FURUNO

OPERATOR'S MANUAL

取 扱 説 明 書

MONITOR UNIT

表示部

MODEL **MU-190**

FURUNO ELECTRIC CO., LTD.

www.furuno.com

ECF

(Elemental Chlorine Free)

The paper used in this manual
is elemental chlorine free.

・ 機器の修理・使用方法等に関するお問い合わせは、お買い上げの販売店・代理店、最寄りの
当社支店・営業所あてへお願いします。

FURUNO ELECTRIC CO., LTD.

古野電気株式会社

・FURUNO Authorized Distributor/Dealer　お問い合わせは

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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.

- 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.
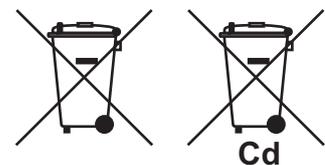
In the USA

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.
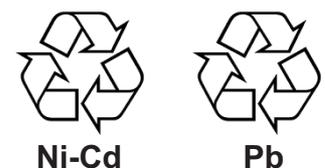
In the other countries

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 a FURUNO agent for service.

❗ **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 a FURUNO agent for service.

🚫 **Do not disassemble or modify the equipment.**

Fire, electrical shock or serious injury can result.

❗ **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 a FURUNO dealer or agent for advice.

⚠ WARNING

❗ **Use the proper fuse.**

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

🚫 **Do not place any object near the exhaust or intake vent.**

Fire may result.

⚠ CAUTION

🚫 **Do not connect/disconnect the signal cable while turning the power on.**

The unit may be damaged.

❗ **Handle the LCD monitor with care.**

The face of the LCD monitor is made of glass. Injury may result if the glass 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-190	1.65 m	1.05 m

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.

TABLE OF CONTENTS

Note: This manual contains both English and Japanese instructions. The Installation Materials, Outline Drawings, and Interconnection Diagram are located at the back of this manual.

FOREWORD

A Word to the Owner of the MU-190

FURUNO Electric Company thanks you for purchasing the MU-190 19" Monitor Unit. We are confident you will discover why the FURUNO name has become synonymous with quality and reliability.

For over 60 years 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-190 are as shown below.

• Selectable screen from RGB (1 port), Digital (2 ports) or Composite (1 port).

• Main or remote display for radars, video sounders, sonars, plotter. For the connectable equipment, see the SYSTEM CONFIGURATION on page vi.

• High resolution display of 1280 x 1024 (SXGA)

• Automatic brilliance adjustment by the light sensor.

• Picture-in-picture function

• Power on/off automatically through the DVI signal.

Program

Program Name	Version	Date of Change
APR PROGRAM	2651020-01.xx	May. 2011
FPGA PROGRAM	2651021-01.xx	May. 2011

xx: minor change

You can see these program numbers on the [SYSTEM] menu (see section 3.6). To open the [SYSTEM] menu, unlock the key operation (see paragraph 3.2.2).

Note: When you connect the monitor unit to FAR-21x7 series, FEA-2107 or FCR-21x7 series, lock the key operation (see paragraph 3.2.2) after confirming the program numbers.

SYSTEM CONFIGURATION

RGB --- FSV-30/30S, etc.

DVI (2 ports) --- FAR-21x7, FEA-2107, FCR-21x7, etc.

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

RS-232C --- FEA-2107, FCR-21x7, etc.

MONITOR UNIT
MU-190

100-230 VAC

Environmental category
MU-190: Protected from the weather
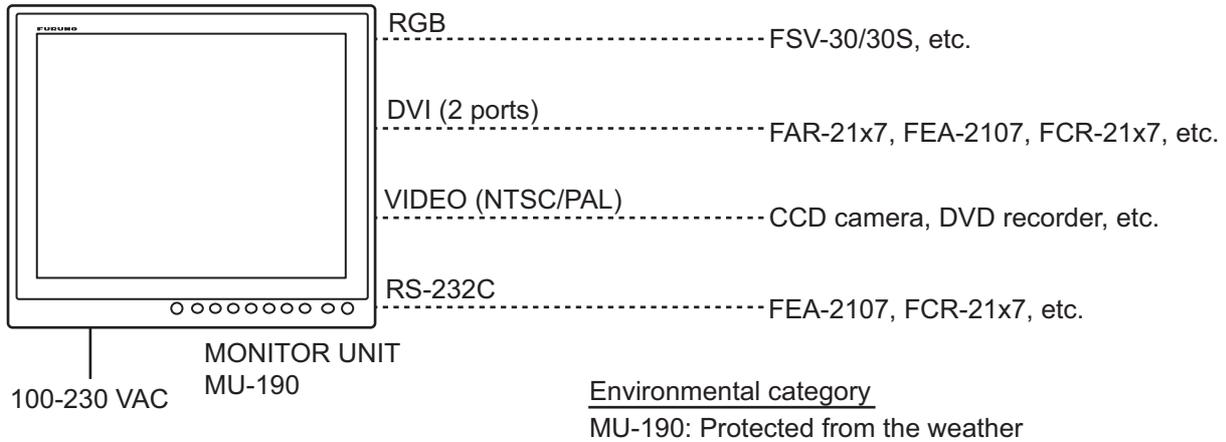
Connectable equipment

Equipment	Resolution	Signal
FCV-1200L/1200LM	VGA*	Analog RGB, via IF-8000
FSV-24/24S	SXGA	Analog RGB
FSV-30/30S	SXGA	Analog RGB
FSV-84/84L	SXGA	Analog RGB
FSV-85/85L	SXGA	Analog RGB
FCV-30	SXGA	Analog RGB
FAR-21x7	SXGA	DVI
FEA-2107	SXGA	DVI
FCR-21x7	SXGA	DVI
MFDBB (NAVnet 3D)	SVGA*	DVI
	XGA*	
	SXGA	

Note 1: Landscape orientation only.

Note 2: *: When inputting VGA, SVGA or XGA, a circle may be displayed as an ellipse because the aspect ratio differs (see "DISP MODE*" on page 15).

EQUIPMENT LISTS

Standard supply

Name	Type	Code No.	Qty	Remarks
Monitor Unit	MU-190	-	1	
Installation Materials	CP26-01600	000-019-210	1 set	• Installation Materials (CP26-01601, Code No.: 001-116-250, See page A-1.) • Cable Assembly (DVI-D/D S-LINK 5M, Code No.: 001-132-960-10)
Accessories	FP26-00401	001-080-780	1 set	LCD Cleaning Cloth (19-028-3125, Code No.: 100-360-671-10)
Spare Parts	SP26-00501	001-116-240	1 set	Glass Tube Fuse (FGBO 250V 1A PBF, Code No.: 000-155-828-10) 3 pcs.

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)	OP26-5	000-016-270	1 set	
Hood Assembly	OP26-6	001-080-930	1 set	
Dust Cover	26-007-1201	001-116-260-10	1	
Flush Mount Kit	OP26-12	001-116-280	1 set	• Flush Mounting Sponge H 19 (26-005-3123, Code No.: 100-351-550-10) • Flush Mounting Sponge V 19 (26-005-3124, Code No.: 100-351-560-10) • Washer Head Screw B (M4x10, Code No.: 000-163-836-10) • Flush Mount Fixture 19 (CP26-01401, Code No.: 001-080-890) **Note:** The quantity of each part depends on the number of units connected.
	OP26-13 (Two units installed side by side)	001-116-290	1 set	
	OP26-14 (Three units installed side by side)	001-116-300	1 set	
Connection Stand (19)	OP26-20	001-139-300	1 set	
Bracket Assembly	OP26-21	001-139-310	1 set	
Hood (19) Assembly	OP26-24	001-139-370	1 set	
Monitor Replacement Kit	OP26-22	001-139-320	1	For flush mount
	OP26-23	001-139-360	1	For tabletop mount
	OP26-26	001-139-390	1	For hood mount

1.   MOUNTING, WIRING

1.1   Preparation

Mounting method

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

- Flush mount, fixed at front (standard)
- Flush mount, fixed at front, with hood (option)
- Flush mount, fixed at rear (option)
- Flush mount, fixed at rear, with hood (option)
- Tabletop mount (option, hood-mountable)
- Flush mount a series side by side, fixed at rear

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

Note 2: For flush mount, take care so that the monitor unit does not fall during the installation.

Mounting location

Select a mounting location considering the following points. This equipment is free from electro-magnetic fields.

- Make sure the mounting location is strong enough to support the weight of the unit.
- Locate the unit away from direct sunlight. An LCD may darken if it is exposed to direct sunlight for a long time.
- Select a location where the screen 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.
- Observe the compass safe distances (see page iii) to prevent interference to a magnetic compass.

Run cables before installing the monitor unit

Run all cables before you install the monitor unit. See the interconnection diagram at the back of this manual.

1.2   Flush Mount, Fixed at Front

Flush mount, fix at front is the standard installation method.

1. Use the flush mounting template (supplied) to make a cutout in the mounting location.

2. Attach the flush mounting sponges H19 and V19 to the back of the monitor unit in the order shown in the figure at right.

Flush Mounting Sponge H19 (5 mm) for top and bottom

Flush Mounting Sponge V19 (2 mm) for left and right
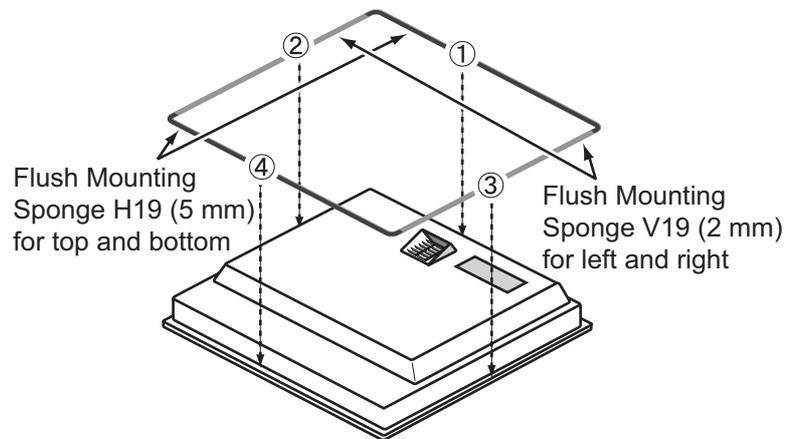
3. Attach the flush mount panels 19 to the monitor unit from the rear with the binding head screws (M4x10, 6 pcs., supplied).

Binding Head Screw

Flush Mount Panel 19
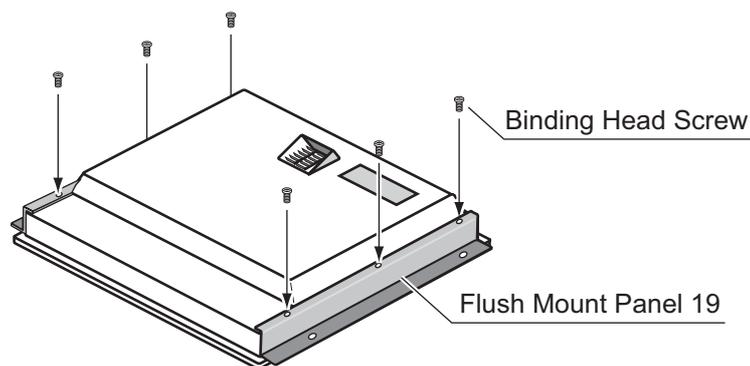
Note: Attach the flush mount panels to both sides of the monitor unit with no gap.

4. Connect all cables at the back of the monitor unit. See section 1.8.

5. Set the monitor unit assembly to the cutout.

6. Fix the monitor unit to the cutout with the self-tapping screws (5x20, 4 pcs., supplied).

Self-Tapping Screw (4 places)

2
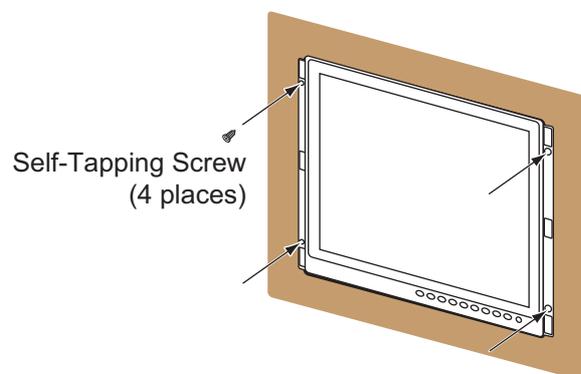
7. Set the masking panel to each side of the monitor unit.

Masking Panel for 19" LCD
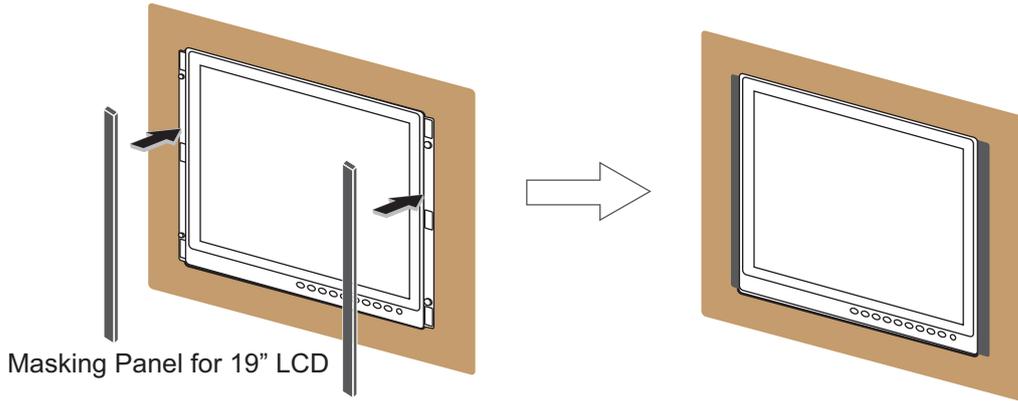
How to attach or detach the masking panel for 19" LCD

Do the following to attach or detach the masking panel for 19" LCD.

