FURUNO

OPERATOR'S MANUAL

MARINE DISPLAY

Model **MU-152**

(Product Name: MONITOR UNIT)

FURUNO ELECTRIC CO., LTD.

www.furuno.com

IMPORTANT NOTICES

General

- This manual has been authored with simplified grammar, to meet the needs of international users.
- The operator of this equipment must read and follow the descriptions in this manual. Wrong operation or maintenance can cancel the warranty or cause injury.
- Do not copy any part of this manual without written permission from FURUNO.
- If this manual is lost or worn, contact your dealer about replacement.
- The contents of this manual and equipment specifications can change without notice.
- The example screens (or illustrations) shown in this manual can be different from the screens you see on your display. The screens you see depend on your system configuration and equipment settings.
- Save this manual for future reference.
- Any modification of the equipment (including software) by persons not authorized by FURUNO will cancel the warranty.
- The following concern acts as our importer in Europe, as defined in DECISION No 768/2008/EC.
  - Name: FURUNO EUROPE B.V.
  - Address: Ridderhaven 19B, 2984 BT Ridderkerk, The Netherlands
- All brand and product names are trademarks, registered trademarks or service marks of their respective holders.

How to discard this product

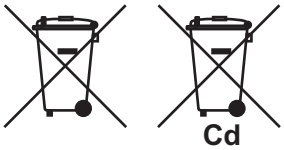
Discard this product according to local regulations for the disposal of industrial waste. For disposal in the USA, see the homepage of the Electronics Industries Alliance (http://www.eiae.org/) for the correct method of disposal.

How to discard a used battery

Some FURUNO products have a battery(ies). To see if your product has a battery, see the chapter on Maintenance. Follow the instructions below if a battery is used. Tape the + and - terminals of battery before disposal to prevent fire, heat generation caused by short circuit.

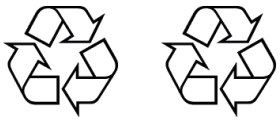
In the European Union

The crossed-out trash can symbol indicates that all types of batteries must not be discarded in standard trash, or at a trash site. Take the used batteries to a battery collection site according to your national legislation and the Batteries Directive 2006/66/EU.



In the USA

The Mobius loop symbol (three chasing arrows) indicates that Ni-Cd and lead-acid rechargeable batteries must be recycled. Take the used batteries to a battery collection site according to local laws.



In the other countries

There are no international standards for the battery recycle symbol. The number of symbols can increase when the other countries make their own recycle symbols in the future.

⚠ SAFETY INSTRUCTIONS

Read these safety instructions before you operate the equipment.

⚠ WARNING	Indicates a condition that can cause death or serious injury if not avoided.
⚠ CAUTION	Indicates a condition that can cause minor or moderate injury if not avoided.

⚠ Warning, Caution	Prohibitive Action	Mandatory Action

Safety Instructions for the Operator

⚠ WARNING

Immediately turn off the power at the switchboard if water leaks into the equipment or something is dropped into the equipment.

Continued use of the equipment can cause fire or electrical shock. Contact your dealer.

Immediately turn off the power at the switchboard if the equipment is emitting smoke or fire.

Continued use of the equipment can cause fire or electrical shock. Contact your dealer.

Turn off the power immediately if you feel the equipment is behaving abnormally.

Turn off the power at the switchboard if the equipment becomes abnormally warm or is emitting odd noises. Contact your dealer.

⚠ WARNING

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can result.

Use the proper fuse.

Use of a wrong fuse can cause fire or damage to the equipment.

⚠ CAUTION

Do not connect/disconnect the signal cable while the power is turned on.

The unit may be damaged.

Handle the display carefully.

Injury can result if the display breaks.

Safety Instructions for the Installer

⚠ WARNING

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

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

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

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

⚠ CAUTION

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

	Standard compass	Steering compass
MU-152	0.65 m	0.40 m

When lifting the monitor unit, hold it together with the hard cover.

Grasping by the hard cover alone may allow the monitor unit to fall, resulting in possible bodily injury or damage to the equipment.

About the TFT LCD

- The TFT LCD is constructed using the latest LCD techniques, and displays 99.99% of its pixels. The remaining 0.01% of the pixels may drop out or blink, however this is not an indication of malfunction.
- The MU-152 is non-bonding monitor unit, so the dew condensation may occur depending on the ambient temperature.

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FOREWORD

A Word to the Owner of the MU-152

FURUNO Electric Company thanks you for purchasing the MU-152 15” Marine Display. We are confident you will discover why the FURUNO name has become synonymous with quality and reliability.

Since 1948, FURUNO Electric Company has enjoyed an enviable reputation for quality and reliability throughout the world. This dedication to excellence is furthered by our extensive global network of agents and dealers.

Your equipment is designed and constructed to meet the rigorous demands of the marine environment. However, no machine can perform its intended function unless properly installed and maintained. Please carefully read and follow the operation, installation and maintenance procedures set forth in this manual.

We would appreciate feedback from you, the end-user, about whether we are achieving our purposes.

Thank you for considering and purchasing FURUNO.

Features

The main features of the MU-152 are as shown below.

- Selectable display format (RGB × 1 line, Digital × 2 lines, Composite × 3 lines).
- Main or remote display for various equipment. For the connectable equipment, see "Connectable equipment (Landscape orientation only)" on page vi.
- All glass, narrow frame design
- Display resolution of 1024 × 768 (XGA)
- Brightness of 400 cd/m^2
- Automatic brilliance adjustment with the light sensor.
- Picture-in-picture function
- Power on/off automatically via DVI signal.

Program

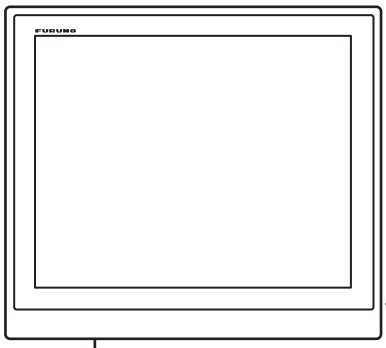
Program Name	Version	Date of Change
APR PROGRAM	2651038-xx.xx	Jul. 2017

xx denotes minor modifications.

CE declaration

With regards to CE declarations, please refer to our website (www.furuno.com), for further information about RoHS conformity declarations.

SYSTEM CONFIGURATION



RGB ---------- CSH-5L/8L MARK-2, etc.

DVI (2 ports) ---------- FAR-15x3/15x8 series, etc.

VIDEO (NTSC/PAL) (3 ports) ---------- CCD camera, DVD recorder, etc.

USB*1 ---------- FAR-1417/1427 processor unit, FCV-1900 processor unit (brilliance control signal)

MONITOR UNIT
MU-152

12-24 VDC

——— : Standard supply
--------- : Optional or local supply
-·-·-·- : Standard cable for FAR-1417/1427 or FCV-1900

Environmental category

MU-152: Protected from the weather

*1: The USB port is for the brilliance control signal from the external equipment. You can not connect a PC or other device.

Connectable equipment (Landscape orientation only)

Equipment	Resolution	Signal
CH-250/250S	VGA	Analog RGB, via IF-8000
CH-270	VGA	Analog RGB, via IF-8000
CH-300	VGA	Analog RGB, via IF-8000
CSH-5L/8L	XGA	Analog RGB
CSH-5L/8LMARK-2	XGA	Analog RGB
CH-500/600	XGA	DVI
FSV-35/35S	SXGA*3	DVI
FCV-30	XGA/SXGA*3	Analog RGB
FCV-2100	XGA/SXGA*3	DVI
FCV-1900	XGA/SXGA*3	DVI
CI-38/68/88	VGA	Analog RGB
FAR-15x3/15x8 series	XGA	DVI
FAR-1417/1427*2	XGA/SXGA*3	DVI
GD-300*2	XGA	DVI
GD-700*2	XGA/SXGA*3	DVI

*2: For Japan only

*3: For SXGA input, a circle may be displayed as an ellipse because the aspect ratio differs. See "[DISP MODE]**" on page 13. Also, it may be difficult to read small characters.

EQUIPMENT LISTS

Standard supply

Name	Type	Code No.	Qty	Remarks
Monitor Unit	MU-152	-	1	
Installation Materials	CP26-02400	000-034-939	1 set	Contents of Installation Materials • Flush Mount Fixture 15 (CP26-01303, Code No.: 001-175-950) • CP26-02401* (Code No.: 001-497-440) • Cable Assembly (MJ-A3SPF0013A-035C, Code No.: 000-176-666-10)
Accessories	FP26-00800	000-034-940	1 set	Contents of Accessories • Hard Cover 15 (26-005-2111-1, Code No.: 100-351-261-10)
Spare Parts	SP66-00503	002-876-340	1 set	Contents of Spare Parts • Glass Tube Fuse (FGBO-A 125V 3A PBF, Code No.: 000-155-850-10) 3 pcs.

*: See the Installation materials at the back of this manual.

Optional supply

Name	Type	Code No.	Qty	Remarks
Cable Assembly	3COX-2P-6C 5M	001-077-230-10	1	Cable length: 5 m (15 pin D-sub connector at both ends)
	3COX-2P-6C 10M	001-077-220-10	1	Cable length: 10 m (15 pin D-sub connector at both ends)
	DVI-D/D S-LINK 5M	001-132-960-10	1	Cable length: 5 m (with DVI-D connector at both ends)
	DVI-D/D S-LINK 10M	001-133-980-10	1	Cable length: 10 m (with DVI-D connector at both ends)
Bracket Assembly (w/knobs)	OP26-35	000-034-941	1 set	
Hood Assembly	OP26-3	001-080-840	1 set	
Flush Mount Kit	OP26-36	001-497-450	1 set	
Accessories	FP26-00401	001-175-940	1	LCD Cleaning Cloth (19-028-3125-6, Code No.: 100-360-676-10)
Flush Mounting Template	C42-00903-B	000-172-218-11	1	For flush mounting, fixed at rear
Operator's Manual	OMJ-44970	000-194-292-1x (x denotes minor modifications.)	1	Japanese version

1. MOUNTING, WIRING

1.1 Preparation

Mounting type

You can install the monitor unit as follows. See the outline drawings at the back of this manual for mounting dimensions.

- Flush mounting, fixed at rear (standard)
- Flush mounting, fixed at front (option)
- Desktop mounting (option)
- Flush mounting, fixed at rear, with hood (option)
- Desktop mounting, with hood (option)

Note 1: The face of the LCD monitor is made of glass. Handle it with care.

Note 2: For flush mounting, the mounting surface must be flat. Do not install the unit on an uneven surface. Also, take care that the monitor unit does not fall during the installation.

Mounting location

When you select a mounting location, remember the following points:

- Make sure the mounting location is strong enough to support the weight of the unit. See the outline drawings at the back of this manual.
- Locate the unit away from direct sunlight. An LCD may black out or condensation may occur if the LCD is exposed to direct sunlight for a long time.
- Select a location where the display can be easily viewed and the controls can be easily operated.
- Leave enough space around the unit for service and maintenance. See the outline drawings at the back of this manual for minimum service clearance.
- Locate the unit away from areas subject to water splash and rain. This monitor unit is for indoor.
- Observe the compass safe distances (see page iii) to prevent interference to a magnetic compass.

Included items

- Monitor Unit
- Flush Mount Fixture 15 (2 pcs.)
- Flush Mounting Sponge H15 (2 pcs.)
- Flush Mounting Sponge V15 (2 pcs.)
- Washer Head Screw (6 pcs.)
- Cable Tie (4 pcs.)
- Cable Assembly (1 pc.)
- Hard Cover 15 (1 pc.)
- Glass Tube Fuse (3 pcs.)
- Operator’s Manual (1 pc.)
- Material Data Sheet (C-RoHS, 1 pc.)

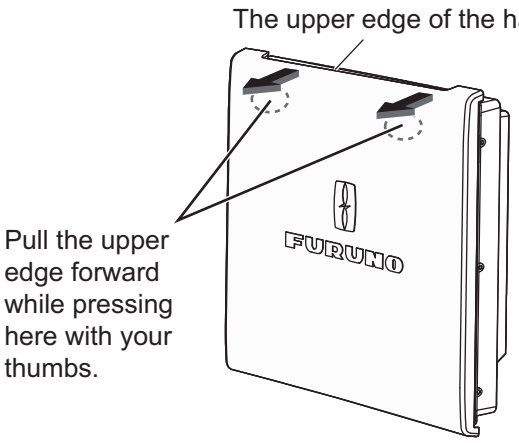
Required tools

The following tools should be prepared in advance for this installation.

- Electrical drill, Hole saw: ϕ18 mm, for making the mounting holes
- Jig saw, File: For making the mounting holes
- Phillips-head screw driver: #2, for securing the flush mount fixtures
- Cable tie: For securing the cables

How to remove/attach the hard cover

Before you install this monitor unit, remove the hard cover as follows.



