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FURUNO

INSTALLATION MANUAL

VOYAGE DATA RECORDER

MODEL VR-5000

(Serial No. 1001 or greater)

FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN

ECF
(Elemental Chlorine Free)
The paper used in this manual
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FURUNO Authorized Distributor/Dealer

 Printed in Japan

Pub. No. IME-44180-H

(TATA) VR-5000

FIRST EDITION :AUG. 2003
H : JUL. 27, 2006

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⚠ SAFETY INSTRUCTIONS

⚠ WARNING

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

Only qualified personnel should work inside the equipment.

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

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

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.

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

Connection of an incorrect power supply can cause fire or damage the equipment. The voltage rating of the equipment appears on the label above the power connector.

⚠ CAUTION

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

	Standard compass (m)	Steering compass (m)
DCU	2.50	1.60
DRU	1.10	0.65
Microphone	0.55	0.35
VHF I/F unit	0.75	0.50
RAP	0.75	0.50

Attach securely grounding to the ship's body.

The grounding is required to prevent electrical shock.

CONTENTS

EQUIPMENT LIST

Standard supply

Unit	Type	Code No.	Q'ty	Remarks
Data Recording Unit (DRU)	VR-5020-6G	-	1	6 GB for connection of single radar
	VR-5020-9G	-		9 GB for connection of two radars
Data Collecting Unit (DCU)	VR-5010	-	1	Including 40 GB removable hard disk
Remote Alarm Panel (RAP)	VR-5016	-	1	
Bridge Microphone	VR-5011	000-040-829	1	
Installation Materials	CP24-00215	004-379-590	1	For DCU
	CP24-00216	004-379-960	1	For RAP
	CP24-00200	000-040-833	1	IEEE1394 Cable 1394M1A1, L=30 m
	CP24-00211	004-379-590	1	For DCU
Spare Parts	SP24-00201	004-554-540	1	Two fuses for 10 A

Optional supply

Unit	Type	Code No.	Q'ty	Remarks
Remote Junction Box (RJB)	IF-8502 or IF-8510	-	1	
Repeater	VR-5025	004-379-630	1	For extending Firewire cable > 30 m
Watertight Box	VR-5012	-		For microphone
VHF Interface Unit	IF-5200	-	1 (2)	To combine mic and loudspeaker lines
Removable Hard Disk	VR-5014	004-379-600		40 GB
Battery	VR-5015	004-381-310	1 set	Two batteries
Microphone	VR-5011	000-040-830	1	Max. 6
RS PCB	OP24-6	004-381-210	1	RS-422 board
RS PCB/Cable	OP24-7	004-381-230	1	RS-422 board w/1.5 m cable
Mic. w/watertight box	VR-5011/ 5012	000-040-472	1	
Live player pro kit	VR-5033-J	004-381-260	1	w/Japanese Manual
	VR-5033-E	004-381-270		w/English Manual
RS PCB	OP24-10	004-381-910	1	RS-422 board 99033-8 (For V3.00)
RS PCB & cable	OP24-11	004-381-930	1	RS-422 board 99033-8 & cable DB37-HD78
SDRAM DIMM 256M	OP24-9	004-381-950	1	Available from Jan. 2006

SYSTEM CONFIGURATION

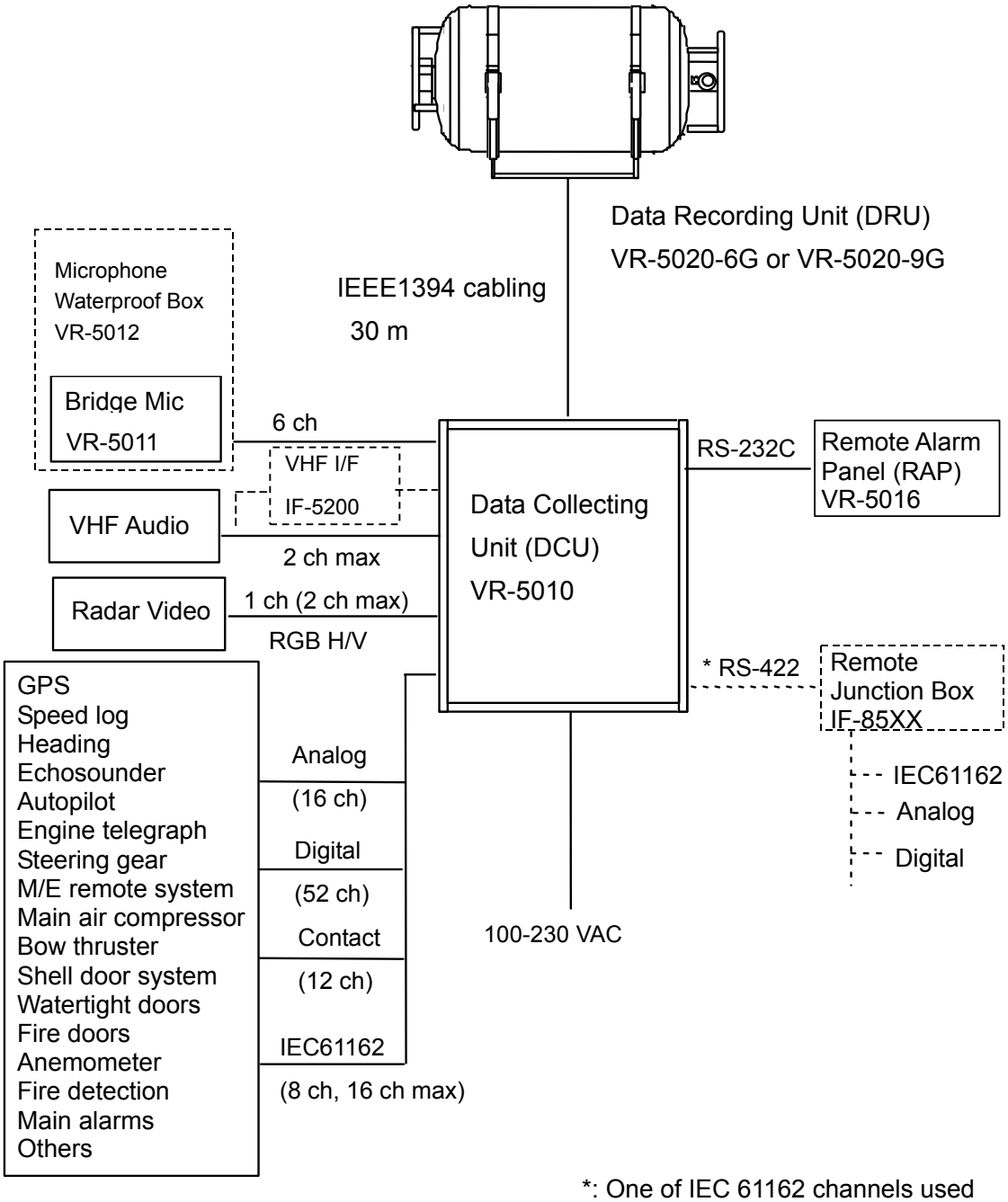


Fig. A System Configuration of VR-5000

Environmental category

DCU, RAP	Protected from weather
DRU	Exposed to weather
Microphone	Protected from weather
VHF I/F unit	Protected from weather

Chapter 1 INSTALLATION

The basic VDR consists of Data Collecting Unit (DCU), Data Recording Unit (DRU) in the protective capsule, six microphones and Remote Alarm Panel (RAP) which indicates the status of the system remotely. Some optional units are available to enhance the basic performance. For example, Remote Junction Box can minimize the cable run and increase the number of the input port, and VHF interface IF-5200 can combine 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 a new data is entered.

The VDR operates on 115/230 VAC mains and 24 VDC power supply. In case of ship's mains failure, backup batteries is used for recording bridge audio for 2 hours. The system configuration of VR-5000 is shown on the next page.

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

1.1 INSTALLING DATA COLLECTING UNIT (DCU)

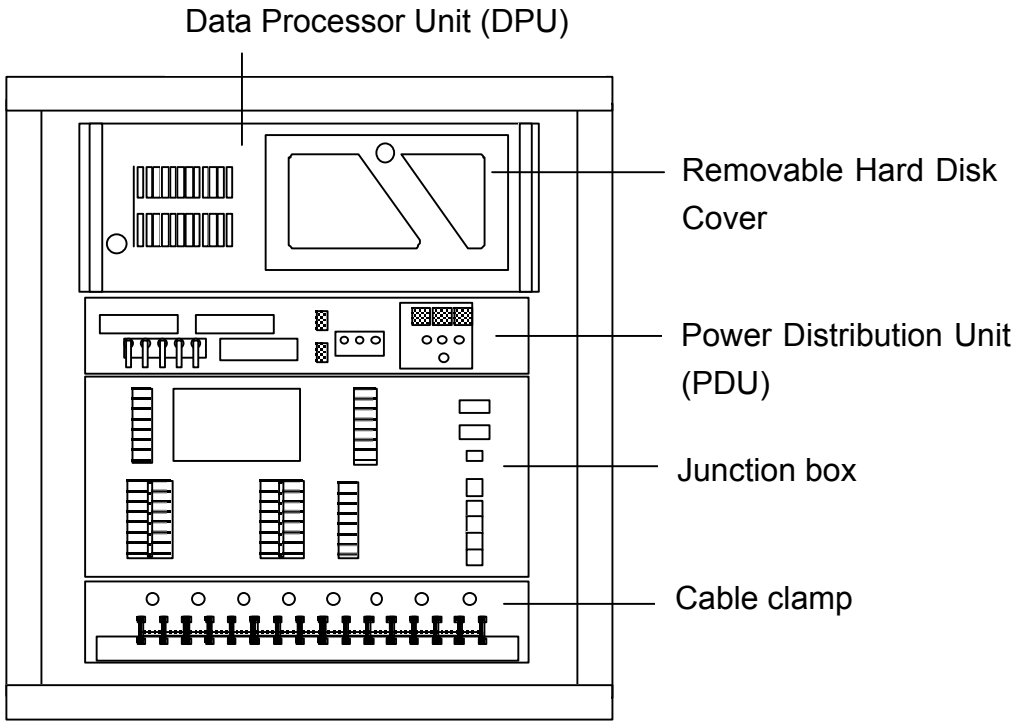
The Data Collecting Unit (DCU), designed for indoor installation, is mounted in a place convenient for connection with relevant sensors and associated devices. The DCU is mounted onto the shock absorber (the figures on next page).

General considerations

Mount the DCU where it is,

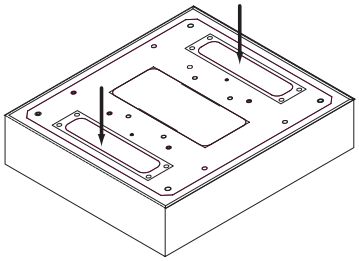
- out of direct sunlight and away from heat sources,
- away from places subject to water splash and rain,
- A magnetic compass will be affected if the DCU is placed too close to the magnetic compass. Observe the compass safe distances on page I to prevent deviation of a magnetic compass.
- 300 mm clearance is required at least either side of the DCU.

There are two cable entries front and rear on the bottom panel. Cover the unused cable entry to prevent a mouse from entering.



Data Collecting Unit (DCU)

1.1.1 Mounting



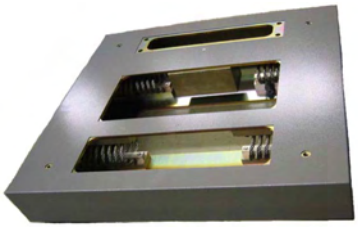
Caution

To install the shock absorber, insert your fingers in the holes marked by arrows and lift.

Lifting by the sides may cause the body of shock absorber drop out of the cover because they are not attached to one another tightly.

The DCU is fixed by using four holes in the bottom plate onto the supplied shock absorber with four M10 bolts as follows. Fix the shock absorber onto the DCU mounting base arranged by the shipyard with four M10 bolts, put the cover over the shock absorber, fix the cover with supplied screws, and then fix the DCU to the shock absorber.

(a) Without cover



(b) With cover

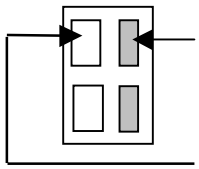
Shock absorber for DCU

1.1.2 Connection

All sensor cables except for radar video are connected to the terminals and connectors on the junction box in the DCU. The Terminal Board is Wago spring-catch terminal blocks for leads of up to 2.5 mm^2 or AWG 14 wires.

Each terminal block has a pair of holes. Insert the lead fitting tool into a hole corresponding to the counterpart hole where a lead is to be inserted. When the lead is inserted in the terminal block, remove the lead tool. Make sure the lead is securely retained in the holder.

Lead fitting tool is fixed to the right on the Terminal Board in the DCU.



Step 1. Insert the lead fitting tool into the right hole.

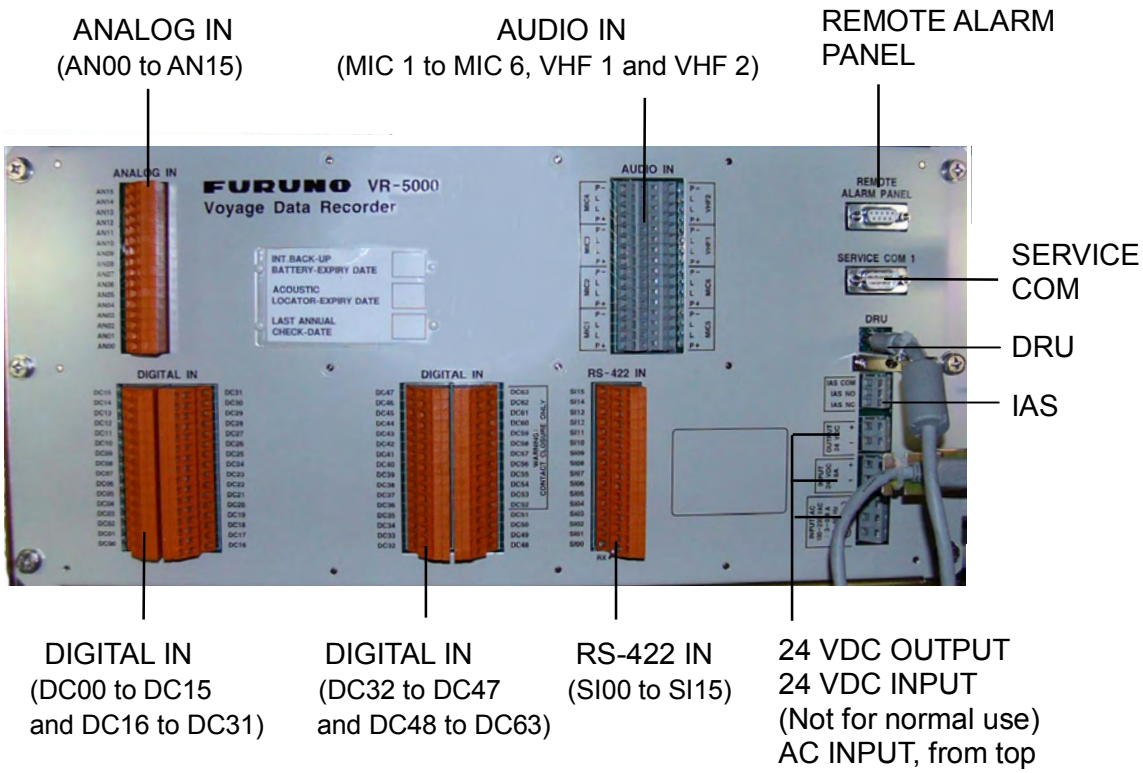
Step 2. Insert the stripped wire into the counterpart hole.

Step 3. Remove the tool. Assure the wire is securely retained.

Location of Lead Fitting Tool (Far right of junction box)

Refer to the interconnection diagram for details of right pins on the terminal boards.

Caution
Turn off the DCU before making connections.



Terminals and Connectors on Junction Box in DCU

The DCU and Data Recording Unit (DRU) are connected with the supplied IEEE1394 or 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 run the cable accordingly.

*FireWire is the trademarked name of Apple which originally developed a very fast external bus technology that supports data transfer rates of up to 400Mbps.

Table describes the function of connectors.

