。 なお、品質は差  
 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.

E ↓

表 2 TABLE 2

機種 ANT. TYPE	200cm型TYPE (XN20AF)	240cm型TYPE (XN24AF)
空中線長 (A) ANT. LENGTH	2,040±10mm	2,550±10mm
回線安全スペース(B) ANT. CLEARANCE	2,200mm	2,700mm
質量 MASS	40kg	42kg

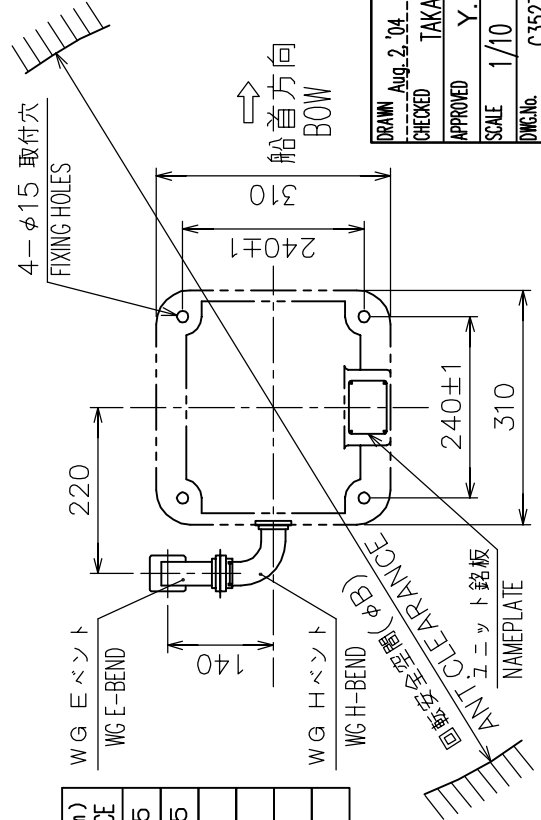
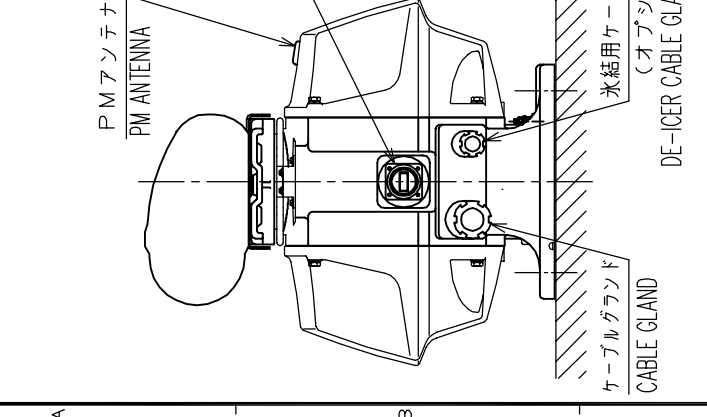
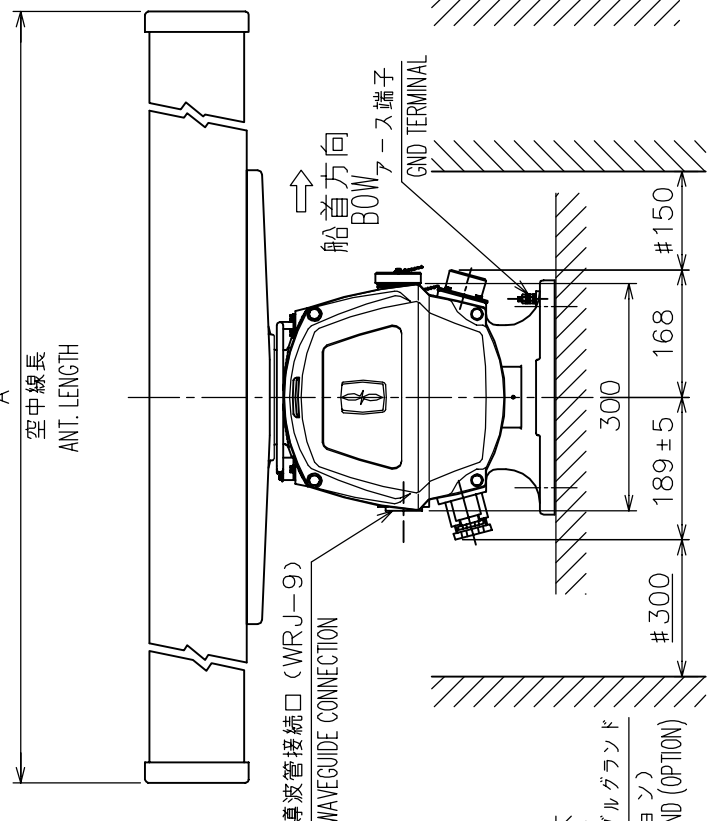
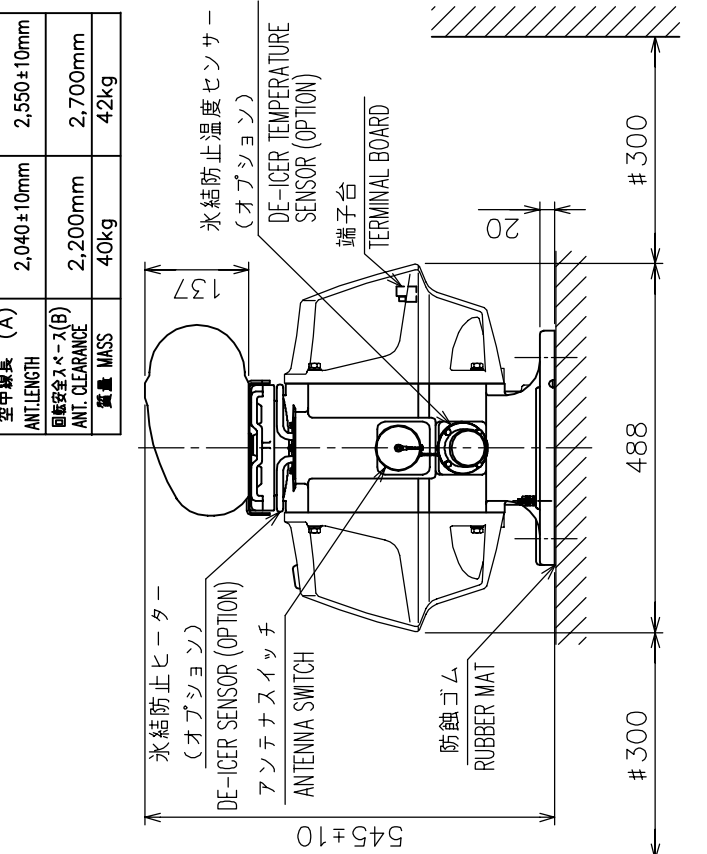


表 1 TABLE 1

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

- 注 記
- 1) #印寸法は最小サービスクリアランスとする。
  - 2) 指定外の寸法公差は表 1 による。
  - 3) 取付用ネジは M12 ボルトを使用のこと。
- NOTE
1. # MINIMUM SERVICE CLEARANCE.
  2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
  3. USE M12 BOLTS FOR FIXING THE UNIT.

DRAWN	Aug. 2, '04	E. MIYOSHI	TITLE	RSB-103 (PM)
CHECKED		TAKAHASHI, T.	名称	空中線部
APPROVED		Y. Hatai	FAR-2827W	外寸図
SCALE	1/10	表 2 参照 MASS SEE TABLE 2	NAME	ANTENNA UNIT
FIG. No.	C3527-G01-B	03-154-320G-2		OUTLINE DRAWING

取付寸法 (矢視 E)  
FIXING DIMENSIONS (VIEW E)

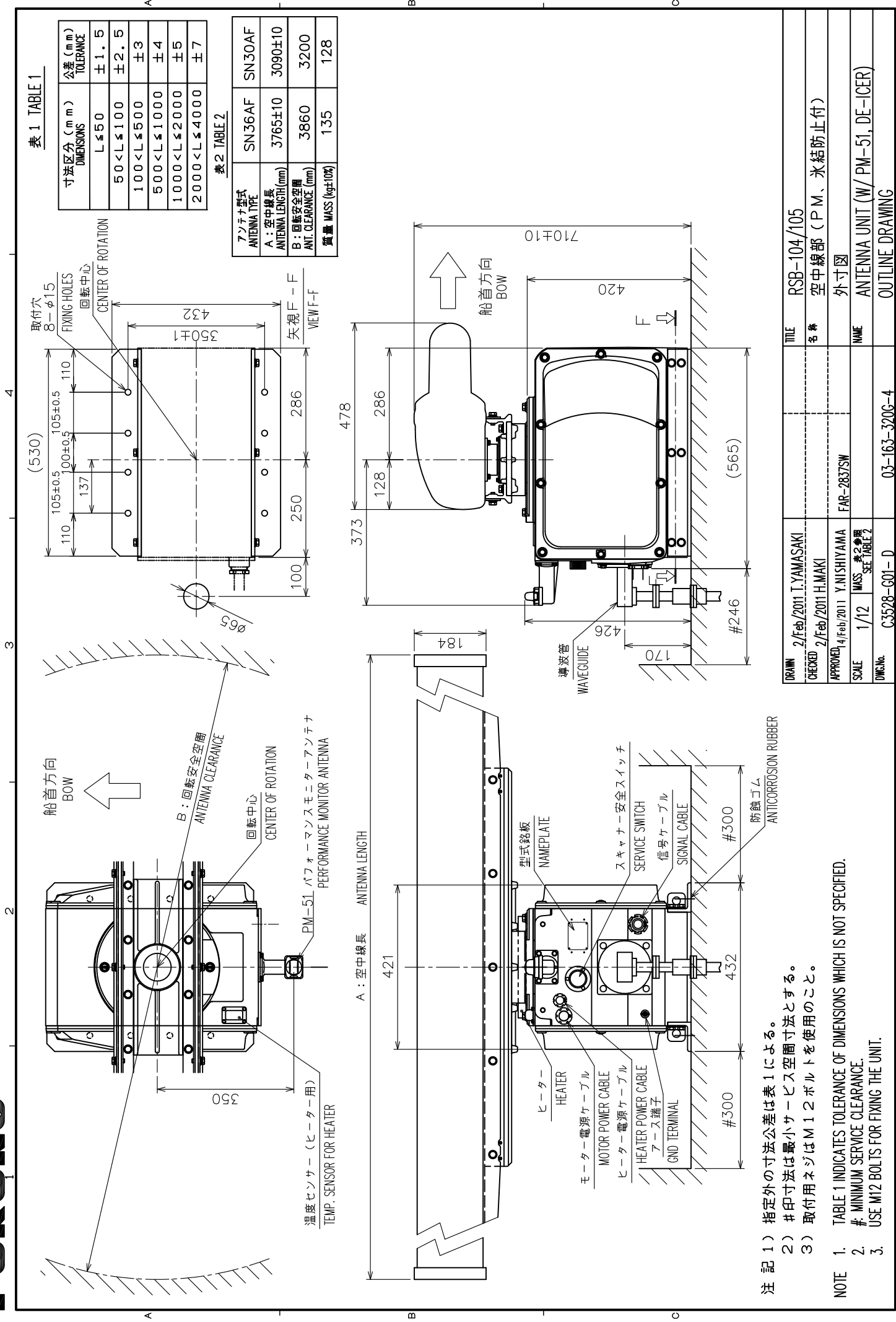


表 1 TABLE 1

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

表 2 TABLE 2

アンテナ型式 ANTENNA TYPE	SN36AF	SN30AF
A: 空中線長 ANTENNA LENGTH (mm)	3765±10	3090±10
B: 回転安全空間 ANT. CLEARANCE (mm)	3860	3200
質量 MASS (kg±10%)	135	128

- 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イタム寸法とする。  
 3) 取付用ネジは M12 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 M12 BOLTS FOR FIXING THE UNIT.

DRAWN	2/Feb/2011 T.YAMASAKI	TITLE	RSB-104/105
CHECKED	2/Feb/2011 H.MAKI	名称	空中線部 (P.M. 氷結防止付)
APPROVED	14/Feb/2011 Y.NISHIYAMA	外寸図	
SCALE	1/12 参考 表 2 参照 SEE TABLE 2	NAME	ANTENNA UNIT (W/PM-51, DE-ICER)
DWG.No.	C3528-G01-D		OUTLINE DRAWING
	03-163-320G-4		