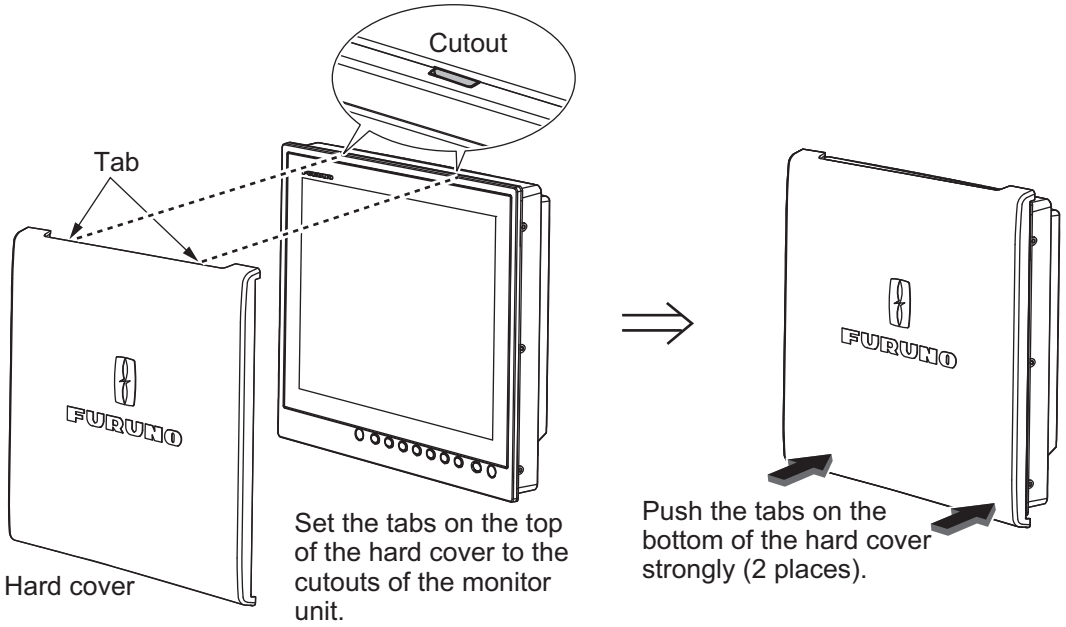
⚠ CAUTION

When lifting the monitor unit, hold it together with the hard cover.

Grasping by the hard cover alone may allow the monitor unit to fall, resulting in possible bodily injury or damage to the equipment.

How to remove the hard cover

To attach the hard cover, follow the illustration in the figure below.



How to attach the hard cover

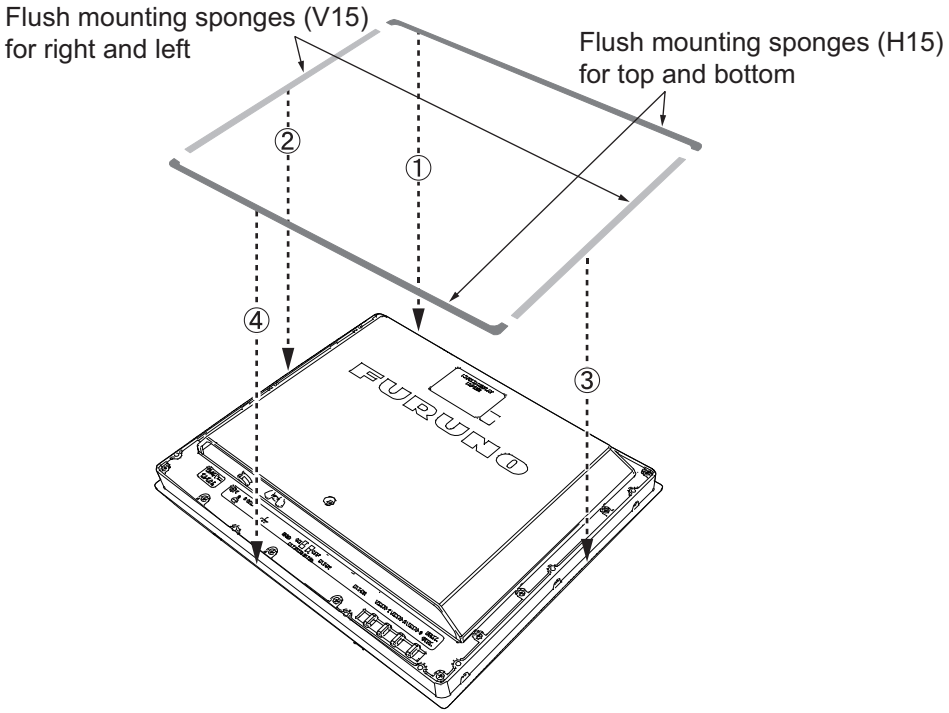
Cable connection

Before you install the monitor unit, run and connect all cables you use. See the interconnection diagram at the back of this manual.

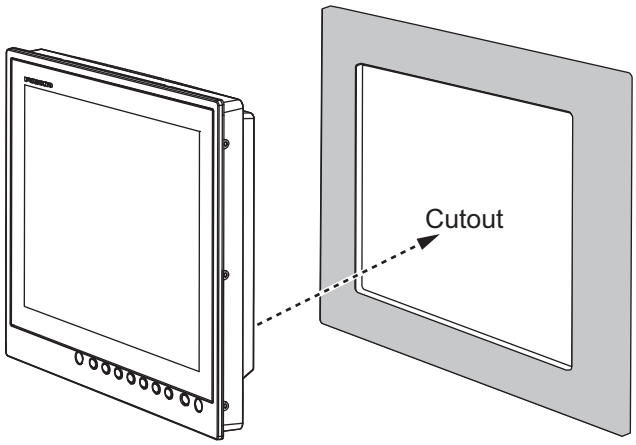
1.2 Flush Mounting, Fixed at Rear (Standard)

This is the standard installation method.

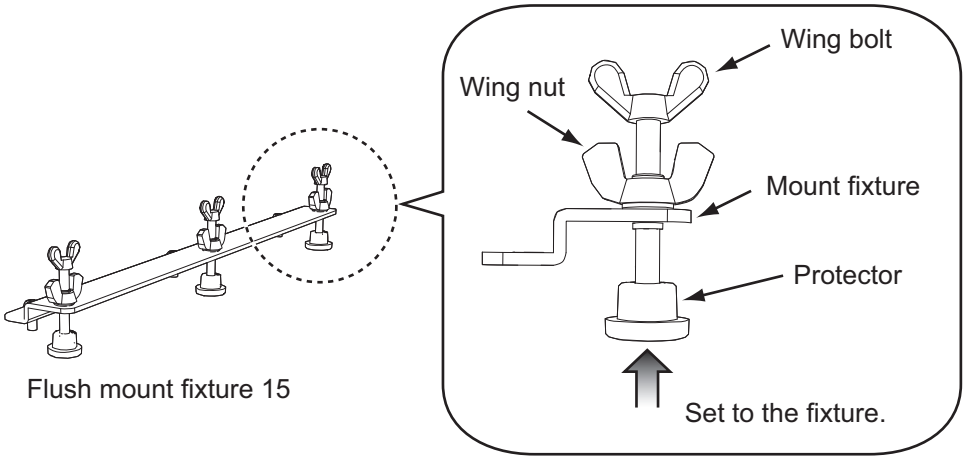
1. Make a cutout in the mounting location referring to the outline drawing at the back of this manual.
2. Attach the flush mounting sponges H15 and V15 in the order shown in the figure below.



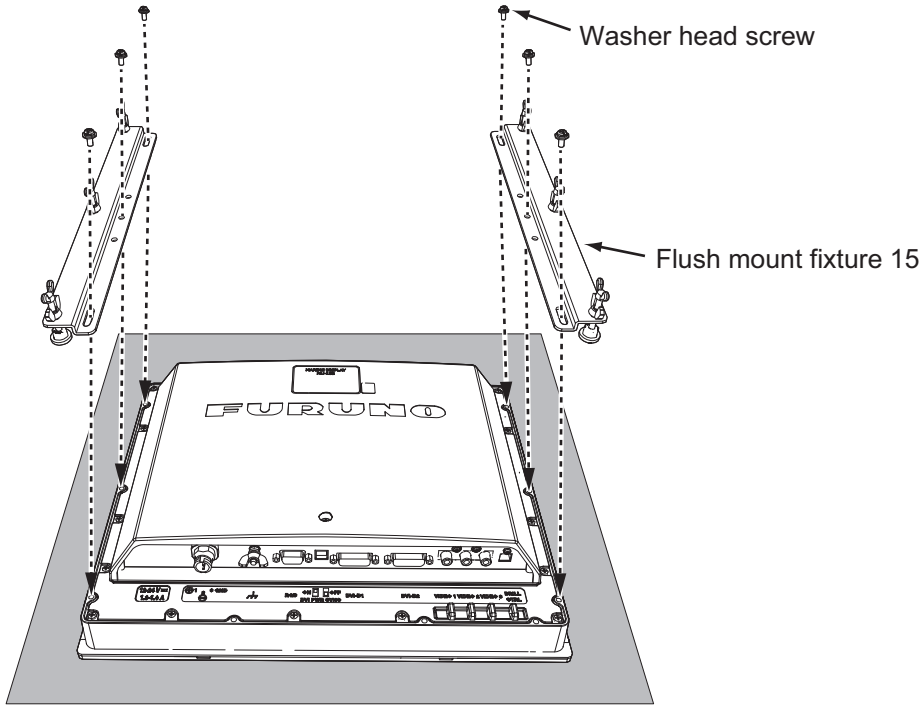
3. Connect all cables at the back of the monitor unit. See section 1.8.
4. Fit the monitor unit to the cutout.



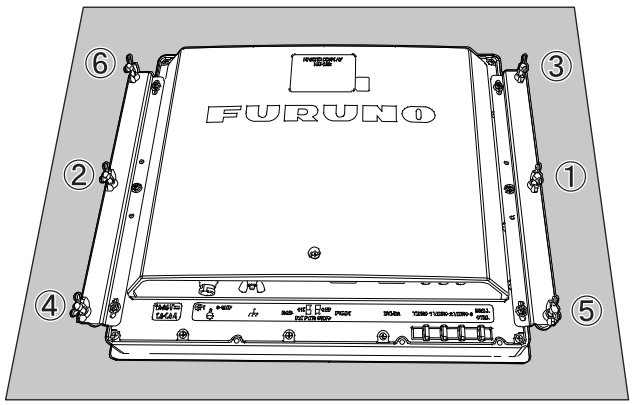
5. Screw the wing bolts and the wing nuts of the flush mount fixture 15 so that the protector moves to the mount fixture.



6. Fasten the flush mount fixture 15 to the right and left sides of the rear of the monitor unit with the washer head screws (6 places).

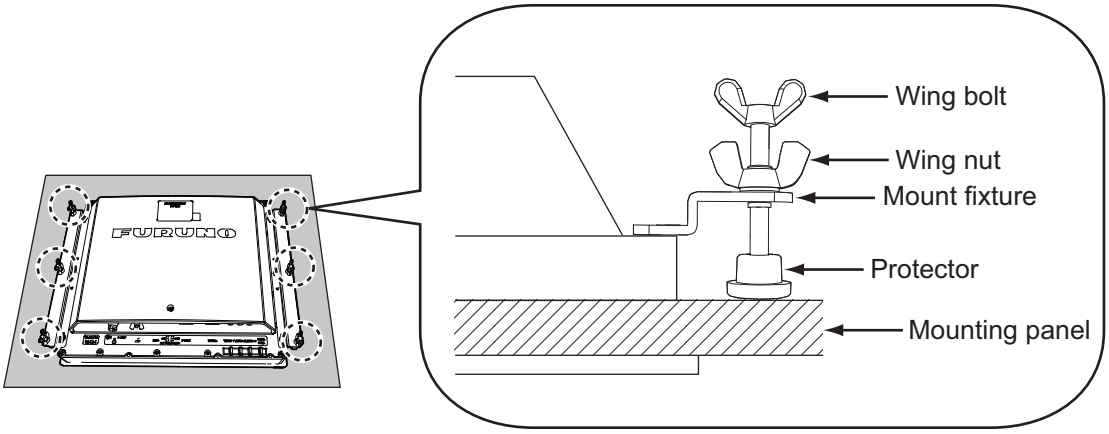


7. Fasten the wing bolts, in the numerical order shown in the figure below so that the protectors touch the mounting panel.



