FURUNO

VOYAGE DATA RECORDER VR-3000 SIMPLIFIED VOYAGE DATA RECORDER VR-3000S Installation Manual

FURUNO ELECTRIC CO., LTD.

www.furuno.co.jp

ECF
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The paper used in this manual
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(DAMI) VR-3000/3000S

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⚠ SAFETY INSTRUCTIONS

⚠ WARNING

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

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

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

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

Do not disassemble or modify the equipment.

Fire, electrical shock or injury may result.

Connect the power cable to correct terminals.

Improper connection may result in electrical shock, fire or injury.

Use the proper power supply.

The rated voltage for this equipment is 24 VDC and 100-230 VAC. Use of a different power supply can damage the equipment.

⚠ CAUTION

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

	Standard compass (m)	Steering compass (m)
DCU	2.15	1.35
JB	1.65	1.05
DRU	1.10	0.65
Microphone	0.55	0.35
Waterproof Microphone	1.05	0.70
VHF I/F unit	0.75	0.50
RAP	0.85	0.55

Attach grounding securely to ship's body.

The grounding is required to prevent electrical shock.

EQUIPMENT LISTS

Standard supply

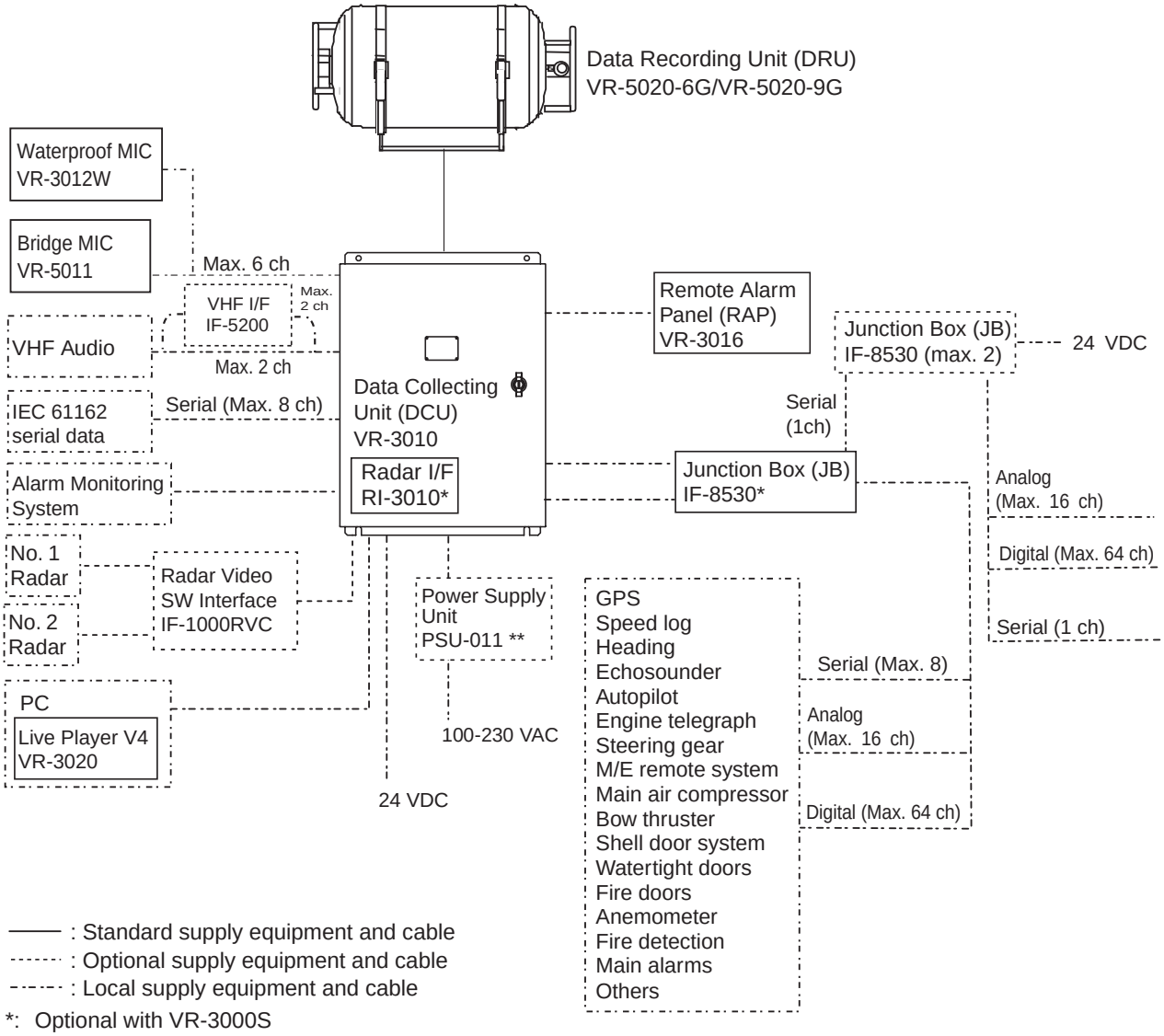
Name	Type	Code No.	Qty	Remarks
Data Collecting Unit	VR-3010	—	1	
Data Recording Unit	VR-5020-6G	—	Choose one	6 GB, for connection of single radar
	VR-5020-9G	—		9 GB, for connection of 2-4 radars
Remote Alarm Panel	VR-3016	—	1	Includes installation materials
Junction Box	IF-8530	—	1 set	Option on VR-3000S
Microphone	VR-5011	—	1-6	Choose quantity
Waterproof Microphone	VR-3012W	—		
Power Supply Unit	PSU-011	—	1	Russian spec. only
Installation Materials	CP24-00605	004-383-250	1 set	For VR-3010, radar 1 to 2 CH
	CP24-00609	004-383-290		For VR-3010, radar 3 to 4 CH
	CP24-00601	004-383-210		For VR-3010, no radar connection.
	CP24-00801	004-384-960	1 set	For VR-3016
	CP24-00217	004-381-090	1 set	For VR-5011
	CP24-00215	004-379-590	1 set	For VR-5020
	CP24-00910	000-042-241	1 set	IEEE1394 cable, 30m, w/armor
	CP24-00920	000-042-242		IEEE1394 cable, 20m, w/armor
	CP24-00930	000-016-261		IEEE1394 cable, 25m, w/armor
Accessories	FP24-00401	001-014-480	1 set	Label for RAP, 24-009-2901 (Code No. 100-338-891-10), 1 pc
	FP24-00201	004-383-300	1 set	English document
	FP24-00203	004-555-560	1 set	For VR-3010
Spare Parts	SP24-00201	004-555-540	1 set	For VR-3010

For detailed information about installation materials, accessories and spare parts, see the packing lists at the end of this manual.

Optional supply

Name	Type	Code No.	Remarks	
VHF Interface Unit	IF-5200	000-040-789	To combine mic and loudspeaker lines	
LAN cable set	CP03-28900	000-082-658	10 m	For installation of IF-8530, w/connector MP5588-C, FR-FTPC-CY (10 m)
	CP03-28910	000-082-659	20 m	
	CP03-28920	000-082-660	30 m	
Backup HDD	VR-3011	004-385-000		
Waterproof Microphone	VR-3012W			
Microphone	VR-5011			
Junction Box	IF-8530	000-041-946	Max. 3 total	
RGBHV cable	BNCX5-DSUB15-L400	000-159-595-10	For connection of radar video signal, max. 4	
	BNCX5-DSUB15-L700	000-159-596-10		
Battery	OP24-12	004-385-010	2 sets	
Radar I/F	RI-3010		For receiving radar video signal	
Installation materials (for connecting radar)	CP24-01200	000-010-132	See Chapter 2.	
	CP24-01210	000-010-133		
Radar Video Switch Interface	IF-1000RVC	—	See operator's manual IF-1000RVC	
Gland Gasket	OP24-16	001-046-260	See page 34	

SYSTEM CONFIGURATION



——— : Standard supply equipment and cable
------- : Optional supply equipment and cable
-·-·-·- : Local supply equipment and cable

*: Optional with VR-3000S
**: Russian spec. only

Environmental category

DCU	Protected from weather
DRU	Exposed to weather
RAP	Protected from weather
Bridge MIC	Protected from weather
Waterproof MIC	Exposed to weather
VHF I/F unit	Protected from weather
JB	Protected from weather
Radar Video SW Interface	Protected from weather

Note: For S-VDR, where it is impossible to obtain radar data, then AIS target data should be recorded as a source of information from other ships. (Ref. IMO Res.MSC.163(78), section 5.4.7).

RECORD OF PUB REV., PROG. NO.

Revision No., Date of Revision	Program No. (software)	Outline of Revision
A Apr. 19, 2006	VR-3000 SYSTEM 2450031-01 RAP 2450026-01.01	1st printing.
A1 (For BSH) June 2, 2006	Same as above	p. iv Added MIC VR-3012W to optional supply. p. v, vi Revised illustrations to show VR-3012W. p. 10, 11, 38 Added mounting and wiring procedures for VR-3012W. p. 13, 14 Revised illustrations to show VR-3012W. D-5, D-6 Added VR-3012W's outline drawings. S-1, S-2 Added VR-3012W to interconnection diagrams.
B: June 16, 2006	Same as above	All pages revised.
C: Aug. 21, 2006	Same as above	Added cover for the beacon.
D: Oct. 4 2006	Same as above	Added installation material for connecting radar.
E: Jan. 18, 2007	Same as above	For Russian TA: added PSU-011.
F: Aug. 2, 2007	RAP/AP 2450026-01.02	For second alarm
G: May 15, 2008	Same as above	Added IF-1000RVC for option.
H: Aug. 27, 2008 Dec. 15, 2008	VDR: 2450031-02.23 RAP-AP: 2450026-01.05	Added OP24-16 for option.

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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 System Overview

The basic VDR consists of

- Data Collecting Unit (DCU)
- Data Recording Unit (DRU) in the protective capsule
- Remote Alarm Panel (RAP) which indicates the status of the system remotely.
- Junction Box (JB) which can minimize the cable run and increase the number of the input ports. (Optional supply with VR-3000S.)
- Bridge microphone (one supplied, max. 6)
- Optional VHF Interface Unit IF-5200 which combines VHF microphone and loudspeaker lines.

The VDR system continuously stores data over past 12 hours in the DRU and removable hard disk. Oldest data is erased as new data is entered.

The VDR operates on 100-230 VAC mains and 24 VDC power supply. In case of ship's mains failure, backup batteries are used for recording bridge audio for 2 hours.

A lot of sensors are connected to the VDR, in different signal types in some cases. Determine all sensors to be connected before installation.

Note: The Data Collecting Unit, Data Recording Unit, Remote Alarm Panel and Junction Box are sometimes referred to by their acronyms.

Data Collecting Unit: DCU
Data Recording Unit: DRU
Remote Alarm Panel: RAP
Junction Box: JB

1.2 Data Collecting Unit

The DCU is designed for on-deck or bulkhead installation, and should be mounted within the wheelhouse. Mount it in a place convenient for connection with relevant sensors and associated devices. For bulkhead mounting, be sure the mounting location is strong enough to support the weight of the unit under the vibration normally encountered onboard the vessel. Be sure to mount the DCU in an area with low humidity and away from high temperature materials, as well as an area with minimal vibration and shock.

Eye bolts are provided at the top of the unit to hoist the unit onboard. Remove them after installation and plug eye bolt holes with supplied cosmetic caps.

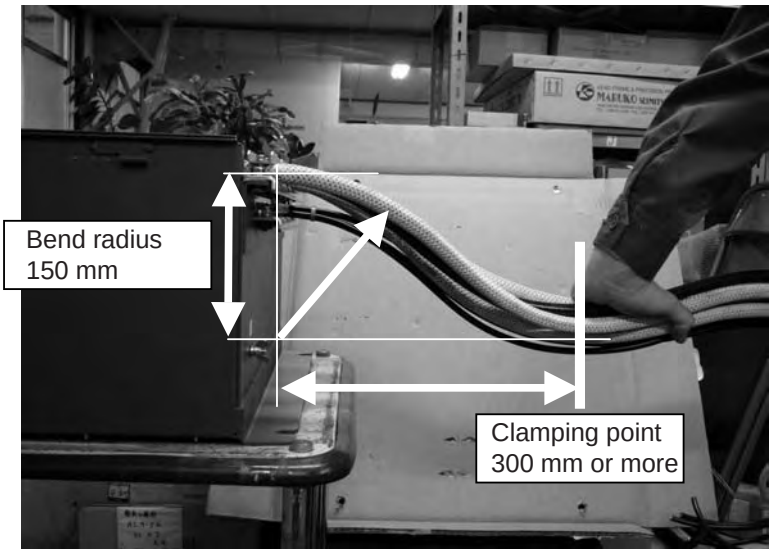
1.2.1 General mounting considerations

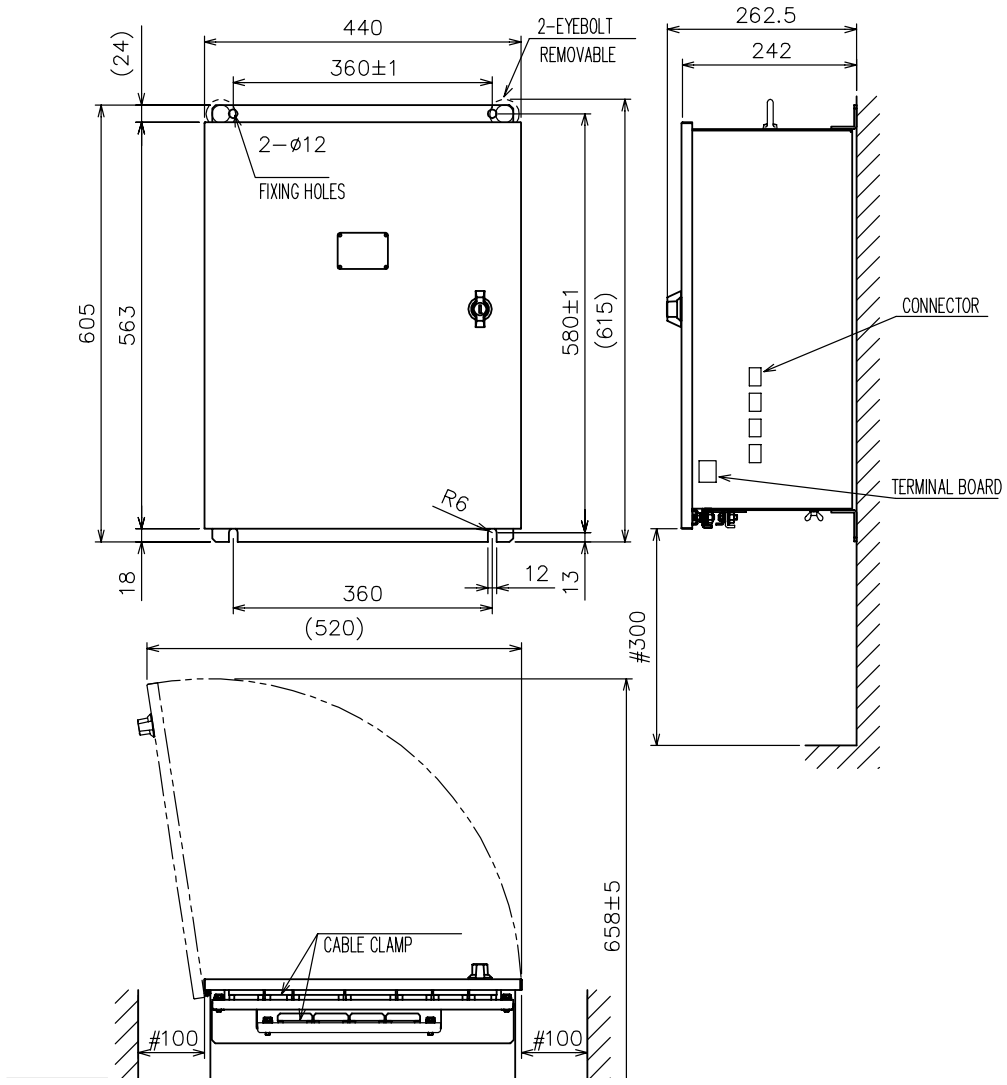
Mount the DCU considering the following points.

- The mounting surface must be flat. If it is not flat, insert a number of washers between the unit and the mounting surface as necessary.
- The mounting location should be away from places subject to water splash and rain.
- Choose the location considering cable lengths, connection of relevant sensors and associated devices, access to connectors and the unit's door.
- A magnetic compass will be affected if the DCU is placed too close to a magnetic compass. Observe the compass safe distances on page ii to prevent deviation of the compass.
- Observe the recommended service clearances shown in the outline drawing.

1.2.2 Mounting dimensions, mounting procedure

Fasten the unit to the chosen location with M10 bolts or ø10 coach bolts.





Mounting dimensions of DCU

1.2.3 Attaching card holder to door

A card holder for convenient storage of LAN cable, IEEE1394 cable, Error code table and Data extraction procedure on the door of the DCU is available. Remove paper from double-sided tape on the card holder and attach it to the door at the location shown below, aligning bottom edge of card holder with bottom edge of door.

DCU door

1.3 Data Recording Unit

The DRU contains a protective capsule and it should be installed in the vicinity of the bridge on the open deck area of the vessel. This will maximize the probability of its survival and facilitate recovery following an incident. The DRU should be positioned clear of rigging and other potential obstructions and as near to the centerline of the ship as possible. Constructing a "fence" around the DRU is recommended.

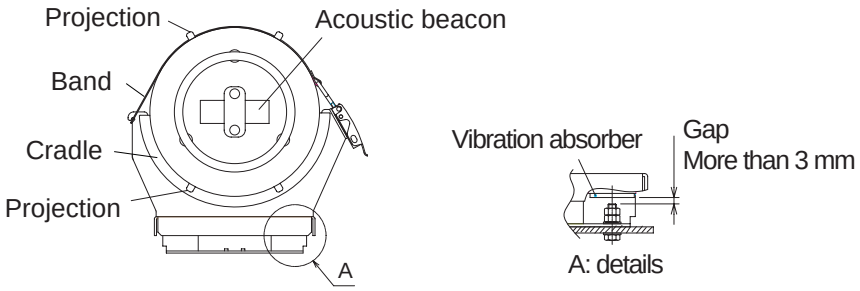
1.3.1 Installation considerations

- Must be separated from fuel or other potential fire hazards.
- Must be separated from probable sources of mechanical damage.
- Must be separated at least 4m from VHF/MF/HF antenna.
- Must be installed in a place that facilitates routing maintenance and copying of recorded data.
- Must be installed where a diver or remote operated vehicle could remove and retrieve.
- There should be a clear and unobstructed area around the DRU to allow a diver or an ROV to work.

1.3.2 Fixed-type DRU

Mounting

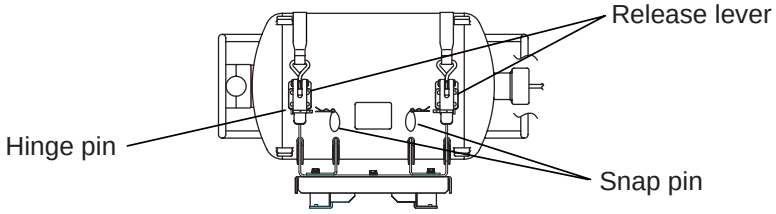
The DRU comes with the mounting bracket fitted. Request shipyard to construct a mounting base for the DRU. (An example of one is shown on page 33.) On the mounting base, mount the bracket with M8 bolts and nuts (double nuts). The gap between vibration absorber and bolt should be at least 3 mm.



Note: *If you once detach the main body from the mounting bracket, fix the main body as shown in the figure above so that the acoustic beacon is horizontal. Then, the main body is securely fixed by the band*.

How to detach the main body

1. Remove two snap pins.
2. Remove two hinge pins.
3. Lift the release levers and detach the main body.



1.4 Junction Box

The Junction Box, optionally available with the VR-3000S, provides for connection of digital, serial and analog equipment, and three units may be connected. The No. 1 JB has the following channels: Eight channels of IEC 61162 (two IEC 61162-2 and six IEC 61162-1), 64 channels of digital, and 16 channels of analog. The No. 2 and No. 3 JBs have 64 channels of digital and 16 channels of analog, respectively.

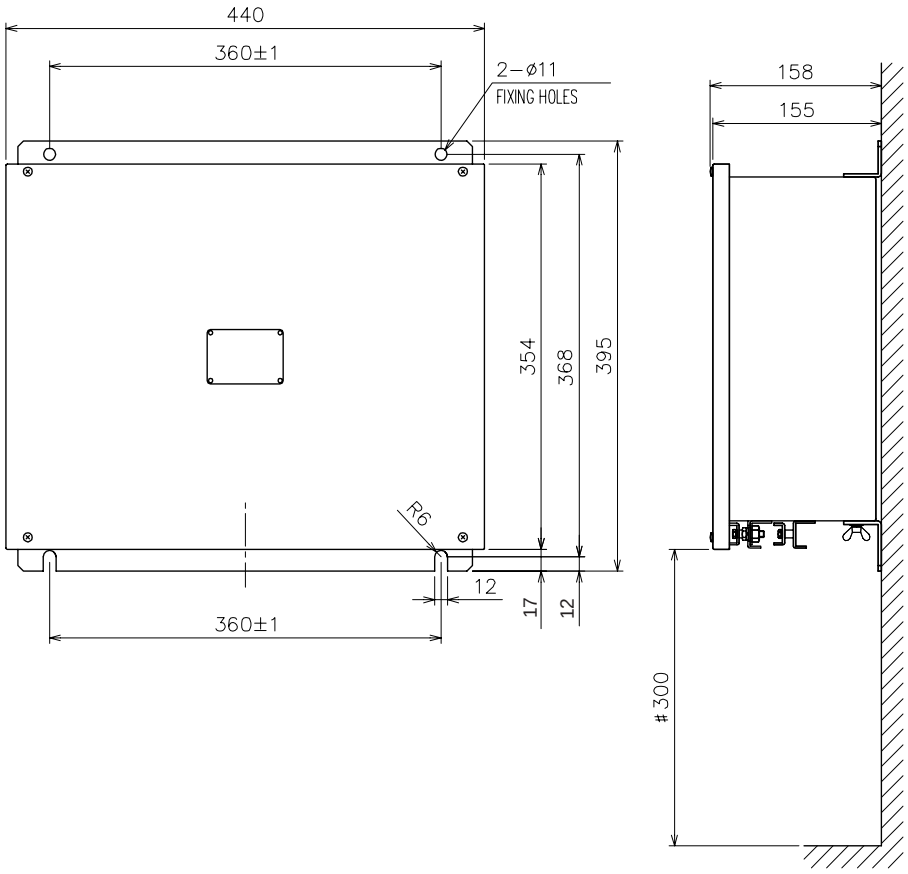
1.4.1 Mounting considerations

The JB can be mounted on a bulkhead or a deck. For bulkhead mounting, be sure the mounting location is strong enough to support the weight of the unit. Mount the JB considering the following points.

- Locate the unit out of sunlight and away from heat sources because of heat that can build up inside the cabinet.
- The mounting location should be away from places subject to water splash and rain.
- Choose the location considering cable lengths, connection of relevant sensors and associated devices, and easy access to connectors inside.
- A magnetic compass will be affected if the JB is placed too close to it. Observe the compass safe distances on page i to prevent deviation of a magnetic compass.
- Observe the recommended service clearances shown in the outline drawing.

1.4.2 Mounting dimensions, mounting procedure

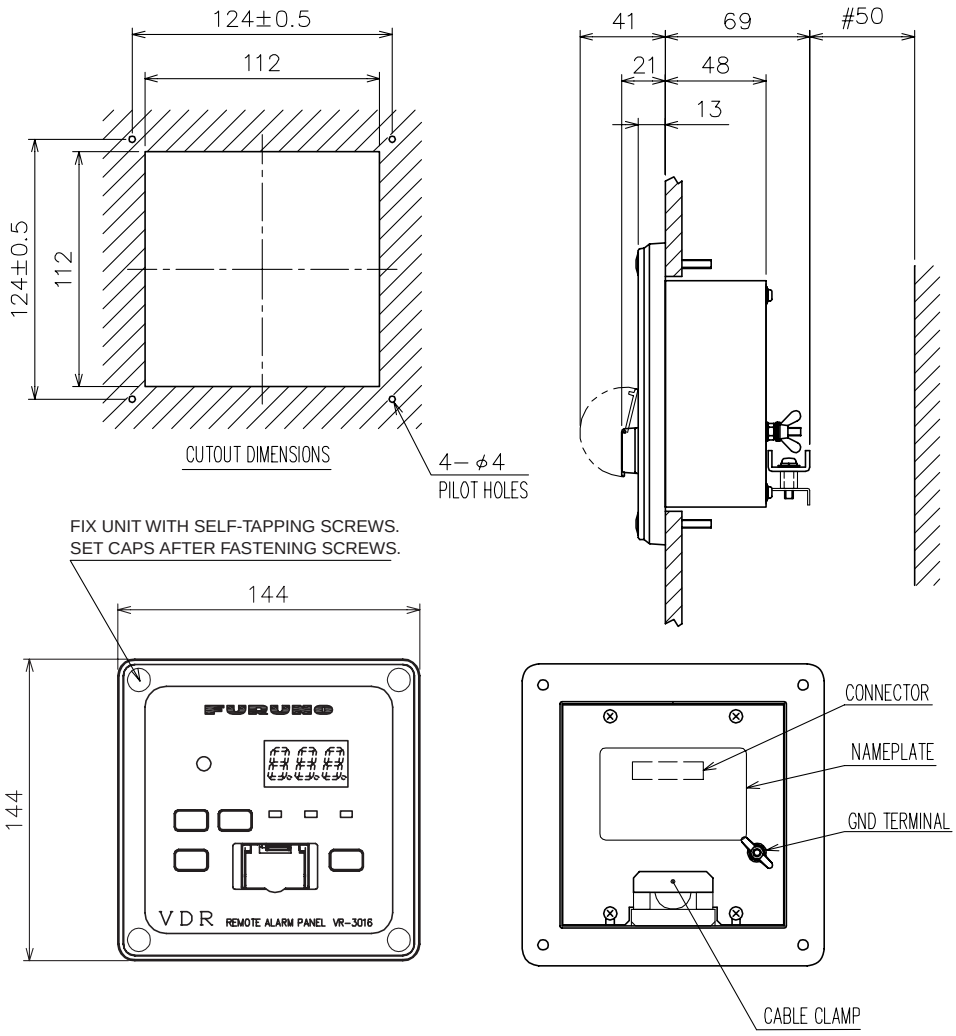
Fasten the unit to the mounting location with M10 bolts or ø10 coach bolts.



Mounting dimensions of junction box

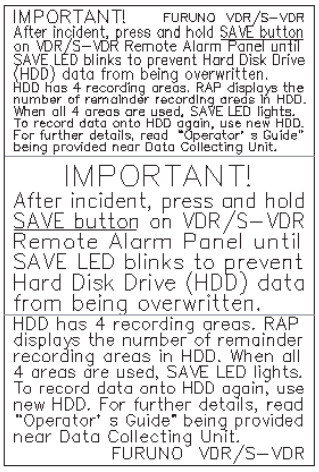
1.5 Remote Alarm Panel

Make sure there is a sufficient space for access to the rear cover for mounting and cabling. The Remote Alarm Panel is flush-mounted. See the outline drawing for cutout size.



Mounting dimensions of Remote Alarm Panel

Attach the IMPORTANT label (large or small one supplied in accessory) near the remote alarm panel.

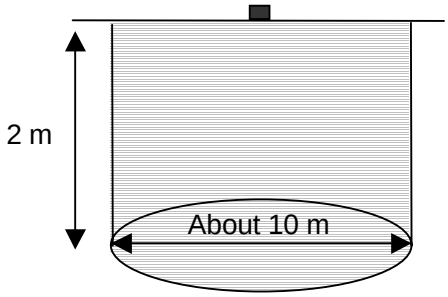


IMPORTANT label
24-009-2901

1.6 Microphone

1.6.1 Bridge microphone VR-5011

The bridge microphone comes with a flush mount plate. Fix the plate with six 4x16 self-tapping screws. The microphone covers an area about 10 m in diameter with the height of 2 m. Six microphones can cover a maximum 60 m diameter bridge area (including wings).