Table - Terminals and connectors on TB

Connector/TB	Signal/Unit to be connected
ANALOG IN	Analog signal, 16 channels
AUDIO IN	Bridge audio, 6 channels and VHF audio, 2 channels
DIGITAL IN	Digital signal, 64 channels (52 channels for voltage signal and 12 channels for contact-closure signal)
RS-422 IN	IEC 61162 serial data 8 channels (standard) 16 channels (max.)
REMOTE ALARM PANEL	Remote alarm panel
SERVICE COM 1	PC for servicing and setting up
DRU	Data recording unit (**Turn off the unit before connection.)**
IAS	Integrated Alarm System
OUTPUT 24 VDC	Optional remote junction box (max 15A)
INPUT 24 VDC	24 VDC
INPUT AC	Ship's mains

1.1.3 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, aligning bottom edge of card holder with bottom edge of door.

1.2 INSTALLING DATA RECORDING UNIT (DRU)

The Data Recording Unit (DRU) includes 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. Making a guard around the DRU is recommended.

Precautions for installing the capsule

.1 Must be separated from fuel or other potential fire hazards

.2 Must be separated from probable sources of mechanical damage

.3 Avoid direct sunlight as much as possible

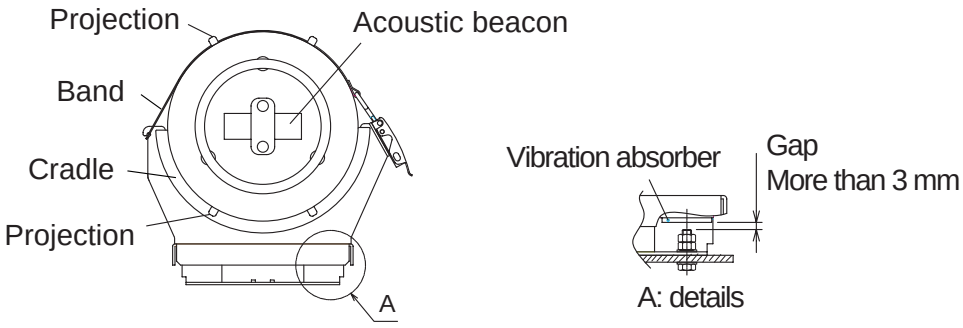
.4 Must be installed in a place that facilitates routing maintenance and copying of recorded data

.5 Must be installed where a diver or remote operated vehicle could remove and retrieve

.6 There should be a clear and unobstructed area around the DRU to allow a diver or an ROV to work

1.2.1 Mounting

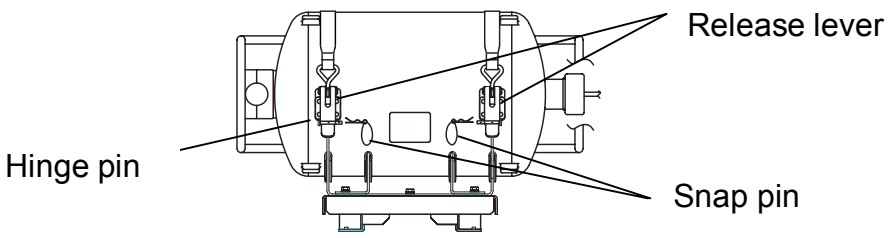
The Data Recording Unit comes with the mounting bracket fitted. Request to a shipyard to construct a mounting base of the DRU. On the mounting base, mount the bracket with M8 bolts and nuts (double nuts). The gap between vibration absorber and bolt should be at least 3mm.



Note: If you once detach the main body from the mounting bracket, fix the main body as shown in the figure above so that acoustic beacon should be 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.



1.2.2 Connection

The DRU is connected to the DCU connector with a non-halogen IEEE 1394 (FireWire) cable, 30 m with IEEE1394 connectors factory-fitted at both ends. The connector is labeled “DCU” and “DRU” respectively.

The cable can be extended to a maximum of 70 m by using an optional repeater and additional 40 m IEEE1394 cable.

The IEEE1394 cable from the DCU is connected to the Data Recording Unit by following the steps below:

.1 Unscrew the cap nut.

.2 Remove and discard the dummy cable.

.3 **Be sure that IEEE1394 plug is marked “DRU” and latches on the plug are cut off.** If not, the plug cannot be disconnected easily because of limited space.

.4 Remove the waterproofing cap of this cable and pass the cable through the cap nut.

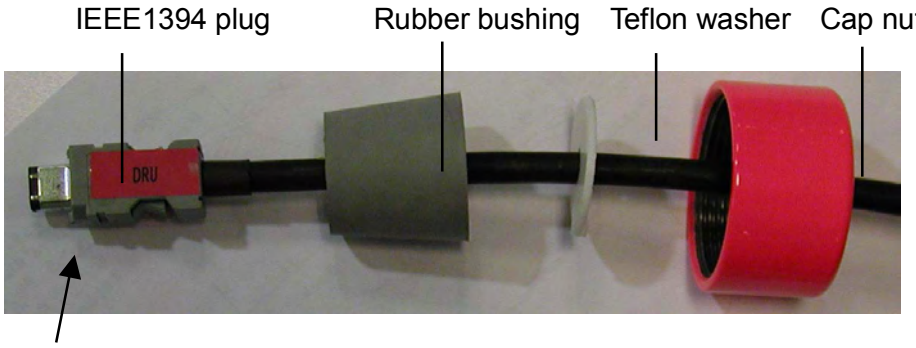
.5 Put the Teflon washer and the rubber bushing as shown below.

.6 Coat the rubber bushing, screw part of the cap nut and contact part of the cable with rubber bushing, with silicone grease.

.7 Insert the IEEE1394 plug into the receptacle.

.8 Slide the bushing down until it fits in position tightly.

.9 **Hand-tighten** the cap nut firmly.



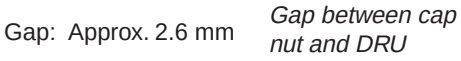
Coat with silicone grease: •Screw part of cap nut
•Rubber bushing
•Contact part of cable with rubber bushing

Placing rubber bushing and Teflon washer

Coat surface of teflon washer with supplied silicone sealant and where cable enters DRU.

How to tighten cap nut

Tighten DRU cap nut until one or two threads are visible. DO NOT tighten cap until end of thread.



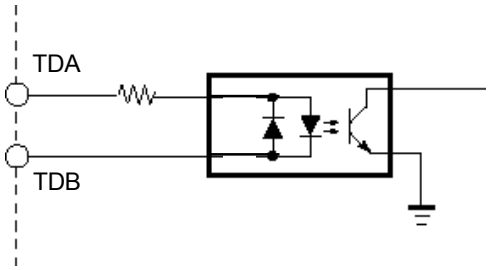
Coat thorougly with silicone sealant for waterproofing.

Waterproofing and cable protection

1.3 CONNECTION OF SENSOR CABLE

1.3.1 IEC 61162 serial data

RS-422 IN terminal board provides eight channels to receive IEC 61162 digital data. Receivable are *all IEC 61162 sentences* and binary data, but at least ZDA or GNA is necessary for stamping date and time. The GPS receiver is connected to channel SI00 generally. Channels, SI08 to SI15 are optional. An optional remote junction box is connected to the DCU through RS-422 interface.



RS-422 interface circuit in VR-5000

1.3.2 Non-IEC 61162 signal

.1 Analog

4 to 20 mA, 0 to 10 V and –10 to +10 V signals can be connected to ANALOG IN terminal board of 16 channels (AN00 to AN15). Input voltage (current) range is set by "Web-Configuration" software.

Voltage signal

The voltage between two input terminals is 24 V or less. (The A/D converter in the Analog interface circuit has input voltage range of ±12V.)

Current signal

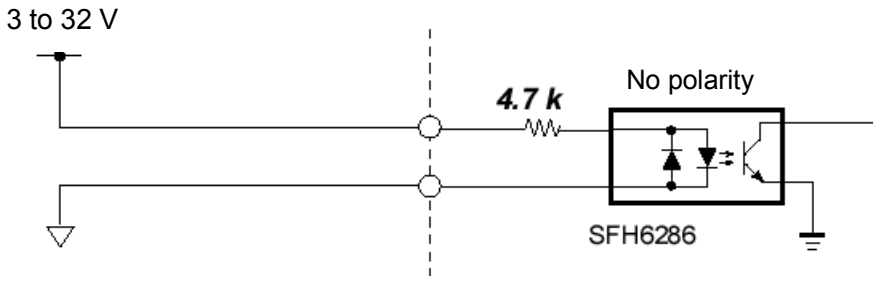
When 4 to 20 mA current signal is connected to ANALOG IN terminal board, a 470-ohm resister, 1/2 W or 1 W must be connected across the input of the corresponding ANALOG IN channel to convert the current signal to the voltage signal. See the figure below.

Connection of 4 to 20 mA current signal

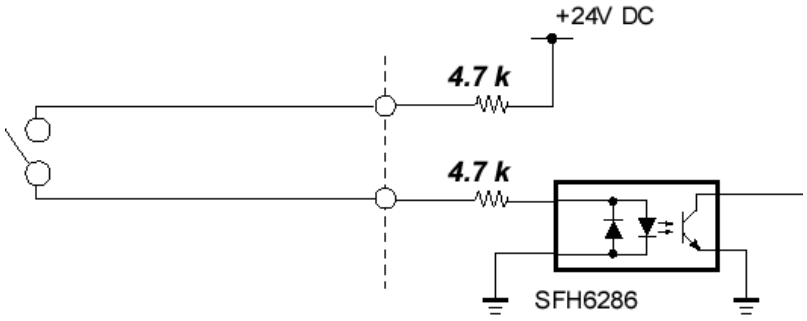
.2 Digital (Voltage and Contact-closure)

Two DIGITAL IN terminal boards are used to connect voltage and contact-closure signals. Galvanic-isolated 52 channels, DC00 to DC51, are used for voltage signal and 12 channels, DC52 to DC63, for contact-closure signal. Range of input voltage is 3 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.

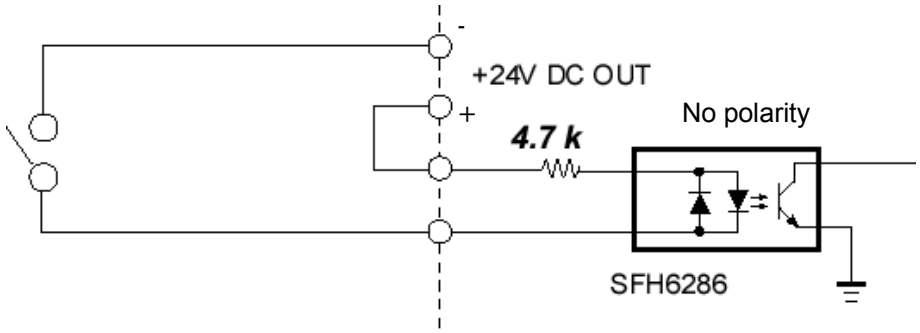


Interfacing of “voltage” signal (DC00 to DC51)

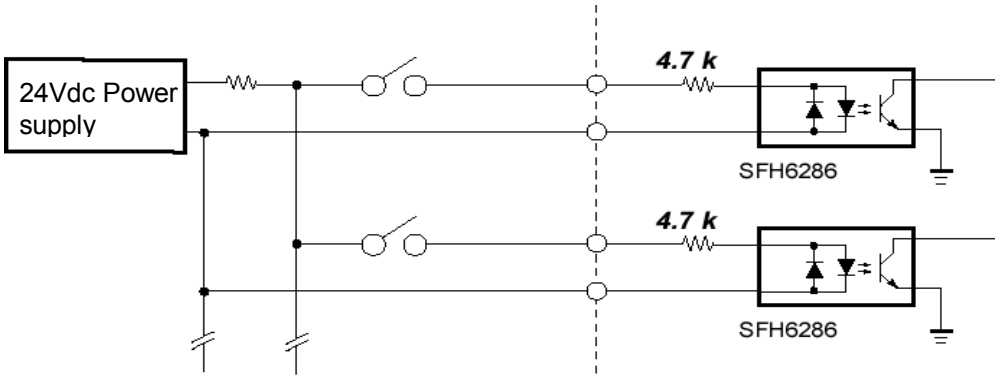


Interfacing of “contact-closure” signal (DC52 to DC63)

Contact-closure signal can be connected to the voltage source terminal, DC00 to DC51 in the following circuit.

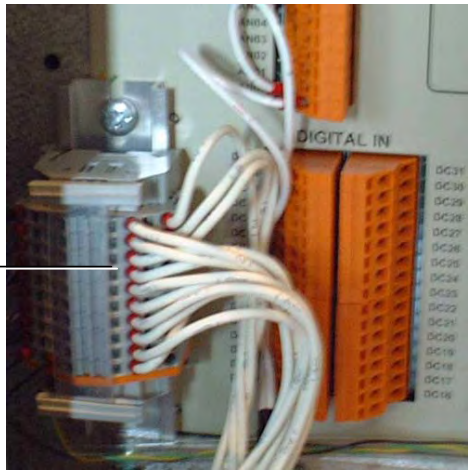


Dry contact connection to DC00 to DC51



Dry contact connection to DC00 to DC51
(Using external power supply)

The right figure shows an example of the terminal board (locally arranged) to distribute 24 VDC to contact-closure sensors.



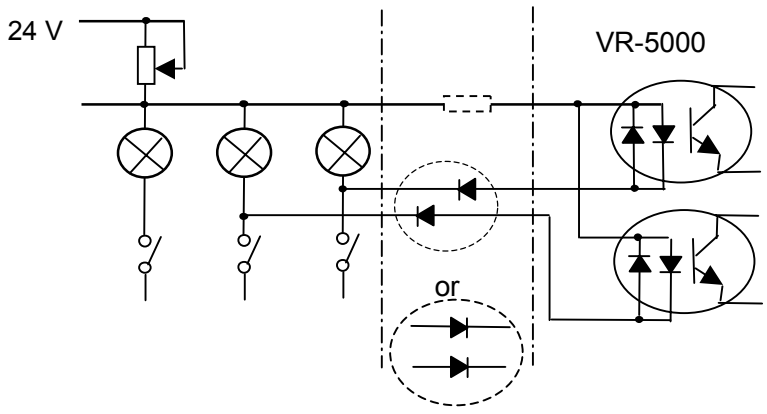
Terminal board (locally arranged) to distribute 24 VDC.

Example of Terminal Board for distribution of 24 VDC

Contact-closure signal

Generally, VR-5000 is connected to a lamp in the mimic panel in parallel to obtain a contact-closure signal. When the status indicator panel provides a dimmer control, a diode must be used as shown in the figure below. Otherwise, active lamp leads another lamp to be on when lamps are dimmed. Adding a resistor, instead of the diode, is another method.

There are hundreds of fire doors in a passenger ship. These are grouped in area to reduce the signal line to the VDR. To do so, confirm with the ship classification society.



Connection of VDR to lamps in fire door mimic panel

1.4 RADAR RGB VIDEO

Interlaced or non-interlaced radar video is connected to video connector VD1 on the PDU by 75-ohm coaxial cable. The VD1 connector includes R, G, B, Hs and Vs connectors of BNC type. The system supports separate sync, sync-on-green (SOG), 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. 80 kHz, positive or negative

.3 Vertical sync signal: Max. 75 Hz

Receivable resolution is 640x480 to 1280x1024 as shown in table below.

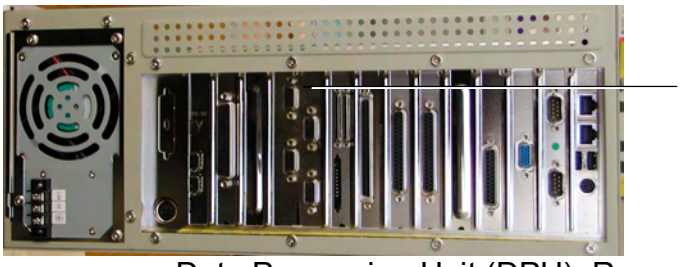
(a)	VGA:	640 x 480	(g)	FR-15x5M3 series:	1024 x 780
(b)	Wide VGA:	852 x 480	(h)	FAR-28x5 series:	1066 x 800*
(c)	CCIR:	738 x 576	(i)	Wide XGA:	1336 x 768
(d)	SVGA:	800 x 600	(j)	SXGA:	1280 x 1024
(e)	Wide SVGA:	1067 x 600	(k)	FR-21x5:	1280 x 1024
(f)	XGA:	1024 x 768			

*: Interlaced video

Front panel of Power Distribution Unit (PDU)

To add BNC connectors assy. (option);

1. Pull out the PDU and remove the VD2 cover plate on the PDU. Fix the BNC connectors assy. on the same location and pass the cable attached to it backward.
2. Plug in the connector of the cable to Frame Grabber board in the DPU. VD2 is connected to the second port from the bottom on Frame Grabber board. Fix the cable with push mount cable ties (supplied as installation materials).