8. Fasten the wing bolts tightly, in the numerical order shown in step 7.

9. Fasten the wing nuts tightly.



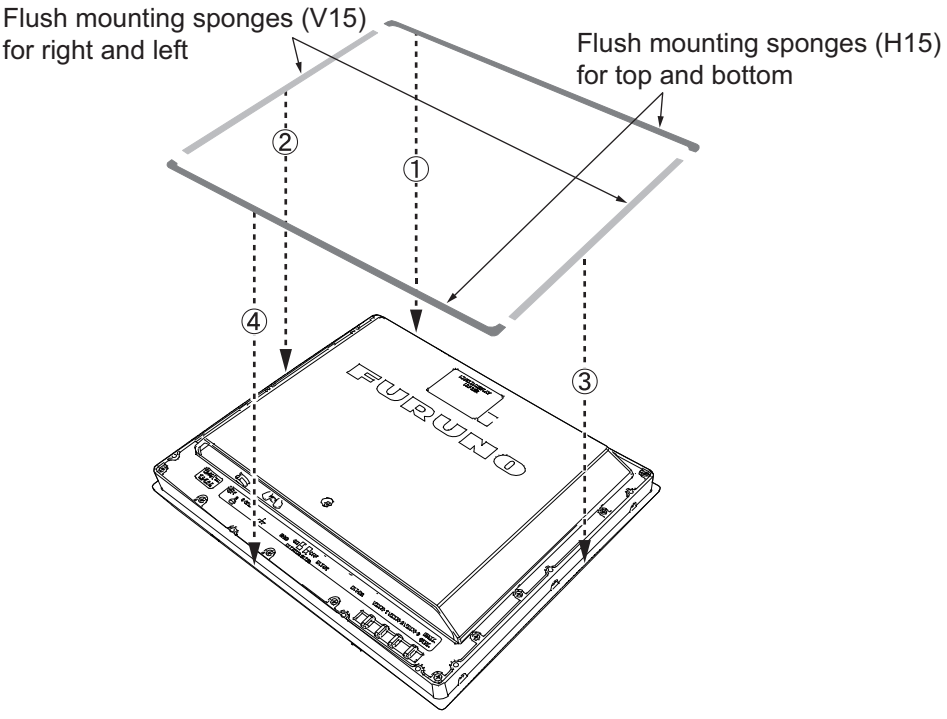
1.3 Flush Mounting, Fixed at Front (Option)

If you do not have the enough space to fix the monitor unit from the rear, you can fix it from the front with the flush mount kit OP26-36 (option).

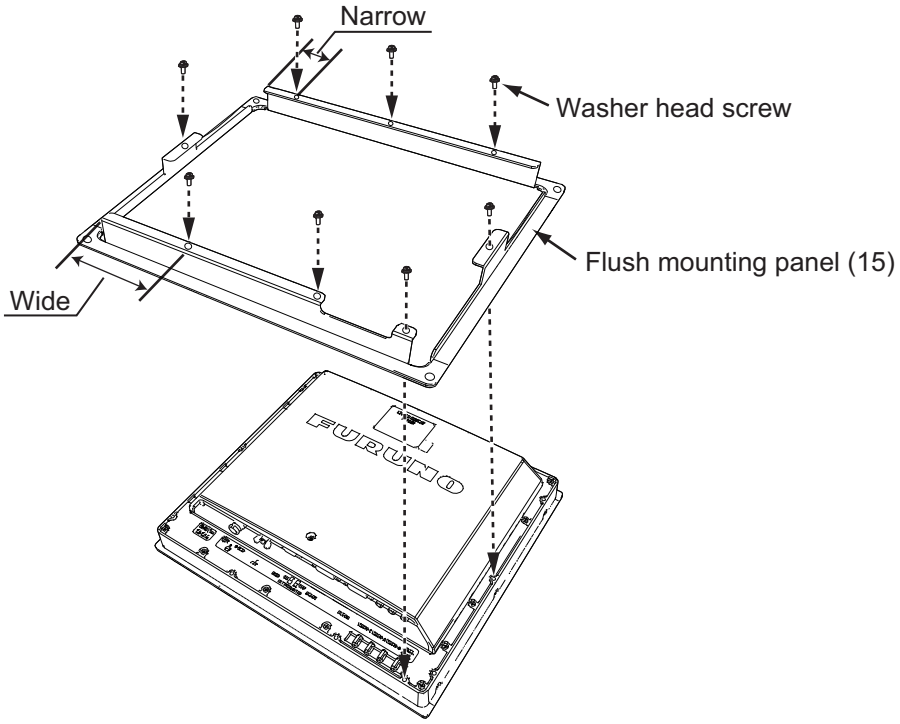
Flush Mount Kit OP26-36 (Code No.: 001-497-450)

Name	Type	Code No.	Qty.
Flush Mounting Panel (15)	OP26-36-1	001-497-520	1
Washer Head Screw	M4×10	000-163-836-10	8
Self Tapping Screw	5×20	000-162-609-10	4
Flush Mounting Template	C42-00909-B	000-172-636-11	1

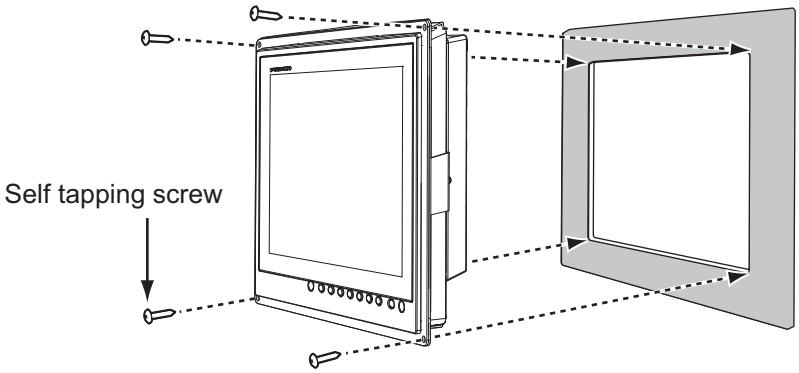
1. Make a cutout in the mounting location with the flush mounting template (included).
2. Attach the flush mounting sponges H15 and V15 in the order shown in the figure below.



3. Attach the flush mounting panel (15) to the monitor unit from the rear with the washer head screws (M4×10, 8 places, torque: 1.2 N•m). Do not confuse the top and bottom of the panel and check that screw holes on the panel and unit are aligned.



4. Connect all cables at the back of the monitor unit. See section 1.8.
5. Fit the monitor unit assembly to the cutout.
6. Secure the monitor unit to the cutout with the self tapping screws (4 places).



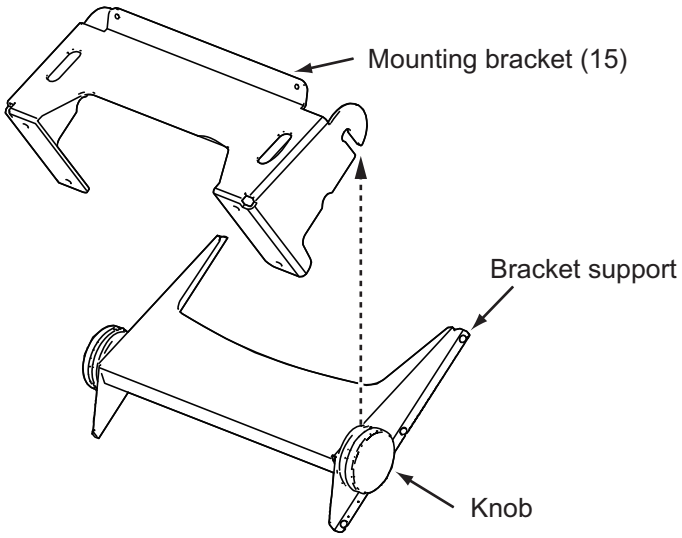
1.4 Desktop Mounting (Option)

You can mount the monitor unit on a desktop, using the bracket assembly OP26-35 (option).

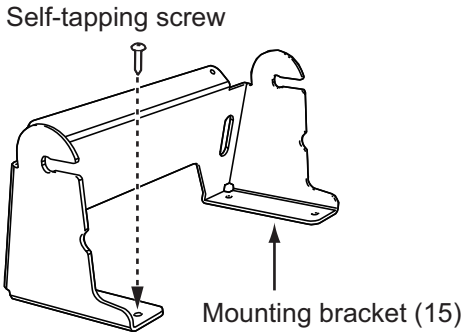
Bracket Assembly OP26-35 (Code No.: 000-034-941)

Name	Type	Code No.	Qty.
Mounting Bracket (15)	OP26-2-1	001-080-820	1
Bracket Support w/knobs	OP26-35-1	001-497-480	
Self-Tapping Screw	5×20	000-162-608-10	4
Binding Head Screw	M4×10	000-172-165-10	6

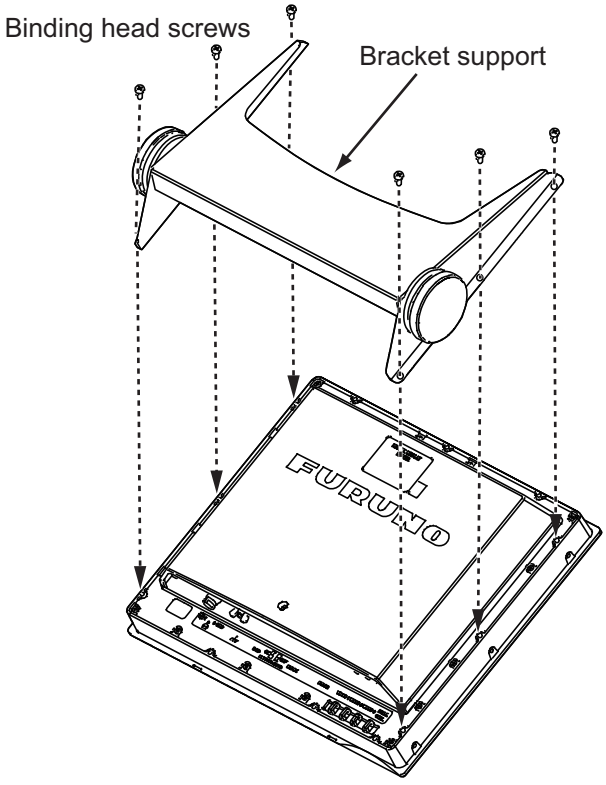
1. Loosen the knobs of the bracket support to separate the mounting bracket (15) from the bracket support.



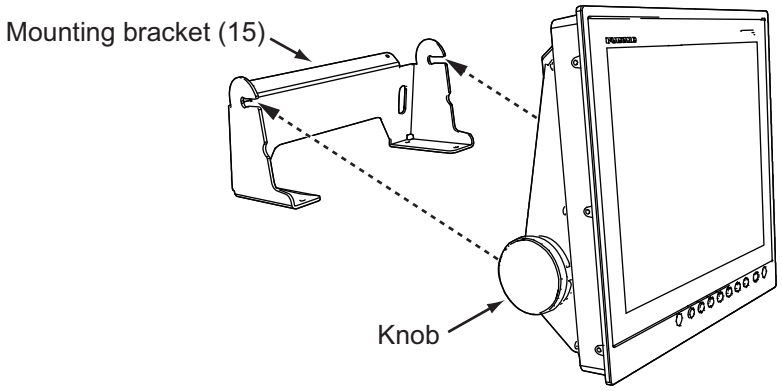
2. Secure the mounting bracket (15) to the mounting location with four self-tapping screws.



3. Attach the bracket support to the rear of the monitor unit with the binding head screws (M4×10, 6 places, torque: 1.2 N•m).



4. Connect all cables at the back of the monitor unit. See section 1.8.
5. Loosen the knobs of the bracket support and set them in the notches on the mounting bracket (15).



6. Adjust the angle of the monitor unit and fasten the knobs tightly.

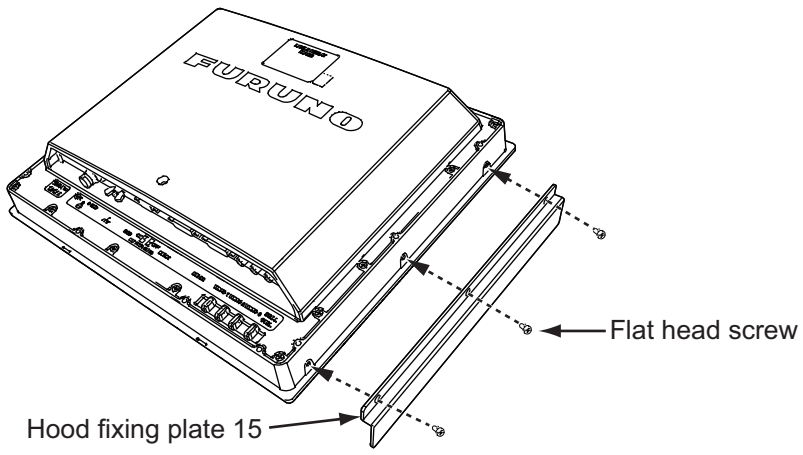
1.5 Flush Mounting, Fixed at Rear, with Hood (Option)

You can attach a hood when flush mounting the unit from the rear, using the hood assembly OP26-3 (option).

