

MARINE RADAR FAR-2157/2157-BB/2157-D *Installation manual*

| | | | |
|--|------------|--------------------------------------|------------|
| SAFETY INSTRUCTIONS | i | 3.3 Adjustment Sweep Timing..... | 3-5 |
| SYSTEM CONFIGURATION | iii | 3.4 Suppressing Main Bang..... | 3-6 |
| EQUIPMENT LISTS | iv | 3.5 Other Settings..... | 3-7 |
| 1. MOUNTING | 1-1 | 4. OPTIONAL EQUIPMENT | 4-1 |
| 1.1 Antenna Unit..... | 1-1 | 4.1 Gyro Converter GC-10..... | 4-1 |
| 1.2 Monitor Unit..... | 1-7 | 4.2 Memory Card Interface Unit..... | 4-10 |
| 1.3 Control Unit..... | 1-10 | 4.3 DVI-RGB Conversion Kit..... | 4-13 |
| 1.4 Processor Unit..... | 1-15 | 4.4 BNC Connector Converter..... | 4-16 |
| 1.5 Power Supply Unit..... | 1-16 | 5. IO DATA | 5-1 |
| 2. WIRING | 2-1 | PACKING LISTS | A-1 |
| 2.1 Wiring Overview..... | 2-1 | OUTLINE DRAWINGS | D-1 |
| 2.2 Antenna Unit..... | 2-2 | INTERCONNECTION DIAGRAM | S-1 |
| 2.3 Monitor Unit (for FAR-2157)..... | 2-8 | | |
| 2.4 Processor Unit..... | 2-9 | | |
| 2.5 Power Supply Unit..... | 2-14 | | |
| 2.6 Changing AC Power Specification..... | 2-16 | | |
| 3. ADJUSTMENT | 3-1 | | |
| 3.1 Initializing tuning..... | 3-1 | | |
| 3.2 Heading Alignment..... | 3-3 | | |

ECF

(Elemental Chlorine Free)

The paper used in this manual
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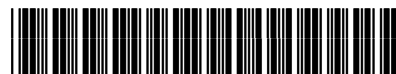
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SAFETY INSTRUCTIONS

The installer must read and follow all the safety instructions before attempting to install 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, may result in minor or moderate injury.



Warning, Caution



Prohibitive Action



Mandatory Action



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 W/m² and 10 W/m² exist are given in the table below.

Note: If the antenna unit is installed at a close distance in front of the wheel house, it may be necessary to halt transmission within a certain sector of antenna revolution. This can be done from the SCANNER menu.

| Radiator type | Distance to 100 W/m ² point | Distance to 10 W/m ² point |
|---------------|--|---------------------------------------|
| XN4A | 1.20 m | 13.60 m |
| XN5A | 1.10 m | 12.30 m |

WARNING



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

Only qualified personnel should work inside the equipment.



Wear a hard hat and safety belt when mounting the antenna unit.

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



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.



Do not install units other than the antenna unit in a place subject to rain or water splash.

Fire, electrical shock or injury can result if water leaks into those units.



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

Fire, electrical shock or injury can result if the power is on during the installation.



Use only the specified power cables.

Use of power cables that are thinner than those specified can cause fire.



Securely attach protective earth to the ship's body.

The protective earth is required to prevent electrical shock.

CAUTION



A proper license is necessary to install a radar.

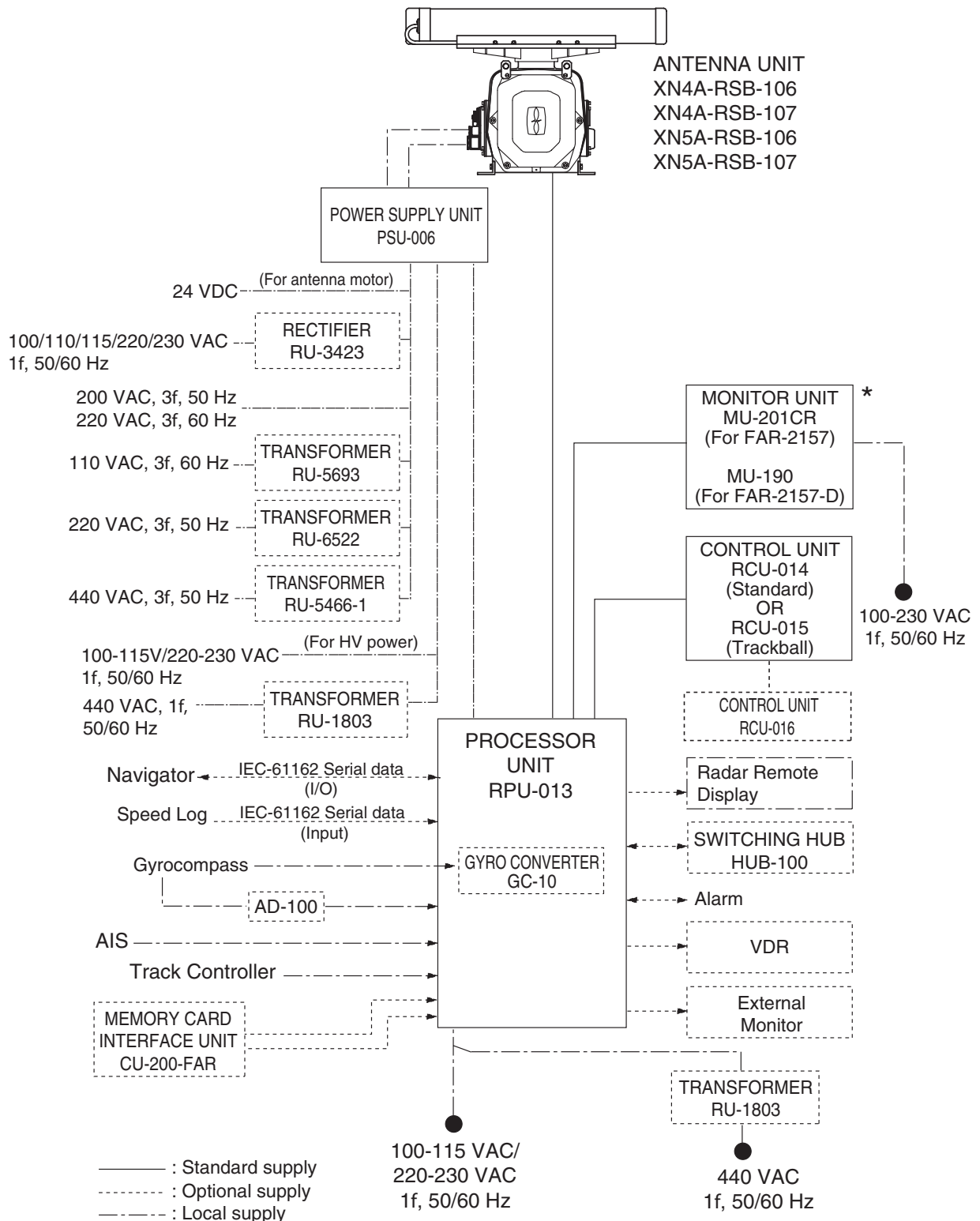
See your dealer for details.



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

| | Standard compass | Steering compass |
|-------------------------------------|------------------|------------------|
| Antenna Unit (60 kw) | 4.30 m | 2.80 m |
| Monitor Unit (MU-201CR) | 1.55 m | 1.00 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 |
| Power Supply Unit (PSU-006) | 0.30 m | 0.30 m |
| Memory Card Interface Unit (CU-200) | 0.90 m | 0.60 m |
| Switching Hub (HUB-100) | 1.00 m | 0.60 m |
| Monitor Unit (MU-190) | 1.65 m | 1.05 m |

SYSTEM CONFIGURATION



* FAR-2157-BB is not equipped with a monitor unit. Procure one locally.

Equipment category

| Unit | Category |
|-------------|------------------------|
| Antenna | Exposed to weather |
| Other units | Protected from weather |

EQUIPMENT LISTS

Standard supply

| Name | Type | Code No. | Qty | Remarks |
|-------------------------|--------------|-------------|------------------|---------------------------------|
| Antenna Unit | XN4A-RSB-106 | – | 1 | 200/220 VAC, 2570 mm |
| | XN4A-RSB-107 | – | | 24 VDC, 2570 mm |
| | XN5A-RSB-106 | – | | 200/220 VAC, 3210 mm |
| | XN5A-RSB-107 | – | | 24 VDC, 3210 mm |
| Power Supply Unit | PSU-006 | – | 1 | |
| Monitor Unit | MU-201CR | – | 1 | For FAR-2157 |
| | MU-190 | – | | For FAR-2157-D |
| Processor Unit | RPU-013 | – | 1 | |
| Control Unit | RCU-014 | – | 1 | Standard type |
| | RCU-015 | – | | Trackball type |
| Installation Materials* | CP03-31301 | 008-572-970 | 1 | For antenna unit |
| | CP03-25700 | 000-080-435 | 1 | 15 m signal cable (RW-9600) |
| | CP03-25710 | 000-080-436 | | 30 m signal cable (RW-9600) |
| | CP03-25730 | 000-082-191 | | 40 m signal cable (RW-9600) |
| | CP03-25720 | 000-080-437 | | 50 m signal cable (RW-9600) |
| | CP03-25800 | 000-080-434 | 1 | Cable assy. for monitor unit |
| | CP03-25602 | 008-535-940 | 1 | For processor unit |
| | CP03-31401 | 008-572-750 | 1 | For power supply unit |
| CP03-25604 | 008-539-850 | 1 | For control unit | |
| Accessories* | FP03-09810 | 008-536-010 | 1 | For monitor unit |
| | FP03-09850 | 008-535-610 | 1 | For standard-type control unit |
| | FP03-09860 | 008-535-690 | | For trackball-type control unit |
| Spare Parts* | SP03-14404 | 008-535-910 | 1 | For processor unit, 100 VAC |
| | SP03-14405 | 008-535-920 | | For processor unit, 220 VAC |
| | SP03-09203 | 008-424-380 | 1 | For 24 VDC antenna unit |
| | SP03-14401 | 008-535-990 | 1 | For FAR-2157's monitor unit |
| | SP03-15501 | 008-572-730 | 1 | For power supply unit, 100 VAC |
| | SP03-15501 | 008-572-740 | | For power supply unit, 220 VAC |

* See packing list at end of this manual.

Optional equipment

| Name | Type | Code No. | Remarks |
|----------------|---------|-------------|---|
| Gyro Converter | GC-10-2 | 000-080-440 | See Chapter 4. |
| Rectifier Unit | RU-3423 | – | 100/110/115/220/230 VAC to 24 DC, for power supply unit |

(Continued on the next page.)

| Name | Type | Code No. | Remarks |
|--|--------------------|-------------|---|
| Stepdown Transformer Unit | RU-1803 | – | 440 to 100 VAC, for processor unit |
| | RU-5693 | – | 110 to 220 VAC, 3 ϕ , for antenna unit |
| | RU-6522 | – | 220 to 200 VAC, 3 ϕ , for antenna unit |
| | RU-5466-1 | – | 440 to 200 VAC, 3 ϕ , for antenna unit |
| Memory Card Interface Unit | CU-200-FAR | 000-081-568 | w/CP03-27430, see Chapter 4. |
| External Alarm Buzzer | OP03-21 | 000-030-097 | |
| Control Unit | RCU-016 | 000-080-299 | Remote type, w/FP03-09860 |
| RAM Card | O0RAM08MC-005 | 004-376-740 | 8MB |
| DVI-RGB Converter Kit | OP03-180-1 | 008-545-590 | For installation in the field. |
| | OP03-180-2 | 008-536-070 | For installation in field. See Ch. 4. |
| Cable Assy. | XH10P-W-6P L=20M | 000-149-748 | Processor unit \leftrightarrow Control unit, 20 m |
| | XH10P-W-6P L=30M | 000-149-749 | Processor unit \leftrightarrow Control unit, 30 m |
| | XH10P-W-5P-A L=10M | 000-149-050 | Between control units, 10 m |
| | XH10P-W-5P-A L=20M | 000-149-051 | Between control units, 20 m |
| | XH10P-W-5P-A L=30M | 000-149-052 | Between control units, 30 m |
| | DVI-D/D S-LINK 10M | 000-150-200 | Processor unit \leftrightarrow Control unit, 10 m |
| | S03-9-5(8-8P) | 008-206-640 | External radar, 5 m, 8-8P |
| | S03-9-10(8-8P) | 008-206-650 | External radar, 10 m, 8-8P |
| | S03-9-15(8-8P) | 008-209-160 | External radar, 15 m, 8-8P |
| Installation Materials (Armored LAN-Cable Kit) | CP03-28900 | 000-082-658 | FR-FTPC-CY 10 m, modular connector MPS588-C, 2 pcs. |
| | CP03-28910 | 000-082-659 | FR-FTPC-CY 20 m, modular connector MPS588-C, 2 pcs. |
| | CP03-28920 | 000-082-660 | FR-FTPC-CY 30 m, modular connector MPS588-C, 2 pcs. |
| Bracket Assy. | FP03-09820 | 008-535-560 | Hanger assy. for monitor unit |
| Handgrip Assy. | FP03-09840 | 008-535-570 | For monitor unit |
| Dust Cover | 03-163-1201 | 100-307-260 | For monitor unit |
| Clamp Assy. | OP03-182 | 008-535-620 | For RCU-014 |
| Flush Mount Kit | FP03-09870 | 008-535-630 | For control unit |
| | OP03-198 | 001-008-050 | |
| Connection Stand | OP03-183 | 008-535-640 | RCU-014 \leftrightarrow MU-201CR |
| | OP03-185 | 008-535-660 | RCU-014 |
| Hanger Kit | FP03-10201 | 008-539-530 | Desktop inst. kit for CU-200-FAR |
| BNC Connector Converter | DSUB-BNC-1 | 000-148-528 | For connecting VDR |
| Switching Hub | HUB-100 | – | See Operator's Manual for HUB-100, issued separately. |
| Hood | FP03-11500 | 001-020-090 | For MU-201CR display unit |
| Slim Hood | FP03-11510 | 001-034-390 | For MU-201CR display unit |

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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, on the radar mast, or on a suitable platform. The mounting location should afford a good all-round view and satisfy the siting and mounting considerations mentioned below.

Siting

- 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.
- Deposits and fumes from a funnel or other exhaust vent can adversely affect the aerial performance and hot gases may deform the radiator. The antenna unit must not be mounted where the temperature is more than 70°C.
- 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.
- Choose a location where reflections from the radar reflector will not be received by the radar antenna.
- The "standard" antenna unit orientation has the cable glands directed toward the bow.
- Leave sufficient space around the unit for maintenance and servicing. See the antenna unit outline drawing for recommended maintenance space.

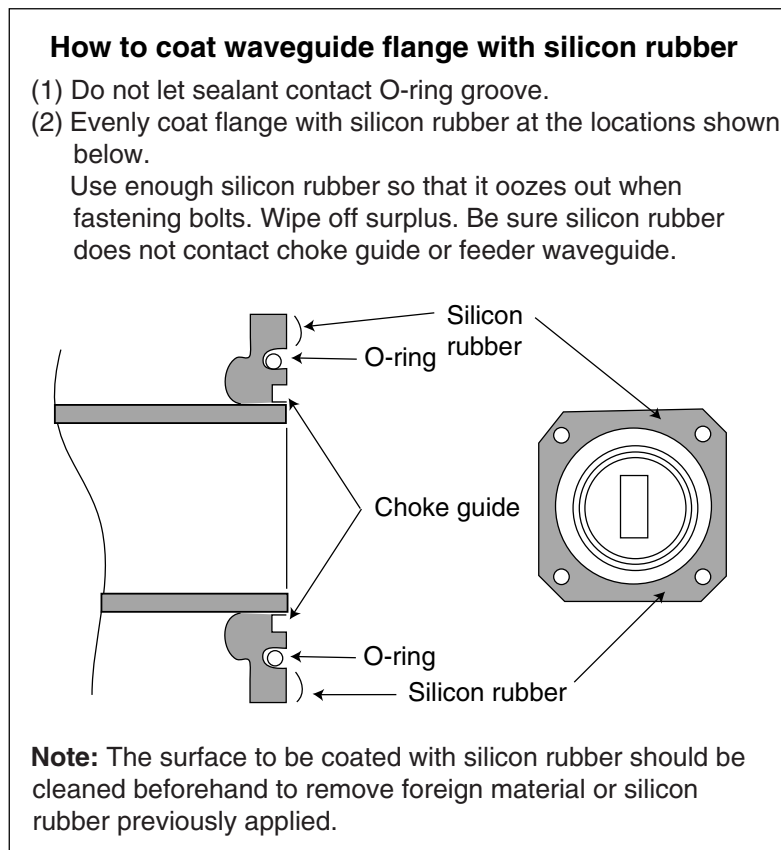
Mounting

- Use rope and crane to hoist the antenna unit to the mounting location. Lifting fixtures are provided on the antenna chassis to which to fasten rope.
- Mount the unit parallel to the waterline.
- A hole is required in the mounting platform for the antenna cable.
- An appropriate platform should be constructed at the mounting location to facilitate installation and maintenance work.
- Connect ground wire between antenna terminal on antenna chassis and ground point.
- If the mounting platform is made of steel paint it to prevent electrolytic corrosion. DO NOT paint the antenna radiator.

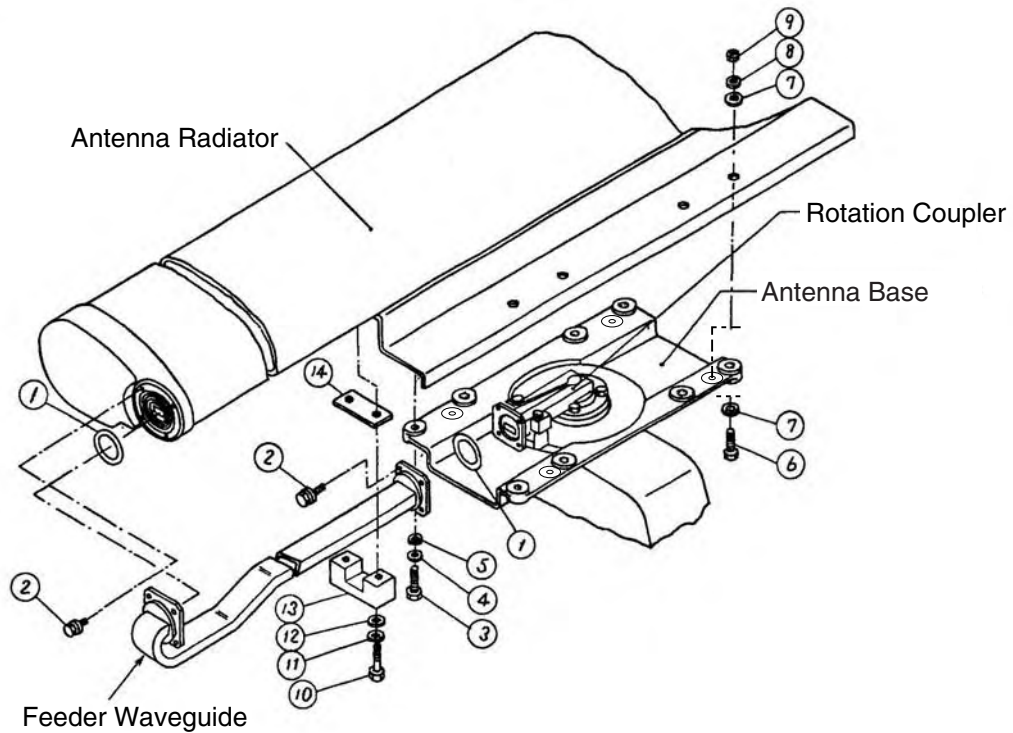
Assembling the antenna unit

The antenna unit should be assembled before mounting it. Follow the procedure below to assemble the antenna unit. The numbers in parentheses refer to the parts numbers shown in the illustration on the next page.

1. Grease the O-ring(1) and set it to the O-ring groove in the flange on the rotation coupler on the antenna base. Fasten the feeder waveguide to the antenna base with hex bolts B(2). Coat the surface of the waveguide flange with silicon rubber, referring to the illustration below for instructions.
2. Loosely fasten the antenna radiator to the antenna base with hex bolts(3) and(6), flat washers(5) and (7), spring washers(4) and (8) and hex nut(9).
3. Grease the O-ring(1) for the antenna radiator and set it to the O-ring groove on the feeder waveguide flange on the antenna radiator. Fasten the feeder waveguide to the antenna radiator with hex head bolts(2).
4. Fasten the waveguide clamp(13) to the waveguide clamp insulator(14) with hex head bolt(10), flat washer(12) and spring washer(11).
5. Securely fasten the antenna radiator to the antenna base.



How to coat waveguide flange with silicon rubber

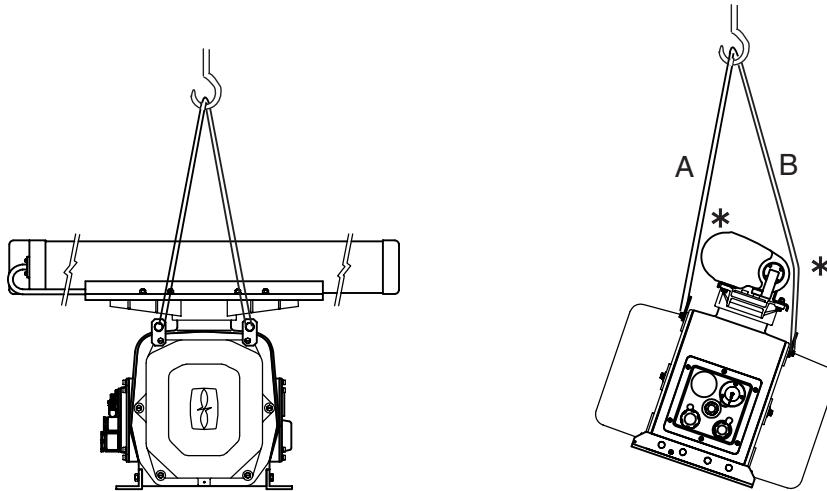


*Parts of antenna unit XN4A/XN5A
List of parts for assembling antenna unit*

| No. | Name | Type | Qty |
|-----|---------------------------|--|-----|
| 1 | O-ring | AS568-125 | 2 |
| 2 | Hex Bolt B | M4x16 (SUS304) | 8 |
| 3 | Hex Bolt | Antenna unit XN4A: M8x25 (SUS304) Antenna unit XN5A: M8x35 (SUS304) | 4 |
| 4 | Spring Washer | M8 (SUS304) | 4 |
| 5 | Flat Washer | M8 (SUS304) | 4 |
| 6 | Hex Bolt | M8x30 (SUS304) | 4 |
| 7 | Flat Washer | M8 (SUS304) | 8 |
| 8 | Spring Washer | M8 (SUS304) | 4 |
| 9 | Hex Nut | M8 (SUS304) | 4 |
| 10 | Hex Bolt | M4x30 (SUS304) | 2 |
| 11 | Spring Washer | M4 (SUS304) | 2 |
| 12 | Flat Washer | M4 (SUS304) | 2 |
| 13 | Waveguide Clamp | RSB-2006-2 | 1 |
| 14 | Waveguide Clamp Insulator | 03-003-4003-0 | 1 |
| | Chemiseal | S-8400W, aluminum tube, 50g | 1 |





How to hoist antenna unit

1. Referring to the illustration below, fasten rope A of approx. 85 cm in length and fasten rope B of approx. 100 cm in length.
2. Place protective material (cardboard, foam, etc.) between rope and radiator at the asterisk-marked locations shown below, to prevent damage to the radiator.
3. Hoist the antenna slightly and confirm that the load applied to the radiator is not excessive. (If load is excessive, lower the antenna unit and adjust lengths of ropes.)
4. Hoist the antenna unit to the mounting location.



How to attach hoisting ropes to antenna unit

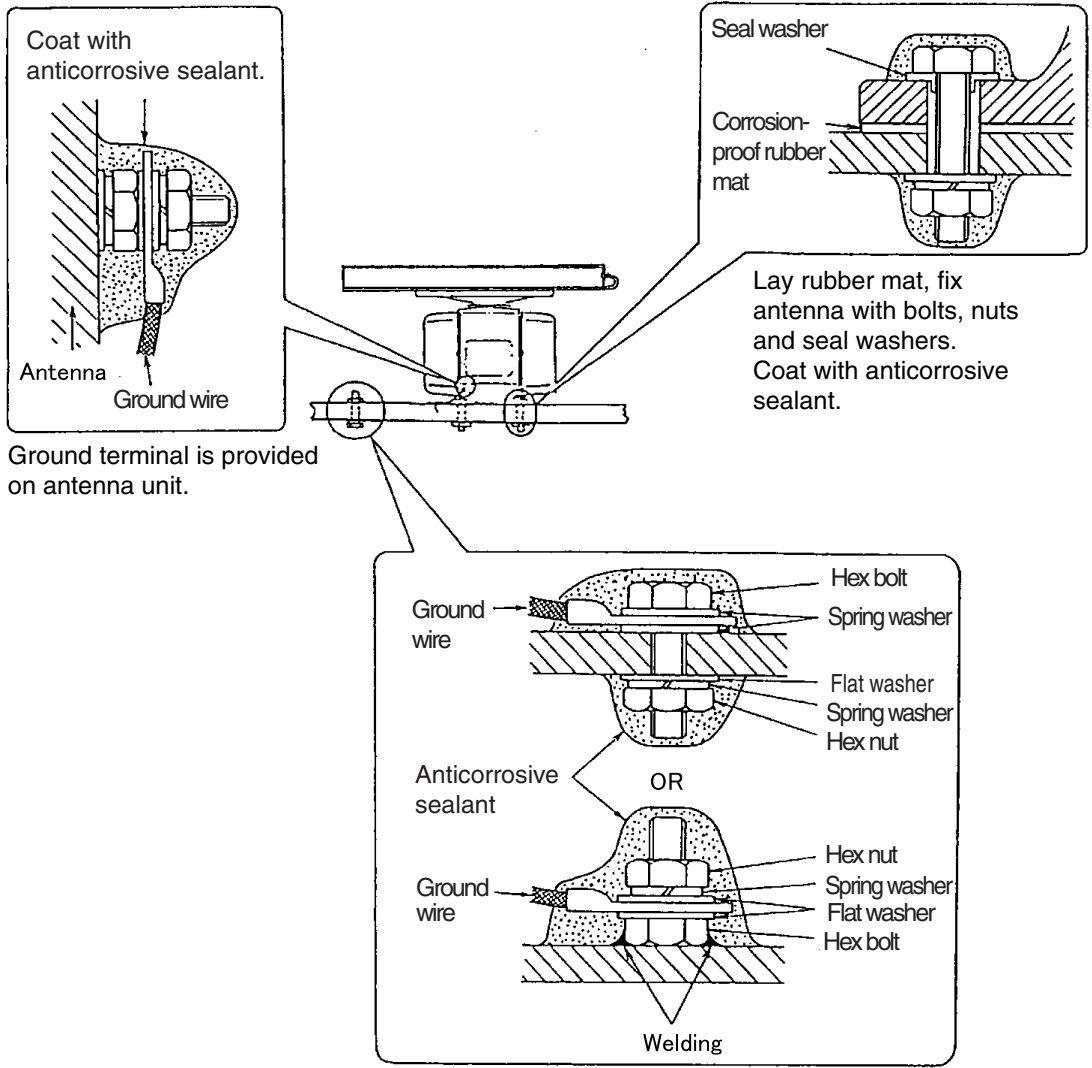
Fastening antenna unit to the mounting platform

|  WARNING | |
|--|---|
|  | <p>Do not open the equipment unless totally familiar with electrical circuits and service manual.</p> <p>Only qualified personnel should work inside the equipment.</p> |
|  | <p>Wear a hard hat and safety belt when mounting the antenna unit.</p> <p>Serious injury or death can result if someone falls from the radar antenna mast.</p> |
|  | <p>Construct a suitable service platform from which to install the antenna unit.</p> <p>Serious injury or death can result if someone falls from the radar antenna mast.</p> |

Note: The antenna unit is made of cast aluminum, which is subject to electrolytic corrosion if the mounting platform is steel or iron. To prevent electrolytic corrosion, use the supplied seal washers and corrosion-proof rubber mat.

Fix the antenna unit to the mounting location, referring to the procedure below and the illustration on the next page.

1. Referring to the antenna unit outline drawing, prepare a mounting platform at the mounting location for the antenna unit.
2. Lay the corrosion-proof rubber mat (supplied) on the mounting platform, aligning the holes on the rubber mat with the fixing holes on the mounting platform.
3. Lay the antenna unit on the rubber mat, orienting it so the cable gland is directed toward ship's bow.
4. Use hex bolts (M12×60), nuts, flat washers and seal washers to fix the antenna unit to the mounting platform.
5. Arrange the ground point at a location on the mounting platform that is within 300 mm from the ground terminal on the antenna unit. Fasten the ground wire (RW-4747, 340 mm) there, using the M6×25 hex bolt, nut and washers.
6. Connect the other end of the ground wire to the ground terminal on the antenna unit.
7. Coat the ground terminal, ground point on the mounting platform and fixing bolts on the antenna unit with anticorrosive sealant (supplied).



How to mount the antenna unit

1.2 Monitor Unit

The monitor unit is can flush mounted in a panel or mounted on a desktop (requires optional accessories).

The FAR-2157-BB is not equipped with a monitor unit. Procure a suitable monitor unit locally. Recommended monitor: SXGA (1280×1024), aspect ratio 5:4.

For MU-190, see the applicable Operator's Manual.

Mounting considerations

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

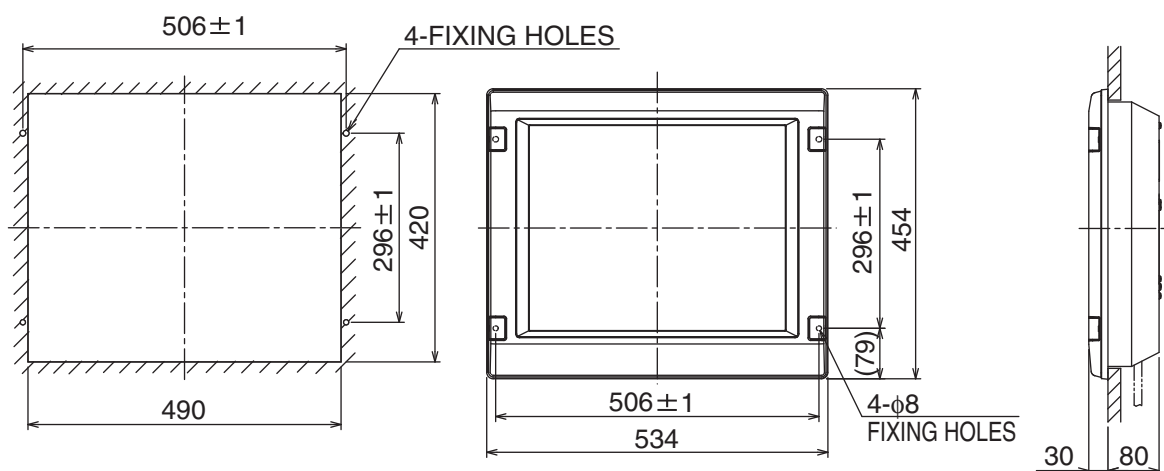
- Select a location where the screen can be viewed conveniently while facing the bow.
- Locate the unit out of direct sunlight and away from heat sources because of heat that can build up inside the cabinet.
- Locate the unit away from places subject to water splash and rain.
- Leave sufficient space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

Mounting procedure

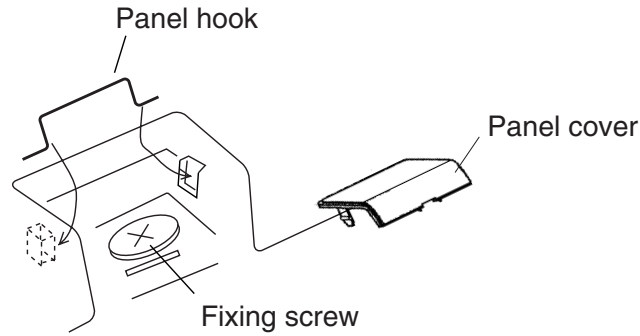
Flush mounting

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

1. Make a cutout in the mounting location referring to the outline drawing shown below.
2. Set the monitor unit to the hole and fix it with four self-tapping screws (6×30).
3. Attach panel hooks near the fixing holes (upper part). See next page. These are used to pull out the monitor unit from the panel for servicing.
4. Attach four panel covers to the fixing holes.



Mounting dimensions for flush mounting the monitor unit



How to attach panel hook and panel cover

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

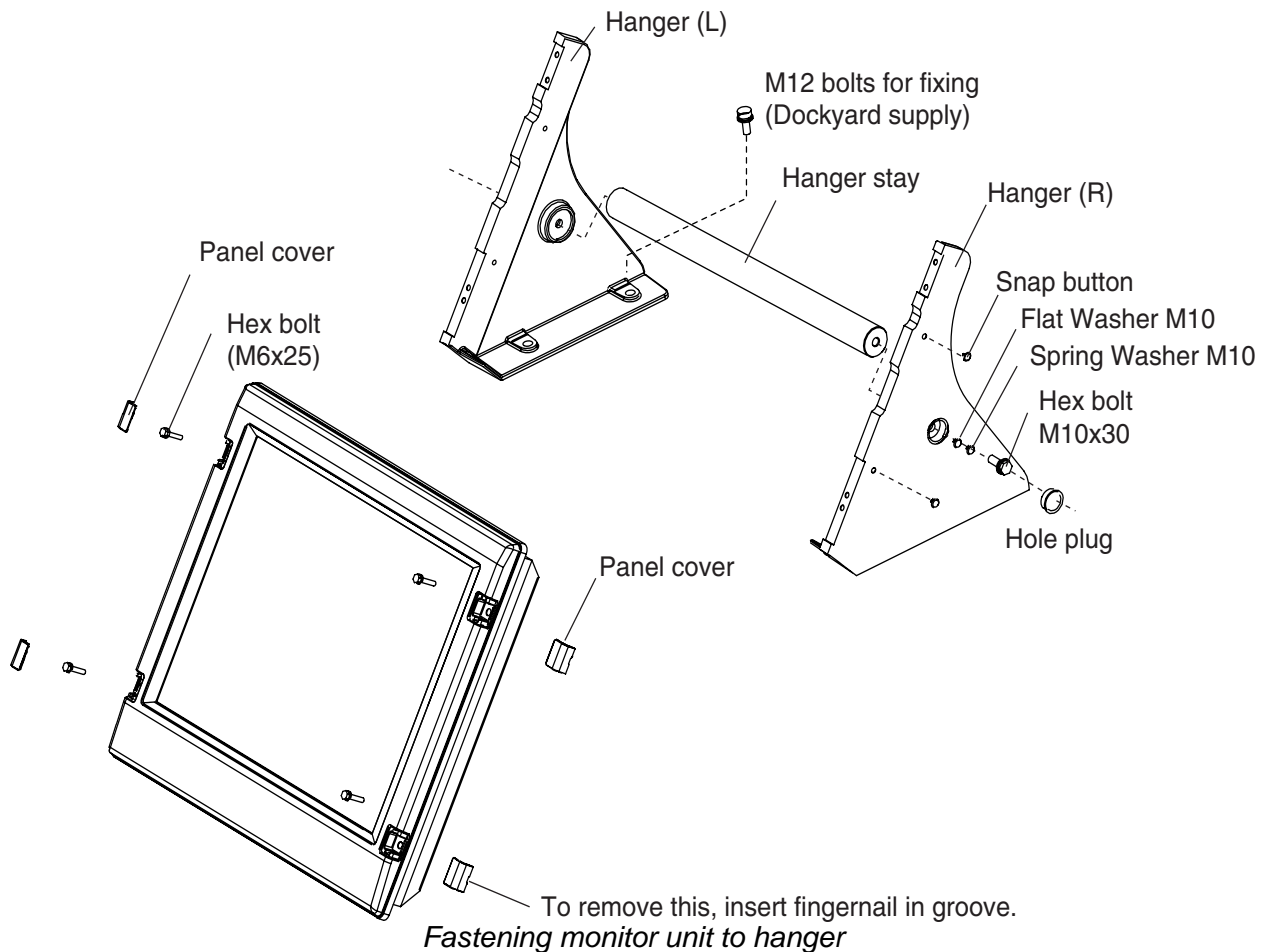
Desktop mounting

Use the optional desktop mounting kit (Type: FP03-09820, Code No.: 008-535-560) to mount the monitor unit on a desktop.

Contents of desktop mounting kit FP03-09820

| Name | Type | Code No. | Qty |
|---------------|--------------|----------------|-----|
| Hanger L | 03-163-1111 | 100-305-141 | 1 |
| Hanger R | 03-163-1112 | 100-305-181 | 1 |
| Hanger stay | 03-163-1113 | 100-305-191 | 1 |
| Hole plug | CP-30-HP-13 | 000-160-074-10 | 2 |
| Snap button | KB-13, Black | 000-570-276-10 | 4 |
| Hex. bolt | M6×25 | 000-162-949-10 | 4 |
| Hex. bolt | M10×30 | 000-162-884-10 | 2 |
| Spring washer | M10 | 000-864-261 | 2 |
| Flat washer | M10 | 000-864-131 | 2 |

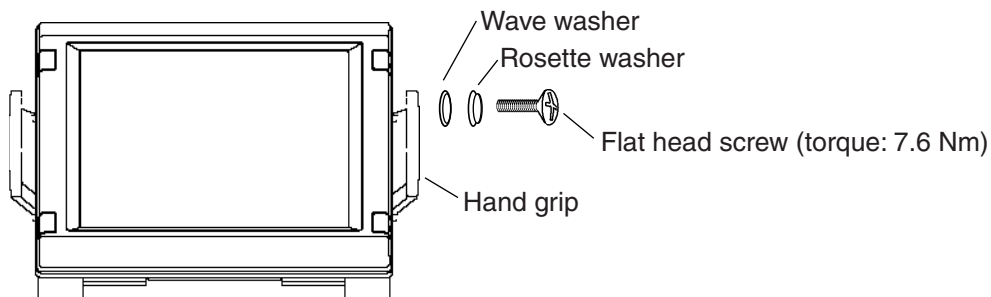
1. Assemble two hangers and hanger stay with two hex bolts (M10×30), flat washers and spring washers and cover each hex bolt with hole plug.
2. Fix the above assembly to the mounting location with four hex bolts (M12, dockyard supply).
3. Fasten the monitor unit to the mounting hanger assembly with four hex bolts (M6×25, supplied).
4. Cover each hex bolt with a panel cover (4 pcs.).
5. Cover fixing holes for hand grips with snap buttons (4 pcs).