Data Processing Unit (DPU), Rear view

FAR-2107 series radar

For the connection between the VR-5000 and FAR-2107 series radar, refer to the installation manuals of FAR-2117/2127/2817/2827, FAR-2137S/2837S or FAR-2827W/2837SW.

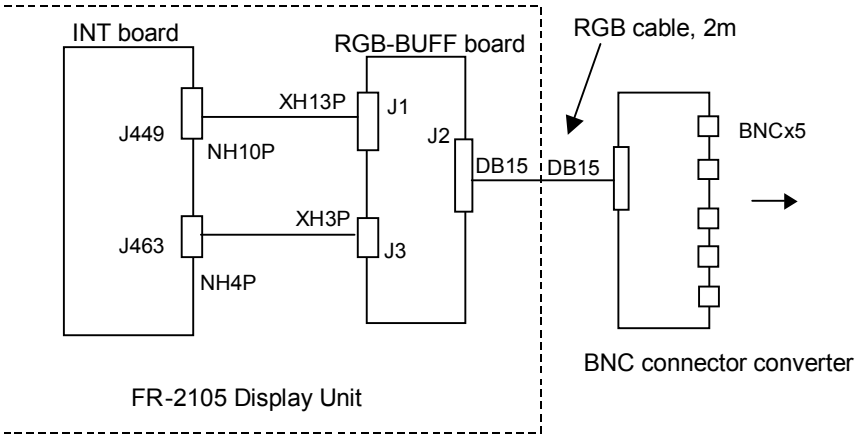
FR-2105 series radar

Following describes the modification on FR-2105 to connect it to the VDR.

Necessary parts

	Parts Name	Type	Code Number	Q'ty
1	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
2	BNC connector converter	DSUB-BNC-1	000-148-528	1
3	2 m RGB cable	KB-HD152K	000-152-099	1

The VDR I/F unit only converts D-sub connector to BNC connector.



Modification on FR-2105

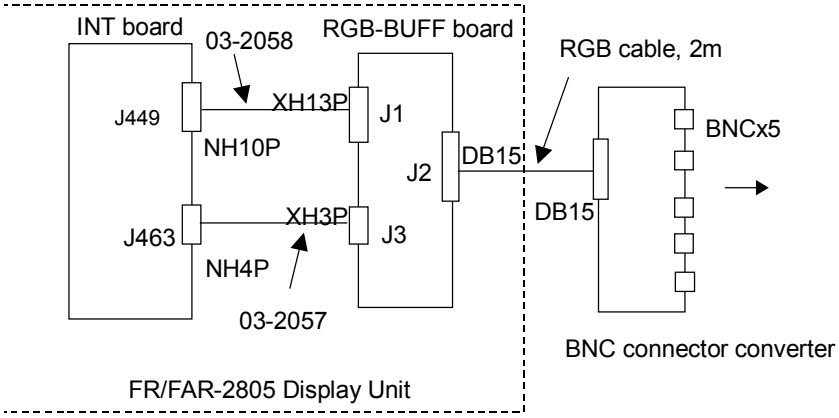
FAR-2805 series radar

Following describes the modification on FR-2805 to connect it to the VDR

Necessary Parts

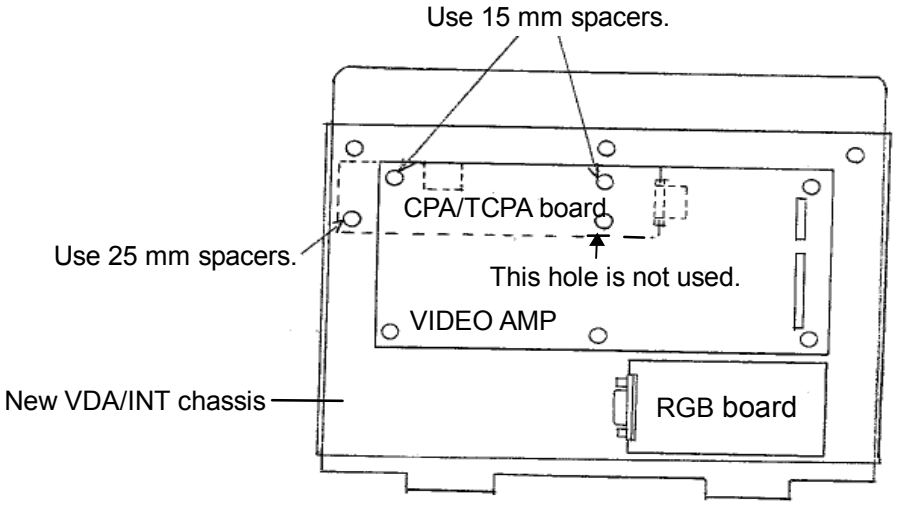
	Parts Name	Type	Code Number	Q'ty
1	VDR I/F kit (1) RGB-BUFF board NH-XH connector assy. NH-XH connector assy. VDA/INT chassis	OP03-177 03P9229A 03-2057, 4-3P 03-2058, 10-13P 03-133-1127-4	008-528-270	1
2	VDR I/F kit (2) (No VDA/INT chassis)	OP03-178	008-528-280	
3	BNC connector converter	DSUB-BNC-1	000-148-528	1
4	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-2805

The figure below illustrates how to mount CPA/TCPA board together with RGB buffer board in FAR-2805 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.

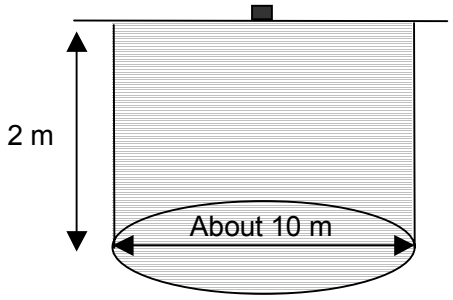


Mounting CPA/TCPA and RGB boards in FAR-2805

1.5 BRIDGE AUDIO

The bridge microphone comes with the flush mount plate. Fix the plate with four M4 screws. The microphone covers an area about 10 m in diameter with the height of 2 m.

The optional watertight box VR-5012 is used when the microphone is installed at the wing where is subjected to a heavy water splash.



Coverage of microphone

Example of microphone at radar station

A maximum of 6 microphones can be connected to MIC 1 to MIC 6 terminals on AUDIO IN terminal board. A dual twisted, balanced cable carries the following signals.

P+ (Red wire): 24 VDC (+) from PDU
L (White wire): Audio signal line, balanced, 0 dBm
L (Green wire): Audio signal line, balanced, 0 dBm
P- (Black wire): 24 VDC (-) from PDU

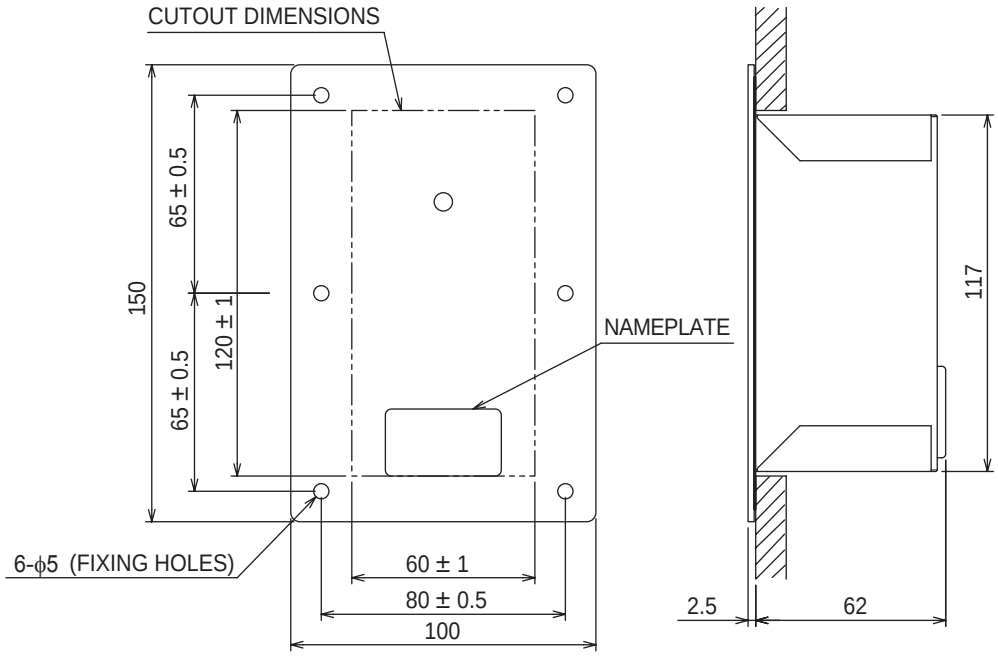
MIC1 audio is mixed with MIC2 audio, MIC3 with MIC4, and MIC5 with MIC6 respectively.

Caution

Turn off the DCU before connecting a microphone, otherwise the microphone will be damaged.

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

- With clearance around it (normally overhead in the bridge)
- Away from noise sources, such as fans, motors, and loudspeakers (1 m or more from air duct)
- Being mounted on a non-vibrating surface to keep noise to a minimum
- Fix the cable to keep noise to a minimum. If the cable runs on the ceiling without fixing, the cable will pick up noise.
- Close to bridge workstations, helmsstand, radar display and plotting table (Complying with IEC61996, 4.6.5)



1.6 VHF COMMUNICATION AUDIO

A maximum of two VHF audio signals is connected to VHF 1 and VHF 2 terminals on AUDIO IN terminal board. IMO requires one VHF audio to be recorded. A dual twisted, balanced cable carries the following signals.

P+: 24 VDC (+) from PDU
L: Audio signal line, balanced, 0 dBm
L: Audio signal line, balanced, 0 dBm
P-: 24 VDC (-) from PDU

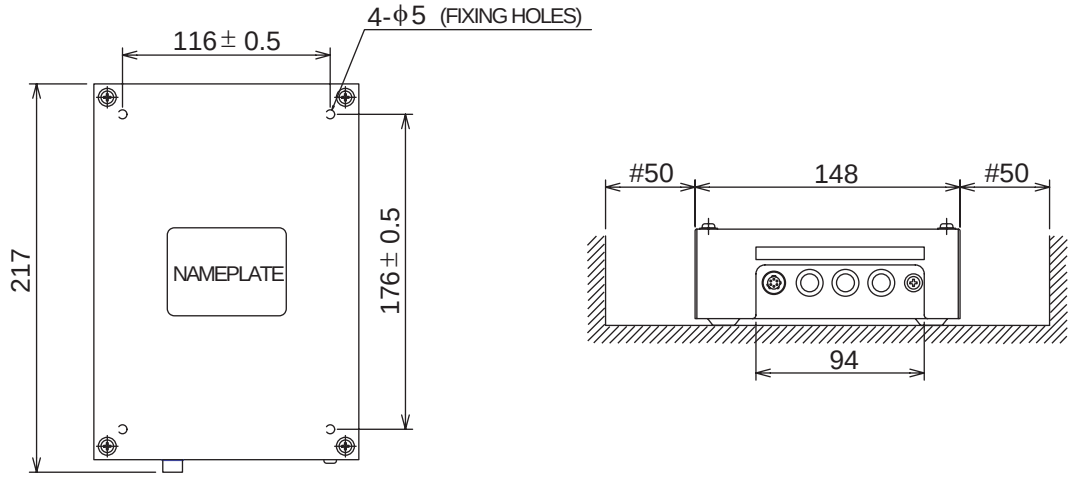
VHF interface unit IF-5200

The VHF interface unit, IF-5200 mixes VHF transmitting and receiving signals for the VDR. When the VHF outputs the mixed signal, this unit is not required.

Mounting

Fix the unit using four 5 mm holes in diameter. Remove the cover to access to holes. When 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 page 2-1.



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)

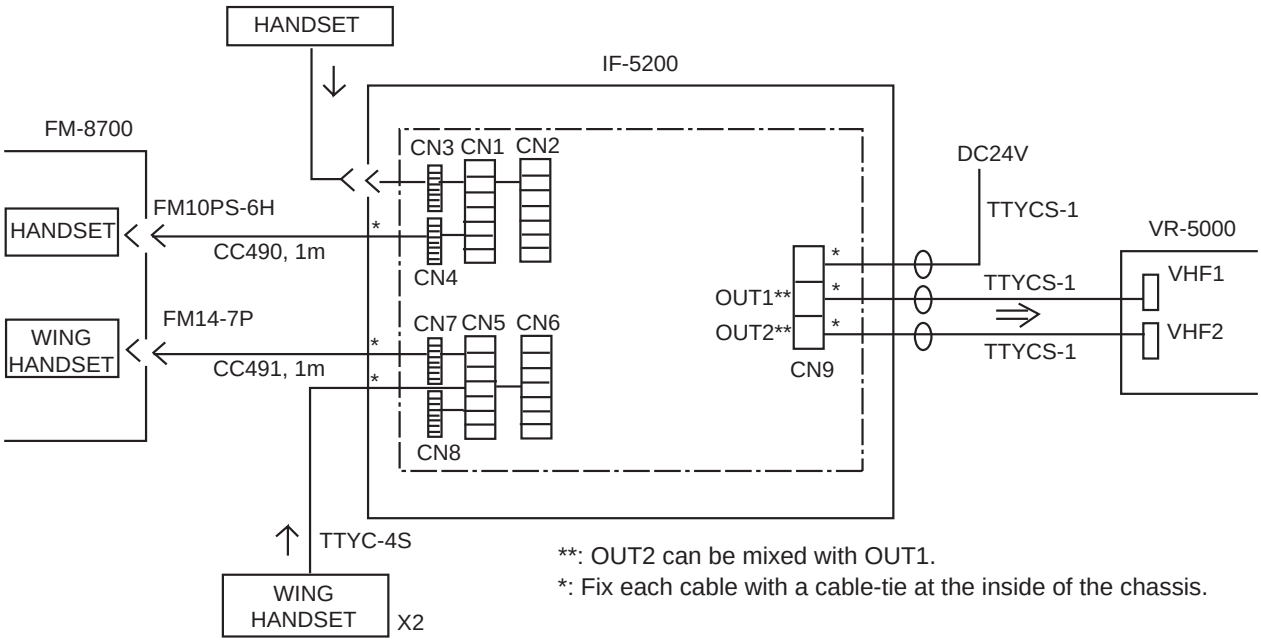
Speaker input level: 32 to 200 ohms, 2 mW, input impedance: 10k ohms

(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.

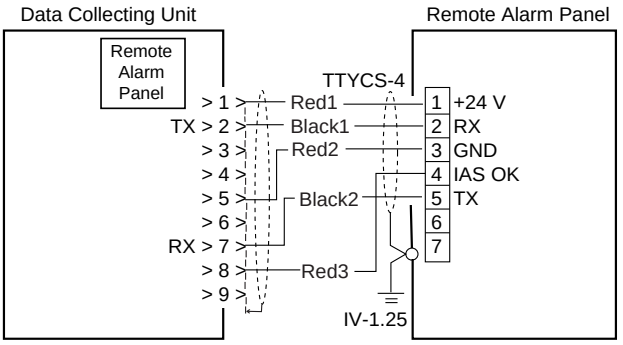


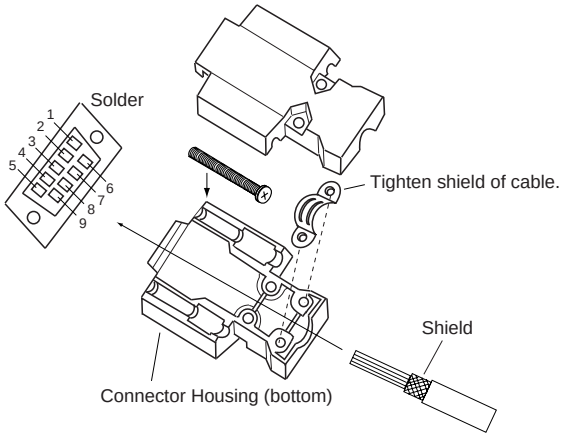
Connection example of FM-8700, IF-5200, VR-5000

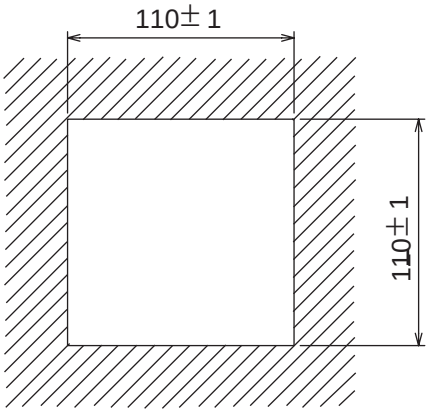
1.7 REMOTE ALARM PANEL

Make sure there is a sufficient space for access to the rear cover for mounting and cabling. The Remote Alarm Panel (RAP) is flush-mounted. See the outline drawing for cutout size. There are two types of the RAP: D-sub and Connector types.

