FURUNO

Installation Manual
VDR/S-VDR
Model VR-7000/VR-7000S

(VOYAGE DATA RECORDER/SIMPLIFIED VOYAGE DATA RECORDER)

FURUNO ELECTRIC CO., LTD.

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ECF
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The paper used in this manual
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⚠ SAFETY INSTRUCTIONS

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

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

⚠ Warning, Caution	🚫 Prohibitive Action	❗ Mandatory Action

⚠ WARNING

Do not open the equipment unless you are well familiar with electrical circuits.

Only qualified personnel should work inside the equipment.

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

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

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

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

⚠ WARNING

Use only the specified power and signal cable.

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

Do not install the equipment where they may get wet from rain or water splash, or in a dusty environment.

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

Ground the equipment to prevent electrical shock and mutual interference.

⚠ CAUTION

Use the proper fuse.

Use of an incorrect fuse may damage the equipment.

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

Unit	Standard compass	Steering compass
Data Collecting Unit VR-7010	2.30 m	1.45 m
Remote Alarm Panel VR-7017	1.15 m	0.75 m
Microphone VR-7011	0.65 m	0.45 m
Waterproof Microphone VR-7012W	0.75 m	0.50 m
Fixed Data Recording Unit VR-7020	0.45 m	0.35 m
Float-free Data Recording Unit VR-7021F	0.80 m	0.40 m
Junction Box VR-7022F	0.80 m	0.50 m
Video LAN Converter IF-7100	1.40 m*/ 1.55 m	0.85 m*/ 1.00 m
Intelligent HUB HUB-3000	1.20 m	0.75 m
Switching HUB HUB-100	1.00 m	0.60 m
Sensor Adapter MC-3000S	2.05 m	1.35 m
Sensor Adapter MC-3010A	0.75 m	0.50 m
Sensor Adapter MC-3020D	1.05 m	0.70 m
Power Supply Unit PSU-011	0.30 m	0.30 m

*: Compass safe distances for the unit whose serial number (SER.NO.) is "200001" or after.

SYSTEM CONFIGURATION

Basic configuration is shown with solid line.

Fixed Data Recording Unit (Fixed DRU) VR-7020*3		Switching HUB HUB-100 — Radar, ECDIS, etc.
		100-230 VAC
Float-free Data Recording Unit (Float-free DRU) VR-7021F*3 — Junction Box VR-7022F*3		Max. 2 units
		VHF Audio
Remote Alarm Panel VR-7017*1		PC
*1: Nominal viewing distance: 0.5 m		Live Player V5 VR-7030

Data Collecting Unit (DCU) VR-7010

Max. 8 units
- Microphone VR-7011
- Waterproof Microphone VR-7012W

- Serial Interface: Max. 2 ch (IEC 61162-1/2)
- Serial Interface: Max. 6 ch (IEC 61162-1)

Intelligent HUB HUB-3000 — Network Equipment

100-230 VAC

Max. 2 units
- Radar/ECDIS display --- Video LAN Converter IF-7100
  - 24 VDC

Junction Box IF-8540 — IF Signal

or

Sensor Adapter MC-3000S — Serial Interface

Sensor Adapter MC-3010A — Analog Interface

Sensor Adapter MC-3020D — Digital IN Interface

*3: When using the VR-7000S, select either the "VR-7020" or the "VR-7021F and VR-7022F".

Power Supply Unit PSU-011*2

*2: For Russian vessel only

100-230 VAC

Environmental category

All units (other than VR-7021F, VR-7022F, VR-7012W and VR-7020)	Protected from the weather
VR-7021F	Portable
VR-7022F, VR-7012W and VR-7020	Exposed to the weather

EQUIPMENT LISTS

<u>Standard Supply</u>

Name	Type	Code No.	Qty	Remarks
Data Collecting Unit	VR-7010	-	1	
Remote Alarm Panel	VR-7017	-	1	
Fixed Data Recording Unit	VR-7020	-	1	When using the VR-7000S, select one.
Float-free Data Recording Unit	VR-7021F	-	1	
Junction Box	VR-7022F	-	1	Only when using the VR-7000S and selecting the VR-7021F
Microphone	VR-7011	-	1-8	
Waterproof Microphone	VR-7012W	-		
Video LAN Converter	IF-7100	-	0-2	
Sensor Adapter	MC-3000S	-	0-1	
Power Supply Unit	PSU-011	-	1	For Russian vessel only
Installation Materials	CP03-31701	001-013-670	1	For PSU-011
	CP24-02401	001-170-350	0-1	For MC-3000S
	CP24-03301	001-279-040	1	For VR-7010
	CP24-03401	001-279-100	1	For VR-7017
	CP24-03501	001-279-130	1-8	For VR-7011
	CP24-03601	001-279-140		For VR-7012W
	CP24-03701	001-279-120	0-2	For IF-7100
	CP24-03801	001-319-050	1	For VR-7020
	CP24-03901	001-600-010	1	For VR-7022F
	CP24-04001	001-321-640	1	For VR-7021F
Accessories	FP24-01110	000-025-269	1	For VR-7010, w/program CD and FP24-01112
Spare Parts	SP24-01101	001-279-030	1	For VR-7010
	SP24-01201	001-279-110	0-2	For IF-7100
	SP24-00701	001-170-390	0-1	For MC-3000S

<u>Optional Supply</u>

Name	Type	Code No.	Remarks
Microphone	VR-7011	-	
Waterproof Microphone	VR-7012W	-	
Video LAN Converter	IF-7100	-	
Junction Box	IF-8540	-	
Sensor Adapter	MC-3000S	-	Serial control unit
	MC-3010A	-	Analog IN
	MC-3010A-N	-	For IF-8540, analog IN
	MC-3020D	-	Digital IN
	MC-3020D-N	-	For IF-8540, digital IN
Intelligent HUB	HUB-3000	-	
Switching HUB	HUB-100	-	

Name	Type	Code No.	Remarks
Case Gasket	OP24-28	001-169-970	For MC-3000S
	OP24-29	001-169-960	For MC-3010A/3020D
SSD Kit 2	OP24-64	001-595-230	For VR-7010
Microphone Replacement Kit	OP24-44	001-279-180	For VR-7011
Installation Materials for Microphone	OP24-45	001-279-190	
IF-8530 Version-up Kit*	OP24-48	001-326-380	w/IF-8530
Front Fixing Panel Kit	OP24-49	001-360-980	For VR-7017
Cable Assy.	DVI-D/D S-LINK 5M	001-132-960-10	DVI-D cable, 5 m
	DVI-D/D S-LINK 10M	001-132-980-10	DVI-D cable, 10 m
	3COX-2P-6C 5M	001-077-230-10	D-SUB cable, 5 m
	3COX-2P-6C 10M	001-077-220-10	D-SUB cable, 10 m
	MC1.5-W-L600	001-187-470-10	Between sensor adapters, 0.6 m
	MC1.5-W-L1000	001-187-480-10	Between sensor adapters, 1 m
	MC1.5-W-L2000	001-187-490-10	Between sensor adapters, 2 m
	MC1.5-W-L3000	001-187-500-10	Between sensor adapters, 3 m
	AI.14-8AI.34-6L1000	001-430-110	For installing additional unit in IF-8540
BNC Coaxial Cable Set	CP24-01200	000-010-132	Coaxial cable (6 core) with BNC connectors, 20 m
	CP24-01210	000-010-133	Coaxial cable (6 core) with BNC connectors, 30 m
Installation Materials	CP03-28900	000-082-658	LAN cable, 10 m
	CP03-28910	000-082-659	LAN cable, 20 m
	CP03-28920	000-082-660	LAN cable, 30 m
	CP03-28930	000-084-368	LAN cable, 50 m
	CP24-02900	001-208-050	LAN cable for HUB-3000, 10 m
	CP24-02910	001-208-060	LAN cable for HUB-3000, 20 m
	CP24-02920	001-208-070	LAN cable for HUB-3000, 30 m
Spare Parts	SP03-15001	001-042-330	For HUB-100
	SP24-00801	001-235-320	For HUB-3000
	SP24-01201	001-279-160	For IF-7100
Crimping Tool	CRIMPFOX 10S	001-206-920	For ferrule
Operator's Manual	OME-44850	000-197-204	For VR-7000/7000S
	OME-44851	000-179-350	For Live Player V5
Instruction Manual	OME-44852	000-179-352	For VDR Maintenance Viewer

*: Discontinued from May 2020.

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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 Data Collecting Unit VR-7010

Mounting consideration

Select a mounting location, keeping in mind the following points:

- Locate the unit away from heat sources.
- Select a location where the shock and vibration are minimal.
- Locate the unit away from places subject to water splash and rain.
- Make the maintenance space shown in the outline drawing for maintenance and checking purpose.
- A magnetic compass will be affected if the unit is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass.
- Select a mounting location considering the length of the cables to be connected to this unit.
  The cables connected the units shown below should be 50 m or less.
  - Fixed DRU
  - Float-free DRU
  - Microphone
  - Waterproof microphone
  - Remote alarm panel
- Select a location where the surface is flat. If it is not flat, insert a number of washers between the unit and the mounting location as necessary.
- Select a location that is strong enough to support the weight of the unit.
- The cable entrance of the unit should face downward.

Mounting

Install the data collecting unit (DCU) on a bulkhead.

1. Fasten the unit with four M10 bolts or φ10 coach bolts (local supply).
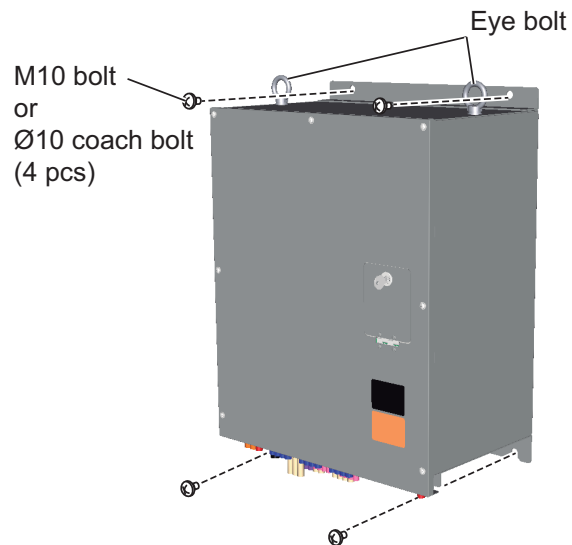
2. Two eye bolts are attached at the top of the unit to hoist the unit onboard. Remove them after the installation.

3. Attach two cosmetic caps (supplied) to eye bolt holes.

1.2 Data Recording Unit (DRU)

1.2.1 Fixed data recording unit VR-7020

The fixed DRU shall be sited in the vicinity of the bridge on the external deck area of the vessel so as to maximize the probability of its survival and recovery following an incident.

VR-7000S systems have either a fixed data recording unit (VR-7020) or a float-free data recording unit (VR-7021F). For configurations that use the VR-7021F, see section 1.2.2.

Mounting consideration

Select a mounting location, keeping in mind the following points:

- Select the mounting location considering the facilitation of underwater removal and retrieval by both divers and ROVs. There should be a clear unobstructed space in the vicinity of the capsule to allow an ROV or diver to work.
- Locate the unit as near to the center line of the ship as possible.
- Locate the unit away from fuel or other potential fire sources.
- Locate the unit away from probable sources of the mechanical damage.
- Make the maintenance space for maintenance and checking purpose.

Mounting

To install the fixed DRU, do the following:

1. Verify that the fixed DRU mounting base lines up with the hull mounting holes. Refer to the figure on the next page for the fixed DRU mounting base template pattern.
2. Ensure the paint around the bottom of the mounting holes on the fixed DRU and hull mounting brackets is removed.
3. Apply the supplied adhesive around the mounting holes on the fixed DRU and hull mounting brackets.
4. Install three lock washers (supplied).
5. Insert bolts through the hull mounting brackets.
6. Fix the fixed DRU with the supplied installation materials.
   See the figure "Hull Grounding Technique" on the next page.

"Hull Ground Technique" and "Mounting Base Template Pattern"

Apply the adhesive (TB5211).

Hex. bolt

Flat washer

Lock washer

Spring washer

Hex. nut

Hull Grounding Technique

DIAMETER
0.594 inches
15.0 mm

DIAMETER
6.901 inches
175.29 mm

3 ×120 Degrees

3.451 inches
87.64 mm

1.725 inches
43.82 mm

2.988 inches
75.90 mm

5.976 inches
151.80 mm
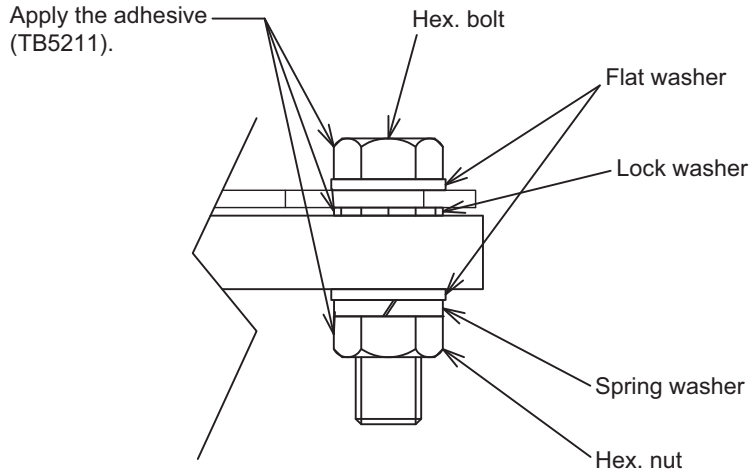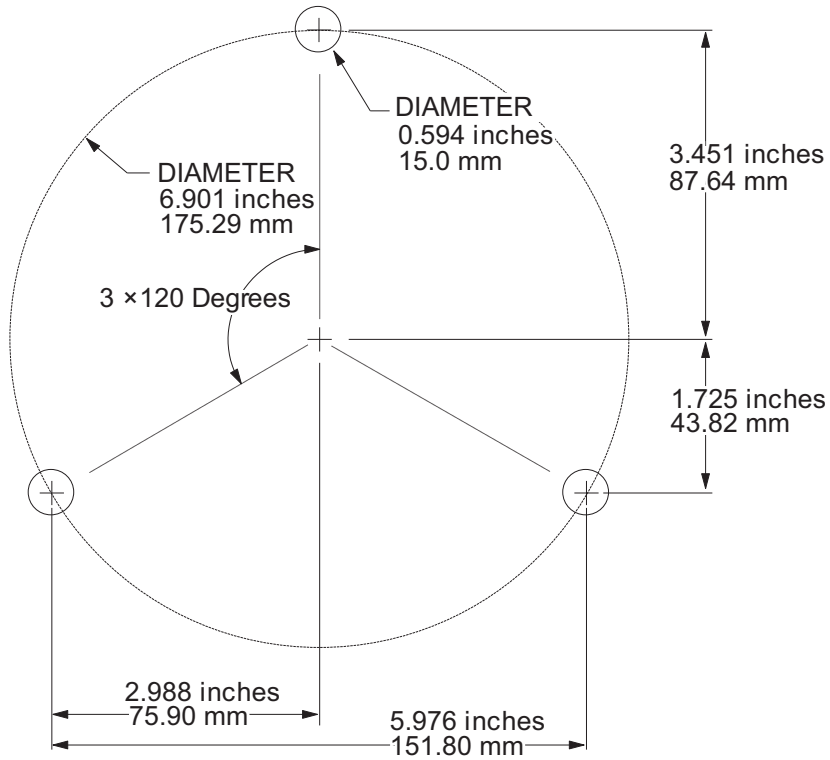
Mounting Base Template Pattern

Beacon battery replacement information sticker

Depending on the time of manufacture, the beacon is supplied with a bag containing the two battery replacement stickers.

Battery replacement information sticker

Attach one sticker on the beacon label of the fixed DRU, so that the arrow mark on label points to the date three years after the delivery date to the customer. For example, if the fixed DRU will be delivered at June, 2020, the battery replacement information sticker must indicate "June, 2023" as shown in the following figure. After attaching the sticker, the remaining sticker must be discarded.

Attach the battery replacement information sticker here.

Attach the sticker so that the arrow mark points to the date three years after the delivery date to the customer. For example, if the fixed DRU will be delivered at June, 2020, the sticker battery must indicate "June, 2023".

Before attaching the sticker   After attaching the sticker

1.2.2   Float-free data recording unit VR-7021F

VR-7000S systems have either a fixed data recording unit (VR-7020) or a float-free data recording unit (VR-7021F). For configurations that use the VR-7020, see section 1.2.1.

Note 1: The IMO obliges that VDR-equipped ships must carry a float-free DRU. The following is an excerpt from the regulation. Observe the following location/installation conditions.

• The float-free DRU must be installed in the vicinity of the navigation bridge, i.e. on the wings of the navigation bridge. Access via vertical ladder should not be accepted. A location on the top of the wheelhouse may be accepted to fulfill the requirement if accessible by stairs.

Note 2: Installation instructions for the VR-7021F are written based on the Jotron Tron40VDR instructions. For detailed information regarding the Jotron Tron40VDR, see the user manual supplied with the VR-7021F.

Mounting consideration

Select a mounting location, keeping in mind the following points:

• The float-free DRU should, with greatest possible probability, float-free and avoid being caught in railings, superstructure, etc., if the ship sinks.

• The float-free DRU should be located so that it may be easily released manually and brought to the survival craft by one person. It should therefore not be located in a radar mast or any other places which can only be reached by vertical ladder.

• Fix the float-free DRU vertically on the bulkhead or handrail so that the cable entrance faces downward. Ensure that the steel hull or plate where the bracket is mounted is completely flat. If it is uneven, the capsule may not make good contact with the docking module.

• Confirm that a buoyant lanyard is attached to the capsule correctly. The buoyant lanyard (for tethering to life craft) is attached to the capsule of the float-free DRU. The buoyant lanyard must be attached to the capsule correctly to prevent its being trapped in the ship's structure when the capsule is released.

• The float-free DRU should be marked with the ship's call sign, serial number, MMSI number (if applicable), and 15 Hex ID before installation.

• The cable between the float-free DRU and junction box (VR-7022F) should be as short as possible.

• The cover of the float-free DRU should be attached correctly. If the cover is not attached correctly, the cover and capsule may drop out of the bracket due to wind and/or vibration. For how to attach the cover, see "How to attach the cover" on page 1-14.

1. MOUNTING
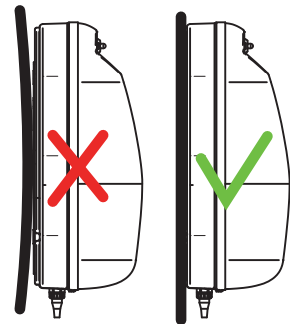
• Ground the unit by connecting the ground plate to the ship's body with the hex. bolt.

• Apply the supplied silicone grease between the docking module and storage module to prevent water from entering (see the figure at step 3 on page 1-11).
The silicone grease is supplied with the float-free DRU. The grease is marked as "Item no.88237 Tron-40VDR". After applying the silicone grease, do not release the capsule from the bracket other than the maintenance. If you release the capsule, apply the silicone grease again when reattach it.

Ground plate
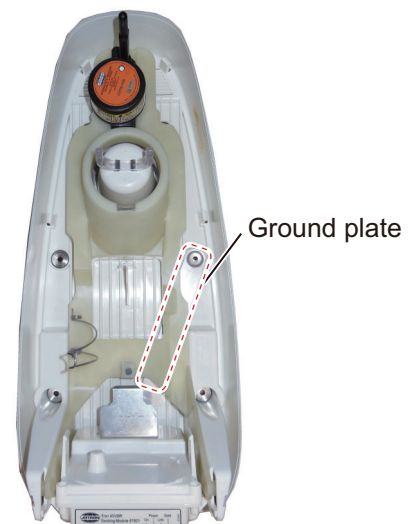
• Do not open the plastic bag for the cable and do not remove the connector cap from the capsule, until you connect the cable to the float-free DRU. Otherwise, the connector is damaged or worn, and it may cause communication error.

Do not open the plastic bag until you connect the cable to the float-free DRU.

Do not remove the connector cap until you connect the cable to the float-free DRU.

• Do not bend and/or twist the cable excessively to secure the cable. Ensure a minimum bend radius of 80 mm.

Bend radius ≥ 80 mm
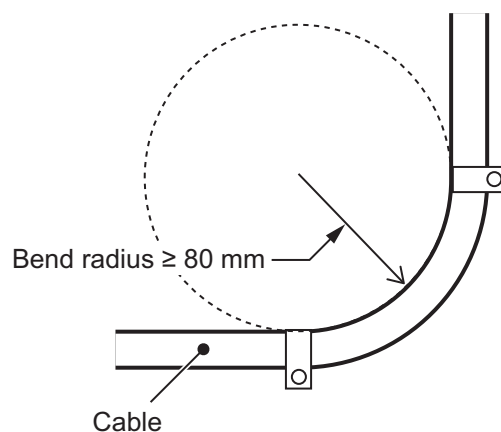
Cable

- Adjust the cable length so that the cable routes vertically to the float-free DRU and horizontally to the junction box. See the example figure to the right for reference.
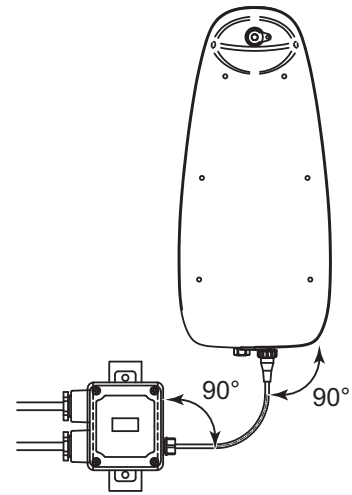
- As shown in the following figure, fasten the bracket and the junction box (VR-7022F) to the steel plate, then fasten the steel plate to the ship's hull.
  For details, see the outline drawing. If there is not enough space on the steel plate to install the junction box there, install only the bracket on the steel plate. The reason for installing the bracket on the steel plate is to prevent water from leaking into the bracket from the rear of the bracket.

  - The thickness of the steel plate should be 6 mm.

  - Install the bracket on a flat steel plate flush with the steel plate.

  - The bending radius for the cable that binds the capsule to the junction box should be 80 mm or more.

  - Pass the ground from the bracket through the steel plate and connect it to the ship's hull.

  - The cable gland on the junction box can be horizontal or vertical.
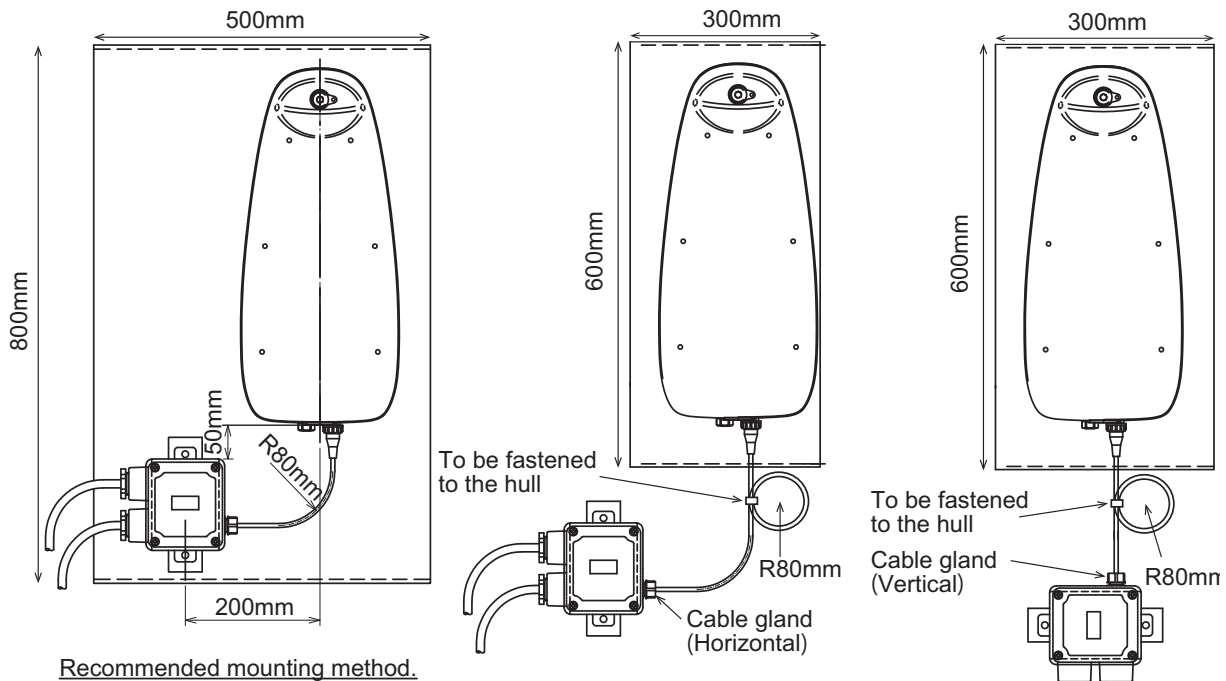
Recommended mounting method.

Mounting method when there is not enough space on the steel plate to install the junction box there.

- Select a place where interference from other radio equipment is minimal.
  The float-free DRU is compliant with IEC 60945. However, some radio equipment (ex. S-band radar antennas) may create excessive electrical fields, which are larger than the IEC 60945 test standards. These large electrical fields can interrupt the radio communication between the storage module and docking module or result in the malfunction of the equipment. To avoid interference from other equipment, keep to the following guidelines:

  - Select a place where the float-free DRU is not exposed to the RF signal from the S-band radar antennas.
    Generally, a place where the radar antenna is not with in the visual field of the float-free DRU (ex. wing opposite to the radar mast) is recommended.

  - Locate the unit 5 m or more away from a VHF antenna.
    The float-free DRU is designed to resist electrical fields of 100 V/m in the VHF frequency range 156 to 165 MHz. In other frequency ranges between 150 kHz to 2 GHz, the float-free DRU resists electrical fields of 10 V/m. Generally, a VHF antenna creates an electrical field of 10 V/m at distance of 3 meters in the antenna lobe. Therefore, it is recommended to locate the unit 5 m or more away from a VHF antenna.

The following picture indicates the recommended and not recommended installation location.

Outside wall of the bridge deck where the radar antenna is not within the visual field is recommended.

Float-free DRU

The radar antenna is within the visual field of the float-free DRU. Therefore, the float-free DRU may be affected by the radar antenna.

Recommended installation location

Not recommended installation location
(The float-free DRU is subject to radar antenna interference.)
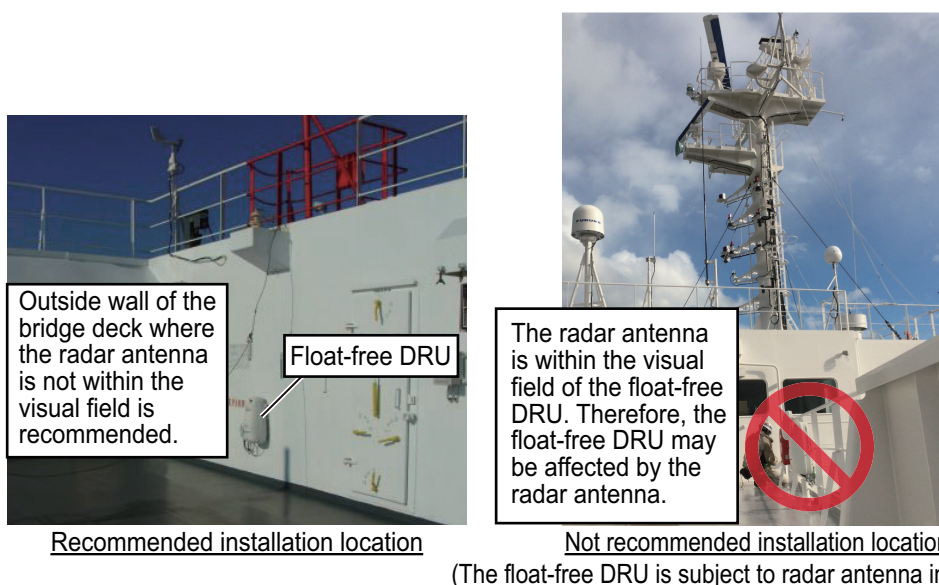
- Outdoor cables for float-free DRU and junction box should be short as possible. If long outdoor cables are required, prepare a steel pipe and run the cable through the pipe to protect the cables from interfering with other radio equipment.

- Before securing the float-free DRU, run a ping test at the planned installation location, to confirm that the float-free DRU is subject to interference from other equipment. For the ping test procedure, see the following procedure.

Ping test

Before securing the float-free DRU, do as follows to run the ping test. The ping test is required to check that the float-free DRU is not subject to interference from other equipment.

1. Set the IP address and subnet mask of the PC as follows:
   - IP address: 10.0.0.101
   - Subnet mask: 255.0.0.0

1-9

Note: The IP address of the float-free DRU is "10.0.0.150".

2. Check that all radars are in standby mode and other antennas are not transmitting any signal.

3. Connect the float-free DRU to the PC and power (24 VDC), referring the following figure.
    Note: The float-free DRU cable may be different, depending on the time of manufacture. Therefore, wire colors that connect to the #3 and #4 pins in the VR-7022F depend on the cable specifications.
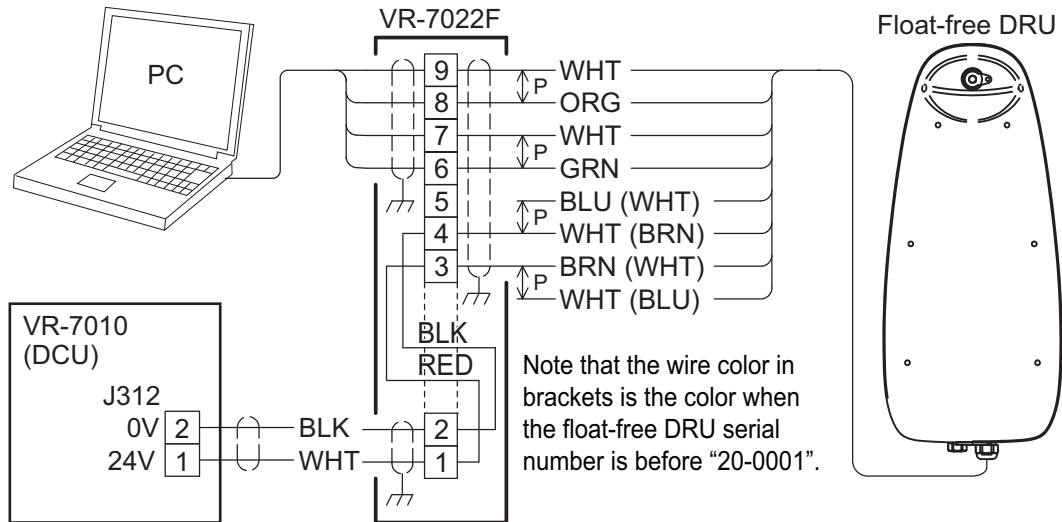
4. Turn the DCU on to supply the power to the float-free DRU.

5. Wait approx. 20 minutes until the float-free DRU starts up.

6. Activate the command prompt on the PC.

7. Enter "ping 10.0.0.150" on the command prompt.

8. Check the test result.
    When the response from the float-free DRU is received successfully and there is no package lost, go to the next step. If the response is not received or some packages are lost, check the connection and that the power is supplied to the float-free DRU, then retry the ping test. If the failure is not rectified, there is a problem in the LAN cable. Replace the LAN cable between the PC and junction box.

9. Enter "ping -l 45000 -n 40 -w 100 10.0.0.150" on the command prompt.
    This commands the PC to request 40 packages of 45 KB and simulates high data load.

10. Check the test result.
    When the response from the float-free DRU is received successfully and there is no package lost, go to the next step. If three packages or more are lost, there may be connection error. Check the connection and retry the ping test.

11. Turn on either one of the radio equipment and start transmitting (ex. S-band radar).

12. Enter "ping -l 45000 -n 40 -w 100 10.0.0.150" on the command prompt.

13. Check the test result.
    When the response from the float-free DRU is received successfully and there is no package lost, the float-free DRU is not interfered with the other equipment. If the response is not received or some packages are lost, the equipment turned on at step 11 is causing the communication error. Change the installation location and retry the ping test.

14. Repeat step 11 to step 13 to check that there is no interference with other equipment.

Mounting

1. Release the safety clip and remove the cover and capsule from the mounting bracket.

Safety clip

Cover
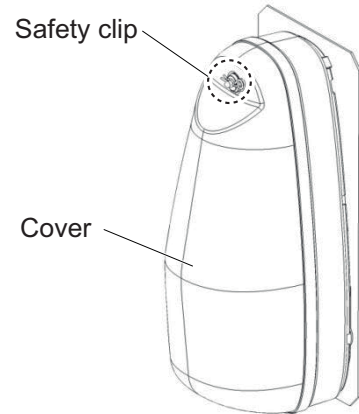
2. Fix the mounting bracket with the supplied installation materials.

Fixing holes (six places)

Detailed view

Flat washer
Spring washer
Socket head bolt
Hex. nut
Bracket
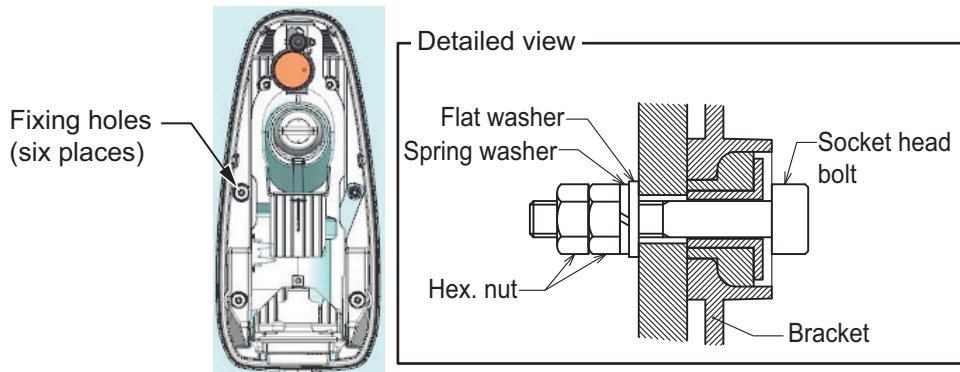
3. Apply the supplied silicone grease between the docking module and storage module, then reattach the capsule.
The silicone grease is supplied with the float-free DRU. The grease is marked as "Item no.88237 Tron-40VDR".
Note: Do not use the silicone grease other than the supplied silicone grease. The silicone grease is used for the maintenance of the float-free DRU, so make a space for storage around the DCU and store the grease on the vessel.

Storage module

Docking module

Approx. 5 cm

Approx. 5 cm

Squeeze the grease by approx. 5 cm from the tube.

Apply the grease evenly to the areas surrounded by the line.

1-11
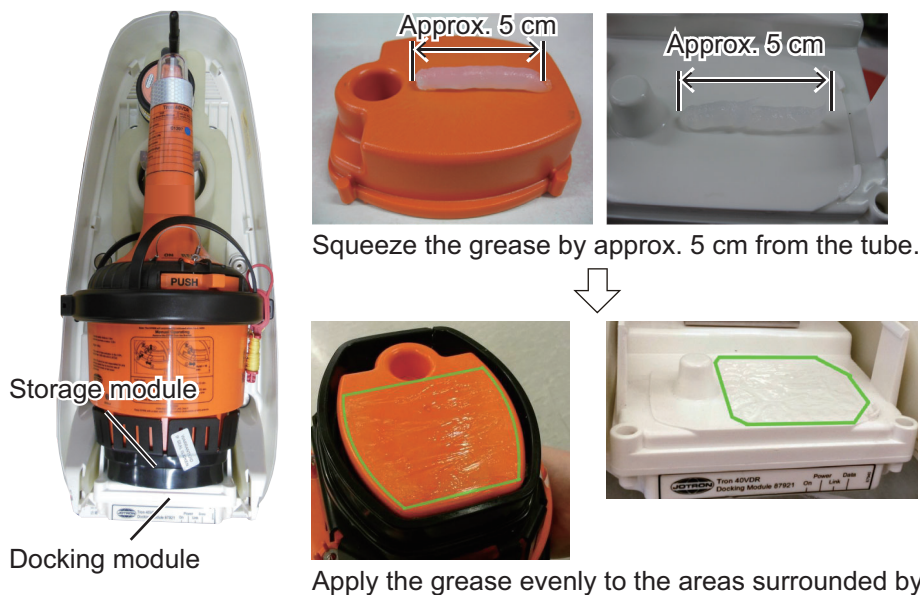
4. Confirm the following points;

   • There is no space or foreign material between the storage module and docking module.

   • The notch on the docking module is placed in the groove of the storage module.

OK

The notch on the docking module is placed in the groove of the storage module.

No space or foreign material between the storage module and docking module.

WRONG

The notch on the docking module is not placed in the groove of the storage module.

There is space between the storage module and docking module.
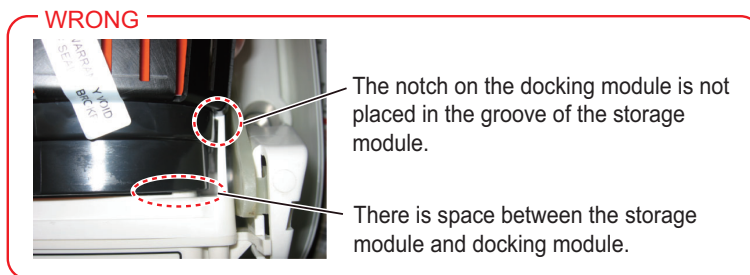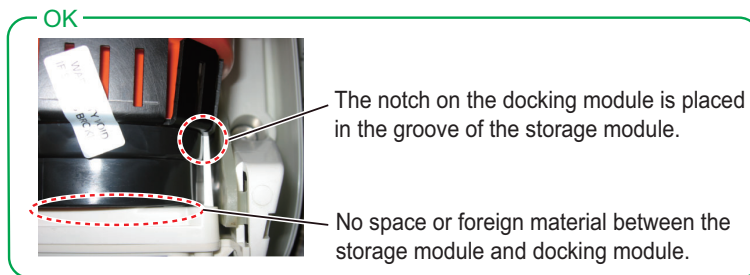
   • The antenna of the capsule is placed in the antenna holder correctly.

Antenna holder

5. Reattach the cover to the bracket correctly, referring to "How to attach the cover" on page 1-14.
   Note: If the cover is not attached correctly, the cover and capsule may drop out of the bracket due to wind and/or vibration.

Recording the expiration date of the battery and hydrostatic release unit

After installing the float-free DRU, confirm the expiration date of the battery (inside the float-free DRU (capsule)) and hydrostatic release unit, then record them to the table in section 3.2. The expiration date is recorded during coding (see page AP-31).

Capsule:
The battery is built-in.

Hydrostatic release unit

Bracket
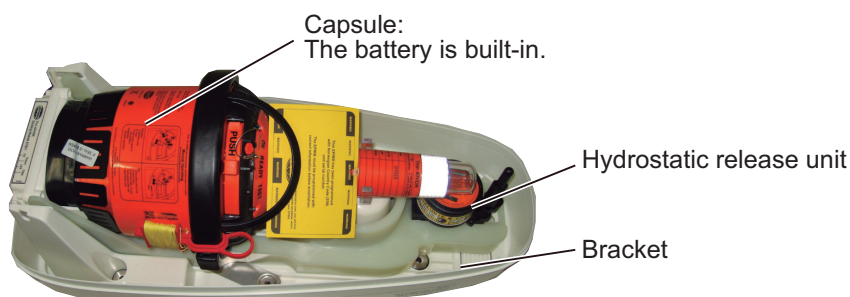
• **Battery in the float-free DRU**
The expiration date of the battery is indicated on the sticker attached to the side of the capsule. According to the expiration date, the numbers on the sticker are cut out

or filled with a permanent marker. For example, when the expiration date is April 2019, "2019" and "4" on the sticker are cut out or filled with a permanent marker. After confirming the expiration date, record it to the table in section 3.2.

Example: When the expiration date is April 2019.
The expiration date is indicated on this sticker.

"2019" is cut out or filled with a permanent marker.

"4" is cut out or filled with a permanent marker.
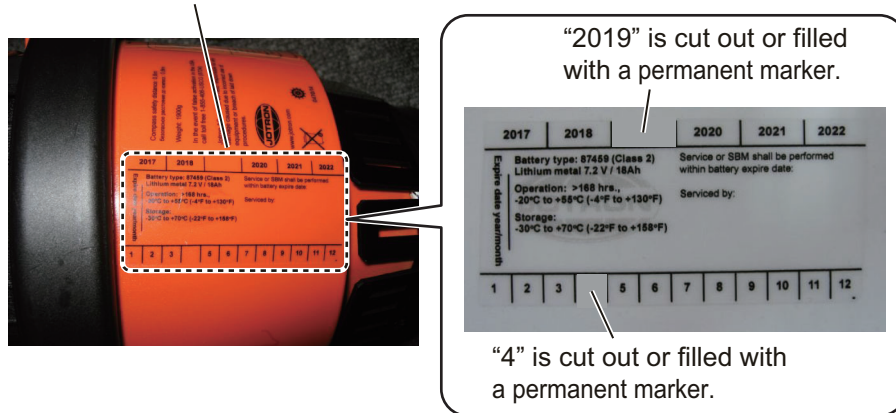
- **Hydrostatic release unit**
  The expiration date of the hydrostatic release unit is indicated on the sticker attached to the side of the unit or the sticker on the side of the bracket. For the sticker attached to the side of the unit, the numbers on the sticker are cut out or filled with a permanent marker according to the expiration date. For example, when the expiration date is June 2016, the numbers below the "2016" and "JUN" on the sticker are cut out or filled with a permanent marker.

Example: When the expiration date is June 2016.

The number below "2016" is cut out or filled with a permanent marker.

The number below "JUN" is cut out or filled with a permanent marker.

For the sticker attached to the side of the bracket, the expiration date is recorded in the field shown below.
After confirming the expiration date, record it to the table in section 3.2.
Note: If the expiration date is not recorded on the sticker, record it on the sticker, referring to the sticker attached to the side of the hydrostatic released unit.

The expiration date is inscribed here.

How to attach the cover

Attach the cover to the bracket as follows. If the cover is not attached correctly, the cover and capsule may drop out of the bracket due to wind and/or vibration.

1. Fit the notch on the cover with the ridge on the bracket.
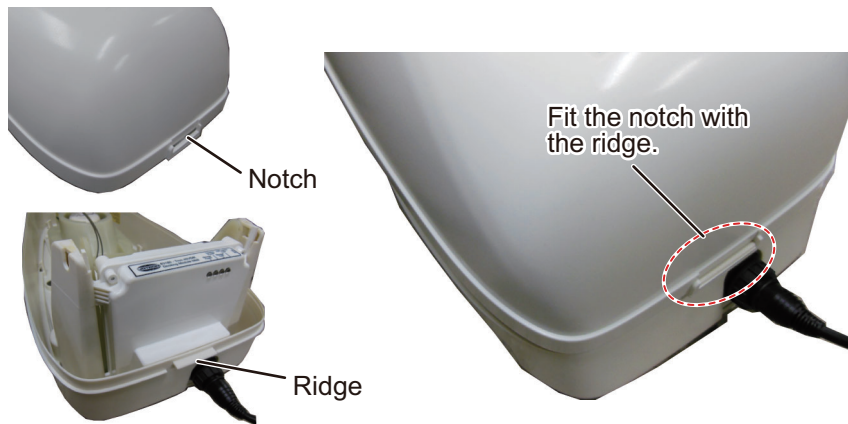
2. There is a groove alongside the cover that has to be aligned and fit around the tongue on the bracket. Align the tongue on the bracket and groove alongside the cover.
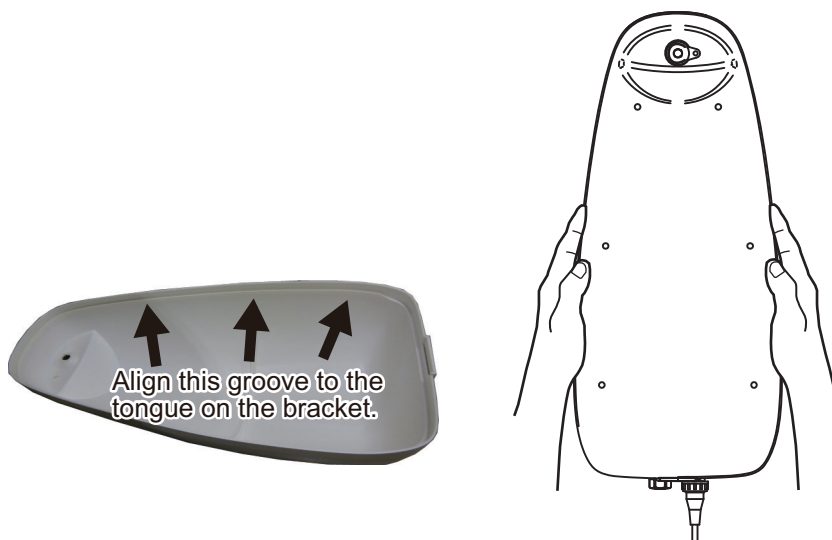
3. Attach the cap to the hole at the top of the cover, then insert the safety clip.
   Note: Make sure the safety clip is mounted correctly, referring to the following figure.
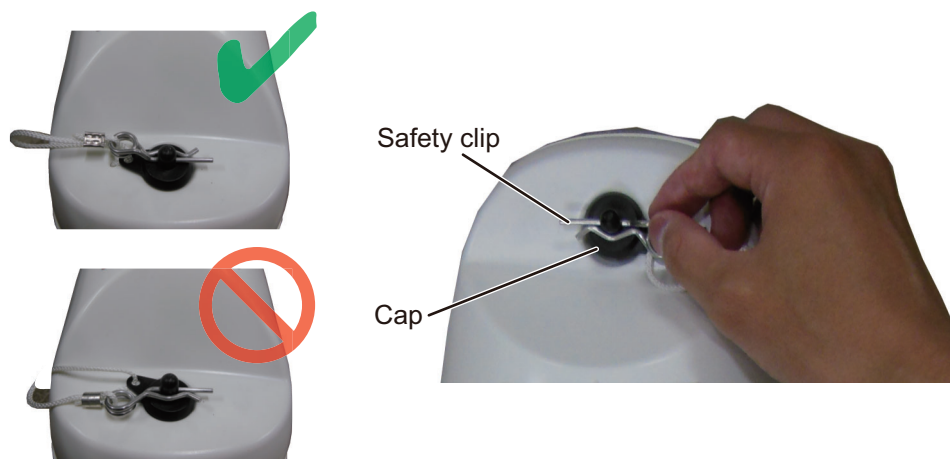
Attaching the SOS placard

The SOS placard is supplied with the float-free DRU. The SOS placard provides the procedure for how to remove the capsule from the float-free DRU manually. Attach the SOS placard to a conspicuous location, such as a bulkhead or handrail, near the float-free DRU.