Attaching hand grips

Hand grips are optionally available for the desktop-mount monitor unit. Attach them as follows:

1. Remove the snap buttons attached at step 5 on the previous page.
2. Fix hand grips with wave washers, rosette washers and flat head screws.



How to attach hand grips

Attaching hood

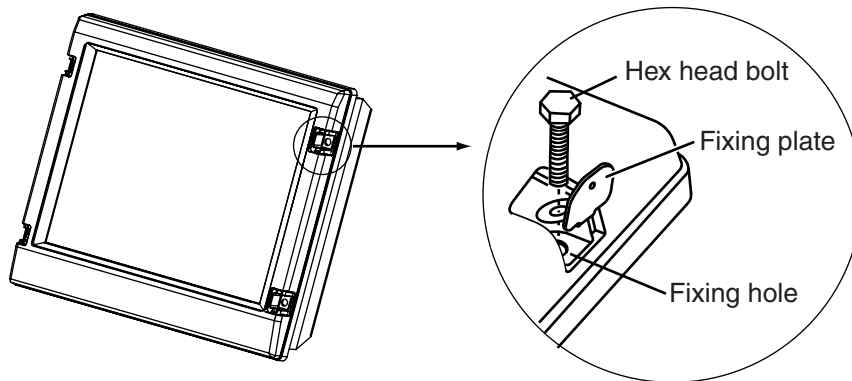
When it is too bright in the daytime, use the optional hood (Type: FP03-11500, Code No.: 001-020-090) to shade the screen.

Contents of hood

| Name | Type | Code No. | Qty. |
|--------------|------------------|----------------|------|
| Hood | FP03-11501 | 001-020-120 | 1 |
| Fixing plate | 03-163-2202-0 | 100-335-560-10 | 4 |
| Screw | M4x10 D=13 US304 | 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

Mounting considerations

The control unit may be mounted on a desktop, with or without the KB fixing metal (supplied) which mounts the control unit at an angle. When selecting a mounting location, keep in mind the following points:

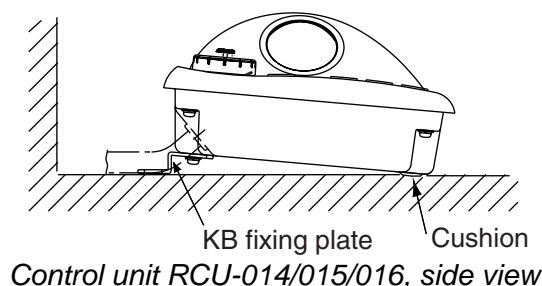
- Select a location where the control unit can be operated conveniently while observing the display screen.
- Locate the unit away from heat sources because of heat that can build up inside the cabinet.
- Locate the equipment away from places subject to water splash and rain.
- Determine the mounting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

Mounting procedure

Fixing with KB (keyboard) fixing plate

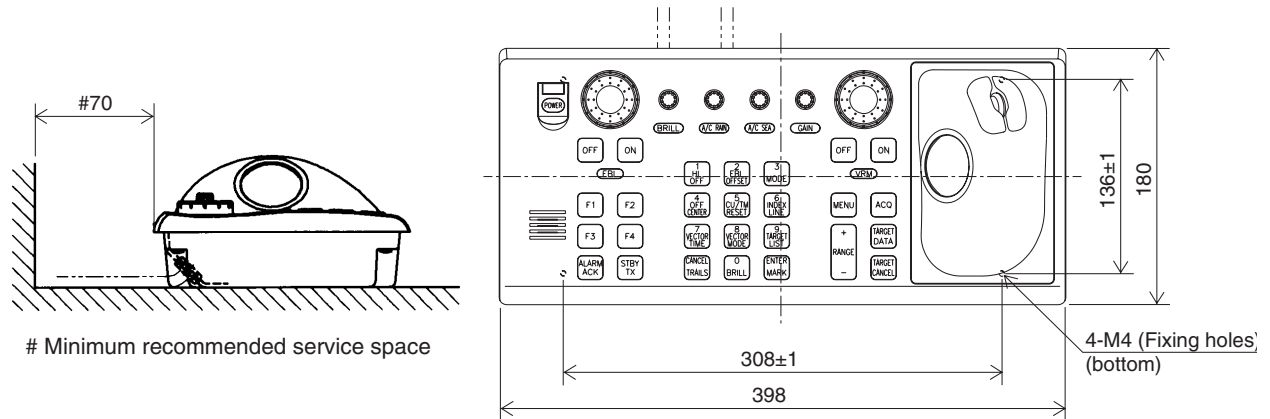
The KB fixing plate sits the control unit at a comfortable angle, like the retractable legs on a PC keyboard.

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

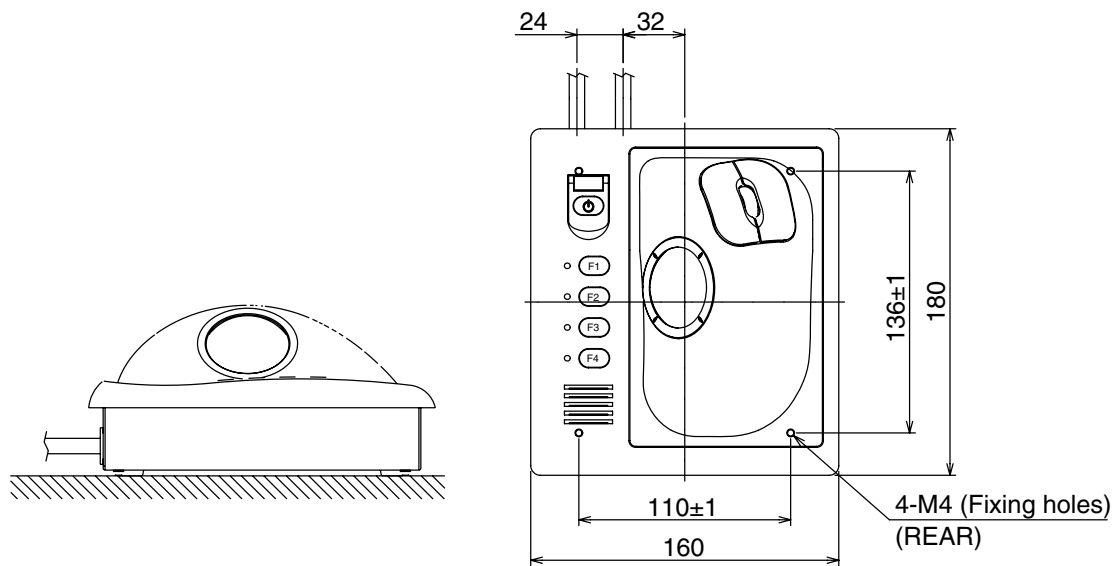


Fixing without KB fixing plate

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 the under side of the desktop. (M4 screws with a sufficient length for the thickness of the desktop should be provided locally.)



Mounting dimensions for control unit RCU-014



Mounting dimensions for control unit RCU-015/RCU-016

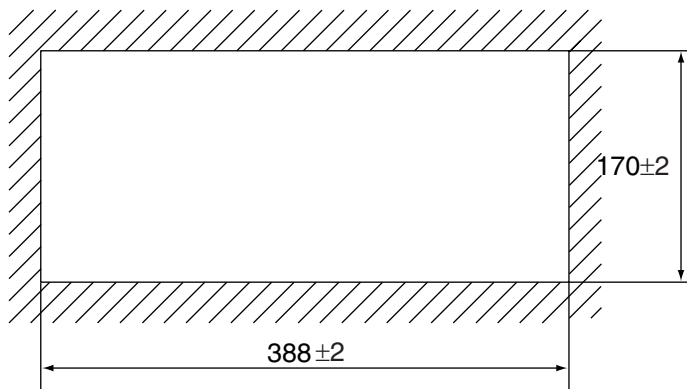
Flush mounting

Use the optional flush mount kit FP03-09870 (Code No. 008-535-630) to flush mount the control unit RCU-014, RCU-015 and/or RCU016 in a console.

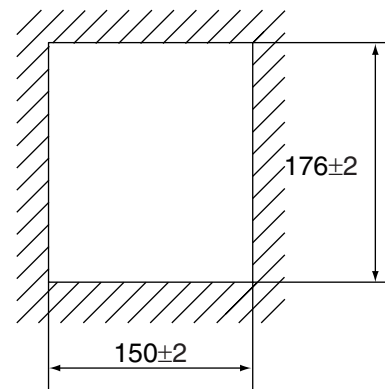
Contents of flush mount kit for RCU-014/015/016

| Name | Type | Qty |
|----------------|-------------|-----|
| Mounting plate | 03-163-7531 | 4 |
| Hex bolt | M5 | 4 |
| Wing screw | M5×40 | 4 |
| Pan head screw | M4×12 | 4 |

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

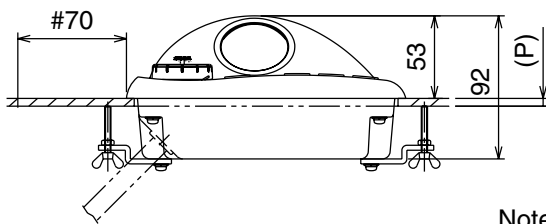


Flush mount cutout for RCU-014



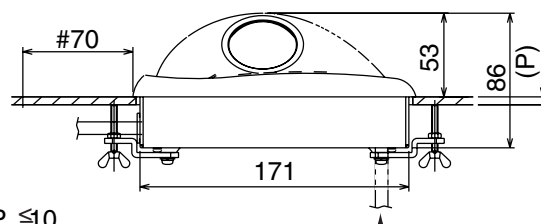
Flush mount cutout for RCU-015 and RCU-016

2. Set the control unit to the cutout.
3. From the rear side, attach the mounting plate to the control unit with four screws.
4. Screw the wing screw to each mounting plate and then insert hex bolt to each wing screw.
5. Fasten each wing screw and then fasten the hex nuts as shown in the figure below.



Note: $P \leq 10$

Minimum recommended service space

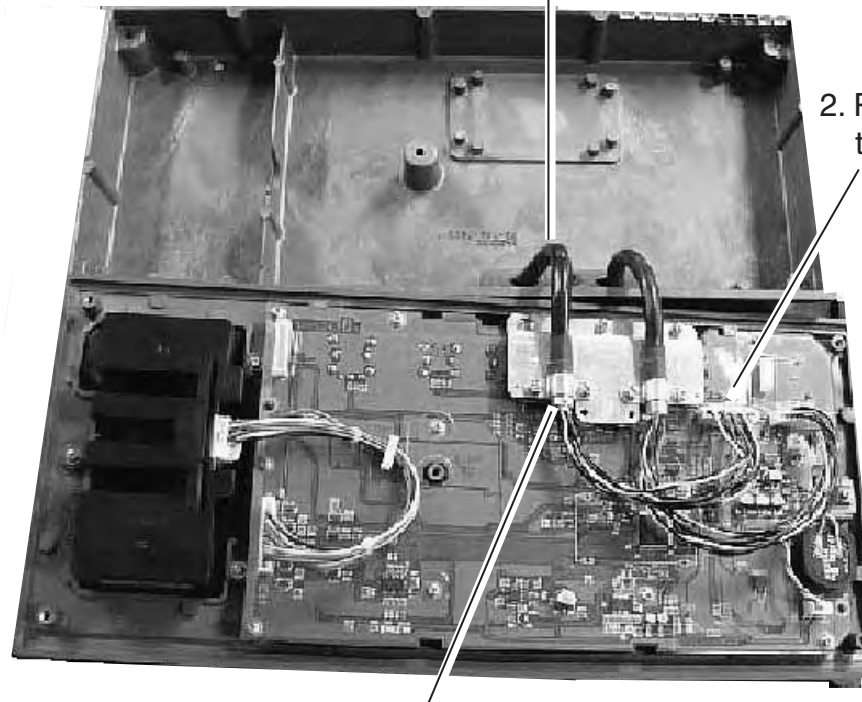


To change location of cable entrance, see page 1-14.

Flush mount mounting dimensions for control unit RCU-014 (left) and RCU-015/RCU-016

Connecting RCU-016 in series with RCU-014

1. Pass the cable from RCU-016.



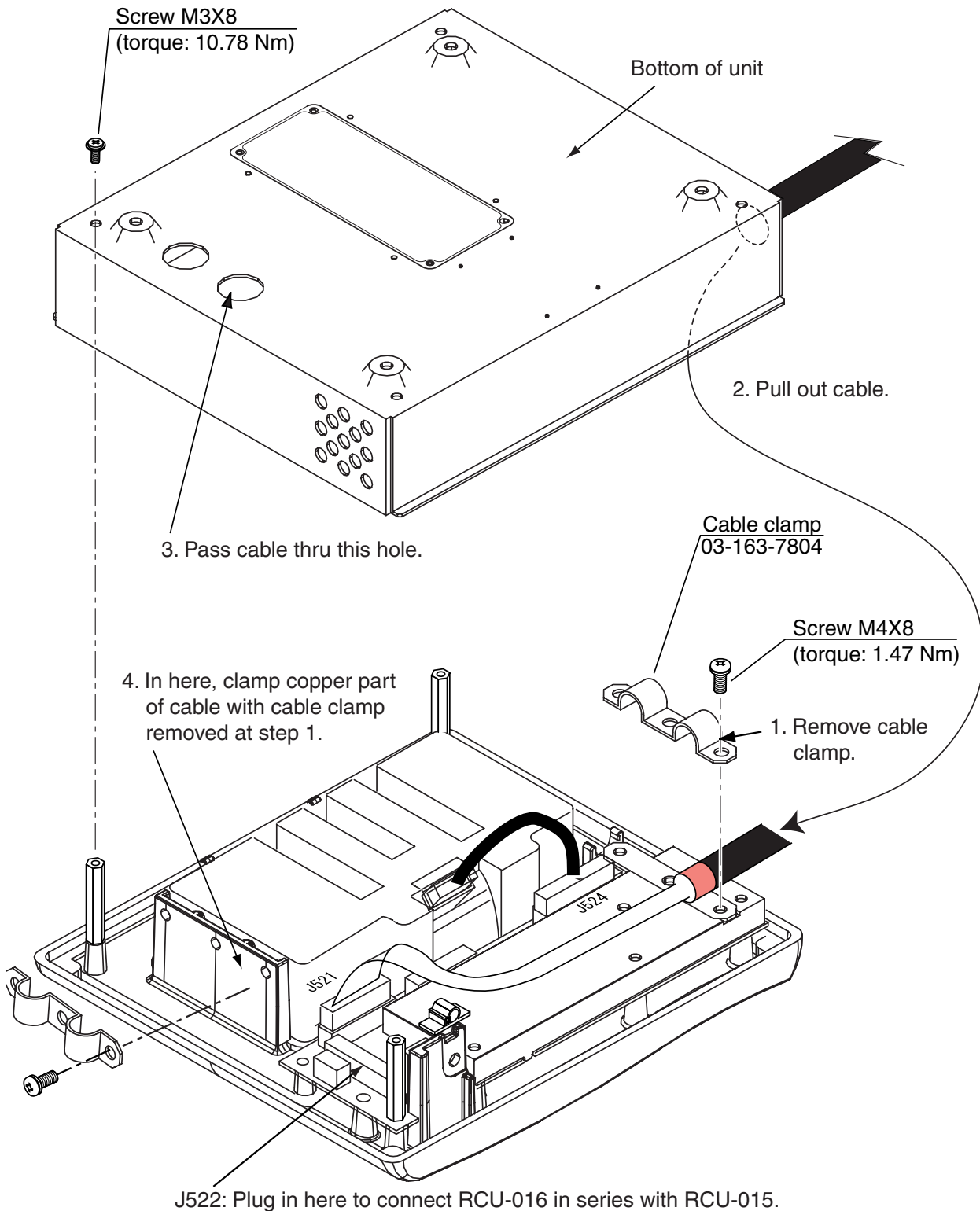
2. Plug in connector to J502.

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

Control unit RCU-014, inside view

Changing the cable entrance on control unit RCU-015/RCU-016

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



Changing cable entrance on control unit RCU-015/RCU-016

1.4 Processor Unit

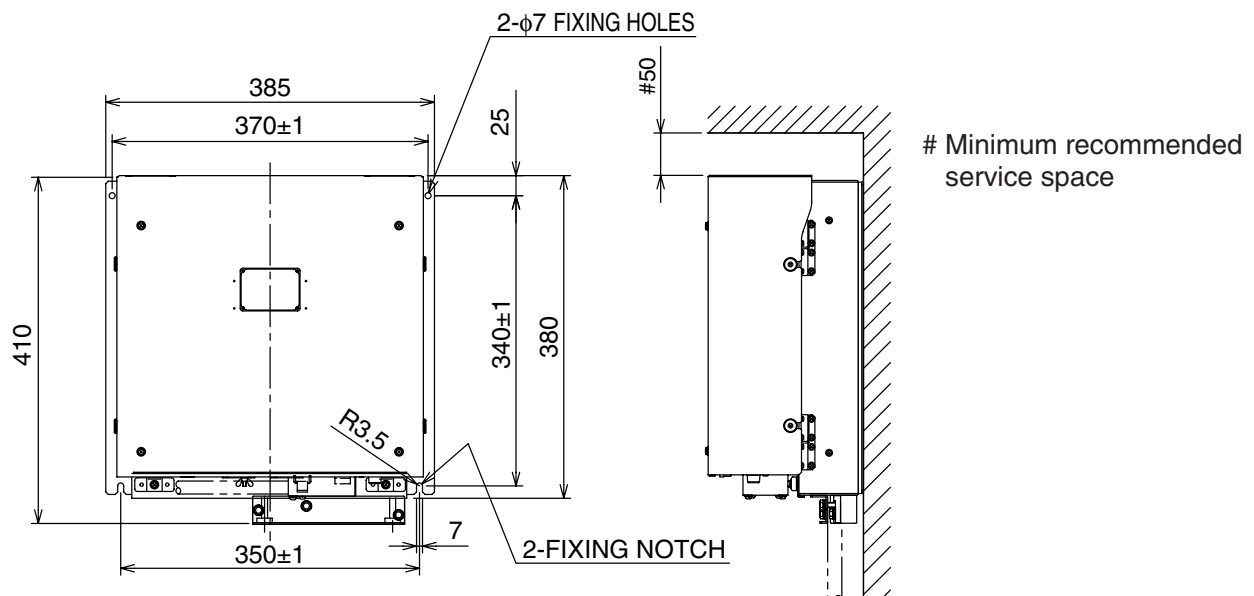
Mounting considerations

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

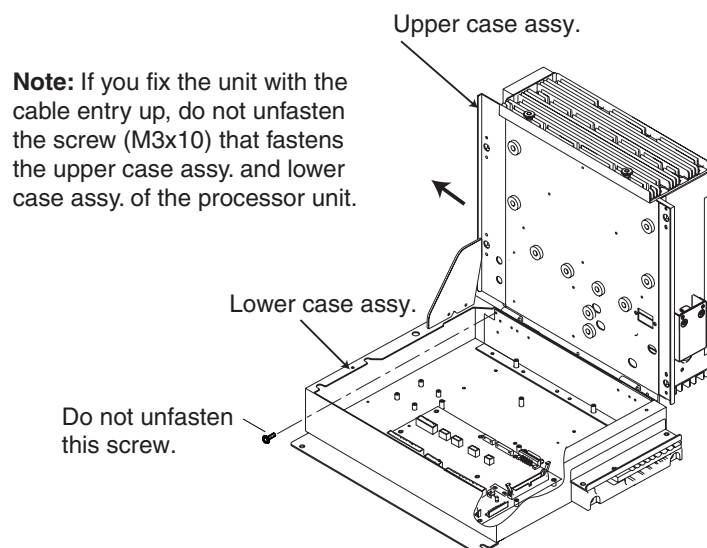
- Locate the processor unit away from heat sources because of heat that can build up inside the cabinet.
- Locate the unit away from places subject to water splash and rain.
- Leave sufficient space at the sides and rear of the unit to facilitate maintenance, referring to the outline drawing.
- A magnetic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

Mounting procedure

Fix the unit with four M6 bolts or self-tapping screws.



Mounting dimensions for processor unit



1.5 Power Supply Unit

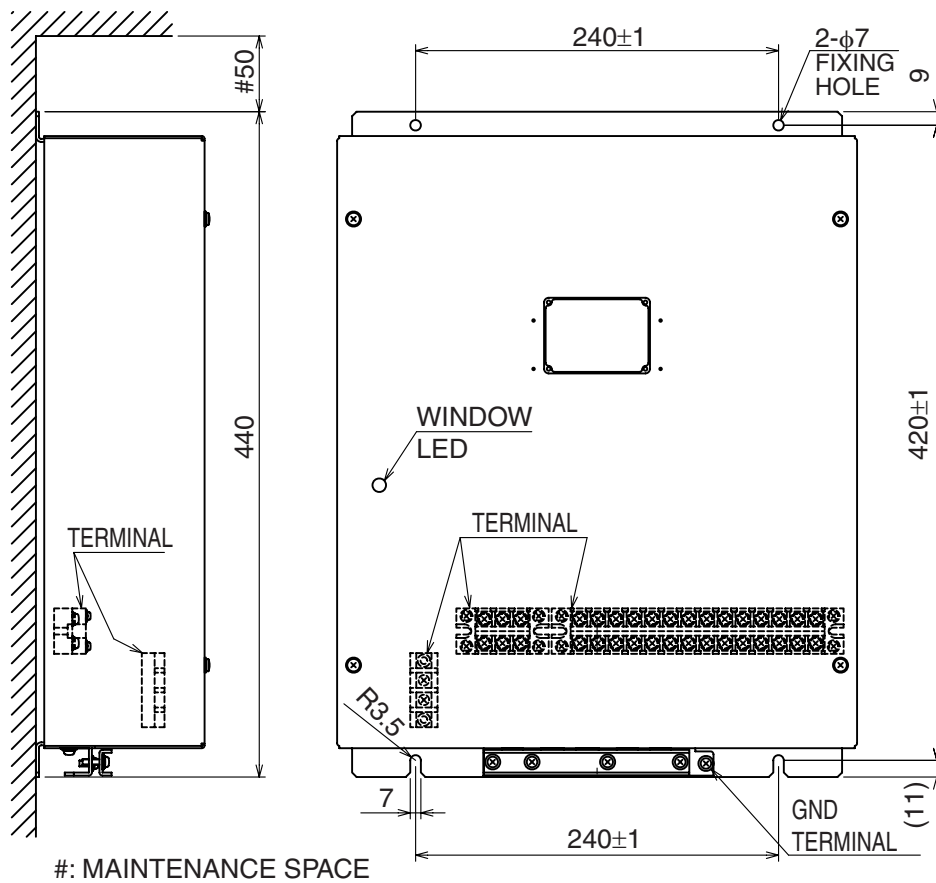
Mounting considerations

The power supply unit may be mounted on a bulkhead or a deck. Because it has no operation requirements it can be located almost anywhere, provided the location is well ventilated.

Mounting procedure

Fix the unit to the mounting location with four 6x20 self-tapping screws (local supply). For mounting on a bulkhead, do the following:

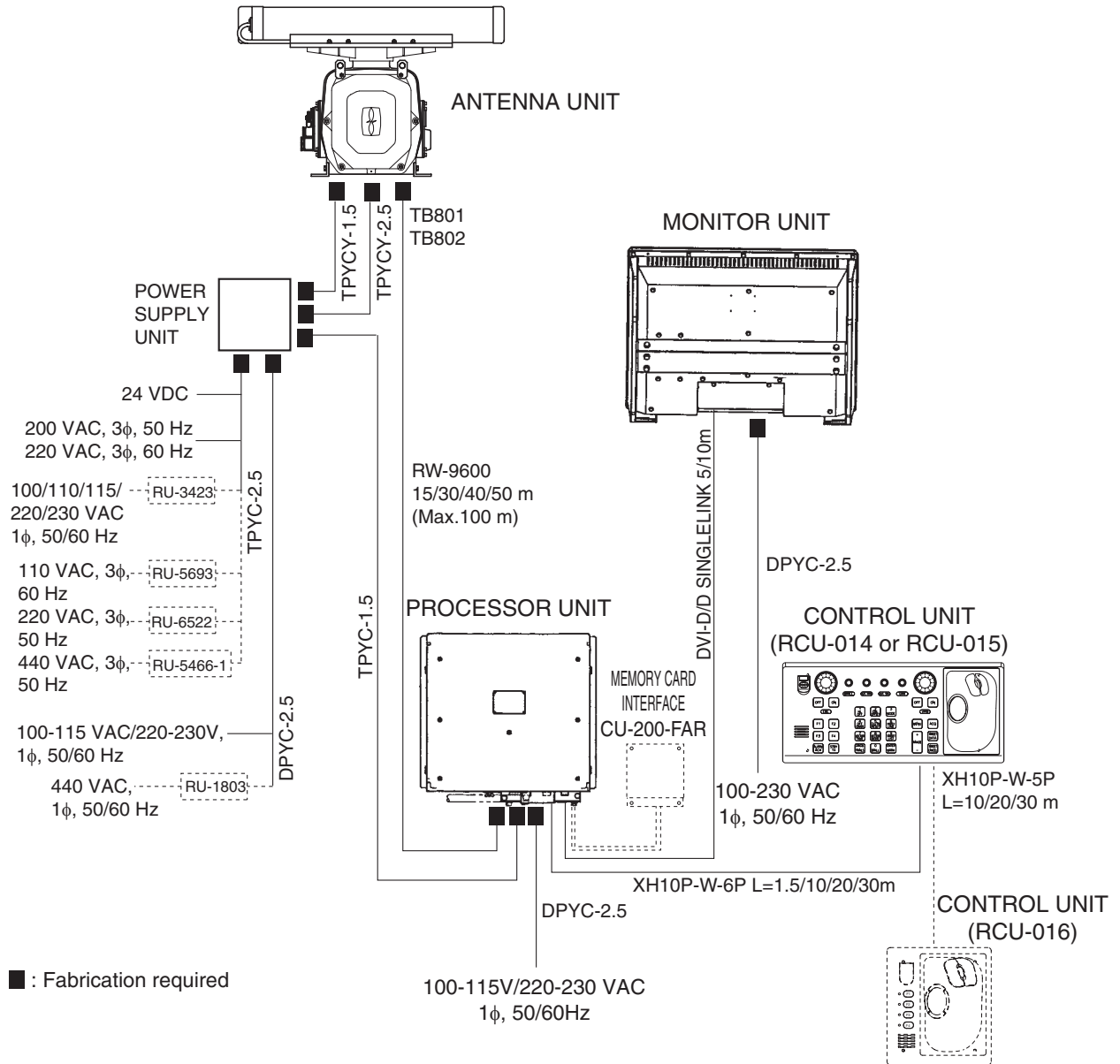
1. Mark location for mounting holes.
2. Screw in the self-tapping screws at the location for the bottom fixing holes, leaving a gap of about 5 mm between the bottom of the screw head and bulkhead.
3. Set the unit to the screws inserted at step 1.
4. Fasten the self-tapping screws at the top of the unit.
5. Tighten all self-tapping screws.



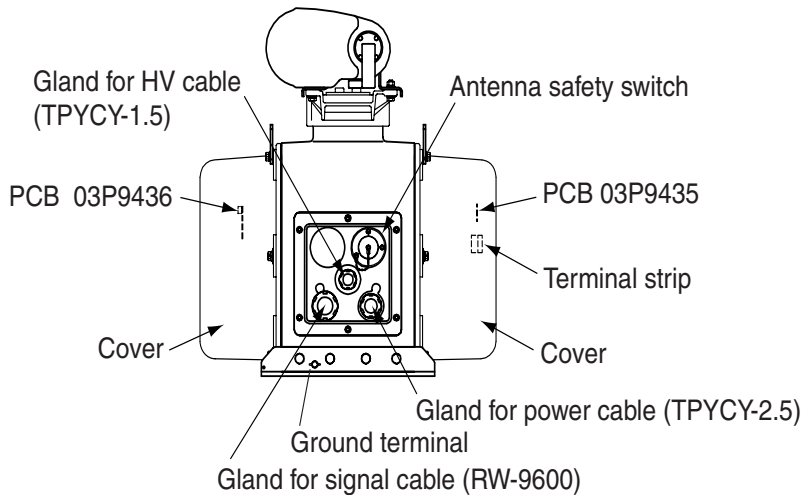
Mounting dimensions for power supply unit

2. WIRING

2.1 Wiring Overview



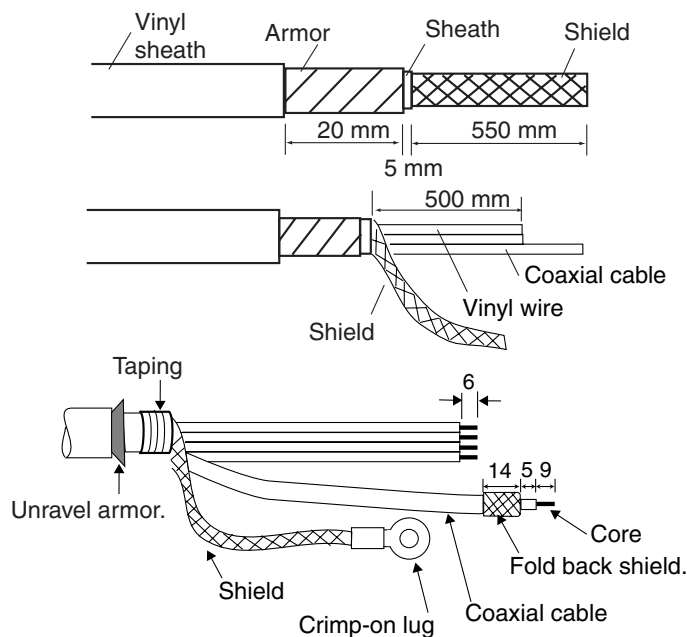
2.2 Antenna Unit



Antenna unit, front view

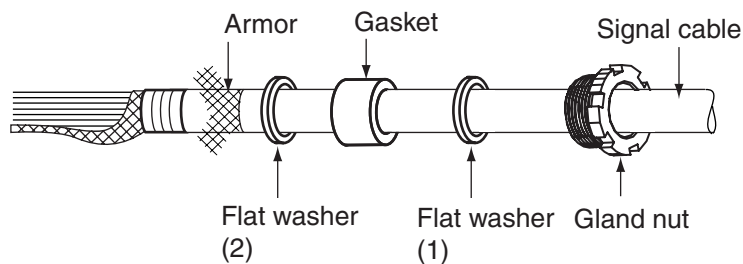
Fabricating signal cable RW-9600

1. Use a ratchet or box wrench (diagonal 13 mm) to open port- and starboard-side covers on the antenna unit.
2. Unfasten the gland nut for the signal cable and remove the gasket, flat washers (3 pcs.) and gland cap. (The gland cap may be discarded.)
3. Fabricate the signal cable as follows:
 - a) Remove the vinyl sheath, armor and sheath by the amounts shown in the figure below.
 - b) Unravel the shield to expose cores.
 - c) Shorten cores (except coax) considering their locations on the terminal inside the antenna unit.
 - d) Shorten the shield, leaving 300 mm. Attach crimp-on-lug (FV5.5-4, yellow, $\phi 4$) to shield.
 - e) Remove the sheath of cores by 6 mm.
 - f) Unravel armor.
 - g) Fix vinyl wire, coaxial cable and shield by taping the shield with vinyl tape at the location shown below.

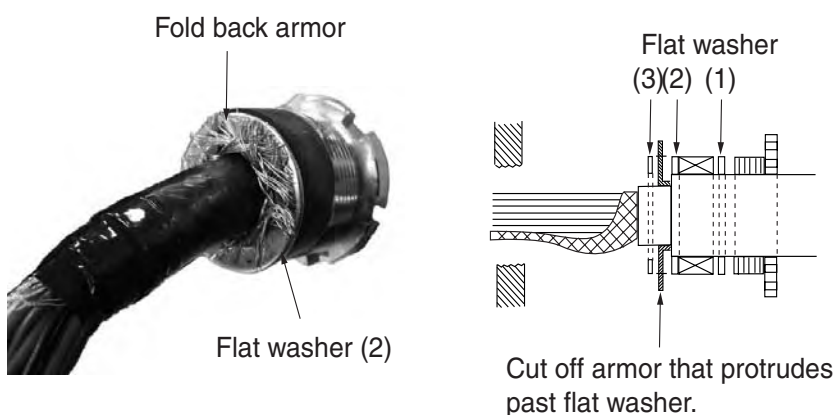


Fabricating signal cable RW-9600

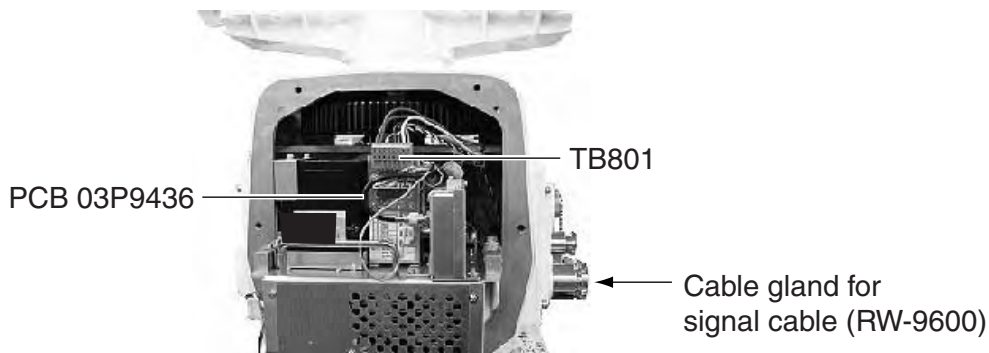
- In the order shown in the figure below, pass the gland nut, flat washers (3 pcs.) and gasket onto the signal cable.



- As shown in the figure below, fold back the armor onto flat washer (2) and insert remaining armor through flat washer (3). Cut off the part of the armor that protrudes past the flat washers (2) and (3).

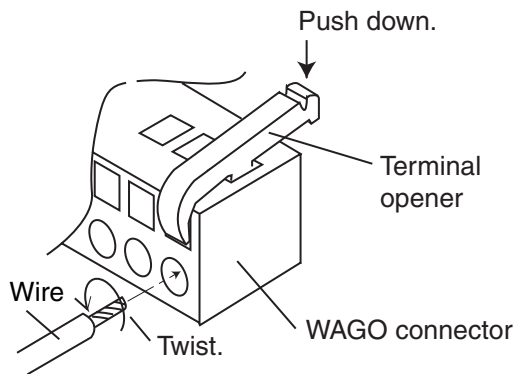


- Lead the signal cable through its cable gland and then into the chassis. Coat the threaded part of gland nut with sealant (supplied) and then tighten the nut.



Antenna unit, front view

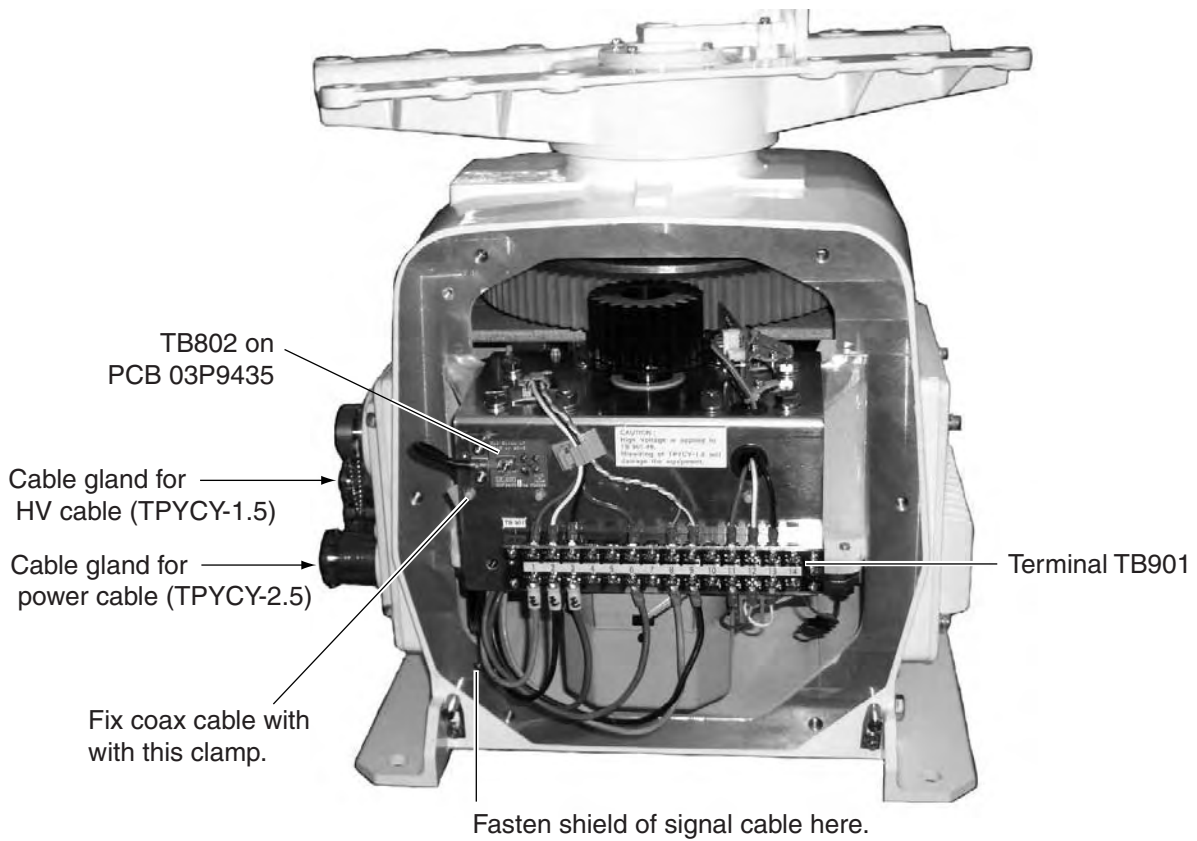
7. Using the terminal opener provided, connect cores (except coaxial cable) to their appropriate locations on TB801 on the PCB 03P9436. Refer to the interconnection diagram for wiring details.