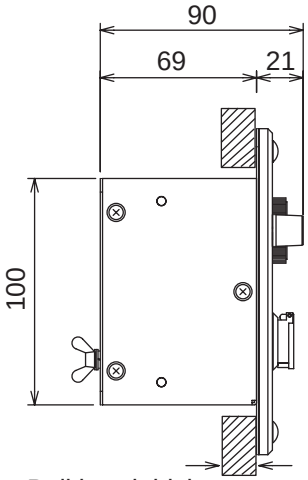
Turn off VR-5000, before connecting/disconnecting the RAP, otherwise PDU board will be damaged.



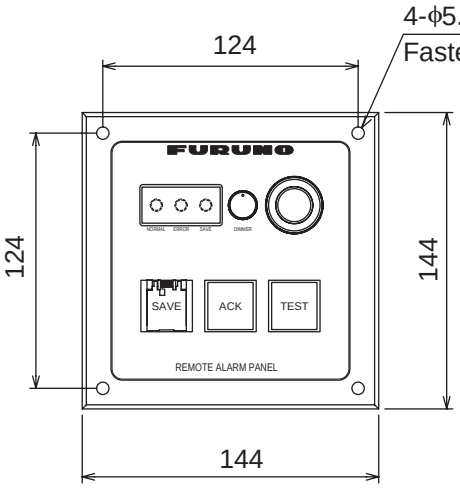




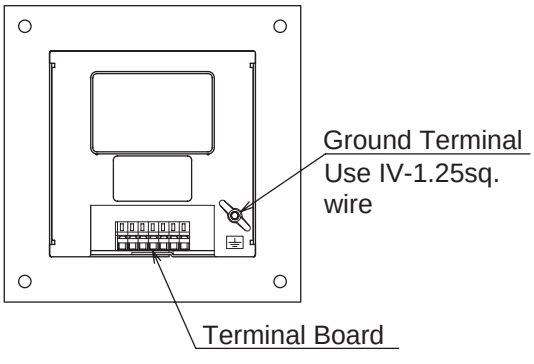
Cutout dimensions



Bulkhead thickness more than 15 mm



Front View



Rear View

1.8 POWER SUPPLY

Connect the ship's mains 115 or 230 VAC (max 3A) to the INPUT AC terminal board by using 2.5 mm^2 or AWG12 wire. The system can also operate from 24 VDC (max10A battery) by using 2.5 mm^2 or AWG12 wire. Observe the polarity when connecting DC source.

Table 1.2 Power Connection

Terminal	Pin No.	Signal Type	Colors
INPUT AC	1	AC LINE	Brown wire, AC line
	2	AC NEUT	Blue wire (Neutral), AC line
	3	AC GND	Green/yellow wire
INPUT 24 VDC	1	DC INPUT +	Red wire
	2	DC INPU T-	Black wire

1.9 REMOTE JUNCTION BOX

An optional remote junction box is connected to RS-422 IN terminal board in the DCU by a single cable, shielded twisted pair.

1.10 INTEGRATED ALARM SYSTEM

An alarm is output from IAS terminal board to the Integrated Alarm System on board the ship.

Pin No.	Signal Name	Description
1	IAS NC	Relay contact, normally closed
2	IAS NO	Relay contact, normally, open
3	IAS COM	Relay common

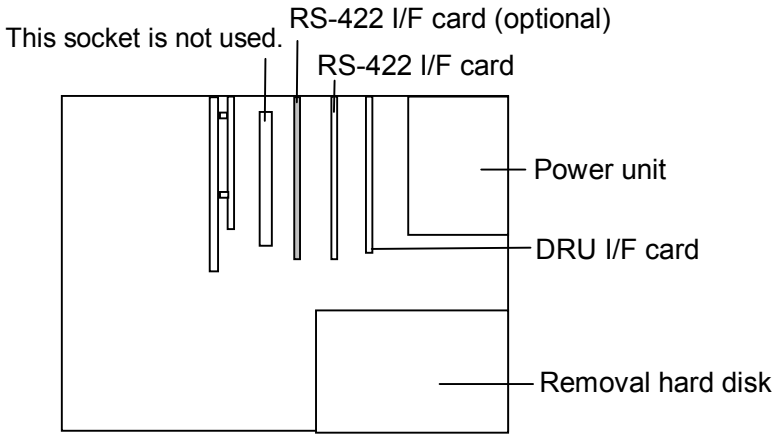
1.11 HOW TO INCREASE CHANNEL NUMBER

The table below lists the maximum channel number available on VR-5000.

Data Type	Standard	Maximum	Remarks
IEC 61162	8 channels	17 channels	Install additional RS-422 I/F card in DPU for 8 channels. Use Remote Junction Box IF-8510 for 1 channel.
Digital	64 channels	288 channels	Use Remote Junction Box.
Analog	16 channels	24 channels	Use Remote Junction Box.
Audio	8 channels	8 channels	No additional channel
Radar Video	1 channel	4 channels	Add BNC connector plate and interconnection cable.

IEC 61162

For extra 8 channels, install optional RS-422 I/F card in the Data Processing Unit (DPU).



DPU with cover removed, top view

Remote Junction Box IF-8510 provides one channel for serial data interfacing.

Analog

Remote Junction Box IF-8510 provides 8 channels for analog interfacing, using two Mitsubishi AJ65BT-64AD Analog/Digital converters. The connection is made with a shielded twisted-pair cable.

Specification of AJ65BT-64AD

Number of input points: 4 points

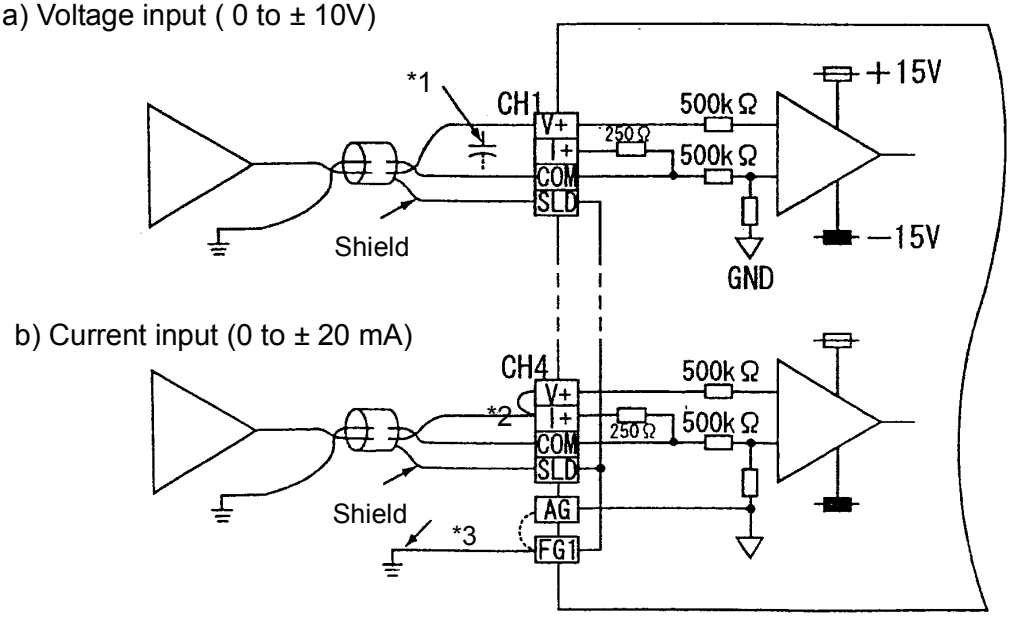
Input: Voltage: 0 to ± 10 V; Current: 0 to ± 20 mA

The jumper plug in the converter selects the input range. (*: Factory-default)

	A*	B	C	D
Voltage input	0 to 10V	1 to 5 V	– 10 to 10V	0 to 5 V
Current input	-	4 to 20 mA	20 to 20 mA	0 to 20 mA

a) Voltage input (0 to ± 10V)

b) Current input (0 to ± 20 mA)



*1: Connect a capacitor, 0.1 to 0.47 uF, 25 V to eliminate or reduce noise and ripple if necessary.
*2: When a current signal is connected, put a jumper between V+ and I+.
*3: Ground FG1. When signal line is noisy, try to ground AG as well.

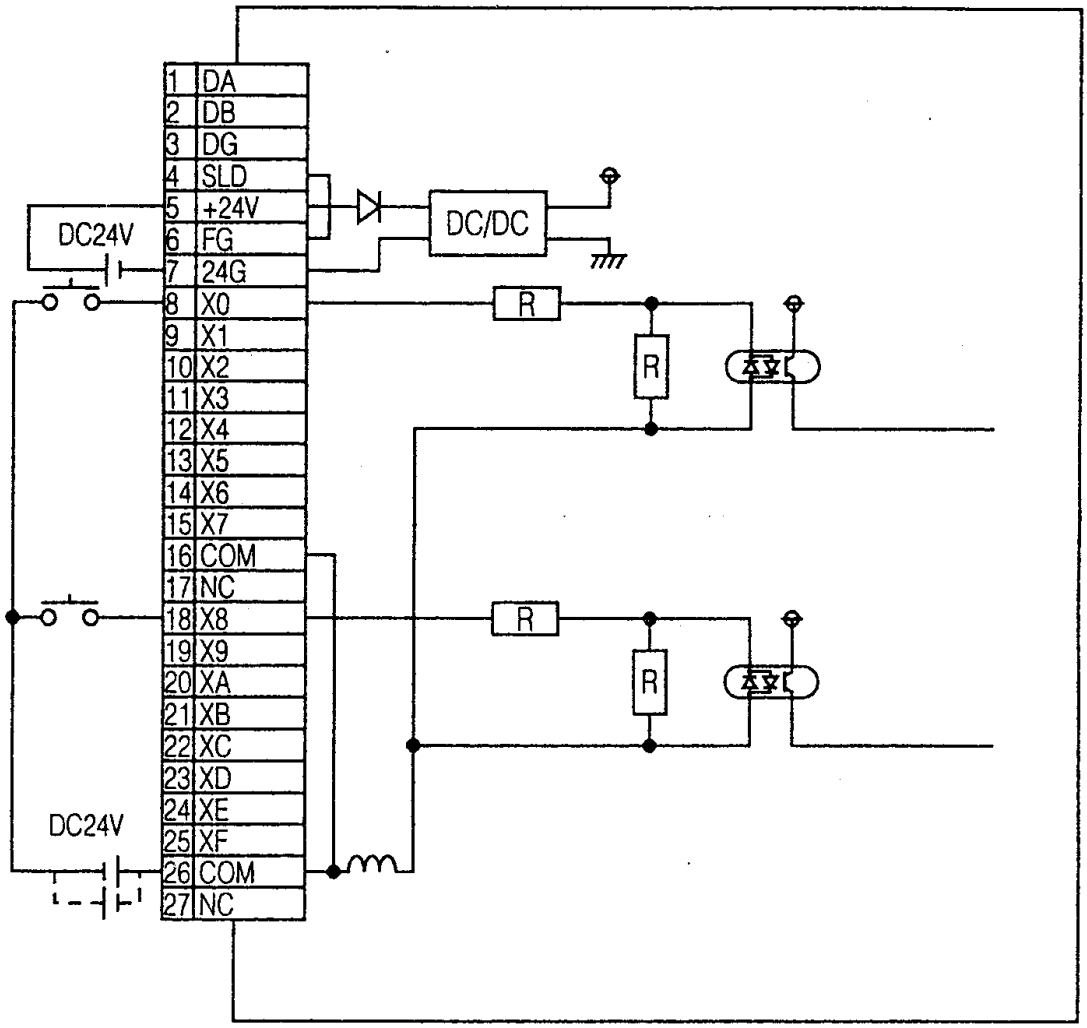
Connection on AJ65BT-64AD

Digital

Remote junction box either IF-8502 or IF-8510 is available optionally to increase the number of digital channels. The table below shows the maximum channels on the remote junction box. The channel number is decided when ordering: specify QX42 or QX81 and the number of modules you need.

Modules receive voltage and contact-closure signals. Two Mitsubishi AJ65BT1-16D are included in the module and set to either + or – common signal by changing the connection. See the figure on next page.

RJB	Module (QX42 or QX81 selectable)		
	AJ65BT1-16D (+ or - common)	QX42 (+ common, Mitsubishi)	QX81 (- common, Mitsubishi)
IF-8502	None	64 inputs x 3 pcs., max.	32 inputs x 5 pcs., max.
IF-8510	16 inputs x 2 pcs. (standard)	64 inputs x 3 pcs., max.	32 inputs x 5 pcs., max



Applicable crimp-on lug: RAV 1.25 to 3.5 or RAV 2 to 3.5 (JIS C 2805)

Connection on AJ65BT1-16D

Radar Video

BNC connector plate is fixed onto the Power Distribution Unit, and then these connectors are wired to the Data Processing Unit (DPU).

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Chapter 2 SETUP

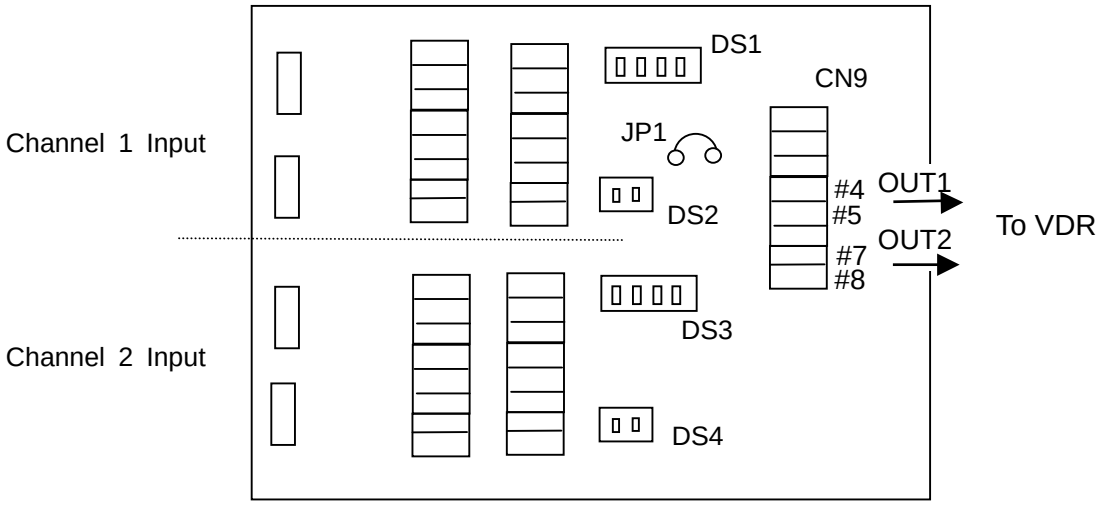
This chapter describes how to setup and check the system.

2.1 VHF INTERFACE UNIT (IF-5200)

2.1.1 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, or #7 and #8 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 IF-5200

Table below lists the function of DS2 and DS4.

DIP Switch	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

2.1.2 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.

2.2 DATA COLLECTING UNIT (VR-5010)

The system configuration must be updated after installation. See VR-5000 Setup manual for details.

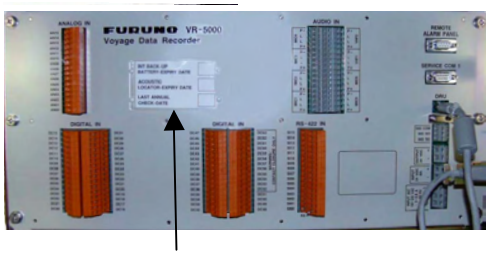
The outline of the system configuration is;

Step 1. Connection of PC
Step 2. Connection of monitor
Step 3. Software configuration
Step 4. Saving configuration data
Step 5. Initialization of index file
Step 6. Restart VR-5000
Step 7. Download configuration data
Step 8. Check of recorded data

2.3 MARKING BATTERY AND POSITION LOCATOR EXPIRY

After installing and setting up, inscribe a expiry date of battery and acoustic beacon on the label on the Data Collecting Unit. The battery has 4 year in-service life. The expiry date starts at installation. The expiry date of the acoustic beacon is marked on the acoustic beacon.