Reverse view of masking panel for 19" LCD

Tab A

Tab B

a

b

c

Front side of monitor unit
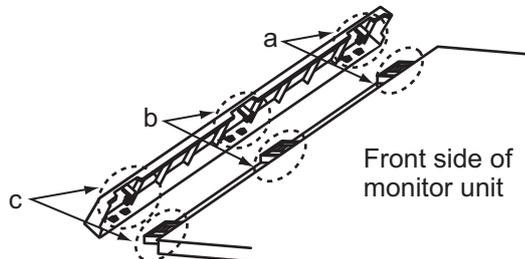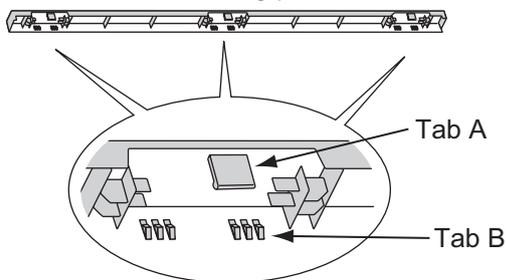
Set the masking panel for 19" LCD to each side of the monitor unit. Attach each tab A to the monitor unit. Be careful not to break the tabs.

To attach, follow order of right arrow (→). To detach, follow order of left arrow (←).

Monitor unit

Masking panel

Set tab B to the edge of the monitor unit.

Attach: Push the masking panel for 19" LCD in the direction ➡, rotate the panel toward the monitor unit, then set each tab A one by one (three places of a, b and c) .

Detach: Push the masking panel for 19" LCD in the direction 1, then release each tab A one by one (three places of a, b and c) in the direction 2.

1.3   Flush Mount, Fixed at Front, with Hood

The flush mount, fixed at front method allows you to attach a hood (19) assembly OP26-24 (option) to the monitor unit.

Hood (19) assembly OP26-24 (Code No.: 001-139-370)

Name	Type	Code No.	Qty
Hood (19) Assembly	OP26-6-1	001-080-970	1
Knob M4	03-163-2303	100-343-602-10	4
Hood Fixing Plate (19)	26-007-1128	100-366-350-10	2
Binding Head Screw	M3x8	000-172-166-10	6

1. Use the flush mounting template (supplied) to make a cutout in the mounting location.

2. Follow steps 2 to 6 in section 1.2.

3. Loosely fix the knobs (4 pcs.) to the hood fixing plates (19) from inside the plates.

Knob ——— Hood Fixing Plate (19)
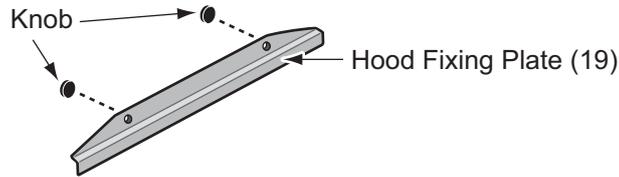
4. Remove the binding head screws (M3x5, 6pcs.) and the side panel bases (6 pcs.) from the flush mount panels 19 attached to the monitor unit.

Side Panel Base (6 pcs.) ———
Binding Head Screw (6 pcs.) ———

Flush Mount Panel 19
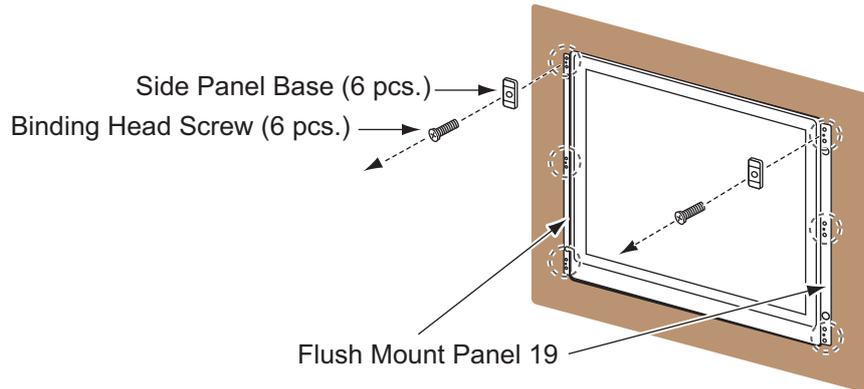
5. Attach the hood fixing plates (19) and the side panel bases to the right and left sides of the monitor unit with the binding head screws (M3x8, 6pcs.)

Side Panel Base (6 pcs.) ———

Binding Head Screw (6 pcs.) ———

Hood Fixing Plate (19)
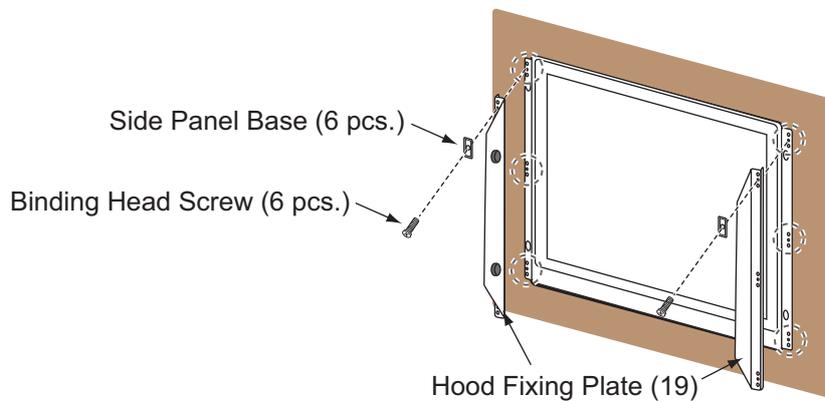
6. Press and rub folds on the hood with your hands to make creases clearly. The degree of creases should be within 90° when the hood is opened.

Hood

Correct

Press and move your hands to upward and downward several times.
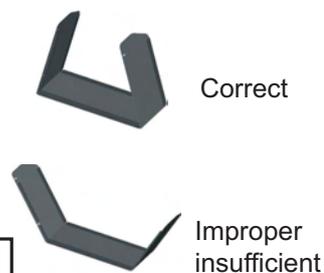
Improper insufficient

4

7. Set the cutouts of the hood (19) assembly to the knobs on the hood fixing plates (19).

Knob (4 pcs.)

Hood (19) Assembly

Hood Fixing Plate 19

Cutout (4 places)
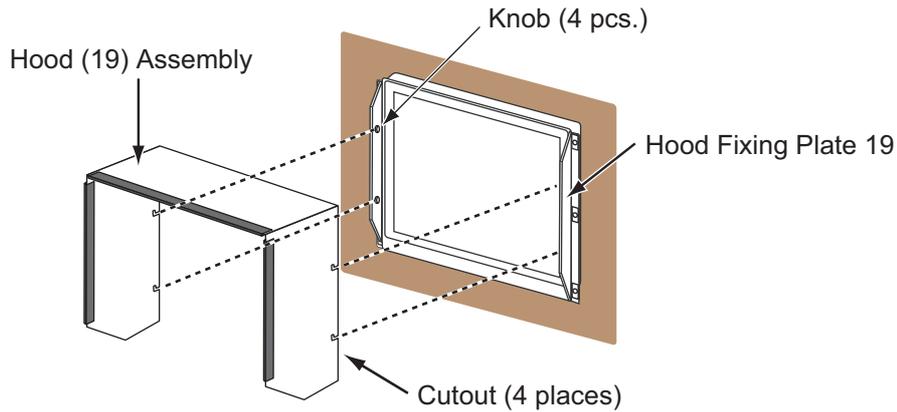
8. Press the top of the hood (19) assembly to set the knobs in the cutouts.

Press

Press
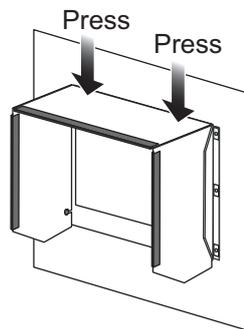
9. Set the hood (19) assembly with the knobs tightly (4 pcs.).

1.4 Flush Mount, Fixed at Rear

The flush mount, fixed at rear method requires the flush mount kit OP26-12 (option, see page vii).

1. Use the flush mounting template (supplied) to make a cutout in the mounting location.

2. Attach the flush mounting sponges H 19 and V 19 to the back of the monitor unit in the order shown in the figure at right.

② ①

Flush Mounting Sponge H 19 for top and bottom

④ ③

Flush Mounting Sponge V 19 for left and right
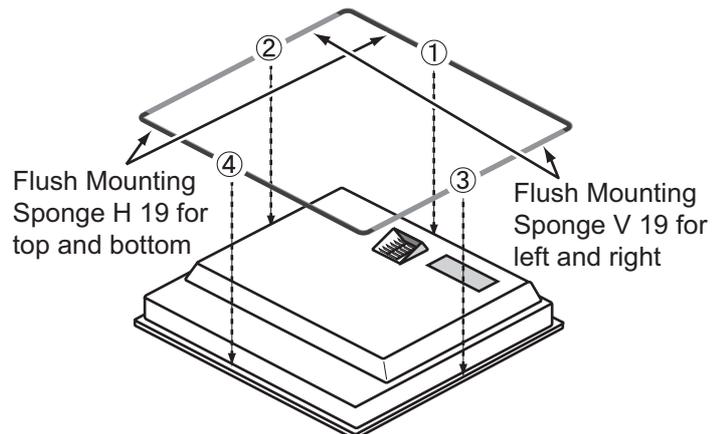
3. Screw the wing bolts and the wing nuts of the flush mount fixture 19 so that the protector for screw moves to the fixing plate.
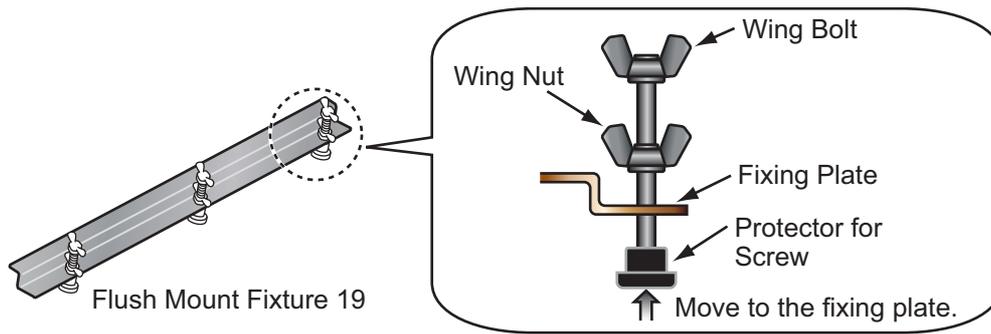
Wing Nut

Wing Bolt

Fixing Plate

Protector for Screw

⇧ Move to the fixing plate.

Flush Mount Fixture 19

4. Connect all cables at the back of the monitor unit. See section 1.8.

5. Set the monitor unit to the cutout.

6. Fasten the flush mount fixture 19 to the right and left sides of the rear of the monitor unit with the washer head screws B (6 pcs.).

Washer Head Screw B (6 places)

Flush Mount Fixture 19
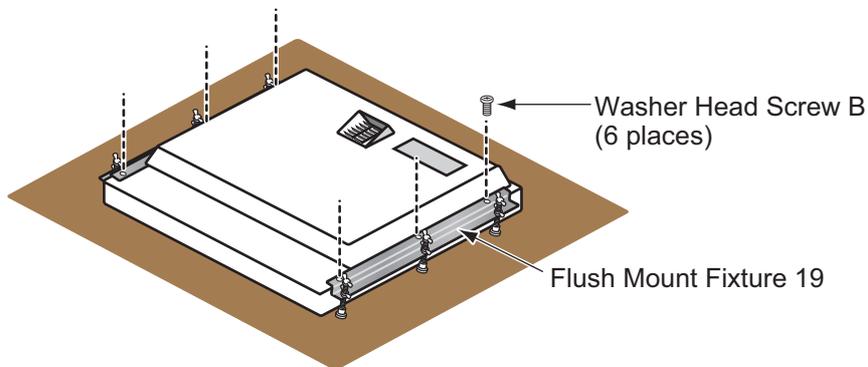
7. Fasten each wing bolt in the order shown in the figure below so that the protector for screw touches the mounting panel.
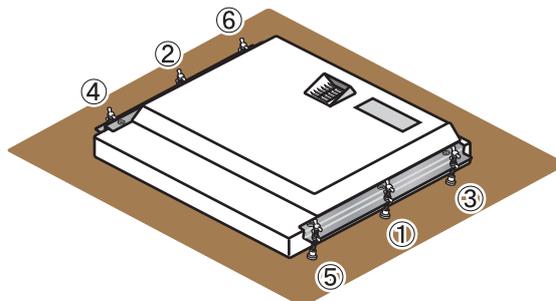
8. Fasten the wing bolts tightly to secure the monitor unit.