Procedure

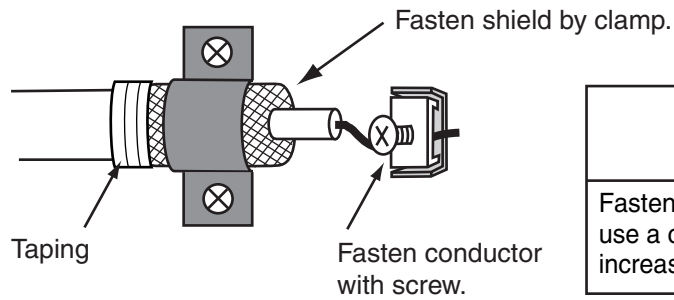
1. Twist core.
2. Insert terminal opener as shown and push down.
3. Insert core into hole.
4. Release terminal opener.
5. Tug on wire to confirm that it is firmly in place.

How to wire WAGO connector



Antenna unit, front view

8. Connect coaxial cable to TB802 on the PCB 03P9435. Fix the shield and conductor as shown below.



NOTICE

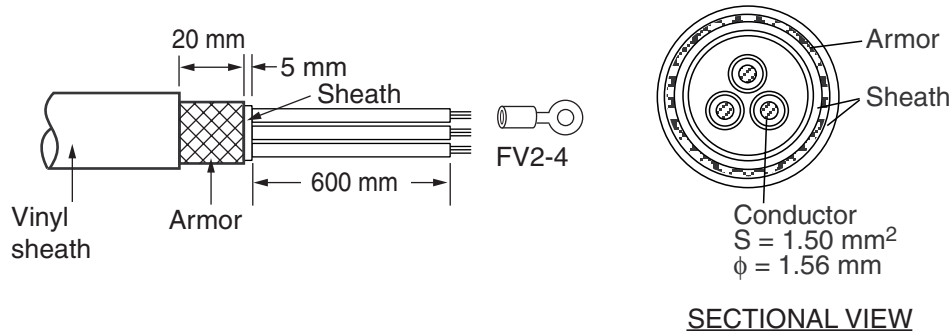
Fasten BARE conductor. Do not use a crimp-on lug, to prevent increased contact resistance.

How to fasten coaxial conductor

9. Referring to the illustration above for location, fasten shield (crimp-on lug FV5.5-4 attached) of signal cable with screw on chassis.
10. Process unused wires as follows:
- Slip shrink tubing onto cores and heat.
 - Bind the wires with a cable tie and pass them through the cable gland on the chassis.
11. Close the cover which protects pcb 03P9436.
12. Seal the cable gland for the signal cable with putty.

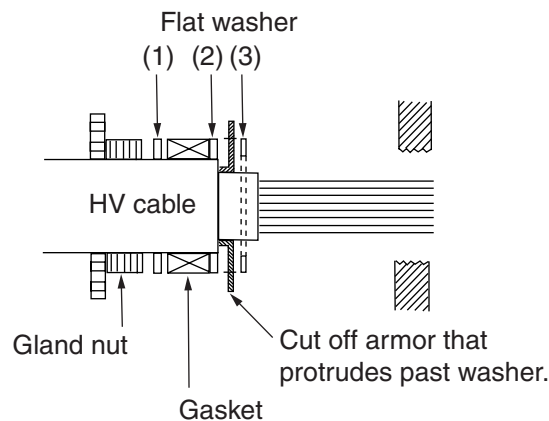
Fabricating HV cable TYP CY-1.5 and power cable TYP CY-2.5

1. Unfasten the gland nut for the HV cable and remove gasket, flat washers (3 pcs.) and gland cap. (The gland cap may be discarded.)
2. Fabricate the HV cable as shown below.



How to fabricate HV cable TYP CY-1.5

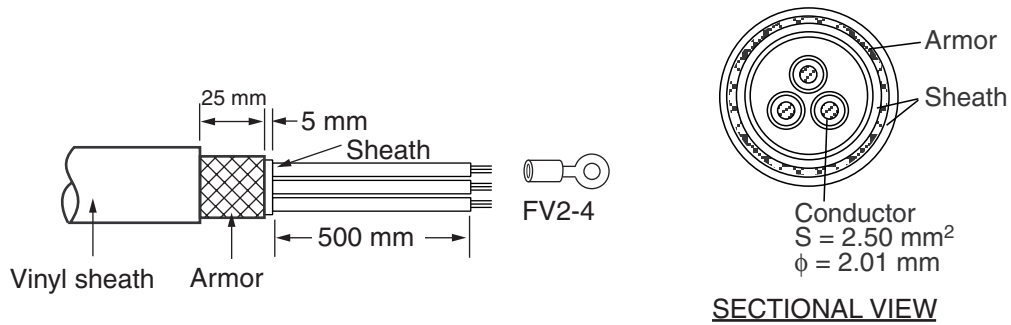
3. In the order shown in the figure below, pass the gland nut, flat washers (3 pcs.) and gasket onto the HV cable.
4. As shown in the figure below, fold back the armor onto flat washer (2) and insert remaining armor through flat washer (3). Cut off the part of the armor that protrudes past the flat washers (2) and (3).



Passing flat washer, etc. onto HV cable

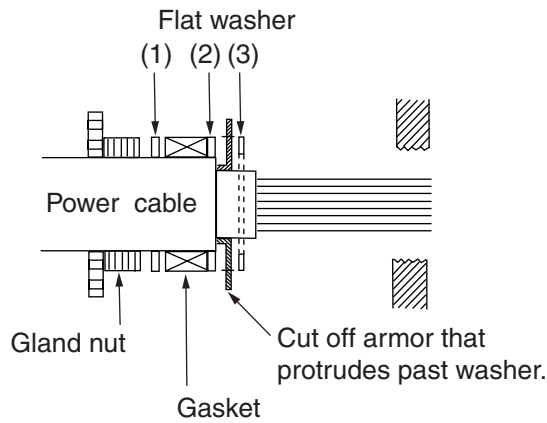
5. Pass the HV cable through its cable gland and then tighten gland nut.
6. Connect wiring to TB901, referring to the interconnection diagram.
7. Unfasten the gland nut for the power cable and remove gasket, flat washer (3 pcs.) and gland cap. (The gland cap may be discarded.)

8. Fabricate the power cable as shown below.



How to fabricate power cable TYPCY-2.5

9. In the order shown in figure below, pass the gland nut, flat washers (3 pcs.) and gasket onto the power cable.
10. As shown in the figure below, fold back the armor onto flat washer (2) and insert remaining armor through flat washer (3). Cut off the part of the armor that protrudes past the flat washers (2) and (3).



Passing flat washer, etc. onto power cable

11. Pass the power cable through its cable gland and tighten gland nut.
12. Connect wiring to the terminal TB901, referring to the interconnection diagram.

| |
|---|
| ⚠ CAUTION |
| High voltage is present at the No. 6 pin of TB901. Miswiring at this pin can damage the antenna unit. |

13. Close the cover that protects pcb 03P9435.
14. Seal the cable gland for the power cable and HV cable with putty.

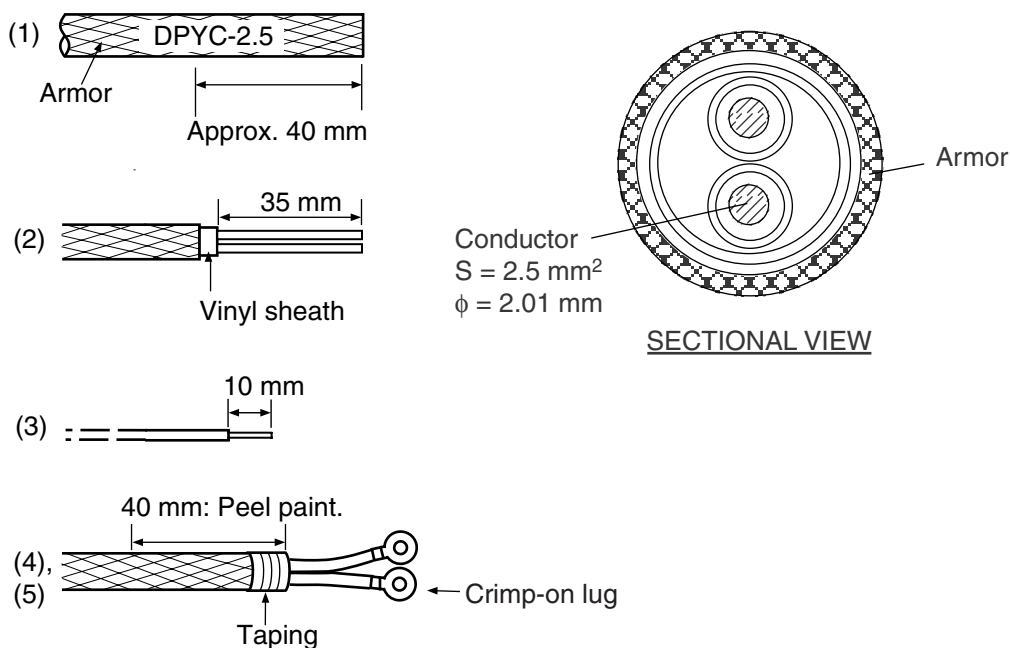
2.3 Monitor Unit

Two cables are terminated at the monitor unit: the signal cable from the processor unit (5 m or 10 m cable) and the power cable from the ship's mains. The signal cable comes with a connector pre-attached to it for connection to the monitor unit. Fabricate the power cable as below. Use cable DPYC-2.5 (Japan Industry Standard) or the equivalent. Be sure to ground the unit, with IV-8sq wire (local supply). For MU-190, see the applicable Operator's Manual.

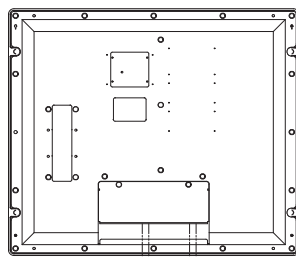
Note: Pass the AC line through a double-contact breaker (shipyard supply). Further, for vessels where the power line is grounded, connect one end of the line to the C (common) terminal and the other end to the H terminal.

Fabricating the power cable DPYC-2.5

1. Remove the armor from the cable by 40 mm.
2. Remove the vinyl sheath by 35 mm.
3. Remove the insulation from the cores by about 10 mm.
4. Peel paint from the armor by 40 mm.
5. Cover the end of the armor with vinyl tape. Fix crimp-on lugs (FV2-4, blue, supplied) to the cores.



Fabricating power cable DPYC-2.5



↑ Cable entrance for signal cable
(Connect end which has no EMI core here.)
↑ Cable entrance for power cable

Monitor unit MU-201CR, rear view

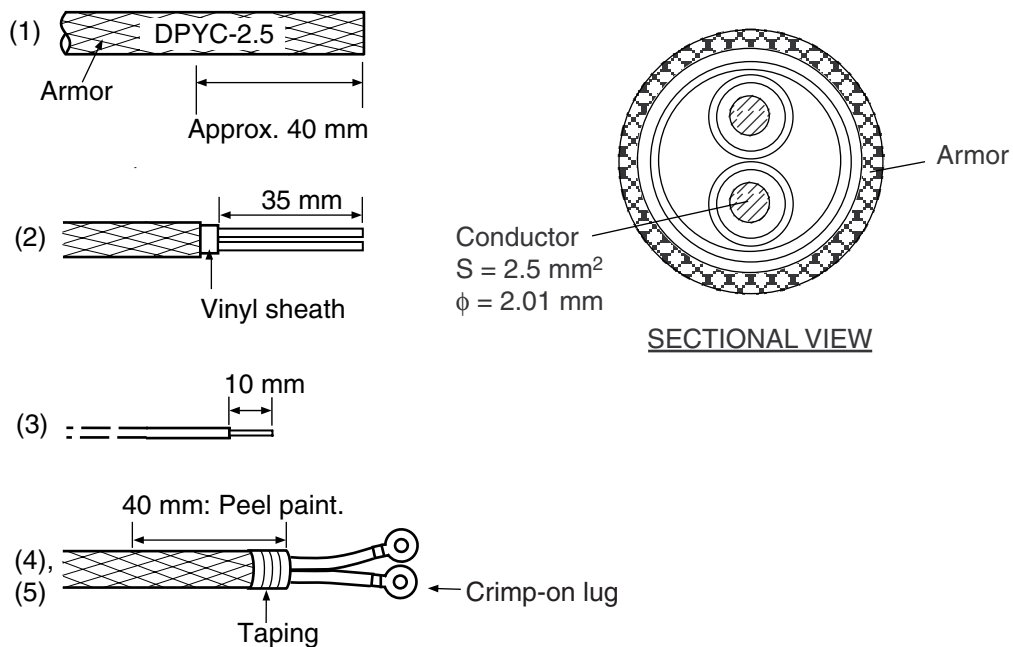
2.4 Processor Unit

Four cables are terminated at the processor unit: the antenna unit cable, monitor unit cable (FAR-2157 only), control unit cable and the power cable. Cables other than the power cable come with a connector preattached to them. Fabricate the power cable as below.

Note: Pass the AC line through a double-contact breaker (shipyard supply). Further, for vessels where the power line is grounded, connect one end of the line to the C (common) terminal and the other end to the H terminal.

Fabricating the power cable DPYC-2.5

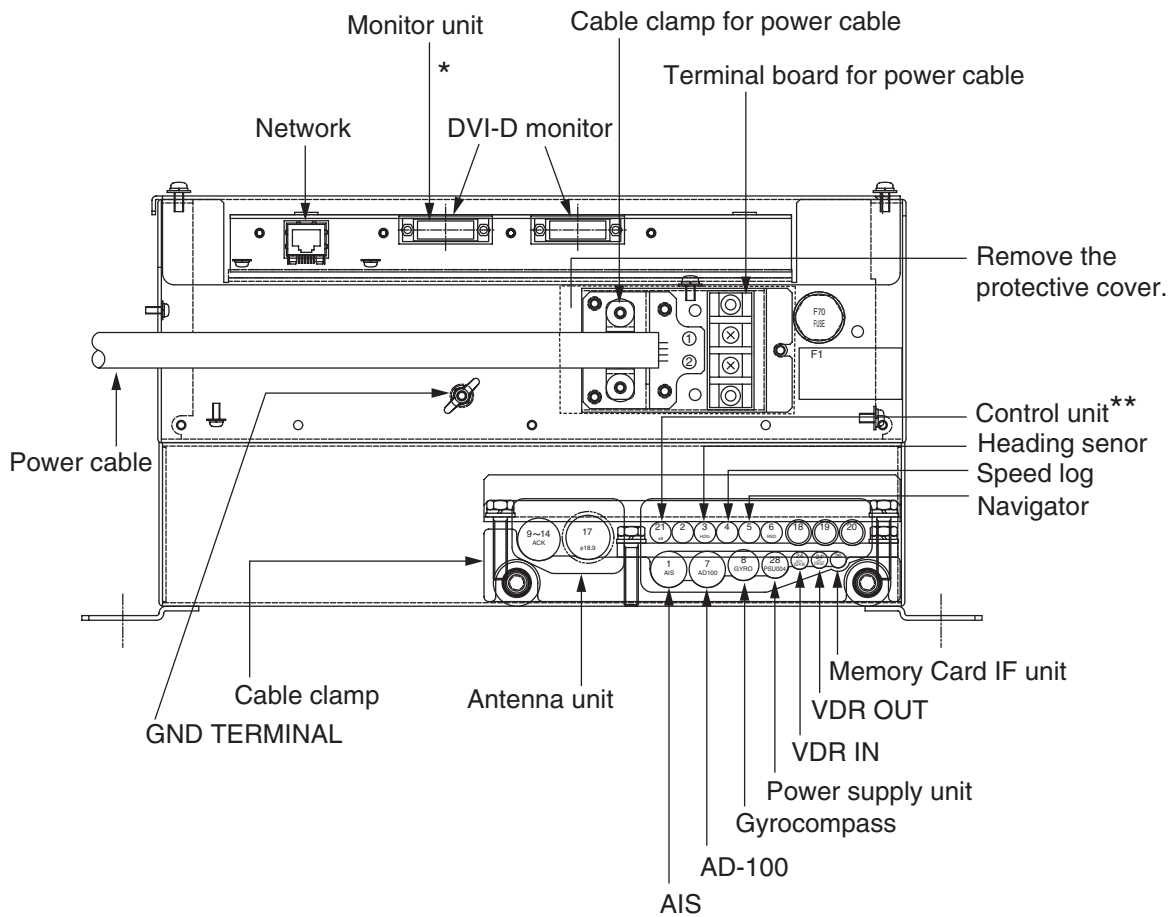
1. Remove the armor from the cable by 40 mm.
2. Remove the vinyl sheath by 35 mm.
3. Remove the insulation from the cores by about 10 mm.
4. Peel paint from the armor by 40 mm.
5. Tape the end of the armor with vinyl tape. Fix crimp-on lugs (FV2-4, blue, supplied) to the cores.



Fabricating power cable DPYC-2.5

Connection of cables

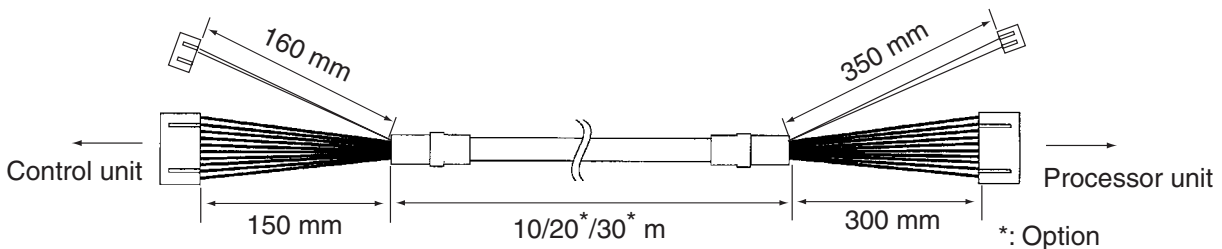
The power cable is connected to the terminal board on the rear panel and the signal cable from the monitor unit is connected to the DVI-D connector. Other cables are connected to the printed circuit board 03P9342. Be sure to ground the unit, with IV-8sq wire (local supply).



Processor unit, rear view

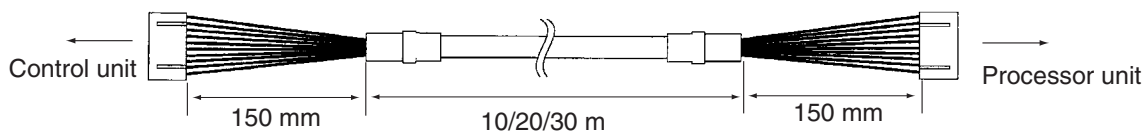
*: The connector with EMI core should be connected to the processor unit.

** : The configuration of optional cable 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

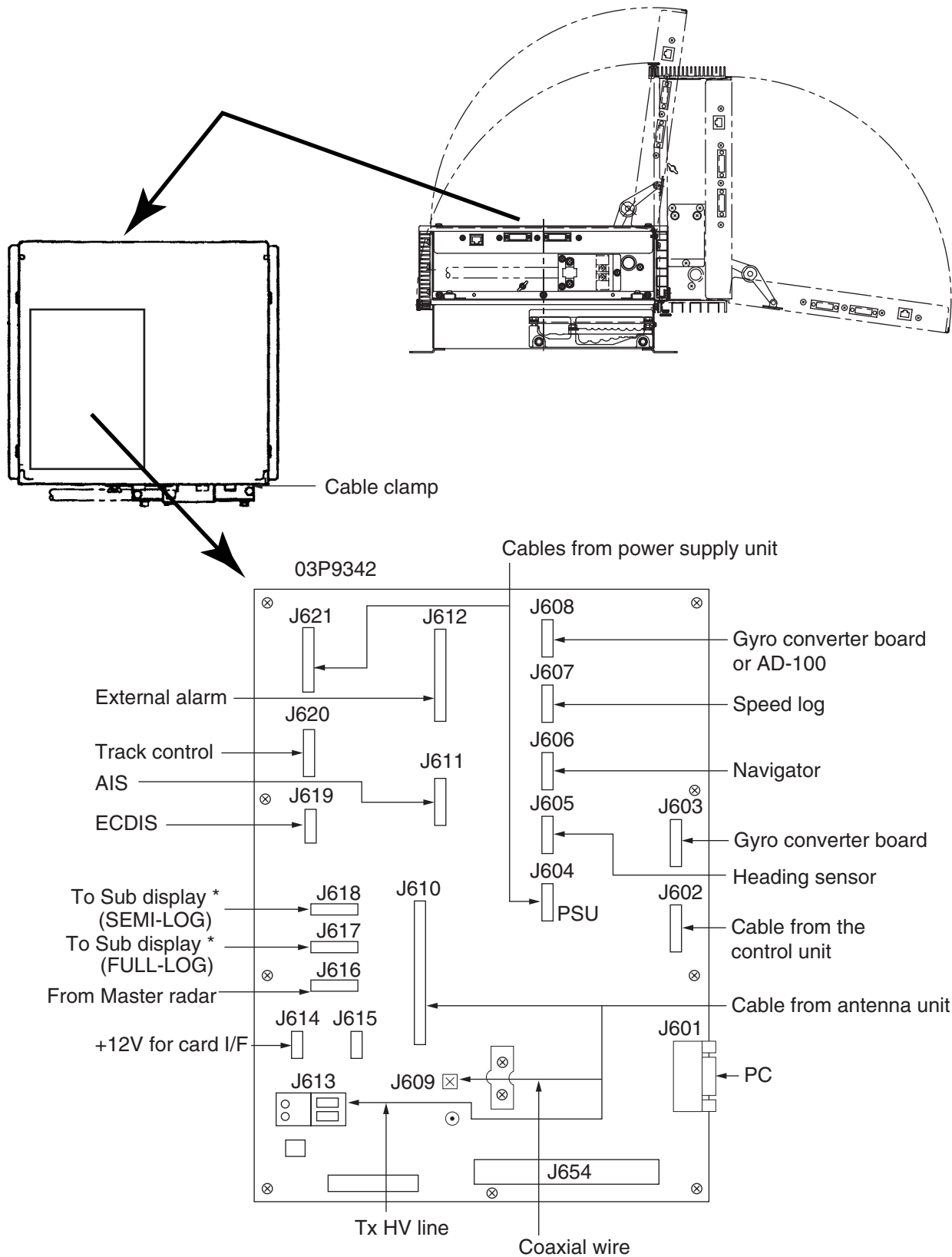
When the RCU-016 is installed, optional cable (XH10P-W-5P-A, L=10/20/30M) is required. Cable fabrication for each end is the same.



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

Location of connectors

Open the processor unit as shown below to access the 03P9342 board, which is for connection of external equipment.

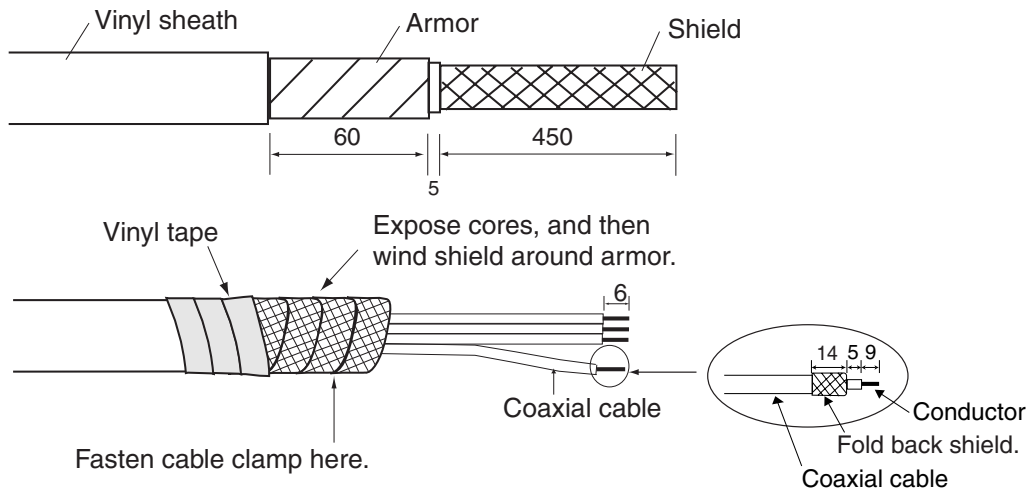


Location of connectors inside the processor unit

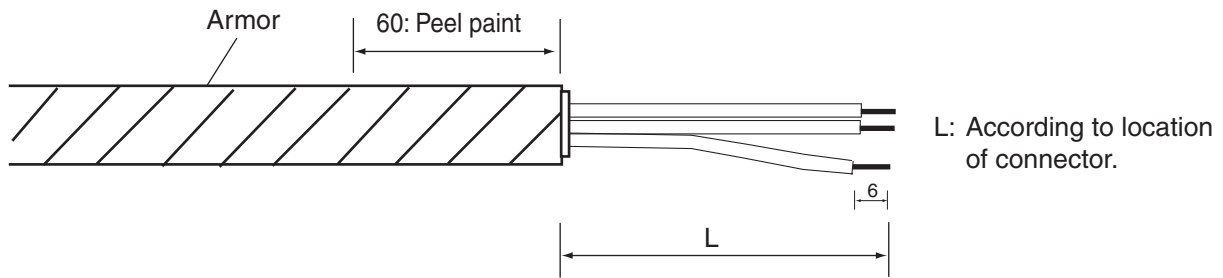
*: See page 2-12 for details.

Cable fabrication for the cables connected to the 03P9342 board

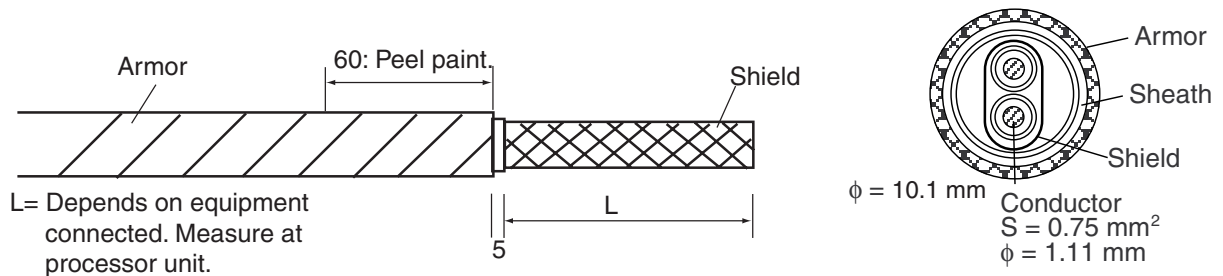
Signal cable RW-9600 (Between antenna unit and processor unit)



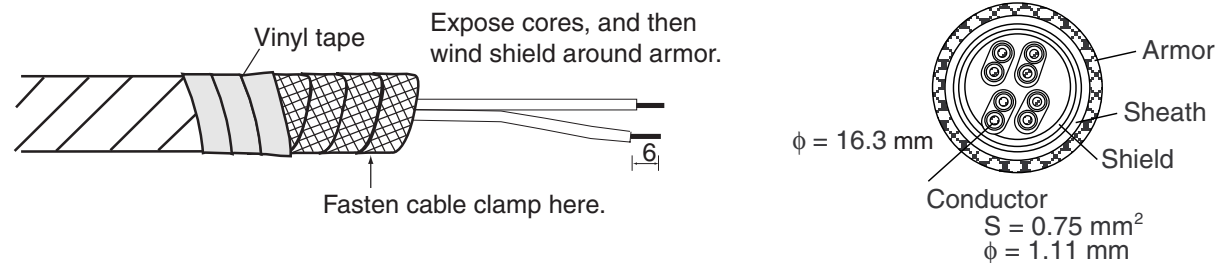
Power cable TPYC-1.5



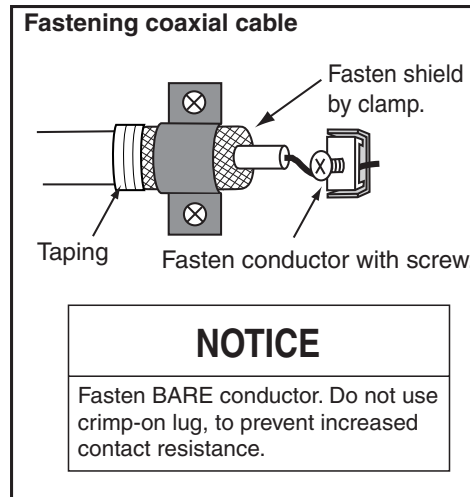
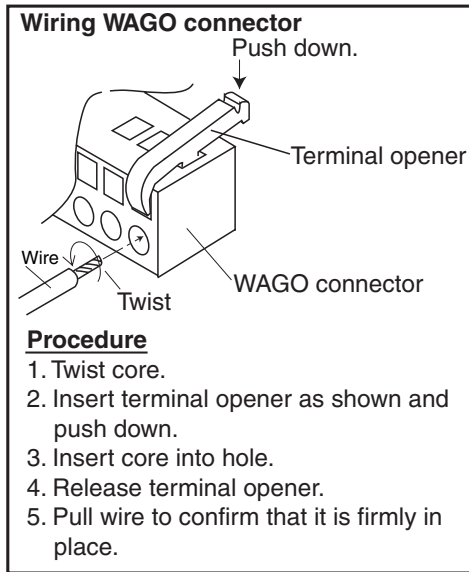
Cables for optional equipment (use TTYCS-1 or TTYCS-4, or equivalent)



TTYCS-1



TTYCS-4



Connection of Sub-display

A conventional remote display and/or FAR-2xx7 series radar can be connected to J617 (FULL-LOG) and J618 (SEMI-LOG) 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.

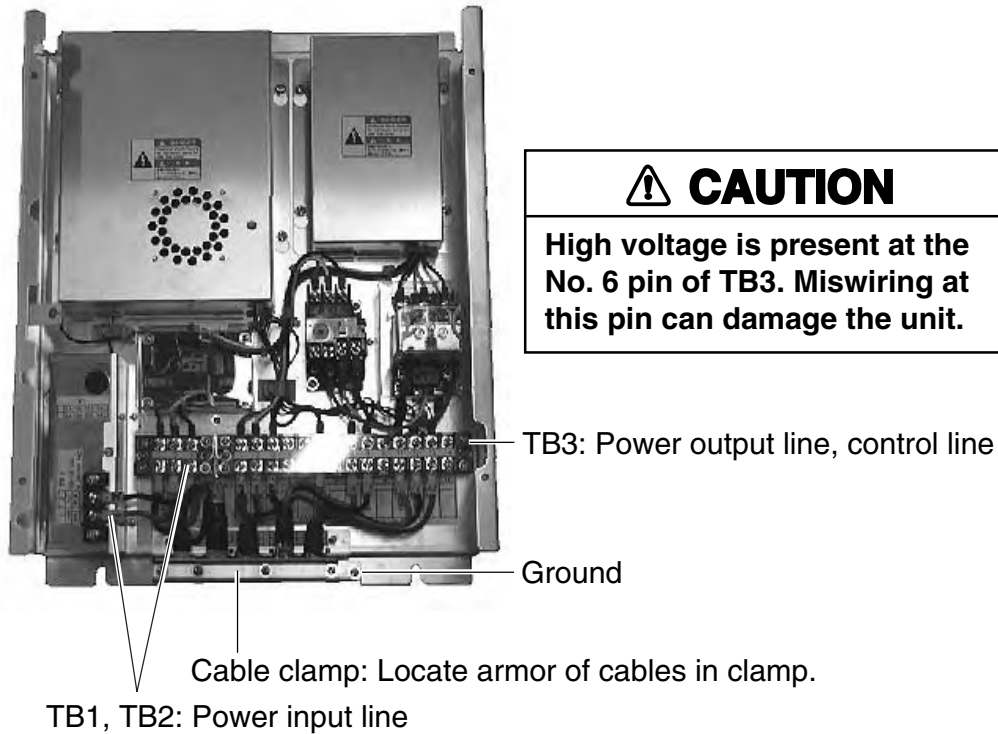
| Port | | Conventional remote display | FAR-2157 |
|---|--------------|---|---|
| J617(FULL-LOG)GAIN and STC are not controlled. Video signal for conventional sub display is output. | Overall gain | Even if input video level is adjusted to 4 Vp-p, the gain is 8 db lower than that on the master radar. | 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)Video signal of main radar controlled GAIN and STC is output. | 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 changes the radar image, however STC is doubly applied, resulting in improper radar picture. Therefore, it is not recommended to use this port. | The STC control has no effect. |

2.5 Power Supply Unit

Wire the power supply unit referring to the interconnection diagram. Be sure to ground the unit, with IV-8sq wire (local supply).

Note 1: Motor specification cannot be changed in the field.

Note 2: Pass the AC line through a double-contact breaker (shipyard supply). Further, for vessels where the power line is grounded, connect one end of the line to the C (common) terminal and the other end to the H terminal.

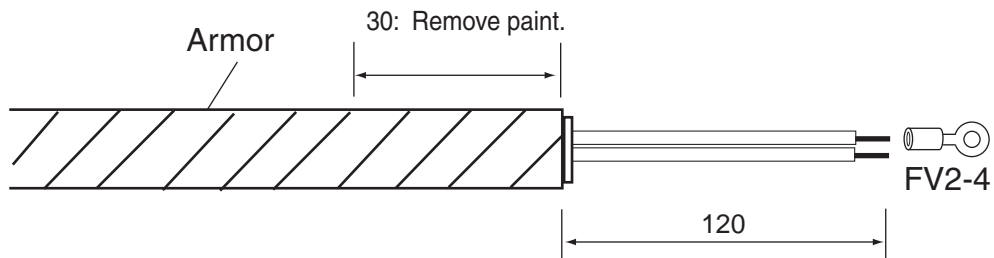


Power supply unit, inside view

Fabricating cable connected to terminal TB1, TB2, TB3

Terminal TB1: cable DPYC-2.5

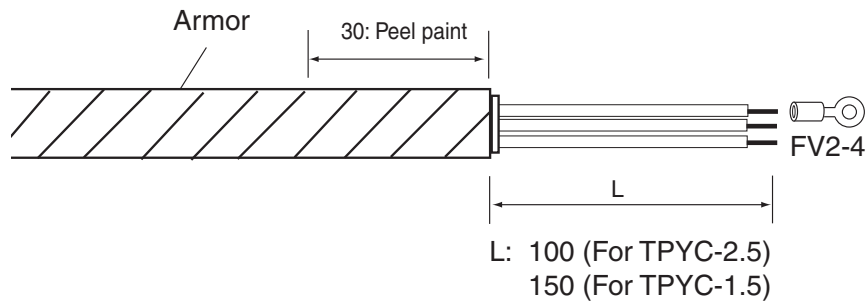
See page 2-8 for sectional view of cable if using equivalent cable.



Terminal TB2: cable TPYC-2.5 (for antenna motor)

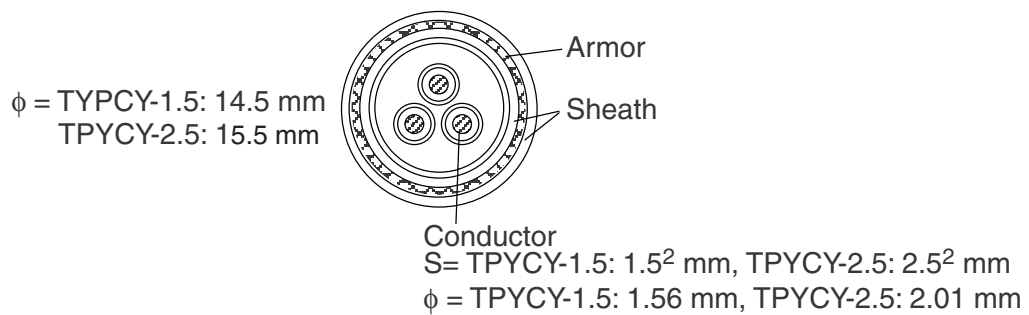
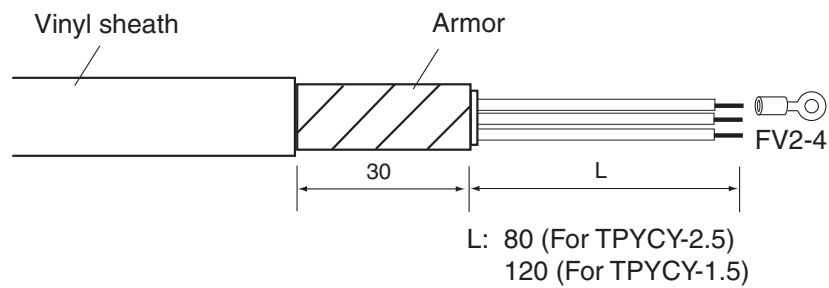
Terminal TB3: #11-#13, cable TYPC-1.5 (between power control section and processor)

See page 2-5 for sectional views of these cables if using equivalent cables.



Terminal TB3: #1-#3 TPYCY-2.5 (between power control section and antenna)

Terminal TB3: #6, #8, #9 TPYCY-1.5 (between power control section and antenna)



2.6 Changing AC Power Specification

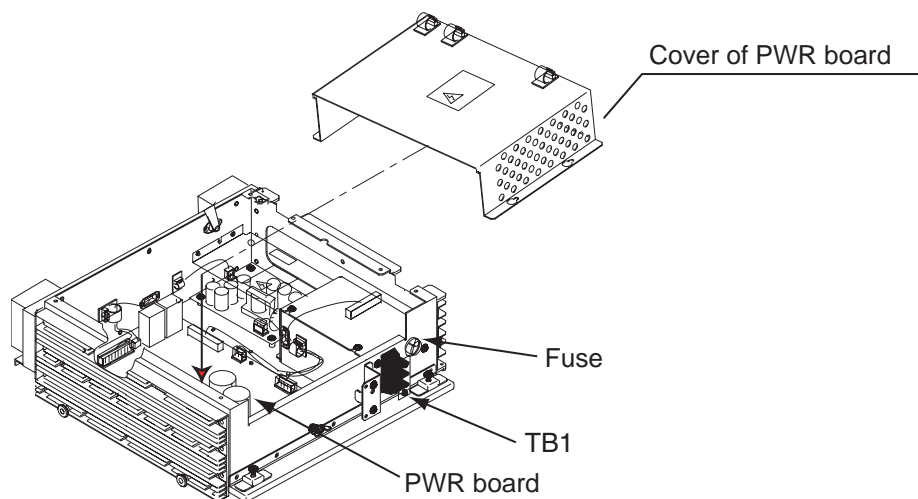
To change AC power specification from 100 VAC to 220 VAC and vice versa, change fuse and jumper wire settings and adjust the overvoltage detection circuit, following the instructions in this section.

