FURUNO

OPERATOR'S MANUAL

REMOTE DISPLAY

MODEL **RD-50**

FURUNO ELECTRIC CO., LTD.

ECF

(Elemental Chlorine Free)

The paper used in this manual
is elemental chlorine free.

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(YOTA) RD-50

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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(ies), see the chapter on Maintenance. Follow the instructions below if a battery(ies) is used.

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.
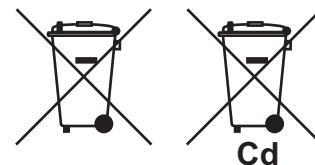
In the USA

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.
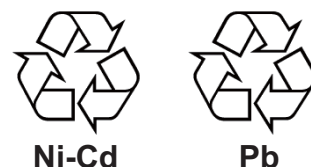
In the other countries

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

⚠ **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.

Safety Instructions for the Operator

⚠ WARNING

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

Fire, electrical shock or serious injury can occur.

❗ **Turn off the power immediately if water leaks into the equipment or smoke or fire is coming from the equipment.**

Failure to turn off the equipment can cause fire or electrical shock.
Contact a FURUNO agent for service.

❗ **Keep heater away from the equipment.**

Heat can change the equipment shape and melt the power cord, which can cause fire or electrical shock.

❗ **Use the correct fuse.**

A wrong fuse can damage the equipment and cause fire.

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.

Safety Instructions for the Installer

⚠ WARNING

❗ **Turn off the power at the switchboard before you install the equipment.**

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

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

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

⚠ CAUTION

⏚ **Ground the equipment to prevent mutual interference.**

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

Model	Standard compass	Steering compass
RD-50	0.45 m	0.30 m
RD-501	1.30 m	0.85 m
RD-502	1.00 m	0.65 m
RD-50 + DS-605	0.95 m	0.60 m

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FOREWORD

A Word to the Owner of the RD-50 Remote Display

Congratulations on your choice of the FURUNO RD-50 Remote Display. We are confident you will see why the FURUNO name has become synonymous with quality and reliability.

For over 60 years FURUNO Electric Company has enjoyed an enviable reputation for innovative and dependable marine electronics equipment. 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 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 equipment.

Features

The RD-50 Remote Display can display the various navigation data by connection with the sensor signals. The main features of the RD-50 are as shown below.

- 8.4" color LCD is visible in direct sunlight.
- The size conforms to DIN (Deutsche Industrie Normen) standards, so there is uniformity among the remote displays of other makers.
- Display the navigation data in digital, graphic and analog formats.
- Screen division (up to four indications) is available.
- Daisy chain connection is available for connecting a total of ten RD-50s.
- When you connect multiple RD-50s, their display brilliances can be adjusted together.

Program Number

Program	Number	Initial Version
RD-50		
Starter	2651006-01.xx	Jan. 2010
Booter	2651007-01.xx	Jan. 2010
Main	2651008-01.xx	Jan. 2010
RD-501, RD-502		
2651009-01.xx		Aug. 2009