INT.BACK-UP BATTERY-EXPIRY DATE	
ACOUSTIC LOCATOR-EXPIRY DATE	
LAST ANNUAL CHECK-DATE	



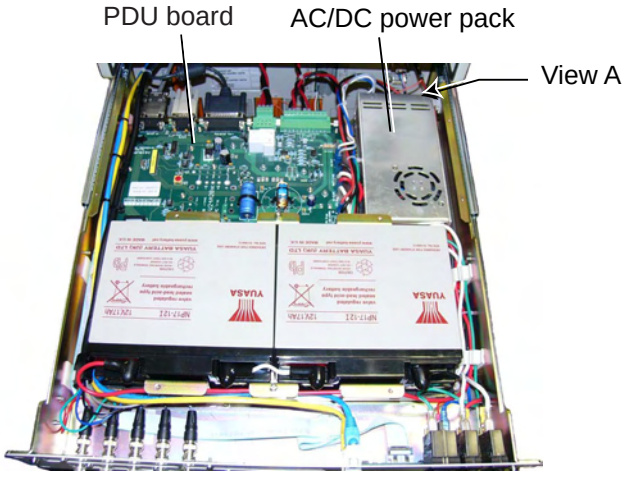
Label case

Place where expiry date is written down

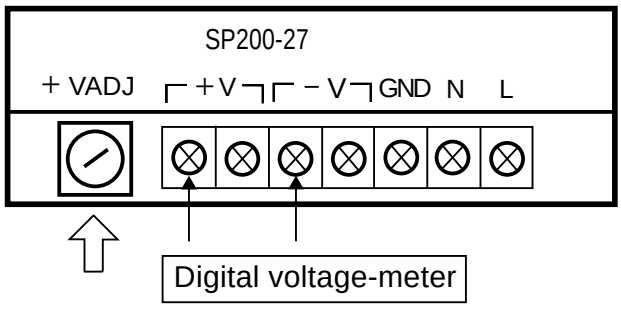
2.4 ADJUSTMENT AFTER REPLACING THE AC/DC POWER PACK

The AC/DC power pack is built in the power distribution unit in the DCU. When you replace it with a new one, adjust the output voltage. If this adjustment is done incorrectly, the internal batteries will not be charged and the charge indicator lamp blinks continuously.

1. After replacing the AC/DC power pack, turn on the MAINS AC SUPPLY switch only.
2. Remove the right side cover. Connect a digital voltage meter to the power pack, and adjust the output voltage by rotating the "+V ADJ" potentiometer at the rear panel of the power pack so that the output voltage is 29.2±0.1 VDC.

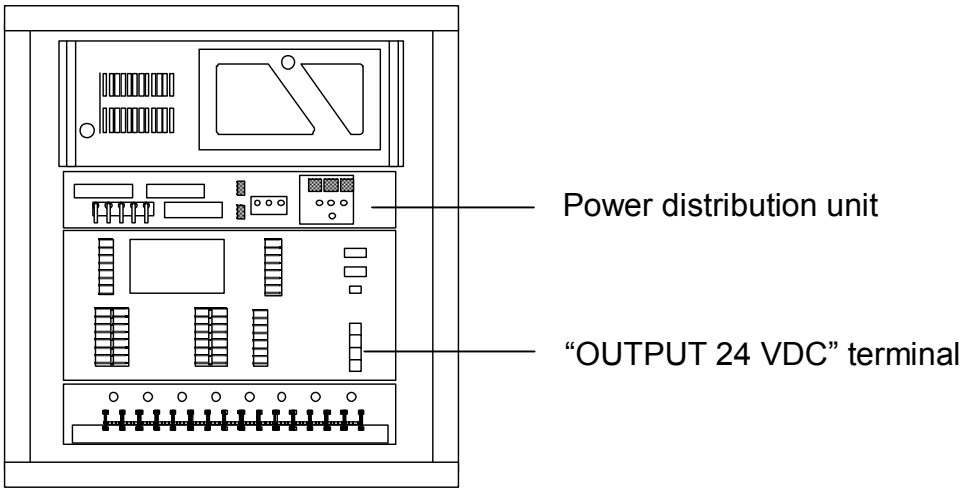


Power distribution unit (top view)



View A

3. Confirm the output voltage from the DC/DC converter in the PDU board as follows.
   a) Turn on the MAINS DC SUPPLY switch only.
   b) Connect a digital voltage meter to the “OUTPUT 24 VDC” terminal in the DCU, and confirm that the voltage is 28.0 to 28.2 VDC.
   c) If it is out of that range, adjust the potentiometer on the PDU board. (If the shield cover is attached to the PDU board, access the potentiometer from the hole in the shield cover.)



DCU

2.5 SYSTEM TIME ADJUSTMENT

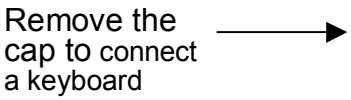
The system time, used for time-stamping VDR data, synchronizes with the UTC time if the system time is behind the UTC time within one hour. However, the system time is set to within two minutes (practically 10 seconds) behind the UTC time after installation to make the synchronization faster.

Note that the system **DOES NOT work** if the system time is ahead of the UTC time.

To adjust the system time, a keyboard with a PS/2 connector and a SXGA monitor are required.

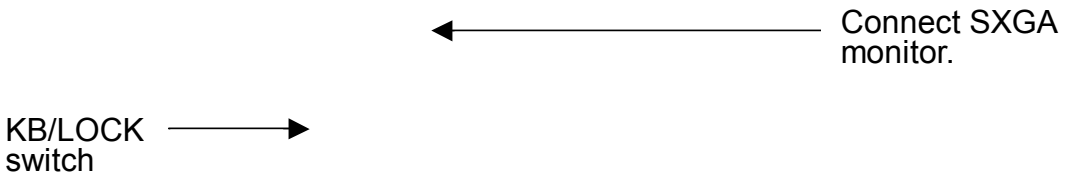
To adjust system time;

1. Connect the SXGA monitor and the keyboard to the data processing unit (DPU) in the DCU. The VGA connector locates left of the removable hard disk.



DPU, front view

2. Unlock the KB/LOCK switch.



DPU front panel, cover opened

3. Turn on the VR-5000 while pressing and holding down the **Delete** key.
4. Wait for the BIOS screen to come up. (Keep the **Delete** key pressed.)
5. Select “Standard CMOS Feature” and press the **Enter** key.
6. Set the system time about 10 seconds behind UTC or GPS time.
7. Press **F10**, **Y**, and **Enter** keys in order to save data.
8. Restart VR-5000.
9. Lock the keyboard with the KB/LOCK switch.
10. Wait until system time synchronizes with the GPS time.

If it is necessary to adjust the system time frequently, the lithium battery CR-2032 on the DPU processor board in the data processing unit (DPU) may be flat.

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Appendix A VR-5000 INPUT SPECIFICATION

1. Digital and Contact Inputs

Channel no.	Description	Active	Remarks
DC 00		Open	Digital input
DC 01		Open	Digital input
DC 02		Open	Digital input
DC 03		Open	Digital input
DC 04		Open	Digital input
DC 05		Open	Digital input
DC 06		Open	Digital input
DC 07		Open	Digital input
DC 08		Open	Digital input
DC 09		Open	Digital input
DC 10		Open	Digital input
DC 11		Open	Digital input
DC 12		Open	Digital input
DC 13		Open	Digital input
DC 14		Open	Digital input
DC 15		Open	Digital input
DC 16		Open	Digital input
DC 17		Open	Digital input
DC 18		Open	Digital input
DC 19		Open	Digital input
DC 20		Open	Digital input
DC 21		Open	Digital input
DC 22		Open	Digital input
DC 23		Open	Digital input
DC 24		Open	Digital input
DC 25		Open	Digital input
DC 26		Open	Digital input
DC 27		Open	Digital input
DC 28		Open	Digital input
DC 29		Open	Digital input
DC 30		Open	Digital input
DC 31		Open	Digital input
DC 32		Open	Digital input
DC 33		Open	Digital input
DC 34		Open	Digital input
DC 35		Open	Digital input
DC 36		Open	Digital input

DC 37		Open	Digital input
DC 38		Open	Digital input
DC 39		Open	Digital input
DC 40		Open	Digital input
DC 41		Open	Digital input
DC 42		Open	Digital input
DC 43		Open	Digital input
DC 44		Open	Digital input
DC 45		Open	Digital input
DC 46		Open	Digital input
DC 47		Open	Digital input
DC 48		Open	Digital input
DC 49		Open	Digital input
DC 50		Open	Digital input
DC 51		Open	Digital input
DC 52		Open	Contact
DC 53		Open	Contact
DC 54		Open	Contact
DC 55		Open	Contact
DC 56		Open	Contact
DC 57		Open	Contact
DC 58		Open	Contact
DC 59		Open	Contact
DC 60		Open	Contact
DC 61		Open	Contact
DC 62		Open	Contact
DC 63		Open	Contact
DC 64		Open	Contact

2. Serial Inputs

Channel no.	Description	Active	Remarks
SI 00	GPS Receiver		
SI 01			
SI 02			
SI 03			
SI 04			
SI 05			
SI 06			
SI 07			
SI 08			Option
SI 09			Option
SI 10			Option

SI 11			Option
SI 12			Option
SI 13			Option
SI 14			Option
SI 15			Option

3. Analog Inputs

Channel no.	Description	Voltage	Remarks
AN 00			
AN 01			
AN 02			
AN 03			
AN 04			
AN 05			
AN 06			
AN 07			
AN 08			
AN 09			
AN 10			
AN 11			
AN 12			
AN 13			
AN 14			
AN 15			

4. Audio Inputs

Channel no.	Description		Remarks
MIC 1			
MIC 2			
MIC 3			
MIC 4			
MIC 5			
MIC 6			
VHF 1			
VHF 2			

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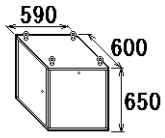
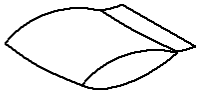
PACKING LIST

VR-5010-J/E-*-CS

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ユニット UNIT			
ﾃﾞｰﾀ収集部 DATA COLLECTION UNIT		VR-5010-* 000-040-754-00 **	1
予備品 SPARE PARTS			
予備品 SPARE PARTS		SP24-00201 004-555-540-00	1
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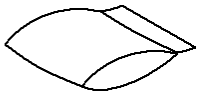
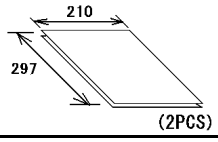
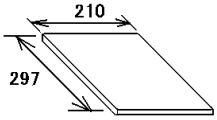
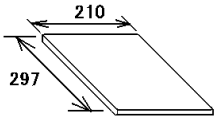
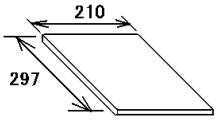
工事材料 INSTALLATION MATERIALS		CP24-00211 004-379-540-00	1
図書 DOCUMENT			
ｴﾗｰｺｰﾄﾞﾋｮｳ ERROR CODE TABLE		E42-00501-* 000-157-307-0*	1
取扱説明書 OPERATOR'S MANUAL		OMJ-44180-* 000-148-204-0* **	1
操作要領書 OPERATOR'S GUIDE		OSJ-44180-* 000-148-657-0* **	1
装備要領書 INSTALLATION MANUAL		IMJ-44180-* 000-148-655-0* **	1

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.

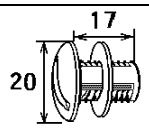
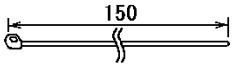
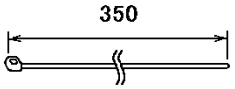
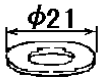
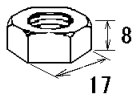
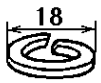
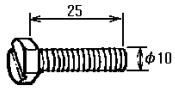
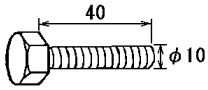
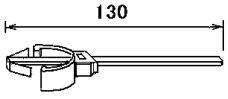
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	004-379-540	24AB-X-9401 -2
TYPE	CP24-00211	1/2

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS		数量 Q'TY	用途／備考 REMARKS
1	ﾎﾞﾙﾄｷｬｯﾌﾟ COSMETIC CAP		CP-30-BC-10		4	
			CODE NO.	000-808-408		
2	ｺﾝﾍﾞｯｸｽ PLASTIC BAND		CV-150HT		20	
			CODE NO.	000-809-225		
3	ｺﾝﾍﾞｯｸｽ PLASTIC BAND		CV-250N		20	
			CODE NO.	000-570-326		
4	ｺﾝﾍﾞｯｸｽ PLASTIC BAND		CV-350N		10	
			CODE NO.	000-595-297		
5	ﾐｶﾞｷ平座金 FLAT WASHER		M10 SUS304		12	
			CODE NO.	000-864-131		
6	六角ﾅｯﾄ　１種 HEX.NUT		M10 SUS304		4	
			CODE NO.	000-863-111		
7	ﾊﾞﾈ座金 SPRING WASHER		M10 SUS304		8	
			CODE NO.	000-864-261		
8	六角ﾎﾞﾙﾄ　ｽﾘ割 HEX.BOLT (SLOTTED HEAD)		M10X25 SUS304		4	
			CODE NO.	000-862-308		
9	六角ﾎﾞﾙﾄ HEX.BOLT		M10X40 SUS304		4	
			CODE NO.	000-862-184		
10	ﾌﾟｯｼｭﾏｳﾝﾄﾀｲ TIEING WIRE BAND		RT30SSF5-W		8	
			CODE NO.	000-153-665		

24AB-X-9401

FURUNO ELECTRIC CO ., LTD.

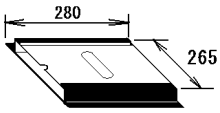
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	004-379-540	24AB-X-9401 -2
TYPE	CP24-00211	2/2

工事材料表

INSTALLATION MATERIALS

番 号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS		数量 Q'TY	用途／備考 REMARKS
11	ｶｰﾄﾞﾎﾙﾀﾞｰ CARD HOLDER		C-26-ﾀﾃ-ﾆ-1		1	
			CODE NO.	000-155-571		

24AB-X-9401

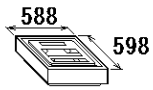
FURUNO ELECTRIC CO ., LTD.

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

PACKING LIST

24AB-X-9854 -0 1/1

VR-5010

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ユニット UNIT			
DCU防振台組品 DCU VIBRATION ISOLATION ASSY.		VR-5010-VIS 004-379-550	1

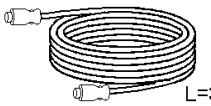
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.		24AB-X-9403 -0
TYPE		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	ｹｰﾌﾞﾙ組品 CABLE ASSY.	 L=30M	1394M1A1 L=30M		1	
			CODE NO.	000-148-668		

24AB-X-9403

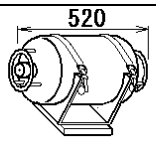
FURUNO ELECTRIC CO ., LTD.

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

PACKING LIST

24AB-X-9853 -1 1/1

VR-5020-6G/9G

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ユニット UNIT			
ﾃﾞｰﾀ記録器 DATA RECORDER		VR-5020-6G 000-040-826 **	1
工事材料 INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP24-00215 004-379-590	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.

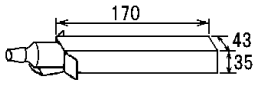
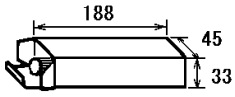
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	004-379-590-00	24AB-X-9402 -3
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 100Gｲﾘ *ｼﾛ* CODE NO. 000-821-026-00	1	
2	ｼﾘｺﾝｸﾞﾘｽ SILICONE GREASE		KS-650N 100G CODE NO. 000-805-203-00	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。

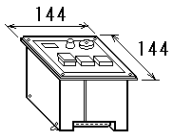
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

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

FURUNO ELECTRIC CO ., LTD.

PACKING LIST

VR-5016

NAME	OUTLINE	DESCRIPTION/CODE Nº	Q'TY
ユニット UNIT			
ﾘﾓｰﾄｱﾗｰﾑﾊﾟﾈﾙ RIMOTE ALARM PANEL		VR-5016 000-041-040	1
工事材料 INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP24-00216 004-379-960	1

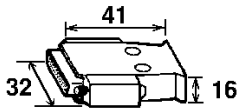
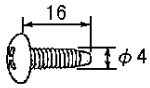
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	004-379-960	24AB-X-9404 -3
TYPE	CP24-00216	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	ｺﾈｸﾀ(17JE) CONNECTOR		17JE-23090-02(D8C)		1	
			CODE NO.	000-156-337		
2	+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ SELF-TAPPING SCREW		4X16 SUS304 1ｼｭ		4	
			CODE NO.	000-802-080		

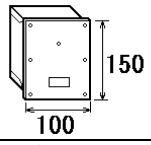
24AB-X-9404

FURUNO ELECTRIC CO ., LTD.