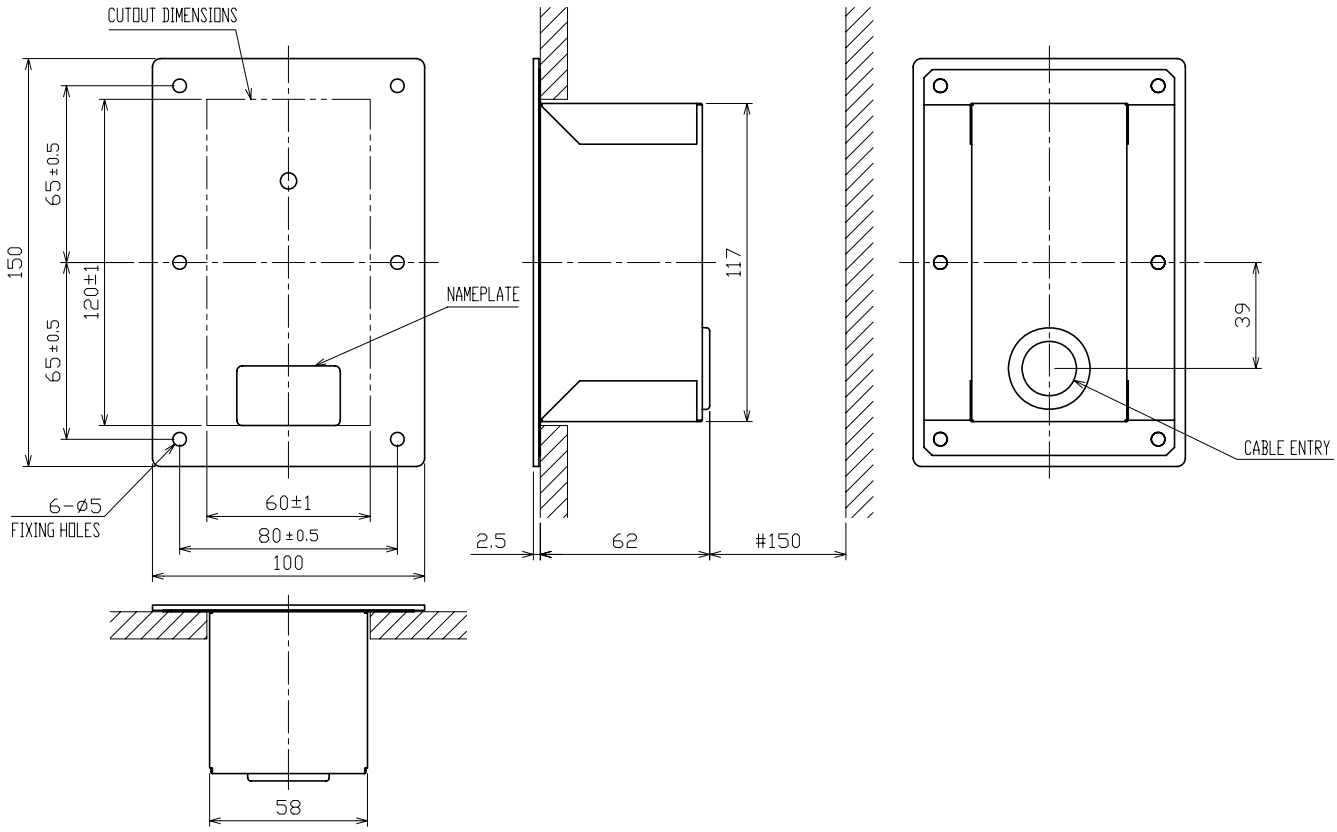
Coverage of microphone

Example of microphone at radar station

Microphone mounting considerations, mounting dimensions

The following consideration must be taken into account to decide the location of the microphone.

- Provide clearance around it (normally overhead in the bridge)
- The microphone is not waterproof, therefore do not install it on a wing.
- Locate away from noise sources, such as fans, motors, and loudspeakers (1 m or more from air duct)
- Mount on a non-vibrating surface to keep noise to a minimum.
- Secure the cable to keep noise to a minimum. If the cable runs on an overhead without securing it, the cable will pick up noise.
- Observe the compass safe distances shown on page i to prevent interference to a magnetic compass.
- Microphones are mounted in the place(s) to pick up voices at the locations shown below. (Complying with IEC 61996, 4.6.5.)
  1) Centerline conning
  2) Bridge wings (if steering gear is installed)
  3) Main radar
  4) Chart table
  5) Helmsstand
  6) Radio room



Mounting dimensions of Microphone VR-5011

1.6.2 Waterproof microphone VR-3012W

The waterproof microphone VR-3012W may be mounted on a wing, and is available in bulkhead and flush mount versions.

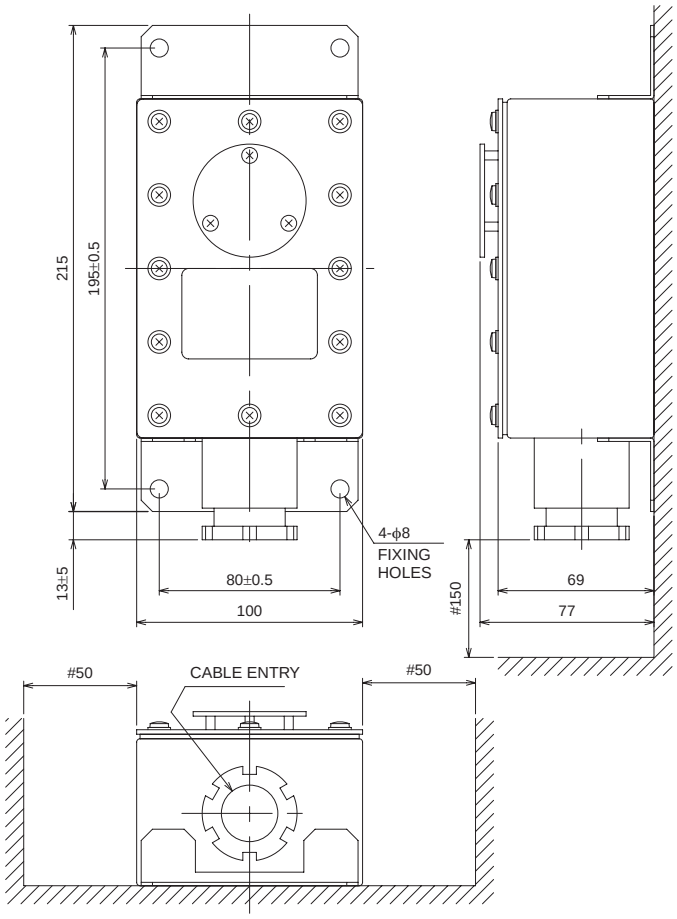
Mounting considerations

The following consideration must be taken into account to decide the location of the waterproof microphone.

- Provide sufficient clearance around the unit for maintenance, etc., referring to the outline drawing.
- Locate away from noise sources, such as fans, motors, and loudspeakers (1 m or more from air duct).
- Mount on a non-vibrating surface to keep noise to a minimum.
- Observe the compass safe distances shown on page i to prevent interference to a magnetic compass.
- Secure the cable to keep noise to a minimum. If the cable runs on an overhead without securing it, the cable will pick up noise.

Bulkhead mount

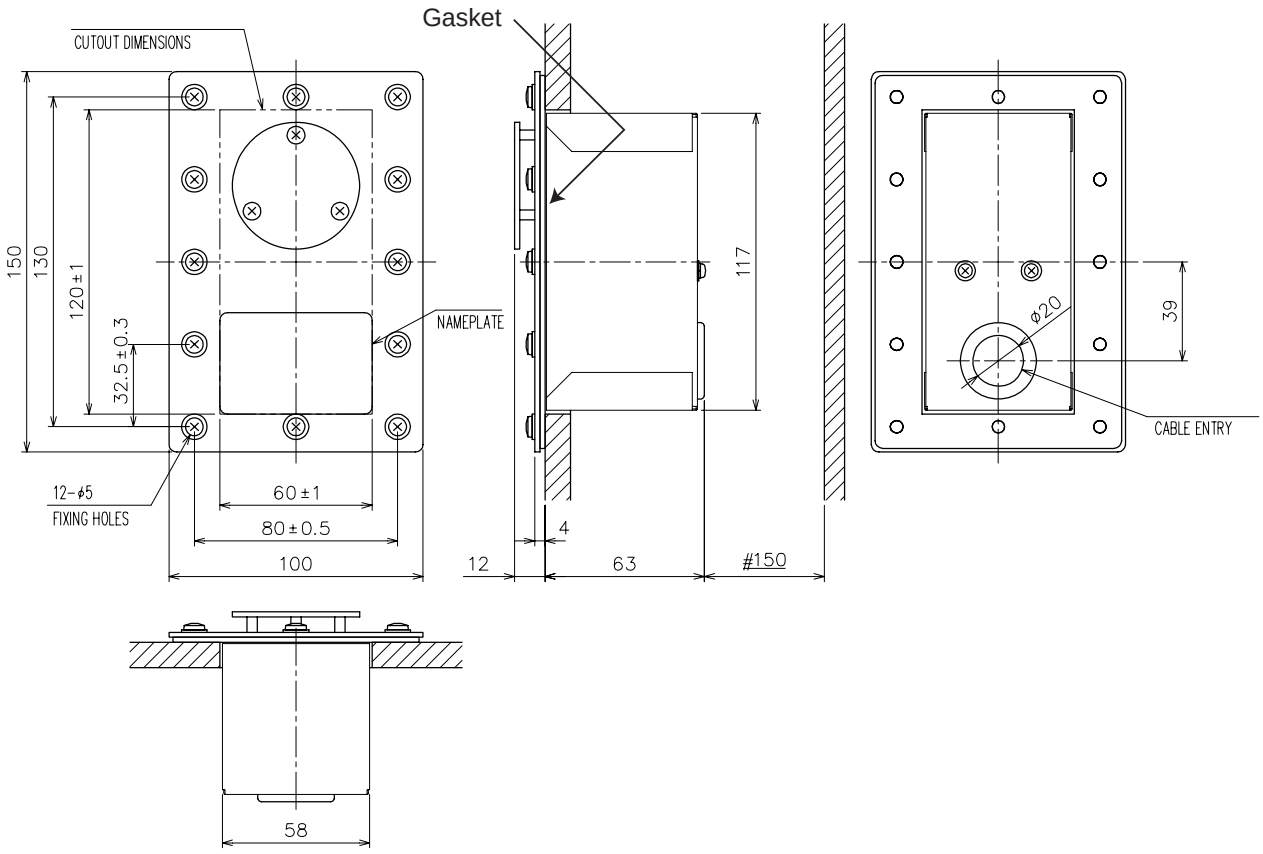
1. Fasten the unit to the mounting location with M6 bolts or ø6coach screws.
2. See “Bulkhead mount” in paragraph 2.6.2 for wiring procedure.



Mounting dimensions for bulkhead mount VR-3012W

Flush mount

1. Prepare a cutout (120x60 mm) in the mounting location, referring to the outline drawing.
2. Dismount the microphone chassis from the case to detach MIC assy.
   Leave the rubber gasket attached to the MIC assy. The case may be discarded.
3. Pass wiring through the cover assy. (supplied).
4. Wire the microphone referring to paragraph 2.6.
5. Set the cover assy. to the MIC assy. and fasten with two screws.
6. Set the entire assy. to the mounting location and fasten with 12 self-tapping screws (4x16).
7. Coat area around the MIC assy. with silicone sealant to enhance waterproofing.



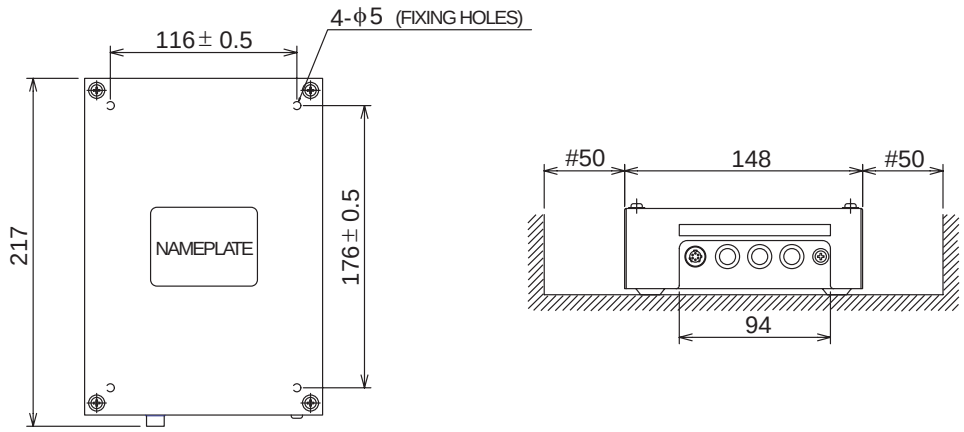
Mounting dimensions for flush mount VR-3012W

1.7 VHF Interface Unit IF-5200 (option)

Mounting

Fix the unit using 4x20 self-tapping screws. Remove the cover to access to holes. When a non-FURUNO VHF is connected to the unit, using the terminal board, remove unused wires and connectors. Otherwise, noise problem may arise.

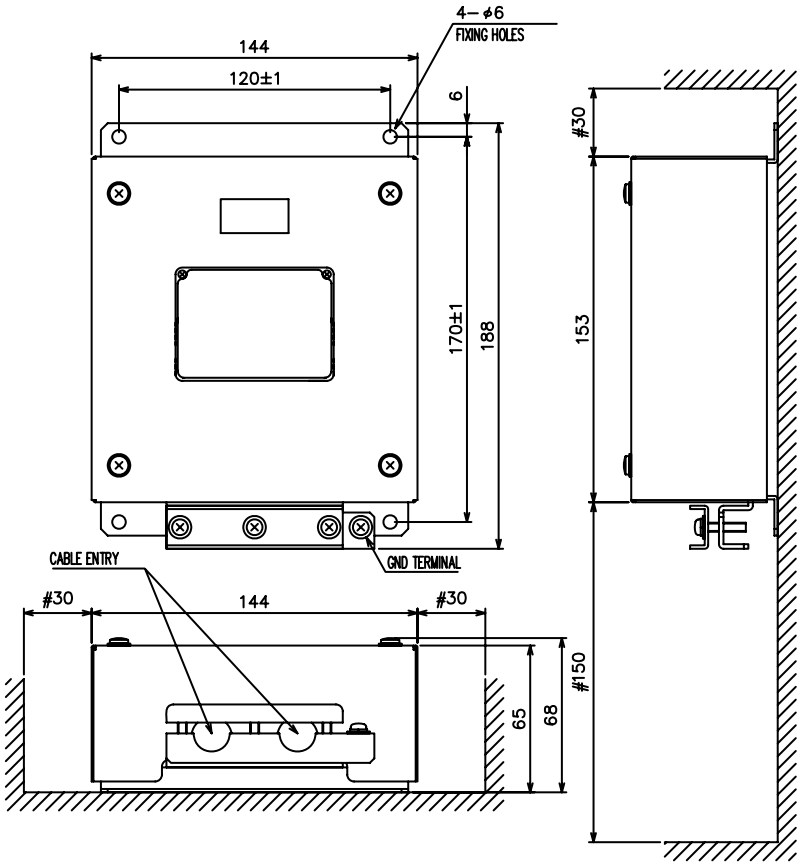
Audio level is adjusted by DIP switches in the interface unit after installation. See paragraph 3.1.



Mounting dimensions of VHF interface unit

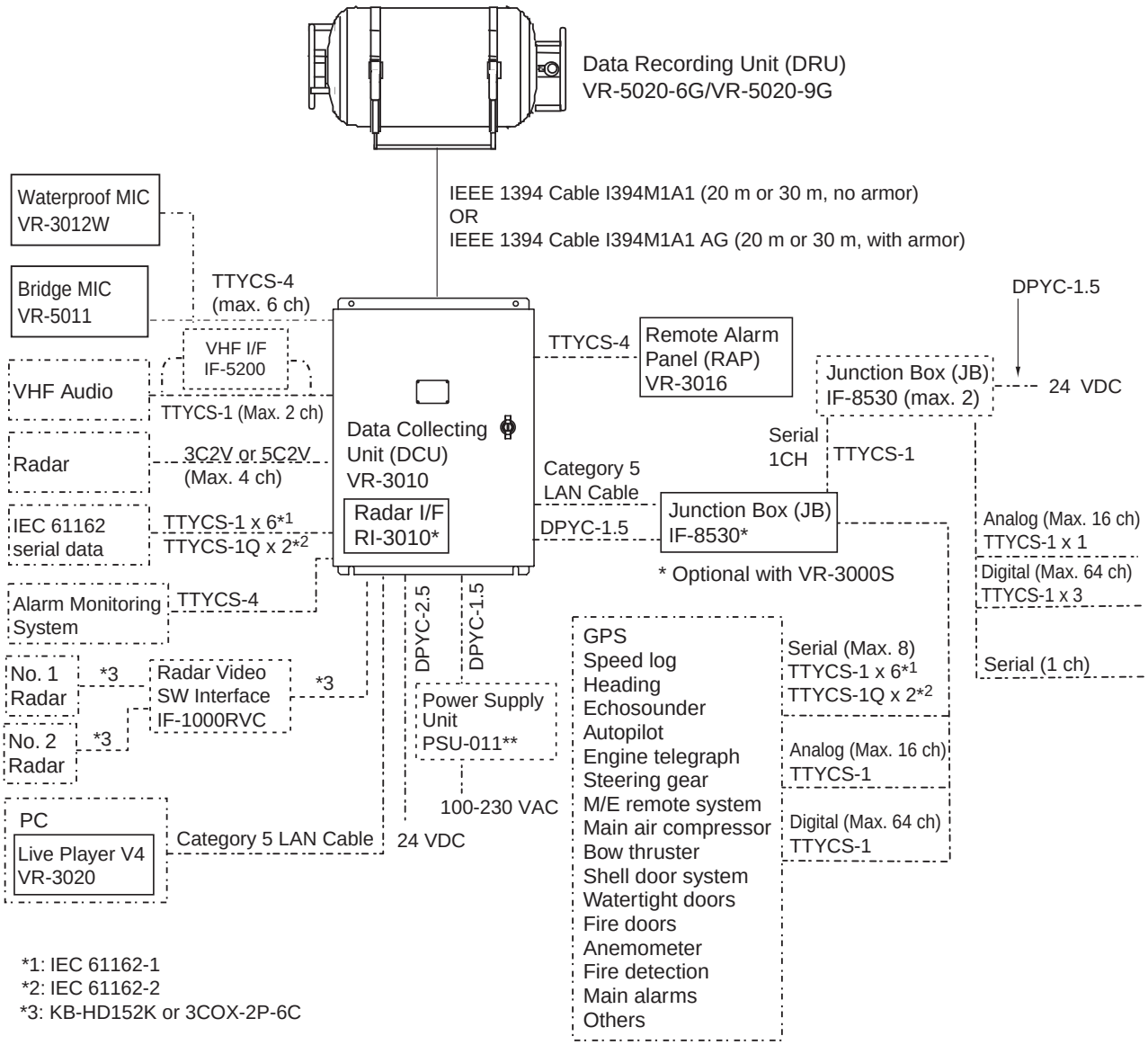
1.8 Power Supply Unit

The Power Supply Unit PSU-011 is required for Russian specification. Fix the unit to the mounting location with 5×20 self-tapping screws.



2. WIRING

2.1 System Wiring



*1: IEC 61162-1
*2: IEC 61162-2
*3: KB-HD152K or 3COX-2P-6C

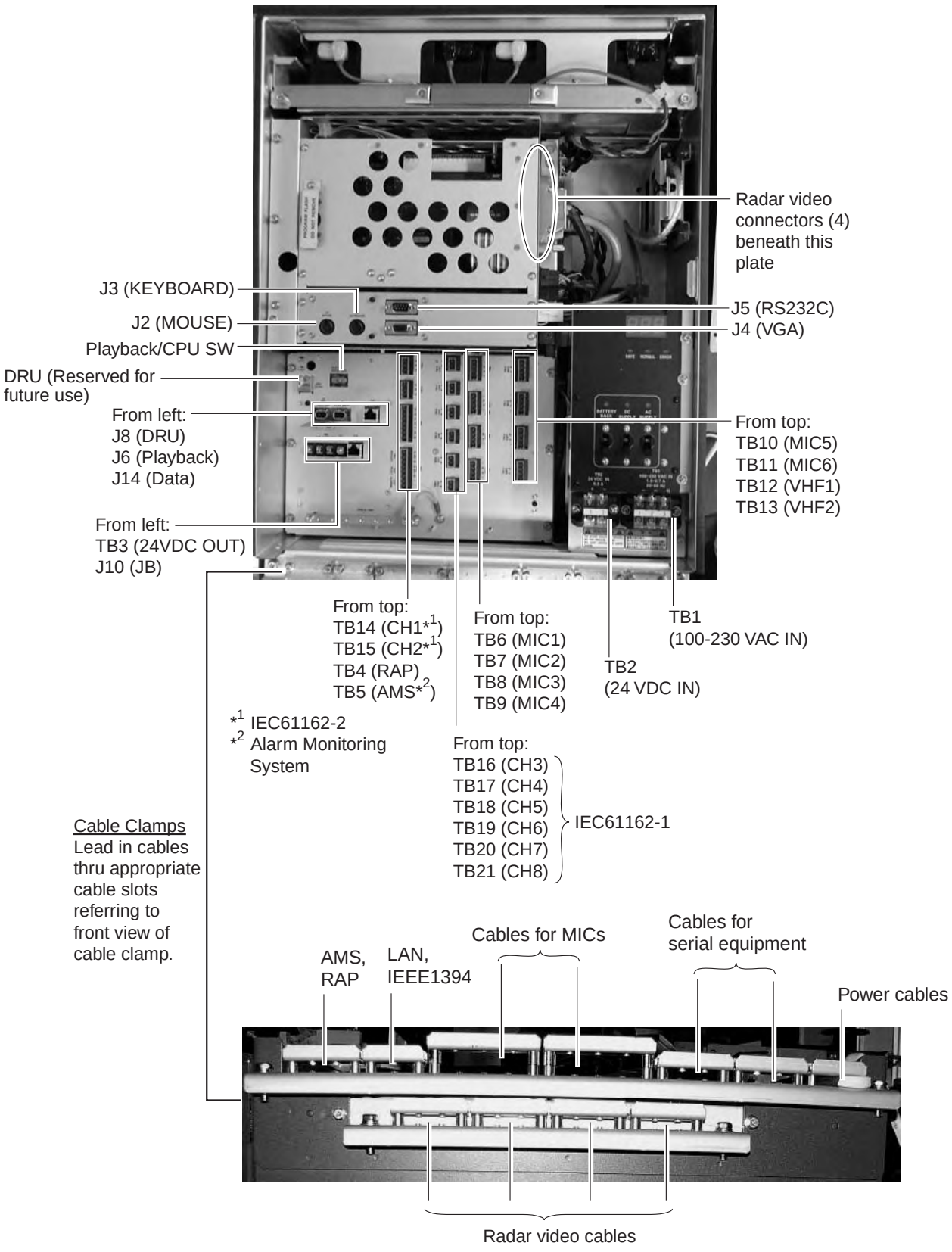
Cable names (Japan Industrial Standard, equivalent may be used) are shown along cable lines together with number of cables required.

——— : Standard supply equipment or cable
------- : Optional supply equipment or cable
- - - - : Local supply equipment or cable

*: Optional with VR-3000S
**: Russian spec. only

2.2 Data Collecting Unit

2.2.1 Location of connectors and terminals



Connectors, terminals, etc. inside the DCU

Terminals and connectors in the DCU

Connector/TB	Signal/Unit to be connected	
TB1 (100-230 VAC IN)	100-230 VAC	
TB2 (24 VDC IN)	24 VDC	
TB3 (24 VDC OUT)	24 VDC for JB	
TB4 (RAP)	Remote Alarm Panel	
TB5 (AMS)	Alarm Monitoring System	
TB6-TB11 (MIC1-MIC6)	Bridge audio, 6 channels	
TB12-TB-13 (VHF1-VHF2)	VHF audio, 2 channels	
TB14-TB21 (CH1-CH8)	Serial data, 8 channels	
J2 (MOUSE)	Mouse	For service
J3 (KEYBOARD)	Keyboard	
J4 (VGA)	Monitor	
J5 (RS232C)	PC	
J6 (PLAYBACK)	Play back data/PC	
J8 (DRU)	DRU	
J10 (JB)	JB	
J14 (DATA)	Live Player V4 VR-3020	
DRU	Reserved for future use	

Refer to the interconnection diagram for details of pins on the terminal boards. **Turn off the DCU before making connections.**

Note 1: The DCU and DRU are connected to each other with the supplied IEEE1394 (sometimes called FireWire*) cable on which two plugs are factory-fitted at both ends. These plugs look like the same but these are different; one has latches and the other does not. These are labeled “DCU” and “DRU,” so connect the cable accordingly.
*FireWire is a registered trademark of the Apple Corporation. It was originally developed as a very fast external bus technology that supports data transfer rates of up to 400Mbps.

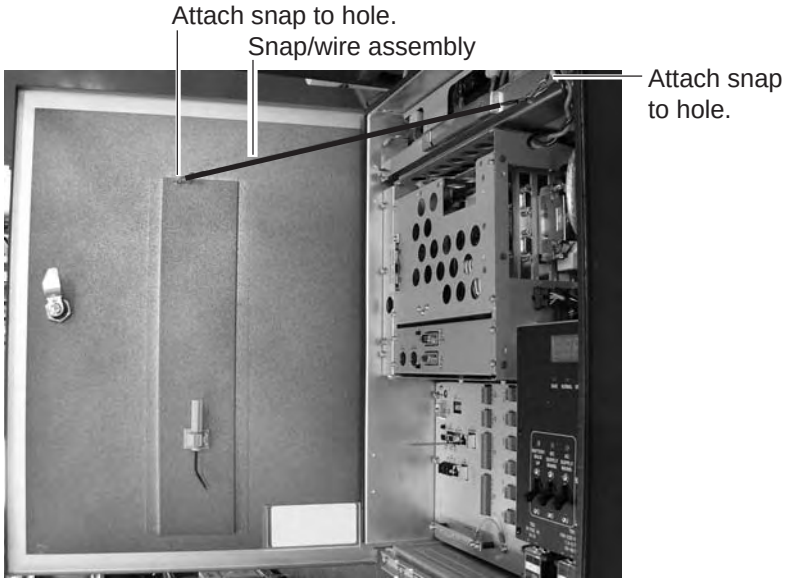
Note 2: Attach cable band (supplied) to each cable to be connected to the DCU and record sensor name/equipment name on each cable band.

2.2.2 Working inside the unit

Snap/wire assembly for keeping door of DCU open

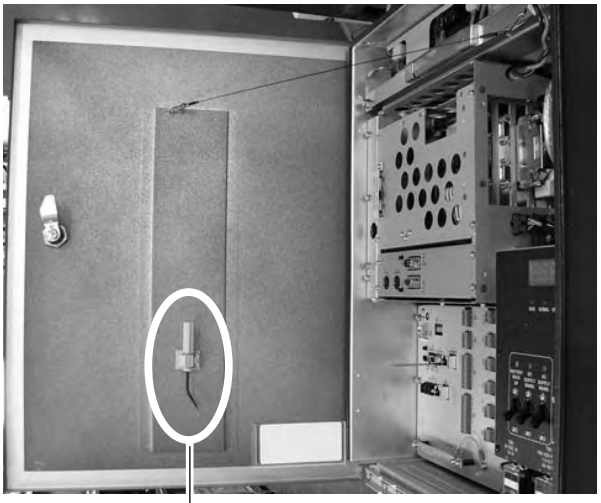
A snap/wire assembly which keeps the door of the DCU open while working inside the DCU is provided. Use it to keep the door open and prevent deformation of the door when it is opened. Attach one snap to the hole on the door and the other snap to the hole to the right of the battery handle. Note that it is not necessary to detach the assembly before closing the door.

This procedure is necessary only when the unit is mounted on the deck.



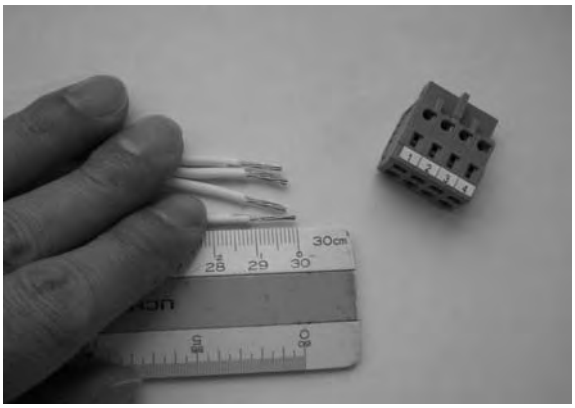
Lead-fitting tool

Radar, MIC, VHF, etc. are connected to the terminals and connectors in the DCU. The terminal board has WAGO connectors for leads of up to 2.5 mm^2 or AWG 14 wires. Use the lead-fitting tool, attached inside the DCU, to fix wires to WAGO connectors, as shown in the illustration below.

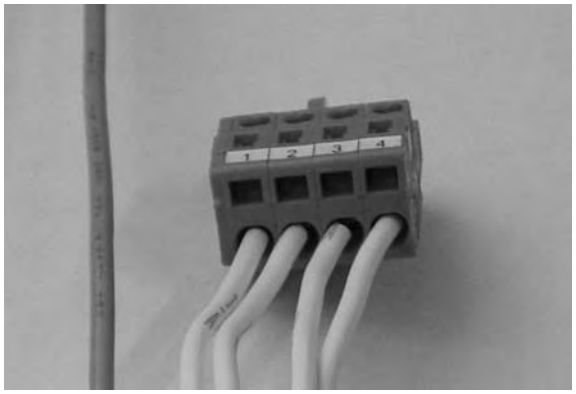


Lead fittting tool

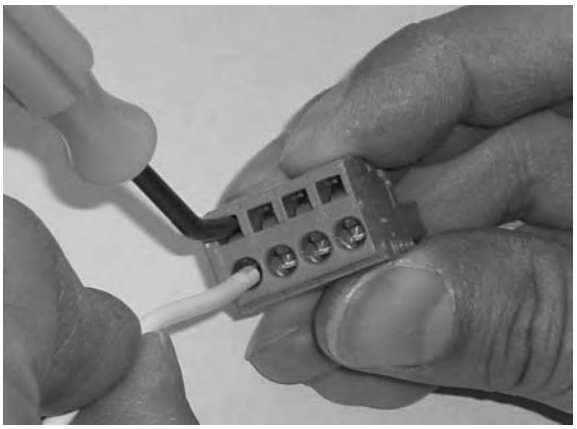
How to use lead-fitting tool



1) Strip sheath by 8-10 mm.