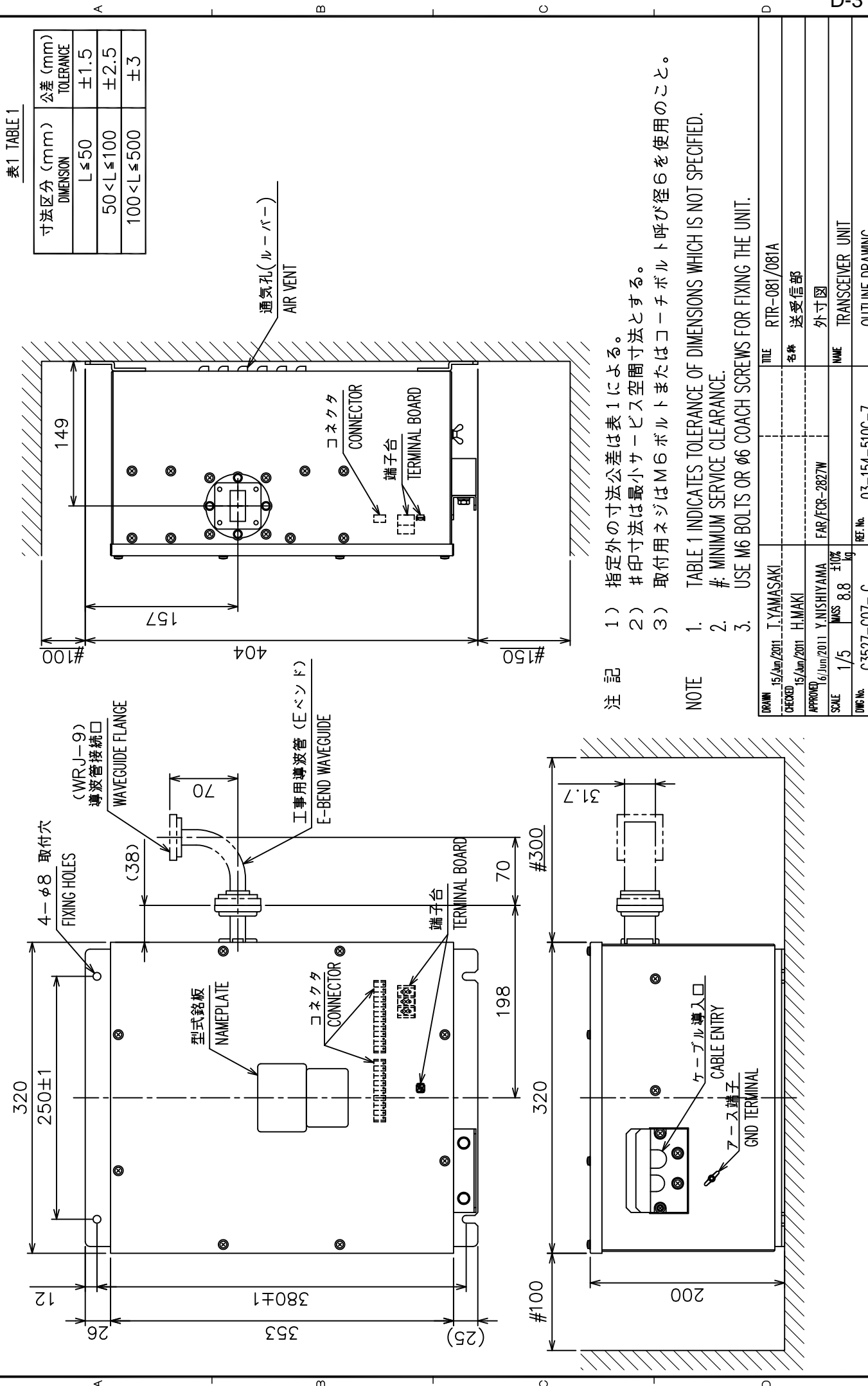


表1 TABLE 1

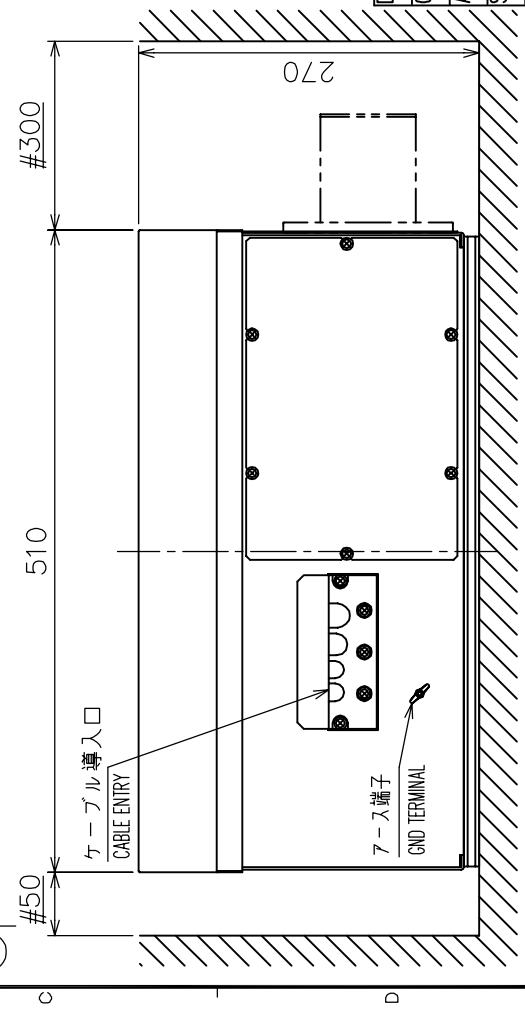
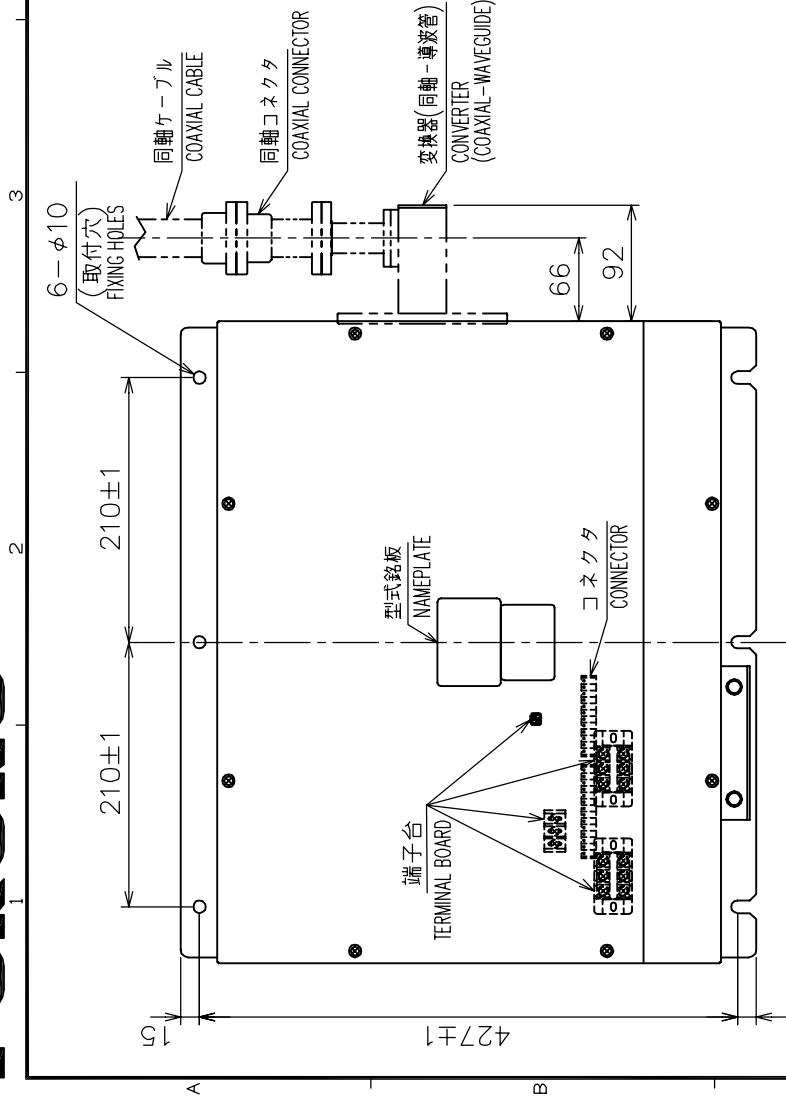
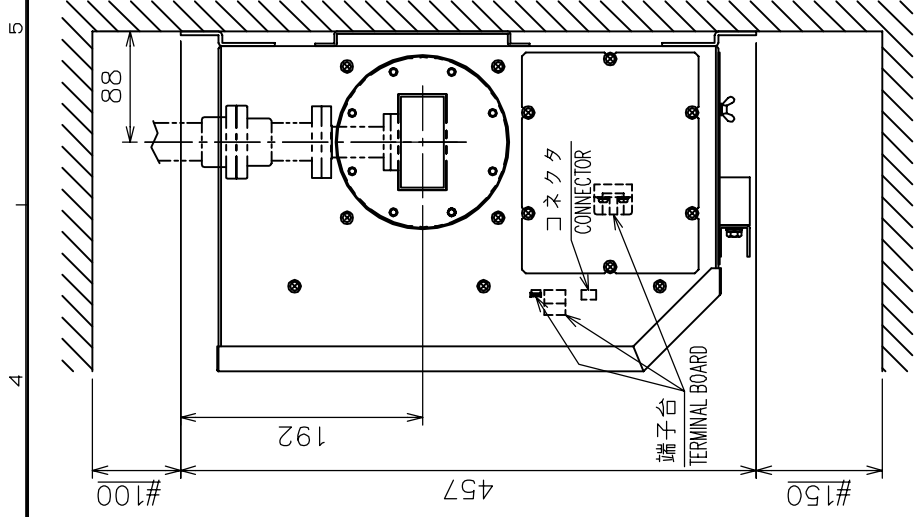
寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3

- 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M6ボルトまたはコーチボルト呼び径6を使用のこと。
- NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
  2. # MINIMUM SERVICE CLEARANCE.
  3. USE M6 BOLTS OR  $\phi 6$  COACH SCREWS FOR FIXING THE UNIT.

DRAWN	15/Apr/2011	T.YAMASAKI	TITLE	RTR-081/081A
CHECKED	15/Apr/2011	H.MAKI	名称	送受信部
APPROVED	16/Jun/2011	Y.NISHIYAMA	外寸図	
SCALE	1/5	WISS ±10% 8.8 kg	NAME	TRANSCIEVER UNIT
DWG No.	C3527-G07-C	REF. No.	03-154-510G-7	OUTLINE DRAWING

表 1 TABLE 1

寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
$L \leq 50$	$\pm 1.5$
$50 < L \leq 100$	$\pm 2.5$
$100 < L \leq 500$	$\pm 3$
$500 < L \leq 1000$	$\pm 4$



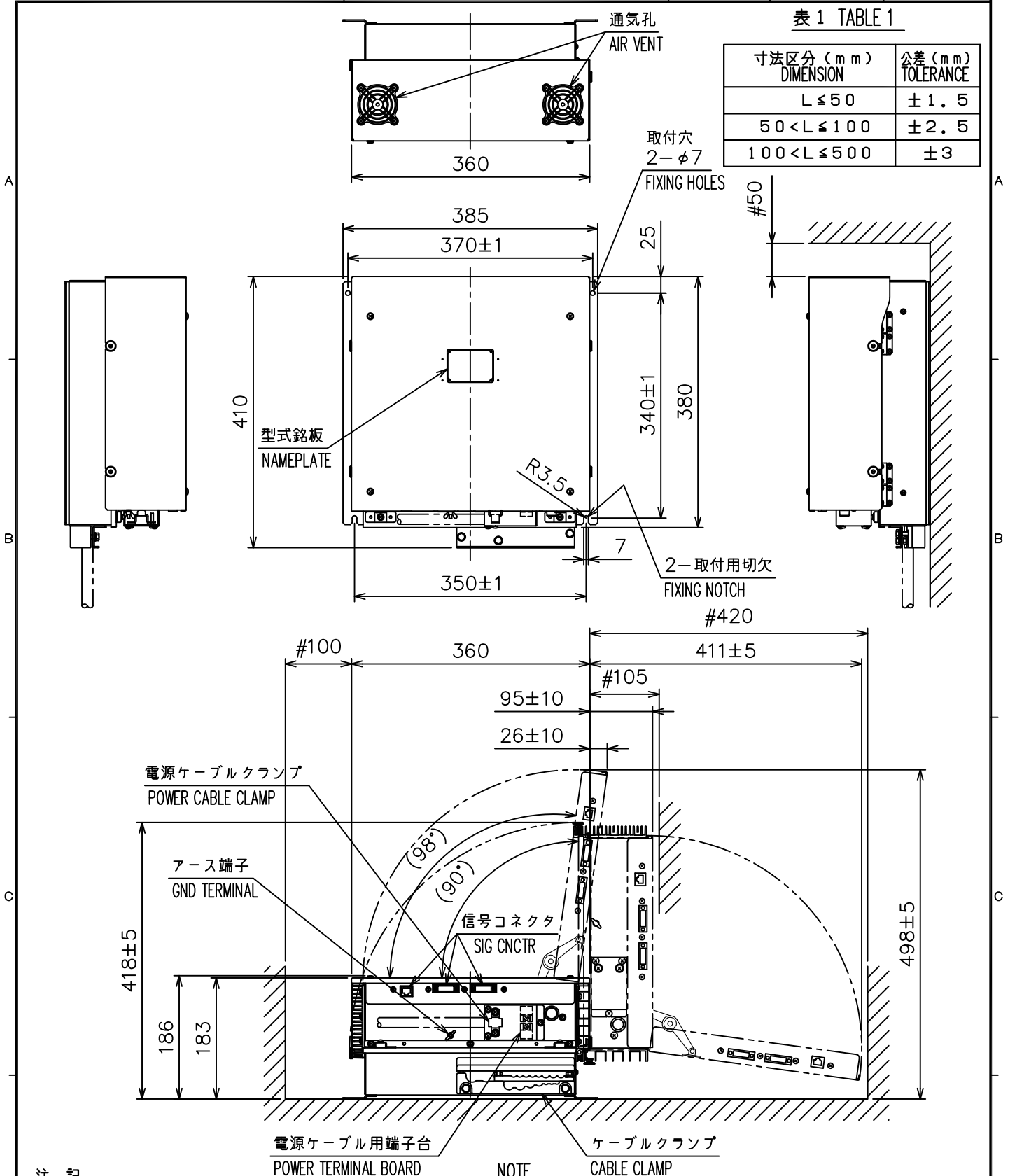
注 記 1) #印寸法は最小サービスインスペーシングとする。  
 2) 指定外の寸法公差は表1による。  
 3) 取付用ネジはM8 ボルトまたはコーチボルト呼び径8を使用のこと。

NOTE 1. # MINIMUM SERVICE CLEARANCE.  
 2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.  
 3. USE M8 BOLTS OR #8 COACH SCREWS FOR FIXING THE UNIT.

DRAWN	Sep. 21, '04	E. MIYOSHI	TITLE	RTR-082
CHECKED		TAKAHASHI, T	名称	送受信部
APPROVED		Y. Hatai	外寸図	
SCALE	1/6	MASS 17.0 kg	NAME	TRANSCIEVER UNIT
DWG No.	C.3528-G02-C	03-163-520G-4		OUTLINE DRAWING

表 1 TABLE 1

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



注 記

- 1) #印寸法は最小サービス空間寸法とする。
- 2) 指定外の寸法公差は表 1 による。
- 3) 取付用ネジは M6 ボルト、またはコーチボルト 呼び径 6 を使用のこと。

NOTE

1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M6 BOLTS OR COACH SCREWS φ6 FOR FIXING THE UNIT.

DRAWN May 15 '07 T. YAMASAKI	TITLE RPU-013/016
CHECKED May 15 '07 T. TAKENO	名称 制御部
APPROVED May 17 '07 R. Esumi	外寸図
SCALE 1/8 MASS 10 ±10% kg	NAME PROCESSOR UNIT
DWG. No. C3519-G03-D	REF. No. 03-163-800G-3 OUTLINE DRAWING



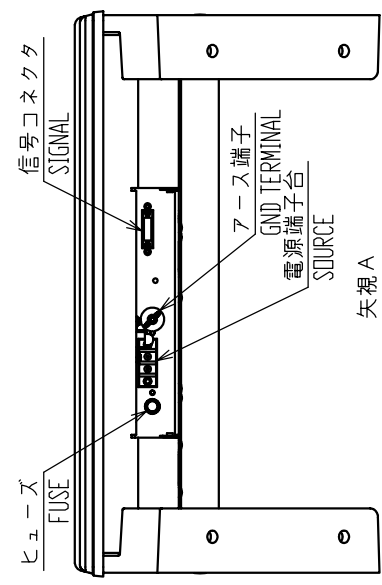
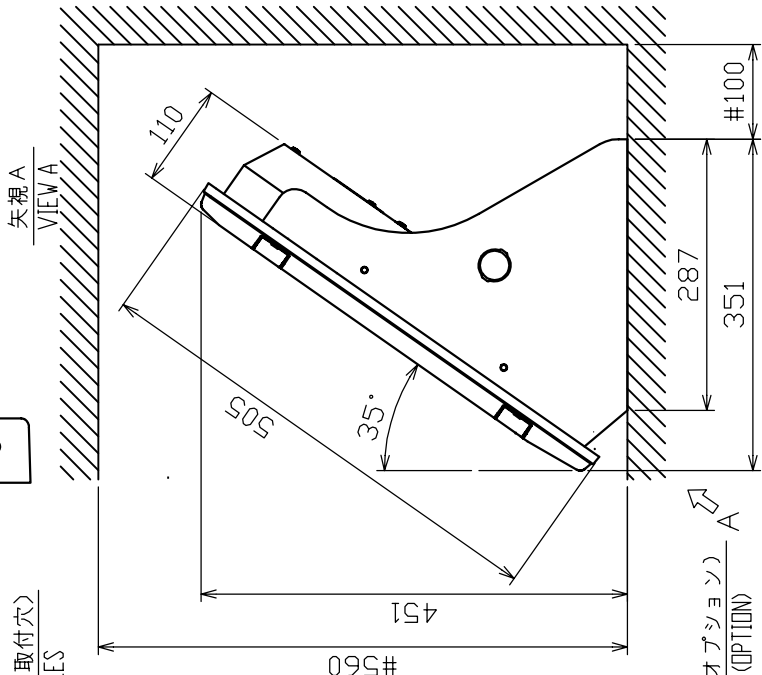
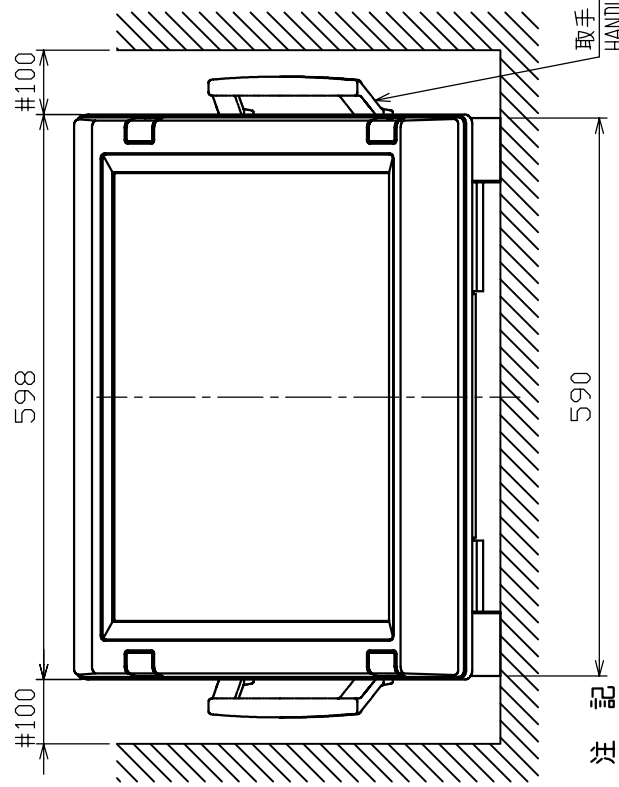
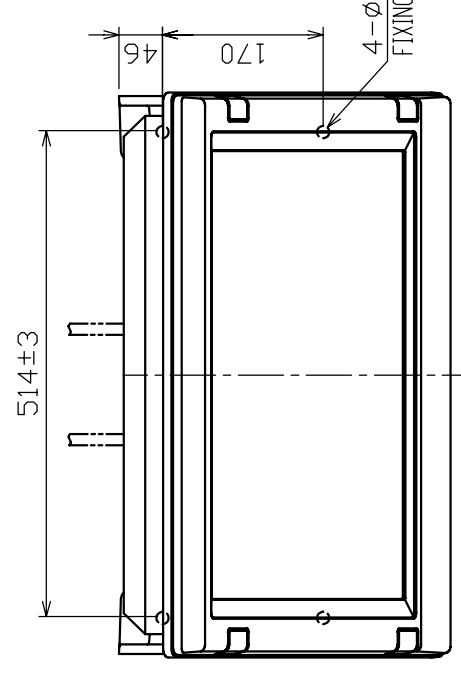
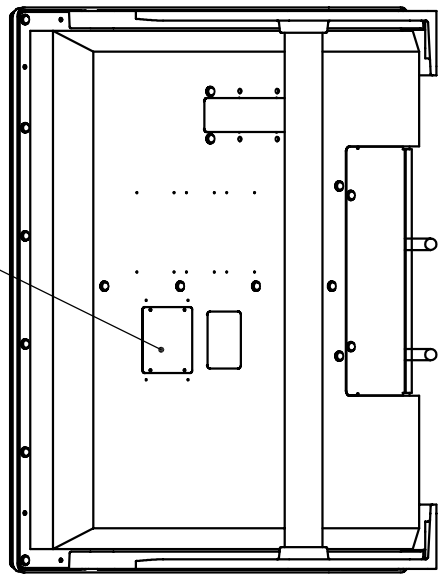