xx: minor change

SYSTEM CONFIGURATION

Single remote display

Remote display RD-50

Daisy output

12-24 VDC

NMEA 0183
sensor signal

Remote controller
RD-501

Dimmer controller
RD-502

———————— : Basic configuration
- - - - - - - - - : Option
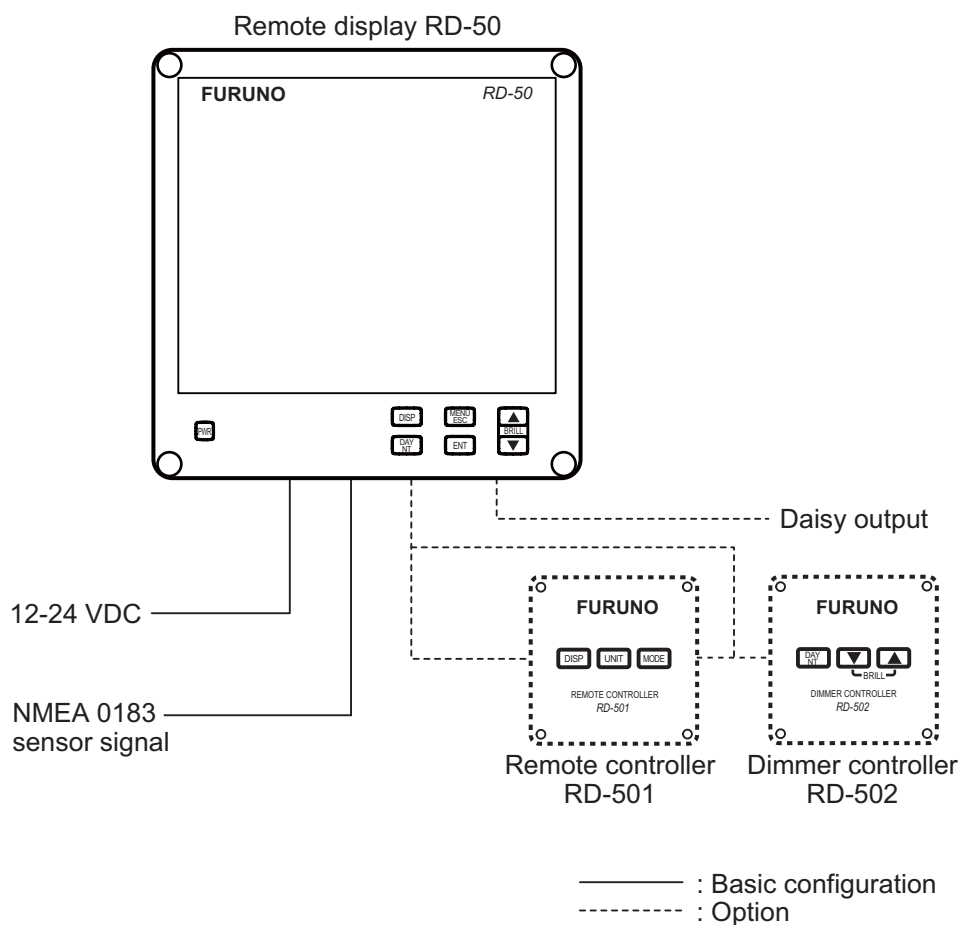
Environmental category

RD-50 RD-501 RD-502	Protected from weather
RD-50 + DS-605	Exposed to weather

Multiple remote displays (daisy chain connection)

Pattern 1: Sensor signal and dimmer controller are commonly used. A total of 10 remote display units can be connected.

a) RD-50 daisy chain
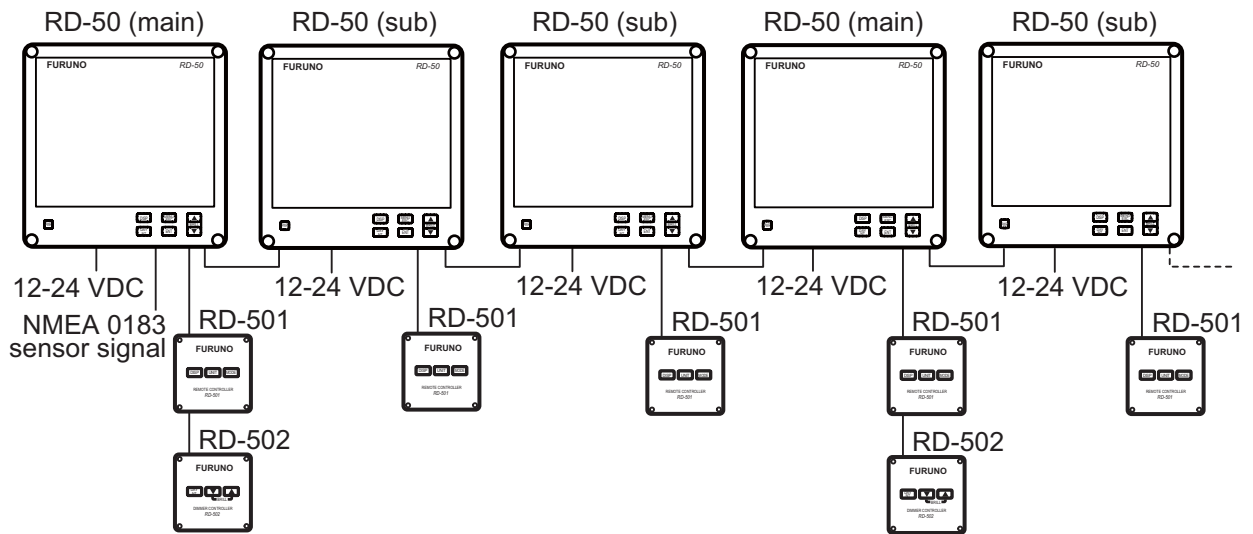
b) RD-50 and RD-20 combination daisy chain
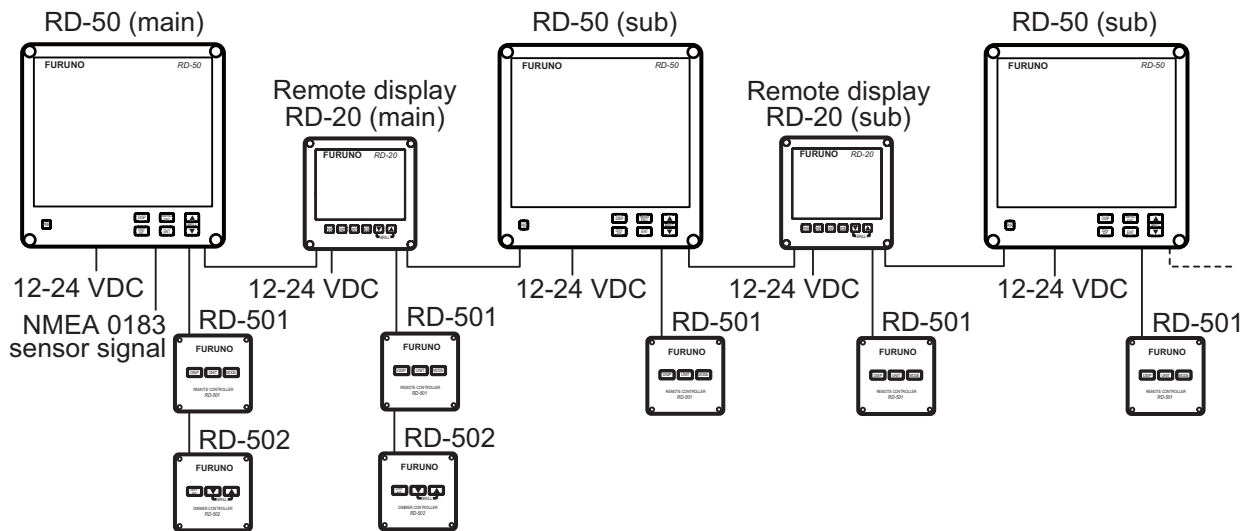
c) RD-50, RD-20 and DS-600 combination daisy chain