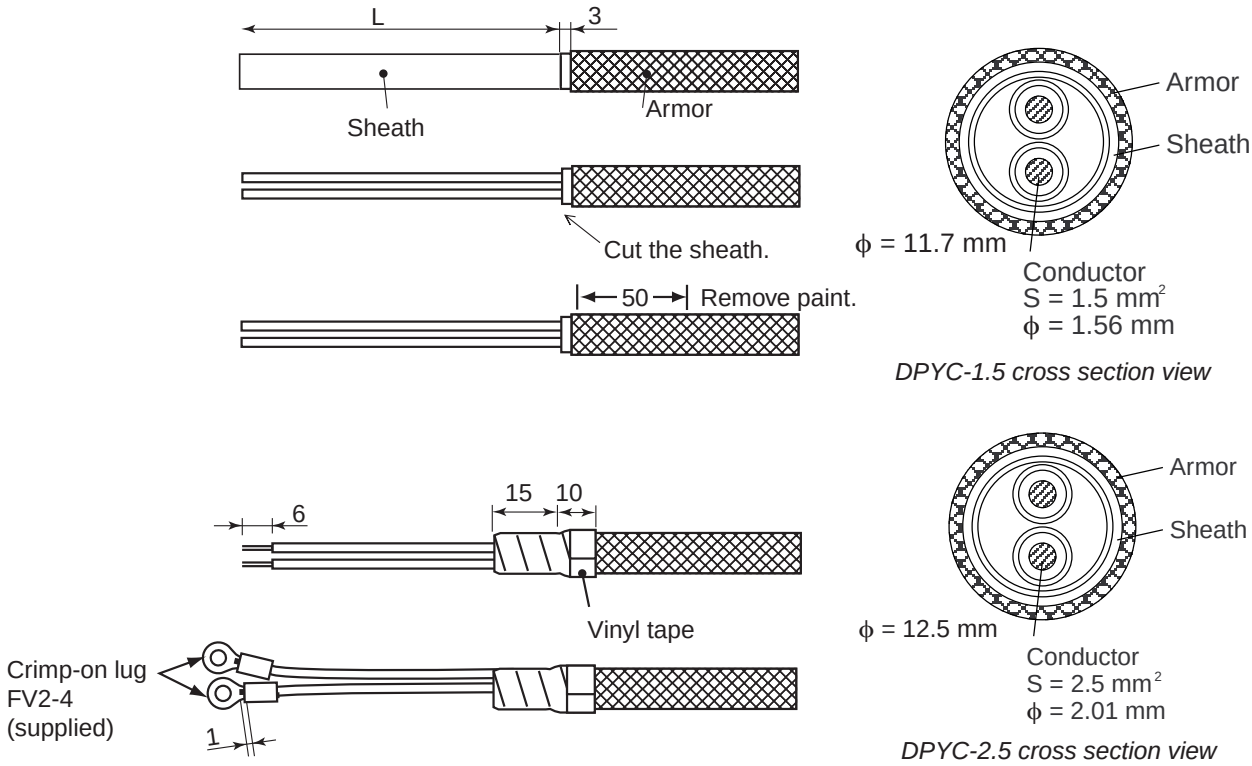
3) Tug on wires to confirm that they are securely inserted.



2) Use lead-fitting tool to open terminal and then insert wire.

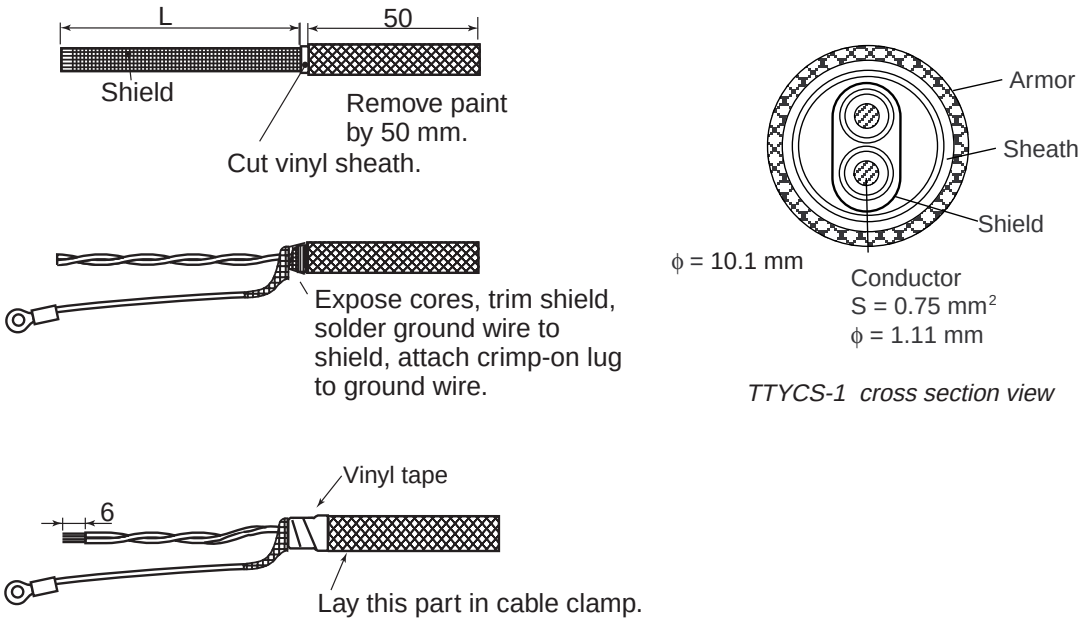
2.2.3 Cable fabrication

DPYC-1.5, DPYC-2.5 (power cables)



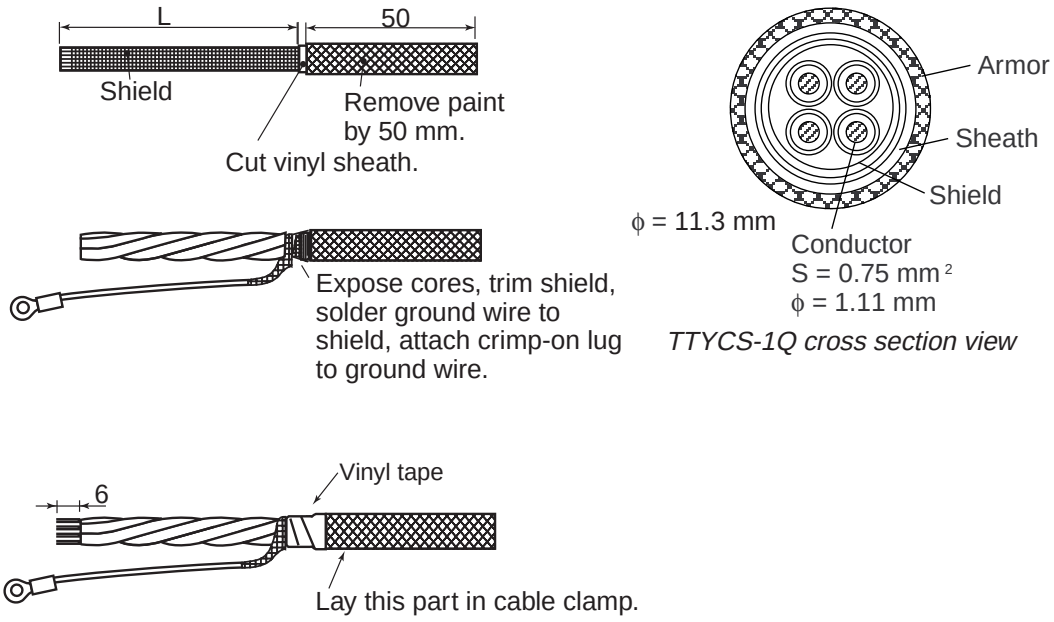
Fabrication of cable type DPYC-1.5, DPYC-2.5 (or equivalent)

TTYCS-1 (Serial equipment, format IEC 61162-1)



Fabrication of cable type TTYCS-1(or equivalent)

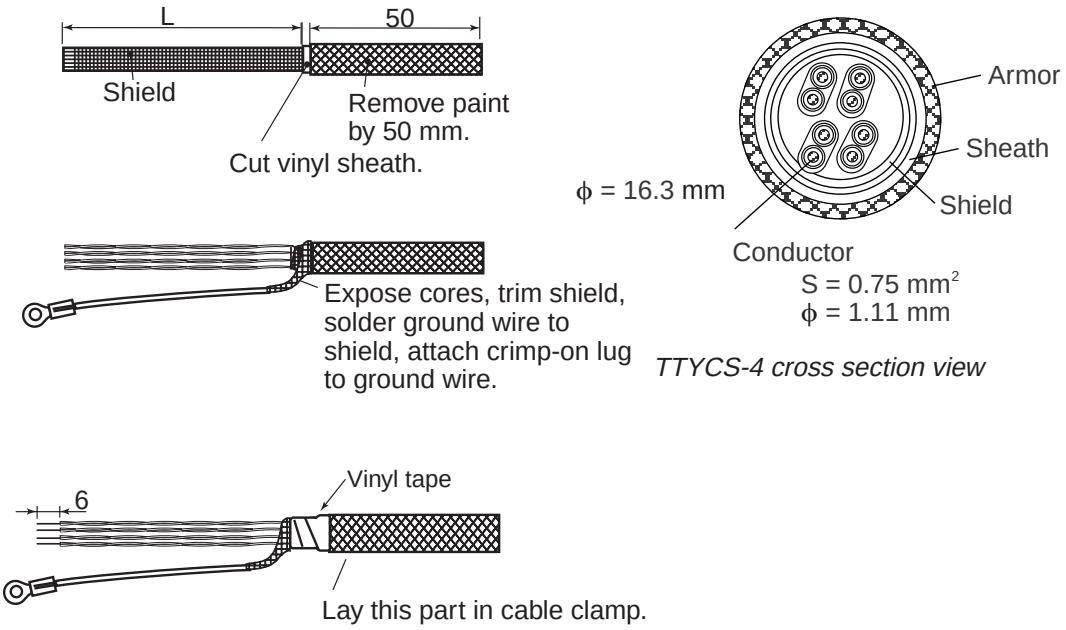
TTYCS-1Q (Serial equipment, format IEC 61162-2)



TTYCS-1Q cross section view

Fabrication of cable type TTYCS-1Q (or equivalent)

TTYCS-4 (Alarm Monitoring System, MIC, RAP, analog equipment)



TTYCS-4 cross section view

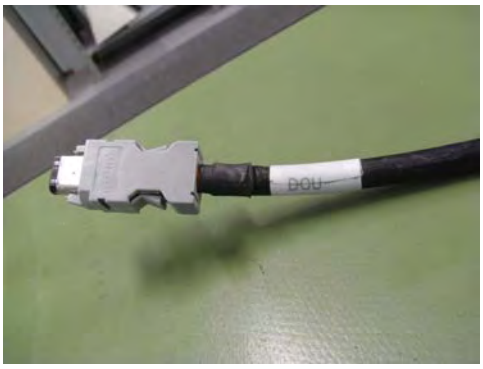
Fabrication of cable type TTYCS-4 (or equivalent)

Note: For crimp-on lugs for TTYCS cables, use those on respective terminal board.

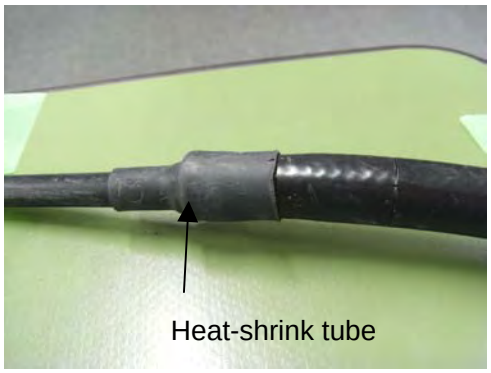
How to process armor of IEEE1394 cable

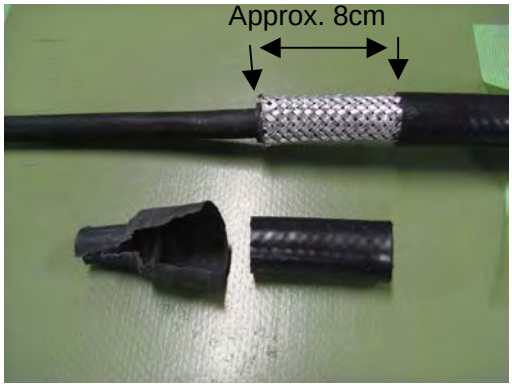
Ground the armor of the IEEE1394 cable by the cable clamp at the DCU. Fabricate the cable as follows.

1. Confirm the label “DCU” at the end of the cable end. (Fabricate the cable at the DCU side.)

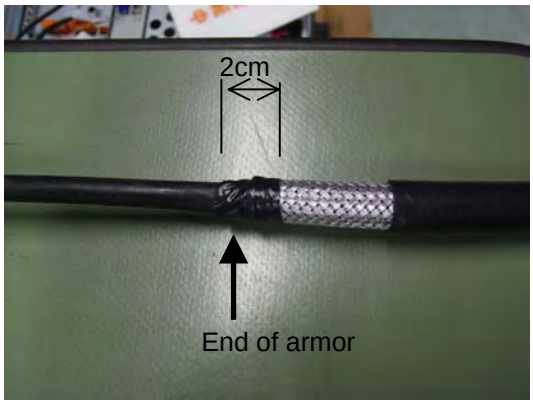


2. Use a box cutter to cut and remove the heat-shrink tube and remove the vinyl sheath approx. 8 cm from the end of the cable.





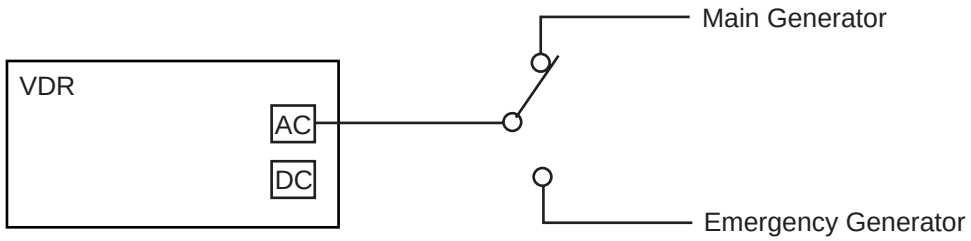
3. Wind the vinyl tape at the end of armor about 2 cm in width so that the end of the armor is centered on the winding.



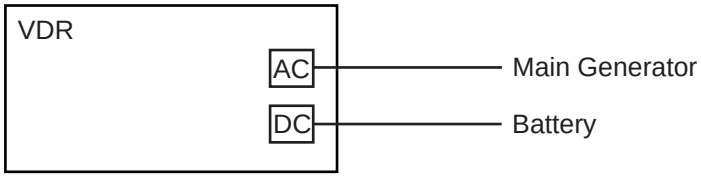
2.2.4 Power supply

Connect the DCU unit as follows:

- **AC power:** Connect the ship's mains to "100-230 VAC IN" in the DCU with cable DPYC-1.5 (or equivalent). If AC emergency source of electrical power is provided, connect it to the AC line.
- **DC power:** If no AC emergency source of electrical power is provided, connect the ship's battery to "24 VDC IN" (max10A battery) in the DCU with cable DPCY-2.5 (or equivalent). Observe the polarity when connecting DC source.
- **Junction Box:** Connect the DCU to the Junction Box with cable DPYC-1.5.



Ship equipped with emergency AC power



Ship has no emergency AC power

Power connections and ship's power arrangement

Power connections in the DCU

Terminal	Pin No.	Signal Type	Remarks
TB1 (100-230 VAC IN)	1	AC LINE	
	2	AC NEUT	
	3	AC GND	
TB2 (24 VDC IN)	1	DC INPUT+	
	2	DC INPUT-	
TB3 (24 VDC OUT)	1	DC OUTPUT+	Connect to TB1 (24 VDC IN) on JB
	2	DC OUTPUT-	

2.2.5 Ground

Connect a ground wire (IV-8sq) between the ground terminal on the unit and ship's grounding bus. Make the length as short as possible.

⚠ CAUTION

Attach grounding securely to the ship's body.

The grounding is required to prevent electrical shock.

2.2.6 Radar RGB video

Interlaced or non-interlaced radar video (4 ch max.) is connected to the video connectors on the RADAR I/F Board (optionally available with the VR-3000S) inside the DCU, with a 15-pin VGA Male to 5x BNC RGBHV cable. (Cable is supplied with VR-3000, and is available optionally with the VR-3000S.) The system supports separate sync, sync-on-green, and composite sync signals.

1) Video signal level: 0.5 to 1 Vpp
   (Minimum sync signal is 50 mV when a composite sync signal is used.)
2) Horizontal sync signal: Max. 91.146 kHz, positive or negative
3) Vertical sync signal: Max. 85 Hz

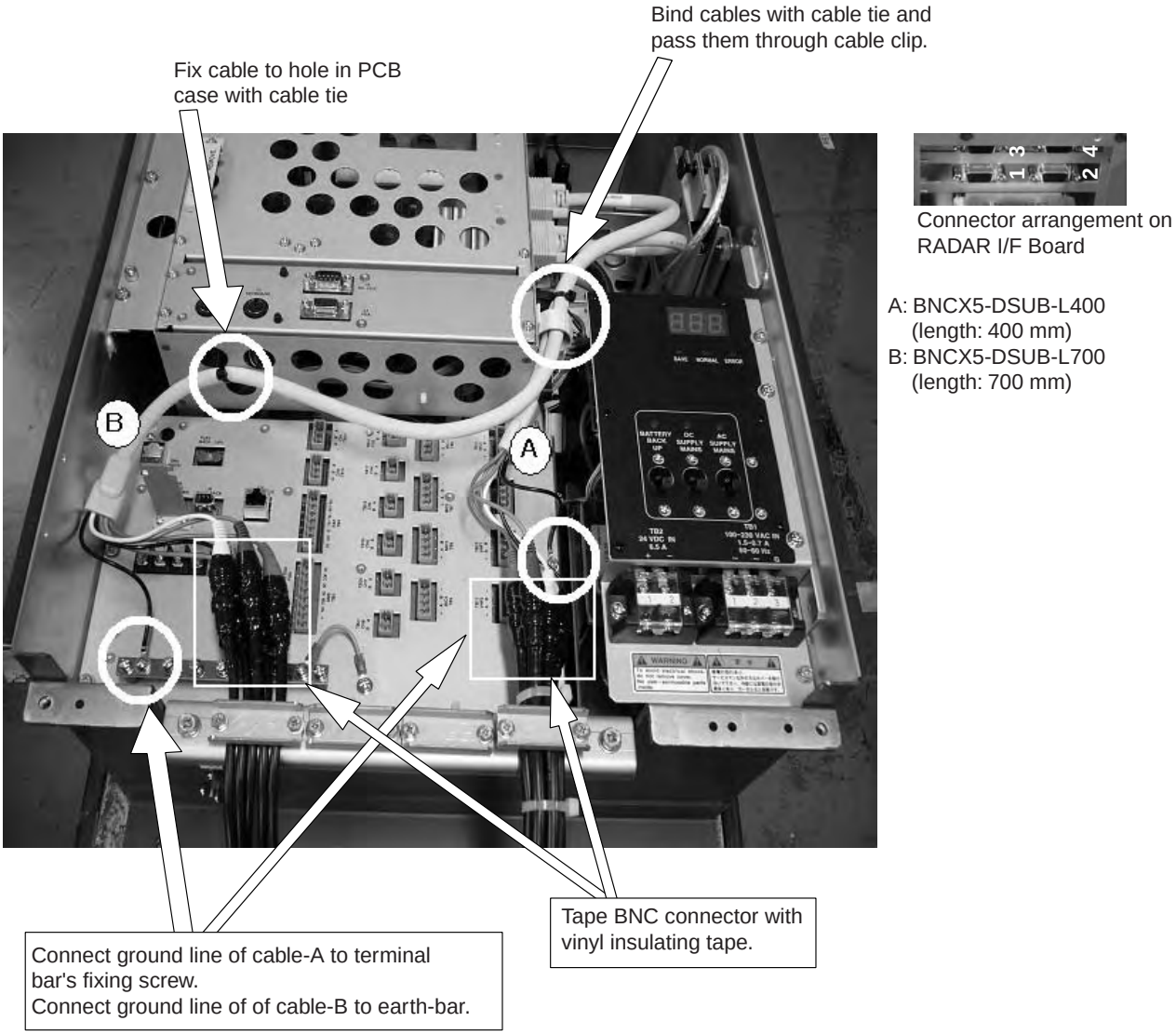
Receivable resolution is 640 x 480 to 1280 x 1024 as shown in table below.

(a)	VGA:	640 x 480	(f)	FR-15x5M3 series:	1024 x 780
(b)	Wide VGA:	852 x 480	(g)	FAR-28x5 series:	1066 x 800
(c)	CCIR:	738 x 576	(h)	Wide XGA:	1336 x 768
(d)	SVGA:	800 x 600	(i)	SXGA:	1280 x 1024
(e)	Wide SVGA:	1067 x 600	(j)	FR-21x5 series:	1280 x 1024

Attach connector assemblies (BNCX5-DSUB15-L400 and BNCX5-DSUB15-L7400) following the illustration on the next page. Connect coaxial cables after attaching connector assemblies. If coaxial cables are to be supplied locally, use type 3C-2V or 5C-2V. (Five cables are required.) A “single cable” (CP24-01200 or CP24-01210) for connection of radar is optionally available.

Type	Coaxial cable	Coaxial connector
CP24-01200	1.5C2V-3C2V-T-20 m (20 m, 6 coaxial cores, large dia. for RGB, small dia. for HV)	1) FB-SPM1D (BNC-P-3), 3 pcs. 2) BNC-P-1.7N, 3 pcs.
CP24-01210	1.5C2V-3C2V-T-30 m (30 m, 6 coaxial cores, large dia. for RGB, small dia. for HV)	1) FB-SPM1D (BNC-P-3), 3 pcs. 2) BNC-P-1.7N, 3 pcs.

Connection of radar video signal in DCU

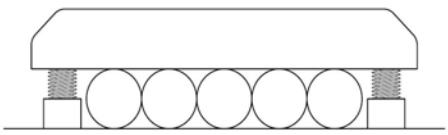


Connector arrangement on RADAR I/F Board

A: BNCX5-DSUB-L400
(length: 400 mm)
B: BNCX5-DSUB-L700
(length: 700 mm)

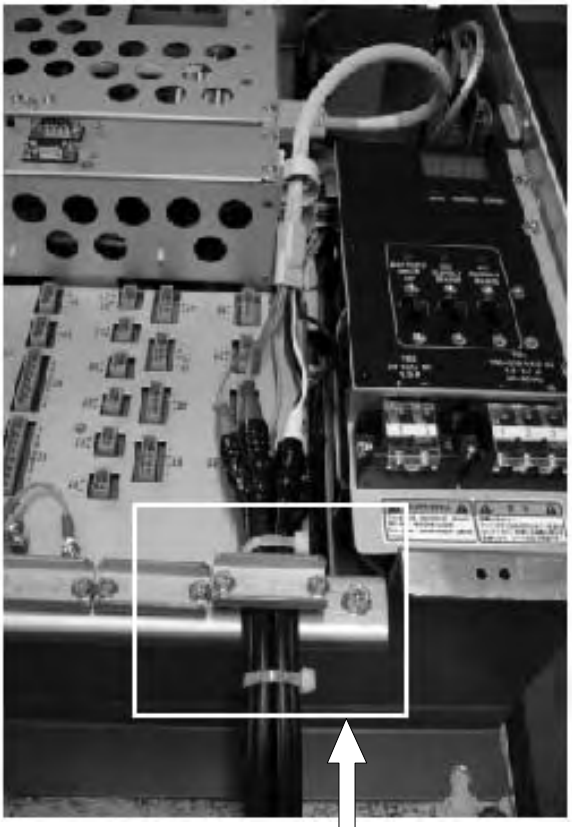
Cable arrangement in cable clamp and coaxial cable type

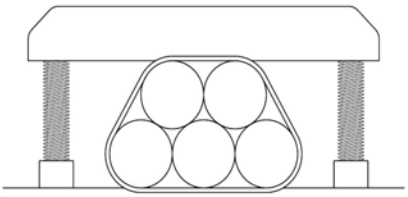
3C-2V coaxial cable



Five coaxial cables

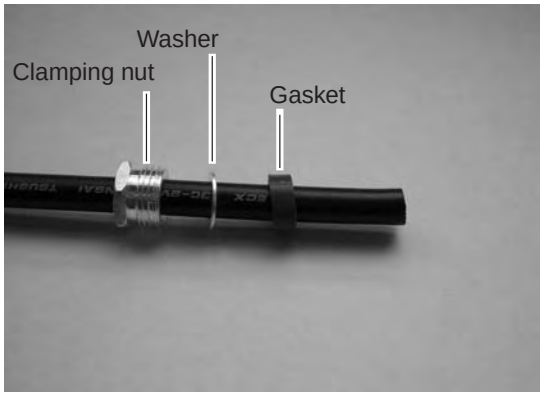
5C-2V coaxial cable



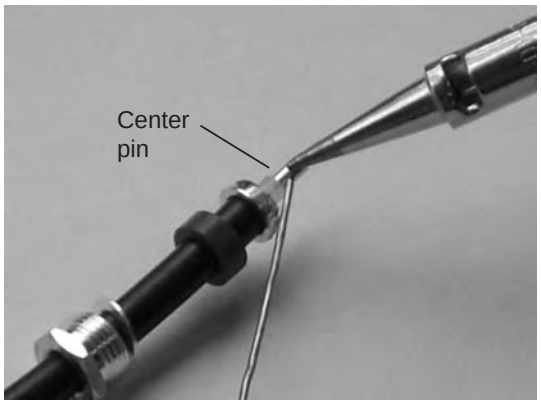


Five coaxial cables bound with
cable tie, inside and outside the DCU.

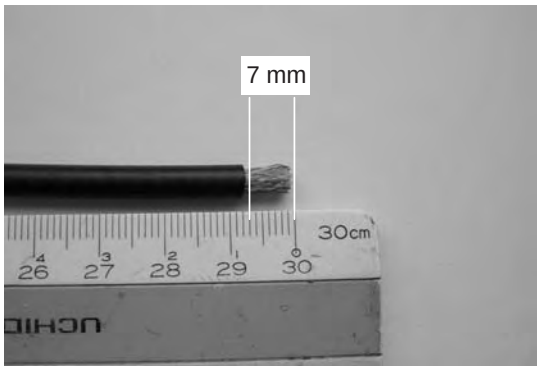
Attaching coaxial connector



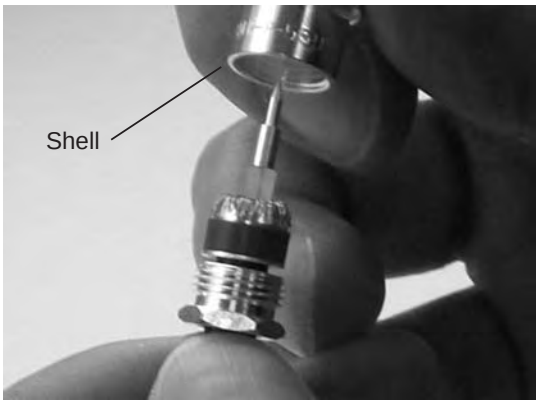
1) Slip clamping nut, washer and gasket onto cable.



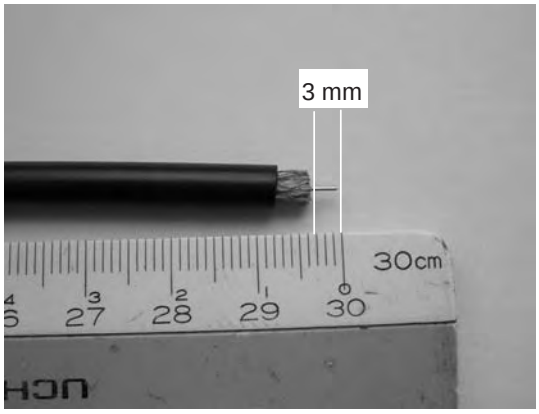
5) Insert center pin to core and solder.



2) Strip sheath by 7 mm.



6) Screw shell into cable.



3) Strip shield and insulator by 3 mm.

Completed

4) Slide clamp onto cable and fold back shield onto clamp.

FAR-21x7/28x7 series radar

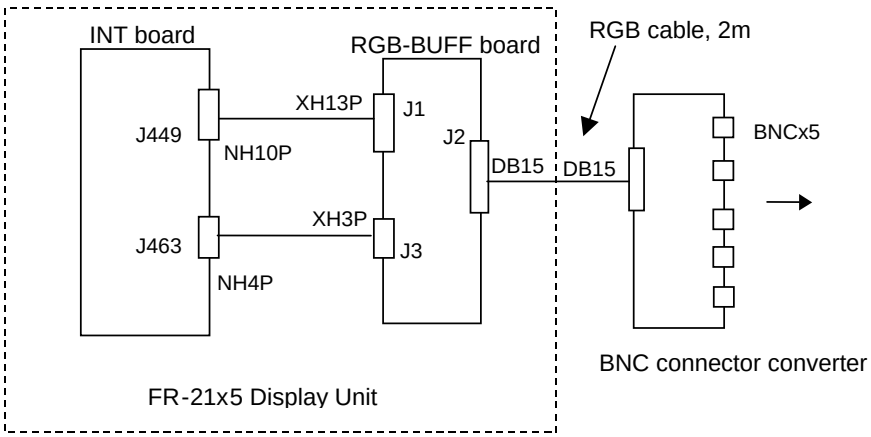
For the connection between the VR-3000 and FAR-21x7/28x7 series radar, refer to the respective radar installation manual.