SOS placard

1-15
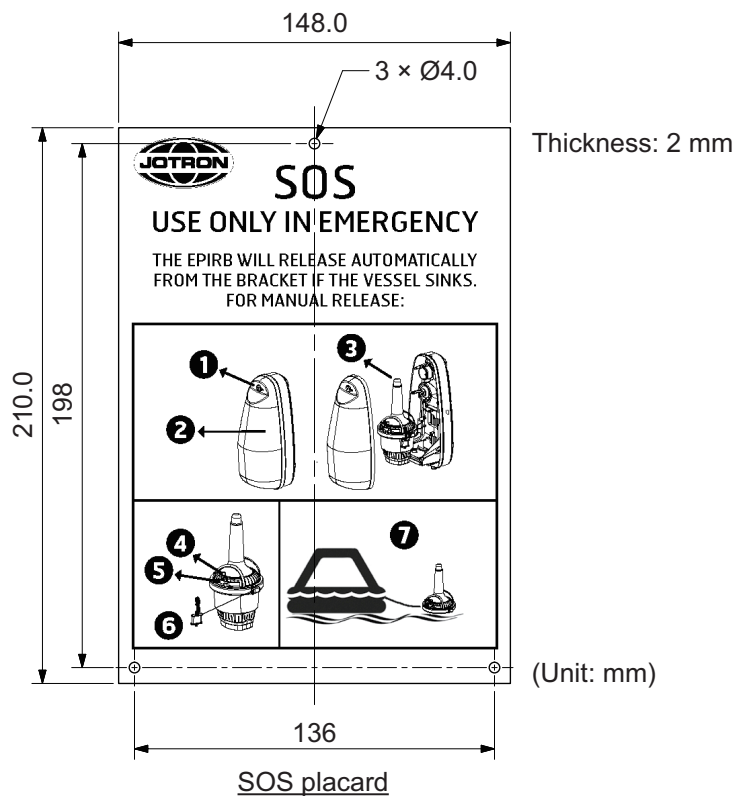
1.3 Junction Box VR-7022F

For configurations that use the VR-7020, the installation procedures outlined in this section and section 2.3 are not required.

Mounting considerations

Select a mounting location, keeping in mind the following points:

- Locate the unit away from heat sources.
- Select a location where the shock and vibration are minimal.
- Make the maintenance space shown in the outline drawing for maintenance and checking purpose.
- A magnetic compass will be affected if the unit is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass.
- Select a mounting location considering the length of the cables to be connected to this unit.
- After fastening the unit, apply the supplied adhesive (TB5211 (SP) 50G) to the fixing holes to prevent corrosion.

Mounting

Fasten the unit with two bolts (M8, local supply) on a bulkhead. The cable gland on the junction box can be horizontal or vertical.
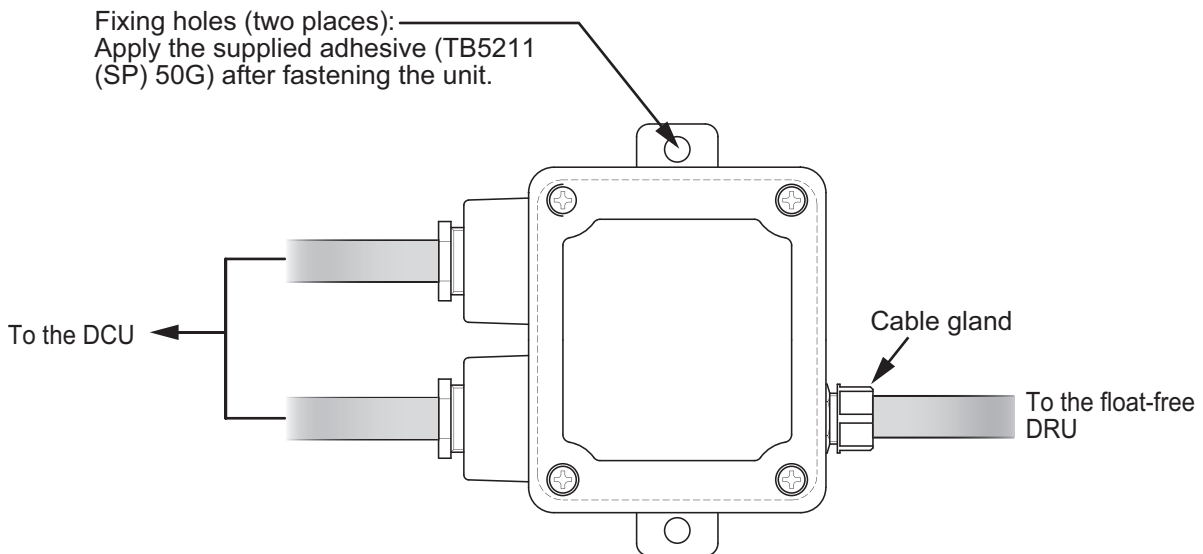
1.4   Remote Alarm Panel VR-7017

Mounting considerations

Select a mounting location, keeping in mind the following points:

- Locate the unit away from heat sources.
- Select a location where the shock and vibration are minimal.
- Locate the unit away from places subject to water splash and rain.
- Make the maintenance space shown in the outline drawing for maintenance and checking purpose.
- A magnetic compass will be affected if the unit is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass.
- Select a mounting location considering the length of the cable to be connected to this unit.

Mounting

The remote alarm panel is designed to be flush-mounted in a console.

1. Make a mounting hole in the mounting location and prepare four pilot holes, referring to the outline drawing at the back of this manual.

2. Remove two binding screws (M3x6) to detach the back cover of the unit.
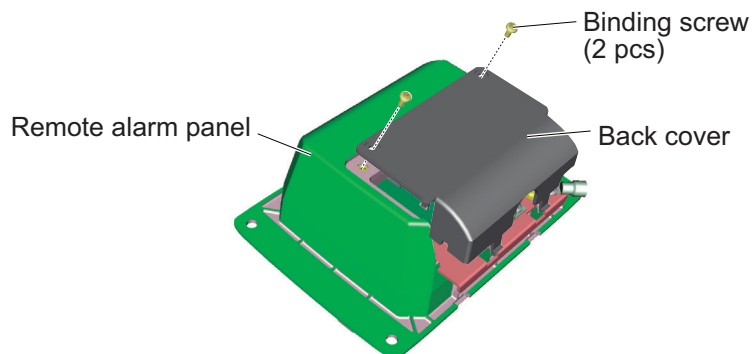
3. Pass the cable through the mounting hole.

4. Connect the cable to the unit. For details of connection and wiring, see section 2.4 and interconnection diagram at the back of this manual.

5. After wiring, reattach the back cover.
   Set the tabs on the back cover to the holes in the unit, then fix it with the screws.
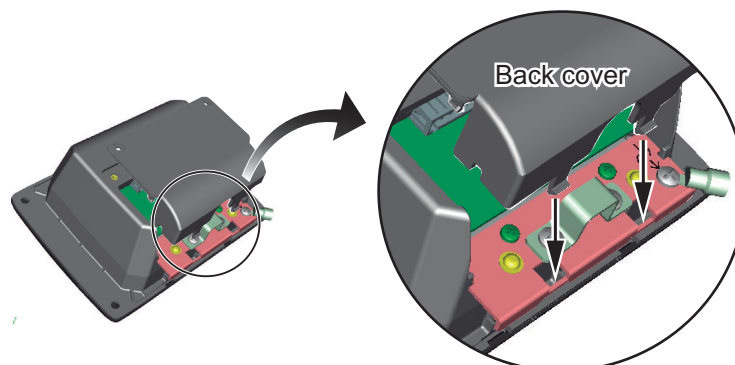
6.   Remove the front cover of the unit by hand.

Front cover

7.   Set the unit to the mounting hole, then fix the unit with four self-tapping screws (supplied).

Self-tapping screw
(4 pcs)

Bulkhead
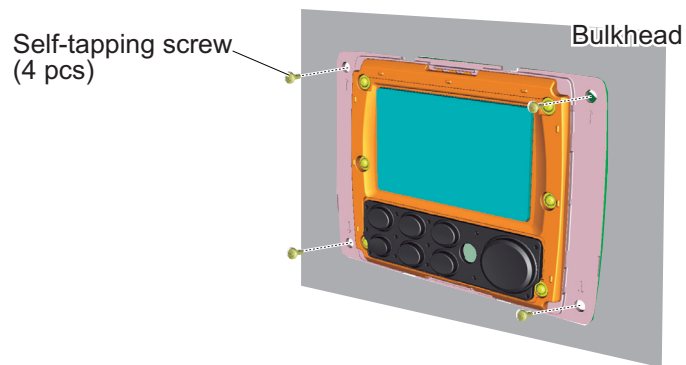
8.   Attach the front cover to the unit.

1.5   Microphone VR-7011

A maximum of eight microphones (waterproof, non-waterproof) can be connected to the DCU.
Audio coverage: Hemisphere area of 3.5 m approx. in radius

Mounting considerations

Select a mounting location, keeping in mind the following points:

- Locate the unit away from heat sources.
- Select a location where the shock and vibration are minimal.
- Locate the unit away from places subject to water splash and rain.
- Make the maintenance space shown in the outline drawing for maintenance and checking purpose.
- A magnetic compass will be affected if the unit is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass.
- Select a mounting location considering the length of the cable to be connected to this unit.
- Locate away from noise sources, such as fans, motors, and loudspeakers (1 m or more from air duct).
- Fix the cable to the bulkhead or overhead with a cable clamp, etc. to keep noise to a minimum.
- Microphones are mounted in the places shown below to pick up voice communications.
  - Center line conning
  - Bridge wings (if steering gear is installed)
  - Main radar
  - Chart table
  - Helmsstand
  - Radio room

Mounting

The microphone is designed to be flush-mounted.

1. Make a mounting hole in the mounting location and prepare four pilot holes, refer-
    ring to the outline drawing at the back of this manual.

2. Remove four binding screws to detach the back cover of the unit.
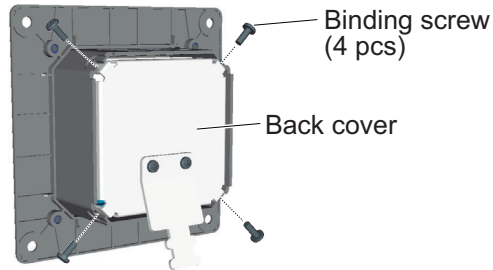
3. Pass the cable through the mounting hole made at step 1.

4. Connect the cable to the unit. For details of connection and wiring, section 2.5 and
    interconnection diagram at the back of this manual.

5. After wiring, attach the back cover to the unit with four binding screws.

6. Set the unit to the mounting hole, then fix the unit with four self-tapping screws
    (supplied).
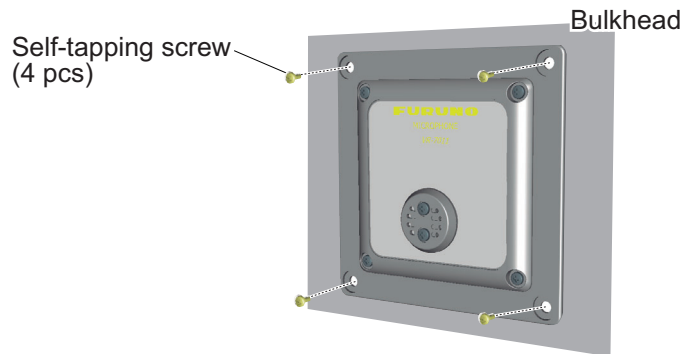
How to replace the VR-5011 with the VR-7011

The mounting holes of the Microphone VR-5011 (for previous models) can be reused when replacing the VR-5011 with the VR-7011, using the optional microphone replacement kit OP24-44.

1. Remove four screws to remove the fixing plate from the VR-7011.
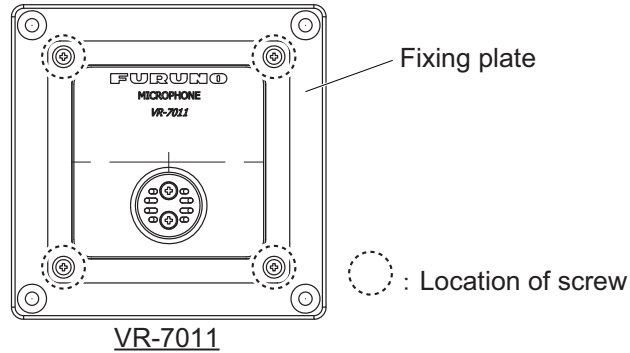
VR-7011

2. See the outline drawing below to resize the mounting hole for the VR-5011.
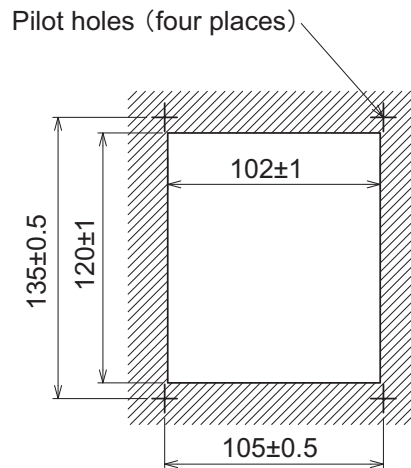
3. Fasten the front fixing panel (option) to the mounting hole with four self-tapping screws ($\phi4\times16$).
   The screws to fasten the front fixing panel are supplied with the VR-7011.

4. Fasten the VR-7011 to the front fixing panel with the screws removed at step 1.

1-21
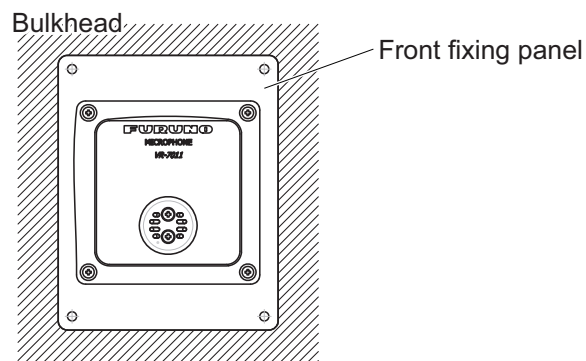
1.6 Waterproof Microphone VR-7012W

A maximum of eight microphones (waterproof, non-waterproof) can be connected to the DCU.
Audio coverage: Hemisphere area of 3.5 m approx. in radius

Mounting considerations

Select a mounting location, keeping in mind the following points:

- Locate the unit away from heat sources.
- Select a location where the shock and vibration are minimal.
- Make the maintenance space shown in the outline drawing for maintenance and checking purpose.
- A magnetic compass will be affected if the unit is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass.
- Select a mounting location considering the length of the cable to be connected to this unit.
- Locate away from noise sources, such as fans, motors, and loudspeakers (1 m or more from air duct).
- Fasten the cable to the bulkhead or overhead with a cable clamp, etc. to keep noise to a minimum.
- Locate the unit away from places subject to radar radio wave of a radar antenna. The noise may be added to the recording data because of the interference from the radio wave of a radar antenna.

Mounting

According to the shipment time, the cable entrance may be the super gland or SC lock.

Mounting instruction and installation materials depend on the figure of the cable entrance.

When the cable entrance is the SC lock

When the cable entrance is the super gland

SC lock (gray)

Super gland (black)
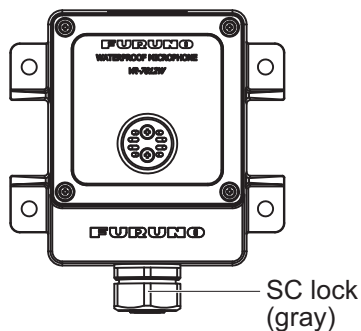
Supplied installation materials:
- Self-tapping screws (4 pcs)
- Sealing insert (1 pcs)
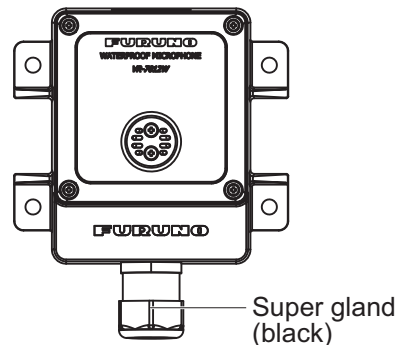
Supplied installation materials:
- Self-tapping screws (4 pcs)
- Cable tie (1 pcs)

When the cable entrance is the SC lock

1. Remove four binding screws to detach the front panel from the waterproof cover.
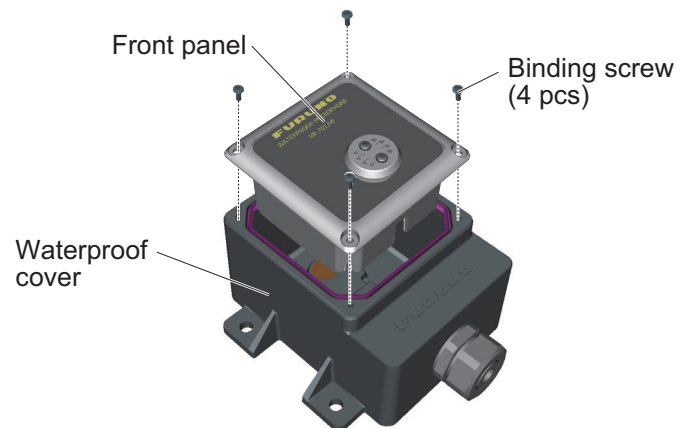
2. Fasten the waterproof cover to the mounting location with four self-tapping screws (supplied).
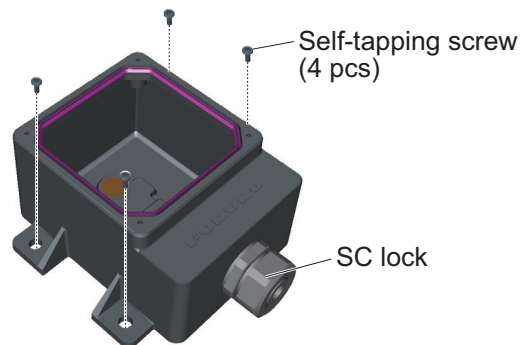
3. Remove the nut and sealing insert from the SC lock.
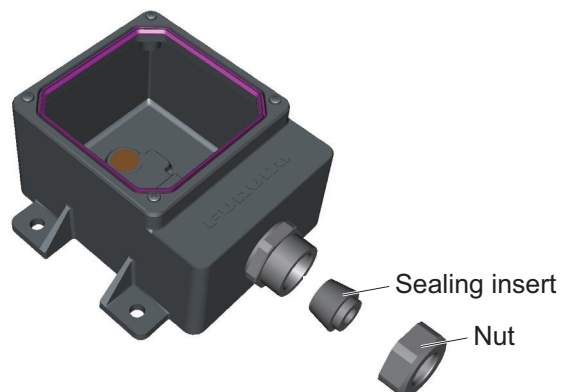
4. Fabricate the cable.
   The SC lock can clamp the cable at the sheath or cable jacket. Select where to clamp the cable, then fabricate the cable.
   The method of fabrication changes with the clamping location.

When the sheath is fixed with the SC lock

Armor:
Cut same length as the cable jacket.
Sheath
Aluminum tape (Cut the drain wire.)
Cable jacket
→|6|←
← 150 or more →|5| ← 170 →

When the cable jacket is fixed with the SC lock

Armor   Sheath   Aluminum tape (Cut the drain wire.)
Cable jacket
→|6|←
← 30 →|5|← 170 →
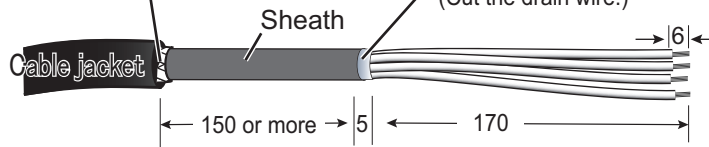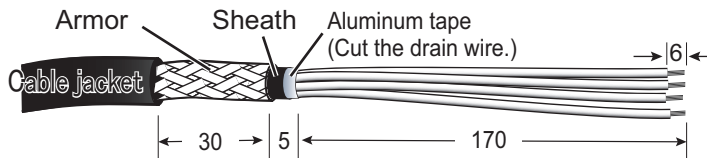
5. Pass the sealing insert and nut onto the cable, then pass the cable through the cable entrance.
   According to the cable clamp location, select the sealing insert.

   • When the sheath is fixed with the SC lock:
     Use the sealing insert (type: SC-4M) removed at step 3. Discard the sealing nut supplied with the installation materials.

   • When the cable jacket is fixed with the SC lock:
     Use the sealing insert (type: SC-4B) supplied with the installation materials. Discard the sealing nut removed at step 3.

6. Wrap the vinyl tape around the cable (see figure below).

When the sheath is fixed with the SC lock
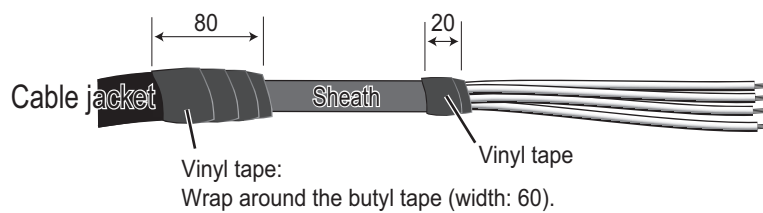
80
20
Cable jacket
Sheath
Vinyl tape:
Wrap around the butyl tape (width: 60).
Vinyl tape

When the cable jacket is fixed with the SC lock

Armor
20
20
Cable jacket
Vinyl tape

7. Connect the cable to the unit. For details, see section 2.6 and the interconnection diagram at the back of this manual.

8. After wiring, tighten the nut according to the information in the table below.
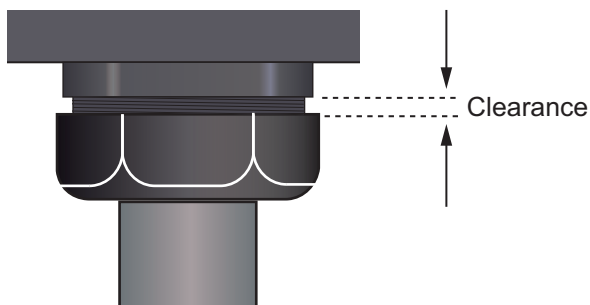
Clamp location	Clearance	Torque
Cable jacket	2.0 mm	2.0 - 2.5 Nm
Sheath	1.5 mm	2.0 - 2.5 Nm

9. Fasten the front panel to the waterproof cover with the four binding screws removed at step 1.

   Note 1: Before fixing the front panel, make sure the waterproofing gasket is correctly seated in the groove in the waterproof cover.

   Note 2: Take care not to bend or pinch the cable.

When the cable entrance is the super gland

1. Remove four binding screws to detach the front panel from the waterproof cover.
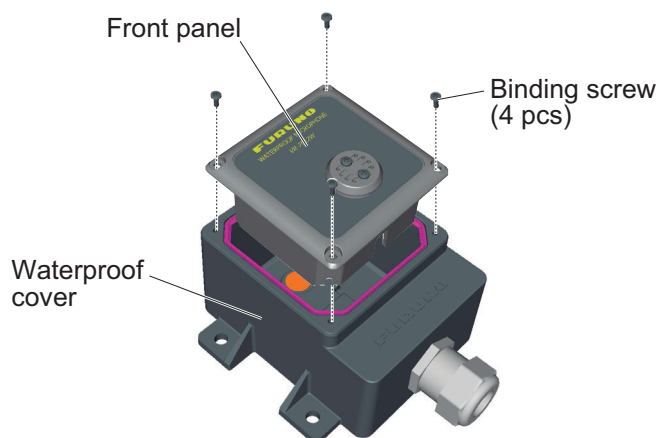
2. Fasten the waterproof cover to the mounting location with four self-tapping screws (supplied).
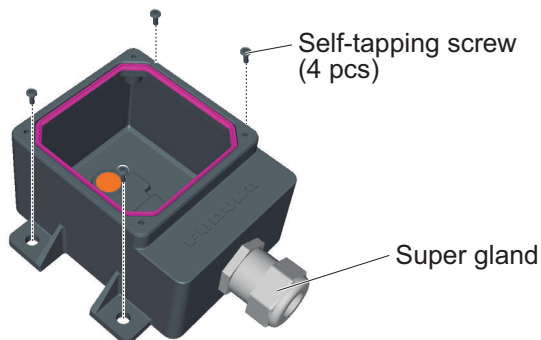
3. Remove the nut from the super gland.

1-25

4. Fabricate the cable.

Armor   Sheath   Aluminum tape
(Cut the drain wire.)

Cable jacket

← 30 → 5 ← 170 → →|6|←
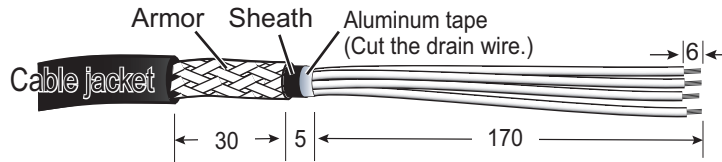
5. Pass the cable through the nut and cable entrance.
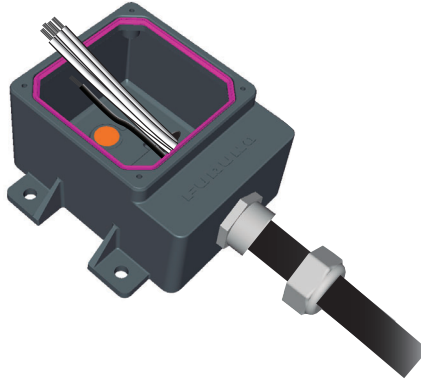
6. Wrap the vinyl tape and cable tie around the cable (see the figure below).
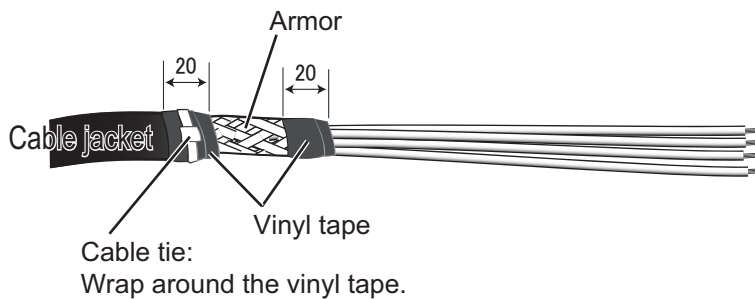
Armor

20   20

Cable jacket

Vinyl tape

Cable tie:
Wrap around the vinyl tape.

7. Connect the cable to the unit. For details, see section 2.6 and the interconnection diagram at the back of this manual.

8. After wiring, fasten the nut so the clearance between it and the gland is 3 mm or less (see figure below).
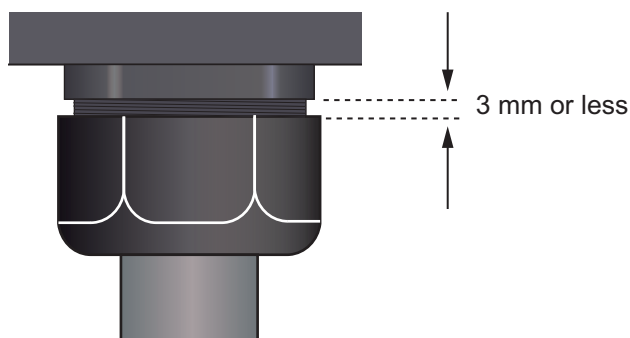
3 mm or less

9. Fasten the front panel to the waterproof cover with the four binding screws removed at step 1.
   Note 1: Before fixing the front panel, make sure the waterproofing gasket is correctly seated in the groove in the waterproof cover.
   Note 2: Take care not to bend or pinch the cable.

1.7 Video LAN Converter IF-7100

## Mounting considerations

Select a mounting location, keeping in mind the following points:

- Locate the unit away from heat sources.
- Select a location where the shock and vibration are minimal.
- Locate the unit away from places subject to water splash and rain.
- Make the maintenance space shown in the outline drawing for maintenance and checking purpose.
- A magnetic compass will be affected if the unit is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass.
- Select a mounting location considering the length of the cables to be connected to this unit.
- For the bulkhead mounting, the cable entrance of the unit should face downward.
- Select the cable length of the DVI cable considering the resolution of the radar/EC-DIS display.
  SXGA or below: less than 10 m
  UXGA or higher: less than 5 m
- Use the cable shown below to input the DVI-D or RGB signal.
  - DVI-D: DVI-D/D S-LINK 5M/10M
  - RGB: BNCX5-DSUB15-L400 and CP24-01200/01210 (see section 2.7.2), or 3COX-2P-6C 5M/10M

Mounting

The video LAN converter can be mounted on the floor, or on a bulkhead.

Fasten the unit with four hex. bolts (M8x25), spring washer, flat washer, and hex. nut. The installation materials are supplied with the IF-7100.
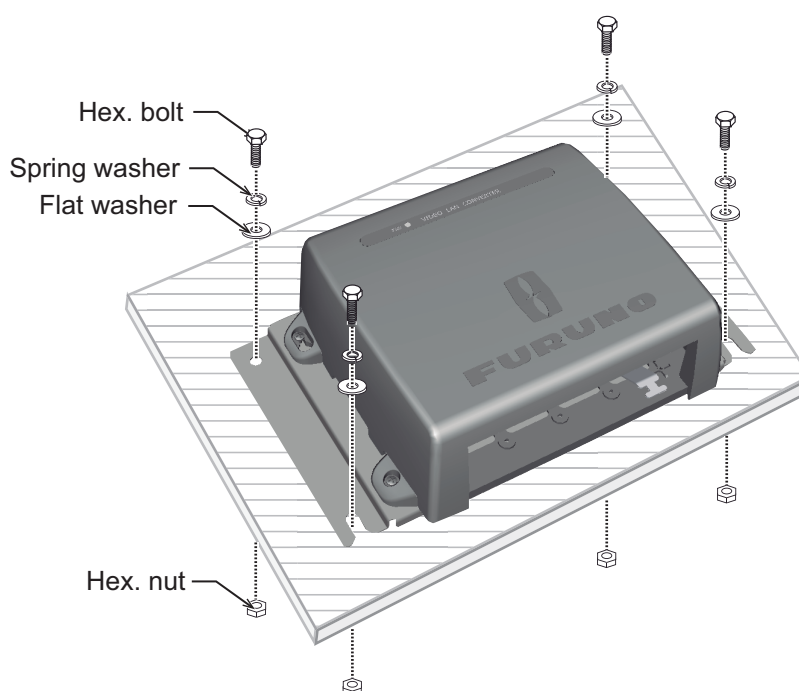
1.8 Sensor Adapter MC-3000S/3010A/3020D

Mounting considerations

Select a mounting location, keeping in mind the following points:

• Locate the unit away from heat sources.

• Select a location where the shock and vibration are minimal.

• Locate the unit away from places subject to water splash and rain.

• Make the maintenance space shown in the outline drawing for maintenance and checking purpose.

• A magnetic compass will be affected if the unit is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass.

• Select a mounting location considering the length of the cables to be connected to this unit.

• Select the mounting location considering the numbers of the sensor adapters connected.
A maximum of eight MC-3000S can be connected to the DCU through the HUB-100. The MC-3000S can connect a maximum of ten additional units in combination with MC-3010A and MC-3020D, using the MC1.5-W cables. However, note that five MC-3010A can be connected.

• Select the mounting location so that the length of cables among the sensor adapters (MC-3000S, 3010A, and 3020D) is less than 6 m. If the total length of the MC1.5-W is more than 6 m, the equipment may not work properly.

Mounting

1. Unfasten four binding screws to remove the cover from the sensor adapter.

2. Fasten four self-tapping screws (ϕ4x20, supplied) to fix the sensor adapter.

3. Reattach the cover.
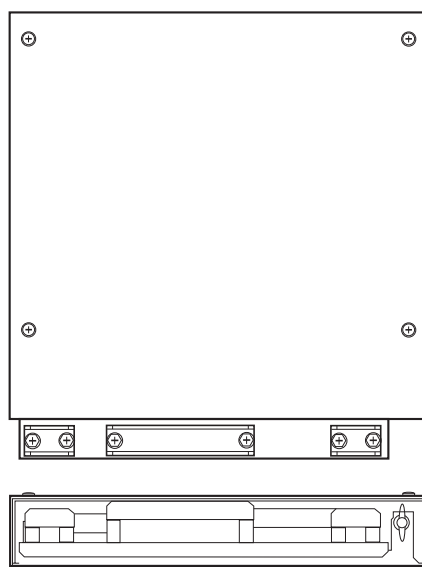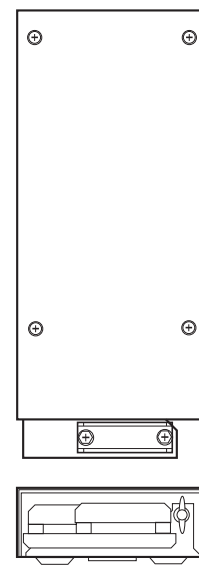
MC-3000S   MC-3010A/3020D
                                (Option)

1.9   Intelligent HUB HUB-3000

Use the optional Intelligent Hub HUB-3000 to connect gateway network equipment. This network cannot be connected with the LAN network on board. Also, to connect with the non-FURUNO system or multiple Live Player V5 (PCs) use this unit.

Mounting considerations

Select a mounting location, keeping in mind the following points:

- Locate the unit away from heat sources.
- Select a location where the shock and vibration are minimal.
- Locate the unit away from places subject to water splash and rain.
- Make the maintenance space shown in the outline drawing for maintenance and checking purpose.
- A magnetic compass will be affected if the unit is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass.
- Select a mounting location considering the length of the cables to be connected to this unit.

Mounting

1. Use two binding screws (M3x6, supplied) to attach the cable clamp (supplied) to the bottom of the HUB-3000.

Binding screw
(M3x6, 2 pcs)

Cable clamp
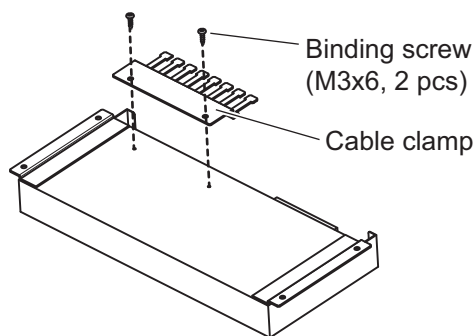
HUB-3000, bottom view

2. Fasten four self-tapping screws (4x20, supplied) to fix the unit.

: Screw holes
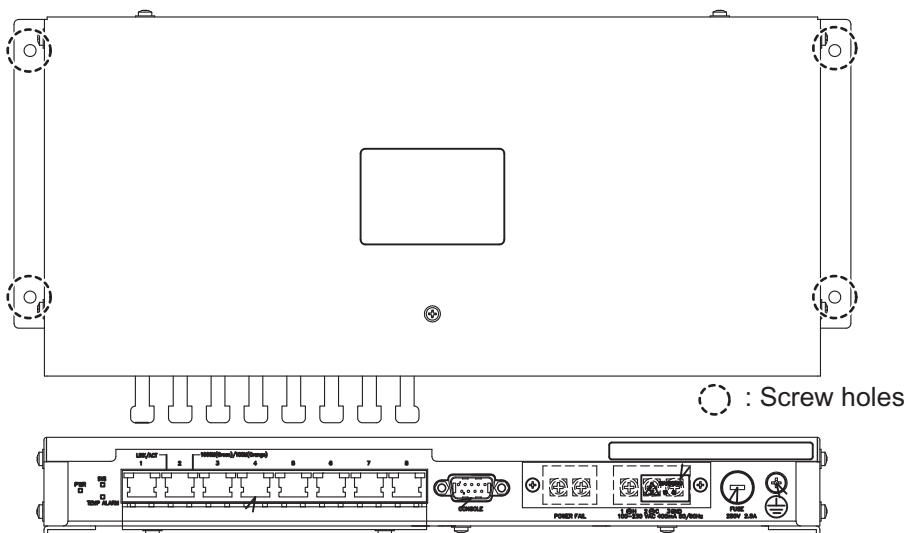
1.10   Power Supply Unit PSU-011

Mounting considerations

Select a mounting location, keeping in mind the following points:

*   Locate the unit away from heat sources.
*   Select a location where the shock and vibration are minimal.
*   Locate the unit away from places subject to water splash and rain.
*   Make the maintenance space shown in the outline drawing for maintenance and checking purpose.
*   A magnetic compass will be affected if the unit is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass.
*   Select a mounting location considering the length of the cables to be connected to this unit.

Mounting

The power supply unit PSU-011 is required for the Russian vessel. Fasten the unit to the mounting location with four self-tapping screws ($\phi 5 \times 20$, supplied).
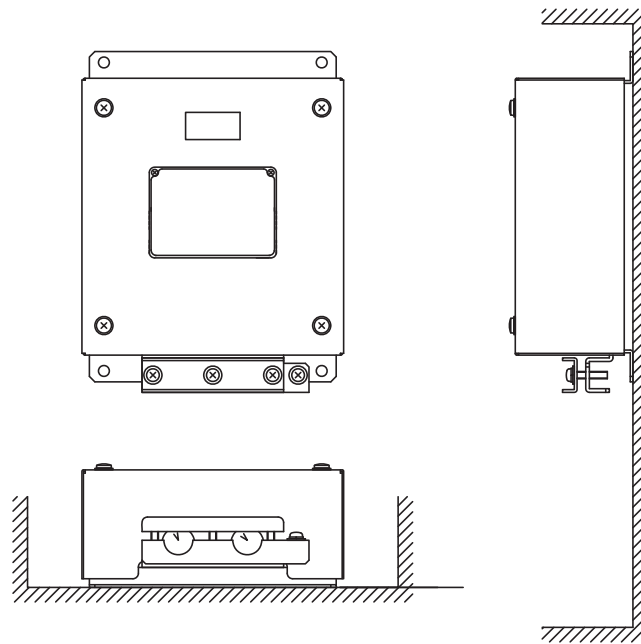
1.11 Switching HUB HUB-100 (Option)

Use the optional Switching HUB HUB-100 to connect sensor networks. This network cannot be connected to the LAN network on board. Note that a commercial PC cannot be connected in this network, other than for the maintenance.

For the mounting procedures, see the operator's manual for HUB-100 (Pub. No.OMC-35191).

Mounting considerations

Select a mounting location, keeping in mind the following points:

*   Locate the unit away from heat sources.
*   Select a location where the shock and vibration are minimal.
*   Locate the unit away from places subject to water splash and rain.
*   Make the maintenance space shown in the outline drawing for maintenance and checking purpose.
*   A magnetic compass will be affected if the unit is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass.
*   Select a mounting location considering the length of the cables to be connected to this unit.

1.12 Junction Box IF-8540 (Option)

A maximum of six sensor adapters can be installed in the junction box (MC-3000S included). The units installed in the junction box change depending on the configuration purchased.

For the mounting and wiring procedures, see the Installation Instruction supplied with the IF-8540 (Pub. No.C42-01504).

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2. WIRING

The illustration on this page shows the general connection of the VR-7000/7000S. For detailed information, see the interconnection diagram. Many of the cables mentioned are JIS (Japanese Industrial Standards) cables. If not available locally, use the equivalent. See the cable guide in the Appendix for how to select equivalent cables.
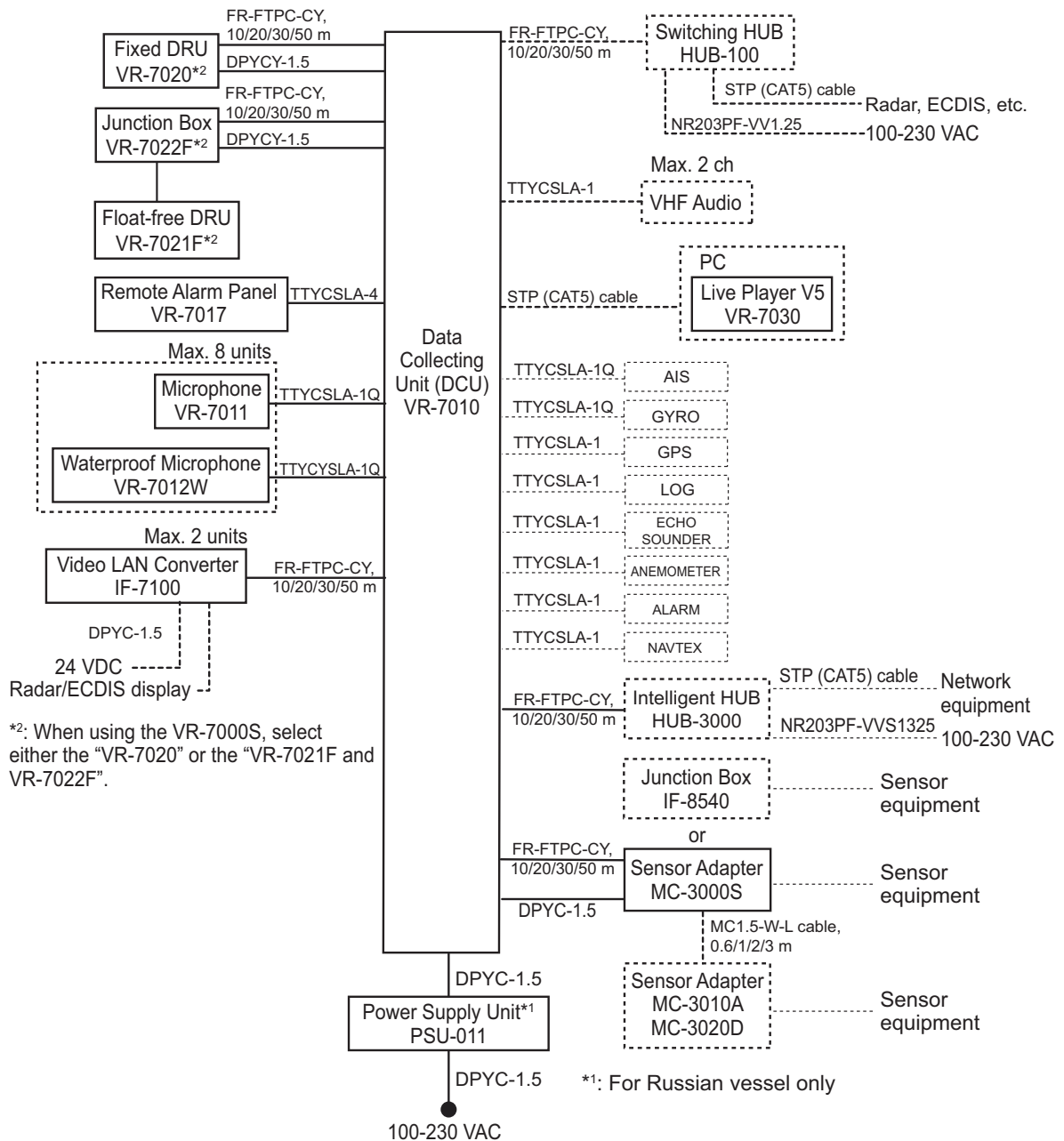
2.1 Data Collecting Unit VR-7010

Note: The DCU can record a maximum of five channels of video data, within the stipulated time. A maximum of seven channels of video data can be input, however six or more channels can not be recorded within the stipulated time. Note that the maximum record channel changes according to a resolution and video format. For details, see VR-7000/7000S operator's manual (OME-44850).

2.1.1 Location of connectors and terminals

To make connections, unfasten seven binding screws, then detach the cover from the DCU.

Note: Turn OFF the ship's mains before making connections.

J35* (VGA)   From left: J41, J42

From top:
J39* (USB)
J38* (USB)

J31* (COM1)

From left:
J21 (LAN9)
J22 (LAN10)
J23 (LAN11)
J24 (LAN12)
J25 (LAN13)
J26 (LAN14)

From left:
J11 (LAN1)
J12 (LAN2)
J13 (LAN3)
J14 (LAN4)
J15 (LAN5)
J16 (LAN6)

Connectors for
serial input
From top:
J303 (CH3)
J304 (CH4)
J305 (CH5)
J306 (CH6)
J307 (CH7)
J308 (CH8)

Connectors for serial input
From left:
J301 (CH1)
J302 (CH2)

Power control panel
See figure below.

From top:
J311 (DRU POWER)
J312 (FLOAT DRU POWER)
J313 (SENSOR ADAPTER POWER)

J1 (AC IN)

From left:
J202 (VHF2)
J201 (VHF1)
J204 (MIC2)
J203 (MIC1)
J206 (MIC4)
J205 (MIC3)
J208 (MIC6)
J207 (MIC5)
J210 (MIC8)
J209 (MIC7)

From top:
J309 (RAP)
J310 (AMS)

Battery:
Confirm that the date
on the label here is
within 18 months.

*: Connector for the maintenance

: Occupied for the internal wiring

J501 (DATA)

J502 (DATA)

When your CPU board is "ADP-586-31"

J35* (VGA)

From top:
J32* (COM2)
J31* (COM1)

From top:
J39* (USB)
J38* (USB)

AC switch

Battery switch
Fuse for AC power
Fuse for battery

Power control panel

Cable clamp location

Fasten each cables connected to the DCU to the location shown below. Clamp the armor of the cable. When the armor of the cable is covered with vinyl (cable jacket), remove it so that the armor lies in the cable clamp.

Attach the cable band (supplied) to each cable to be connected to the DCU and record sensor name/equipment name on each cable band.