9. Fasten the wing nuts tightly.

Wing Bolt

Wing Nut

Fixing Plate

Protector for Screw

Mounting Panel

6
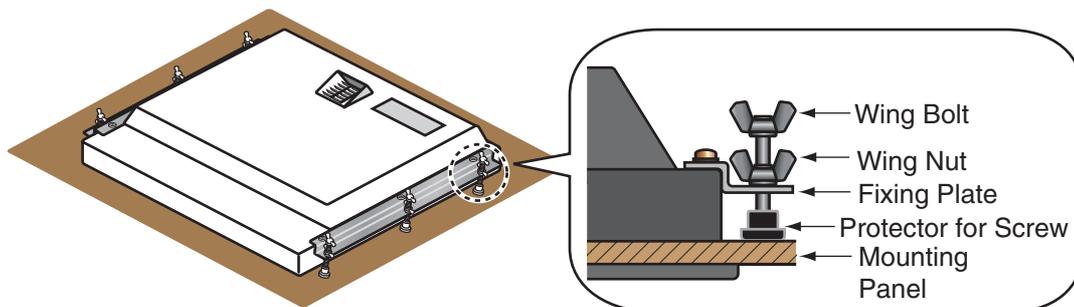
1.5 Flush Mount, Fixed at Rear, with Hood

The flush mount, fixed at rear method allows you to attach a hood assembly OP26-6 (option) to the monitor unit.

Hood assembly OP26-6 (Code No.: 001-080-930)

Name	Type	Code No.	Qty
Hood (19) Assembly	OP26-6-1	001-080-970	1
Flush Mounting Sponge V 19	26-005-3124	100-351-560-10	2
Hood Fixing Plate 19	26-005-3302	100-351-611-10	2
F-Mount Hood Packing 19	26-005-3305	100-351-620-10	2
Knob M4	03-163-2303	100-343-602-10	4
Flat Head Screw	M3x8	000-172-167-10	6
Flush Mounting Template	C42-00910	000-172-637-10	1

1. Use the flush mounting template (supplied) to make a cutout in the mounting location.

2. Fix the hood fixing plates 19 to the right and left sides of the monitor unit with the flat head screws (6 pcs.).

Hood Fixing Plate 19

Flat Head Screw
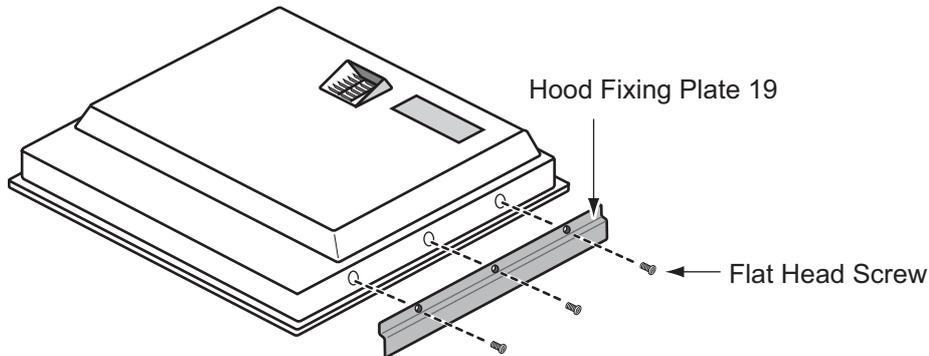
3. Attach the F-mount hood packing 19 to the top and bottom brims. Then, attach the flush mounting sponge V 19 to the right and left brims of the monitor unit from the rear side.

F-Mount Hood Packing 19 for top and bottom

Flush Mounting Sponge V 19 for left and right
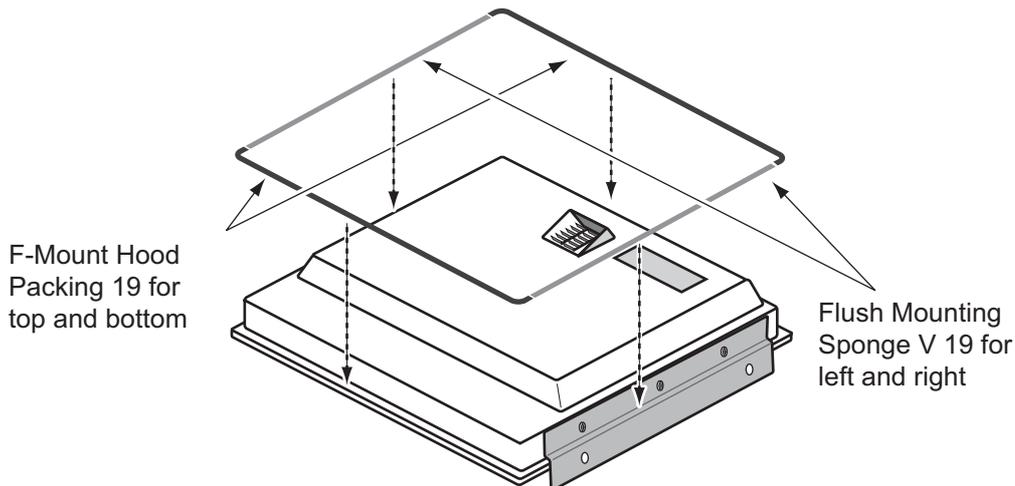
4. Follow steps 3 to 9 in section 1.4 to fix the monitor unit to the mounting location.

5. Loosely fix the knobs (4 pcs.) to the hood fixing plate 19 from inside the plate.

6. Set the cutouts of the hood (19) assembly to the knobs on the hood fixing plates 19.

Knob (4 pcs.)

Hood (19) Assembly

Hood Fixing Plate 19

Cutout (4 places)
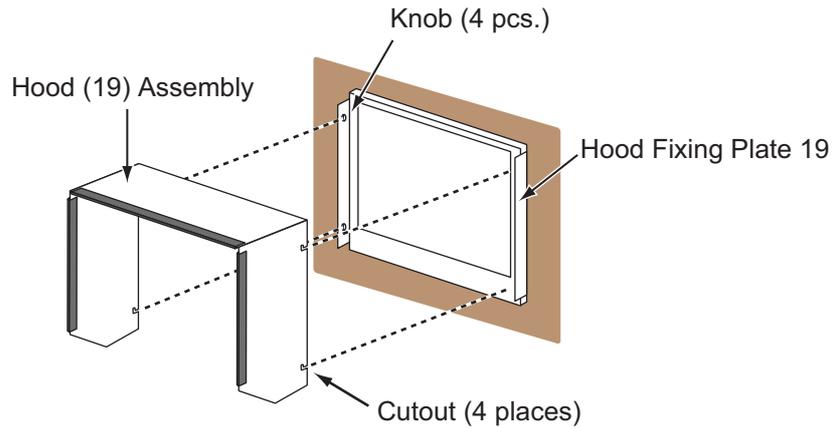
7. Press the top of the hood assembly to set the knobs in the cutouts.

Press

Press
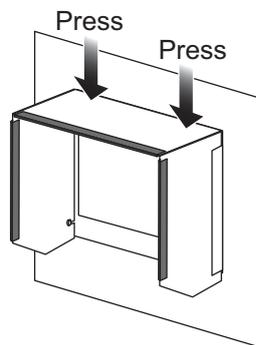
8. Set the hood assembly with the knobs tightly (4 pcs.).

1.6 Tabletop Mount

You can fix the monitor unit to a tabletop, using the bracket assembly OP26-5 (option).

Bracket Assembly OP26-5 (Code No.: 000-016-270)

Name	Type	Code No.	Qty
Mounting Bracket (19)	OP26-5-1	001-080-910	1
Bracket Support w/Knobs	OP26-5-2	001-080-920	1
Self-Tapping Screw	5x20	000-162-608-10	4
Binding Head Screw	M4x10	000-172-165-10	9

1. Loosen the knobs of the bracket support to separate the mounting bracket (19) from the bracket support.

Mounting Bracket (19)

Bracket Support w/Knobs

Knob

8
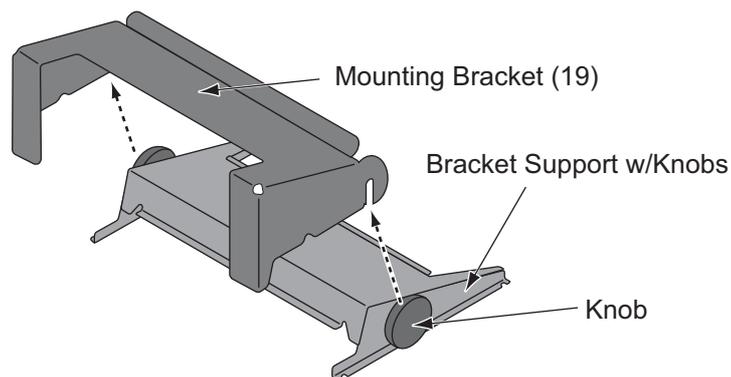
1. MOUNTING, WIRING

2. Set the mounting bracket to the mounting location with four self-tapping screws.

Self-Tapping Screw →
(4 places)

Mounting Bracket (19) →
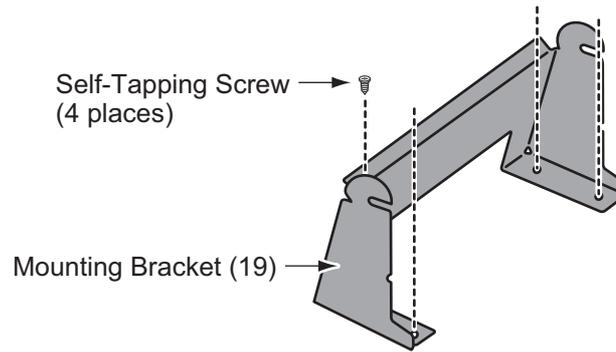
3. Attach the bracket support to the rear of the monitor unit with the binding head screws (9 pcs.).

Bracket Support w/Knobs

Binding Head Screw (9 places)

Binding Head
Screw

Rear view
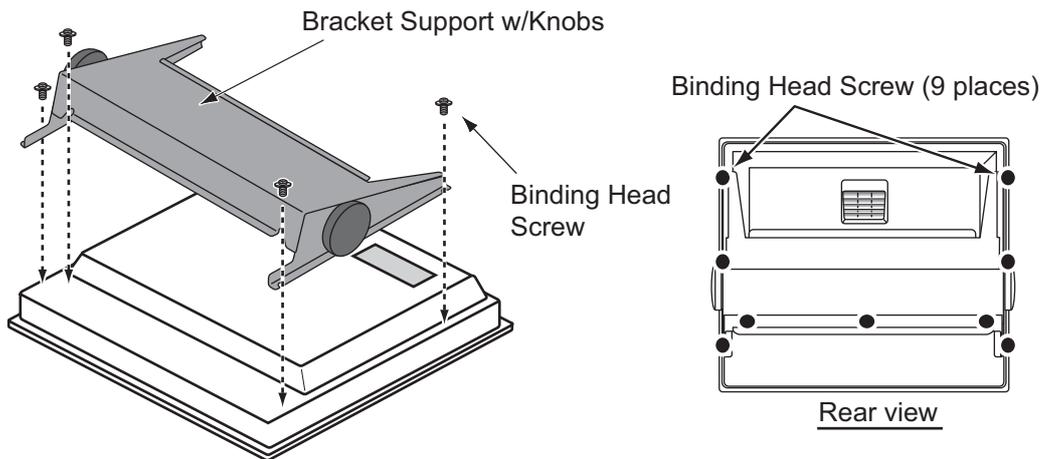
4. Connect all cables at the back of the monitor unit. See section 1.8.

5. Loosen the knobs of the bracket support and set knobs in the notches on the mounting bracket.

Mounting Bracket (19)   Knob
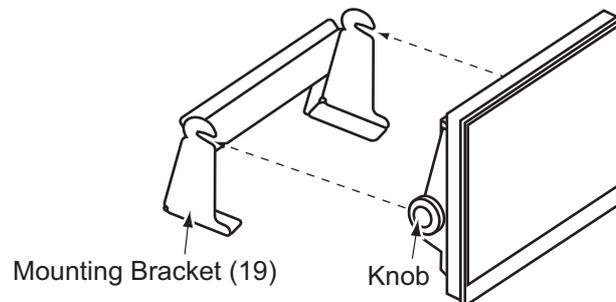
6. Adjust the angle of the monitor unit and fix the knobs tightly.

How to attach the hood

You can attach a hood to the tabletop-mounted monitor unit, using the hood assembly OP26-6 (option).

1. Follow steps 1 to 3 in section 1.6.
2. Fix the hood fixing plates 19 to the right and left of the monitor unit with the flat head screws (6 places). (See step 2 in section 1.5.)
3. Follow steps 4 to 5 in section 1.6.
4. Follow steps 5 to 8 in section 1.5.

1.7   Flush Mount a Series Side by Side

You can flush mount two or three monitor units side by side, using the optional flush mount kit OP26-13 for two monitor units or OP26-14 for three monitor units (see page vii).