Processor unit

Add or remove jumper connector P108 from the PWR board 03P9339 and change the fuse in the processor unit according to ship's mains. Then, adjust the overvoltage detection circuit, the procedure for which is shown on the next page.

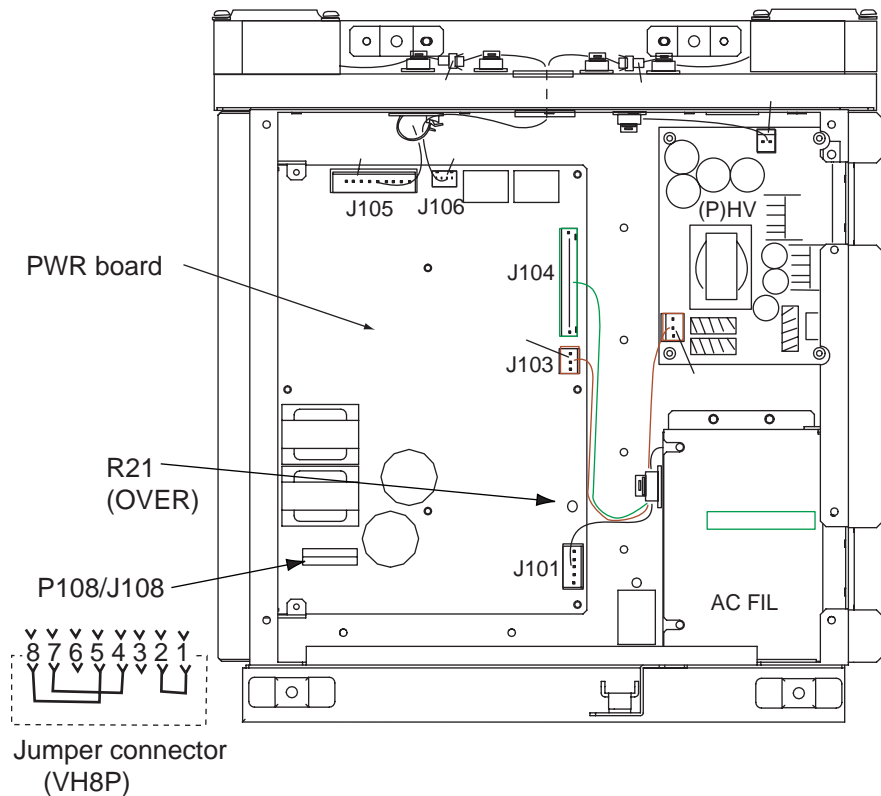
Note: When switching from 220 VAC to 100 VAC, construct a jumper connector locally, referring to the illustration on the next page. (VH8 connector housing is to be plugged into J108.)

| Power supply | Fuse | Jumper connector P108 |
|--------------|------|-----------------------|
| 100 VAC | 10A | Necessary |
| 220 VAC | 5A | Unnecessary |



Upper part of processor unit
(SPU assembly omitted)

Processor unit, inside view



Processor unit, inside view

How to adjust the overvoltage detection circuit:

1. Add or remove the jumper connector P108 as appropriate and change the fuse, referring to the table on the previous page for details.
2. On the PWR board, set R21 fully clockwise.
3. Connect a variable transformer between ship's mains and the input power terminal board TB-1 in 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 R21 counterclockwise gradually until the overvoltage detection circuit activates (i.e., power supply cuts off).
6. Lower the output voltage of the variable transformer and confirm that the radar automatically turns on with a voltage lower than 142 VAC or 284 VAC.
7. Gradually increase the output voltage of the variable transformer and confirm that the overvoltage detection circuit activates at 144 V or 288 VAC of the variable transformer output.
8. Assemble and connect the processor unit.

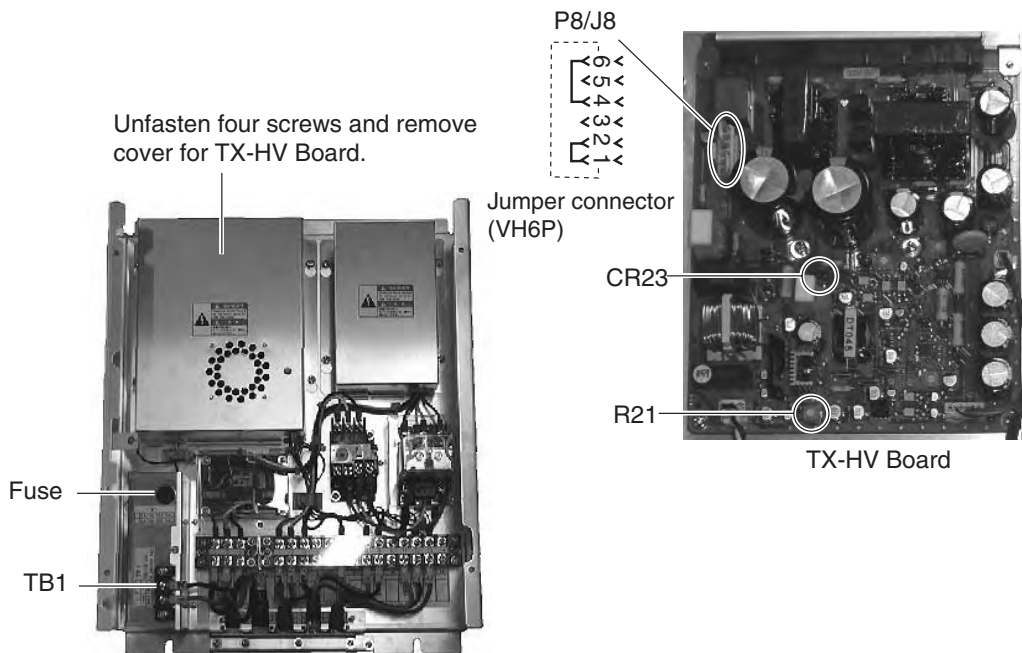
Power supply unit

Refer to the illustration and table below to add (or remove) jumper connector P8 from the TX-HV Board (03P9350) and change fuse.

After completing jumper and fuse arrangements, adjust the overvoltage detection circuit, using a variable transformer.

Note: When switching from 220 VAC to 100 VAC, construct a jumper connector locally, referring to the illustration below. (VH6 connector housing is to be plugged into J8.)

| Power | Fuse | Jumper connector P8 |
|---------|------|---------------------|
| 100 VAC | 5A | Required |
| 220 VAC | 3A | Unnecessary |



How to adjust the overvoltage detection circuit

1. Add or remove the jumper connector P8 as appropriate and change the fuse, referring to the table above for details.
2. On the PWR board, set R21 fully clockwise.
3. Connect a variable transformer between ship's mains and the input power terminal board TB-1 in 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 R21 counterclockwise gradually until the overvoltage detection circuit activates (i.e., power supply cuts off).
6. Lower the output voltage of the variable transformer and confirm that the radar automatically turns on with a voltage lower than 142 VAC or 284 VAC.
7. Gradually increase the output voltage of the variable transformer and confirm that the overvoltage detection circuit activates at 144 V or 288 VAC of the variable transformer output.
8. Assemble and connect the power supply unit.

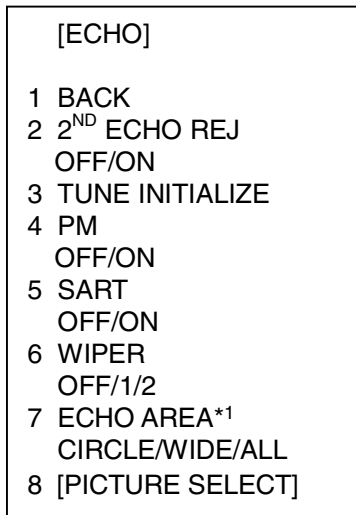
3. ADJUSTMENTS

This section provides the information necessary for setting and adjusting the radar, which is carried out from the radar's menu system. Menus may be accessed from the keyboard or on-screen menu in case of Control Unit RCU-014, or on-screen menu in case of Control Unit RCU-015.

The menu illustrations in this chapter show default settings in bold face.

3.1 Initializing Tuning

1. Transmit the radar on 48 nm range.
2. Rotate the [GAIN] control until the value on the gain bar is 70-80.
3. Left-click the MENU box at the right side of the screen.
4. Spin the thumbwheel to choose 1 ECHO and then push the thumbwheel.



*1 Not available on IMO or A type radar

ECHO menu

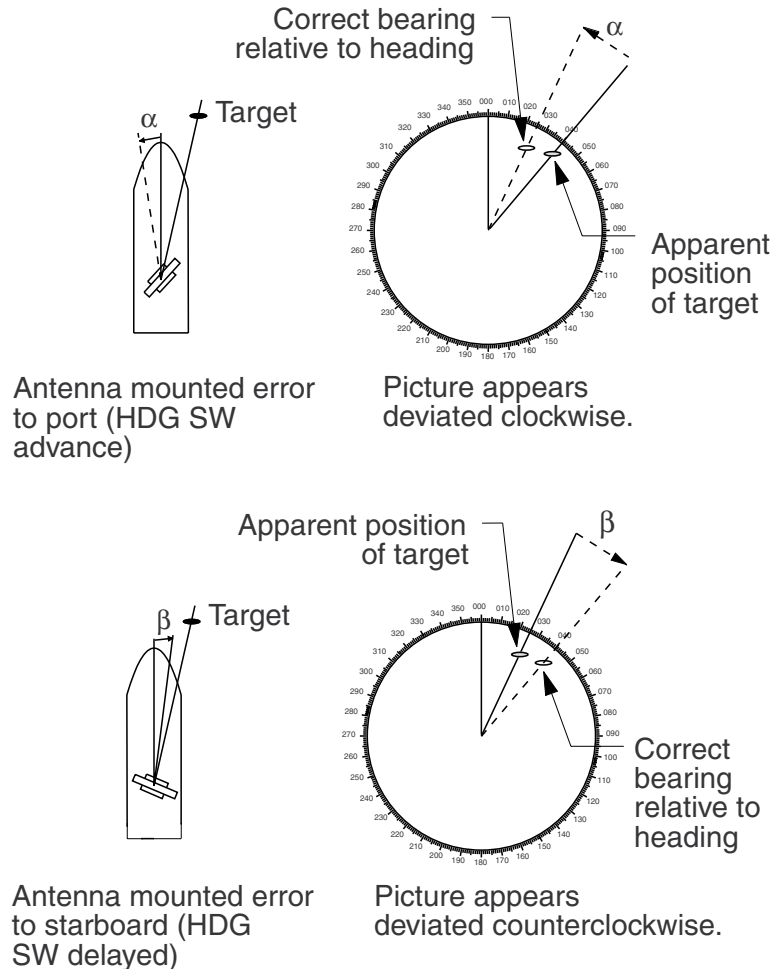
5. Spin the thumbwheel to choose 3 TUNE INITIALIZE.
6. Push the thumbwheel to initialize automatic tuning.

In a few moments 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] control to show echoes clearly.

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

3.2 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:
 - a) Roll the trackball to place the arrow in the EBL1 or EBL2 box (at bottom left corner), whichever EBL you want to use.
 - b) Push the left button to turn on the EBL.
 - c) Push the left button again to send the cursor inside the effective display area.
 - d) Roll the trackball (coarse adjustment) or spin the thumbwheel (fine adjustment) to bisect the target with the EBL.
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. Left-click the MENU box at the right side of the screen to close the menu.

6. For Control Unit RCU-014:

- a) While pressing and holding down the [HL OFF] key, press the [MENU] key five times.
- b) Press the [0] key to show the INITIALIZE menu.

For Control Unit RCU-015:

See the procedure on the next page for how to show the INITIALIZE menu.

| |
|-------------------|
| [INITIALIZE] |
| 1 BACK |
| 2 [ECHO ADJ] |
| 3 [SCANNER] |
| 4 [INSTALLATION] |
| 5 [OWN SHIP INFO] |
| 6 [ARP PRESET] |
| 7 [NETWORK] |
| 8 [OTHER] |

INITIALIZE menu

- 7. **RCU-014:** Press the [2] key to open the ECHO ADJ menu.
RCU-015: Choose 2 ECHO ADJ and then push the thumbwheel.

| |
|---|
| [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 |

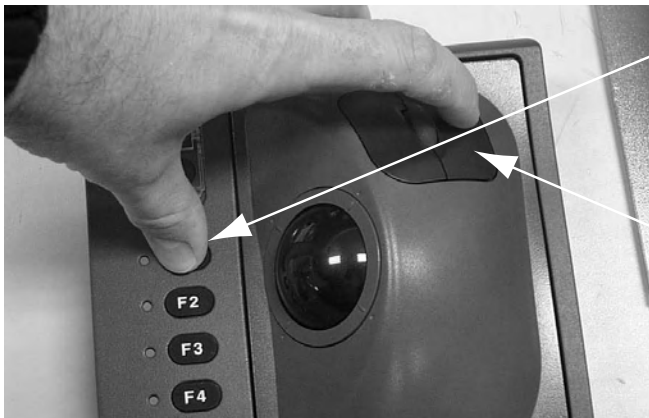
ECHO ADJ menu

- 8. **RCU-014:** Press the [3] key to choose HD ALIGN.
RCU-015: Choose 3 HD ALIGN and then push the thumbwheel.
- 9. **RCU-014:** Key in the bearing difference. The setting range is 0 to 359.9(°).
RCU-015: Spin the thumbwheel to set the bearing difference and then push the thumbwheel.
The setting range is 0 to 359.9(°).
- 10. Confirm that the target echo is displayed at correct bearing on the screen and then push the thumbwheel.
- 11. **RCU-014:** Press the [MENU] key to finish.
RCU-015: Left-click the MENU box to finish.

How to access the INITIALIZE Menu with Control Unit RCU-015



1. Use the trackball to place the pointer on the MENU box so it is highlighted. DO NOT click the menu box - just leave the pointer over "MENU".



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

3. Push the right button five times. You should hear three beeps on the fifth push.



The INITIALIZE menu appears. Choose 4 [INSTALLATION] to show the installation menus.

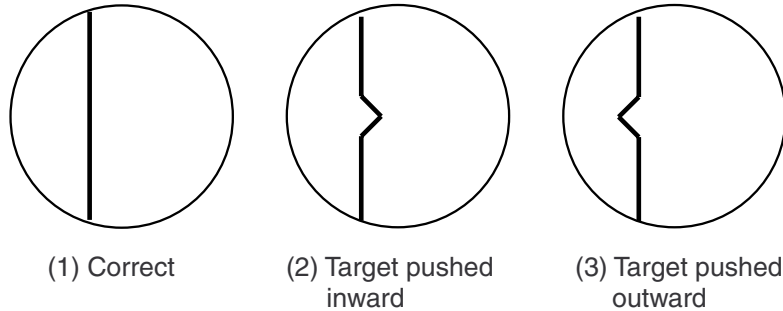
How to adjust heading of external radar from this radar

1. Put the cursor in the ANT box at the top left corner then push the right button.
2. Press the [8] key to select SUB MONITOR.
3. Push the [8] key until ON is selected then push the left button.
4. Push the right button.
5. Left-click the ANT box to select SUB MONITOR.
6. Follow the procedure on page 3-3.

3.3 Adjusting Sweep Timing

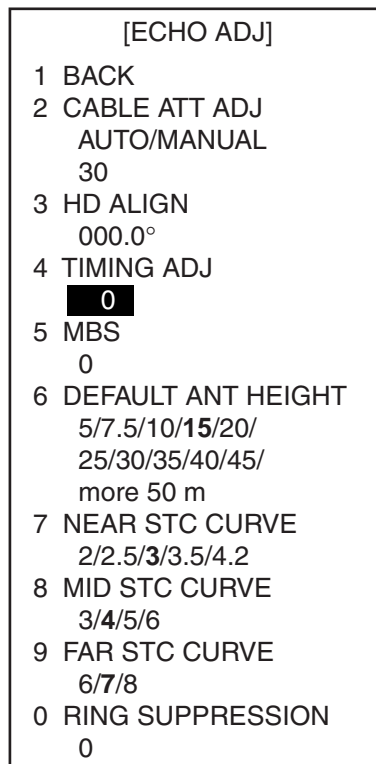
Sweep timing differs with respect to the length of the signal cable between the antenna unit and the processor unit. Adjust sweep timing to prevent the following symptoms:

- 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 the 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 the radar picture controls to display picture properly.
3. Select a target echo which should be displayed straightly.
4. On the ECHO ADJ menu, choose 4 TIMING ADJ.



ECHO ADJ menu

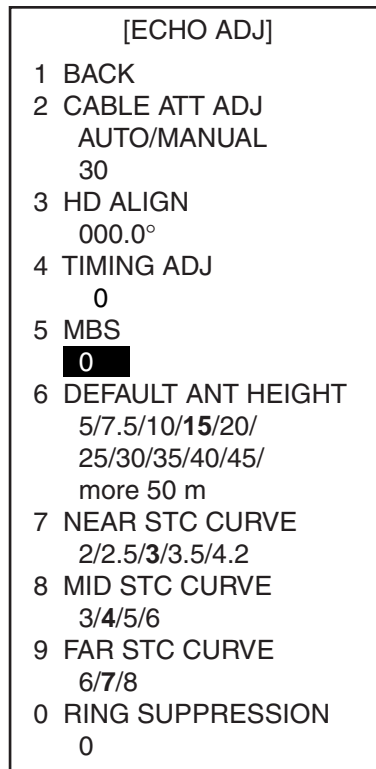
5. Spin the thumbwheel to set a suitable value which causes the target to be displayed straightly. The setting range is 0 to 4095.
6. Left-click the MENU box to finish.

Note: The sweep timing of an external radar can be adjusted from this radar. Do steps 1-5 on page 3-4 and then do the procedure on this page.

3.4 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. On the ECHO ADJ menu, choose 5 MBS.



ECHO ADJ menu

5. Spin the thumbwheel to set a suitable value so that the main bang disappears. The setting range is 0 to 255.
6. Left-click the MENU box to finish.

3.5 Other Settings

ECHO menu setting

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

| | |
|------------|---|
| [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

CABLE ATT ADJ

Before adjusting, set the radar as follows (Same as default setting of PICTURE1):

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

To adjust the cable attenuation manually, choose MANUAL and push the thumbwheel. With the gain set to 80, spin the thumbwheel until noise just appears on the screen. Default setting is 30 for the antenna cable length of 15 m. The setting range is 0 to 73.

To adjust the cable attenuation automatically, choose AUTO and push the thumbwheel. 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 from 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

The default setting is suitable for most conditions. If necessary, change the setting according to sea conditions.

RING SUPPRESSION

This is mainly used to remove "ring" noise that 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.