Note: If you mislay a cable, the cable clamp may not keep the cable securely.
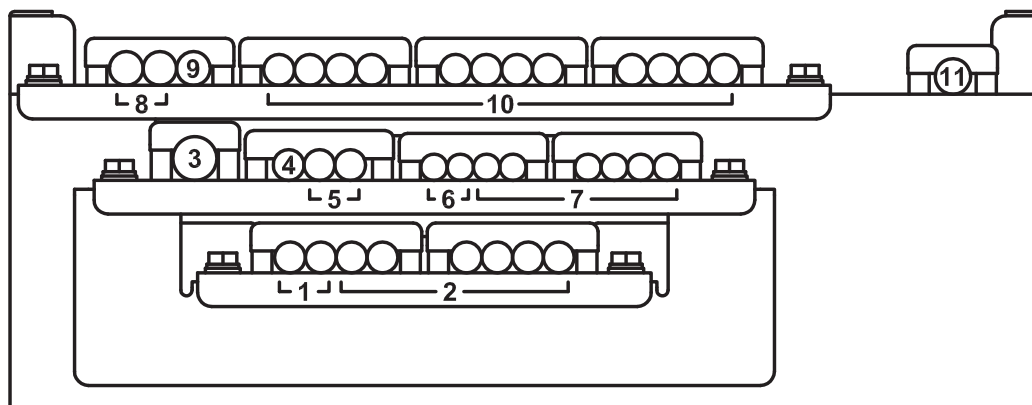
Clamp location No.	Cable	Connector No.	Signal/Unit to be connected
1	TTYCYSLA-1Q, TTYCSLA-1Q	J203-J210 (MIC1-MIC8)	Microphone, Waterproof microphone
2			
3	TTYCSLA-4	J309 (RAP)	Remote alarm panel
4	TTYCSLA-1Q	J310 (AMS)	AMS (Serial)
5	TTYCSLA-1Q	J301-J302 (CH1-CH2)	Serial input (IEC61162-1/2)
6	TTYCSLA-1	J201-J202 (VHF1-VHF2)	VHF audio, 2 channels
7	TTYCSLA-1	J303-J308 (CH3-CH8)	Serial input (IEC61162-1)
8	DPYCY-1.5*1	J311 (DRU POWER)	Output 24VDC for the fixed DRU
		J312 (FLOAT DRU POWER)	Output 24VDC for the float-free DRU
9	DPYC-1.5*1	J313 (SENSOR ADAPTER POWER)	Output 24VDC for the sensor adapter or junction box (IF-8540)
10	FR-FTPC-CY, MPYC-12*2	J11-J16 (LAN1-LAN6)	Radar, ECDIS, sensor (IEC61162-450), sensor adapter, RMS, junction box (IF-8540)
		J21-J24 (LAN9-LAN12)	Float-free DRU, video LAN converter
		J25-J25 (LAN13-LAN14)	Fixed DRU
11	DPYC-1.5*1	J1 (AC IN)	100-230 VAC

*1: Attach the rod terminal to the signal cores. For details, see "ROD TERMINALS" on page AP-7.

*2: For the MPYC-12 cable, connect to the J310 (AMS) port for the connection of the contact signal. Clamp the MPYC-12 cable to the same position as the LAN cables (clamp location no. 10).

Notice for the connection with the remote alarm panel

When connecting the DCU to the remote alarm panel (RAP), do as follows to prevent the malfunction due to the difference of ground voltages between the DCU and RAP.

1. Connect the ground terminal of the DCU and remote alarm panel to the ship's ground.
2. Connect the serial cable to either J309 port of the DCU or J101 port of the remote alarm panel.
3. For the port not connected at step 2, insert the signal core to **# 5 pin (GND) only**, then connect the connector.
4. Disconnect the connector connected at step 3, then insert other signal cores and reconnect the connector.

Crimp-on lug for the drain wire

Two crimp-on lugs are preattached in the DCU (see the figure below). Attach the crimp-on lug to the drain wire of the cable for the AMS (serial) and remote alarm panel, then connect the lug to its original location.
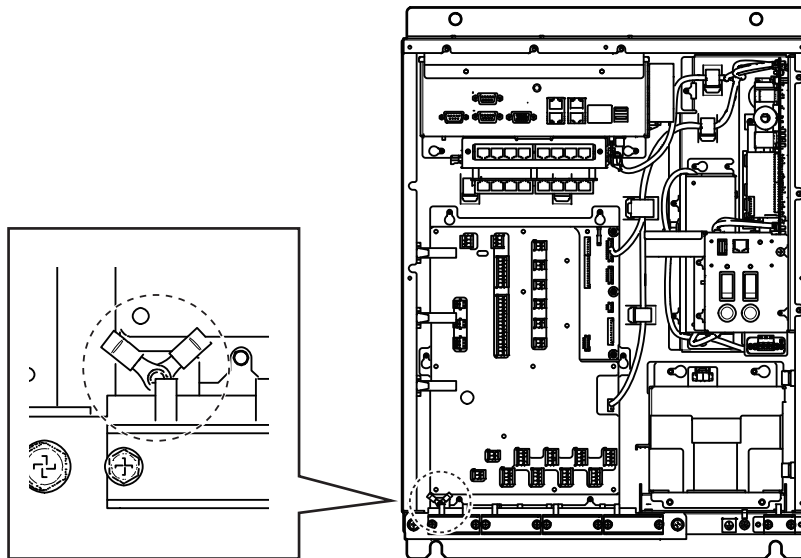
2.1.2 Power supply

Connect the AC power 100-230 VAC to J1 of the DCU through the emergency switch board (ESB). For the connection, use the DPYC-1.5 cable. The DCU is compatible with 100-230 VAC input (universal power supply), so it is not necessary to change the tap setting on the switchboard.
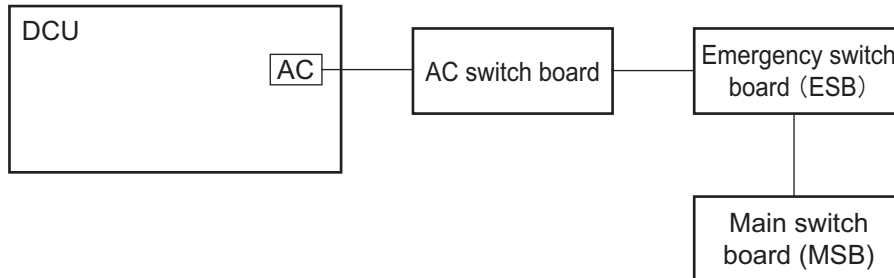
2.1.3 Ground connection

To ground the DCU, use the crimp-on lug preattached to the DCU (see figure below). Attach the crimp-on lug to the ground wire (IV-2sq.), then connect the lug as shown below.

Attach the crimp-on lug to the ground wire, then fix here.
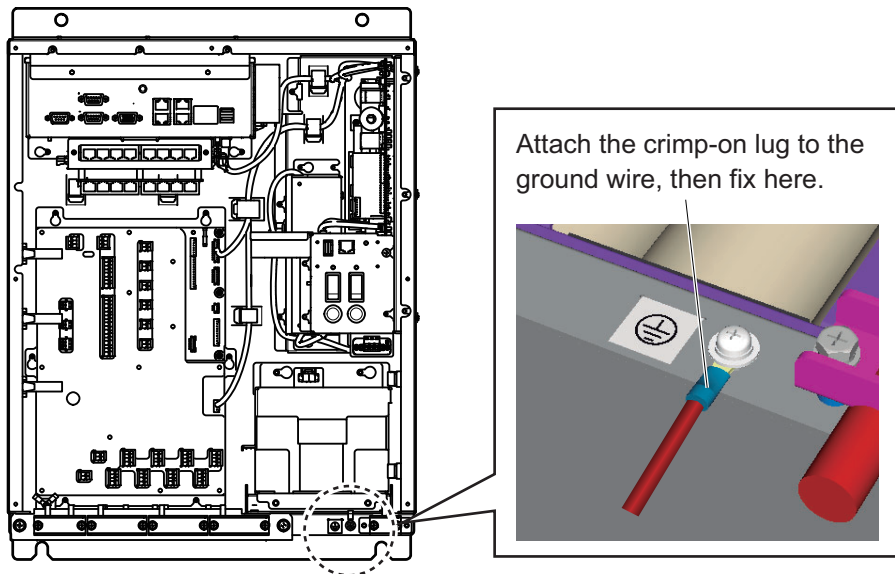
2.1.4 Changing internal LAN connection (for video signal input with IEC61162-450 format)

The J502 port (DATA) is connected to the J17 port internally in default. When you input the radar/ECDIS video signal with the IEC61162-450 (LAN) format, disconnect the LAN cable from the J17 port and connect it to the J26 port.

Note: To record chart information, video signal input from the ECDIS is required.
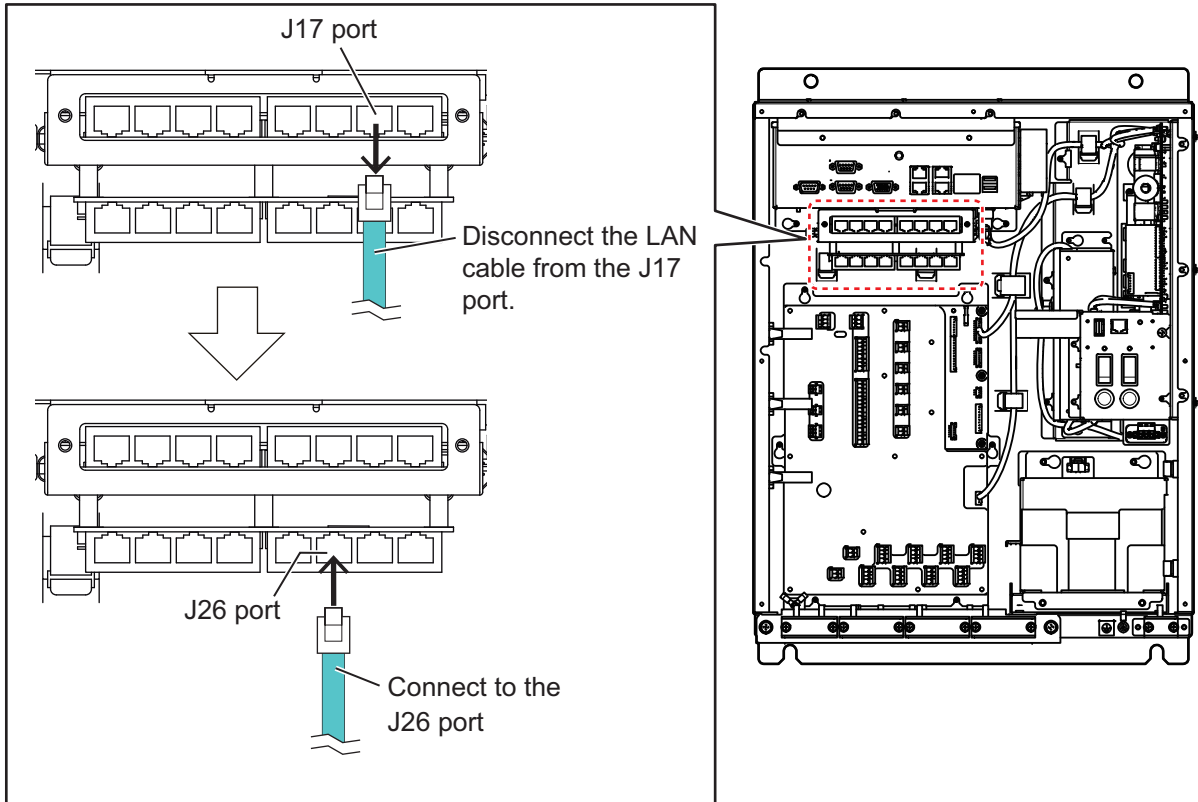
According to the access point (J17 or J26), the IP address for the VDR and PC changes.

Access point for J502	IP address for VDR	IP address for PC
J17 (Default)	172.31.16.200	172.31.16.201 or 172.31.16.202
J26	10.0.0.100	10.0.0.101 or 10.0.0.102

2.1.5   Alarm Monitoring System

Connect the AMS (Alarm Monitoring System) to J310 of the DCU. The connector J310 can output/input signals shown below.

Output
- System failure
- Power failure
- Local ACK

Input
- Remote ACK
- Buzzer stop

Connector J310

Pin #	Signal name	Input/Output	Cable
1	RD_H_AMS	Input	TTYCSLA-4
2	RD_C_AMS		
3	TD_A_AMS	Output	
4	TD_B_AMS		
5	GND	-	No connection
6	SYS_FAIL+	Output	MPYC-12
7	SYS_FAIL-		
8	POWER_FAIL+	Output	
9	POWER_FAIL-		
10	LOCAL_ACK+	Output	
11	LOCAL_ACK-		
12	REMOTE_ACK+	Input	
13	REMOTE_ACK-		
14	BUZZER_STOP+	Input	
15	BUZZER_STOP-		
16	NC	-	No connection

System failure (output)

The VR-7000/7000S notifies the AMS that an alert has been generated. The system failure signal is output as normally closed (NC).

2-7
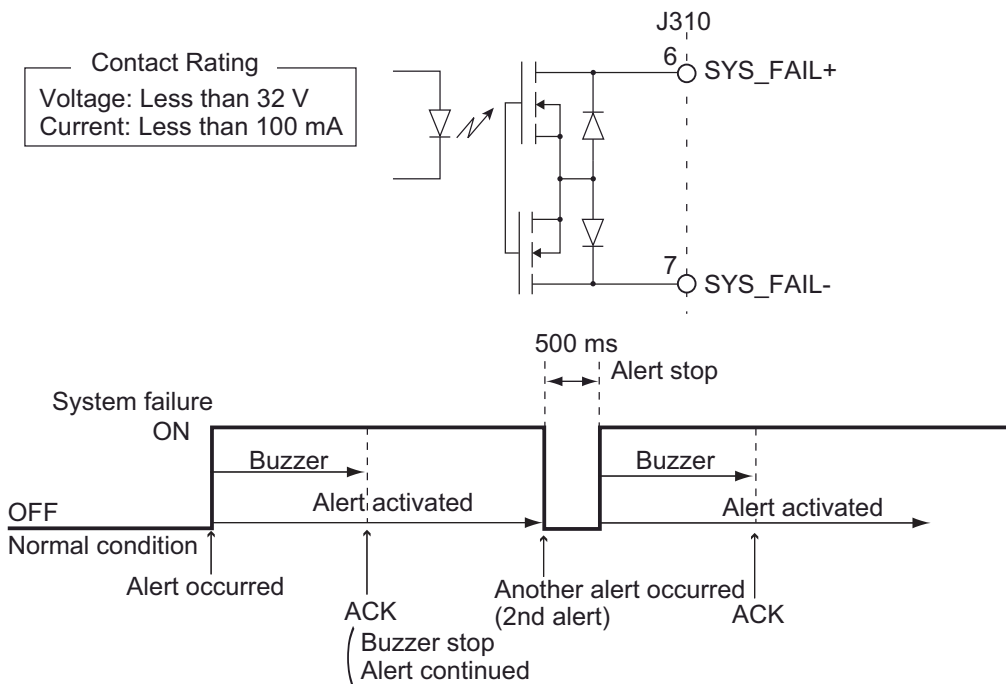
Power failure (output)

The VR-7000/7000S notifies the AMS of power failure. The power failure signal is output as normally close (NC).

- Supplied by AC power: Close
- Power off or supplied by the battery: Open
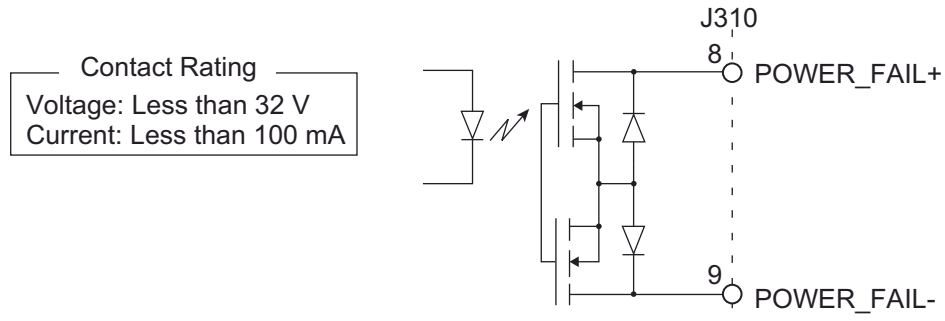
Local ACK (output)

The VR-7000/7000S notifies the AMS that it has acknowledged an alarm. The alarm acknowledge signal is output as normally open (NO).
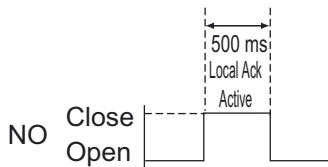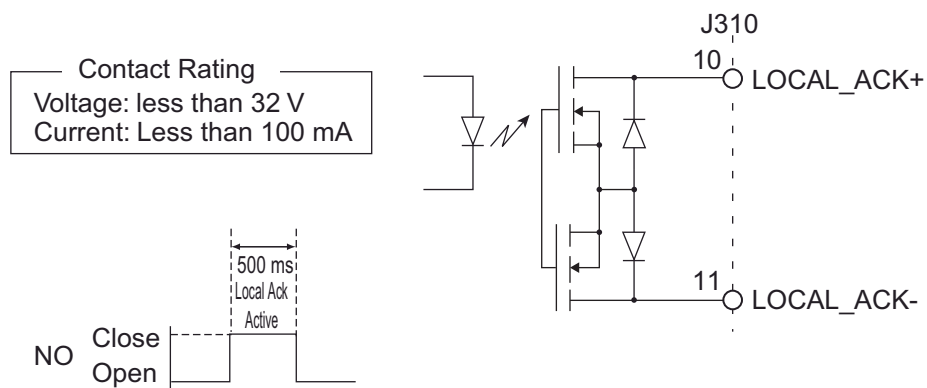
Active interval of Local ACK signal is 500 ±5 msec.

Local ACK signal

Remote ACK (input)

The AMS notifies the VR-7000/7000S that it has acknowledged an alarm. The remote ACK signal is input as normally open (NO).

Note: Input the contact signal. Voltage can not be input.

J310

Contact Rating
Voltage resistance: More than 32 V
Current capacity: More than 5 mA

REMOTE_ACK+ 12

REMOTE_ACK- 13

Total impedance (contact and cable)
shall be less than 500 ohms.
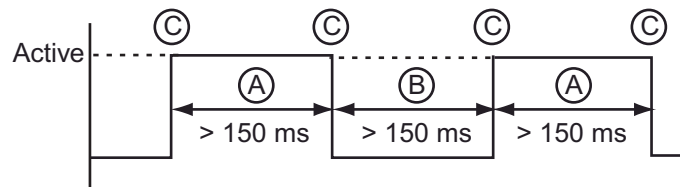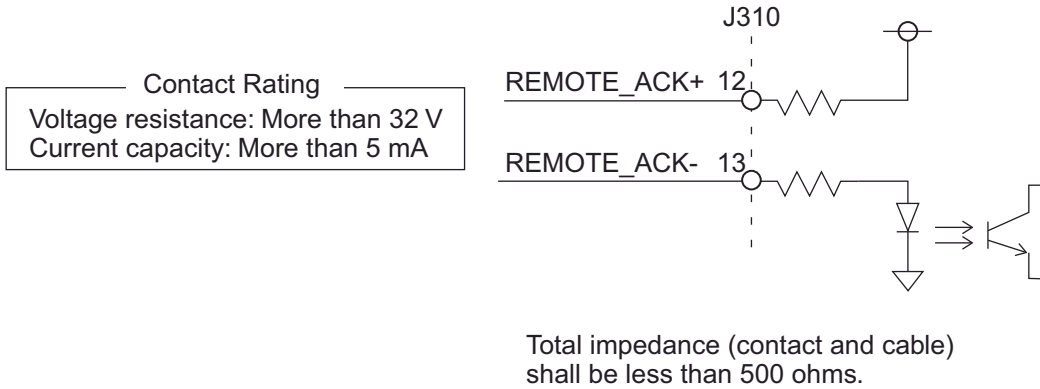
Active interval Ⓐ and Ⓑ of Remote ACK
signal shall be more than 150 msec.
Chattering may be present at interval Ⓒ .

> 150 ms   > 150 ms   > 150 ms

Remote ACK signal

Buzzer stop (input)

The AMS notifies the VR-7000/7000S that it has acknowledged the buzzer stop. The buzzer stop signal is input as normally open (NO).

Note: Input the contact signal. Voltage can not be input.

J310

Contact Rating
Voltage resistance: More than 32 V
Current capacity: More than 5 mA

BUZZER_STOP+ 14

BUZZER_STOP- 15

Total impedance (contact and cable)
shall be less than 500 ohms.

2-9
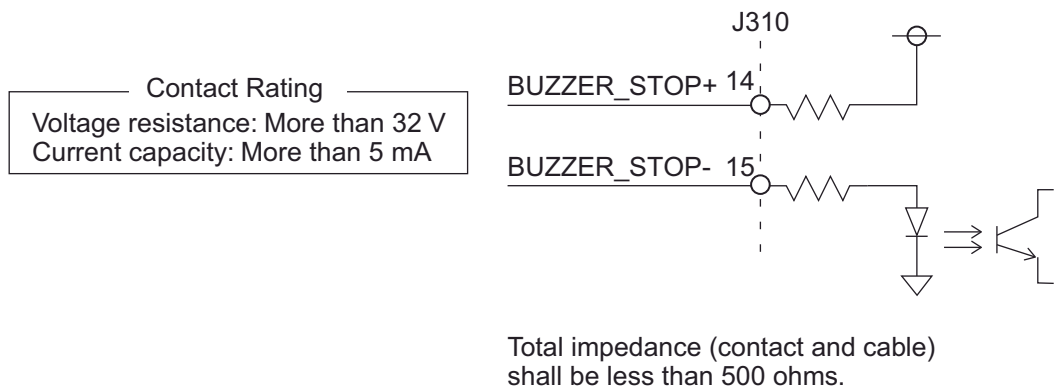
2.2 Data Recording Unit

2.2.1 Fixed Data Recording Unit VR-7020

A good grounding bond is required between the fixed DRU base plate and ship hull. Be sure that the external tooth lock washers are clamped between the bare metal of the fixed DRU base plate and the bare hull by the mounting bolts. See the figure on page 1-4.

Power and Ethernet Wiring Diagram

Connect the power and Ethernet signal to the terminal board. Supply the power source from the DCU (J311).

Note 1: Ensure that electrical power is de-energized prior to connecting the fixed DRU electrical power supply.

Note 2: Connect the Ethernet cable (FR-FTPC-CY) before connecting the power cable.

1. Pass the cables through the terminal board cover (supplied).

2. Use the rod terminal (supplied) to connect the signal cores of the cables to the terminal board.
   DPYCY-1.5 cable: Use the rod terminal AI 1.5-6 BK.
   FR-FTPC-CY cable: Use the rod terminal AI 0.14-8 GY.
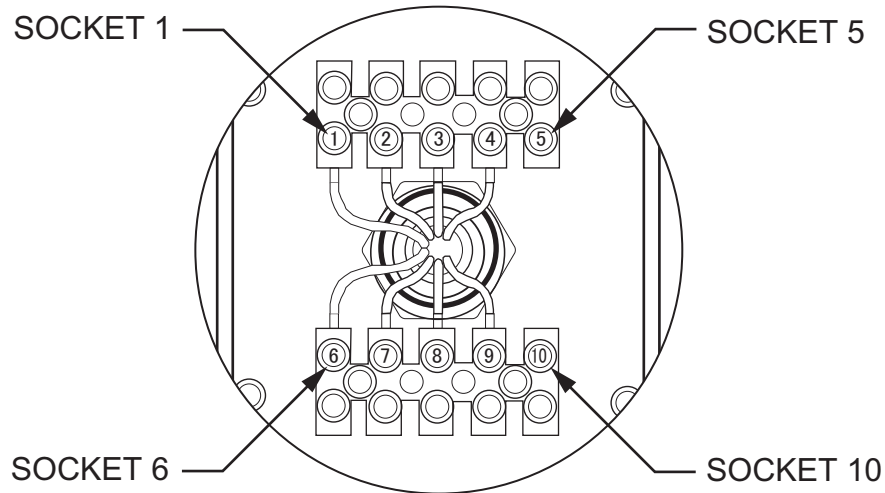
Power and Ethernet Terminal Block Front View

Socket number	Signal	Cable
1	24 V	DPYCY-1.5
2	24 V	No connection
3	0 V	DPYCY-1.5
4	0 V	No connection
5	N/C	No connection
6	TD_P	
7	TD_N	FR-FTPC-CY
8	RD_P	
9	RD_N	
10	N/C	No connection

Cable fabrication

• DPYCY-1.5 cable

35 20 100

Cable jacket

Twist the wires.

Attach the rod terminal.

Fasten this part with the cable gland.

Vinyl sheath

Vinyl tape (width: 10)

• FR-FTPC-CY cable

35 20 100

Cable jacket

Cut the unused wires.

Attach the rod terminal.

Fasten this part with the cable gland.

Vinyl sheath

Vinyl tape (width: 10)
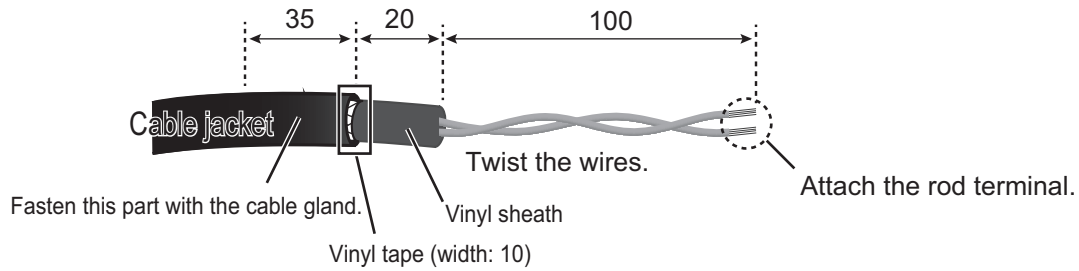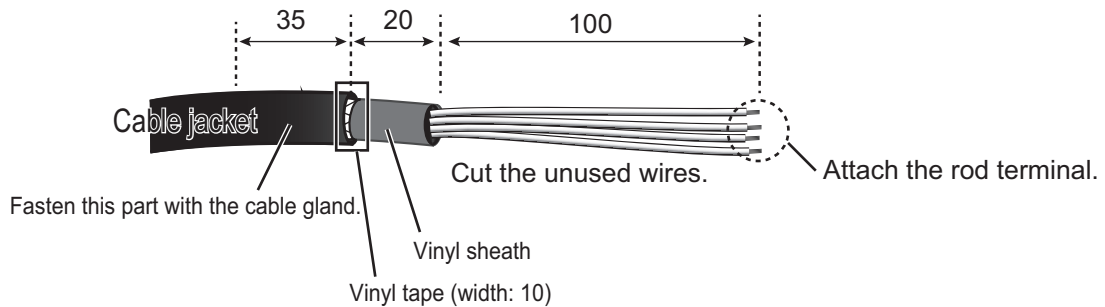
Notes for wiring

• Insert the rod terminals to the terminal board securely and fasten the terminal board screws to keep the wires from touching the terminal board cover.

• When it is hard to attach the rod terminal to the cores of the DPYCY-1.5 cable, cut out the wire jacket. Be careful not to damage the cores when cutting the wire jacket

Core

Rod terminal

Wire jacket

Cut the wire jacket.
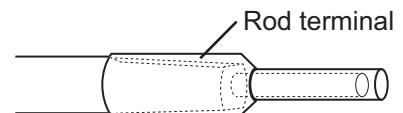
Attach the rod terminal to the core.

• When it is hard to insert the rod terminals attached to the FR-FTPC-CY cable to the terminal board, cut the rod terminal about 2 mm.

3.   Attach the terminal board cover to the unit with six screws (supplied).

Terminal board cover

DPYCY-1.5 cable

To DCU (J311)

To DCU (J25)

FR-FTPC-CY cable
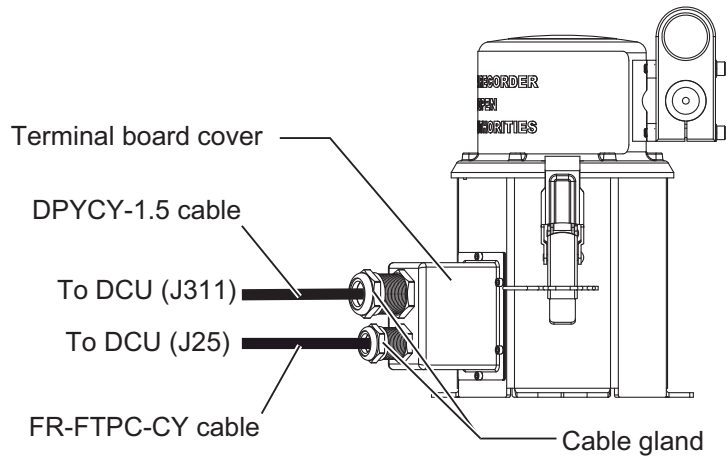
Cable gland

4.   Fasten two cable glands.
     Tightening torque:

   •   Upper cable gland: 6.67 N•m

   •   Lower cable gland: 5 N•m

5.   To prevent water from entering into the unit, apply the supplied adhesive
     (TB5211) to the cable entrances and contact area between the terminal board
     cover and unit.

Terminal board cover

Apply the adhesive
(TB5211).

Apply the adhesive
(TB5211).
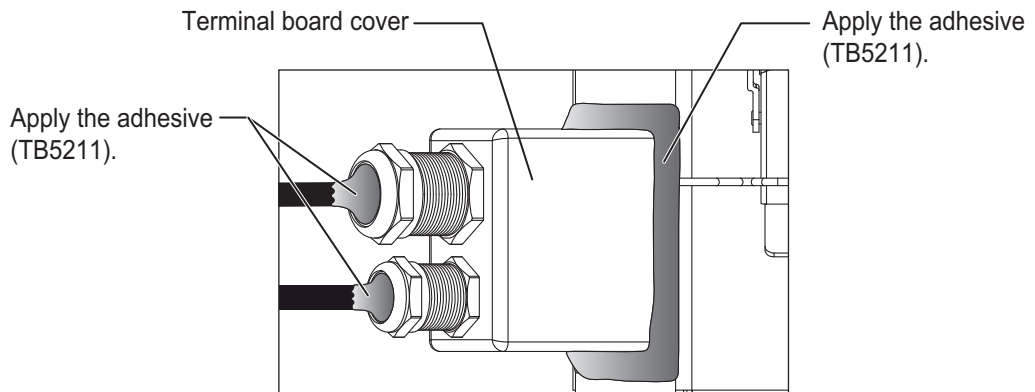
2.2.2   Float-free Data Recording Unit VR-7021F

To connect the float-free data recording unit VR-7021F to the DCU, use the junction
box VR-7022F. For details, see section 2.3.

LED indication of the docking module

After wiring the float-free DRU, check
the LED on the docking module to con-
firm that the float-free DRU works prop-
erly. See the following table for the LED
indication meanings.

LED
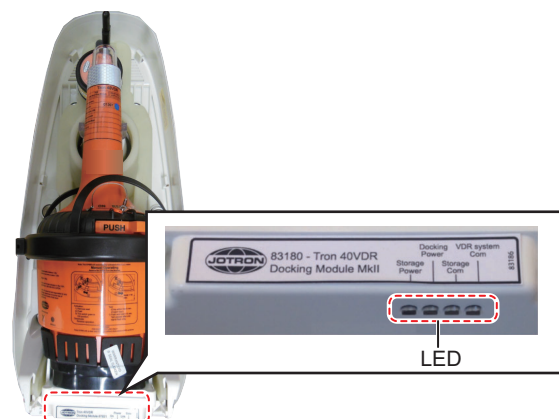
LED	Storage Power	Docking Power	Storage Com	VDR system Com
ON	Power is supplied to the storage module.	Power is supplied to the docking module.	The storage module is connected to the docking module, but communication is not established.	The DCU is connected to the docking module, but communication is not established.
OFF	Power is not supplied to the storage module.	Power is not supplied to the docking module.	The storage module is not connected to the docking module.	The DCU is not connected to the docking module.
Flash	The watchdog is activated.	The watchdog is activated.	The storage module is connected to the docking module and communication is established correctly.	The DCU is connected to the docking module and communication is established correctly.

2.3   Junction Box VR-7022F

To connect the float-free data recording unit VR-7021F to the DCU, use the junction box VR-7022F.

For configurations that use the VR-7020, the installation procedures outlined in this section and section 1.3 are not required.
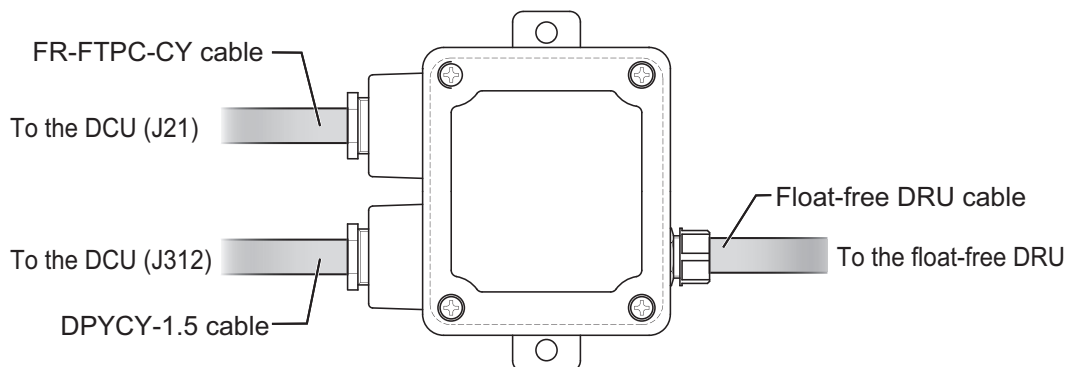
1. Remove four screws to remove the cover from the junction box.

2. Unfasten three cable glands, then pass each cable through the cable entrance.

3. Fabricate the cables.

    • DPYCY-1.5 cable

• FR-FTPC-CY cable

80

Cut the unused wires.

Cable jacket

Twist the orange and
white/orange wires.

Twist the green and
white/green wires.

Vinyl tape (width: 10)

50

Attach the crimp-on lug to the armor.

• Float-free DRU cable

80

60

20

Cable jacket

Aluminum tape

Vinyl tape (width: 10)

50
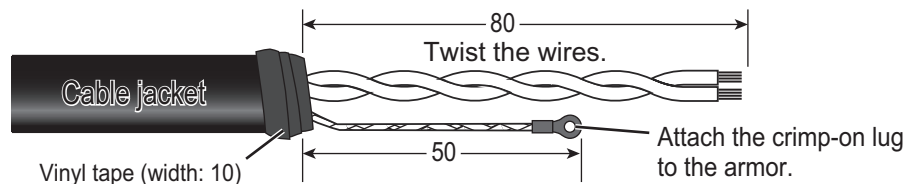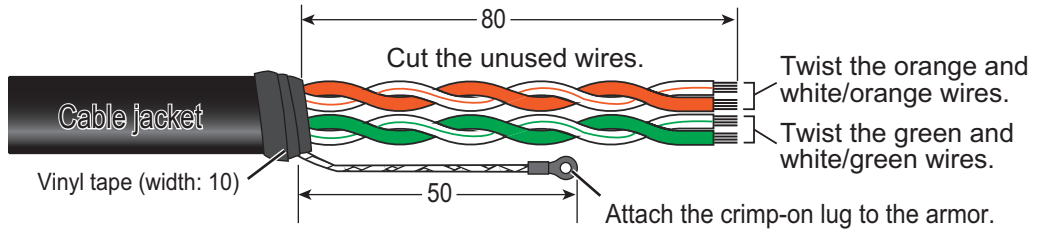
Attach the crimp-on lug to
the drain wire.
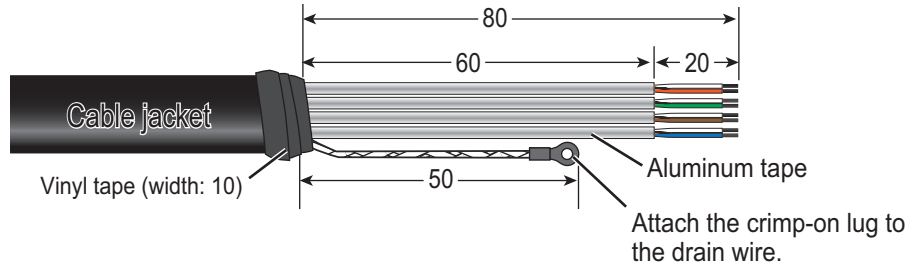
4. Connect the wires to the terminal board of the junction box.
    Note: The float-free DRU cable may be different, depending on the time of man-ufacture. Therefore, wire colors that connect to the #3 and #4 pins in the VR-7022F depend on the cable specifications.

Note that the wire color in brackets is the
color when the float-free DRU serial number
is before "20-0001".
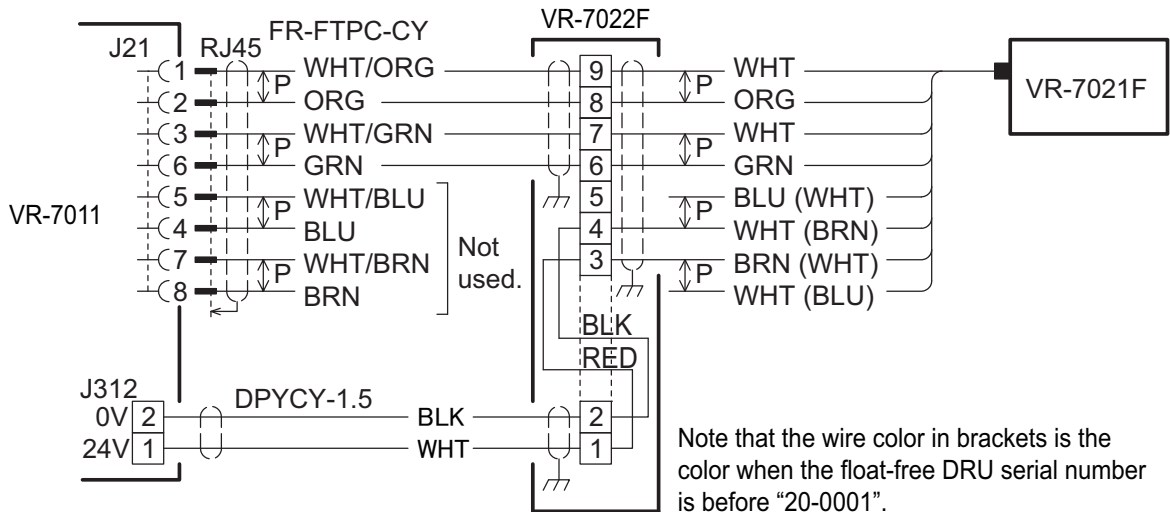
5. Fasten the cable glands to fix the cable.
    The cables must project 10 mm inside of the junction box.
    Note: Fasten the cable glands by hand. Do not use a wrench, to prevent damage to the gland.

Secure the shield (armor) of the FR-FTPC-CY cable to the junction box chassis.
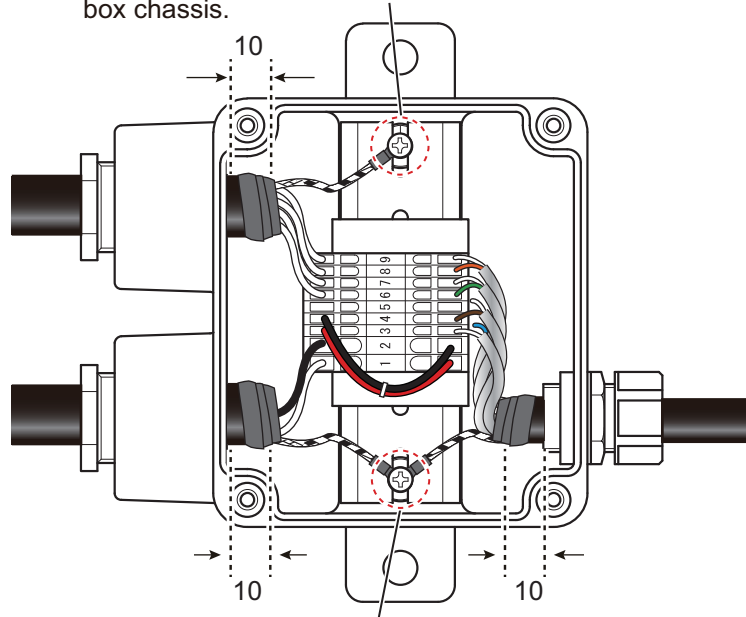
Secure the shield (drain wire) of the float-free DRU and the shield (armor) of the DPYCY-1.5 cable to the junction box chassis.

6. Reattach the cover to the junction box.

7. To prevent water from entering into the unit, apply the supplied adhesive (TB5211 (SP) 50G) to cable entrances (three locations).

2.4   Remote Alarm Panel VR-7017

Connect wiring to the terminal board of the unit, referring to the interconnection diagram at the back of this manual. See appendix 2 for how to fabricate the cable. After wiring the cable, fix the cable with the cable clamp.

Remote alarm panel (back cover removed)

After fabricating the cable, connect it the connector J101.

Connector J101

Pin No.	Signal	In/Out
1	TD_A	Out
2	TD_B	Out
3	RD_H	In
4	RD_C	In
5	GND	-
6	NET_S (24V)	In
7	NET_C (0V)	-
8*	NC	-
9*	NET_H	-
10*	NET_L	-

*: No connection

The crimp-on lug is preattached here. Attach the crimp-on lug to the drain wire of the cable connected with the DCU. Fix the ground and drain wire (crimp-on lug) here.
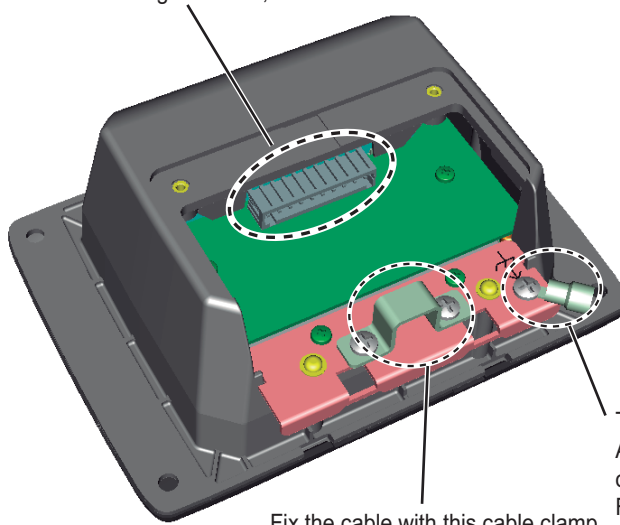
Fix the cable with this cable clamp.

Note: When you connect between the DCU and remote alarm panel, see "Notice for the connection with the remote alarm panel" on page 2-4.

2.5   Microphone VR-7011

Connect wiring to the terminal board of the unit, referring to the interconnection diagram at the back of this manual. See appendix 2 for how to fabricate the cable.

<u>Microphone (back cover removed)</u>
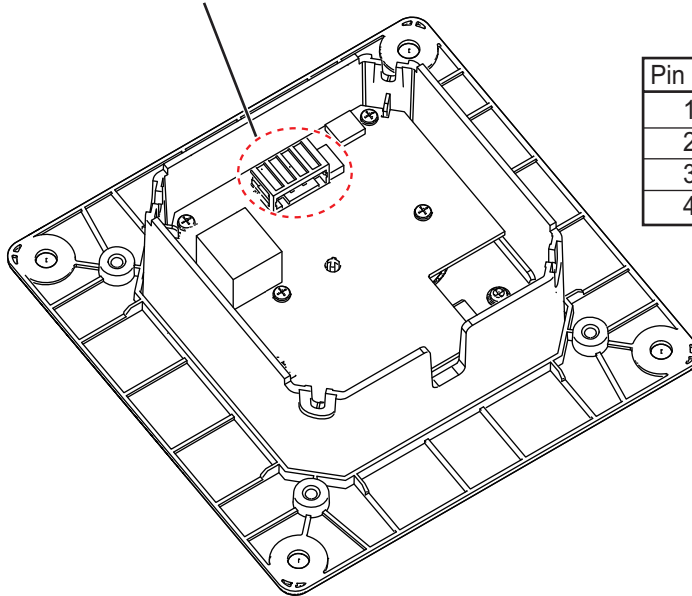
After fabricating the cable, connect it to the connector J1.

Connector J1

Pin No.	Signal	In/Out
1	12 VDC	In
2	GND	-
3	MIC_AUDIO	Out
4	MICTEST	In

After wiring the cable, reattach the back cover to the unit. Then fix the cable to the cable clamp with the cable tie (supplied).

Fix the cable to this cable clamp.
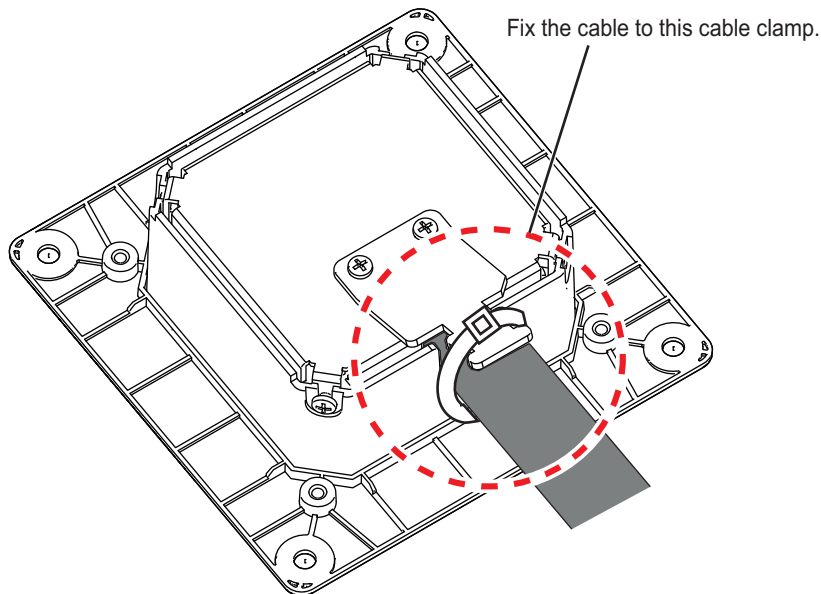
2.6   Waterproof Microphone VR-7012W

Connect wiring to the terminal board of the unit, referring to the interconnection diagram at the back of this manual. See section 1.6 for how to fabricate the cable.

