

Installation Manual

ECDIS

Model FMD-3100

(ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM)

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For PCU-3010

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SAFETY INSTRUCTIONS

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



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.



Warning, Caution



Prohibitive Action



Mandatory Action



WARNING



**ELECTRICAL
SHOCK
HAZARD**

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

Only qualified personnel are allowed to work inside the equipment.



Turn off the power at the mains switch-board before beginning the installation.

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



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

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



Use only the specified power cable.

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



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

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



WARNING



Attach protective earth securely to the ship's body.

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



CAUTION

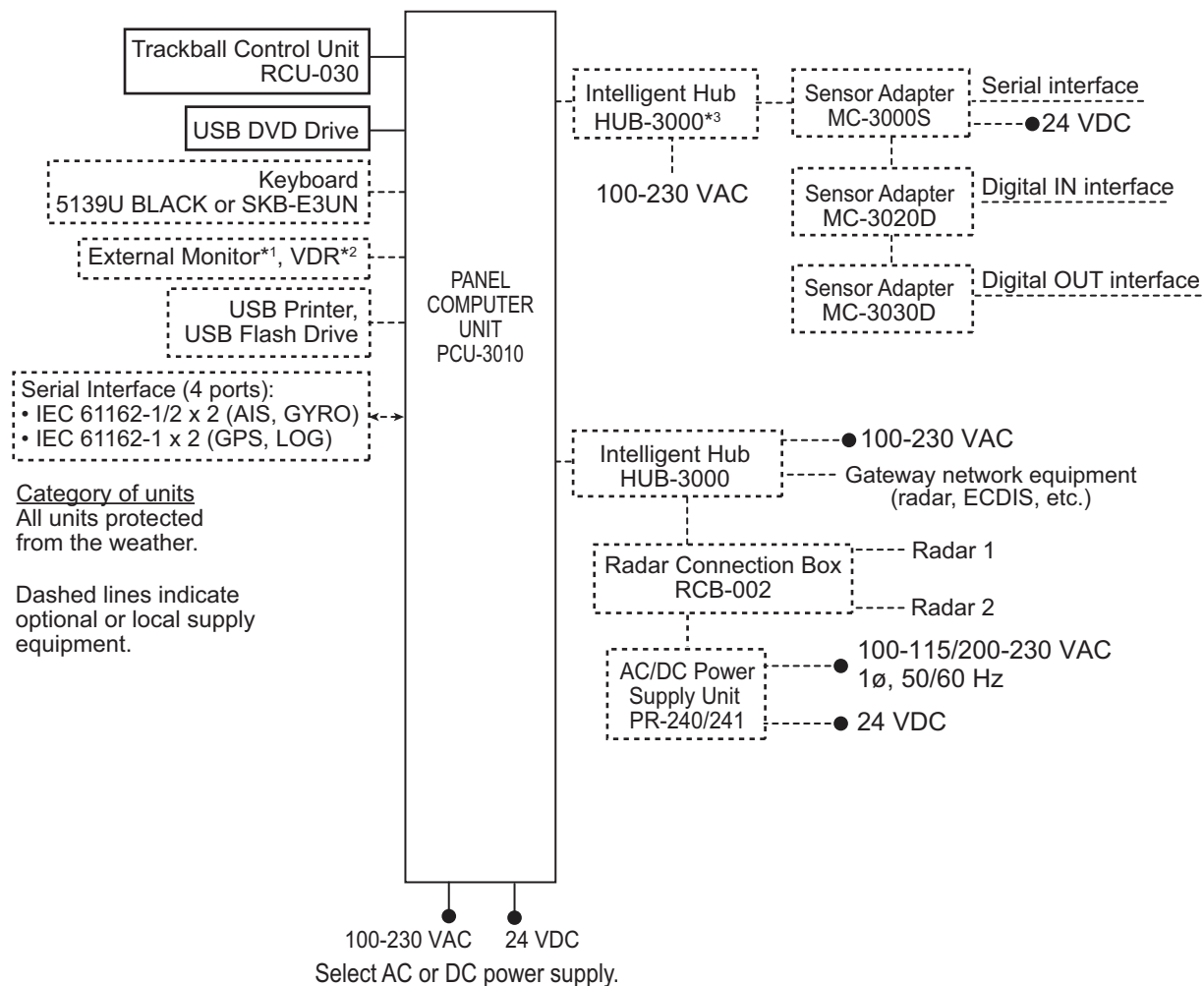


Observe the following compass safe distances to prevent interference to a magnetic compass:

Unit	Standard compass	Steering compass
Panel Computer Unit (PCU-3010)	0.95 m	0.6 m
Trackball Control Unit (RCU-030)	0.5 m	0.3 m
Intelligent HUB (HUB-3000)	1.20 m	0.75 m
Switching HUB (HUB-100)	1.00 m	0.60 m
Sensor Adapter (MC-3000S)	2.05 m	1.35 m
Sensor Adapter (MC-3020D)	1.05 m	0.70 m
Sensor Adapter (MC-3030D)	0.90 m	0.60 m
Radar Connection Box (RCB-002)	1.45 m	0.95 m

SYSTEM CONFIGURATION

Single workstation

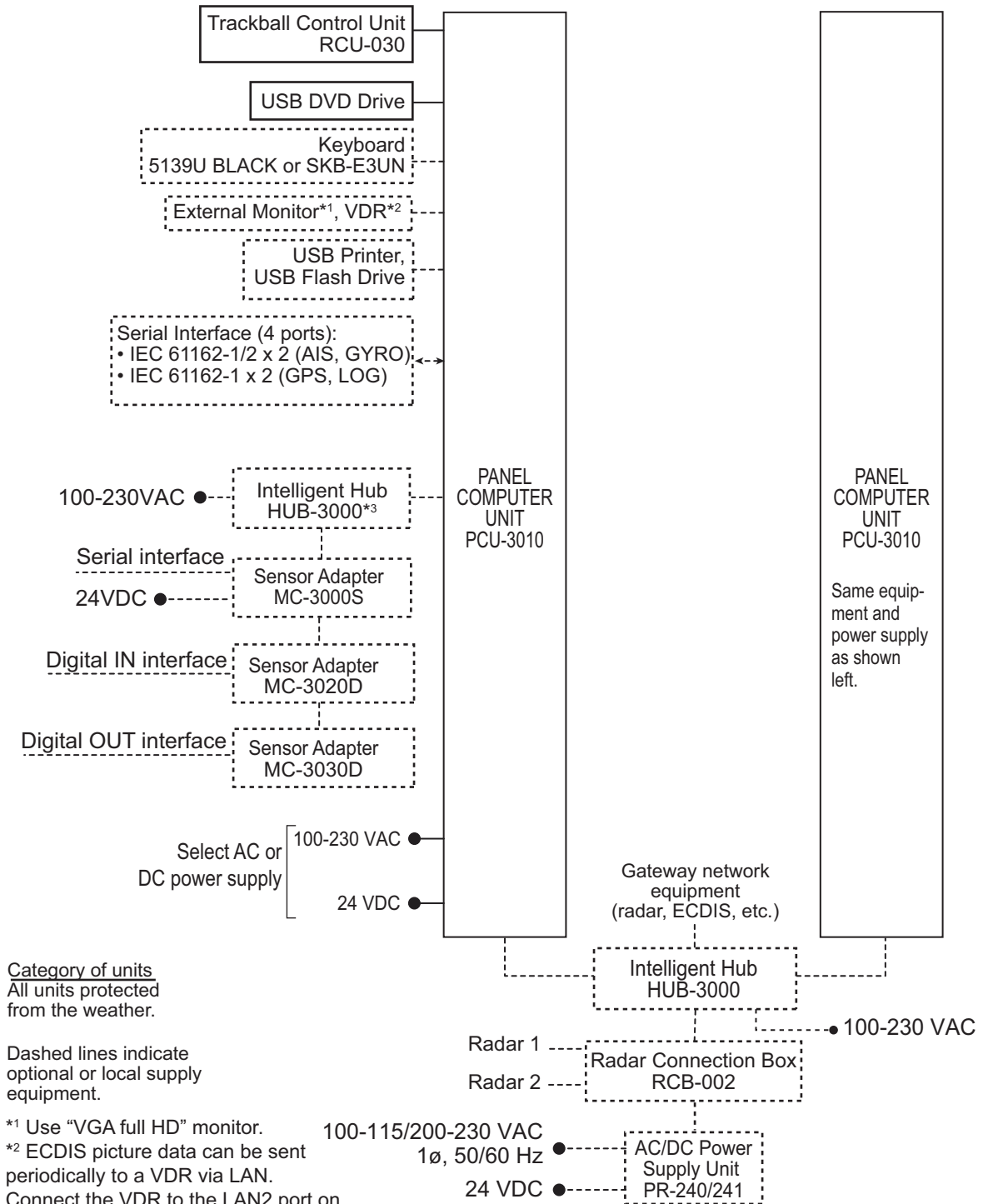


*¹ Use "VGA full HD" monitor.

*² ECDIS picture data can be sent periodically to a VDR via LAN.

Connect the VDR to the LAN2 port on the Panel PC to send the data.

*³ For IEC 61162-450 Ed.1 complying network, use Switching Hub HUB-100.

Multiple workstations (Maximum 3)

EQUIPMENT LIST

Standard Supply

Name	Type	Code No.	Qty	Remarks
Panel Computer Unit	PCU-3010	-	1	
Trackball Control Unit	RCU-030	-	1	
Installation Materials	CP24-03102	001-567-110	1	For PCU-3010
Accessories	FP24-01030	000-038-691	1	DVD drive

Optional Supply

Name	Type	Code No.	Remarks
Radar Connection Box	RCB-002	-	For connection of external radar
Sensor Adapter	MC-3000S	-	Serial control unit
	MC-3020D	-	Digital IN
	MC-3030D	-	Digital OUT
Intelligent HUB	HUB-3000	-	
Switching HUB	HUB-100	-	
AC/DC Power Supply Unit	PR-240	-	
	PR-241	-	
Ferrite Core	OP86-11	001-594-450	For PR-241
Case Gasket	OP24-28	001-169-970	For MC-3000S
	OP24-29	001-169-960	For MC-3020D/3030D
Flush Mount Kit	OP24-38	001-263-190	For RCU-030
Cable Clamp	OP24-58	001-562-560	For PCU-3010
Hood	OP24-60	001-562-580	For PCU-3010
Keyboard	OP24-41	001-263-250	For PCU-3000/PCU-3010, with keyboard (5139U or 5139U BLACK)
	OP24-62	001-590-780	For PCU-3000/PCU-3010, with keyboard (SKB-E3UN)
Bracket	OP24-59	001-562-570	For PCU-3010
USB Dongle	EC-3000	000-570-740	For PCU-3010
Crimping Tool	CRIMPFOX 10S	001-206-920	For ferrule
Installation Materials	CP03-28900	000-082-658	LAN cable, 10 m
	CP03-28910	000-082-659	LAN cable, 20 m
	CP03-28920	000-082-660	LAN cable, 30 m
	CP24-02900	001-208-050	LAN cable, 10 m, for HUB-3000
	CP24-02910	001-208-060	LAN cable, 20 m, for HUB-3000
	CP24-02920	001-208-070	LAN cable, 30 m, for HUB-3000

Name	Type	Code No.	Remarks
Cable Assy.	3COX-2P-6C 5M	001-077-230-10	For external monitor, VDR, 5m
	MC1.5-W-L600	001-187-470-10	Between sensor adapters, 0.6 m
	MC1.5-W-L1000	001-187-480-10	Between sensor adapters, 1 m
	MC1.5-W-L2000	001-187-490-10	Between sensor adapters, 2 m
	MC1.5-W-L3000	001-187-500-10	Between sensor adapters, 3 m
	MJ-A10SPF0020A-050+	001-283-370-00	For Non-FURUNO radars, 5 m
	MJ-A10SPF0020A-100+	001-283-380-00	For Non-FURUNO radars, 10 m
	MJ-A10SPF0020A-200+	001-283-390-00	For Non-FURUNO radars, 20 m
	MJ-A10SPF0020A-300+	001-283-400-00	For Non-FURUNO radars. 30 m
Operator's Manual	OME-44841-*	000-196-492-1*	English
LOP Instruction Manual	E42-01411-*	000-190-356-1*	English

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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 Panel Computer Unit (PCU-3010)

The PCU-3010 can be flush-mounted or desktop-mounted (optional).

Mounting considerations

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

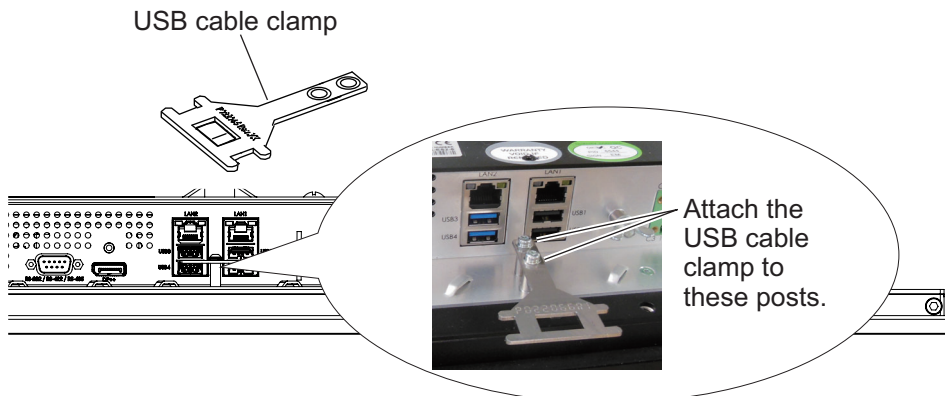
- Locate the PCU away from heat sources. The cabinet can build up heat inside, causing undue wear to electrical components.
- Choose the mounting location while considering the length of cable between the PCU and other equipment to be connected.
- Do not cover the air intakes near the connectors at the base of the PCU.
- Leave at least 50 mm clearance around the rear air vents of the unit to allow heat dissipation.
- Locate the PCU away from areas which may be subject to splash or rain.
- Referring to the outline diagrams at the back of this manual, leave sufficient space around the equipment to facilitate maintenance.
- Keep in mind the desired location of the trackball unit. Make sure there is enough room to install the Trackball Control Unit near the PCU.
- A magnetic compass will be affected if the equipment is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass.
- Vibration at the mounting location should be minimum.
- Alarm and alert buzzer sounds are generated from a speaker on the face of the PCU. To avoid sound dampening, do not place any object in front of the PCU. Ensure the speaker hole is kept free of dust and water.

1. MOUNTING

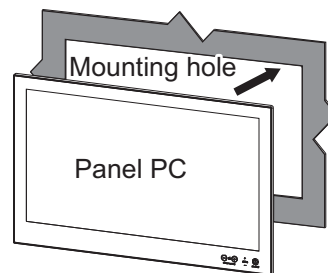
1.1.1 Flush mounting

You will need a Torx screwdriver (T10, T25) to complete this procedure.

1. Attach the USB cable clamp to the PCU using the Torx screws supplied.

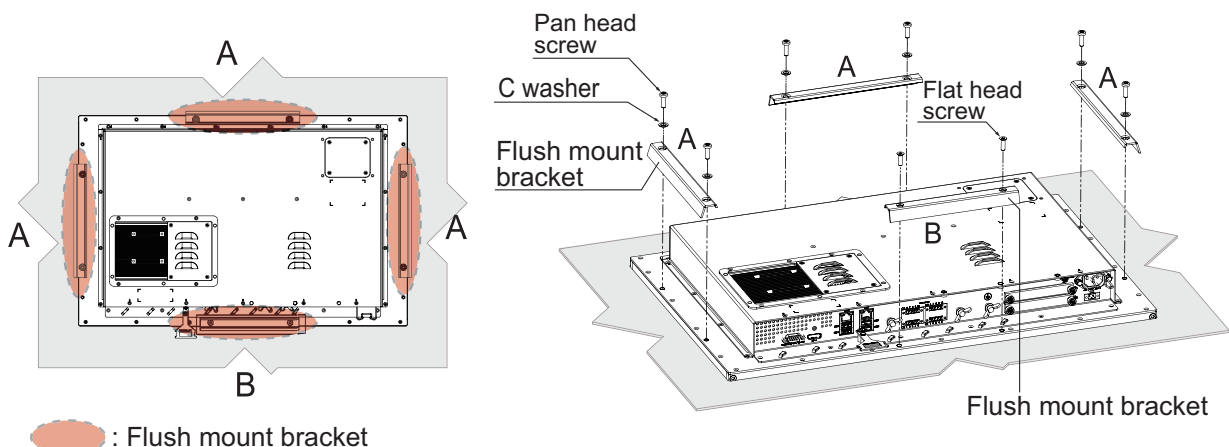


2. Make a cutout in the mounting location, referring to the outline drawings at the back of this manual.
3. Connect all cables to their appropriate slot on the PCU. Take care to leave enough slack in the cables to allow access for maintenance and repair.
4. Slide the unit into the cutout. Take care to not to bend or squash any cabling.



Note: User controls and ports should be facing downwards.

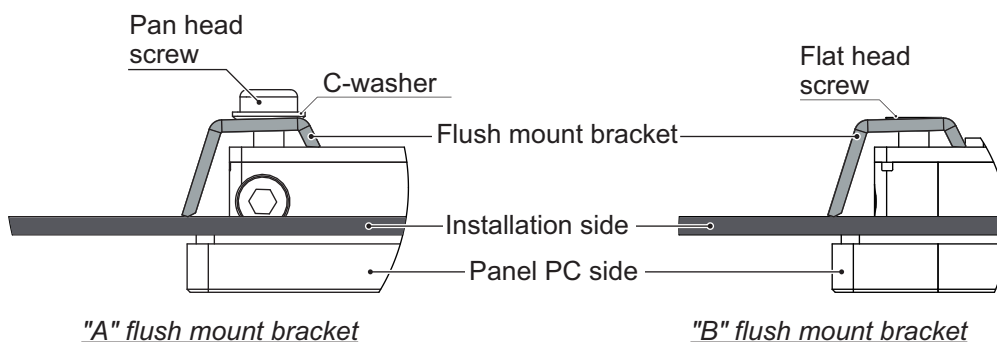
5. Taking care not to confuse the bracket types (see figure below), fasten each bracket into place, referring to the figure below.



- "A" flush mount bracket: Use pan head screws (M5×16) and C washer.
- "B" flush mount bracket: Use flat head screws (M5×16). Only the "B" flush mount bracket (for the lower part) has different lengths and screw holes.

Installation side (rear side)

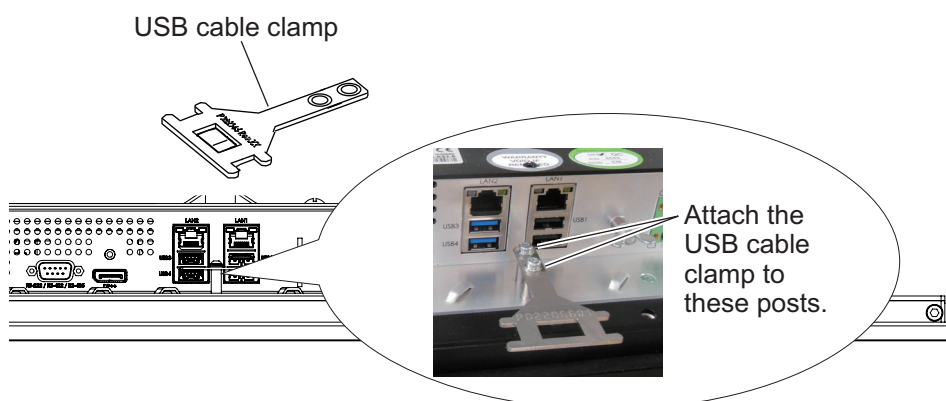
Fasten the flush mount brackets as shown below.



1.1.2 Desktop mounting (optional)

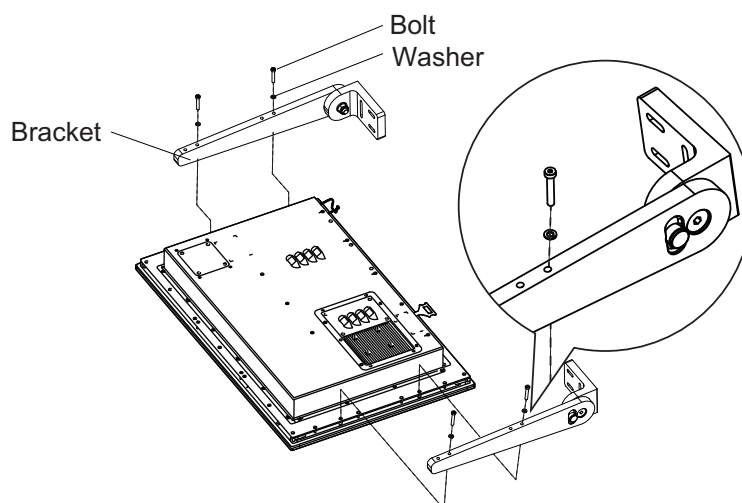
You will need a Torx screwdriver (T10) and a 4mm hexagon wrench to do this procedure.

1. Attach the USB cable clamp to the PCU using the supplied screws (2 pcs.).



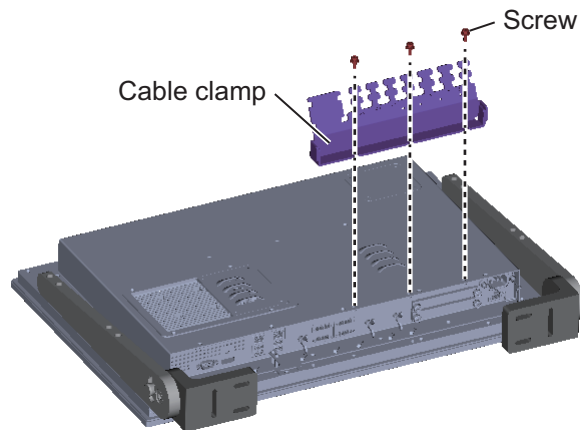
2. Attach the brackets to the PCU-3010, referring to the figure below. It is essential that the brackets are attached using the bottom screw holes, as shown in the diagram below. Failure to do so will result in undue vibrations.

Note: Ensure the PCU-3010 is placed face-down on a soft, clean area to prevent damage to the screen.

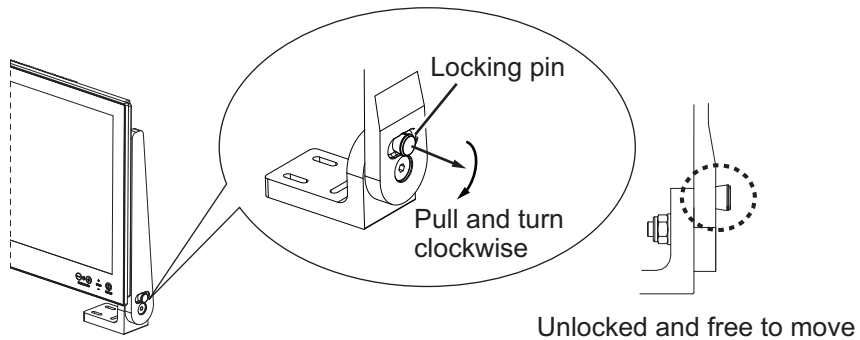


1. MOUNTING

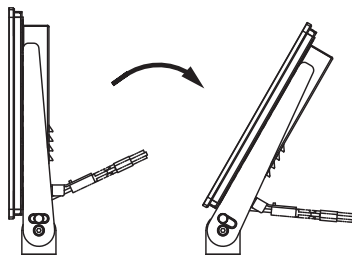
3. Attach the cable clamp (supplied) to the rear of the PCU-3010 using the supplied screws (M5×12, 3 pcs.).



4. Referring to the figure below, tilt the PCU 90° rearwards by unlocking the brackets. Hold the unit in place, then pull and turn the locking pins clockwise, one at a time, to set the pin in the unlock position.

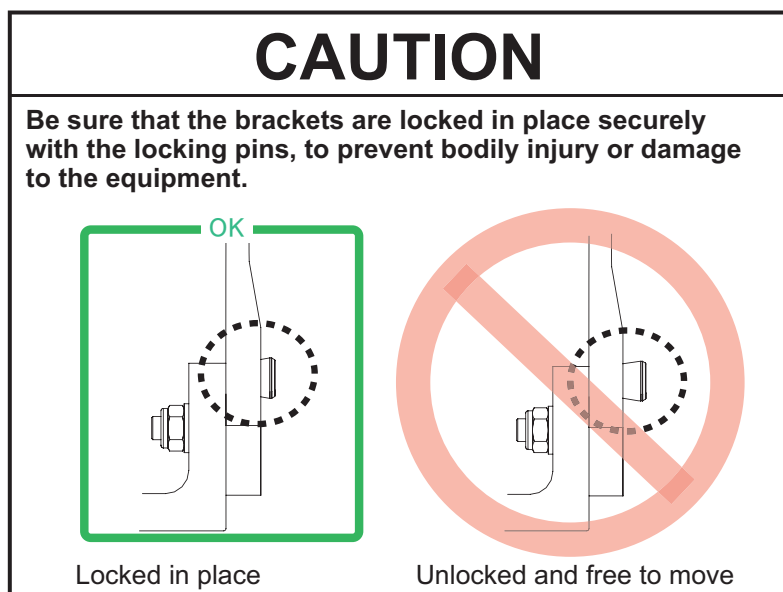
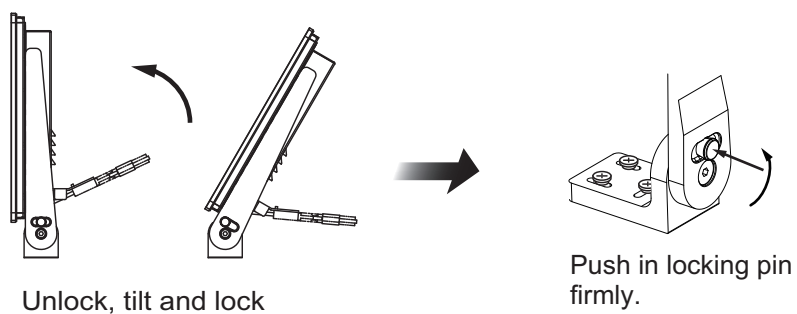


5. After tilting the PCU turn the locking pin counter clockwise to lock the bracket in place.



6. Attach the footings of the brackets in place at the mounting location using the self-tapping screws (φ6×30, 6 pcs.) included in the mounting kit.

7. Referring to the figure below, set the PCU upright at a comfortable viewing angle, then turn the locking pin counterclockwise to lock the brackets in place.



1. MOUNTING

1.1.3 How to attach the hood (optional)

Follow the procedure below to install the optional hood (type: OP24-60). You will need these tools.

Flush-mounting: T25 Torx screwdriver

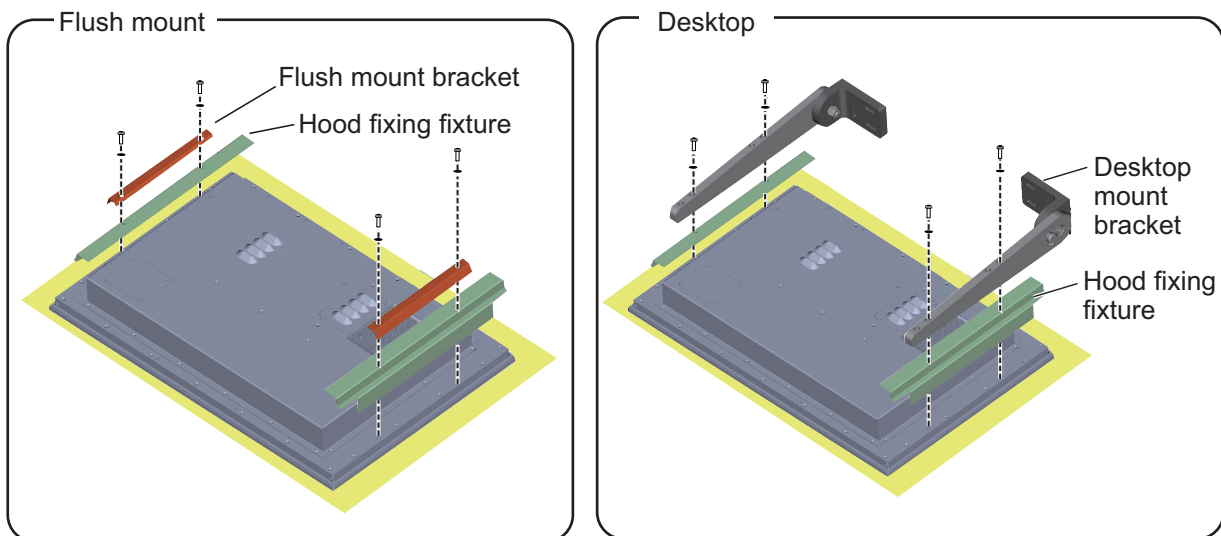
Desktop mounting: 4 mm hex wrench

1. Referring to the figure below, fit the hood reinforcement fixture to the back of the PCU-3010.

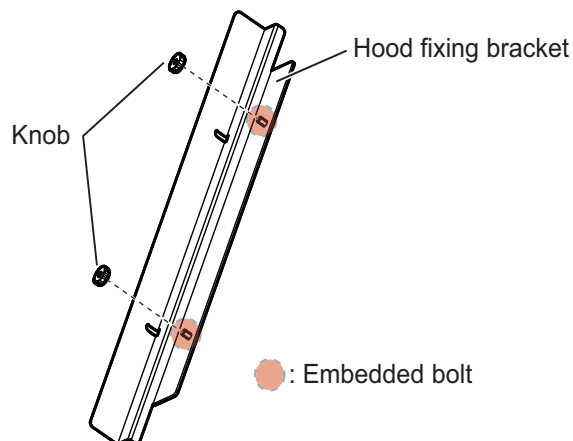
Flush-mounting: Install the hood fixing fixture with the flush mount brackets.

Desktop mounting: Install the hood fixing fixture with the desktop mount brackets.