表 1 TABLE 1

寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
$L \leq 50$	$\pm 1.5$
$50 < L \leq 100$	$\pm 2.5$
$100 < L \leq 500$	$\pm 3$
$500 < L \leq 1000$	$\pm 4$



型式銘板  
NAMEPLATE



注 記  
1) #印寸法は最小サービス空間寸法とする。  
2) 指定外の寸法公差は表 1 による。  
3) 取付には M10 ボルトまたはコーチボルト呼び径 9 を使用のこと。

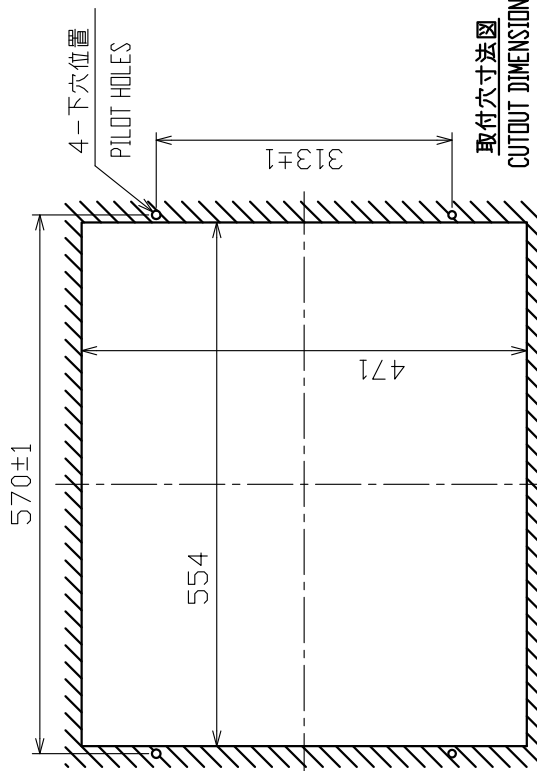
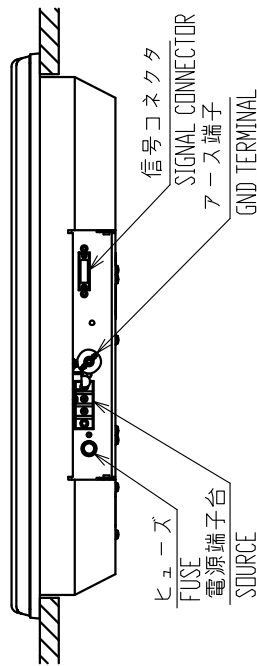
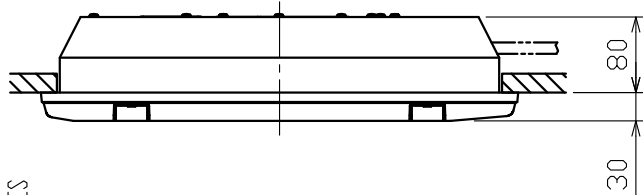
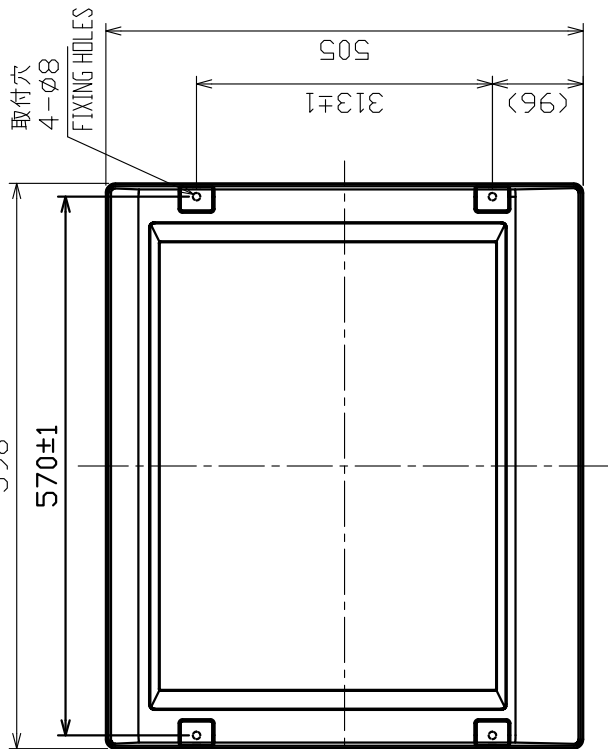
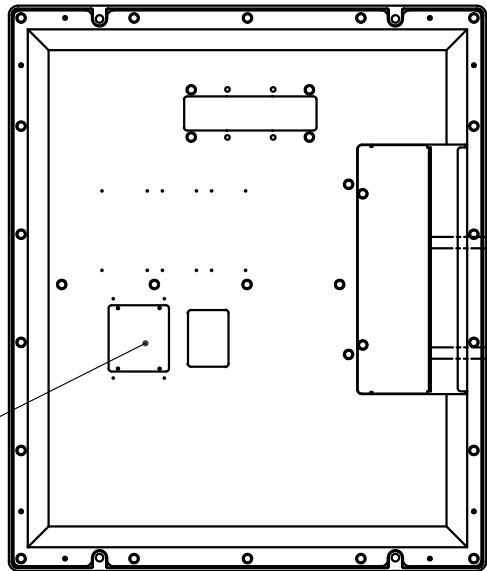
- NOTE
- # MINIMUM SERVICE CLEARANCE.
  - TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
  - USE M10 BOLTS OR COACH SCREWS φ9 FOR FIXING THE UNIT.

DRAWN	Jan. 7 '04	E. MIYOSHI	TITLE	MU-231CR
CHECKED		Takahashi T.	名称	表示部 (卓上装備)
APPROVED		Y. Hatai	外寸図	
SCALE	1/8	WKS 22	NAME	MONITOR UNIT (DESKTOP MOUNT)
DWG No.	C3524-G01-B	#006 kg		OUTLINE DRAWING
				03-163-200G-2

表 1 TABLE 1

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

型式銘板  
NAMEPLATE



取付穴寸法図  
CUTOUT DIMENSIONS

- 注 記 1) 指定外の寸法公差は表 1 による。  
 2) 取付には + トラスタップピンネジ呼び径 6×30 を使用のこと。
- NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.  
 2. USE TAPPING SCREWS  $\phi 6 \times 30$  FOR FIXING THE UNIT.

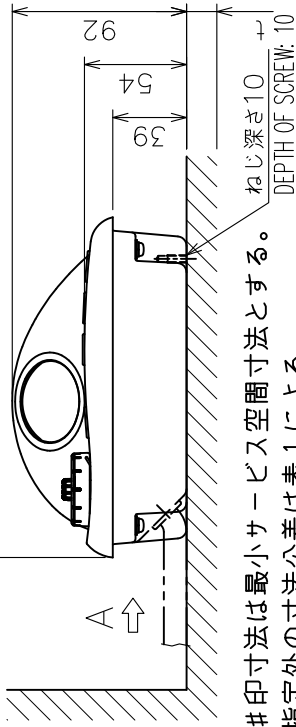
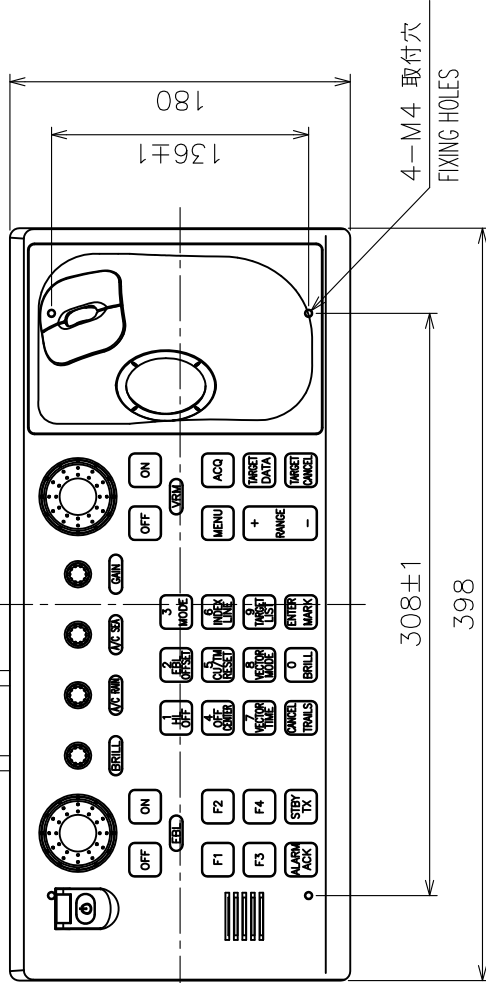
DRAWN	1/Sep/2010	T.YAMASAKI	TITLE	MU-231CR
CHECKED	1/Sep/2010	T.TAKAHASHI	名称	表示部 (埋込装備)
APPROVED	1/Sep/2010	Y.NISHIYAMA	外寸図	
SCALE	1/8	質量 15 kg	NAME	MONITOR UNIT (FLUSH MOUNT)
FIG.No.	C3524-G02-C	REF.No.	03-163-210G-2	OUTLINE DRAWING

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

制御部用  
TO CONTROL UNIT

リモート操作部用 (オプション)  
TO REMOTE CONTROL (OPTION)



- 注 記
- 1) # 印寸法は最小サービス空間寸法とする。
  - 2) 指定外の寸法公差は表 1 による。
  - 3) 取付用ネジはセムスB (M4X12) を使用のこと。  
取付面板厚 (t) は  $2 \leq t \leq 4$  とする。それ以外は、  
ネジ長さを  $(t + 7.8) \pm 2$  とする。

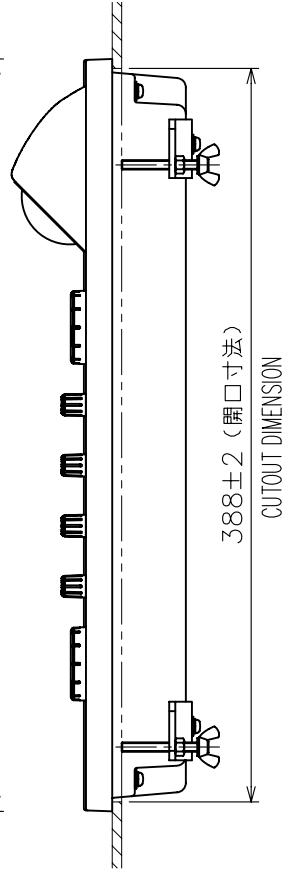
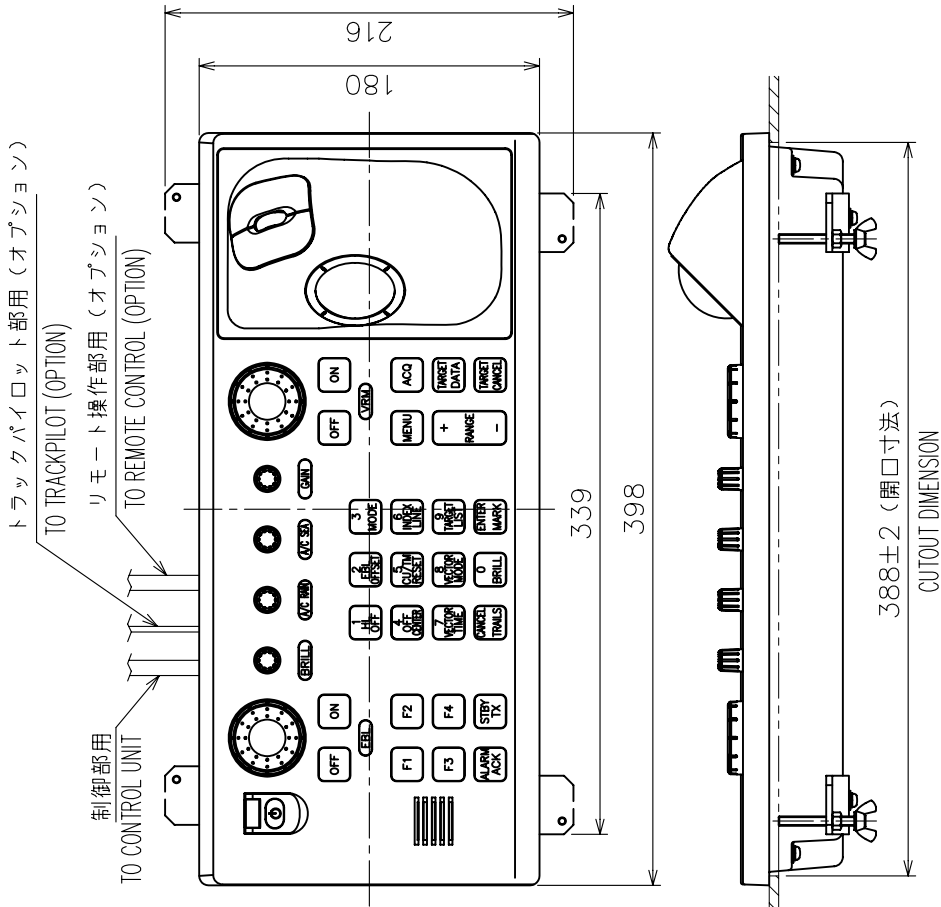
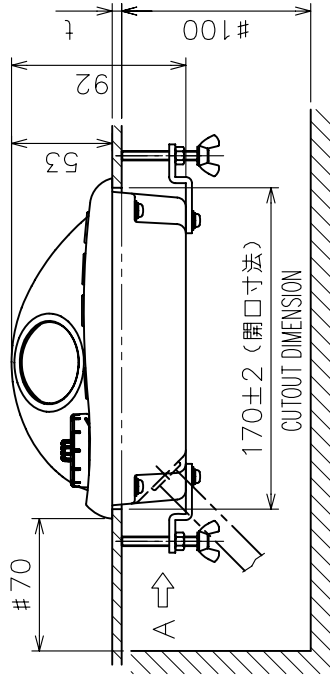
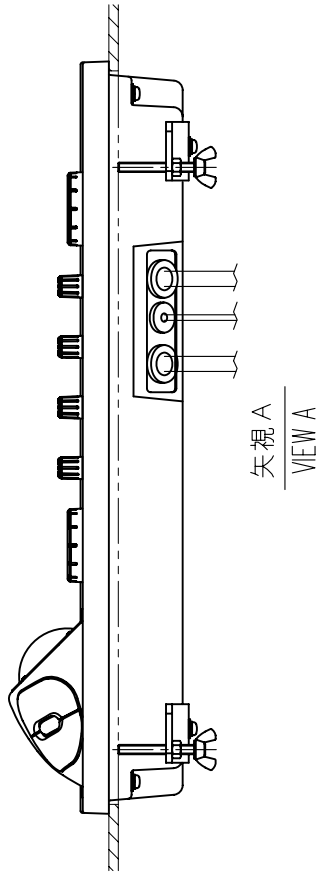
NOTE

1. # MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M4x12 SCREWS FOR FIXING THE UNIT.  
THICKNESS OF MOUNTING BOARD(t) SHOULD BE  $2 \leq t \leq 4$ .  
FOR THICKER ONE USE SCREW LENGTH:  $(t+7.8) \pm 2$ .