Front panel of the waterproof microphone (rear side)

After fabricating the cable, connect it to the connector J1.
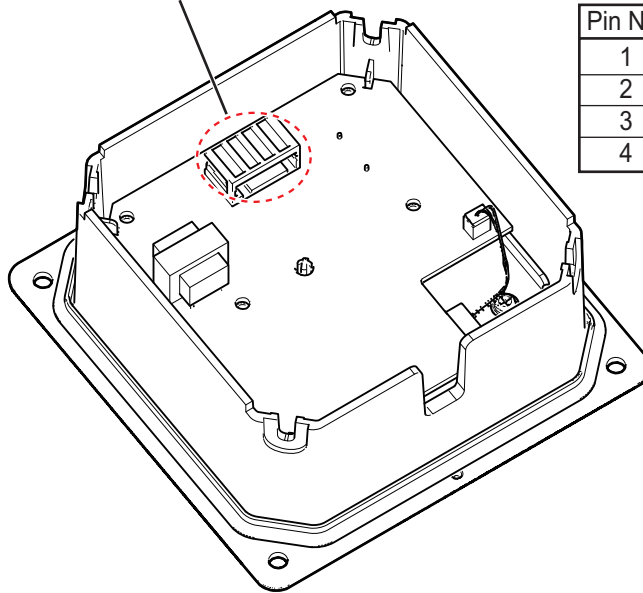
Connector J1

Pin No.	Signal	In/Out
1	12 VDC	In
2	GND	-
3	MIC_AUDIO	Out
4	MICTEST	In

After wiring the cable, reattach the front panel to the waterproof cover. Then fasten the super gland or SC lock to fix the cable.

Fasten the cable gland or cable lock.
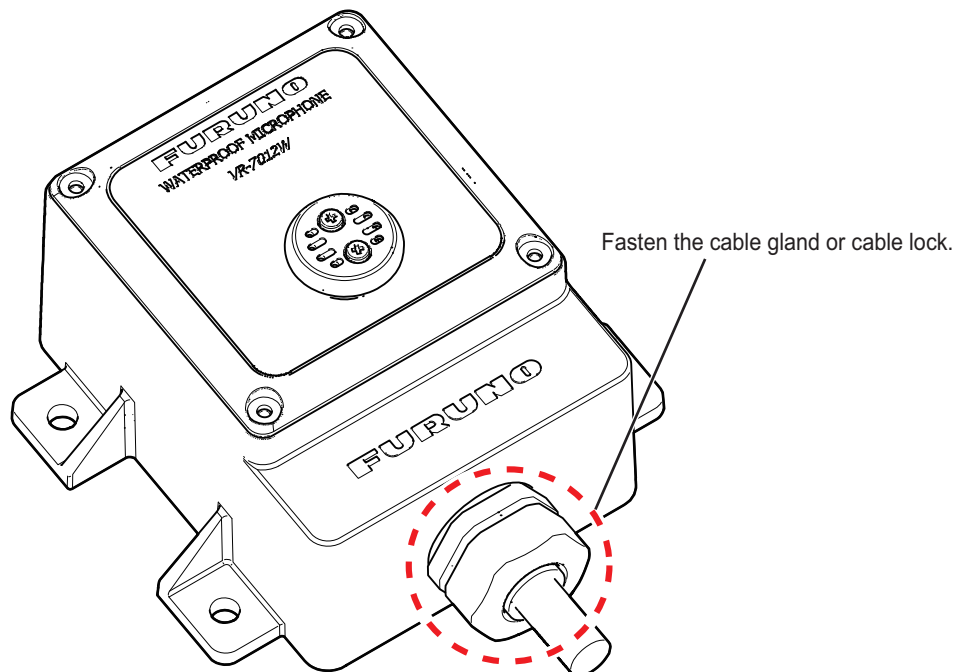
2.7 Video LAN Converter IF-7100

The video LAN converter converts the radar/ECDIS video signal (DVI-D or RGB) to a LAN signal. Use the cable shown below to input the DVI-D or RGB signal.

- DVI-D: DVI-D/D S-LINK 5M/10M
- RGB: BNCX5-DSUB15-L400 and CP24-01200/01210 (see section 2.7.2), or 3COX-2P-6C 5M/10M
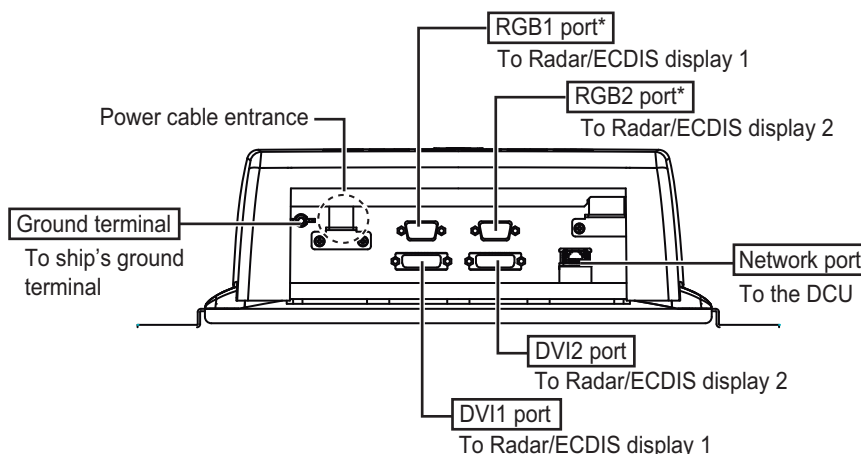
The video LAN converter has two input channels for DVI-D and two input channels for RGB*. The combinations of input channels shown below are available. Set the input channels for the video LAN converter, using the VDR Maintenance Viewer program. For how to set, see the instruction manual of the VDR Maintenance Viewer (OME-44852).

- DVI1 and DVI2
- RGB1* and DVI2
- DVI1 and RGB2*
- RGB1* and RGB2*

*: The RGB1 and RGB2 ports are available when the serial number (SER.NO.) of the video LAN converter is "200001" or after. If you need to input the RGB signal to the unit whose serial number (SER.NO.) is before "200001", use the RGB-DVI converter (maker: IMAGENECS, model: RS-1530A) to convert to the DVI-D signal.

Note 1: Do not connect/disconnect the DVI-D or RGB connectors while the turning the power on.

Note 2: Turn on or off the IF-7100 and connected equipment (radar or ECDIS processor unit) in the order shown below.

- Turning the power on: Tun on the IF-7100 before the connected equipment.
- Turning the power off: Turn off the connected equipment before the IF-7100.

Note 3: The IF-7100 does not have a power switch. Turn off the IF-7100 from the main switchboard.

Note 4: The IF-7100 can detect and adjust the DVI-D signal automatically. However, the RGB signal must be manually adjusted, using the Maintenance Viewer program. For how to adjust, see the instruction manual of the VDR Maintenance Viewer (OME-44852).

Note 5: When you use the IF-7100 that is compatible with RGB signal input, update the programs shown below to version 1.04 or after.

- VDR System Program
- Live Player V5
- VDR Maintenance Viewer

2.7.1 Video signal (DVI-D/RGB) available with IF-7100

The IF-7100 is compatible with separate sync signals shown below.

• Video signal level: Compliant with the VESA standard.

• Horizontal sync signal: Max.91.146 kHz, positive or negative

• Vertical sync signal: Max. 85 Hz

The table below shows receivable resolution for the IF-7100.

Resolution	DVI-D	RGB
VGA (640×480)	OK	OK
SVGA (800×600)	OK	OK
XGA (1024×768)	OK	OK
Resolution for FAR-28×7 series (1360×1024)	OK	OK
Resolution for FAR-2××8 series, WXGA+[1] (1440×900)	ON	NG
SXGA (1280×1024)	OK	OK
WSXGA+ (1680×1050)	OK	NG
UXGA (1600×1200)	OK	OK
Full HD[2] [3](1920×1080)	OK	NG
WUXGA[3] (1920×1200)	OK	NG
Resolution for FAR-28×5 series (1066×800)	NG	OK

[1]: To receive WXGA+ video signal, the IF-7100 FPGA program version should be "01.03" or later and serial number (SER.NO.) should be "200991" or later.

[2]: Compliant with CEA standard,

[3]: For the maximum channel number that can be recorded, see "Recordable resolution and maximum channel number" below.

Recordable resolution and maximum channel number

When the video signal is input through the IF-7100, the resolution and maximum channel number that can be recorded are shown in the table below.

No. of pcs	Resolution/Max. channel number
1 SSD (512 GB)	UXGA 2 ch[1] + Full HD 1 ch[1]
2 SSDs (1 TB)	UXGA 2 ch[1] + Full HD 1 ch[1] + WUXGA 1 ch[2]

[1]: Recorded to the long term device (SSD), fixed DRU and float-free DRU.

[2]: Recorded to the long term device (SSD) only.

2.7.2 Fabrication of the coaxial cable

When you connect the IF-7100 with a radar or ECDIS using the coaxial cable, prepare the cable shown below.

- BNCX5-DSUB15-L400: D-SUB-BNC connector cable
- CP24-01200/01210: Coaxial cable (six core, unfabricated) with BNC connectors

Fabricate the coaxial cable as follows:
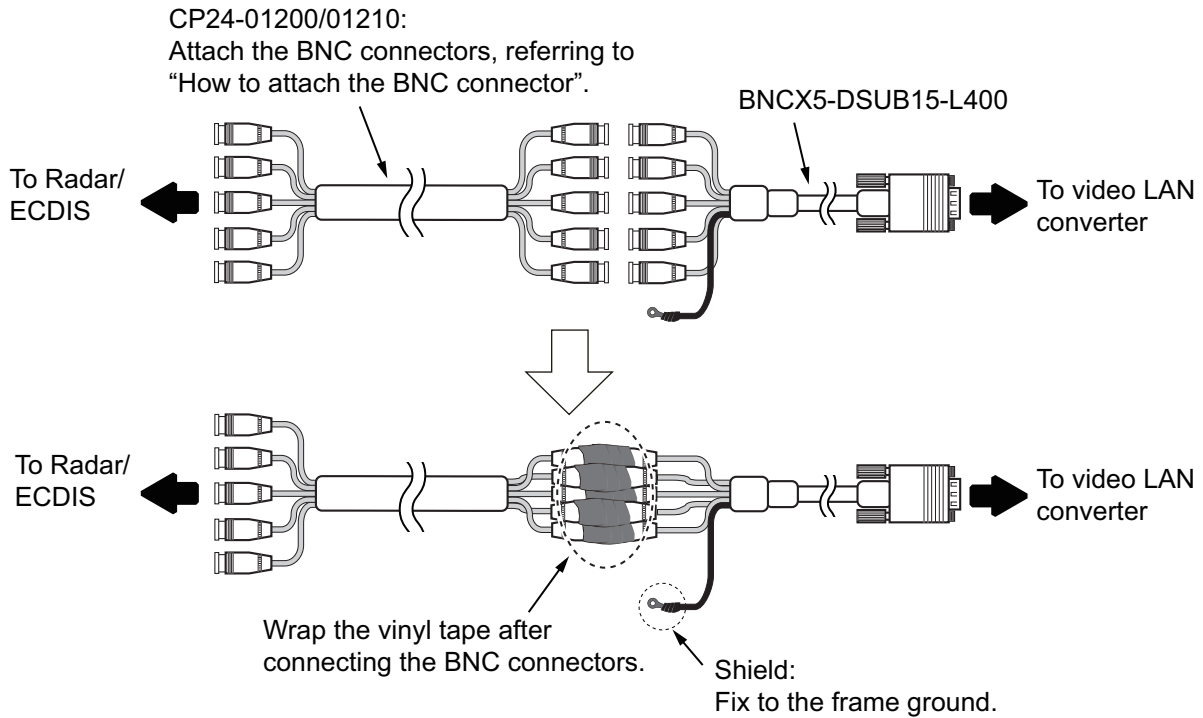
How to attach the BNC connector

1. Pass the clamping nut, washer, and gasket onto the cable.

2. Remove the vinyl sheath by 7 mm.
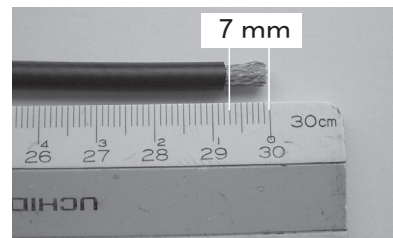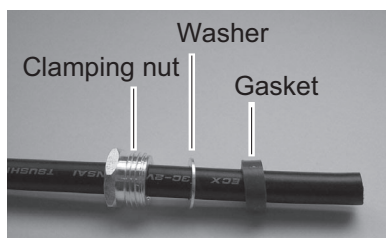
3. Remove the shield and insulator by 3 mm.

4. Pass the clamp onto the cable and fold back the shield on to the clamp.
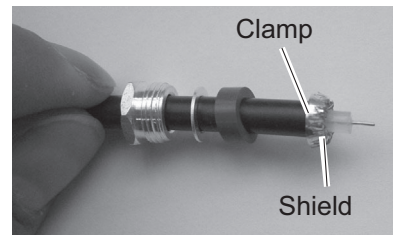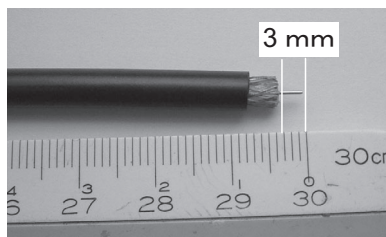
5. Insert the center pin to the core and solder.

Center pin

6. Screw the shell into the cable.

Shell
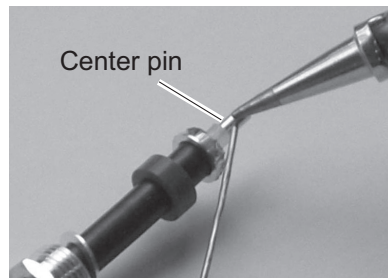
7. Completed.

2.7.3 Connections

1. Remove the outside cover of the video LAN converter; hold the right and left sides of the cover and pull the cover outward.

2. Remove eight binding screws (M3x6) to detach the chassis cover.

Binding screws (8 pcs)

Chassis cover
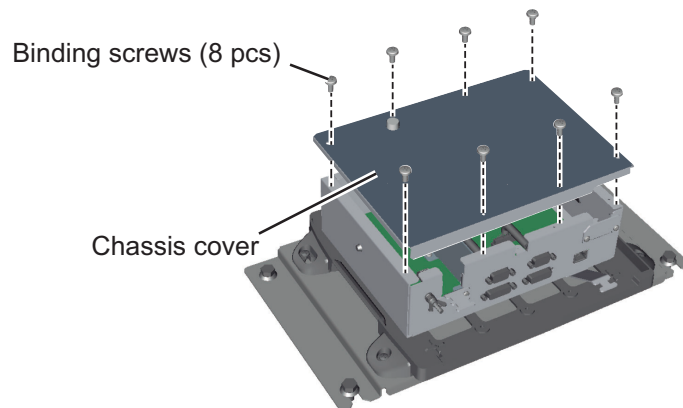
3. Fabricate the power cable.
   Remove the armor and vinyl sheath by 226 mm, then expose the signal cores by 6 mm. Wrap vinyl tape around the edge of the armor.

Vinyl sheath

Armor

226

6

Vinyl tape
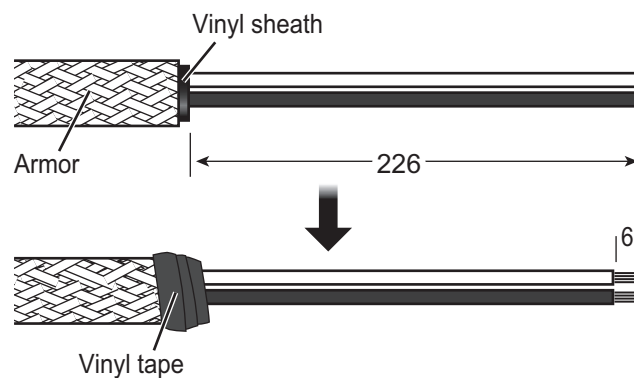
4. Fix the armor of the power cable to the cable clamp, using the supplied cable tie.

5. Attach the supplied rod terminal (type: A1.5-10) to the signal cores for connection to the J1 port.

6. Connect the cores to the connector that is pre-inserted at the J1 port.

7. Fold the excess cable (inside the unit), then fix the excess cable at the cable saddle indicated in the figure below.
    Note: The cable length between the cable saddle and J1 port should be as short as possible. Also, route the cables so that they do not make contact with the armor.
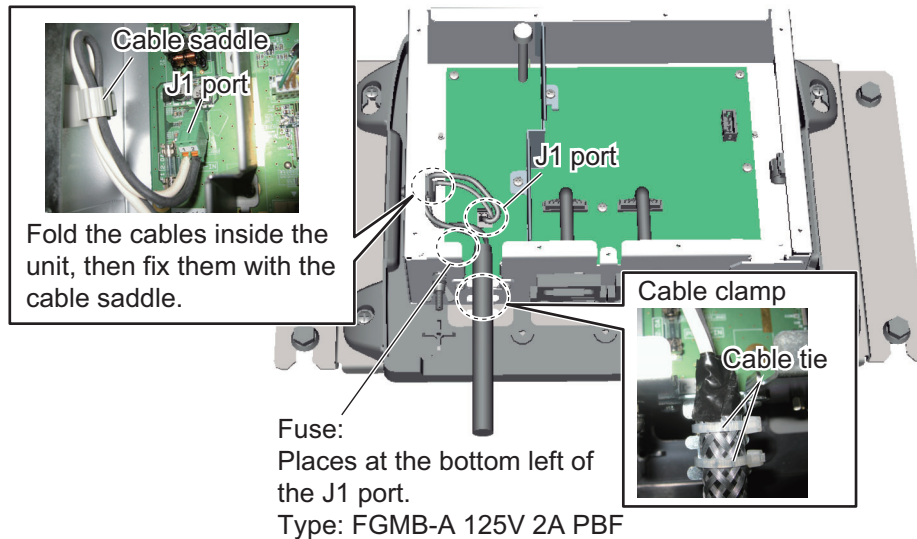
8. Reattach the chassis cover.

9. Connect the DVI-D, RGB, and LAN cables.

10. Fix the LAN cable to the cable clamp with the supplied cable tie.
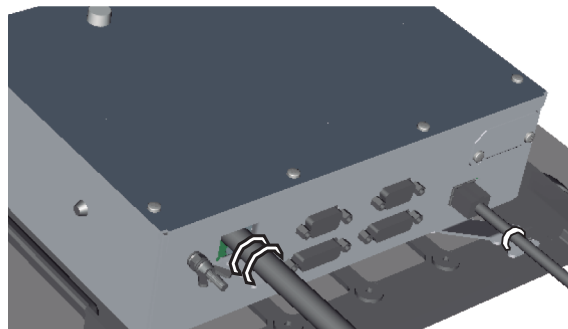
11. Reattach the outside cover.

2.7.4 Connection with a FURUNO radar

Connection with the FAR-21×7/FAR-28×7 series radar

For the connection between the IF-7100 and FAR-21×7/FAR-28×7 series radar, see the respective radar installation manual.

Note: When the FAR-28×7 series radar is connected to the IF-7100, set the DIP switch inside the unit (see section 3.3).

Connection with the FR-21×5 series radar

Prepare the items shown below and modify the FR-21×5 series radar to connect it to the IF-7100.

Name	Type	Part No.	Qty
RGB Buffer Kit • RGB-BUFF Board • NH-XH Connector • NH-XH Connector	OP03-162 • 03P9229A • NH10P-XH13P • NH4P-XH3P	008-501-130	1
Connector Converter	DSUB-BNC-1	001-239-950	1
Analog RGB Cable	KB-HD152K	001-237-500	1
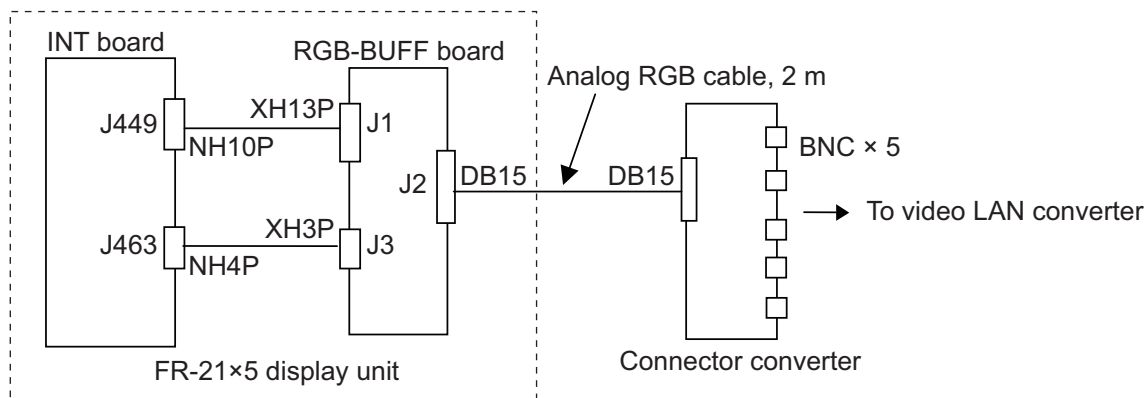
Connection with the FAR-28×5/FR-28×5 series radar

Prepare the items shown below and modify the FAR-28×5/FR-28×5 series radar to connect it to the IF-7100.

Name	Type	Part No.	Qty
VDR I/F Kit 1*[1] • RGB-BUFF Board • NH-XH Connector • NH-XH Connector • VDA/INT Chassis	OP03-177 • 03P9229A • 03-2057 (4-3P) • 03-2058 (10-13P) • 03-133-1127-4	008-528-270	1
VDR I/F Kit 2*[2] • RGB-BUFF Board • NH-XH Connector • NH-XH Connector	OP03-178 • 03P9229A • 03-2057 (4-3P) • 03-2058 (10-13P)	008-528-280	
Connector Converter	DSUB-BNC-1	001-239-950	1
Analog RGB Cable	KB-HD152K	001-237-500	1

*[1]: For display unit produced in June 2002 and before.

*[2]: For display unit produced in June 2002 and after.

FAR-28×5/FR-28×5 display unit
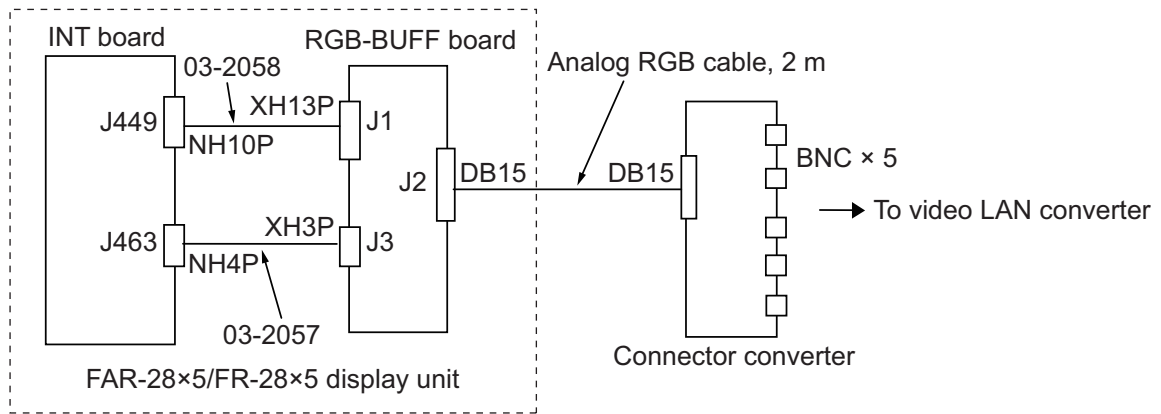
The figure below shows how to mount CPA/TCPA board together with RGB-BUFF board in the FAR-28×5/FR-28×5 series radar. The VDA/INT chassis should be new type, 03-133-1127-4. The CPA/TCPA is powered from #6 (12 V) and #8 (GND) of he power terminal block DTB-2. The J463 port on the INT board is used for the RGB-BUFF board.
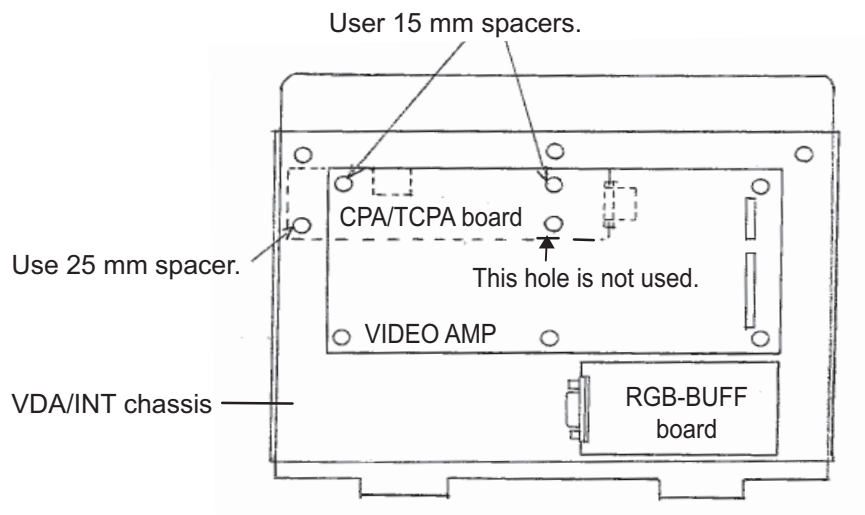
2.8 Sensor Adapters

A maximum of eight MC-3000S can be connected to the DCU through the HUB-100. The MC-3000S can connect a maximum of ten additional units in combination with MC-3010A and MC-3020D, using the MC1.5-W cables. However, note that five MC-3010A can be connected.

When you connect two or more MC-3000S, see the Instruction Manual (OME-44852) to set the MC-3000S.

When fabricating the MC1.5-W cables, use the rod terminal (ferrule type, supplied) to maintain performance. This fabrication requires the optional crimping tool (type: CRIMPFOX 10S).

For how to attach the rod terminal and the relations between the connectors and rod terminals, see "ROD TERMINALS" on page AP-7. Also, the stickers attached on the reverse side of the covers show the detailed connections.

Note 1: Use the MC1.5-W cable between the sensor adapters.

Pin No.	Cable color (MC1.5-W)	Signal
1	Red	24V_OUT or 24V_IN
2	Black	24V_GND
3	White	MODBUS-A
4	Blue	MODBUS-B
5	Gray	GND

Note 2: The total length of the MC1.5-W cables should be less than 6 m to prevent malfunction.

2.8.1 MC-3000S connections

Unfasten four screws to remove the cover, pass the cables through the clamps and attach the cables to respective connectors. The shield part of the cable (or drain wire) must be fastened by (connected to) the clamp. For fabrication of the cables connected to the unit, see appendix 2.

For TTYCSLA cables, pass the drain wire into the shrinking tube (local supply), then use these crimp-on lugs and screws to connect drain wires from TTYCSLA cables to here.
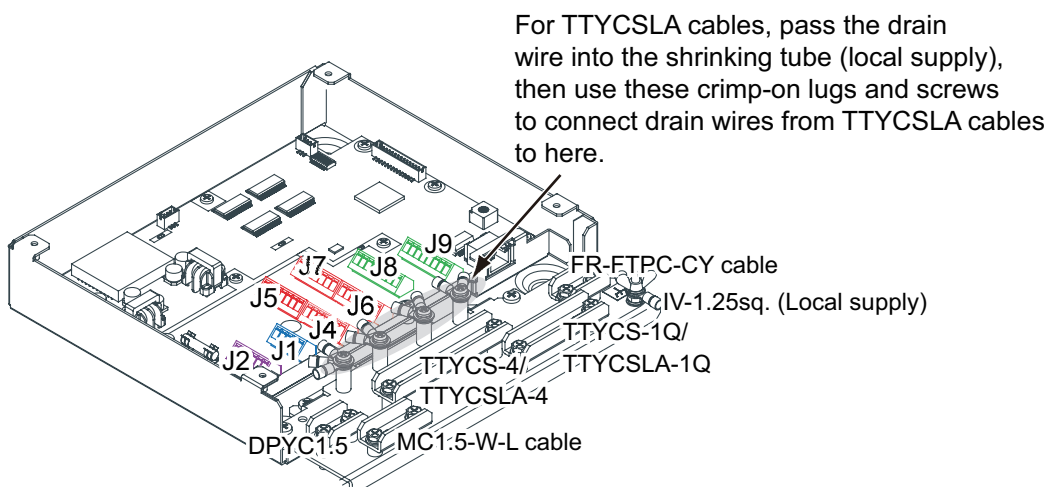
Note: Fasten the cable shield with the cable clamp.

How to set NC/NO output (J2)

The POWER FAIL signal on the connector J2 can be set to NC (normally closed) output or NO (normally open) output as shown in the table below.

Connector J2

Pin #	Signal name	In/Out	Description	NO	NC
1	24V_IN	-	24 VDC	DPYC-1.5	
2	24V_GND	-	GND (24 VDC)		
3	PWR_FAIL_A	Out	Power fail output	TTYCS(LA)-1	No connection
4	PWR_FAIL_COM	Out	Power fail output		TTYCS(LA)-1
5	PWR_FAIL_B	Out	Power fail output	No connection	

How to set input specification (J4 to J9)

For connectors J4 to J7, the connections are different depending on the input specifications as shown below.

Connector J4

Pin #	Signal name	In/Out	Description	IEC61162-2	IEC61162-1
1	TD1-A	Out	Serial CH1, output IEC61162-1/2/modbus	TTYCS(LA)-4	TTYCS(LA)-4
2	TD1-B	Out	Serial CH1, output IEC61162-1/2/modbus		
3	RD1-A	In	Serial CH1, input IEC61162-2/modbus		No connection
4	RD1-B	In	Serial CH1, input IEC61162-2/modbus		
5	ISOGND1	-	Isolation, GND (CH1)		
6	RD1-H	In	Serial CH1, input IEC61162-1	No connection	TTYCS(LA)-4
7	RD1-C	In	Serial CH1, input IEC61162-1		

Connector J5

Pin #	Signal name	In/Out	Description	IEC61162-2	IEC61162-1
1	TD2-A	Out	Serial CH2, output IEC61162-1/2/modbus	TTYCS(LA)-4	TTYCS(LA)-4
2	TD2-B	Out	Serial CH2, output IEC61162-1/2/modbus		
3	RD2-A	In	Serial CH2, input IEC61162-2/modbus		No connection
4	RD2-B	In	Serial CH2, input IEC61162-2/modbus		
5	ISOGND2	-	Isolation, GND (CH2)		
6	RD2-H	In	Serial CH2, input IEC61162-1	No connection	TTYCS(LA)-4
7	RD2-C	In	Serial CH2, input IEC61162-1		

Connector J6

Pin #	Signal name	In/Out	Description	IEC61162-2	IEC61162-1
1	TD3-A	Out	Serial CH3, output IEC61162-1/2	TTYCS(LA)-4	TTYCS(LA)-4
2	TD3-B	Out	Serial CH3, output IEC61162-1/2		
3	RD3-A	In	Serial CH3, input IEC61162-2		No connection
4	RD3-B	In	Serial CH3, input IEC61162-2		
5	ISOGND3	-	Isolation, GND (CH3)		
6	RD3-H	In	Serial CH3, input IEC61162-1	No connection	TTYCS(LA)-4
7	RD3-C	In	Serial CH3, input IEC61162-1		

Connector J7

Pin #	Signal name	In/Out	Description	IEC61162-2	IEC61162-1
1	TD4-A	Out	Serial CH4, output IEC61162-1/2	TTYCS(LA)-4	TTYCS(LA)-4
2	TD4-B	Out	Serial CH4, output IEC61162-1/2		
3	RD4-A	In	Serial CH4, input IEC61162-2		No connection
4	RD4-B	In	Serial CH4, input IEC61162-2		
5	ISOGND4	-	Isolation, GND (CH4)		
6	RD4-H	In	Serial CH4, input IEC61162-1	No connection	TTYCS(LA)-4
7	RD4-C	In	Serial CH4, input IEC61162-1		

Connector J8

Pin #	Signal name	In/Out	Description	Used cable
1	TD5-A	Out	Serial CH5, output IEC61162-1	TTYCS-1Q or TTYCSLA-1Q
2	TD5-B	Out	Serial CH5, output IEC61162-1	
3	RD5-H	In	Serial CH5, input IEC61162-1	
4	RD5-C	In	Serial CH5, input IEC61162-1	
5	TD6-A	Out	Serial CH6, output IEC61162-1	
6	TD6-B	Out	Serial CH6, output IEC61162-1	
7	RD6-H	In	Serial CH6, input IEC61162-1	
8	RD6-C	In	Serial CH6, input IEC61162-1	

Connector J9

Pin #	Signal name	In/Out	Description	Used cable
1	TD7-A	Out	Serial CH7, output IEC61162-1	TTYCS-1Q or TTYCSLA-1Q
2	TD7-B	Out	Serial CH7, output IEC61162-1	
3	RD7-H	In	Serial CH7, input IEC61162-1	
4	RD7-C	In	Serial CH7, input IEC61162-1	
5	TD8-A	Out	Serial CH8, output IEC61162-1	
6	TD8-B	Out	Serial CH8, output IEC61162-1	
7	RD8-H	In	Serial CH8, input IEC61162-1	
8	RD8-C	In	Serial CH8, input IEC61162-1	

2.8.2 MC-3000S jumper and MODBUS settings

Set the jumper blocks in the MC-CS Board (24P0114) referring to the tables that follow.
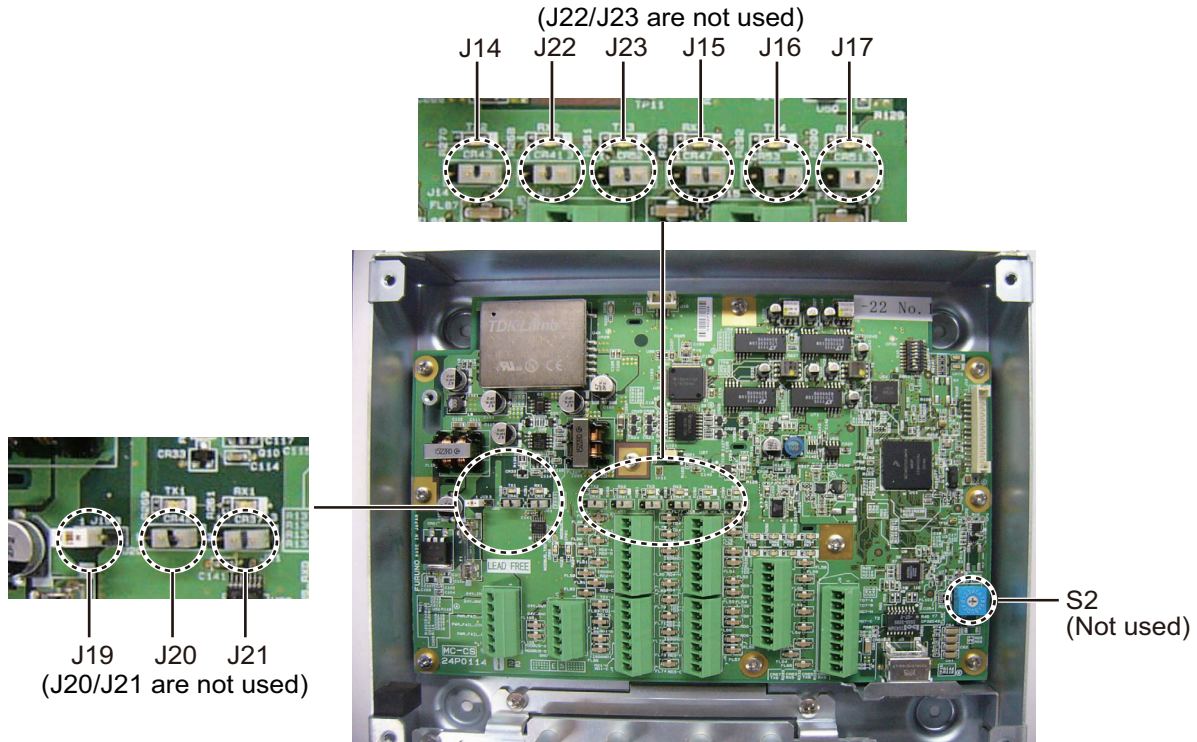
MC-CS Board (24P0114)

Setting termination resistors

Use the jumper block J19 to set the termination resistor on/off for the MODBUS communication on the connector J1. For the first and last sensor adapter in a series, their termination resistors should be set to ON. Use the MC-CS Board with the default setting because it becomes the "first" adapter in a series.

Jumper block J19		Connector J1
1-2	SHORT	Termination resistor: ON (default setting)
2-3	OPEN	
1-2	OPEN	Termination resistor: OFF
2-3	SHORT	

Set the jumper blocks J14 through J17 to turn the termination resistors on connectors J4 through J7 respectively.

(Termination resistor ON)

• When setting the starting/ending terminal for the multipoint, or the multipoint is not connected (CH1 to 4).

(Terminal resistor OFF)

• When setting the terminal other than starting/ending for the multipoint (CH1 to 4).

Jumper block J14		Connector J4 (CH1)
1-2	SHORT	Termination resistor: ON (default setting)
2-3	OPEN	
1-2	OPEN	Termination resistor: OFF
2-3	SHORT	

Jumper block J15		Connector J5 (CH2)
1-2	SHORT	Termination resistor: ON (default setting)
2-3	OPEN	
1-2	OPEN	Termination resistor: OFF
2-3	SHORT	

Jumper block J16		Connector J6 (CH3)
1-2	SHORT	Termination resistor: ON (default setting)
2-3	OPEN	
1-2	OPEN	Termination resistor: OFF
2-3	SHORT	

Jumper block J17		Connector J7 (CH4)
1-2	SHORT	Termination resistor: ON (default setting)
2-3	OPEN	
1-2	OPEN	Termination resistor: OFF
2-3	SHORT	

2.8.3 Case packing for MC-3000S OP24-28 (optional)

The optional kit OP24-28 protects the connectors on the MC-3000S to waterproofing standard IPX2.

Case packing (type: OP24-28, code no.: 001-169-970)

Name	Type	Code No.	Qty
Case packing (serial)	21-014-2051	100-367-880-10	2

1. Unfasten four binding screws to remove the cover from the adapter.
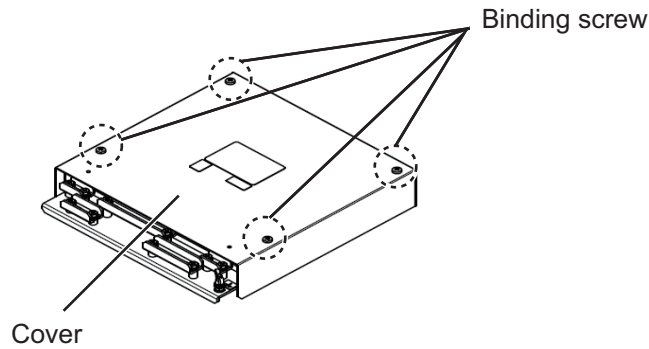
Binding screw

Cover

2. Peel the paper from the case packing, then attach the case packing to the reverse side of the cover and the body unit as shown below.

Case packing

Cover (reverse side)   Case packing

Case packing

Body unit   Case packing
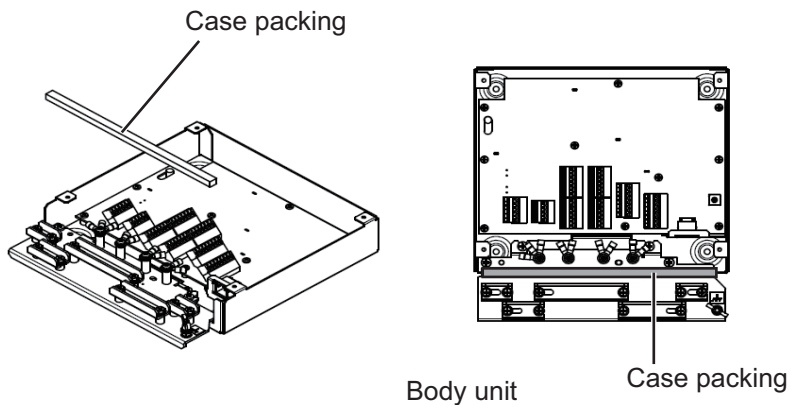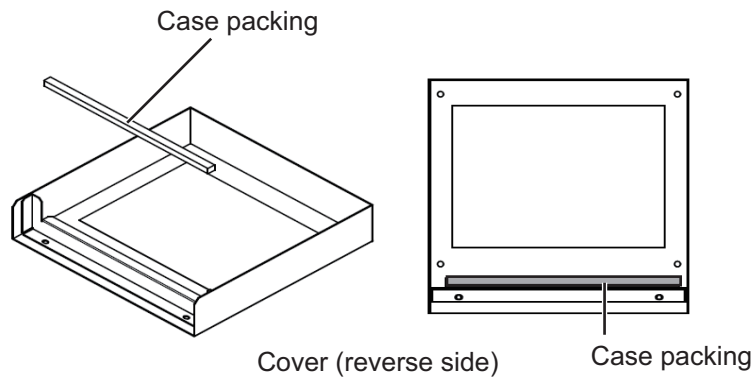
3. Attach the cover to the MC-3000S body unit.

2.8.4   MC-3010A/3020D connections

Unfasten four screws to remove the cover, pass the cables through the clamps and attach the cables to respective connectors. The shield part of the cable (or drain wire) must be fastened by (connected to) the clamp. For fabrication of the cables connected to the unit, see appendix 2.

- MC-3010A: Inputs analog signal. To set MC-3010A to the current input, connect short pins to each terminals.

- MC-3020D: Inputs digital signal (8ch contact input). Contact or voltage input is selectable (contact input requires short pins).

For TTYCSLA cables, pass the drain wire through the shrink tube, then attach these crimp-on lugs and screws to connect drain wires to here.
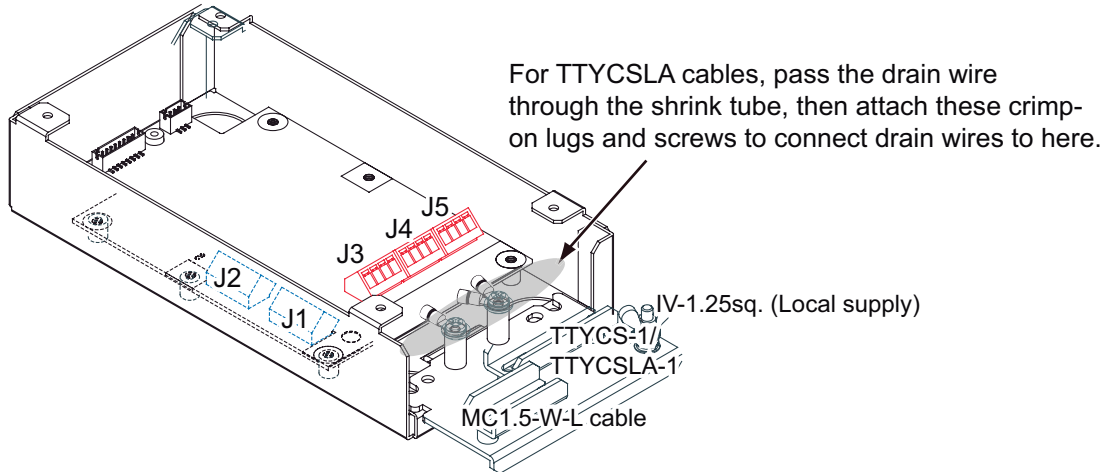
Note: Fasten the cable shield with the cable clamp.
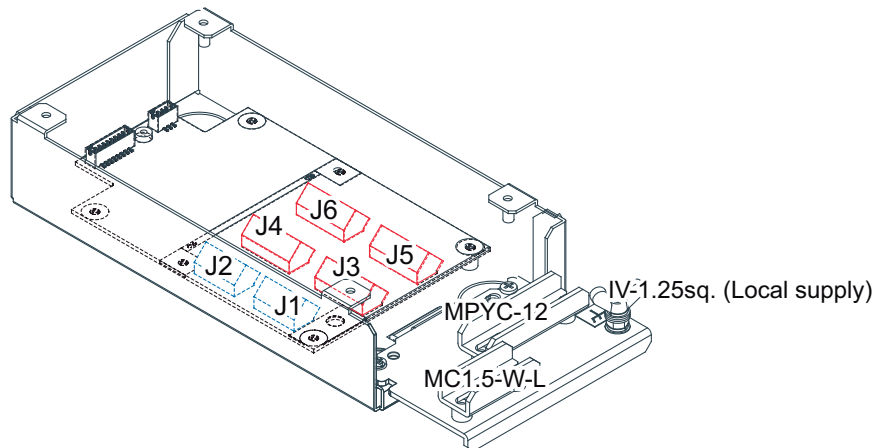
MC-3010A

Note: Fasten the cable shield with the cable clamp.

MC-3020D

Input type (MC-3010A)

Select the type of the analog data input, power voltage or power current. When changing the input type, turn off the MC-3010A and on again to put change in effect.

Note 1: For current input, use the AWG wire for jumper.

Note 2: The input must not exceed the range of the input voltage, to prevent malfunction.
-Setting for voltage input: -10 V to +10 V or 0 to 10 V (depending on the setting)
-Setting for current input: 4 mA to 20 mA.