SCANNER menu

1. Open the INITIALIZE menu as described on page 3-3 and 3-4.
2. Choose 3 SCANNER 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
```

SCANNER menu

BLIND SECTOR 1 and BLIND SECTOR 2

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

ANT REVOLUTION

No use.

ANT SW and ANT STOPPED

This is used for antenna maintenance by service personnel.

M SPEC

No use.

BB TYPE

Choose type of radar. Select "BB" for FAR-2157-BB.

INSTALLATION menu

Open the INSTALLATION menu by choosing 4 INSTALLATION from the INITIALIZE menu.

RADAR

Automatically selected to MAIN when 4 RADAR NO is selected to 1-4; SUB when the same item is selected to 5-8.

RANGE UNIT

Choose NM, SM, km or kyd (kilo yard) as appropriate. For the IMO- and A-type radars the range unit is fixed at "NM".

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 radars from one another.

MODEL

Choose "50".

TYPE

Choose radar type from among the following options:

IMO: IMO compliant

A: Near-IMO specifications

B: International fishing vessels

C: Japanese flag vessels

W: Washington state (USA) ferry

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.

| | |
|----------------|---|
| [INSTALLATION] | |
| 1 | BACK |
| 2 | RADAR* ¹ MAIN/SUB |
| 3 | RANGE UNIT* ² NM/SM/km/kyd |
| 4 | RADAR NO* ³ 1/2/3/4/5/6/7/8 |
| 5 | RADAR POSN FORE/ MAIN TOP / MAIN 2ND/MAIN 3RD/ AFT/PORT/ STARBOARD |
| 6 | MODEL 6/12/25 UP/25 DOWN/ 50/30 UP/30 DOWN/60 |
| 7 | TYPE IMO/A/B/C/W |
| 8 | ON TIME XX.XH |
| 9 | TX TIME XX.XH |

*1: No selection

*2: Not shown on IMO- or A-type radar.

*3: No.1-4: with antenna unit
No.5-8: without antenna unit

INSTALLATION menu

OWN SHIP INFO menu

Open the OWN SHIP INFO menu by choosing 5 OWN SHIP INFO from the INITIALIZE menu.

| | |
|----------------|------------------|
| [OWNSHIP INFO] | |
| 1 | BACK |
| 2 | LENGTH/WIDTH |
| | LENGTH 100 m |
| | WIDTH 50 m |
| 3 | SCANNER POSN |
| | BOW 0 m |
| | PORT 0 m |
| 4 | SUB SCANNER POSN |
| | BOW 0 m |
| | PORT 0 m |
| 5 | GPS1 ANT POSN |
| | BOW 0 m |
| | PORT 0 m |
| 6 | GPS2 ANT POSN |
| | BOW 0 m |
| | LEFT 0 m |
| 7 | CONNING POSN |
| | BOW 0 m |
| | PORT 0 m |

OWN SHIP INFO menu

LENGTH/WIDTH, SCANNER POSN and SUB SCANNER POSN

To accurately inscribe own ship marker on the screen, enter length and width of the ship and scanner position from the bow and left sides, for both main and sub scanners. 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

This is for AIS. Enter the GPS antenna position, from the bow and left side. The setting ranges are the same as above.

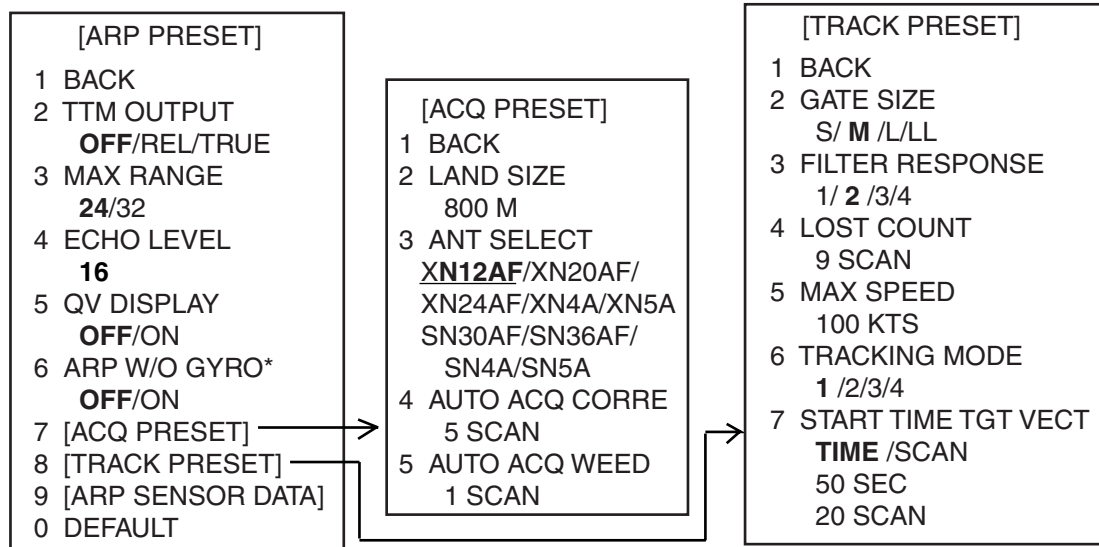
CONNING POSN

Enter the conning position, from the bow and left side. The setting ranges are the same as those shown on the preceding page. When you set the reference point as the conning position, these values are used to correct the radar antenna position.

Note: If two or more radars are installed, all items on the OWN SHIP INFO menu should be the same except 3 SCANNER.

ARPA PRESET menu

Open the ARPA PRESET menu by choosing 6 ARP PRESET from the INITIALIZE menu.



*: Not shown on IMO radar.

ARP-related menus

TTM OUTPUT

Set the output format of tracked targets among OFF, REL and TRUE.

OFF: No output

REL (relative): Target bearing from own ship, degree relative.
Target course, degree relative.

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

Note: The TTM OUTPUT port changes according to the setting for INS as described on page 3-13.

INS-OFF: Output from J619 port

INS-SERIAL: Output from J620 port

INS-LAN: Output from NETWORK port

MAX RANGE

Choose the maximum ARPA tracking range, 24 or 32 nm.

ECHO LEVEL

Set echo detection level. The setting range is 1 to 31.

QV DISPLAY

OFF: Normal picture

ON: Quantized picture. Always off at power on.

ARP W/O GYRO (Not shown on IMO radar)

ARPA may be used without a gyrocompass. Choose ON to use ARPA without a gyrocompass.

LAND SIZE

Set the minimum echo size to be considered a landmass. The setting range is 100 to 1000 m, in increments of 100 m.

ANT SELECT

Set the model of antenna radiator used.

AUTO ACQ CORRE

Set the number of consecutive echoes to receive from a target before initiating automatic acquisition on it. The setting range is 3 to 10.

AUTO ACQ WEED

Set the number of consecutive "no echoes" from a target before canceling automatic acquisition on it. 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. Choose 1 for better trackability; 4 for better stability.

LOST COUNT

Set the number of consecutive "no echoes" before an acquired target is declared as a lost target. 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 how to wait from time of acquisition to display of vector. Choose TIME to set by time (seconds) or SCAN to set by number of antenna scans.

OTHER menu

Open the OTHER menu by choosing 8 OTHERS from the INITIALIZE menu.

| | |
|---|-----------------------------------|
| | [OTHERS] |
| 1 | BACK |
| 2 | DEMO ECHO OFF/EG/SPU/PC |
| 3 | EAV w/o GYRO OFF/ON |
| 4 | ARP SELECT ARPA/ATA |
| 5 | INS OFF/SERIAL/LAN |

OTHER menu

EAV w/o GYRO

Echo averaging can be used without a gyrocompass. Choose ON to use echo averaging without a gyrocompass.

ARP SELECT

Choose ARPA or ATA depending on your radar system.

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.

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4. OPTIONAL EQUIPMENT

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.

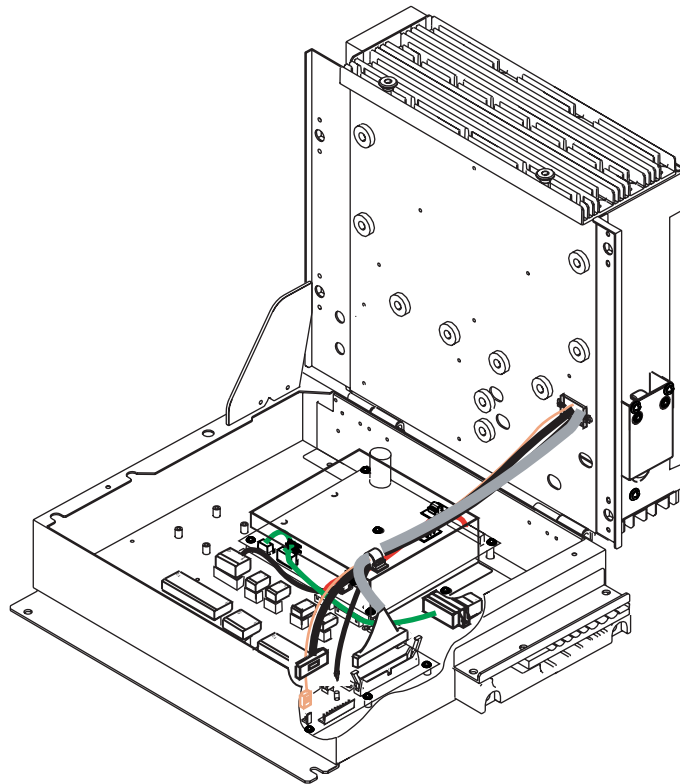
This section explains how to install the GC-10 (mainly consisting of the GYRO CONVERTER board) and set it up according to the gyrocompass connected.

Installing the GYRO CONVERTER board

Necessary Parts: Gyro Converter GC-10-2 (Code no. 000-080-440)

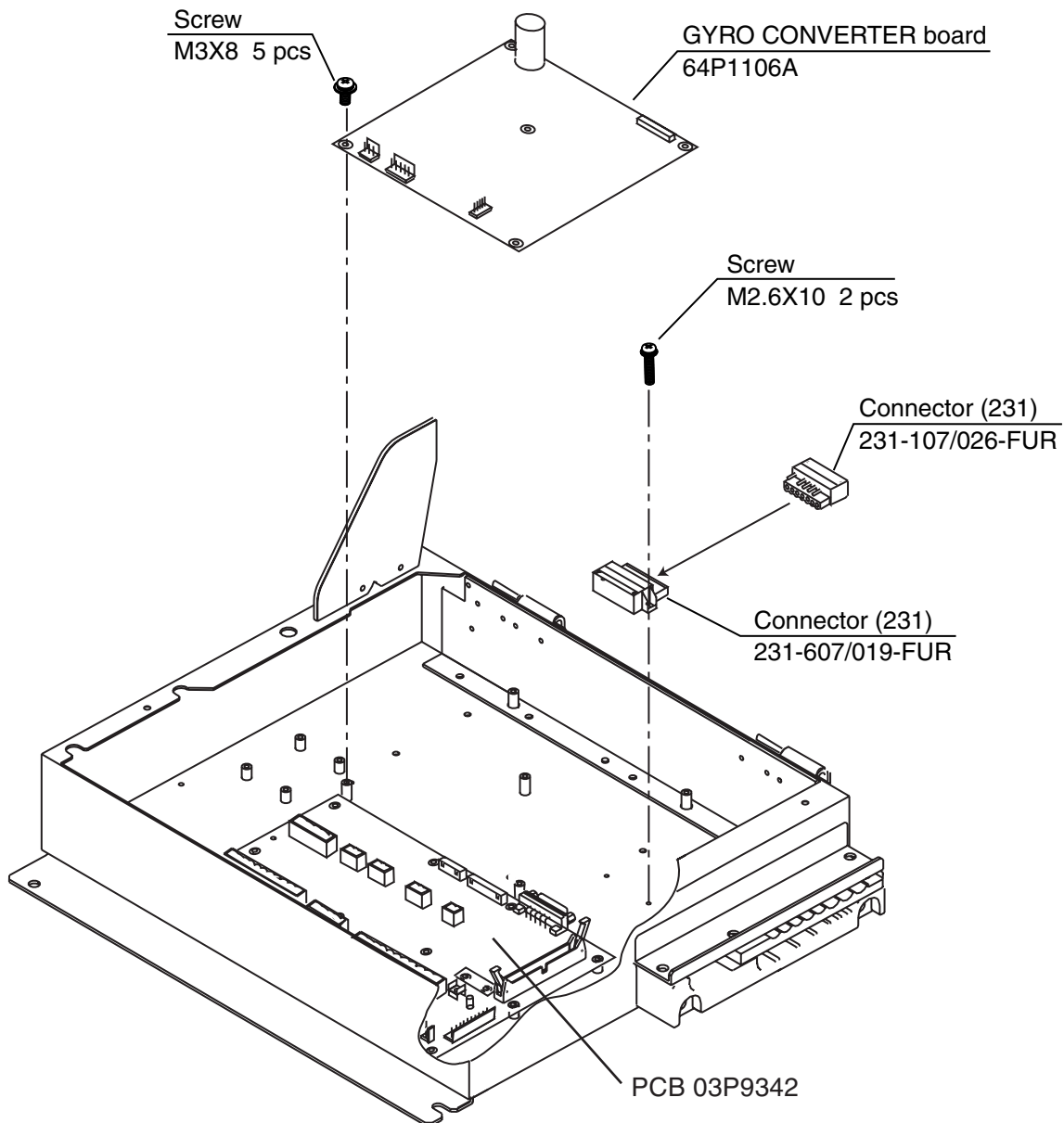
See packing list at the back of this manual for details.

1. Open the processor unit.



Processor unit, inside view

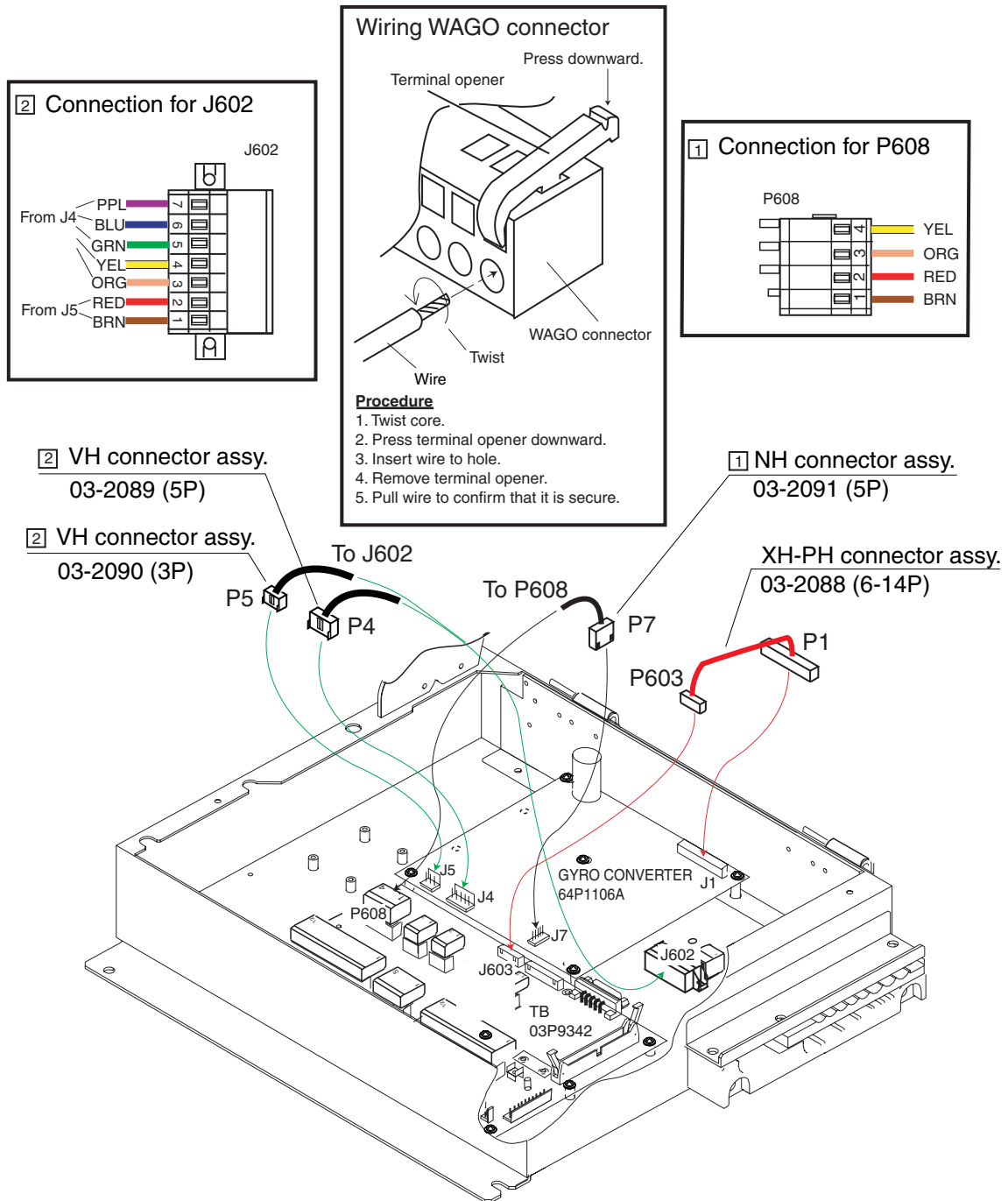
2. Fasten the GYRO CONVERTER board inside the processor unit with five washer head screws.
3. Fix connector 231-607/019-FUR (called J602) with two screws.



Fixing GYRO CONVERTER board inside the processor unit

4. Connect the GYRO CONVERTER board to the 03P9342 board with XH-PH 03-2088 connector assy. (6-14P) and NH connector assy. 03-2091.

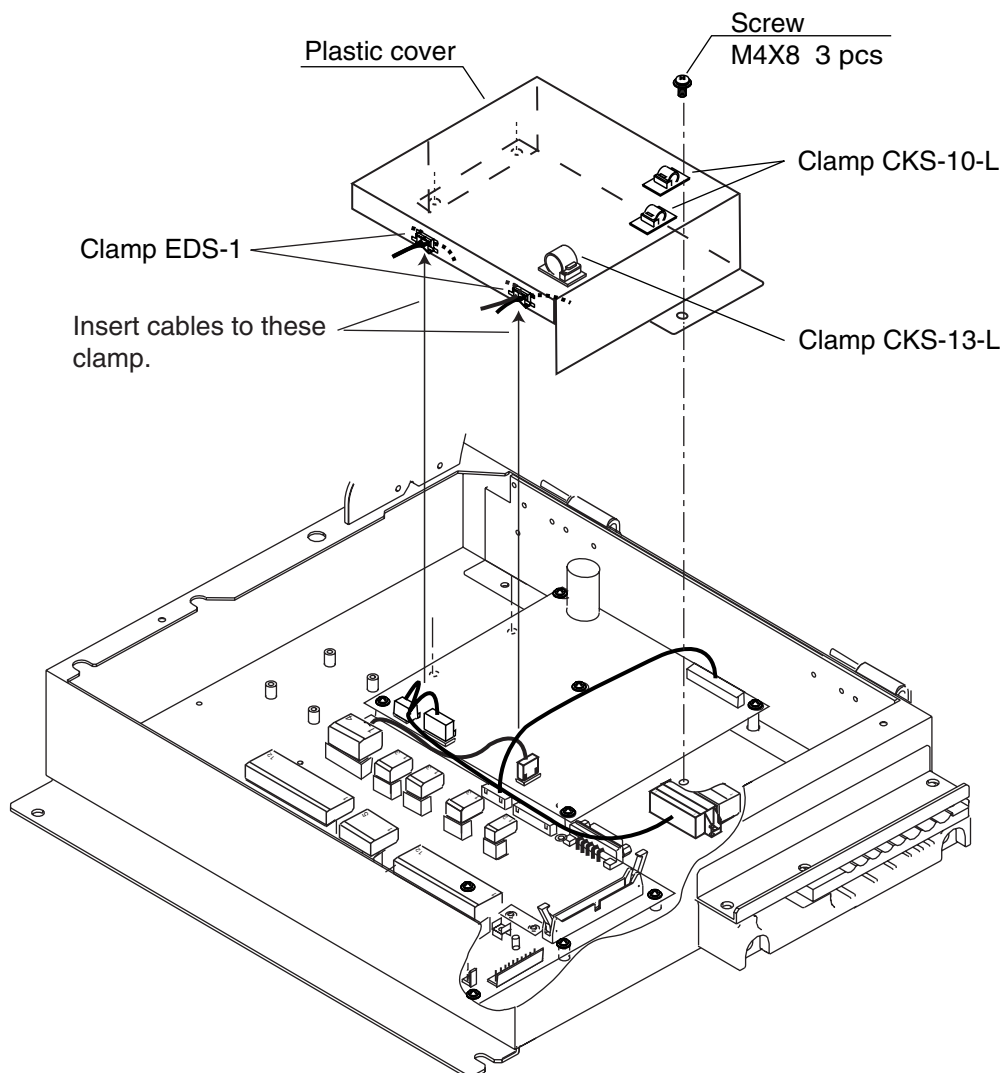
5. Connect J602 (attached at step 3) to the GYRO CONVERTER board with two VH connector assemblies 03-2089 (3P) and 03-2090 (5P).



Connecting connector assemblies inside processor unit

6. 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 4-6
 - 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

7. Pass the gyrocompass cable through the cable clamp and connect it to connector J602 as shown in the figure below.
8. Attach the clamps to the plastic cover and then attach the cover to the GYRO CONVERTER board as shown in the figure below. Pass cables thru the clamp ED-1.



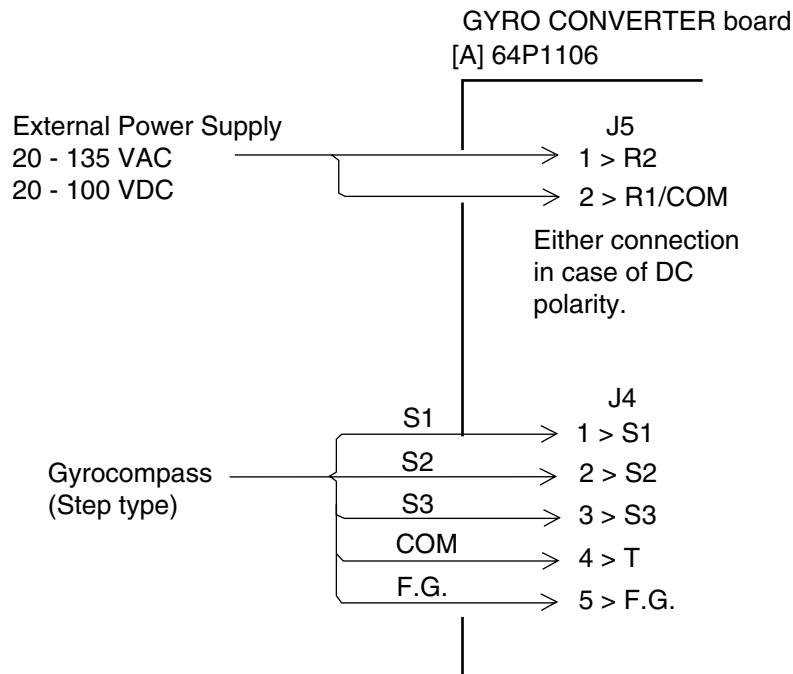
Attaching plastic cover for GYRO CONVERTER board

9. 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 the gyrocompass 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 the power turned on, set #8 of SW2 from OFF to ON, then OFF again to effect changes.

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 | SW2-1 | 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 | SW2-2 | SW2-3 | 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 | SW1-1 | SW1-2 | SW1-3 |
|-------|-------|-------|-------|
| 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

Select data Tx interval for ports 1 to 6 with jumper wires JP6 and JP7. The Tx interval is available in 25 msec or 200 msec. Use 25 msec 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 |
|-----------|-------|
| 4800 bps | OFF |
| 38400 bps | ON |

11) Power fail detection

| Talker | SW3-3 |
|---------|-------|
| Disable | OFF |
| Enable | ON |

12) Stator signal loss detection

| Detection | SW2-7 |
|-----------|-------|
| Yes | OFF |
| No | ON |

(Use OFF for radar only) SW2-4: factory use only
SW3-4: not used

After setting jumpers and DIP switches, reset the power or set SW2-8 to "CPU".

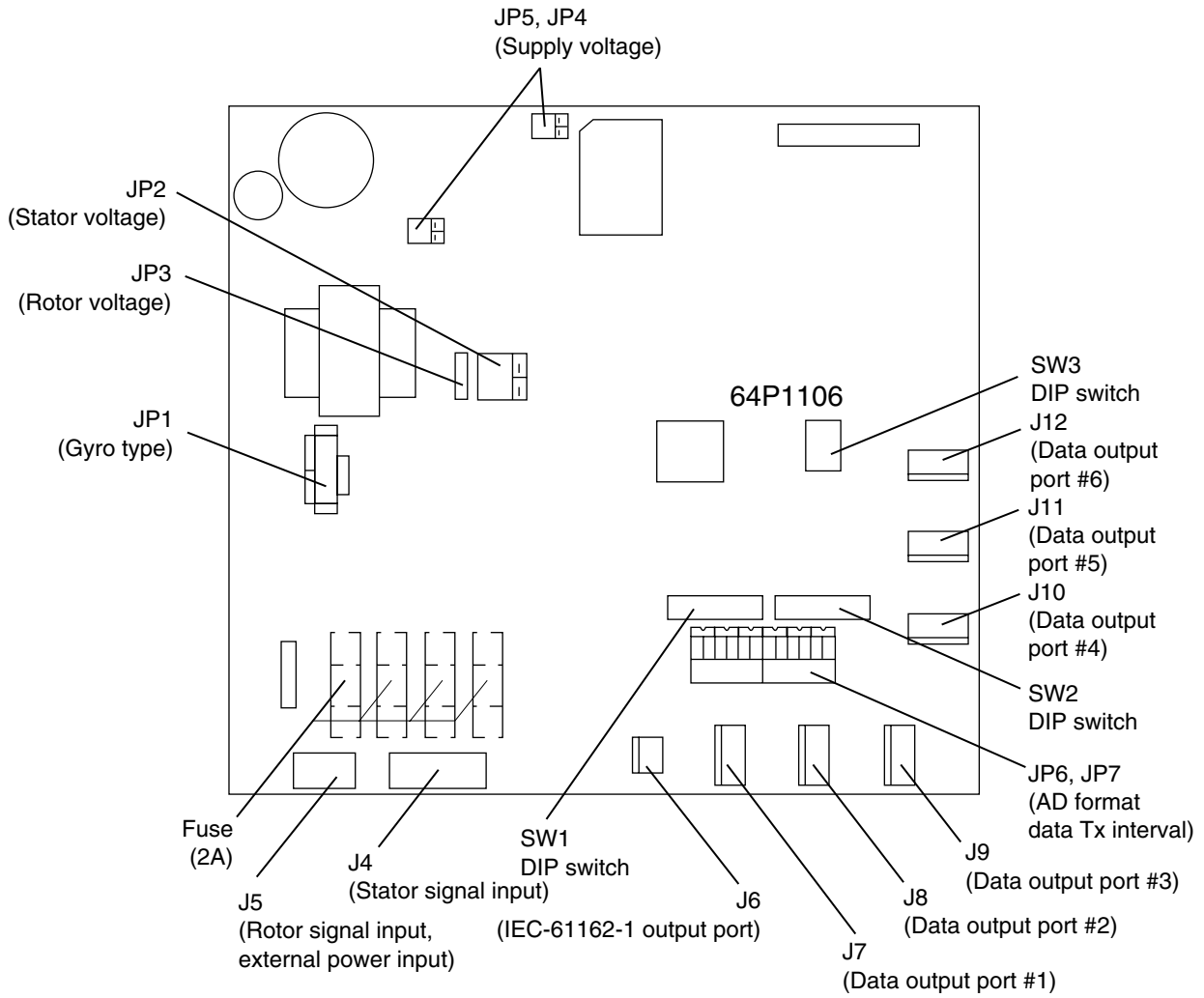
Setting method 2: by make and model of gyrocompass

| 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-1/1A/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 | Remove | #2 | - | * | * | |
| | CMZ-250X/ 300X/500 | DC synchronous 360x | OFF | OFF | OFF | OFF | OFF | OFF | OFF | ON | ON | - | ON | OFF | Remove | #2 | - | * | * |
| | | DC step 35V 180x COM(+),3-wire(-) | ON | OFF | OFF | ON | OFF | 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 | OFF | ON | ON | - | ON | OFF | Remove | #2 | - | * | * | |
| Plath | NAVGAT III | 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 | #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 | 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 | 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 | OFF | ON | ON | - | OFF | OFF | #4, #5,#6 | #2 | - | #1 | #1 |
| | TG-6000 | DC step 24V 180x | ON | OFF | OFF | ON | OFF | 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 | 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 | OFF | 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 | OFF | 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 35 VDC, set JP1 to #4, #5, #6.

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

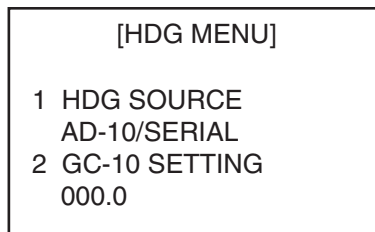


GYRO CONVERTER board

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. Right-click the HDG box at the top right corner on the screen.



HDG menu

2. Spin the thumbwheel to choose 1 HDG SOURCE and push the left button.
3. Spin the thumbwheel to choose AD-10 and push the left button.
4. Spin the thumbwheel to choose 2 GC-10 SETTING and push the left button.
5. Spin the thumbwheel to set gyrocompass reading and push the left button.
6. Push the right button close the menu.

4.2 Memory Card Interface Unit

Mounting considerations

When selecting a mounting location, observe the following points:

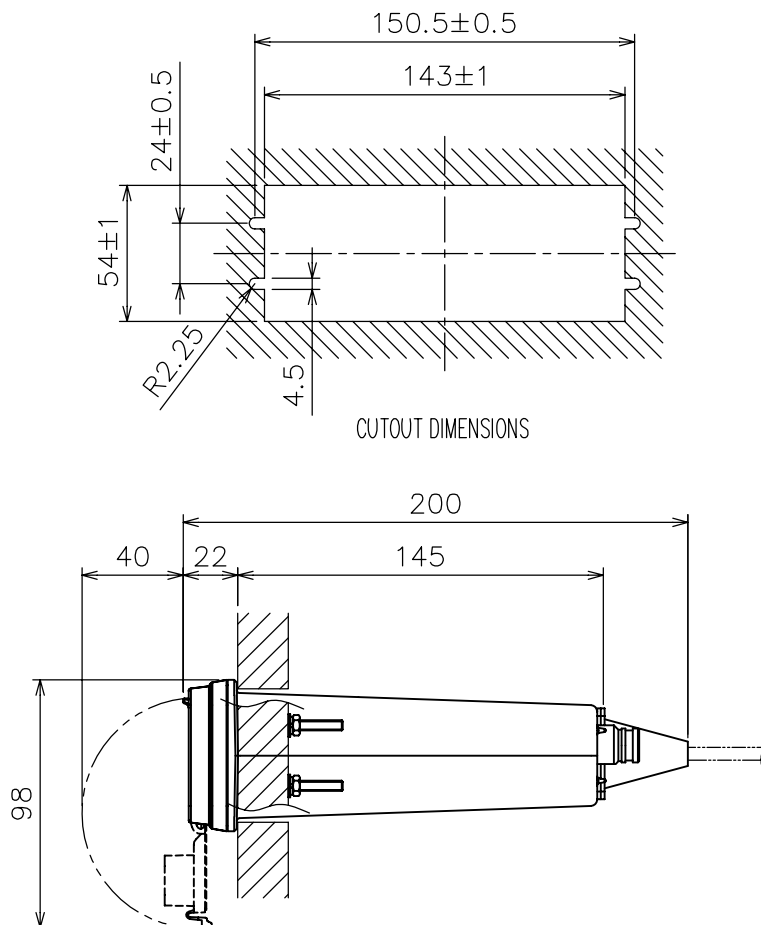
- Locate the unit away from heat sources because of heat that can build up inside the cabinet.
- Locate the unit away from places subject to water splash and rain.
- Leave sufficient space at the sides and rear of the unit to facilitate maintenance.
- A magnetic compass will be affected if the unit is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

Mounting procedure

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 on 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 dimensions for memory card interface unit

Desktop mount

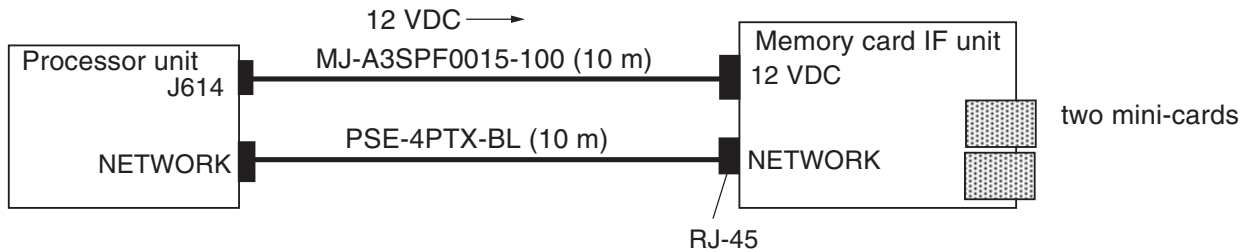
Requires the optional desktop mount kit FP03-10201. Refer to the packing list at the back of this manual for further information about this kit.

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

Connections

One memory card IF unit and one processor unit

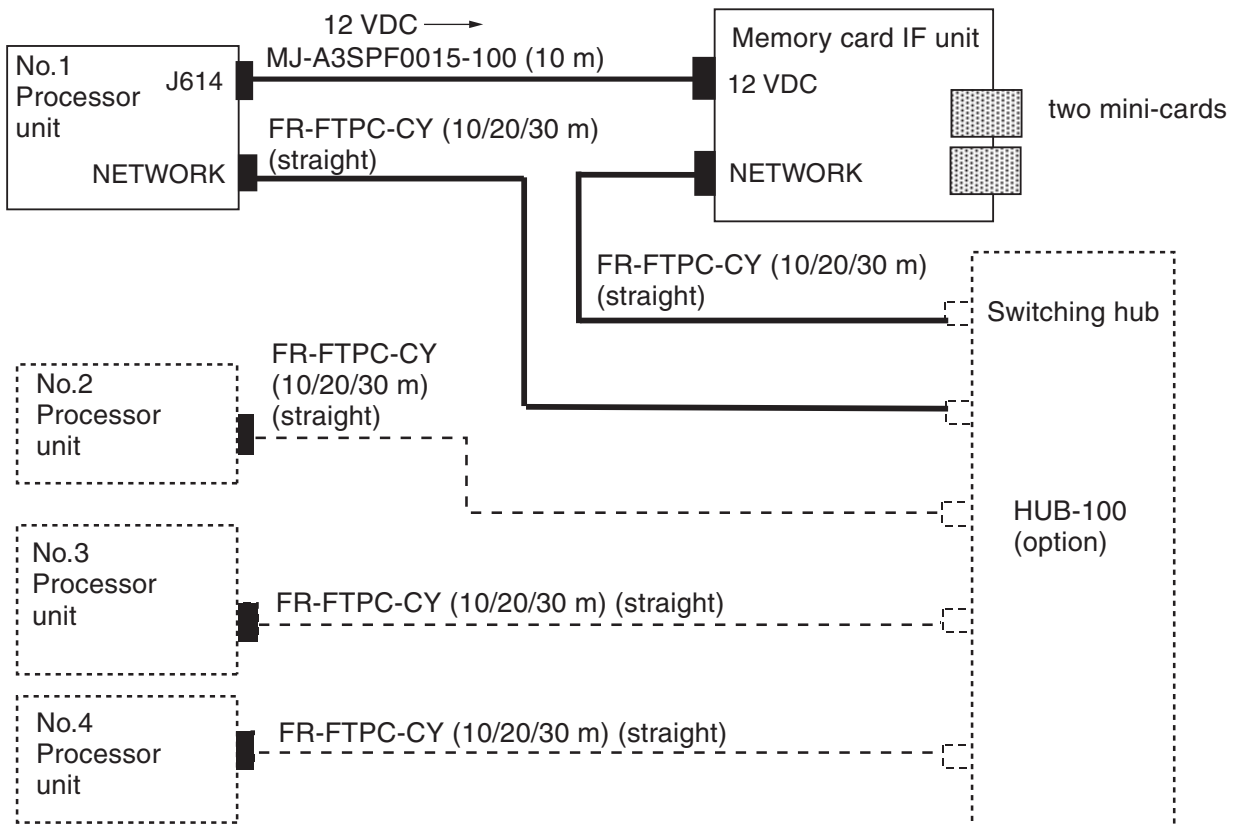
Connect as shown below.



Connections for one memory card interface unit

One memory card IF unit and multiple processor units

Prepare optional armored LAN cable kit and Switching Hub HUB-100. Connect as shown below.



Connecting one memory card interface unit and multiple processor units via switching hub

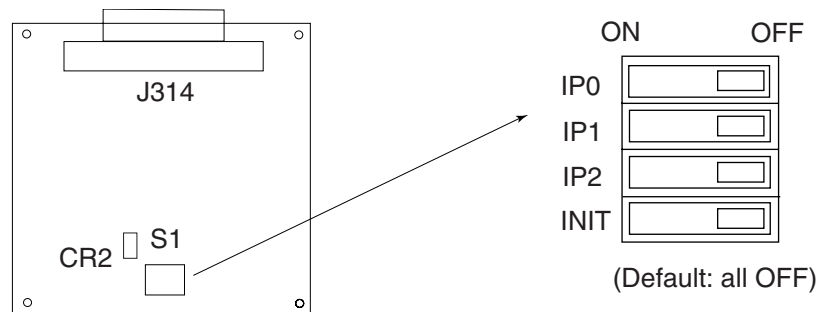
it

Armored LAN cable kit

| Type | Code No. | Contents |
|------------|-------------|--|
| 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 a network, change ID code for the second unit.

1. Remove the cover and set the IP0 bit of the DIP switch S1 on the CARDCPU board (03P9333) to ON.
2. Set INIT bit of S1 to ON and turn on the radar. Wait until CR2 starts blinking. DO NOT turn off the power until CR2 starts blinking.
3. Turn off the power and set INIT bit to OFF.



CARDCPU board 03P9333

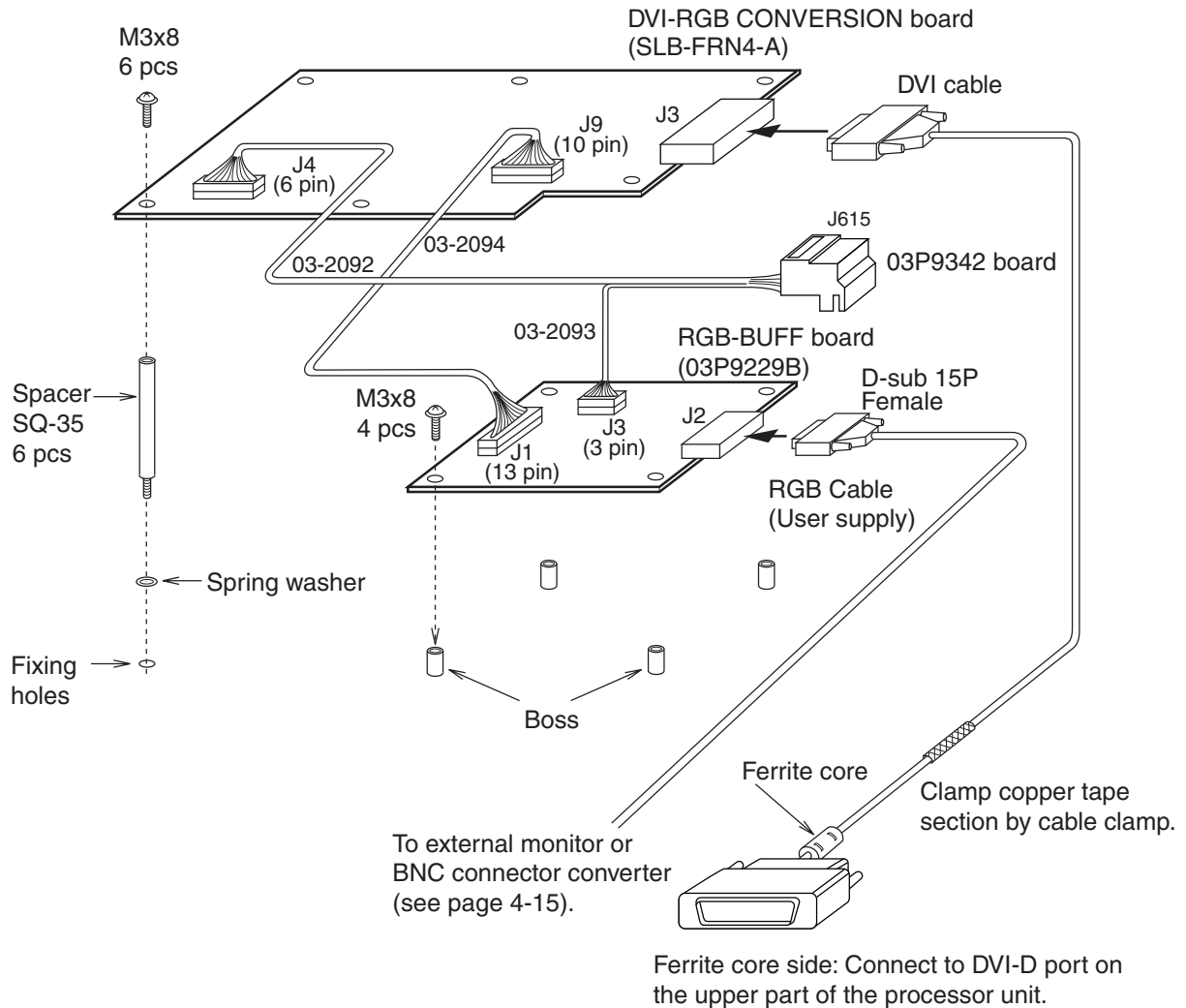
Memory card interface unit, showing location of DIP switch S1