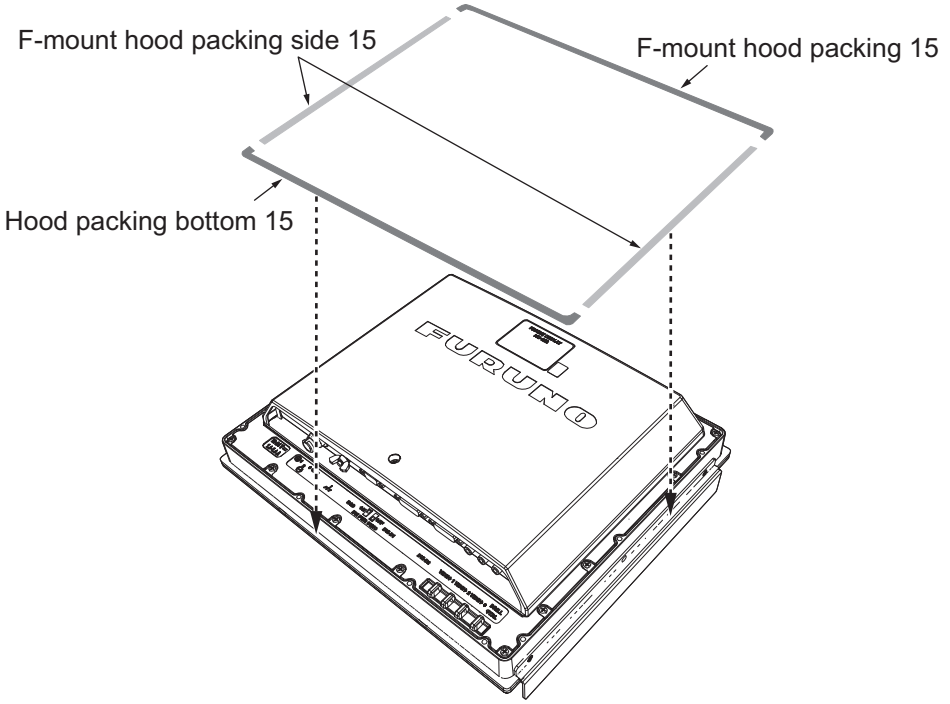
Hood Assembly OP26-3 (Code No.: 001-080-840)

Name	Type	Code No.	Qty.
Hood (15) Assembly	OP26-3-1	001-080-950	1
Hood Fixing Plate 15	26-005-2302-1	100-351-321-10	2
F-Mount Hood Packing 15	26-005-2305	100-351-710-10	1
Hood Packing Bottom 15	26-005-2306	100-351-720-10	1
F-Mount Hood Packing Side 15	26-005-2307	100-351-730-10	2
Knob M4	03-163-2303-2	100-343-602-10	4
Flat Head Screw	M3×8	000-172-167-10	6
Flush Mounting Template	C42-00908-B	000-172-635-11	1

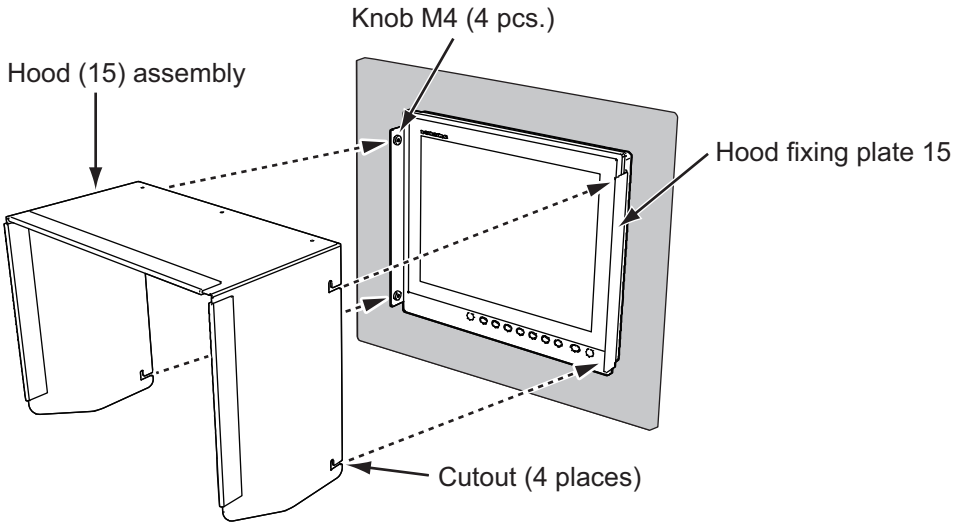
1. Make a cutout in the mounting location with the flush mounting template (included).
2. Attach the hood fixing plates 15 to the right and left of the monitor unit with flat head screws (M3×8, 6 places, torque: 0.6 N•m).



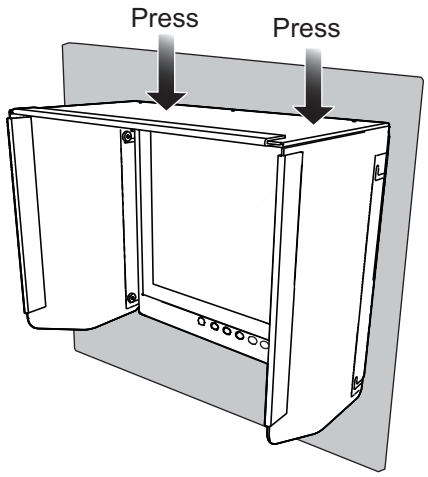
3. Attach the F-mount hood packing 15 to the top brim, the hood packing bottom 15 to the bottom brim, and then attach the F-mount hood packing side 15 to the right and left sides of the monitor unit from the rear side as shown the figure below.



4. Follow steps 3 to 9 in section 1.2 to fit the monitor unit to the mounting location.
5. Loosely fix the knobs M4 (4 pcs.) to the hood fixing plates 15.
6. Slide the cutouts of the hood (15) assembly onto the knobs M4.



7. Press the top of the hood (15) assembly to fit the knobs M4 in the cutouts.



8. Fasten the knobs (4 places) to secure the hood (15) assembly in place.

1.6 Desktop Mounting, with Hood (Option)

You can attach a hood when desktop mounting the unit, using the hood assembly OP26-3 (option) and the bracket assembly OP26-35 (option). See sections 1.4 and 1.5.

1. Follow steps 1 to 3 in section 1.4.
2. Follow steps 1 to 8 in section 1.5.
3. Follow steps 5 and 6 in section 1.4.

1.7 Replacing the MU-151C with the MU-152

There are two methods to replace an existing flush mounted MU-151C with the MU-152; fixed from the front (requires the flush mount kit, available as an optional extra), or fixed from the rear. We recommend the flush mounting fixed at front to hide the screw holes.

Fixing from the front

1. Use the flush mounting template (included with the optional kit) to broaden the cutout at the mounting location.
2. Follow steps 2 to 6 in section 1.3.

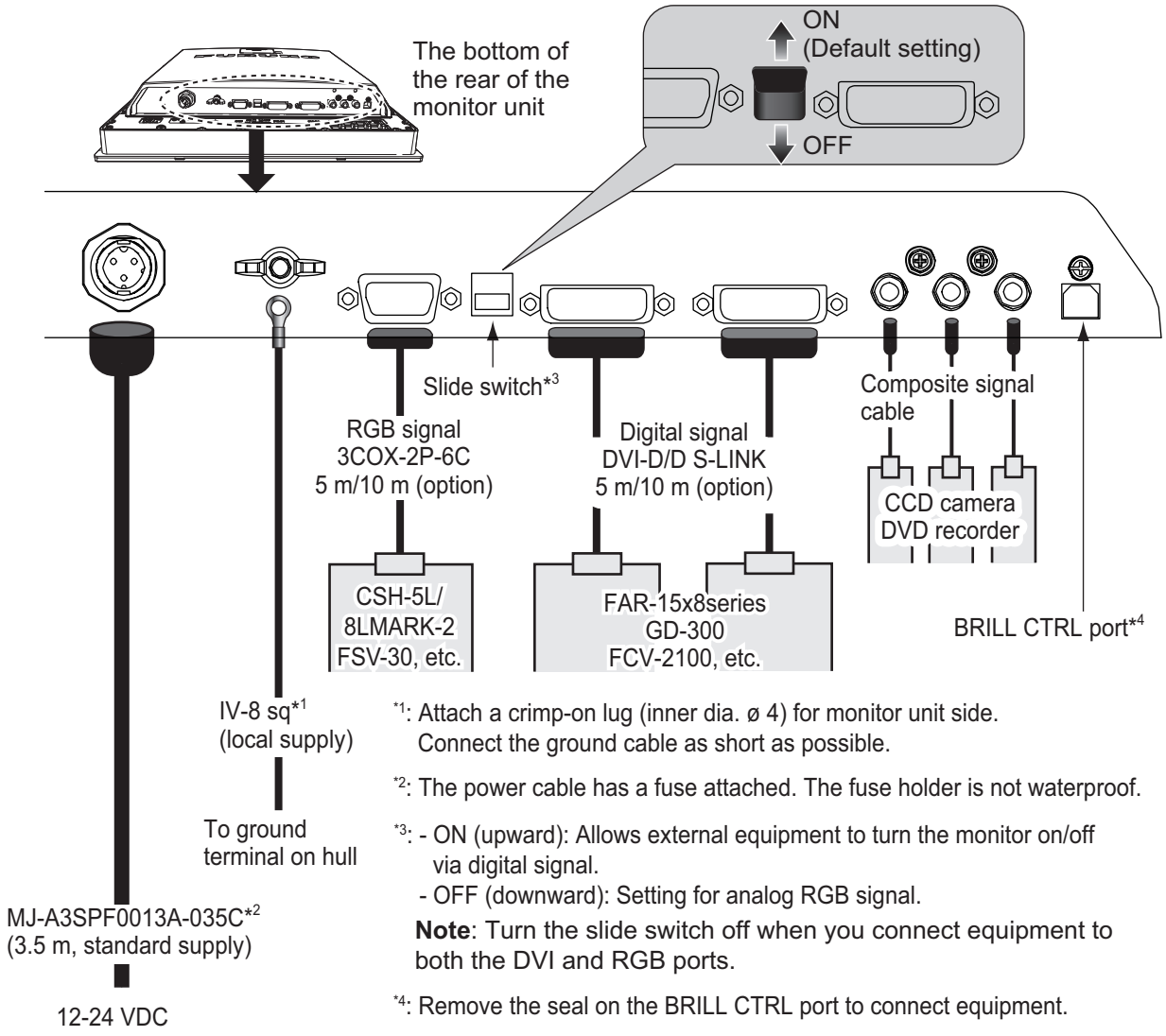
Fixing from the rear

1. Referring to the outline drawing at the back of this manual, broaden the cutout at the mounting location.
2. Follow steps 2 to 9 in section 1.2.

1.8 Wiring

Refer to the figure below and the interconnection diagram at the back of this manual to connect cables.

Connector



*1: Attach a crimp-on lug (inner dia. ø 4) for monitor unit side. Connect the ground cable as short as possible.

*2: The power cable has a fuse attached. The fuse holder is not waterproof.

*3: - ON (upward): Allows external equipment to turn the monitor on/off via digital signal.
- OFF (downward): Setting for analog RGB signal.

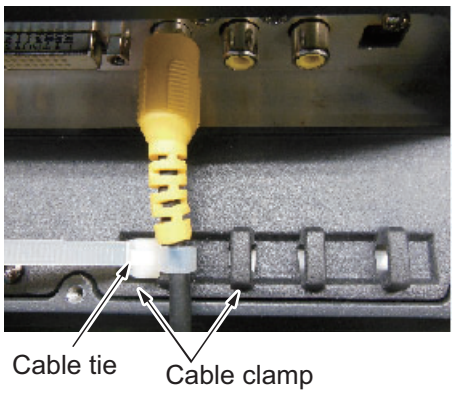
Note: Turn the slide switch off when you connect equipment to both the DVI and RGB ports.

*4: Remove the seal on the BRILL CTRL port to connect equipment.

How to secure composite signal cable

Secure composite cables with cable ties at the cable clamps, to prevent disconnection.

1. Pass the cable tie (supplied) through the side of the cable clamp.
2. Set the cable in the cable tie and fasten the cable tie.
3. Cut off excess cable tie with nippers.



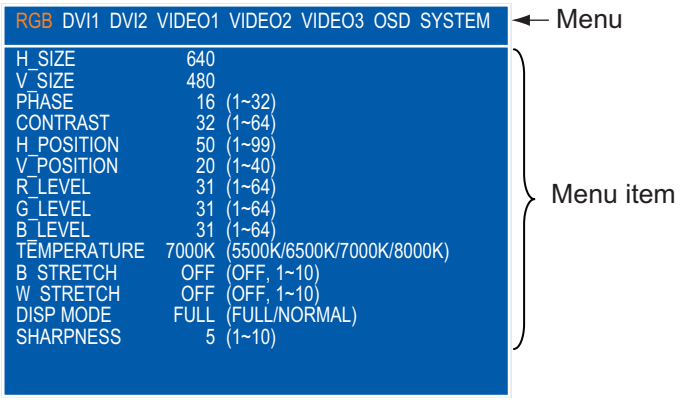
2. ADJUSTMENTS

Adjust the MU-152 according to the equipment connected.

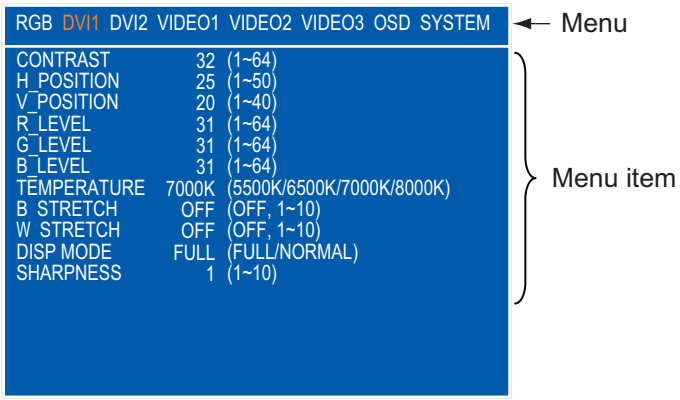
2.1 RGB/DVI Setting

You can adjust the settings for the RGB, DVI-D1 and DVI-D2 ports individually. Turn on the external equipment and adjust the monitor unit as follows.