• Power voltage: Input the amount of power voltage change to the operational amplifier.
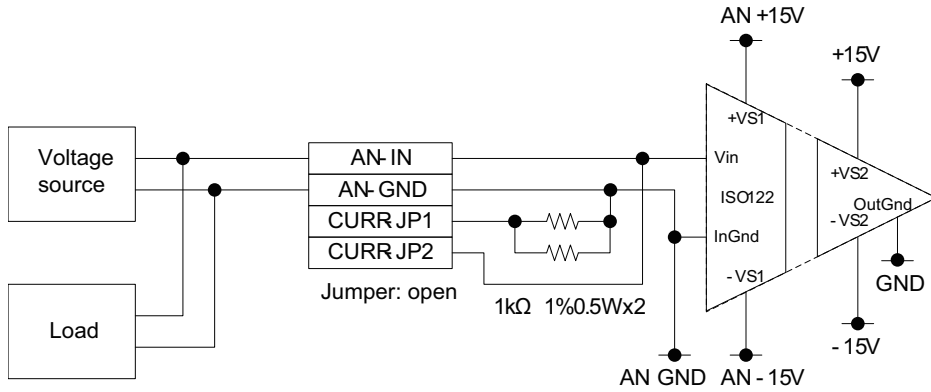
• Power current: Pass the power current to the shunt resistor, 1 kΩ/parallel (combined resistance: 500Ω) to input the amount of voltage change at the both ends of the resistor to the operational amplifier.
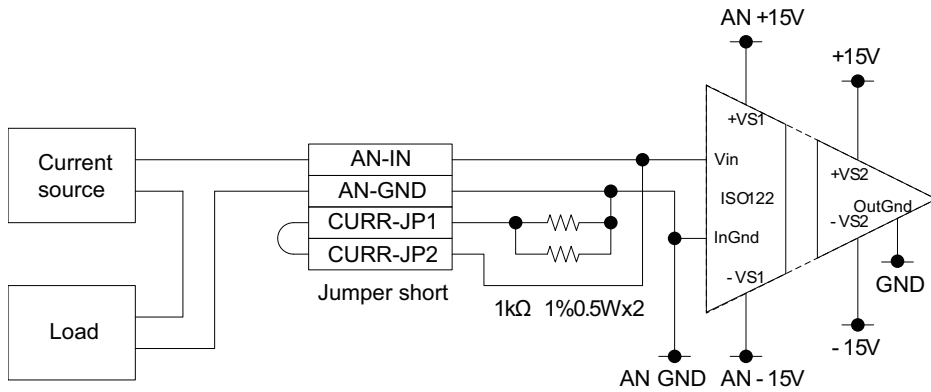
Connector J3

Pin #	Signal name	In/Out	Description	Power voltage	Power current
1	AN1_IN	In	Analog 1 input	TTYCS(LA)-1	
2	AN1_GND	-	Analog 1 GND		
3	CURR1_JP1	-	Analog 1 input, power current/ voltage setting jumper 1	Pin #3-#4: open	Pin #3-#4: short
4	CURR1_JP2	-	Analog 1 input, power current/ voltage setting jumper 1		

Connector J4

Pin #	Signal name	In/Out	Description	Power voltage	Power current
1	AN2_IN	In	Analog 2 input	TTYCS(LA)-1	
2	AN2_GND	-	Analog 2 GND		
3	CURR2_JP1	-	Analog 2 input, power current/ voltage setting jumper 1	Pin #3-#4: open	Pin #3-#4: short
4	CURR2_JP2	-	Analog 2 input, power current/ voltage setting jumper 1		

Connector J5

Pin #	Signal name	In/Out	Description	Power voltage	Power current
1	AN3_IN	In	Analog 3 input	TTYCS(LA)-1	
2	AN3_GND	-	Analog 3 GND		
3	CURR3_JP1	-	Analog 3 input, power current/ voltage setting jumper 1	Pin #3-#4: open	Pin #3-#4: short
4	CURR3_JP2	-	Analog 3 input, power current/ voltage setting jumper 1		

How to set contact input (MC-3020D)

Use the connectors J3 to J6 on the MC-DIN Board (24P0116) to set the contact input. See the tables on the next page.

Note 1: For contact input, use the AWG24 wire for jumper.

Note: The input must not exceed the range of the input voltage, to prevent malfunction.
-Setting for voltage input: 21.6V to 31.2V
-Setting for contact input: Voltage cannot be input (contact signal only).

• Input circuit for voltage input
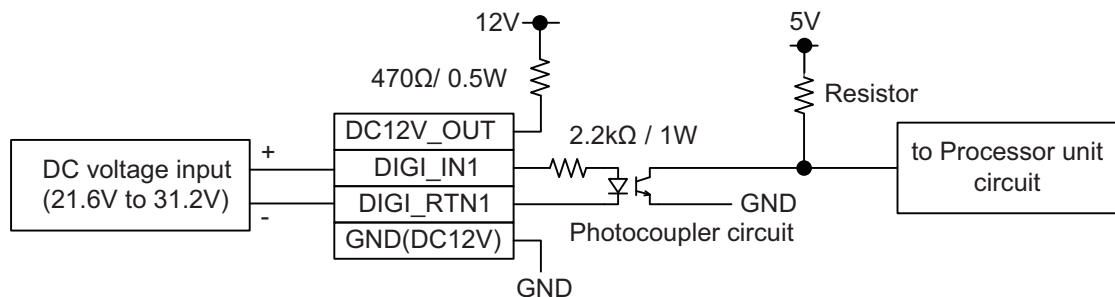
- Input circuit for contact input

12V
5V
470Ω/ 0.5W
Resistor
Use the AWG24 wire for jumper.
DC12V_OUT
2.2kΩ / 1W
to Processor unit circuit
Contact input
DIGI_IN1
DIGI_RTN1
GND
DIGI_RTN1
GND(DC12V)
Photocoupler circuit
GND
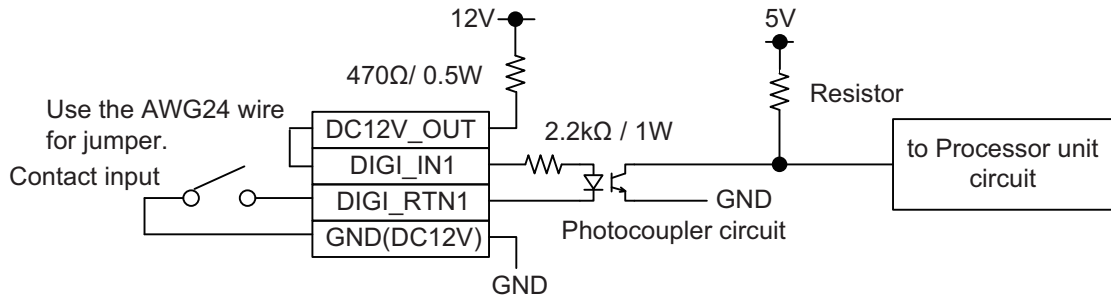
Connector J3

Pin #	Signal name	In/ Out	Remarks	ACK1 contact	ACK1 voltage	ACK2 contact	ACK2 voltage
1	DC12V_OUT	Out	ACK1 In	Pin #1-#2: short	No connection		
2	DIGI_IN1	In			MPYC-12		-
3	DIGI_RTN1	Out		MPYC-12			
4	GND (DC12V)	In			No connection		
5	DC12V_OUT	Out	ACK2 In			Pin #1-#2: short	No connection
6	DIGI_IN2	In			-		MPYC-12
7	DIGI_RTN2	Out				MPYC-12	
8	GND (DC12V)	In					No connection

Connector J4

Pin #	Signal name	In/ Out	Remarks	ACK3 contact	ACK3 voltage	ACK4 contact	ACK4 voltage
1	DC12V_OUT	Out	ACK3 In	Pin #1-#2: short	No connection		
2	DIGI_IN3	In			MPYC-12		-
3	DIGI_RTN3	Out		MPYC-12			
4	GND (DC12V)	In			No connection		
5	DC12V_OUT	Out	ACK4 In			Pin #1-#2: short	No connection
6	DIGI_IN4	In			-		MPYC-12
7	DIGI_RTN4	Out				MPYC-12	
8	GND (DC12V)	In					No connection

Connector J5

Pin #	Signal name	In/ Out	Remarks	ACK5 contact	ACK5 voltage	ACK6 contact	ACK6 voltage
1	DC12V_OUT	Out	ACK5 In	Pin #1-#2: short	No connection		
2	DIGI_IN5	In			MPYC-12		-
3	DIGI_RTN5	Out		MPYC-12			
4	GND (DC12V)	In			No connection		
5	DC12V_OUT	Out	ACK6 In			Pin #1-#2: short	No connection
6	DIGI_IN6	In			-		MPYC-12
7	DIGI_RTN6	Out				MPYC-12	
8	GND (DC12V)	In					No connection

Connector J6

Pin #	Signal name	In/Out	Remarks	ACK7 contact	ACK7 voltage	ACK8 contact	ACK8 voltage
1	DC12V_OUT	Out	ACK7 In	Pin #1-#2: short	No connection		
2	DIGI_IN7	In			MPYC-12		
3	DIGI_RTN7	Out		MPYC-12		-	
4	GND (DC12V)	In			No connection		
5	DC12V_OUT	Out	ACK8 In			Pin #1-#2: short	No connection
6	DIGI_IN8	In					MPYC-12
7	DIGI_RTN8	Out		-		MPYC-12	
8	GND (DC12V)	In					No connection

2.8.5 MC-3010A/3020D jumper setting

This section shows how to set the MC-ANLG Board (24P0115, for MC-3010A) and MC-DIN Board (24P0116, for MC-3020D).
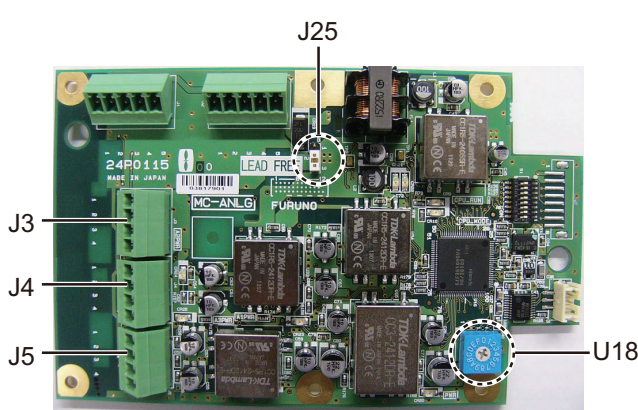
MC-ANLG Board (24P0115)
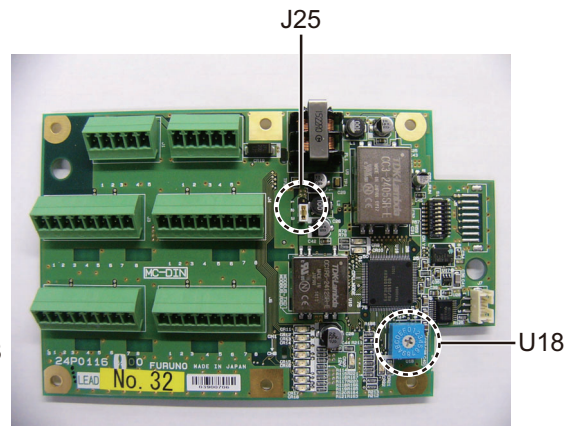
MC-DIN Board (24P0116)

Setting MODBUS addresses

Use the rotary switch U18 to set the MODBUS address with a digit of number from "0". When multiple sensor adapters are connected to the MC-3000S, the same number cannot be used among them. (The same number can be shared between the MC-3000S and a sensor adapter.)

Setting termination resistors

Use the jumper block J25 to set the termination resistor on/off for the MODBUS communication on the connector J1. For the first and last sensor adapter in a series, their termination resistors should be set to ON. If not, communication between sensor adapters is not possible.

| Jumper block J25		Connector J1
1-2	OPEN	Termination resistor: OFF (default setting)
2-3	SHORT	
1-2	SHORT	Termination resistor: ON
2-3	OPEN	

2.8.6   MC-3010A/3020D case packing OP24-29 (optional)

The optional kit OP24-29 protects the connectors on the MC-3010A/3020D to water-proofing standard IPX2.

Case packing (type: OP24-29, code no.: 001-169-960)

Name	Type	Code No.	Qty
Case packing	21-014-2052-2	100-367-961-10	2

1. Unfasten four binding screws to remove the cover from the adapter.
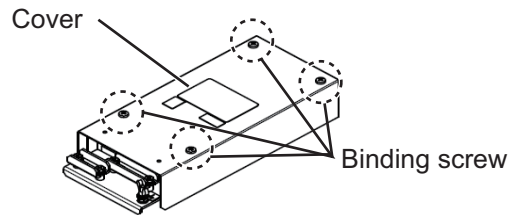
2. Peel the paper from the case packing, then attach the case packing to the reverse side of the cover and the body unit as shown below.

Cover (reverse side)
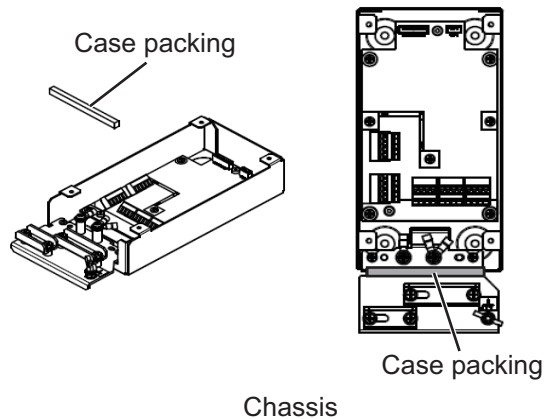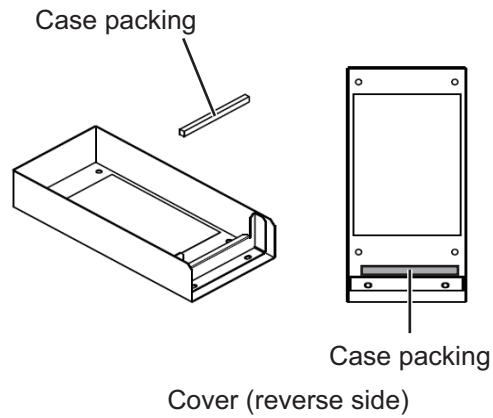
Chassis

3. Attach the cover to the MC-3010A/3020D chassis.

2.9   Intelligent HUB HUB-3000

Fix the LAN cable connected to the cable clamp using the cable ties (supplied).
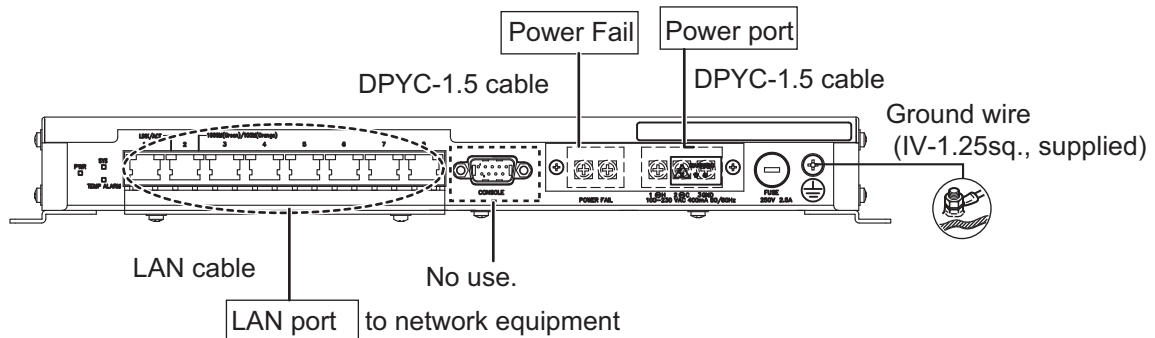
Attach the LAN port cap (supplied) to the unused connector holes to provide waterproofing standard IPX2.
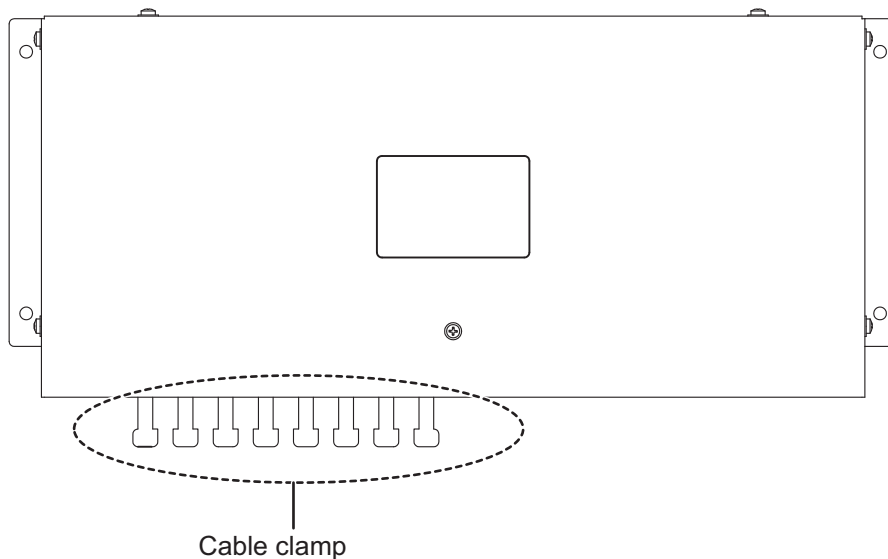
2.10   Power Supply Unit PSU-011

For wiring details, refer to the interconnection diagram at the back of this manual.

1. Unfasten the cable clamp.

2. Remove four screws to remove the cover from the unit.

3. Attach the crimp-on lugs (FV2-4, supplied) to the power cable, then connect between the PSU-011 and J1 port on the DCU.

4. Attach the crimp-on lugs (FV2-4, supplied) to the power cable, then connect between the PSU-011 and power source.

5. Fasten the cable clamp, then reattach the cover.

2.11   IP Addresses of the Unit

The IP addresses of each unit are shown below.

```
┌─────────────────────────────────────────────────────────────────────────────┐
│                        ┌──────────────────┐  ┌─────┐  ┌──────────────────────────┐
│                        │                  │  │ J21 ├──┤ Float-Free DRU VR-7021F   │
│                        │                  │  └─────┘  │ IP address: 10.0.0.150    │
│                        │                  │           └──────────────────────────┘
│                        │                  │  ┌─────┐  ┌──────────────────────────┐ Radar/ECDIS
│                        │                  │  │ J22 ├──┤ Video LAN Converter VR-7100
│                        │                  │  └─────┘  │ (VLC1)
│  ┌ ─ ─ ─ ─ ─ ─ ─ ─ ┐   │                  │           │ IP address: 10.0.0.120   │
│                        │                  │  ┌─────┐  ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐ Radar/ECDIS
│  │ AUDIO Board      │  │                  │  │ J23 ├──  Video LAN Converter VR-7100
│    24P0134             │                  │  └─────┘  │ (VLC2)
│  │ IP address:      │  │ For internal     │           │ IP address: 10.0.0.130   │
│    10.0.0.110          │ network          │  ┌─────┐  └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
│  └ ─ ─ ─ ─ ─ ─ ─ ─ ┘   │ IP address:      │  │ J24 │
│                        │ 10.0.0.100       │  └─────┘
│                        │                  │  ┌─────┐  ┌──────────────────────────┐
│                        │                  │  │ J25 ├──┤ Fixed DRU VR-7020         │
│                        │                  │  └─────┘  │ IP address: 10.0.0.140    │
│  Data Collecting       │                  │           └──────────────────────────┘
│  Unit (DCU)            │                  │  ┌─────┐ ┌─────┐ ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
│  VR-7010               │                  │  │J26* ├─┤J502 ├─  PC (Live Player/Maintenance Viewer)
│                        └──────────────────┘  └─────┘ └─────┘ │ IP address: 10.0.0.101 or
│                                                                            10.0.0.102          │
│                                                              └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
│                        ┌──────────────────┐  ┌─────┐
│                        │                  │  │ J11 ├───┐      ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
│                        │                  │  └─────┘   │       Radar/ECDIS/AMS
│                        │                  │  ┌─────┐   │      │ (IEC61162-450)            │
│                        │                  │  │ J12 │   ├──────  IP address: 172.31.**.**
│                        │                  │  └─────┘   │      └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
│                        │                  │  ┌─────┐  ┌┴──┐   ┌──────────────────────────┐
│                        │                  │  │ J13 ├──│HUB│───│ Sensor Adapter
│                        │                  │  └─────┘  │   │   │ IP address:
│                        │ For IEC61162-450 │  ┌─────┐  │   │   │ 172.31.17.101
│                        │ IP address range:│  │ J14 ├──│   │   │ 172.31.16.102
│                        │ 172.31.16.1-254, │  └─────┘  │   │   │ 172.31.17.102
│                        │ 172.31.17.1-254  │  ┌─────┐  │   │   │ 172.31.16.103
│                        │ (Default:        │  │ J15 ├──│   │   │ 172.31.17.103
│                        │ 172.31.16.200)   │  └─────┘  └───┘   │ 172.31.16.104
│                        │                  │                   │ 172.31.17.104             │
│                        │                  │  ┌─────┐   ┌──────────────────────────┐
│                        │                  │  │ J16 ├───┤ Sensor Adapter MC-3000S  │
│                        │                  │  └─────┘   │ IP address: 172.31.16.101 │
│                        │                  │            └──────────────────────────┘
│                        │                  │  ┌─────┐ ┌─────┐ ┌──────────────────────────┐
│                        │                  │  │J17*1├─┤J502 ├─┤ PC (Live Player/Maintenance
│                        └──────────────────┘  └─────┘ └─────┘ │ Viewer)
│                        ┌──────────────────┐  ┌─────┐         │ IP address: 172.31.16.201 or
│                        │ For external     │  │J41*2│                      172.31.16.202   │
│                        │ network          │  └─────┘         └──────────────────────────┘
│                        │ IP address:      │  ┌─────┐
│                        │ Not assigned     │  │J42*2│
│                        │ (Default)        │  └─────┘
│                        └──────────────────┘
└─────────────────────────────────────────────────────────────────────────────┘
```

*1: The J502 port (DATA) is connected to the J17 port internally in default. When you input the radar/ECDIS video signal with the IEC61162-450 (LAN) format, disconnect the LAN cable from the J17 port and connect it to the J26 port (see section 2.1.4).

*2: If your CPU board is "ADP-586-31", the DCU does not have J41 and J42 ports.

3. SETTING UP THE EQUIPMENT

After installing the VR-7000/7000S, configure the system. For details, see the manual for VDR Maintenance Viewer and Live Player V5.

The outline of the setup is as below.

Step 1. Network setting on PC and VDR
Step 2. Software setting
Step 3. Backup data setting
Step 4. Software configuration from file data
Step 5. Media management
Step 6. Other functions

After setting up, save a backup copy of the configuration data to both a CompactFlash (CF) in the DCU and the PC that has the VDR Maintenance Viewer.

3.1 System Time Adjustment

The system time, used for time-stamping VDR data, synchronizes with the UTC time if the system time is behind the UTC time within 10 seconds. After Installing the VR-7000/7000S, do the procedure bellow to set the system time within 10 seconds behind the UTC time.

1. Remove seven binding screws to detach the cover from the DCU.

2. Connect a VGA monitor and keyboard to the DCU.

Connect a VGA monitor to the VGA port.

Connect a keyboard to the USB port.
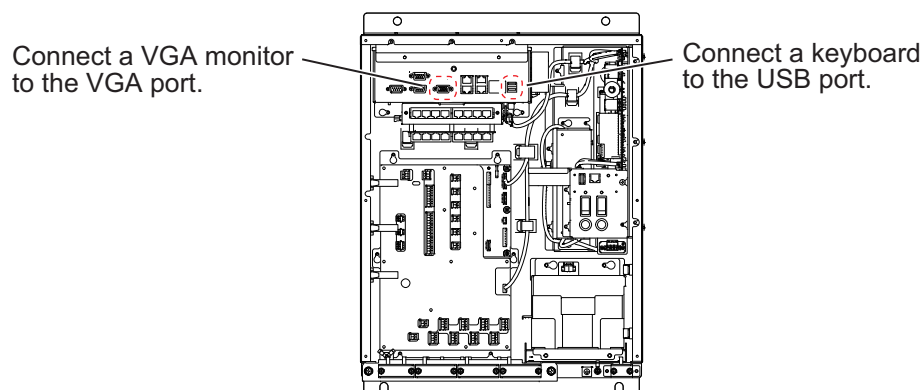
3. Turn on the system while pressing and holding down the **F2** key.

4. Wait until the BIOS display appears. (Keep the **F2** key pressed.)

5. Set the system time within 10 seconds behind the UTC time.

6. Press the **F10**, **Y**, and **Enter** keys in order to save data.

7. Reboot the system.

8. Confirm that the system time is within 10 seconds behind the UTC time.

3.2 Recording Expiration Date of Parts

After installing and setting up the system, cut out (or copy and cut) the expiration data sheet provided below. Then record the date of expiration date of each item on the sheet.

For VR-7000S systems, record the expiration date for either the VR-7020 or the VR-7021F, as appropriate.

Interval-specific parts	Life	Date of expiration
Battery in DCU	4 years	
Hydrostatic release unit in float-free DRU	2 years	
Battery in float-free DRU	5 years	
Battery in the beacon of fixed DRU	3 years	

• Battery in DCU
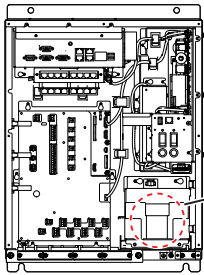
Size	xxx-xxxx-xx
Date	xx xx xx
S.NO	xxxxxxxx

This date is production date.
Install within 18 months after the date.
Record the installation date + four years.

• Hydrostatic release unit in float-free DRU
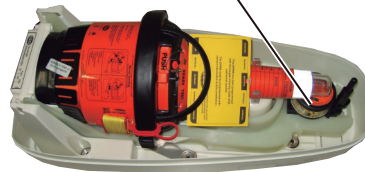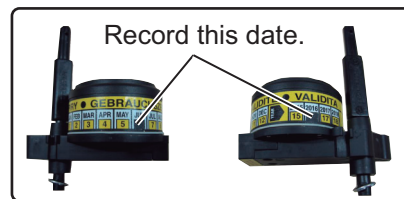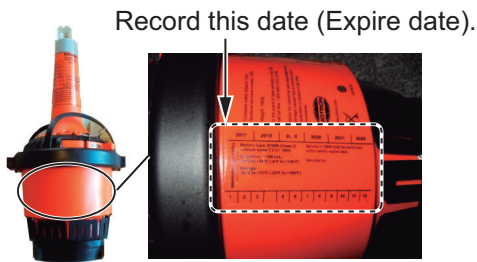
Record this date.

• Battery in float-free DRU

Record this date (Expire date).

• Battery in the beacon of fixed DRU
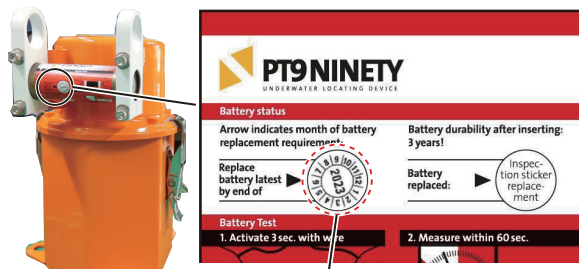
Record this date* (battery replacement information for beacon).

*: If the label on the beacon is the following label, record the date on the label + three years.

Record this date (date of inserting the internal battery) + three years.

After recording the date of expiration, place the sheet in the card holder on the rear side of the DCU cover. In addition, enter the expiration date information to the VDR, using the VDR Maintenance Viewer program. For how to enter the information, see the instruction manual of the VDR Maintenance Viewer (OME-44852).

Card holder

Rear side of the DCU cover
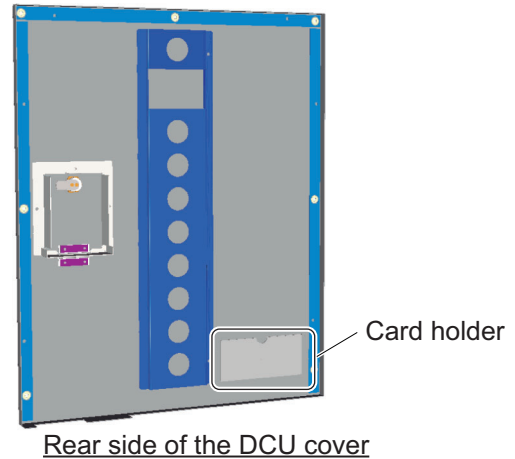
3.3 DIP Switch Setting in Video LAN Converter

Set the DIP switch (S1) in the cases shown below.

- When two video LAN converters are installed:
  Turn on the S1-1 in the No.2 video LAN converter (No.2 VLC).

- When the RGB1 or RGB2 port is used:
  Turn on the S1-3 (RGB1) or S1-4 (RGB2) when you input the video signal of the FAR-28×7 series radar (resolution: 1360×1024) to the RGB port.

The location and setting of the DIP switch are shown below.

DIP switch S1
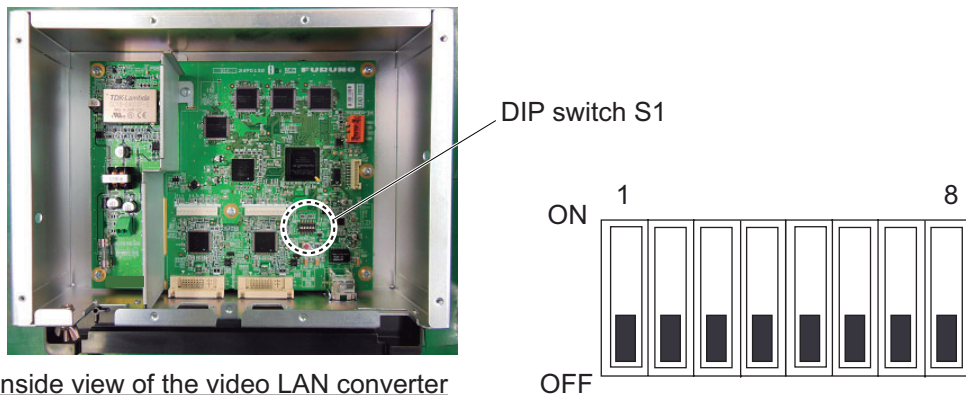
Inside view of the video LAN converter

Dip SW	S1-1	S1-2	S1-3	S1-4	S1-5 to S1-8
ON	No.2 VLC	Used for maintenance.	For inputting the video signal of the FAR-28×7 series radar (resolution: 1360×1024) to the RGB1 port.	For inputting the video signal of the FAR-28×7 series radar (resolution: 1360×1024) to the RGB2 port.	No use.
OFF (Default setting)	No.1 VLC	Normal operation.	For inputting the video signal of the FAR-21×7 series radar or other model to the RGB1 port.	For inputting the video signal of the FAR-21×7 series radar or other model to the RGB2 port.	Normal operation.

3.4 How to Configure the VR-7000S

This procedure is for VR-7000S (Program version 1.10 and later) systems, in case of a VR-7000 system, skip this procedure.

Note: If you purchased a VR-7000S without capsule, remove the wheel label attached on the Data Collecting Unit.

1. Start the VDR Maintenance Viewer.

2. From the menu, select [Maintenance], [VDR Config Management], [Download]. Click the [OK]button twice then the [Close] button.

3. Click the [System] tab.

4. Select the VR-7000S in the [VDR Type].

5. Put a check in check box for [Fixed DRU Connection] (VR-7020) or [Float DRU Connection] (VR-7021F) as appropriate for your system configuration. [Fixed DRU Connection] is checked by default.

6. Confirm that [SAVE Function] is checked. This field is not checked if VR-7000 is selected step 4.

7. Click the [Set] button.

8. From the menu, select [Maintenance], [VDR Config Management], [Upload].

9. A confirmation window appears; click the [OK] button to start uploading to the VDR.

10. Click the [Write] button.

11. The message "VDR will be rebooted. Continue?" appears. Click the [OK] button to continue.
You are logged out of the VDR Maintenance Viewer. The reboot takes several minutes.

12. After the reboot, press the **MENU/ESC** key to open the main menu on the base screen of the RAP (Remote Alarm Panel).

13. Use the cursorpad (▲ or ▼) to select [Settings], [Servicemen Settings] in order. [Enter Password] pop-up window appears.

14. Press ▲, ▼, ◄, ►, **MENU/ESC**, **ENT** in order.

15. Use the cursorpad (▲ or ▼) to select [Save Function] then press the **ENT** key.

16. Use the cursorpad (◄ or ►) to select [ON] then press the **ENT** key.
Note 1: Using the VR-7000S, make the [SAVE Function] active.
Note 2: About the [SAVE Function], if each setting between DCU and RAP is different, the alert appears. Using the VR-7000, make the [SAVE Function] inactive. Using the VR-7000S, make the [SAVE Function] active.
Note 3: If you select the different recording unit step 5 from the recording unit actually installed, the alert appears. Select the correct recording unit step 5.

3.5 Brilliance Sharing with EC-3000 Units

The RAP can share the brilliance settings with EC-3000 units (ex: ECDIS, chart radar) in the same network. When you adjust the brilliance of the EC-3000 units, the brilliance of the RAP is automatically changed. Note that the brilliance of the EC-3000 units is not changed when the RAP brilliance is changed.

To enable the brilliance sharing function, do as follows.

Note: The VDR software version must be "01.40" or later to use the brilliance sharing function.

1. Start the VDR Maintenance Viewer.

2. From the menu, select [Maintenance], [VDR Config Management], [Download]. Click the [OK] button twice then the [Close] button.

3. Click the [System] tab.

4. Put a check in check box for [Brilliance Sync Function].

5. Click the [Set] button.

6. From the menu, select [Maintenance], [VDR Config Management], [Upload].

7. A confirmation window appears; click the [OK] button to start uploading to the VDR.

8. Click the [Write] button.

9. The message "VDR will be rebooted. Continue?" appears. Click the [OK] button to continue.
   You are logged out of the VDR Maintenance Viewer. The reboot takes several minutes.

10. After the reboot, press the **MENU/ESC** key to open the main menu on the base screen of the RAP (Remote Alarm Panel).

11. Use the cursorpad (▲ or ▼) to select [Settings], [Servicemen Settings] in order. [Enter Password] pop-up window appears.

12. Press ▲, ▼, ◀, ▶, **MENU/ESC**, **ENT** in order.

13. Use the cursorpad (▲ or ▼) to select [Brilliance Sync Function] then press the **ENT** key.

14. Use the cursorpad (◀ or ▶) to select [ON] then press the **ENT** key.
    When [Brilliance Sync Function] is set to [ON], the menu items for the brilliance sharing ([Brilliance Sync] and [Brilliance Sync Settings]) appear on the [Settings] menu.

15. Press the **MENU/ESC** key to go back to the [Settings] menu.

16. Use the cursorpad (▲ or ▼) to select [Brilliance Sync] then press the **ENT** key.

17. Use the cursorpad (◀ or ▶) to select [ON] then press the **ENT** key.

18. Adjust the brilliance of the EC-3000 units, then confirm that the RAP brilliance changes accordingly.

Consistency check

Open the event log on the VDR Maintenance Viewer to check the consistency of the brilliance sharing setting between DCU and RAP. For how to open the event log, see the Instruction Manual (OME-44852).

• When the startup event log is "Brilliance sync function settings are the same.", the setting consistency is correct.

• When the startup event log is "Brilliance sync function settings are difference.", the brilliance sharing setting is different between the DCU and RAP. Check the settings for the DCU and RAP.

3.6 Timeout Settings for Serial Input Signal

Be sure to set the timeout settings for all serial channels. If the timeout setting is not adjusted, the serial communication error alert does not occur when serial connected equipment is disconnected.

You can adjust the timeout settings from the VDR Maintenance Viewer*. The timeout settings must be higher than the transmission rate of the connected equipment.

After completing the timeout settings, it is recommended that you make a copy of the following table and make a note of the settings, then put the table on a wall near the remote alarm panel.

*: For how to use the VDR Maintenance Viewer, see the Instruction Manual (OME-44852).

VDR Serial Input Signal List

Serial CH No.	Equipment Name	Timeout Setting
01		
02		
03		
04		
05		
06		
07		
08		
09		
10		
11		
12		
13		
14		
15		
16		

3.7 Connecting with External Network

To connect with an external network other than the VDR private network and IEC61162-450 network, use the J41 or J42 port. The IP addresses for ports J41 and J42 are not assigned by default. Set the IP address and activate the port filtering from the VDR Maintenance Viewer*.

*: For how to use the VDR Maintenance Viewer, see the Instruction Manual (OME-44852).

Note 1: If your CPU board is "ADP-586-31", the DCU does not have J41 and J42 ports.

Note 2: When the port filtering is activated, access to the VDR from an external network is only available via Live Player V5. Note that the VDR Maintenance Viewer can not access the VDR from an external network. To use the VDR Maintenance Viewer, connect to ports J11 to J16, J21 to J26 or J501. Also, VDR data is sent correctly regardless of the port filtering setting.

APPENDIX 1 JIS CABLE GUIDE

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

JIS cable names may have up to 6 alphabetical characters, followed by a dash and a numerical value (example: DPYC-2.5).
For core types D and T, the numerical designation indicates the *cross-sectional Area (mm^2)* of the core wire(s) in the cable.
For core types M and TT, the numerical designation indicates the *number of core wires* in the cable.

1. Core Type
D: Double core power line
T: Triple core power line
M: Multi core
TT: Twisted pair communications
        (1Q=quad cable)

2. Insulation Type
P: Ethylene Propylene Rubber

3. Sheath Type
Y: PVC (Vinyl)

DPYCY

TPYCY

4. Armor Type
C: Steel

5. Sheath Type
Y: Anticorrosive vinyl sheath

6.   Shielding Type
S: All cores in one sheath
-S: Indivisually sheathed cores
SLA: All cores in one shield, plastic tape w/aluminum tape
-SLA: Individually shielded cores, plastic tape w/aluminum tape
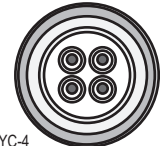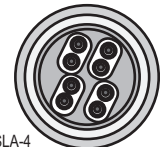
MPYC-4

TTYCSLA-4

EX: TTYCYSLA - 4   MPYC - 4
     1 2 3 4 5   6   1 2 3 4
     Designation type └ Core Area (mm^2) ┘   Designation type ┘   # of cores ┘

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

Type	Core Area	Core Diameter	Cable Diameter	Type	Core Area	Core Diameter	Cable Diameter
DPYC-1.5	1.5mm^2	1.56mm	11.7mm	TTYCS-1	0.75mm^2	1.11mm	10.1mm
DPYC-2.5	2.5mm^2	2.01mm	12.8mm	TTYCS-1T	0.75mm^2	1.11mm	10.6mm
DPYC-4	4.0mm^2	2.55mm	13.9mm	TTYCS-1Q	0.75mm^2	1.11mm	11.3mm
DPYC-6	6.0mm^2	3.12mm	15.2mm	TTYCS-4	0.75mm^2	1.11mm	16.3mm
DPYC-10	10.0mm^2	4.05mm	17.1mm	TTYCSLA-1	0.75mm^2	1.11mm	9.4mm
DPYCY-1.5	1.5mm^2	1.56mm	13.7mm	TTYCSLA-1T	0.75mm^2	1.11mm	10.1mm
DPYCY-2.5	2.5mm^2	2.01mm	14.8mm	TTYCSLA-1Q	0.75mm^2	1.11mm	10.8mm
DPYCY-4	4.0mm^2	2.55mm	15.9mm	TTYCSLA-4	0.75mm^2	1.11mm	15.7mm
MPYC-2	1.0mm^2	1.29mm	10.0mm	TTYCY-1	0.75mm^2	1.11mm	11.0mm
MPYC-4	1.0mm^2	1.29mm	11.2mm	TTYCY-1T	0.75mm^2	1.11mm	11.7mm
MPYC-7	1.0mm^2	1.29mm	13.2mm	TTYCY-1Q	0.75mm^2	1.11mm	12.6mm
MPYC-12	1.0mm^2	1.29mm	16.8mm	TTYCY-4	0.75mm^2	1.11mm	17.7mm
TPYC-1.5	1.5mm^2	1.56mm	12.5mm	TTYCY-4S	0.75mm^2	1.11mm	21.1mm
TPYC-2.5	2.5mm^2	2.01mm	13.5mm	TTYCY-4SLA	0.75mm^2	1.11mm	19.5mm
TPYC-4	4.0mm^2	2.55mm	14.7mm	TTYCYS-1	0.75mm^2	1.11mm	12.1mm
TPYCY-1.5	1.5mm^2	1.56mm	14.5mm	TTYCYS-4	0.75mm^2	1.11mm	18.5mm
TPYCY-2.5	2.5mm^2	2.01mm	15.5mm	TTYCYSLA-1	0.75mm^2	1.11mm	11.2mm
TPYCY-4	4.0mm^2	2.55mm	16.9mm	TTYCYSLA-4	0.75mm^2	1.11mm	17.9mm

APPENDIX 2 CABLE FABRICATION

Fabrication of DPYC cable
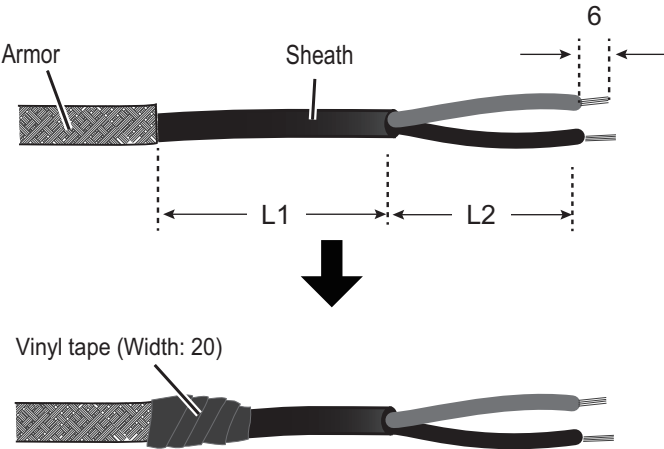
Fabrication of DPYCY cable
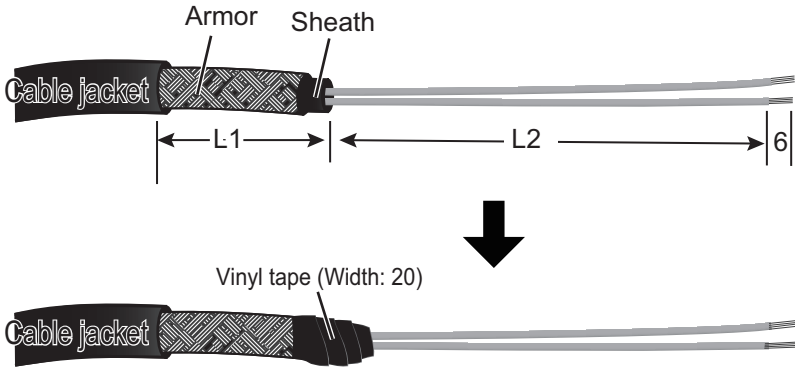
Fabrication of TTYCSLA cable
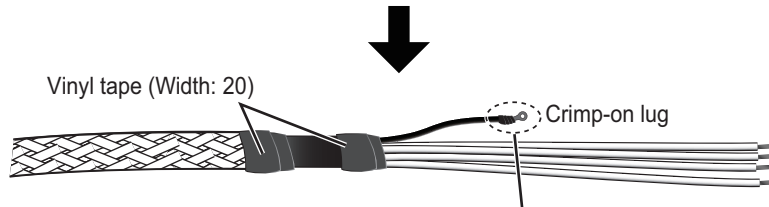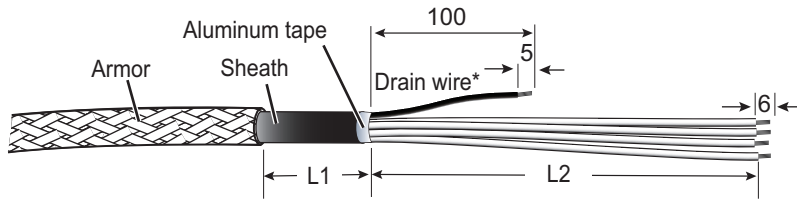
*: The drain wire is not required for the access points shown below.

Access point	
Unit	Connector No.
VR-7010	J301-J308
	J201-J210
VR-7011	J1

Fabrication of TTYCYSLA cable

Fabrication of MC1.5-W-L cable

Vinyl tape Shield (fold back) Core: 6

10 20 L1
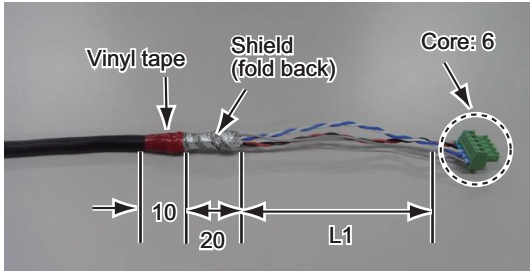
Fabrication of MPYC-12 cable (MC-3020D)

135
80 or more
95
No use: 50
(Wind vinyl tape to insulate.) Core: 6
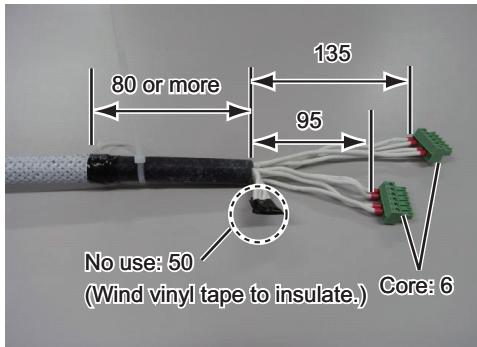
How to connect wires to the WAGO connector

Press downward.
Terminal opener
Wire WAGO connector
Twist
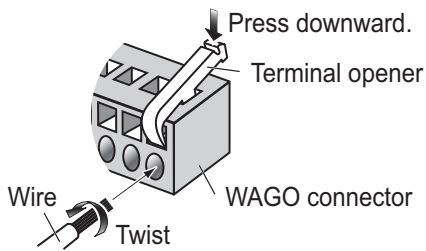
<Procedure>
1. Twist the cores.
2. Press the terminal opener downward.
3. Insert the wire to hole.
4. Remove the terminal opener.
5. Pull the wire to confirm that it is secure.

The terminal opener is preattached inside of the DCU. See the figure below.