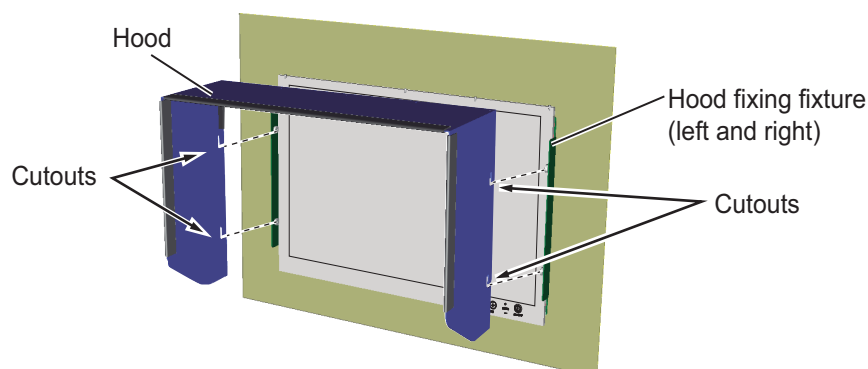
Note: The screws and washers to fix the hood fixing fixture are supplied with the PC-3010.



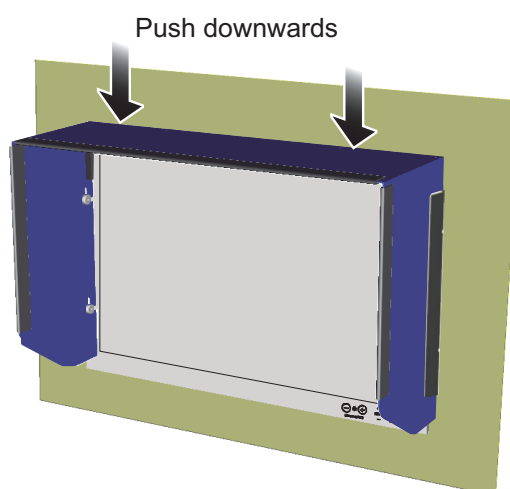
2. Screw in knurled knobs (4 pieces) loosely from the inside onto the embedded bolts of the hood fixing brackets (2 pieces).



3. Using the cutouts in the hood, set the hood in place between the knobs and the hood fixing fixtures.



4. Referring to the figure below, push the hood down to align the cutouts with the knobs.



5. Fasten the knobs to secure the hood in place.

1.1.4 How to install the keyboard (optional)

For OP24-41

To install the optional keyboard (Type: 5139U BLACK, contained in OP24-41), do the following procedure.

1. Stick the smaller velcro tape (Fastener, 4 pcs., supplied with the optional kit) to the four corners of the rear of the keyboard.
2. Fit the larger velcro tape (Fastener, 4 pcs., supplied with the optional kit) to the smaller tape.
3. Remove the protective film from the larger velcro tape.
4. Fit the keyboard at the installation location.

1. MOUNTING

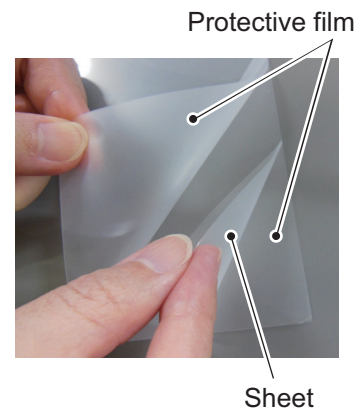
For OP24-62

To install the optional keyboard (Type: SKB-E3UN, contained in OP24-62), do the following procedure.

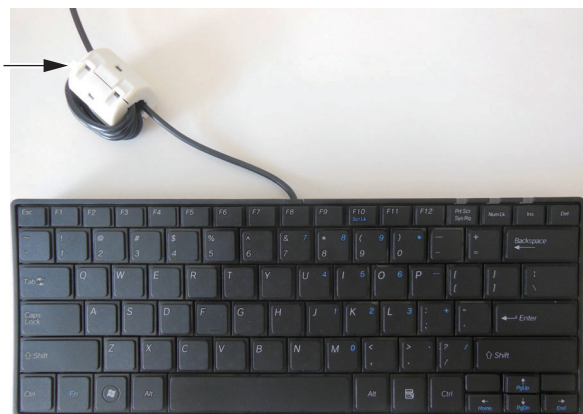
- Referring to the following steps, fit the static electricity prevention sheet (included as optional kit) to the keyboard, then fix the keyboard at the installation location using the double-sided tape (Tape V/H, supplied with the optional kit).
 - Remove the protective film from one side of the supplied double-sided tape, then stick the tape to the 4 edges of the rear of the keyboard.
 - Remove the protective film on both sides of the sheet, then fit the sheet to the keyboard.
Note: The sheet is extremely thin and should be handled with care.
 - Remove the protective film from the double-sided tape on the rear of the keyboard, then fix the sheet to the tape.
- Stick the smaller velcro tape (Fastener, 5 pcs., supplied with the optional kit) to the four corners of the rear of the keyboard and to the EMI core.
- Fit the larger velcro tape (Fastener, 5 pcs., supplied with the optional kit) to the smaller tape.
- Remove the protective film from the larger velcro tape.
- Fit the keyboard at the installation location.
- Depending on the installation location and environment, move and then fit the EMI cores as required.

The following points should be observed when moving the EMI cores:

- Do not remove or disconnect the USB cable.
- Do not apply undue stress or weight to the base of the cable connection on the keyboard.
- The EMI core must not be suspended freely as this puts strain on the cable.
- Re-wrap the cable around the EMI core a total of 6 times. The cable should pass through the EMI core a total of 7 times.



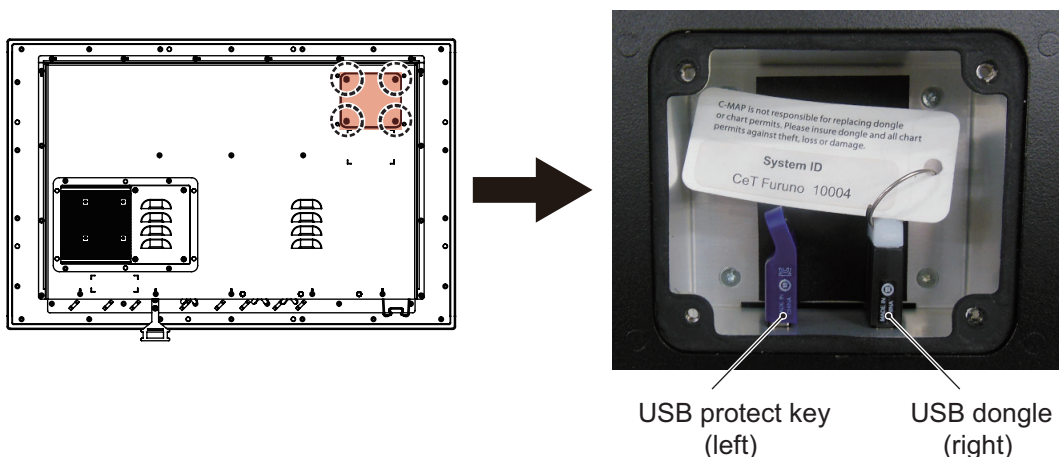
EMI core
If you change the position, re-wrap cable around the core 6 times.



1.1.5 How to replace the USB protect key and USB dongle

You will need a Torx screwdriver (T10) to do the replacement.

Turn off the power **BEFORE** replacing the USB protect key (ENC chart use) and USB dongle (C-MAP chart use). Unfasten the four screws circled in the figure below to open the lid. The USB protect key is on the left; the USB dongle on the right.



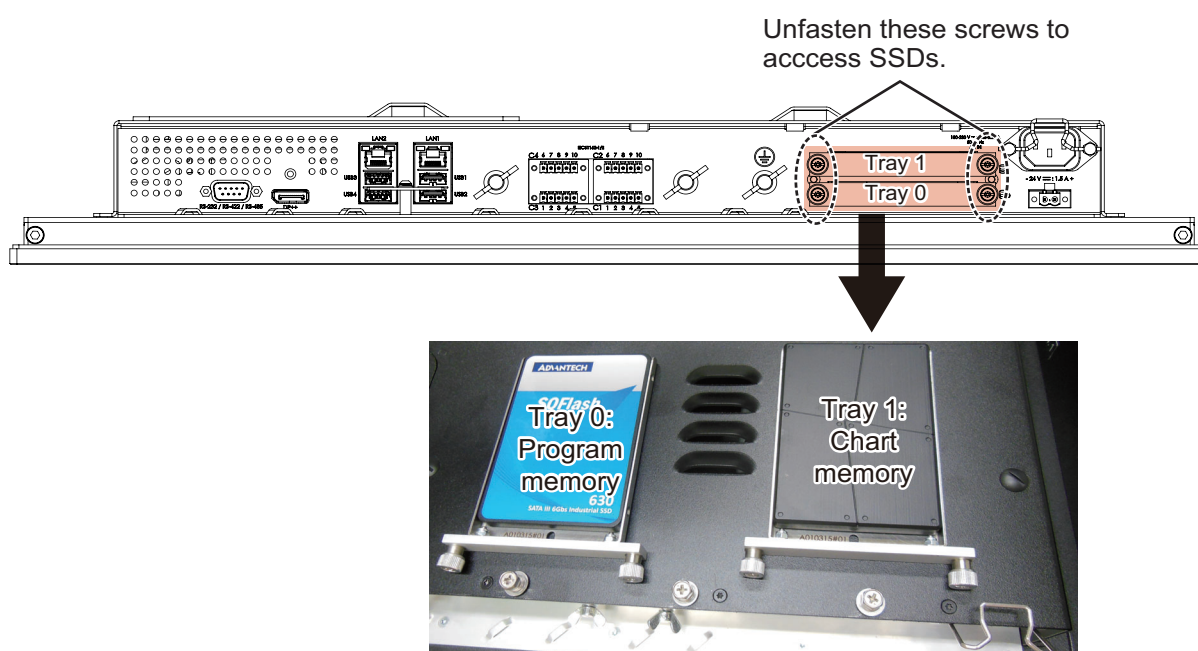
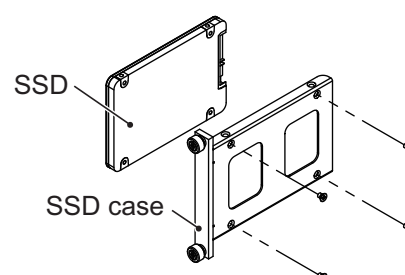
1.1.6 How to replace an SSD

You will need a Phillips-head screwdriver (PH2) to do the replacement.

Remove the SSD case from the SSD slot. Unfasten the screws circled in the figure below, then remove the SSD. Be sure to insert SSDs into their correct slots to prevent possible equipment malfunction.

Tray 0: program memory (4 GB)

Tray 1: chart memory (64 GB)



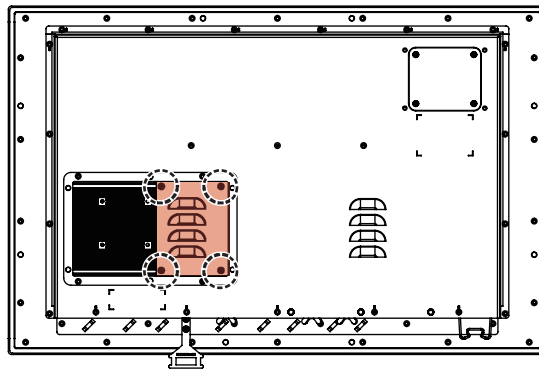
1.1.7 How to replace the fan

The life of the fan is approximately five years. Replace the fan when any of the following occurs.

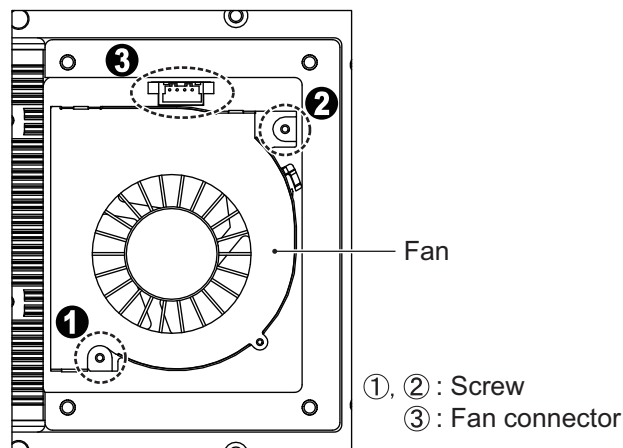
- The recommended replacement interval of five years has passed.
- The fan emits strange noises when the processor unit is powered.
- The Alert 30002 "Processor Unit Fan1 Fan No Rotation" is generated.

You will need a Torx screwdriver (T10) to do the replacement.

1. Turn off the power to the FMD-3100.
2. On the rear panel, unfasten the four screws fixing the fan cover.



3. Referring to the figure below, unfasten two fixing screws and disconnect the fan connector, in that order, to remove the fan.



4. Connect the fan connector of the new fan.
5. Set the fan to the unit, then fasten the two fixing screws.
6. Close the fan cover.

1.2 Trackball Control Unit (RCU-030)

The Trackball Control Unit (RCU-030) can be mounted on a desktop in two configurations.

- Desktop with mounting plate (Standard installation)
- Flush mounted inside a console (Optional)

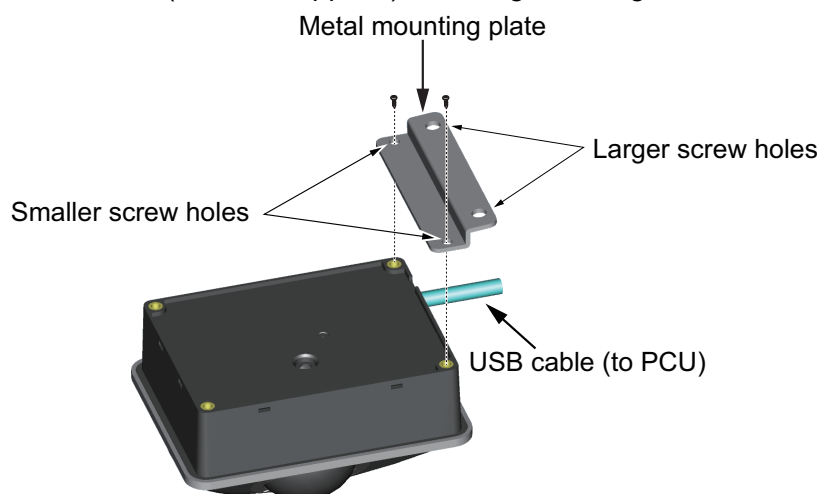
Mounting considerations

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

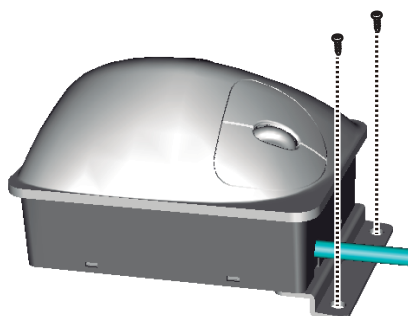
- Select a location where the unit can be operated conventionally.
- Locate the unit away from heat sources. The cabinet can build up heat inside, causing undue wear to electrical components.
- Locate the unit away from areas which may be subject to water splash and rain.
- Referring to the outline diagrams at the back of this manual, leave sufficient space around the equipment to facilitate maintenance.
- Consider the length of the signal cable and the distance between the unit and the PCU. Leave enough slack in the cable to allow for maintenance.
- A magnetic compass will be affected if the equipment is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass.

1.2.1 Desktop mounting (with metal mounting plate)

1. Fix the metal mounting plate (supplied) to the bottom of the unit using two washer head screws (M4×10, supplied), referring to the figure below.



2. Fix the unit to the mounting location using two self-tapping screws (φ5×20, supplied locally).



1. MOUNTING

1.2.2 Flush mounting (optional)

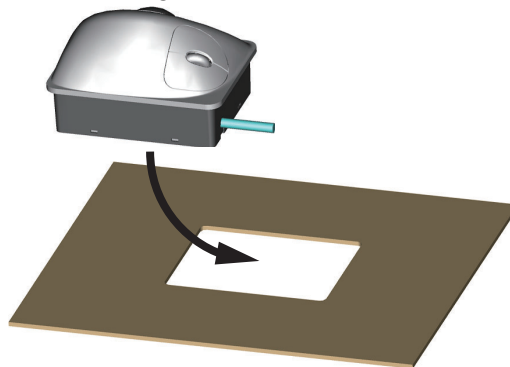
You can use the optional FM FIXTURE ASSEMBLY kit (OP24-38) to flush-mount the unit.

Type: OP24-38, Code No.: 001-263-190

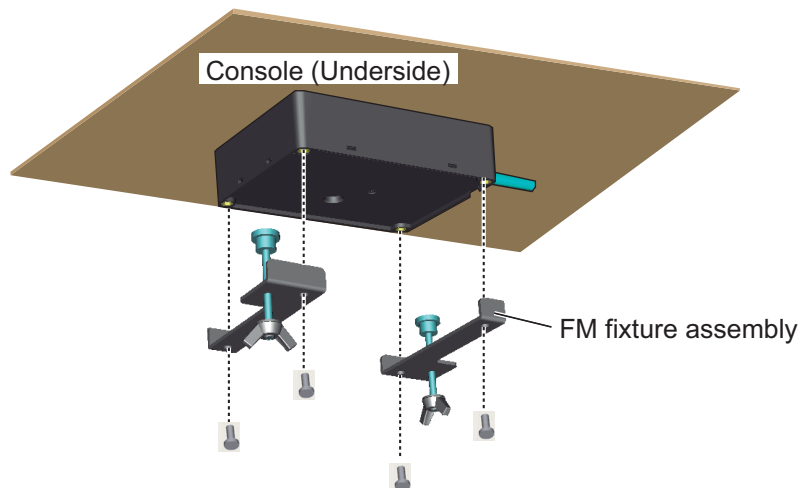
Name	Type	Qty
FM Fixture Assembly	OP24-38-1	2
Washer Head Screw	M4×10	4

Note: The flush mount location must have a thickness of at least 10 mm, with a maximum thickness of 20 mm.

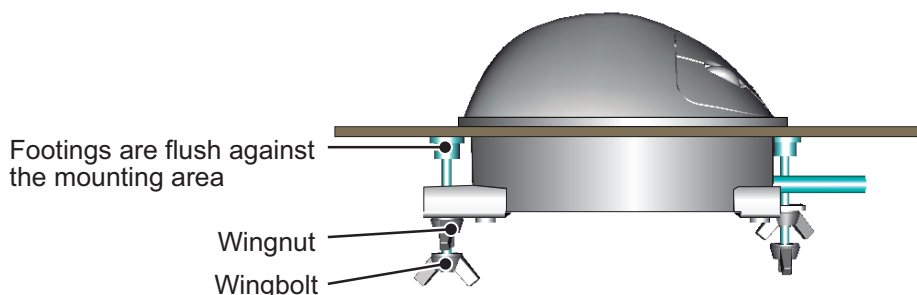
1. Referring the outline drawing at the back of the manual, mark and cut a hole in the position you wish to locate the unit.
2. Set the USB cable through the hole, then place the unit inside the hole.



3. Attach two FM (flush mount) fixture assembly to the unit's under side using four washer head screws (M4×10), both included in the kit.



4. Fasten the wingbolts until the footing is flush against the mounting area.



5. Tighten the wingnuts until the unit is firmly secured.

1.3 Sensor Adapter MC-3000S/3020D/3030D (Optional)

Mounting considerations

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

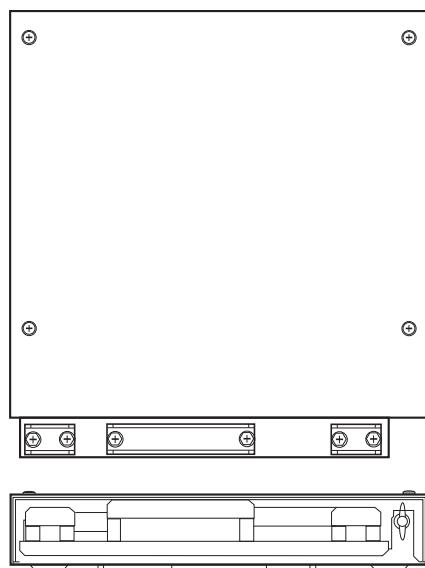
- Locate the equipment away from heat sources because of heat that can build up inside the cabinet.
- Take into account the length of the cables to connected to the equipment when choosing an installation location.
- Vibration at the mounting location should be minimum.
- Locate the equipment away from places subject to water splash and rain.
- Referring to the outline diagrams at the back of this manual, leave sufficient space around the equipment to facilitate maintenance.
- A magnetic compass will be affected if the equipment is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass.
- Select the mounting location considering the numbers of the sensor adapters connected.

A maximum of eight MC-3000S can be connected to a sensor network (for redundant connection:16). Maximum 10 sensor adapters (MC-3020D/3030D) can be connected to a single MC-3000S.

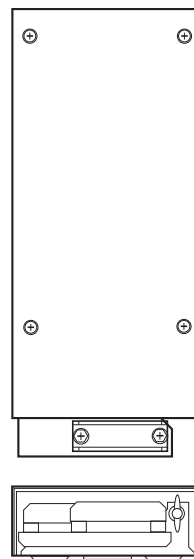
- Select the mounting location so that the length of cables among the sensor adapters (MC-3000S, 3020D and 3030D) is less than 6 m. If the length is more than 6 m, the equipment may not work properly.

How to mount the sensor adapter

1. Unfasten four binding screws to remove the cover from the Sensor Adapter.
2. Fasten four self-tapping screws (4x20, supplied) to fix the Sensor Adapter.
3. Reattach the cover.



MC-3000S



MC-3020D/3030D

1.4 Intelligent Hub HUB-3000 (Optional)

Use the optional Intelligent Hub HUB-3000 to connect gateway network or sensor network. Do not use this hub to connect other shipboard LAN gateway network or sensor network. Do not connect a PC to this network for other than maintenance.

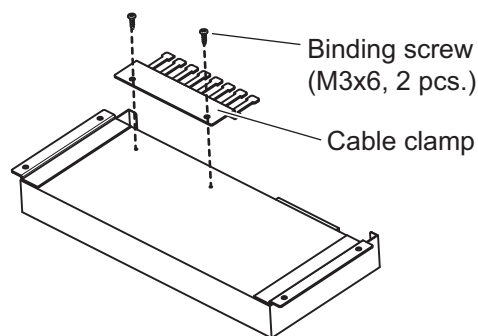
Mounting considerations

Keep the following points in mind when selection a mounting location:

- Locate the HUB-3000 away from heat sources. The cabinet can build up heat inside, causing undue wear to electrical components.
- Take into account the length of the cables to connected to the equipment when choosing an installation location.
- Locate the HUB-3000 away from areas which may be subject to splash or rain.
- Referring to the outline diagrams at the back of this manual, leave sufficient space at the rear of the HUB-3000 to facilitate maintenance.
- A magnetic compass will be affected if the equipment is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass.
- Vibration at the mounting location should be minimum.

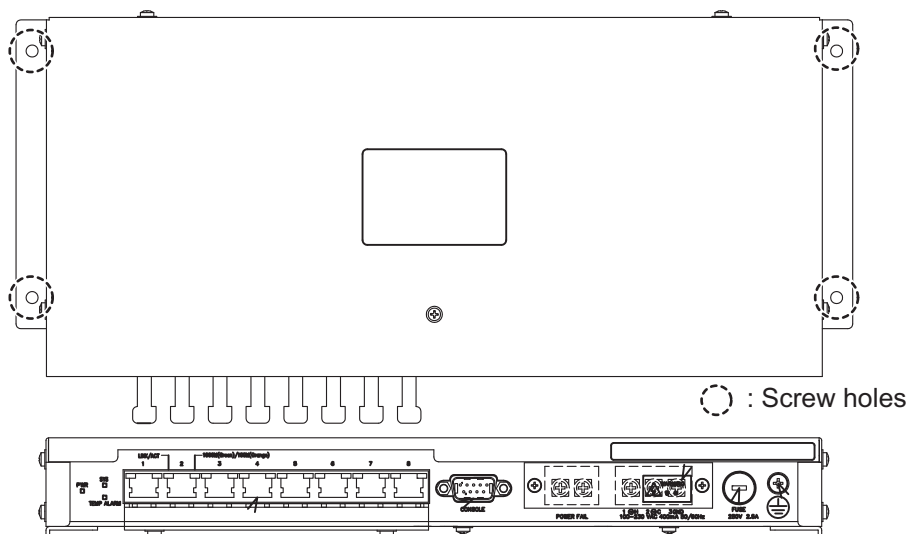
How to mount the intelligent hub HUB-3000

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



HUB-3000, bottom view

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



1.5 Mounting the Switching Hub HUB-100 (Optional)

Use the optional Switching HUB HUB-100 to connect IEC61162-450 Ed.1 complying sensor network. Do not use this hub to connect other shipboard LAN gateway network or sensor network. Do not connect a PC to this network for other than maintenance.

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

Mounting considerations

Keep the following points in mind when selection a mounting location:

- Locate the HUB-100 away from heat sources. The cabinet can build up heat inside, causing undue wear to electrical components.
- The HUB-100 should be fixed firmly so that rough seas and vibrations do not cause the unit to move in any manner.
- Locate the HUB-1000 away from areas which may be subject to splash or rain.
- Referring to the outline diagrams at the back of this manual, leave sufficient space at the rear of the equipment to facilitate maintenance.
- A magnetic compass will be affected if the equipment is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass.
- Vibration at the mounting location should be minimum.

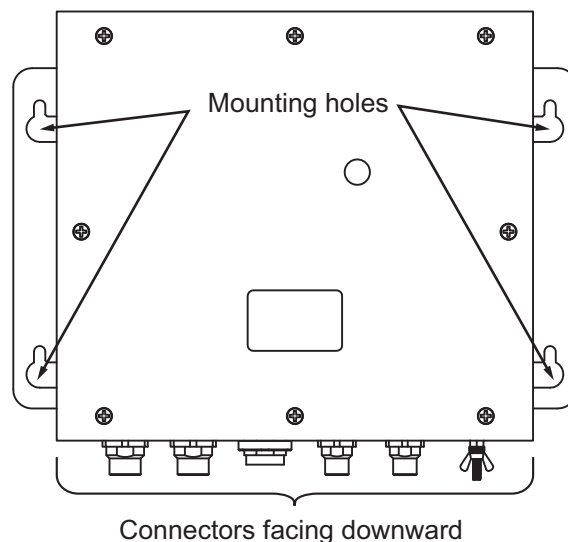
1.6 Radar Connection Box RCB-002 (Optional)

You can display signals from up to two external radars on the FMD-3100 by using the RCB-002. The RCB-002 must be connected via the Gateway Network.

Mounting considerations

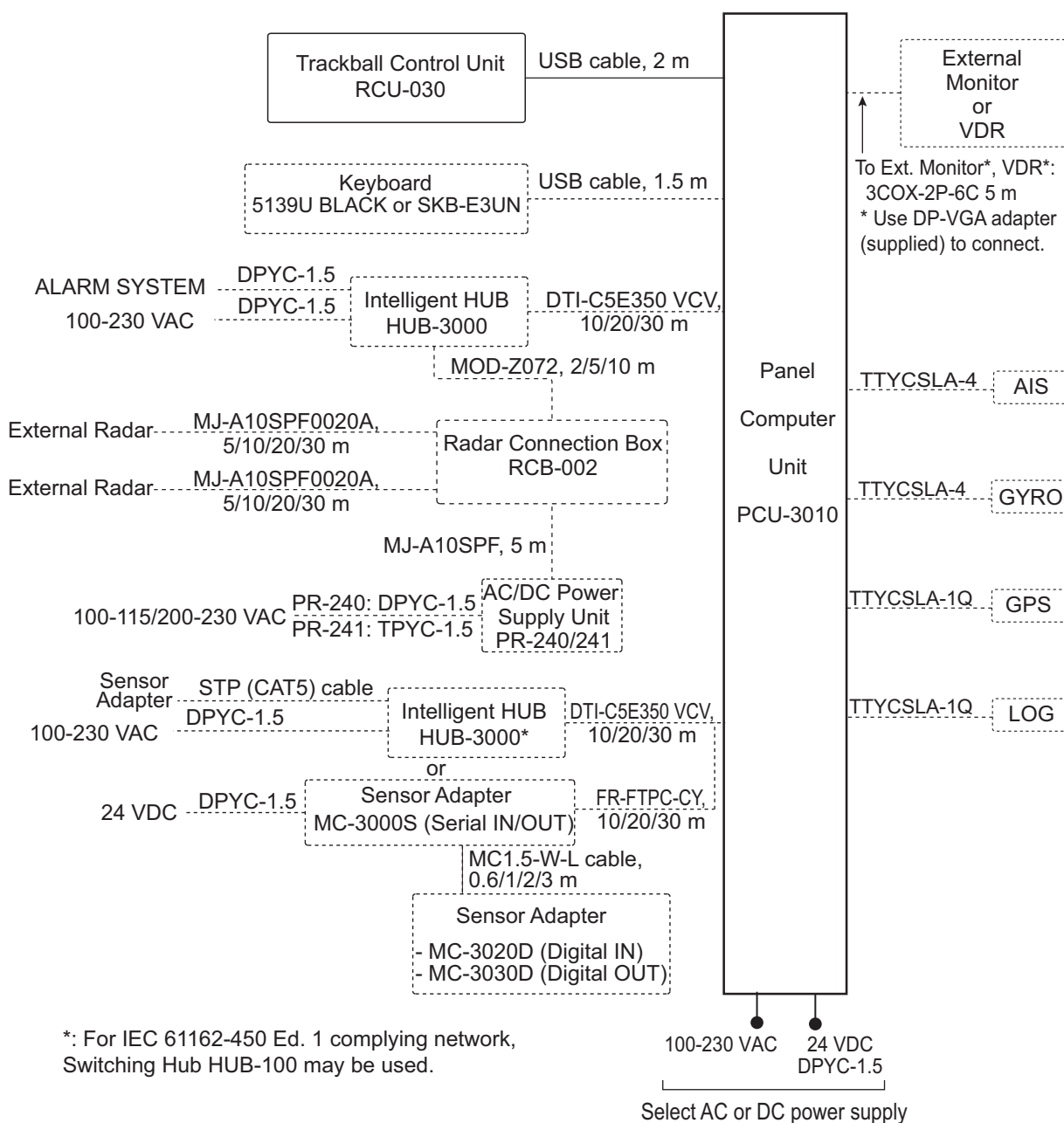
Keep the following points in mind when selection a mounting location:

- Locate the RCB-002 away from heat sources. The cabinet can build up heat inside, causing undue wear to electrical components.
 - Take into account the length of the cables to connected to the RCB-002 when choosing an installation location.
 - The RCB-002 should be fixed firmly so that rough seas and vibrations do not cause the unit to move in any manner.
 - Locate the RCB-002 away from areas which may be subject to splash or rain.
 - Referring to the outline diagrams at the back of this manual, leave sufficient space at the rear of the RCB-002 to facilitate maintenance.
 - A magnetic compass will be affected if the equipment is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass.
 - Vibration at the mounting location should be minimum.
1. Referring to the outline drawing at the back of this manual, drill four holes ($\phi 5 \times 20$) in the mounting location.
 2. Secure the RCB-002 firmly in place using $\phi 5 \times 20$ tapping screws. Make sure the RCB-002 is not subject to undue vibrations.