4.3 DVI-RGB Conversion Kit

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 an RGB monitor or VDR (Voyage Data Recorder).

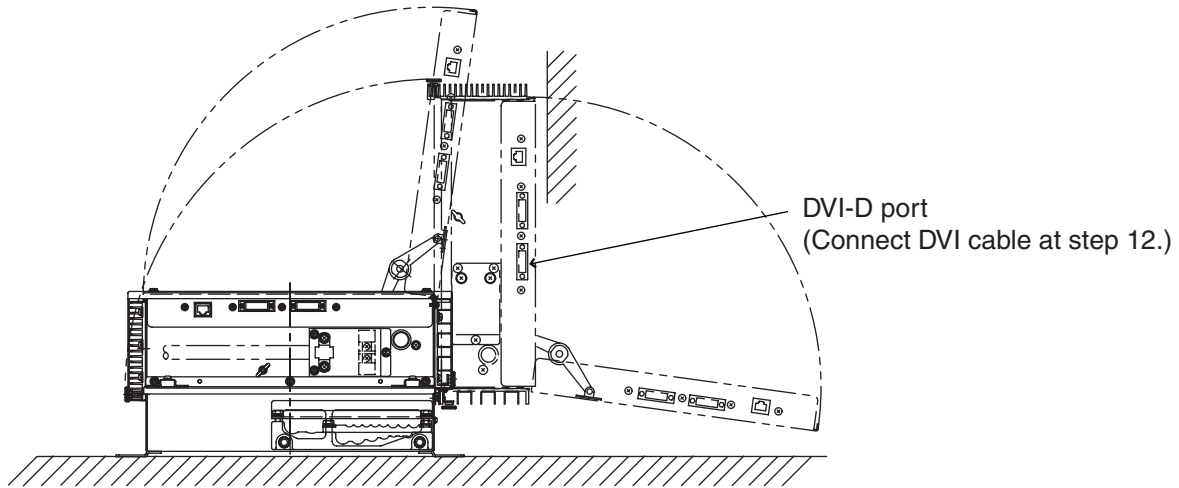
Name: DVI-RGB conversion kit
 Type: OP03-180-2
 Code no.: 008-536-070

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



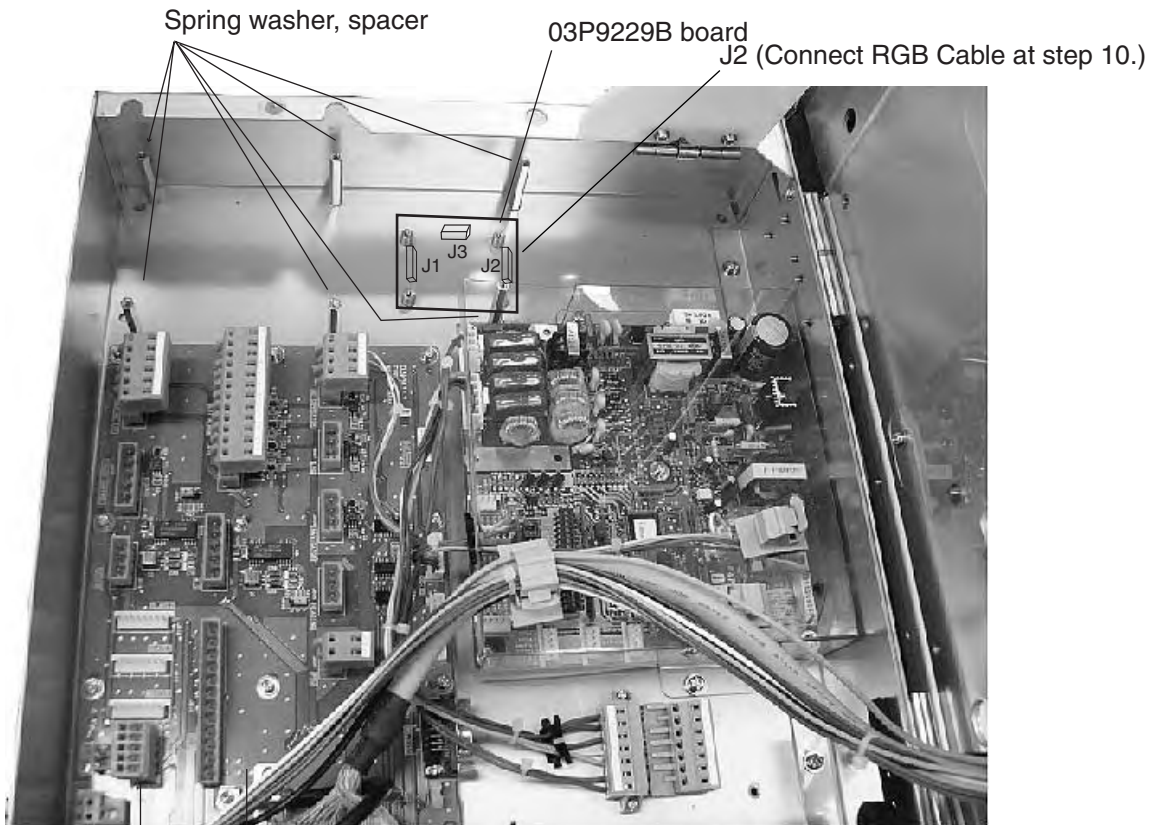
How to wire the DVI-RBG conversion board

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



Processor unit, side view

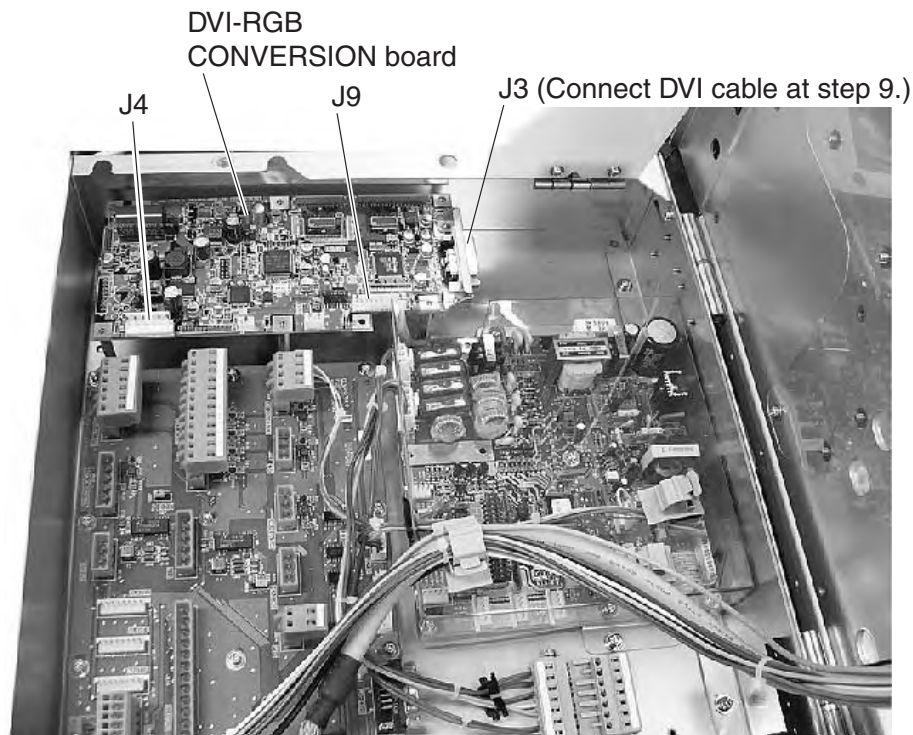
2. Fix the RGB-BUFF board (03P9229B board) with four screws. (See the figure below.)
3. Attach the connector assemblies to J1 and J3 on the 03P9229B board as follows.
J1: 13-pin connector of the connector assembly 03-2094
J3: 3-pin connector of the connector assembly 03-2093
4. Attach six sets of spring washers and spacers at the locations shown below.



03P9342 board
J615 (Connect connector assemblies at step 8.)

Processor unit (bottom chassis)

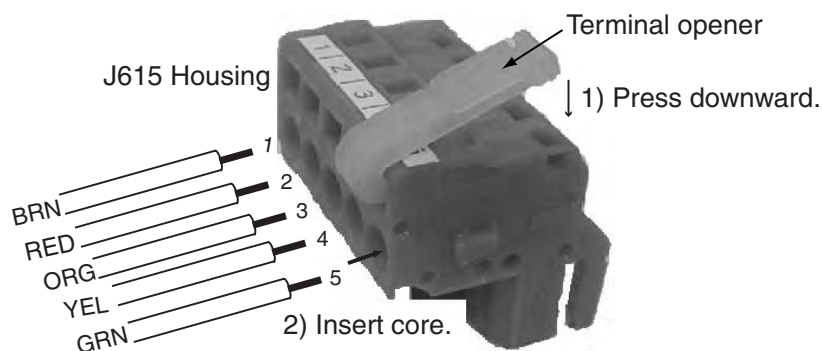
5. Attach the DVI-RGB CONVERSION board to the location shown below.



Fixing the DVI-RGB conversion board inside the processor unit

6. Attach the 10-pin connector from J1 on the 03P9229B 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 03P9229B board and the cable from J4 on the DVI-RGB CONVERSION board to J615. Attach J615 to the 03P9342 board.

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

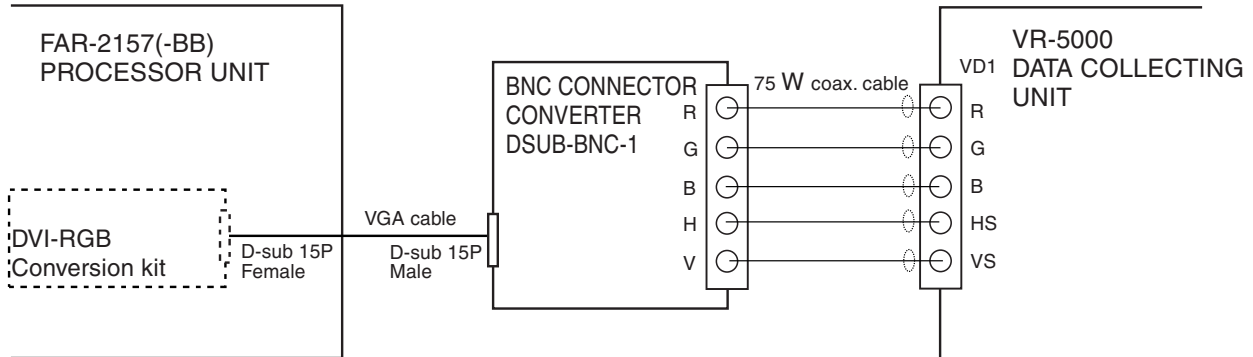


Connecting wires to the housing

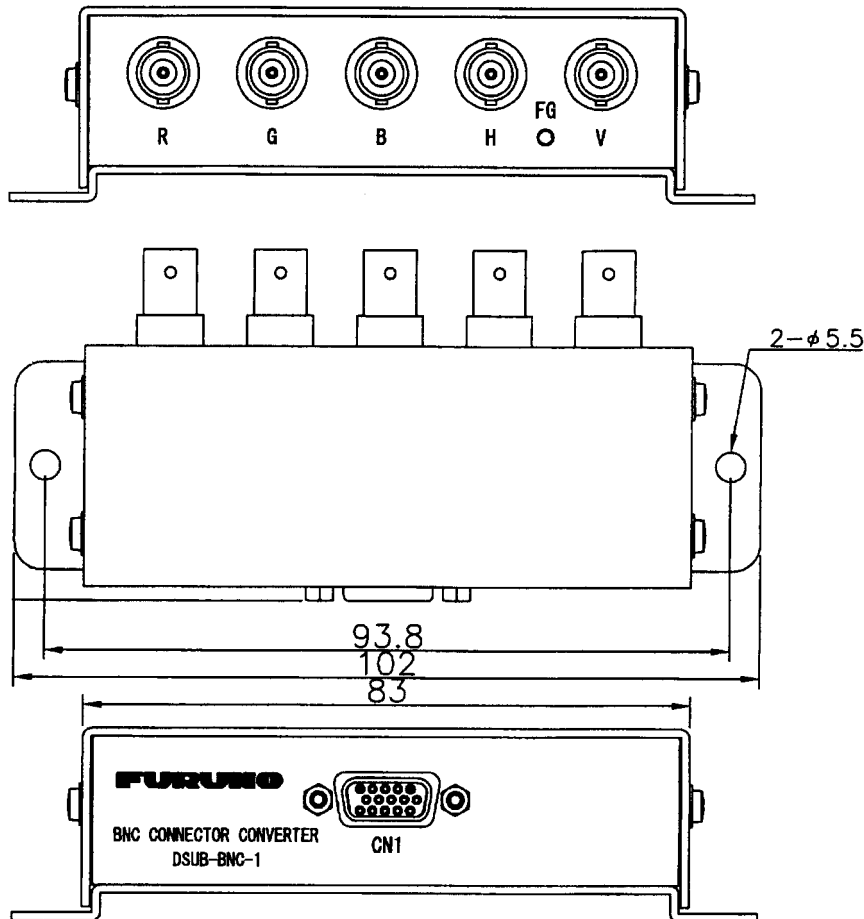
9. Connect the DVI cable to J3 on the DVI-RGB CONVERSION board. Connect the end that does not have the ferrite core.
10. Pass an RGB cable (local supply) through the cable clamp and connect it to J2 on the 03P9229B board.
11. Pass the DVI cable through the cable clamp, laying the section with copper tape in the cable clamp.
12. Assemble the processor unit and connect the other end of the DVI cable to the DVI-D port.

4.4 BNC Connector Converter

To connect the FURUNO Voyage Data Recorder VR-5000 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 ohm coaxial cables (between the BNC connector converter and VR-5000) are required.



Connecting VR-5000 to FAR-2157(-BB) via BNC connector converter



BNC connector converter

5. IO DATA

Available input and output data are shown in the tables below and input and output sentences are shown on the next page.

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.

Input

| Data | Specifications | Contents | Remarks |
|-----------------------|----------------------------------|--|--|
| Heading signal | Synchro or step | GC-10 required | Switching between AD-10 and IEC 61162 is done from menu. |
| | AD-10 format | External AD-100 | |
| | IEC 61162-2 | | |
| Speed signal | IEC 61162-1 | | |
| Navigator data | IEC 61162-1 | Position, course, speed, LORAN-C TD, waypoint, route, time, wind speed and direction, current data, depth, water temperature, roll, pitch, ROT | |
| External radar signal | Heading, Bearing, Trigger, Video | No GAIN, STC control | Operate as remote display |
| Alarm ACK input | Contact closure signal | | Input signal from alarm system |
| Track Control unit | RS-422 | | Option |

Output

| Data | Specifications | Contents | Remarks |
|-----------------------------|-------------------------------------|---|---|
| Radar system data | RS-232C | RSD, OSD, TLL | For PC plotter |
| ARPA data | IEC 61162-1 | TTM | For ECDIS |
| Remote display signal | Heading, Bearing, Tx Trigger, Video | | 2 ports |
| External LCD monitor signal | DVI | Same as main monitor unit | 2 systems max. |
| External CRT monitor signal | R, G, B, H, V | Same as main monitor unit | Option |
| Alarm signal | Contact closure signal | Output to alarm system by using photo-relay | 4 outputs, output content selected from menu. |

IEC 61162 input sentence and priority

| Item | Sentence and order of priority |
|-------------------|--------------------------------|
| Speed (STW) | VBW>VHW |
| Speed (SOG) | VBW |
| Speed (position) | VTG>RMC |
| Heading (True) | HDT* |
| Position | GGA>GLL>RMC>RMA |
| Waypoint | BWR>BWC>RMB |
| Date | ZDA |
| Depth | DPT>DBT>DBS |
| Water temperature | MTW |
| Wind | MWV |

IEC 61162 output sentence

| Item | Sentence |
|-------------------|------------------------|
| Target L/L | TLL (Not on IMO radar) |
| Radar system data | RSD |
| Own ship data | OSD |
| ARPA target data | TTM |

HDT is IEC61162-2, all other sentences are IEC61162-1 ed2.

PACKING LIST XN4A*

03BE-X-9852-5 1/1

A-2

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---|---------|--|------|
| ユニット UNIT | | | |
| アンテナ | | XN4A | 1 |
| ANTENNA | | 008-324-130-00 ** | |
| フィードWG | | XN4A | 1 |
| FEEDER W. G. ASSEMBLY | | 008-321-270-00 | |
| アンテナ工材 ANTENNA INSTALLATION MATERIALS XN4A | | | |
| Oリング | | AS568-125 1115-70 | 2 |
| O-RING | | 000-851-840-00 | |
| ケミシール | | S-8400W アルミチューブ 50G S-8400W アルミチューブ 50G | 1 |
| SILICON RUBBER | | 000-158-483-10 000-158-483-00 | |
| バネ座金 | | M4 SUS304 | 2 |
| SPRING WASHER | | 000-167-405-10 | |
| バネ座金 | | M8 SUS304 | 8 |
| SPRING WASHER | | 000-167-410-10 | |
| ミカキ丸平座金 | | M4 SUS304 | 2 |
| FLAT WASHER | | 000-167-455-10 | |
| ミカキ丸平座金 | | M8 SUS304 | 12 |
| FLAT WASHER | | 000-167-464-10 | |

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

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

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|------------------------------|---------|----------------------|------|
| 線材加工品 | | FR-700/1000/1200 | 1 |
| GROUNDING WIRE | | 008-162-720-00 | |
| 導波管押さえ1.E型 | | RSB-2006-2 | 1 |
| W. G. CLAMP | | 360-220-062-10 | |
| 導波管間座 | | 03-003-4003-0 ROHS | 1 |
| WAVEGUIDE CLAMP INSULATOR | | 300-340-030-10 | |
| 六角スリワリ ねじB | | M4X16 SUS304 | 8 |
| HEX. HEAD SLOT BOLT-B WASHER | | 000-162-940-10 | |
| 六角スリワリ ボルト | | M4X30 SUS304 | 2 |
| HEXAGONAL HEAD SLOT BOLT | | 000-162-893-10 | |
| 六角スリワリ ボルト | | M8X30 SUS304 | 4 |
| HEXAGONAL HEAD SLOT BOLT | | 000-162-922-10 | |
| 六角スリワリ ボルト | | M8X35 SUS304 | 4 |
| HEXAGONAL HEAD SLOT BOLT | | 000-162-923-10 | |
| 六角ナット 1ｼュ | | M8 SUS304 | 4 |
| HEX. NUT | | 000-167-479-10 | |

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.
03BE-X-9852

A-1

03BX-X-9851 -0 1/1

PACKING LIST RSB-106-083-S/RSB-107-083-S

| NAME | OUTLINE | DESCRIPTION/CODE | Q'TY |
|------------------------------------|---------|-----------------------------|------|
| ユニット UNIT | | | |
| 空中線本体部組品 | | RSB-106-083-S/RSB-107-083-S | 1 |
| ANTENNA DRIVE UNIT | | 000-090-655-00 ** | |
| 予備品 SPARE PARTS | | | |
| 予備品 | | SP03-09203 | 1 |
| SPARE PARTS | | 008-424-380-00 | |
| 工事材料 INSTALLATION MATERIALS | | | |
| 工事材料 | | CP03-31301 | 1 |
| INSTALLATION MATERIALS | | 008-572-970-00 | |

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

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

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

03BX-X-9851

| CODE NO. | | 008-572-970-00 | | 036X-X-9401-5 | |
|------------------------|--------------------------------|----------------|---|---------------|------------------|
| TYPE | | CP03-31301 | | 1/2 | |
| 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 | シールワッシャー SEAL WASHER | | 03-001-3002-0 ROHS CODE NO. 300-130-020-10 | 4 | |
| 2 | 防蝕ゴム ANTI-CORROSION RUBBER | | 03-029-0301-2 ROHS CODE NO. 100-091-112-10 | 2 | |
| 3 | 操作パイプ TERMINAL OPENER | | Z31-131 CODE NO. 000-165-800-10 | 1 | |
| 4 | 圧着端子 CRIMP-ON LUG | | FV2-4 CODE NO. 000-157-247-10 | 6 | |
| 5 | 圧着端子 CRIMP-ON LUG | | FV5.5-4(LF) CODE NO. 000-166-744-10 | 1 | |
| 6 | バネ座金 SPRING WASHER | | M12 SUS304 CODE NO. 000-167-397-10 | 4 | |
| 7 | 平坦ワッシャー FLAT WASHER | | M12 SUS304 CODE NO. 000-167-446-10 | 4 | |
| 8 | 六角ナット HEXAGONAL NUT | | M12 SUS304 CODE NO. 000-167-491-10 | 4 | |
| 9 | 六角ヘッド全ネジ HEXAGON HEAD SCREW | | M12X60 SUS304 CODE NO. 000-162-813-10 | 4 | |
| 10 | 六角ナット HEXAGONAL NUT | | M6 SUS304 CODE NO. 000-158-856-10 | 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 XN5A*

03BE-X-9853-5 1/1

A-3

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---------------------------------------|---------|--|------|
| ユニット UNIT | | | |
| アンテナ ANTENNA | | XN5A 008-422-940-00 ** | 1 |
| フィードWG FEEDER W. B. ASSEMBLY | | XN5A 008-422-950-00 | 1 |
| アンテナ工材 ANTENNA INSTALLATION MATERIALS | | | |
| Oリング O-RING | | AS568-125 1115-70 000-851-840-00 | 2 |
| ケミシール SILICON RUBBER | | S-8400W アルミチューブ 50G S-8400W アルミチューブ 50G 000-158-483-10 000-158-483-00 | 1 |
| バネ座金 SPRING WASHER | | M4 SUS304 000-167-405-10 | 2 |
| バネ座金 SPRING WASHER | | M8 SUS304 000-167-410-10 | 8 |
| ミガキ丸平座金 FLAT WASHER | | M4 SUS304 000-167-455-10 | 2 |
| ミガキ丸平座金 FLAT WASHER | | M8 SUS304 000-167-464-10 | 12 |

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

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|---|---------|--------------------------------------|------|
| 導波管押さえE型 W. G. CLAMP | | RSB-2006-2 360-220-062-10 | 1 |
| 導波管間座 WAVEGUIDE CLAMP INSULATOR | | 03-003-4003-0 ROHS 300-340-030-10 | 1 |
| 六角スリット ねじ HEX. HEAD SLOT BOLT-B WASHER | | M4X16 SUS304 000-162-940-10 | 8 |
| 六角スリット ボルト HEXAGONAL HEAD SLOT BOLT | | M4X30 SUS304 000-162-893-10 | 2 |
| 六角スリット ボルト HEXAGONAL HEAD SLOT BOLT | | M8X25 SUS304 000-162-921-10 | 4 |
| 六角スリット ボルト HEXAGONAL HEAD SLOT BOLT | | M8X30 SUS304 000-162-922-10 | 4 |
| 六角ナット HEX. NUT | | M8 SUS304 000-167-479-10 | 4 |



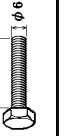

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。

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. | 008-572-970-00 | 036X-X-9401-5 |
| TYPE | CP03-31301 | 2/2 |

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 | バネ座金 SPRING WASHER |  | M6 SUS304 CODE NO. 000-158-865-10 | 1 | |
| 12 | ミガキ平座金 FLAT WASHER |  | M6 SUS304 CODE NO. 000-158-864-10 | 3 | |
| 13 | 六角ボルト HEXAGONAL HEAD BOLT |  | M6X25 SUS304 CODE NO. 000-162-871-10 | 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 | |



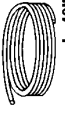

型式/コード番号が2段の場合、下段より上段に代わる標準部品であり、どちらが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.
QUALITY IS THE SAME.
(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

| | |
|----------|---------------|
| CODE NO. | 036L-X-9401-6 |
| TYPE | 1/1 |

工事材料表

INSTALLATION MATERIALS

FAR-21**/28**, FOR-21**/28**

| 番号 NO. | 名称 NAME | 略図 OUTLINE | 型名/規格 DESCRIPTIONS | 数量 QTY | 用途/備考 REMARKS |
|-----------|----------------------------|---|--|-----------|---|
| 1 | ケーブル(14C) 14-CORE CABLE |  | RW-9600 *15M* CODE NO. 001-078-400-10 | 1 | 選択 TO BE SELECTED 番号ケーブル SIGNAL CABLE |
| 2 | ケーブル(14C) 14-CORE CABLE |  | RW-9600 *30M* CODE NO. 001-078-410-10 | 1 | 選択 TO BE SELECTED 番号ケーブル SIGNAL CABLE |
| 3 | ケーブル(14C) 14-CORE CABLE |  | RW-9600 *40M* CODE NO. 001-078-420-10 | 1 | 選択 TO BE SELECTED 番号ケーブル SIGNAL CABLE |
| 4 | ケーブル(14C) 14-CORE CABLE |  | RW-9600 *50M* CODE NO. 001-078-430-10 | 1 | 選択 TO BE SELECTED 番号ケーブル 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.)

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|--------------------------------|---------|----------------------------------|--------|
| UNIT | | | |
| 制御部 PROCESSOR UNIT | | RPU-013* 000-081-381-00 ** | 1 |
| SPARE PARTS | | | |
| 予備品 SPARE PARTS | | SPO3-14404 008-535-910-00 | 1 (*1) |
| 予備品 SPARE PARTS | | SPO3-14405 008-535-920-00 | 1 (*1) |
| 予備品 SPARE PARTS | | SPO3-14406 008-535-930-00 | 1 (*1) |
| INSTALLATION MATERIALS | | | |
| 工事材料 INSTALLATION MATERIALS | | CP03-25602 008-535-940-00 | 1 (*2) |
| 工事材料 INSTALLATION MATERIALS | | CP03-25603 008-535-950-00 | 1 (*2) |
| DOCUMENT | | | |
| 取扱説明書 OPERATOR'S MANUAL | | OM*-35190-* 000-147-451-1* ** | 1 |
| 取扱説明書 OPERATOR'S MANUAL | | OM*-35221-* 000-164-255-1* ** | 1 (*3) |
| 装備要領書 INSTALLATION MANUAL | | IM*-35***-* 000-148-692-1* ** | 1 |
| 操作要領書 OPERATOR'S GUIDE | | OS*-35190-* 000-153-046-1* ** | 1 |

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.(*) (2)は、それぞれ仕様選択品を表します。
 (*1) (*2) INDICATE SPECIFICATION SELECTIVE ITEM.