FR-21x5 series radar

Modify the FR-21x5 series radar as shown below to connect it to the VR-3000/VR-3000S.

Parts of FR-21x5 series radar modification kit

Parts Name	Type	Code No.	Qty
RGB buffer kit RGB-BUFF board NH-XH connector assy. NH-XH connector assy.	OP03-162 03P9229A NH10P-XH13P NH4P-XH3P	008-501-130	1 set
BNC connector converter	DSUB-BNC-1	000-148-528	1
2 m RGB cable	KB-HD152K	000-152-099	1



Modification on FR-21x5 series radar

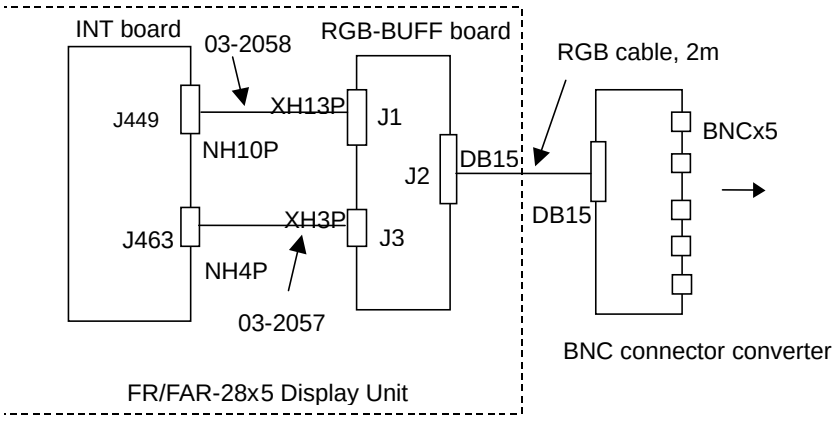
FAR/FR-28x5 series radar

Modify the FAR/FR-28x5 series radar as shown below to connect it to the VDR.

Parts of FAR/FR-28x5 series radar modification kit

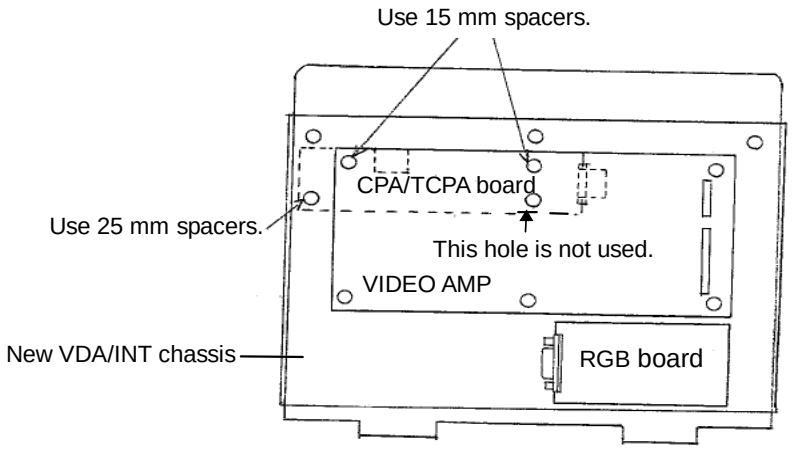
Parts Name	Type	Code No.	Qty
VDR I/F kit (1) RGB-BUFF board NH-XH connector assy. NH-XH connector assy. VDA/INT chassis	OP03-177 03P9229A 03-2057, 4-3P 03-2058, 10-13P 03-133-1127-4	008-528-270	1 set
VDR I/F kit (2) (No VDA/INT chassis)	OP03-178	008-528-280	
BNC connector converter	DSUB-BNC-1	000-148-528	1
2 m RGB cable	KB-HD152K	000-152-099	1

Kit (1): For display units being produced in June 2002 and before.
Kit (2): For display units being produced in July 2002 and after.



Modification on FAR/FR-28x5 series radar

The figure below illustrates how to mount CPA/TCPA board together with RGB buffer board in FAR/FR-28x5 series radar. VDA/INT chassis should be new type, 03-133-1127-3. CPA/TCPA board is powered from #6 (12V) and #8 (GND) of DTB-2. J463 on INT board is used for RGB board.



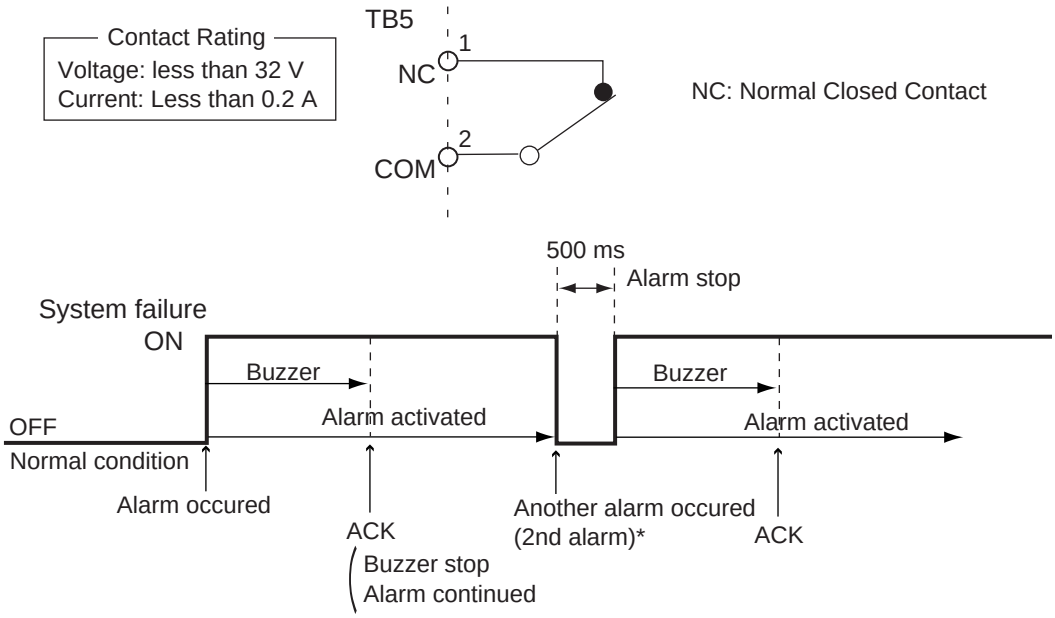
Mounting PA/TCPA and RGB boards in FAR/FR-28x5

2.2.7 Alarm Monitoring System (AMS)

The Alarm Monitoring System connects to TB5 in the DCU, with cable TTYCS-4 (see page 19 for cable fabrication and cable construction). Three types of signals are generated: system failure, local ACK and remote ACK. See the figure below and the two on the next page for details.

System failure

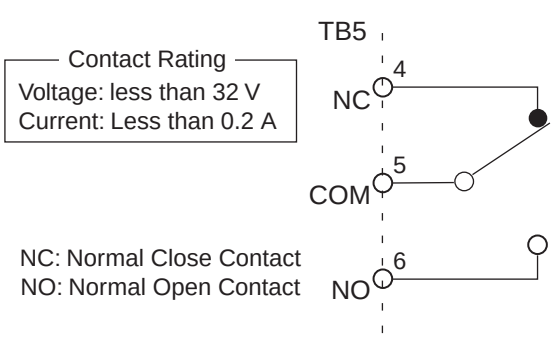
VR-3000/VR-3000S notifies the AMS that an alarm has been generated. Use NC port.

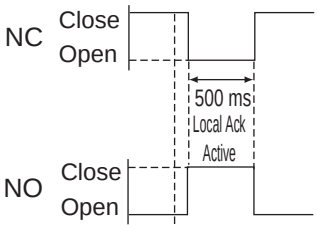


*: When error code 086 or 084 occurs, system failure can not be output by 2nd alarm.

Local ACK

VR-3000/VR-3000S notifies the AMS that it has acknowledged system failure.



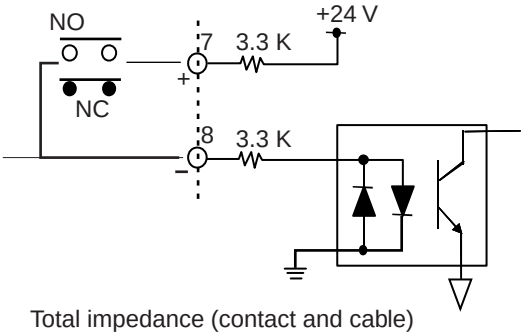


Active interval of Local ACK signal is 500 msec ±5 msec.

Local ACK signal

Remote ACK

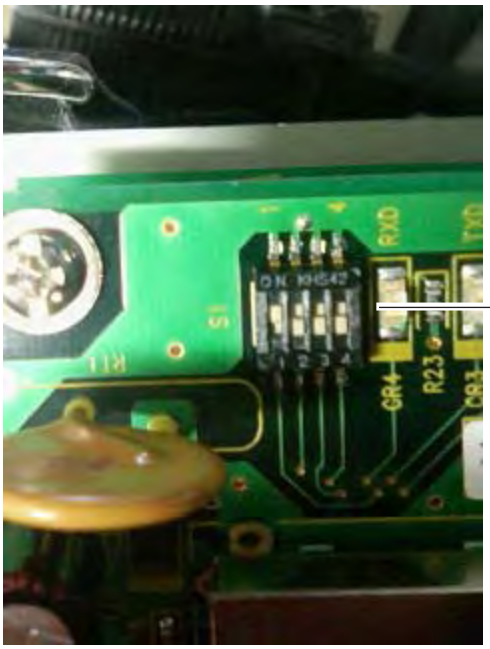
AMS notifies the VR-3000/VR-3000S that it has acknowledged system failure.

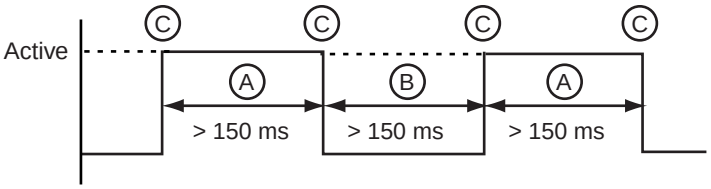


Total impedance (contact and cable) shall be less than 500 ohms.

NC: Normal Close Contact
NO: Normal Open Contact

Choose close or open contact with S1#4 on AP MAIN board (24P0075B)
ON=Normal Close
OFF=Normal Open (default)





Active interval (A) and (B) of Remote ACK signal shall be more than 150 msec.
Chattering may be present at interval (C).

Remote ACK signal

2.3 Data Recording Unit (connecting IEEE1394 cable)

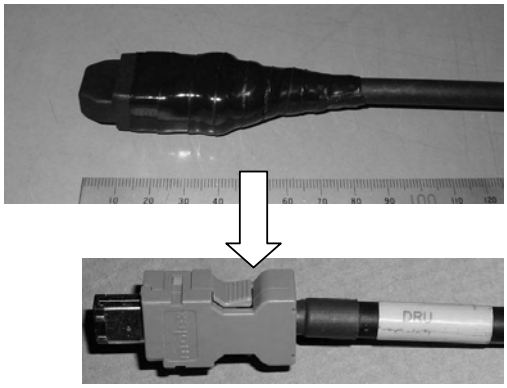
The DRU is connected to the DCU connector with a non-halogen IEEE1394 cable, 20 m or 30 m with IEEE1394 connectors factory-fitted at both ends. The connectors are labeled “DCU” and “DRU,” respectively; do not confuse the connectors.

Additionally, observe the following handling considerations:

- **Do not cut the cable.**
- If welding of cable gland or cabling support is necessary, weld BEFORE running cable.
- Take care not to damage shield of cable.
- The connector which is to be attached to the DCU must be protected from rain. If necessary, run the cable through conduit or the like.

Connection at DRU

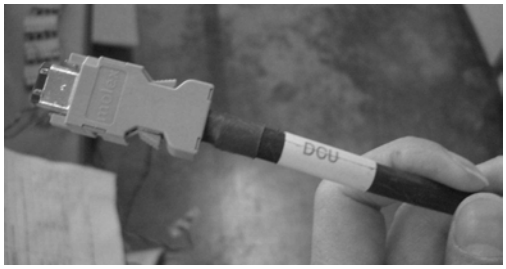
DRU end

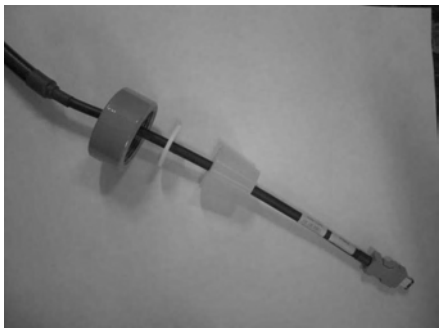


DRU end of the cable is delivered with a waterproof coating. DO NOT remove this coating until it is time to connect cable to DRU. There is no notch to prevent the cable from being pulled out on the DRU side of the cable.

Take great care not to damage the cable when removing the waterproof coating.

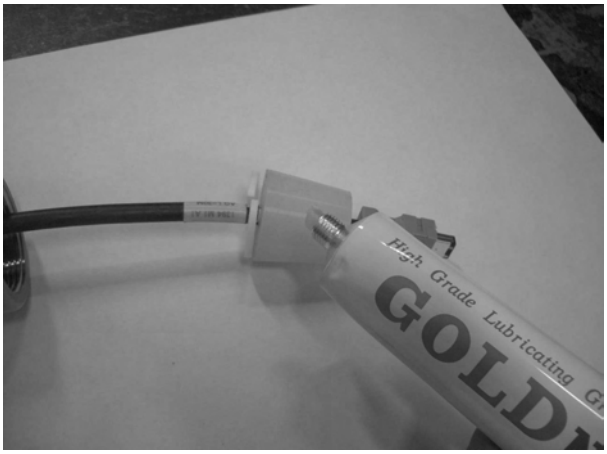
There is no coating on the DCU end of the cable.



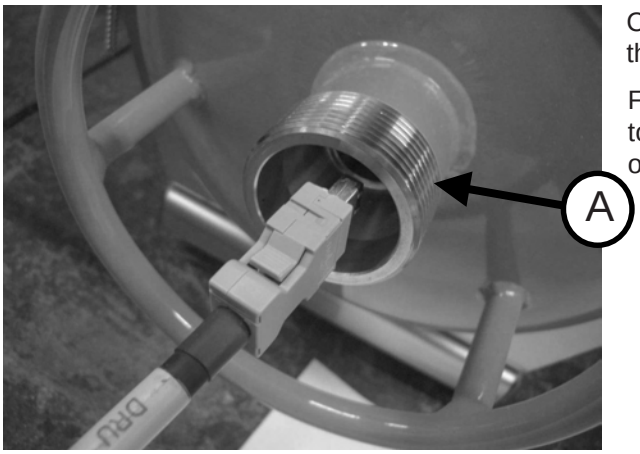


Connecting to DRU

Slide cap nut, teflon washer and rubber bushing onto the cable in that order.



Grease inside and outside of rubber bushing with supplied fluid compound. This allows for the rubber bushing/cable and rubber bushing/DRU connections to slide easily. It is important not to forget to do this process.

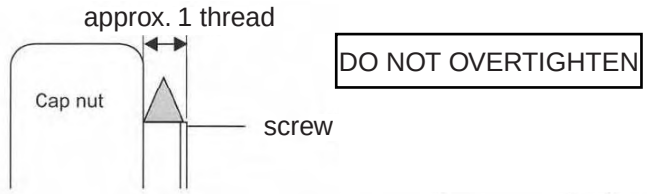


Coat threads "A" with fluid compound to prevent the scew component from burn.

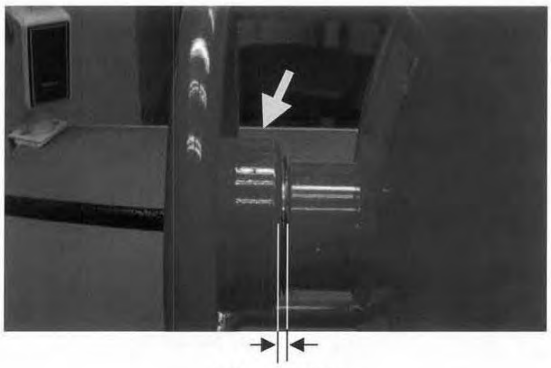
First, connect the cable connector to the DRU. Do not apply the connector oil compund.

Push the cable in towards the DRU and affix the teflon washer and rubber bushing. (Not pushing the cable can result in the fastening notch not connecting properly, and is a common cause of a poor quality connection)

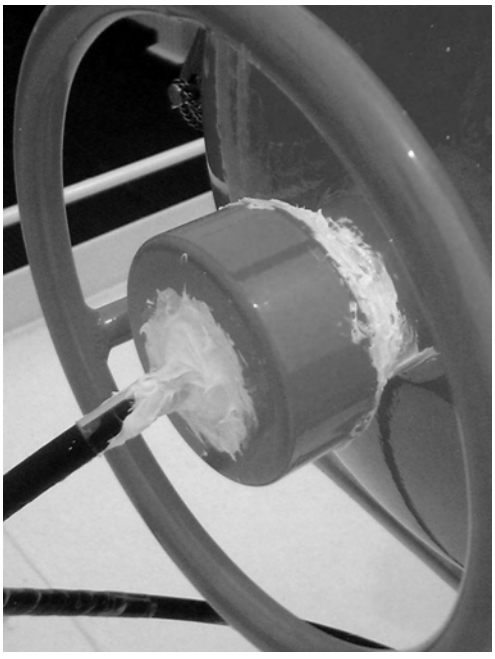
Coat surface of teflon washer and with the connecting part of the cable with supplied silicone sealant.



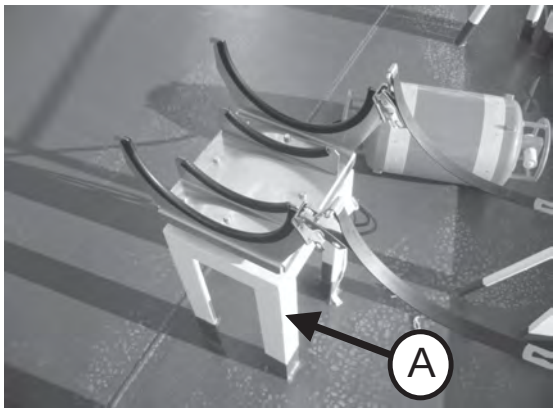
How to tighten cap nut



Tighten DRU cap nut until it stops turning. (The DRU edge must be in contact with inside side edge of the cap nut). Confirm at this time that approx. one thread of the cap nut remains visible.



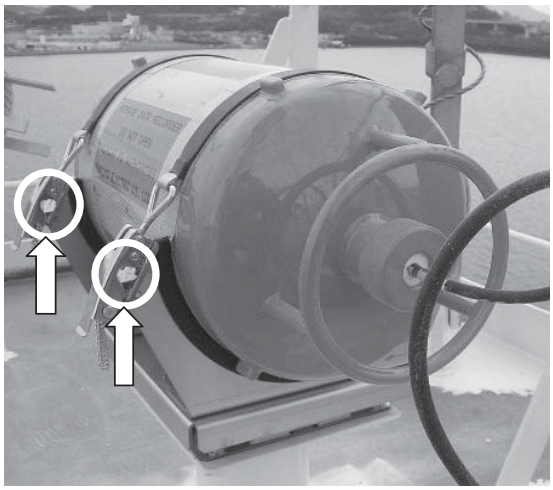
Coat the area around the cable connection, and the cap nut, with silicone sealaent for waterproofing.



- Mounting base "A" to be supplied by shipyard.
- Mount DRU on compass deck.
- Choose location which affords easy retreival.
- Locate well away from other machinery, etc.
- It is preferable to bundle as much excess cable as possible below decks.

- DO NOT cut cable even if it is too long.
- Loop cable (min. 30cm loop, leave as much extra cable as possible), and affix near the DRU (do not attach to the handle).
- Affix the cable to deck securely at intervals using convex hooks , clamps, etc so that it cannot be moved (The curvature radius must be greater than 15cm).

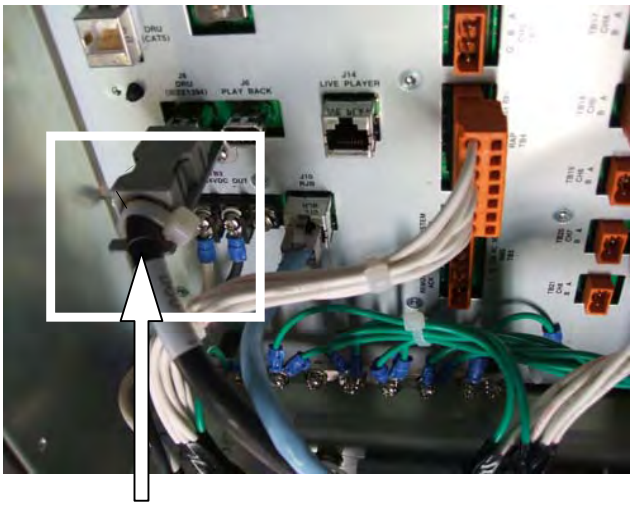
To keep the curvature radius 15cm or more, DO NOT wrap around the handle.



Fit rocker pins.

Connection at DCU

Connect cable to the DRU connector (J8) in the DCU and secure it with a cable tie. Using vinyl tape, tape from tip of connector to about 8 cm.



Secure cable to post with cable tie. Tape from connector tip to about 8 cm with vinyl tape.

Optional Kit

The optional kit is provided for the cable ran (IEEE1394 Cable) passing through the deck.

Name: Gland gasket OP24-16, Code number: 001-046-260

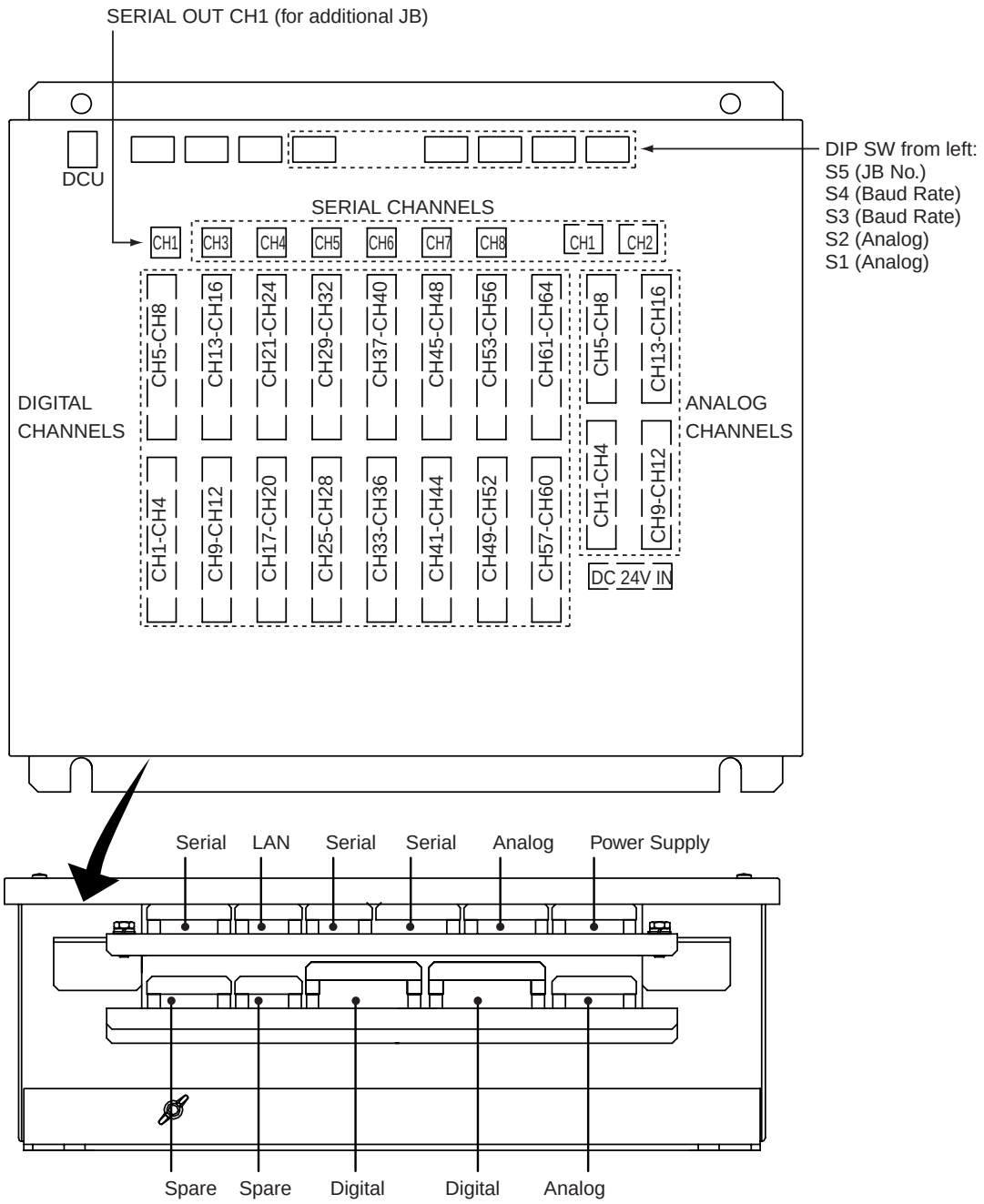
Name	Type	Code No.	Q'ty
Gasket	24-004-1503	100-347-370-10	1
Washer	24-004-1504	100-347-380-10	4

2.4 Junction Box

2.4.1 Location of connectors

Navigation device, etc. are connected to the terminals and connectors on the terminal board in the JB. The terminal board has WAGO spring-catch terminal blocks for leads of up to 2.5 mm^2 or AWG 14 wires.

Insert wires into holes in the connectors the same as on the terminal board in the DCU.



Location of connectors inside the junction box, where to lead in cables thru cable clamps

2.4.2 Cable fabrication

Cable type DPYC-1.5 (power), TTYCS-1 and TTYCS-1Q (serial IEC 61162-1 and IEC 61162-2, respectively), and TTYCS-1 (analog) connect various equipment to the JB. For fabrication of those cables, see paragraph 1.1.3.

2.4.3 Ground

Connect a ground wire (IV-8sq) between the ground terminal on the unit and ship's grounding bus.

⚠ CAUTION

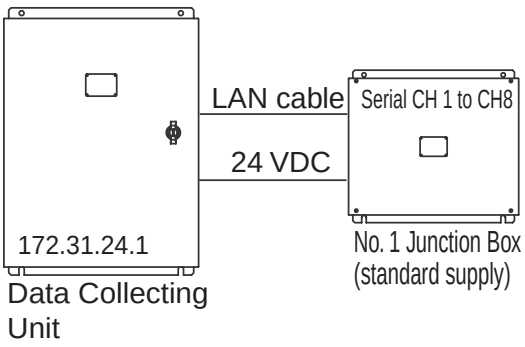
Attach grounding securely to the ship's body.

The grounding is required to prevent electrical shock.

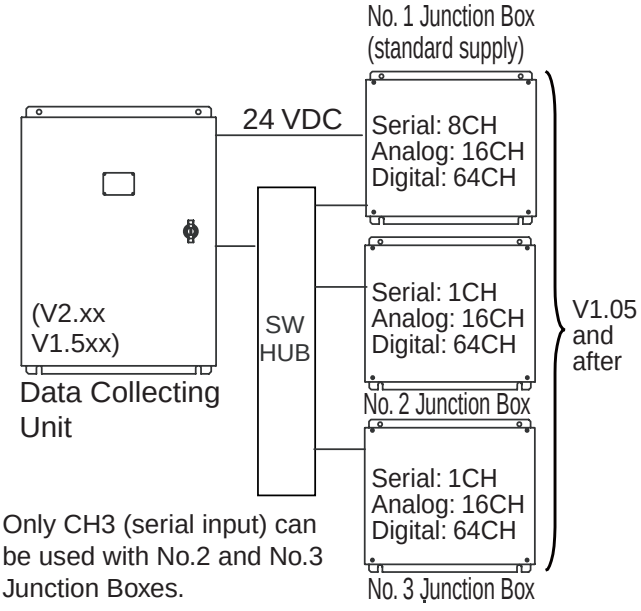
2.4.4 Connection of additional junction boxes

Maximum two additional junction boxes may be installed. An additional junction box has connections for 1 serial channel (IEC 61162-1, CH3 only), 64 digital channels, and 16 analog channels. See the figure below for general wiring.

When installing additional junction boxes, set junction box no. (2 and 3) with DIP SW S5. If the junction box no. of additional junction boxes is left as "1", data will not be output from the junction box. For setting procedure, see page 50.