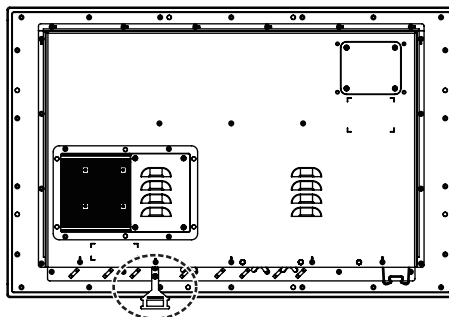
2. WIRING

The illustration on this page shows the general connection between the FMD-3100 and external equipment. For detailed information, see the interconnection diagram at the back of this manual. Many of the cables mentioned are JIS (Japan Industry Standard) cables. If not available locally, use the equivalent. See the cable guide in the Appendix for how to select equivalent cables.



Wiring considerations

- USB cable lengths should be within 5 m, with or without the USB extension cable. Full function cannot be guaranteed if the overall length exceeds 5 m.
- The PCU-3010 is not compatible with the USB 3.0 equipment.
- USB cables should be secured using the clamp highlighted in the figure below.



— Cable clamp for USB cables

- LAN cable lengths between units should be within 50 m.
- The Display Port outputs FULL HD resolution. To connect an analog input device, use the DP-VGA adapter (supplied).
- If extension or division of the RGB cable is required, use the IMAGENICS type CIF-12H RGB divider.
- Ensure all grounding wires are connected between grounding terminals on each equipment and ship's earth.
- If a UPS (user supply) is connected to this equipment, ensure the grounding lamp does not light up.
- Use the following LAN cables for the network if they are available locally.
 - Sensor Network: Cat5 or better.
 - Gateway Network: Cat5e or better.
- If LAN cables are not available locally, use the optional LAN cables as below:
 - Sensor network - FR-FTPC-CY (Cat5 equivalent).
 - Gateway network - DTI-C5E350 VCV (Cat5e equivalent).
- ECDIS control unit RCU-024 and RCU-026 are not compatible with this equipment.
- To connect this equipment to a VR-3000/S, use the Display Port, with DP-VGA adapter (supplied). The Display Port outputs FULL HD resolution and requires a synchronizer to convert the output to UXGA.
- When connecting a digital input device, use our recommended DP-DVI adapter (manufacturer: Hatteland Technology, model: DPM2DVI-DF-A1 (SG300000198)).
- When connecting a VDR device via LAN, connect the VDR device to the LAN2 port.

Network and sensor considerations

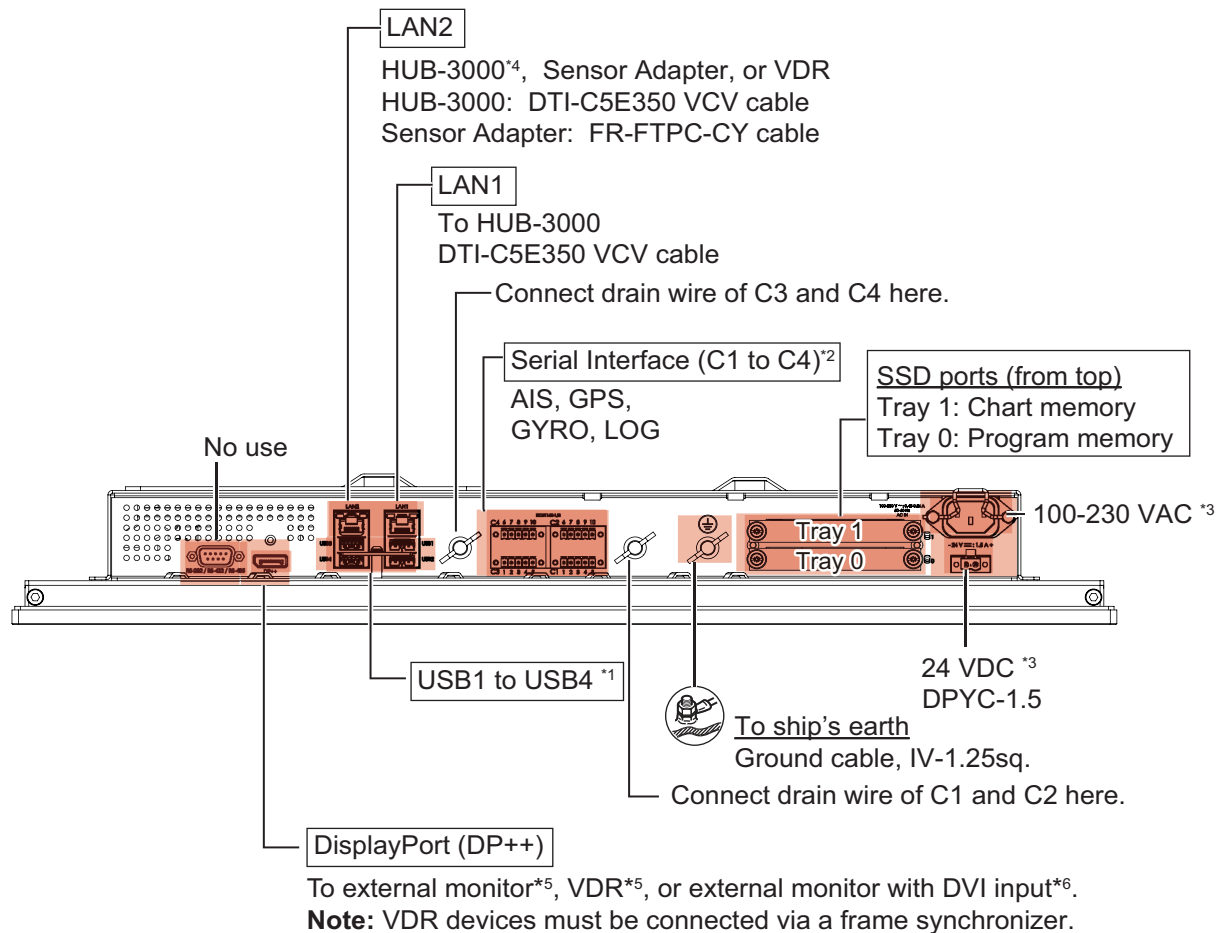
Consider the following points when installing the network.

- For IEC 61162-450 Ed.1 complying network, use the optional Switching Hub HUB-100. For IEC 61162-450 Ed.2 complying network, use the optional Intelligent Hub HUB-3000.
- Do not connect the vessel's on-board LAN to either of the above networks. Also, commercial PCs cannot be connected to the gateway network, other than for maintenance.
- Connect to other ECDIS units and radars (FEA-2xx7, FAR-2xx7 series, etc) using the gateway network.
- When constructing a network with two or more FAR-2xx7 radars, an FMD-3x00 unit and using a HUB-3000, the HUB-3000 querier must be configured. For how to set the HUB-3000 querier, see the instruction manual (E42-01811).
- The FMD-3100 processor unit does not support IGMP snooping or CGMP enabled switch.
- The FMD-3100 does not have a router or repeater hub function.
- The Switching Hub HUB-100 is optionally available for connection to the FMD-3100.
- The Switching Hub HUB-100 does not support IGMP snooping or CGMP enabled switch.
- When you use IEC61162-450 compatible sensors, set [Transmission Group] on the [Common Installation Settings] menu. For how to set [Transmission Group], see the instruction manual (E42-01811).
- To ensure the security of the FURUNO network, be sure to connect with non-FURUNO networks via the service gateway (tBOX810-83A-FL).
- At least one AMS device must be installed in the navigation equipment.

2.1 Panel Computer Unit PCU-3010

2.1.1 Connections to the PCU-3010

Referring to the figure below, connect the PCU to its respective peripherals.



^{*1}

USB1	: RCU-030
USB2	: USB storage or DVD drive
USB3	: 5139U BLACK or SKB-E3UN (keyboard)
USB4	: Connect USB storage or DVD drive with ext. cable.

^{*2}

C1 port	TTYCSLA-4 or
C2 port	TTYCSLA-1Q
C3 port	TTYCSLA-1Q
C4 port	TTYCSLA-1Q

^{*3}: Select AC or DC power supply.

^{*4}: Use HUB-100 for IEC 61162-450 Ed. 1 complying network.

^{*5}: Connect with 3COX-2P-6C cable and supplied DP-VGA adapter.



^{*6}: Connect with DVI-D/D S-LINK(5m) cable and Hatteland Technology make DP-DVI adapter DPM2DVI-DF-A1 (SG300000198).
(cable, adapter: arrange locally)

On USB cable connection

Fasten the USB cable to the cable clamp with a cable tie (width: 5 mm).

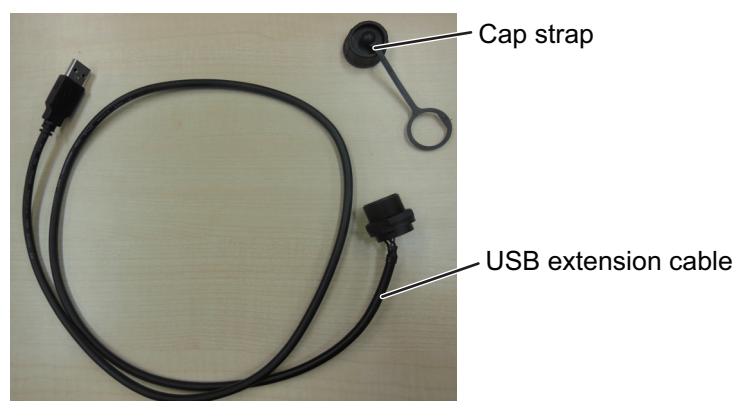
- The USB cable connected between USB1 and the Trackball Control Unit should be separately fastened to the cable clamp.
- Observe the following points with regards to the keyboard.
 - **When no keyboard is connected**, do not connect equipment to USB3. Further, separately fasten the extension cable from USB4 to the USB cable clamp, using a cable tie.
 - **When a keyboard is connected**, bind the keyboard cable together with the extension cable from USB4 to the USB cable clamp.

Depending on your power supply (applied voltage), choose the correct cabling for power input, referring to the table below.

Voltage	Cable	Description
230 VAC	TP52/TC01 cable	Type F "Schuko", included with PCU-3010. 
100 VAC	TP11/TC01 cable	Type B, included with PCU-3010. 
24 VDC	DPYC-1.5 cable (JIS cable)	See paragraph 2.1.3 for how to fabricate the power cable.

2.1.2 Connecting the flush mountable USB extension cable

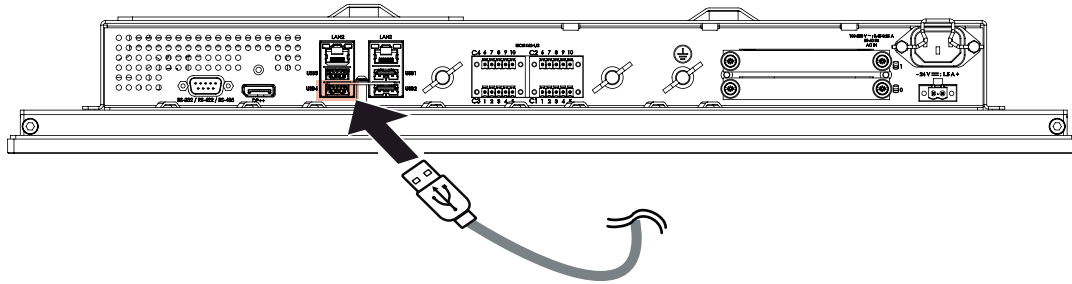
You may require an extension from the USB port on the PCU. A 1m length USB extension cable is included with the PCU. When using another USB extension cable, make sure the total length is shorter than 5 m.



You can connect the flush-mounted extension cable by doing the following:

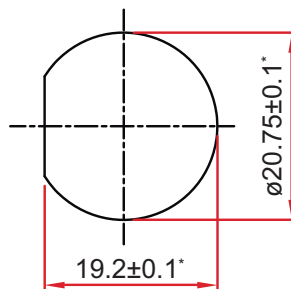
2. WIRING

1. Connect the USB extension cable to the port USB4 on the PCU.



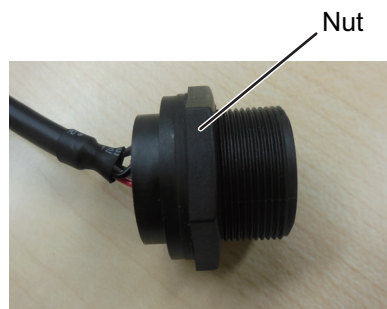
2. Referring to the figure below, make an installation hole where necessary.

Dimensions for installation hole

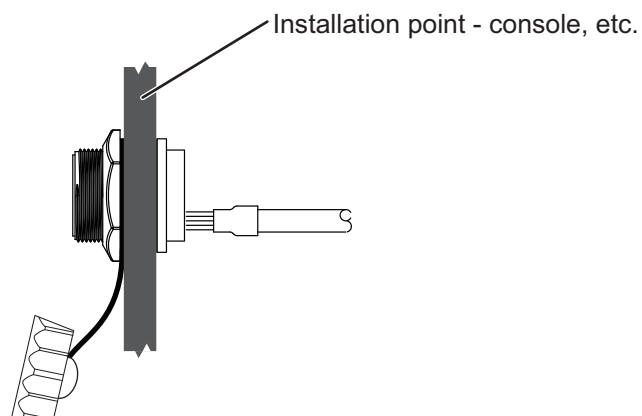


*Measurement units are in mm

3. Unfasten the nut.



4. Insert the cable into the installation hole from the rear.
5. Place the cap strap, then tighten the nut to secure the cable. See the figure below.

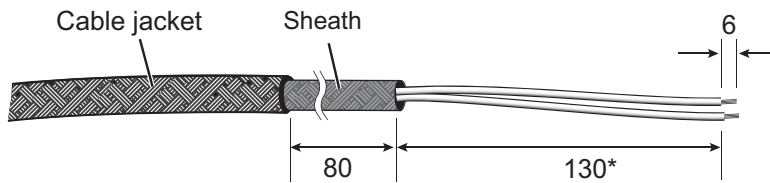


Note: Always screw the cap on when the extension cable is not in use.

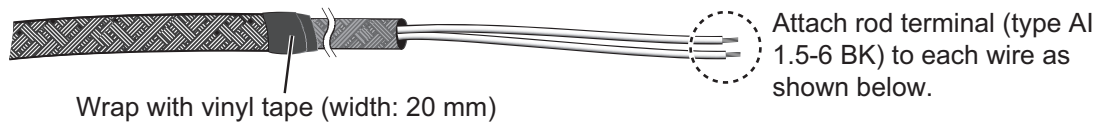
2.1.3 Fabricating the power cables

For AC power, connect the unit with the supplied AC power cables. For DC power, fabricate DPYC-1.5 cable as shown below. Terminal block must also be fitted.

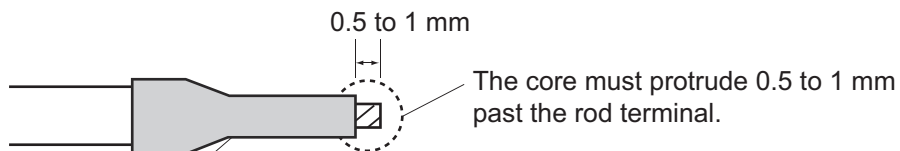
For cable clamp location, see paragraph 2.1.6.



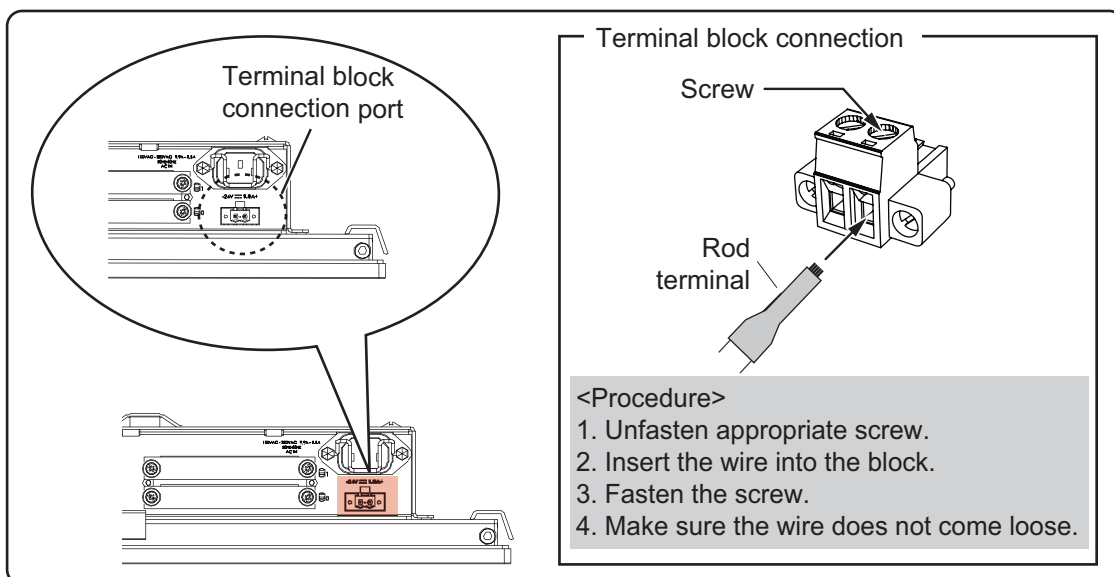
* For flush mount installation, the length should be based on the installation location.



How to attach the rod terminal

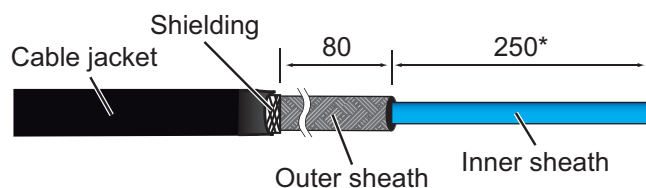


After attaching the rod terminal, use a crimping tool (CRIMPFOX 10S, option) to crimp.



2.1.4 Fabricating LAN cables

Fabricate the LAN cable (FR-FTPC-CY, DTI-C5E350 VCV), as shown below. (Wrap both edges of the armor with vinyl tape.) Confirm that the shield of the cable touches to the shell of the modular plug.



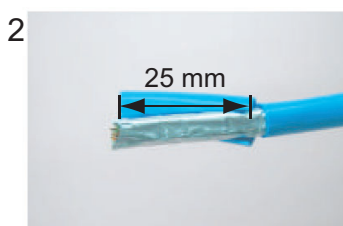
* For flush mount installation, the length should be based on the installation location.



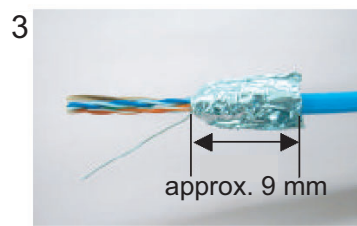
Cover the cable jacket with insulated tape (20 mm width).



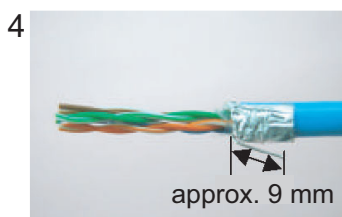
Expose inner sheath.



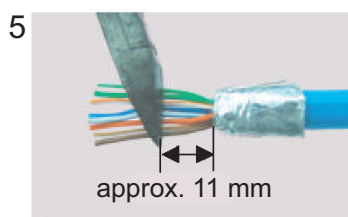
Remove the sheath by approx 25 mm. Be careful not to damage inner shield and cores.



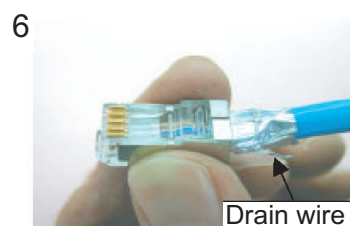
Fold back the shield, wrap it onto the outer sheath and cut it, leaving 9 mm.



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



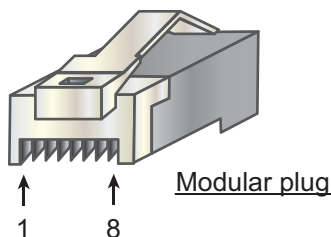
Straighten and flatten the core in order and cut them, leaving 11 mm.



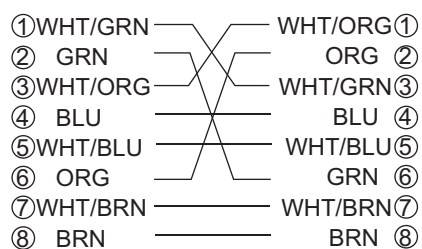
Insert the cable into the modular plug so that the folded part of the shield enters into the plug housing. The drain wire should be located on the tab side of the jack.



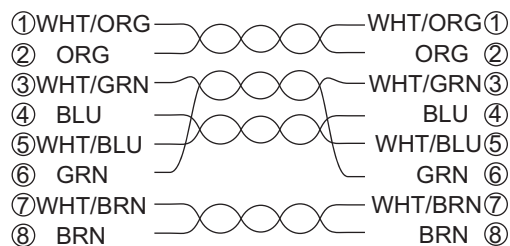
Using special crimping tool MPT5-8AS (PANDUIT CORP.), crimp the modular plug. Finally check the plug visually.



[Cross cable]



[Straight cable]

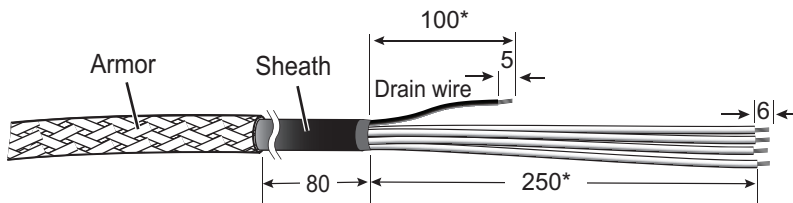


2.1.5 Fabricating, connecting TTYCSLA cable (JIS cable)

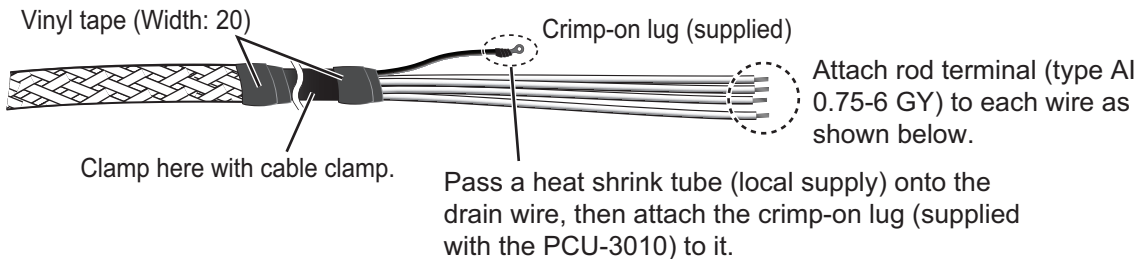
How to fabricate the TTYCSLA cable

Fabricate the TTYCSLA cables as shown below to connect them to the terminal block on the PCU-3010 (See the following page for how to connect wires to the terminal block.)

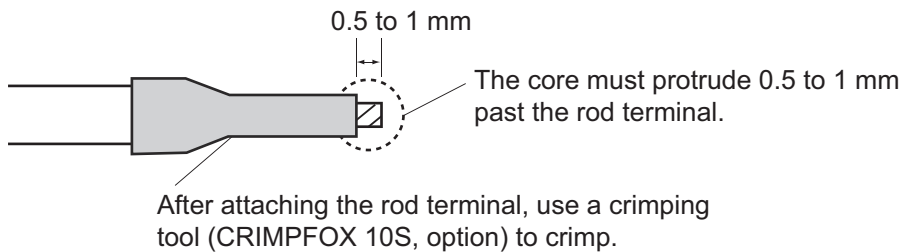
After fabricating the cable, attach the terminal block and EMI ferrite core (supplied). For how to attach the connector mount and EMI ferrite core, see the next page.



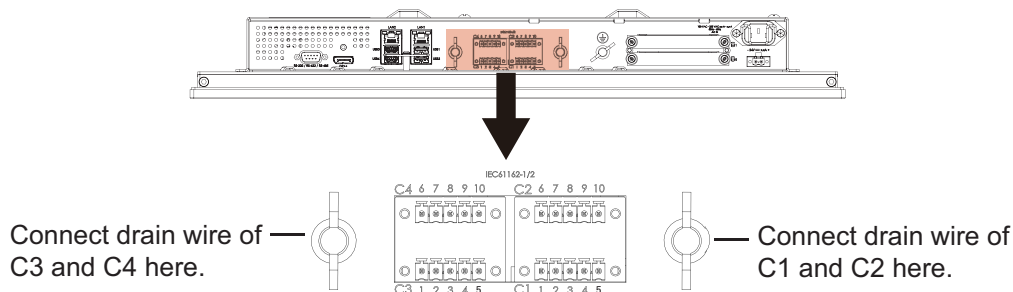
* For flush mount installation, the length should be based on the installation location.



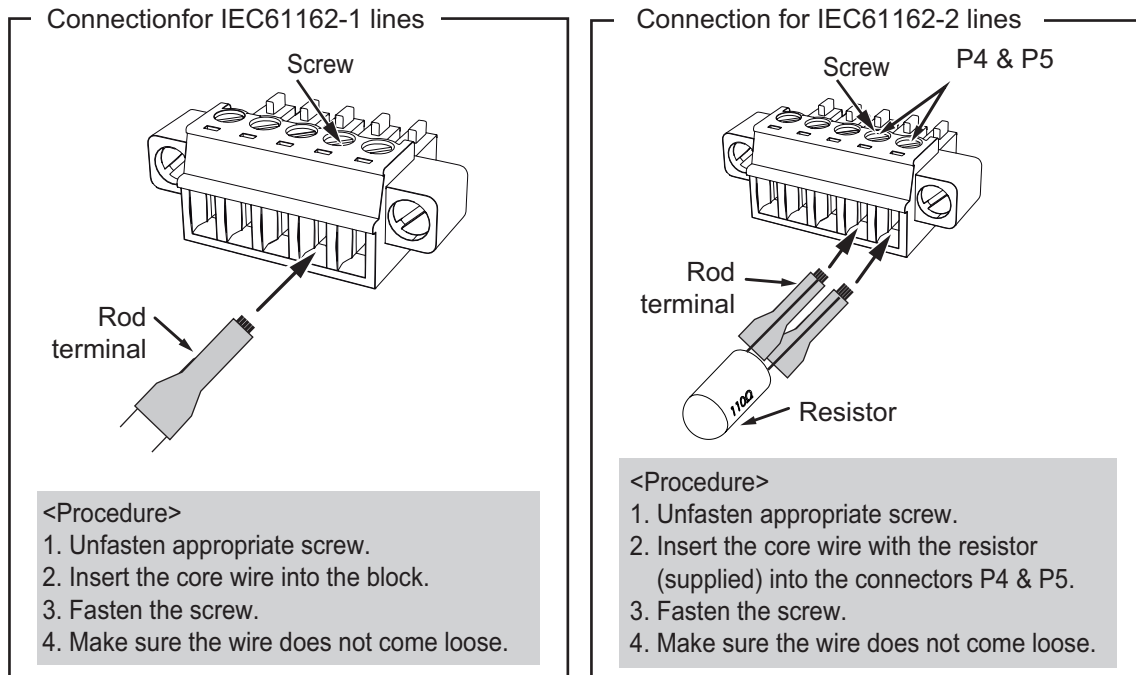
How to attach the rod terminal



For flush mounted installations, connect the drain wires to respective terminal.



How to connect the TTYCSLA cable to the terminal block



How to attach the EMI ferrite core

Attach the EMI ferrite core (supplied) to each connected cable group, as close to the Connector as possible, leaving the drain wire loose (See figure below).