Terminal opener

DCU (cover removed)
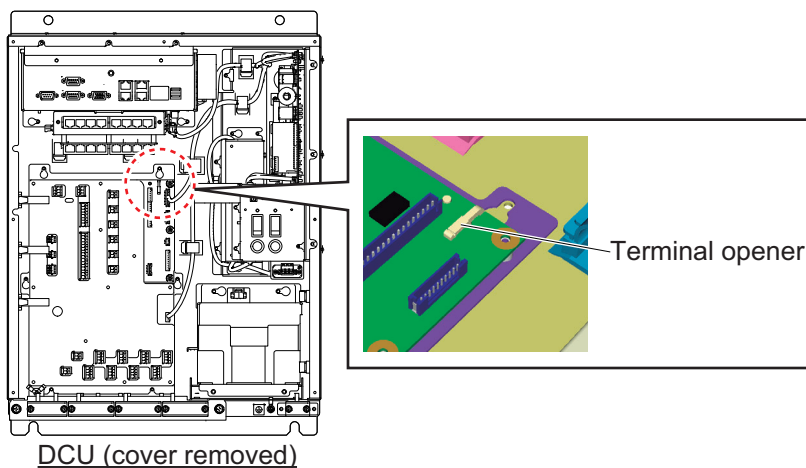
You can use the slotted head screwdriver instead of the terminal opener.

AP-4

Fabrication of the LAN cable

・For VR-7010

Armor

| L1 | L2 |

Cable jacket

Outer vinyl sheath

Inner vinyl sheath

Vinyl tape (Width: 20)

・For other units

Armor

| L1 | L2 |

Cable jacket

Outer vinyl sheath

Inner vinyl sheath

Vinyl tape (Width: 20)
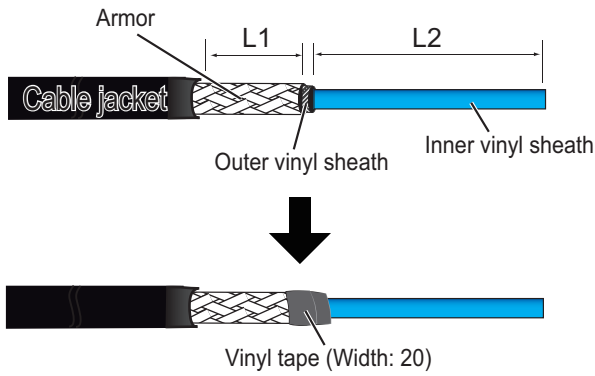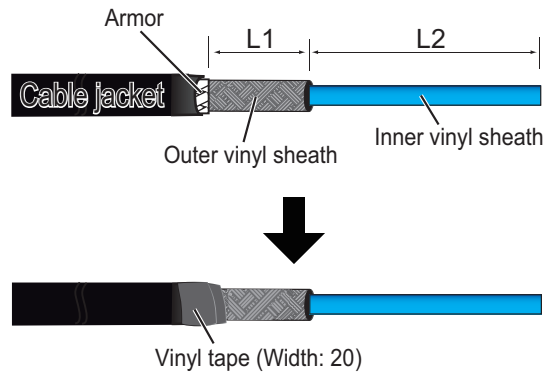
1

Expose inner vinyl sheath.

2

25 mm

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

3

approx. 9 mm
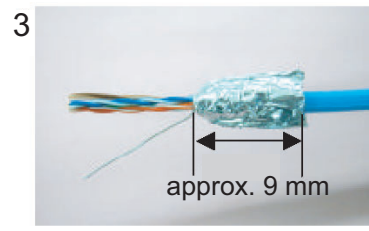
Fold back the shield, wrap it onto the inner vinyl sheath and cut it, leaving 9 mm.

4

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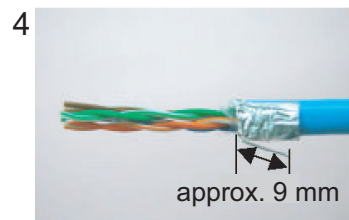
Fold back drain wire and cut it, leaving 9 mm.

5

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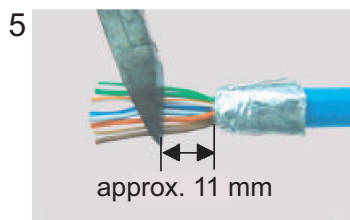
Straighten and flatten the core in order and cut them, leaving 11 mm.

6

Drain wire

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

7

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

Modular plug

1   8

[Cross cable]

①WHT/GRN ——— WHT/ORG①
② GRN ——— ORG ②
③WHT/ORG ——— WHT/GRN③
④ BLU ——— BLU ④
⑤WHT/BLU ——— WHT/BLU⑤
⑥ ORG ——— GRN ⑥
⑦WHT/BRN ——— WHT/BRN⑦
⑧ BRN ——— BRN ⑧

[Straight cable]

①WHT/ORG ——— WHT/ORG①
② ORG ——— ORG ②
③WHT/GRN ——— WHT/GRN③
④ BLU ——— BLU ④
⑤WHT/BLU ——— WHT/BLU⑤
⑥ GRN ——— GRN ⑥
⑦WHT/BRN ——— WHT/BRN⑦
⑧ BRN ——— BRN ⑧

AP-5
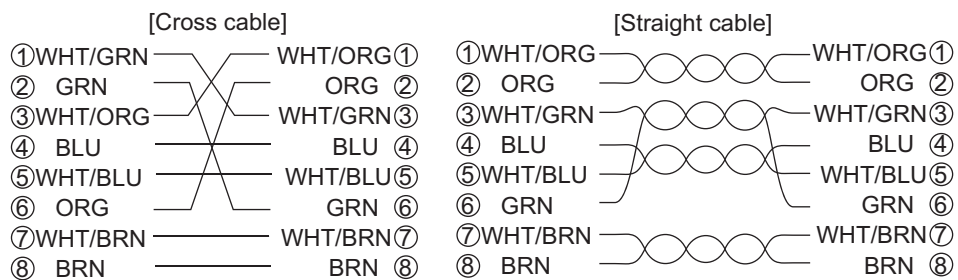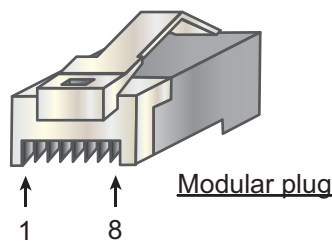
The length of "L"

The length of "L1" and "L2" in the figure on AP-2 to AP-5 page is shown below.

Cable	Access point		The length of "L"	
	Unit	Connector No.	L1	L2
DPYC cable	VR-7010	J1	0 mm	More than 200 mm
		J313	0 mm	More than 350 mm
	IF-7100	J1	0 mm	220 mm
	MC-3000S	J2	80 mm	85 mm
DPYCY cable	VR-7010	J311-J312	30 mm	More than 350 mm
TTYCSLA cable	VR-7010	J309	0 mm	500 mm
		J310	0 mm	500 mm
		J301-J308	0 mm	500 mm
		J201-J202	0 mm	500 mm
		J203-J208	0 mm	250 mm
	VR-7011	J1	0 mm	50 mm
	VR-7017	J101	30 mm	100 mm
	MC-3000S	J2	80 mm	100 mm
		J4/J6	80 mm	100 mm
		J5/J7	80 mm	120 mm
		J8	80 mm	#1 to 4: 100 mm #5 to 8: 95 mm
		J9	80 mm	#1 to 4: 100 mm #5 to 8: 90 mm
	MC-3010A	J3-J5	80 mm	60 mm
TTYCYSLA cable	VR-7010	J209-J210	30 mm	250 mm
	VR-7012W	J1	See section 1.6.	
FR-FTPC-CY cable	VR-7010	J11-J16	30 mm	725 mm
		J21-J26	30 mm	725 mm
	IF-7100	J4	0 mm	55 mm
	MC-3000S	J3	50 mm	55 mm
MC1.5-W-L cable	MC-3000S	J1	110 mm	-
	MC-3010A/ MC-3020D	J1	120 mm	-
		J2	100 mm	-

APPENDIX 3 ROD TERMINALS

How to attach the rod terminal (ferrule type)

Vinyl sheath

Core

L

0.5 to 1 mm

Rod terminal (ferrule type):
After attaching the rod terminal, use the
optional crimping tool CRIMPFOX 10S
to crimp.
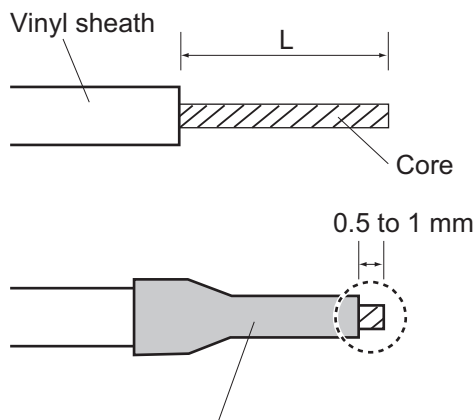
Rod terminal	The length of "L"
AI 1.5-6 BK (black)	6 mm
AI 0.34-6 TQ (blue)	
AI 0.75-6 GY (gray)	
AI 1-6 RD (red)	
AI 0.14-8 GY (gray)	8 mm
A 1.5-10	10 mm

VR-7010 (AC IN)

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J1	1	AC_H	AI 1.5-6 BK (black)	DPYC-1.5
	2	AC_C		
	3	NC	-	-

VR-7010 TB Board (24P0133)

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J311	1	24 V	A 1.5-10	DPYCY-1.5
	2	0 V		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J312	1	24 V	A 1.5-10	DPYCY-1.5
	2	0 V		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J313	1	24 V	A 1.5-10	DPYC-1.5
	2	0 V		
	3	NC	-	-

IF-7100 VLC Board (24P0132)

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J1	1	24 V_IN	A 1.5-10	DPYC-1.5
	2	24 V_GND		

VR-7020

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J1	1	24 V	AI 1.5-6 BK (black)	DPYCY-1.5
	2	24 V	-	-
	3	0 V	AI 1.5-6 BK (black)	DPYCY-1.5
	4	0 V	-	-
	5	N/C	-	-
	6	TD_P	AI 0.14-8 GY (gray)	FR-FTPC-CY
	7	TD_N		
	8	RD_P		
	9	RD_N		
	10	N/C	-	-

MC-3000S, MC-CS Board (24P0114)

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J1	1	24V_VOUT	AI 0.34-6 TQ (blue)	MC1.5-W-Lxxx
	2	24V_GND		
	3	MODBUS-A	AI 0.14-8 GY (gray)	
	4	MODBUS-B		
	5	GND		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J2	1	24V_IN	AI 1.5-6 BK (black)	DPYC-1.5
	2	24V_GND		
	3	PWR_FAIL-A	AI 0.75-6 GY (Gray)	TTYCS-4 TTYCSLA-4
	4	PWR_FAIL-COM		
	5	PWR_FAIL-B		
	6	NC	-	-

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J4	1	TD1-A	AI 0.75-6 GY (Gray)	TTYCS-4 TTYCSLA-4
	2	TD1-B		
	3	RD1-A		
	4	RD1-B		
	5	ISOGND1		
	6	RD1-H		
	7	RD1-C		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J5	1	TD2-A	AI 0.75-6 GY (gray)	TTYCS-4 TTYCSLA-4
	2	TD2-B		
	3	RD2-A		
	4	RD2-B		
	5	ISOGND2		
	6	RD2-H		
	7	RD2-C		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J6	1	TD3-A	AI 0.75-6 GY (gray)	TTYCS-4 TTYCSLA-4
	2	TD3-B		
	3	RD3-A		
	4	RD3-B		
	5	ISOGND3		
	6	RD3-H		
	7	RD3-C		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J7	1	TD4-A	AI 0.75-6 GY (gray)	TTYCS-4 TTYCSLA-4
	2	TD4-B		
	3	RD4-A		
	4	RD4-B		
	5	ISOGND4		
	6	RD4-H		
	7	RD4-C		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J8	1	TD5-A	AI 0.75-6 GY (gray)	TTYCS-1Q TTYCSLA-1Q
	2	TD5-B		
	3	RD5-H		
	4	RD5-C		
	5	TD6-A		TTYCS-1Q TTYCSLA-1Q
	6	TD6-B		
	7	RD6-H		
	8	RD6-C		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J9	1	TD7-A	AI 0.75-6 GY (gray)	TTYCS-1Q TTYCSLA-1Q
	2	TD7-B		
	3	RD7-H		
	4	RD7-C		
	5	TD8-A		TTYCS-1Q TTYCSLA-1Q
	6	TD8-B		
	7	RD8-H		
	8	RD8-C		

MC-3010A MC-ANALG Board (24P0115)

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J1	1	24V_IN	AI 0.34-6 TQ (blue)	MC1.5-W-Lxxx
	2	24V_GND		
	3	MODBUS-A	AI 0.14-8 GY (gray)	
	4	MODBUS-B		
	5	GND		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J2	1	24V_OUT	AI 0.34-6 TQ (blue)	MC1.5-W-Lxxx
	2	24V_GND		
	3	MODBUS-A	AI 0.14-8 GY (gray)	
	4	MODBUS-B		
	5	GND		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J3*	1	AN1_IN	AI 0.75-6 GY (gray)	TTYCS-1 TTYCSLA-1
	2	AN1_GND		
	3	CURR1_JP1		
	4	CURR1_JP2		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J4*	1	AN2_IN	AI 0.75-6 GY (gray)	TTYCS-1 TTYCSLA-1
	2	AN2_GND		
	3	CURR2_JP1		
	4	CURR2_JP2		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J5*	1	AN3_IN	AI 0.75-6 GY (gray)	TTYCS-1 TTYCSLA-1
	2	AN3_GND		
	3	CURR3_JP1		
	4	CURR3_JP2		

*: For pin #3 and 4, no cable is connected. However the jumper connection is necessary depending on the input specification.

MC-3020D, MC-DIN Board (24P0116)

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J1	1	24V_IN	AI 0.34-6 TQ (blue)	MC1.5-W-Lxxx
	2	24V_GND		
	3	MODBUS-A	AI 0.14-8 GY (gray)	
	4	MODBUS-B		
	5	GND		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J2	1	24V_OUT	AI 0.34-6 TQ (blue)	MC1.5-W-Lxxx
	2	24V_GND		
	3	MODBUS-A	AI 0.14-8 GY (gray)	
	4	MODBUS-B		
	5	GND		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J3*	1	DV12V_OUT1	AI 1-6 RD (red)	MPYC-12
	2	DIGI_IN1		
	3	DIGI_RTN1		
	4	GND		
	5	DC12V_OUT2		
	6	DIGI_IN2		
	7	DIGI_RTN2		
	8	GND		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J4*	1	DV12V_OUT3	AI 1-6 RD (red)	MPYC-12
	2	DIGI_IN3		
	3	DIGI_RTN3		
	4	GND		
	5	DC12V_OUT4		
	6	DIGI_IN4		
	7	DIGI_RTN4		
	8	GND		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J5*	1	DV12V_OUT5	AI 1-6 RD (red)	MPYC-12
	2	DIGI_IN5		
	3	DIGI_RTN5		
	4	GND		
	5	DC12V_OUT6		
	6	DIGI_IN6		
	7	DIGI_RTN6		
	8	GND		

*: Pin #1 and 5: no cable connection. However the jumper connection is necessary between #1 and 2 and #5 and 6 depending on the input specification.

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J6*	1	DV12V_OUT7	AI 1-6 RD (red)	MPYC-12
	2	DIGI_IN7		
	3	DIGI_RTN7		
	4	GND		
	5	DC12V_OUT8		
	6	DIGI_IN8		
	7	DIGI_RTN8		
	8	GND		

*: Pin #1 and 5: no cable connection. However the jumper connection is necessary between #1 and 2 and #5 and 6 depending on the input specification.

APPENDIX 4 DIGITAL INTERFACE

Digital Interface

ACN - Alert command

$--ACN,hhmmss.ss,aaa,x.x,x.x,c,a*hh<CR><LF>
           1   2 3   4 5 6
1. Time (UTC)
2. Manufacturer mnemonic code (3 digits)
3. Alert Identifier (0 - 9999999)
4. Alert Instance (1 - 999999,nul)
5. Alert command (A,Q,O,S)
   A=acknowledge
   Q=request/repeat information
   O*=responsibility transfer
   S=silence
   *: Not supported.
6. Sentence status flag (C) (fixed)

ALA - Set detail alarm condition

$--ALA, hhmmss.ss, aa, aa, xx, xxx, A, A, c—c *hh<CR><LF>
             1   2   3   4   5 6 7   8

1. Event time
   Event time of alarm condition change includeing acknowledgement state change. If this is not available, this shouled be a null field.
2. System Indicator of original alarm source
   Indicator characters as system of alarm source. This field is two fixed characters, see IEC61162-1 Ed.5.
3. Sub system equipment indicator of original alarm source
   Indicator characters as sub-system of alarm source. This field is two fixed characters, see IEC61162-1 Ed.5. For group alarms or if no sub-system can be identified, this should be a null field.
4. Instance number of equipment/unit/item
   Instance number identifying the equipment, unit or item. This field is two fixed numeric characters.
5. Type of alarm
   Type of alarm. This field is three fixed numeric characters as defined in IEC61162-1 Ed.5. Codes 900 to 999 are user definable.
6. Alarm condition
   This field is a single character specified by the following.
         N = normal state;
         H = alarm state (threshold exceeded);
         J = alarm state (extreme threshold exceeded);
         L = alarm state (low threshold exceeded, i.e. not reached);
         K = ararm state (extreme low threshold exceeded, i.e. not reached);
         X = other.
7. Alarm's acknowledged state
   This field is a single character specified by the following:
         A = acknowledged;
         V = not acknowledged;
         B = broadcast (acknowledged not applicable);
         H = habour mode;
         O = override.
8. Alarm's description text
   Additional and optional descriptive text/alarm detail condition tag. Maximum number of characters will be limited by maximum sentence length and length of other fields.

ALC - Cyclic alert list

$--ALC,xx,xx,xx,x.x, aaa,x.x,x.x,x.x,""""" *hh<CR><LF>
         1 2 3 4   5 6 7 8 9

1. Total number of sentences this message (01 to 99)
2. Sentence number (01 to 99)
3. Sequential message identifier (00 to 99)
4. Number of alert entries (0 to 3)
5. Manufacturer mnemonic code (FEC, null)
6. Alert identifier (999 or 10001 to 10999)
7. Alert instance (null)
8. Revision counter (1 to 99)
9. Additional alert entries (same as 5 and 8)

ALF - Alert sentence

$--ALF,x,x,x,hhmmss.ss,a,a,a,aaa,x.x,x.x,x.x,x,c--c*hh<CR><LF>
       1 2 3   4   5 6 7 8   9 10 11 12 13

1. Total number of ALF sentences for this message (1, 2)
2. Sentence number (1, 2)
3. Sequential message identifier (0 to 9)
4. Time of last change (hh=00 to 23, mm=00 to 59, ss.ss=00.00 to 60.99), null
5. Alert category (A=Alert category A, B=Alert category B, C=Alert category C), null
6. Alert priority (A=Alarm, W=Warning, C=Caution), null when #2 is 2.
7. Alert state (V=Not ACKed, S=Silence, A=ACked, O*/U=Resolved, Not ACKed, N=Normal state), null when #2 is 2.
   *: Not supported.
8. Manufacturer mnemonic code (FEC, null)
9. Alert identifier (999 or 10001 to 10999)
10. Alert instance (null)
11. Revision counter (1 to 99)
12. Escalation counter (0 to 2)
13. Alert text (max. 16 characters)

ALR - Set alarm state

$--ALR,hhmmss.ss,xxx,A,A,c--c*hh<CR><LF>
             1   2 3 4 5

1. Time of alarm condition change, UTC (000000.00 to 240001.00)
2. Unique alarm number (identifier) at alarm source (000 to 999)
3. Alarm condition (A=threshold exceeded, V=not exceeded)
4. Alarm's acknowledge state (A=acknowledged, V=not acknowledged)
5. Alarm's description text (alphanumeric)

DOR - Door status indication

$--DOR,a,hhmmss.ss,aa,cc,xxx,xxx,a,a,c--c*hh<CR><LF>
         1   2   3 4   5   6   7 8 9

1. Message type
   S=Status for section: the number of faulty and/or open doors reported in the division specified in
   field 4 and 5. The section may be a whole section (one or both of the division indicator fields are null) or
   a sub-section. The status S is normally transmitted at regular intervals.
   E = Status for single door. (E may be used to indicate an event).
   F = Fault in system: Division indicator fields defines the section when provided.
2. Event time
   Time when this status/message was valid.
3. Type of door monitoring system
   The field is two characters, see table below.
4. First division indicator
   First division indicator where door is located.
5. Second division indicator
   Second division indicator where door is located.
6. Door number or door open count
   This field is three fixed numeric characters. When the message type field is E this field identifies the
   door. When message type fields is S this field contains the number of doors that are open or faulty.
   When the message type field is F this field is null.
7. Door status
   When the message type is S or F this field shold be a null field. When the message type field is E.
   this field is specified by the following:
   O = Open   C = Close   F = Free status (for watertight door)   X = Fault (door status unknown)
8. Water tight door switch setting
   This field includes a single character specified by the following:
   O = Harbour mode (allowed open) C = Sea mode (ordered closed)
9. Message's description text
   Descriptive text/door tag. If a door allocation identifier is string type, it is possible to use this field instead
   of the above door allocation fields. The maximum number of characters will be limited by the maximum
   sentence length and the length of other fields.

Type of door monitoring system		First division indicator	Second division indicator
ID	System category		
WT	Watertight door	Number of watertight bulk-head/frame number	Deck number
WS	Semi-watertight door (splash-tight)		
FD	Fire door	Number / letter of zone. This can also be identifier for control and monitoring main system.	Deck number or control system loop number or other control system division indicator as is appropriate for system
HD	Hull (shell) door	Door indication number / frame number	Deck number
OT	Other	As above	As above

DPT - Depth

$--DPT,x.x,x.x,x.x*hh<CR><LF>
       1   2   3

1. Water depth relative to the transducer, in meters (0.00 to 99999.99)
2. Offset from transducer, in meters (-99.99 to 99.99)
3. Minimum range scale in use (no use)

DTM - Datum reference

$--DTM,ccc,a,x.x,a,x.x,a,x.x,ccc*hh<CR><LF>
            1 2 3 4 5 6 7   8
 1. Local datum (W84=WGS84 W72=WGS72 S85=SGS85, P90=PE90
    User defined=999, IHO datum code
 2. Local datum subdivision code (null or one character)
 3. Lat offset, min (-59.99999 to 59.59999)
 4. N/S
 5. Lon offset, min (no use)
 6. E/W
 7. Altitude offset, meters (no use)
 8. Reference datum (W84=WGS84 W72=WGS72 S85=SGS85, P90=PE90)

ETL - Engine telegraph operation status

$--ETL,hhmmss.ss,a,xx,xx,a,x*hh<CR><LF>
            1   2 3 4 5 6
 1. Event time (UTC)
 2. Message type (O=Order A=Answerback)
 3. Position indicator of engine telegraph
      00=Stop engine
      01=[AH] Dead Slow
      02=[AH] Slow
      03=[AH] Half
      04=Full
      05=[AH] Nav. Full
      11=[AS] Dead Slow
      12=[AS] Slow
      13=[AS] Half
      14=[AS] Fulll
      15=[AS] Crash Astern
 4. Position indication of sub telegraph (000 to 100)
 5. Operating location indicator (B=Bridge P=Port wing S=Starboard wing C=Engine control room
    E=Engine side/local W=Wing)
 6. Number of engine or propeller shaft (000 to 100)

FIR - Fire detection

$--FIR , $\underset{1}{A}$, $\underset{2}{hhmmss.ss}$, $\underset{3}{aa}$, $\underset{4}{cc}$, $\underset{5}{xxx}$, $\underset{6}{xxx}$, $\underset{7}{a}$, $\underset{8}{a}$, $\underset{9}{c--c}$ *hh<CR><LF>

1. Message type
   S: Status for section: the number of faulty and activated condition reported as number in field 6.The section
   may be a whole section (one or both of the division indicator fields are null) or a sub-section. The status S
   is normally transmitted at regular intervals. Examples of use are given in Annex E.
   E: Status for each detecter. (E may be used to indicate an event.)
   F: Fault in system: Division indicator fields defines the section when provided.
   D: Disabled: Detector is manually or automatically disabled from giving fire alarms.
2. Event time
   Time of condition change or acknowledgement. This may be a null field.
3. Type of fire detection system
   The field is two fixed characters, see table below.
4. First division indicator
   First division indicator where detector is located. This field is two characters, see table below.
5. Second division indecator
   Second division indicator where the detector is located. This field is three numeric characters, see table below.
6. Fire ditector number or activation detection count
   This field is three fixed numeric characters. When the message type field is E, this field identifies the detector.
   When message type field is S this field contains the number of detectors activated. When the message
   type field is F or D this field is null.
7. Condition
   When the message type field is S this field should be a null field. When the message type field is E, F or D this
   field includes a single character specified by the following:
         A = Activation
         V = Non-activation
         X = Fault (state unknown)
8. Alarm's acknowledgement state
   When the message field type is E or F this field includes a single character specified by the following:
         A = acknowledged
         V = not acknowledged
   When the message field type is S or D this shold be a null field.
9. Message description text
   Descriptive text/sensor location tag. If a sensor location identifier is string type, it is possible to use this field instead
   of above sensor allocation fields. Maximum number of characters will be limited by the maximum sentence
   length and the length of other fields.

Type of door monitoring system		First division indicator	Second division indicator
ID	System category		
FD	Generic fire detector, can be any of ones below.	Number / letter of zone. This can also be a control and monitoring system main unit identifier, for example fire central number / letter.	Loop number. This can be also be another control and monitoring sub-system identifier, for example sub-central.
FH	Heat type detector		
FS	Smoke type detector		
FD	Smoke and heat detector		
FM	Manual call point		
GD	Any gas detector	As above	As above
GO	Oxygen gas detector		
GS	Hydrogen Sulphide gas detector		
GH	Hydro-carbon gas detector		
SF	Sprinkler flow switch	As above	As above
SV	Sprinkler manual valve release		
CO	CO_2 manual release	As above	As above
OT	Other	As above	As above
Note: For units controlled from the fire system (typically all FD, FH, FS, FD and FM), the normal division indicators should be fire zone and loop number.			

GEN - Generic status information

$--GEN,hhhh,hhmmss.ss,hhhh,.....,hhhh *hh<CR><LF>
               1   2   3   4   5

1. Index of first packed binary field in sentence
   Index of first group in GEN sentence. Address is represented in hexadecimal format in the
   HEX range 0000 trough FFFF. The 16-bit address is formatted as fixed 4-character HEX field.
2. Time stamp
   This may be a null field.
3. Packed binary field
   The packed binary field is represented as a 6-bit value.
   The 16-bit value is formatted as fixed 4-character HEX field. This may be a null field.
4. Variable number of packed binary field
   Optional repeated packed binary field. Each repeat increases the index by one.
   Up to seven repetitions yielding a total of 128 bits per sentence is possible.
5. Packed binary field
   The packed binary field is represented as a 6-bit value.
   The 16-bit value is formatted as fixed 4-character HEX field. This may be a null field.

GGA - Global positioning system fix data

$--GGA,hhmmss.ss,llll.lll,a,yyyyy.yyy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx*hh<CR><LF>
              1   2 3   4   5 6 7 8   9 10 11 12 13 14

1. UTC of position (no use)
2. Latitude (0.00000 to 9000.00000)
3. N/S
4. Longitude (0.00000 to 18000.00000)
5. E/W
6. GPS quality indicator (1 to 5, 8)
7. Number of satllite in use (00 to 99)
8. Horizontal dilution of precision (0.00 to 999.99)
9. Antenna altitude above/below mean sea level (-999.99 to 9999.99)
10. Units of antenna altitude, m
11. Geoidal separation (-999.99 to 9999.99)
12. Units of geoidal separation, m
13. Age of differential GPS data (0 to 99)
14. Differential reference station ID (0000 to 1023)

GLL - Geographic position, latitude/longitude

$--GLL,llll.lll,a,yyyyy.yyy,a,hhmmss.ss,a,x*hh<CR><LF>
            1   2   3   4   5   6 7

1. Latitude (0.00000 to 9000.00000)
2. N/S
3. Longitude (0.00000 to 18000.00000)
4. E/W
5. UTC of position (no use)
6. Status (A=data valid V=data invalid)
7. Mode indicator (A=Autonomous D=Differential S=Simulator)

GNS - GNSS fix data

$--GNS,hhmmss.ss,llll.lll,a,lllll.lll,a,c--c,xx,x.x,x.x,x.x,x.x,x.x,a*hh<CR><LF>
     1   2 3 4 5 6 7 8 9 10 11 12 13

1. UTC of position (no use)
2. Latitude (0.00000 to 9000.00000)
3. N/S
4. Longitude (0.00000 to 18000.00000)
5. E/W
6. Mode indicator
 N=No fix A=Autonomous D=Differential P=Precise R=Real Time Kinematic
 F=Float RTK E=Estimated Mode M=Manual Input Mode S=Simulator Mode
7. Total number of satellites in use (00 to 99)
8. HDOP (0.0 to 999.99)
9. Antenna altitude, meters (-999.99 to 9999.99)
10. Geoidal separation (-999.99 to 9999.99)
11. Age of differential data (0 to 999)
12. Differential reference station ID (0000 to 1023)
13. Naivgational status indicator

HBT - Heartbeat supervision sentence

$--HBT,x.x,A,x*hh<CR><LF>
   1 2 3

1. Configured repeat interval (00.0 to 99.9(s))
2. Equipment status, A=Normal (fixed)
3. Sequential sequence identifier (0 to 9)

HDG - Heading Magnetic

$--HDG,x.x,x.x,a,x.x,a*hh<CR><LF>
   1 2 3 4 5

1. Magnetic sensor heading, degrees (0.00 to 360.00)
2. Magnetic deviation, degrees (0.0 to 180.00)
3. E/W
4. Magnetic variation, degrees (0.0 to 180.00)
5. E/W

HDT - Heading, true

$--HDT,xxx.x,T*hh<CR><LF>
   1 2

1. Heading, degrees (0.00 to 360.00)
2. True (T)

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HRM - Heel angle, roll period and roll amplitude measurement device

$--HRM,x.x,x.x,x.x,x.x,A,x.x,x.x,hhmmss.ss,xx,xx,*hh<CR><LF>
          1 2   3   4 5 6 7   8   9 10

1. Actual heel angle, degrees (see Note 1)
2. Roll period, seconds (see Note 2)
3. Roll amplitude, port side, degrees (see Note 3)
4. Roll amplitude, starboard side, degrees (see Note 4)
5. Status (see Note 5)
6. Roll peak hold value, port side, degrees (see Note 6)
7. Roll peak hold value, starboard side, degrees (see Note 7)
8. Peak hold value reset time (see Note 8)
9. Peak hold value reset day, 01 to 31 (see Note 9)
10. Peak hold value reset month, 01 to 12 (see Note 10)

Note 1: Actual heel angle, momentary angle of roll referenced to a levelled ship to port or starboard side, (positive value starboard, negative value port)

Note 2: Roll period, time between successive maximum values of heel angle to port over starboard and back to port (or the other way round)

Note 3: Roll amplitude of port side as positive value, maximum value of heel angle to port side of the latest motion

Note 4: Roll amplitude of starboard side, maximum value of heel angle to starboard side of the latest motion

Note 5: Status, A=data valid, V=data invalid

Note 6: Roll peak hold value of port side, maximum value of heel angle to port side of the motions measured from the last reset with a minimum resolution of 1 degree. This shall be a null field when data is not available

Note 7: Roll peak hold value of starboard side, maximum value of heel angle to starboard side of the motions measured from the last reset with a minimum resolution of 1 degree. This shall be a null field when data is not available

Note 8: Peak hold value reset time, time when the peak hold values are reset, UTC hour, minute and second. Decimal point and fractions of the seconds shall not be used. This shall be a null field when data is not available

Note 9: Peak hold value reset day, day when the peak hold values are reset, UTC day. This shall be a null field when data is not available

Note 10: Peak hold value reset month, month when the peak hold values are reset, UTC month. This shall be a null field when data is not available

HSS - Hull stress surveillance systems

$--HSS,c--c,x.x,A*hh<CR><LF>
          1   2 3

1. Measurement point ID
2. Measurement value
3. Data status
   A = data valid
   V = data invalid

HTC - Heading/Track control command

$--HTC,A,x.x,a,a,a,x.x,x.x,x.x,x.x,x.x,x.x,x.x,a,a*hh<CR><LF>
   1 2 3 4 5 6 7 8 9 10 11 12 13 14

1. Override, A = in use, V = not in use
2. Commanded rudder angle, degrees
3. Commanded rudder direction, L/R=Port/starboard
4. Selected steering mode
5. Turn mode R=Radius controlled
    T=Turn rate controlled
    N=Turn is not controlled
6. Commanded rudder limit, degrees (unsigned)
7. Commanded off-heading limit, degrees (unsigned)
8. Commanded radius of turn for heading changes, n.miles
9. Commanded rate of turn to heading changes, deg/min
10. Commanded heading-to-steer, degrees
11. Commanded off-track limit, n.miles (unsigned)
12. Commanded track, degrees
13. Heading reference in use, T/M
14. Sentence status

HTD - Heading/Track control data

$--HTD,A,x.x,a,a,a,x.x,x.x,x.x,x.x,x.x,x.x,x.x,a,A,A,A,x.x*hh<CR><LF>
    1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

1. Override, A=In use, V=Not in use
2. Commanded rudder angle, degrees
3. Commanded rudder direction, L/R=Port/starboard
4. Selected steering mode
5. Turn mode R=Radius controlled
    T=Turn rate controlled
    N=Turn is not controlled
6. Commanded rudder limit, degrees (unsigned)
7. Commanded off-heading limit, degrees (unsigned)
8. Commanded radius of turn for heading changes, n.miles
9. Commanded rate of turn to heading changes, deg/min
10. Commanded heading-to-steer, degrees
11. Commanded off-track limit, n.miles (unsigned)
12. Commanded track, degrees
13. Heading reference in use, T/M
14. Rudder status (A=Within limits, V=Limit reached or exceeded)
15. Off-heading status (A=Within limits, V=Limit reached or exceeded)
16. Off-track status (A=Within limits, V=Limit reached or exceeded)
17. Vessel heading, degrees

MTW - Water temperature

$--MTW, x.x, C*hh<CR><LF>
    1

1. Water temperature, degrees C (-9.999 to 99.999)

MWV - Wind speed and angle

$--MWV,x.x,a,x.x,a,A*hh<CR><LF>
   1 2 3 4 5

1. Wind angle, 0° to 359°
2. Reference, R = relative, T = true
3. Wind speed
4. Wind speed units, K = km/h M =m/s N = knots
5. Status, A = data valid V = data invalid

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NSR - Navigation status report

$--NSR, a, A, a, A, a, A, a, A, a, A, a, a, A *hh<CR><LF>
        1 2 3 4 5 6 7 8 9 10 11 12 13

1. Integrity of heading (see NOTE 1)
2. Plausibility of heading (see NOTE 2)
3. Integrity of position (see NOTE 1)
4. Plausibility of position (see NOTE 2)
5. Integrity of STW (see NOTE 1)
6. Plausibility of STW (NOTE 2)
7. Integrity of SOG and COG (see NOTE 1)
8. Plausibility of SOG and COG (see NOTE 2)
9. Integrity of depth (see NOTE 1)
10. Plausibility of depth (see NOTE 2)
11. Mode of STW (see NOTE 3)
12 Integrity of time (see NOTE 1)
13. Plausibility of time (see NOTE 2)

NOTE 1 Integrity status:
P = Passed, Integrity verification passed
F = Failed, integrity verification not passed
D = Doubtful, integrity verification not possible
N = Not available, reporting device does not support integrity check

NOTE 2 Plausibility status:
A = Yes (Plausible)
V = No (Not plausible)
N = Not available, reporting device does not support plausibility check

NOTE 3 Mode of STW
W = Measured water reference
E = Estimated/calculated from non-water referenced sources
M = Manual input
N = Not available

PRC - Propulsion remote control status

$--PRC,x.x,A,x.x,a,x.x,a,a,x*hh<CR><LF>
        1 2   3 4 5 6 7 8

1. Lever demand position (-100 to 100, 0=Stop)
2. Lever demand status (A=Data valid   V=Data invalid)
3. RPM demand value (-9999.9 to 9999.9)
4. RPM mode indicator (P=Per cent R=Revolutions per min.)
5. Pitch demand value (-999.9 to 999.9)
6. Pitch mode indicator (P=Per cent D=Degrees V=Data invalid)
7. Operating location indicator (B=Bridge P=Port wing S=Starboard wing
   C=Engine control room E=Engine side/local W=Wing)
8. Number of engine or propeller shaft (00 to 99)

RMC - Recommended minimum specific GPS/TRANSMIT data

$--RMC,hhmmss.ss,A,llll.ll,a,yyyyy.yy,a,x.x,x.x,ddmmyy,x.x,a,a,a*hh<CR><LF>
                1   2 3 4   5   6 7 8   9   10 11 1213

1. UTC of position fix (000000 to 235959)
2. Status (A=Data valid, V=Navigation receiver warning)
3. Latitude (0.0000 to 9000.0000)
4. N/S
5. Longitude (0.0000 to 18000.0000)
6. E/W
7. Speed over ground, knots (0.0 to 9999.9)
8. Course over ground, degrees true (0.0 to 359.0)
9. Date (010100 to 311299)
10. Magnetic variation, degrees E/W (0.0 - 180.0/NULL)
11. E/W
12. Mode indicator (A= Autonomous   D= Differential mode   E=Estimated (dead reckoning) mode)
    M=Manual input mode S= Simulator N=Data not valid)
13. Navigational status indication

ROR - Rudder order status

$--ROR, x.x, A, x.x, A, a*hh<CR><LF>
        1 2   3 4 5

1. Starboard (or single) rudder order (-90 to 90.0)
2. Status (A=Valid V=Invalid)
3. Port rudder order (-90.0 to 90.0)
4. Status (A=Valid V=Invalid)
5. Command source location (B=Bridge P=Port wing S=Starboard wing
   C=Engine control room E=Engine side/local W=Wing)

ROT - Rate of turn

$--ROT,x.x,A*hh<CR><LF>
        1 2

1. Rate of turn, deg/min, "-"=bow turns to port (-9999.9 to 9999.9)
2. Status: A=Data valid, V=Data invalid

RPM - Revolutions

$ --RPM, a, x, x.x, x.x, A*hh<CR><LF>
         1 2 3   4 5

1. Source (S=Shaft   E=Engine)
2. Engine or shaft number (00 to 99)
3. Speed, revolutions/min (-9999.99 to 9999.99)
4. Propeller pitch (-100.0 to 100.0)
5. Status (A=Data invalid V=Data valid)

RSA - Rudder sensor angle

$--RSA,x.x,A,x.x,A*hh<CR><LF>
          └─┘ └─┘
           1   2

1. Starboard (or single) rudder sensor status
   Status A = vaild,
       V = data invalid
2. Port rudder sensor
   Status A = vaild,
       V = data invalid

RTE - Routes
$--RTE,x.x,x.x,a,c--c,c--c,........,c--c*hh <CR><LF>
          1   2 3 4   5   6   7
1. Total number of messages being transmitted (1 to n, or null)
2. Sentence number (1 to n, or null)
3. Message mode (C=Complete route W=Working route, first listed)
4. Route identifier (alphabet or null)
5. Waypoint identifier (alphabet or null)
6. Additional waypoint indentifiers
7. Waypoint "n" identifier (alphabet or null)

THS - True heading & status
 $--THS,xxx.x,a*hh<CR><LF>
              1   2
 1. Heading, degrees True (0.00 to 360.00)
 2. Mode indicator (A=Autonomous E=Estimated M=Manual input
     S=Simulator V=Data not valid)

TRC - Thruster control data
$--TRC,x,x.x,a,x.x,a,x.x, a,a*hh<CR><LF>
         1 2 3 4 5 6 7 8
1. Number of thruster, bow or stern
   Odd = Bow thruster Even = Stern thrusters
2. RPM demand value
    "-" port
3. RPM mode indicator
   P = Per cent (%): 0 - 100 % from zero to maximum rpm
   R = Revolutions per min V = data invalid
   This should not be a null field.
4. Pitch demand value
    "-" port
5. Pitch mode indicator
   P = Per cent (%) D = Degree (°) V = Data invalid
6. Azimuth demand (000.0 to 359.9)
   Direction of thrust in degrees (0° - 360°). This may be a null field.
7. Operating location indicator
   B = Bridge P = Port wing S = Starboard wing
   C = Engine control room E = Engine side/local W = Wing
   This should not be a null field.
8. Sentence status flag
   R = Sentence is status report of current settings (used for a reply to a query).
   C = Sentence is a configuration command to change settings. A sentence without
       "C" is not a command.

TRD - Thruster response data

$--TRD, x, x.x, A, x.x, A, x.x*hh<CR><LF>
         1 2 3   4   5 6

1. Number of thrusters
   Odd=Bow thruster Even=Stern thrusters
2. RPM response
3. RPM mode indicator
   P = P = Per cent (%): 0 - 100 % from zero to maximum rpm
   R = Revolutions per minute (RPM)
   V = data invalid
   This should not be a null field.
4. Pitch response value
   "-" port
5. Pitch mode indicator
   P = P = Per cent (%) D = Degrees V = data invalid
   This should not be a null field.
6. Azimuth response
   Direction of thrust in degrees (0° - 360°). This may be a null field.

TTM - Tracked target message

$--TTM,xx,x.x,x.x,a,x.x,x.x,a,x.x,x.x,a,c--c,a,a,hhmmss.ss,a*hh<CR><LF>
          1   2   3 4 5   6 7 8   9 10 11 12 13   14   15

1. Target number (00 to 99)
2. Target distance from own ship (0.000 to 999.9)
3. Bearing from own ship,degrees (0.0 to 359.9)
4. True or Relative
5. Target speed (0.00 to 99.9, 100.0 to 999.9)
6. Target course, degrees (0.0 to 359.9)
7. True or Relative
8. Distance of closet point of approach (0.000 to 999.9)
9. Time to CPA, min., "-" increasing (-6000 to 6000)
10. Speed/distance units, K=Km, km/h N=knots, km S=sm, mph)
11. Target name (c--c)
12. Target status (L=Lost Q=Acquiring T=Tracking)
13. Reference target (R, null otherwise)
14. Time of data (hhmmss.ss)
15. Type of acquisition (A=Automatic M=Manual R=Reported)

VBW - Dual ground/water speed

$--VBW,x.x,x.x,x,x.x,x.x,x,x.x,x,x.x,x*hh<CR><LF>
         1 2 3 4 5 6 7 8 9 10

1. Longitudinal water speed, knots (-9999.99 to 9999.99)
2. Transverse water speed, knots (-9999.99 to 9999.99)
3. Status: water speed, A=Data valid V=Data invalid
4. Longitudinal ground speed, knots (-9999.99 to 9999.99)
5. Transverse ground speed, knots (-9999.99 to 9999.99)
6. Status: ground speed, A=Data valid V=Data invalid
7. Stern transverse water speed, knots (-9999.99 to 9999.99)
8. Status: stern water speed, A=Data valid V=Data invalid
9. Stern transverse ground speed, knots (-9999.99 to 9999.99)
10. Status: stern ground speed, A=Data valid V=Data invalid

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VDM - UAIS VHF data-link message

!--VDM,x,x,x,x,s--s,x*hh<CR><LF>
       1 2 3 4 5 6

1. Total number of sentences needed to transfer the message (1 to 9)
2. Sentence number (1 to 9)
3. Sequential message identifier (0 to 9, null)
4. AIS channel (A or B)
5. Encapsulated ITU-R M.1371 radio message (1 to 63 bytes)
6. Number of fill-bits (0 to 5)

VDO - UAIS VHF data-link own vessel report

!--VDO,x,x,x,x,s--s,x*hh<CR><LF>
       1 2 3 4 5 6

1. Total number of sentences needed to transfer the message (1 to 9)
2. Sentence number (1 to 9)
3. Sequential message identifier (0 to 9, null)
4. AIS channel Number (A or B)
5. Encapsulated ITU-R M.1371 radio message (1 to 63 bytes)
6. Number of fill-bits (0 to 5)

VDR - Set and drift

$--VDR,x.x,T,x.x,M,x.x,N*hh <CR><LF>
        1 2 3 4 5 6

1. Direction, degrees (0.0 to 360.0)
2. T=True (fixed)
3. Direction, degrees (0.0 to 360.0)
4. M=Magnetic (fixed)
5. Current speed (0 to 99.99)
6. N=Knots (fixed)

VHW - Water speed and headings

$--VHW,x.x,T,x.x,M,x.x,N,x.x,K*hh <CR><LF>
        1   2   3   4

1. Heading, degrees true
2. Heading, degrees magnetic
3. Speed, knots
4. Speed, km/h

VLW - Dual ground/water distance

$--VLW,x.x,N,x.x,N,x.x,N,x.x,N*hh<CR><LF>
        1 2 3 4 5 6 7 8

1. Total cumulative water distance (0.0 to 999999.999)
2. N=Nautical miles
3. Water distance since reset (0.000 to 999999.999)
4. N=Nautical miles
5. Total cumulative ground distance (no use)
6. N=Nautical miles (no use)
7. Ground distance since reset (no use)
8. N=Nautical miles (no use)

VTG - Course over ground and ground speed

$--VTG,x.x,T,x.x,M,x.x,N,x.x,K,a*hh <CR><LF>
          1 2 3 4 5 6 7 8 9

1. Course over ground, degrees (0.0 to 359.9)
2. T=True (fixed)
3. Course over ground, degrees (0.0 to 359.9)
4. M=Magnetic (fixed)
5. Speed over ground, knots (0.00 to 9999.9)
6. N=Knots (fixed)
7. Speed over ground (0.00 to 9999.9)
8. K=km/h (fixed)
9. Mode indicator (A=Autonomous, D=Differential E=Estimated (dead reckoning)
   M=Manual input S=Simulator N=Data not valid)

WAT - Water level detection

$--WAT, a, hhmmss.ss, aa, xx, xx, xxx, a, a, c--c*hh<CR><LF>
         1   2   3   4   5   6 7 8   9

1. Message type
   S: Status for section: Number of faulty and activated condition reported as number in field 4 and 5.
   The section may be a whole section (one or both of the location indicator fields are null) or a
   sub-section. The stusus S is normally transmitted at regular intervals.
   E: Status for each water level detector. (E may be used to indicate an event.)
   F: Fault in system: location indicator fields define the sections when provided.
2. Time stamp
   Time when this status/message was valid.
3. Type of water alarm
   Indicator characters showing system detecting water level. The field is two characters.
   WL = Water level ditection system;
   BI = High water level by bilge system;
   HD = Water leakage at hull (shell) door;
   OT = others.
4. First location indicator
   First location indicator characters showing detection location. This field is two characters.
   The contents of this field is not defined by this standard, but the two location fields should
   uniquely define the source for the alarm.
5. Second location indicator
   Second location indicator characters showing detection location. This field is two characters.
   The contents of this field is not defined by this standard, but the two location fields should
   uniquely define the source for the alarm.
6. Detection point number or detection point count
   This field is three fixed numeric characters. When the message type field is E this field identifies
   the high-water-level detection point. When the message type field is S this field contains the number
   of the water leakage detection points. When the message type field is F this field is a null field.
7. Alarm condition
   This field is a single character specified by the following:
   N = normal state
   H = alarm state (threshold exceeded)
   J = alarm state (extreme threshold exceeded)
   L = alarm state (Low threshold exceeded i.e. not reached)
   K = alarm state(extreme low threshold exceeded i.e. not reached)
   X = Fault (state unknown)
8. Override setting
   O = Override mode (water allowed in space);
   N = Normal mode (water not allowed in space);
9. Message description text
   Descriptive text/level detector tag. If a level detector identifier type, it is possible to use this field
   instead of above level detector fields. Maximum number of characters will be limited by maximum
   sentence length and length of other fields.