 3.(*) (3) FAR-2157/2167DS仕様のみの添付されます。
 SUPPLIED WITH FAR-2157/2167DS ONLY.

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期届であり、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

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 |
|-----------|--------------------------|---------------|------------------------------------|------------|-------------------------------|
| AC用 | | | | | |
| 1 | 操作バ - TERMINAL OPENER | | 734-131 CODE NO. 000-165-800-10 | 1 | 制御部用 FOR PROCESSOR UNIT |
| 2 | 操作バ - TERMINAL OPENER | | 734-230 CODE NO. 000-147-417-10 | 1 | 制御部用 FOR PROCESSOR UNIT |
| 3 | 圧着端子 CRIMP-ON LUG | | FV2-4 CODE NO. 000-157-247-10 | 2 | 制御部用 FOR PROCESSOR UNIT |

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期届であり、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

PSU-006

036X-X-9852 -0 1/1

A-15

| NAME | UNIT | OUTLINE | DESCRIPTION/CODE | Q.TY |
|-----------------------------|------|---------|------------------|------|
| 電源制御部 POWER CONTROL UNIT | | | PSU-006-**-* | 1 |
| 予備品 | | | | |
| 予備品 | | | 000-090-665-00 | ** |
| 予備品 | | | SP03-15501 | 1 |
| 予備品 | | | 008-572-730-00 | (*1) |
| 予備品 | | | SP03-15502 | 1 |
| 予備品 | | | 008-572-740-00 | (*1) |
| 工事材料 | | | | |
| 工事材料 | | | CP03-31401 | 1 |
| 工事材料 | | | 008-572-750-00 | |

(*)の予備品は、仕様によりJAC100用:SP03-15501、AC20用:SP03-15502。
*1: SELECT ONE ACCORDING TO PROCESSOR UNIT'S SPECIFICATIONS : SP03-15501 FOR 100VAC OR SP03-15502 FOR 220VAC

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.)

036X-X-9852

FURUNO

A-16

| CODE NO. | 008-572-750-00 | | 036X-X-9402 -1 |
|------------------------|----------------------|-------------------------|--------------------|
| | TYPE | CP03-31401 | |
| 工事材料表 | | | |
| INSTALLATION MATERIALS | | | |
| 番号 NO. | 名称 NAME | 略図 OUTLINE | 用途 / 備考 REMARKS |
| 1 | 圧着端子 CRIMP-ON LUG | | |
| | | 型名 / 規格 DESCRIPTIONS | 数量 Q.TY |
| | | F/2-4 | 14 |
| | | CODE NO. | |
| | | 000-157-247-10 | |

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.

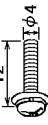
036X-X-9402

FURUNO

| | | |
|----------|----------------|---------------|
| CODE NO. | 008-539-850-00 | 03GL-X-9411-1 |
| TYPE | CP03-25604 | 1/1 |

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 | ++* 洗車 WASHER HEAD SCREW *B* |  | MAX12 C2700W MBN12 CODE NO. 000-163-192-10 | 4 | |

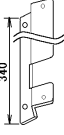
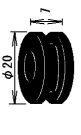
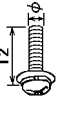
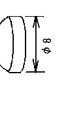
型式/コード番号が2段の場合、下段より上段に代わる通達期版であり、どちらかが入っています。なお、図面は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

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

付属品表

ACCESSORIES

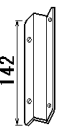
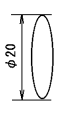
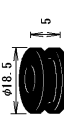
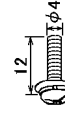
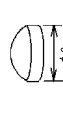
| 番号 NO. | 名称 NAME | 略図 OUTLINE | 型名/規格 DESCRIPTIONS | 数量 Q.TY | 用途/備考 REMARKS |
|-----------|---------------------------------|---|---|------------|--------------------------|
| 1 | KB直付金具 KB FIXING METAL |  | 03-163-7521-1 ROHS CODE NO. 100-306-251-10 | 1 | 操作部用 FOR CONTROL UNIT |
| 2 | 7' Dφ外 GROMMET |  | G-39 CODE NO. 000-166-401-10 | 1 | 操作部用 FOR CONTROL UNIT |
| 3 | ++* 洗車 WASHER HEAD SCREW *B* |  | MAX12 C2700W MBN12 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通達期版であり、どちらかが入っています。なお、図面は変わりません。
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. | 008-535-690-00 | 03GL-X-9506-7 |
| TYPE | FP03-09860 | 1/1 |

付属品表

ACCESSORIES


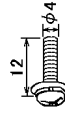

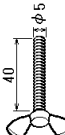
| 番号 NO. | 名称 NAME | 略図 OUTLINE | 型名/規格 DESCRIPTIONS | 数量 Q.TY | 用途/備考 REMARKS |
|-----------|-----------------------------------|---|---|------------|--------------------------|
| 1 | 鍵盤付金具(T) KEYBOARD FIXTURE |  | 03-163-7821-1 ROHS CODE NO. 100-306-291-10 | 1 | 操作部用 FOR CONTROL UNIT |
| 2 | ブラインドシール BLIND SEAL |  | 22-020-1005-1 ROHS CODE NO. 100-173-591-10 | 3 | 操作部用 FOR CONTROL UNIT |
| 3 | ワッシャー GROMMET |  | G-49 CODE NO. 000-166-406-10 | 1 | 操作部用 FOR CONTROL UNIT |
| 4 | ワッシャー付ネジ WASHER HEAD SCREW *B* |  | I4X12 C2700W/IBN12 CODE NO. 000-163-192-10 | 2 | 操作部用 FOR CONTROL UNIT |
| 5 | ゴム足 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通達期届であり、どちらかが入っています。なお、図面は変わりません。
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。)

| | | |
|----------|----------------|---------------|
| 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 | フラッシュ付金具 FLUSH MOUNTING PLATE |  | 03-163-7531-1 ROHS CODE NO. 100-306-261-10 | 4 | |
| 2 | ワッシャー付ネジ WASHER HEAD SCREW *B* |  | I4X12 C2700W/IBN12 CODE NO. 000-163-192-10 | 4 | |
| 3 | 六角ナット HEX. NUT |  | M5 SUS304 CODE NO. 000-165-921-10 | 4 | |
| 4 | 蝶ネジ 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通達期届であり、どちらかが入っています。なお、図面は変わりません。
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。)

| | | |
|----------|----------------|---------------|
| CODE NO. | 008-535-560-00 | 036L-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 | ハンガー L HANGER L | | 03-163-1111-1 ROHS 03-163-1111-1 CODE NO. 100-305-141-10 100-305-141-00 | 1 | |
| 2 | ハンガー R HANGER R | | 03-163-1112-1 ROHS 03-163-1112-1 CODE NO. 100-305-181-10 100-305-181-00 | 1 | |
| 3 | ハンガー脚柱(20) HANGER STAY | | 03-163-1113-1 ROHS 03-163-1113-1 CODE NO. 100-305-191-10 | 1 | |
| 4 | ホールの栓 HOLE PLUG | | CP-30-HP-13 CODE NO. 100-160-074-10 | 2 | |
| 5 | シンプボタン SNMP BUTTON | | KB-133P ホック用 CODE NO. 100-570-276-10 | 4 | |
| 6 | フラット平座金 FLAT WASHER | | M10 SUS304 CODE NO. 100-167-232-10 | 2 | |
| 7 | 平座金 SPRING WASHER | | M10 SUS304 CODE NO. 100-167-233-10 | 2 | |
| 8 | 六角ボルト HEX BOLT | | M10X30 SUS304 CODE NO. 100-162-884-10 | 2 | |
| 9 | 六角ボルト用 スロットド Washer Head HEX BOLT (SLOTTED WASHER HEAD) | | M6X25 SUS304 CODE NO. 100-162-949-10 | 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. | 008-535-570-00 | 036L-X-9502-3 |
| TYPE | FP03-09840 | 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 | 取手 HANDLE | | 14-002-125-2 ROHS CODE NO. 840-211-252-10 | 2 | |
| 2 | 円形平座金 ROSETTE WASHER | | M6 C2700W ホック用 M6 C2700W ホック用 CODE NO. 000-165-604-10 000-864-910-00 | 4 | |
| 3 | 丸皿小ネジ OVAL HEAD SCREW | | M6X20 C2700W ホック用 CODE NO. 000-163-677-10 | 4 | |
| 4 | 波座金 WAVE WASHER | | WV-6 SUS CODE NO. 000-167-384-10 | 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.)

PACKING LIST

CU-200-FAR

A-25
0360-X-9855 -4 1/1

| NAME | OUTLINE | DESCRIPTION/CODE | Q'TY |
|---|---------|---|------|
| ユニット | | | |
| メモリカードインターフェイス MEMORY CARD INTERFACE | | CU-200 000-081-569-00 | 1 |
| 工事材料 | | | |
| 工事材料 INSTALLATION MATERIALS | | CP03-27431 008-544-400-00 | 1 |
| その他工材 | | | |
| ケーブル組品 CABLE ASSY. | | P5E-4PTX-BL 000-164-637-10 000-147-510-00 | 1 |
| ケーブル組品WJ CABLE ASSY. | | MJ-ASSPF0015-100C 000-156-054-11 | 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.)

0360-X-9855

FURUNO

A-26

| CODE NO. | | 008-544-400-00 | | 0360-X-9404-6 | |
|-----------|--|----------------|---|---------------|------------------|
| TYPE | | CP03-27431 | | 1/1 | |
| 番号 NO. | 名称 NAME | 略図 OUTLINE | 型名/規格 DESCRIPTIONS | 数量 Q'TY | 用途/備考 REMARKS |
| 1 | 舵輪貼りマーク (BSH) STEERING WHEEL LABEL | | 03-801-0851-4 CODE NO. 100-2777-724-10 | 1 | |
| 2 | バネ座金 SPRING WASHER | | M4 SUS304 CODE NO. 000-167-405-10 | 4 | |
| 3 | シワ丸平座金 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 | | MAX50 SUS304 CODE NO. 000-162-679-10 | 4 | |
| 6 | 舵輪マーク貼付要領 LABEL ATTACHING PROCEDURE | | C32-00407-4-7/24 CODE NO. 000-150-918-14 | 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.)

FURUNO ELECTRIC CO., LTD.

0360-X-9404

A-28

| NAME | OUTLINE | DESCRIPTION/CODE | Q'TY |
|------------------------------------|---------|-------------------------------------|------|
| 予備品 SPARE PARTS | | | |
| 予備品 SPARE PARTS | | SP03-13300 008-419-280-00 | 1 |
| その他部品 OTHER PARTS | | | |
| 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. | | 03-2090 (3P) 008-534-660-00 | 1 |
| VHコネクタ VH CONNECTOR ASSY. | | 03-2089 (5P) 008-534-650-00 | 1 |
| XH-PHコネクタ XH-PH CONNECTOR ASSY. | | 03-2088 (6-14P) 008-534-640-00 | 1 |
| 演算プリント PROCESSOR BOARD | | 64P1106A(LF) 004-655-920-00 | 1 |
| +ナハ' ねじB WASHER HEAD SCREW(B) | | M4X8 C2700W MBN12 000-163-200-10 | 3 |

| NAME | OUTLINE | DESCRIPTION/CODE | Q'TY |
|-------------------------------|---------|--|------|
| +ナハ' ねじB WASHER HEAD SCREW | | M3X8 C2700W MBN12 000-163-190-10 | 5 |
| +ナハ' ねじA WASHER HEAD SCREW | | M2.6X10 C2700W MBN12 000-163-477-10 | 2 |
| コネクタ(231) CONNECTOR | | 231-607/019-FUR 000-147-414-11 | 1 |
| コネクタ(231) CONNECTOR | | 231-107/026-FUR 000-147-413-11 | 1 |

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

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、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.
03GL-X-9852

A-27

FURUNO

付属品表

ACCESSORIES

For CU-200 Desktop mount kit

Option

| 番号 NO. | 名称 NAME | 略図 OUTLINE | 型名/規格 DESCRIPTIONS | 数量 Q'TY | 用途/備考 REMARKS |
|-----------|-------------------------------|---------------|---|------------|------------------|
| 1 | 取り付け金具 MOUNTING BRACKET | | 19-023-3081-0 CODE NO. 100-316-250-10 | 1 | |
| 2 | +ナハ'ねじA SELF-TAPPING SCREW | | 5X20 SUS304 CODE NO. 000-162-608-10 | 4 | |
| 3 | +ナハ'ねじA WASHER HEAD SCREW | | M4X10 C2700W MBN12 CODE NO. 000-163-167-10 | 4 | |

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、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.

0360-X-9502

| NAME | OUTLINE | DESCRIPTION/CODE No. | Q'TY |
|-------------------|---------|----------------------|------|
| その他部品 | | | |
| ナット M3 | | M3X8 C2700W MBN12 | 10 |
| WASHER HEAD SCREW | | 000-163-190-10 | |
| DVI-RGB組品 | | SLB-FRM4-A | 1 |
| DVI-RGB ASSY. | | 008-537-660-00 | |
| RGB-BUFF7リット | | 03P9229E(LF) | 1 |
| RGB-BUFF BOARD | | 008-554-940-00 | |
| VHコネクタ | | 03-2092 (6P) | 1 |
| VH CONNECTOR | | 008-534-690-00 | |
| XHコネクタ | | 03-2093 (3P) | 1 |
| XH CONNECTOR | | 008-534-700-00 | |
| XHコネクタ | | 03-2094 (13-10P) | 1 |
| XH CONNECTOR | | 008-534-710-00 | |
| ケーブル組品 | | DVI-D/D S-LINK 0.85M | 1 |
| CABLE ASSY. | | 000-148-644-00 | |
| スペーサー | | SQ-35 | 6 |
| SPACER | | 000-159-310-10 | |
| バネワッシャー | | M3 C5191W MBN12 | 6 |
| SPRING WASHER | | M3 C5191W MBN12 | 6 |
| | | 000-168-187-10 | |
| | | 000-864-204-00 | |

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。
 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

工事材料表

For LAN cable kit

| INSTALLATION MATERIALS | | Option | |
|------------------------|--------------------------------|-----------------------|------------|
| 番号 NO. | 名称 NAME | 略図 OUTLINE | 数量 Q'TY |
| 1 | モジュラーコネクタ MODULAR CONNECTOR | | 2 |
| | | 型名/規格 DESCRIPTIONS | |
| | | MPS688-C | |
| | | CODE NO. | |
| | | 000-166-044-10 | |

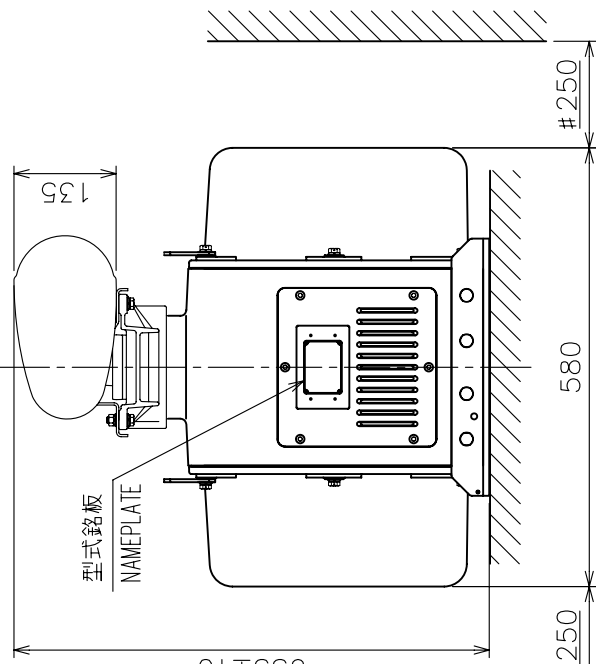
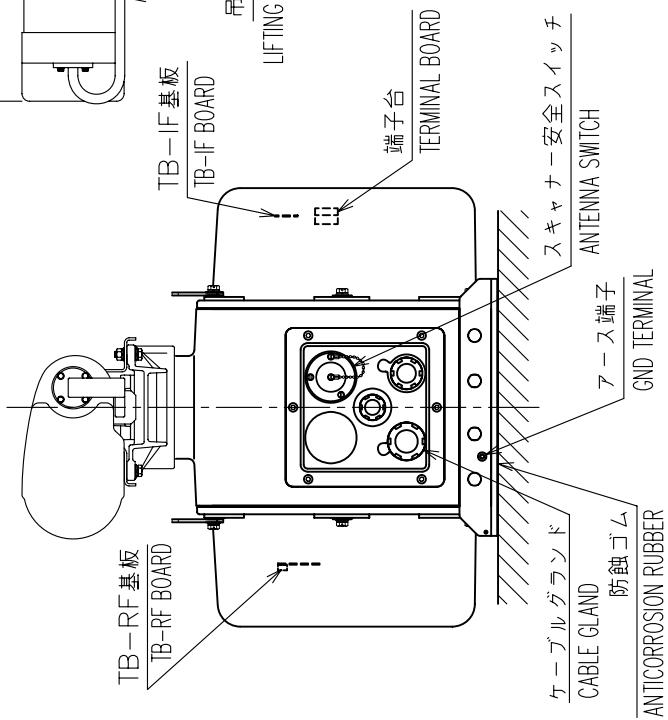
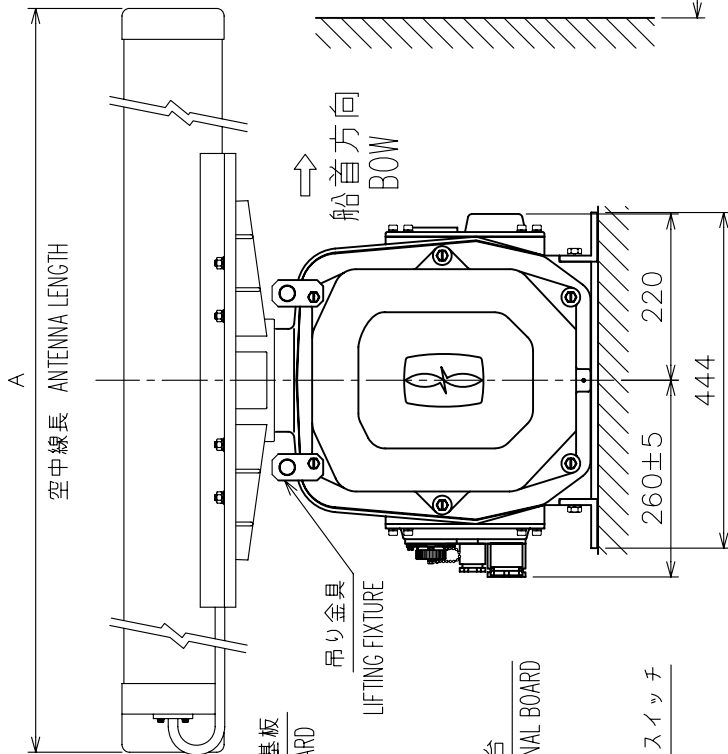
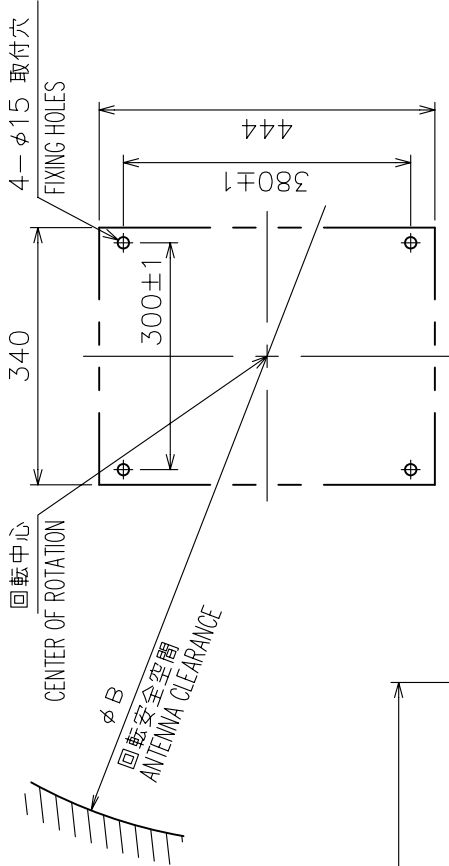
型式コード番号が2段の場合、下段より上段に代わる通達部品であり、どちらが入っています。なお、品質は変わりません。
 TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
 (略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

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 ANT. TYPE | XN4A (240cm型) | XN5A (300cm型) |
|-----------------------------|------------------|------------------|
| A: 空中線長 ANT. LENGTH | 2,570 ± 10mm | 3,210 ± 10mm |
| B: 回転安全空間 ANT. CLEARANCE | 2,700mm | 3,340mm |
| 質量 MASS | 74kg ± 10% | 79kg ± 10% |



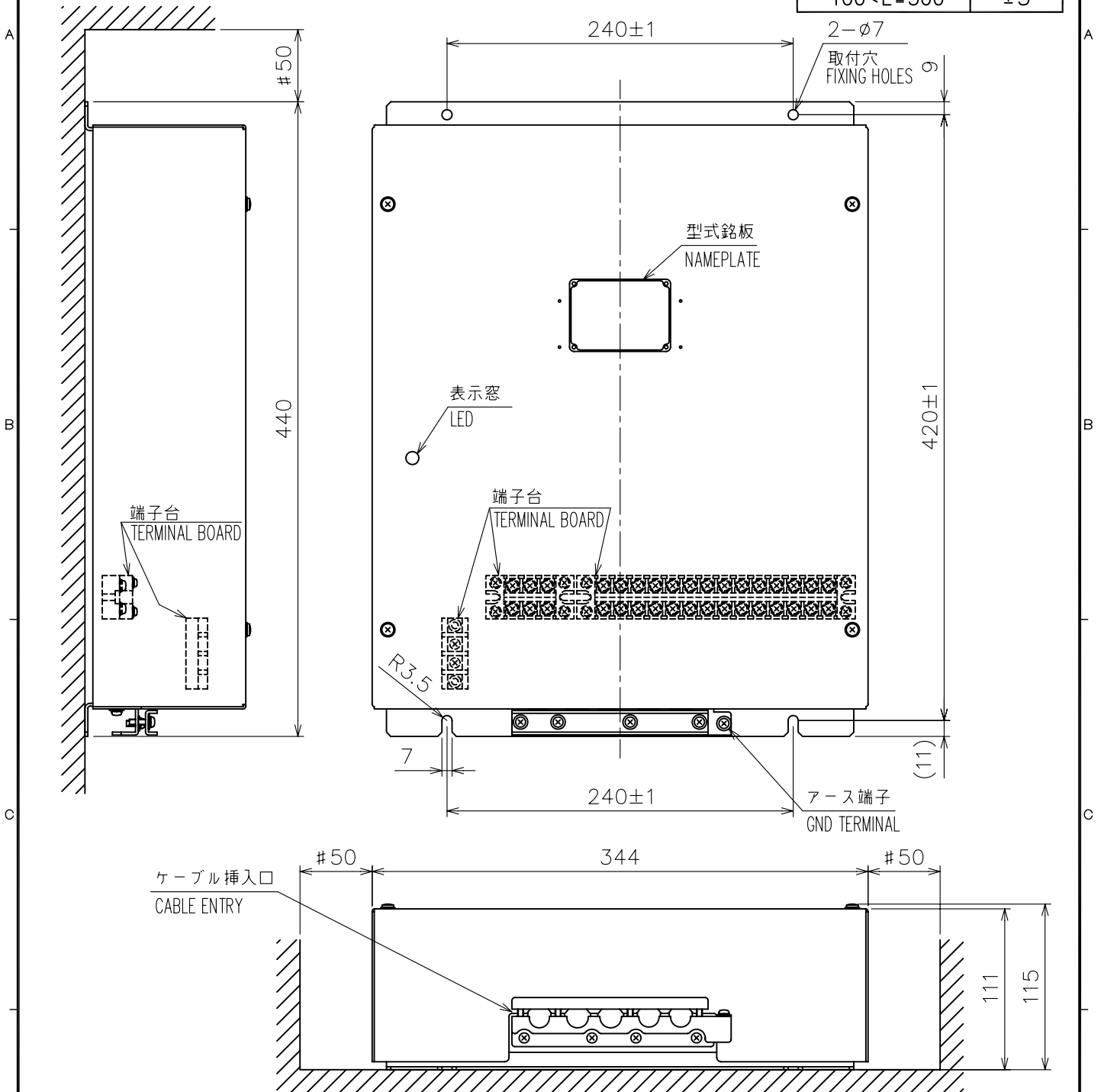
注記 1) #印寸法は最小サービスクリアランスとする。
 2) 指定外の寸法公差は表1による。
 3) 取付用ネジはM12ボルトを使用のこと。

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 | Dec. 27, 06 E. MIYOSHI | TITLE | RSB-106/107 |
| CHECKED | TAKAHASHI, T | 名称 | 空中線部 |
| APPROVED | Y. Hotoi | 外寸図 | |
| SCALE | 1/10 | NAME | ANTENNA UNIT |
| DWG.No. | C3522-G01-A | REF.No. | 03-171-300G-2 |
| | | | OUTLINE DRAWING |

表 1 TABLE 1

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



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ピンネジ呼び径 6×20 を使用のこと。

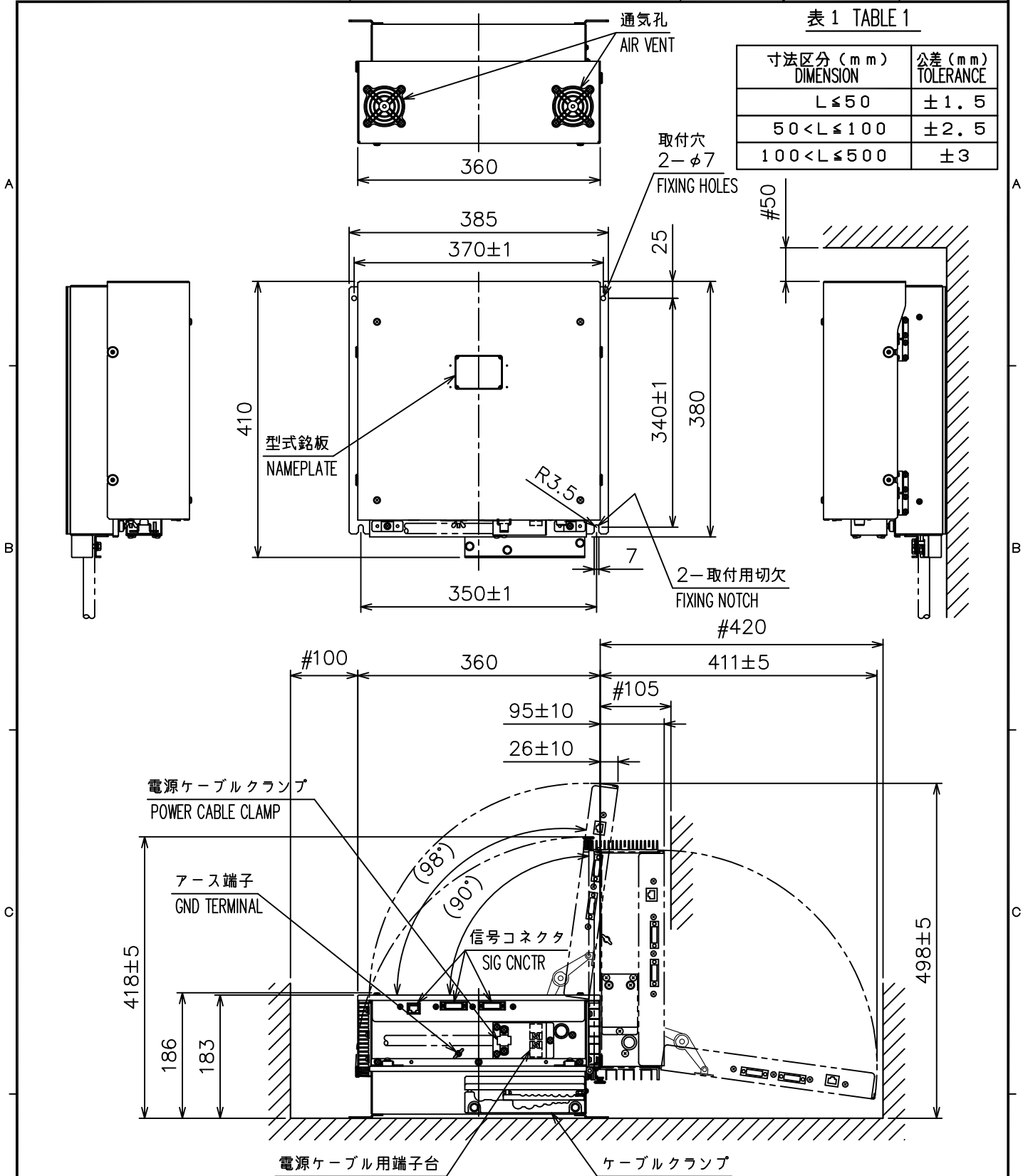
NOTE

- #: MINIMUM SERVICE CLEARANCE.
- TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
- USE SELF-TAPPING SCREWS 6×20 FOR FIXING THE UNIT.

| | |
|---------------------------------------|------------------------------|
| DRAWN Jan. 30, '07 E. MIYOSHI | TITLE PSU-006 |
| CHECKED TAKAHASHI, T | 名称 電源制御部 |
| APPROVED Y. Hatai | FAR-2157/2167DS 外寸図 |
| SCALE 1/4 | MASS $5.2 \pm 10\%$ kg |
| DWG.No. C3523-G01-A | REF.No. 03-171-900G-3 |
| NAME POWER UNIT OUTLINE DRAWING | |

表 1 TABLE 1

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



注 記

- 1) #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

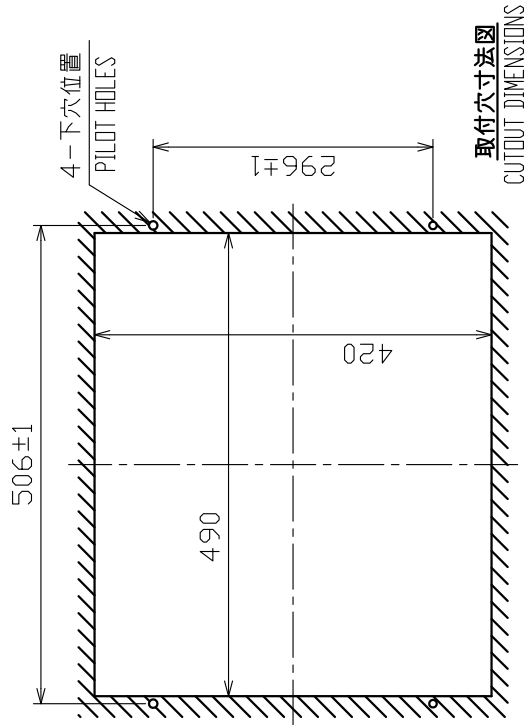
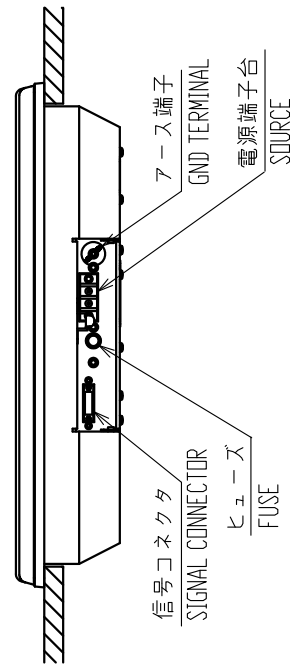
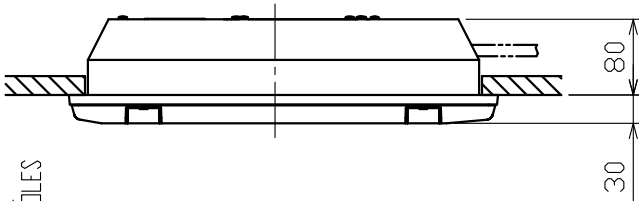
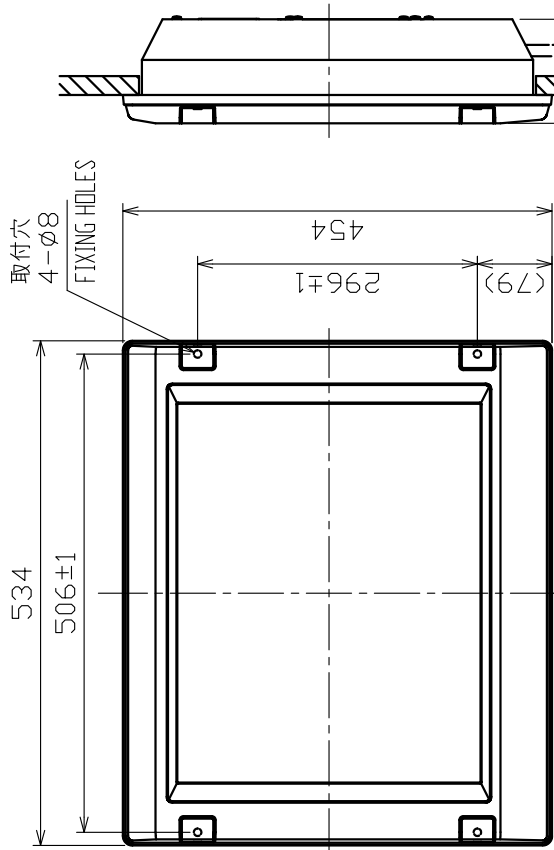
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M6 BOLTS OR COACH SCREWS φ6 FOR FIXING THE UNIT.

| | | | |
|----------|------------------------|-----------------|----------------|
| 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 ≤ 50 | ±1.5 |
| 50 < L ≤ 100 | ±2.5 |
| 100 < L ≤ 500 | ±3 |
| 500 < L ≤ 1000 | ±4 |

型式銘板
NAMEPLATE

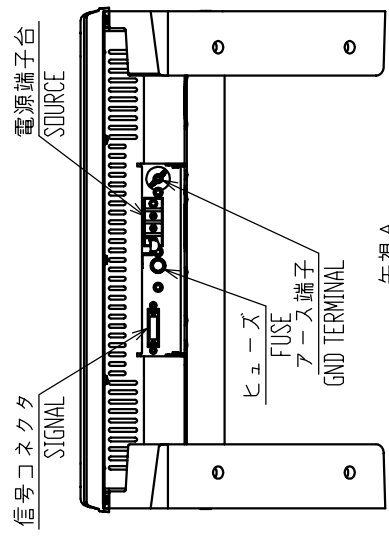


- 注 記 1) 指定外の寸法公差は表 1 による。
2) 取付には + トラスタップピンネジ呼び径 6×30 を使用のこと。
- NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. USE TAPPING SCREWS φ6×30 FOR FIXING THE UNIT.

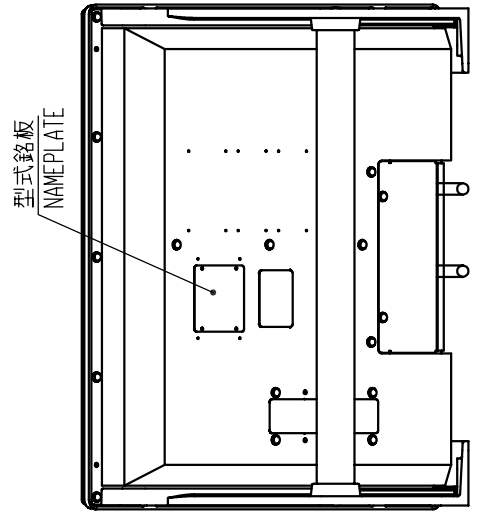
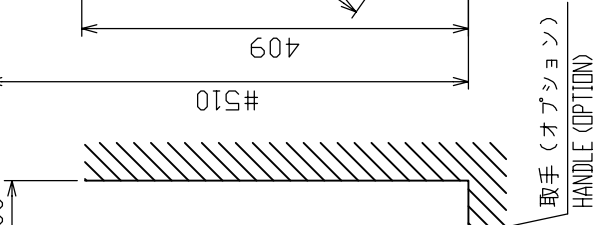
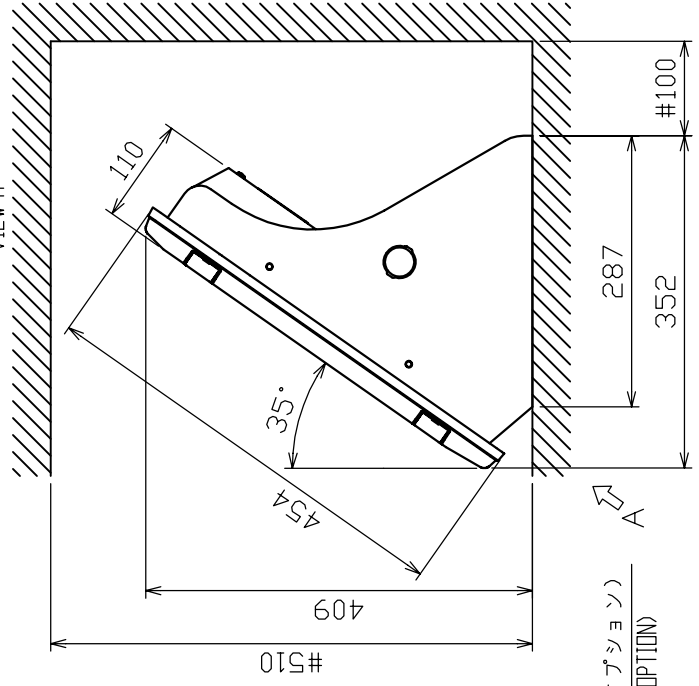
| | | | | |
|----------|-------------|-------------|---------|----------------------------|
| DRAWN | 1/Sep/2010 | T.YAMASAKI | TITLE | MU-201CR |
| CHECKED | 1/Sep/2010 | T.TAKAHASHI | 名称 | 表示部 (埋込装備) |
| APPROVED | 1/Sep/2010 | Y.NISHIYAMA | 外寸図 | MONITOR UNIT (FLUSH MOUNT) |
| SCALE | 1/8 | 質量 11 kg | 図名 | OUTLINE DRAWING |
| DWG.No. | C3519-G05-C | | REF.No. | 03-163-110G-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 |



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

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

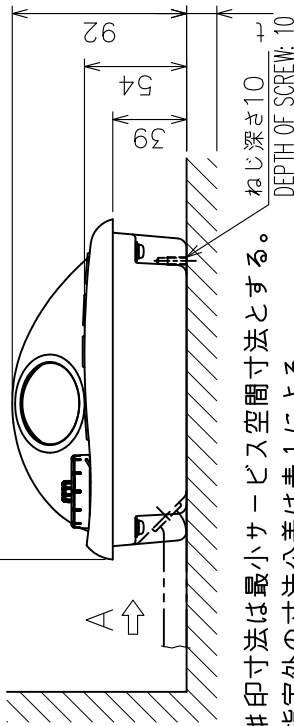
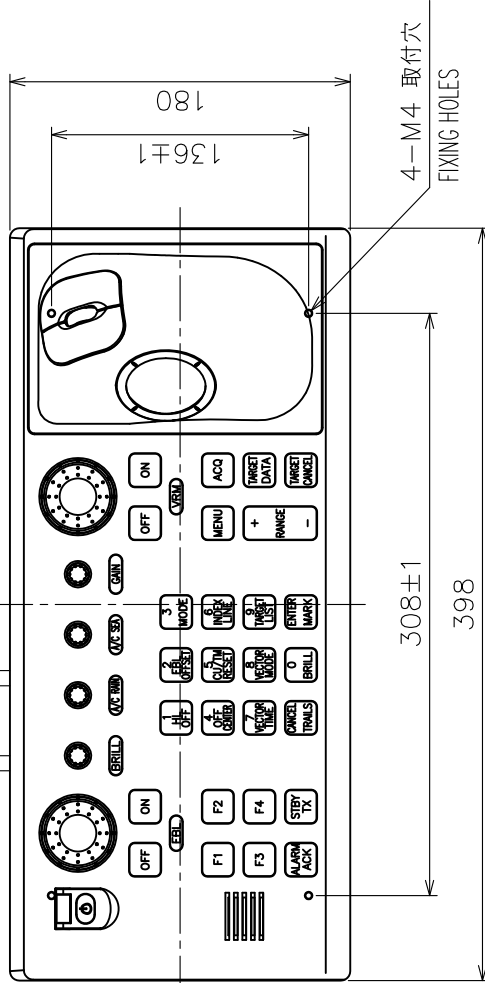
| | | | | |
|----------|-------------|------------------|-------|------------------------------|
| DRAWN | Jan. 7 '04 | E. MIYOSHI | TITLE | MU-200CR |
| CHECKED | | T. akahashi T. | 名称 | 表示部 (卓上装備) |
| APPROVED | | Y. Hatai | 外寸図 | |
| SCALE | 1/8 | 1/8 MASS 17.0 kg | NAME | MONITOR UNIT (DESKTOP MOUNT) |
| DWG. No. | C3519-G04-B | 03-163-100G-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。

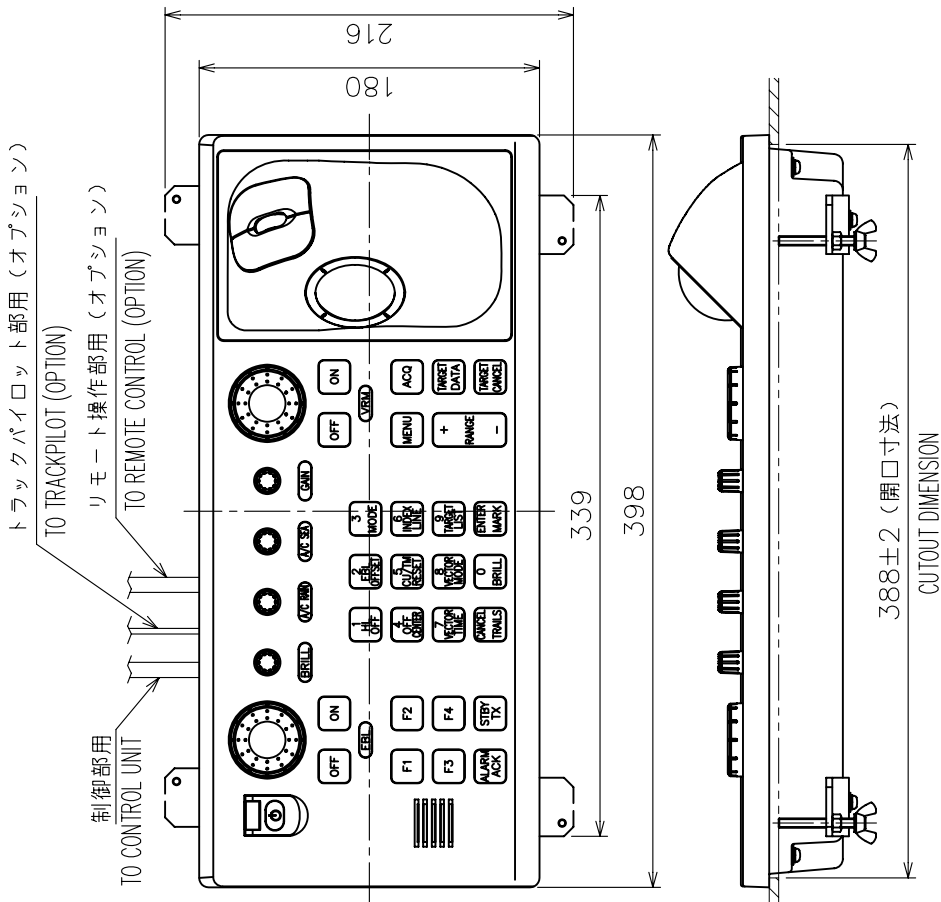
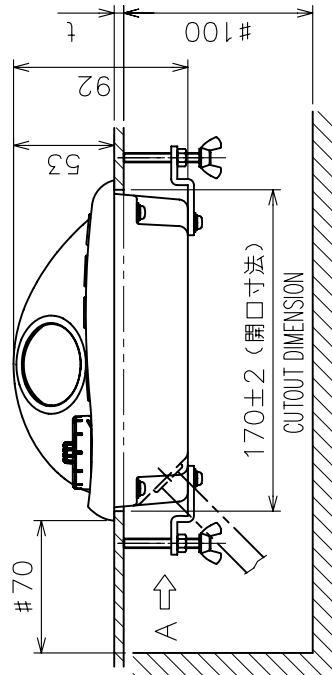
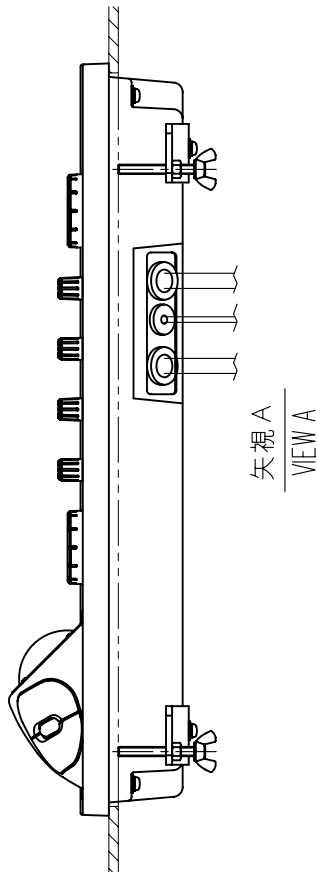
NOTE

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 | T. 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) DIMENSION | 公差 (mm) TOLERANCE |
|------------------------|----------------------|
| L ≤ 50 | ± 1.5 |
| 50 < L ≤ 100 | ± 2.5 |
| 100 < L ≤ 500 | ± 3 |

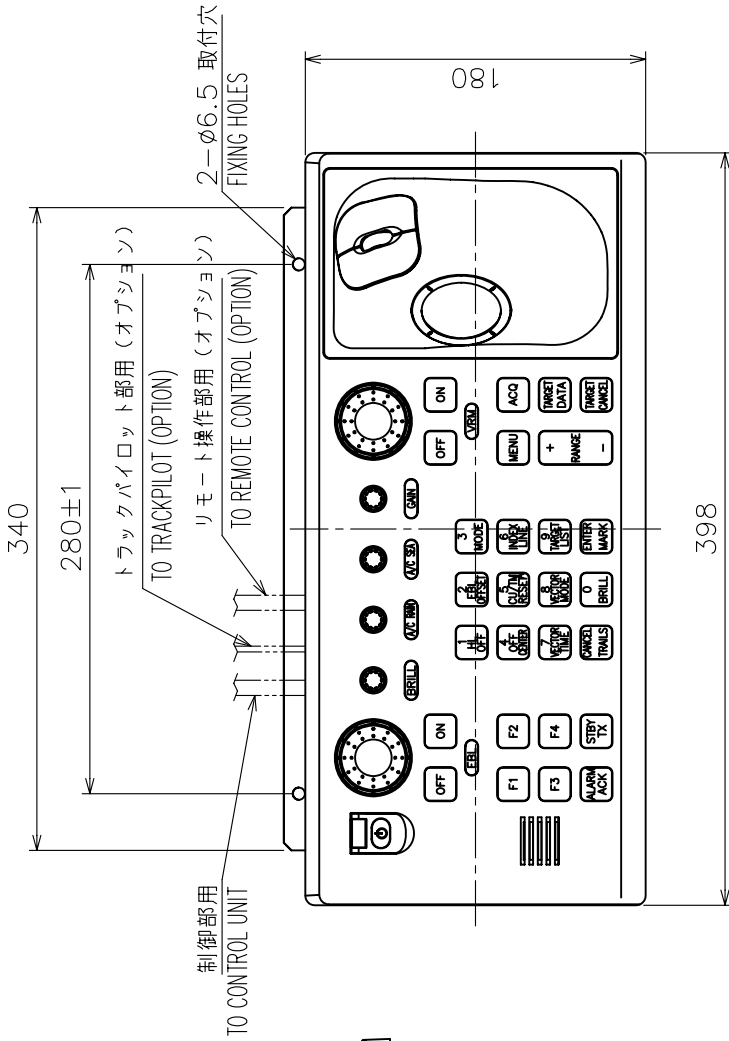
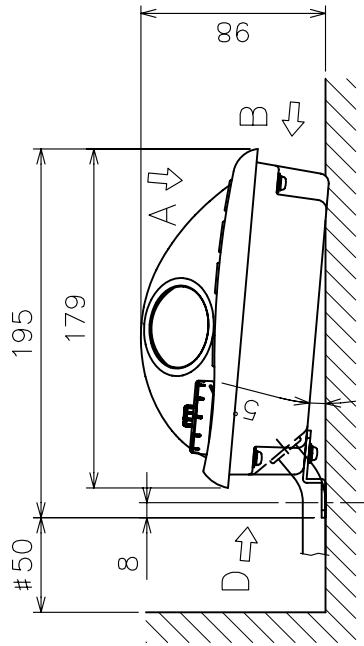
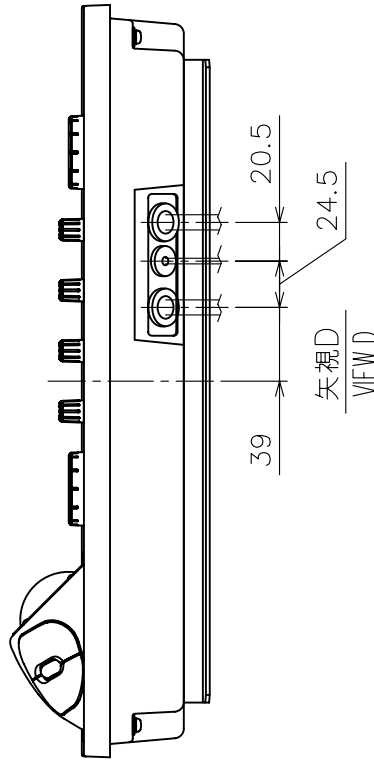


- 注記 1) #印寸法は最小サービス空間寸法とする。
 2) 指定外の寸法公差は表1による。
 3) 取付面板厚 (t) は最大20とする。
- NOTE 1. # MINIMUM SERVICE CLEARANCE.
 2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
 3. THICKNESS OF MOUNTING BOARD(t) SHOULD BE MAX. 20.

| | | | | |
|----------|-------------|---------------|-----------------|----------------------------|
| 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 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 |



矢視A
VIEW A

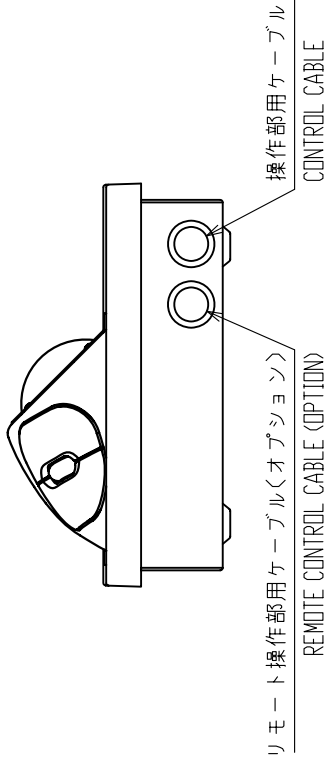
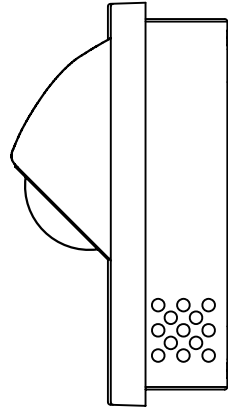
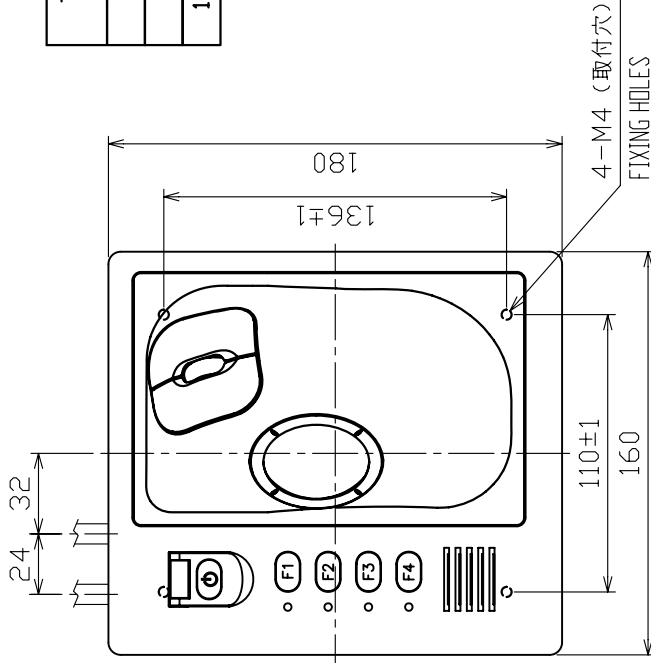
矢視B
VIEW B

| | | | | |
|----------|-------------|--|-------|---|
| 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0.7kgを含有 #10M 質量は0.7kgを含有 MASS INCLUDES 10m CABLE | NAME | CONTROL UNIT (TABLETOP MOUNT W/ KB PLATE) |
| DWG. No. | C3524-605-C | 03-163-752G-2 | | OUTLINE DRAWING |

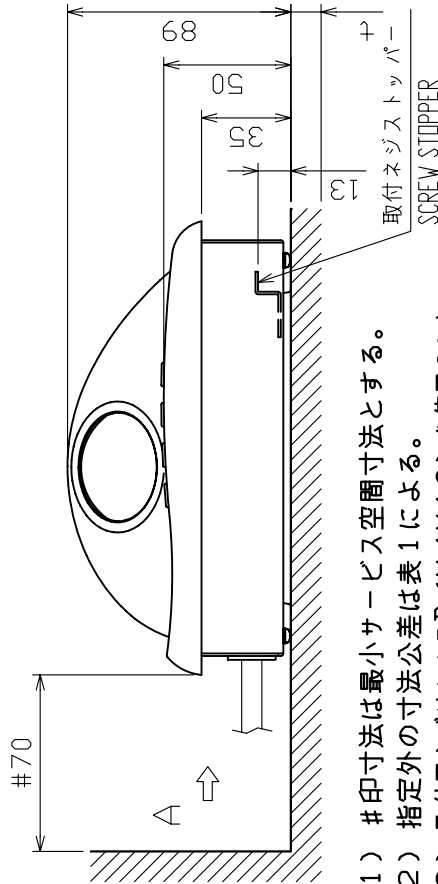
- 注 記 1) # 印寸法は最小サービス空間寸法とする。
 2) 指定外の寸法公差は表 1 による。
 3) 取付用ネジはトラスタップネジ呼び径6、またはM6 ボルトを使用のこと。
- NOTE 1. # MINIMUM SERVICE CLEARANCE.
 2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
 3. USE TAPPING SCREW φ6 OR M6 BOLTS FOR FIXING THE UNIT.

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



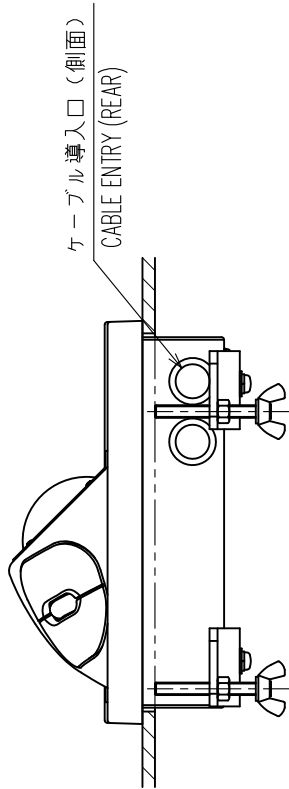
- 注 記
- 1) #印寸法は最小サービス空間寸法とする。
 - 2) 指定外の寸法公差は表1による。
 - 3) 取付用ネジはセムスB (M4×12) を使用のこと。
取付面板厚(七)は2 ≤ 七 ≤ 5とする。それ以外は、
ネジ長さを (七 + 7.8) ± 2とする。

- 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(七) SHOULD BE 2 ≤ 七 ≤ 5.
FOR THICKER ONE USE SCREW LENGTH: (七+7.8) ± 2.

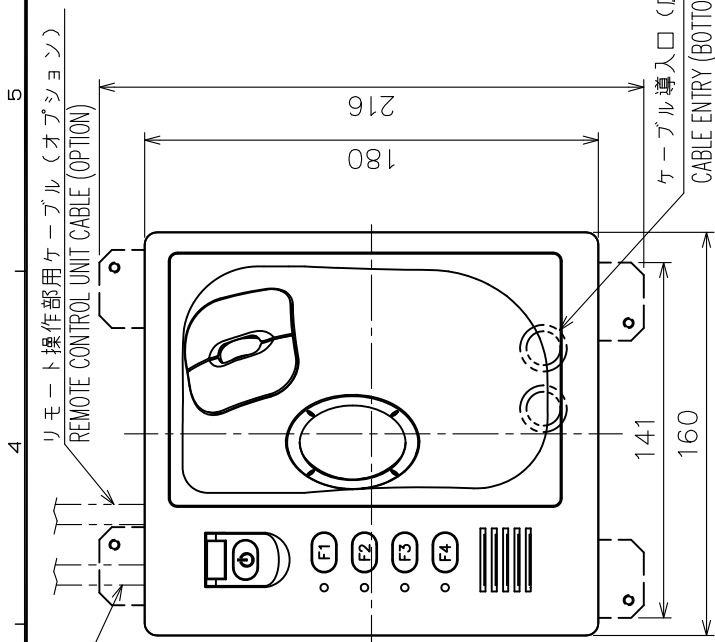
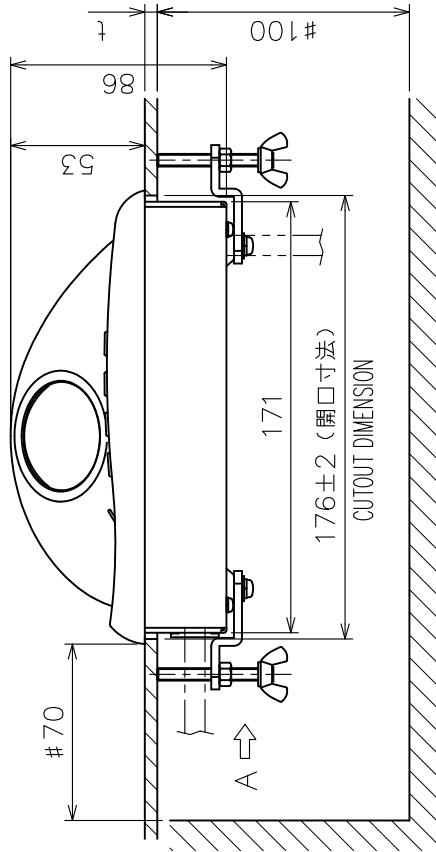
| | | | | |
|----------|-------------|--|---------------|------------------------------|
| DRAWN | Apr. 17 '07 | T. YAMASAKI | TITLE | RCU-015/015FEA |
| CHECKED | Apr. 17 '07 | T. TAKENO | 名称 | 操作部 (卓上装備) |
| APPROVED | Apr. 23 '07 | R. Esumi | 外寸図 | |
| SCALE | 1/3 | 質量 2.4 kg 質量中心位置を含む。 MASS V/ 100 CABLE | 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 |
|------------------------|----------------------|
| $L \leq 50$ | ± 1.5 |
| $50 < L \leq 100$ | ± 2.5 |
| $100 < L \leq 500$ | ± 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) 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

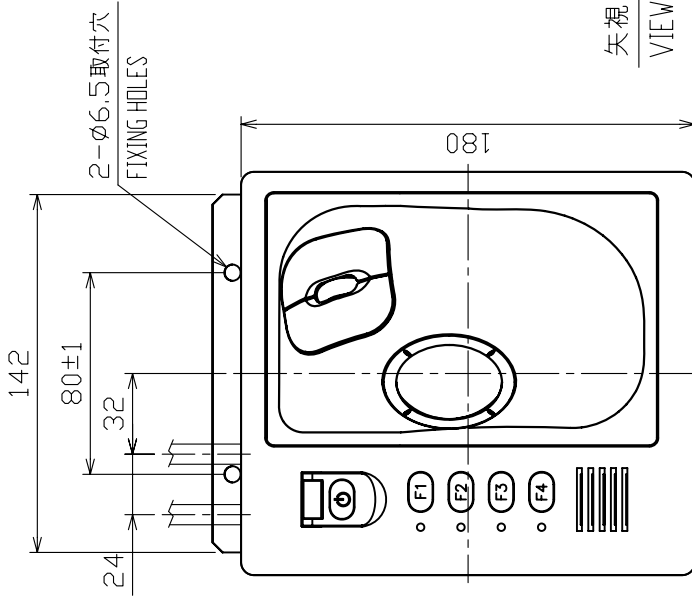
NOTE

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) |
| DWG.No. | C3519-G14-D | 質量 (100%)ケーブルを含む。 MASS INCLUDES 10m CABLE | OUTLINE DRAWING | |
| | | | | 03-163-786G-2 |

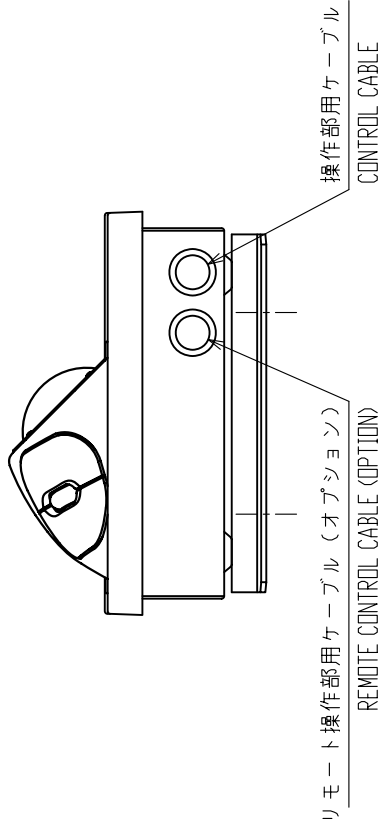
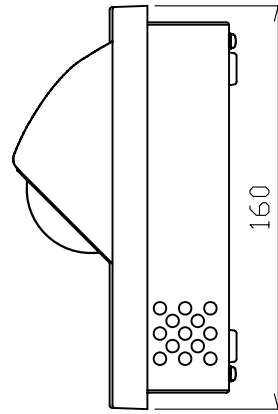
表 1 TABLE 1

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

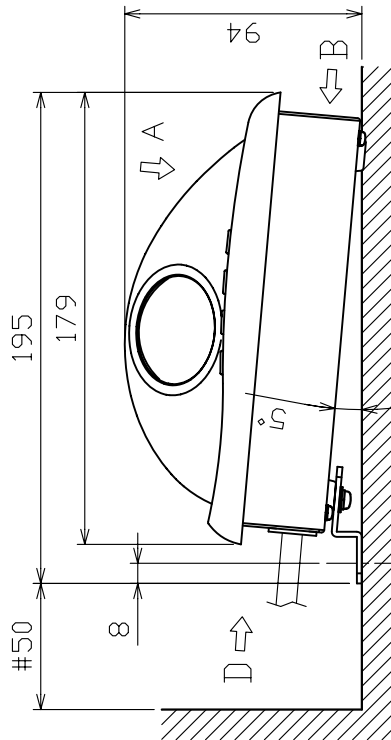


矢視A
VIEW A

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。

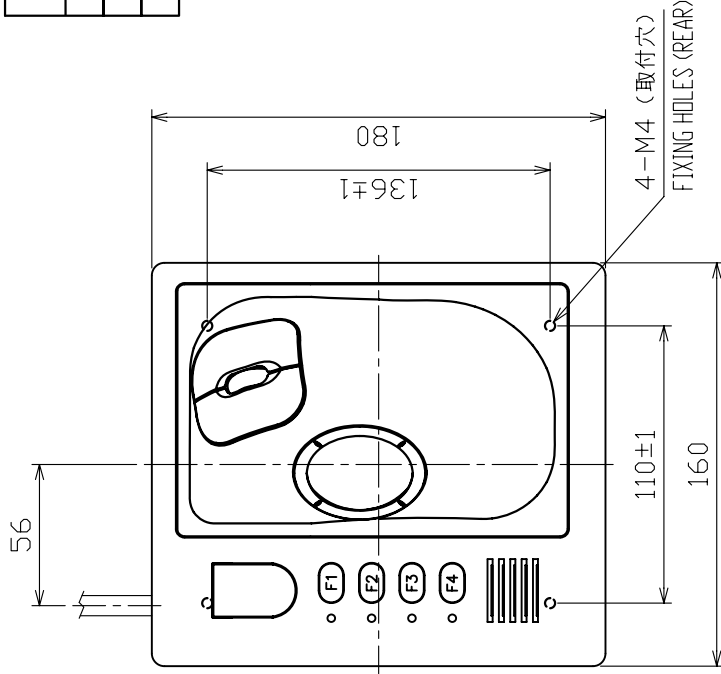
NOTE

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 | MASS 2.5 kg | NAME | CONTROL UNIT (TABLETOP MOUNT W/ FIXTURE) |
| DWG. No. | C3519-G15-C | 03-163-787G-1 | | OUTLINE DRAWING |

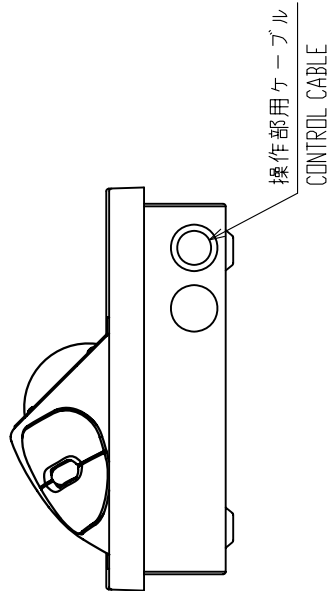
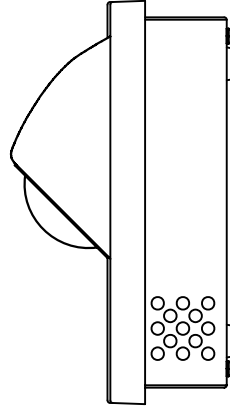
表 1 TABLE 1

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

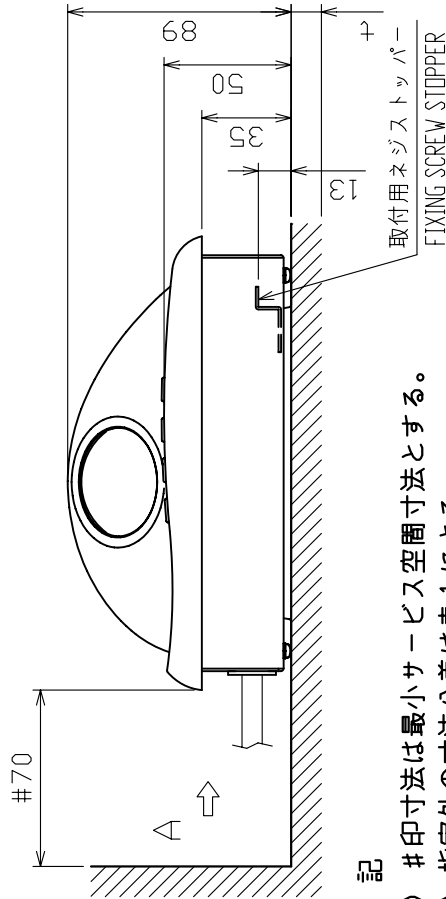


NOTE

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

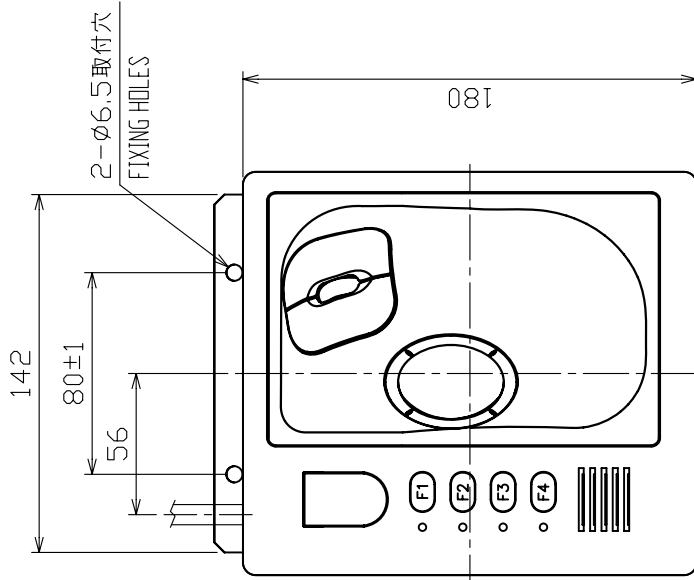


- 注 記
- 1) # 印寸法は最小サービス空間寸法とする。
 - 2) 指定外の寸法公差は表 1 による。
 - 3) 取付用ネジはセムスB (M4X12) を使用のこと。
取付面板厚(t)は $2 \leq t \leq 5$ とする。
それ以外はネジ長さ $(t+7.8) \pm 2$ のセムスBを使用のこと。

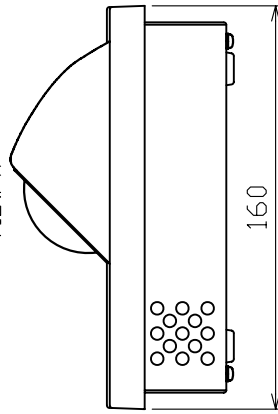
| | | | | |
|----------|-------------|--|-------|------------------------------|
| DRAWN | Feb. 7 '07 | E. MIYOSHI | TITLE | RCU-016 |
| CHECKED | | TAKAHASHI, T | 名称 | 操作部 (卓上装備) |
| APPROVED | | Y. Hatai | 外寸図 | |
| SCALE | 1/3 | 質量 2.4 kg 寸法 10ヶ所 質量 10ヶ所 質量 10ヶ所 | NAME | CONTROL UNIT (DESKTOP MOUNT)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

表 1 TABLE 1

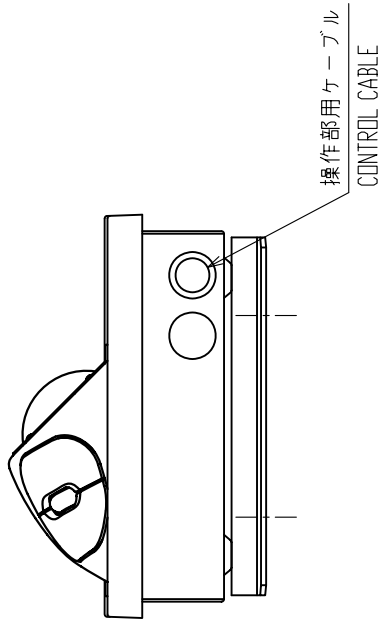
| 寸法区分 (mm) DIMENSIONS | 公差 (mm) TOLERANCE |
|-------------------------|----------------------|
| L ≤ 50 | ± 1.5 |
| 50 < L ≤ 100 | ± 2.5 |
| 100 < L ≤ 500 | ± 3 |



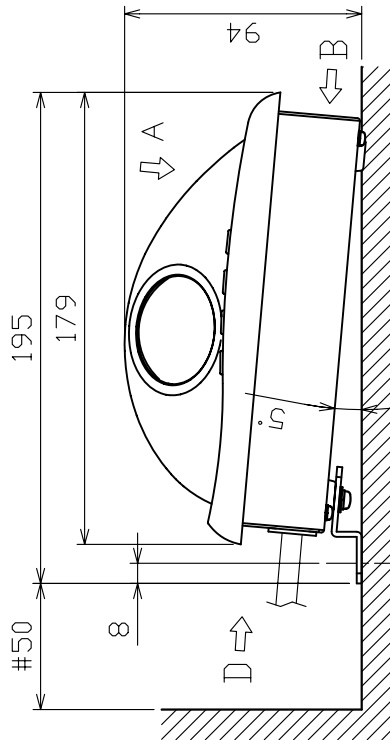
矢視 A
VIEW A



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) 取付用ネジはトラスクピッチネジ呼び径6、またはM6ボルトを使用のこと。

NOTE

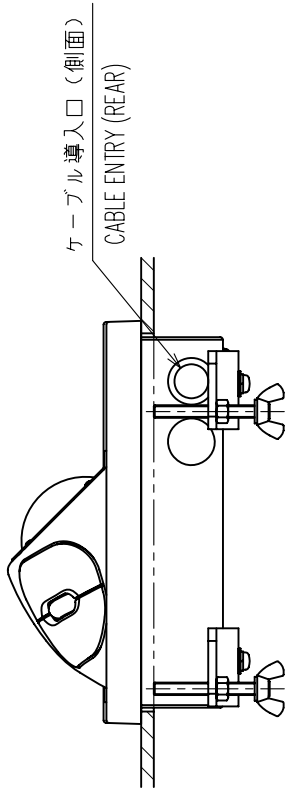
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS, WHICH IS NOT SPECIFIED.
3. USE TAPPING SCREWS #6 OR M6 BOLTS FOR FIXING THE UNIT.

| | | | | |
|----------|-------------|---|-------|--|
| DRAWN | 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 | 100% 質量100%寸法を呼び。 MASS W/ 100% DIM. CABLE | NAME | CONTROL UNIT (TABLETOP MOUNT W/ FIXTURE) |
| FIG.No. | C3519-G12-C | 03-163-782G-2 | | OUTLINE DRAWING |

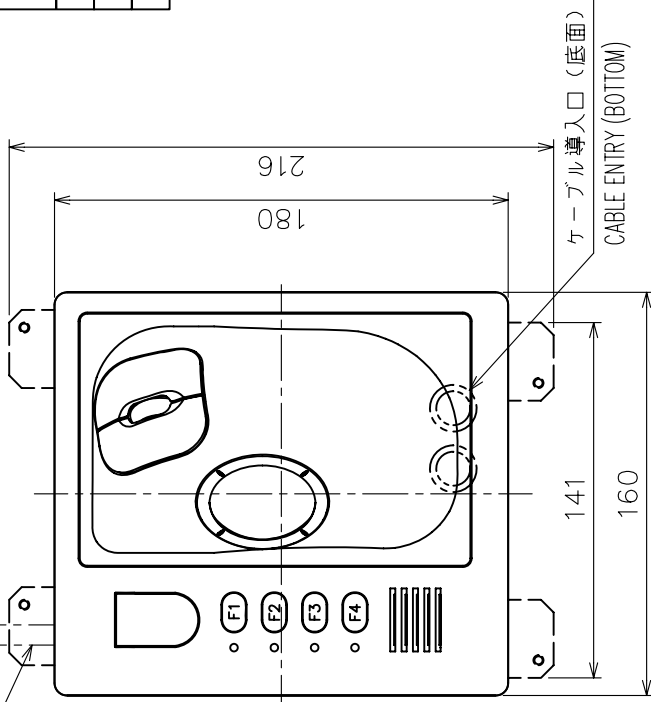
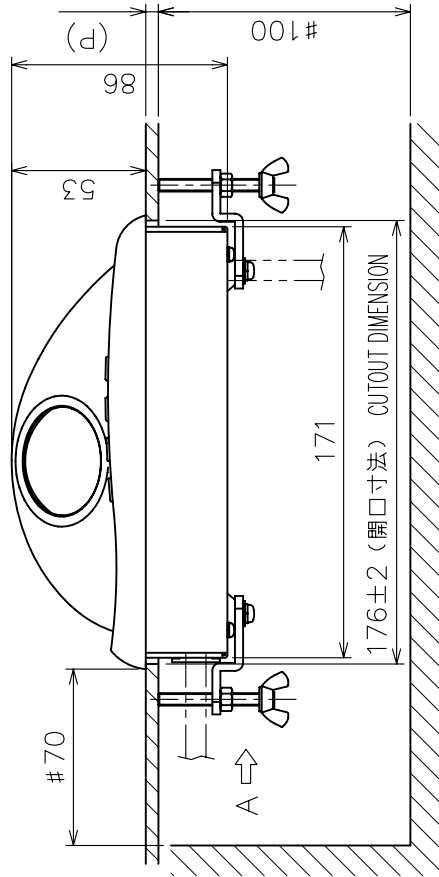
表 1 TABLE 1

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

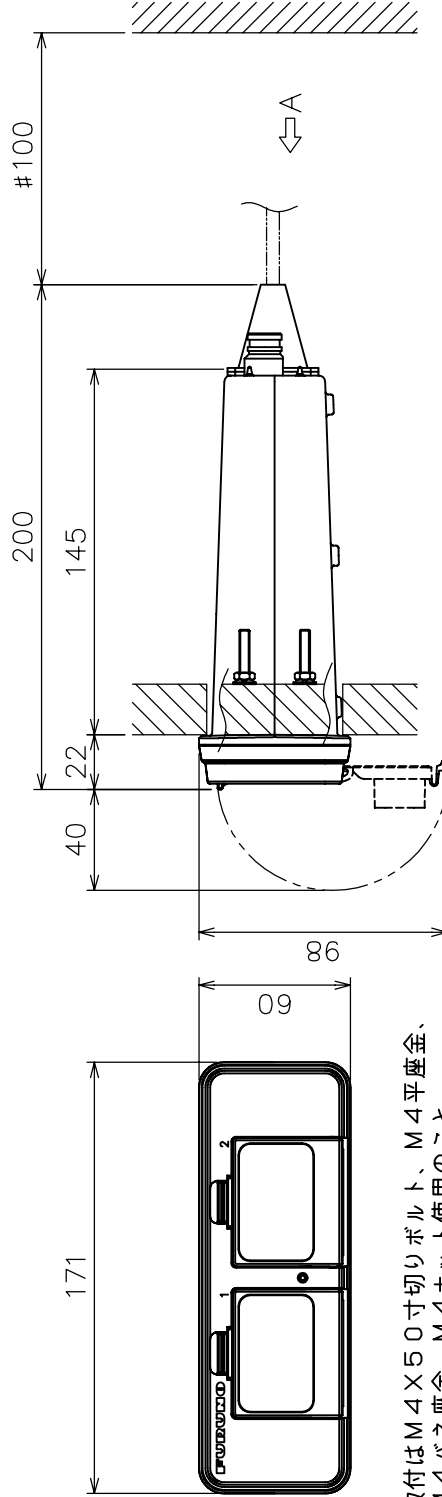
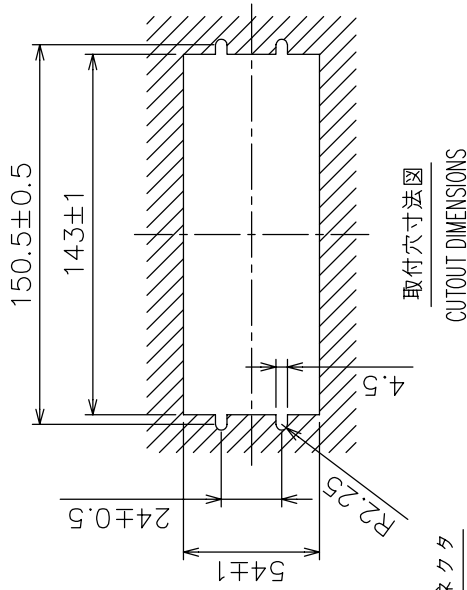
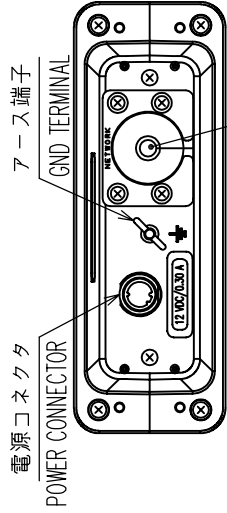
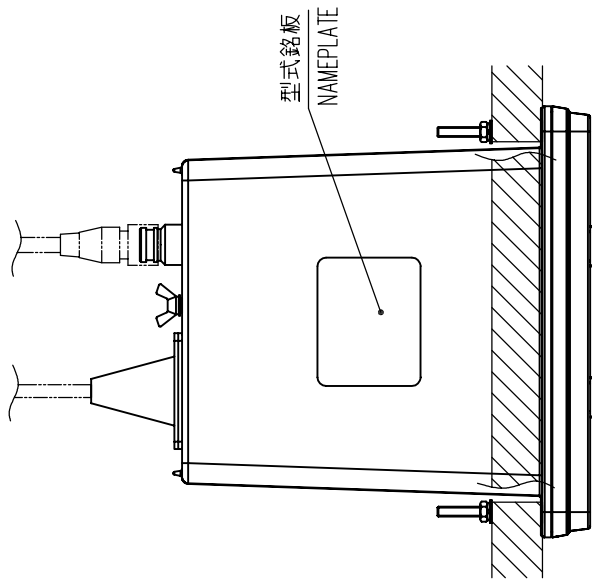
NOTE

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 ² ケーブル厚さを含む。 MASS W/ 10m. CABLE | NAME | CONTROL UNIT (FLUSH MOUNT) |
| DMG.No. | C3519-G11-D | 03-163-781C-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。

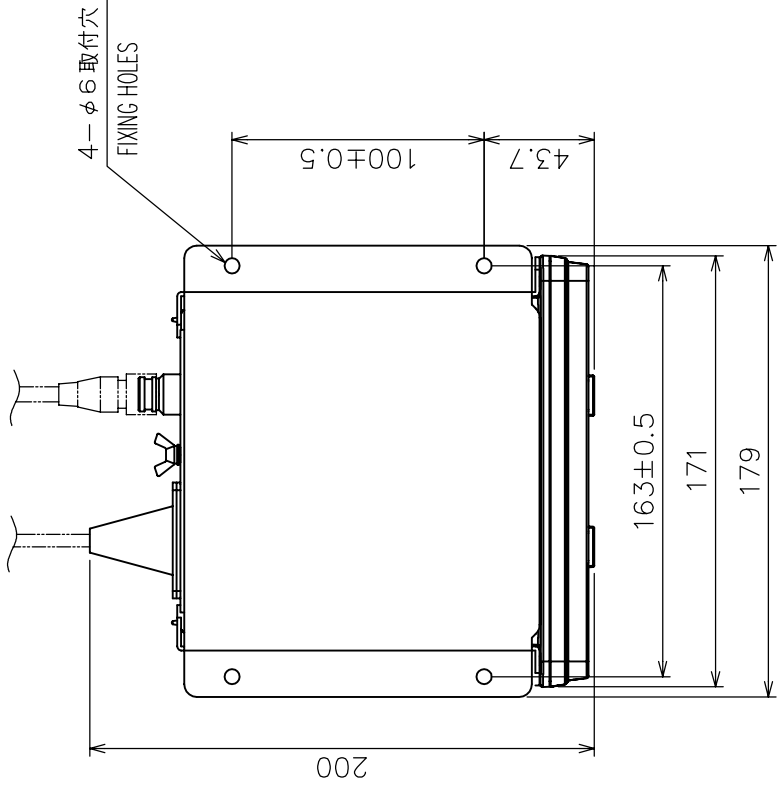
- NOTE
1. USE M4X50 BOLTS, M4 FLAT WASHERS, M4 SPRING WASHERS AND M4 NUTS FOR FIXING.
 2. # MINIMUM SERVICE CLEARANCE.
 3. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

| | | | | |
|----------|------------------------|-----------------|-------|--|
| 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. | C3532-604-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 |

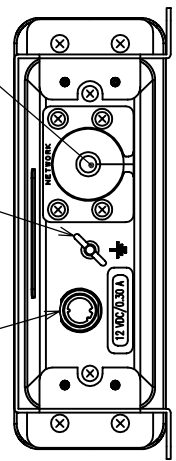
4-φ6 取付穴
FIXING HOLES



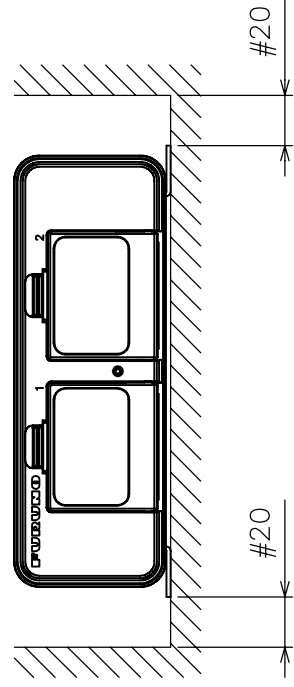
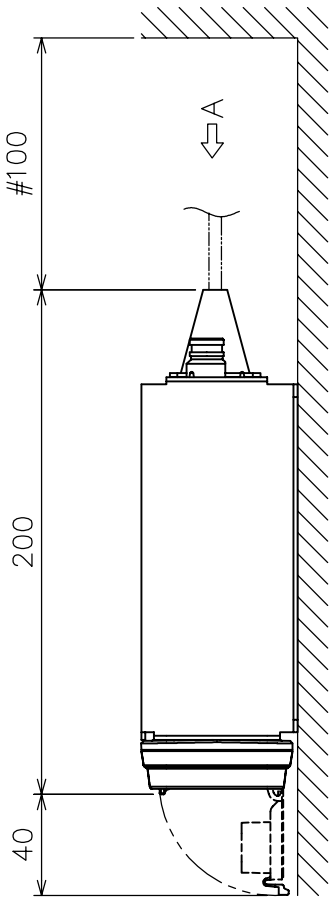
電源コネクタ
POWER CONNECTOR

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 CHECKED APPROVED SCALE DWG. No. | Mar. 29, '04 E. MIYOSHI TAKAHASHI, T Y. Hatai 1/3 C3532-605-B | FAR-2117 SERIES MODEL 1833C MODEL 1833C-BB FORM 1.3 19-023-310G-1 | TITLE 名 称 外 寸 図 NAME MEMORY CARD INTERFACE UNIT (TABLETOP MOUNT) OUTLINE DRAWING | CU-200 防水型カードインターフェイス(卓上装備) |
|---|--|---|---|--------------------------------|

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.

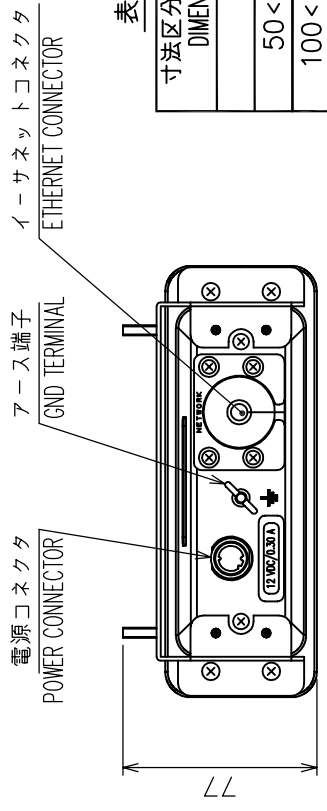
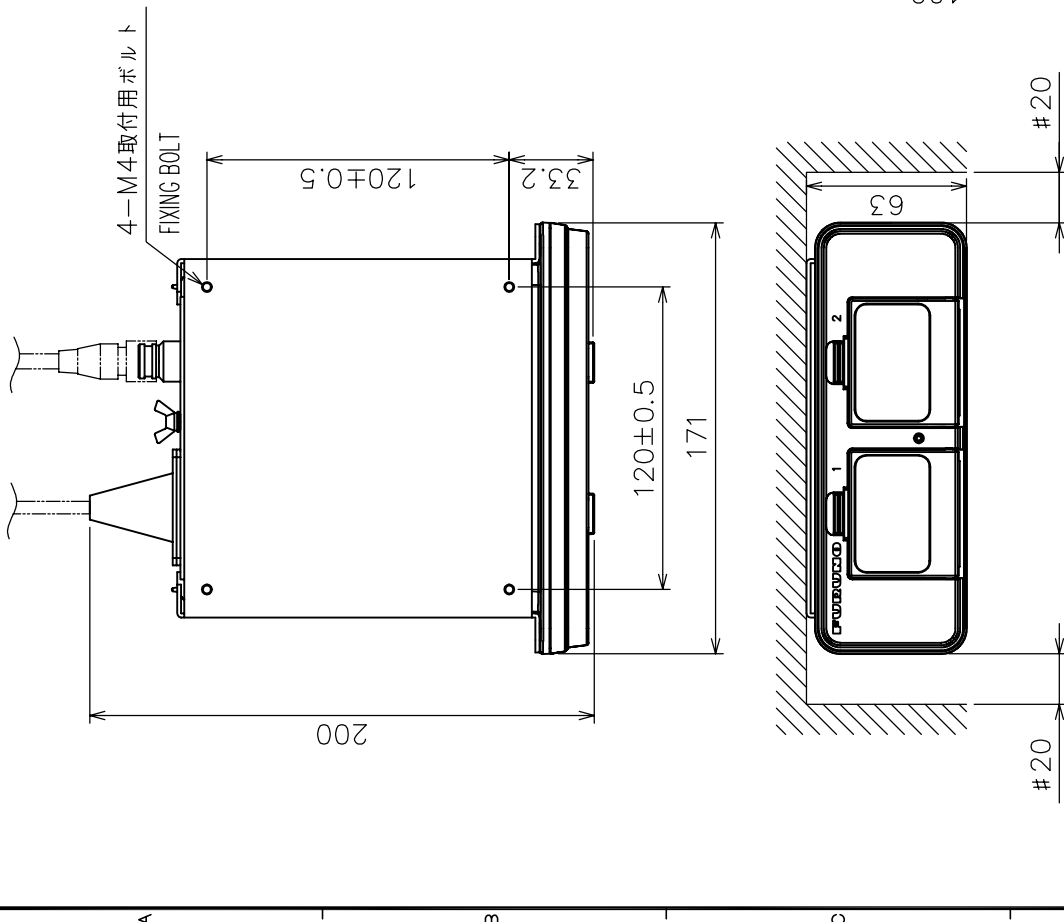
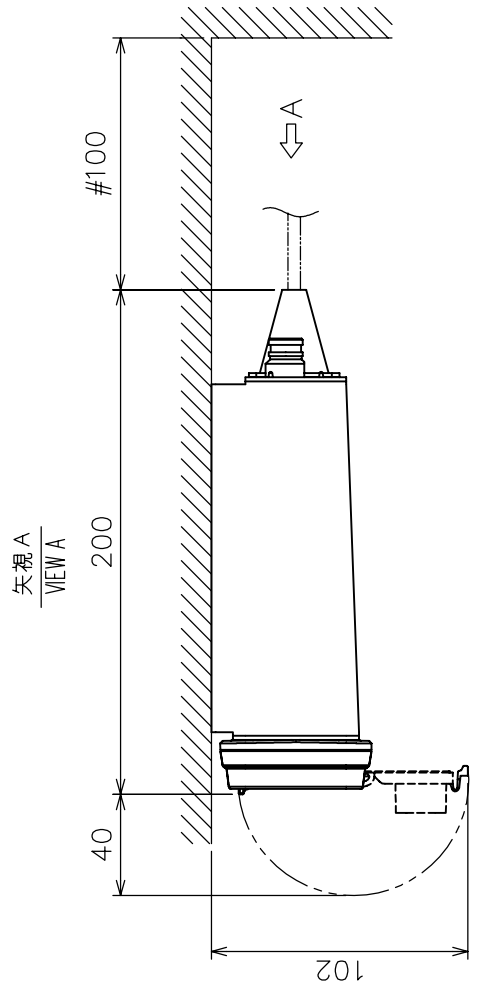


表 1 TABLE 1

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



| | | | | |
|----------|-------------------------|-----------------|-----------------|---|
| 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 | |

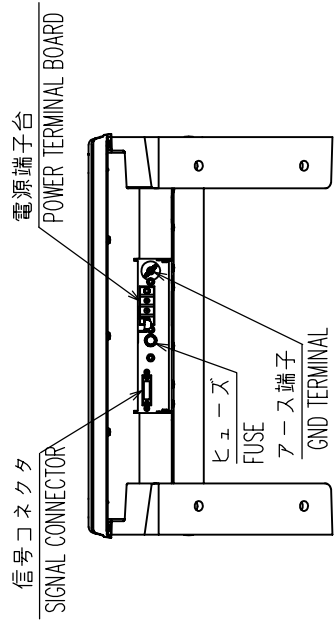
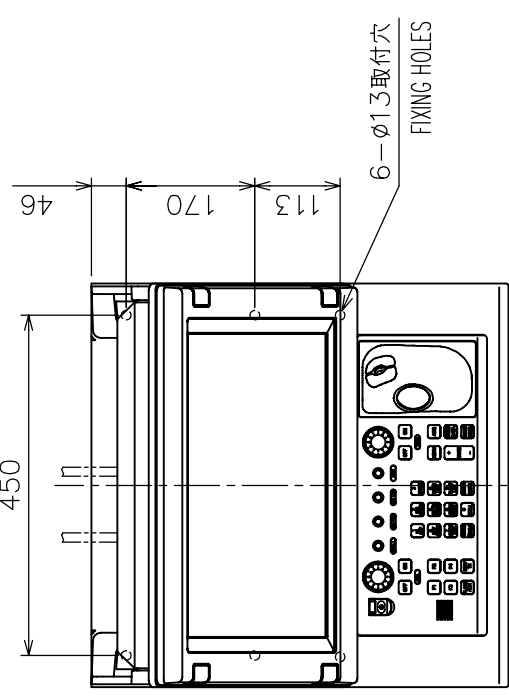
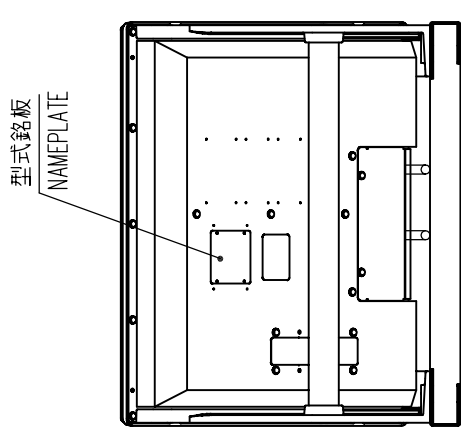
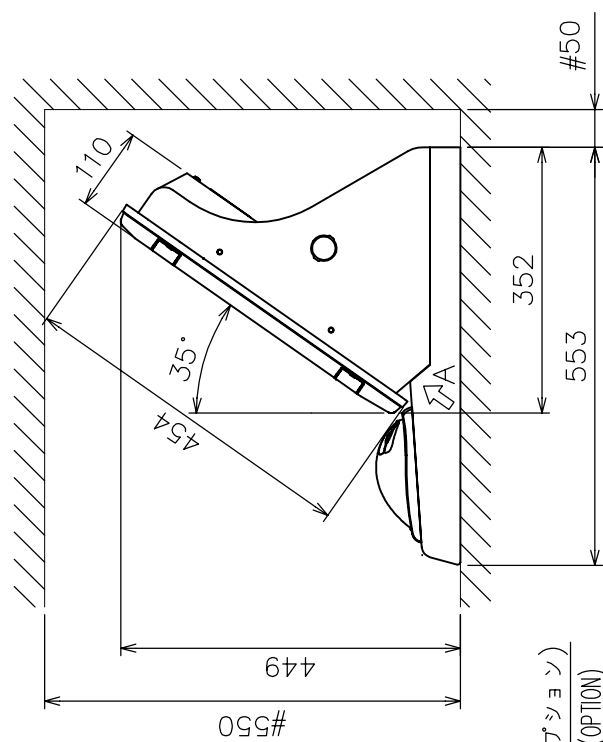


表 1 TABLE 1

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

矢視 A
VIEW A

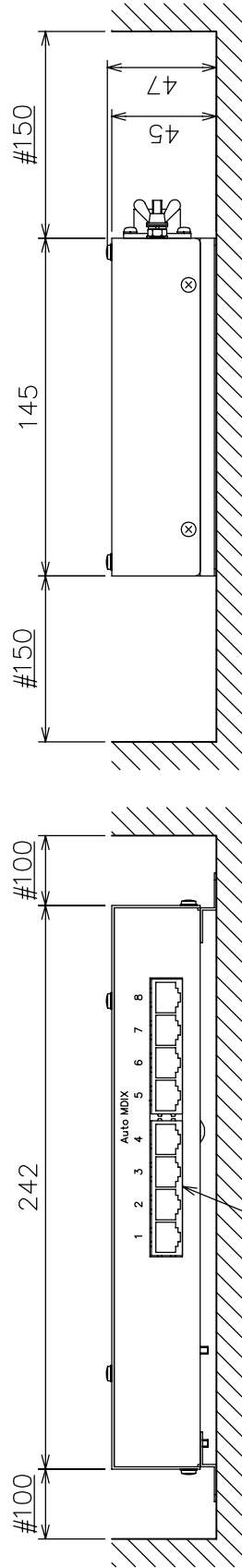
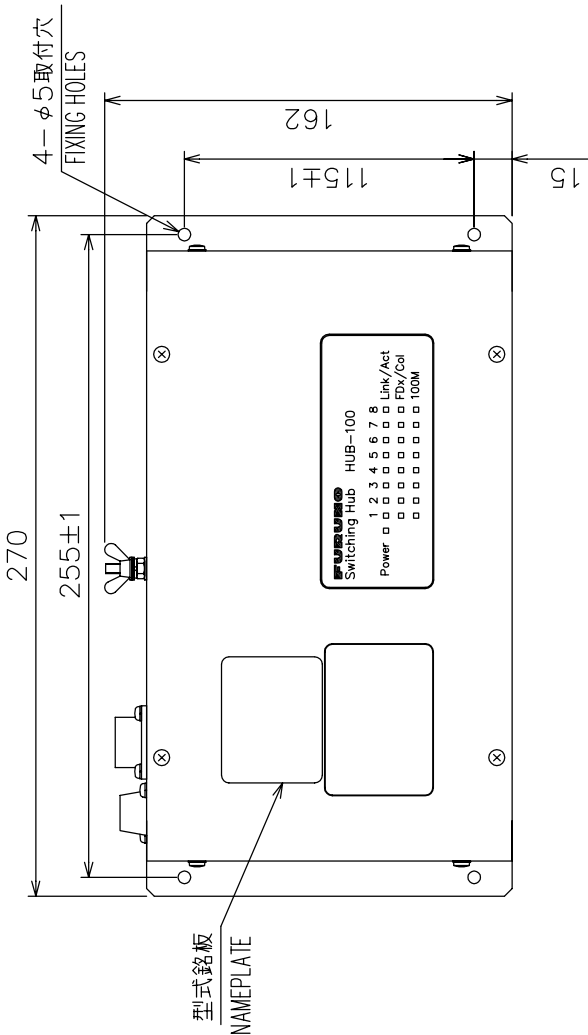


- 注記
- 1) #印寸法は最小サービスクリアランスとする。
 - 2) 指定外の寸法公差は表1による。
 - 3) 取付用ネジはM10ボルト、またはコーチボルト呼び径9を使用のこと。
 - 4) 質量は操作部ケーブル(10m)を含む。
- NOTE
1. # MINIMUM SERVICE CLEARANCE.
 2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
 3. USE M10 BOLTS OR COACH SCREWS φ9 FOR FIXING THE UNIT.
 4. MASS INCLUDES CONTROL CABLE (10m).

| | | | | |
|----------|-------------|---------------|-------|---------------------------------|
| DRAWN | Mar. 18 '04 | E. MIYOSHI | TITLE | MU-201CR w/ RCU-014 |
| CHECKED | | TAKAHASHI, T | 名称 | 指示部 (連結タイプ) |
| APPROVED | | Y. Hatai | 外寸図 | |
| SCALE | 1/1.0 | MASS 27 kg | NAME | DISPLAY UNIT (COMBINATION TYPE) |
| DWG. No. | C3519-G27-A | 03-163-760G-2 | | OUTLINE DRAWING |

表 1 TABLE 1

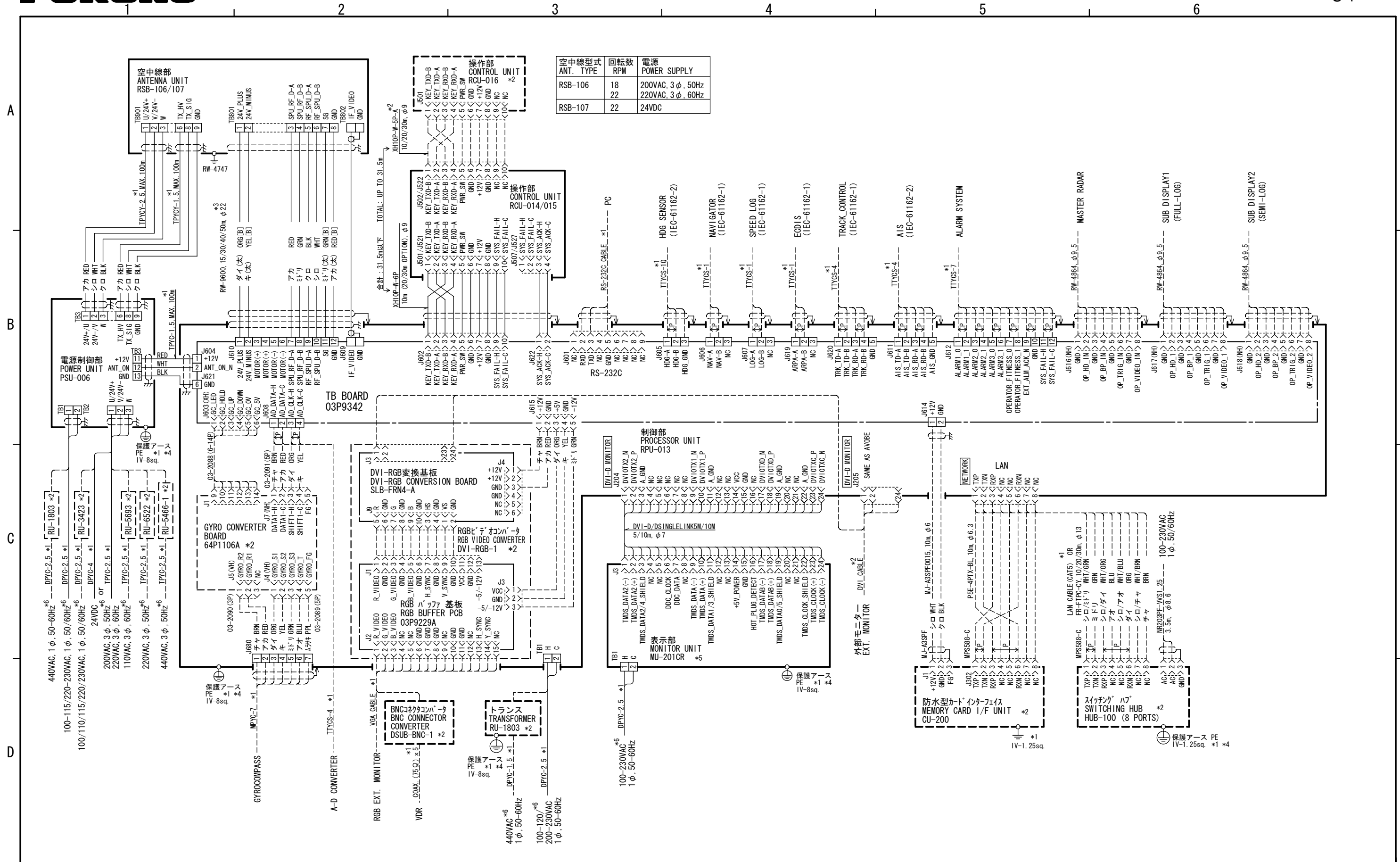
| 寸法区分 (mm) DIMENSIONS | 公差 (mm) TOLERANCE |
|-------------------------|----------------------|
| $L \leq 50$ | ± 1.5 |
| $50 < L \leq 100$ | ± 2.5 |
| $100 < L \leq 500$ | ± 3 |



- 注 記
- 1) 取付用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 | Matsuguchi | 外寸図 | |
| SCALE | 1/3 | MASS 1.5 kg ±10% | NAME | SWITCHING HUB |
| DWG.No. | C3519-G18-B | | | OUTLINE DRAWING |



| 空中線型式 ANT. TYPE | 回転数 RPM | 電源 POWER SUPPLY |
|--------------------|------------|--------------------|
| RSB-106 | 18 | 200VAC, 3φ, 50Hz |
| RSB-107 | 22 | 220VAC, 3φ, 60Hz |
| | | 24VDC |

- 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) 保護アース用ケーブルは緑/黄の絶縁線を使用のこと。
 - * 5) FAR-2157-BBのときは支給なし。
 - * 6) 交流は両極切りブレーカ (造船所手配) を経由すること。

- NOTES
- *1: SHIPYARD SUPPLY.
 - *2: OPTION.
 - *3: MAX. 100m. (JUNCTION BOX RJB-001 IS REQUIRED FOR EXTENSION)
 - *4: USE GRN/YEL VINYL INSULATION WIRE FOR PROTECTIVE EARTH.
 - *5: NOT SUPPLIED FOR FAR-2157-BB.
 - *6: PASS THE AC LINE THROUGH A DOUBLE-CONTACT BREAKER (SHIPYARD SUPPLY).

| | |
|--------------------------|---------------------------|
| DRAWN Feb. 1 '07 Maki | TYPE FAR-2157/2157-BB |
| CHECKED TAKAHASHI, T | 名称 船舶用レーダー/ARPA |
| APPROVED Y. Hatai | 相互結線図 |
| SCALE MASS kg | NAME MARINE RADAR/ARPA |
| DWG. No. C3522-C01-C | INTERCONNECTION DIAGRAM |

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