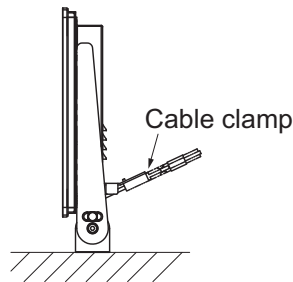


How to set input/output specifications for terminal blocks C1 to C4

Port No.	PIN No.	Signal	In/ Out	Description	IEC61162-2	IEC61162-1
C1	1	TxD-	Out	Serial CH1,Output IEC61162-1/2	TTYCSLA-4	TTYCSLA-1Q
	2	TxD+	Out	Serial CH1,Output IEC61162-1/2		
	3	ISOGND	-	Isolation GND (CH1)		No connection
	4	RxD-	In	Serial CH1,Input IEC61162-1/2		TTYCSLA-1Q
	5	RxD+	In	Serial CH1,Input IEC61162-1/2		
C2	6	TxD-	Out	Serial CH2,Output IEC61162-1/2	TTYCSLA-4	TTYCSLA-1Q
	7	TxD+	Out	Serial CH2,Output IEC61162-1/2		
	8	ISOGND	-	Isolation GND (CH2)		No connection
	9	RxD-	In	Serial CH2,Input IEC61162-1/2		TTYCSLA-1Q
	10	RxD+	In	Serial CH2,Input IEC61162-1/2		
C3	1	TxD-	Out	Serial CH3,Output IEC61162-1	-	TTYCSLA-1Q
	2	TxD+	Out	Serial CH3,Output IEC61162-1		
	3	ISOGND	-	Isolation GND (CH3)		No connection
	4	RxD-	In	Serial CH3,Input IEC61162-1		TTYCSLA-1Q
	5	RxD+	In	Serial CH3,Input IEC61162-1		
C4	6	TxD-	Out	Serial CH4,Output IEC61162-1	-	TTYCSLA-1Q
	7	TxD+	Out	Serial CH4,Output IEC61162-1		
	8	ISOGND	-	Isolation GND (CH4)		No connection
	9	RxD-	In	Serial CH4,Input IEC61162-1		TTYCSLA-1Q
	10	RxD+	In	Serial CH4,Input IEC61162-1		

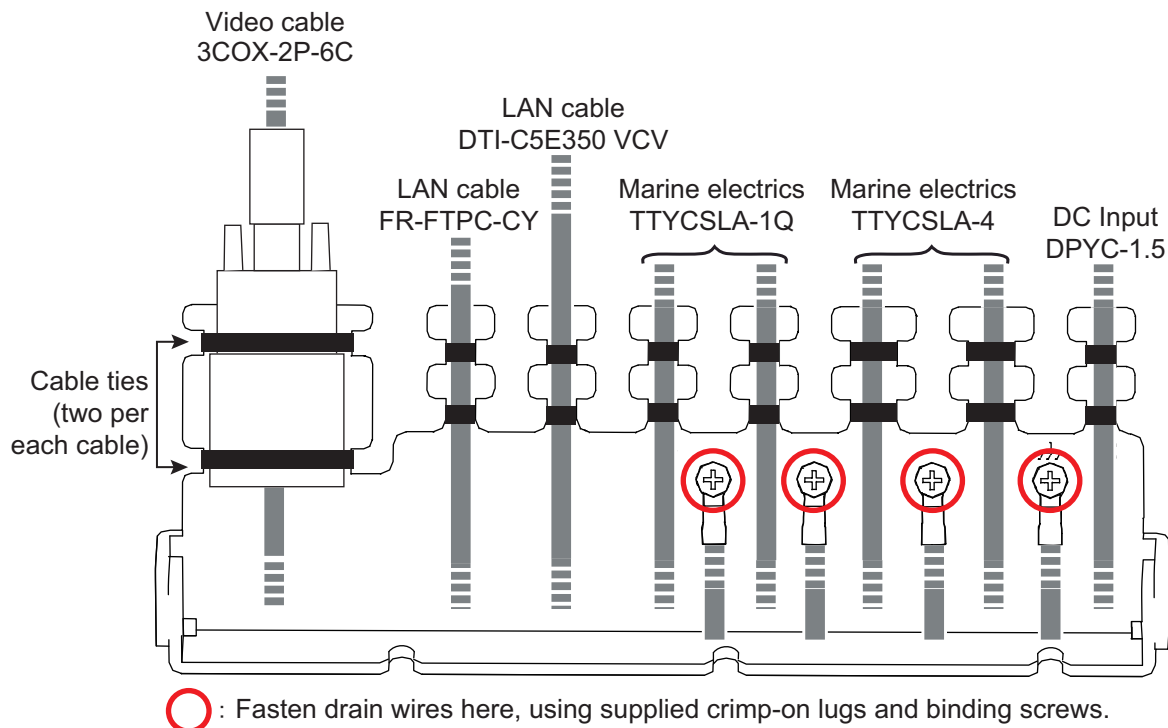
2.1.6 Securing cables to the cable clamp

When installing the unit with the desktop option, use the cable clamp to secure the electrical wiring, LAN cable, DC power cable, and video cable (3COX-2P-6C).



When not using the cable clamp, drain wires must be connected to the grounding point on the PCU-3010 (See the figure in paragraph 2.1.1).

When using the cable clamp, connect the drain wires of cables to the screws circled in the figure below. Fasten cables to the clamp with two cable ties for each cable. The cable ties should be 5mm in width.



2.1.7 Alert interface types and maximum number of alert interfaces

The PCU-3010 has the following alert interface types and quantities:

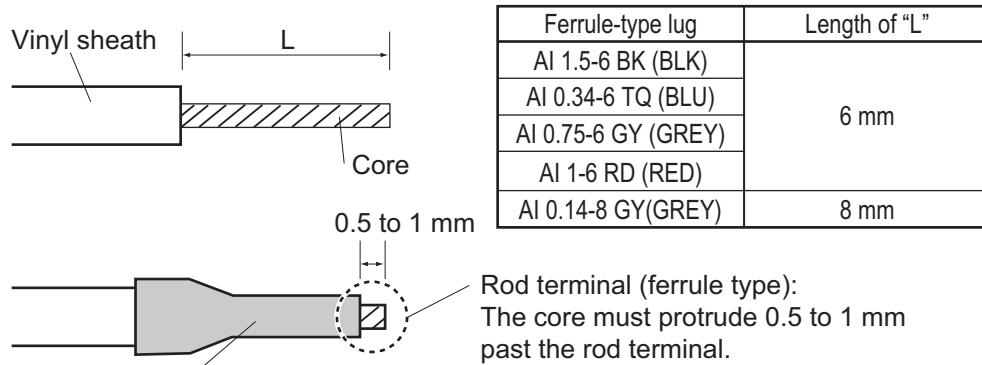
- IEC 61162-1/2 (2 ports)
- IEC 61162-1 (2 ports)
- IEC 61162-450 (1 port)

2.2 Sensor Adapters (Optional)

Maximum eight MC-3000S can be connected to a sensor network (for the redundant connection: 16). The MC-3000S (serial input/output, IEC61162-2/1, 4ch) can connect max. 10 sensor adapters using the MC1.5-W cables.

To connect the lines to the connector on the sensor adapter, use the rod terminal (ferrule type, supplied) to maintain performance. This fabrication requires the optional crimping tool (type: CRIMPFOX 10S).

How to attach ferrule-type lug



Rod terminal (ferrule type):

After attaching the rod terminal, use the optional crimping tool CRIMPFOX 10S to crimp.

For the relations between the connectors and rod terminals, see page AP-2. Also, the stickers attached on the reverse side of the covers show the detailed connections.

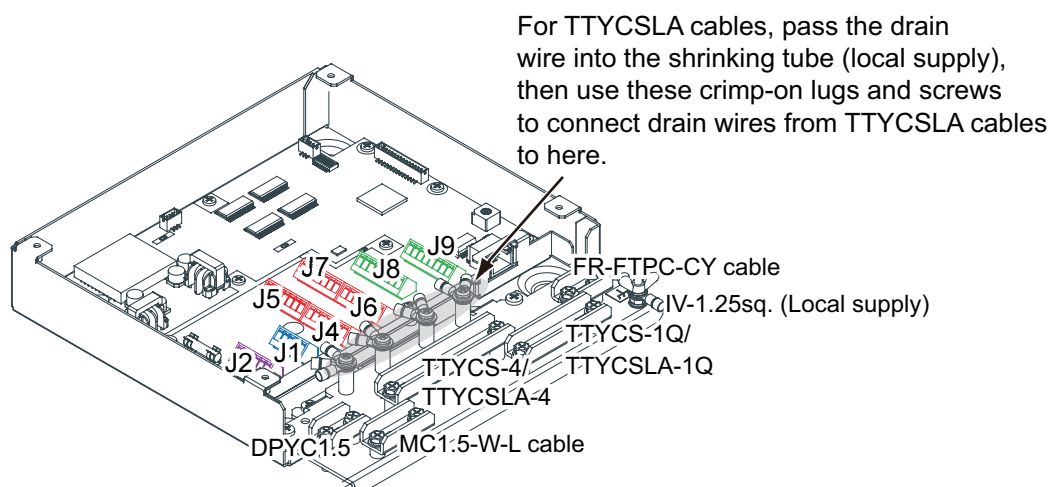
Use the MC1.5-W cable between the sensor adapters. Attach the cables to the applicable pins.

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

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

2.2.1 MC-3000S connections

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



Note: Fasten the cable shield with the cable clamp.

How to set NC/NO output (J2)

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

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

How to set input specification (J4 to J9)

For connectors J4 to J7, the connections are different depending on the input specifications as shown below. Also, for J8 and J9, the signals which are input/output are shown.

Connector J4

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

Connector J5

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

Connector J6

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

Connector J7

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

Connector J8

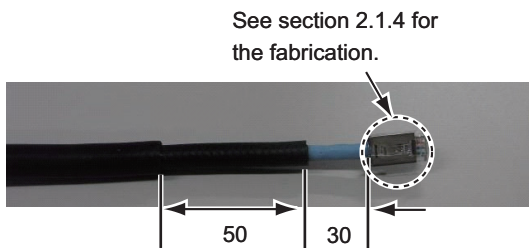
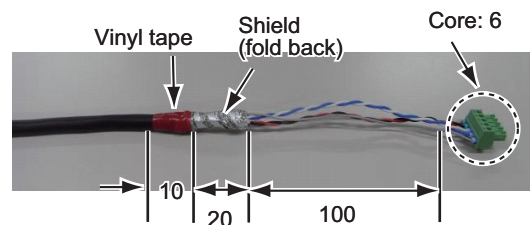
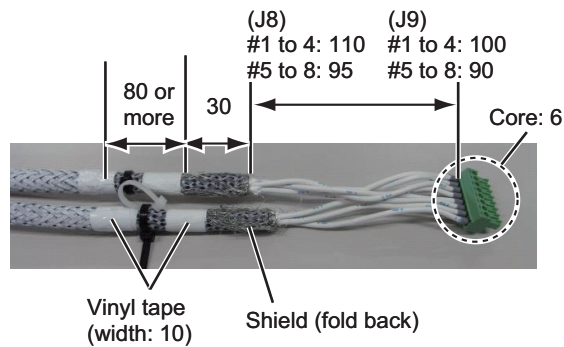
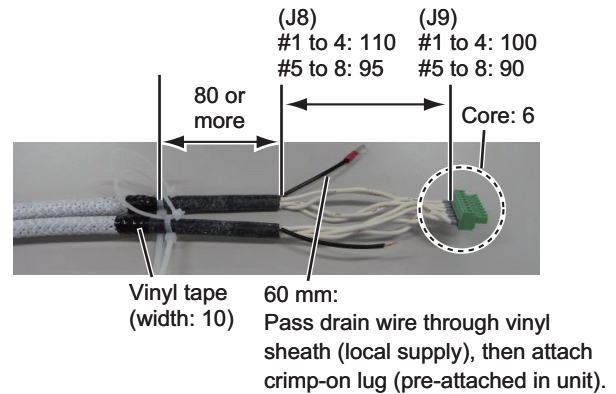
Pin#	Signal name	In/Out	Description	Used cable
1	TD5-A	Out	Serial CH5, output IEC61162-1	TTYCS-1Q or TTYCSLA-1Q
2	TD5-B	Out	Serial CH5, output IEC61162-1	
3	RD5-H	In	Serial CH5, input IEC61162-1	
4	RD5-C	In	Serial CH5, input IEC61162-1	
5	TD6-A	Out	Serial CH6, output IEC61162-1	
6	TD6-B	Out	Serial CH6,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

Connector J9

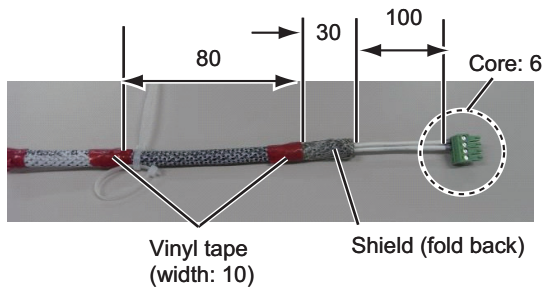
Pin#	Signal name	In/Out	Description	Used cable
1	TD7-A	Out	Serial CH7, output IEC61162-1	TTYCS-1Q or TTYCSLA-1Q
2	TD7-B	Out	Serial CH7, output IEC61162-1	
3	RD7-H	In	Serial CH7, input IEC61162-1	
4	RD7-C	In	Serial CH7, input IEC61162-1	
5	TD8-A	Out	Serial CH8, output IEC61162-1	
6	TD8-B	Out	Serial CH8,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

2.2.2 MC-3000S connection fabrications

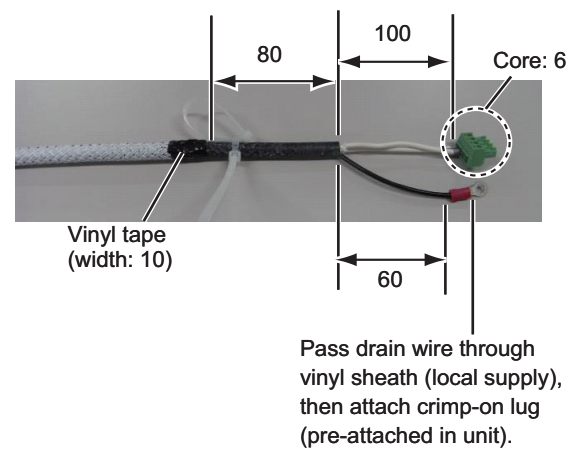
Fabricate the cables to be connected to the MC-3000S referring to the figure below.

LAN cable (FR-FTPC-CY)MC1.5-W-L600/1000/2000/3000 cableTTYCS-1Q cableTTYCSLA-1Q cable

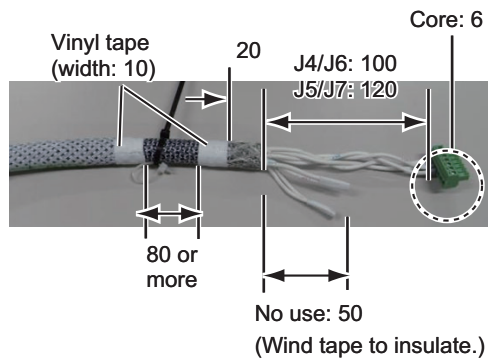
TTYCS-1 cable



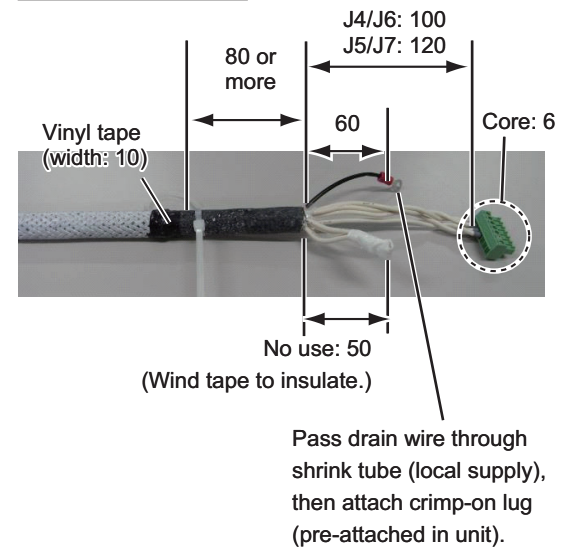
TTYCSLA-1 cable



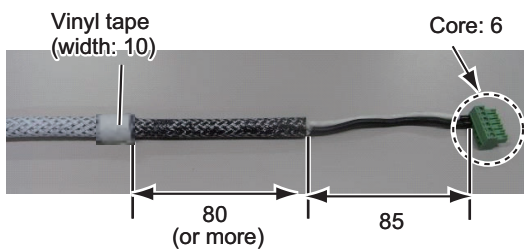
TTYCS-4 cable



TTYCSLA-4 cable

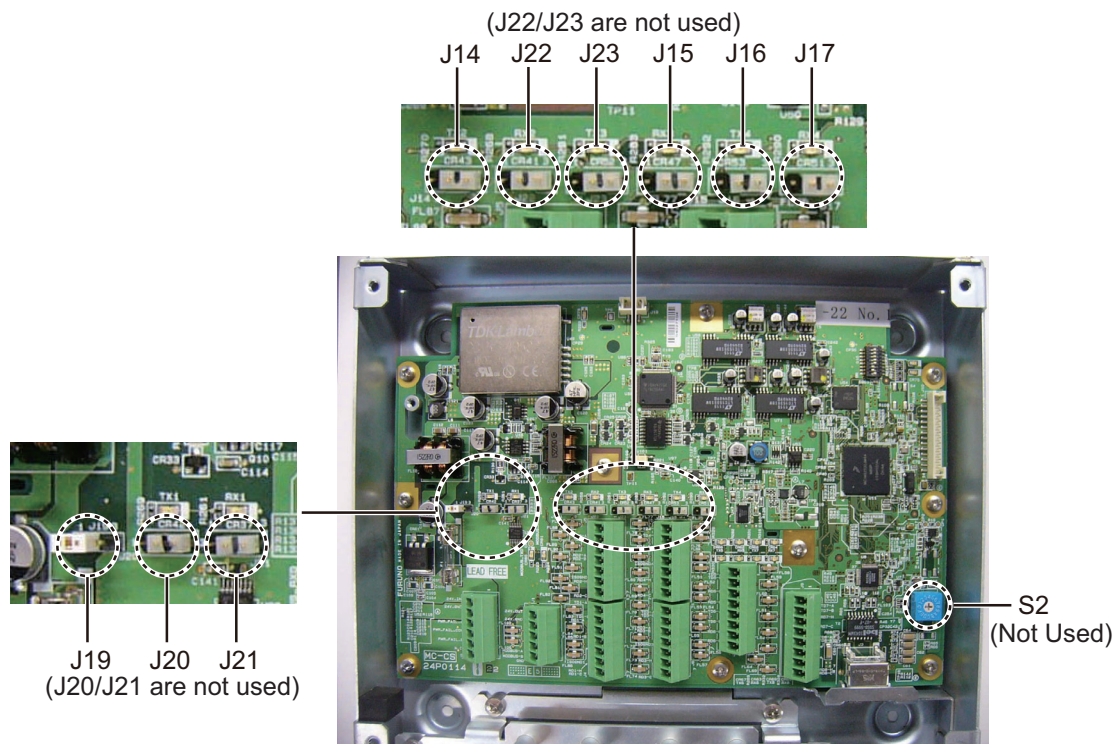


DPYC-1.5 cable



2.2.3 MC-3000S Jumper and MODBUS settings

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



MC-CS Board (24P0114)

Setting termination resistors on the Jumper block:

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

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

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

(Termination resistor ON)

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

(Terminal resistor OFF)

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

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

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

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

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

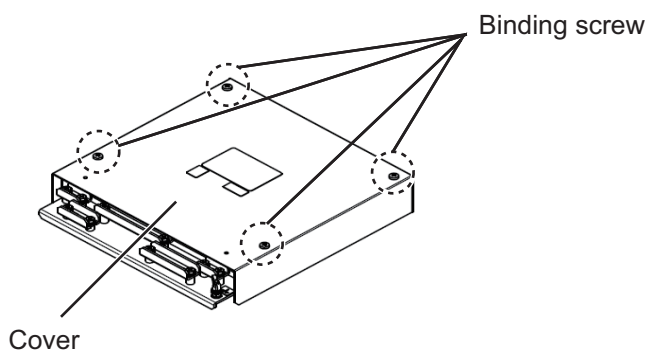
2.2.4 Waterproof case packing for MC-3000S (optional)

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

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

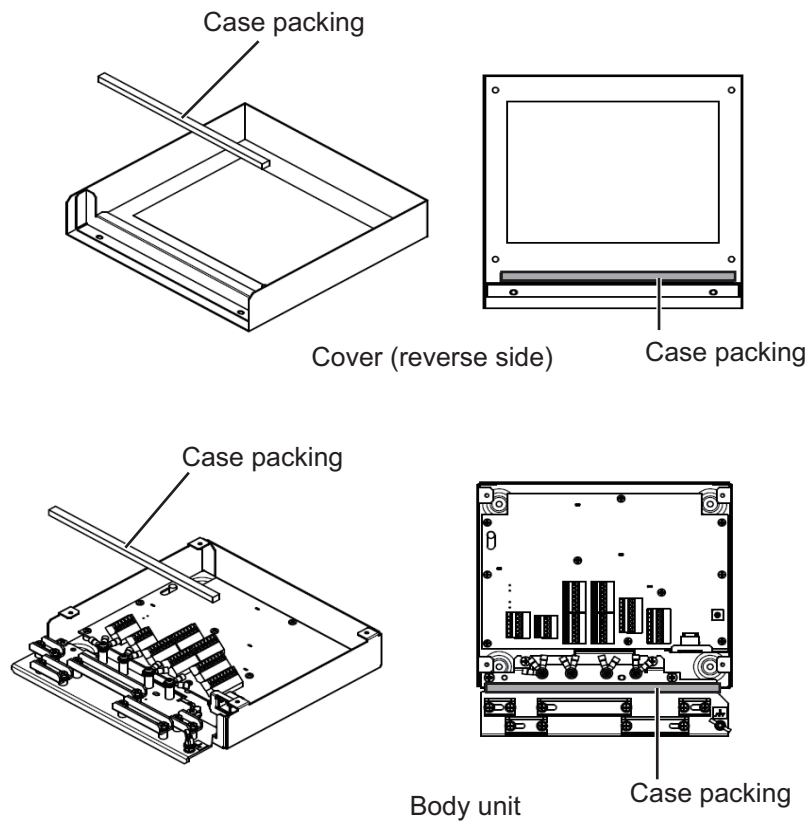
Name	Type	Code No.	Qty	Remarks
Case packing (serial)	21-014-2051	100-367-880-10	2	For MC-3000S

- Unfasten four binding screws to remove the cover from the adapter.



2. WIRING

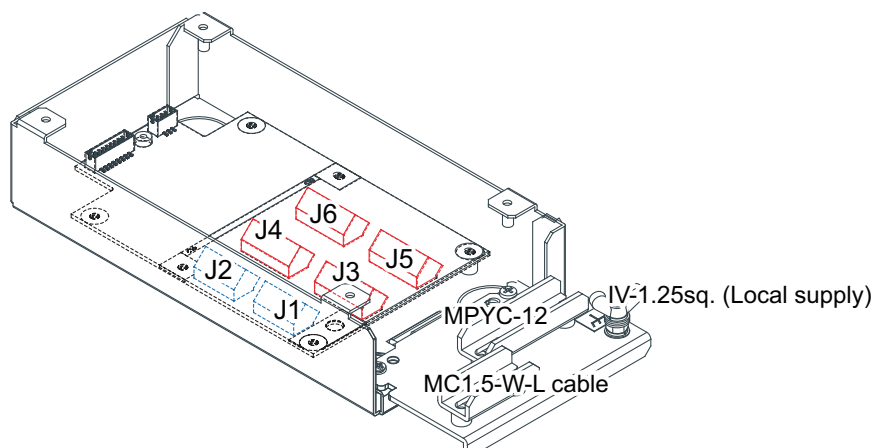
2. Peel the paper from the case packing, then attach the case packing to the reverse side of the cover and the body unit as shown below.



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

2.2.5 MC-3020/3030D connections

- MC-3020D: Inputs digital signal (8ch contact input). Contact or voltage input is selectable (contact input requires jumper pins).
- MC-3030D: Outputs digital signal (8ch, normal open/close).



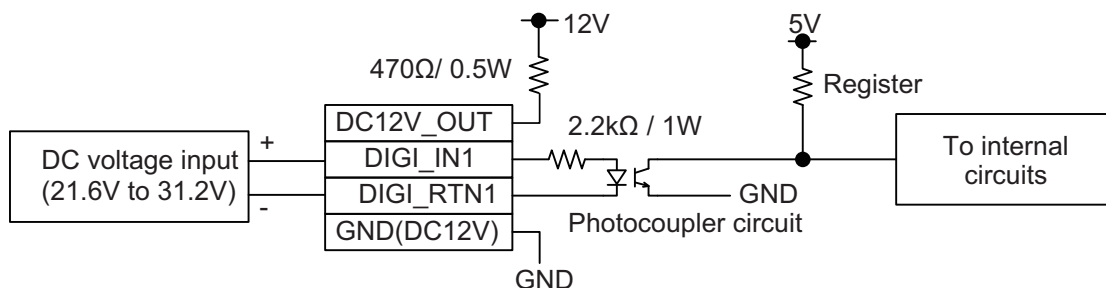
Note: Fasten the cable shield with the cable clamp.

MC-3020D/3030D

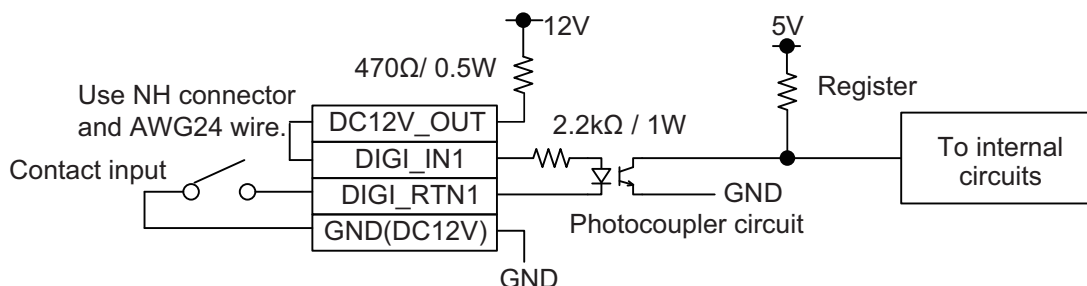
How to set ACK input (MC-3020D)

Use the connectors J3 to J6 on the MC-DIN Board (24P0116) to set the ACK input for ACK1 to ACK8 as shown below.

- Input circuit for voltage input



- Input circuit for contact input



Note: The input must not exceed the range of the input voltage, to prevent malfunction.

-Setting for voltage input: 21.6 V to 31.2 V

-Setting for contact input: Voltage cannot be input (contact signal only).

Connector J3

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

2. WIRING

Connector J4

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

Connector J5

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

Connector J6

Pin #	Signal name	In/Out	Remarks	ACK7 contact	ACK7 voltage	ACK8 contact	ACK8 voltage
1	DC12V_OUT	Out	ACK1 In	Pin #1-#2: short MPYC-12	No connection	Depending on ACK7 input	
2	DIGI_IN7	In			MPYC-12		
3	DIGI_RTN7	Out			No connection		
4	GND (DC12V)	In					
5	DC12V_OUT	Out	ACK2 In	Depending on ACK8 input		Pin #1-#2: short	No connection
6	DIGI_IN8	In				MPYC-12	MPYC-12
7	DIGI_RTN8	Out					
8	GND (DC12V)	In					NO connection

How to set alarm output (MC-3030D)

Use the connector J3 to J6 on the MC_OUT Board (24P0117) to select NC (normal close) or NO (normal open) for alarm output 1 to 8.

Connector J3

Pin #	Signal name	In/ Out	Remarks	Alarm1 NO Out	Alarm1 NC Out	Alarm2 NO Out	Alarm2 NC Out
1	A1	Out	Alarm1 Out	MPYC-12	No connection	-	
2	COM1				MPYC-12		
3	B1			No connection			
4	A2		Alarm2 Out	-		MPYC-12	No connection
5	COM2						MPYC-12
6	B2					No connection	

Connector J4

Pin #	Signal name	In/ Out	Remarks	Alarm3 NO Out	Alarm3 NC Out	Alarm4 NO Out	Alarm4 NC Out
1	A3	Out	Alarm3 Out	MPYC-12	No connection	-	
2	COM3				MPYC-12		
3	B3			No connection			
4	A4		Alarm4 Out	-		MPYC-12	No connection
5	COM4						MPYC-12
6	B4					No connection	

Connector J5

Pin #	Signal name	In/ Out	Remarks	Alarm5 NO Out	Alarm5 NC Out	Alarm6 NO Out	Alarm6 NC Out
1	A5	Out	Alarm5 Out	MPYC-12	No connection	-	
2	COM5				MPYC-12		
3	B5			No connection			
4	A6		Alarm5 Out	-		MPYC-12	No connection
5	COM6						MPYC-12
6	B6					No connection	

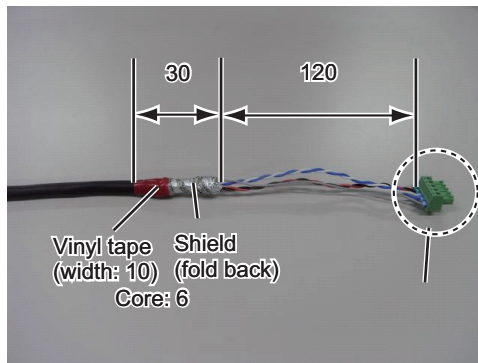
Connector J6

Pin #	Signal name	In/ Out	Remarks	Alarm7 NO Out	Alarm7 NC Out	Alarm8 NO Out	Alarm8 NC Out
1	A7	Out	Alarm7 Out	MPYC-12	No connection	-	
2	COM7				MPYC-12		
3	B7			No connection			
4	A8		Alarm8 Out	-		MPYC-12	No connection
5	COM8						MPYC-12
6	B8					No connection	

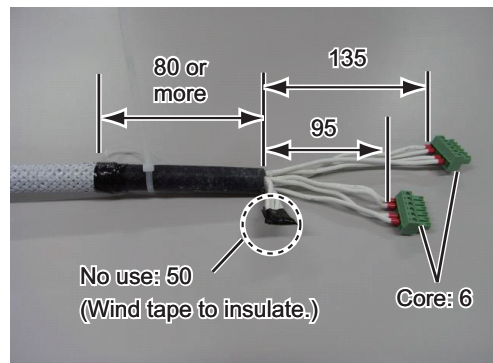
2.2.6 Cable fabrication for MC-3020D/3030D connections

Using the figures below for reference, fabricate the cables to be connected to the MC-3020D/3030D.

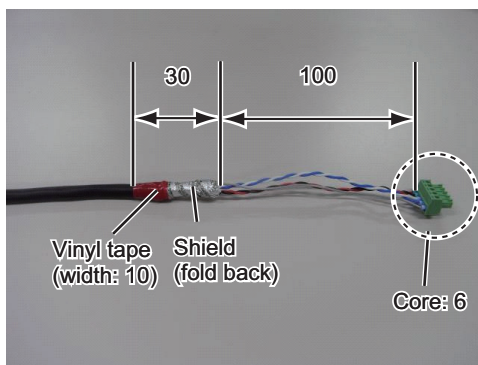
MC1.5-W-L600/1000/2000/3000 cable
(Input)



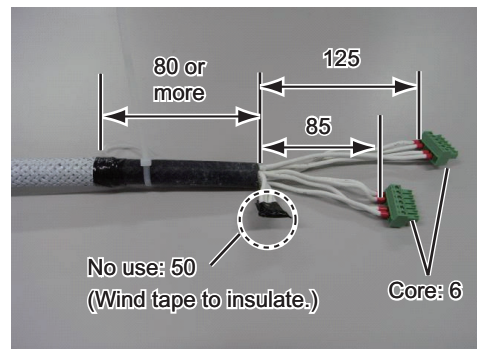
MPYC-12 cable (MC-3020D)



MC1.5-W-L600/1000/2000/3000 cable
(Output)



MPYC-12 cable (MC-3030D)

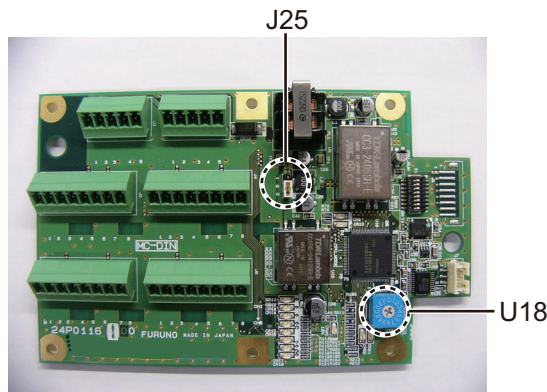


2.2.7 How to set jumper blocks in the sensor adapters

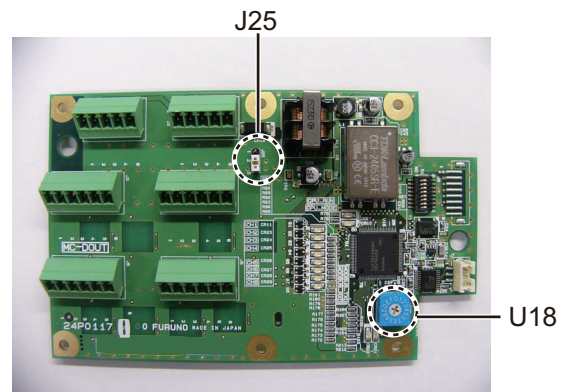
MC-3020D/3030D

This paragraph shows how to set the MC-DIN Board (24P0116, for MC-3020D) and MC-DOUT Board (24P0117, for MC-3030D).