WPL - Waypoint location

$--WPL,llll.ll,a,yyyyy.yy,a,c--c*hh<CR><LF>
      1   2   3   4 5

1. Waypoint latitude (0.000000 to 9000.00000)
2. N/S
3. Waypoint longitude (0.00000 to 18000.00000
4. E/W
5. Waypoint identifier (No use)

XDR - Transducer measurements

$--XDR, a, x.x, a, c--c,………………a, x.x, a, c--c*hh<CR><LF>
       1 2   3 4   5   └──────┬──────┘
                                            6

1. Transducer type, transducer No. 1 (see Note 2)
2. Measurement data, transducer No. 1
3. Units of measure, transducer No. 1 (see Note 2)
4. Transducer No. 1 ID
5. Data, variable number of transducers
6. Transducer "n" (see Note 1)

Note 1: Sets of the four fields "type-data-units-ID" are allowed for an undefined number of transducers. Up to "n" transducers may be included within the limits of allowed sentence length; null fields are not required except where portions of the "type-data-units-ID" combination are not available.

Note 2: Allowed transducer types and their units of measure are:

Transducer	Type field	Units	Comments
Temperature	C	C = degrees Celsius	
Angular displacement	A	D = degrees	"-" = anticlockwiseKilograms per
Absolute humidity	B	K = kg/m^3	cubic metre"-" = compression
Linear displacement	D	M = metres	
Frequency	F	H = Hertz	ppt = parts per thousand"-" = com-
Salinity	L	S = ppt	pression"-" = vacuum
Force	N	N = newtons	
Pressure	P	P = pascals	
Flow rate	R	I = litres/s	
Tachometer	T	R = revolutions/min	
Humidity	H	P = per cent	
Volume	V	M = cubic metres	
Voltage	U	V = volts	1 = ON, CLOSED; 0 = OFF,
Current	I	A = amperes	OPENx.x = variable data
Switch or valve	S	None (null)	
Generic	G	None (null)	

ZDA - Time and date

$--ZDA,hhmmss.ss,xx,xx,xxxx,xx,xx*hh<CR><LF>
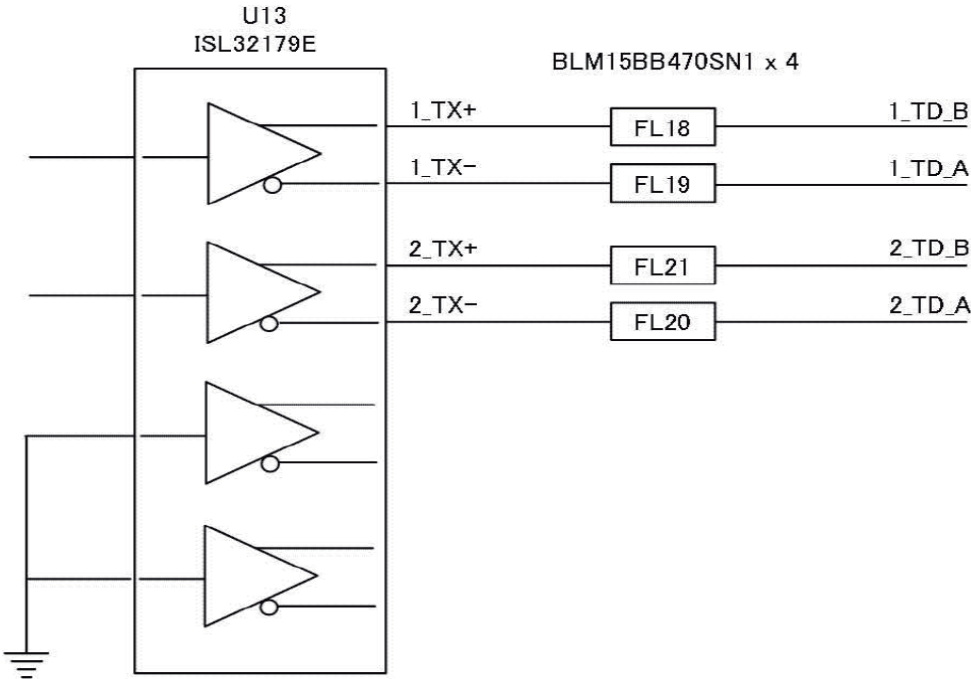   1   2 3   4   5 6

1. UTC
2. Day, 01 to 31 (UTC)
3. Month, 01 to 12 (UTC)
4. Year (UTC)
5. Local zone hours (00 h to ±13h)
6. Local zone minutes (00 to +59)

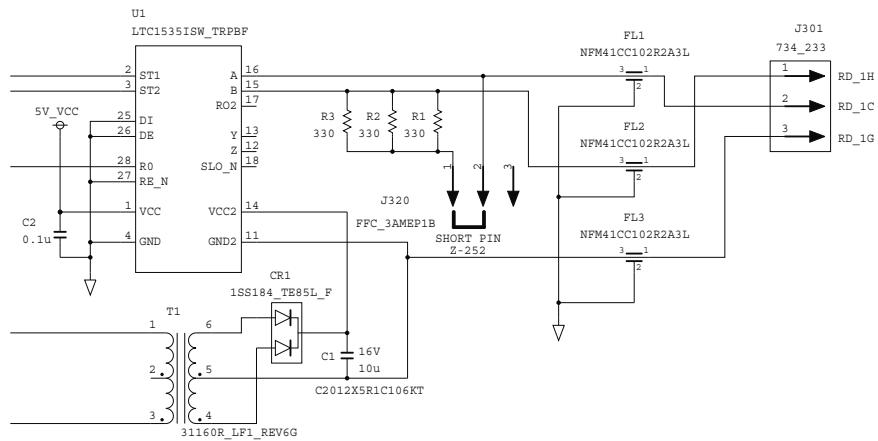## Serial Interface: IEC61162-1

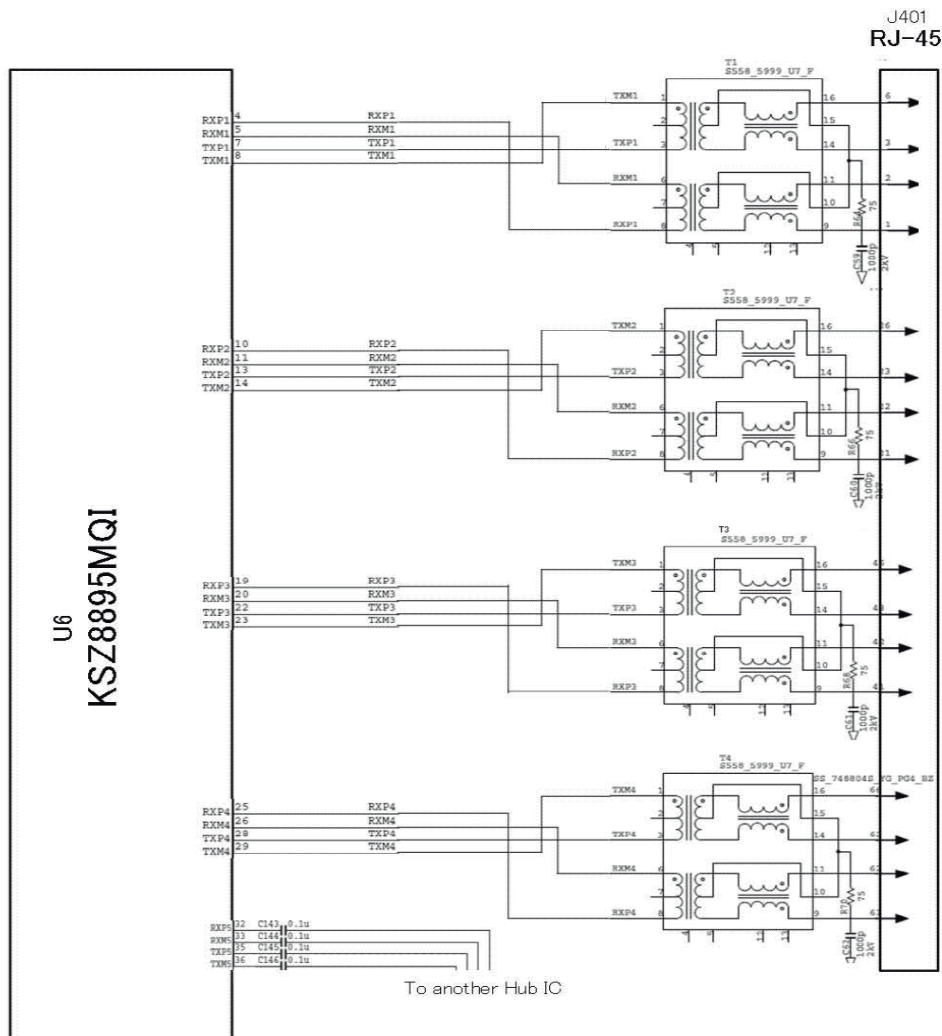• Data Collecting Unit, input
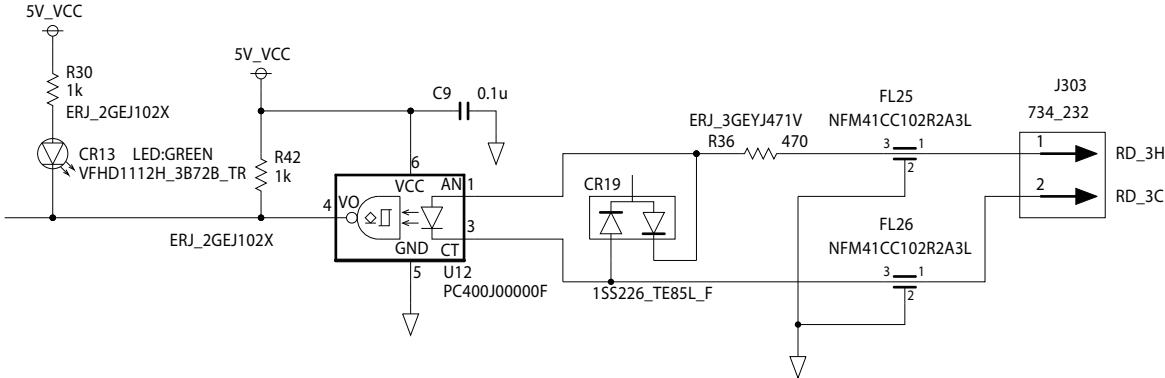
• Data Collecting Unit, output

Serial Interface: IEC61162-2

• Data Collecting Unit, input

Serial Interface: IEC61162-450

APPENDIX 5 CODING OF THE FLOAT-FREE DRU

Similarly to a satellite EPIRB (Emergency Position Indicate Radio Beacon), the capsule of the float-free DRU is coded before installation. The ship's MMSI, name, call sign, etc. are recorded to the capsule during coding, and this information is indicated on the capsule.

The expiration date of both the battery in the capsule and the hydrostatic release unit is coded into the capsule of the float-free DRU as shown below.

<u>Battery in the capsule</u>

The expiration date of the battery is calculated from the year and month of manufacture. The year and month manufacture for the battery is indicated on the sticker at the side of the capsule.

The year and month of manufacture

The expiration date is calculated as follows;

• <u>Year and month of coding ≤ Year and month of manufacture + 2.5 years</u>:
  The expiration date is 5 years after the year and month of coding.

• <u>Year and month of coding > Year and month of manufacture + 2.5 years</u>:
  This battery cannot be used.

The calculated expiration date is marked as follows;

<u>Example: When the expiration date is April 2019.</u>
The expiration date is indicated on this sticker.

"2019" is cut out or filled with a permanent marker.

"4" is cut out or filled with a permanent marker.

Hydrostatic release unit

The expiration date of the hydrostatic release unit is 2 years after the year and month of coding. The expiration date is indicated on the sticker attached on the side of the unit and sticker on the side of the bracket.

• For the sticker attached on the side of the unit:

Example: When the expiration date is June 2016.
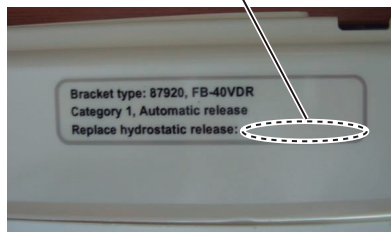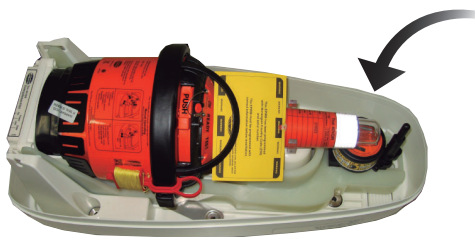

The number below "2016" is cut out or filled with a permanent marker.

The number below "JUN" is cut out or filled with a permanent marker.

• For the sticker on the side of the bracket:

The expiration date is inscribed here.

AP-32

PACKING LIST

VR-7017-MIJ , VR-7017-S-MIJ

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
リモートアラームパネル	175 129	VR-7017*-MIJ	1
REMOTE ALARM PANEL		000-028-685-00 **	
工事材料 INSTALLATION MATERIALS			
工事材料		CP24-03401	1
INSTALLATION MATERIALS		001-279-100-00	

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.

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

C4485-Z04-C

PACKING LIST

VR-7010-*V , VR-7010-*HKV

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
データ収集ユニット	516 424 260	VR-7010-*	1
DATA COLLECTING UNIT		000-025-262-00 **	
付属品 ACCESSORIES			
インストールソフト&図書CD	φ120	VR-7030 SW&MANUAL CD	1
INSTALL SOFT & MANUAL CD		000-191-754-1-*	
ケーブル(組品)LAN	L=2M	MOD-Z072-020+	1
LAN CABLE ASSEMBLY		001-167-880-10	
付属品		FP24-01102	1
ACCESSORIES		001-279-070-00	(*1)
付属品		FP24-01112	1
ACCESSORIES		001-279-080-00	(*2)
工事材料 INSTALLATION MATERIALS			
工事材料		CP24-03301	1
INSTALLATION MATERIALS		001-279-040-00	
図書 DOCUMENT			
操作要領書	210 297	OS*-44850-*	1
OPERATOR'S GUIDE		000-179-343-1-* **	
装備要領書	210 297	IM*-44850-*	1
INSTALLATION MANUAL		000-192-319-1-* **	

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

2.(*1)は、和文仕様用です。
2.(*1) FOR JAPANESE SET.

3.(*2)は、英文仕様用です。
3.(*2) FOR ENGLISH SET.

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

C4485-Z03-C

A-3

VR-7011-MIJ

NAME		OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット	UNIT			
マイクロフォン MICROPHONE		130 / 130 / 47	VR-7011-MIJ 000-028-681-00	1
工事材料	INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS			CP24-03501 001-279-130-00	1

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

C4485-Z05-C

A-4

VR-7012W-MIJ

NAME		OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット	UNIT			
防水型マイク WATERPROOF MICROPHONE		102 / 77 / 135	VR-7012W-MIJ 000-028-683-00	1
工事材料	INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS			CP24-03601 001-279-140-00	1

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

C4485-Z06-C

PACKING LIST

IF-7100 , IF-7100-HK   24A0-X-9856 -0   1/1

A-5

NAME		OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット	**UNIT**			
ビデオLANコンバータ SENSOR VIDEO LAN CONVERTER		400 / 251 / 111	IF-7100* 000-025-278-00 **	1
予備品	**SPARE PARTS**			
予備品 SPARE PARTS			SP24-01201 001-279-110-00	1
工事材料	**INSTALLATION MATERIALS**			
工事材料 INSTALLATION MATERIALS			CP24-03701 001-279-120-00	1

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

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

C4485-Z07-A

PACKING LIST

MC-3000S   24AL-X-9858 -2   1/1

A-6

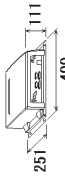| NAME		OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット	**UNIT**			
センサアダプター SENSOR ADAPTER		220 / 215 / 46	MC-3000S 000-020-522-00	1
予備品	**SPARE PARTS**			
予備品 SPARE PARTS			SP24-00701 001-370-670-00	1
工事材料	**INSTALLATION MATERIALS**			
工事材料 INSTALLATION MATERIALS			CP24-02401 001-370-680-00	1

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

C4473-Z05-C

PACKING LIST

24A0-X-9860 -1 1/1

VR-7022F

A-8

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
ジャンクションボックス JUNCTION BOX	89 117 170	VR-7022F 000-026-884-00	1
工事材料 INSTALLATION MATERIALS			
INSTALLATION MATERIALS		CP24-03901 001-600-010-00	1

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

C4485-Z10-B

PACKING LIST

00GMX-9868 -0 1/1

PSU-011

A-7

NAME	OUTLINE	DESCRIPTION/CODE	QTY
UNIT			
POWER CONTROL UNIT	153 144 65	PSU-011 000-010-324-00	1
INSTALLATION MATERIALS			
INSTALLATION MATERIALS		CP03-31701 001-013-670-00	1

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.

DIMENSIONS IN DRAWING FOR REFERENCE ONLY.

C3527-Z03-A

FURUNO

工事材料表
INSTALLATION MATERIALS

CODE NO.	001-279-040-00	24A0-X-9401-3
TYPE	CP24-03301	1/1

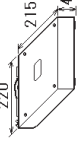| 番号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS / CODE NO.	数量 Q'TY	用途／備考 REMARKS
1	フェルール(ボゥクタンシ) FERRULE CRIMPING TERMINAL	φ3 10	A 1.5-10 / 000-179-870-11	10	
2	フェルール(ボゥクタンシ) FERRULE CRIMPING TERMINAL	φ4 12	AI 1.5-6 BK / AI 1.5-6 BK / 000-176-412-11 / 000-176-412-10	5	
3	ボルトキャップ COSMETIC CAP	17 20	CP-30-BC-10-BLACK / 000-179-377-10	2	
4	コネクタ(モゥラ) MODULAR CONNECTOR	8 23 12	MPS588-C / 000-166-044-10	15	
5	ケーブルバンド CABLE BAND	109	PLF1M-M / 000-116-921-10	40	

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 UPPERPRODUCT. QUALITY IS THE SAME.

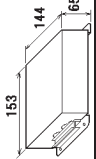(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO ., LTD.

C4485-M01-D

FURUNO

PSU-011

工事材料表
INSTALLATION MATERIALS

CODE NO.	001-013-670-00	03GM-X-9405-1
TYPE	CP03-31701	1/1

番号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS / CODE NO.	数量 Q'TY	用途／備考 REMARKS
1	圧着端子 CRIMP-ON LUG	21 9	FV2-4 BLU K / 000-157-247-11	4	

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

FURUNO ELECTRIC CO ., LTD.

C3527-M04-B

FURUNO

工事材料表
INSTALLATION MATERIALS

CODE NO.	001-279-130-00
TYPE	CP24-03501

24A0-X-9403 -0 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	+トラスタッピンネジ 1シュ SELF TAPPING SCREW	16 / φ4	4X16 SUS304 CODE NO. 000-162-605-10	4	
2	コンベ ツクス CABLE TIE	150	CV-150N CODE NO. 000-162-186-10	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.
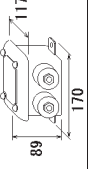QUALITY IS THE SAME. DIMENSIONS IN DRAWING FOR REFERENCE ONLY.
(略図の寸法は、参考値です。)

FURUNO ELECTRIC CO ., LTD.

C4485-M03-A

FURUNO

工事材料表
INSTALLATION MATERIALS

CODE NO.	001-279-100-00
TYPE	CP24-03401

24A0-X-9402 -0 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	+トラスタッピンネジ 1シュ SELF TAPPING SCREW	16 / φ4	4X16 SUS304 CODE NO. 000-162-605-10	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. DIMENSIONS IN DRAWING FOR REFERENCE ONLY.
(略図の寸法は、参考値です。)

FURUNO ELECTRIC CO ., LTD.

C4485-M02-A

FURUNO

工事材料表
INSTALLATION MATERIALS

CODE NO.	001-279-120-00				24A0-X-9405-2
TYPE	CP24-03701				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	フェルール(ボゲクリンプ) FERRULE CRIMPING TERMINAL	φ3 / 10	A 1.5 -10 CODE NO.	000-179-870-11	5	
2	コンベックス CABLE TIE	150	CV-150N CODE NO.	000-162-186-10	3	
3	六角ナット 1シュ HEX. NUT	7 / 13	M8 SUS304 CODE NO.	000-167-479-10	4	
4	ミガキ丸平座金 FLAT WASHER	φ17	M8 SUS304 CODE NO.	000-167-464-10	4	
5	バネ座金 SPRING WASHER	15	M8 SUS304 CODE NO.	000-167-410-10	4	
6	六角ボルト HEXAGONAL HEAD BOLT	25 / φ8	M8X25 SUS304 CODE NO.	000-162-879-10	4	

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

FURUNO ELECTRIC CO ., LTD.

C4485-M05-C

FURUNO

工事材料表
INSTALLATION MATERIALS

CODE NO.	001-279-140-00				24A0-X-9404-1
TYPE	CP24-03601				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	+トラスタッピンネジ 1シュ SELF-TAPPING SCREW	30 / φ6	6X30 SUS304 CODE NO.	000-162-614-10	4	
2	ゴムスリーブ SLEEVERUBBER	φ24 / 18	SC-4B3ト CODE NO.	000-190-346-10	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.）

FURUNO ELECTRIC CO ., LTD.

C4485-M04-B

FURUNO

工事材料表
INSTALLATION MATERIALS

CODE NO.	001-600-010-00	24A0-X-9408-3
TYPE	CP24-03901	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	接着剤 ADHESIVE	164 / 35 / 28	TB5211(SP) 50G CODE NO. 000-192-662-10	1	
2	GHSラベル GHS NOTIFICATION	210 / 297	E72-01606-* CODE NO. 000-193-289-1*	1	

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

FURUNO ELECTRIC CO ., LTD.

C4485-M08-D

FURUNO

工事材料表
INSTALLATION MATERIALS

CODE NO.	001-319-050-00	24A0-X-9407-5
TYPE	CP24-03801	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	フェルール(ボ゛クラシン) FERRULE CRIMPING TERMINAL	13 φ2	AI 0.14-8 GY -1000 AI 0.14-8 GY -1000 CODE NO. 000-176-689-11 000-176-689-10	10	
2	フェルール(ボ゛クラシン) FERRULE CRIMPING TERMINAL	12 φ4	AI 1.5-6 BK AI 1.5-6 BK CODE NO. 000-176-412-11 000-176-412-10	5	
3	バネ座金 SPRING WASHER	22	M12 SUS316L CODE NO. 000-167-396-10	3	
4	平座金 FLAT WASHER	φ24	M12 SUS316L CODE NO. 000-167-417-10	6	
5	六角ナット Fニュ HEXAGONAL NUT	10 / 19	M12 SUS316L CODE NO. 000-167-494-10	3	
6	六角ボルト／刻印付 HEXAGONAL HEAD BOLT	45 φ12	M12X45 SUS316L CODE NO. 000-178-722-10	3	
7	接着剤袋詰 ADHESIVE	164 / 35 / 28	TB5211 50G CODE NO. 001-477-870-00	1	

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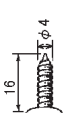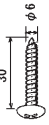
FURUNO ELECTRIC CO ., LTD.

C4485-M07-F

FURUNO

工事材料表
INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	CODE NO.	数量 Q'TY	用途/備考 REMARKS
1	+トラスタッピンネジ 1シュ SELF-TAPPING SCREW		4X20 SUS304	000-158-850-10	4	
2	フェルール(ボウタンシ) FERRULE CRIMPING TERMINAL		AI 0.14-8 GY -1000	000-176-689-11	10	
3	フェルール(ボウタンシ) FERRULE CRIMPING TERMINAL		AI 0.34-6 TQ	000-176-410-11	10	
4	フェルール(ボウタンシ) FERRULE CRIMPING TERMINAL		AI 0.75-6 GY	000-176-411-11	40	
5	フェルール(ボウタンシ) FERRULE CRIMPING TERMINAL		AI 1.5-6 BK / AI 1.5-6 BK	000-176-412-11 / 000-176-412-10	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.

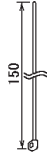(略図の寸法は、参考値です。) DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO .,LTD.

C4473-M04-E

FURUNO

工事材料表
INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	CODE NO.	数量 Q'TY	用途/備考 REMARKS
1	バネザガネ SPRING WASHER		M6 SUS316L	000-167-409-10	6	
2	平座金 FLAT WASHER		M6 SUS316L	000-167-420-10	6	
3	六角ナット 1シュ HEXAGONAL NUT		M6 SUS316L	000-167-499-10	12	
4	六角穴付ボルト HEXAGONAL HEAD BOLT		M6X40 SUS316L	000-162-749-10	6	

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.

C4485-M09-C

FURUNO — SPARE PARTS LIST FOR

	CODE NO.	001-279-030-00	24A0-X-9301-2 1/1
	TYPE	SP24-01101	BOX NO. P

SHIP NO.　　USE　　SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	PER VES	SPARE	REMARKS/CODE NO.
1	ヒューズ GLASS TUBE FUSE	30 φ6	FGB0-A 250V 10A PBF	2	2	6	000-155-839-10

MFR'S NAME　FURUNO ELECTRIC CO., LTD.　DWG NO. C4485-P01-C　1/1

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

FURUNO — 付属品表 ACCESSORIES

	CODE NO.	001-279-080-00	24A0-X-9504-1 1/1
	TYPE	FP24-01101	

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	カードホルダー CARD HOLDER	308 / 284	C-26-C-A4 CODE NO. 000-197-048-10	1	
2	データ抽出要領 DATA EXTRACTION PROCEDURE	210 / 297	E42-01402-* CODE NO. 000-179-354-I*	1	

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

FURUNO ELECTRIC CO., LTD.

C4485-F04-B

FURUNO

SPARE PARTS LIST FOR

CODE NO.	001-370-670-00	24AL-X-9303-3 1/1
TYPE	SP24-00701	BOX NO. P

SHIP NO.

U S E

SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	SPARE	REMARKS/CODE NO.
1	ヒューズ GLASS TUBE FUSE	20 φ5	FGMB-A 125V 3A PBF	1	1	3	000-157-481-10

MFR'S NAME   FURUNO ELECTRIC CO., LTD.   DWG NO. C4475-P01-D   1/1

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

FURUNO

SPARE PARTS LIST FOR

CODE NO.	001-279-110-00	24A0-X-9302-2 1/1
TYPE	SP24-01201	BOX NO. P
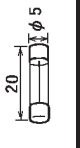
SHIP NO.

U S E

SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	SPARE	REMARKS/CODE NO.
1	ヒューズ GLASS TUBE FUSE	20 φ5	FGMB-A 125V 2A PBF	1	1	3	000-157-479-10

MFR'S NAME   FURUNO ELECTRIC CO., LTD.   DWG NO. C4485-P02-C   1/1

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

FURUNO

2－アイボルト（取外し可）
EYE-BOLTS (REMOVABLE)

310±1

取付穴
2－φ12
FIXING HOLES

電源部取出寸法
＃245
CLEARANCE FOR REMOUNTING POWER BLOCK

260

信号コネクタ
SIGNAL CONNECTOR
データコネクタ
DATA PORT

信号コネクタ
SIGNAL CONNECTOR

データコネクタ
DATA PORT

電源コネクタ
POWER CONNECTOR

(582)
568

544±1

516

90°

(108)

電源コネクタ
POWER CONNECTOR

型式銘板
NAMEPLATE

ケーブルクランプ
CABLE CLAMP

350±1

(21)

12

12

2－取付用切欠
FIXING NOTCH

＃300

＃100
424
＃100

ケーブルクランプ
CABLE CLAMP

アース端子
GND TERMINAL

表1 TABLE 1

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

注 記　1）　指定外の寸法公差は表1による。
　　　　2）　＃印寸法は最小サービス空間寸法とする。
　　　　3）　取付用ネジはＭ１０ボルト又はコーチボルト呼び１０を使用のこと。

NOTE　1.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
　　　　2.　＃: MINIMUM SERVICE CLERANCE.
　　　　3.　USE M10 BOLTS OR COARCH SCREWS ø10 FOR FIXING THE UNIT.

DRAWN 1/Jul/2014 T.YAMASAKI		TITLE	VR-7010
CHECKED 1/Jul/2014 H.MAKI		名称	データ収集ユニット
APPROVED 2/Jul/2014 H.MAKI	VR-7000		外寸図
SCALE 1/6	MASS 29 ±10% kg	NAME	DATA COLLECTING UNIT
DWG. No. C4485-G01-C	REF. No. 24-015-100G-2		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

131.47±0.5

87.64±0.5

取付穴
3−ø15
FIXING HOLES

151.81±0.5

ø175.29±0.5

取付寸法
MOUNTING DIMENSIONS

237.57

(167.3)

♯150

ケーブル
CABLE

VOYAGE DATA RECORDER
DO NOT OPEN
REPORT TO AUTHORITIES

型式銘板
NAMEPLATE

168.25

ケーブル導入口
CABLE ENTRY

255.28

RECORDER
OPEN
AUTHORITIES

275.20

166.68

184.72
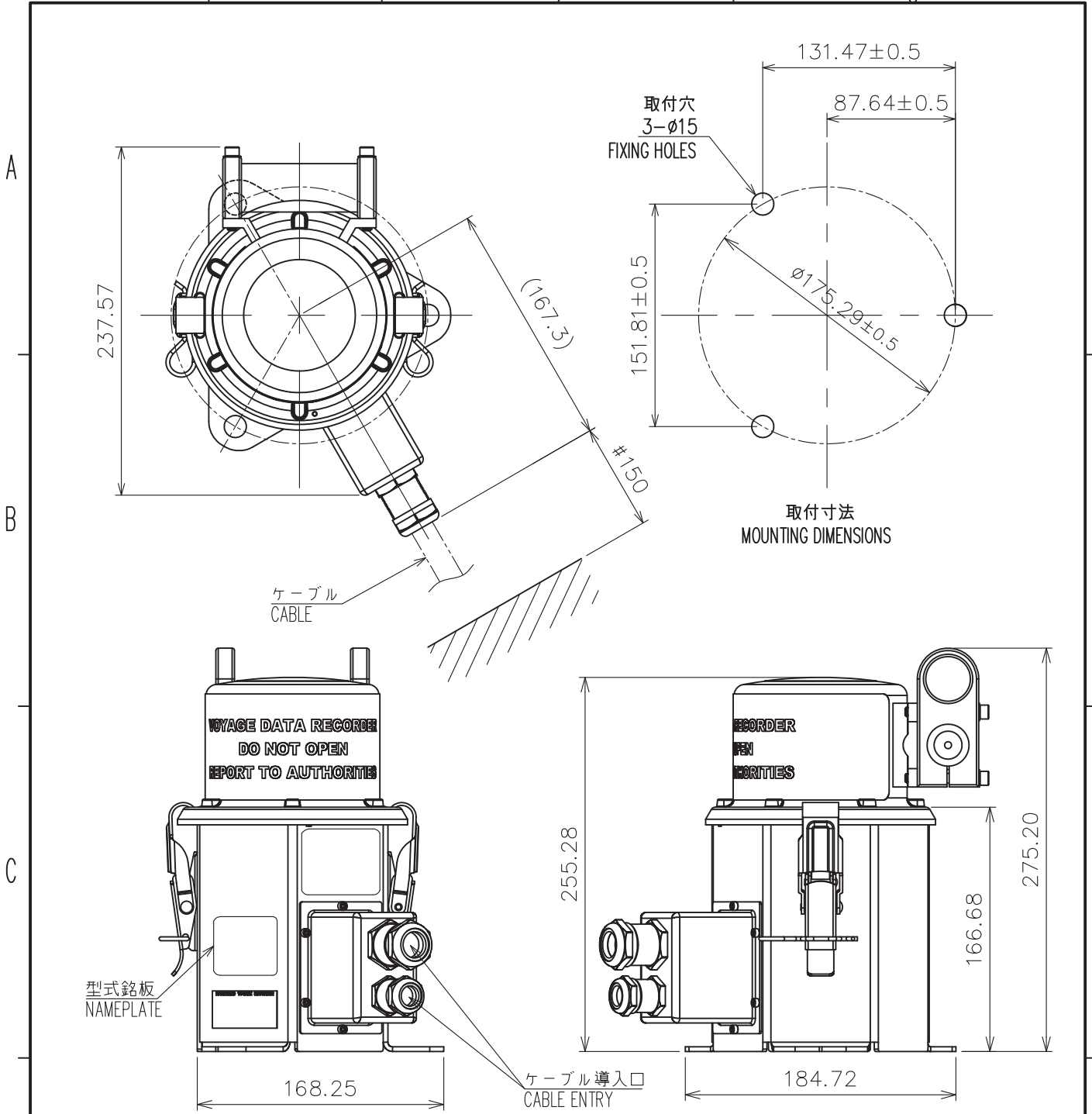
注　記
１）　指定なき寸法公差は表１による。
２）　♯印寸法は最小サービス空間寸法とする。
３）　取付用ネジはＭ１２ボルトを使用のこと。
　NOTE
1.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2.　♯: MINIMUM SERVICE CLEARANCE.
3.　USE M12 BOLTS FOR FIXING THE UNIT.

表１　TABLE 1

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

DRAWN 26/Jun/2014 T.YAMASAKI		TITLE VR-7020
CHECKED 26/Jun/2014 H.MAKI		名称 固定式データ記録器
APPROVED 27/Jun/2014 H.MAKI	VR-7000	外寸図
SCALE 1/4	MASS 7.3 ±10% kg	NAME FIXED DATA RECORDING UNIT
DWG. No. C4485-G06- C	REF. No. 24-015-430G-1	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO
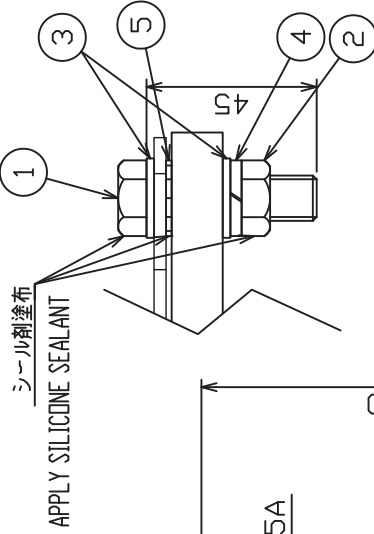
取付部詳細（尺度：1/2）
DETAIL FOR FIXING (SCALE:1/2)

45

シール剤塗布
APPLY SILICONE SEALANT

船首
BOW

3-φ15

φ175.3

151.79

131.47

400

SGP 125A

150

15

15

150

C20

φ210

10-15

電路
CABLE GUIDE

取付台作成例（参考）
STANCHION (FOR REFERENCE)

船首
BOW

船首
BOW

237.6

275.2

184.5

255.3

168.3

注記
1）取付台は造船所手配とする。

NOTE
1. STANCHION SHOULD BE PREPARED BY SHIPYARD.

品番 ITEM	品名 NAME		材質 MATERIAL	数量 QTY.	図番 DWG.No.	摘要 REMARKS
5	歯付座金	LOCK WASHER	SUS316L	3	M12	
4	八ネ座金	SPRING WASHER	SUS316L	3	M12	
3	平座金	PLANE WASHER	SUS316L	6	M12	
2	六角ナット	HEX. NUT	SUS316L	3	M12	
1	六角ボルト	HEX. BOLT	SUS316L	3	M12×45	

工事材料
INSTALLATION MATERIAL

TITLE VR-7020
名称 固定式データ記録器
装備要領
NAME FIXED DATA RECORDING UNIT
INSTALLATION PROCEDURE

VR-7000

REF. No.

DRAWN 31/Jul/2014 T.YAMASAKI
CHECKED 31/Jul/2014 H.MAKI
APPROVED 31/Jul/2014 H.MAKI
MASS kg
SCALE 1/8
DWG. No. C4485-Y01-C

FURUNO ELECTRIC CO., LTD.

P.W. 平座金

六角ナット
NUT

壁（取付板）BULKHEAD (PLATE)

六角穴付ボルト
M6×40
HEX. SOCKET BOLT

バネ座金
S.W.

BOTTOM OF CHASSIS
ユニット筐体

B部 詳細（尺度：1/1）
DETAIL FOR B (SCALE: 1/1)

〈215.5〉

型式銘板
NAMEPLATE

532.6±1.0

ケーブル
CABLE

〈50〉

#100

91.2±0.3

157.2±0.5

163.3±0.3

157.2±0.5

172±0.3

266.4±0.5

6.5

取付穴
6－φ6.5
FIXING HOLES

〈237.3〉

〈19〉

LAN/SOURCE
CONNECTOR
LAN・電源
コネクタ

〈45.3〉

注 記
1) #印寸法は最小サービス空間寸法とする。
2) 図中の公差はユニットメーカーの記載公差である。
3) 取付用ネジはM6×40六角穴付きボルトを使用のこと。
4) 壁（取付板）の厚さ（A）は4～10mmとする。

NOTE
1. #: MINIMUM SERVICE CLEARANCE.
2. TOLERANCES OF DIMENSIONS ARE INFORMATION FROM THE UNIT MAKER.
3. USE M6x40 SOCKET HEAD BOLTS FOR FIXING THE UNIT.
4. BULKHEAD THICKNESS (A): BETWEEN 4 AND 10.

DRAWN	3/Oct/2017	T.YAMASAKI		TITLE	VR-7021F（BRACKET）
CHECKED	3/Oct/2017	H.MAKI		名称	自己浮揚式データ記録器（ケース）
APPROVED	4/Oct/2017 H.MAKI		VR-7000/7000S		外寸図
SCALE	1/5	MASS 4.8	±10% kg	質量は記録器本体を含む。 MASS INCLUDES MAIN UNIT.	NAME	FLOAT-FREE DATA RECORDING UNIT W/BRACKET
DWG.No.	C4485-G08-J	REF.No.	24-015-431G-3		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

232

397

140

83

107

192

ø180

必要に応じて補強する
REINFORCE IF REQUIRED

データ記録器のみの場合
FOR DRU ONLY

取付台寸法例（造船所手配）
EXAMPLE OF MOUNTING BASE
(SHIPYARD SUPPLY)

177.8 / 157.2 / 157.2 / 157.2 / 307.8

6-φ7
91.2
t=6
163.3
300
78
172
500
600
800
70

SDSプラカード
SDS PLACARD

148
210

237.3
91.2
163.3
172
6-φ6.5
157.2 / 157.2 / 109
50
R80
200
50
50
150

ジャンクションボックス
JUNCTION BOX

取付穴 2-φ10
FIXING HOLES

665
532.6
215.5
400
170
70
B

B部 詳細（尺度：1/1）
DETAIL FOR B (SCALE:1/1)

BRACKET

注記
1) レーダー空中線部のRF信号にさらされない場所を選ぶこと。
2) VHFアンテナから5m以上離すこと。
3) SDSプラカードは装備位置付近のよく見える位置に取り付けること。

NOTE
1. SELECT A PLACE WHERE IS NOT EXPOSED TO THE RF SIGNAL FROM RADAR ANTENNA.
2. KEEP THE UNIT 5m OR MORE AWAY FROM VHF ANTENNA.
3. ATTACH THE SDS PLACARD TO A CONSPICIOUS LOCATION.

ITEM 品番	NAME 品名	QTY 数量	MATERIAL 材質	DWG.NO. 図番	REMARKS 備考
4	バネ座金 SPRING WASHER	6	SUS316L		M6
3	平座金 PLANE WASHER	6	SUS316L		M6
2	六角ナット HEX.NUT	12	SUS316L		M6
1	六角穴付ボルト HEX.SOCKET HEAD BOLT	6	SUS316L		M6×40

工事材料
INSTALLATION MATERIAL

TITLE VR-702IF
名称 自己浮揚式データ記録器
NAME 装備要領
FLOAT-FREE DATA RECORDING UNIT
INSTALLATION PROCEDURE

VR-7000

DRAWN 9/Feb/2021 T.YAMASAKI
CHECKED 9/Feb/2021 H.MAKI
APPROVED 9/Feb/2021 H.MAKI
SCALE 1/10
MASS ±10% kg
DWG.No. C4485-Y02-J
REF.No.

FURUNO ELECTRIC CO.,LTD.

FURUNO

FURUNO ELECTRIC CO., LTD.
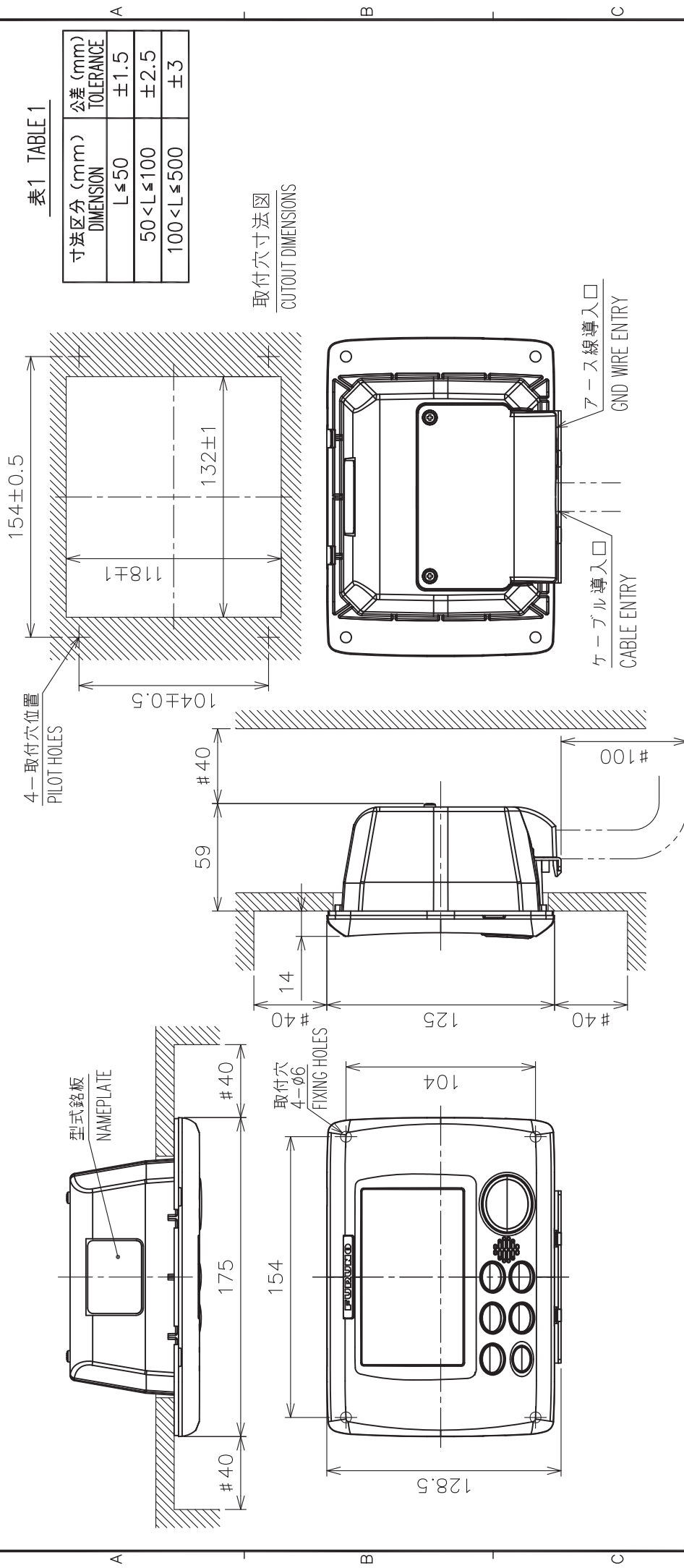
表1 TABLE 1

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

取付穴寸法図
CUTOUT DIMENSIONS

154±0.5

132±1

118±1

104±0.5

アース線導入口
GND WIRE ENTRY

ケーブル導入口
CABLE ENTRY

4-取付穴位置
PILOT HOLES

#40

59

#100

14

125

#40

#40

型式銘板
NAMEPLATE

#40

175

154

取付穴
4-φ6
FIXING HOLES

104

128.5

#40

TITLE	VR-7017
名称	リモートアラームパネル（埋込装備）
NAME	REMOTE ALARM PANEL (FLUSH MOUNT)
	外寸図
	OUTLINE DRAWING

DRAWN 18/Jun/2014 T.YAMASAKI
CHECKED 18/Jun/2014 H.MAKI
APPROVED 19/Jun/2014 H.MAKI
SCALE 1/3 MASS 0.64 kg
DWG.No. C4485-G10-B

VR-7000
質量はケーブルを含まず
MASS DOES NOT INCLUDE CABLE.
REF.No. 24-015-2020-1

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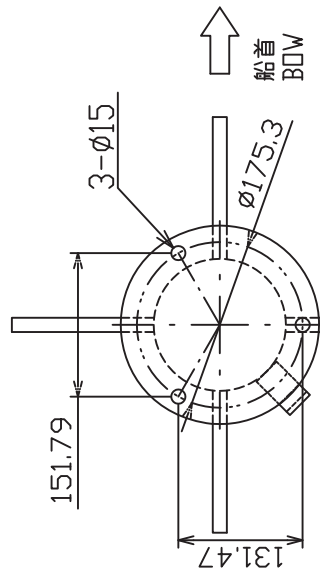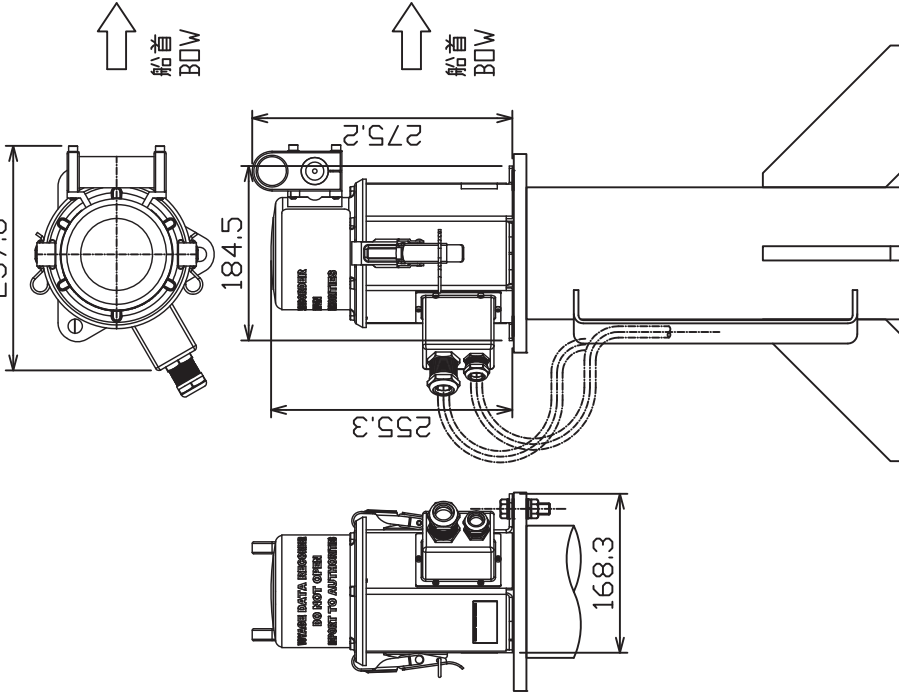3) 取付ネジはトラスタッピンネジ呼び径4×16を使用のこと。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS φ4x16 FOR FIXING THE UNIT.