DRAWN	Jun. 11 '08	T. YAMASAKI	TITLE	RCU-014/020
CHECKED	Jun. 11 '08	I. TAKENO	名称	操作部
APPROVED	Jan. 18 '08	R. Esumi	外寸図	
SCALE	1/4	質量 3.7 kg	NAME	CONTROL UNIT
DWG.No.	C3519-G06-E	03-163-750G-4	OUTLINE DRAWING	

表 1 TABLE 1

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



- 注 記 1) #印寸法は最小サービス空間寸法とする。  
 2) 指定外の寸法公差は表1による。  
 3) 取付面板厚 (t) は最大20とする。

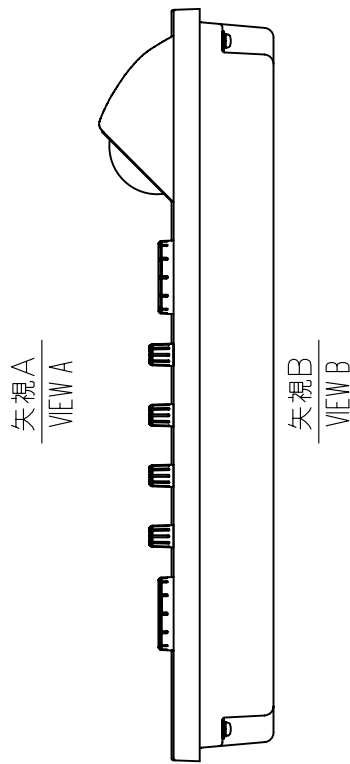
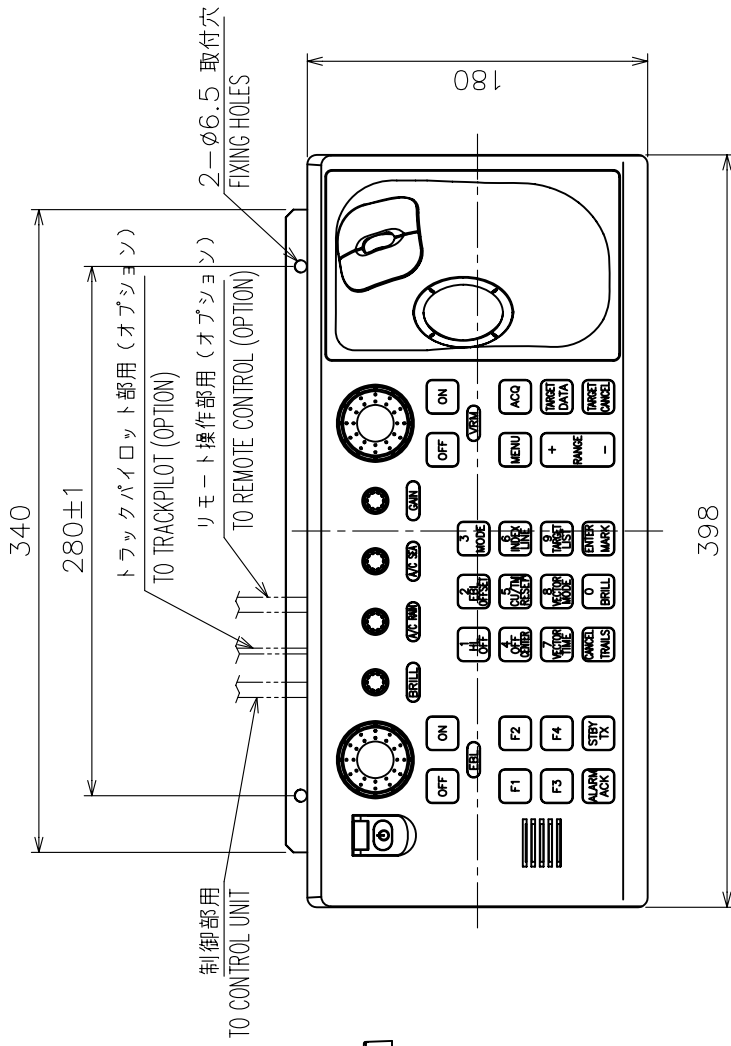
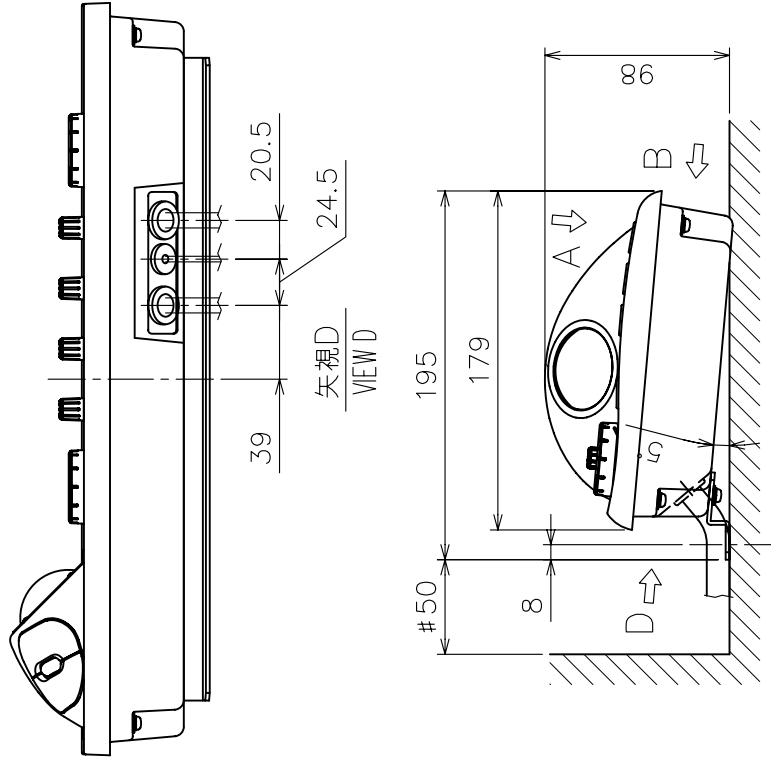
NOTE 1. # MINIMUM SERVICE CLEARANCE.

2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.  
 3. THICKNESS OF MOUNTING BOARD(t) SHOULD BE MAX. 20.

DRAWN	Apr. 19 '07	T. YAMASAKI	TITLE	RCU-014/020
CHECKED	Apr. 19 '07	I. TAKENO	名称	操作部 (埋込装備)
APPROVED	Apr. 23 '07	R. Esumi	外寸図	
SCALE	1/4	質量10mmケーブルを含む #10K 質量 3.8 kg	NAME	CONTROL UNIT (FLUSH MOUNT)
DWG.No.	C3524-G04-D	03-163-751G-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

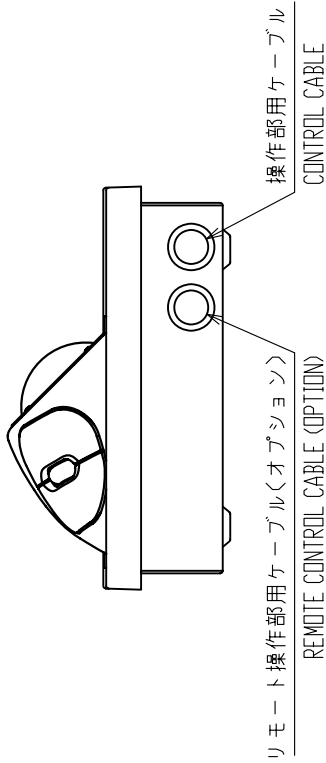
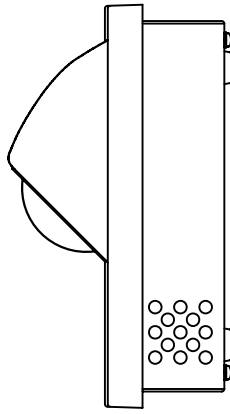
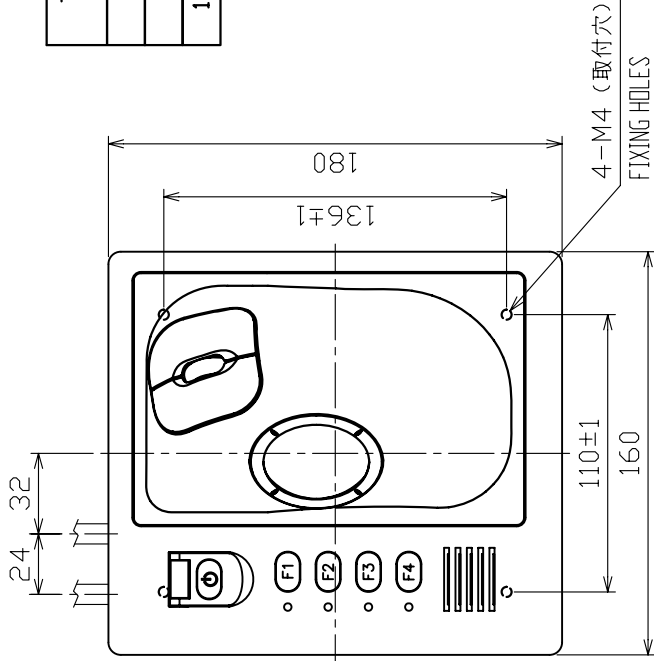


DRAWN	Apr. 19 '07	T. YAMASAKI	TITLE	RCU-014/020
CHECKED	Apr. 19 '07	T. TAKENO	名称	操作部 (直付金具装備)
APPROVED	Apr. 23 '07	R. Esumi	外寸図	
SCALE	1/4	質量は0.1mmスケールを含む #10M 質量は0.1mmスケールを含む MASS INCLUDES 10m CABLE	NAME	CONTROL UNIT (TABLETOP MOUNT W/KB PLATE)
DWG. No.	C3524-G05-C	03-163-752G-2		OUTLINE DRAWING

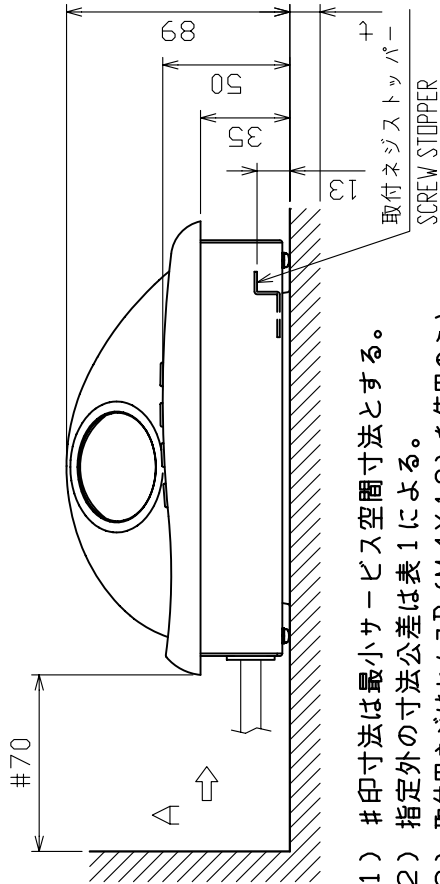
- 注 記
- 1) #印寸法は最小サービス空間寸法とする。
  - 2) 指定外の寸法公差は表 1 による。
  - 3) 取付用ネジはトラスタップネジ呼び径6、またはM6 ボルトを使用のこと。
- NOTE
1. # MINIMUM SERVICE CLEARANCE.
  2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
  3. USE TAPPING SCREW Ø6 OR M6 BOLTS FOR FIXING THE UNIT.

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



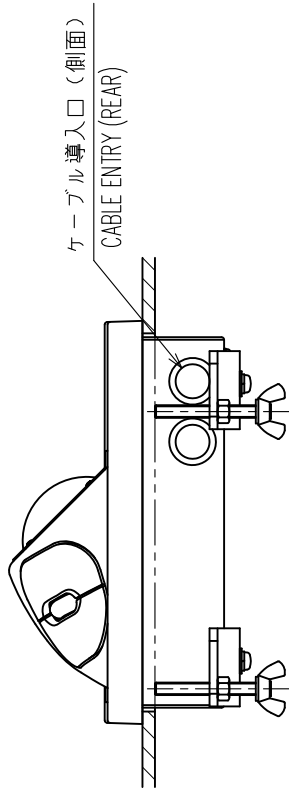
- 注 記
- 1) #印寸法は最小サービス空間寸法とする。
  - 2) 指定外の寸法公差は表1による。
  - 3) 取付用ネジはセムスB (M4×12) を使用のこと。  
取付面板厚(七)は2 ≤ t ≤ 5とする。それ以外は、  
ネジ長さを (t + 7.8) ± 2とする。

- NOTE
1. # MINIMUM SERVICE CLEARANCE.
  2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
  3. USE M4x12 SCREWS FOR FIXING THE UNIT.  
THICKNESS OF MOUNTING BOARD(t) SHOULD BE 2 ≤ t ≤ 5.  
FOR THICKER ONE USE SCREW LENGTH: (t+7.8)±2.

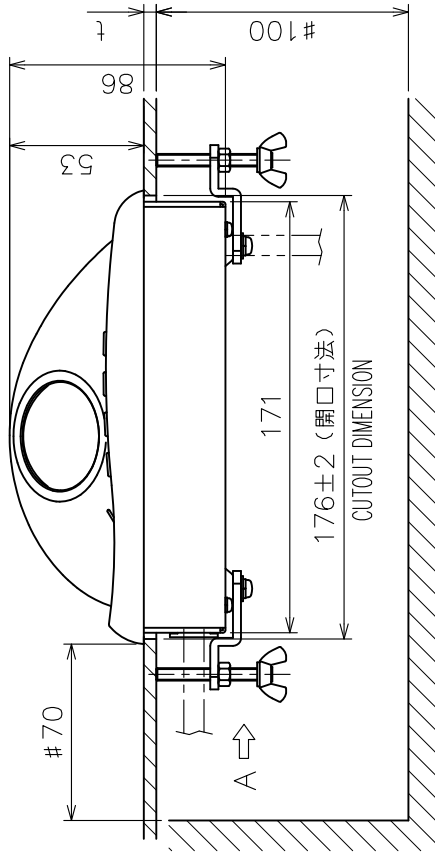
DRAWN	Apr. 17 '07	T. YAMASAKI	TITLE	RCU-015/015FEA
CHECKED	Apr. 17 '07	T. TAKENO	名称	操作部 (卓上装備)
APPROVED	Apr. 23 '07	R. Esumi	外寸図	
SCALE	1/3	質量 2.4 kg 質量中心位置を含む。	NAME	CONTROL UNIT (DESKTOP MOUNT)
DWG.No.	C3519-G13-C	REF.No.	03-163-785G-2	OUTLINE DRAWING

表 1 TABLE 1

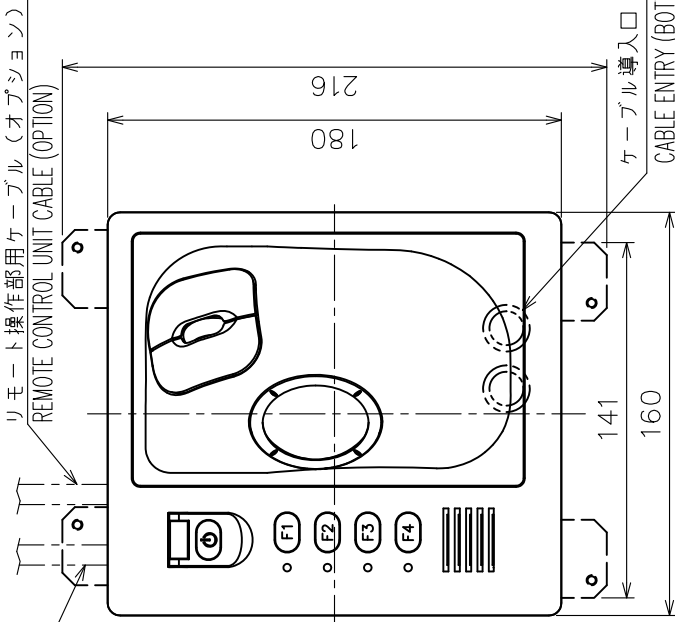
寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
$L \leq 50$	$\pm 1.5$
$50 < L \leq 100$	$\pm 2.5$
$100 < L \leq 500$	$\pm 3$



矢視 A  
VIEW A



176 ± 2 (開口寸法)  
CUTOUT DIMENSION



ケーブル導入口 (底面)  
CABLE ENTRY (BOTTOM)

注 記

- 1) #印寸法は最小サービス空間寸法とする。
- 2) 指定外の寸法公差は表 1 による。
- 3) ケーブル導入口は側面・底面から選択のこと。
- 4) 取付面板厚 (t) は最大 1.0 とする

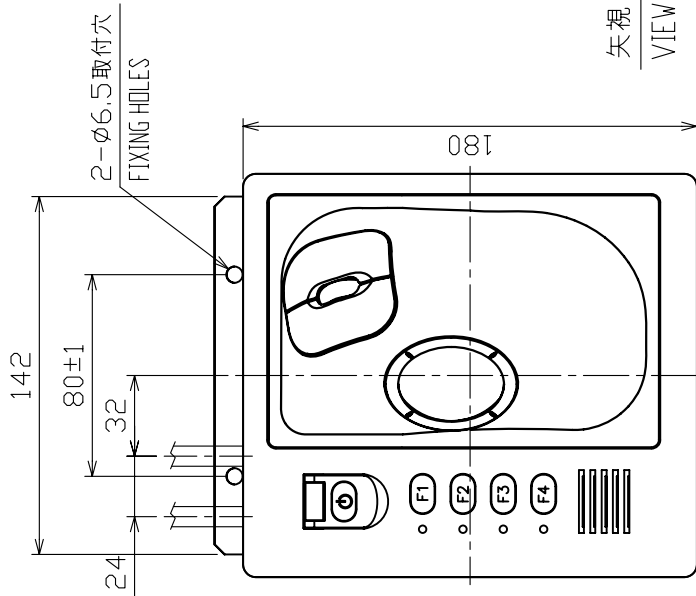
NOTE

1. # MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. SELECT CABLE ENTRY FROM REAR OR SIDE.
4. THICKNESS OF MOUNTING BOARD (t) SHOULD BE MAX. 1.0.