Setting MODBUS addresses: Use the rotary switch (U18) to set the MODBUS address with a digit of number from “0”. When multiple sensor adapters are connected to the MC-3000S, the same number cannot be used among them. (It is allowed to use the same number between the MC-3000S and a sensor adapter.)



MC-DIN Board (24P0116)



MC-OUT Board (24P0117)

Setting termination resistors on the Jumper block

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

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

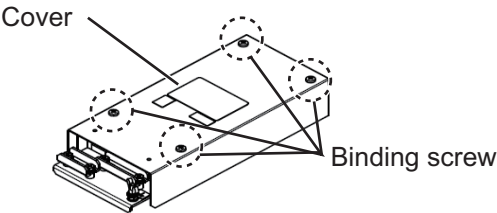
2.2.8 MC-3020D/3030D Waterproof case packing OP24-29 (Optional)

The optional kit OP24-29 protects the connectors on the MC-3020D/3030D to waterproofing standard IPX2.

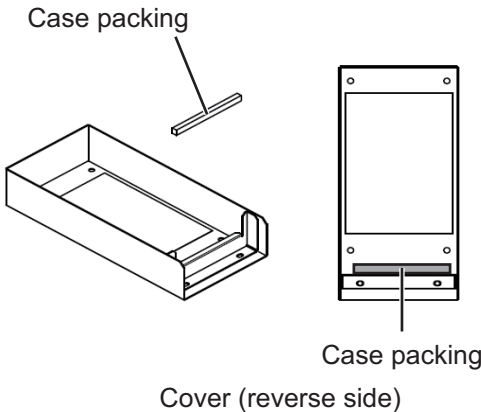
Case packing (type: OP24-29, code no.: 001-169-960)

Name	Type	Code No.	Qty	Remarks
Case packing (analog)	21-014-2052-2	100-367-961-10	2	MC-3020D/3030D

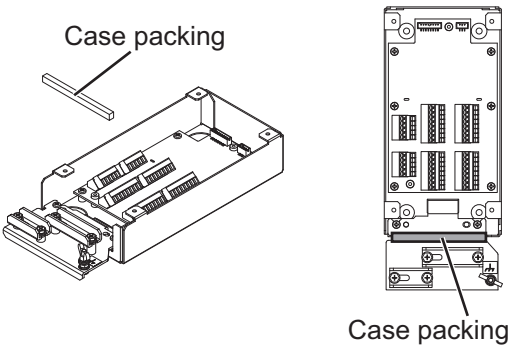
1. Unfasten four binding screws to remove the cover from the adapter.



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

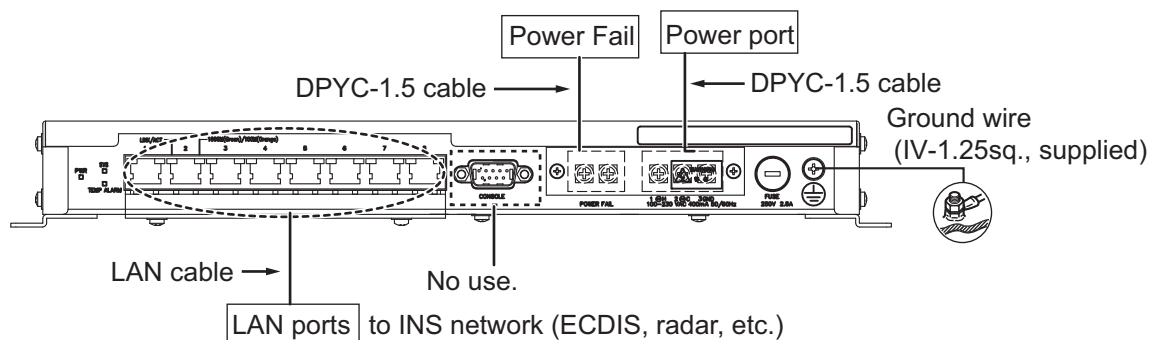


3. Attach the cover to the MC-3020D/3030D chassis.

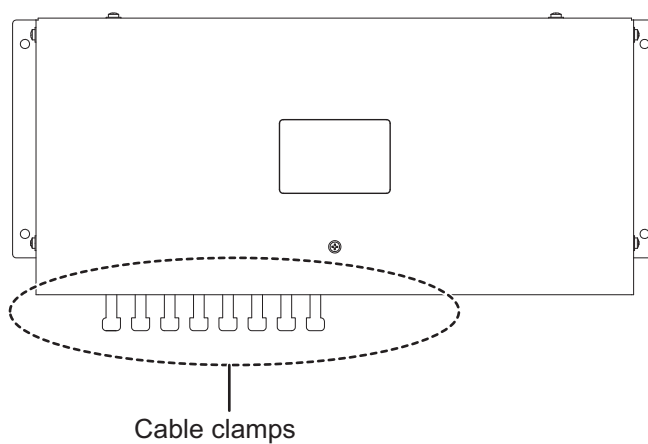


2.3 Intelligent HUB HUB-3000 (Optional)

Fix any LAN cables connected to the HUB-3000 to their respective cable clamps using cable ties (supplied).

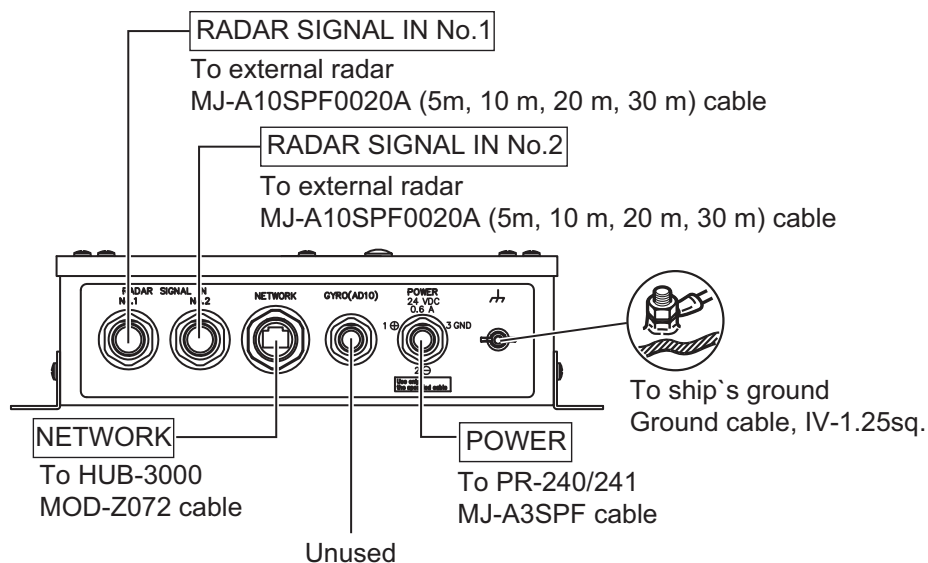


Attach the LAN cap (supplied) to the unused connector holes to provide waterproofing standard IPX2.



2.4 Radar Connection Box RCB-002 (Optional)

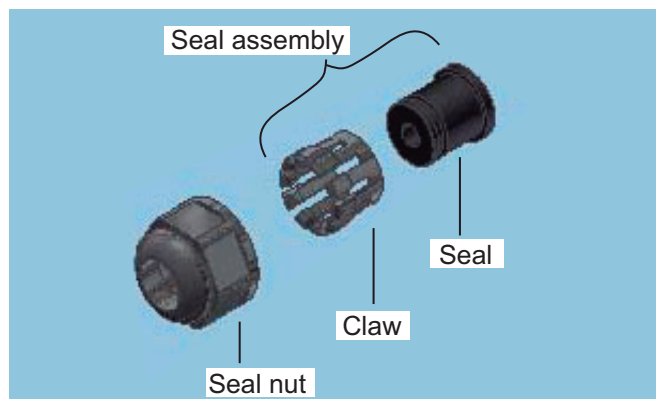
The RCB-002 is capable of connecting the FMD-3100 with up to two external radar systems. Referring to the figure and table below, connect the respective equipment to the RCB-002.



Connecting LAN cables

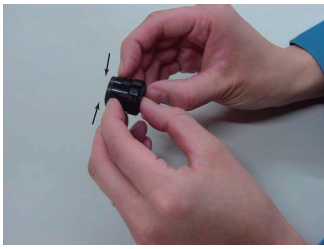
When connecting LAN cables (MOD-Z072) to the RCB-002, use the following procedure.

1. Unfasten and remove the sealing nut from the NETWORK port on the RCB-002, then remove the seal assembly. See the figure below for reference.




2. Dismantle the seal assembly as shown below.

Dismantling the seal assembly



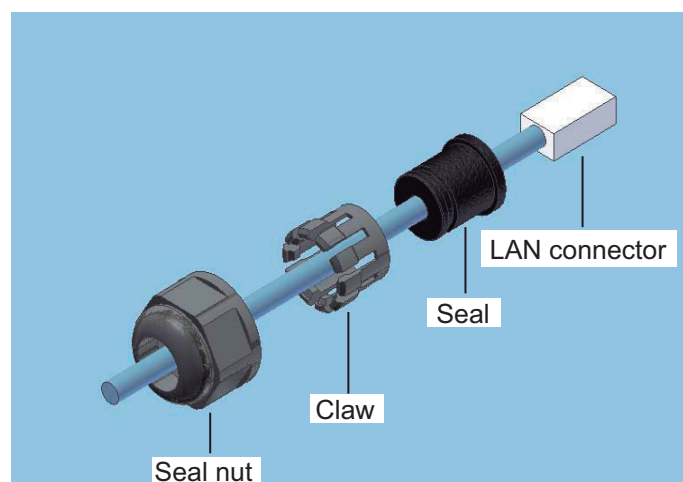
STEP 1:
Hold the fat end of the seal assembly with both thumbs while placing the index fingernails between the seal and the claw.

Use caution to avoid injury.

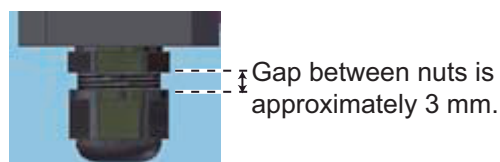


STEP 2:
Using the thumbs, gently push the seal out of the claw.

3. Referring to the figure below, pass the LAN cable through the seal nut, then the claw and finally the seal.



4. Connect the LAN cable to the connector.
5. Join the claw and seal to form the seal assembly, then firmly join the seal assembly to the LAN connector.
6. Fasten the seal nut and secure the cable. Continue to fasten the nut until the space between the two nuts is approximately 3 mm. See the figure below for reference.



2.4.1 Jumper settings for RCB-002

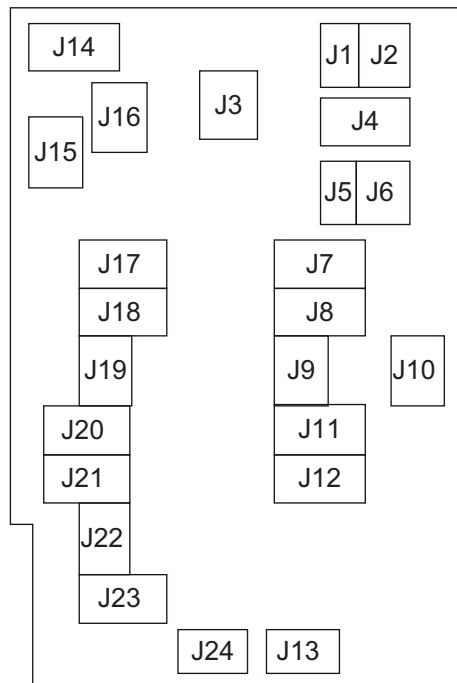
The RCB-002 is compatible with the following radars.

Maker	Model	Maker	Model
FURUNO*	<ul style="list-style-type: none"> FAR-14×7 series FAR-2××7 series FAR-2××5 series Model 1835 	Japan Radio Company (JRC)	JMA-9100 series
		Tokyo Keiki Inc.	BR-3440 series
		*: FURUNO radars are only compatible with the CH2 (RADAR SIGNAL IN NO.2 port).	

Change the jumper settings on the RA/IF board (24P0140) according to the radar to be connected, referring the tables on the next page.

For details of the values for each jumper block on the RA/IF board (24P0140), see "RA/IF BOARD JUMPER VALUES" on page AP-23.

Jumper locations on the RA/IF board (24P0140)



CH1 settings (RADAR SIGNAL IN NO.1)

Using the table below for reference, change the jumper settings to suit the appropriate radar connection. Use the figure on the previous page for jumper locations.

Jumper	Radar to be connected	
	JMA-9100 series	BR-3440 series
J1	#2-3: short	
J2	#3-6: short	
J3	#2-6: short	#1-5: short
J4	#1-2: short	
J5	#2-3: short	
J6	#3-6: short	
J10	#3-7: short	#2-6: short
J13	#1-2: short	#2-3: short

CH2 settings (RADAR SIGNAL IN NO.2)

Using the table below for reference, change the jumper settings to suit the appropriate radar connection. Use the figure on the previous page for jumper locations.

Jumper	Radar to be connected		
	FURUNO radars	JMA-9100 series	BR-3440 series
J7	#2-3: short	#1-2: short	
J8	#1-2: short	#2-3: short	
J9	#1-4: short	#3-6: short	
J11	#2-3: short	#1-2: short	
J12	#1-2: short	#1-2: short	
J14	#2-3: short	#1-2: short	
J15	#2-3: short	#1-2: short	
J16	#2-6: short	#2-6: short	#1-5: short
J17	#2-3: short	#1-2: short	
J18	#1-2: short	#2-3: short	
J19	#1-4: short	#3-6: short	
J20	#2-3: short	#1-2: short	
J21	#2-3: short	#1-2: short	
J22	#3-7: short	#3-7: short	#2-6: short
J23	#2-3: short	#1-2: short	
J24	#1-2: short	#1-2: short	#2-3: short

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APPX. 1 JIS CABLE GUIDE

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

JIS cable names may have up to 6 alphabetical characters, followed by a dash and a numerical value (example: DPYC-2.5).

For core types D and T, the numerical designation indicates the *cross-sectional Area (mm²)* of the core wire(s) in the cable.

For core types M and TT, the numerical designation indicates the *number of core wires* in the cable.

1. Core Type

D: Double core power line

T: Triple core power line

M: Multi core

TT: Twisted pair communications
(1Q=quad cable)

2. Insulation Type

P: Ethylene Propylene Rubber

3. Sheath Type

Y: PVC (Vinyl)

4. Armor Type

C: Steel

5. Sheath Type

Y: Anticorrosive vinyl sheath

6. Shielding Type

SLA: All cores in one shield, plastic tape w/aluminum tape

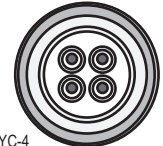
-SLA: Individually shielded cores, plastic tape w/aluminum tape



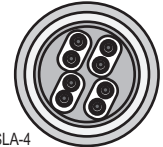
DPYC



TPYC



MPYC-4



TTYCSLA-4

EX: ^{1 3 4 5 6} TTYC ⁶ YSLA - 4
Designation type # of twisted pairs

^{1 2 3 4} MPYC - 4
Designation type # of cores

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

Type	Area	Core Diameter	Cable Diameter	Type	Area	Core Diameter	Cable Diameter
DPYC-1.5	1.5mm ²	1.56mm	11.7mm	TTYCSLA-1	0.75mm ²	1.11mm	9.4mm
DPYC-2.5	2.5mm ²	2.01mm	12.8mm	TTYCSLA-1T	0.75mm ²	1.11mm	10.1mm
DPYC-4	4.0mm ²	2.55mm	13.9mm	TTYCSLA-1Q	0.75mm ²	1.11mm	10.8mm
DPYC-6	6.0mm ²	3.12mm	15.2mm	TTYCSLA-4	0.75mm ²	1.11mm	15.7mm
DPYC-10	10.0mm ²	4.05mm	17.1mm	TTYCY-1	0.75mm ²	1.11mm	11.0mm
DPYCY-1.5	1.5mm ²	1.56mm	13.7mm	TTYCY-1T	0.75mm ²	1.11mm	11.7mm
DPYCY-2.5	2.5mm ²	2.01mm	14.8mm	TTYCY-1Q	0.75mm ²	1.11mm	12.6mm
DPYCY-4	4.0mm ²	2.55mm	15.9mm	TTYCY-4	0.75mm ²	1.11mm	17.7mm
MPYC-2	1.0mm ²	1.29mm	10.0mm	TTYCY-4SLA	0.75mm ²	1.11mm	19.5mm
MPYC-4	1.0mm ²	1.29mm	11.2mm	TTYCYSLA-1	0.75mm ²	1.11mm	11.2mm
MPYC-7	1.0mm ²	1.29mm	13.2mm	TTYCYSLA-4	0.75mm ²	1.11mm	17.9mm
MPYC-12	1.0mm ²	1.29mm	16.8mm	TTPYCSLA-1	0.75mm ²	1.11mm	9.2mm
TPYC-1.5	1.5mm ²	1.56mm	12.5mm	TTPYCSLA-1T	0.75mm ²	1.11mm	9.8mm
TPYC-2.5	2.5mm ²	2.01mm	13.5mm	TTPYCSLA-1Q	0.75mm ²	1.11mm	10.5mm
TPYC-4	4.0mm ²	2.55mm	14.7mm	TTPYCSLA-4	0.75mm ²	1.11mm	15.3mm
TPYCY-1.5	1.5mm ²	1.56mm	14.5mm				
TPYCY-2.5	2.5mm ²	2.01mm	15.5mm				
TPYCY-4	4.0mm ²	2.55mm	16.9mm				

APPX. 2 ROD TERMINALS

PCU-3010

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable	
				IEC61162-2	IEC61162-1
C1	1	TxD-	AI 0.75-6 GY	TTYCSLA-4	TTYCSLA-1Q
	2	TxD+			No connection
	3	ISOGND			TTYCSLA-1Q
	4	RxD-			
	5	RxD+			
C2	6	TxD-	AI 0.75-6 GY	TTYCSLA-4	TTYCSLA-1Q
	7	TxD+			No connection
	8	ISOGND			TTYCSLA-1Q
	9	RxD-			
	10	RxD+			
C3	1	TxD-	AI 0.75-6 GY	—	TTYCSLA-1Q
	2	TxD+			No connection
	3	ISOGND			TTYCSLA-1Q
	4	RxD-			
	5	RxD+			
C4	6	TxD-	AI 0.75-6 GY	—	TTYCSLA-1Q
	7	TxD+			No connection
	8	ISOGND			TTYCSLA-1Q
	9	RxD-			
	10	RxD+			

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
24V IN	—	24V+	AI 1.5-6 BK	DPYC-1.5
	—	24V-	AI 1.5-6 BK	

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

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

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

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

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

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

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

APPX. 2 ROD TERMINALS

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

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

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

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

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

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

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J4*	1	DV12V_OUT3	AI 1-6 RD (red)	MPYC-12
	2	DIGI_IN3		
	3	DIGI_RTN3		
	4	GND		
	5	DC12V_OUT4		
	6	DIGI_IN4		
	7	DIGI_RTN4		
	8	GND		
Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J5*	1	DV12V_OUT5	AI 1-6 RD (red)	MPYC-12
	2	DIGI_IN5		
	3	DIGI_RTN5		
	4	GND		
	5	DC12V_OUT6		
	6	DIGI_IN6		
	7	DIGI_RTN6		
	8	GND		
Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J6*	1	DV12V_OUT7	AI 1-6 RD (red)	MPYC-12
	2	DIGI_IN7		
	3	DIGI_RTN7		
	4	GND		
	5	DC12V_OUT8		
	6	DIGI_IN8		
	7	DIGI_RTN8		
	8	GND		

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

MC-3030D, MC-DOUT Board (24P0117)

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

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

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J3	1	A1	AI 1-6 RD (red)	MPYC-12
	2	COM1		
	3	B1		
	4	A2		
	5	COM2		
	6	B2		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J4	1	A3	AI 1-6 RD (red)	MPYC-12
	2	COM3		
	3	B3		
	4	A4		
	5	COM4		
	6	B4		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J5	1	A5	AI 1-6 RD (red)	MPYC-12
	2	COM5		
	3	B5		
	4	A6		
	5	COM6		
	6	B6		

Connector #	Pin #	Signal name	Rod terminal to use	Connected cable
J6	1	A7	AI 1-6 RD (red)	MPYC-12
	2	COM7		
	3	B7		
	4	A8		
	5	COM8		
	6	B8		

APPX. 3 DIGITAL INTERFACE

Digital Interface

Input sentences

ABK, ACN, ALC, ALF, ALR, ARC, CUR, DBT, DPT, DTM, ETL, GGA, GLL, GNS, HBT, HCR, HDT, MTW, MWV, NRM, NRX, NSR, OSD, PRC, RMC, ROR, ROT, RPM, RRT, RSA, THS, TLB, TRC, TRD, TTD, TTM, VBW, VDM, VDO, VDR, VHW, VLW, VSD, VTG, XDR, ZDA

Output sentences

ABM, ACK, ACN, ALC, ALF, ALR, ARC, BBM, DDC, EVE, HBT, HTC, OSD, RRT, RTE, VBW, VDR, VSD, WPL, XTE

FURUNO proprietary input sentence

PFEC (pidat, pireq, VRpio, Ilcdo, Ilmba, SDmsi, rmset)

FURUNO proprietary output sentence

PFEC (pidat, pireq, Ilcdo, Ilmba, rmset)

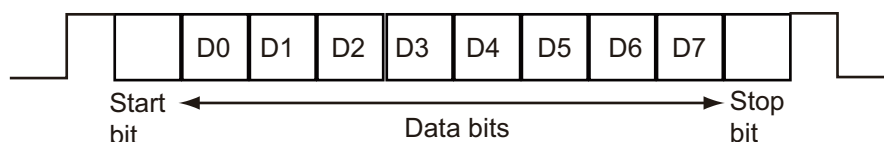
Data reception

Data is received in serial asynchronous form in accordance with the standard referenced in IEC 61162-2.

The following parameters are used:

Baud rate: 38,400 bps (HDT, THS, !AIVDM, !AIVDO, !AIABK, \$AIALR). The baud rate of all other sentences is 4800 bps

Data bits: 8 (D7 = 0), Parity: none, Stop bits: 1



Data Sentences

Input sentences

ABK - UAIS Addressed and binary broadcast acknowledgement

\$--ABK,xxxxxxxx,x,x,x,x,x*hh<CR><LF>
1 2 3 4 5

1. MMSI of the addressed AIS unit (9 digits)
2. AIS channel of reception (No use)
3. Message ID (6, 8, 12, 14)
4. Message sequence number (0 to 9)
5. Type of acknowledgement (See below)
 - 0 = Message (6 or 12) successfully received by the addressed AIS unit
 - 1 = message was broadcast (6 or 12), but not ACK by addressed AIS unit
 - 2 = message could not be broadcast (quantity of encapsulated data exceeds five slots)
 - 3 = requested broadcast of message (8, 14 or 15) has been successfully completed
 - 4 = late reception of message (7 or 13) ACK that was addressed to this AIS unit (own ship and referenced a valid transaction)
 - 5 = message has been read and acknowledged on a display unit.

APPX. 3 DIGITAL INTERFACE

ACN - Alert command

\$--ACN,hhmmss.ss,aaa,x.x,x.x,c,a*hh<CR><LF>
1 2 3 4 5 6

1. Time (No use)
2. Manufacturer mnemonic code (3 digit alphanumeric code, null)
3. Alert Identifier (0, 1 to 999 or 10000 to 9999999)
4. Alert Instance (0 to 999999, null)
5. Alert command (A,Q,O,S)
 - A=acknowledge
 - Q=request/repeat information
 - O=responsibility transfer
 - S=silence
6. Sentence status flag(C) (fixed)

ALC - Cyclic alert list

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

1. Total number of sentences for this message (01 to 99)
 2. Sentence number (01 to 99)
 3. Sequential message identifier (00 to 99)
 4. Number of alert entries (0 to 3)
 5. Manufacturer mnemonic code (FEC, null)
 6. Alert identifier (1 to 999 or 10000 to 9999999)
 7. Alert instance (1 to 999999, null)
 8. Revision counter (1 to 99)
 9. Additional alert entries (see Note)
- Alert entry 1
See Note

Note: Alert entry 0 to n: Each alert entry consists of

- Manufacturer Identifier (see ALF Manufacturer)
- Alert Identifier (see ALF Alert identifier)
- Alert instance (see ALF instance)
- Revision counter (see ALF revision counter)

Each entry identifies a certain alert with a certain state.

It is not allowed that an alert entry is split between two ALC sentences.