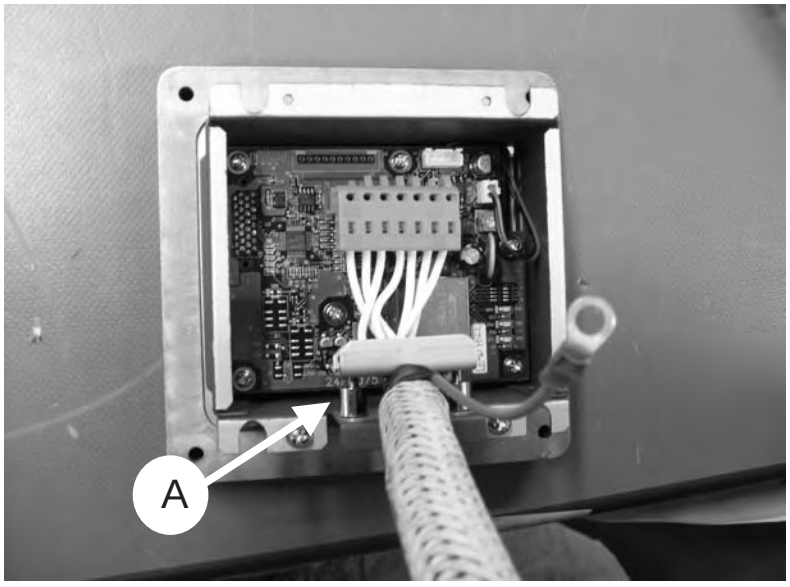


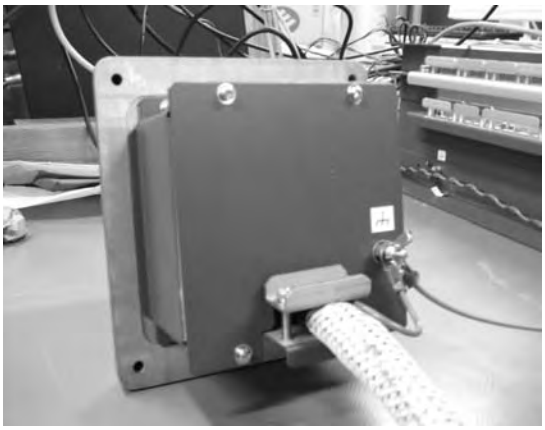
Connection of one Junction Box



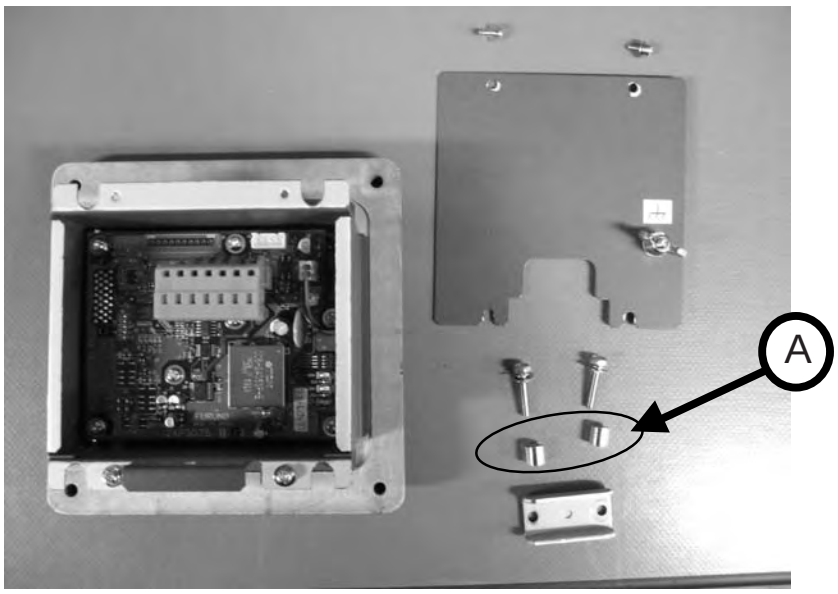
Connection of two or three Junction Boxes

2.5 Remote Alarm Panel





- Clamp armor of cable.
- Connect shield to shield screw on back panel.
- Connect Wago connector to terminal after removing chip to avoid damage to terminal.
- Spacer "A" is not necesary when space is too wide as in A above.
- Tape fabricated part of cable with vinyl tape.



Wiring RAP

2.6 Microphone

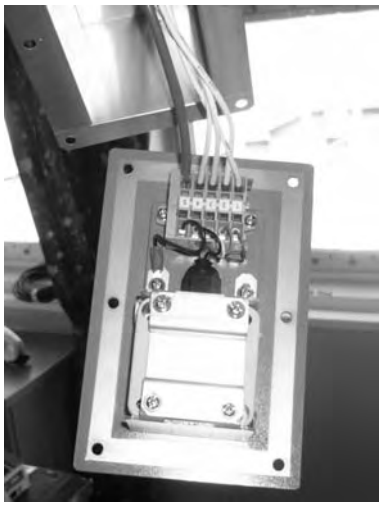
A maximum of 6 microphones can be connected, to TB6 thru TB11 in the DCU. A dual twisted, balanced cable carries the following signals:

+: 24 VDC (+)
A: Audio signal line, balanced, 0 dBm
B: Audio signal line, balanced, 0 dBm
-: 24 VDC (-)

MIC1 audio is mixed with MIC2 audio, MIC3 with MIC4, and MIC5 with MIC6, respectively.

CAUTION: Turn off the DCU before connecting a microphone, to prevent damage to the microphone.

2.6.1 VR-5011



- Refer to page 19 for cable fabrication.
- Connect shield to screw on chassis as shown.
- Tape fabricated part of cable with vinyl tape.

NOTICE

After installing microphones, test them to make sure they are not picking up noise and that the sound quality is good.

2.6.2 VR-3012W

Bulkhead mount

1. Unfasten the cover.
2. Lead in wiring through the cable gland and connect it to the terminal board on the rear side the cover, referring to the interconnection diagram. See page 19 for how to fabricate the cable. Be sure to ground shield. Tape fabricated part of wiring with vinyl tape.
3. Close the cover.

Flush mount

1. Connect wiring to the terminal board on the rear side of the cover, referring to the interconnection diagram. See page 19 for how to fabricate the cable. Be sure to ground shield. Tape fabricated part of wiring with vinyl tape.
2. Fasten the cover to the housing.

NOTICE

After installing microphones, test them to make sure they are not picking up noise and that the sound quality is good.

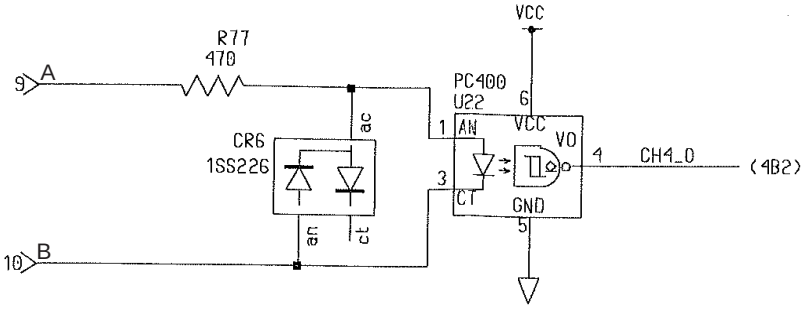
2.7 Sensor Data

Note: The serial channels in the Junction Box IF-8530 can receive the maximum of 82 characters in a sentence, consisting of a maximum of 79 characters between the starting delimiter "$" or "!" and the terminating delimiter <CR>, <LF> as defined by NMEA0183/IEC61162.

2.7.1 IEC 61162-1 serial data

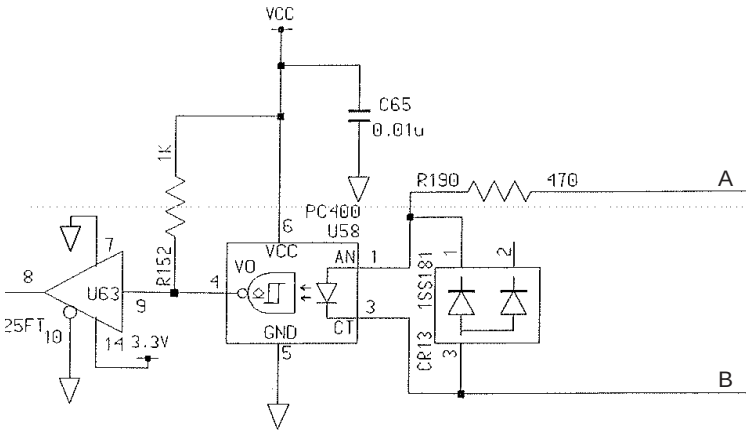
12 channels are provided to receive IEC 61162-1 serial data, six in the DCU and six in the JB. Receivable are *all IEC 61162 sentences* and binary data, but at least ZDA is necessary for stamping date and time.

Data Collecting Unit



IEC 61162-1 interface circuit in Data Collecting Unit

Junction Box

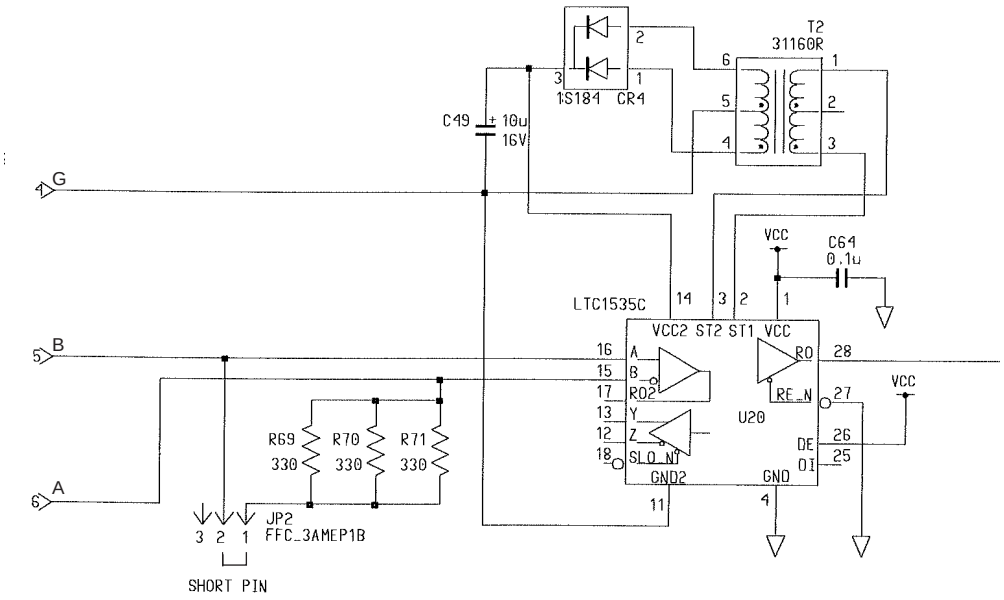


IEC 61162-1 interface circuit in Junction Box

2.7.2 IEC 61162-2 serial data

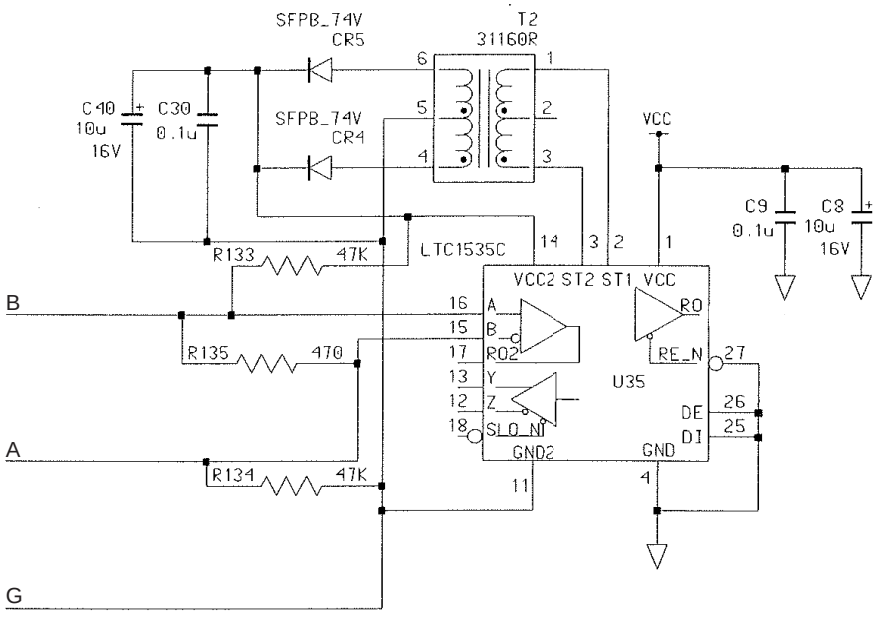
4 channels are provided to receive IEC 61162-2 serial data, two in the DCU and two in the JB.

Data Collecting Unit



IEC 61162-2 interface circuit in Data Collecting Unit

Junction Box



IEC 61162-2 interface circuit in Junction Box

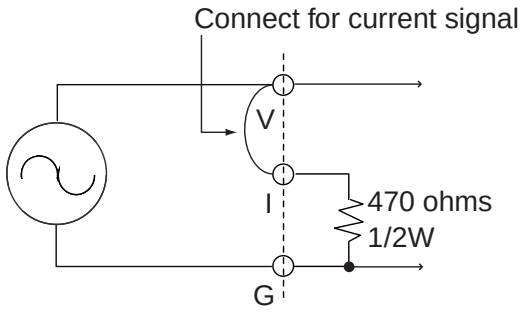
2.7.3 Non-IEC 61162 signal

1) Analog

4 to 20 mA, 0 to 10 V and –10 to +10 V signals (max. 16 channels) can be connected to the ANALOG terminals in the JB. Input voltage (current) range is set by DIP switches in the junction box.

Voltage signal
The voltage between two input terminals is 0 to +10V or –10 to +10 V.

Current signal
For 4 to 20 mA current signal set jumper between I and V as shown below.

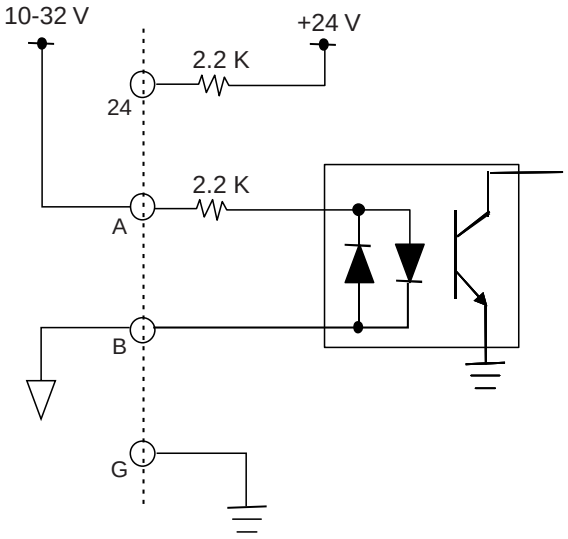


Connection of 4-20 mA current signal

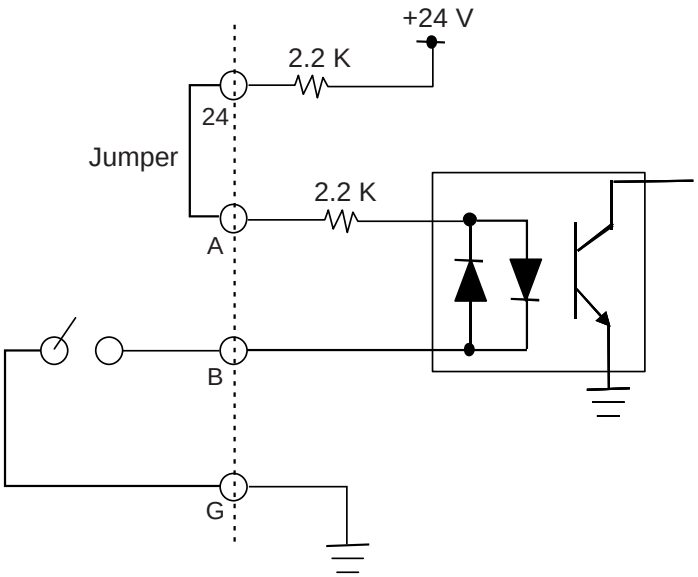
2) Digital (Voltage and Contact-closure)

The terminals for digital input in the JB connect voltage and contact-closure signals. Range of input voltage is 10 to 32 V. The system sends 24 VDC to ”floating contact.”

The figures below show the digital interface circuit for voltage and contact-closure signals respectively.



Interfacing of voltage signal



Interfacing of contact-closure signal

Note: Jumpers are fitted at factory between A and 24 terminals for CH1 to CH32 in order to connect contact-closure signal. To connect a voltage signal to CH1 to CH32, remove jumper by using two openers attached inside the junction box. To connect a contact-closure signal to CH33 to CH64, short between A and 24 terminals by using a jumper wire (local supply).

2.8 VHF Interface Unit

Two VHF audio signals may be connected to the terminal board in the DCU. IMO requires one VHF audio to be recorded. A dual twisted, balanced cable carries the following signals:

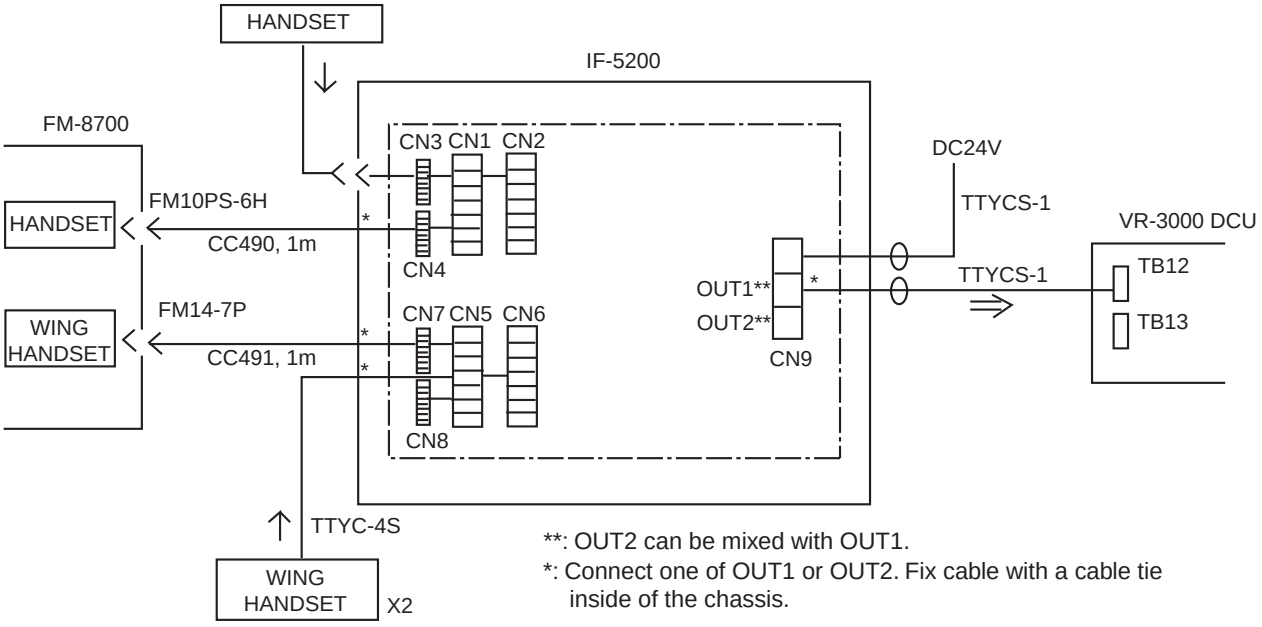
+: 24 VDC (+)
A: Audio signal line, balanced, 0 dBm
B: Audio signal line, balanced, 0 dBm
-: 24 VDC (-)

The VHF interface unit mixes VHF transmitting and receiving signals for the VDR. When the VHF outputs the mixed signal, this unit is not required.

Specifications

Power Supply:	24 VDC (21.6 to 31.6 VDC), 40mA
Mic input level:	-16 to –56 dBm, Input impedance: >10k ohms (Factory default: -46 dBm, 600 ohms: 10dB ATT ON)
Speaker input level:	32 to 200 ohms, 2 mW, input impedance: 10k ohms (Factory default: 2 mW, 200 ohms: 10dB ATT OFF)
PTT Switch signal:	TTL level
Output:	0 dBm±10dB, 600 ohms, balanced

When a wing handset is used, the connection is made as follows.

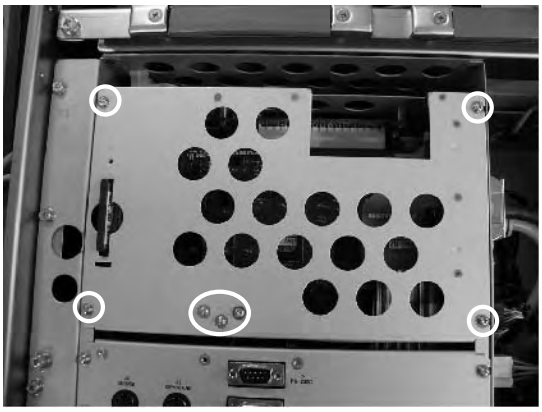


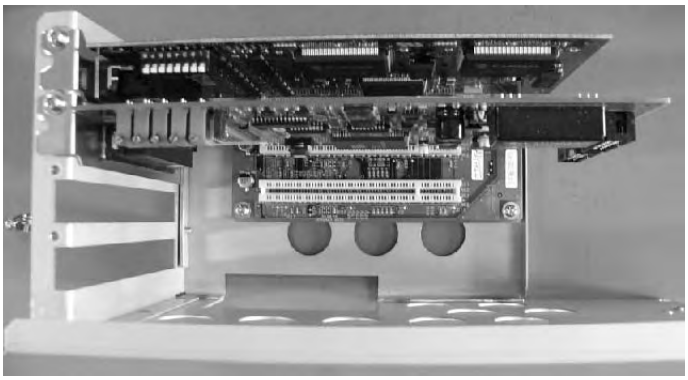
Connecting FM-8700 to DCU via interface unit IF-5200

2.9 Installation of Interface Board for Radar

When the interface board for connection of radar(s) is not installed at the factory, install it (in the DCU) as shown below.

1. Loosen the seven screws circled below to detach the four PCB case cover and fixing plate.

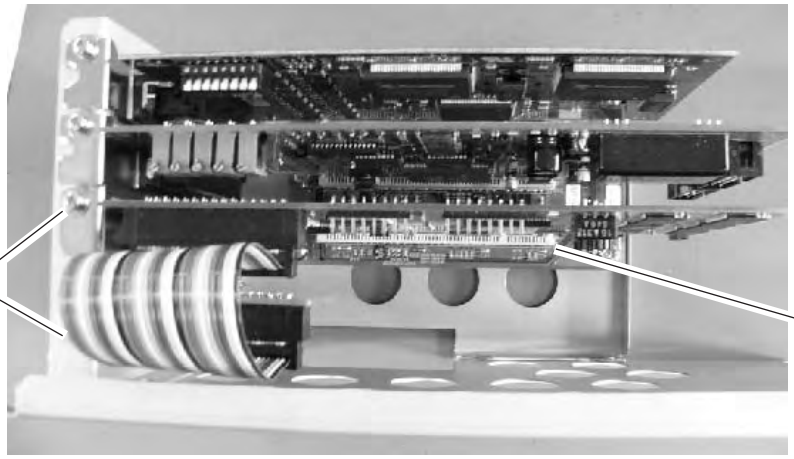




PCB card case

Fixing plate

2. Connect the flat cable between the two interface boards if it is not already connected.
3. Set the boards in the PCB card case as shown below.



4. Fix the boards with the screws provided.
5. Refasten the fixing plate.
6. Set the PCB card case in the DCU and reattach the PCB case cover.
7. Connect cabling as shown on page 21-24.

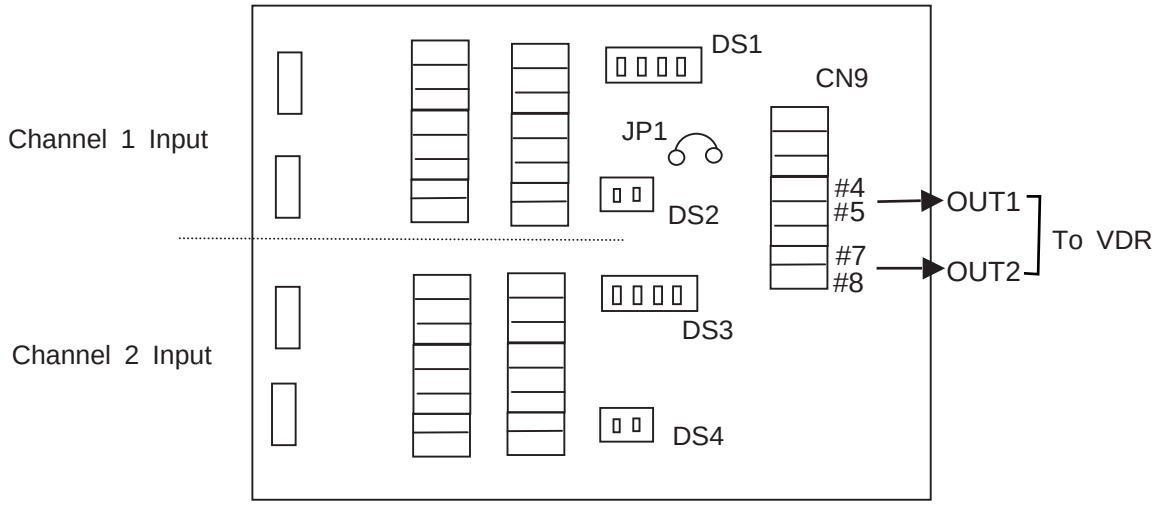
3. SETUP

This chapter describes how to set up and check the system.

3.1 VHF Interface Unit

3.1.1 Audio level adjustment

DS1 and DS3 are 10 dB step attenuators for channel 1 and 2 microphone lines respectively. Set the DIP switch so that the audio output level between #4 and #5 (OUT1) and between #7 and #8 (OUT2) of CN9 is 0 dBm (2.2 Vp-p).
Factory-setting: 10 dB (ON); 20 dB (OFF); 30 dB (OFF) and 40 dB (OFF).



Location of DIP switches and jumper wire in VHF interface unit

Functions of #1 and #2 segments of DS2 and DS4

Segment # of DS2 and DS4	Function
#1 (10 dB ATT)	Attenuates speaker signal by 10 dB. Factory-setting: OFF
#2 (MIX)	When set to OFF, either “mic” or “sp” signal is sent to the VDR according to the PTT switch status. When ON, both “mic” and “sp” signals are always sent to the VDR. Factory-setting: OFF

3.1.2 Jumper setting

Jumper wire JP1 functions as follows:

- Short circuit (Factory-setting): “Input” signals from CH1 and CH2 are output from OUT 1 port and OUT 2 port, respectively.
- Open circuit: “Input” signals from CH1 and CH2 are output from OUT 1 port.

3.2 Data Collecting Unit

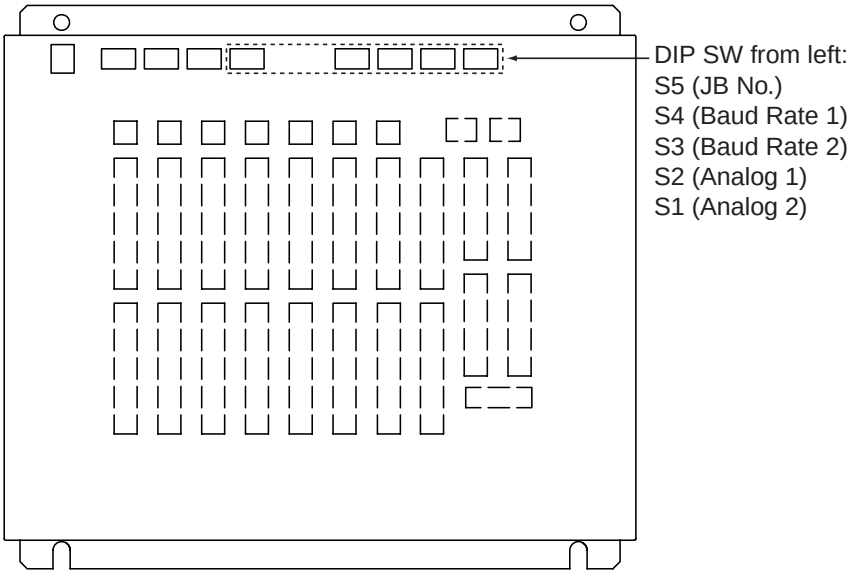
The system configuration must be updated after installation. See instruction manual for VDR Maintenance Viewer and operator's manual for Live Player V4 for the procedure.

The outline of the system configuration is;

Step 1: Network setting on PC
Step 2: Connection of PC
Step 3: Software configuration
Step 4: Making a backup copy of configuration data
Step 5: Software configuration from file data
Step 6: Media management
Step 7: Other functions

3.3 DIP Switches in Junction Box

DIP switches in the JB are provided to set up the system according to equipment connected. The default setting for all DIP switches is “OFF”.



Junction box, inside view

Analog signal (DIP SW S1, DIP SW S2)

Channel	SW No.	SW Label	Analog Signal Range Setting	
			-10V to +10 V	0 V to +10 V or 4-20 mA
CH1	S2-1	1	OFF	ON
CH2	S2-2	2	OFF	ON
CH3	S2-3	3	OFF	ON
CH4	S2-4	4	OFF	ON
CH5	S2-5	5	OFF	ON
CH6	S2-6	6	OFF	ON
CH7	S2-7	7	OFF	ON
CH8	S2-8	8	OFF	ON
CH9	S1-1	9	OFF	ON
CH10	S1-2	10	OFF	ON
CH11	S1-3	11	OFF	ON
CH12	S1-4	12	OFF	ON
CH13	S1-5	13	OFF	ON
CH14	S1-6	14	OFF	ON
CH15	S1-7	15	OFF	ON
CH16	S1-8	16	OFF	ON

Serial data baud rate (DIP SW S3, S4)

Use for No. 1 JB (Set S5-6, S5-7, S5-8 as OFF, OFF, OFF.)