DRAWN	Apr. 19 '07	I. YAMASAKI	TITLE	RCU-015/015FEA
CHECKED	Apr. 19 '07	T. TAKENO	名称	操作部 (埋込装備)
APPROVED	Apr. 23 '07	R. Esumi	外寸図	
SCALE	1/3	質量 2.5 kg	NAME	CONTROL UNIT (FLUSH MOUNT)
DMG.No.	C3519-G14-D	質量 (100%) のケーブルを含む。 MASS INCLUDES 10m CABLE	OUTLINE DRAWING	
				03-163-786G-2

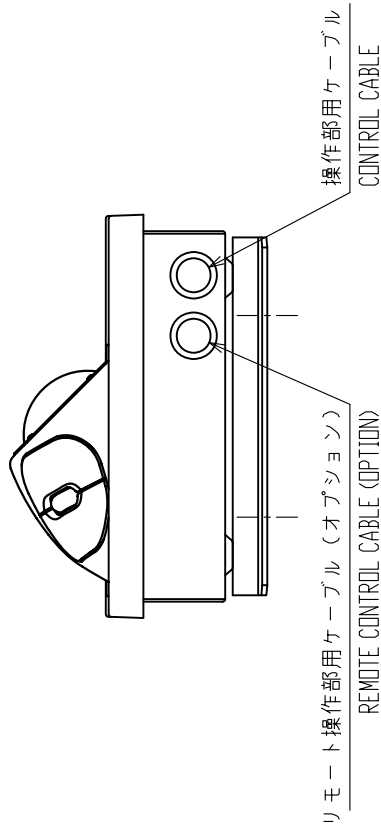
表 1 TABLE 1

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

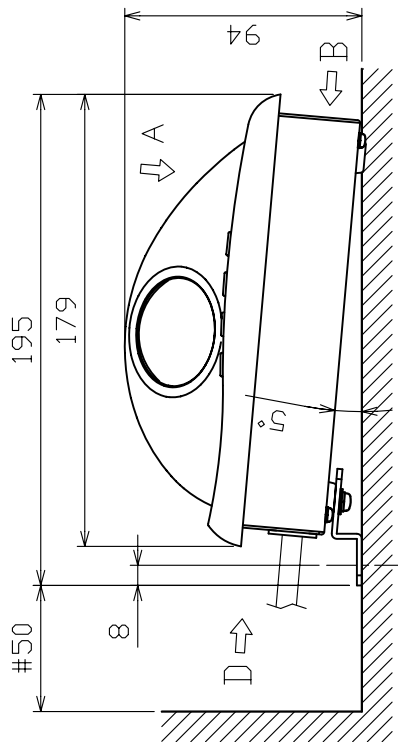


矢視 A  
VIEW A

矢視 B  
VIEW B



矢視 D  
VIEW D



注 記

- 1) #印寸法は最小サービス空間寸法とする。
- 2) 指定外の寸法公差は表 1 による。
- 3) 取付にはトラスタップピンネジ呼び径6またはM6 ボルトを使用のこと。

NOTE

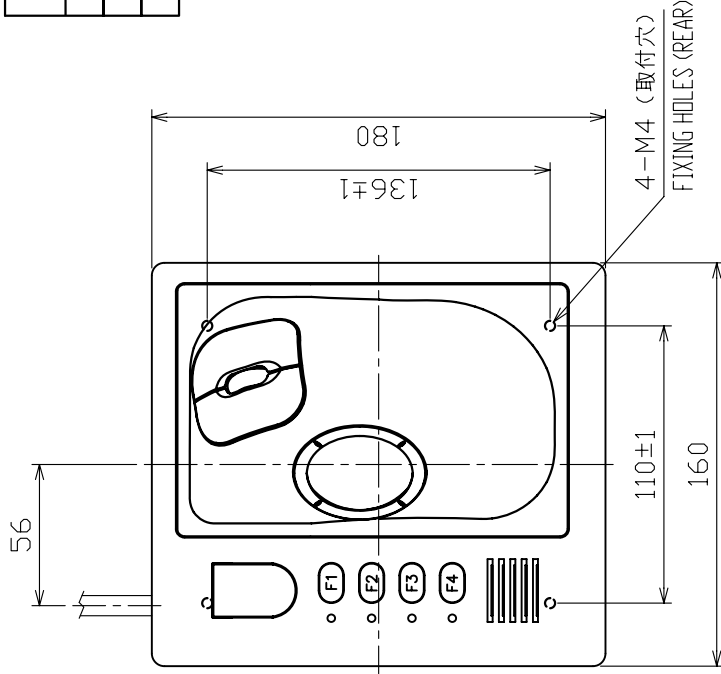
1. # MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE TAPPING SCREWS #6 OR M6 BOLTS FOR FIXING THE UNIT.

DRAWN	Apr. 19 '07	T. YAMASAKI	TITLE	RCU-015/015FEA
CHECKED	Apr. 19 '07	T. TAKENO	名称	操作部 (取付金具装備)
APPROVED	Apr. 23 '07	R. Esumi	外寸図	
SCALE	1/3	質量 2.5 kg	NAME	CONTROL UNIT (TABLETOP MOUNT W/ FIXTURE)
FIG. No.	C3519-G15-C	質量は10mmワッフル蓋を含む。 MASS W/ 10mm CABLE		OUTLINE DRAWING
				03-163-787G-1



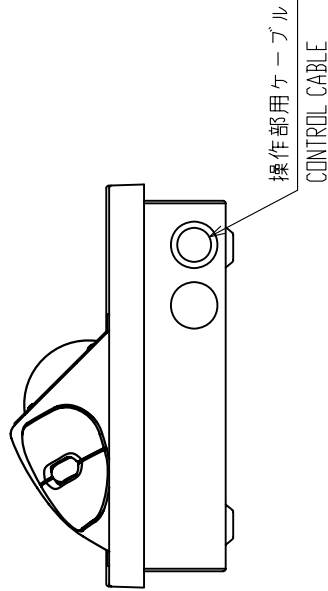
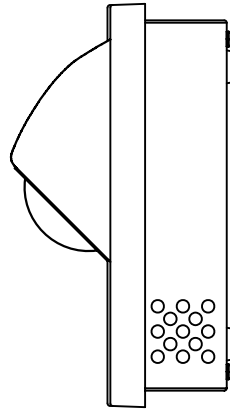
表 1 TABLE 1

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

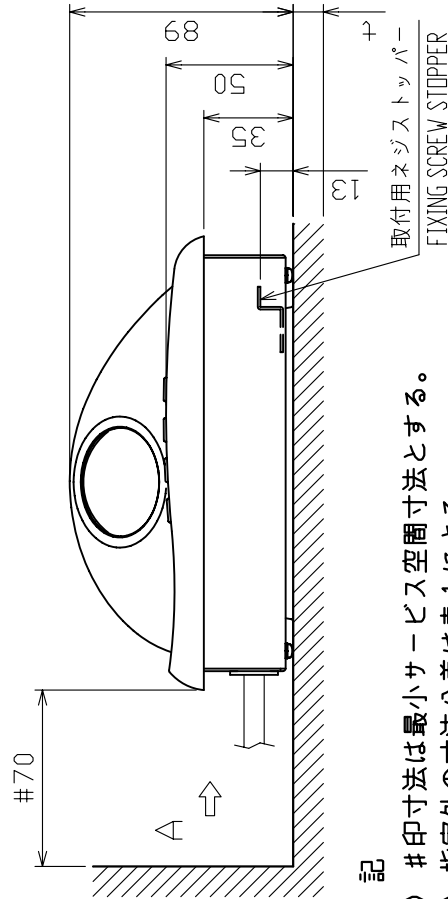


NOTE

1. # MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M4X12 SCREWS FOR FIXING. THICKNESS OF MOUNTING BOARD SHOULD BE  $2 \leq t \leq 5$ . FOR USING GREATER THICKNESS, USE SCREW WHOSE LENGTH IS  $(t+7.8) \pm 2$ .



矢視A  
VIEW A



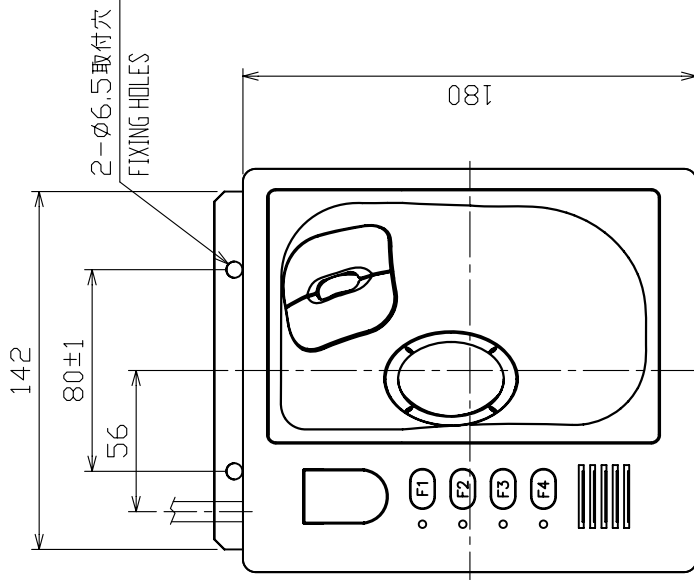
注 記

- 1) # 印寸法は最小サービス空間寸法とする。
- 2) 指定外の寸法公差は表 1 による。
- 3) 取付用ネジはセムスB (M4X12) を使用のこと。  
取付面板厚(t)は  $2 \leq t \leq 5$  とする。  
それ以外はネジ長さ  $(t+7.8) \pm 2$  のセムスBを使用のこと。

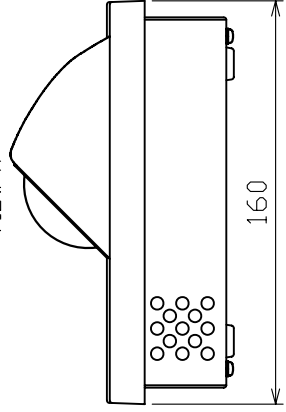
DRAWN	Feb. 7 '07	E. MIYOSHI	TITLE	RCU-016
CHECKED		TAKAHASHI, T	名称	操作部 (卓上装備)
APPROVED		Y. Hatai	外寸図	
SCALE	1/3	質量 2.4 kg 寸法 10ヶ所 質量 10ヶ所 質量 10ヶ所	NAME	CONTROL UNIT (DESKTOP MOUNT)
DWG. No.	C3519-G16-C	03-163-780G-4		OUTLINE DRAWING

表 1 TABLE 1

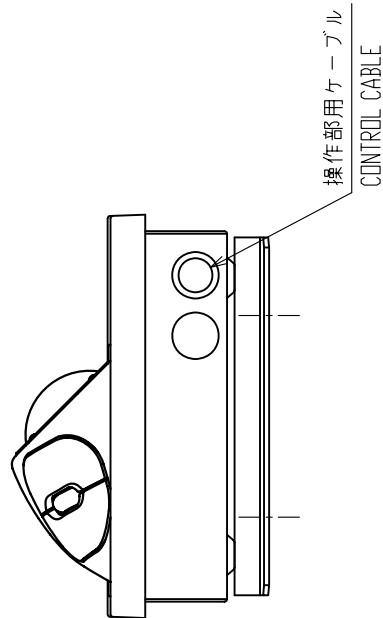
寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
L ≤ 50	± 1.5
50 < L ≤ 100	± 2.5
100 < L ≤ 500	± 3



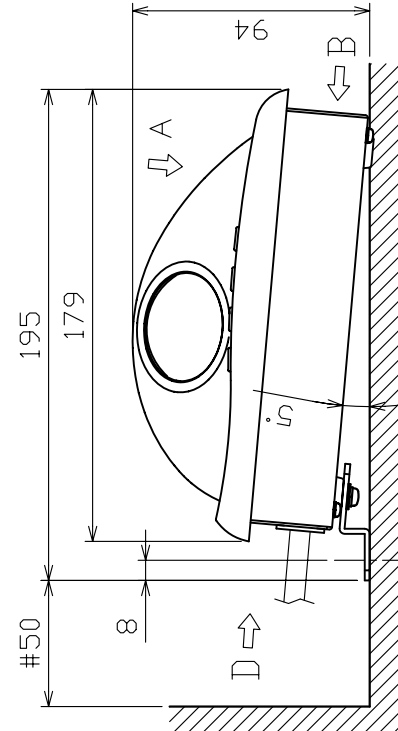
矢視 A  
VIEW A



矢視 B  
VIEW B



矢視 D  
VIEW D



注 記

- 1) #印寸法は最小サービスクリアランスとする。
- 2) 指定外の寸法公差は表 1 による。
- 3) 取付用ネジはトラスクピピンネジ呼び径6、またはM6ボルトを使用のこと。

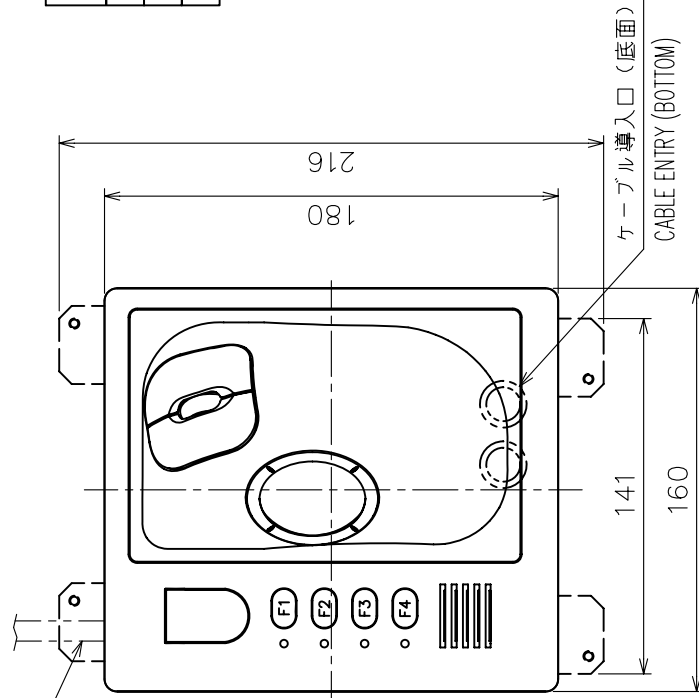
NOTE

1. # MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS, WHICH IS NOT SPECIFIED.
3. USE TAPPING SCREWS φ6 OR M6 BOLTS FOR FIXING THE UNIT.