ALF - Alert sentence

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

1. Total number of ALF sentences for this message (1, 2)
2. Sentence number (1, 2)
3. Sequential message identifier (0 to 9)
4. Time of last change (hh=00 to 23, mm=00 to 59, ss.ss=00.00 to 59.99), null when #2 is 2
5. Alert category (A=Alert category A, B=Alert category B, C=Alert category C), null when #2 is 2
6. Alert priority (A=Alarm, W=Warning, C=Caution), null when #2 is 2
7. Alert state (A/S/O/U/V/N/null)
 - A=Acknowledged
 - S=Silence,
 - O=Active-responsibility transferred
 - U=Rectified-unacknowledged
 - V=Not acknowledged
 - N=Normal state
 - null when #2 is 2
8. Manufacturer mnemonic code (FEC, null)
9. Alert identifier (1 to 999 or 10000 to 9999999)
10. Alert instance (1 to 999999, null)
11. Revision counter (1 to 99)
12. Escalation counter (0 to 9)
13. Alert text (max. 16 characters)

ALR - Set alarm state

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

1. Time of alarm condition change, UTC (000000.00 to 235959.99)
2. Unique alarm number (identifier) at alarm source (000 to 999, null)
3. Alarm condition (A=threshold exceeded, V=not exceeded)
4. Alarm acknowledge state (A=acknowledged, V=not acknowledged)
5. Alarm description text (alphanumeric characters, max. 32)

ARC - Alert command refused

\$--ARC,hhmmss.ss,aaa,x.x,x.x,c*hh<CR><LF>
 1 2 3 4 5

1. Release time of the alert command refused (000000.00 to 235959.99)
2. Used for proprietary alerts, defined by the manufacturer (FEC, null)
3. The alert identifier (1 to 999 or 10000 to 9999999)
4. The alert instance (1 to 999999, null)
5. Refused alert command (A, Q, O, S)
 A=acknowledge
 Q=request/repeat information
 O=responsibility transfer
 S=silence

CUR - Current

\$--CUR,A,x,x,x,x,x,x,a,x,x,x,x,x,a*hh<CR><LF>
 1 2 3 4 5 6 7 8 9 1011

1. Validity of data (A=valid, V=not valid)
2. Data set number (0 to 9)
3. Layer number (0.0 to 3.0)
4. Current depth in meters (0.00 to 99.99)
5. Current direction in degrees (0.00 to 360.00)
6. Direction reference in use (true or relative)
7. Current speed in knots (0.00 to 99.99)
8. Reference layer depth in meters (No use)
9. Heading (0 to 360.00)
10. Heading reference in use (true or magnetic)
11. Speed reference (B=Bottom track W=Water track P=Positioning system)

DBT - Depth below transducer

\$--DBT,xxxx.x,f,xxxx.x,M,xxxx.x,F*hh<CR><LF>
 1 2 3 4 5 6

1. Water depth (0.00 to 99999.99)
2. feet
3. Water depth (0.00 to 99999.99)
4. Meters
5. Water depth (0.00 to 99999.99)
6. Fathoms

DPT - Depth

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

1. Water depth relative to the transducer, meters (0.00 to 99999.99)
2. Offset from transducer, meters (No use)
3. Maximum range scale in use (No use)

APPX. 3 DIGITAL INTERFACE

DTM - Datum reference

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

1. Local datum (W84=WGS84 W72=WGS72 S85=SGS85 P90=PE90 999=User defined null)
2. Local datum subdivision code (No use)
3. Lat offset, min (No use)
4. N/S (No use)
5. Lon offset, min (No use)
6. E/W (No use)
7. Altitude offset, meters (No use)
8. Reference datum (No use)

ETL - Engine telegraph operation status

\$--ETL,hhmmss.ss,a,xx,xx,a,x*hh<CR><LF>
1 2 3 4 5 6

1. Event time (UTC) (000000.00 to 235960.99)
2. Message type (O=order A=answerback)
3. Position indicator of engine telegraph
 - 00 = Stop engine
 - 01 = [AH] Dead Slow
 - 02 = [AH] Slow
 - 03 = [AH] Half
 - 04 = [AH] Full
 - 05 = [AH] Nav. Full
 - 11 = [AS] Dead Slow
 - 12 = [AS] Slow
 - 13 = [AS] Half
 - 14 = [AS] Full
 - 15 = [AS] Crash Astern
4. Position indication of sub telegraph (20/30/40)
5. Operating location indicator (B=bridge P=port wing S=starboard wing C=engine control room E=engine side/local W=wing, null)
6. Number of engine or propeller shaft (0 to 9)

GGA - Global positioning system fix data

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

1. UTC of position (no use)
2. Latitude (0000.00000 to 9000.00000)
3. N/S
4. Longitude (0000.00000 to 18000.00000)
5. E/W
6. GPS quality indicator (1 to 8)
7. Number of satellite in use (No use)
8. Horizontal dilution of precision (0.0 to 999.9)
9. Antenna altitude above/below mean sealevel (No use)
10. Unit, m (No use)
11. Geoidal separation (No use)
12. Unit, m (No use)
13. Age of differential GPS data (0.00 to 999.99)
14. Differential reference station ID (No use)

GLL - Geographic position, latitude/longitude

\$--GLL,IIII.LL,a,yyyyy.yy,a,hhmmss.ss,a,x*hh<CR><LF>
 1 2 3 4 5 6 7

1. Latitude (0000.00000 to 9000.00000)
2. N/S
3. Longitude (0000.00000 to 18000.00000)
4. E/W
5. UTC of position (No use)
6. Status (A=data valid V=data invalid)
7. Mode indicator (A=Autonomous D=Differential E=Estimated M=Manual input S=Simulator)

GNS - GNSS fix data

\$--GNS,hhmmss.ss,IIII.LL,a,yyyyy.yy,a,c--c,xx,x.x,x.x,x.x,x.x,x.x,a*hh<CR><LF>
 1 2 3 4 5 6 7 8 9 10 11 12 13

1. UTC of position (no use)
2. Latitude (0000.00000 to 9000.00000)
3. N/S
4. Longitude (0000.00000 to 18000.00000)
5. E/W
6. Mode indicator (A, D, E, F, M, N, P, R, S)
 A=Autonomous D=Differential E=Estimated Mode F=Float RTK M=Manual Input Mode
 N=No fix P=Precise R=Real Time Kinematic S=Simulator Mode
7. Total number of satellites in use (No use)
8. HDOP (0.00 to 999.99)
9. Antenna altitude, meters (No use)
10. Geoidal separation (No use)
11. Age of differential data (0.00 to 99.99)
12. Differential reference station ID (No use)
13. Navigational status indicator (S=Safe, C=Caution, U=Unsafe, V=Not valid)

HBT - Heartbeat supervision sentence

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

1. Configured repeat interval (0 to 999, null)
2. Equipment status (A=Normal V=System fail)
3. Sequential sentence identifier (0 to 9)

HCR - Heading Correction Report

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

1. Heading, degrees true (0.00 to 360.00)
2. Mode indicator
 A = Autonomous
 E = Estimated (dead reckoning)
 M = Manual input
 S = Simulator mode
 V = Data not valid (including standby)
3. Correction state
 A = Both Speed/latitude and dynamic correction included in heading
 D = Dynamic correction included in heading
 S = Speed/latitude correction included in heading
 N = No correction included in heading
 V = Not available, reporting device does not know about correction state
4. Correction value (-180 to 180, null)

APPX. 3 DIGITAL INTERFACE

HDT - Heading, true

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

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

MTW - Water temperature

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

1. Water temperature, degrees C (-100.000 to 100.000)

MWV - Wind speed and angle

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

1. Wind angle, degrees (0.00 to 360.00)
2. Reference (R/T, R=Relative, T=Theoretical)
3. Wind speed (0.00 to 9999.99)
4. Wind speed units (K=km/h M=m/s N=knots S=mph)
5. Status (A=data valid V=data invalid)

NRM - NAVTEX receiver mask

\$--NRM, x,x,hhhhhhhh,hhhhhhhh,a*hh<CR><LF>
1 2 3 4 5

1. Function code
 - 0 = request messages for the given mask
 - 1 = set/report the storage mask
 - 2 = set/report the printer mask
 - 3 = set/report the INS mask
 - 4 to 9 = reserved
2. Frequency table index
 - 1 = 490 kHz
 - 2 = 518 kHz
 - 3 = 4209.5 kHz
 - 4 to 9 = reserved
3. Transmitter coverage area mask
4. Message type mask
5. Sentence status flag
 - R = status report of current settings
 - C = configuration command to change settings

NRX - Navtex received data

\$--NRX,xxx,xxx,xx,aaxx,x,hhmmss.ss,xx,xx,xxxx,xxxx,xxxx,A,c--c*hh<CR><LF>
 1 2 3 4 5 6 7 8 9 10 11 12 13

1. Number of sentences (001 to 999)
2. Sentence number (001 to 999)
3. Sequential message ID (00 to 99)
4. Navtex message code (aaxx aa: AA to ZZ xx: 00 to 99, null)
5. Frequency table index
 - 0 = not received over air
 - 1 = 490 kHz
 - 2 = 518 kHz
 - 3 = 4209.5 kHz
 - 4 to 9 = reserved
 - null
6. UTC of receipt of message (No use)
7. Day (01 to 31, null)
8. Month (01 to 12, null)
9. Year (0000 to 9999, null)
10. Total number of characters in this series of NRX sentences (1 to 8000, null)
11. Total number of bad characters (0 to 8000, null)
12. Status indication (A=correct message, V=incorrect message; null)
13. Message body (English alphanumeric characters)

NSR - Navigation status report

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

1. Integrity of heading¹⁾
2. Plausibility of heading²⁾
3. Integrity of position¹⁾
4. Plausibility of position²⁾
5. Integrity of STW¹⁾
6. Plausibility of STW²⁾
7. Integrity of SOG and COG¹⁾
8. Plausibility of SOG and COG²⁾
9. Integrity of depth¹⁾
10. Plausibility of depth²⁾
11. Mode of STW³⁾
12. Integrity of time¹⁾
13. Plausibility of time²⁾

Comments:**1) Integrity status**

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

2) Plausibility status

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

3) Mode of STW

W = Measured water reference
 E = Estimated/calculated from non-water reference sources
 M = Manual input
 N = Not available

APPX. 3 DIGITAL INTERFACE

OSD - Own ship data

\$--OSD,x.x,A,x.x,a,x.x,a,x.x,x,x,a*hh<CR><LF>
1 2 3 4 5 6 7 8 9

1. Heading, degrees true (0.00 to 359.99, null)
2. Heading status (A=data valid, V=data invalid)
3. Vessel course, degrees true (0.00 to 359.99, null)
4. Course reference (B/M/W/R/P, null)
B=Bottom tracking log
M=Manually entered
W=Water referenced
R=Radar tracking (of fixed target)
P=Positioning system ground reference
5. Vessel speed (0.00 to 999.99, null)
6. Speed reference (B/M/W/R/P, null)
7. Vessel set, degrees true, manually entered (0.00 to 359.99, null)
8. Vessel drift (speed), manually entered (0.00 to 99.99, null)
9. Speed units (N=Knots)

PRC - Propulsion remote control

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

1. Lever demand position (-100 to 100, 0=Stop, null)
2. Lever demand status (A=data valid V=data invalid)
3. RPM demand value (-9999.9 to 9999.9, null)
4. RPM mode indicator (P=per cent R=Revolutions per min V=data invalid)
5. Pitch demand value (-999.9 to 999.9, null)
6. Pitch mode indicator (P=per cent D=degrees V=data invalid)
7. Operating location indicator (B=bridge P=port wing S=starboard wing
C=engine control room E=engine side/local W=Wing)
8. Number of engine or propeller shaft (0 to 9)

RMC - Recommended minimum specific GPS/TRANSIT datas

\$--RMC,hhmmss.ss,A,lll.ll,a,yyyyy.yy,a,x.x,x.x,ddmmyy,x.x,a,a*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13

1. UTC of position fix (No use)
2. Status (A=data valid, V=navigation receiver warning)
3. Latitude (0000.00000 to 9000.00000)
4. N/S
5. Longitude (00000.00000 to 18000.00000)
6. E/W
7. Speed over ground, knots (0.00 to 99.94)
8. Course over ground, degrees true (0.0 to 360.0)
9. Date (No use)
10. Magnetic variation, degrees (No use)
11. E/W (No use)
12. Mode indicator (A=Autonomous mode D=Differential mode S=Simulator
F=Float RTK P=Precise R=Real time kinematic E=Estimated (DR) M=Manual)
13. Navigational status indication (S=Safe C=Caution U=Unsafe V=Navigational status not valid)

ROR - Rudder order status

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

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

ROT - Rate of turn

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

1. Rate of turn, deg/min, "-"=bow turns to port (-9999.99 to 9999.99)
2. Status (A=data valid, V=data invalid)

RPM - Revolutions

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

1. Source (S=shaft E=engine)
2. Engine or shaft number (0 to 9)
3. Speed, revolutions/min (-9999.99 to 9999.99)
4. Propeller pitch (-100.0 to 100.0)
5. Status (A=data invalid V=data valid)

RRT - Report route transfer

\$--RRT, a, c-c, c-c, c-c, a, a *hh <CR><LF>
1 2 3 4 5 6

1. Reported transfer type.
(M=Monitored route, A=Alternative route for editing, Q=Query for transmitting any monitored or alternative route for editing)
2. Name of transferred route. (Max. 30 characters, null)
3. Version of transferred route. (Max. 20 characters, null)
4. ID of current waypoint for monitored route. (Max. 10 characters, null)
5. File transfer statues of transferred route.
(A=Successful reception of the route file transfer, E=Error in reception of the route file transfer, null)
6. Status of the intended application of the transferred route.
(A=Content of the received route accepted and valid, V=Content of received route rejected, P=Pending, application level has not yet evaluated the received route, N=Not applicable, null).

RSA - Rudder sensor angle

\$--RSA,x.x,A,x.x,A*hh<CR><LF>
1 2 3 4

1. Starboard(or single) rudder sensor data (-180 to 180.0, null)
2. Starboard(or single) rudder sensor status (A=Valid V=Data invalid)
3. Port rudder sensor data (-180 to 180.0, null)
4. Port rudder sensor status (A=Valid V=Data invalid)

THS - True heading & status

\$--THS,xxx.x,a*hh<CR><LF>
1 2

1. Heading, degrees True (0.00 to 360.00)
2. Mode indicator (A=Autonomous E=Estimated M=Manual input S=Simulator V=Data not valid)

TLB - Target label

\$--TLB,x,x,x,c--c,x,x,c--c,...,x,x,c--c*hh<CR><LF>

1 2 3
3

1. Target number "n" reported by the device
2. Label assigned to target "n"²⁾
3. Additional label pairs¹⁾

Comments:

- 1) This sentence allows several target number/label pairs to be sent in a single message, the maximum sentence length limits the number of labels allowed in a message.
- 2) Null fields indicate that no common label is specified, not that a null label should be used. The intent is to use a null field as a place holder. A device that provides tracked target data should use its "local" label (usually the target number) unless it has received a TLB sentence specifying a common label.

TRC - Thruster control data

\$--TRC,x,x,x,a,x,x,a,x,x,a*hh<CR><LF>

1 2 3 4 5 6 7 8

1. Number of thruster, bow or stern (0 to 9)
2. RPM demand value (-999.9 to 999.9)
3. RPM mode indicator (P=per cent R=revolutions per min
V=data invalid)
4. Pitch demand value (-180.0 to 180.0)
5. Pitch mode indicator (P=per cent D=degree V=data invalid)
6. Azimuth demand (000.0 to 359.9)
7. Operating location indicator (B=bridge P=port wing S=starboard wing
C=engine control room E=engine side/local W=Wing)
8. Sentence flag status (No use)

TRD - Thruster response data

\$--TRD,x,x,x,a,x,x,a,x,x*hh<CR><LF>

1 2 3 4 5 6

1. Number of thruster, bow or stern (0 to 9)
2. RPM response (-999.9 to 999.9, null)
3. RPM mode indicator (P=per cent R=revolutions per min
V=data invalid)
4. Pitch response value (-999.9 to 999.9, null)
5. Pitch mode indicator (P=per cent D=degree V=data invalid)
6. Azimuth response (000.0 to 359.9, null)

TTD - Tracked target data

!--TTD,xx,xx,x,s--s,x*hh<CR><LF>

1 2 3 4 5

1. Total hex number of sentences need to transfer the message (1 to FF)
2. Hex sentence number (1 to FF)
3. Sequential message identifier (0 to 9)
4. Encapsulated trancked target data (6 bit binary-converted data)
5. Number of fill bits (0 to 5)

TTM - Tracked target message

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

1. Target number (00 to 999)
2. Target distance from own ship (0.000 to 99.999)
3. Bearing from own ship, degrees (0.0 to 360.0)
4. True or Relative (T)
5. Target speed (0.00 to 999.99, null)
6. Target course, degrees (0.0 to 360.0, null)
7. True or Relative
8. Distance of closest point of approach (0.00 to 99.99, null)
9. Time to CPA, min., "-" increasing (-99.99 to 99.99, null)
10. Speed/distance units (K=km/km/h N=nm/kn S=sm/mph)
11. Target name (null)
12. Target status (L=Lost Q=Acquiring T=Tracking)
13. Reference target (R, null otherwise)
14. UTC of data (null)
15. Type of acquisition (A=Automatic M=Manual R=Reported)

VBW - Dual ground/water speed

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

1. Longitudinal water speed, knots (-99.949 to 99.949)
2. Transverse water speed, knots (-99.949 to 99.949, null)
3. Status: water speed, A=data valid V=data invalid
4. Longitudinal ground speed, knots (-99.949 to 99.949)
5. Transverse ground speed, knots (-99.949 to 99.949, null)
6. Status: ground speed, A=data valid V=data invalid
7. Stern transverse water speed, knots (-99.949 to 99.949)
8. Status: stern water speed, A=data valid V=data invalid
9. Stern transverse ground speed, knots (-99.949 to 99.949)
10. Status: stern ground speed, A=data valid V=data invalid

VDM - UAIS VHF data-link message

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

1. Total number of sentences needed to transfer the message (1 to 9)
2. Message sentence number (1 to 9)
3. Sequential message identifier (0 to 9, null)
4. AIS channel Number (A, B, null)
5. Encapsulated ITU-R M.1371 radio message (1 to 62 bytes)
6. Number of fill-bits (0 to 5)

VDO - UAIS VHF data-link own vessel report

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

1. Total number of sentences needed to transfer the message (1 to 9)
2. Message sentence number (1 to 9)
3. Sequential message identifier (0 to 9, null)
4. AIS channel Number (A/B/C/D/null)
5. Encapsulated ITU-R M.1371 radio message (1 to 62 bytes)
6. Number of fill-bits (0 to 5)

APPX. 3 DIGITAL INTERFACE

VDR - Set and drift

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

1. Direction, degrees (0.00 to 360.00)
2. T=True (fixed)
3. Direction, degrees (0.00 to 360.00, null)
4. M=Magnetic (fixed)
5. Current speed (0 to 99.99)
6. N=Knots (fixed)

VHW - Water speed and headings

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

1. Heading, degrees (No use)
2. T=True (No use)
3. Heading, degrees (No use)
4. M=Magnetic (No use)
5. Speed (-99.94 to 99.94)
6. N=Knots (fixed)
7. Speed (-99.94 to 99.94)
8. K=km/h (fixed)

VLW - Dual Ground / Water Distance

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

1. Total cumulative water distance
2. nautical miles
3. Water distance since reset
4. nautical miles
5. Total cumulative ground distance
6. nautical miles
7. Ground distance since reset
8. nautical miles

VSD - UAIS Voyage static data

\$--VSD,x.x,x.x,x.x,c--c,hhmmss.ss,xx,xx,x.x,x.x*hh<CR><LF>
1 2 3 4 5 6 7 8 9

1. Type of ship and cargo category (0 to 255, null)
2. Maximum present static draught (0 to 25.5 meters, null)
3. Persons on-board (0 to 8191, null)
4. Destination (1 to 20 characters, null)
5. Estimated UTC of arrival at destination (000000.00 to 235959.99, null, 246000.00)
6. Estimated day of arrival at destination (00 to 31 (UTC), null)
7. Estimated month of arrival at destination (00 to 12 (UTC), null)
8. Navigational status (0 to 15, null)
9. Regional application flags (null)

VTG - Course over ground and ground speed

\$--VTG,x,x,T,x,x,M,x,x,N,x,x,K,a*hh<CR><LF>

1 2 3 4 5 6 7 8 9

1. Course over ground, degrees (0.00 to 360.00)
2. T=True (fixed)
3. Course over ground, degrees (No use)
4. M=Magnetic (No use)
5. Speed over ground, knots (0.00 to 99.94)
6. N=Knots (fixed)
7. Speed over ground, km/h (0.00 to 99.94)
8. K=km/h (fixed)
9. Mode indicator (A=Autonomous, D=Differential E=Estimated (dead reckoning)
M=Manual input S=Simulator P=Precision)

XDR - Transducer measurements

\$--XDR,a,x,x,a,c--c,a,x,x,a,c--c,...*hh<CR><LF>

1 2 3 4 5 6 7 8 n

1. Transducer type, transducer No. 1 (U/I)
2. Measurement data, transducer No. 1 (-10.00 to 10.00 when #1 is "U", 0.00400 to 0.0200 when #1 is "I")
3. Units of measure, transducer No. 1 (V/A)
4. Transducer No. 1 ID (6 characters)
5. Transducer type, transducer No. 2 (U/I)
6. Measurement data, transducer No. 2 (-10.00 to 10.00 when #1 is "U", 0.00400 to 0.0200 when #1 is "I")
7. Units of measure, transducer No. 2 (V/A)
8. Transducer No. 2 ID (6 characters)
- n. repeat above

ZDA - Time and date

\$--ZDA,hhmmss.ss,xx,xx,xxxx,xx,xx*hh<CR><LF>

1 2 3 4 5 6

1. UTC (000000.00 to 235960.99)
2. Day (01 to 31)
3. Month (01 to 12)
4. Year (UTC, 1970 to 2037)
5. Local zone, hours (No use)
6. Local zone, minutes (No use)

Output sentences

See input sentences for ACN, ALC, ALF, ALR, ARC, HBT, OSD, RRT, VBW, VDR and VSD.

ABM - UAIS Addressed binary and safety related message

!--ABM,x,x,x,xxxxxxxx,x,xx,s--s,x*hh<CR><LF>

1 2 3 4 5 6 7 8

1. Total number of sentences needed to transfer the message (1 to 9)
2. Message sentence number (1 to 9)
3. Message sequence identifier (0 to 3)
4. The MMSI of destination AIS unit for the ITU-R M.1371 message (9 digits)
5. AIS channel for broadcast of the radio message (0 to 3)
6. VDL message number (6 or 12), see ITU-R M.1371
7. Encapsulated data (1 to 60 bytes)
8. Number of fill-bits (0 to 5)

APPX. 3 DIGITAL INTERFACE

ACK - Acknowledge alarm

\$--ACK,xxx*hh<CR><LF>

1

1. Local alarm number (identifier) (000 to 999, null)

BBM - UAIS broadcast binary message

!--BBM,x,x,x,x,xx,s--s,x*hh<CR><LF>

1 2 3 4 5 6 7

1. Total number of sentences needed to transfer the message (1 to 9)
2. Sentence number (1 to 9)
3. Sequential Message identifier (0 to 9)
4. AIS channel for broadcast of the radio message (0 to 3)
5. ITU-R M.1371 message ID (8 or 14)
6. Encapsulated data (1 to 60 bytes)
7. Number of fill-bits, 0 to 5

DDC - Display dimming control

\$--DDC,a,xx,a,a*hh<CR><LF>

1 2 3 4

1. Display dimming preset (null)
2. Brightness percentage (00 to 99)
3. Color palette preset (null)
4. Sentences status flag (R=report of current settings, C=configuration command)

EVE - General event message

\$--EVE,hhmmss.ss,c--c,c--c*hh <CR><LF>

1 2 3

1. Event time (000000.00 to 235959.99)
2. Tag code used for identification of source of event (RA0001 to RA0010, EI0001 to EI0016, IN0001 to IN0016, II0001 to II0016)
3. Event description (OPERATION)

RTE - Routes

\$--RTE,x,x,x,x,a,c—c,c—c,...,c—c*hh<CR><LF>

1 2 3 4 5 ... n

1. Total number of sentences being transmitted (1 to n/null)
2. Sentence number (1 to n/null)
3. Message mode (c/w/null)
c = complete route, all waypoints
w = working route, first listed waypoint is "FROM", second is "TO" and remaining are rest of route
4. Route identifier/null
5. Waypoint identifier/null
- ... Additional waypoint identifiers
- n. Waypoint "n" identifier

WPL - Waypoint Location

\$--WPL,llll.ll,a,yyyy.yy,a,c--c*hh<CR><LF>

1 2 3 4 5

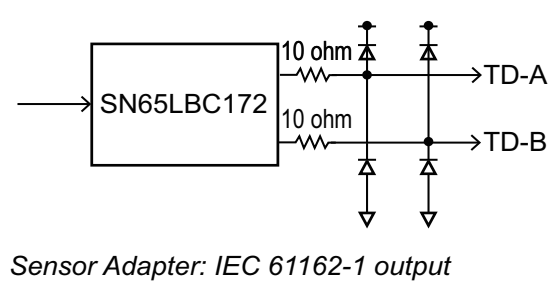
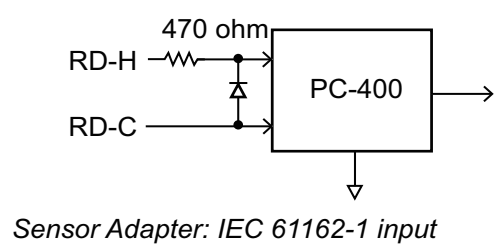
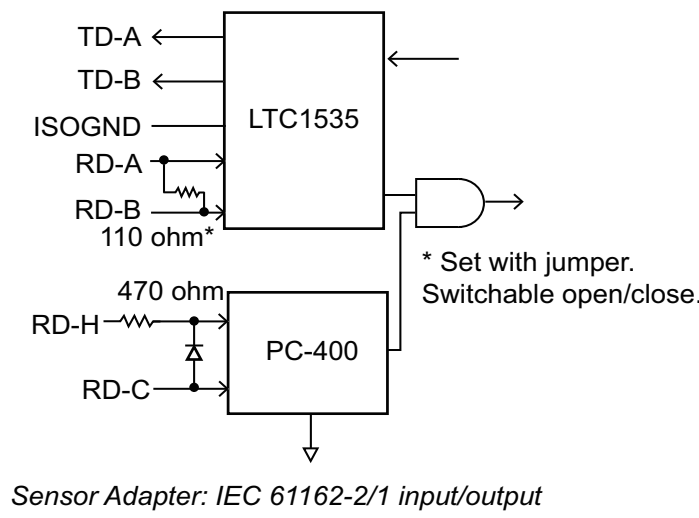
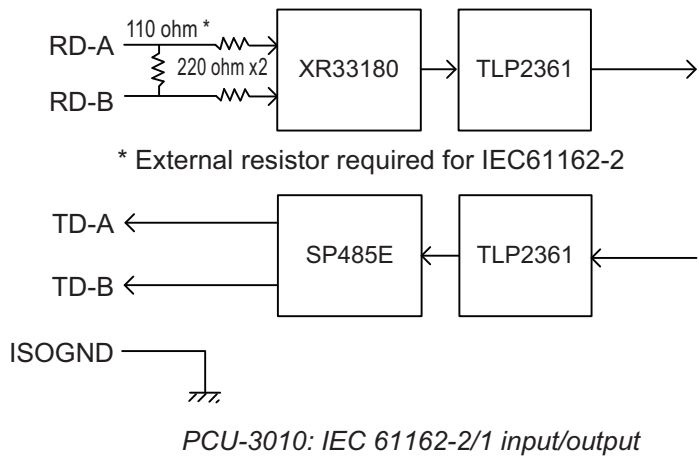
1. Waypoint latitude (0000.00000 to 9000.00000)
2. N/S
3. Waypoint longitude (00000.00000 to 18000.00000)
4. E/W
5. Waypoint identifier (No use)

XTE - Cross-track error, measured

\$--XTE,A,A,x.x,a,N,a*hh<CR><LF>
 1 2 3 4 5 6

1. Status: A=data valid V=Loran-C blink or SNR warning
2. Status: A=data valid V=Loran-C cycle lock warning flag
3. Magnitude of cross-track error (0.000 to 100.000)
4. Direction to steer, L/R
5. Units, nautical miles (fixed)
6. Mode indicator (A=Autonomous mode D=Differential mode S=Simulator mode)

Serial Interface



APPX. 4 RA/IF BOARD JUMPER VALUES

The values for each jumper block on the RA/IF board (24P0140) are shown below.

CH1/CH2 signal settings

J1/J8 HD-TERM		J3/J16 VID-TERM		J5/J18 BP-TERM		J10/J22 TRG-TERM	
1-2	1.2 kΩ	1-5	75Ω	1-2	1.2 kΩ	1-5	50Ω
2-3	OFF	2-6	50Ω	2-3	OFF	2-6	75Ω
J2/J9 HD-PULL UP		3-7	1.2 kΩ	J6/J19 BP-PULL UP		3-7	180kΩ
1-4	5V IN	4-8	100 kΩ	1-4	5V IN	4-8	1.2 kΩ
2-5	OC (560Ω)	J4/J12 HD-POLARITY		2-5	OC (560Ω)	J13/J24 BP-PULSE NUM	
3-6	OC (1 kΩ)	1-2	NORMAL	3-6	OC (1 kΩ)	1-2	2048
		2-3	REVERSE			2-3	1024

Input bypass settings (CH2 only)

J7/J11 HD-INTERFACE		J17/J20 BP-INTERFACE	
1-2	ADJUST	1-2	ADJUST
2-3	BYPASS	2-3	BYPASS
J14/J15 VID-INTERFACE		J21/J23	
1-2	ADJUST	1-2	ADJUST
2-3	BYPASS	2-3	BYPASS

APPX. 5 ALERT LIST

The table starting from the bottom of the page lists the possible alerts for this equipment. Each alert is listed with alert IDs (ALF and ALR), alert description, and priority/category. This equipment can output alerts in ALF or ALR format. The alert number depends on the output format and may differ between formats.

This unit supports the aggregate alert function. Aggregate alerts are a grouping of similar alerts. When an aggregated alert occurs, the aggregated alert name (header alert) is displayed on the AMS connected to this unit. The following table lists the ALF alert numbers and aggregate alert names that are subject to aggregate alerts.

Aggregated Alert Name	Alert priority	ALF No.
Critical Point	Warning	3038,x

x=Instance number

If the alert other than "anchor watch" alert is not acknowledged within the set time (escalation time), the alarm will sound again and the alert will be re-issued (the alert status will be repeated). If the anchor watch alert is not acknowledged within 120 seconds after being generated, the priority changes from "warning" to "alarm". The default escalation times are as follows:

- Alerts complying with IEC 62923-2: 270 s (fixed)
- Alerts not complying with IEC 62923-2: 60 s (changeable)
- Anchor watch: 120 s (fixed)

The escalation time for "anchor watch" alerts is the time specified in IEC61174. Settings cannot be changed.

Note 1: The priority of some alerts can be changed to "Caution". See the Operator's Manual.

Note 2: This unit's alerts are not subject to Responsibility Transfer Alerts.