Channel	SW No.	SW Label	Serial Baud Rate Setting (bps)			
			4800	9600	19200	38400
CH1[*1]	S4-1	1A	OFF	—	—	ON
	S4-2	1B	OFF	—	—	ON
CH2[*1]	S4-3	2A	OFF	—	—	ON
	S4-4	2B	OFF	—	—	ON
CH3[*2]	S4-5	3A	OFF	ON	OFF	—
	S4-6	3B	OFF	OFF	ON	—
CH4[*2]	S4-7	4A	OFF	ON	OFF	—
	S4-8	4B	OFF	OFF	ON	—
CH5[*2]	S3-1	5A	OFF	ON	OFF	—
	S3-2	5B	OFF	OFF	ON	—
CH6[*2]	S3-3	6A	OFF	ON	OFF	—
	S3-4	6B	OFF	OFF	ON	—
CH7[*2]	S3-5	7A	OFF	ON	OFF	—
	S3-6	7B	OFF	OFF	ON	—
CH8[*2]	S3-7	8A	OFF	ON	OFF	—
	S3-8	8B	OFF	OFF	ON	—

[*1] IEC 61162-2, [*2] IEC 61162-1

When serial out CH1 of No. 2 or No. 3 JB is connected to CH3 to CH8 of previous JB, set the CH switch for 19200 bps.

Use for No.2, No. 3 JB. (Set S5-6, S5-7, S5-8 as OFF, OFF, ON or OFF, ON, OFF.)

Channel	SW No.	SW Label	Serial Baud Rate Setting (bps)			
			4800	9600	19200	38400
CH3[*2]	S4-5	3A	OFF	ON	—	—
	S4-6	3B	OFF	OFF	—	—

[*2] IEC 61162-1

Only CH3 functions on JB No. 2 and No. 3.

Junction box no. setting (DIP SW S5)

JB No.	JB DIP SW	JB IP Address	JB NW Mode
1	S5-6: OFF S5-7: OFF S5-8: OFF	172.31.24.10 S5-1: OFF S5-2: OFF S5-3: OFF S5-4: OFF	S5-5: OFF
2	S5-6: OFF S5-7: OFF S5-8: ON	172.31.24.11 S5-1: ON S5-2: OFF S5-3: OFF S5-4: ON	S5-5: ON
3	S5-6: OFF S5-7: ON S5-8: OFF	172.31.24.12 S5-1: OFF S5-2: ON S5-3: OFF S5-4: ON	S5-5: ON

No. 2, No. 3 JB: Additional junction boxes (2nd or 3rd JB)

3.4 Recording Expiration Date of Parts

After installing and setting up the system, record the expiration date of major parts of the system, on the sheet provided. Cut out (or copy and cut) an expiration data sheet from the ones below. For interval-specific parts record date of expiration and for general consumable parts the date of replacement. Place the card in the card holder on the inside of the door of the DCU. The expiration period starts from date of installation.

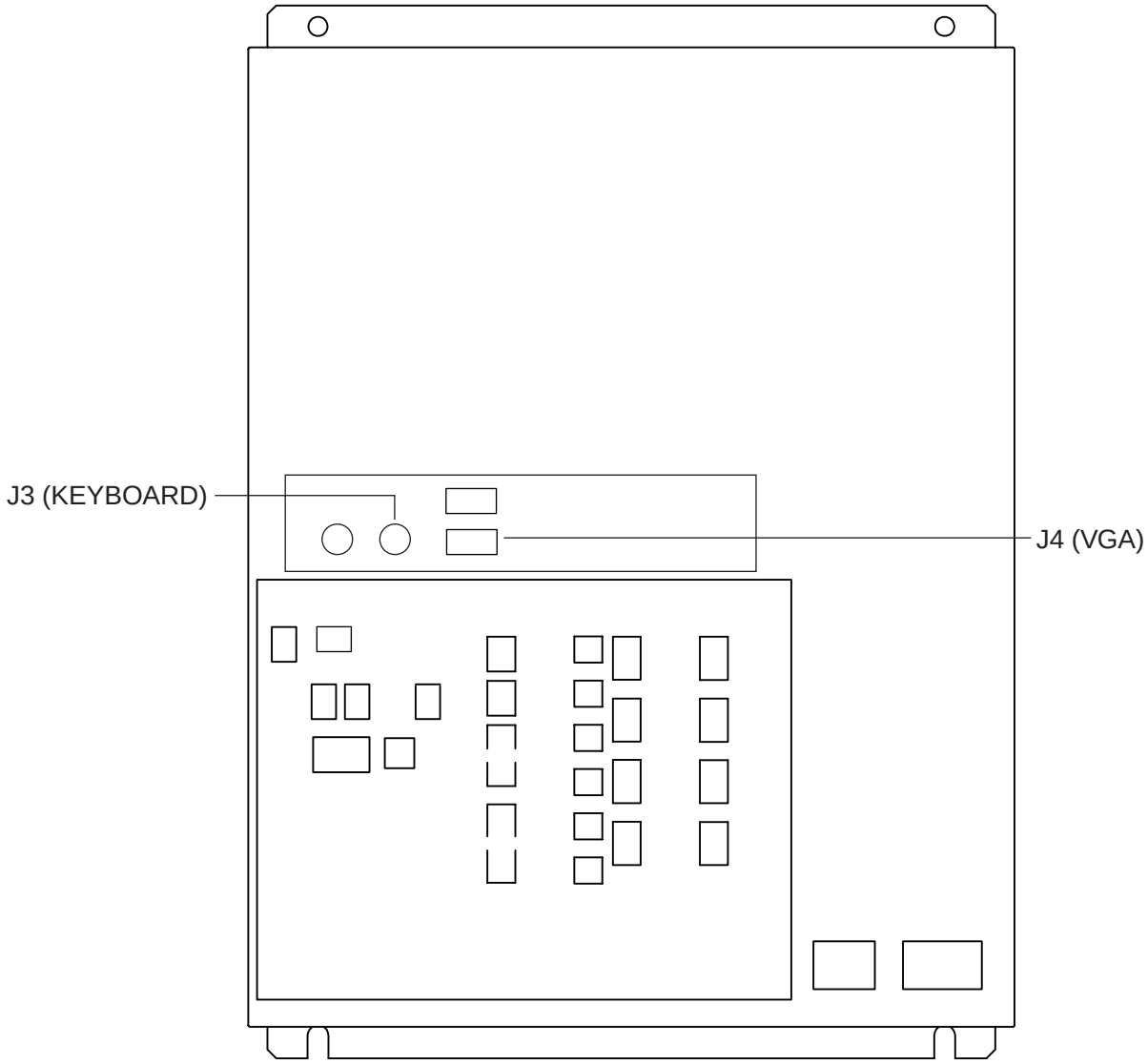
Interval-specific parts	Interval	Date of expiration
Battery in DCU	4 years	
Underwater acoustic beacon in DRU	6 years	
General consumable parts	**Life**	**Date of replacement**
Backup HDD	2 years	
DC power fan	6 years	
DCU chassis fan	6 years	
DCU CPU fan	6 years	
CMOS battery on CPU board in DCU	6 years	
AC power supply	6 years	

Interval-specific parts	Interval	Date of expiration
Battery in DCU	4 years	
Underwater acoustic beacon in DRU 6	6 years	
General consumable parts	**Life**	**Date of replacement**
Backup HDD	2 years	
DC power fan	6 years	
DCU chassis fan	6 years	
DCU CPU fan	6 years	
CMOS battery on CPU board in DCU	6 years	
AC power supply	6 years	

3.5 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 one hour. However, the system time is set to within two minutes (typically 10 seconds) behind the UTC time after installation to make the synchronization faster.

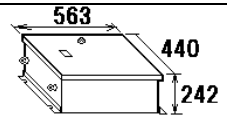
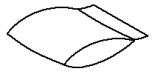
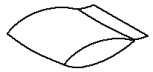
1. Connect VGA monitor and keyboard to the DCU, at the locations shown below.

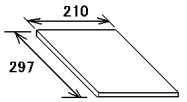
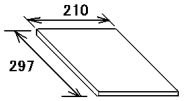
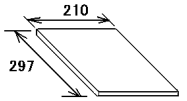
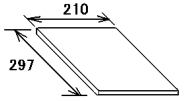


DCU, door opened

2. Turn on the VR-3000 while pressing and holding down the **Delete** key.
3. Wait for the BIOS screen to come up. (Keep the **Delete** key pressed.)
4. Select “Standard CMOS Feature” and press the **Enter** key.
5. Set the system time about 10 seconds behind UTC or GPS time.
6. Press **F10**, **Y**, and **Enter** keys in order to save data.
7. Restart VR-3000.
8. Wait until system time synchronizes with the GPS time.

PACKING LIST VR-3010/3010-S-I/3010-S-N

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
ﾃﾞｰﾀ収集ﾕﾆｯﾄ DATA COLLECTING UNIT(DCU)		VR-3010/3010-S-I/N 000-042-169-00 **	1
予備品 SPARE PARTS			
予備品 SPARE PARTS		SP24-00201 004-555-540-00	1
付属品 ACCESSORIES			
付属品 ACCESSORIES		FP24-00202 004-383-310-00	1 (*1)
付属品 ACCESSORIES		FP24-00201 004-383-300-00	1 (*1)
付属品 ACCESSORIES		FP24-00203 004-555-560-00	1
工事材料 INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP24-00605 004-383-250-00	1 (*2)
工事材料 INSTALLATION MATERIALS		CP24-00609 004-383-290-00	1 (*2)

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
工事材料 INSTALLATION MATERIALS		CP24-00601 004-383-210-00	1 (*2)
図書 DOCUMENT			
取扱説明書 OPERATOR'S MANUAL		OM*-44370-* 000-157-077-1* **	1
操作要領書 OPERATOR'S GUIDE		OS*-44370-* 000-157-088-1* **	1
装備要領書 INSTALLATION MANUAL		IM*-44370-* 000-157-079-1* **	1
取扱説明書(和) OPERATOR'S MANUAL		OMJ-44373-* 000-169-588-1* **	1 (*3)

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

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

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

3.(*3)の取扱説明書は、ｻｰﾋﾞｽﾏﾝが持ち帰ります。
(*3) OPERATOR'S MANUAL SHOULD BE RETURN TO ENGINEER.

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

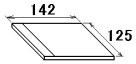
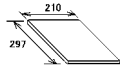
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

FURUNO

CODE NO.	004-383-300-00	24AE-X-9501 -3
TYPE	FP24-00201	1/1

付属品表

ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	CD-ROM CD-ROM		2450045/46- CODE NO. 001-052-950-00	1	
2	取扱説明書(英) OPERATOR'S MANUAL		OME-44372-* CODE NO. 000-169-584-1*	1	

型式/ｺｰﾄﾞ番号が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.

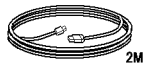
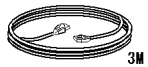
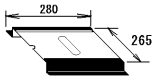
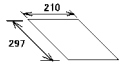
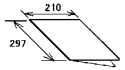
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	004-555-560-00	24AE-X-9503 -2
TYPE	FP24-00203	1/1

付属品表

ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｹｰﾌﾞﾙ(IEEE1394) CABLE		AIE896 CODE NO. 000-151-843-00	1	
2	LANｹｰﾌﾞﾙ(ﾌﾞﾙｰ) LAN CABLE ASSEMBLY		ALT-03BX CODE NO. 000-159-485-00	1	
3	ｶｰﾄﾞﾎﾙﾀﾞｰ CARD HOLDER		C-26-ﾀﾃｰﾆ-1 C-26-ﾀﾃｰﾆ-1 CODE NO. 000-165-407-10 000-155-571-00	1	
4	ｴﾗｰｺｰﾄﾞﾋｮｳ ERROR CODE TABLE		C42-00407-* CODE NO. 000-159-488-1*	1	
5	ﾃﾞｰﾀﾁｭｳｼｭﾂﾖｳﾘｮｳ DATA EXTRACTION PROCEDURE		C42-00408-* CODE NO. 000-159-489-1*	1	

型式/ｺｰﾄﾞ番号が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.

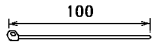
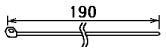
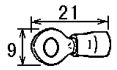
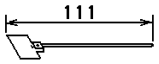
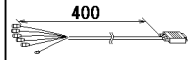
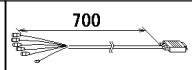
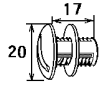
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	004-383-290-00	24AE-X-9403 -7
TYPE	CP24-00609	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｺﾝﾍﾞｯｸｽ CABLE TIE		CV-100N CODE NO. 000-162-167-10	20	
2	ｺﾝﾍﾞｯｸｽ CABLE TIE		CV-200N CODE NO. 000-162-183-10	20	
3	圧着端子 CRIMP-ON LUG		FV2-4 CODE NO. 000-157-247-10	10	
4	ｽﾅｯﾌﾟ/ﾜｲﾔｰｸﾐﾋﾝ SNAP/WIRE ASSEMBLY		020170A0000-L410 CODE NO. 000-161-454-10	1	
5	ｹｰﾌﾞﾙﾊﾞﾝﾄﾞ CABLE BAND		PLF1M-M CODE NO. 000-116-921-10	30	
6	ｺﾈｸﾀ組品 CONNECTOR ASSY.		BNCX5-DSUB15-L400 CODE NO. 000-159-595-01	2	
7	ｺﾈｸﾀ組品 CONNECTOR ASSY.		BNCX5-DSUB15-L700 CODE NO. 000-159-596-01	2	
8	ﾎﾞﾙﾄｷｬｯﾌﾟ COSMETIC CAP		CP-30-BC-10 CP-30-BC-10 CODE NO. 000-164-572-10 000-808-408-00	2	

型式/ｺｰﾄﾞ番号が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.

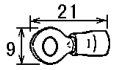
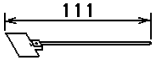
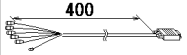
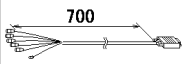
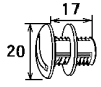
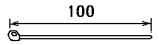
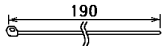
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	004-383-250-00	24AE-X-9402 -6
TYPE	CP24-00605	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	圧着端子 CRIMP-ON LUG		FV2-4 CODE NO. 000-157-247-10	10	
2	ｽﾅｯﾌﾟ/ﾜｲﾔｰｸﾐﾋﾝ SNAP/WIRE ASSEMBLY		020170A0000-L410 CODE NO. 000-161-454-10	1	
3	ｹｰﾌﾞﾙﾊﾞﾝﾄﾞ CABLE BAND		PLF1M-M CODE NO. 000-116-921-10	30	
4	ｺﾈｸﾀ組品 CONNECTOR ASSY.		BNCX5-DSUB15-L400 CODE NO. 000-159-595-01	1	
5	ｺﾈｸﾀ組品 CONNECTOR ASSY.		BNCX5-DSUB15-L700 CODE NO. 000-159-596-01	1	
6	ﾎﾞﾙﾄｷｬｯﾌﾟ COSMETIC CAP		CP-30-BC-10 CP-30-BC-10 CODE NO. 000-164-572-10 000-808-408-00	2	
7	ｺﾝﾍﾞｯｸｽ CABLE TIE		CV-100N CODE NO. 000-162-167-10	20	
8	ｺﾝﾍﾞｯｸｽ CABLE TIE		CV-200N CODE NO. 000-162-183-10	20	

型式/ｺｰﾄﾞ番号が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.

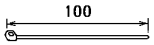
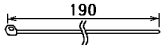
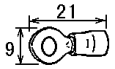
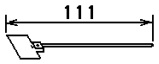
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	004-383-210-00	24AE-X-9404 -6
TYPE	CP24-00601	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｺﾝﾍﾞｯｸｽ CABLE TIE		CV-100N CODE NO. 000-162-167-10	20	
2	ｺﾝﾍﾞｯｸｽ CABLE TIE		CV-200N CODE NO. 000-162-183-10	20	
3	圧着端子 CRIMP-ON LUG		FV2-4 CODE NO. 000-157-247-10	10	
4	ｽﾅｯﾌﾟ/ﾜｲﾔｰｸﾐﾋﾝ SNAP/WIRE ASSEMBLY		020170A0000-L410 CODE NO. 000-161-454-10	1	
5	ｹｰﾌﾞﾙﾊﾞﾝﾄﾞ CABLE BAND		PLF1M-M CODE NO. 000-116-921-10	30	
6	ﾎﾞﾙﾄｷｬｯﾌﾟ COSMETIC CAP		CP-30-BC-10 CP-30-BC-10 CODE NO. 000-164-572-10 000-808-408-00	2	

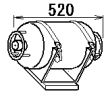
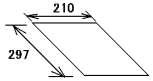
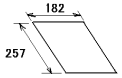
型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

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

PACKING LIST

VR-5020-6G/9G

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット　UNIT			
ﾃﾞｰﾀ記録器 DATA RECORDER		VR-5020-6G 000-040-826-00 **	1
工事材料　INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP24-00215 004-379-590-00	1
図書　DOCUMENT			
CONFIG変更お願い CHANGE CONFIGURATION MENU		C42-00710-* 000-168-026-1*	1
ﾊﾟｰﾃｨｼｮﾝ手順 PARTITION PROCEDURE		E42-00804-* 000-170-394-1*	1

1.ｺｰﾄﾞ番号末尾の[**]は、選択品の代表型式/ｺｰﾄﾞを表します。
CODE NUMBER ENDED BY "**" INDICATES THE NUMBER OF TYPICAL MATERIAL.

型式/ｺｰﾄﾞ番号が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.

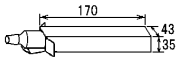
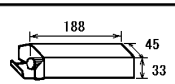
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	004-379-590-00	24AB-X-9402 -5
TYPE	CP24-00215	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｼﾘｺﾝｺﾞﾑ SILICONE SEALANT		KE-45-W-100 CODE NO. 000-166-578-10	1	
2	ｵｲﾙｺﾝﾊﾟｳﾝﾄﾞ FLUID COMPOUND		KS-650N-100 CODE NO. 000-166-579-10	1	

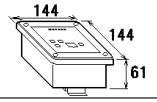
型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

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

PACKING LIST

VR-3016

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット　UNIT			
ﾘﾓｰﾄｱﾗｰﾑﾊﾟﾈﾙ REMOTE ALARM PANEL(RAP)		VR-3016 000-041-949-00	1
付属品　ACCESSORIES			
付属品 ACCESSORIES		FP24-00401 001-014-480-00	1
工事材料　INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP24-00801 004-384-960-00	1

型式/ｺｰﾄﾞ番号が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.

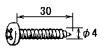
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	004-384-960-00	24AE-X-9401 -1
TYPE	CP24-00801	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｷｬｯﾌﾟ CAP		040-3025 040-3025 CODE NO. 000-164-927-10 000-515-248-00	4	
2	+ﾅﾍﾞﾀｯﾋﾟﾝﾈｼﾞ 1ｼｭ SELF-TAPPING SCREW		4X30 SUS304 4X30 SUS304 1ｼｭ CODE NO. 000-162-659-10 000-809-321-00	4	

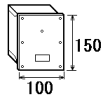
型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

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

PACKING LIST

VR-5011-CS

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
ﾏｲｸﾛﾌｫﾝ MICROPHONE		VR-5011 000-040-830	1
工事材料 INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP24-00217 004-381-090	1

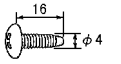
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	004-381-090-00	24AB-X-9405 -2
TYPE	CP24-00217	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ 1ｼｭ SELF-TAPPING SCREW		4X16 SUS304 CODE NO. 000-162-605-10	6	

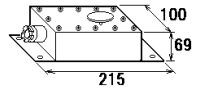
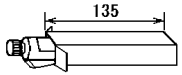
型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

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

PACKING LIST

VR-3012W

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
防水ﾏｲｸ WATERPROOF MICROPHONE		VR-3012W 000-042-244-00	1
付属品 ACCESSORIES		**FP24-00300**	
付属品 ACCESSORIES		FP24-00300 004-658-340-00	1
工事材料 INSTALLATION MATERIALS		**CP24-01100**	
ｹﾐｼｰﾙ SILICON RUBBER		S-8400W ｱﾙﾐﾁｭｰﾌﾞ50G S-8400W ｱﾙﾐﾁｭｰﾌﾞ50G 000-158-483-10 000-158-483-00	1

型式/ｺｰﾄﾞ番号が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

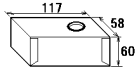
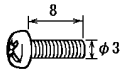
CODE NO.	004-658-340-00	24AE-X-9504 -3
TYPE	FP24-00300	1/1

付属品表

ACCESSORIES

WATERPROOF MICROPHONE

VR-3012W

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｶﾊﾞｰ組品 COVER ASSY.		FP24-00301 CODE NO. 004-658-330-00	1	
2	+ﾅﾍﾞ小ﾈｼﾞ PANHEAD SCREW		M3X8 C2700W MBNI2 CODE NO. 000-163-431-10	2	
3	ﾐｶﾞｷ平座金 FLAT WASHER		M3 C2680R CODE NO. 000-168-181-10	2	
4	ﾊﾞﾈｻﾞｶﾞﾈ SPRING WASHER		M3 C5191W CODE NO. 000-168-187-10	2	

型式/ｺｰﾄﾞ番号が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。

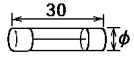
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

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

FURUNO

CODE NO.	004-555-540-00	24AE-X-9301 -0 1/1
TYPE	SP24-00201	BOX NO. P

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

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	QUANTITY SPARE	REMARKS/CODE NO.
1	ﾋｭｰｽﾞ FUSE		FGBO 125V 10A PBF			2	000-155-826-10

MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	24AE-X-9301	1/1

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

型式/ｺｰﾄﾞ番号が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.

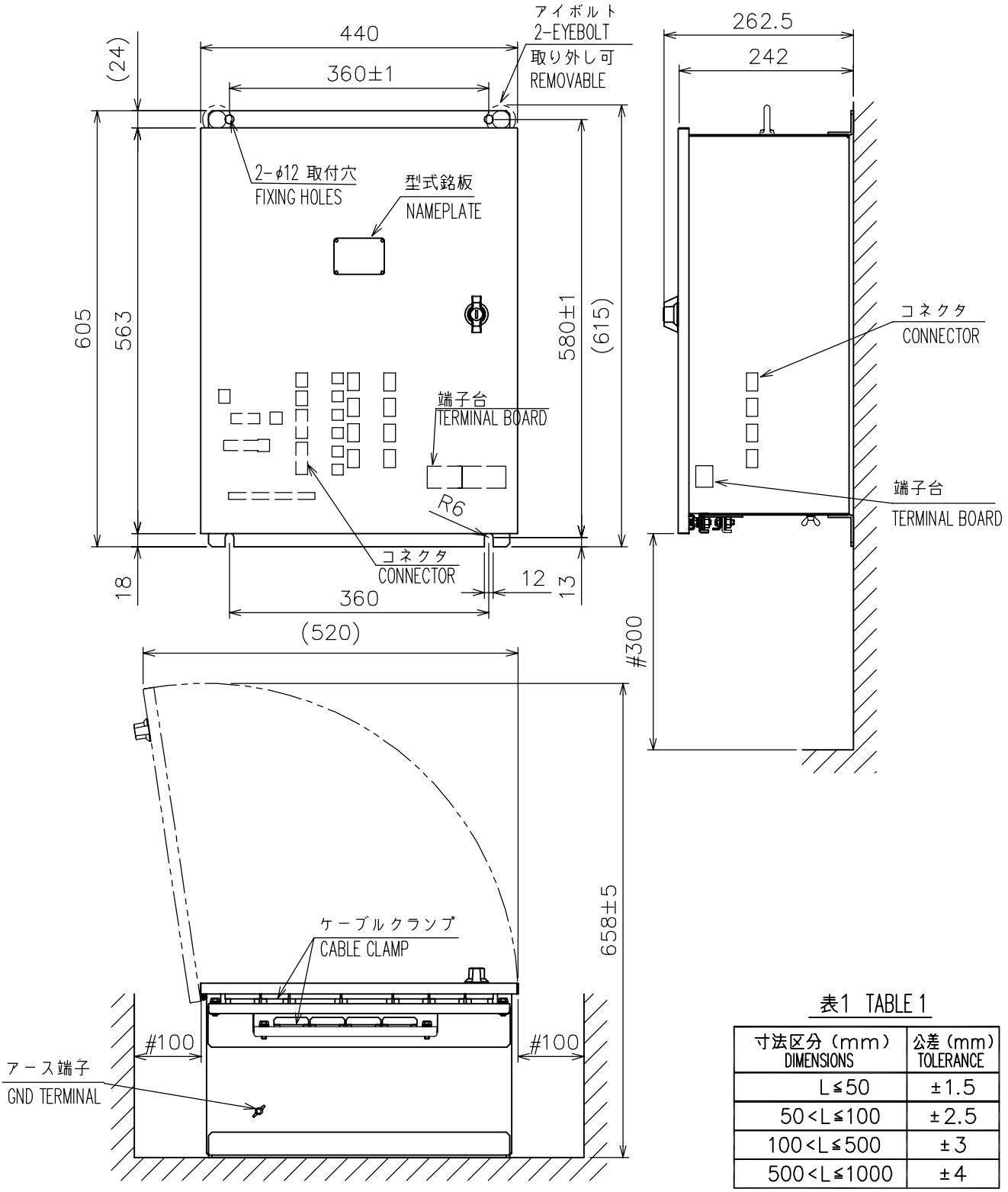


表1 TABLE 1

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

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M10ボルト又はコーチボルト呼び10を使用のこと。

NOTE　1.　#: MINIMUM SERVICE CLEARANCE.
2.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3.　USE M10 BOLTS OR COACH BOLTS φ10 FOR FIXING THE UNIT.

DRAWN Apr. 27, '06 E. MIYOSHI		TITLE	VR-3010
CHECKED TAKAHASHI.T		名称	データ収集ユニット
APPROVED Y. Hatai	VR-3000/3000S		外寸図
SCALE 1/8 MASS 46 ±10% kg		NAME	DATA COLLECTING UNIT
DWG.No. C4437-G01- C	REF.No. 24-009-100G-3		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

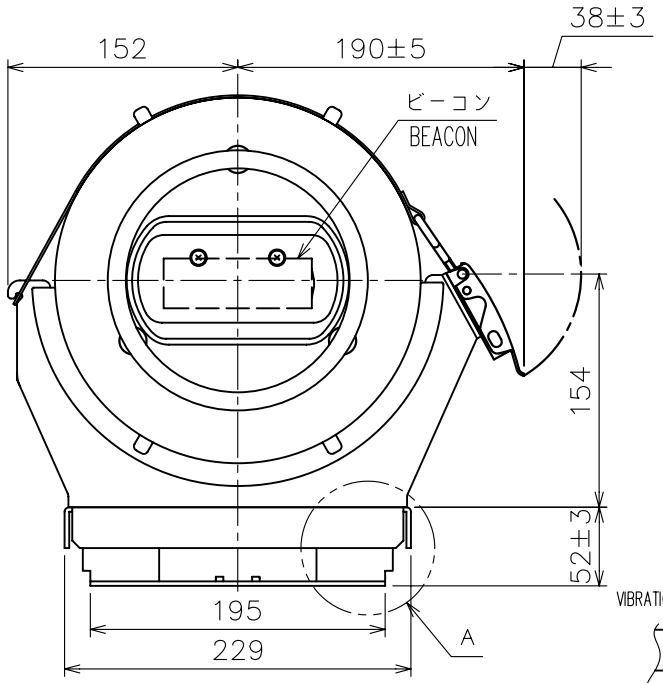
FURUNO

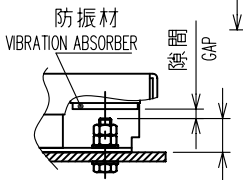
表１ TABLE 1

寸法区分（ｍｍ） DIMENSIONS	公差（ｍｍ） TOLERANCE
Ｌ≦５０	±１．５
５０＜Ｌ≦１００	±２．５
１００＜Ｌ≦５００	±３
５００＜Ｌ≦１０００	±４

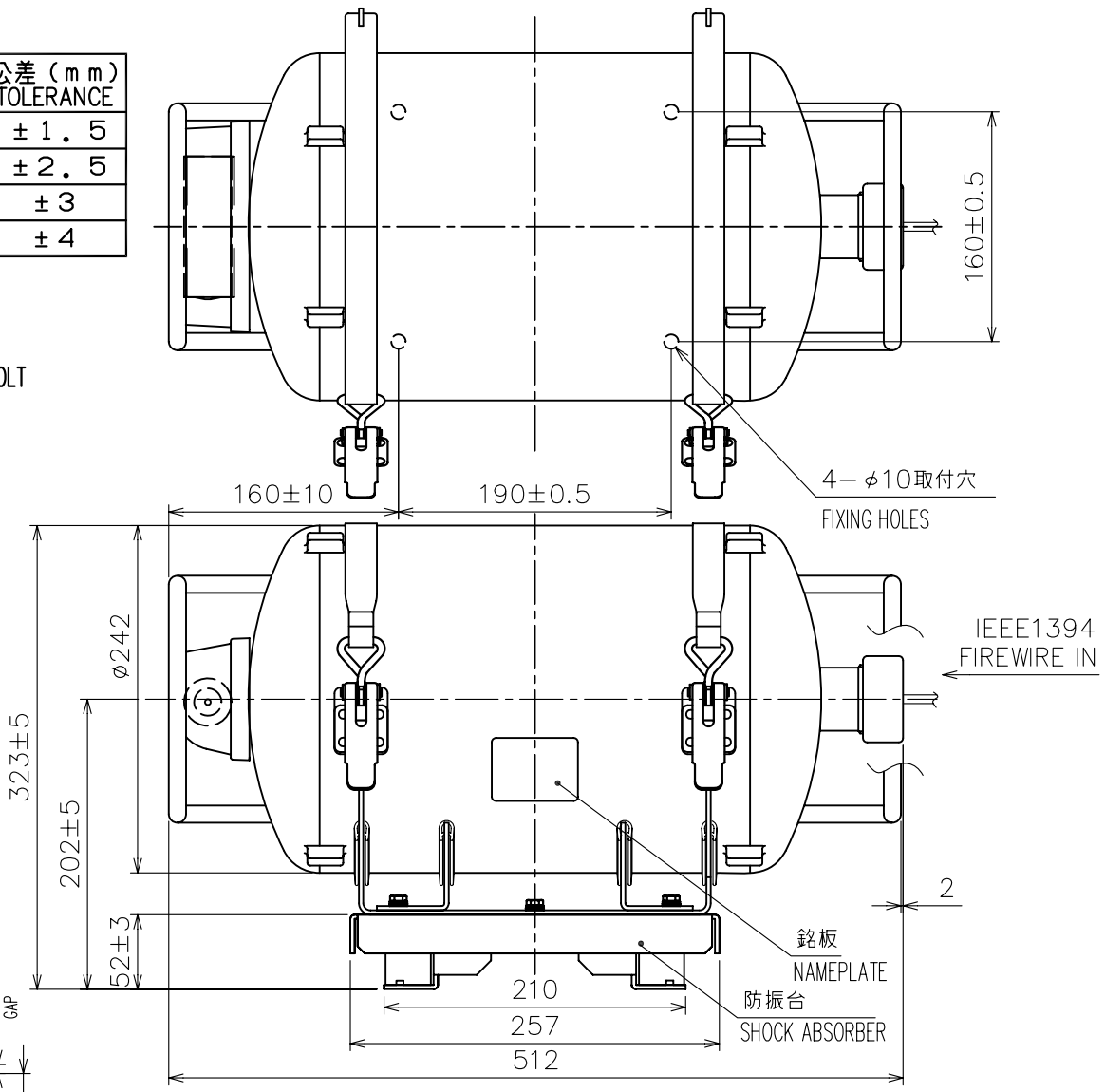
注　記　１）　指定外の寸法公差は表１による。
　　２）　取付用ネジはＭ８ボルトを使用のこと。
　　また、防振材との隙間は３ｍｍ以上確保すること。（Ａ部参照）

NOTE　1.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
　　2.　USE M8 BOLTS FOR FIXING. FURTHER, THE GAP BETWEEN VIBRATION ABSORBER AND BOLT SHOULD BE AT LEAST 3 mm. REFER TO "A".