1.   Make a cutout in the mounting location as shown below (see page D-4).

892±1   389±1   4-Ø18   (9)   (9)

For two monitor units

1342±1   389±1   4-Ø18   (9)   (9)
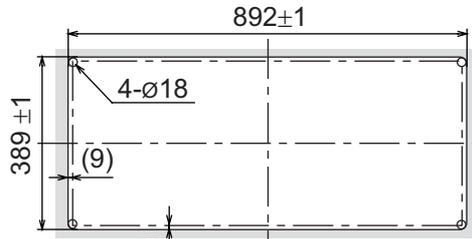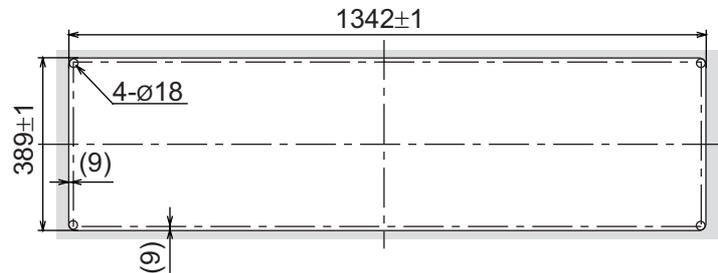
For three monitor units

2.   Follow steps 2 to 5 in section 1.4 to set the two or three monitor units in the mounting location.

3.   Attach the flush mount fixtures 19 with the washer head screws B to join the two or three monitor units.

Join the two monitor units with the flush mount fixtures 19 (4 pcs.).
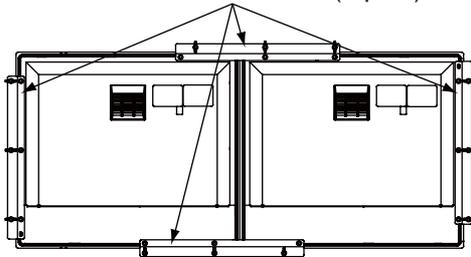
Join the three monitor units with the flush mount fixtures 19 (6 pcs.).
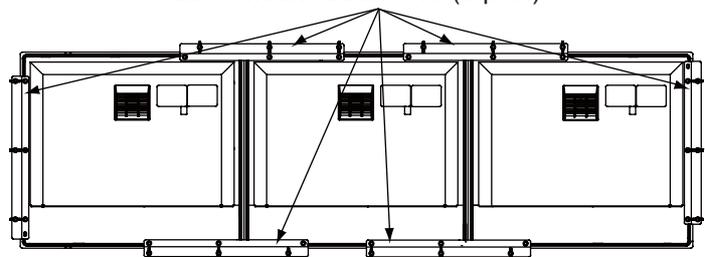
4.   Fasten two or three monitor units tightly. See steps 7 to 9 in section 1.4.

1.8   Wiring

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

Connector

Attach the Terminal Board Gear Cover again after connecting cables.

The bottom of the rear of the monitor unit

DPYC-1.5
Armor
Sheath
Conductor
S = 1.5 mm^2
ϕ = 1.56 mm
ϕ = 11.7 mm

Power switch
Fuse
IV-8 sq (local supply) *1
To ground terminal on hull
Slide switch *2
Composite signal cable
BRILL CTRL port *3
CCD camera DVD recorder
DPYC-1.5 (or equivalent)
100-230 VAC
RGB signal 3COX-2P-6C 5 m/10 m (option)
Digital signal DVI-D/D S-LINK 5 m (standard)/ 10 m (option)
RS-232C cable (Max. 10 m)

FSV-84/84L
FSV-30/S-BB
FSV-24/S-BB
FCV-30
FCV-1200L/M

FAR-21x7
FEA-2107
FCR-21x7

FEA-2107
FCR-21x7

*1: Attach a crimp-on lug (inner dia. ϕ4) for monitor unit side. Make the length of the ground wire as short as possible.

*2: Slide switch

• ON (upward): Allow digital signal from external equipment to control on/off of the monitor unit.

• OFF (downward): Set to OFF for analog RGB signal.

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

*3: BRILL CTRL port

No use. Do not remove the sticker from the connector.

How to fix power cable

Fix the power cable with the cable clamp to prevent it from loosening.

MU-190

Cable clamp

Replace MU-201CE with MU-190

Cut the connector of the power cable (15-565, supplied on the MU-201CE). Attach a crimp-on lug (supplied on the MU-190) to each cable core then connect the cables as in the figure at right.

Local supply

Length: 40 mm   Length: 60 mm
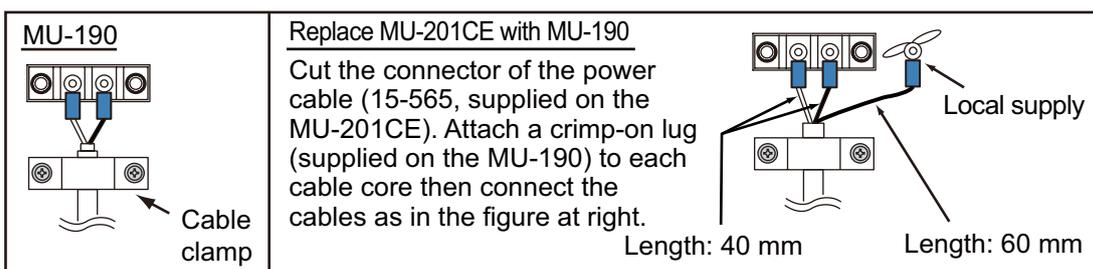
2. ADJUSTMENTS

Adjust the MU-190 according to the equipment connected.

Note: Sections 2.2, 2.3 and 2.4 are for Non-SOLAS.

2.1 Installation Settings

The [INSTALLATION SETTING] menu appears only when the power is turned on for the first time after installation.

INSTALLATION SETTING ◁────────────────────── ← Menu

EXT BRILL CTRL   RS-232C   (OFF/DVI1/DVI2/RS-232C/RS-485/USB)
SERIAL BAUDRATE   9600bps   (4800/9600/19200/38400)
COLOR CALIBRATION   ON   (OFF/ON)   ← Menu item
KEY LOCK   ON   (OFF/ON)

SAVE AND EXIT   YES   (NO/YES)
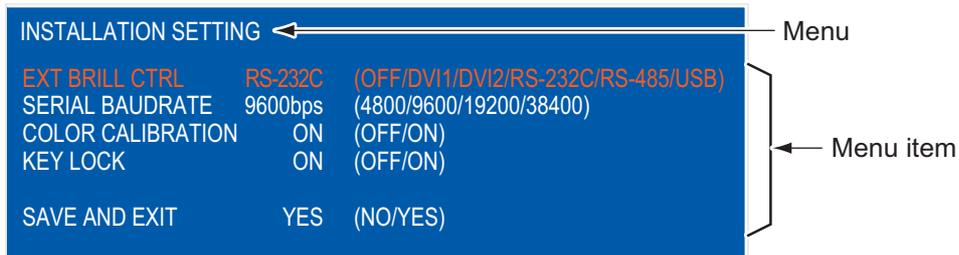
For ECDIS (FEA-2107) or chart radar (FCR-21x7), no adjustment is necessary. Keep this equipment in the default settings.

For IMO radar (FAR-21x7) or Non-SOLAS, adjust this equipment according to the equipment connected, referring to the following table.

Connected equipment	EXT BRILL CTRL	SERIAL BAUDRATE	COLOR CALIBRATION	KEY LOCK	DVI PWR SYNC *2
FEA-2107, FCR-21x7	RS-232C	9600	ON	ON	ON
FAR-21x7	DVI *1	-	OFF	ON	ON
Other	OFF	-	OFF	OFF	OFF

Gray items: Default setting

*1: To connect to the processor unit of a radar, connect the video signal cable to the DVI-D1 port. Then, select DVI1 to display the radar picture (see section 3.4).

*2: "DVI PWR SYNC" is the slide switch at the bottom rear of the monitor unit. See the "Slide switch" below.

Slide switch

Set the slide switch (located between RGB and DVI ports) to OFF when you connect the RGB signal or both RGB and DVI signals. Otherwise, the monitor will not turn on. The slide switch is set at the factory to ON to control the power on/off from the equipment connected via DVI signal.

Bottom rear of the monitor unit

12
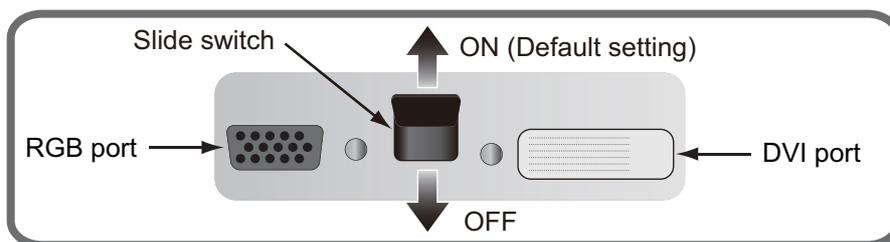
2. ADJUSTMENTS

1. Press the ▲ or ▼ key to select the menu item to adjust on the [INSTALLATION SETTING] menu. The menu item and setting currently selected (the cursor) is shown in orange.

2. Press the ◀ or ▶ key to change the setting.

3. After you adjust all settings, press the ▼ key to select [SAVE AND EXIT]. The confirmation message appears.

```
INSTALLATION SETTING

EXT BRILL CTRL      RS-232C    (OFF/DVI1/DVI2/RS-232C/RS-485/USB)
SERIAL BAUDRATE     9600bps    (4800/9600/19200/38400)
COLOR CALIBRATION      ON      (OFF/ON)
KEY LOCK               ON      (OFF/ON)

SAVE AND EXIT         YES      (NO/YES)


   Save configuration changes and exit now?  YES[→]   NO[←]
```
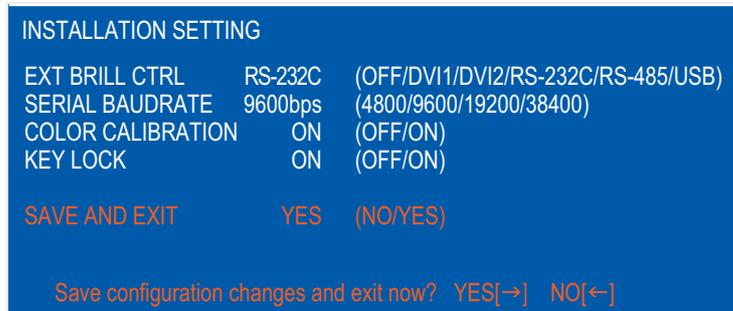
4. Press the ▶ key. The settings are saved and the menu is closed.
   Note: To cancel the settings, press the ◀ key. The indication changes from [YES] to [NO] and you can move the cursor to the menu items with the ▲ key.

[INSTALLATION SETTING] menu descriptions

Menu item	Function	Setting
[EXT BRILL CTRL]	Adjust the brilliance of the monitor unit from the external equipment. [OFF]: You can not adjust the brilliance from the external equipment. You can adjust the brilliance with the ⏻/**BRILL** key. [DVI1]: When the DVI1 signal is shown, you can adjust the brilliance of this display from the equipment connected to DVI-D1 port. For the screen other than the DVI1, you can adjust the brilliance with the ⏻/**BRILL** key. [DVI2]: When the DVI2 signal is shown, you can adjust the brilliance of this display from the equipment connected to DVI-D2 port. For the screen other than the DVI2, you can adjust the brilliance with the ⏻/**BRILL** key. [RS-232C]:You can adjust the brilliance from the equipment connected to RS-232C port. [RS-485], [USB]: No use.	[OFF], [DVI1], [DVI2], [RS-232C], [RS-485], [USB]
[SERIAL BAUDRATE]	Select the serial baud rate according to the equipment connected. **Note:** This function is available when you set [EXT BRILL CTRL] to [RS-232C].	[4800bps], [9600bps], [19200bps], [38400bps]
[COLOR CALIBRATION]	Select whether to use color-adjusted correction data or not. [OFF]: Do not use the adjusted data. [ON]: Use the adjusted data.	[OFF], [ON]
[KEY LOCK]	Select whether to lock the key operation or not (see paragraph 3.2.2). [OFF]: Do not lock the key operation. [ON]: Lock the key operation.	[OFF], [ON]
[SAVE AND EXIT]	Select whether to save the settings or not. [NO]: Cancel the settings. [YES]: Save the settings.	[NO], [YES]

How to open the [INSTALLATION SETTING] menu

Turn off the monitor unit. While you hold the **DISP** key, press the ⏻**/BRILL** key to turn on the monitor unit. Press and hold the **DISP** key for more than five seconds.

Note: When the "DVI PWR SYNC" slide switch is ON, turn on the connected external equipment while you press the **DISP** key to turn on the monitor unit.

2.2 RGB/DVI Setting (For Non-SOLAS)

You can adjust the screen from the RGB, DVI-D1 and DVI-D2 ports individually. Turn on each 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 main menu closes automatically when there is no operation for one minute.

3. Press the ◀ or ▶ key to select [RGB], [DVI1] or [DVI2]. The current setting (the cursor) is shown in orange. The menu items available depend on the selected menu. The [DVI1] and [DVI2] setting menus contain the same items.
    Note: The menus in gray are not available because of no signal.