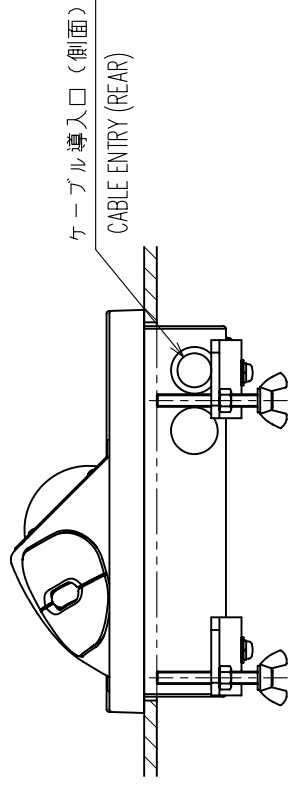
DRAWN	Feb. 5 '07	E. MIYOSHI	TITLE	RCU-016
CHECKED		TAKAHASHI, T	名称	操作部 (取付金具装備)
APPROVED		Y. Ho tai	外寸図	
SCALE	1/3	SCALE 2.5倍 質量100g以下を要す。 MASS W/ 100g CABLE	NAME	CONTROL UNIT (TABLETOP MOUNT W/ FIXTURE)
FIG.No.	C3519-G12-C	03-163-782G-2		OUTLINE DRAWING

表 1 TABLE 1

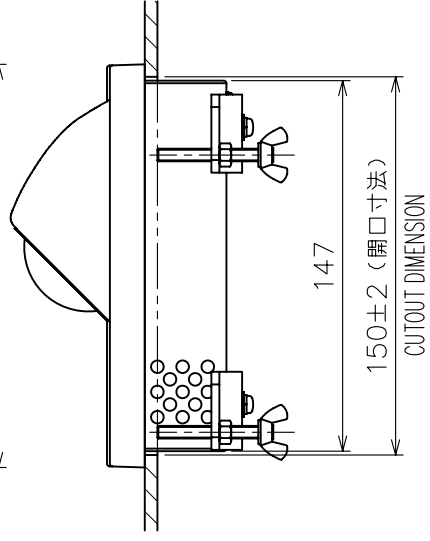
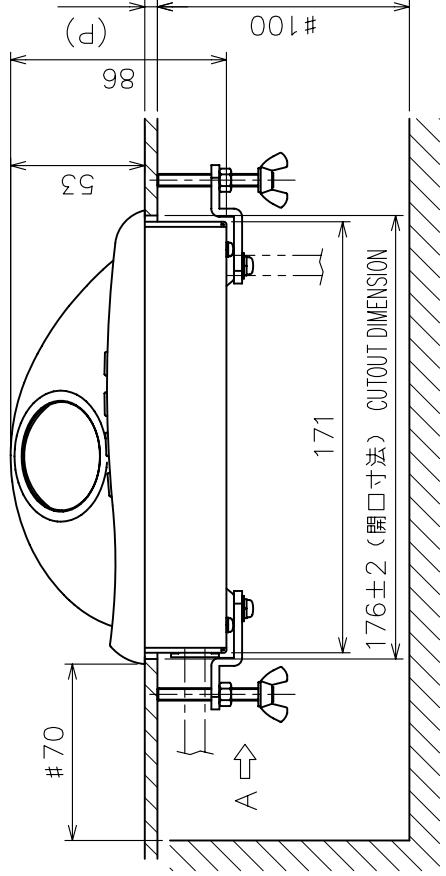
寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
$L \leq 50$	$\pm 1.5$
$50 < L \leq 100$	$\pm 2.5$
$100 < L \leq 500$	$\pm 3$



操作部用ケーブル  
CONTROL UNIT CABLE



矢視 A  
VIEW A



注 記

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

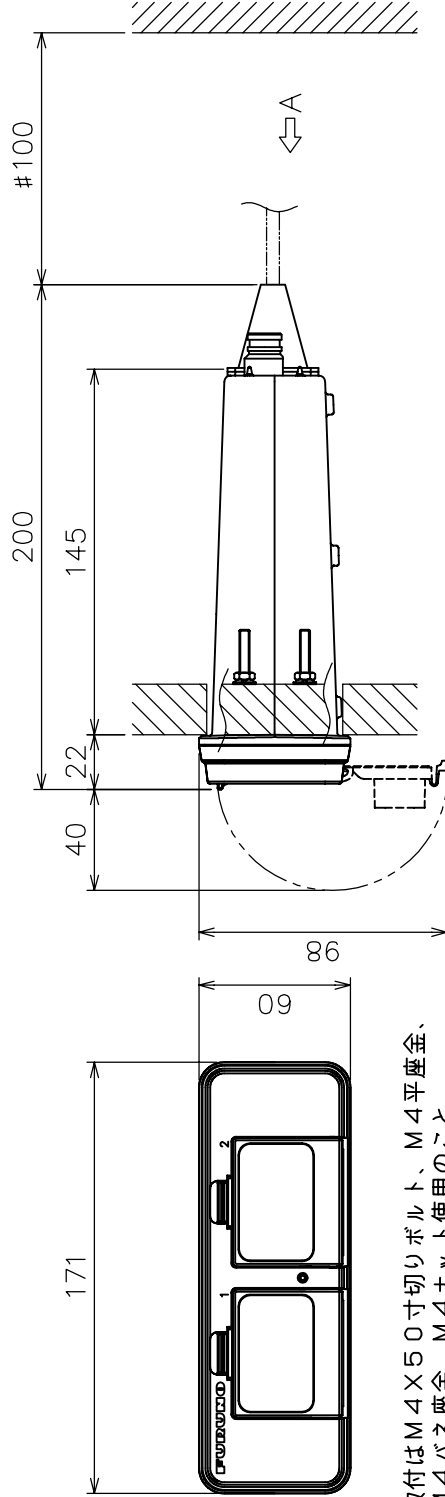
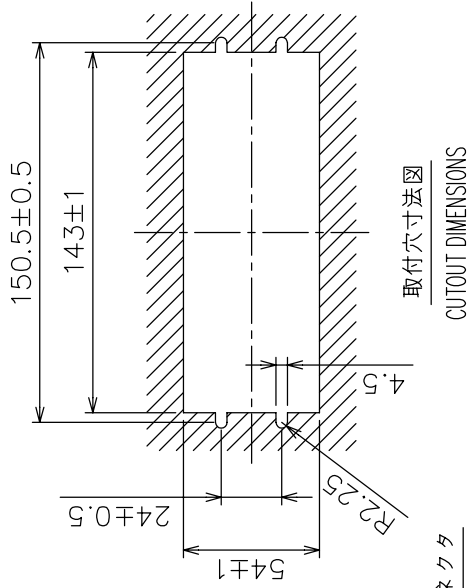
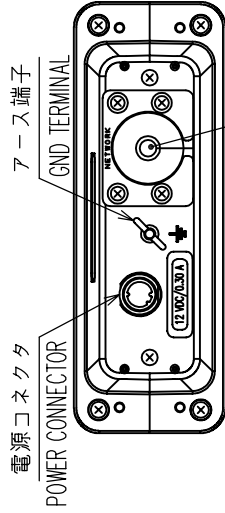
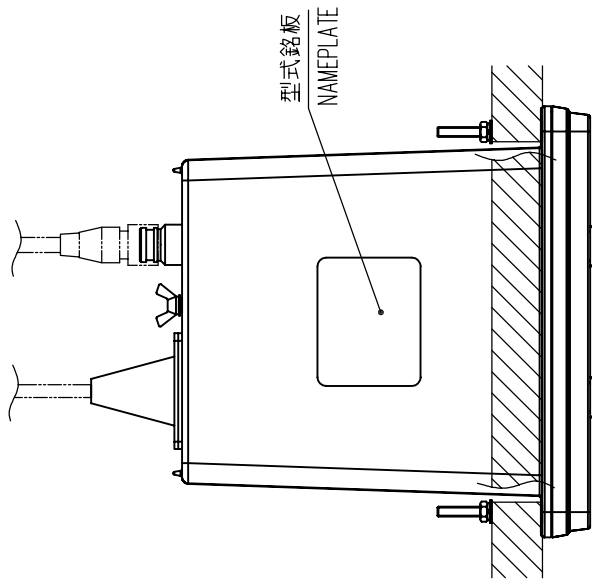
NOTE

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

DRAWN	Feb. 6 '07.	E. MIYOSHI	TITLE	RCU-016
CHECKED		TAKAHASHI, T	名称	操作部 (埋込装備)
APPROVED		Y. Hotoi	外寸図	
SCALE	1/3	MASS ±10% FAR-2117 SER. 質量 10mm <sup>2</sup> ケーブル厚さを含む。 MASS W/ 10m CABLE	NAME	CONTROL UNIT (FLUSH MOUNT)
DMG.No.	C3519-G11-D	03-163-781G-4	OUTLINE DRAWING	

表 1 TABLE 1

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



- 注 記
- 1) 取付は M4X50 寸切りボルト、M4 平座金、M4 バネ座金、M4 ナット 使用のこと。
  - 2) # 印寸法は最小サービスクリアランスとする。
  - 3) 指定外の寸法公差は表 1 による。

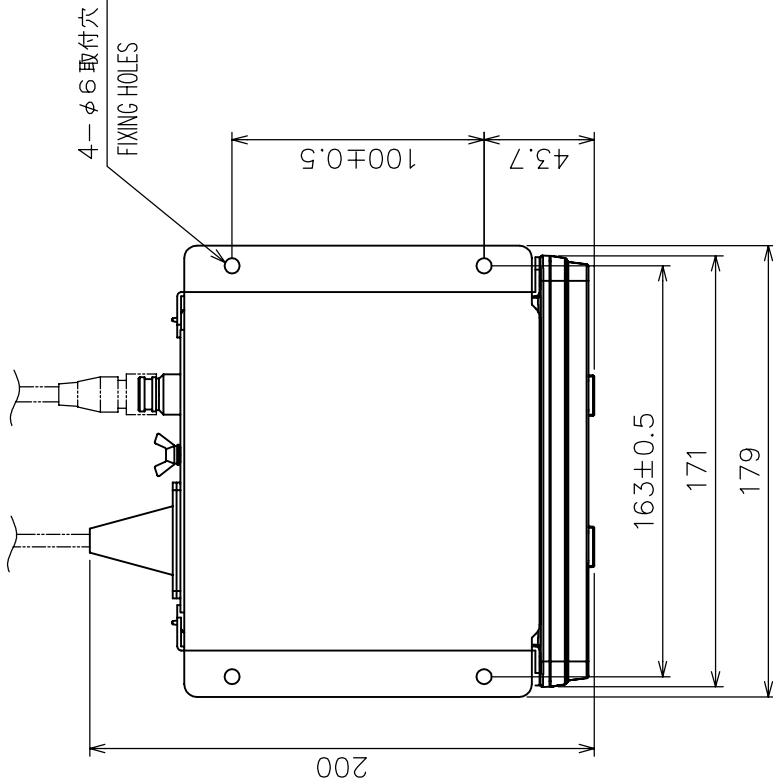
- NOTE
1. USE M4X50 BOLTS, M4 FLAT WASHERS, M4 SPRING WASHERS AND M4 NUTS FOR FIXING.
  2. # MINIMUM SERVICE CLEARANCE.
  3. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

DRAWN	Mar. 29 '04 E. MIYOSHI	FAR-2117 SERIES	TITLE	CU-200
CHECKED	TAKAHASHI, T	MODEL 1833C	名称	防水型カードインターフェース(埋込装備)
APPROVED	Y. Hatai	MODEL 1833C-BB	外寸図	
SCALE	1/3	1/3	NAME	MEMORY CARD INTERFACE UNIT (FLUSH MOUNT)
DWG.No.	C3532-004-B	19-023-300G-1		OUTLINE DRAWING

表 1 TABLE 1

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

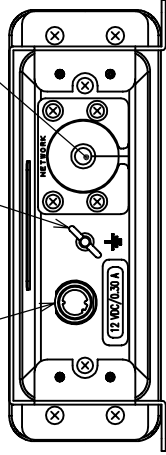
4-φ6 取付穴  
FIXING HOLES



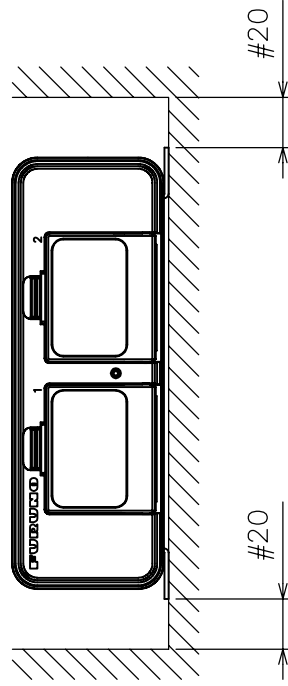
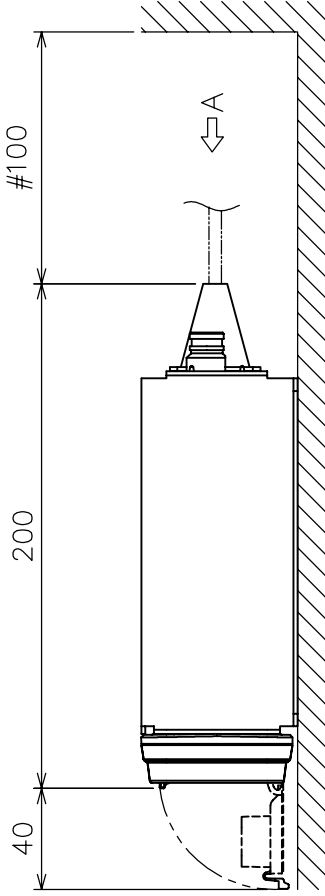
電源コネクタ  
POWER CONNECTOR

アース端子  
GND TERMINAL

イーサネットコネクタ  
ETHERNET CONNECTOR



矢視 A  
VIEW A



- 注 記
- # 印寸法は最小サービス空間寸法とする。
  - 指定外の寸法公差は表 1 による。
  - 取付用ネジは + トラスタップピンネジ呼び径 5 × 2.0 を使用のこと。
- NOTE
- # MINIMUM SERVICE CLEARANCE.
  - TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
  - USE SELF-TAPPING SCREWS 5X2.0 FOR FIXING THE UNIT.

DRAWN	Mar. 29 '04	E. MIYOSHI	FAR-2117 SERIES	TITLE	CU-200
CHECKED		TAKAHASHI, T	MODEL 1833C	名称	防水型カードインターフェイス(卓上装備)
APPROVED		Y. Hatai	MODEL 1833C-BB		外寸図
SCALE	1/3	1/MS	FORM 1.3	NAME	MEMORY CARD INTERFACE UNIT (TABLETOP MOUNT)
DWG. No.	C3532-005-B		19-023-310G-1		OUTLINE DRAWING

注記

- 1) #印寸法は最小サービス空間寸法とする。
- 2) 指定外の寸法公差は表1による。
- 3) 取付用ナットはM4ナットを使用のこと。
- 4) 取付板厚は最大8mmとする。

NOTE

1. # MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE NUT M4 FOR FIXING THE UNIT.
4. MAX. MOUNTING BASE THICKNESS IS 8 MM.

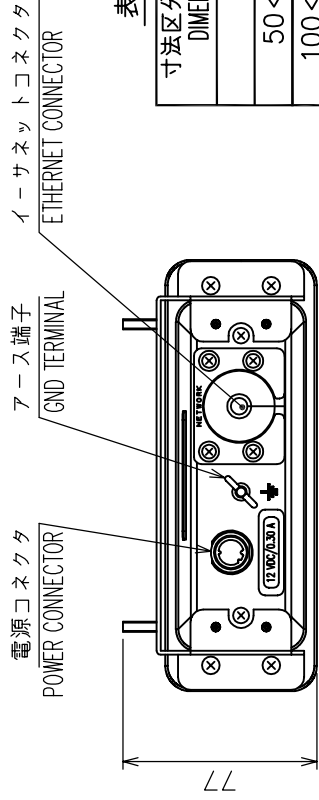
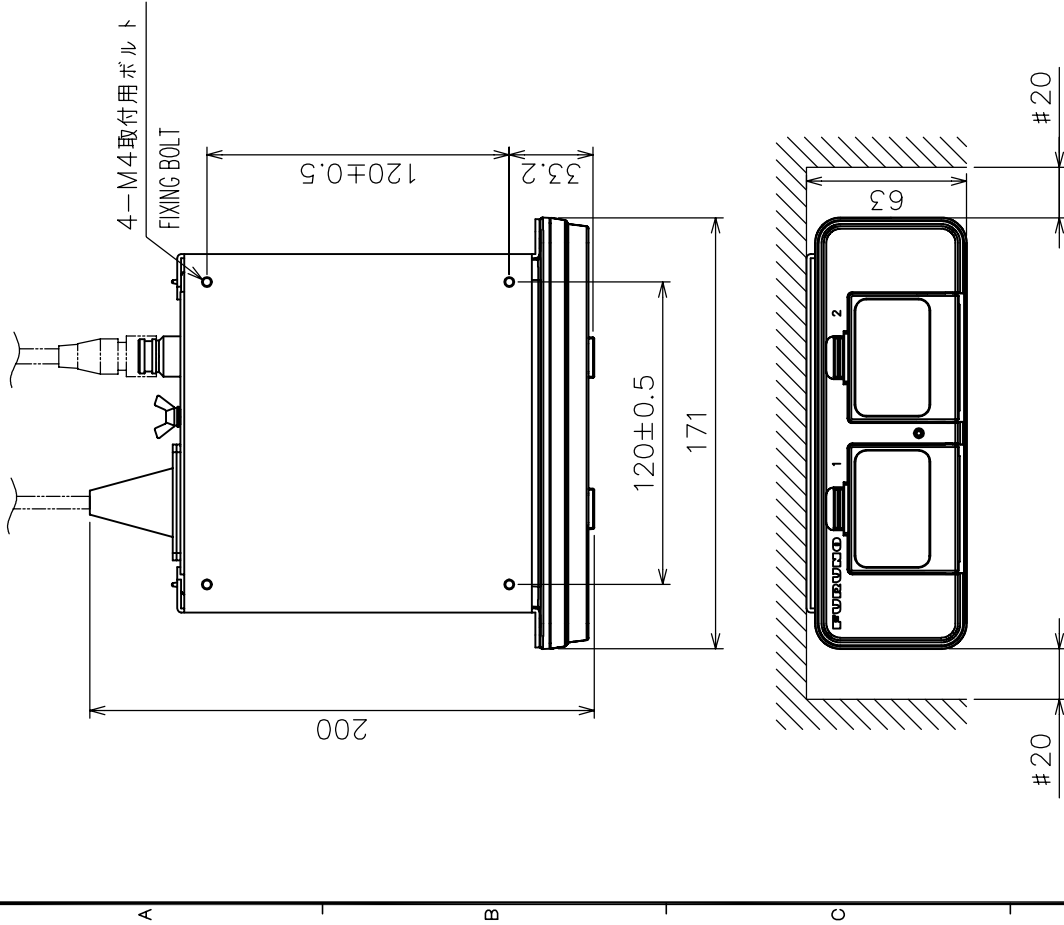
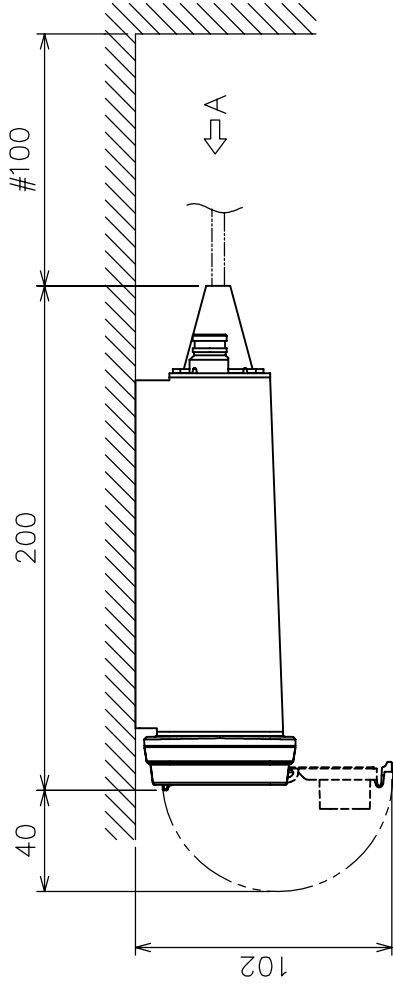