Priority: Alarm, Warning, Caution

Alert No.		Alert Name, Meaning and Remedy	Priority/Category
ALF ID	ALR ID		
3005,-	465	Name: Invalid Datum Meaning: Primary position sensor uses non-WGS-84 datum or missing datum information. Remedy: Check status of GPS sensor.	Warning/B
3038,1 to 3038,199	-	Name: WPT Approach XX (XX is WPT No.) Meaning: The wheel over point has been approached. Remedy: Take helm if needed.	Warning/A
3038, 100000	-	Name: Critical Area Meaning: Entering user chart notes area. Remedy: Confirm description of notes.	Warning/A
3003,-	985	Name: Lost Interface Meaning: Data from external equipment is lost. Remedy: Check connection of external equipment	Caution/B
3003,1	541	Name: AIS MSG Send ERR Meaning: AIS message transmission failed. Remedy: Check the connection with AIS.	Caution/B
3003,2	667	Name: AP Receive Error Meaning: Communication between AP and ECDIS is discontinued. Remedy: Check the connection in the Autopilot.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
3024,1	172	Name: Off Track Meaning: While monitoring route, ship position deviates more than XTD limit Remedy: Make XTD smaller.	Alarm/A
3031,1	171	Name: Safety Contour Meaning: When a check area is set, the vessel entered a shallower area than the threshold set in [Safety Contour]. Remedy: Reconfirm Safety Contour setting or change the course.	Alarm/A
3031,2	496	Name: Anchor Watch Meaning: While anchor watch alert function is enabled, ship's position has been outside of alarm area centering certain position for more than 3 seconds. Remedy: Be careful of dragging anchor.	Alarm/A
30312,-	510	Name: Lost MODBUS COM Meaning: Connection to the MODBUS is lost or interrupted. Remedy: Check connection.	Warning/B
3032,2	495	Name: Anchor Watch Meaning: While anchor watch alert function is enabled, ship's position has been outside of alarm area centering certain position for more than 3 seconds. Remedy: Be careful of dragging anchor.	Warning/A
3035,1	620	Name: USR CHT Danger Meaning: A User Chart Danger Area that is set to Warning/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,2	621	Name: Separation Zone Meaning: A Traffic Separation Zone that is set to Warning/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,3	622	Name: ITZ Meaning: An Inshore Traffic Zone that is set to Warning/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,4	623	Name: Restricted Area Meaning: A Restricted Area that is set to Warning/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,5	624	Name: Caution Area Meaning: A Caution Area that is set to Warning/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,6	625	Name: OFS PROD Area Meaning: An Offshore Production Area that is set to Warning/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Warning/A

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
3035,7	626	Name: MIL PRAC Area Meaning: A Military Protection Area that is set to Warning/ Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,8	627	Name: SPL Landing Area Meaning: A Seaplane Landing Area that is set to Warning/ Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,9	628	Name: SM Transit Lane Meaning: A Submarine Transit Lane that is set to Warning/ Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,10	629	Name: Anchorage Area Meaning: An Anchorage Area that is set to Warning/Cau- tion in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,11	630	Name: Marine Farm Meaning: A Marine Farm/Aquaculture that is set to Warn- ing/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,12	631	Name: PSSA Area Meaning: A PSSA Area that is set to Warning/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,13	632	Name: ATBA Meaning: An Areas to be Avoided that is set to Alarm in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,14	645	Name: NAV Hazard Meaning: One or more navigational hazards detected by the Look-ahead function. Remedy: Adjust course as necessary.	Warning/A
3036,1	594	Name: USR CHT Danger Meaning: A User Chart Danger Area that is set to Warning/ Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,2	595	Name: Separation Zone Meaning: A Traffic Separation Zone that is set to Warning/ Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,3	596	Name: ITZ Meaning: An Inshore Traffic Zone that is set to Warning/ Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
3036,4	597	Name: Restricted Area Meaning: A Restricted Area that is set to Warning/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,5	598	Name: Caution Area Meaning: A Caution Area that is set to Warning/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,6	599	Name: OFS PROD Area Meaning: An Offshore Production Area that is set to Warning/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,7	600	Name: MIL PRAC Area Meaning: A Military Protection Area that is set to Warning/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,8	601	Name: SPL Landing Area Meaning: A Seaplane Landing Area that is set to Warning/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,9	602	Name: SM Transit Lane Meaning: A Submarine Transit Lane that is set to Warning/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,10	603	Name: Anchorage Area Meaning: An Anchorage Area that is set to Warning/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,11	604	Name: Marine Farm Meaning: A Marine Farm/Aquaculture that is set to Warning/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,12	605	Name: PSSA Area Meaning: A PSSA Area that is set to Warning/Caution in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,13	606	Name: ATBA Meaning: An Areas to be Avoided that is set to Alarm in chart alert is detected inside the check area. Remedy: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,14	607	Name: NAV Hazard Meaning: One or more navigational hazards detected by the Look-ahead function. Remedy: Adjust course as necessary.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
3043,3	530	Name: AIS Display 95% Meaning: 95% of maximum number of AIS targets which can be displayed is used. Remedy: Adjust [AIS DISP FILTER] settings.	Caution/B
3042,3	531	Name: AIS Display Full Meaning: Maximum number of AIS targets which can be displayed is used. Remedy: Adjust [AIS DISP FILTER] settings.	Warning/A
3043,4	532	Name: AIS Capacity 95% Meaning: 95% of maximum number of AIS targets which can be displayed is used. Remedy: Adjust [AIS DISP FILTER] settings.	Caution/B
3042,4	533	Name: AIS CPTY Full Meaning: Maximum number of AIS targets which can be displayed is used. Remedy: Adjust [AIS DISP FILTER] settings.	Warning/A
3042,5	535	Name: Active AIS Full Meaning: 100% of capacity for active AIS is used. Remedy: The number of active AIS target became 100% of its limit. Change the unnecessary targets to sleep mode.	Warning/A
3043,5	534	Name: Active AIS 95% Meaning: 95% of capacity for active AIS is used. Remedy: The number of active AIS target became 95% of its limit. Change the unnecessary targets to sleep mode	Caution/B
30432,-	431	Name: HUB-3000 Error Meaning: A network error has occurred between the HUB-3000 and one or more connected units. Remedy: Check network connections between the EC-3000 and networked units.	Warning/B
30645,-	644	Name: Actual UKC Limit Meaning: Actual depth is outside the preset UKC limit. Remedy: Check depth, adjust heading accordingly.	Warning/A
30703,-	700	Name: RT Version > 1 Meaning: Received route transfer sentence (RTZ) is a higher version than this system. Remedy: Check route details. Some route details may not be displayed correctly.	Caution/B
30801,-	485	Name: Depth Limit Meaning: Seabed has been less than set depth for more than 3 seconds. Remedy: Be careful of risk of grounding.	Alarm/A
3015,21	170	Name: Lost Position Meaning: All position data has been lost for more than 30 seconds. Remedy: Check the connection with all GPS.	Warning/B
3015,22	272	Name: Lost UTC Signal Meaning: Time data of all available GPS sensor has been not available for more than 3 seconds. Remedy: Check position sensor, sensor status.	Warning/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
3015,23	277	Name: Lost Wind Signal Meaning: Wind speed/direction data of all available WIND sensors has been not available for more than 3 seconds. Remedy: Check the connection with all wind sensors. Also, check sensor status.	Warning/B
3015,24	279	Name: Lost COG/SOG SIG Meaning: COG/SOG data input stopped for three seconds. Remedy: Check the connection with all GPS sensors. Also, check sensor status.	Warning/B
3015,25	284	Name: Lost LOG(BT) SIG Meaning: SOG data of all available LOG (ground speed) sensors has been not available for more than 3 seconds. Remedy: Check the connection with all LOG sensors. Also, check sensor status.	Warning/B
3015,26	450	Name: Lost Heading SIG Meaning: Heading data of all available gyro has been not available for more than 2 seconds. Remedy: Check the connection with all gyro. Also, check sensor status.	Warning/B
3015,27	453	Name: Lost SDME Signal Meaning: Speed data from all available SDME has been not available for more than 3 seconds. Remedy: Check the connection with all SDME. Also, check sensor status.	Warning/B
3015,28	278	Name: Lost LOG(WT) SIG Meaning: STW data of all available SDME sensors has been not available for more than 3 seconds. Remedy: Check the connection with all SDME. Also, check sensor status.	Warning/B
3015,30	380	Name: Lost AIS COM Meaning: Data from AIS has been discontinued for more than set time. (Set at installation) Default: 60 seconds AIS is turned off, or there is a problem with network. Remedy: Check the connection with AIS and network.	Warning/B
3016,24	382	Name: Lost COG/SOG SIG Meaning: COG/SOG data input stopped for three seconds. Remedy: Check the connection with all GPS sensors. Also, check sensor status.	Caution/B
3016,25	383	Name: Lost LOG(BT) SIG Meaning: SOG data of all available LOG (ground speed) sensors has been not available for more than 3 seconds. Remedy: Check the connection with all LOG sensors. Also, check sensor status.	Caution/B
3016,28	384	Name: Lost LOG(WT) SIG Meaning: Speed data from all available SDME has been not available for more than 3 seconds. Remedy: Check the connection with all SDME. Also, check sensor status.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
3016,30	381	Name: Lost AIS COM Meaning: Data from AIS has been discontinued for more than set time. (Set at installation) Default: 60 seconds AIS is turned off, or there is a problem with network. Remedy: Check the connection with AIS and network.	Caution/B
30403,1	255	Name: Lost Gyro1 COM Meaning: Data from No.1 gyro has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.1 gyro is turned off, or there is a problem with network.	Caution/B
30403,2	256	Name: Lost Gyro2 COM Meaning: Data from No.2 gyro has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.2 gyro is turned off, or there is a problem with network.	Caution/B
30403,3	257	Name: Lost Gyro3 COM Meaning: Data from No.3 gyro has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.3 gyro is turned off, or there is a problem with network.	Caution/B
30403,4	258	Name: Lost Gyro4 COM Meaning: Data from No.4 gyro has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.4 gyro is turned off, or there is a problem with network.	Caution/B
30403,5	259	Name: Lost Gyro5 COM Meaning: Data from No.5 gyro has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.5 gyro is turned off, or there is a problem with network.	Caution/B
30603,1	273	Name: Lost Bow Depth Meaning: Depth data of all available depth sensor(Bow) has been not available for more than 3 seconds. Remedy: Check the connection with all echo sounders.	Caution/B
30603,2	274	Name: Lost MID Depth Meaning: Depth data of all available depth sensor(Mid) has been not available for more than 3 seconds. Remedy: Check the connection with all echo sounders.	Caution/B
30603,3	275	Name: Lost Stern Depth Meaning: Depth data of all available depth sensor(Stern) has been not available for more than 3 seconds. Remedy: Check the connection with all echo sounders.	Caution/B
30603,5	285	Name: Lost HDG MAG Meaning: Heading data of all available magnetic gyro has been not available for more than 3 seconds. Remedy: Check the connection with all magnetic gyro.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30603,6	276	Name: Lost Depth Meaning: Depth data of all available depth sensors has been not available for more than 3 seconds. Remedy: Check the connection with all echo sounders.	Caution/B
30682,1	680	Name: Watch End Meaning: Watch is ending. Remedy: Prepare to make turn(s).	Warning/B
30682,2	681	Name: Repeated Timer Meaning: The action set with repeated timer is approaching. Remedy: Take the actions scheduled in advance.	Warning/B
30682,3	682	Name: Specified Timer Meaning: The action set with specified timer is approaching. Remedy: Take the actions scheduled in advance.	Warning/B
33035,1	634	Name: UKC Limit Meaning: Measured depth from echo sounder is less than set UKC limit value. Remedy: Be careful that measured depth is less than UKC limit.	Warning/A
33035,2	635	Name: Non-official ENC Meaning: A non-official ENC with warning and caution settings was detected in the fore monitoring check area. Remedy: Install official ENC.	Warning/A
33035,3	636	Name: No Vector Chart Meaning: A vector chart without warning and caution was detected in the fore monitoring check area, Remedy: Install latest vector chart.	Warning/A
33035,4	637	Name: Not Up-to-date Meaning: When Not Up to Date is set to Warning/Caution in chart alert, a chart area that is not up-to-date is detected inside the check area. Remedy: Install latest chart.	Warning/A
33035,5	638	Name: Permit Expired Meaning: When Permit Expired is set to Warning/Caution in chart alert, a chart area that has an expired permit is detected inside the check area. Remedy: Update chart permits.	Warning/A
33035,6	646	Name: Sounding UKC LIM Meaning: Chart depth for one or more legs is outside of UKC threshold. Remedy: Adjust course as necessary.	Warning/A
33035,7	647	Name: Too Many Dangers Meaning: Selected route and look-ahead area have too many dangerous objects. Remedy: The check area may not be completely checked for dangerous objects. Make the route or look-ahead area smaller.	Warning/A
33036,1	608	Name: UKC Limit Meaning: Measured depth from echo sounder is less than UKC limit value. Remedy: Be careful that measured depth is less than UKC limit.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
33036,2	609	Name: Non-official ENC Meaning: When Non-official ENC is set to Warning/Caution in chart alert, the non-official chart area is detected inside the check area. Remedy: Install latest official ENC.	Caution/B
33036,3	611	Name: No Vector Chart Meaning: When No Vector Chart is set to Warning/Caution in chart alert, the No Vector Chart area is detected inside the check area. Remedy: Install vector charts.	Caution/B
33036,4	612	Name: Not Up-to-date Meaning: When Not Up to Date is set to Warning/Caution in chart alert, a chart area that is not up-to-date is detected inside the check area. Remedy: Install latest chart.	Caution/B
33036,5	613	Name: Permit Expired Meaning: When Permit Expired is set to Caution in chart alert, a chart area the has an expired permit is detected inside the check area. Remedy: Update chart permits.	Caution/B
33036,6	614	Name: Sounding UKC LIM Meaning: Chart depth for one or more legs is outside the UKC threshold. Remedy: Adjust course accordingly.	Caution/B
33036,7	615	Name: Too Many Dangers Meaning: Selected route and look-ahead area have too many dangerous objects. Remedy: The check area may not be completely checked for dangerous objects. Make the route or look-ahead area smaller.	Caution/B
3008,100	691	Name: Route Failure Meaning: Route monitoring is stopped due to internal error. Remedy: Check own ship position.	Warning/B
30303,1	030	Name: Lost SA1 COM Meaning: Communication error with No.1 sensor adapter is detected. 30 seconds timeout. No.1 sensor adapter is turned off, or there is a problem with network. Remedy: Check the connection with No.1 sensor adapter and network.	Caution/B
30303,2	031	Name: Lost SA2 COM Meaning: Communication error with No.2 sensor adapter is detected. 30 seconds timeout. No.2 sensor adapter is turned off, or there is a problem with network. Remedy: Check the connection with No.2 sensor adapter and network.	Caution/B
30303,3	032	Name: Lost SA3 COM Meaning: Communication error with No.3 sensor adapter is detected. 30 seconds timeout. No.3 sensor adapter is turned off, or there is a problem with network. Remedy: Check the connection with No.3 sensor adapter and network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30303,4	033	Name: Lost SA4 COM Meaning: Communication error with No.4 sensor adapter is detected. 30 seconds timeout. No.4 sensor adapter is turned off, or there is a problem with network. Remedy: Check the connection with No.4 sensor adapter and network.	Caution/B
30303,5	034	Name: Lost SA5 COM Meaning: Communication error with No.5 sensor adapter is detected. 30 seconds timeout. No.5 sensor adapter is turned off, or there is a problem with network. Remedy: Check the connection with No.5 sensor adapter and network.	Caution/B
30303,6	035	Name: Lost SA6 COM Meaning: Communication error with No.6 sensor adapter is detected. 30 seconds timeout. No.6 sensor adapter is turned off, or there is a problem with network. Remedy: Check the connection with No.6 sensor adapter and network.	Caution/B
30303,7	036	Name: Lost SA7 COM Meaning: Communication error with No.7 sensor adapter is detected. 30 seconds timeout. No.7 sensor adapter is turned off, or there is a problem with network. Remedy: Check the connection with No.7 sensor adapter and network.	Caution/B
30303,8	037	Name: Lost SA8 COM Meaning: Communication error with No.8 sensor adapter is detected. 30 seconds timeout. No.8 sensor adapter is turned off, or there is a problem with network. Remedy: Check the connection with No.8 sensor adapter and network.	Caution/B
30303,9	038	Name: Lost SA9 COM Meaning: Communication error with No.9 sensor adapter is detected. 30 seconds timeout. No.9 sensor adapter is turned off, or there is a problem with network. Remedy: Check the connection with No.9 sensor adapter and network.	Caution/B
30303,10	039	Name: Lost SA10 COM Meaning: Communication error with No.10 sensor adapter is detected. 30 seconds timeout. No.10 sensor adapter is turned off, or there is a problem with network. Remedy: Check the connection with No.10 sensor adapter and network.	Caution/B
30303,11	094	Name: Lost SA11 COM Meaning: Communication error with No.11 sensor adapter is detected. 30 seconds timeout. No.11 sensor adapter is turned off, or there is a problem with network. Remedy: Check the connection with No.11 sensor adapter and network.	Caution/B
30303,12	095	Name: Lost SA12 COM Meaning: Communication error with No.12 sensor adapter is detected. 30 seconds timeout. No.12 sensor adapter is turned off, or there is a problem with network. Remedy: Check the connection with No.12 sensor adapter and network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30303,13	096	Name: Lost SA13 COM Meaning: Communication error with No.13 sensor adapter is detected. 30 seconds timeout. No.13 sensor adapter is turned off, or there is a problem with network. Remedy: Check the connection with No.13 sensor adapter and network.	Caution/B
30303,14	097	Name: Lost SA14 COM Meaning: Communication error with No.14 sensor adapter is detected. 30 seconds timeout. No.14 sensor adapter is turned off, or there is a problem with network. Remedy: Check the connection with No.14 sensor adapter and network.	Caution/B
30303,15	098	Name: Lost SA15 COM Meaning: Communication error with No.15 sensor adapter is detected. 30 seconds timeout. No.15 sensor adapter is turned off, or there is a problem with network. Remedy: Check the connection with No.15 sensor adapter and network.	Caution/B
30303,16	099	Name: Lost SA16 COM Meaning: Communication error with No.16 sensor adapter is detected. 30 seconds timeout. No.16 sensor adapter is turned off, or there is a problem with network. Remedy: Check the connection with No.16 sensor adapter and network.	Caution/B
30403,11	391	Name: Lost ROT Gyro1 Meaning: Data from No.1 ROT gyro has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: Check the connection with No.1 ROT gyro.	Caution/B
30403,12	392	Name: Lost ROT Gyro2 Meaning: Data from No.2 ROT gyro has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: Check the connection with No.2 ROT gyro.	Caution/B
30403,13	393	Name: Lost ROT Gyro3 Meaning: Data from No.3 ROT gyro has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: Check the connection with No.3 ROT gyro.	Caution/B
30403,21	290	Name: Lost GPS1 COM Meaning: Ship position data from No.1 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.1 GPS is turned off, or there is a problem with network.	Caution/B
30403,22	291	Name: Lost GPS2 COM Meaning: Ship position data from No.2 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.2 GPS is turned off, or there is a problem with network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403,23	292	Name: Lost GPS3 COM Meaning: Ship position data from No.3 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.3 GPS is turned off, or there is a problem with network.	Caution/B
30403,24	293	Name: Lost GPS4 COM Meaning: Ship position data from No.4 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.4 GPS is turned off, or there is a problem with network.	Caution/B
30403,25	294	Name: Lost GPS5 COM Meaning: Ship position data from No.5 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.5 GPS is turned off, or there is a problem with network.	Caution/B
30403,26	295	Name: Lost GPS6 COM Meaning: Ship position data from No.6 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.6 GPS is turned off, or there is a problem with network.	Caution/B
30403,27	296	Name: Lost GPS7 COM Meaning: Ship position data from No.7 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.7 GPS is turned off, or there is a problem with network.	Caution/B
30403,28	297	Name: Lost GPS8 COM Meaning: Ship position data from No.8 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.8 GPS is turned off, or there is a problem with network.	Caution/B
30403,29	298	Name: Lost GPS9 COM Meaning: Ship position data from No.9 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.9 GPS is turned off, or there is a problem with network.	Caution/B
30403,30	299	Name: Lost GPS10 COM Meaning: Ship position data from No.10 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.10 GPS is turned off, or there is a problem with network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403,41	280	Name: Lost SDME 1 COM Meaning: Speed data from No.1 SDME has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.1 SDME is turned off, or there is a problem with network. Remedy: Check the connection with No.1 SDME and network.	Caution/B
30403,42	281	Name: Lost SDME 2 COM Meaning: Speed data from No.2 SDME has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.2 SDME is turned off, or there is a problem with network. Remedy: Check the connection with No.2 SDME and network.	Caution/B
30403,43	282	Name: Lost SDME 3 COM Meaning: Speed data from No.3 SDME has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.3 SDME is turned off, or there is a problem with network. Remedy: Check the connection with No.3 SDME and network.	Caution/B
30403,51	235	Name: Lost Depth1 COM Meaning: Input of depth data from No.1 echo sounder has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.1 echo sounder is turned off, or there is a problem with network.	Caution/B
30403,52	236	Name: Lost Depth2 COM Meaning: Input of depth data from No.2 echo sounder has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.2 echo sounder is turned off, or there is a problem with network.	Caution/B
30403,53	237	Name: Lost Depth3 COM Meaning: Input of depth data from No.3 echo sounder has been discontinued for more than set time. (Set at installation) Default: 60 seconds Remedy: No.3 echo sounder is turned off, or there is a problem with network.	Caution/B
30403,61	300	Name: Lost Rudder1 COM Meaning: Rudder data from No.1 rudder sensor has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.1 Rudder is turned off, or there is a problem with network. Remedy: Check the connection with No.1 rudder sensor and network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403,62	301	Name: Lost Rudder2 COM Meaning: Rudder data from No.2 rudder sensor has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.2 Rudder is turned off, or there is a problem with network. Remedy: Check the connection with No.2 rudder sensor and network.	Caution/B
30403,63	302	Name: Lost Rudder3 COM Meaning: Rudder data from No.3 rudder sensor has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.3 Rudder is turned off, or there is a problem with network. Remedy: Check the connection with No.3 rudder sensor and network.	Caution/B
30403,71	303	Name: Lost HCS1 COM Meaning: Data from No.1 HCS has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.1 HCS is turned off, or there is a problem with network. Remedy: Check the connection with No.1 HCS and network.	Caution/B
30403,72	304	Name: Lost HCS2 COM Meaning: Data from No.2 HCS has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.2 HCS is turned off, or there is a problem with network. Remedy: Check the connection with No.2 HCS and network.	Caution/B
30403,81	305	Name: Lost VDR COM Meaning: Sentence from VDR has been discontinued for more than set time. (Set at installation) Default: 180 seconds VDR is turned off, or there is a problem with network. Remedy: Check the connection with VDR and network.	Caution/B
30403,91	306	Name: Lost BNWAS1 COM Meaning: Caution Sentence from BNWAS1 has been discontinued for more than set time. (Set at installation) Default: 180 seconds BNWAS1 is turned off, or there is a problem with network. Remedy: Check the connection with BNWAS1 and network.	Caution/B
30403,92	307	Name: Lost BNWAS2 COM Meaning: Caution Sentence from BNWAS2 has been discontinued for more than set time. (Set at installation) Default: 180 seconds BNWAS2 is turned off, or there is a problem with network. Remedy: Check the connection with BNWAS2 and network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403,93	308	Name: Lost BNWAS3 COM Meaning: Caution Sentence from BNWAS3 has been discontinued for more than set time. (Set at installation) Default: 180 seconds BNWAS3 is turned off, or there is a problem with network. Remedy: Check the connection with BNWAS3 and network.	Caution/B
30403, 101	360	Name: Lost WIND1 COM Meaning: Data from No.1 wind sensor has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.1 wind sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.1 wind sensor.	Caution/B
30403, 102	361	Name: Lost WIND2 COM Meaning: Data from No.2 wind sensor has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.2 wind sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.2 wind sensor.	Caution/B
30403, 103	362	Name: Lost WIND3 COM Meaning: Data from No.3 wind sensor has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.3 wind sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.3 wind sensor.	Caution/B
30403, 111	370	Name: Lost CURRENT COM Meaning: Data from water current has been discontinued for more than set time. (Set at installation) Default: 60 seconds Water current sensor is turned off, or there is a problem with network. Remedy: Check the connection with water current and network.	Caution/B
30403, 121	371	Name: Lost TEMP COM Meaning: Data from water temp. has been discontinued for more than set time. (Set at installation) Default: 60 seconds Water temp sensor is turned off, or there is a problem with network. Remedy: Check the connection with water temp and network.	Caution/B
30403, 141	390	Name: Lost NAVTEX COM Meaning: Data from NAVTEX has been discontinued for more than set time. (Set at installation) Default: 180 seconds NAVTEX is turned off, or there is a problem with network. Remedy: Check the connection with NAVTEX and network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403, 151	310	Name: Lost OTHER1 COM Meaning: Data from No.1 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.1 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.1 other sensor and network.	Caution/B
30403, 152	311	Name: Lost OTHER2 COM Meaning: Data from No.2 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.2 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.2 other sensor and network.	Caution/B
30403, 153	312	Name: Lost OTHER3 COM Meaning: Data from No.3 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.3 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.3 other sensor and network.	Caution/B
30403, 154	313	Name: Lost OTHER4 COM Meaning: Data from No.4 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.4 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.4 other sensor and network.	Caution/B
30403, 155	314	Name: Lost OTHER5 COM Meaning: Data from No.5 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.5 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.5 other sensor and network.	Caution/B
30403, 156	315	Name: Lost OTHER6 COM Meaning: Data from No.6 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.6 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.6 other sensor and network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403, 157	316	Name: Lost OTHER7 COM Meaning: Data from No.7 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.7 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.7 other sensor and network.	Caution/B
30403, 158	317	Name: Lost OTHER8 COM Meaning: Data from No.8 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.8 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.8 other sensor and network.	Caution/B
30403, 159	318	Name: Lost OTHER9 COM Meaning: Data from No.9 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.9 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.9 other sensor and network.	Caution/B
30403, 160	319	Name: Lost OTHER10 COM Meaning: Data from No.10 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.10 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.10 other sensor and network.	Caution/B
30403, 161	411	Name: Lost OTHER11 COM Meaning: Data from No.11 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.11 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.11 other sensor and network.	Caution/B
30403, 162	412	Name: Lost OTHER12 COM Meaning: Data from No.12 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.12 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.12 other sensor and network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403, 163	413	Name: Lost OTHER13 COM Meaning: Data from No.13 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.13 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.13 other sensor and network.	Caution/B
30403, 164	414	Name: Lost OTHER14 COM Meaning: Data from No.14 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.14 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.14 other sensor and network.	Caution/B
30403, 165	415	Name: Lost OTHER15 COM Meaning: Data from No.15 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.15 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.15 other sensor and network.	Caution/B
30403, 166	416	Name: Lost OTHER16 COM Meaning: Data from No.16 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.16 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.16 other sensor and network.	Caution/B
30403, 167	417	Name: Lost OTHER17 COM Meaning: Data from No.17 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.17 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.17 other sensor and network.	Caution/B
30403, 168	418	Name: Lost OTHER18 COM Meaning: Data from No.18 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.18 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.18 other sensor and network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403, 169	419	Name: Lost OTHER19 COM Meaning: Data from No.19 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.19 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.19 other sensor and network.	Caution/B
30403, 170	420	Name: Lost OTHER20 COM Meaning: Data from No.20 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.20 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.20 other sensor and network.	Caution/B
30403, 171	421	Name: Lost OTHER21 COM Meaning: Data from No.21 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.21 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.21 other sensor and network.	Caution/B
30403, 172	422	Name: Lost OTHER22 COM Meaning: Data from No.22 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.22 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.22 other sensor and network.	Caution/B
30403, 173	423	Name: Lost OTHER23 COM Meaning: Data from No.23 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.23 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.23 other sensor and network.	Caution/B
30403, 174	424	Name: Lost OTHER24 COM Meaning: Data from No.24 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.24 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.24 other sensor and network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403, 175	425	Name: Lost OTHER25 COM Meaning: Data from No.25 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.25 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.25 other sensor and network.	Caution/B
30403, 176	426	Name: Lost OTHER26 COM Meaning: Data from No.26 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.26 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.26 other sensor and network.	Caution/B
30403, 177	427	Name: Lost OTHER27 COM Meaning: Data from No.27 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.27 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.27 other sensor and network.	Caution/B
30403, 178	428	Name: Lost OTHER28 COM Meaning: Data from No.28 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.28 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.28 other sensor and network.	Caution/B
30403, 179	429	Name: Lost OTHER29 COM Meaning: Data from No.29 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.29 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.29 other sensor and network.	Caution/B
30403, 180	430	Name: Lost OTHER30 COM Meaning: Data from No.30 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.30 other sensor is turned off, or there is a problem with network. Remedy: Check the connection with No.30 other sensor and network.	Caution/B

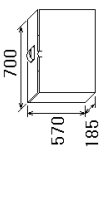
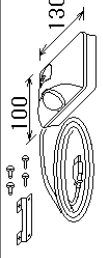
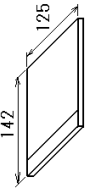
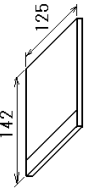
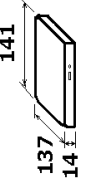

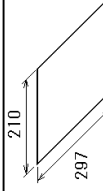
Priority: Indication

All indication alerts are in category "B". Note that the ALF sentence is not output.

Note: Indication alerts appears in both the Alert box and the Alert list, just like any other alert.

Alert No.		Alert Name, Meaning and Remedy
ALF ID	ALR ID	
30001,17	073	Name: Processor Unit CPU Temp High Meaning: The temperature of the CPU in the processor unit is rising. Remedy: Turn off the processor unit. Wait several minutes then turn on the power. If the message appears, contact a FURUNO agent or dealer to request service.
30001,19	075	Name: Processor Unit CPU Board Temp High Meaning: The temperature of the CPU board in the processor unit is rising. Remedy: Turn off the processor unit. Wait several minutes then turn on the power. If the message appears, contact a FURUNO agent or dealer to request service.
30001,23	079	Name: Processor Unit Fan1 Rotation Speed Lowering Meaning: The rotation speed of the No. 1 fan in the processor unit is lowering. Remedy: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30001,26	089	Name: Processor Unit CPU board Battery Power Error Meaning: CPU board battery voltage in processor unit is out of threshold. Remedy: Turn off the processor unit. Wait several minutes then turn on the power. If the message appears, contact a FURUNO agent or dealer to request service.
30001,27	090	Name: Processor Unit CPU board Core Power Error Meaning: CPU board core voltage error has occurred. Remedy: Turn off the processor unit. Wait several minutes then turn on the power. If the message appears, contact a FURUNO agent or dealer to request service.
30001,31	400	Name: Network Printer Not Available Meaning: The network printer cannot be detected. There may be a connection error or an error (out of paper, jam, out of ink, etc.) on the printer side. Remedy: Make sure the printer is connected to the network. Make sure that no errors (out of paper, jam, out of ink, etc.) have occurred on the printer side.
30001,32	401	Name: Local Printer Not Available Meaning: The local printer cannot be detected. There may be a connection error or an error (out of paper, jam, out of ink, etc.) on the printer side. Remedy: Make sure the printer is connected to the network. Make sure that no errors (out of paper, jam, out of ink, etc.) have occurred on the printer side.
30002,14	083	Name: Processor Unit Fan1 No Rotation Meaning: The No. 1 fan in the processor unit has stopped rotating. Remedy: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30002,17	086	Name: Processor Unit CPU board 5V Power Error Meaning: Voltage error (5V) on the CPU board. Remedy: If this occurs frequently, contact a FURUNO agent or dealer and report the frequency of occurrence.

Alert No.		Alert Name, Meaning and Remedy
ALF ID	ALR ID	
30002,18	087	Name: Processor Unit CPU board 3.3V Power Error Meaning: Voltage error (3.3V) on the CPU board. Remedy: If this occurs frequently, contact a FURUNO agent or dealer and report the frequency of occurrence.
30002,19	088	Name: Processor Unit CPU board 12V Power Error Meaning: Voltage error (12V) on the CPU board. Remedy: If this occurs frequently, contact a FURUNO agent or dealer and report the frequency of occurrence.
30050,1	320	Name: Lost CH1 COM Meaning: Communication with the EC-3000 serial port CH1 has been interrupted for more than the time set at installation (default setting: no timeout). Remedy: Check the serial port.
30050,2	321	Name: Lost CH2 COM Meaning: Communication with the EC-3000 serial port CH2 has been interrupted for more than the time set at installation (default setting: no timeout). Remedy: Check the serial port.
30050,3	322	Name: Lost CH3 COM Meaning: Communication with the EC-3000 serial port CH3 has been interrupted for more than the time set at installation (default setting: no timeout). Remedy: Check the serial port.
30050,4	323	Name: Lost CH4 COM Meaning: Communication with the EC-3000 serial port CH4 has been interrupted for more than the time set at installation (default setting: no timeout). Remedy: Check the serial port.
30807,-	820	Name: NAVTEX Message Received Meaning: Navtex message has been received. Remedy: Check the content of the message.