RGB	DVI1	DVI2	VIDEO	OSD	SYSTEM
H_SIZE		1280			
V_SIZE		1024			
PHASE		16	(1~32)		
BRIGHTNESS		128	(1~256)		
CONTRAST		32	(1~64)		
H_POSITION		50	(1~99)		
V_POSITION		20	(1~40)		
R_LEVEL		128	(1~256)		
G_LEVEL		128	(1~256)		
B_LEVEL		128	(1~256)		
TEMPERATURE		7000K	(5000K~9300K)		
B STRETCH		OFF	(OFF, 1~10)		
W STRETCH		OFF	(OFF, 1~10)		
DISP MODE		FULL	(FULL/NORMAL)		
SHARPNESS		5	(1~10)		

RGB setting menu

← Menu →

Menu item

RGB	DVI1	DVI2	VIDEO	OSD	SYSTEM
BRIGHTNESS		128	(1~256)		
CONTRAST		32	(1~64)		
H_POSITION		25	(1~50)		
V_POSITION		20	(1~40)		
R_LEVEL		128	(1~256)		
G_LEVEL		128	(1~256)		
B_LEVEL		128	(1~256)		
TEMPERATURE		7000K	(5000K~9300K)		
B STRETCH		OFF	(OFF, 1~10)		
W STRETCH		OFF	(OFF, 1~10)		
DISP MODE		FULL	(FULL/NORMAL)		
SHARPNESS		1	(1~10)		

DVI 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)	Adjust the image size horizontally. Horizontal size: ◀ (narrow), ▶ (wide)	Depending on input signal
V_SIZE (Only for RGB menu)	Adjust the image size vertically. Vertical size: ◀ (narrow), ▶ (wide)	
PHASE** (Only for RGB menu)	Adjust the sample timing so that the flicker disappears and the text is clear.	1 to 32
BRIGHTNESS	Adjust the red, green and blue color level at one time.	1 to 256
CONTRAST	Adjust the contrast level. ◀ (darken), ▶ (brighten)	1 to 64
H_POSITION	Move the image position horizontally. ◀ (leftward), ▶ (rightward)	1 to 99 (RGB), 1 to 50 (DVI1, DVI2)
V_POSITION	Move the image position vertically. ◀ (upward), ▶ (downward)	1 to 40
R_LEVEL	Adjust the red color level. ◀ (weaken), ▶ (strengthen)	1 to 256
G_LEVEL	Adjust the green color level. ◀ (weaken), ▶ (strengthen)	1 to 256
B_LEVEL	Adjust the blue color level. ◀ (weaken), ▶ (strengthen)	1 to 256
TEMPERATURE	Adjust the color temperature. ◀ (strengthen the red color level), ▶ (strengthen the blue color level)	5000 to 9300K (Step is 100.)
B STRETCH	Emphasize the black color. [OFF] (standard), ◀ (weaken), ▶ (strengthen)	[OFF], 1 to 10
W STRETCH	Emphasize the white color. [OFF] (standard), ◀ (weaken), ▶ (strengthen)	[OFF], 1 to 10
DISP MODE*	Select the display method. [FULL]: Show the input signal on entire screen. [NORMAL]: Show the input signal with original aspect ratio.	[FULL], [NORMAL]
SHARPNESS**	Sharpen the edges horizontally. ◀ (soften characters and lines), ▶ (sharpen characters and lines)	1 to 10

*: When inputting VGA, SVGA or XGA, a circle may be displayed as an ellipse because the aspect ratio differs. In this case, set [DISP MODE] to [NORMAL] on the [RGB], [DVI1], or [DVI2] menus. A black bar appears on the top and bottom of the picture, but this is normal.

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

2.3   Video Composite Signal Setting (For Non-SO-LAS)

You can adjust the VIDEO signal from the VIDEO port. The VIDEO signal is also displayed in the PIP window (see section 3.5).

1. Select the signal to adjust at the DISP selection window.

2. Press the **MENU** key to show the menu.

3. Press the ◀ or ▶ key to select [VIDEO].

```
RGB     DVI1    DVI2    VIDEO    OSD     SYSTEM

PIP_SIZE            5   (1~10)
CONTRAST           32   (1~64)
R_LEVEL           128   (1~256)
G_LEVEL           128   (1~256)
B_LEVEL           128   (1~256)
TEMPERATURE     7000K   (5000K~9300K)
B STRETCH         OFF   (OFF, 1~10)
W STRETCH         OFF   (OFF, 1~10)
```

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.

[VIDEO] menu descriptions

Menu item	Function	Setting
PIP_SIZE	Adjust the size of the picture-in-picture window. **Note:** This setting is available when the PIP window is displayed.	1 (52 mm x 35 mm) to 10 (285 mm x 194 mm)
CONTRAST	Adjust the contrast level. ◀ (darken), ▶ (brighten)	1 to 64
R_LEVEL	Adjust the red color level. ◀ (weaken), ▶ (strengthen)	1 to 256
G_LEVEL	Adjust the green color level. ◀ (weaken), ▶ (strengthen)	1 to 256
B_LEVEL	Adjust the blue color level. ◀ (weaken), ▶ (strengthen)	1 to 256
TEMPERATURE	Adjust the color temperature. ◀ (strengthen the red color level), ▶ (strengthen the blue color level)	5000 to 9300K (Step is 100.)
B STRETCH	Emphasize the black color. [OFF] (standard), ◀ (weaken), ▶ (strengthen)	[OFF], 1 to 10
W STRETCH	Emphasize the white color. [OFF] (standard), ◀ (weaken), ▶ (strengthen)	[OFF], 1 to 10

2.4 The Menu Window Setting (For Non-SOLAS)

2.4.1 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].

RGB	DVI1	DVI2	VIDEO	OSD	SYSTEM

H_POSITION   14 (1~29)
V_POSITION   33 (1~37)
TRANSLUCENT   OFF (OFF/ON)

CUSTOM NAME
RGB   : RGB_____
DVI1   : DVI1_____
DVI2   : DVI2_____
VIDEO   : VIDEO_____
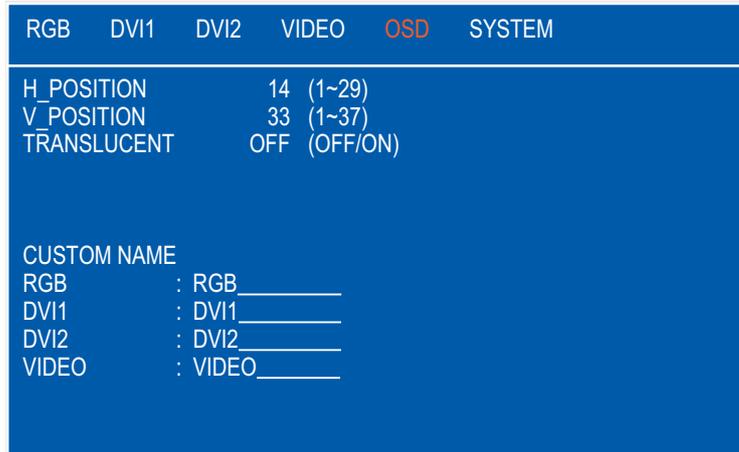
3. Press the ▲ or ▼ key to select the menu item to adjust.

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	Move the menu window horizontally. ◀ (leftward), ▶ (rightward)	1 to 29
V_POSITION	Move the menu window vertically. ◀ (upward), ▶ (downward)	1 to 37
TRANSLUCENT	Adjust 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]
CUSTOM NAME	See paragraph 2.4.2.	

2.4.2   How to change the signal name

You can change the signal name ([RGB], [DVI1/2] or [VIDEO]) to a name (ex. the equipment name) which is easy to understand. The name is shown in the DISP selection window and the indication shown at the upper right of the screen (see section 3.4).

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 signal to change its name in the signal name area. In the example below, [RGB] is selected.

```
 RGB    DVI1    DVI2    VIDEO    OSD    SYSTEM

 H_POSITION           14  (1~29)
 V_POSITION           33  (1~37)
 TRANSLUCENT         OFF  (OFF/ON)


 CUSTOM NAME
 RGB                :  RGB_____
 DVI1               :  DVI1_____
 DVI2               :  DVI2_____
 VIDEO              :  VIDEO_____
```

Signal name area
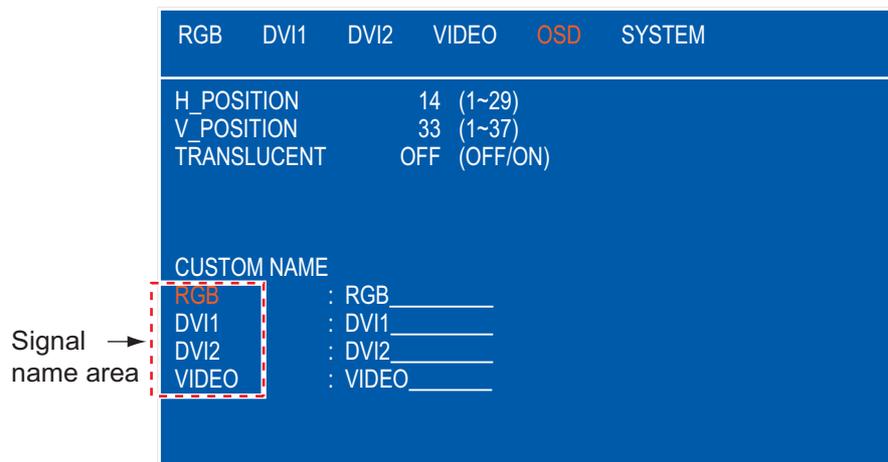
4.   Press the ▶ key to select the character to change. In the example below, "G" of RGB is selected.

```
 CUSTOM NAME
 RGB                :  RGB_____
 DVI1               :  DVI1_____
 DVI2               :  DVI2_____
 VIDEO              :  VIDEO_____
```
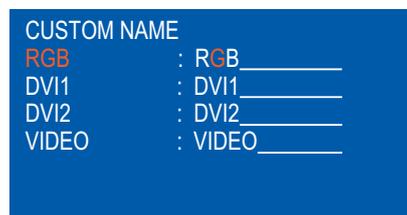
5.   Press the ▲ or ▼ key to select an appropriate alphanumeric character. In the example below, "5" is selected. You can use a maximum of ten characters. "A to Z", "0 to 9", "–", ".", " " (space) are available.

```
 CUSTOM NAME
 RGB                :  R5B_____
 DVI1               :  DVI1_____
 DVI2               :  DVI2_____
 VIDEO              :  VIDEO_____
```
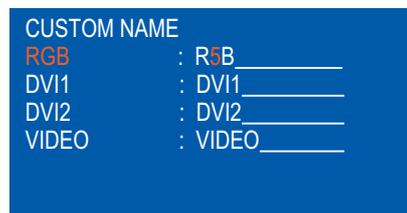
6.   To change another signal name, press the ◀ key several times to return the cursor to the signal name area. Repeat steps 3 to 5.

7.   Press the **MENU** key to close the menu.

3. OPERATION

Note: When you connect the monitor unit to FAR-21x7, FEA-2107 or FCR-21x7, you can turn the power on/off and adjust the brilliance via the application of the FAR-21x7, FEA-2107 or FCR-21x7 only (see section 2.1).

3.1 Controls
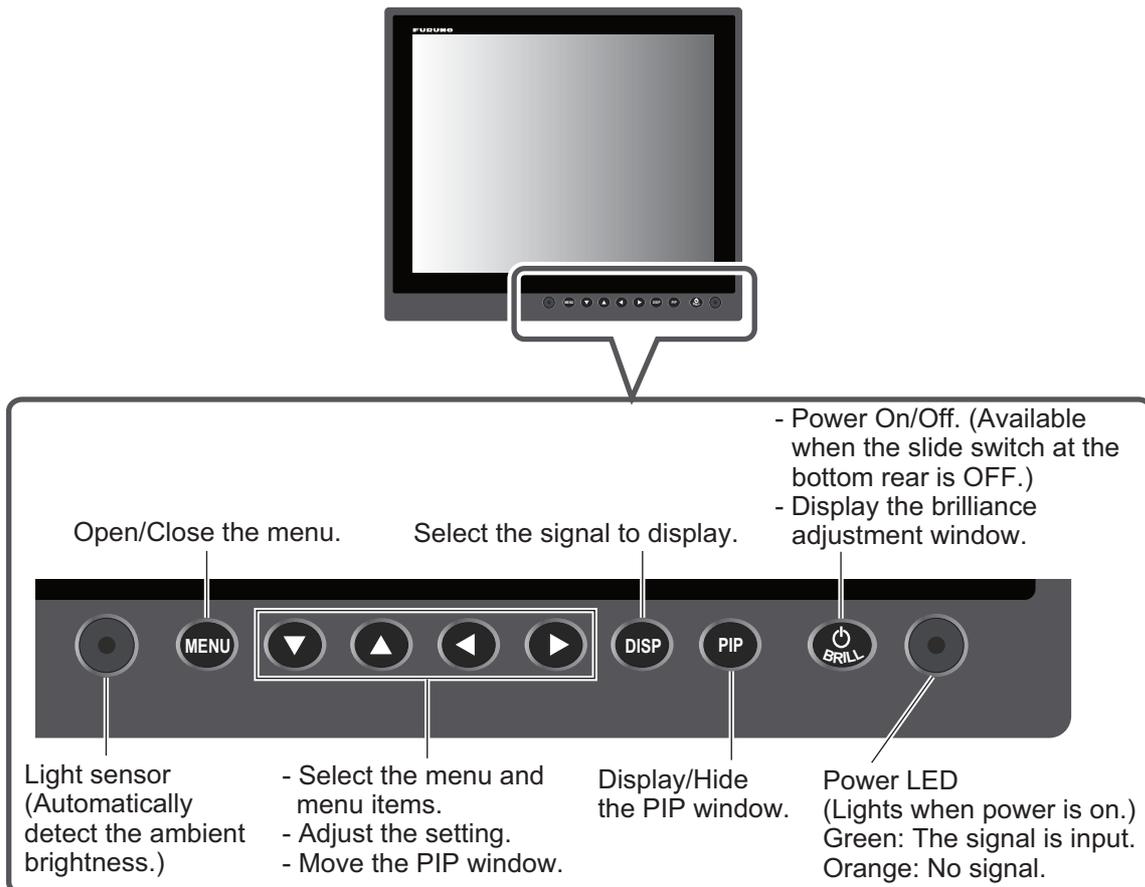
The dimmer for the power LED and keys changes with the display brilliance. Also, when you connect the monitor unit to FAR-21x7, FEA-2107 or FCR-21x7, the dimmer for the power LED and keys changes with the brilliance modes (Day, Dusk, Night) of those models. When you connect the monitor unit to the equipment other than FAR-21x7, FEA-2107 or FCR-21x7, the control is done from the MU-190. If the keys of MU-190 are not illuminated, provide external, dimmable illumination, e.g. gooseneck lamp.