Doppler sonar
display unit
DS-600

RD-50 (sub)

RD-50 (sub)

Remote display
RD-20 (main)

Remote display
RD-20 (sub)

12-24 VDC

12-24 VDC

12-24 VDC

12-24 VDC

RD-501

RD-501

RD-501

RD-501

RD-501

RD-502

RD-502
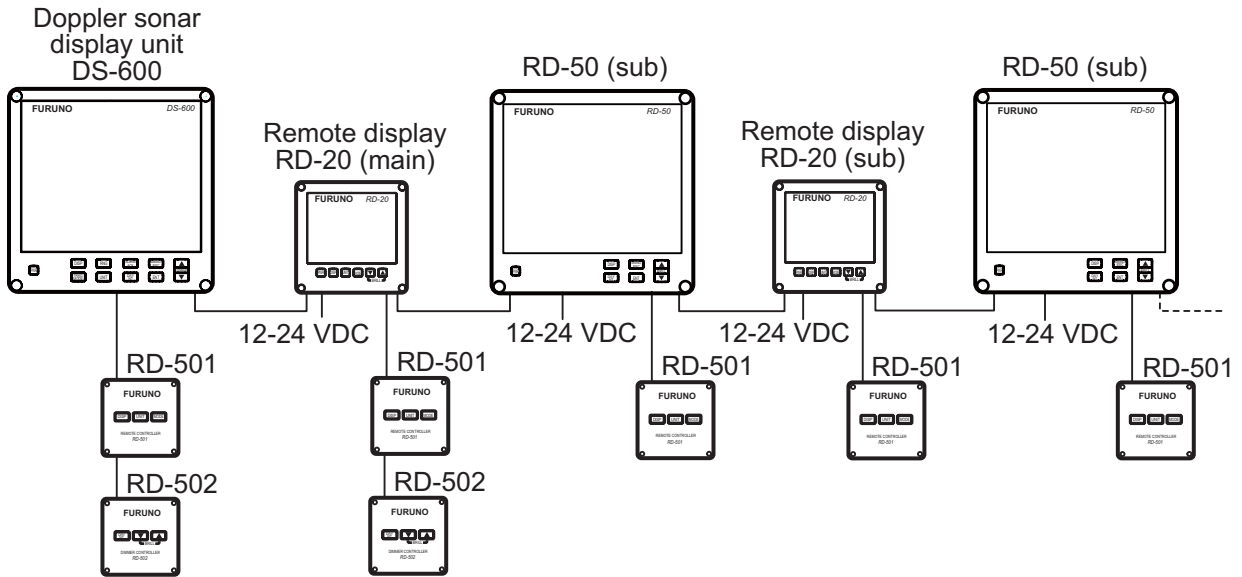
Pattern 2: Dimmer controller is commonly used. A total of 10 remote display (RD-50) units can be connected.