(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 №	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

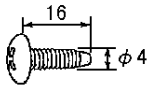
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	004-381-090	24AB-X-9405 -1
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 SELF-TAPPING SCREW		4X16 SUS304 1ｼｭ		6	
			CODE NO.	000-802-080		

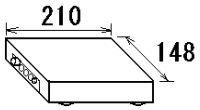
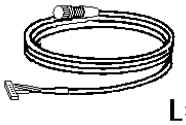
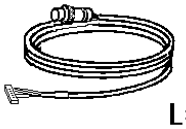
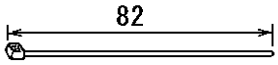
24AB-X-9405

FURUNO ELECTRIC CO ., LTD.

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

PACKING LIST

IF-5200

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ユニット UNIT			
ｲﾝﾀｰﾌｪｲｽﾕﾆｯﾄ INTERFACE UNIT		IF-5200 999-999-008 *	1
付属品 ACCESSORIES			
ﾏｲｸ延長ｹｰﾌﾞﾙ1 MIC EXTENSION CABLE		CC490 999-999-009 *	1
ﾏｲｸ延長ｹｰﾌﾞﾙ2 MIC EXTENSION CABLE		CC491 999-999-010 *	1
ｲﾝｼｭﾛｯｸﾀｲ PLASTIC BAND		T-18R 999-999-011 *	6

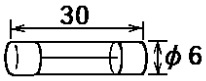
1.ｺｰﾄﾞ番号末尾の[*]は、ﾀﾞﾐｰｺｰﾄﾞに付き、注文できません。
* THIS CODE CANNOT BE ORDERED.

（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。

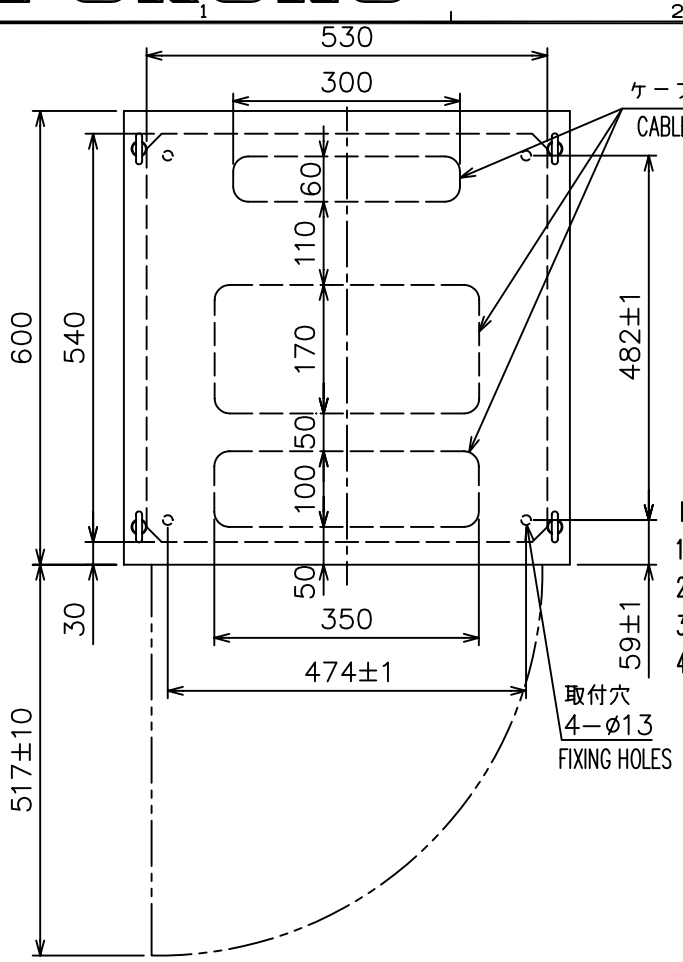
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

FURUNO

D-1

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

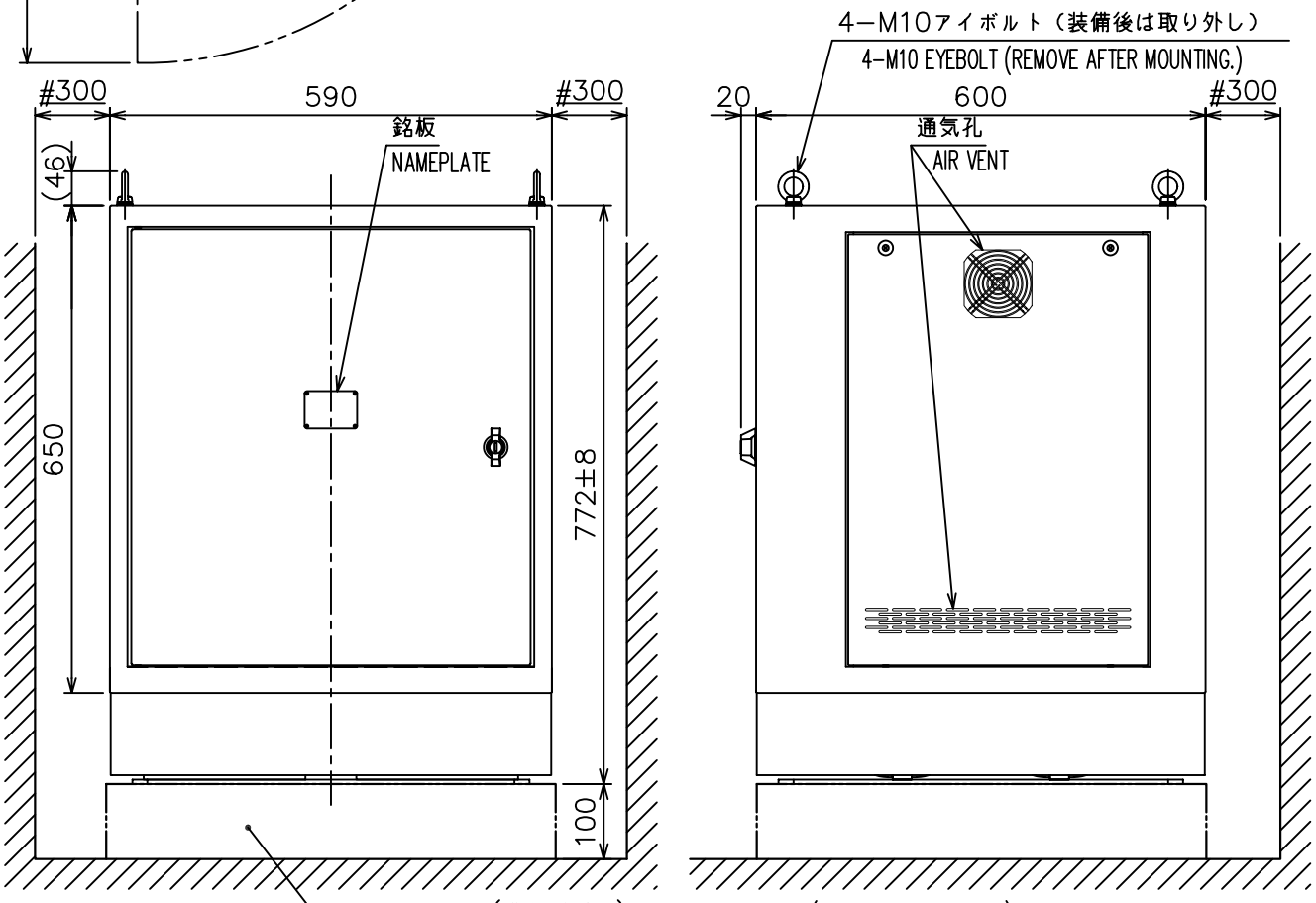


注 記

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ボルトまたはコーチボルト呼び径９を使用。
4）防振台はケーブル導入口の大きい方が前になるよう取付ける。

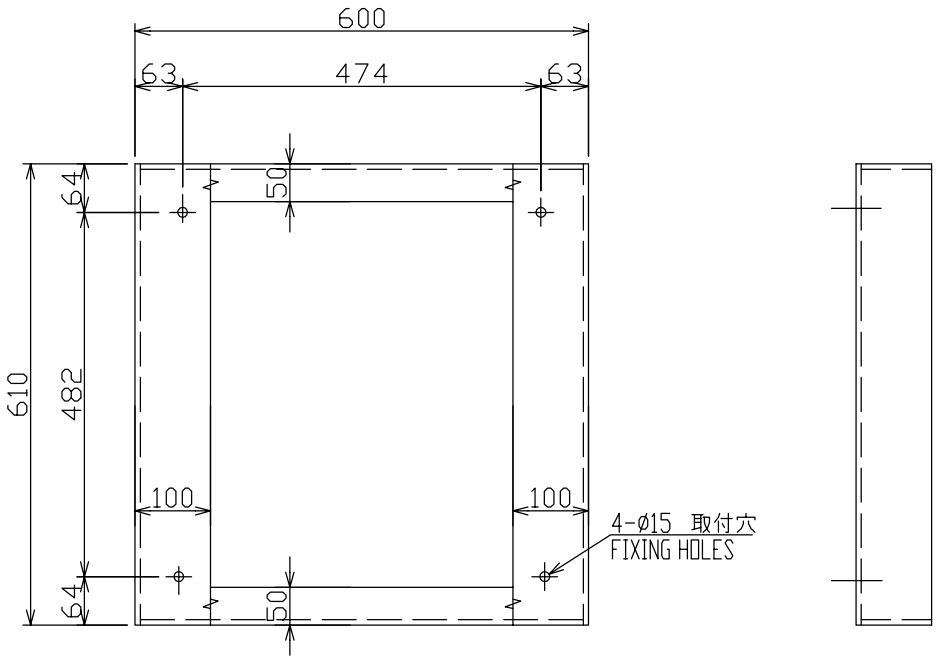
NOTE

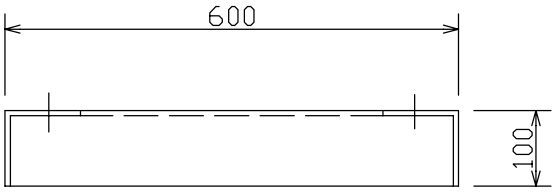
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M10 BOLTS OR COACH SCREWS ø9 FOR FIXING THE UNIT.
4. MOUNT THE LARGER CABLE ENTRY OF SHOCK ABSORBER FACE TO FRONT SIDE.



DRAWN Feb. 2 '05 T.YAMASAKI			TITLE VR-5010
CHECKED Feb. 2 '05 T.MATSUGUCHI			名称 データ収集部
APPROVED Feb.02'05 T.Matsuguchi	VR-5000		外寸図
SCALE 1/10	MASS 135 ±10% kg		NAME DATA COLLECTING UNIT
DWG.No. C4418-G01- L	24-004-200G- 3		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.





注記
造船所手配。

NOTE
SHIPYARD SUPPLY.

DRAWN Mar. 17 '04 T.YAMASAKI			TITLE MOUNTING BASE FOR DCU VR-5010
CHECKED Mar. 17 '04 Y.ESUMI			名称 データ収集部マウントベース
APPROVED Mar.19'04 H.Hayashi	VR-5000		外寸図
SCALE 1/10	MASS ±10% kg		NAME DATA COLLECTING UNIT MOUNTING BASE
DWG.No. C4418-G07- B			OUTLINE DRAWING

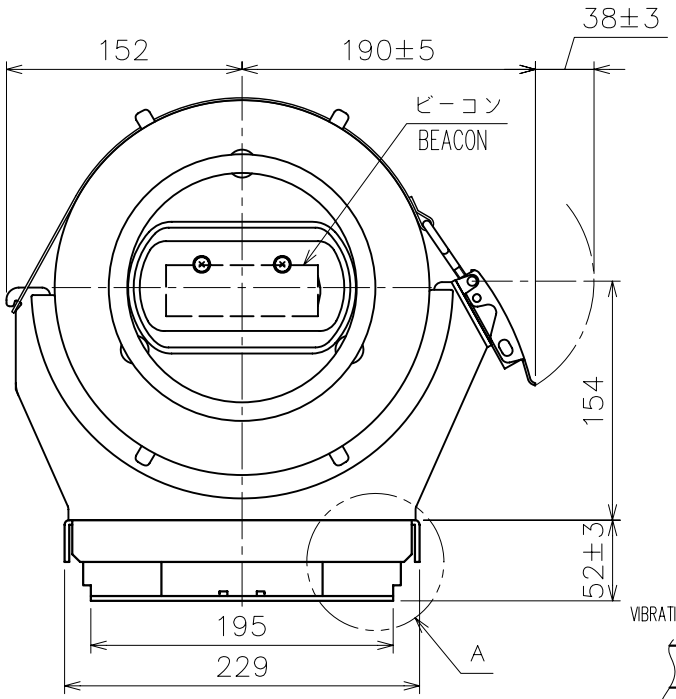
FURUNO

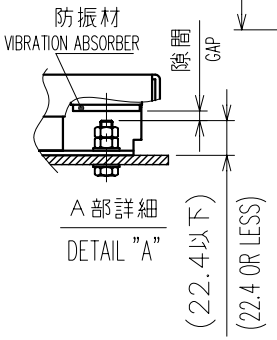
表１ TABLE 1

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

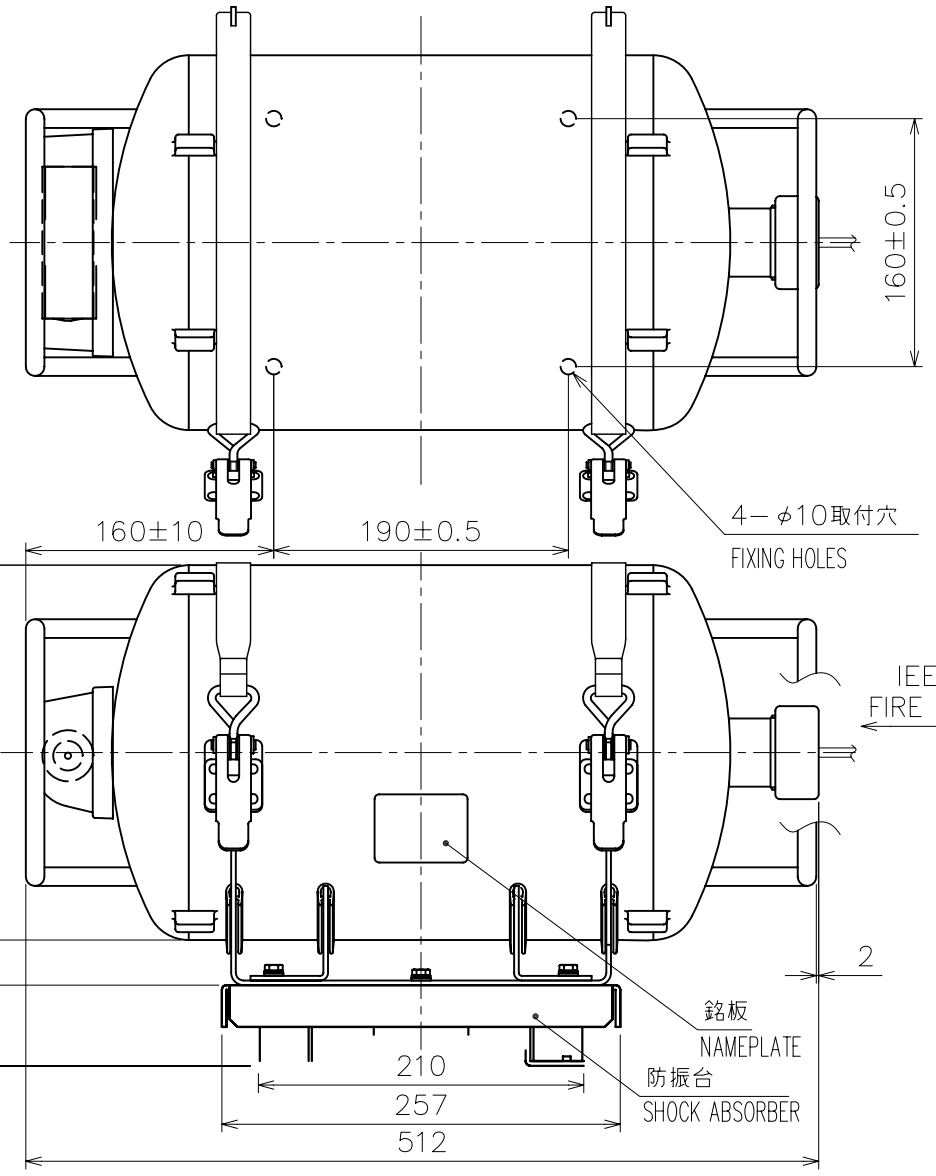
注　記　１）　指定外の寸法公差は表１による。
　　２）　取付用ネジはＭ８ボルトを使用のこと。
　　また、防振材との隙間は３ｍｍ以上確保すること。（Ａ部参照）