3.2 How to Turn the Power On/Off

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: The screen refreshes slower in low ambient temperature.

3. OPERATION

Slide switch "ON"

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

Note 1: You can not turn on the power with the ⏻/**BRILL** key on MU-190.

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

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 message shown right appears on the screen.

> SHUT DOWN
> This monitor will shut down in three seconds.

3.2.2   Unlock the key operation

All the keys of the monitor unit are locked by default. Unlock the keys to operate all menus.

1. Turn off the monitor unit.

2. While you hold the **PIP** key, press the ⏻/**BRILL** key to turn on the monitor unit. Press and hold the **PIP** key for more than five seconds. The key operation is unlocked.
    Note: When the slide switch is ON, turn on the connected external equipment while you press the **PIP** key to turn on the monitor unit.

3. To lock the key operation, turn off the monitor unit and then turn it on while you hold the **PIP** key.

The setting of [KEY LOCK] in the [INSTALLATION SETTING] menu ([OFF/ON]) is mutually changed.

3.3   How to Adjust the Display Brilliance

You can adjust the display brilliance as follows:

Note: This function is available when [AUTO DIMMER] on the [SYSTEM] menu is [OFF] and [EXT BRILL CTRL] on the [INSTALLATION SETTING] menu is [OFF]. See section 2.1 and paragraph 3.6.1.

1. Press the ⏻/**BRILL** key momentarily to show the BRILL adjustment window. The window shown right disappears if there is no operation for five seconds.

> BRILL   46

2. Press the ◄ or ► key to adjust the brilliance (setting range: 1 - 50).

3. Press the ▲ or ▼ key to close the window.
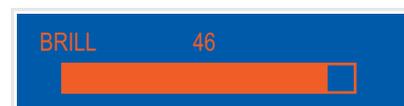
Warning: If you turn off the monitor unit with minimum brilliance, the unit starts with minimum brilliance the next time it is turned on. This can make it difficult to see warnings from applications connected, etc. depending on current lighting conditions. If this occurs, do the following according to the equipment connected;
For FAR-21x7, FEA-2107, FCR-21x7: The brilliance of the monitor unit is adjusted only via the application of those equipment. See the appropriate operator's manual.

For Non-SOLAS: Press the ⏻/**BRILL** key repeatedly to adjust the brilliance.

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 window shows the signal names as you customized them at paragraph 2.4.2. This window disappears if there is no operation for five seconds.

2. Press the ▲ or ▼ key to select a signal.
    [RGB]: Show the signal from the RGB port.
    [DVI1], [DVI2]: Show the signal from the selected DVI port.
    [VIDEO]: Show the external video from the VIDEO port.

3. Press the ◄ or ► key to close the window. The name of the selected signal appears at the right top corner 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.
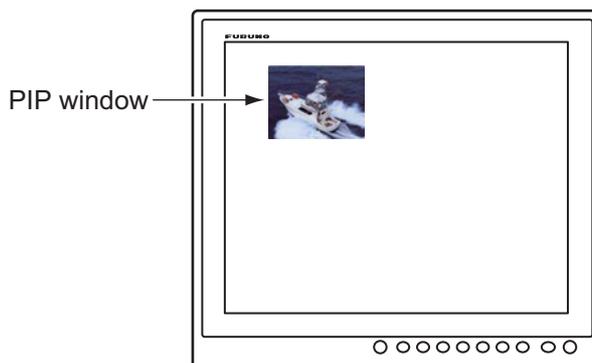
PIP window

1. With the RGB, DVI1 or DVI2 display shown, press the **PIP** key to show the PIP window. To hide the PIP window, press the **PIP** key again.

2. You can move the PIP window by pressing the arrow keys when the menu is closed.

Note: You can adjust the size of the PIP window on the [VIDEO] menu (see section 2.3).

3.6   SYSTEM Menu

The [SYSTEM] menu controls the brilliance, clears the memory and shows signal status and program number.

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 interval 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].

Signal status, serial number, program number and elapsed time
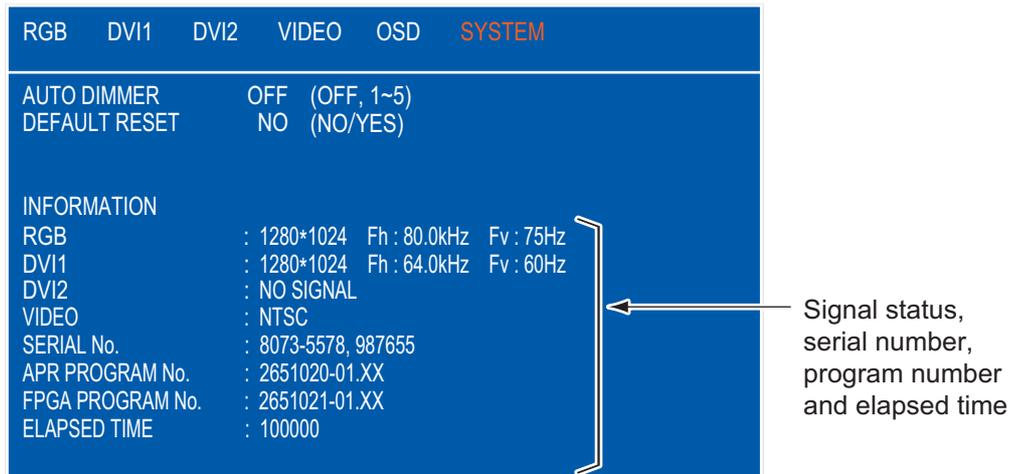
3. Press the ▲ or ▼ key to select [AUTO DIMMER].

4. Press the ◀ or ▶ key to select an interval to check brightness.

  - [OFF]: Turn of this function.
  - [1]: Every two seconds
  - [2]: Every 30 seconds
  - [3]: Every minute
  - [4]: Every three minutes
  - [5]: Every five minutes

  Note: When you connect the monitor unit to FAR-21x7, FEA-2107 or FCR-21x7, set to [OFF].

5. Press the **MENU** key to close the menu.

3.6.2   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 ▲ or ▼ key to select [DEFAULT RESET].

4. Press the ▶ key. The indication changes from "NO" to "YES".
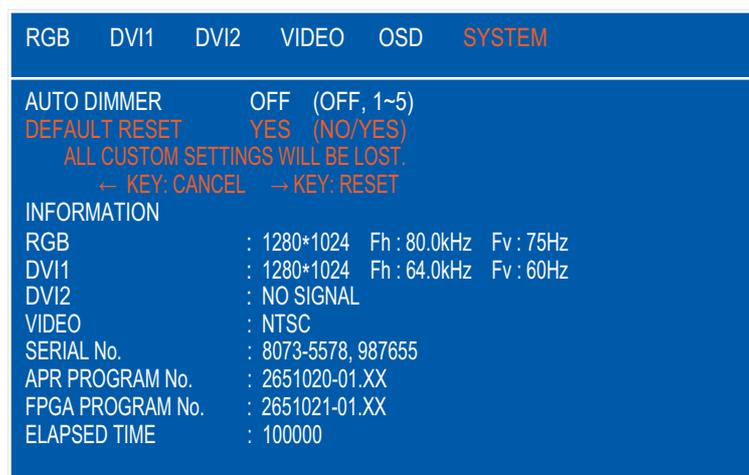
Note: To cancel, press the ◀ key. The indication changes from "YES" to "NO".

5. Press the ▶ key to select [RESET].

22

4. MAINTENANCE, TROUBLESHOOTING

<table>
<tr><td colspan="2" align="center">

NOTICE
</td></tr>
<tr><td colspan="2">

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.
</td></tr>
</table>

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.
- Wipe the LCD carefully to prevent scratching, using an LCD cleaning cloth (supplied as accessory). To remove dirt or salt deposits, use an LCD cleaner, wiping slowly with tissue paper so as to dissolve the dirt or salt. Change paper frequently so the salt or dirt will not scratch the LCD. Do not use solvents such as thinner, acetone or benzene for cleaning. Also, do not use degreaser or antifog solution, as they can strip the coating from the LCD.

Fuse replacement

The fuse in the fuse holder at the bottom of the display 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, request service.

> ⚠ **WARNING**
>
> **Use the proper fuse.**
>
> Use of a wrong fuse can cause fire or damage to the equipment.

Name	Type	Code Number	Remarks
Glass Tube Fuse	FGBO 250V 1A PBF	000-155-828-10	

LCD replacement

The life of the LCD is approximately 50,000 hours. The actual number of hours depends on ambient temperature and humidity. When the brilliance cannot be raised sufficiently, replace the LCD.

Fan replacement

The life of the each fan is shown in the table on the next page. The actual number of hours depends on ambient temperature. When the fan does not rotate sufficiently, the message "FAN ERROR" is shown. Turn off the power and call for service to request replacement of the fan.

Item	Life	Type	Code Number
FAN1	Approximately 40,000 hours	MFB52A-12HA-001	000-172-023-10
FAN4	Approximately 60,000 hours	LQ0DDB0094	000-172-144-10

4.2   Troubleshooting

See the following table to find the possible causes of trouble and the actions to restore normal operation. If repair of the equipment is necessary, report the result of the troubleshooting to the service technician.

Case	Remedy
You can not turn on the power.	• Check if the power switch at the bottom of the display is on. • Check the setting of the slide switch. • Check the battery voltage with a multimeter. • Check the fuse at the bottom of the display. • 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 external equipment connected to turn off the monitor.
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.

4.3   Parts Location and Parts List

Parts location

MFB52A-12HA-001, 26S0028 (Fan (FAN1), Wind direction: top-left)
LQ0DDB0094, 26S0048 (Fan motor assembly (FAN4), Wind direction: upward)

OZP-120-12/15-J06

26P0023

ESSIP33A-1C
(AD board)

LQ190E1LX51,
26S0027 (LCD)
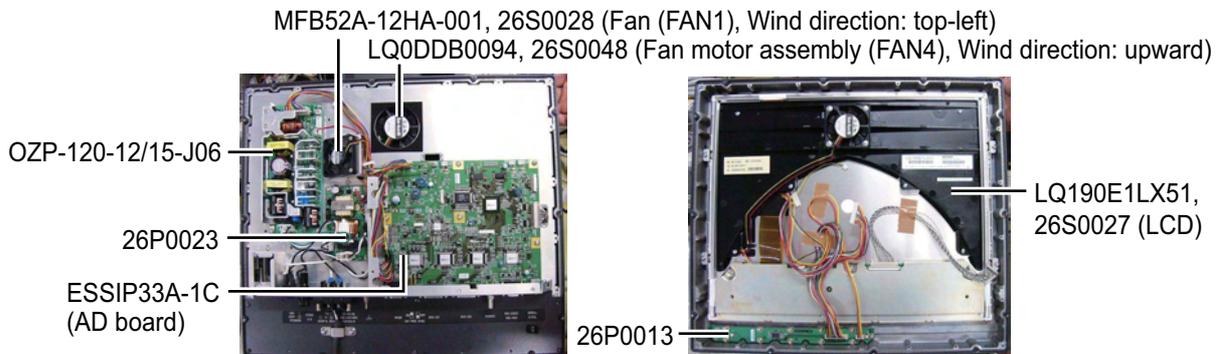
26P0013

Parts list

ELECTRICAL PARTS	Model	MU-190
	Unit	Monitor unit MU-190

PRINTED CIRCUIT BOARD	Code No.
OZP-120-12/15-J06	-
26P0023 (PSW board)	-
ESSIP33A-1C (AD board)	-
26P0013	-
LCD	**Code No.**
LQ190E1LX51, 26S0027	-
FAN	**Code No.**
MFB52A-12HA-001, 26S0028 (FAN1)	-
LQ0DDB0094, 26S0048 (FAN4)	-