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
ハ°ルPC部箱詰品		PCU-3010-*	1
PANEL COMPUTER UNIT COMPLETE SET		000-037-184-00 **	
トラックボール操作部		RCU-030	1
TRACKBALL CONTROL UNIT		000-024-900-00 **	
付属品 ACCESSORIES			
DVD-R書込品		2450112-	1
FMD-3100 INSTALL DVD		001-567-120-00	(*)3
DVD-R書込品		2450112-	1
FMD-3100 INSTALL DVD		001-624-690-00	(*)3
DVDドライブ*		DVSM-PLV8U2-BKB	1
DVD DRIVE		000-197-328-11	
工事材料 INSTALLATION MATERIALS			
工事材料		OP24-03102	1
INSTALLATION MATERIALS		001-567-110-00	
図書 DOCUMENT			
ドングルインフォメーションシート			1
DONGLE INFORMATION SHEET		999-999-085-0*	(*)

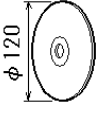
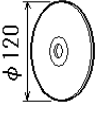





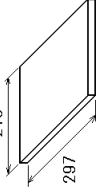
1.コード番号末尾の[**]は、選択品の代表コードを表します。

1.CODE NUMBER ENDING WITH “**” INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

2.(*)の書類は、英文仕様専用。(*)2の書類は、和文仕様専用。

2.(*)1 MARKED DOCUMENTS ARE FOR ENGLISH SET ONLY.(*)2 MARKED DOCUMENTS ARE FOR JAPANESE SET ONLY.

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

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
取扱説明CD		FMD310X O/M *CD-ROM*	1
OPERATOR'S MANUAL CD		000-199-428-1*	(*)2
取扱説明CD		FMD310X O/M *CD-ROM*	1
OPERATOR'S MANUAL CD		000-196-491-1*	(*)1
操作要領書		OS*-44841-*	1
OPERATOR'S GUIDE		000-196-494-1* **	(*)1
操作要領書 (和)		OSJ-44842-*	1
OPERATOR'S GUIDE (JP)		000-199-423-1*	(*)2
装備設定要領書		*42-01811-*	1
INSTRUCTION MANUAL		000-196-367-1* **	(*)1
装備設定要領書		J42-02115-*	1
INSTRUCTION MANUAL		000-199-380-1*	(*)2
装備要領書		IM*-44841-*	1
INSTALLATION MANUAL		000-196-497-1* **	(*)1
装備要領書 (和)		IMJ-44842-*	1
INSTALLATION MANUAL (JP)		000-199-425-1*	(*)2

3.(*)は、ダミーコードに付き、注文できません。

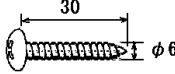
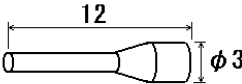
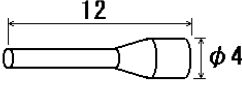
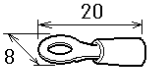
3.(*) THIS CODE CANNOT BE ORDERED.

4.(*)3:仕様により選択。和文(-J)仕様は00156712000、それ以外は00162469000になります。

4.(*)3: SELECT ONE ACCORDING TO SPECIFICATIONS: 00156712000 FOR JAPANESE(-J) SPEC ONLY.

FURUNO

CODE NO.	001-567-110-00	24AN-X-9404 -1
TYPE	CP24-03102	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	+トラスタップ 1シ SELF-TAPPING SCREW		6X30 SUS304 CODE NO. 000-162-614-10	6	
2	フェールル (ホウタンシ) FERRULE CRIMPING TERMINAL		AI 0, 75-6 GY CODE NO. 000-176-411-11	22	
3	フェールル (ホウタンシ) FERRULE CRIMPING TERMINAL		AI 1, 5-6 BK AI 1, 5-6 BK CODE NO. 000-176-412-11 000-176-412-10	3	
4	圧着端子 CRIMP-ON LUG		FV1. 25-4 (LF) RED K CODE NO. 000-166-666-11	6	

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

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

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

FURUNO ELECTRIC CO., LTD.

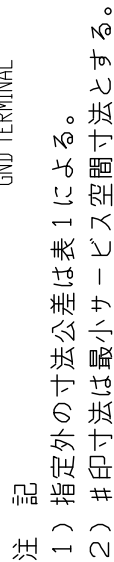


表1 TABLE 1

公差 (mm) TOLERANCE	尺寸区分 (mm) DIMENSION
±1.5	L ≤ 50
±2.5	50 < L ≤ 100
±3	100 < L ≤ 500
±4	500 < L ≤ 1000

品
共

- 1) 指定外の寸法公差は表1による。
- 2) # 品寸は寸法公差は小サビ問題寸法とする。

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #; MINIMUM SERVICE CLEARANCE.

DRAWN	26/Dec/2019	I. YAMASAKI				TITLE	PCU-3010
CHECKED	26/Dec/2019	H. MAKI				名称	パネルPC部 (埋込装備)
APPROVED							外寸図
	26/Dec/2019	H. MAKI	END-3000			NAME	PANEL COMPUTER UNIT (FLUSH MOUNT)
SCALE	1/10	11.2	100% 質量は、フル・オプションを含まず、 MASS DOES NOT INCLUDES CABLE/OPTION.				
FIG. No.	C4484-106-	0	REF. No.	24-016-	0165-3		PLT. I/F. DRAWING

公差 (mm) TOLERANCE	尺寸区分 (mm) DIMENSION
±1.5	L ≤ 50
±2.5	50 < L ≤ 100
±3	100 < L ≤ 500
±4	500 < L ≤ 1000



- 1) 指定外の寸法公差は表 1 による。
- 2) # 印寸法は最小サージス空間寸法とする。
- 3) 取付用ネジはトラスタップ・ピンネジ呼び径 6×30 または M6 ボルトを使用のこと。

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

2. #: MINIMUM SERVICE CLEARANCE;

3. USE TAPPING SCREWS $\phi 6 \times 30$ OR M6 BOLTS FOR FIXING THE UNIT.

DRAWN	26/Dec/2019	T. YAMASAKI	TITLE	PCU-3010
CHECKED	26/Dec/2019	H. MAKI	名称	パネルPC部（卓上装備）
APPROVED	26/Dec/2019	H. MAKI	外寸図	
SCALE	1/10	MASS 13.3 kg	NAME	PANEL COMPUTER UNIT (TABLETOP MOUNT)
DWG.No.	C4484-G07-D	REF.No.	24-016-2010-3	OUTLINE DRAWING

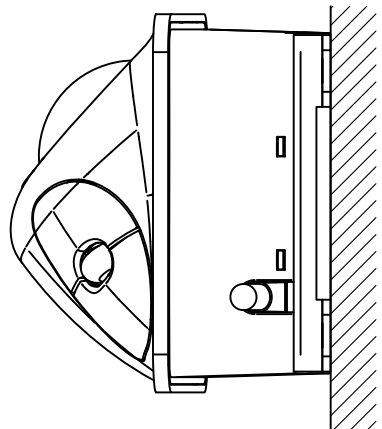
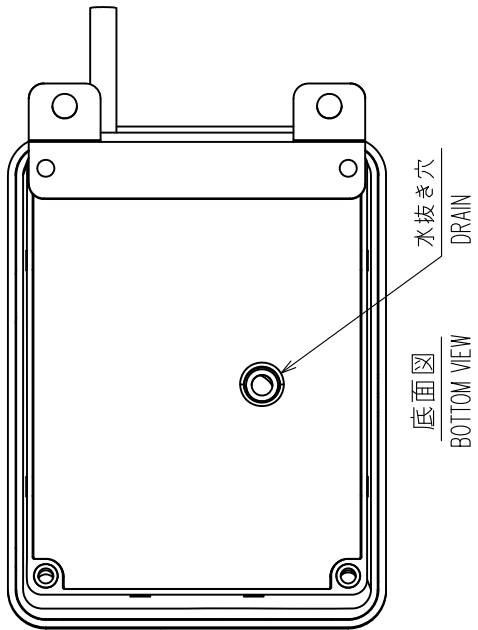
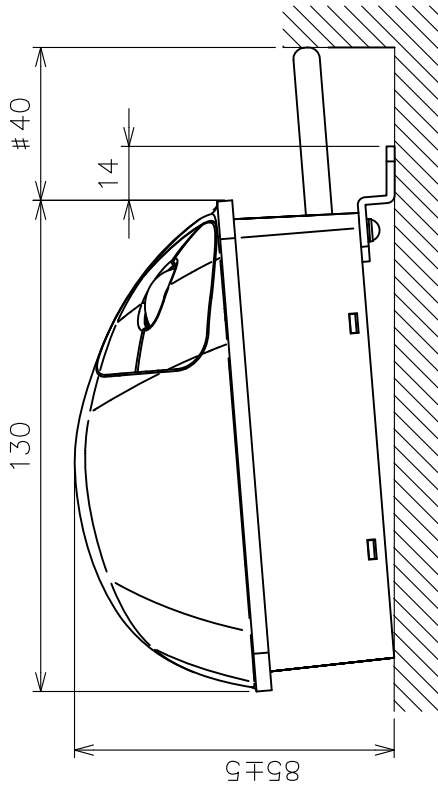
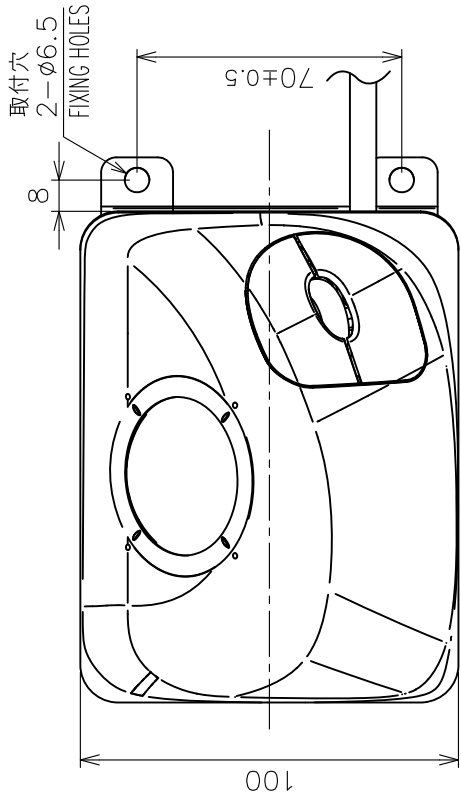
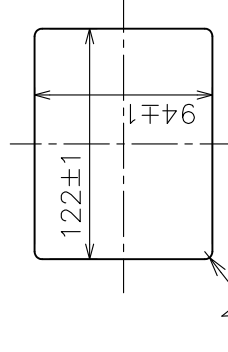
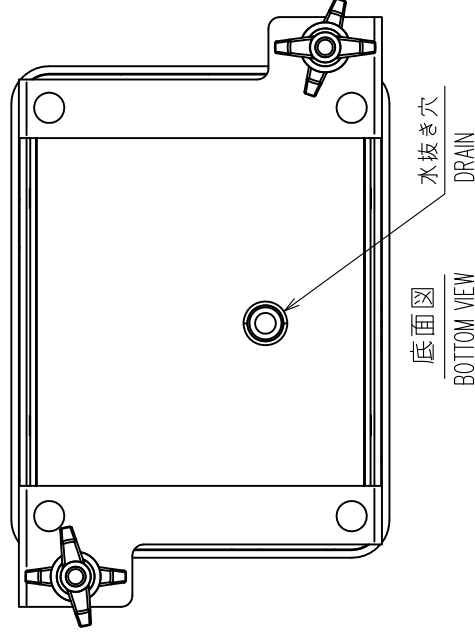
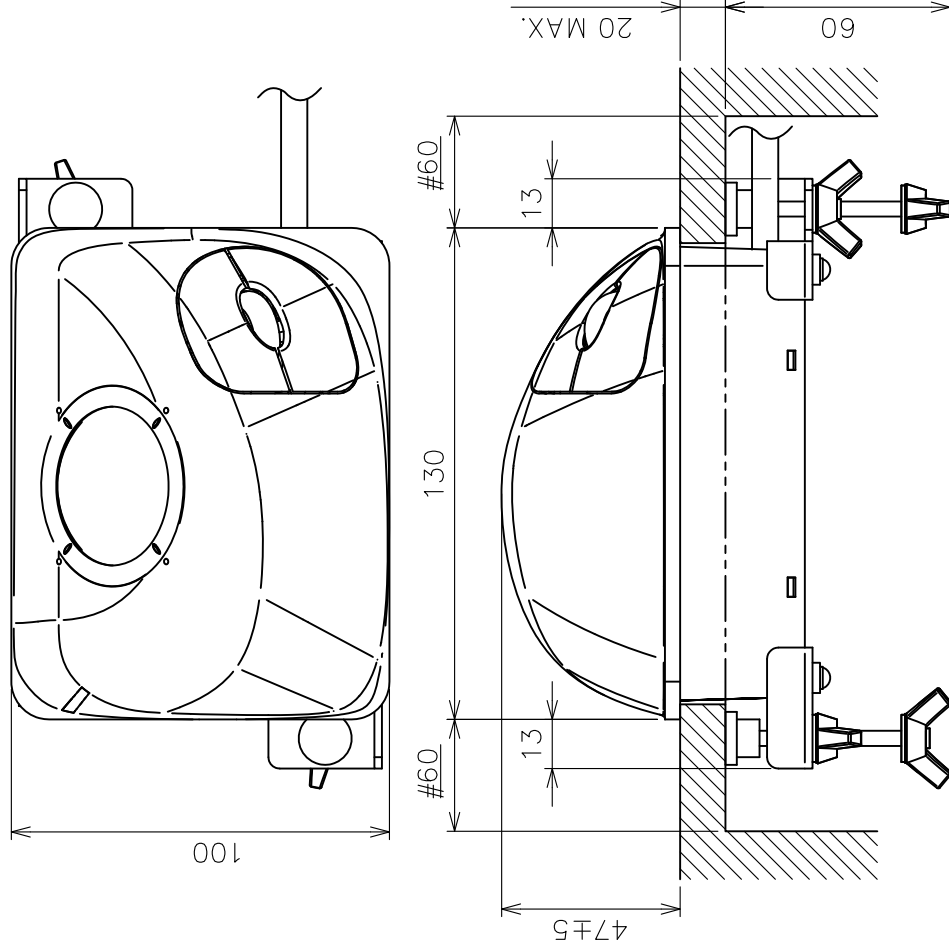


表1 TABLE 1

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

- 注 記 1) 指定外の寸法公差は表 1 による。
2) # 印寸法は最小サービスクリアランスとする。
3) 取付ネジはトラスタッピピンネジ呼び径 5×2.0 を使用のこと。
- NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS $\phi 5 \times 2.0$ FOR FIXING THE UNIT.

DRAWN	6/Nov/2013	T. YAMASAKI	TITLE	RCU-030
CHECKED	6/Nov/2013	H. MAKI	名称	トラックボール操作部 (取付金具)
APPROVED	7/Nov/2013	H. MAKI	外寸図	
SCALE	1/2	WASS 0.4 kg	NAME	TRACKBALL CONTROL UNIT (FIXTURE MOUNT)
DMC No.	C4484-G01-A	REF. No.		OUTLINE DRAWING



取付穴寸法 (尺度: 1 / 4)

CUTOUT DIMENSIONS (SCALE: 1/4)

表1 TABLE 1

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

DRAWN	6/Nov/2013	T. YAMASAKI			TITLE	RCU-030
CHECKED	6/Nov/2013	H. MAKI			名称	トラックボール操作部 (埋込装備)
APPROVED	7/Nov/2013	H. MAKI				外寸図
SCALE	1/2	MASS 0.5 ±0.5% kg	FWD-3100 質量は2mケーブルを含む。 MASS INCLUDES 2m CABLE.		NAME	TRACKBALL CONTROL UNIT (FLUSH MOUNT)
DWG.No.	C4484-G02- A	REF.No.	24-016-120C-0			OUTLINE DRAWING

注記 1) 指定外の寸法公差は表 1 による。

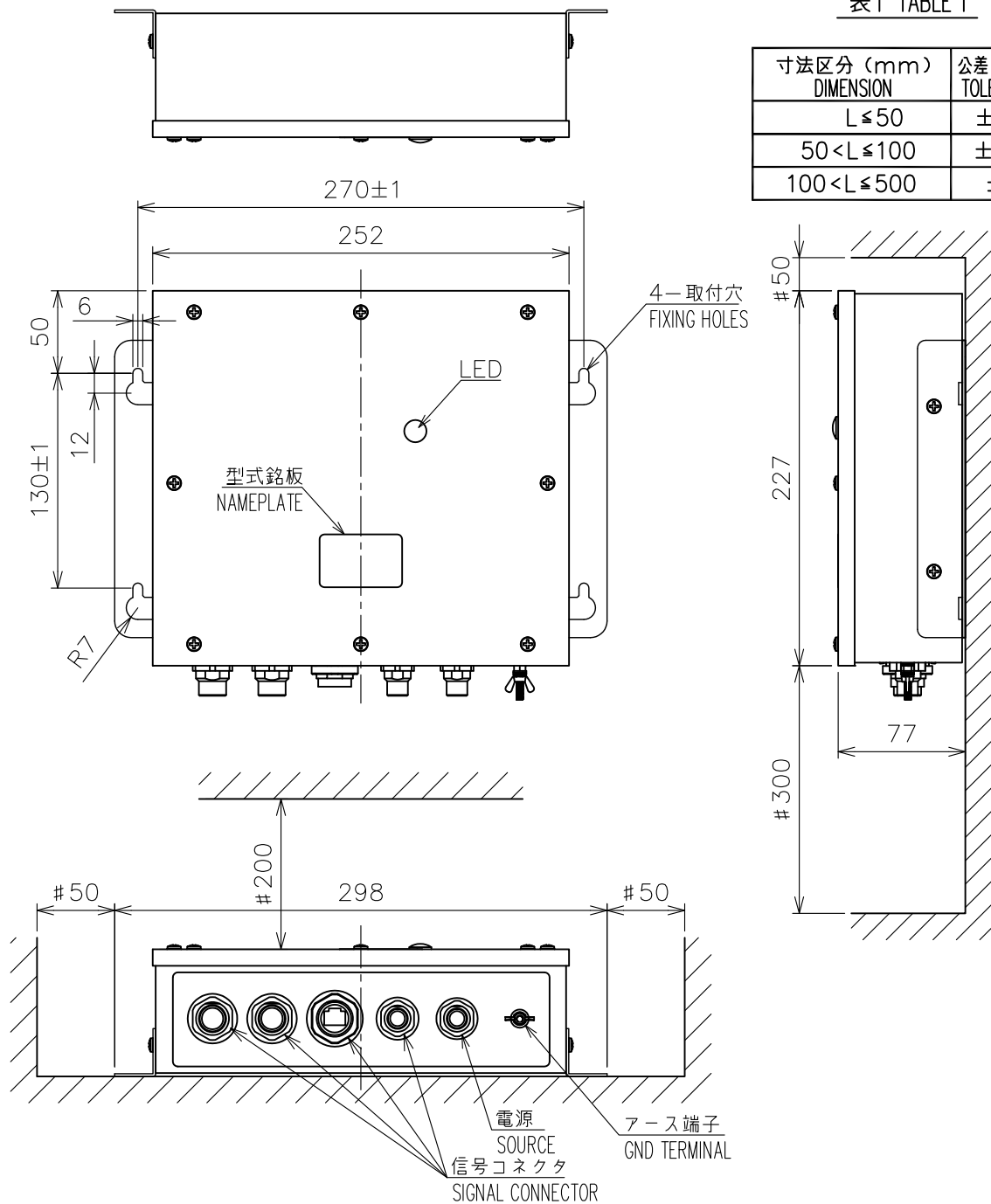
2) #印寸法は最小サービスペース寸法とする。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

2. #: MINIMUM SERVICE CLEARANCE.

表1 TABLE 1

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



- 注 記 1) 指定外の寸法公差は表 1 による。
2) # 印寸法は最小サービス空間寸法とする。
3) 取付用ネジはトラスタッピンネジ呼び径 5 × 20 を使用のこと。
4) 壁掛装備は、必ずコネクタが下方となるよう取付けること。

- NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS $\phi 5 \times 20$ FOR FIXING THE UNIT.
4. FOR BULKHEAD MOUNT, FACE THE CONNECTORS DOWNWARD.

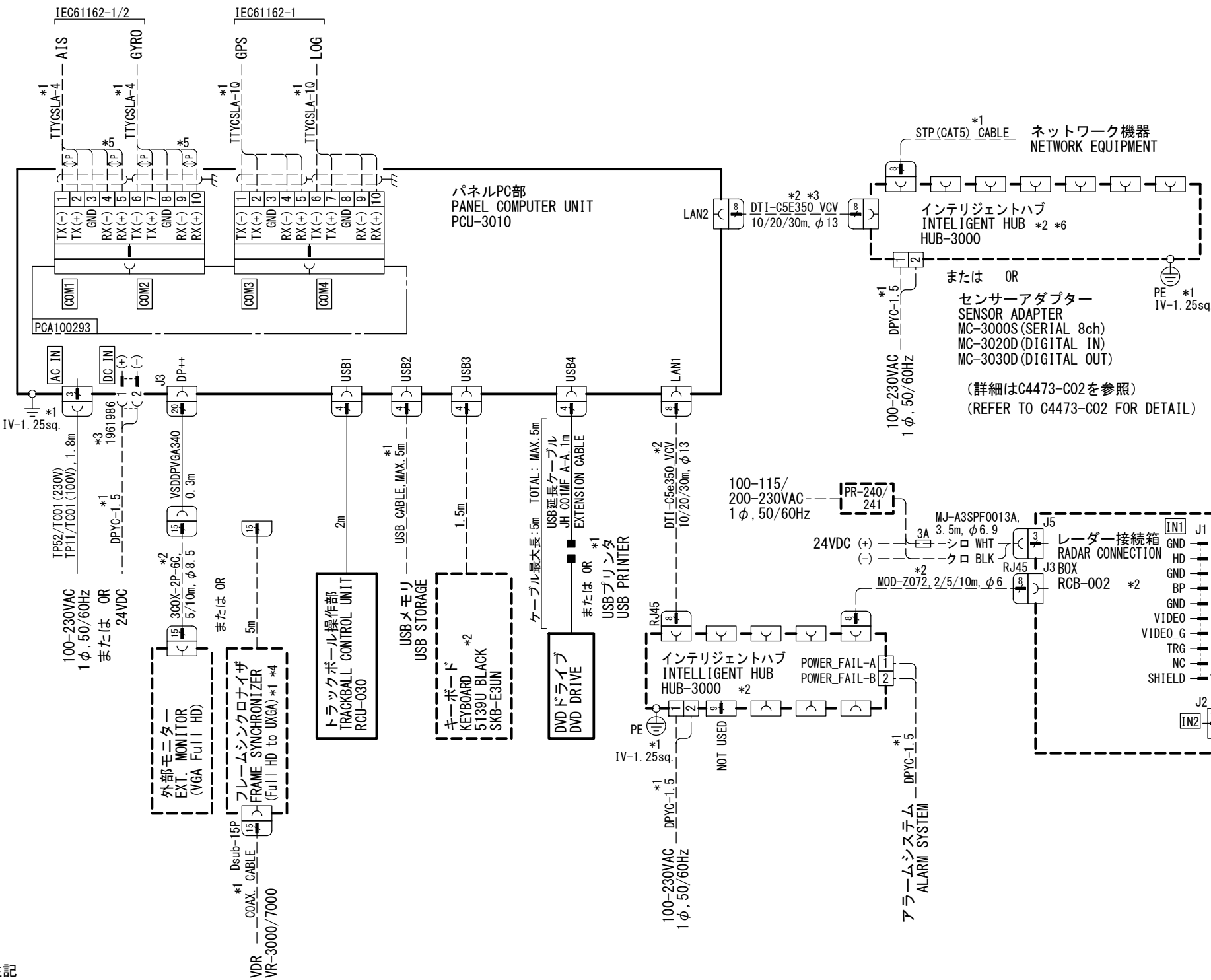
DRAWN	22/Aug/2019 T.YAMASAKI	TITLE	RCB-002/002A
CHECKED	22/Aug/2019 H.MAKI	名称	レーダー接続箱 (壁掛・卓上装備)
APPROVED	22/Aug/2019 H.MAKI		外寸図
SCALE	1/4	MASS	3.0 $\pm 10\%$ kg
DWG. No.	C4484-G03-C	REF. No.	24-016-130G-1
			OUTLINE DRAWING

A

B

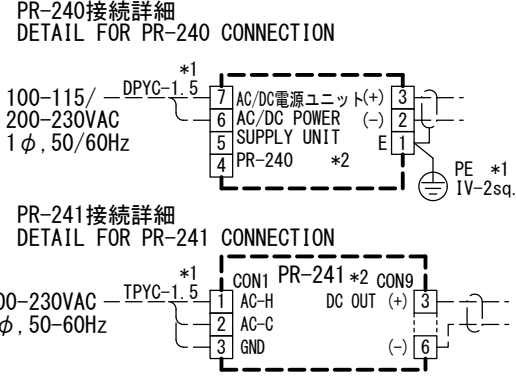
C

D

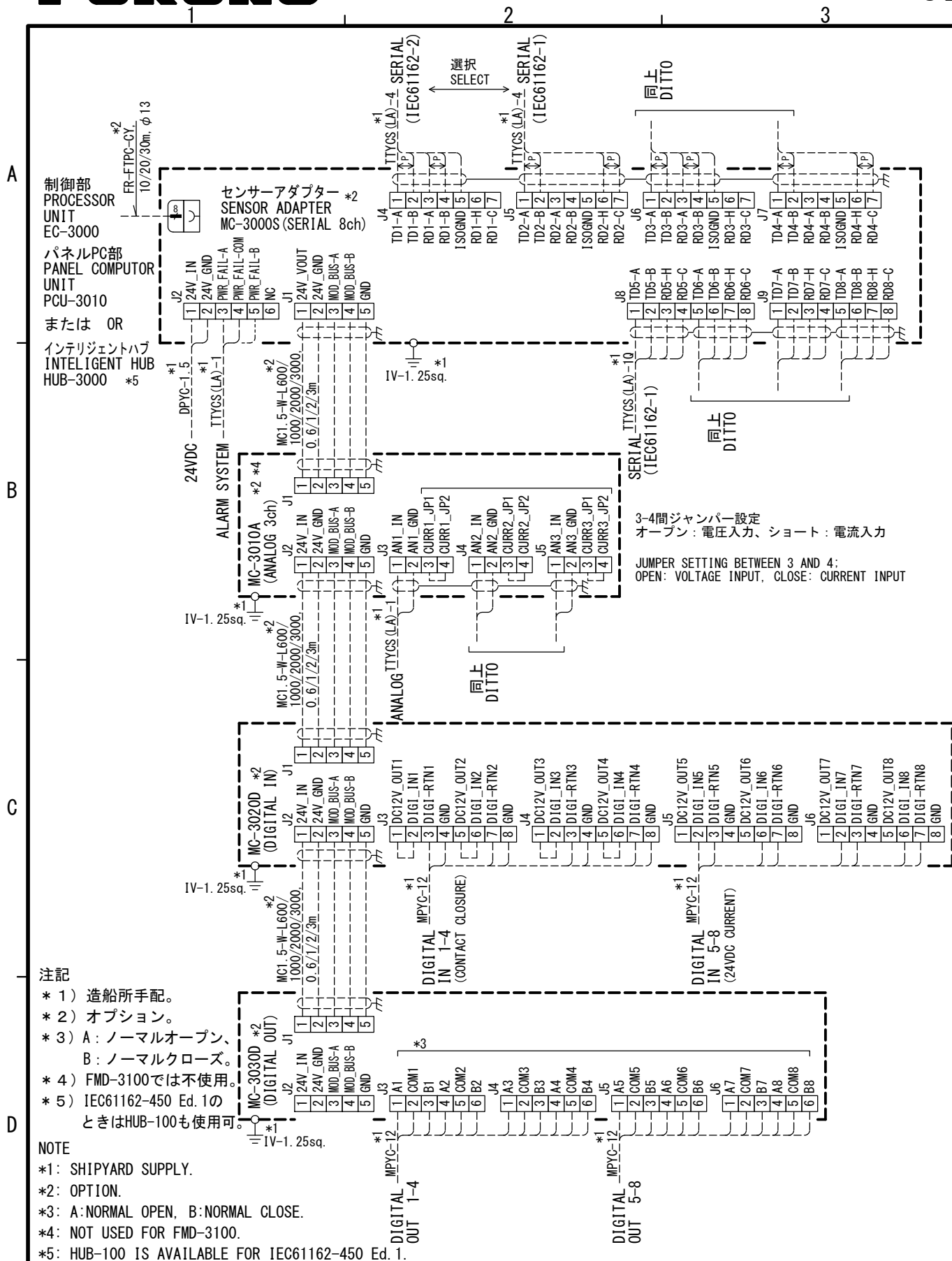


- 注記
- * 1) 造船所手配。
 - * 2) オプション。
 - * 3) コネクタは現地にて取付け。
 - * 4) 推奨 : IMAGENICS RS-1500A など。
 - * 5) IEC61162-2 のとき、RX (+) と RX (-) の間に終端抵抗が必要。
IEC61162-1 では、3、8 番ピンのアイソレートグラウンドは不要。
 - * 6) IEC61162-450 Ed.1 でネットワークを構成するときは、HUB-100 も使用可。

- NOTE
- *1: SHIPYARD SUPPLY.
 - *2: OPTION.
 - *3: FIT CONNECTORS AT LOCAL.
 - *4: RECOMMENDED: IMAGENICS RS-1500A, ETC.
 - *5: IEC61162-2 REQUIRES A TERMINATOR BETWEEN RX(+) AND RX(-).
IEC61162-1 DOES NOT REQUIRE ISOLATE GROUND AT 3 OR 8 PINS.
 - *6: HUB-100 ALSO AVAILABLE WHEN THE NETWORK FOR IEC61162-450 Ed.1 IS USED.



DRAWN 7/Mar/2022 T. YAMASAKI		TITLE FMD-3100 (PCU-3010)
CHECKED 7/Mar/2022 H. MAKI		名称 電子海図情報表示装置 (IEC62923-1/2準拠)
APPROVED 16/Mar/2022 H.MAKI		相互結線図
SCALE MASS kg		NAME ECDIS (COMPLIES WITH IEC62923-1/2)
DWG No. C4484-C02- H	REF. No. 24-016-6001-6	INTERCONNECTION DIAGRAM



DRAWN 5/Nov/2021 T. YAMASAKI		TITLE MC-3000S/3010A/3020D/3030D	
CHECKED 5/Nov/2021 H. MAKI		名称 センサーアダプター (IEC62923-1/2準拠)	
APPROVED 5/Nov/2021 H.MAKI		相互結線図	
SCALE MASS kg		NAME SENSOR ADAPTER (IEC62923-1/2)	
DWG. No. C4473-C02- H		REF. No. 24-014-6003-2	
		INTERCONNECTION DIAGRAM	