1. Select the signal to adjust at the DISP selection window. See section 3.4.
   1) Press the **DISP** key.
   2) Press the ▲ or ▼ key to select [RGB], [DVI1] or [DVI2].
2. Press the **MENU** key to show the menu. The menu closes automatically when there is no operation for one minute.
3. Press the ◀ or ▶ key to select [RGB], [DVI1] or [DVI2]. The current selection (the cursor) is shown in orange. The displayed menu items depend on the selected menu. The [DVI1] and [DVI2] menus show the same menu items.
   Note: If there is no signal, menu items appear in gray and are not available.



[RGB] setting menu



[DVI1/2] setting menu

4. Press the ▲ or ▼ key to select the menu item to adjust.
5. Press the ◀ or ▶ key to adjust the setting.
6. Press the **MENU** key to close the menu.

[RGB], [DVI1/2] menu descriptions

Menu item	Function	Setting
[H_SIZE] (Only for [RGB] menu)	Adjusts the image size horizontally. Horizontal size: ◀ (narrow), ▶ (wide)	Depending on input signal
[V_SIZE] (Only for [RGB] menu)	Adjusts the image size vertically. Vertical size: ◀ (narrow), ▶ (wide)	
[PHASE]* (Only for [RGB] menu)	Adjusts the sample timing so that screen flicker disappears and the text is clear.	1 to 32
[CONTRAST]	Adjusts the contrast level. ◀ (darken), ▶ (brighten)	1 to 64
[H_POSITION]	Moves the image position horizontally. ◀ (leftward), ▶ (rightward)	1 to 99 ([RGB]), 1 to 50 ([DVI1], [DVI2])
[V_POSITION]	Moves the image position vertically. ◀ (upward), ▶ (downward)	1 to 40
[R_LEVEL]	Adjusts the red color level. ◀ (weaken), ▶ (strengthen)	1 to 64
[G_LEVEL]	Adjusts the green color level. ◀ (weaken), ▶ (strengthen)	1 to 64
[B_LEVEL]	Adjusts the blue color level. ◀ (weaken), ▶ (strengthen)	1 to 64
[TEMPERATURE]	Adjusts the color temperature. [5500K] (the most reddish), [8000K] (the most bluish)	5500K, 6500K, 7000K, 8000K
[B STRETCH]	Emphasizes the black color. [OFF] (standard), ◀ (weaken), ▶ (strengthen)	[OFF], 1 to 10
[W STRETCH]	Emphasizes the white color. [OFF] (standard), ◀ (weaken), ▶ (strengthen)	[OFF], 1 to 10
[DISP MODE]**	Selects the display method. [FULL]: Shows the input signal on entire screen. [NORMAL]: Shows the input signal with original aspect ratio.	[FULL], [NORMAL]
[SHARPNESS]*	Sharpens the edge horizontally. ◀ (soften characters and lines), ▶ (sharpens characters and lines)	1 to 10

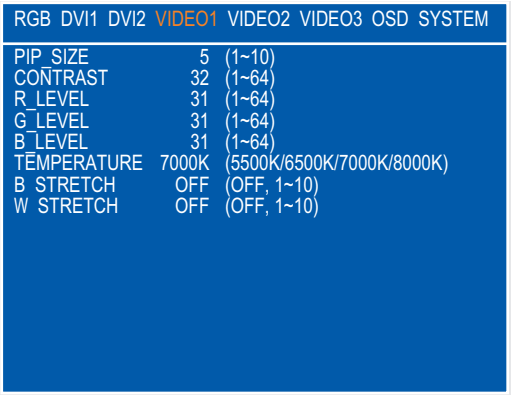
*: If the characters are not clear, adjust [PHASE] and [SHARPNESS].

**: For SXGA input, a circle may be displayed as an ellipse because the aspect ratio differs. In this case, set [DISP MODE] to [NORMAL]. The right and left edges of the screen are left blank, but this is normal.

2.2 Video Composite Signal Setting

You can adjust the VIDEO1, 2 or 3 signal from the VIDEO1, VIDEO2 and VIDEO3 ports separately. The VIDEO1, 2 or 3 signal is also displayed in the PIP window (see section 3.5).

1. Select the signal to adjust at the DISP selection window (see section 3.4).
2. Press the **MENU** key to show the menu.
3. Press the ◀ or ▶ key to select [VIDEO1], [VIDEO2] or [VIDEO3]. The [VIDEO1], [VIDEO2] and [VIDEO3] menus show the same menu items.



4. Press the ▲ or ▼ key to select the menu item to adjust.
5. Press the ◀ or ▶ key to adjust the setting.
6. Press the **MENU** key to close the menu.

[VIDEO1/2/3] menu descriptions

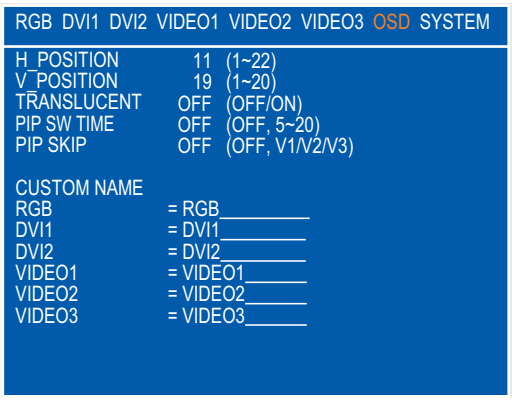
Menu item	Function	Setting
[PIP_SIZE]	Adjusts the size of the picture-in-picture window. **Note:** This setting is available when the PIP window is displayed.	1 (47 mm×31 mm) to 10 (235 mm×160 mm)
[CONTRAST]	Adjusts the contrast level. ◀ (darken), ▶ (brighten)	1 to 64
[R_LEVEL]	Adjusts the red color level. ◀ (weaken), ▶ (strengthen)	1 to 64
[G_LEVEL]	Adjusts the green color level. ◀ (weaken), ▶ (strengthen)	1 to 64
[B_LEVEL]	Adjusts the blue color level. ◀ (weaken), ▶ (strengthen)	1 to 64
[TEMPERATURE]	Adjusts the color temperature. [5500K] (the most reddish), [8000K] (the most bluish)	5500K, 6500K, 7000K, 8000K
[B STRETCH]	Emphasizes the black color. [OFF] (standard), ◀ (weaken), ▶ (strengthen)	[OFF], 1 to 10
[W STRETCH]	Emphasizes the white color. [OFF] (standard), ◀ (weaken), ▶ (strengthen)	[OFF], 1 to 10

2.3 The Menu Window Setting

2.3.1 How to adjust the menu window

You can adjust the position and transparency of the menu window on the [OSD] (On Screen Display) menu.

1. Press the **MENU** key to show the menu.
2. Press the ◀ or ▶ key to select [OSD].



3. Press the ▲ or ▼ key to select the menu item to adjust.
4. Press the ◀ or ▶ key to adjust the setting.
5. Press the **MENU** key to close the menu.

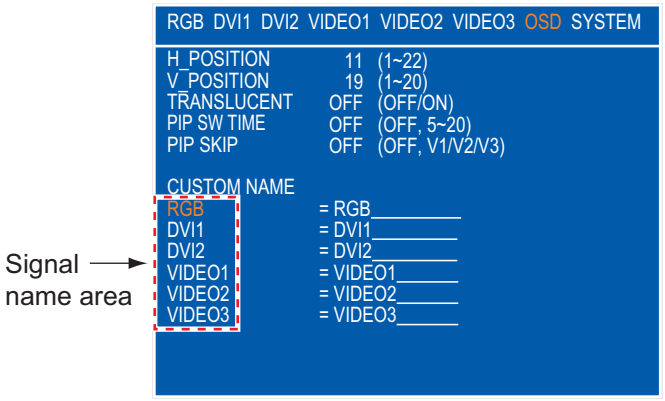
[OSD] menu descriptions

Menu item	Function	Setting
[H_POSITION]	Moves the menu window horizontally. ◀ (leftward), ▶ (rightward)	1 to 29
[V_POSITION]	Moves the menu window vertically. ◀ (upward), ▶ (downward)	1 to 37
[TRANSLUCENT]	Adjusts the transparency of the background color (blue) on the menu window. [OFF]: Blue, [ON]: Translucent **Note:** Alpha blending technology is used for transparency effects.	[OFF], [ON]
[PIP SW TIME]	Switches the screen image on the PIP window among VIDEO1, VIDEO2 and VIDEO3 at the interval (5 to 20 seconds) selected here. When [OFF] is selected, this function is not available.	[OFF], 5 to 20
[PIP SKIP]	Selects which video signals to skip in the PIP window when [PIP SW TIME] is active. [OFF]: VIDEO1, VIDEO2 and VIDEO3 are shown in turn. [V1]: VIDEO1 is skipped. VIDEO2 and VIDEO3 are shown alternately. [V2]: VIDEO2 is skipped. VIDEO1 and VIDEO3 are shown alternately. [V3]: VIDEO3 is skipped. VIDEO1 and VIDEO2 are shown alternately.	[OFF], [V1], [V2], [V3]
[CUSTOM NAME]	See section 2.3.2.	

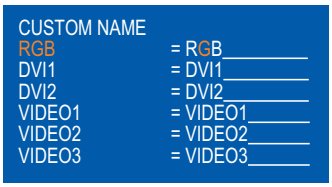
2.3.2 How to change the signal name

You can change the signal name ([RGB], [DVI1/2] or [VIDEO1/2/3]) to a name which is easier to understand, such as the name of the connected equipment. The changed name is shown in the DISP selection window, PIP selection window and the indication shown at the upper right of the screen. See sections 3.4 and 3.5.

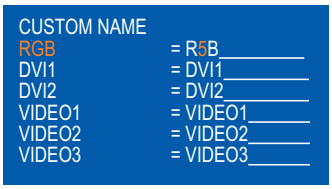
1. Press the **MENU** key to show the menu.
2. Press the ◀ or ▶ key to select [OSD].
3. Press the ▼ key to select the signal whose name you want to change. In the example below, [RGB] is selected.



4. Press the ▶ key to select the character to change. In the example below, [G] of RGB is selected.



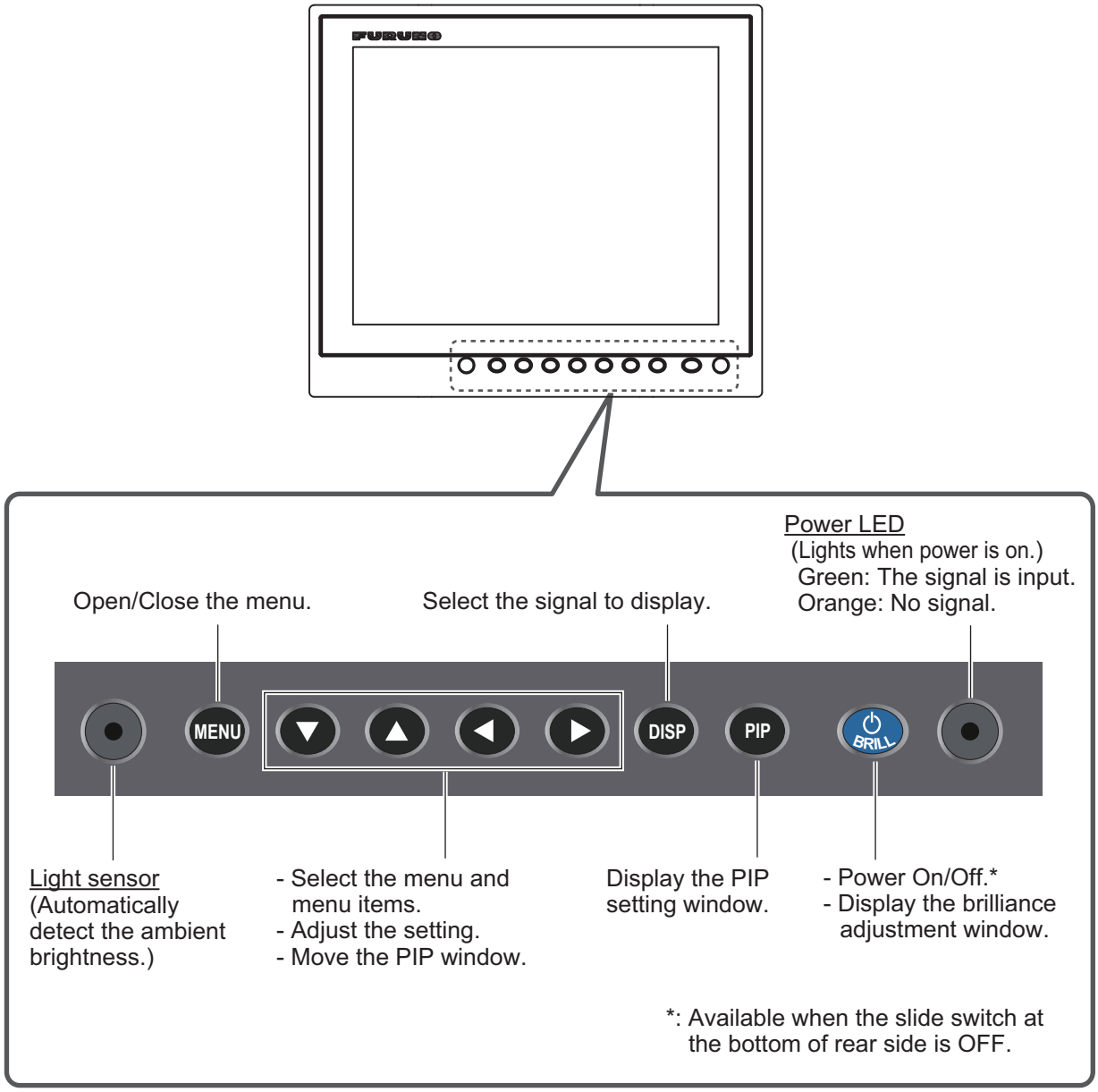
5. Press the ▲ or ▼ key to select an appropriate alphanumeric character. In the example below, [5] is selected. You can set up to ten characters. “A to Z”, “0 to 9”, “–”, “.”, “ ” (space) are available.