24

SPECIFICATIONS OF MONITOR UNIT
MU-190

1   GENERAL

1.1	Display	19-inch color LCD
1.2	Effective area	376.32 x 301.06 mm
1.3	Resolution	SXGA (1280 x 1024 pixel)
1.4	Pixel pitch	0.294 mm (Horizon/Vertical)
1.5	Brightness	450 cd/m^2 typical
1.6	Contrast	900: 1
1.7	View angle	160° (up/down, left/right 80° or more)
1.8	Visible distance	1.02 m nominal
1.9	Input signal	
	RGB analog	1 port, non-interlace, RGB signal: 0.7 Vp-p, Sync. Signal: TTL level
	DVI-D	2 ports, DVI-standard, VESA DDC2B
	Composite signal	1 port, NTSC/PAL-standard, Video signal: 0.7 Vp-p
	USB	USB1.1, 12 Mbps (for dimmer control)
	RS-232C	EIA/TIA-232, 9600 bps (4800/19200/38400 bps)

2   POWER SUPPLY

100-230 VAC: 0.7-0.4 A, 1 phase, 50/60Hz

3   ENVIRONMENTAL CONDITION

3.1	Ambient temperature	-15°C to +55°C
3.2	Relative humidity	93% or less at 40°C
3.3	Degree of protection	IP22
3.4	Category of equipment	Protected from the weather
3.5	Vibration	IEC 60945 Ed.4

5   UNIT COLOR

N2.5

FURUNO

CODE NO.	001-116-250-00	26AH-X-9401 -2
TYPE	CP26-01601	1/1

工事材料表
INSTALLATION MATERIALS

MU-190

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マウントスポンジ V19 FLUSH MOUNTING SPONGE V 19	369 ⤷5	26-005-3124-0	CODE NO. 100-351-560-10	2	
2	化粧パネル19 MASKING PANEL FOR 19″ LCD	397 ⤷19	26-007-1124-2	CODE NO. 100-363-462-10	2	
3	Fマウントスポンジ H19 FLUSH MOUNTING SPONGE H19	450 ⤷14	26-007-1127-0	CODE NO. 100-363-240-10	2	
4	+トラスタッピンネジ 1シュ SELF-TAPPING SCREW	20 φ5	5X20 SUS304	CODE NO. 000-162-608-10	4	
5	コンベックス CONVEX	125	CV-125N	CODE NO. 000-172-164-10	1	
6	圧着端子 CRIMP-ON LUG	20 8	FV1.25-4(LF)	CODE NO. 000-166-666-10	2	
7	+バインドコネジ BINDING HEAD SCREW	10 φ4	M4X10 SUS304	CODE NO. 000-172-165-10	6	
8	Fマウントパネル19組品 FLUSH MOUNT PANEL 19	369 ⤷41	CP26-01603	CODE NO. 001-134-900-00	2	
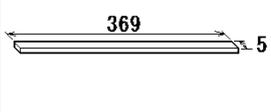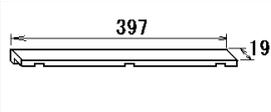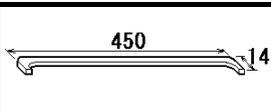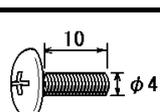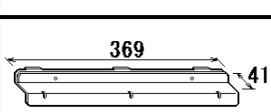
型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM.　THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.
QUALITY IS THE SAME.
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）
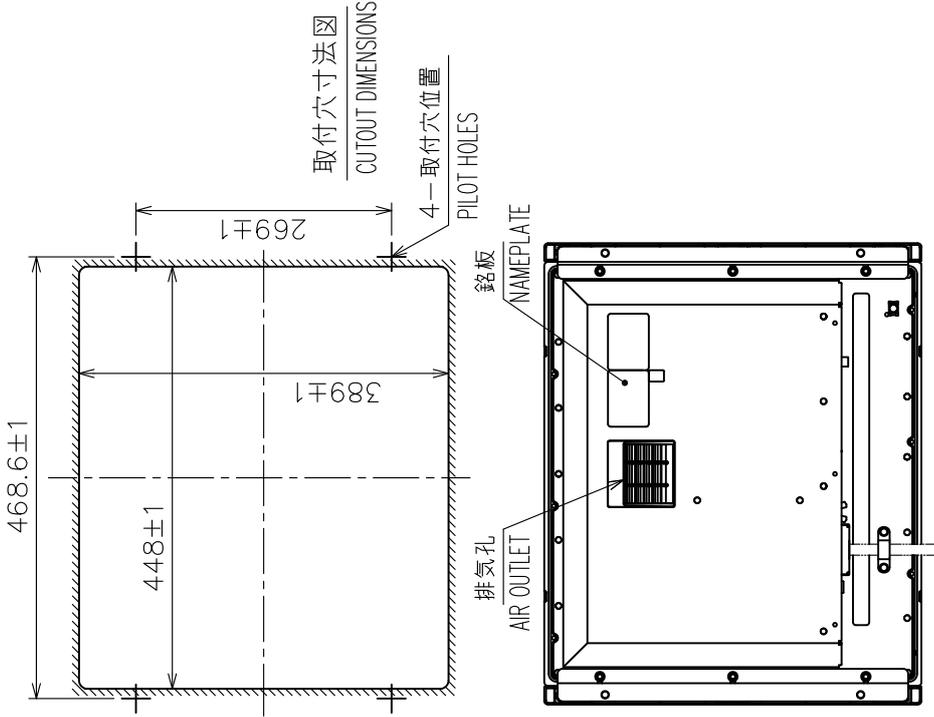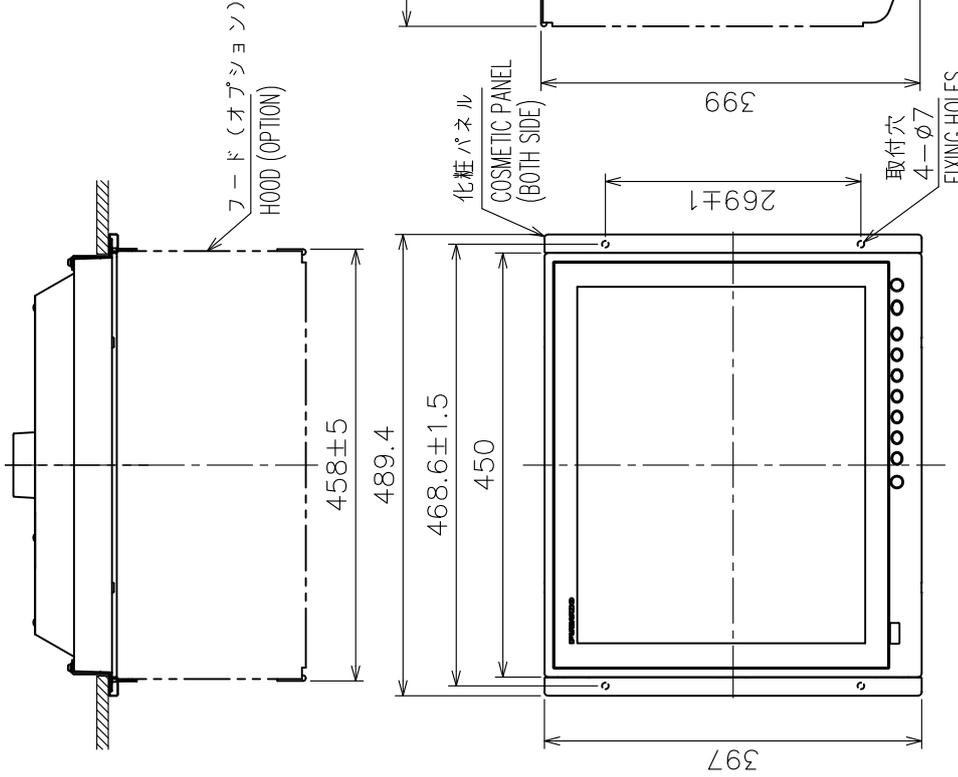
FURUNO ELECTRIC CO., LTD.　　26AH-X-9401

FURUNO

取付穴寸法図
CUTOUT DIMENSIONS

4-取付穴位置
PILOT HOLES

269±1

389±1

448±1

468.6±1

銘板
NAMEPLATE

排気孔
AIR OUTLET

表1 TABLE1

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

#50

110

(A)

10

198

399

269±1

取付穴 4-φ7
FIXING HOLES

フード（オプション）
HOOD (OPTION)

化粧パネル
COSMETIC PANEL
(BOTH SIDE)

458±5

489.4

468.6±1.5

450

397

吸気孔
AIR INLET

ヒューズ
FUSE

電源端子台
SOURCE

ケーブルクランプ
CABLE CLAMP

アース端子
GND TERMINAL

信号コネクタ
SIGNAL CONNECTOR

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS φ5x20 FOR FIXING THE UNIT.
4. BULKHEAD THICKNESS(A): 10≤A≤20.

注 記
1）指定以外の寸法公差は表1による。
2）#印寸法は最小サービス空間寸法とする。
3）取付ネジはトラスタッピンネジ呼び径5×20を使用のこと。
4）壁の厚さ（A）は最小10、最大20とする。

TITLE	MU-190
名称	表示部（埋込装備F）
	外寸図
NAME	MONITOR UNIT (FLUSH MOUNT F)
	OUTLINE DRAWING
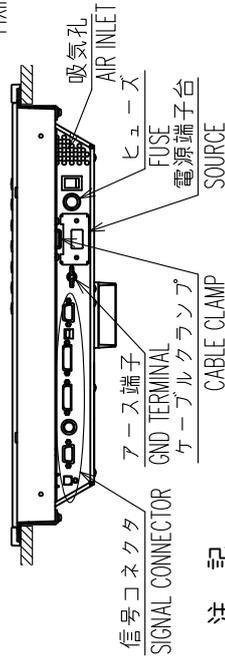
DRAWN	18/May/2011 T.YAMASAKI
CHECKED	18/May/2011 H.MAKI
APPROVED	20/May/2011 Y.NISHIYAMA
SCALE 1/8	MASS 8.8 kg ±10%

質量はオプションを含みます。
MASS DOES NOT INCLUDE OPTION.

DWG.No. C3519-G33-E
REF.No. 26-007-100G-4

FURUNO ELECTRIC CO., LTD.

FURUNO

FURUNO ELECTRIC CO., LTD.

表1 TABLE 1

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

389±1

D±1

取付穴寸法
CUTOUT DIMENSIONS

R9

銘板
NAMEPLATE

排気孔
AIR OUTLET

#50
109

199
B±1

5.5

399

表2 TABLE 2

フード HOOD	B (mm)	D (mm)
なし BLANK	6	442
あり ATTACHED	7	446
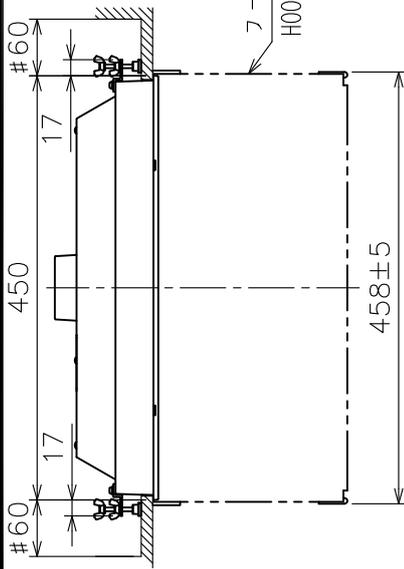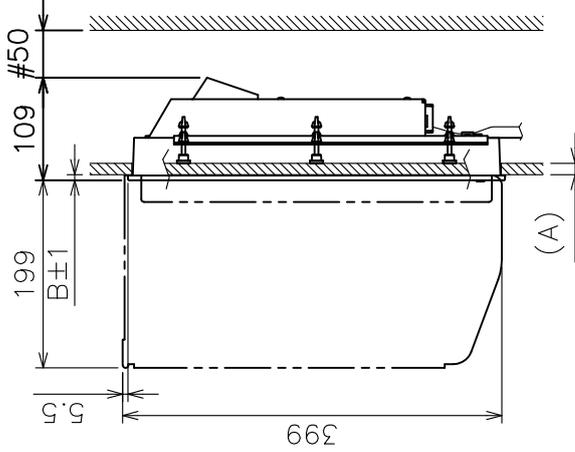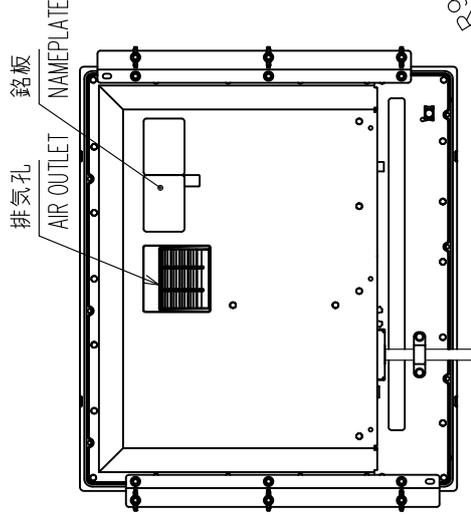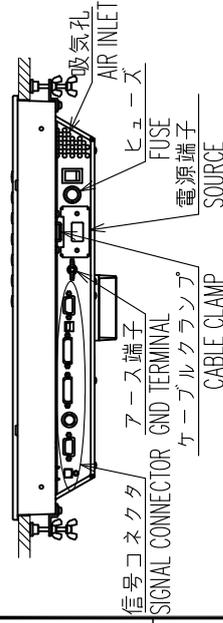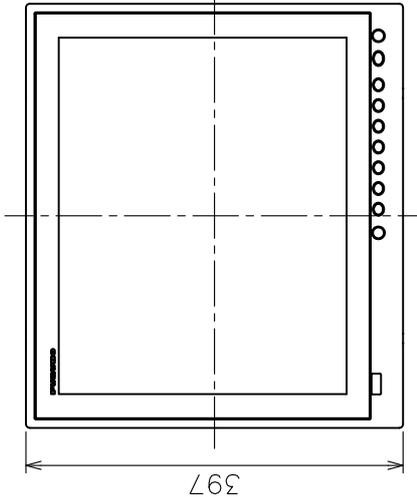
フード (オプション)
HOOD (OPTION)

#60
17
17
450
458±5

60

397

吸気孔
AIR INLET

ヒューズ
FUSE

電源端子
SOURCE

ケーブルクランプ
CABLE CLAMP

アース端子
GND TERMINAL

信号コネクタ
SIGNAL CONNECTOR

(A)

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

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) は最小10、最大20とする。
4) B、Dの各寸法は表2による。

DRAWN	1/Mar/2011	T.YAMASAKI		TITLE	MU-190
CHECKED	1/Mar/2011	H.MAKI		名称	表示部 (埋込装備S)
APPROVED	3/Mar/2011	Y.NISHIYAMA			外寸図
SCALE	1/8	MASS 8.8 kg	質量はオプションを含みます。 ±10% MASS DOES NOT INCLUDE OPTION.	NAME	MONITOR UNIT (FLUSH MOUNT S)
DWG.No.	C3519-G34-C		REF.No. 26-007-1110G-3		OUTLINE DRAWING

FURUNO

FURUNO ELECTRIC CO., LTD.