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 Jul. 17, '06 Maki		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- H	24-004-100G-3		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

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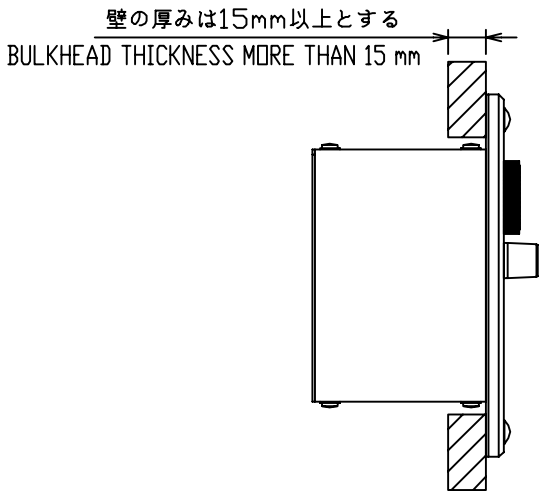
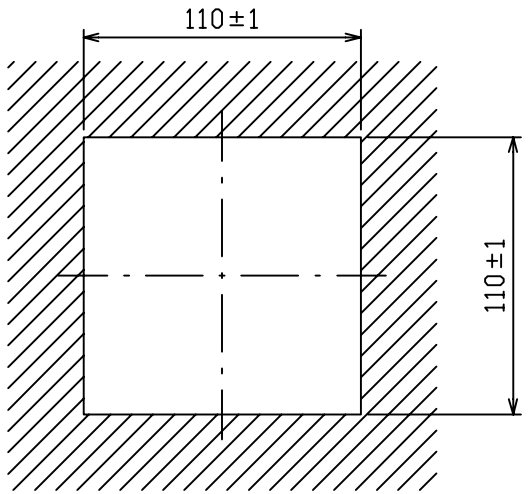
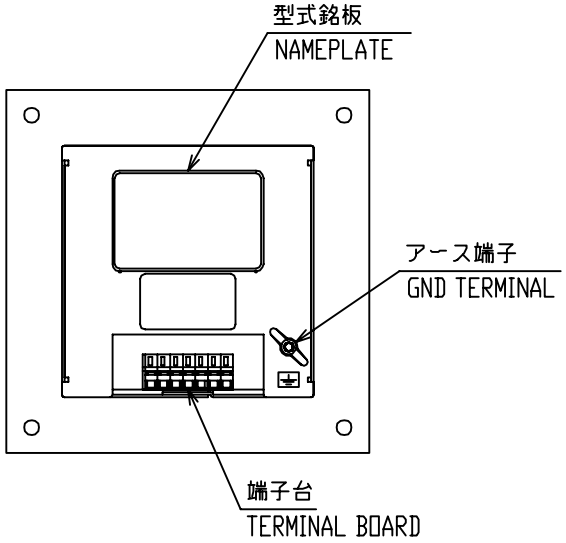
表 1 TABLE 1

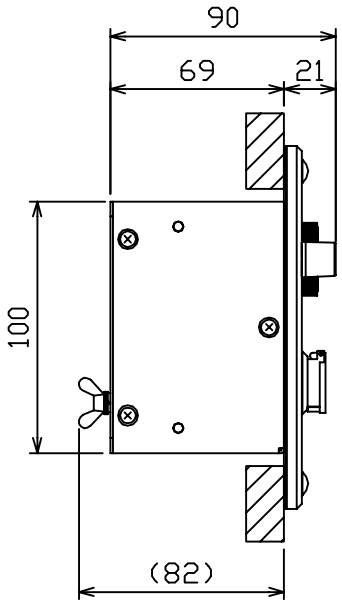
寸法区分（mm） DIMENSIONS	公差（mm） TOLERANCE
L≦50	±1．5
50<L≦100	±2．5
100<L≦500	±3

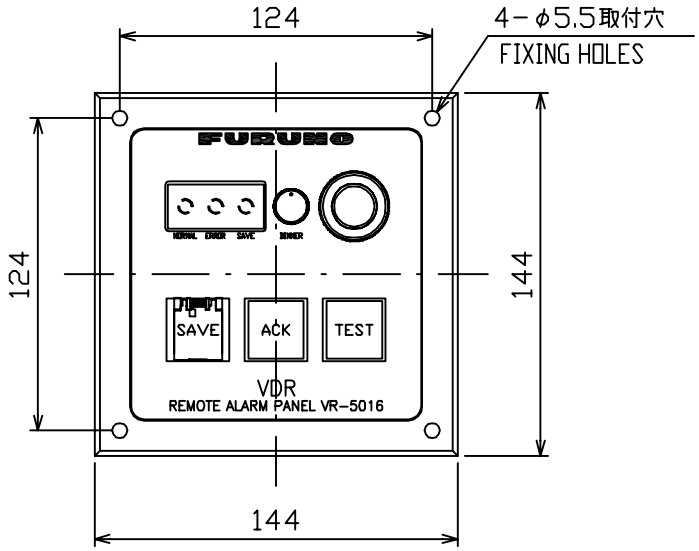




取付穴寸法図
CUTOUT DIMENSIONS







注 記
1） 指定外の寸法公差は表1による。
2） 取付用ネジはトラスタッピンネジ呼び径4×16を使用のこと。
3） 取り付ける壁の厚みは15mm以上とする。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. USE SELF-TAPPING SCREWS 4X16 FOR FIXING THE UNIT.
3. BULKHEAD THICKNESS SHOULD BE MORE THAM 15 mm.

DRAWN	MAY 12 '05 E. MIYOSHI		TITLE VR-5016
CHECKED	TAKAHASHI. T		名称 リモートアラームパネル
APPROVED	Y. Hatai	VR-5000	外寸図
SCALE	1/3 MASS 0.93 ±10% kg		NAME REMOTE ALARM PANEL
DWG.No.	C4418-G08-C	REF.No. 24-004-300G-2	OUTLINE DRAWING

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FURUNO ELECTRIC CO., LTD.

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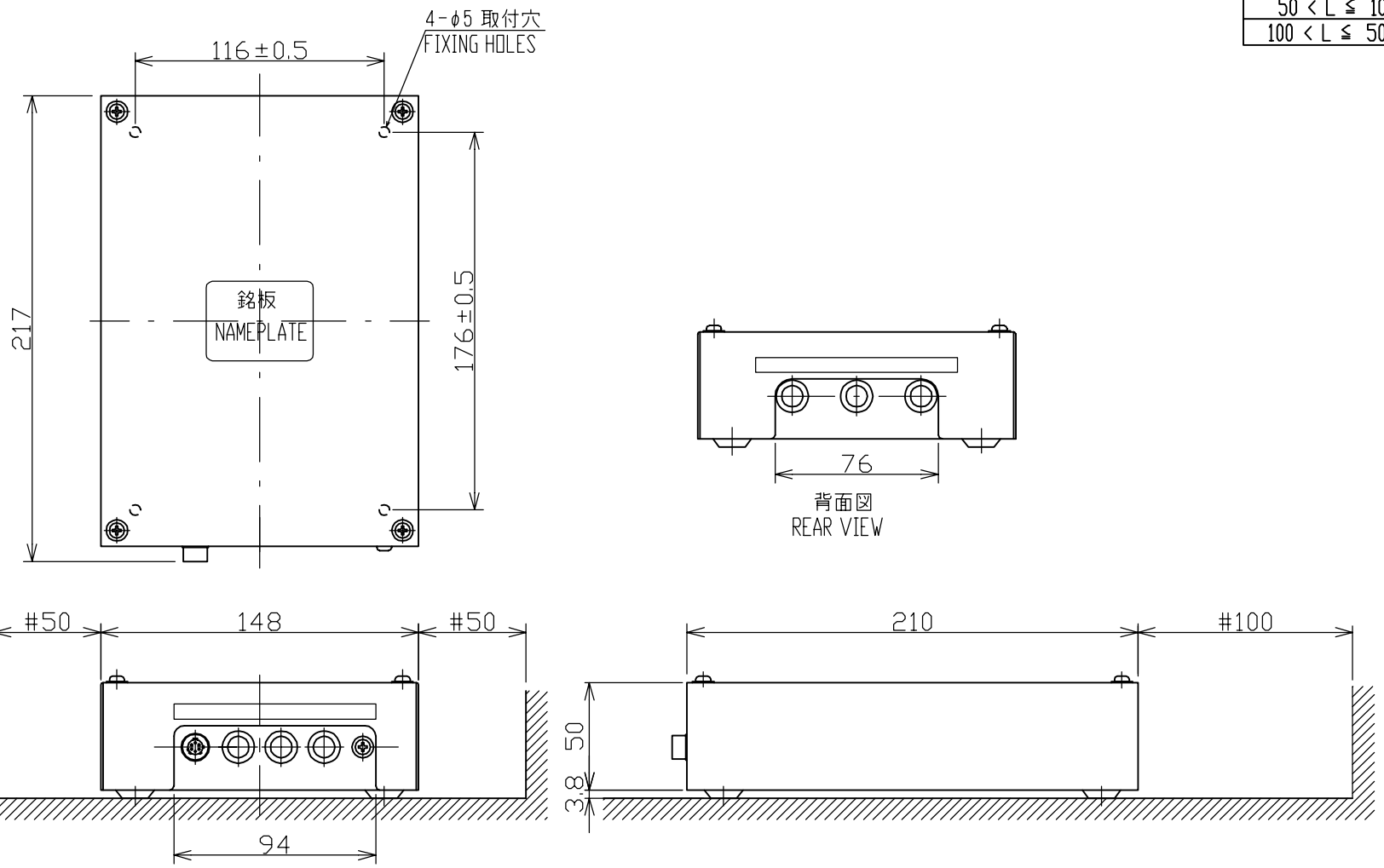
表1 TABLE 1

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

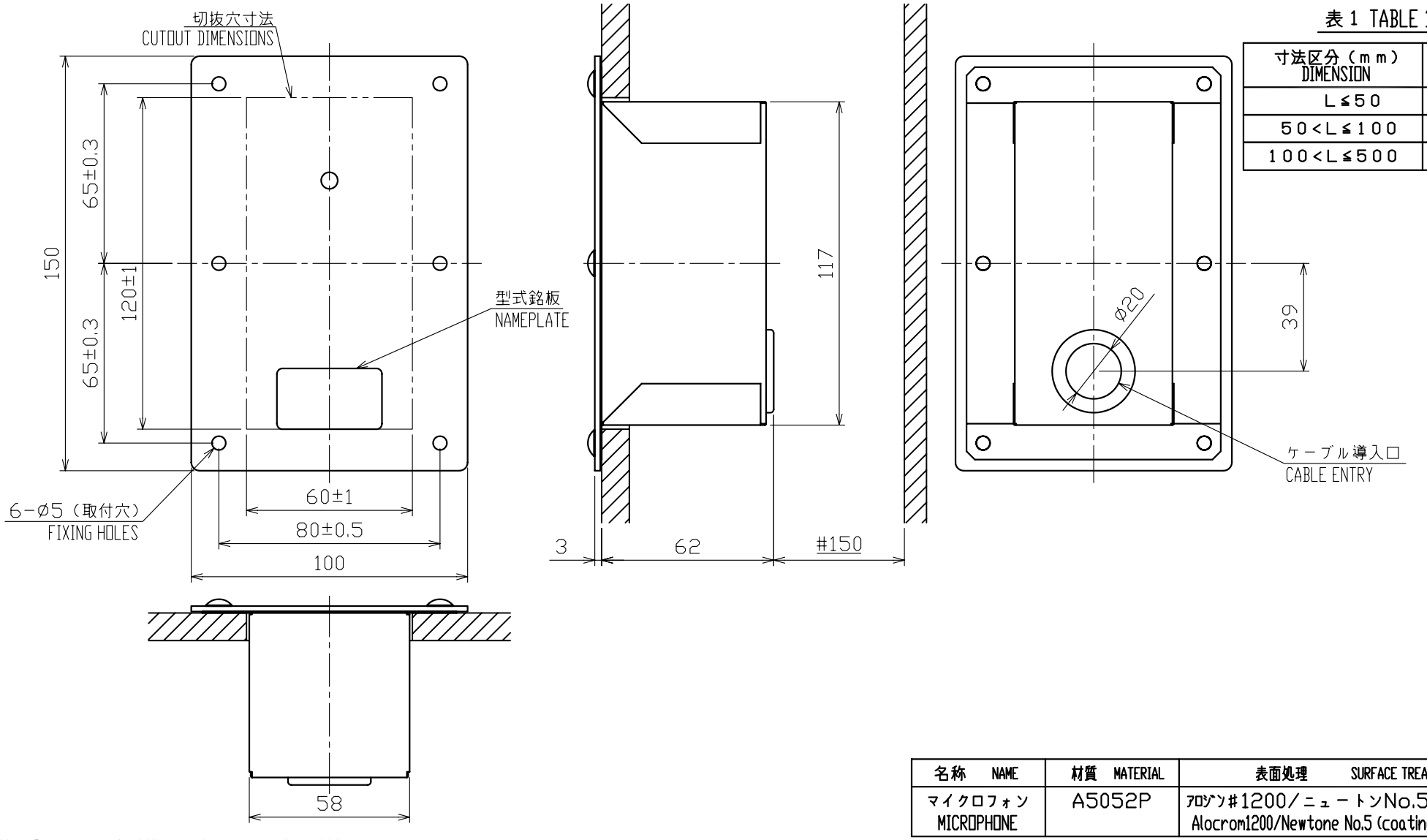


表 1 TABLE 1

寸法区分（mm） 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)

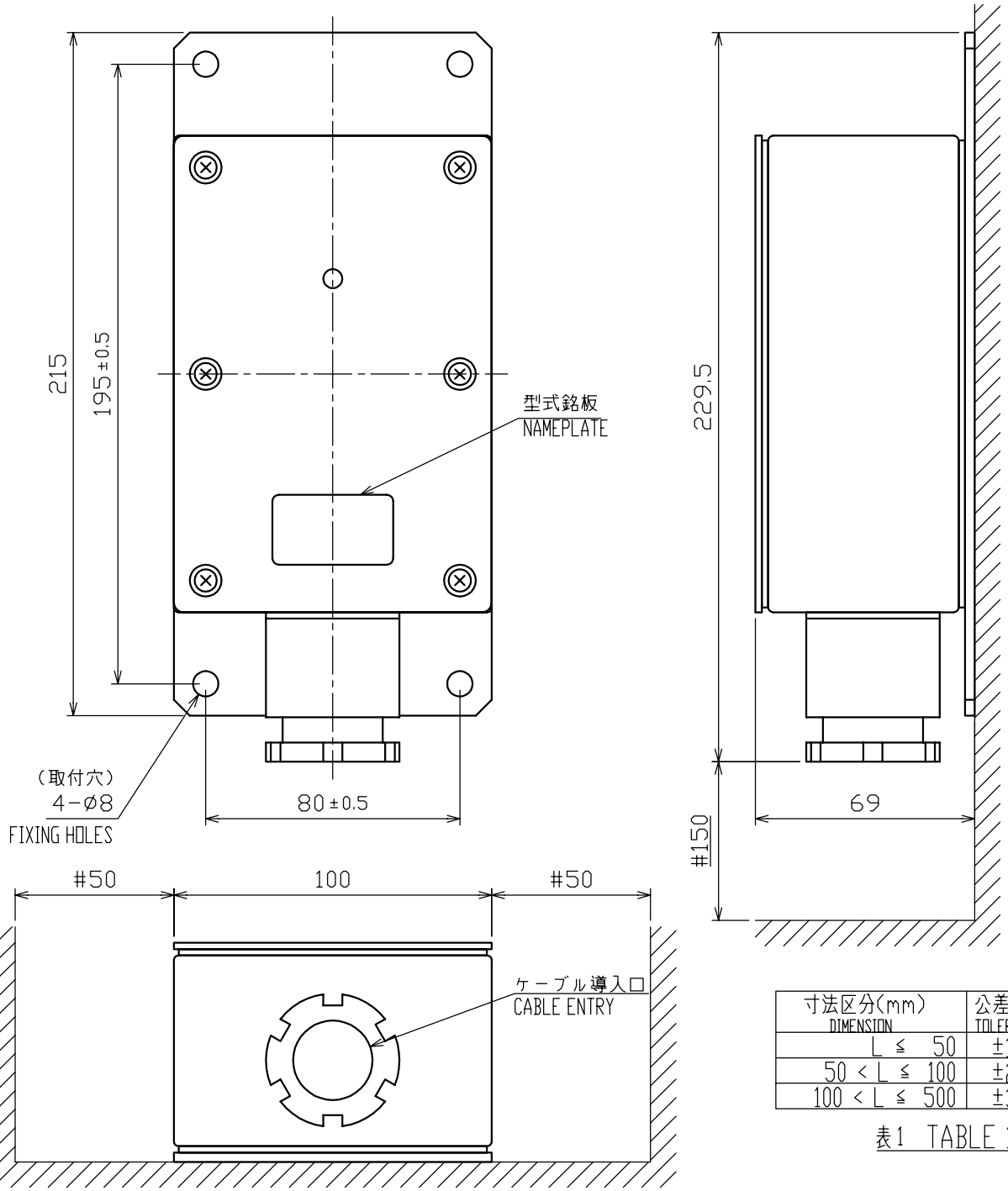
注　記　1）＃印寸法は最小サービス空間寸法とする。
　　2）指定外の寸法公差は表１による。
　　3）取付用ネジは＋トラスタッピンネジ呼び径４×１６を使用のこと。

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.