6. To change another signal name, press the ◀ key several times to return the cursor to the signal name area. Repeat steps 3 to 5.
7. Press the **MENU** key to close the menu.

3. OPERATION

3.1 Controls



3.2 How to Turn the Power On/Off

This section shows how to turn on/off the monitor unit and the key lock function.

3.2.1 Turn the power on/off

How to turn on/off the power depends on the setting of the slide switch. The slide switch is set when the monitor unit is installed. See section 1.8.

Note 1: When you restart the monitor unit, wait at least three seconds before powering the unit.

Note 2: The screen refreshes slower in low ambient temperatures.

Slide switch "ON"

The external equipment connected to the DVI port (DVI-D1 or DVI-D2) can power on/off the monitor unit. See the external equipment's operator's manual.

Note 1: You can not turn on the power with the ⏻ **/BRILL** key on the MU-152.

Note 2: When you connect the cables to both DVI-D1 and DVI-D2 ports, turn off the power of both connected equipment to turn off the monitor unit.

Note 3: When turning off the power with long press of the ⏻ **/BRILL** key on the MU-152, do the following procedures to restart the MU-152.

1) Restart the equipment connected to the DVI-D1 or DVI-D2 port.
2) Disconnect the power cable from the MU-152, then connect it again.

Slide switch "OFF"

1. Press the ⏻ **/BRILL** key to turn on the monitor unit.
2. Press and hold the ⏻ **/BRILL** key for three seconds to turn off the monitor unit. While you hold the key, the indication shown in the figure to the right appears.

3.2.2 Lock the key operation

You can lock the monitor unit to prevent operation. Any key (except the ⏻ **/BRILL** key) will be inoperative.

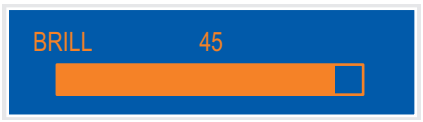
1. While you hold the **PIP** key, turn on the monitor unit. Keep the **PIP** key pressed for more than five seconds.
   Note: When the slide switch is ON, turn on the connected external equipment while pressing the **PIP** key to turn on the monitor unit.
2. To cancel the lock, turn off the monitor unit and then turn it on while you hold the **PIP** key. Keep the **PIP** key pressed for more than five seconds.

Note: The menu is not displayed when the monitor unit is locked. All menu settings retain their value from before the monitor unit is locked.

3.3 How to Adjust the Display Brilliance

You can adjust the display brilliance as follows:

Note: This function is available when [AUTO DIMMER] and [EXT BRILL CTRL] on the [SYSTEM] menu are set to [OFF]. See section 3.6.1.



1. Press the ⏻/**BRILL** key momentarily to show the BRILL adjustment window. The window closes automatically when there is no operation for five seconds.
2. Press the ◀ or ▶ key to adjust the brilliance. You can also adjust the brilliance by pressing the ⏻/**BRILL** key repeatedly. The setting range is 1 to 50 (default: 50).
3. Press the ▲ or ▼ key to close the window.

Note 1: If you turn off the monitor unit with the minimum brilliance, it may be difficult to see the screen when you next turn the power on, due to ambient light. In this case, press the ⏻/**BRILL** key repeatedly.

Note 2: When connecting the MU-152 to the FAR-15x3/15x8, FAR-1417/1427 or FCV-1900, you can adjust the display brilliance from the equipment's control unit. See section 3.6.2.

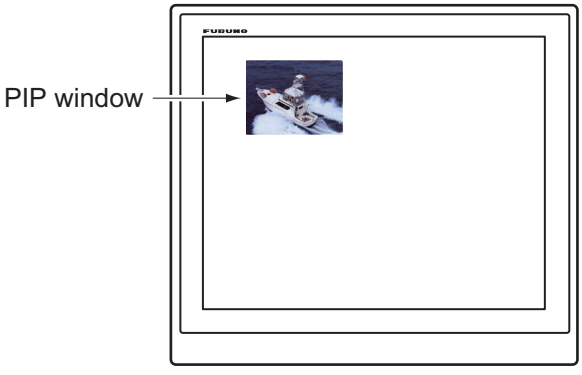
3.4 How to Select the Source for Main Picture

Select the signal to display on the entire screen as follows:

1. Press the **DISP** key to show the DISP selection window. The signal names are shown as customized at section 2.3.2 on the window. The window closes automatically when there is no operation for five seconds.
2. Press the ▲ or ▼ key to select a signal. You can also select the signal by pressing the **DISP** key continuously.
   [RGB]: The signal from the RGB port is displayed.
   [DVI1], [DVI2]: The signal from the selected DVI port is displayed.
   [VIDEO1] to [VIDEO3]: The external video from the selected VIDEO port is displayed.
3. Press the ◀ or ▶ key to close the window. The name of the selected signal appears at the top right of the screen for five seconds after the DISP selection window disappears. If there is no signal, "NO SIGNAL" appears.

3.5 How to Display the PIP Window

The PIP (picture-in-picture) window, which displays the picture input to the VIDEO port, is available on the RGB, DVI1 and DVI2 displays.



1. When the RGB, DVI1 or DVI2 display appears, press the **PIP** key to show the PIP selection window. The signal names appear with their customized name (see section 2.3.2). The window closes automatically when there is no operation for five seconds.

2. Press the ▲ or ▼ key to select the VIDEO port required. [VIDEO1] (2 or 3) can also be selected by pressing the **PIP** key continuously. When you select the [VIDEO1], [VIDEO2] or [VIDEO3], the PIP window is displayed. To close the PIP window, select [OFF].
3. Press the ◀ or ▶ key to close the PIP selection window.
4. You can move the PIP window by pressing the arrow keys when the menu is closed. Press and hold the arrow keys to move the PIP window quickly.

Note 1: To show the VIDEO1, VIDEO2 and VIDEO3 pictures alternately, set the cycle time (5 to 20 sec) with [PIP SW TIME] on the [OSD] menu. In this case, the above setting is invalid. See section 2.3.1.

Note 2: You can adjust the size of the PIP window on the [VIDEO1] (2 or 3) menu(s). See section 2.2.

3.6 SYSTEM Menu

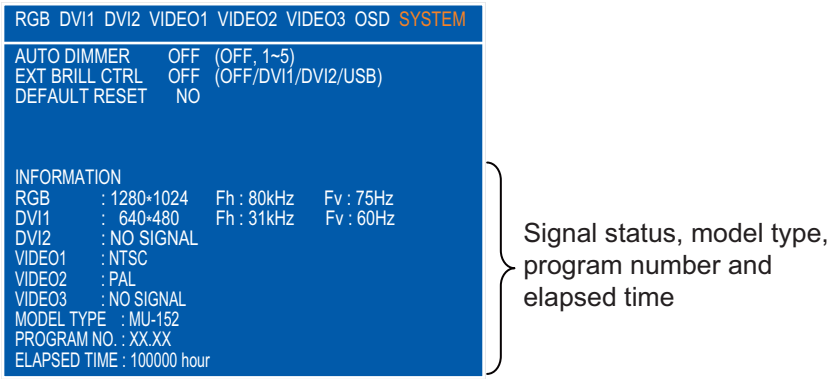
You can set the brilliance control and clear the memory on the [SYSTEM] menu. Also, you can check signal status, the program number and the elapsed time (total time since first use) on the [SYSTEM] menu.

3.6.1 How to set the auto dimmer

The auto dimmer feature automatically adjusts the brilliance according to the ambient brightness detected by the light sensor on the front panel. Also, you can select the intervals at which the brilliance is adjusted.

Note: Do not put any objects in front of the light sensor.

1. Press the **MENU** key to show the menu.
2. Press the ▶ key to select [SYSTEM]. The message “Input Signal Searching Please Wait” is displayed and then the [SYSTEM] menu shown in the figure below is displayed.



3. Press the ▼ key to select [AUTO DIMMER].
4. Press the ◀ or ▶ key to select the adjustment interval.
   - [OFF]: Disable this function.
   - [1]: Every two seconds
   - [2]: Every 30 seconds
   - [3]: Every minute
   - [4]: Every three minutes
   - [5]: Every five minutes
5. Press the **MENU** key to close the menu.

3.6.2 How to adjust the brilliance from the external equipment

When the FAR-15x3/15x8 is connected to the DVI-D1 or DVI-D2 port, or the FAR-1417/1427 or FCV-1900 is connected to the USB port, you can adjust the display brilliance from the connected equipment.

Note 1: This function is available when [AUTO DIMMER] on the [SYSTEM] menu is set to [OFF].

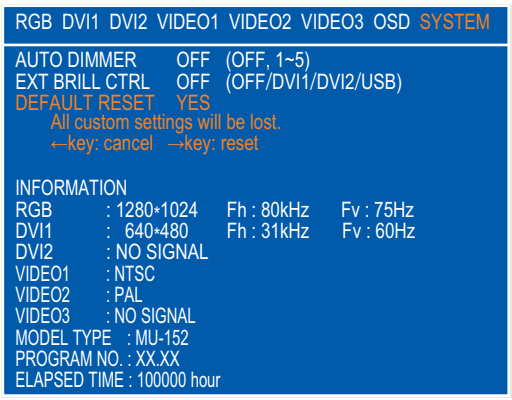
Note 2: The FAR-1417/1427 is for Japan only.

1. Press the **MENU** key to show the menu.
2. Press the ▶ key to select [SYSTEM].
3. Press the ▼ key to select [EXT BRILL CTRL].
4. Press the ◀ or ▶ key to set the desired input item.
   [OFF]: You can not adjust the brilliance from the external equipment.
   [DVI1]: When the DVI1 is displayed, the brilliance signal from DVI-D1 port controls this display's brilliance. The ⏻**/BRILL** key is available for screens other than the screen input from DVI1.
   [DVI2]: When the DVI2 is displayed, the brilliance signal from DVI-D2 port controls this display's brilliance. The ⏻**/BRILL** key is available for screens other than the screen input from DVI2.
   [USB]: The brilliance signal from USB port controls this display's brilliance. The ⏻**/BRILL** key is not available.
5. Press the **MENU** key to close the menu.

3.6.3 How to clear the memory

You can clear the memory to restore the default settings.

1. Press the **MENU** key to show the menu.
2. Press the ▶ key to select [SYSTEM].
3. Press the ▼ key to select [DEFAULT RESET].
4. Press the ▶ key. The indication changes from [NO] to [YES].



Note: To cancel, press the ◀ key. The indication changes from [YES] to [NO].

5. Press the ▶ key to select [reset].

4. MAINTENANCE, TROUBLESHOOTING

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.

4.1 Maintenance

Routine maintenance

Regular maintenance is important for good performance. Check the following on a regular basis to keep the equipment in good condition.

- Check that the connectors at the bottom of the monitor unit are tightly fastened.
- Check the ground wire and ground terminal for rust. Clean if necessary. Confirm that the ground wire is tightly fastened.
- Remove dust and dirt from the monitor unit with a dry, soft cloth. Do not use chemical cleaners to clean any part of the monitor unit. They can remove paint and markings.
- Check the dust or dirt is not on the display. Wipe it carefully to prevent scratching. For difficult to remove dirt or salt deposits, use a cloth made wet with water and neutral detergent (less than 1% detergent). Squeeze the cloth dry then clean the display. When the display is clean, gently wipe the display with a clean, soft, dry cloth, to prevent scratching.

Fuse replacement

The fuse in the fuse holder on the power cable protects the equipment from overvoltage and overcurrent. If the fuse blows, find the cause before you replace it. If the fuse blows again after replacement, contact your dealer.

⚠ WARNING

Use the proper fuse.

Use of a wrong fuse can cause fire or damage to the equipment.