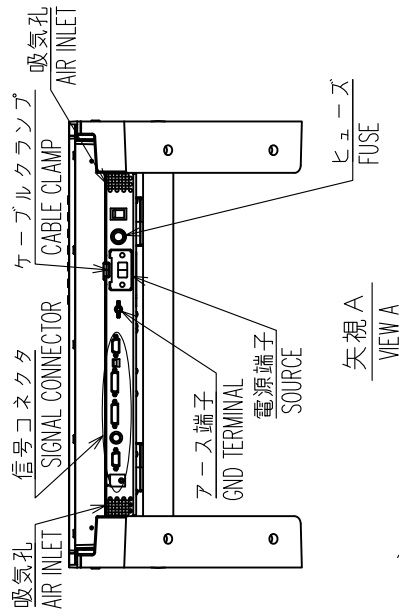
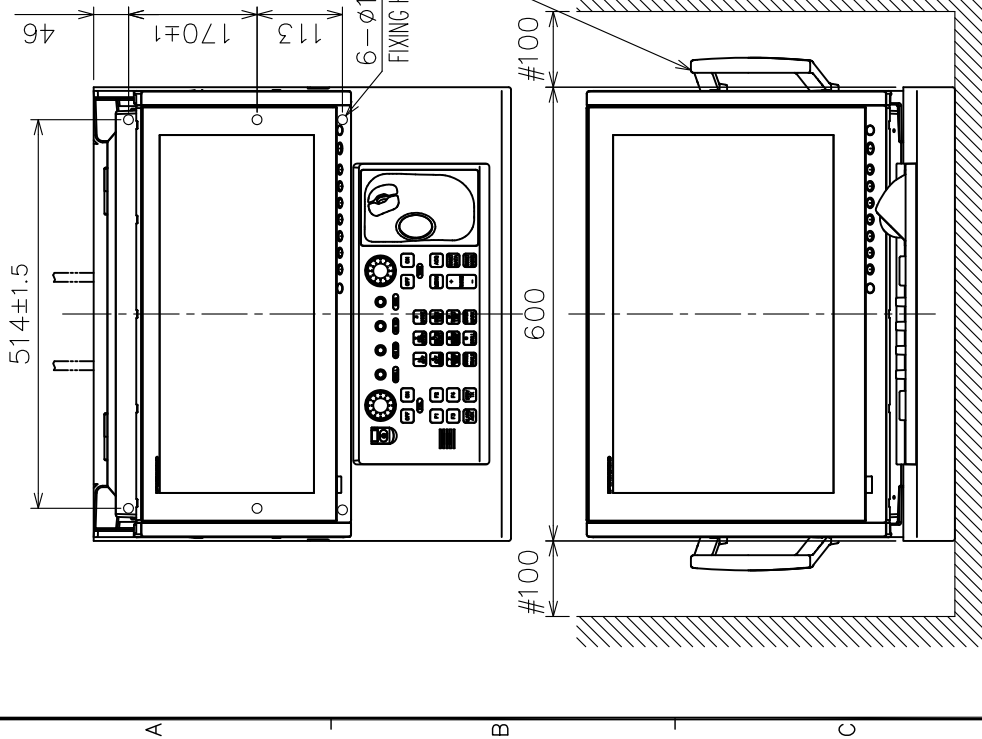
表 1 TABLE 1

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

矢視 A  
VIEW A



DRAWN	Mar. 29, '04 E. MIYOSHI	FAR-2117 SERIES	TITLE	CU-200
CHECKED	TAKAHASHI, T	MODEL 1833C	名 称	防水型カードインターフェイス(天井装備)
APPROVED	Y. Hatai	MODEL 1833C-BB	外寸図	
SCALE	1/3	1/3	NAME	MEMORY CARD INTERFACE UNIT (OVERHEAD MOUNT)
DWG.No.	C3532-006-B	19-023-320G-1		OUTLINE DRAWING



取手 (オプション)  
HANDLE (OPTION)

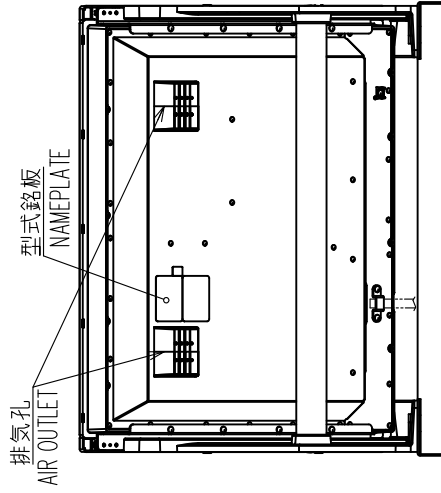
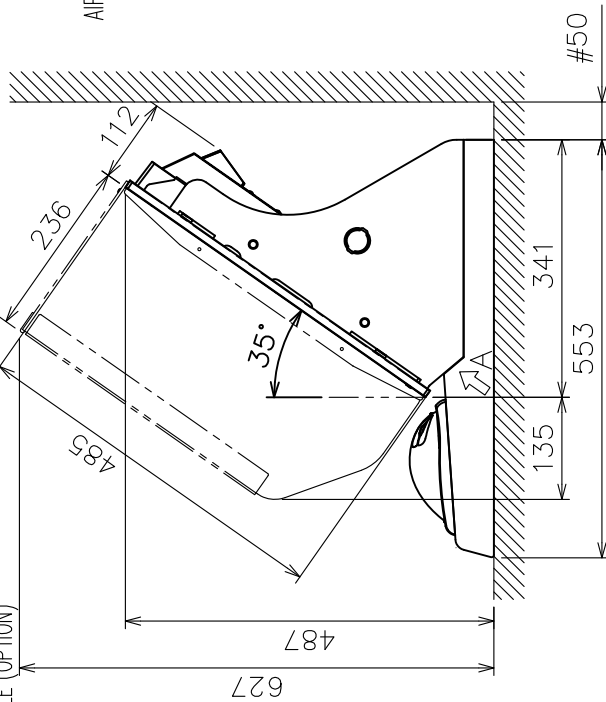


表1 TABLE 1

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

## 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M10ボルト、またはコーチボルト呼び径9を使用のこと。
- 4) 質量は操作部ケーブル(10m)を含む。

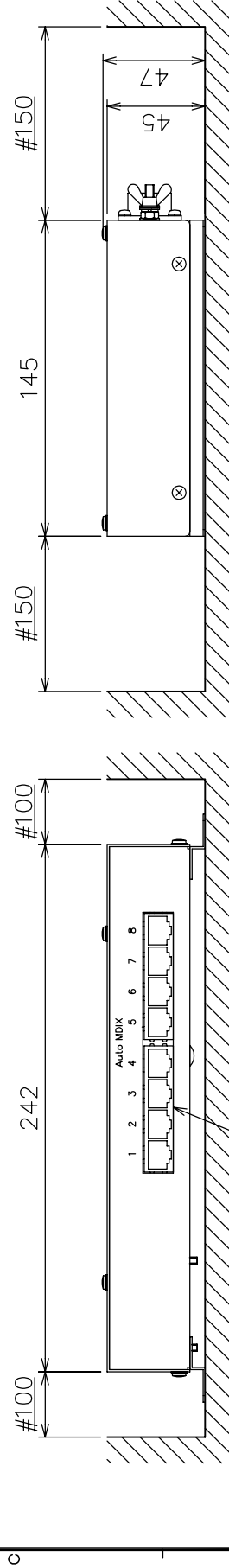
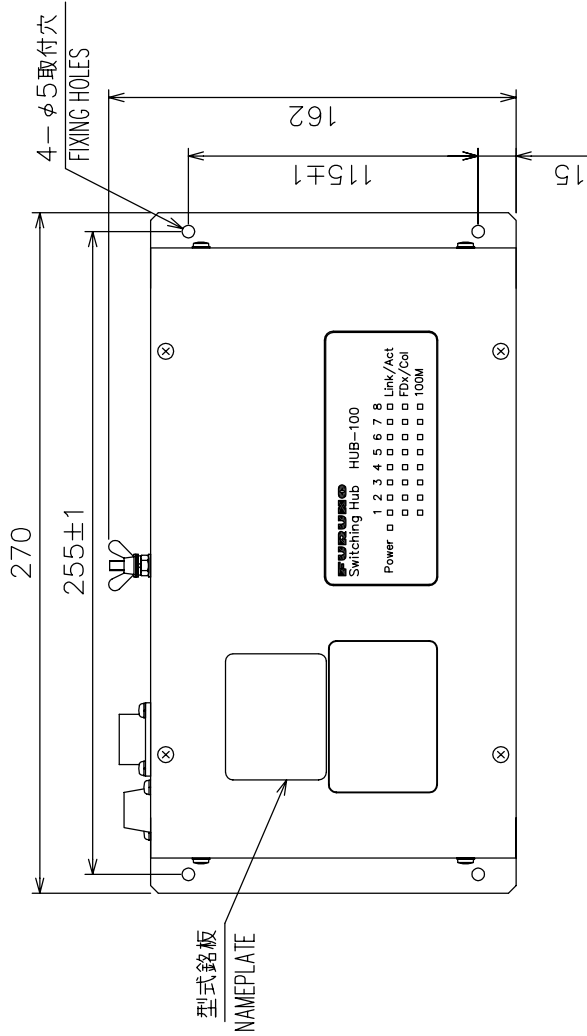
## NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. # MINIMUM SERVICE CLEARANCE.
3. USE M10 BOLTS OR COACH SCREWS  $\phi$ 9 FOR FIXING THE UNIT.
4. MASS INCLUDES CONTROL CABLE (10m).

DRAWN	18/May/2011	T.YAMASAKI	TITLE	MU-231 W/RCU-014
CHECKED	18/May/2011	H.MAKI	名称	表示部 (連結タイプ)
APPROVED	20/May/2011	Y.NISHIYAMA	外寸図	
SCALE	1/10	MASS 30 kg	NAME	DISPLAY UNIT (COMBINATION TYPE)
DWG No.	C3524-G07-B	03-163-761G-3	OUTLINE DRAWING	

表 1 TABLE 1

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



注 記

- 1) 取付ネジはトラスタップネジ呼び径4×16を使用のこと
- 2) 指定外寸法公差は表1による
- 3) #印寸法は最小サービス空間寸法とする

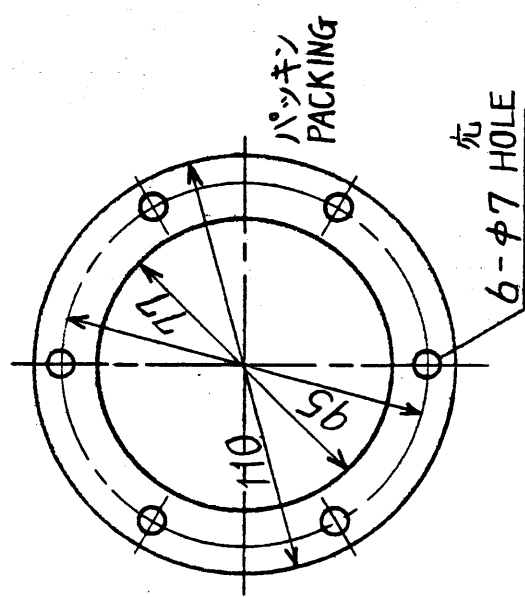
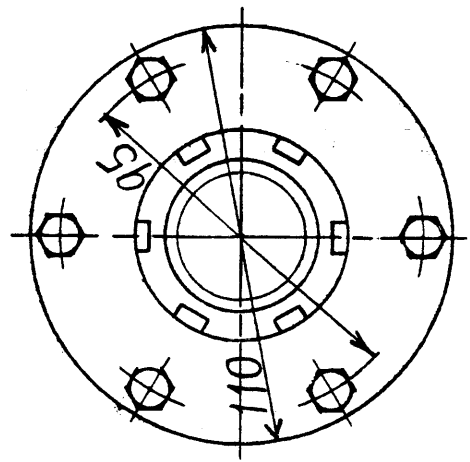
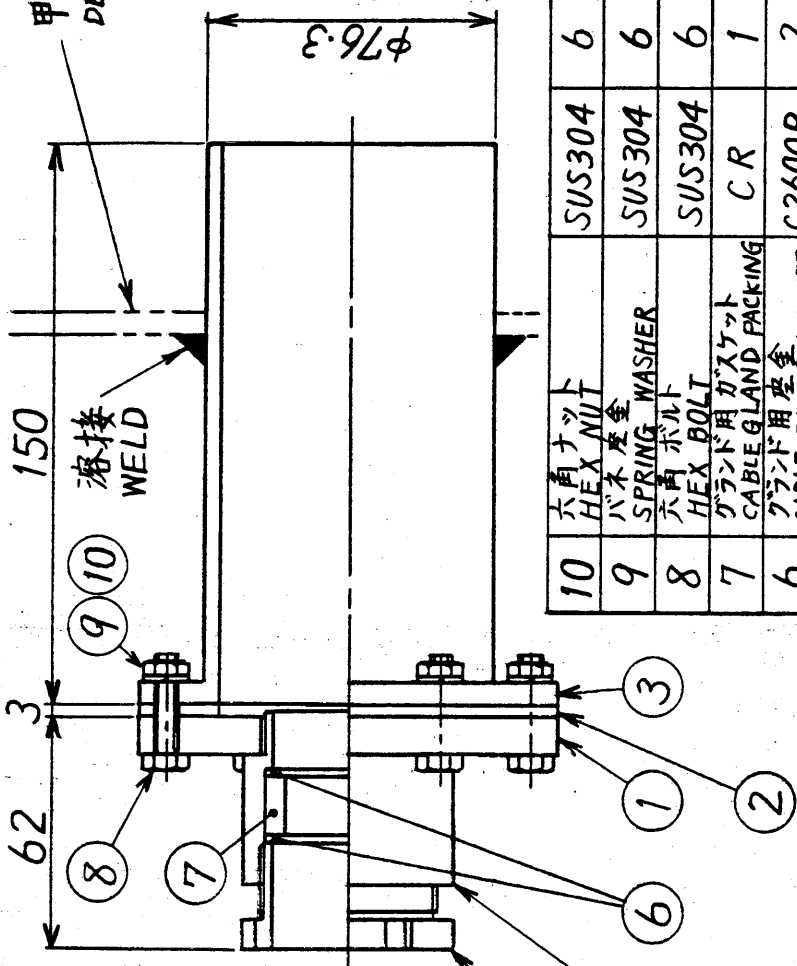
NOTE

1. USE TAPPING SCREWS 4x16 FOR FIXING THE UNIT.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. # MINIMUM SERVICE CLEARANCE.