名称 NAME	材質 MATERIAL	表面処理 SURFACE TREATMENT
防 水 箱 WATERPROOF BOX	A5052P	ｱﾛｼﾞﾝ#1200／ニュートンNo.5（塗装） Alocrom1200/Newtone No.5 (coating color)



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

表1 TABLE 1

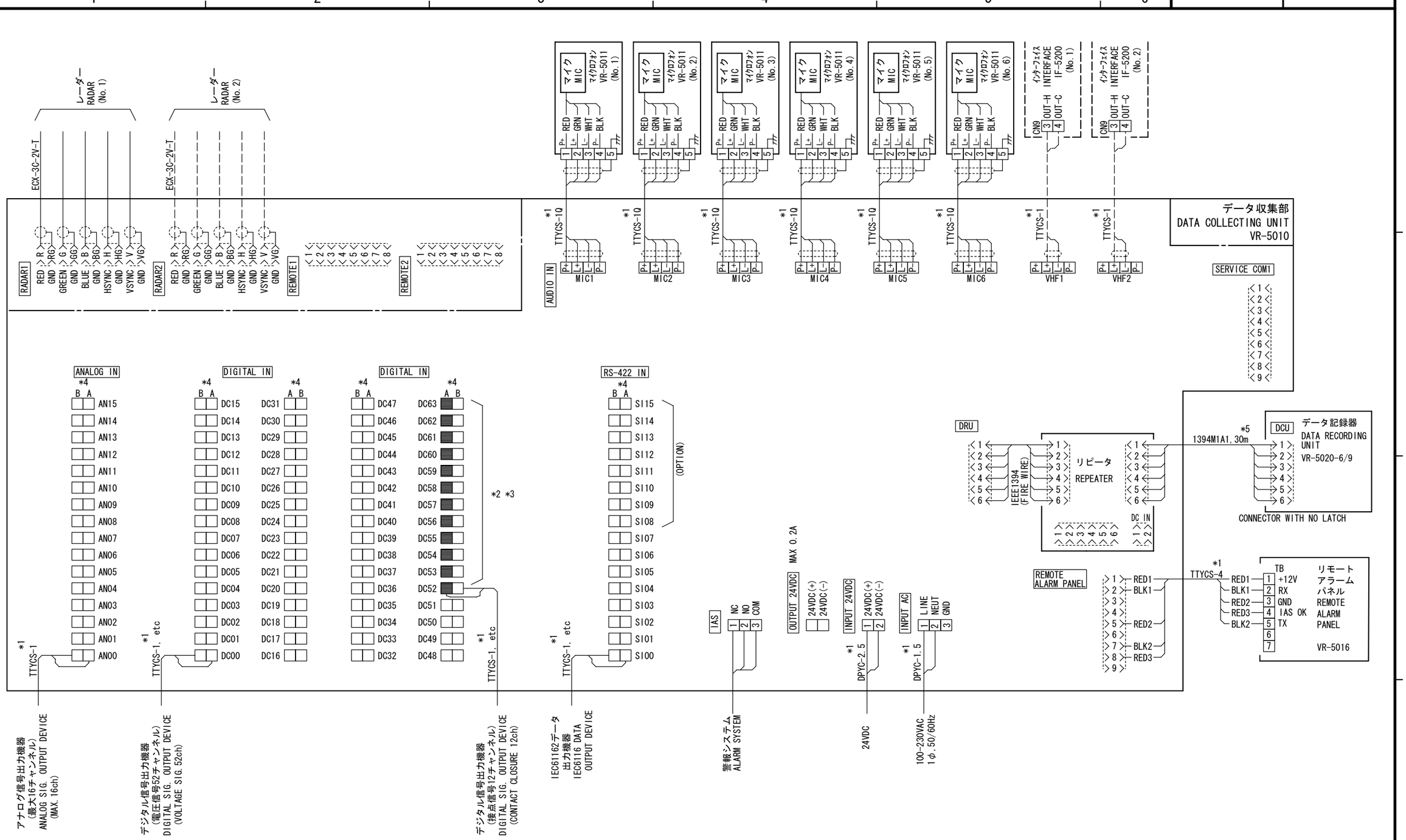
注記 1）指定なき寸法公差は表1による。
2）#印寸法は最小サービス空間寸法とする。
3）取付にはM6ボルトまたはコーチボルト
呼び径6を使用のこと。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. #: RECOMMENDED SERVICE CLEARANCE.
3. USE M6 BOLTS OR COACH BOLTS ø6 FOR FIXING THE UNIT.

DRAWN Apr. 28 '03 T.YAMASAKI			TITLE VR-5012
CHECKED Apr. 28 '03 T.MATSUGUCHI			名称 マイク防水箱
APPROVED Apr. 30 '30 T.Matsuguchi	VR-5000		外寸図
SCALE 1/2	MASS 0.9 ±10% kg		NAME MICROPHONE WATERPROOF BOX
DWG.No. C4418-G05- C	14-058-992G-0		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。

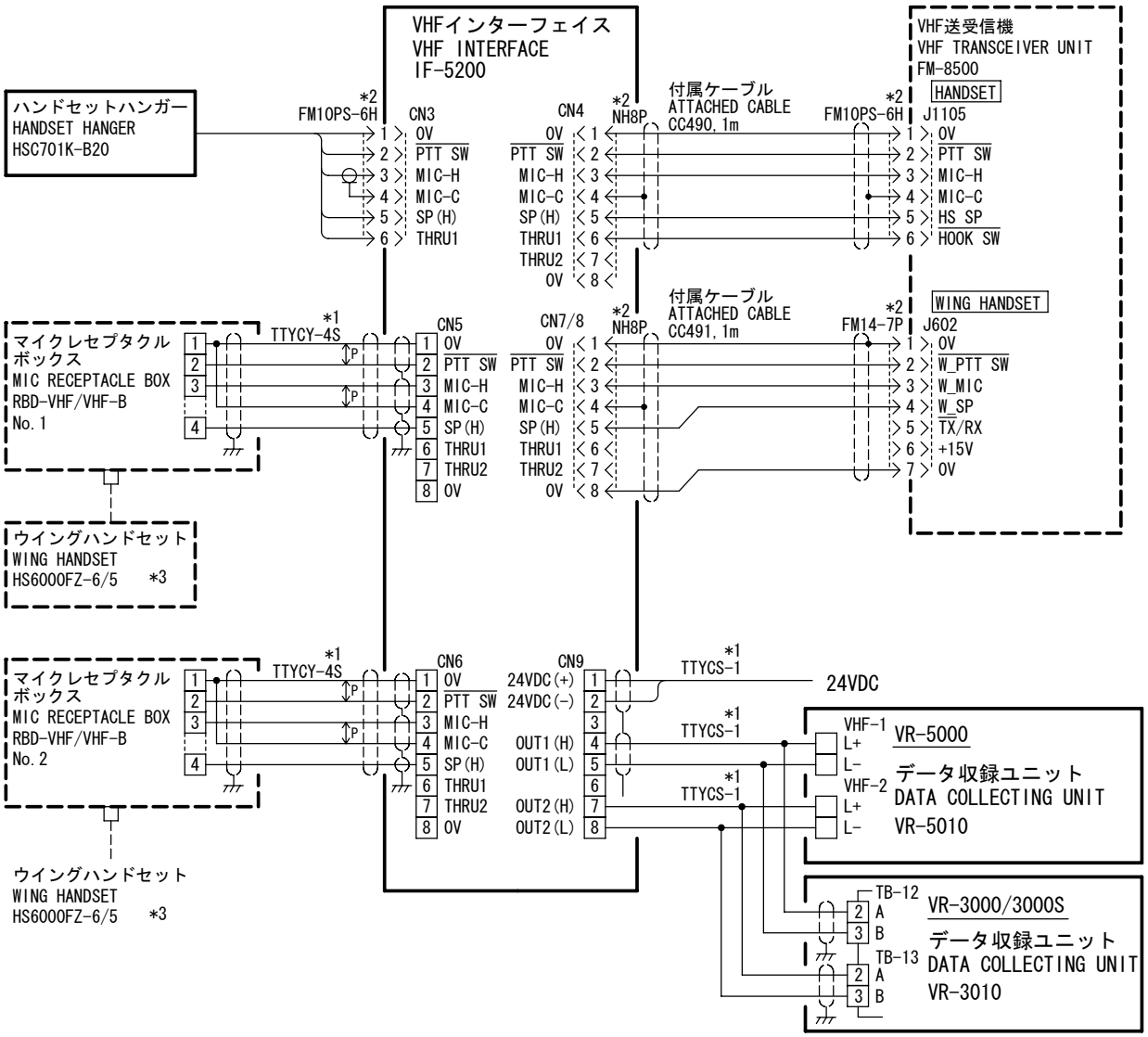
注記
＊１）造船所手配
＊２）ドライ接点専用(COMMONは下部端子Bへ接続)
＊３）ドライ接点の場合、COMMONは追加端子に接続すること
＊４）Aは上部端子、Bは下部端子
＊５）切断不可

CONSULT WITH SHIPOWNER AND/OR SHIPYARD ABOUT CONNECTION OF DEVICES.

NOTE
*1. SHIPYARD SUPPLY.
*2. CONTACT CLOSURE ONLY. (COMMON LINE CONNECT LOWER TERMINALS "B".)
*3. IN CASE OF CONTACT CLOSURE,
ALL COMMONS SHALL BE CONNECTED TO THE ADDITIONAL TERMINALS.
*4. A ARE UPPER TERMINAL AND B ARE LOWER TERMINAL.
*5. NEVER CUT THE CABLE.

DRAWN May 31 '04 K.MIYAZAWA		TITLE	VR-5000
CHECKED TAKAHASHI.T		名称	航海情報記録装置
APPROVED Y.Hatai			相互結線図
SCALE / MASS kg		NAME	VOYAGE DATA RECORDER
DWG No. C4418-C01- B			INTERCONNECTION DIAGRAM

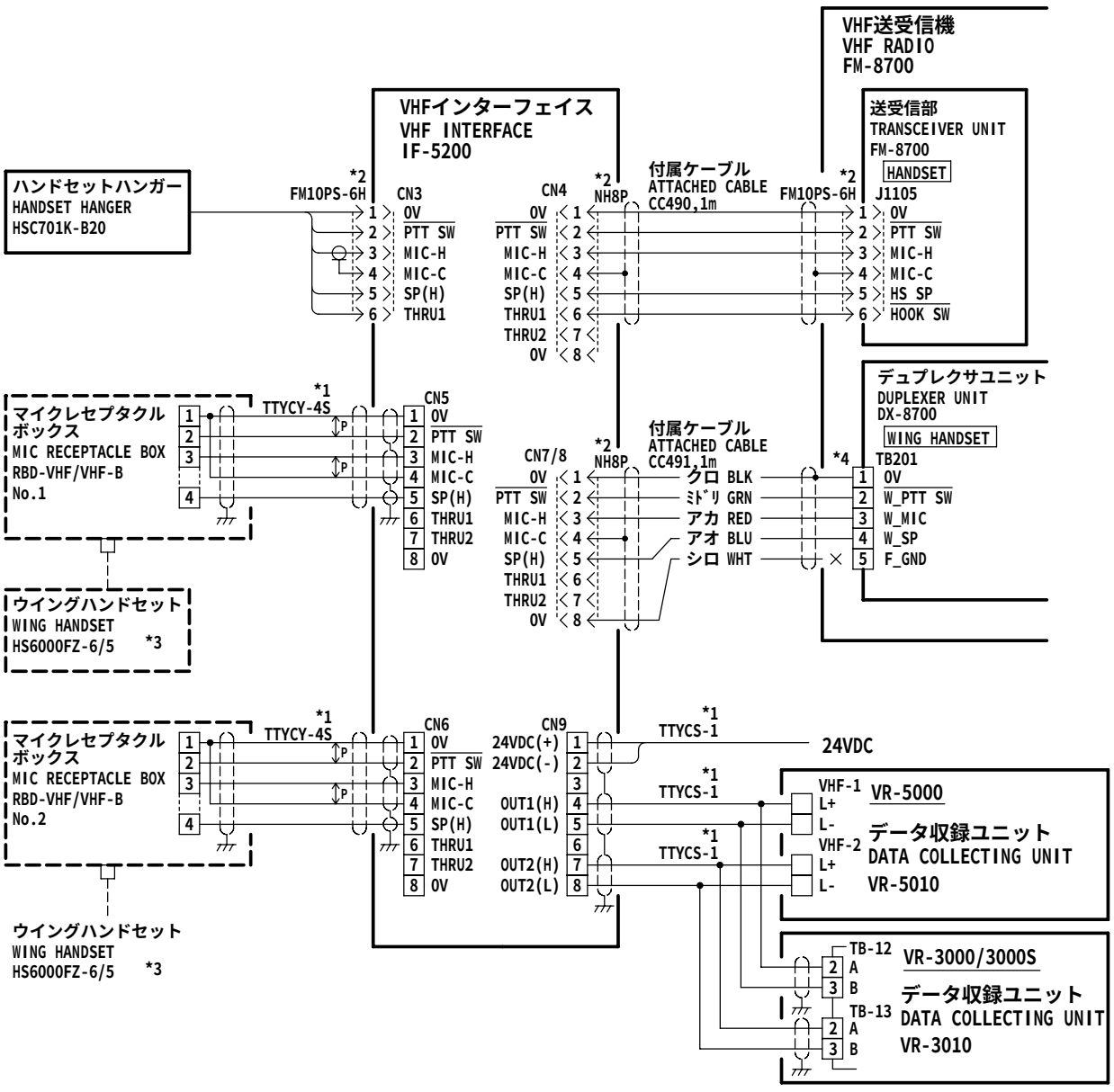
FURUNO ELECTRIC CO., LTD.



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



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

Label for expiry date

If necessary, cut each label and use for inscribing the expiry date.

INT.BACK-UP BATTERY-EXPIRY DATE	
ACOUSTIC LOCATOR-EXPIRY DATE	
LAST ANNUAL CHECK-DATE	

INT.BACK-UP BATTERY-EXPIRY DATE	
ACOUSTIC LOCATOR-EXPIRY DATE	
LAST ANNUAL CHECK-DATE	

INT.BACK-UP BATTERY-EXPIRY DATE	
ACOUSTIC LOCATOR-EXPIRY DATE	
LAST ANNUAL CHECK-DATE	

INT.BACK-UP BATTERY-EXPIRY DATE	
ACOUSTIC LOCATOR-EXPIRY DATE	
LAST ANNUAL CHECK-DATE	

INT.BACK-UP BATTERY-EXPIRY DATE	
ACOUSTIC LOCATOR-EXPIRY DATE	
LAST ANNUAL CHECK-DATE	

INT.BACK-UP BATTERY-EXPIRY DATE	
ACOUSTIC LOCATOR-EXPIRY DATE	
LAST ANNUAL CHECK-DATE	

Save the label inserting the label case on the Data collecting unit.