FURUNO ELECTRIC CO., LTD.

4—取付穴位置
PILOT HOLES

取付穴寸法
CUTOUT DIMENSIONS

113±0.5

102±1

102±1

113±0.5

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

#150

55

38

20

9

ケーブル
CABLE

ケーブル導入口
CABLE ENTRY

型式銘板
NAMEPLATE

マイク
MICROPHONE

130

113±0.5

取付穴
4—φ5.5
FIXING HOLES

113±0.5

130

FURUNO
MICROPHONE
VR-7011

注記 1) 指定外の寸法公差は表1による。
2) #印寸法は最小サービス空間寸法とする。
3) 取付用ネジは、バインドタッピンネジ呼び径4X16を使用のこと。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE BIND TAPPING SCREWS φ4x16 FOR FIXING THE UNIT.

DRAWN	18/Jun/2014	T.YAMASAKI		TITLE	VR-7011
CHECKED	18/Jun/2014	H.MAKI		名称	マイクロフォン（埋込装備）
APPROVED	19/Jun/2014	H.MAKI	VR-7000		外寸図
SCALE	1/2	MASS 0.33 kg	質量はケーブルを含まず。 MASS DOES NOT INCLUDE CABLE.	NAME	MICROPHONE (FLUSH MOUNT)
DWG.No.	C4485-G04-B		REF.No.	24-015-4009-0	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

型式銘板
NAMEPLATE

125±0.5

取付穴
4－φ8
FIXING HOLES

105

30

135

75±0.5

FURUNO
WATERPROOF MICROPHONE
VR-7012W

マイク
MICROPHONE

FURUNO

88

77

160

#250

ケーブル
CABLE

#70

145

ケーブル導入口
CABLE ENTRY

#70
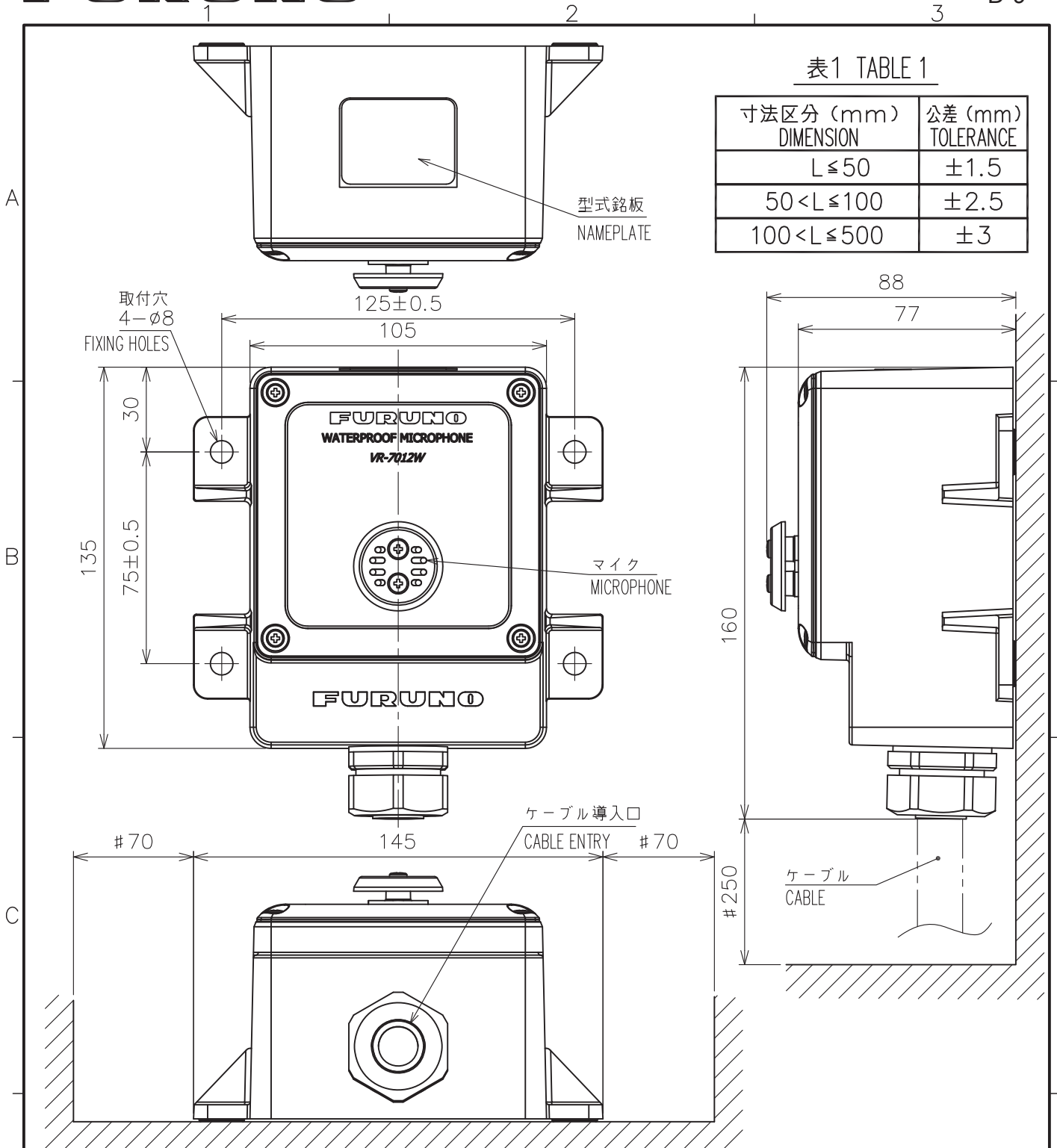
注記　１）指定外の寸法公差は表１による。
　　　２）＃印寸法は最小サービス空間寸法とする。
　　　３）取付用ネジはトラスタッピンネジ呼び径６Ｘ３０を使用のこと。

NOTE　1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
　　　2. #: MINIMUM SERVICE CLEARANCE.
　　　3. USE TAPPING SCREWS ø6x30 FOR FIXING THE UNIT.

DRAWN 4/Sep/2014 T.YAMASAKI		TITLE VR-7012W
CHECKED 4/Sep/2014 H.MAKI		名称 防水マイクロフォン（壁掛装備）
APPROVED 4/Sep/2014 H.MAKI	VR-7000	外寸図
SCALE 1/2　MASS 0.62 ±10% kg	質量はケーブルを含まず。MASS DOES NOT INCLUDE CABLE.	NAME WATERPROOF MICROPHONE (BULKHEAD MOUNT)
DWG. No. C4485-G05- C	REF. No. 24-015-410G-1	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

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

型式銘板
NAMEPLATE

364±1

取付穴
2-φ10
FIXING HOLES

111

170±1

43

251

10

2-取付用切欠
FIXING NOTCH

#300

ケーブル
CABLE

電源ケーブル導入口
POWER CABLE ENTRY

アース端子
GND TERMINAL

信号コネクタ
SIGNAL CONNECTOR

#70　　　　400　　　　#70

注 記　　1）指定外の寸法公差は表1による。
　　　　　2）＃印寸法は最小サービス空間寸法とする。
　　　　　3）取付ネジはＭ８ボルトとする。

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

DRAWN 18/Jun/2014　T.YAMASAKI			TITLE 名称 外寸図 NAME	IF-7100
CHECKED 18/Jun/2014　H.MAKI				ビデオLANコンバータ
APPROVED 19/Jun/2014 H.MAKI	VR-7000			
SCALE 1/5	MASS 3.2 ±10% kg			VIDEO LAN CONVERTER
DWG. No. C4485-G09-B	REF. No. 24-015-300G-0			OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

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

42

#100
169
#150

取付穴 4-φ5
FIXING HOLES

172
153
103±0.5
33

350
336±1

型式銘鈑
NAMEPLATE

324

#100

#100

信号コネクタ
SIGNAL CONNECTOR

POWER-FAIL

電源
SOURCE

ヒューズ
FUSE

アース端子
GND TERMINAL

注記 1) 指定外の寸法公差は表1による。
2) #印寸法は最小サービス空間寸法とする。
3) 取付用メジはトラスタッピンネジ呼び径4×20を使用のこと。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS ø4x20 FOR FIXING THE UNIT.

DRAWN	8/Jun/2018	T.YAMASAKI		TITLE	HUB-3000
CHECKED	8/Jun/2018	H.MAKI		名称	インテリジェントハブ
APPROVED	8/Jun/2018	H.MAKI	FMD-3200		外寸図
SCALE	1/3	MASS	1.5 kg	質量はケーブルを含まず。 MASS DOES NOT INCLUDE CABLE.	NAME	INTELLIGENT HUB
DWG. No.	C4473-G12- C		±10%	REF. No.	24-014-350G-2	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

220

180±0.5

取付穴
4−φ5
FIXING HOLES

48

41

5

A

235.5

150±0.5

64

型式銘板
NAMEPLATE

コネクタ
CONNECTOR

LAN

215

#150

B

電源ケーブル
POWER CABLE

ケーブル導入口
CABLE ENTRY

アース端子
GND TERMINAL

C

表1　TABLE 1

注 記　1)　指定外の寸法公差は表1による。
　　　　2)　♯印寸法は最小サービス空間寸法とする。
　　　　3)　取付用ネジはトラスタッピンネジ呼び径4×20を使用のこと。

NOTE　1.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
　　　　2.　#: MINIMUM SERVICE CLEARANCE.
　　　　3.　USE TAPPING SCREWS φ4x20 FOR FIXING THE UNIT.

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

DRAWN 11/Jan/2012　T.YAMASAKI		TITLE 名称 NAME	MC−3000S
CHECKED 11/Jan/2012　H.MAKI			センサーアダプター（シリアル）
APPROVED 13/Jan/2012　Y.NISHIYAMA	FMD−3200		外寸図
SCALE 1/2	MASS 1.5　±10% kg	質量はケーブルを含まず。 MASS DOES NOT INCLUDE CABLE.	SENSOR ADAPTER (SERIAL)
DWG. No. C4473−G08− A	REF. No. 24−014−200G−1		OUTLINE DRAWING

FURUNO

100

60±0.5

取付穴
4-φ5
FIXING HOLES

型式銘板
NAMEPLATE

コネクタ
CONNECTOR

150±0.5

235.5

48

41

5

64

#150

ブロック間接続ケーブル
CABLE TO CONNECT BLOCKS

ケーブル導入口
CABLE ENTRY

アース端子
GND TERMINAL

表1 TABLE 1

注 記 1) 指定外の寸法公差は表1による。
      2) #印寸法は最小サービス空間寸法とする。
      3) 取付用ネジはトラスタッピンネジ呼び径4×20を使用のこと。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
      2. #: MINIMUM SERVICE CLEARANCE.
      3. USE TAPPING SCREWS φ4x20 FOR FIXING THE UNIT.

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

DRAWN 11/Jan/2012 T.YAMASAKI		TITLE MC-3010A
CHECKED 11/Jan/2012 H.MAKI		名称 センサーアダプター（アナログ）
APPROVED 13/Jan/2012 Y.NISHIYAMA	FMD-3200	外寸図
SCALE 1/2	MASS 0.8 ±10% kg 質量はケーブルを含まず。MASS DOES NOT INCLUDE CABLE.	NAME SENSOR ADAPTER (ANALOG)
DWG. No. C4473-G09-A	REF. No. 24-014-210G-1	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

100

60±0.5

取付穴
4-φ5
FIXING HOLES

型式銘板
NAMEPLATE

コネクタ
CONNECTOR

150±0.5

64

48

41

5

235.5

#150

ブロック間接続ケーブル
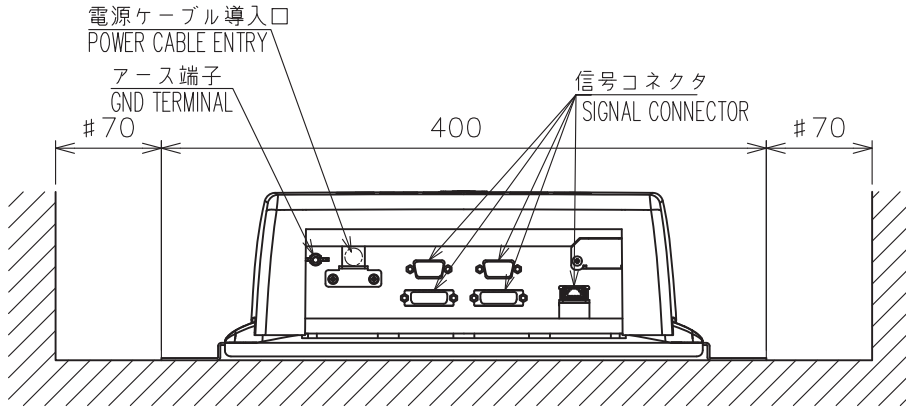CABLE TO CONNECT BLOCKS
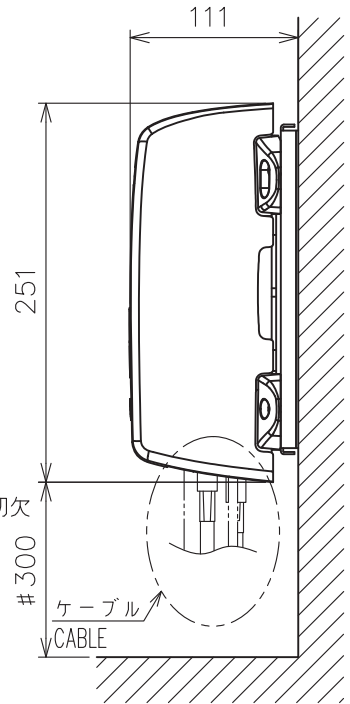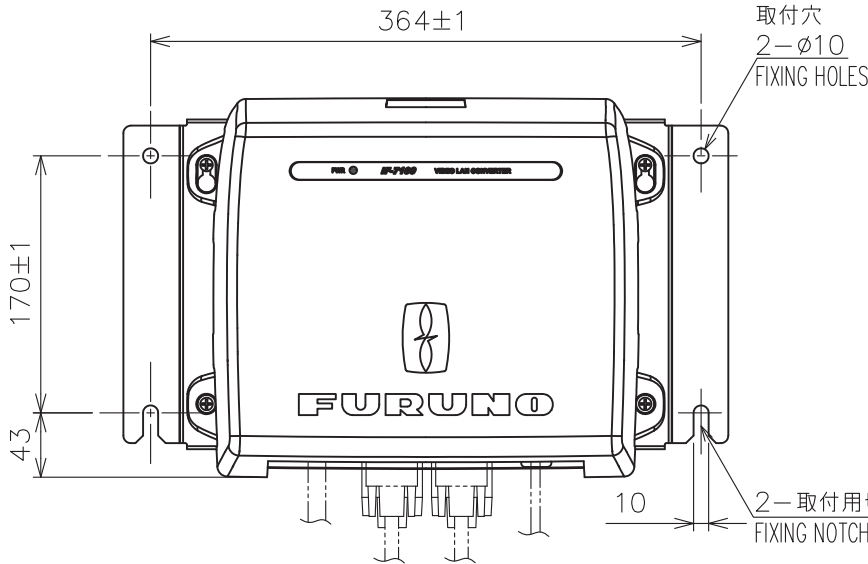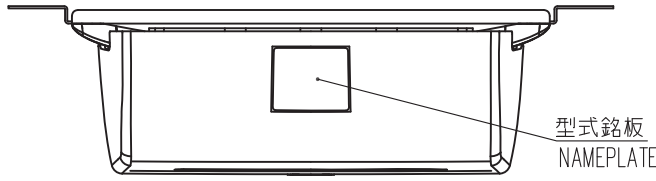
ケーブル導入口
CABLE ENTRY

アース端子
GND TERMINAL

表1 TABLE 1

注 記　1）　指定外の寸法公差は表１による。
　　　　2）　♯印寸法は最小サービス空間寸法とする。
　　　　3）　取付用ネジはトラスタッピンネジ呼び径４×２０を使用のこと。

NOTE　1.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
　　　　2.　#: MINIMUM SERVICE CLEARANCE.
　　　　3.　USE TAPPING SCREWS ø4x20 FOR FIXING THE UNIT.

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

DRAWN	11/Jan/2012 T.YAMASAKI		TITLE	MC-3020D
CHECKED	11/Jan/2012 H.MAKI		名称	センサーアダプター（デジタルイン）
APPROVED	13/Jan/2012 Y.NISHIYAMA	FMD-3200		外寸図
SCALE	1/2　MASS 0.8 ±10% kg	質量はケーブルを含まず。 MASS DOES NOT INCLUDE CABLE.	NAME	SENSOR ADAPTER (DIGITAL IN)
DWG. No.	C4473-G10-A	REF. No. 24-014-220G-1		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

(152.4)

25.5   117

32

取付穴
2-φ10
FIXING HOLES

型式銘板
NAMEPLATE

150±1

136

20c

20c

(31)

#60

170

#60

ケーブル導入口
CABLE ENTRY

(36)

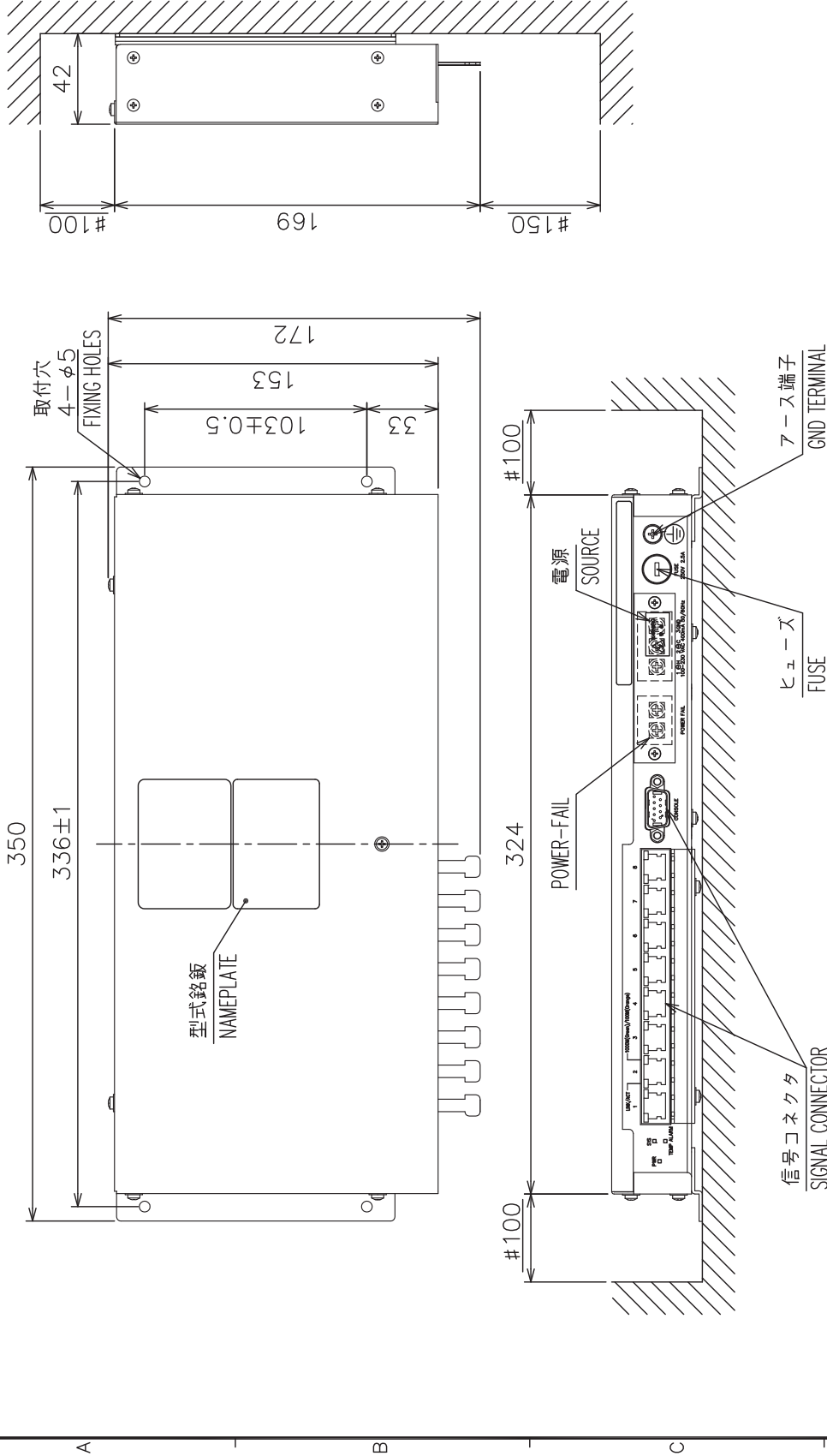#250   (171)   #150

φ9 MAX.

φ15 MAX.

73

89

注 記　1）指定外の寸法公差は表１による。
　　　　2）＃印寸法は最小サービス空間寸法とする。
　　　　3）取付用ネジはＭ８ボルトを使用のこと。

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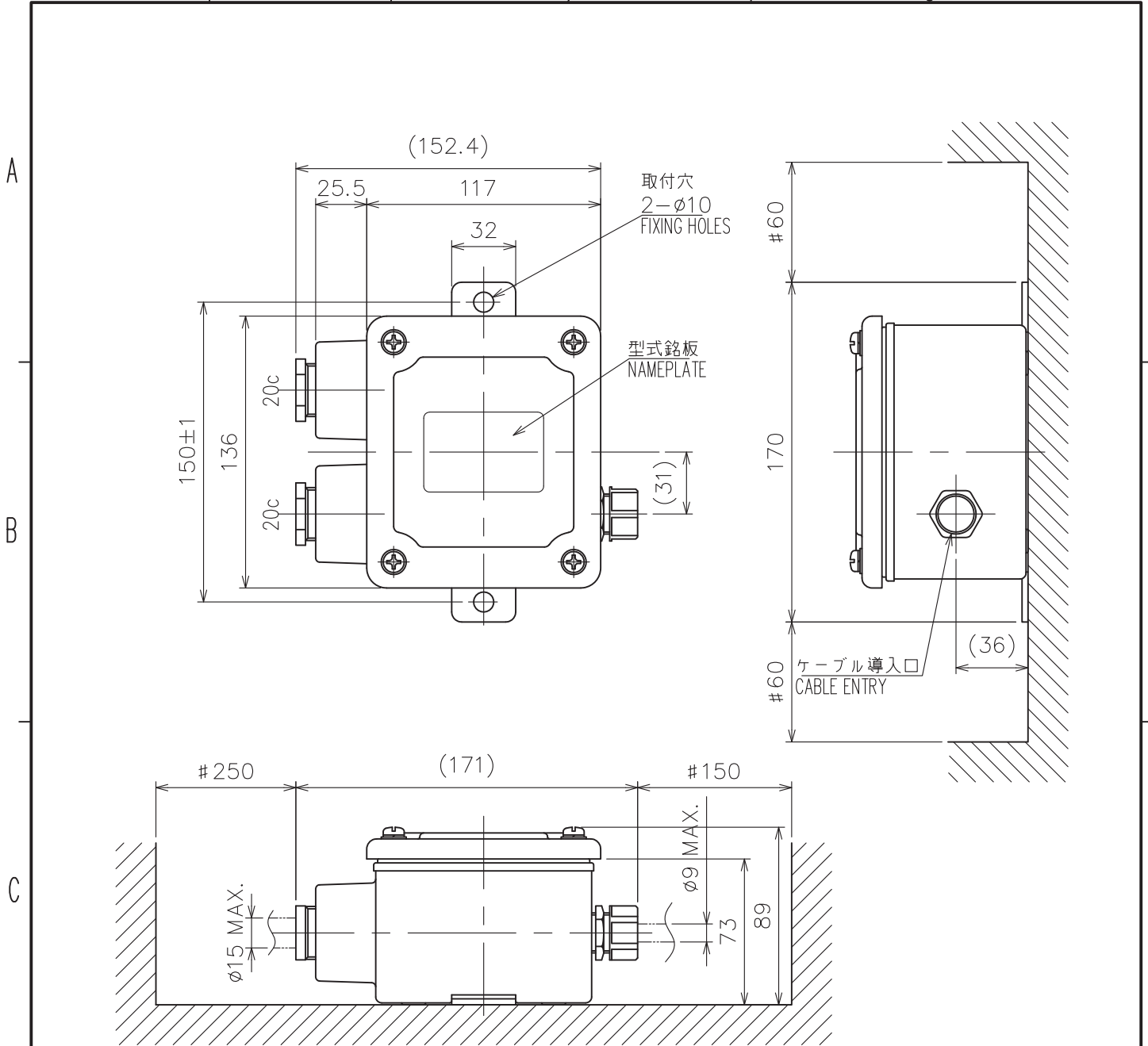
表 1　TABLE 1

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

DRAWN 29/Oct/2014 T.YAMASAKI		TITLE	VR-7022F
CHECKED 29/Oct/2014 H.MAKI		名称	ジャンクションボックス
APPROVED 29/Oct/2014 H.MAKI	VR-7000		外寸図
SCALE 1/2　MASS 1.5 ±10% kg		NAME	JUNCTION BOX
DWG.No. C4485-G11- G	REF.No. 24-015-432G-3		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

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

144

120±1

6

#30

153

表示窓
LED

型式銘板
NAMEPLATE

端子台
TERMINAL BOARD

170±1

188

端子台
TERMINAL BOARD

ケーブル導入口
CABLE ENTRY

アース端子
GND TERMINAL

#30   144   #30

#150

65

68
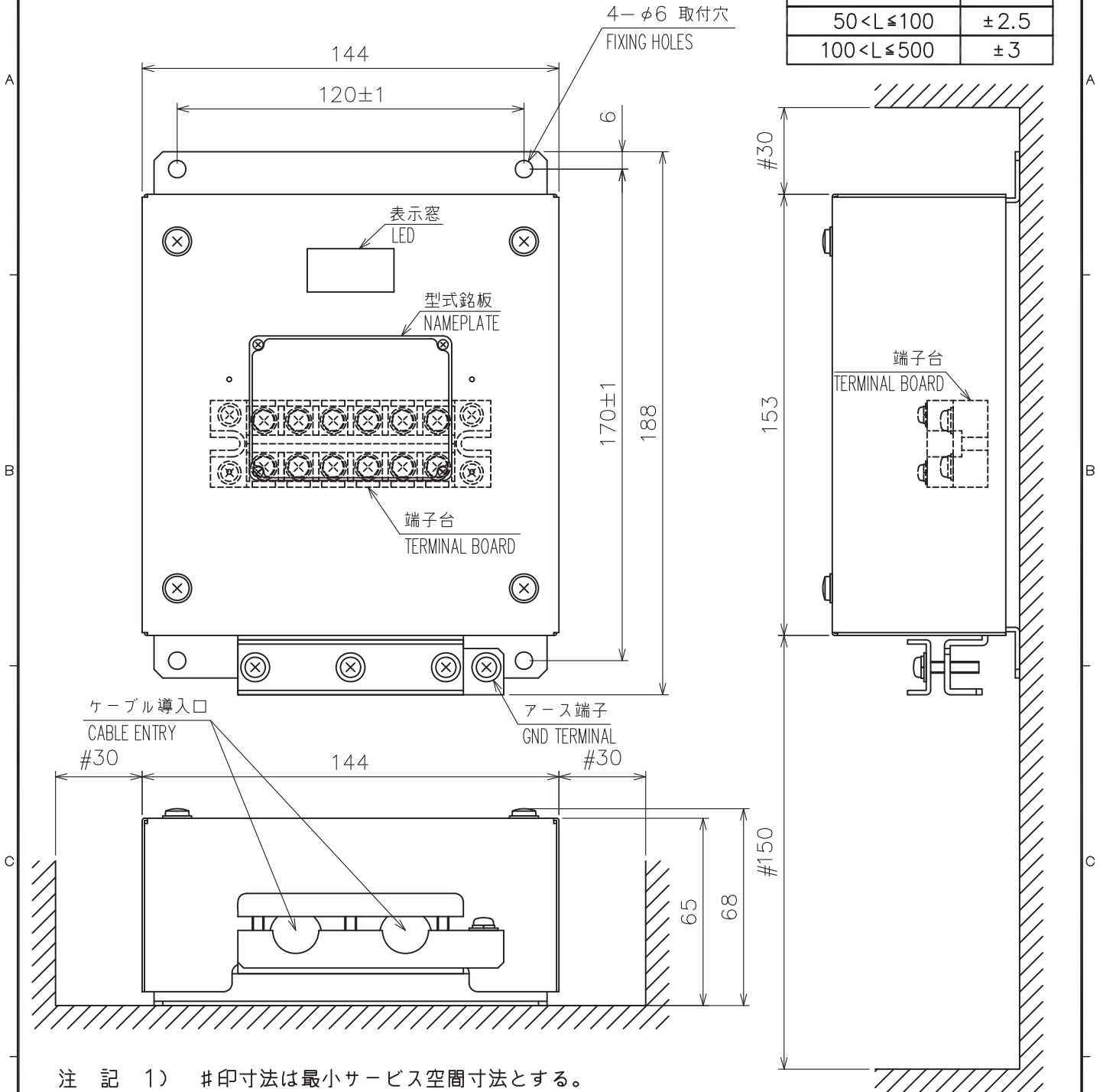
注 記 1) ＃印寸法は最小サービス空間寸法とする。
      2) 指定外の寸法公差は表１による。
      3) 取付用ネジはトラスタッピンネジ呼び径５×２０を使用のこと。

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

DRAWN	Dec. 5, '06 E. MIYOSHI		TITLE	PSU-011
CHECKED	TAKAHASHI. T		名称	電源制御部
APPROVED	Y. Hatai	FAR-2827W		外寸図
SCALE	1/2	MASS 0.59 ±10% kg	NAME	POWER SUPPLY UNIT
DWG.No.	C3527-G06- A	REF.No. 03-154-900G-0		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

S-1

リモートアラームパネル
REMOTE ALARM PANEL
VR-7017

自己浮揚式データ記録器
FLOAT-FREE DATA RECORDING UNIT
VR-7021F

固定式データ記録器
FIXED DATA RECORDING UNIT
VR-7020

レーダー映像
RADAR PICTURE

ビデオLANコンバータ
VIDEO LAN CONVERTER
IF-7100

ビデオLANコンバータ *2
VIDEO LAN CONVERTER
IF-7100 *2

センサーアダプター
SENSOR ADAPTER
MC-3010A
MC-3020D *2

センサーアダプター
SENSOR ADAPTER
MC-3000S

接続箱
JUNCTION BOX
IF-8540 *2
または OR FOR DATA EXTRACTION

PC (LIVE PLAYER)

アラームモニタリングシステム
ALARM MONITORING SYSTEM

RADAR/ECDIS
HUB-3000
HUB-100
IEC61162-450
SHIP'S LAN

VR-7022F

ETHERNET HUB
100BASE-TX

データ収集ユニット
DATA COLLECTING UNIT
VR-7010

RAP I/F

MIC I/F

VHF I/F

IEC61162-1/2

CPU BOARD

マイクロフォン
MICROPHONE
VR-7011

同土 DITTO

マイクロフォン
MICROPHONE
VR-7011 または OR
防水型マイク
WATERPROOF MIC.
VR-7012W

ウイング用
FOR WING

音声マイク
(最大8台)
AUDIO MIC
(MAX. 8 SETS)

VHF RECEIVER
(MAX. 2 ch)

SERIAL CH1 IEC61162-1/2
SERIAL CH2 IEC61162-1/2
SERIAL CH3 IEC61162-1
SERIAL CH4 IEC61162-1
SERIAL CH5 IEC61162-1
SERIAL CH6 IEC61162-1
SERIAL CH7 IEC61162-1
SERIAL CH8 IEC61162-1

VGA CABLE
RS-2320 CABLE
USB CABLE
USB KEYBOARD
(FOR MAINTENANCE)

電源制御部
POWER SUPPLY UNIT
PSU-011 *2 *4

PE 保護アース
保護アース *1

100-230VAC
1φ, 50/60Hz

VR-7020接続詳細
DETAIL FOR VR-7020 CONNECTION

VR-7021F接続詳細
DETAIL FOR VR-7021F CONNECTION

ジャンクションボックス
JUNCTION BOX
VR-7022F

不使用線はテープで絶縁する
INSULATE THE WIRES UNUSED.

番号20-0001以降 (それ以前の型式)
SER. #20-0001 (PREVIOUS MODEL)
OR LATER

各信号の接続に関しては造船所/船主との事前打合せが必要です。
CONSULT WITH SHIPOWNER AND/OR SHIPYARD ABOUT CONNECTION OF DEVICES.

注記
＊1）造船所手配
＊2）オプション
＊3）防水型にはTTYCYSLAを使用。
＊4）ロシア型検仕様のみ。

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: USE TTYCYSLA CABLE FOR WATERPROOF MIC.
*4: FOR RUSSIAN FLAG VESSELS ONLY.

DRAWN	24/Jan/2020 T.YAMASAKI	TITLE	VR-7000
CHECKED	24/Jan/2020 H.MAKI	名称	航海情報記録装置
APPROVED	12/Feb/2020 H.MAKI		相互結線図
SCALE	MASS kg	NAME	VOYAGE DATA RECORDER
DWG No. C4485-C01- N	REF. No.		INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

FURUNO

リモートアラームパネル
REMOTE ALARM PANEL
VR-7017

J101
1 TD_A
2 TD_B
3 RD_H
4 RD_C
5 GND
6 NET-S (24V)
7 NET-C (0V)
8 NET-H
9 NC
10 NET-L

RAP I/F

自己浮揚式データ記録器
FLOAT-FREE DATA
RECORDING UNIT
VR-7021F *2

VR-7022F

DC OUT

固定式データ記録器
FIXED DATA
RECORDING UNIT
VR-7020 *2

または
OR

レーダー映像
RADAR PICTURE

ビデオLANコンバータ
VIDEO LAN CONVERTER
IF-7100
RGB1 DVI1 RGB2 DVI2
CH1 CH2
24V_IN
24V_GND

レーダー映像
RADAR PICTURE

ビデオLANコンバータ
VIDEO LAN CONVERTER
IF-7100 *2
RGB1 DVI1 RGB2 DVI2
CH1 CH2
24V_IN
24V_GND

RADAR/ECDIS
HUB-3000
HUB-100
IEC61162-450
SHIP'S LAN

センサーアダプター
SENSOR ADAPTER
MC-3010A
MC-3020D *2

センサーアダプター
SENSOR ADAPTER
MC-3000S
24V_IN
24V_GND

接続箱
JUNCTION BOX
IF-8540 *2

FOR DATA EXTRACTION

PC (LIVE PLAYER)

アラームモニタリングシステム
ALARM MONITORING SYSTEM

データ収集ユニット
DATA COLLECTING UNIT
VR-7010

ETHERNET HUB
100BASE-TX

J309 / J312 / J311 / J21 / J25 / J22 / J23 / J24 / J26 / J11 / J12 / J13 / J14 / J15 / J16 / J313 / J501 / J502 / J310

MIC I/F
J203 J204 J205 J206 J207 J208 J209 J210
12VDC / GND / MIC_AUDIO / MICTEST

VHF I/F
J201 J202
VHF_AUDIO

IEC61162-1/2
J301 J302 J303 J304 J305 J306 J307 J308
RD_H / RD_C / RD_G

CPU BOARD
J35 J31 J38 J39
Dsub15P Dsub9P LOWER UPPER
VGA CABLE
RS-232C CABLE
USB CABLE
USB KEYBOARD
(FOR MAINTENANCE)

AC IN
J1
1 AC_H
2 AC_C
3 NC

PE 保護アース *1
IV-2sq.

DPYC-1.5 *1
電源制御部
POWER SUPPLY
UNIT *2 *4
PSU-011

100-230VAC
1φ, 50/60Hz

マイクロフォン
MICROPHONE
VR-7011
同上 DITTO

マイクロフォン
MICROPHONE
VR-7011 または OR
防水型マイク
WATERPROOF MIC.
VR-7012W
同上 DITTO

MIC1 MIC2 MIC3 MIC4 MIC5 MIC6 MIC7 MIC8

ウイング用
FOR WING

音声マイク
(最大8台)
AUDIO MIC
(MAX. 8 SETS)

VHF1 VHF2
VHF RECEIVER
(MAX. 2 ch)

SERIAL CH1 IEC61162-1/2
SERIAL CH2 IEC61162-1/2
SERIAL CH3 IEC61162-1
SERIAL CH4 IEC61162-1
SERIAL CH5 IEC61162-1
SERIAL CH6 IEC61162-1
SERIAL CH7 IEC61162-1
SERIAL CH8 IEC61162-1

SYS_FAIL+ / SYS_FAIL- / POWER_FAIL+ / POWER_FAIL- / LOCAL_ACK+ / LOCAL_ACK- / REMOTE_ACK+ / REMOTE_ACK- / BUZZER_STOP+ / BUZZER_STOP- / NC

VR-7020接続詳細
DETAIL FOR VR-7020 CONNECTION

J311 DPYCY-1.5 *1
24V シロ WHT
0V クロ BLK

VR-7010
J25 RJ45 FR-FTPC-CY *2
シロ/ダイ WHT/ORG
ダイ ORG
シロ/ミドリ WHT/GRN
ミドリ GRN
シロ/アオ WHT/BLU
アオ BLU
シロ/チャ WHT/BRN
チャ BRN

VR-7020
24V / 24V / 0V / 0V / NC
TD_P / TD_N / RD_P / RD_N / NC

不使用線はテープで絶縁する
INSULATE THE WIRES UNUSED.

VR-7021F接続詳細
DETAIL FOR VR-7021F CONNECTION

J21 RJ45 FR-FTPC-CY *2
シロ/ダイ WHT/ORG
ダイ ORG
シロ/ミドリ WHT/GRN
ミドリ GRN
シロ/アオ WHT/BLU
アオ BLU
シロ/チャ WHT/BRN
チャ BRN

ジャンクションボックス
JUNCTION BOX
VR-7022F
100785 (*2)
83157.2m

クロ BLK
アカ RED

シロ/ダイ ORG / シロ WHT / BLU / BRN / WHT

VR-7021F

J312 DPYCY-1.5 *1
0V クロ BLK
24V シロ WHT

番号20-0001以降 (それ以前の型式)
SER. 20-0001 (PREVIOUS MODEL)
OR LATER

不使用線はテープで絶縁する
INSULATE THE WIRES UNUSED.

各信号の接続に関しては造船所/船主との事前打合せが必要です。
CONSULT WITH SHIPOWNER AND/OR SHIPYARD ABOUT CONNECTION OF DEVICES.

注記
＊1）造船所手配
＊2）オプション
＊3）防水型にはTTYCYSLAを使用。
＊4）ロシア型検仕様のみ。

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: USE TTYCSLA CABLE FOR WATERPROOF MIC.
*4: FOR RUSSIAN FLAG VESSELS ONLY.

DRAWN 24/Jan/2020 T. YAMASAKI		TITLE VR-7000S
CHECKED 24/Jan/2020 H. MAKI		名称 簡易型航海情報記録装置
APPROVED 12/Feb/2020 H. MAKI		相互結線図
SCALE	MASS kg	NAME SIMPLIFIED VOYAGE DATA RECORDER
DWG No. C4495-C01- D	REF. No.	INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.
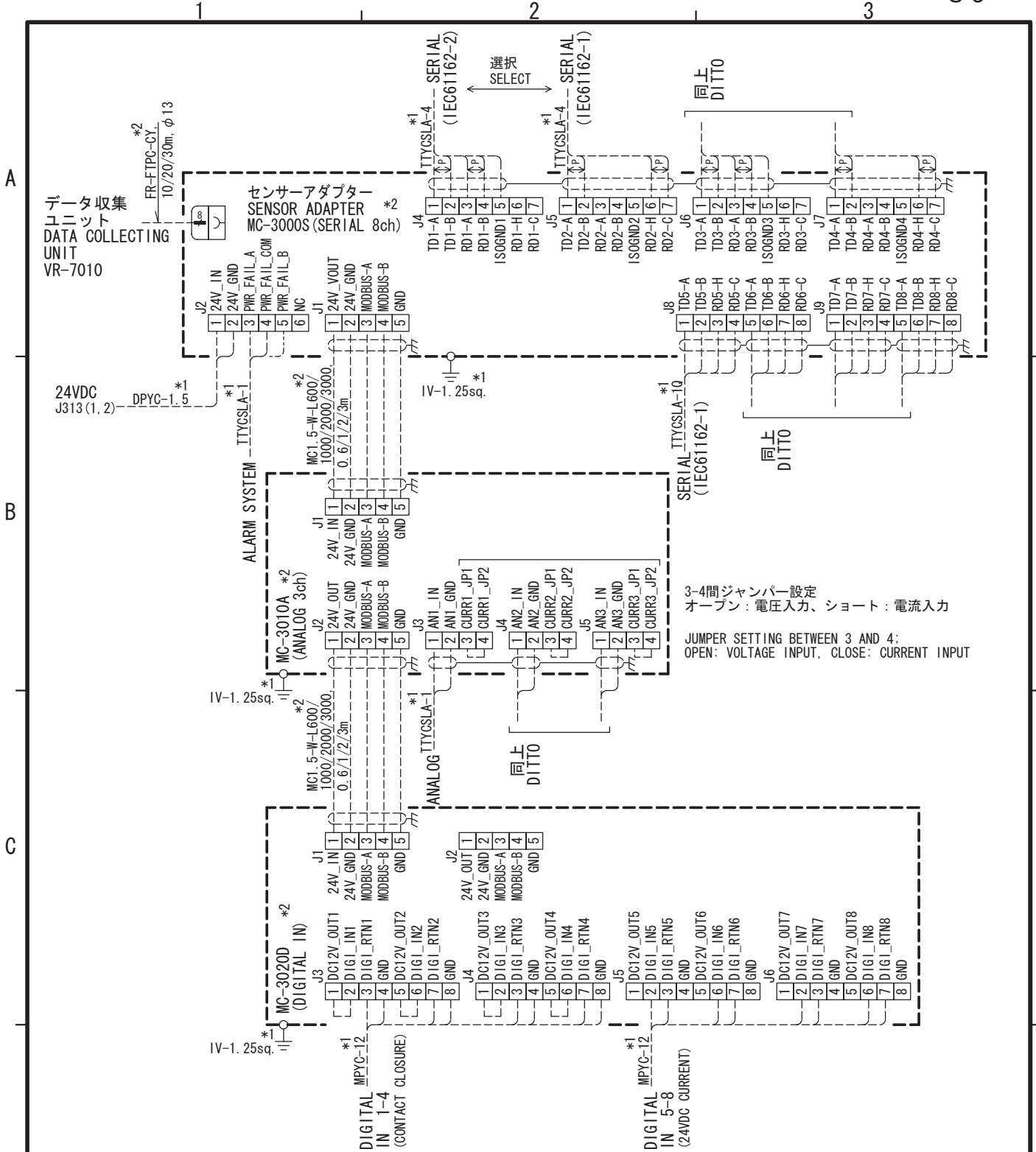
注記
＊１）造船所手配。
＊２）オプション。

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.

3-4間ジャンパー設定
オープン：電圧入力、ショート：電流入力

JUMPER SETTING BETWEEN 3 AND 4;
OPEN: VOLTAGE INPUT, CLOSE: CURRENT INPUT

選択
SELECT

DRAWN		TITLE	MC-3000S/3010A/3020D
9/Apr/2014 T.YAMASAKI		名称	センサーアダプター
CHECKED			
14/Apr/2014 H.MAKI			相互結線図
APPROVED			
21/Apr/2014 H.MAKI	VR-7000		
SCALE	MASS kg	NAME	SENSOR ADAPTER
DWG. No. C4485-C02- B	REF. No. 24-014-6003-2		INTERCONNECTION DIAGRAM

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