DRAWN	Mar. 31 '04	T. YAMASAKI	TITLE	HUB-100
CHECKED	Mar. 31 '04	T. MATSUGUCHI	名称	イーサネットスイッチングハブ
APPROVED	Apr. 05 '04	マツグチ	外寸図	
SCALE	1/3	MASS 1.5 kg ±10%	NAME	SWITCHING HUB
DWG.No.	C3519-G18-B			OUTLINE DRAWING



甲板又は隔壁  
DECK OR BULKHEAD

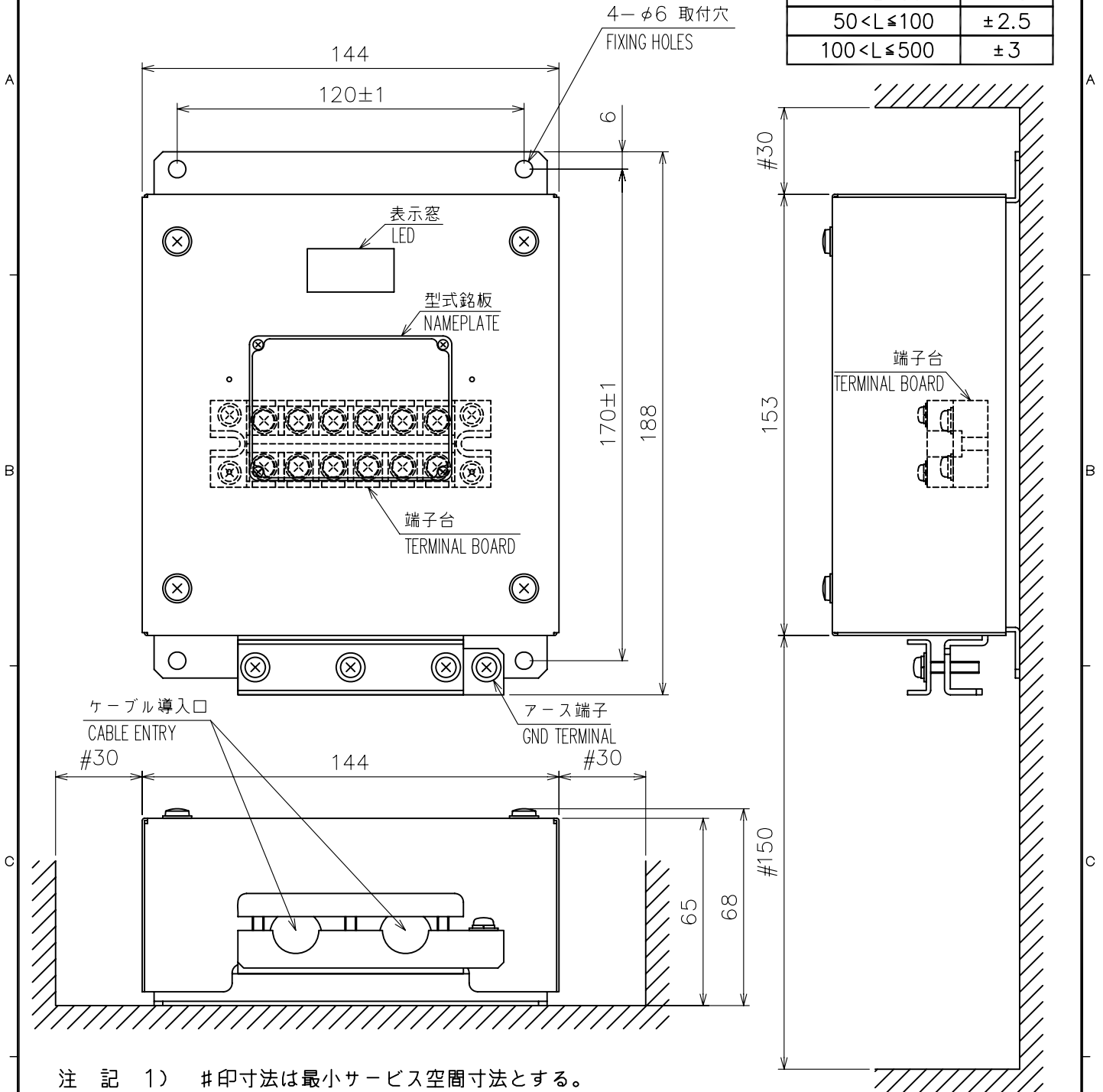


10	六角ナット HEX NUT	SUS304	6	M6	000863109
9	バネ座金 SPRING WASHER	SUS304	6	M6	000864260
8	六角ボルト HEX BOLT	SUS304	6	M6x25	000862133
7	ケーブル用パッキング CABLE GLAND PACKING	C R	1	40A	000870226
6	ケーブル用座金 CABLE GLAND WASHER	C2600P	2	40A	000870217
5	ケーブル用ハウジング CABLE GLAND HOUSING	C3604B	1	A40	000870191
4	ケーブル用ナット CABLE GLAND SCREW	C3604B	1	40用 FOR 40	000870198
3	甲板台座接合品 DECK-THRU PIPE	S34P STK-41	1	RWF-1100	310611000
2	パッキング PACKING	コルク COLK	1	RWF-1001	310610010
1	フランジ FLANGE	C2600P	1	03-009-0351	300903510
品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG. NO.	備用 REMARK

課長 APPROVED	池谷	尺度 SCALE	1/2	名称 TITLE	甲板貫通金具装備図
検図 CHECKED		図法 DRAWING	三角法 TRIGON	数量 QTY	1
製図 DRAWN	58.8.23 南	重量 WEIGHT	kg	図番 DWG. NO.	C3010-005-A

表 1 TABLE 1

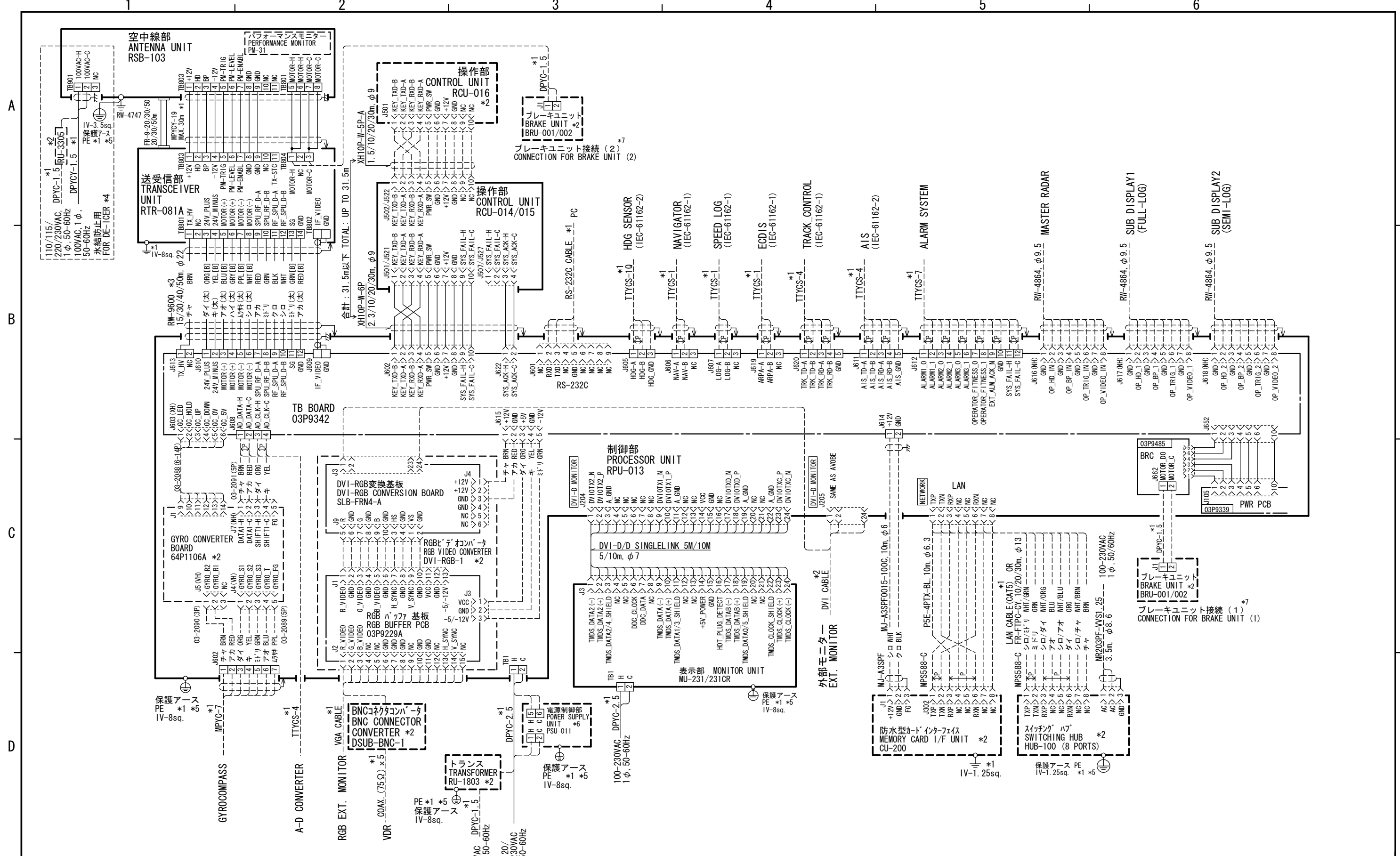
寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
$L \leq 50$	$\pm 1.5$
$50 < L \leq 100$	$\pm 2.5$
$100 < L \leq 500$	$\pm 3$



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

- NOTE
1. #: MINIMUM SERVICE CLEARANCE.
  2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
  3. USE SELF-TAPPING SCREWS 5x20 FOR FIXING THE UNIT.

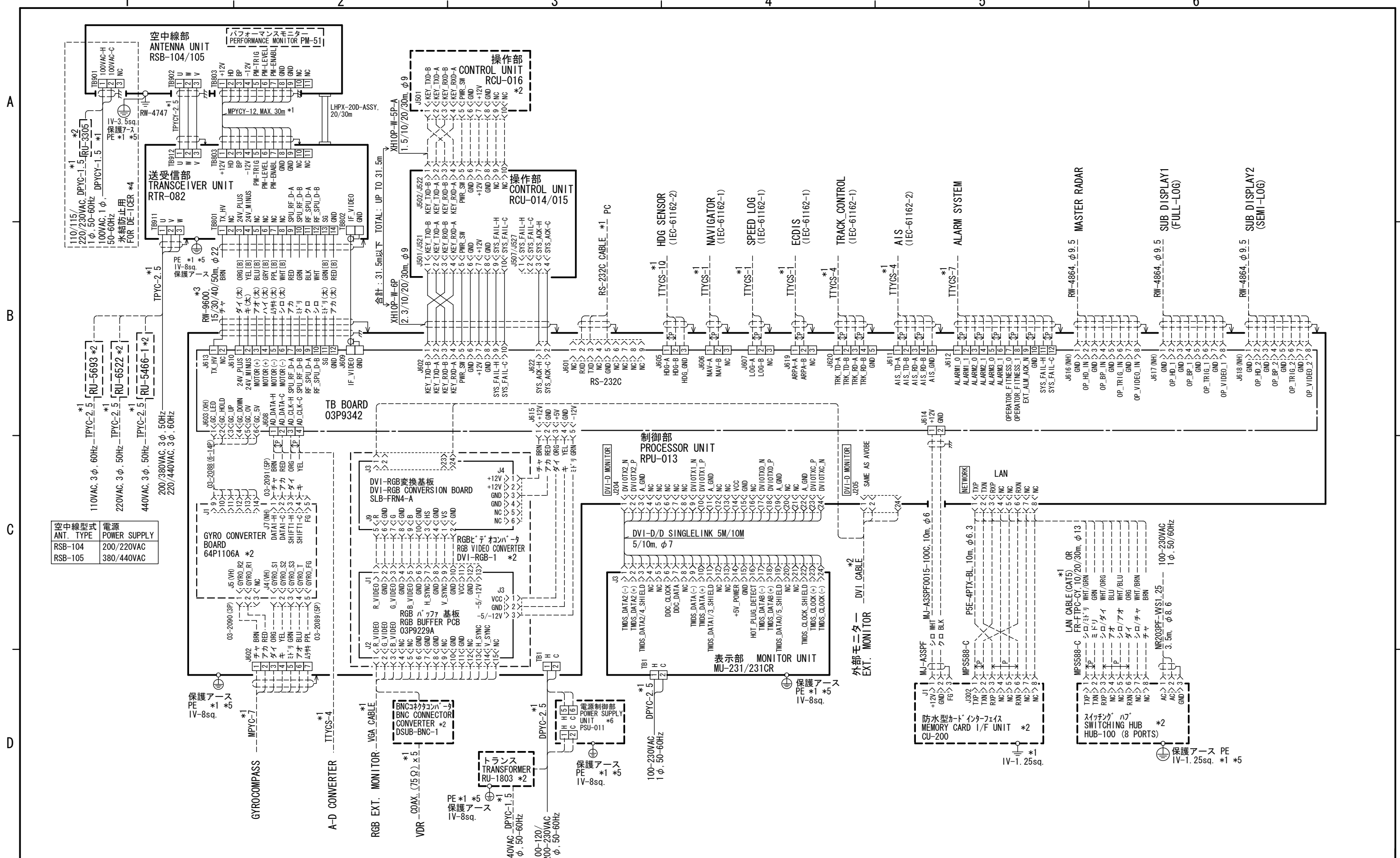
DRAWN Dec. 5, '06	E. MIYOSHI	TITLE PSU-011
CHECKED	TAKAHASHI, T	名称 電源制御部
APPROVED	Y. Hatai	外寸図
SCALE 1/2	MASS 0.59 $\pm 10\%$ kg	NAME POWER SUPPLY UNIT
DWG.No. C3527-G06-A	REF.No. 03-154-900G-0	OUTLINE DRAWING



注記  
 \*1: 造船所手配  
 \*2: オプション  
 \*3: 最長 100m (延長するときは接続箱RJB-001が必要)。  
 \*4: 船内配電盤では3Aのブレーカを使用。  
 \*5: 保護アース用ケーブルは緑/黄の絶縁線を使用のこと。  
 \*6: ロシア型機仕様のみ。  
 \*7: ブレーキユニットの接続はいずれかを選択。

NOTES  
 \*1: SHIPYARD SUPPLY  
 \*2: OPTION  
 \*3: MAX. 100m. (JUNCTION BOX RJB-001 IS REQUIRED FOR EXTENSION.)  
 \*4: USE 3A BREAKER IN SHIP'S MAINS SWITCH BOX.  
 \*5: USE GRN/YEL WIRE FOR PROTECTIVE EARTH.  
 \*6: FOR RUSSIAN FLAG VESSELS ONLY.  
 \*7: SELECT 1 OR 2 FOR CONNECTION OF BRAKE UNIT.

DRAWN	12/Apr/2011 T. YAMASAKI	TYPE	FAR-2827W
CHECKED	12/Apr/2011 H. MAKI	名称	船舶用レーダー/ARPA
APPROVED	13/Apr/2011 Y. NISHIYAMA		相互結線図
SCALE	MASS kg	NAME	MARINE RADAR/ARPA
DWG. No.	C3527-C01-Q	REF. No.	03-163-6003-3
		INTERCONNECTION DIAGRAM	



空中線型式 ANT. TYPE	電源 POWER SUPPLY
RSB-104	200/220VAC
RSB-105	380/440VAC

- 注記  
 \*1: 造船所手配  
 \*2: オプション  
 \*3: 最長 100m (延長するときは接続箱RJB-001が必要)。  
 \*4: 船内配電盤では3Aのブレーカを使用。  
 \*5: 保護アース用ケーブルは緑/黄の絶縁線を使用のこと。  
 \*6: ロシア型検仕様のみ。

- NOTES  
 \*1: SHIPYARD SUPPLY  
 \*2: OPTION  
 \*3: MAX. 100m. (JUNCTION BOX RJB-001 IS REQUIRED FOR EXTENSION.)  
 \*4: USE 3A BREAKER IN SHIP'S MAINS SWITCH BOX.  
 \*5: USE GRN/YEL WIRE FOR PROTECTIVE EARTH.  
 \*6: FOR RUSSIAN FLAG VESSELS ONLY.

DRAWN	12/Sep/2012 T. YAMASAKI	TYPE	FAR-2837SW
CHECKED	12/Sep/2012 H. MAKI	名称	船舶用レーダー/ARPA
APPROVED	19/Sep/2012 Y. NISHIYAMA	相互結線図	
SCALE	MASS kg	NAME	MARINE RADAR/ARPA
DWG. No.	C3528-C01-Q	REF. No.	03-163-6004-7
		INTERCONNECTION DIAGRAM	