Name	Type	Code No.
Fuse	FGBO-A 125V 3A PBF	000-155-850-10

LCD replacement

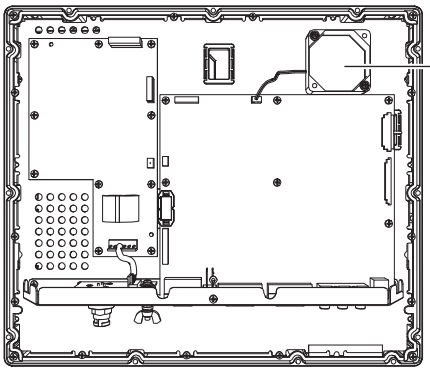
The life of the LCD is approximately 100,000 hours. The actual numbers of hours depends on ambient temperature and humidity. When the brilliance cannot be raised sufficiently, contact your dealer to request replacement of the LCD.

Fan replacement

The life of the fan is approximately 95,000 hours. The actual numbers of hours depends on ambient temperature. When the fan cannot be rotated sufficiently, the message "FAN ERROR" is shown for 10 seconds after approx. 30 seconds from power-on. Turn off the power and contact your dealer to request replacement of the fan.

Note: When replacing the fan, check the mounting direction of fan referring to the figure below (rear inside view).

Name	Type	Code No.
Fan Motor Assembly	109P0512H728	000-194-365-10



Fix the fan so that the label on the fan is directed downward, that is to the screen side.

4.2 Troubleshooting

See the following table to find the possible causes and the actions to restore normal operation. If repair of the equipment is necessary, contact your dealer and report the result of the troubleshooting to the serviceman.

Troubleshooting

Case	Remedy
You can not turn on the power.	• Check the setting for the slide switch. See section 1.8. • Check the battery voltage with a multimeter. • Check the fuse on the power cable. • Fasten the power cable tightly.
You can not turn off the power.	• Press and hold the ⏻/**BRILL** key for eight seconds. • When the slide switch is set to ON, turn off the connected external equipment.
No picture	• Fasten the cables tightly. • Check the input signal. See section 3.6. • Check the setting for DISP selection window. See section 3.4. • Check if the display brilliance is not set to minimum.
You can not operate any key except the ⏻/**BRILL** key.	Cancel the key lock function. See paragraph 3.2.2.
The small rectangular frame in black is displayed on the screen.	Press the **PIP** key then select [OFF].

APPENDIX 1 ABBREVIATIONS

	Abbreviation	Meaning
A	APR	Application Program
	AUTO	Automatic
B	B	Black
	BRILL	Brilliance
C	CCD	Charge-Coupled Device
	CH	Type of FURUNO searchlight sonar
	CI	Type of FURUNO current indicator
	CSH	Type of FURUNO color scanning sonar
	CTRL	Control
D	DISP	Display
	DVD	Digital Versatile Disc
	DVI	Digital Visual Interface
E	EXT	External
F	FAR	Type of FURUNO radar
	FCV	Type of FURUNO fish finder
	Fh	Horizontal Frequency
	FSV	Type of FURUNO color scanning sonar
	Fv	Vertical Frequency
G	GD	Type of FURUNO color video plotter
H	H	Horizontal
L	LCD	Liquid Crystal Display
	LED	Light-Emitting Diode
N	NO.	Number
	NTSC	National Television System Committee
O	OSD	On-Screen Display
P	PAL	Phase Alternating Line
	PC	Personal Computer
	PIP	Picture-in-Picture
Q	Qty	Quantity
R	RGB	Red/Green/Blue
S	SW	Switch
	SXGA	Super Extended Graphics Array (1280×1024)
U	USB	Universal Serial Bus
V	V	Vertical
	VGA	Video Graphics Array (640×480)
W	W	White
X	XGA	Extended Graphics Array (1024×768)

Units of measurement

Abbreviation	Meaning	Abbreviation	Meaning
A	Ampere(s)	mm	Millimeter(s)
Hz	Hertz(es)	pc.	Piece
K	Kelvin	pcs.	Pieces
kHz	Kilohertz(es)	V	Volt(s)
m	Meter(s)		

SPECIFICATIONS OF MONITOR UNIT
MU-152

1 GENERAL

1.1	Screen type	15-inch color LCD, 1024 x 768 (XGA)
1.2	Effective area	304 x 228 mm approx.
1.3	Pixel pitch	0.297 mm (Horizon/Vertical)
1.4	Brightness	400 cd/m^2 typical
1.5	Contrast	900: 1
1.6	View angle	80° or more (left/right and up/down)
1.7	Visible distance	1.02 m nominal
1.8	Input signal	
	RGB analog	1 port, Non-interlace, RGB signal: 0.7 Vp-p, Sync. signal: TTL level
	DVI-D	2 port, DVI-standard, VESA DDC2B
	Composite	3 port, NTSC/PAL-standard, Video signal: 0.7 Vp-p, Sync. signal: 0.3 V
	USB	1 port, USB1.1, 12Mbps, for brilliance control

2 POWER SUPPLY

12-24 VDC: 1.9-0.9 A

3 ENVIRONMENTAL CONDITION

3.1	Ambient temperature	-15°C to +55°C
3.2	Relative humidity	93% at +40°C
3.3	Degree of protection	IP56 (CFR46, front panel), IP22 (chassis)
3.4	Vibration	IEC60945 Ed.4

4 UNIT COLOR

N2.5

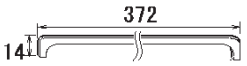
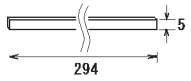
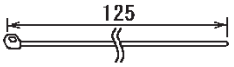
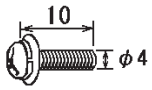
FURUNO

CODE NO.	001-497-440-00	26AN-X-9401 -0
TYPE	CP26-02401	1/1

工事材料表

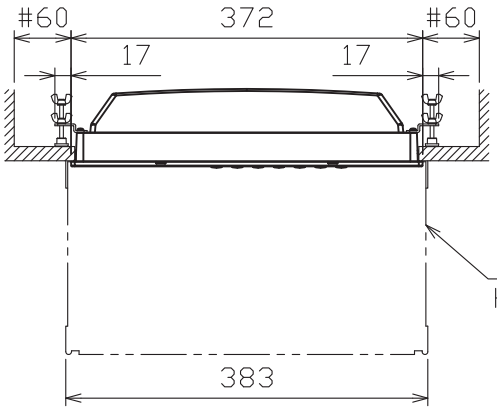
INSTALLATION MATERIALS

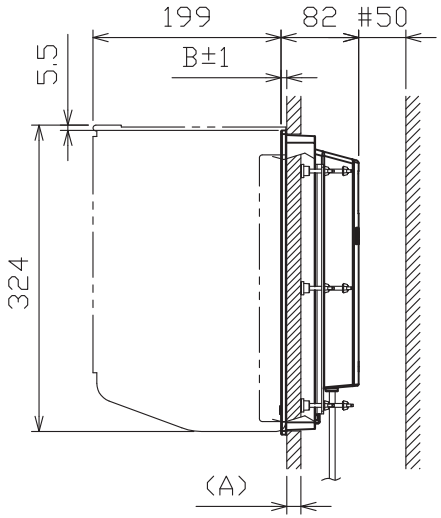
MU-152

番 号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	FﾏｳﾝﾄｽﾎﾟﾝｼﾞH15 FLUSH MOUNTING SPONGE H 15		26-005-2123-0 CODE NO. 100-351-280-10	2	
2	FﾏｳﾝﾄｽﾎﾟﾝｼﾞV15 FLUSH MOUNTING SPONGE V 15		26-005-2124-0 CODE NO. 100-351-290-10	2	
3	ｺﾝﾍﾞｯｸｽ CABLE TIE		CV-125N CODE NO. 000-172-164-10	4	
4	+ﾅﾍﾞｾﾑｽB WASHER HEAD SCREW *B*		M4X10 SUS304 CODE NO. 000-163-836-10	6	

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

FURUNO





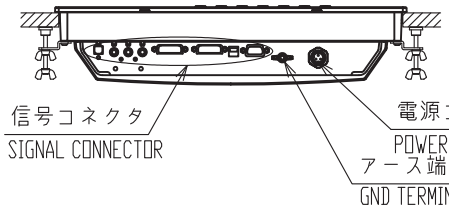
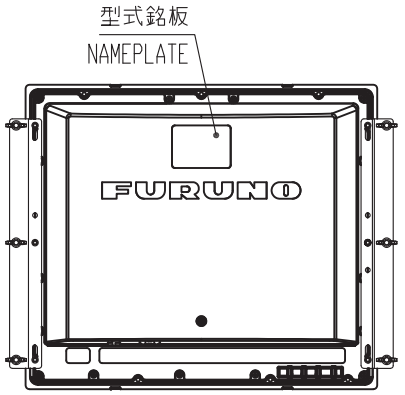


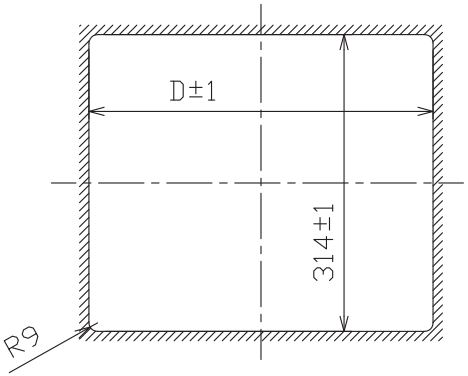
表2 TABLE 2

フードHOOD	B (mm)	D (mm)
なし NO	6	364
あり YES	7	368

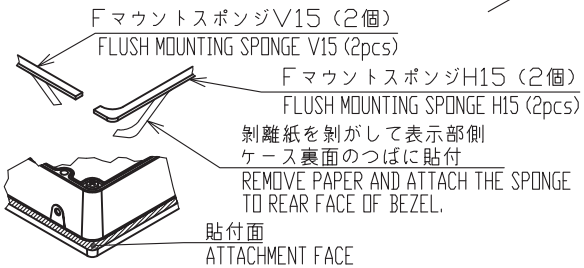
表1 TABLE 1

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





取付穴寸法図
CUTOUT DIMENSIONS



付属スポンジの貼付方法
SPONGE ATTACHMENT METHOD

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）壁の厚さ（Ａ）は最少１０ｍｍ、最大２０ｍｍとする。

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. BULKHEAD THICKNESS (A): 10≦A≦20.

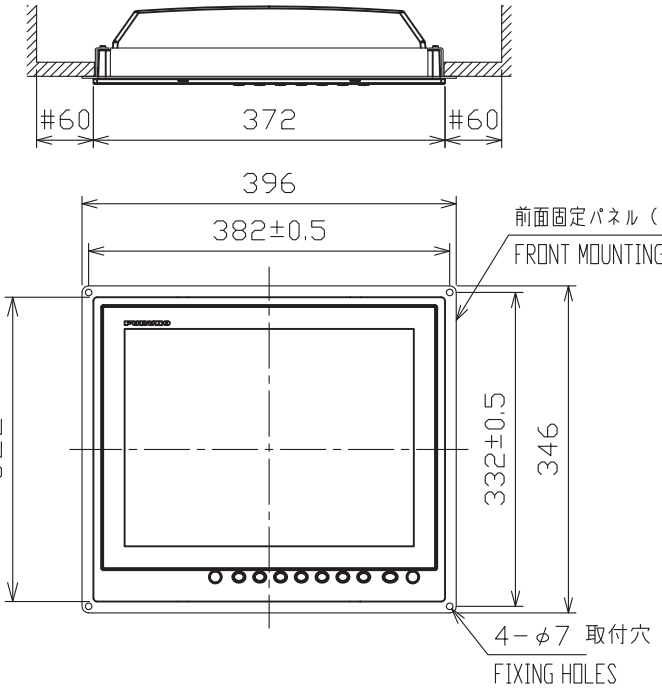
DRAWN 16/Aug/2017 T.YAMASAKI		TITLE	MU-152
CHECKED 16/Aug/2017 H.MAKI		名称	表示部（埋込装備S）
APPROVED 16/Aug/2017 H.MAKI			外寸図
SCALE 1/8 MASS 4.9 ±10% kg	質量はオプションを含まず。 MASS DOES NOT INCLUDE OPTION.	NAME	MONITOR UNIT (FLUSH MOUNT S)
DWG.No. C4497-G01- B	REF.No. 26-010-100G-3		OUTLINE DRAWING

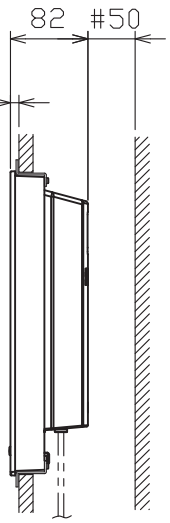
FURUNO ELECTRIC CO., LTD.