A部詳細
DETAIL "A"



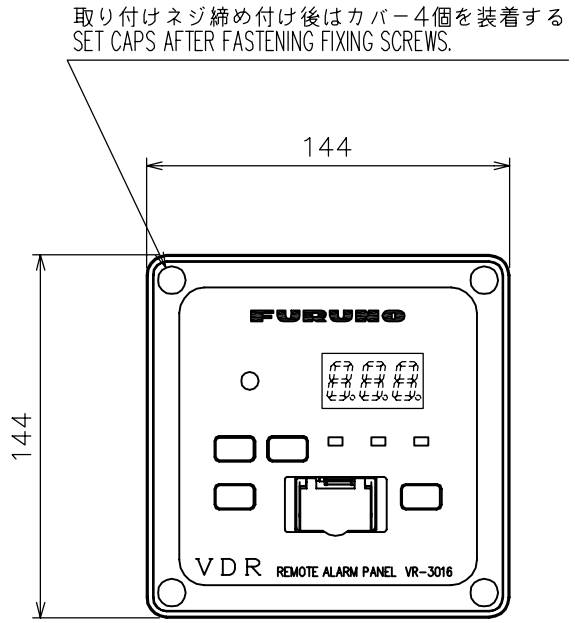
DRAWN Sep. 2, '06 E. MIYOSHI		TITLE	VR-5020
CHECKED TAKAHASHI. T		名称	データ記録器
APPROVED Y. Hatai	VR-5000		外寸図
SCALE 1/5 MASS 37 ±10% kg		NAME	DATA RECORDING UNIT
DWG.No. C4418-G02- J	24-004-100G-3		OUTLINE DRAWING

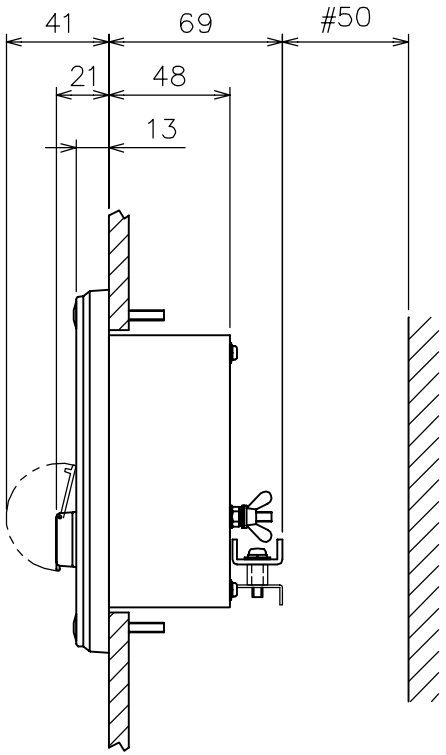
FURUNO ELECTRIC CO., LTD.

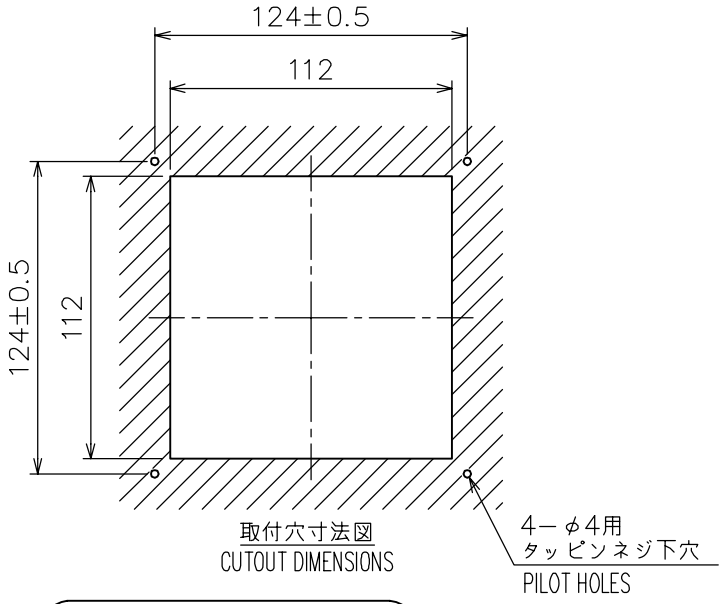
FURUNO

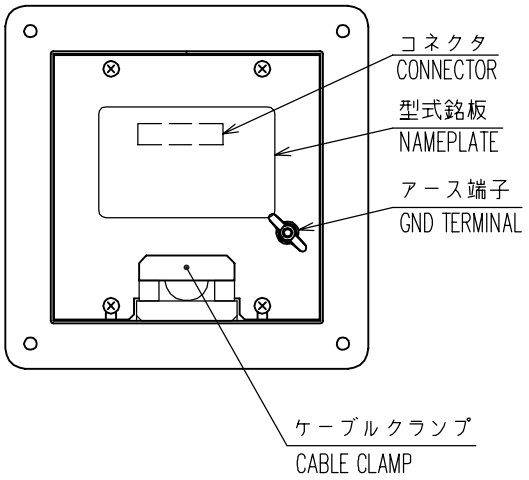
表1 TABLE 1

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









注 記 1） #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） 取付用ネジは付属のナベタッピンネジ呼び径4×30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 4x30 FOR FIXING THE UNIT.

DRAWN Mar. 23, '06 E. MIYOSHI			TITLE VR-3016
CHECKED TAKAHASHI.T			名称 リモートアラームパネル
APPROVED Takahashi		VR-3000/3000S	外寸図
SCALE 1/3	MASS 1.0 ±10% kg		NAME REMOTE ALARM PANEL
DWG.No. C4437-G02- B		REF.No. 24-009-200G-2	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

D-3

FURUNO

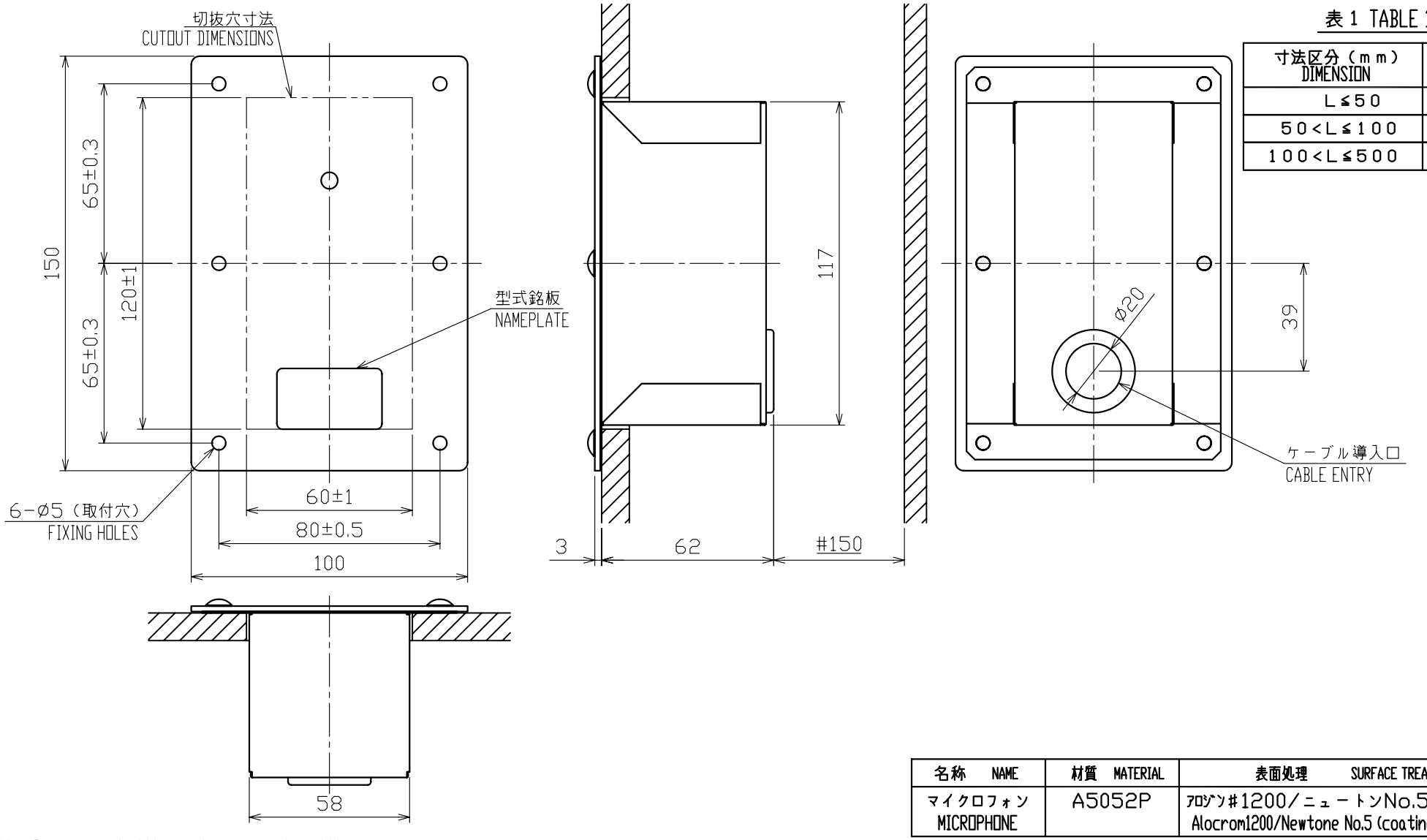


表 1 TABLE 1

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

名称 NAME	材質 MATERIAL	表面処理 SURFACE TREATMENT
マイクロフォン MICROPHONE	A5052P	ｱﾛｼﾞﾝ#1200／ニュートンNo.5（塗装） Alocrom1200/Newtone No.5 (coating color)

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４×１６を使用のこと。

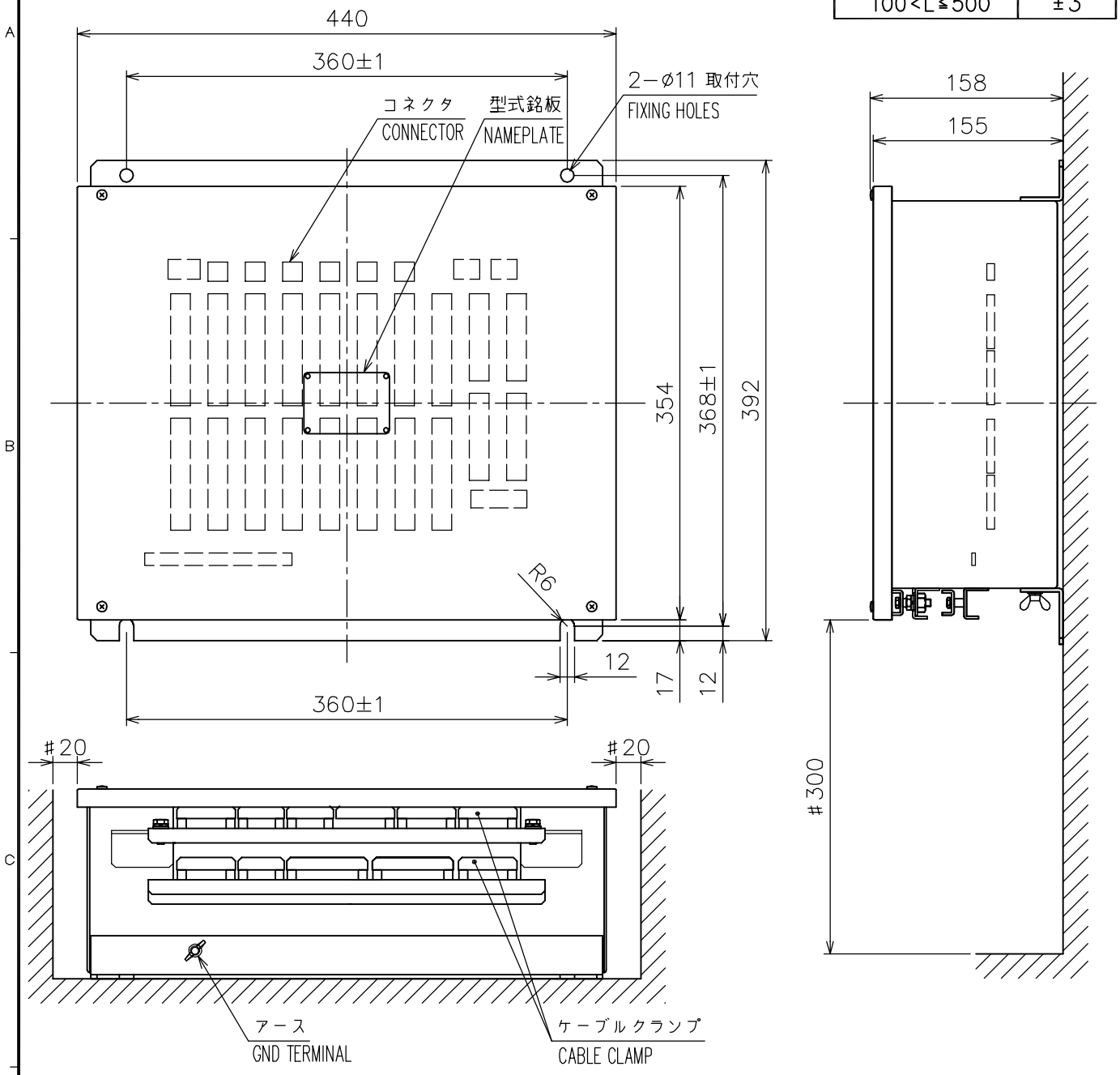
NOTE　1. #: MINIMUM SERVICE CLERANCE.
　　2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
　　3. USE TAPPING SCREWS ø4x16 FOR FIXING THE UNIT.

DRAWN Feb. 25 '05 T.YAMASAKI		TITLE VR-5011
CHECKED Feb. 25 '05 T.MATSUGUCHI		名称 マイクロフォン
APPROVED Feb. 25 '05 T.Matsuguchi	VR-5000	外寸図
SCALE 1/2 MASS 0.3 ±10% kg		NAME MICROPHONE
DWG.No. C4418-G04- E	14-058-991G-1	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



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

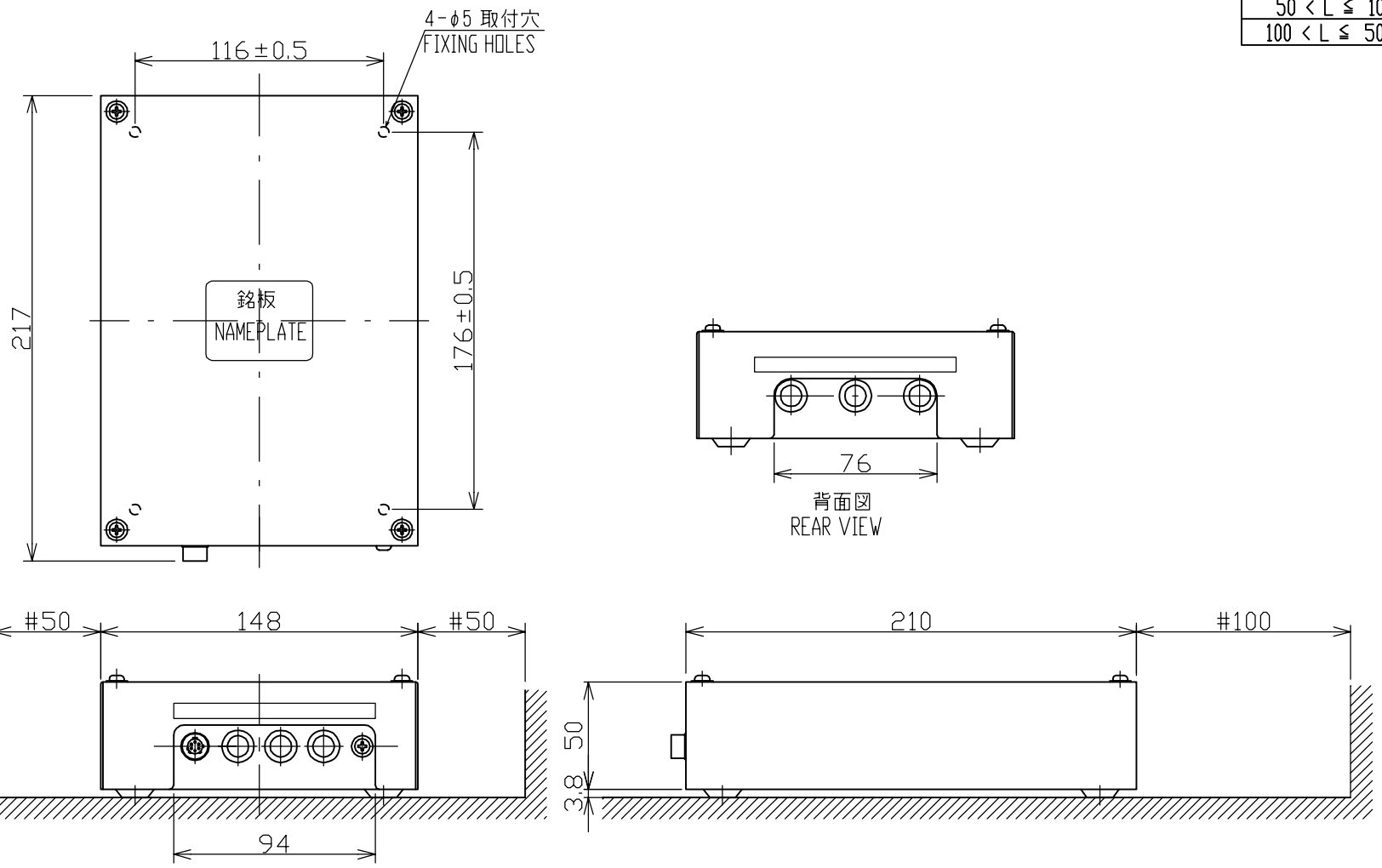
NOTE　1.　#: MINIMUM SERVICE CLEARANCE.
2.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3.　USE M10 BOLTS OR COACH BOLTS ø10 FOR FIXING THE UNIT.

DRAWN Apr. 27, '06 E.MIYOSHI		TITLE	IF-8530
CHECKED TAKAHASHI.T		名称	接続箱
APPROVED Y. Hatai	VR-3000/3000S		外寸図
SCALE 1/5	MASS 13.0 ±10% kg	NAME	JUNCTION BOX
DWG.No. C4437-G03- C	REF.No. 24-009-300G-3		OUTLINE DRAWING

FURUNO

表1 TABLE 1

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



注記
1）#印寸法は最小サービス空間寸法とする。
2）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. #: MINIMUM SERVICE CLEARANCE.
2. USE SELF-TAPPING SCREWS 4x20 FOR FIXING THE UNIT.

DRAWN Apr. 27, '06 E.MIYOSHI			TITLE IF-5200
CHECKED TAKAHASHI.T			名称 VHFインターフェイス
APPROVED Y. Hatai	VR-3000/3000S VR-5000		外寸図
SCALE 1/3	MASS 1.0 ±10% kg		NAME VHF INTERFACE
DWG No. C4418-G03-D			OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

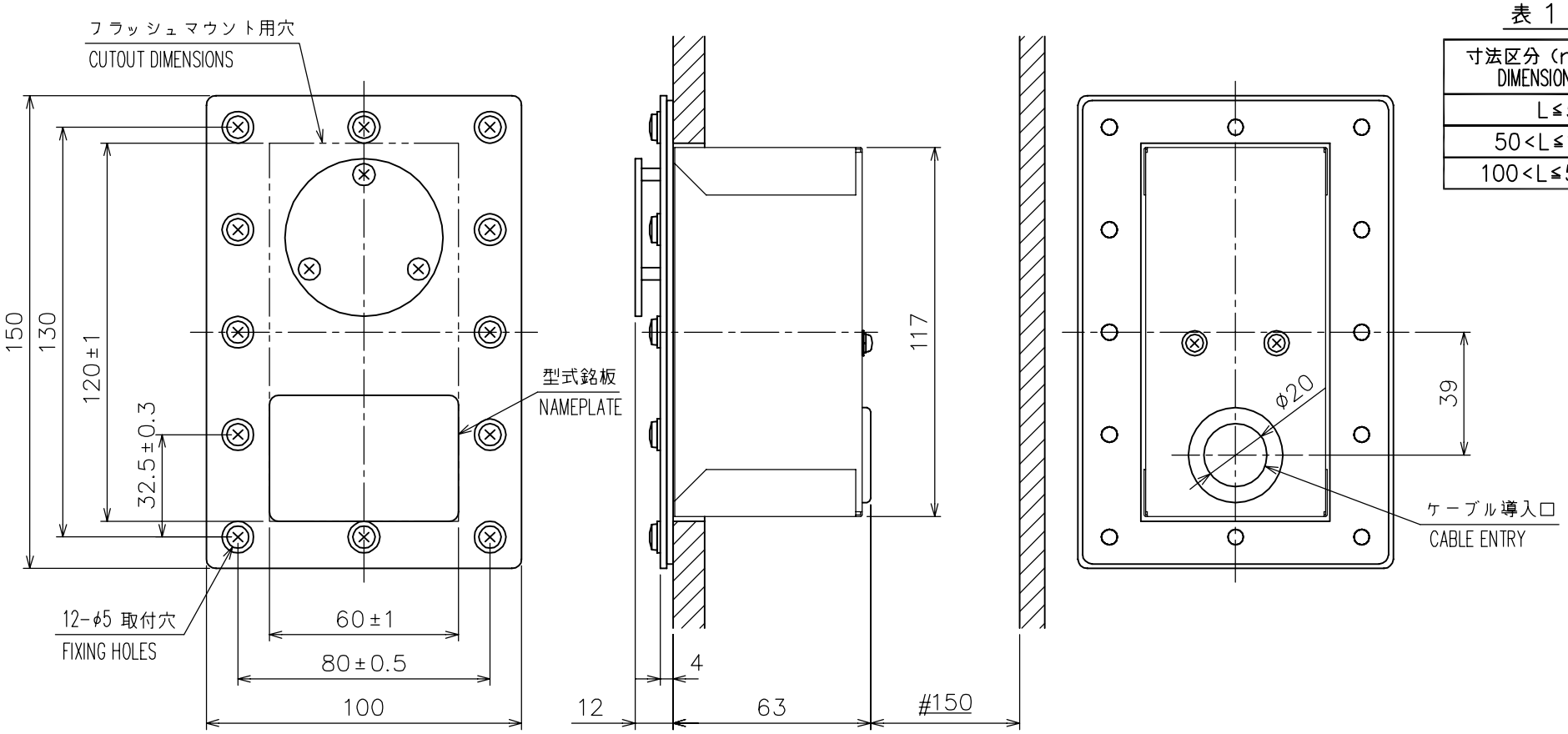
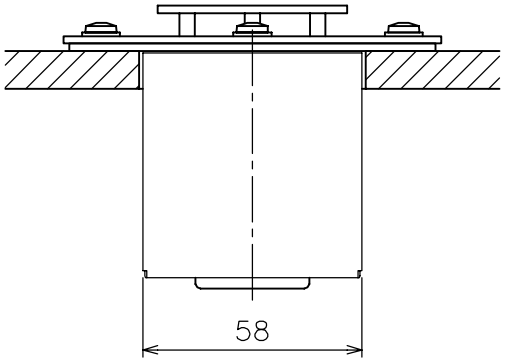


表 1 TABLE 1

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



注　記　1）＃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４×１６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 4x16 FOR FIXING THE UNIT.