表1 TABLE 1

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

型式銘板
NAMEPLATE

排気孔
AIR OUTLET

A

信号コネクタ
SIGNAL CONNECTOR

ケーブルクランプ
CABLE CLAMP
アース端子
GND TERMINAL

矢視 A
VIEW A

電源端子
SOURCE
ヒューズ
FUSE
吸気孔
AIR INLET

取付穴 4-φ7
FIXING HOLES

フード（オプション）
HOOD (OPTION)

34±5

199

380±0.5

458±5

80±0.5

273±5

109

100±5

217±5

433±5

441±5

563±5

#150

160

14±5

427±5

#80

450

432

470

#80

397

注 記 NOTE
1) 指定外の寸法公差は表1による。
   TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2) #印寸法は最小サービス空間寸法とする。
   #: MINIMUM SERVICE CLEARANCE.
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。
   USE TAPPING SCREWS φ5x20 FOR FIXING THE UNIT.

DRAWN	1/Mar/2011	T.YAMASAKI	
CHECKED	1/Mar/2011	H.MAKI	質量はオプションを含みます。
APPROVED	3/Mar/2011	Y.NISHIYAMA	MASS DOES NOT INCLUDE OPTION.
SCALE	1/8	MASS 11 kg ±10%	REF.No. 26-007-1206-2
DWG.No.	C3519-G35-C		

TITLE MU-190
名称 表示部（卓上装備）
MONITOR UNIT (TABLETOP MOUNT)
NAME 外寸図
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

判式銘板
NAMEPLATE

排気孔
AIR OUTLET

#50
#60
397
#60
109
17
6±1
(A)

取付穴寸法
CUTOUT DIMENSIONS

#60
17
389±1
1350
450
450
450
1342±1 (B)
17
#60
R9

吸気孔
AIR INLET

ヒューズ
FUSE
電源端子
POWER TERMINAL

アース端子
GND TERMINAL
ケーブルクランプ
CABLE CLAMP

信号コネクタ
SIGNAL CONNECTOR
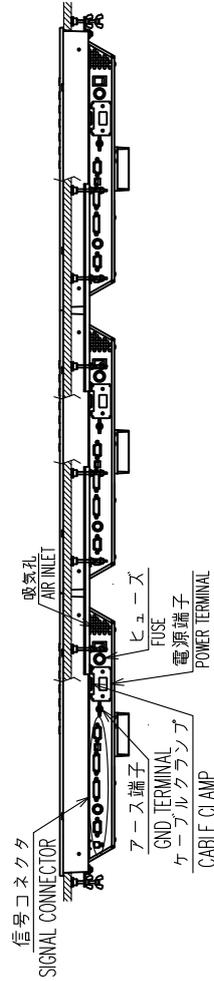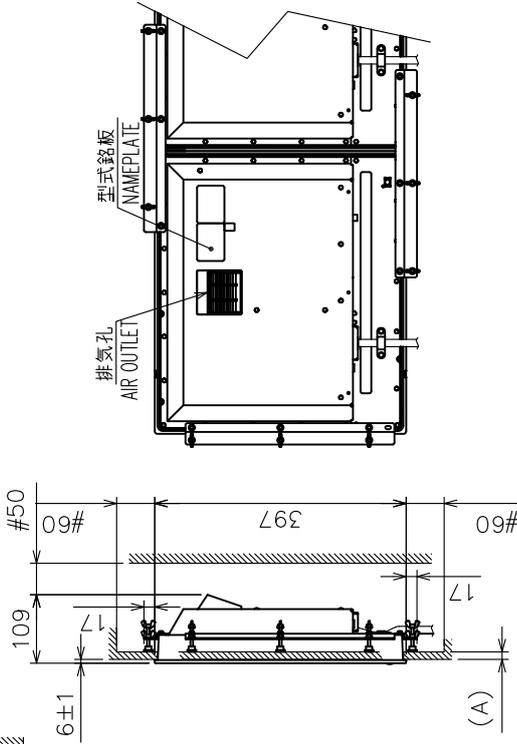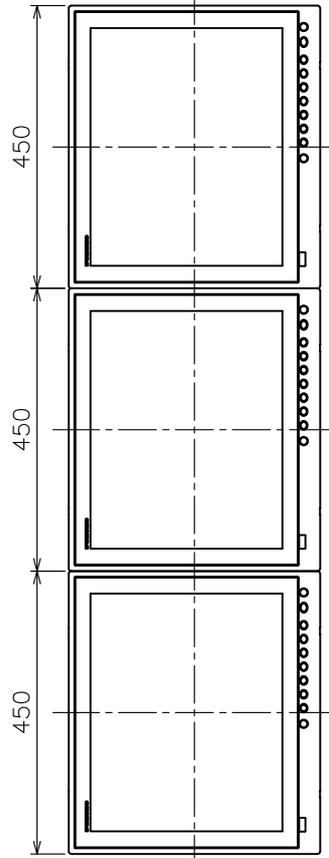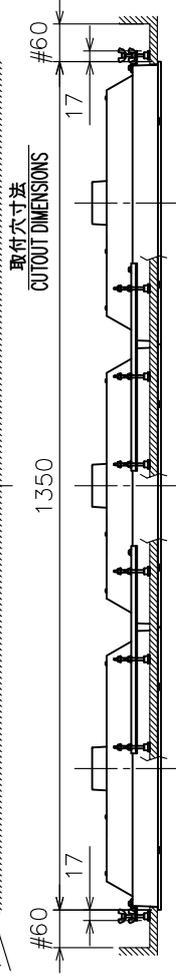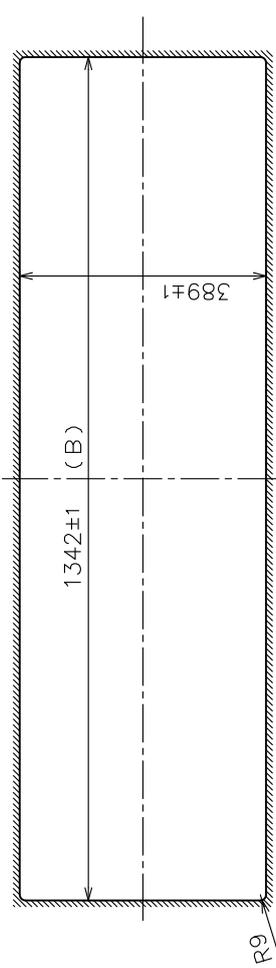
注記 1） 指定外の寸法公差は表1による。
2） #印寸法は最小サービス空間寸法とする。
3） 壁の厚さ（A）は最小10mm、最大20mmとする。
4） 取付穴寸法Bは（450×連結台数−8）mmとする。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. # MINIMUM SERVICE CLEARANCE.
3. BULKHEAD THICKNESS (A): 10≦A≦20
4. CUTOUT DIMENSION (B): 450x(No. OF UNITS)-8

DRAWN	22/Feb/2011	T.YAMASAKI		TITLE	MU-190
CHECKED	22/Feb/2011	H.MAKI		名称	表示部（埋込装備、三連）
APPROVED	1/Mar/2011	Y.NISHIYAMA			外寸図
SCALE	1/12	MASS 25.4 kg ±10%	質量は3台分 MASS INCLUDES 3 SETS.	NAME	MONITOR UNIT (FLUSH MOUNT, 3 SETS) OUTLINE DRAWING
DWG.No.	C3519-G36−A		REF.No. 26-007-130G-3		

FURUNO ELECTRIC CO., LTD.

FURUNO

レーダー制御部
RADAR PROCESSOR UNIT
RPU-013 (FAR-2117ser.)

DVI-D
J3
1 DVIOTX2_N
2 DVIOTX2_P
3 A_GND
4 NC
5 NC
6 NC
7 NC
8 NC
9 DVIOTX1_N
10 DVIOTX1_P
11 A_GND
12 NC
13 NC
14 Vcc
15 GND
16 NC
17 DVIOTXD_N
18 DVIOTXD_P
19 A_GND
20 NC
21 NC
22 A_GND
23 DVIOTXC_P
24 DVIOTXC_N

ECDIS演算部
ECDIS PROCESSOR UNIT
EC-1000C

輝度制御用
FOR BRILL. CONTROL

DVI1/2

COM1
1 DCD
2 RXD
3 TXD
4 DTR
5 GND
6 DSR
7 RTS
8 CTS
9 RI

DVI-D/D SINGLELINK5M/10M
5/10m, φ7
*2
*P

DVI-D/D SINGLELINK5M
5m, φ7
*2

DSUB9P-DSUB9P-5M
*3

表示部
MONITOR UNIT
MU-190/231

DVI-D1
J3
1 TMDS_DATA2_N
2 TMDS_DATA2_P
3 TMDS_DATA2_SHIELD
4 NC
5 NC
6 DDC_CLOCK
7 DDC_DATA
8 NC
9 TMDS_DATA1_N
10 TMDS_DATA1_P
11 TMDS_DATA1_SHIELD
12 NC
13 NC
14 5V_P
15 GND
16 HOT_PLUG_DETECT
17 TMDS_DATA0_N
18 TMDS_DATA0_P
19 TMDS_DATA0_SHIELD
20 NC
21 NC
22 TMDS_CLOCK_SHIELD
23 TMDS_CLOCK_P
24 TMDS_CLOCK_N

DVI-D2
同上
DITTO

J4
24

Dsub-9P
J7
1 NC
2 TXD
3 RXD
4 RD-C
5 GND
6 TD-B
7 RD-H
8 TD-A
9 NC

RS-232C

IV-8sq. *1

POWER
TB1
1 AC
2 AC

RGB
J2
1 RED
2 GREEN
3 BLUE
4 NC
5 GND
6 GND
7 GND
8 NC
9 NC
10 GND
11 NC
12 NC
13 HSYNC_N
14 VSYNC_N
15 NC

VIDEO
J5
*1
BNC

BRILL CTRL
J6
1 VBUS
2 D-
3 D+
4 GND

100-230VAC
1φ, 50/60Hz
DPYC-1.5 *1

魚群探知機
ソナー
レーダー
プロッタ
3COX-2P-2C, 5/10m, φ8.5
*2

ECHO SOUNDER
SONAR
RADAR
PLOTTER

VIDEO DEVICE
COAX. CABLE (75Ω) *1

EXTERNAL EQUIPMENT
USB CABLE MAX. 5m

注記
*1) 造船所手配。
*2) オプション。
*3) EC-1000C構成組品。

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: CABLE ASSY. INCLUDED IN MATERIAL FOR EC-1000C.

DRAWN	31/Aug/2010 T. YAMASAKI
CHECKED	31/Aug/2010 T. TAKAHASHI
APPROVED	
SCALE	MASS kg
DWG No.	C3524-C01- A
REF. No.	

TITLE MU-190/231
名称 表示部
相互結線図
NAME MONITOR UNIT
INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

A

B

C

1   2   3   4

FURUNO

FURUNO ELECTRIC CO., LTD.
9-52 Ashihara-cho, Nishinomiya, 662-8580, Japan
Tel: +81 (798) 65-2111   Fax: +81 (798) 65-4200
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Publication No. DOCQA0186

EC Declaration of Conformity

C E

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-190 and MU-231

(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, clauses 9.2, 9.3, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8 and 10.9
IEC 60945: Ed.3.0: 1996, clauses 10.2 and 10.3

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

For assessment, see

- EMC Test Report FLI 12-10-068 Rev.1, December 6, 2010 prepared by Furuno Labotech International Co., Ltd.

This declaration is issued according to the Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC.

On behalf of Furuno Electric Co., Ltd.

Takahiko Kusuda
Manager, QMS Secretariat
Quality Assurance Department

Nishinomiya City, Japan
January 5, 2011

(Place and date of issue)   (name and signature or equivalent marking of authorized person)