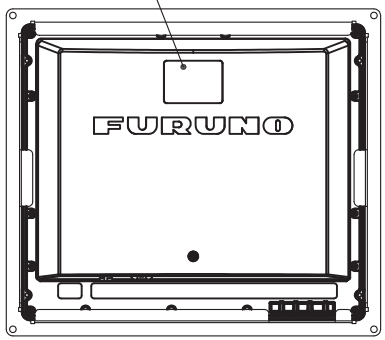
FURUNO

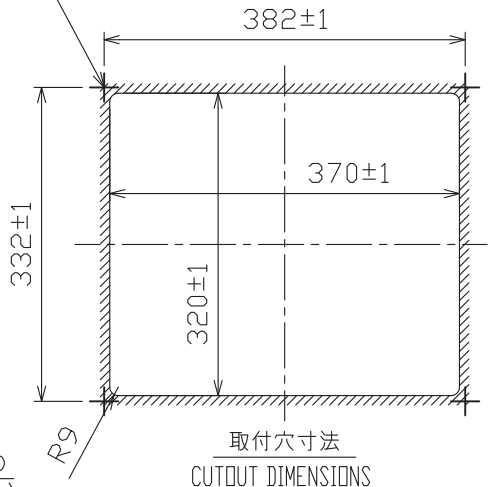
表1 TABLE 1

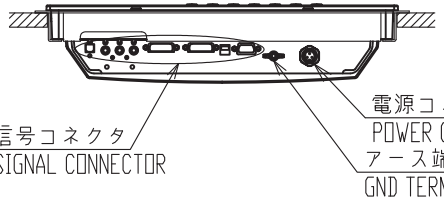
寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3











付属スポンジの貼付方法
SPONGE ATTACHMENT METHOD

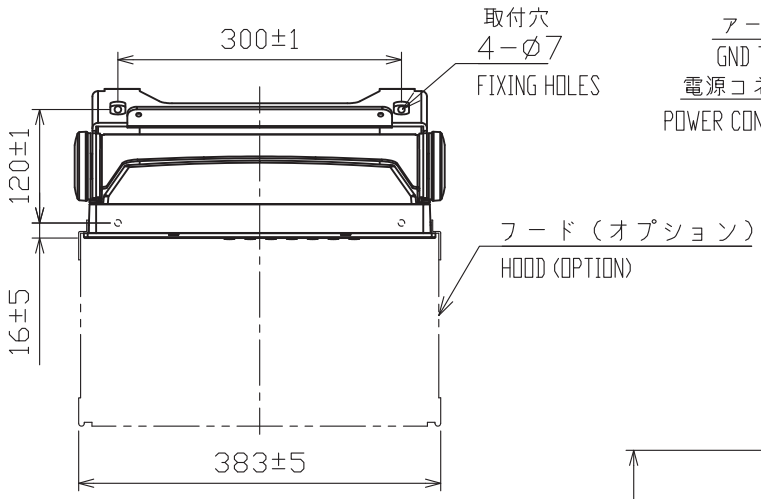
注　記
1）指定外の寸法公差は表1による。
2）＃印寸法は最小サービス空間寸法とする。
3）取付用ネジはトラスタッピンネジ呼び径５×２０を使用のこと。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS ø5x20 FOR FIXING THE UNIT.

DRAWN 16/Aug/2017 T.YAMASAKI		TITLE	MU-152
CHECKED 16/Aug/2017 H.MAKI		名称	表示部（埋込装備F）
APPROVED 16/Aug/2017 H.MAKI			外寸図
SCALE 1/8 MASS 4.9 ±10% kg	質量はオプションを含まず。 MASS DOES NOT INCLUDE OPTION.	NAME	MONITOR UNIT (FLUSH MOUNT F)
DWG.No. C4497-G03- B	REF.No. 26-010-120G-3		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO



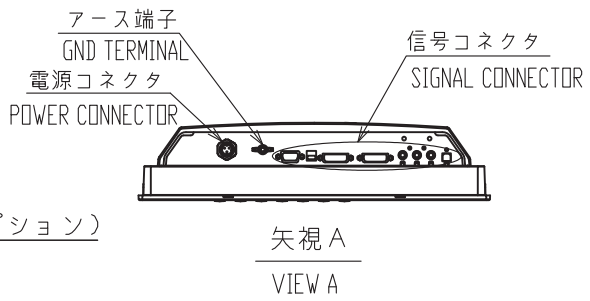
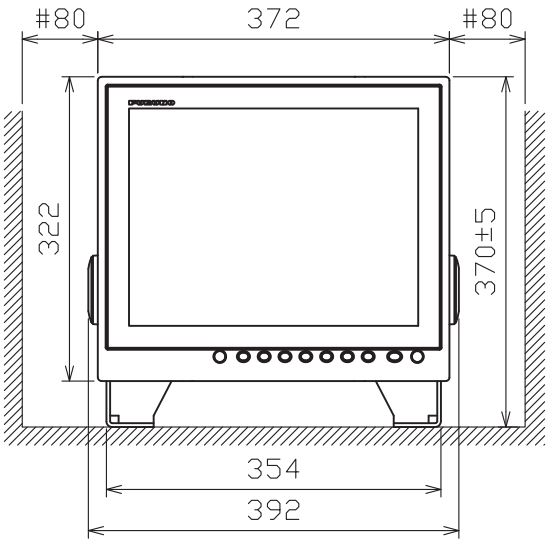
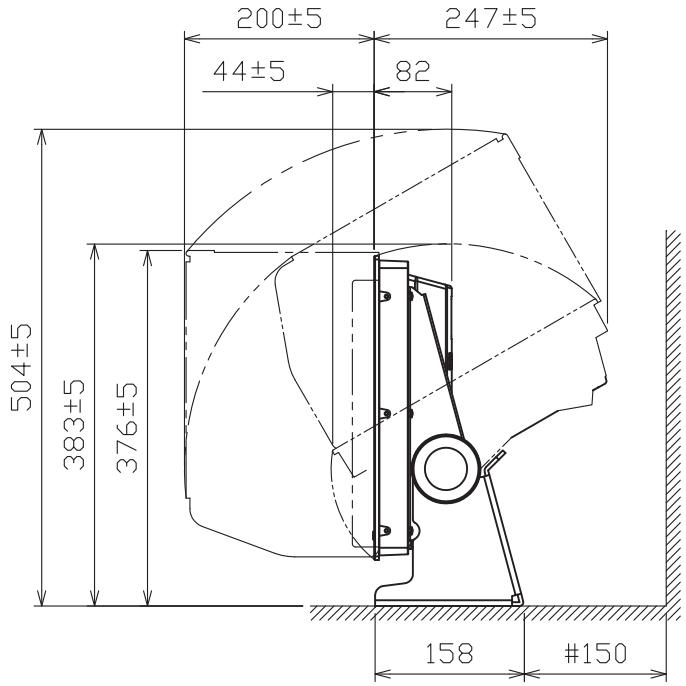
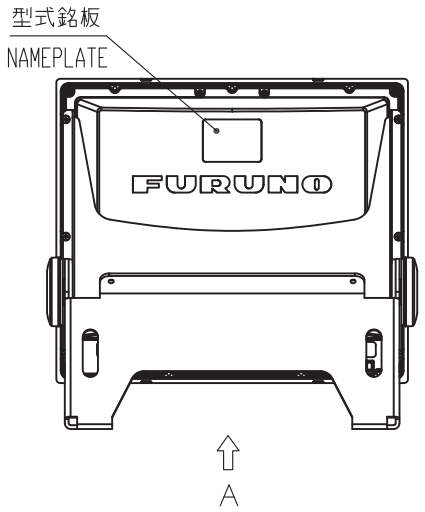


表1 TABLE 1

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







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。

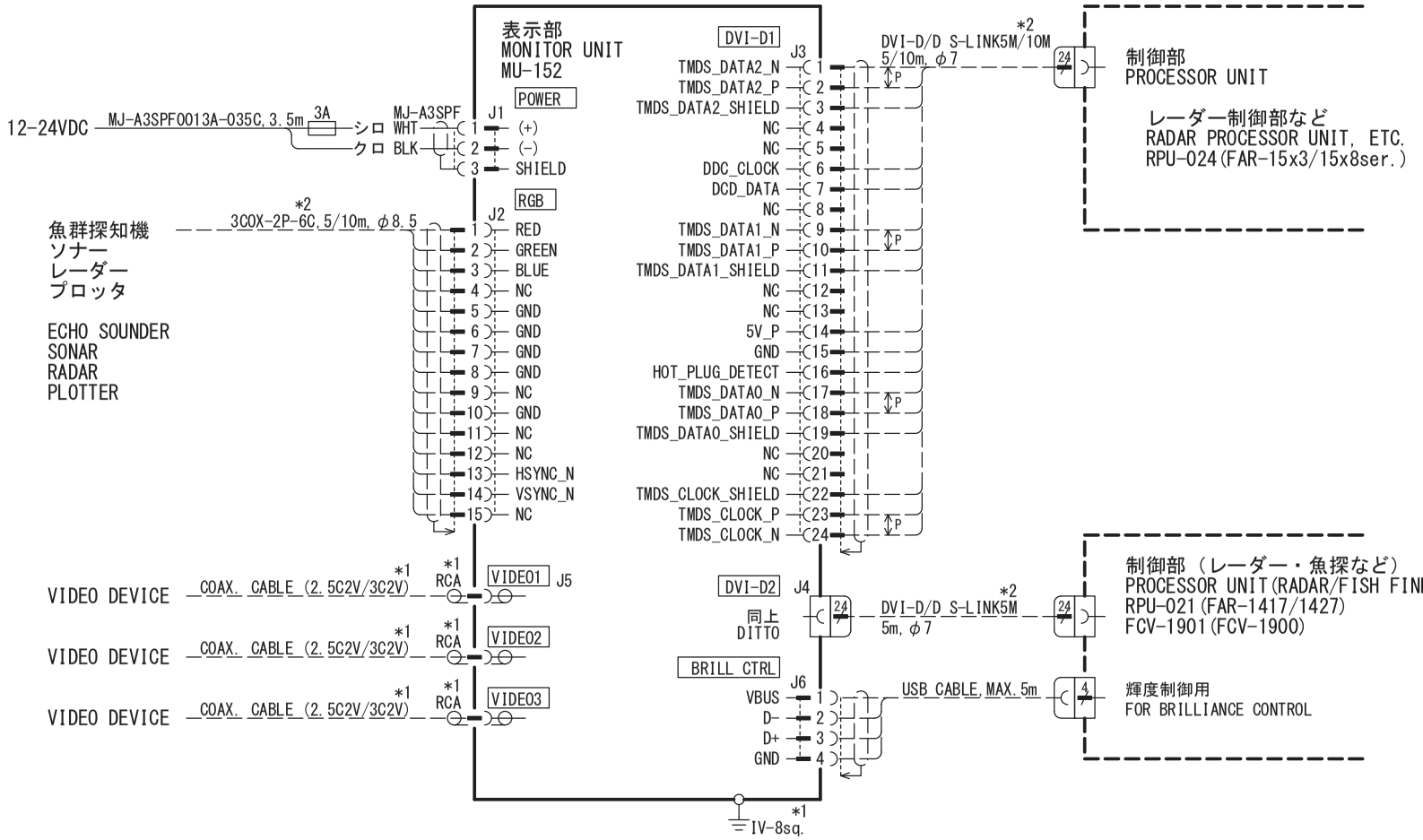
NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS Ø5x20 FOR FIXING THE UNIT.

DRAWN 16/Aug/2017 T.YAMASAKI		TITLE	MU-152
CHECKED 16/Aug/2017 H.MAKI		名称	表示部（卓上装備）
APPROVED 16/Aug/2017 H.MAKI			外寸図
SCALE 1/8 MASS 6.9 ±10% kg	質量はオプションを含まず。 MASS DOES NOT INCLUDE OPTION.	NAME	MONITOR UNIT (TABLETOP MOUNT)
DWG.No. C4497-G02- B	REF.No. 26-010-110G-3		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO



注記
＊１）造船所手配。
＊２）オプション。

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.

DRAWN 22/Jun/2017 T. YAMASAKI		TITLE	MU-152
CHECKED 22/Jun/2017 H. MAKI		名称	表示部
APPROVED 23/Jun/2017 H.MAKI			相互結線図
SCALE / MASS kg		NAME	MONITOR UNIT
DWG No. C4497-C01- A	REF. No. 26-010-5001-0		INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

FURUNO ELECTRIC CO., LTD.
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www.furuno.com

Publication No. DOCQA1159

EC Declaration of Conformity

CE

We FURUNO ELECTRIC CO., LTD.

(Manufacturer)

9-52 Ashihara-Cho, Nishinomiya City, 662-8580, Hyogo, Japan

(Address)

declare under our sole responsibility that the product

MONITOR UNIT MU-152

(Model name, type number)

to which this declaration relates is in conformity with the following standard(s) or other normative document(s)

IEC 60945 Ed.4.0: 2002 incl. Corr. 1: 2008
IEC 60945 Ed.3.0: 1996, clause 10.3

(title and/or number and date of issue of the standard(s) or other normative document(s))

For assessment, see

- Test Report LIC 12-17-070, LIC 12-17-071, LIC 12-17-072 and LIC 12-17-074, August 31, 2017 prepared by Labotech International Co., Ltd.

This declaration is issued according to the Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

On behalf of Furuno Electric Co., Ltd.

Y. Shogaki

Yoshitaka Shogaki
Department General Manager
Quality Assurance Department

Nishinomiya City, Japan
September 14, 2017

(Place and date of issue)

(name and signature or equivalent marking of authorized person)

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9-52 Ashihara-cho,
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