DRAWN Jun. 2, '06 E. MIYOSHI		TITLE	VR-3012W
CHECKED TAKAHASHI. T		名称	防水型マイクロフォン（埋込装備）
APPROVED Y. Hatai	VR-3000		外寸図
SCALE 1/2 MASS 0.3 ±10% kg		NAME	WATERPROOF MICROPHONE (FLUSH MOUNT)
DWG No. C4437-G04-B	24-009-501G-1		OUTLINE DRAWING

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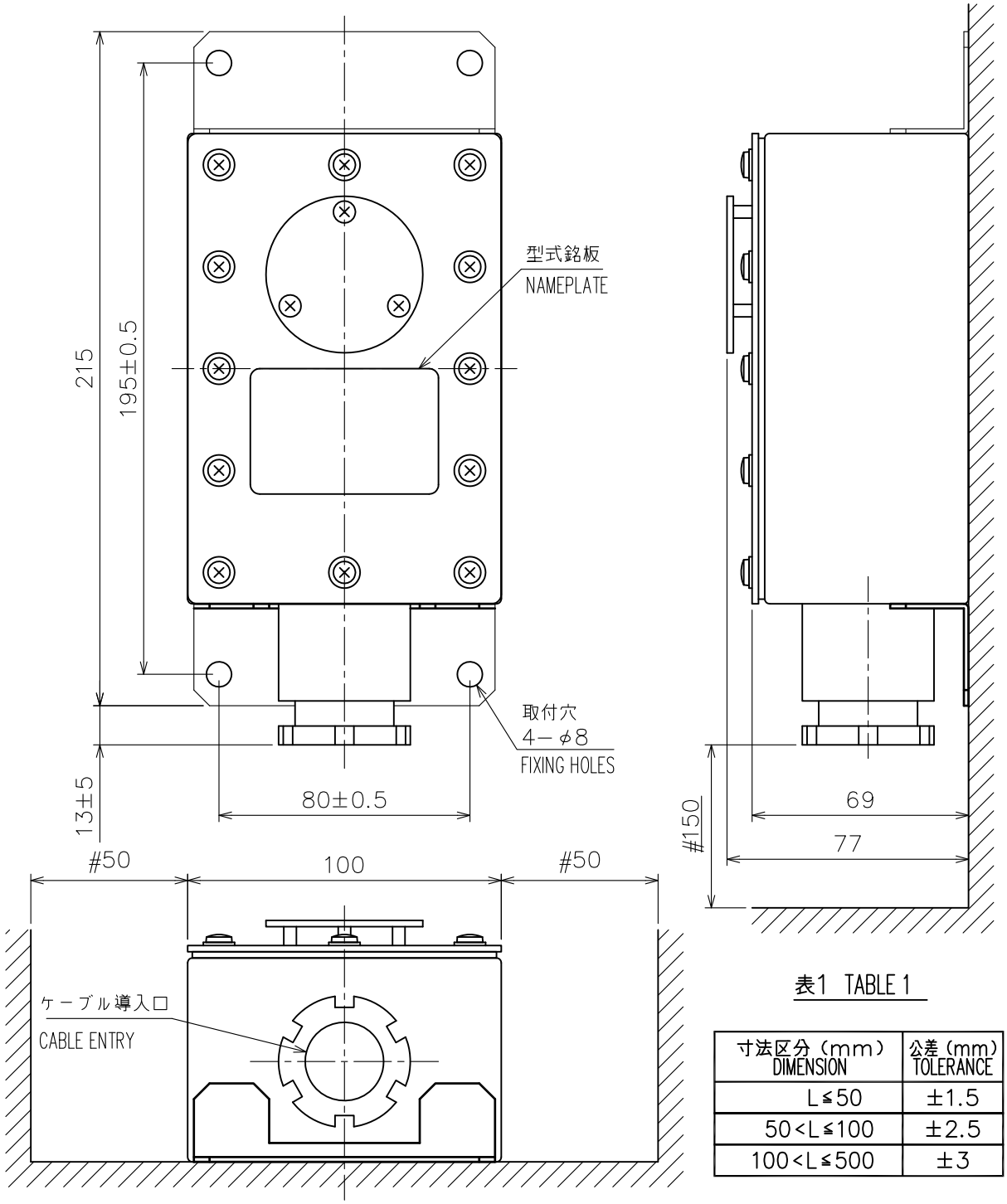


表1 TABLE 1

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

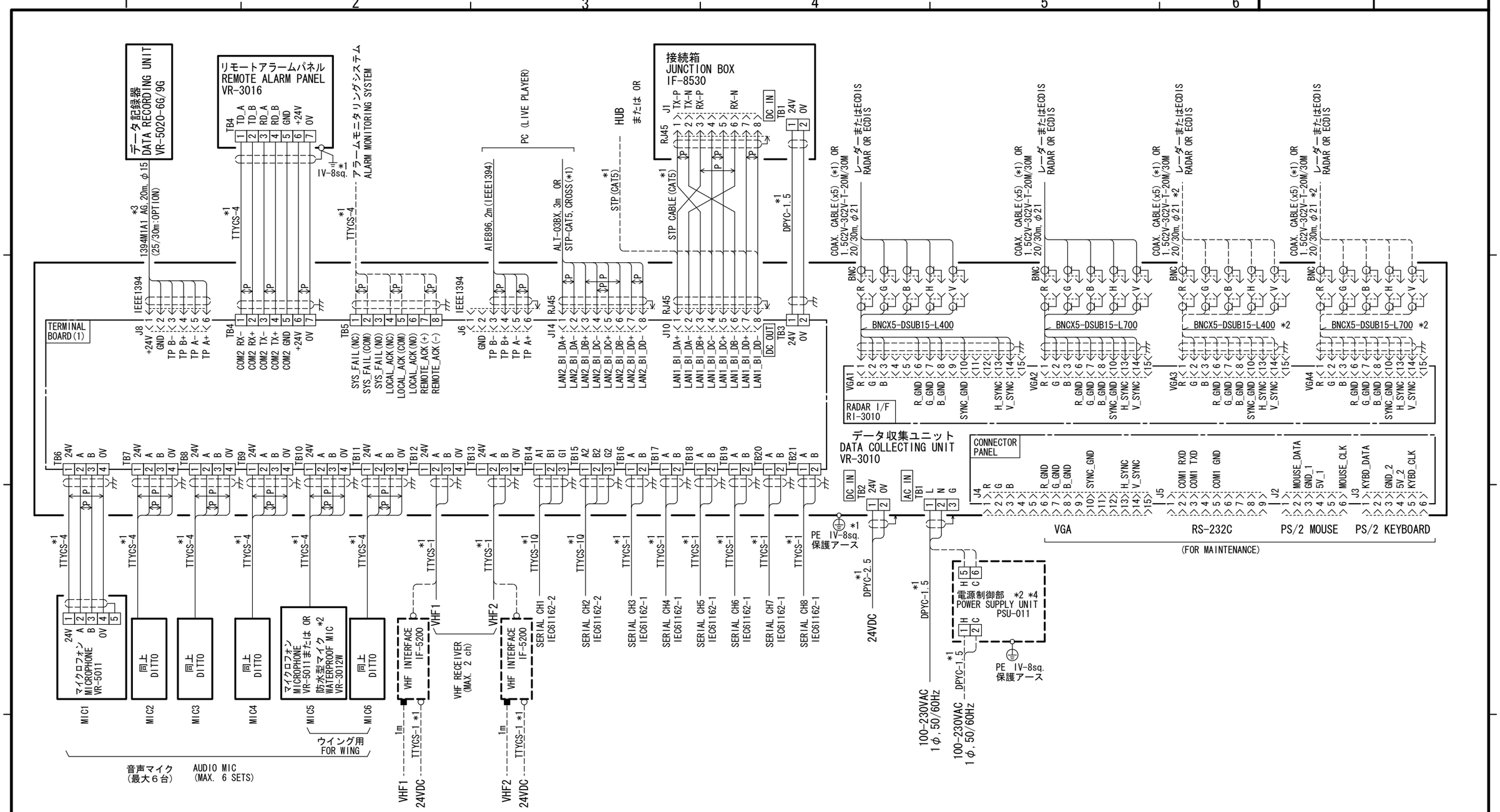
注 記 1） ＃印寸法は最小サービス空間寸法とする。
2） 指定外の寸法公差は表１による。
3） 取付用ネジはＭ６ボルト、またはコーチボルト呼び径６を使用のこと。

NOTE 1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M6 BOLTS OR COACH SCREWS ø6 FOR FIXING THE UNIT.

DRAWN 13/May/08 T.YAMASAKI		TITLE	VR-3012W
CHECKED 13/May/08 T.TAKENO		名称	防水型マイクロフォン（壁掛装備）
APPROVED 16/May/08 R.Esumi	VR-3000		外寸図
SCALE 1/2 MASS 0.9 ±10% kg		NAME	WATERPROOF MICROPHONE (BULKHEAD MOUNT)
DWG.No. C4437-G05- C	REF.No. 24-009-500G- 1		OUTLINE DRAWING

FURUNO

S-1



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）切断不可
＊４）ロシア仕様のみ。

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: NEVER CUT THE CABLE.
*4: FOR RUSSIAN SPECIFICATION ONLY.

DRAWN 28/Jan/2011 T.YAMASAKI			TITLE VR-3000
CHECKED 28/Jan/2011 H.MAKI			名称 航海情報記録装置
APPROVED 9/Feb/2011 Y.NISHIYAMA			相互結線図
SCALE	MASS kg		NAME VOYAGE DATA RECORDER
DWG No. C4437-C01- K	REF. No.		INTERCONNECTION DIAGRAM

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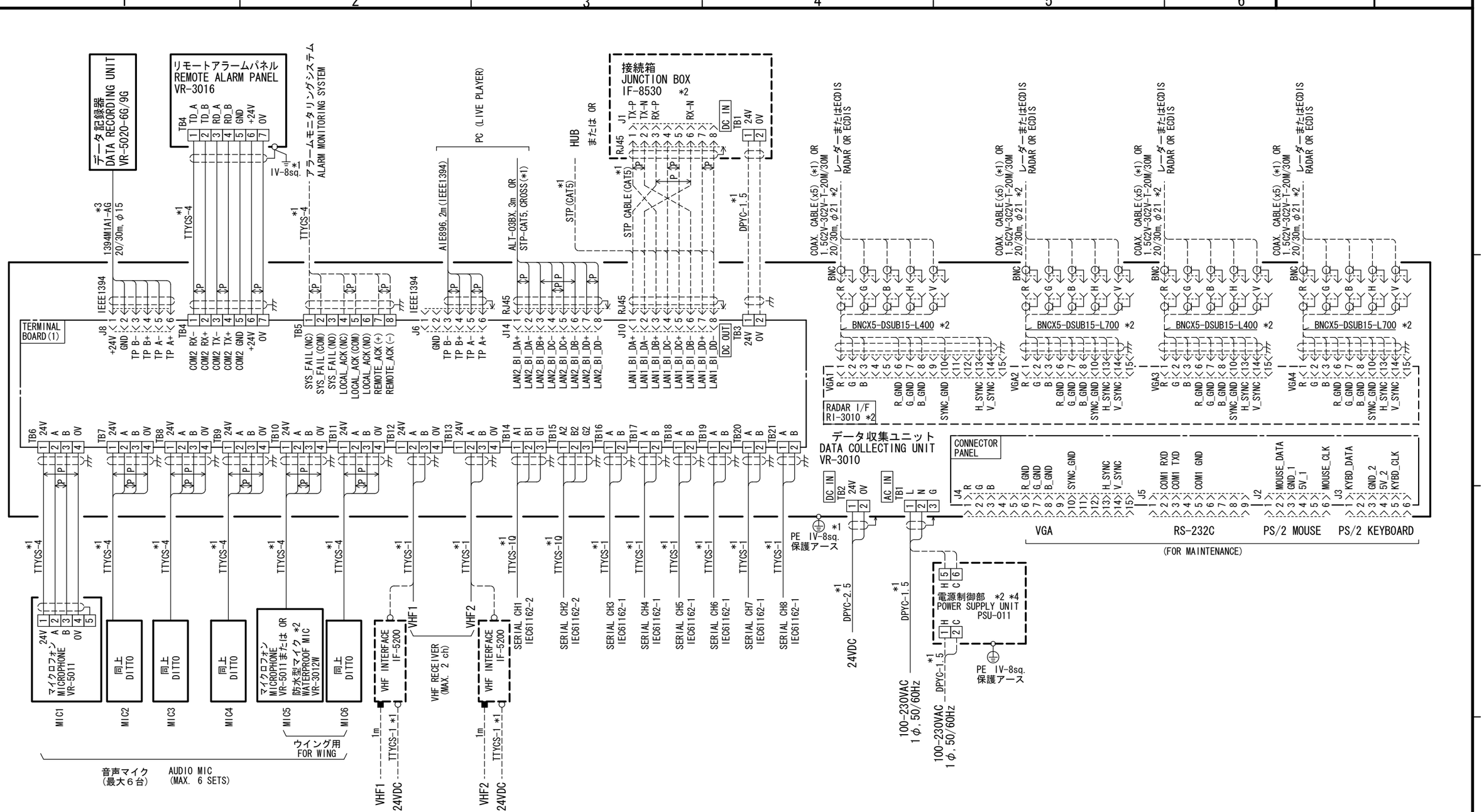
FURUNO

S-2



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）切断不可
＊４）ロシア仕様のみ。

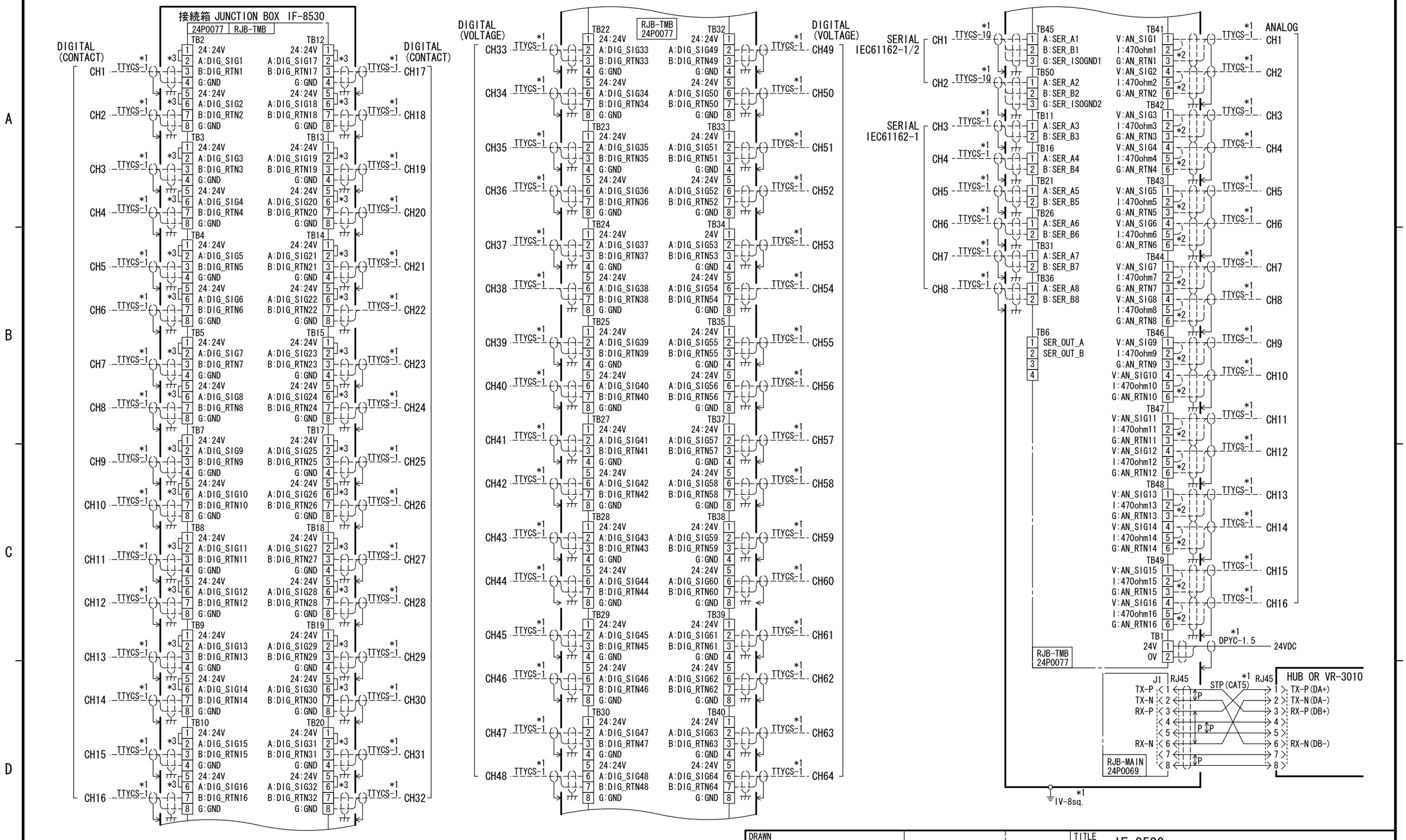
NOTE
*1. SHIPYARD SUPPLY.
*2. OPTION.
*3. NEVER CUT THE CABLE.
*4. FOR RUSSIAN SPECIFICATION ONLY.

DRAWN 22/Feb/2011 T. YAMASAKI			TITLE VR-3000S
CHECKED 22/Feb/2011 H. MAKI			名称 簡易型航海情報記録装置
APPROVED 22/Feb/2011 Y.NISHIYAMA			相互結線図
SCALE	MASS kg		NAME SIMPLIFIED VOYAGE DATA RECORDER
DWG No. C4436-C01- J	REF. No.		INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

FURUNO

S-3



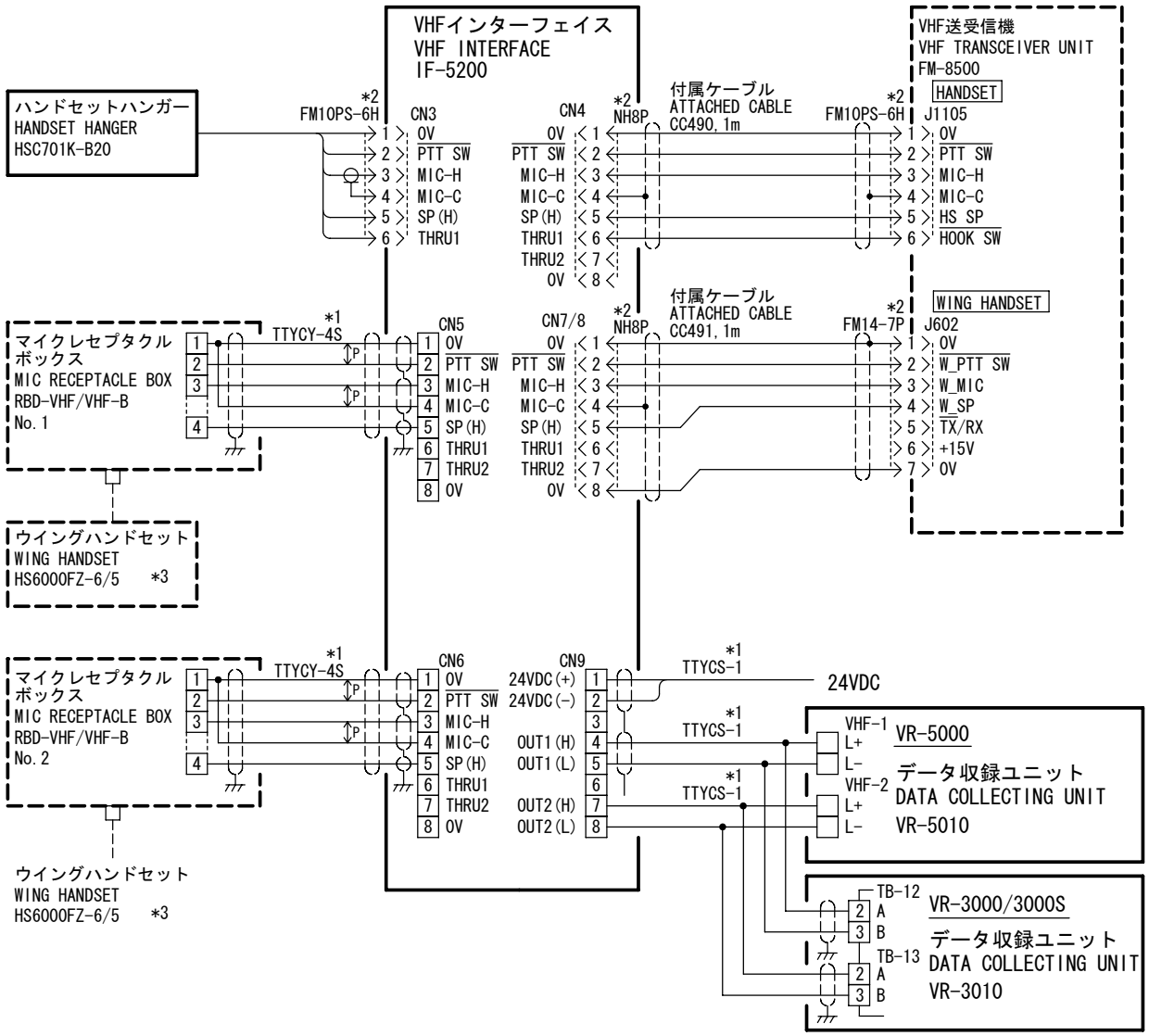
各信号の接続に関しては造船所/船主との事前打合せが必要です。
注記
＊１）造船所手配。
＊２）入力信号が4-20mAの場合はV-I間をショートすること。
＊３）接点信号接続用に24V-A端子間にジャンパー取付済。
　　電圧信号接続時は設定を変更する。

CONSULT WITH SHIPOWNER AND/OR SHIPYARD ABOUT CONNECTION OF DEVICES.
NOTE
*1: SHIPYARD SUPPLY.
*2: SET JUMPER BETWEEN I AND V FOR 4-20mA SIGNAL.
*3: JUMPER SET BETWEEN 24V AND A-TERMINAL AT FACTORY.
MODIFY SETTING TO CONNECT A VOLTAGE LINE.

DRAWN 28/Jan/2011 T.YAMASAKI			TITLE IF-8530
CHECKED 28/Jan/2011 H.MAKI			名称 接続箱
APPROVED 9/Feb/2011 Y.NISHIYAMA		VR-3000/3000S	相互結線図
SCALE	MASS kg		NAME JUNCTION BOX
DWG No. C4437-C02- J		REF. No.	INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

FURUNO

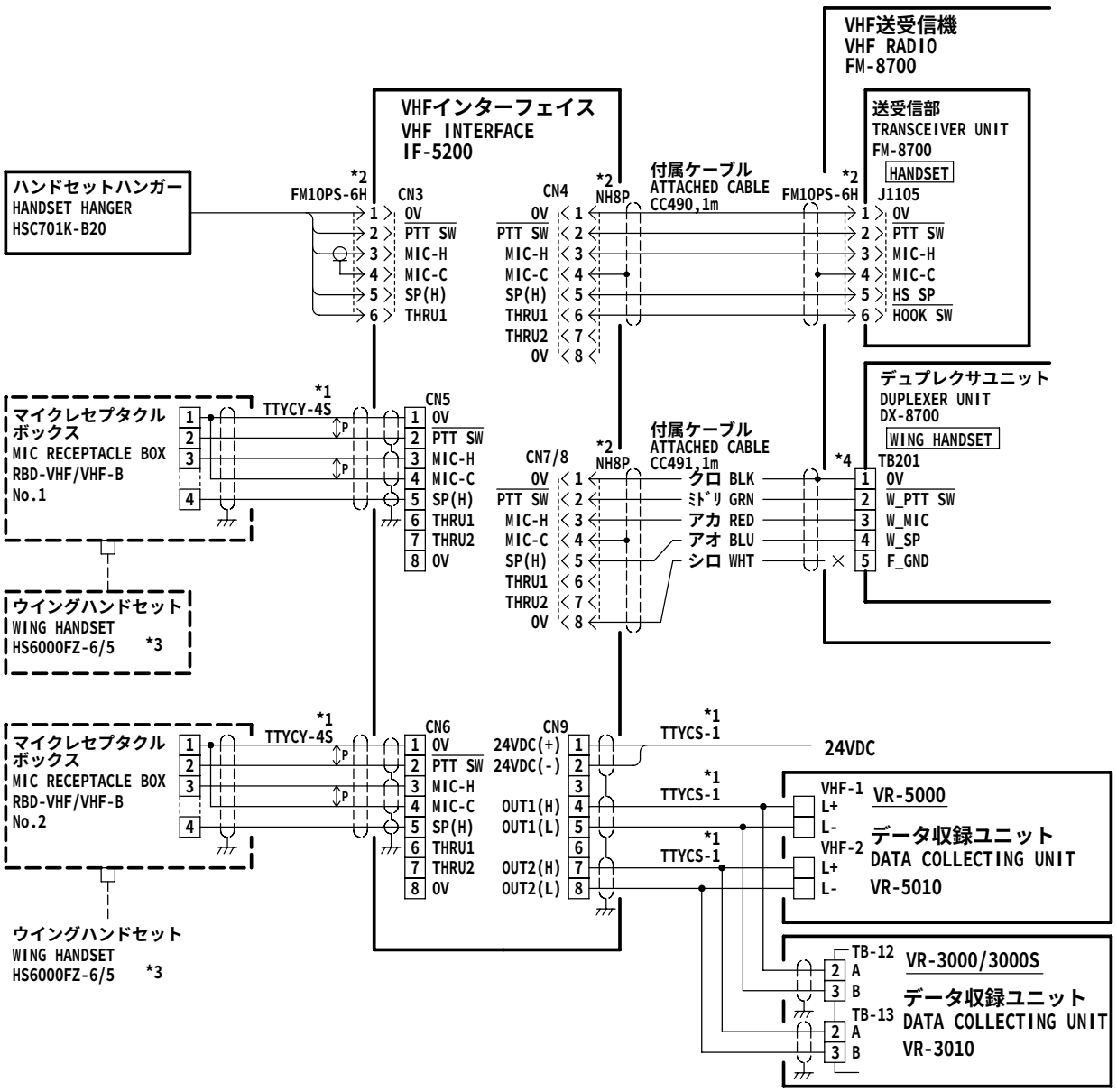


注記
＊１）造船所手配。
＊２）工場にて取付済み。
＊３）1台のウイングハンドセットを共用する。

NOTE
*1. SHIPYARD SUPPLY.
*2. FITTED AT FACTORY.
*3. ONE WING HANDSET IS USED IN COMMON.

DRAWN MAY 23, '06 E.MIYOSHI		TITLE	IF-5200 (W/FM-8500)
CHECKED TAKAHASHI.T		名称	VHFインターフェイス
APPROVED Y. Hatai			相互結線図
SCALE / MASS kg		NAME	VHF INTERFACE
DWG. No. C4418-C02- J			INTERCONNECTION DIAGRAM

FURUNO

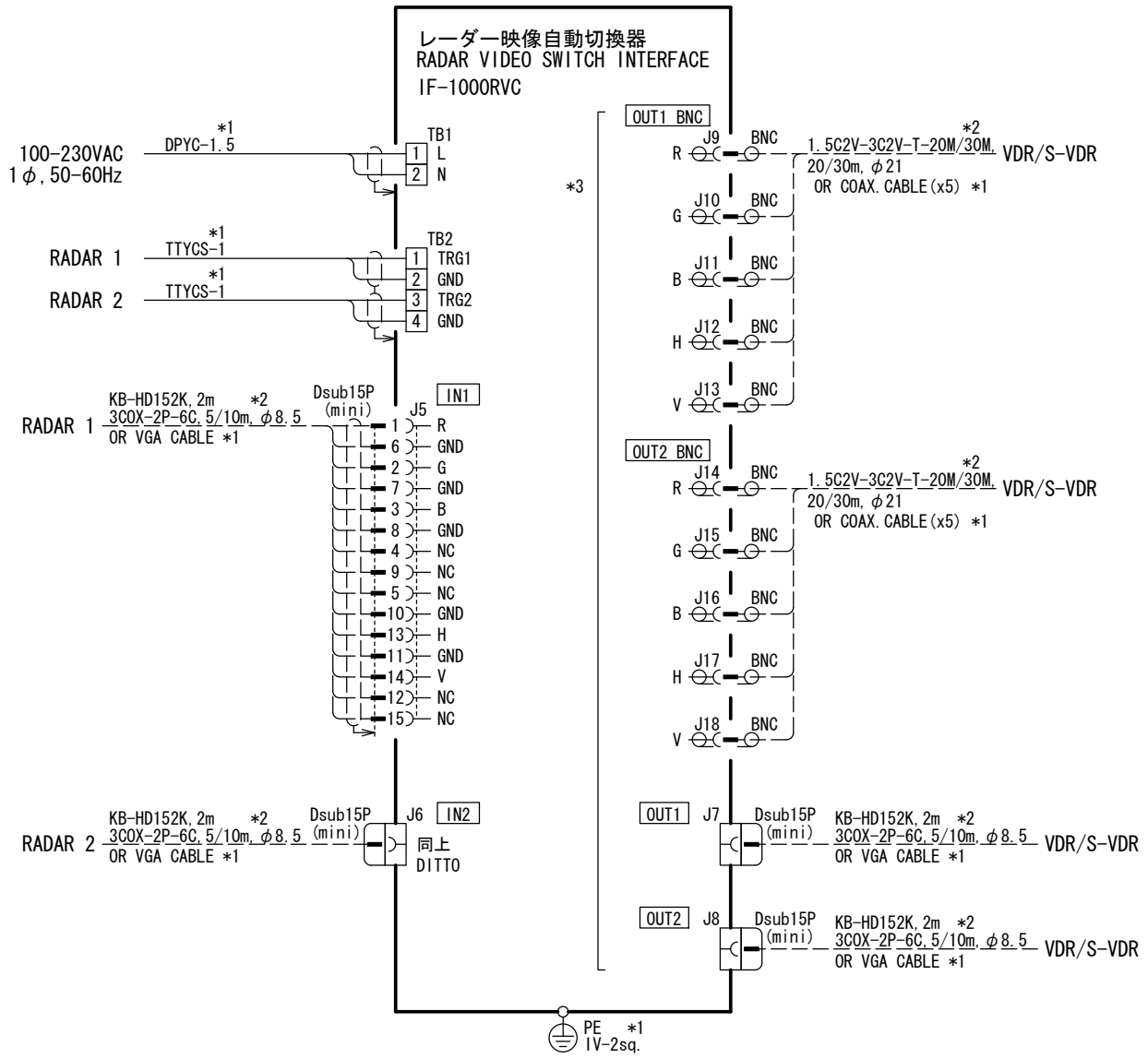


注記
＊1）造船所手配。
＊2）工場にて取付済み。
＊3）1台のウイングハンドセットを共用する。
＊4）コネクタプラグを取り外して結線する。

NOTE
*1. SHIPYARD SUPPLY.
*2. FITTED AT FACTORY.
*3. ONE WING HANDSET IS USED IN COMMON.
*4. CONNECT CORES AFTER REMOVE CONNECTOR PLUG.

DRAWN Jun. 26,'06 E.MIYOSHI		TITLE	IF-5200 (W/FM-8700)
CHECKED TAKAHASHI.T		名称	VHFインターフェイス
APPROVED Y.Hatai			相互結線図
SCALE / MASS kg		NAME	VHF INTERFACE
DWG.No. C4418-C03- K			INTERCONNECTION DIAGRAM

FURUNO



注記
＊１）造船所手配。
＊２）オプション。
＊３）出力はBNCまたはDsubのいずれかを選択。（内部設定）

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: SELECT BNC OR D-SUB OUTPUT. (MODIFY INNER SETTING)

DRAWN 8/May/08 T.YAMASAKI		TITLE	IF-1000RVC
CHECKED 8/May/08 T.TAKENO		名称	レーダー映像自動切換器
APPROVED 16/May/08 R.Esumi	VR-5000/3000		相互結線図
SCALE / MASS kg		NAME	RADAR VIDEO SWITCH INTERFACE
DWG. No. C4418-C06- A	REF. No. 24-009-5050-0		INTERCONNECTION DIAGRAM