RD-50 (main)

RD-50 (sub)

RD-50 (sub)

RD-50 (sub)

RD-50 (sub)

12-24 VDC

12-24 VDC

12-24 VDC

12-24 VDC

12-24 VDC

NMEA 0183
sensor signal

NMEA 0183
sensor signal

NMEA 0183
sensor signal

NMEA 0183
sensor signal

NMEA 0183
sensor signal

RD-501

RD-502
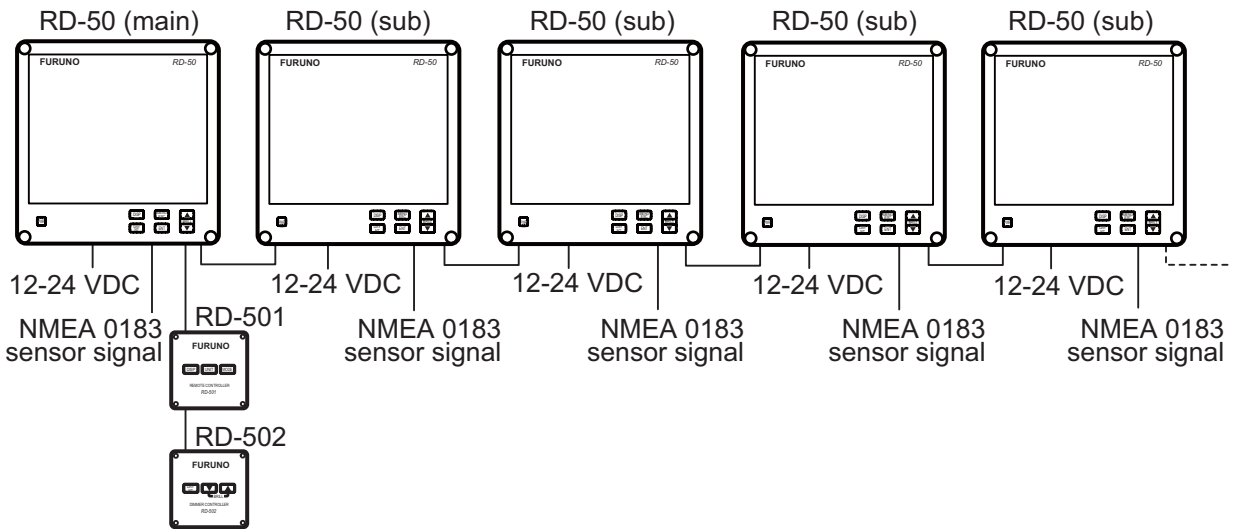
1. BASIC OPERATION

1.1 Controls

Remote display RD-50
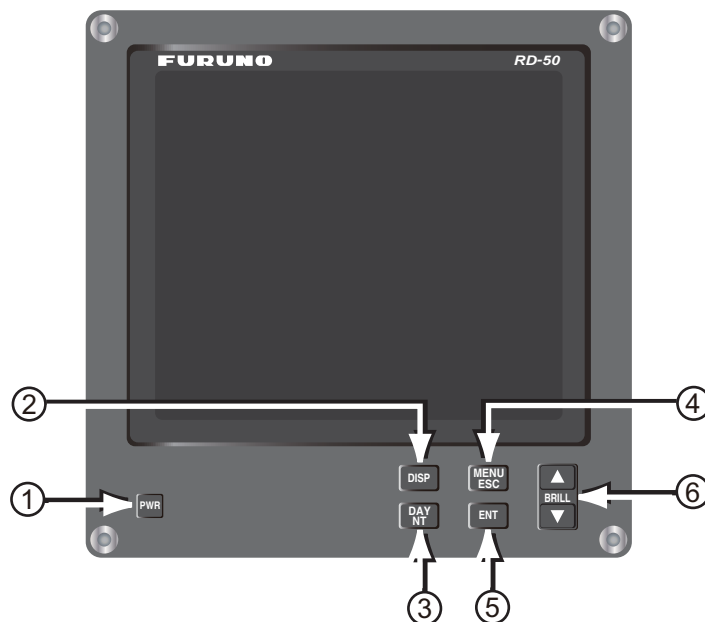
No.	Control	Description
1	PWR	Turn on/off the power.
2	DISP	• Switch the screen. • Return to the data screen during MENU display.
3	DAY/NT	Switch the display between daytime use and nighttime use on a "main" RD-50 (not available with "sub" RD-50). Daytime: Black characters on white background. Nighttime: White characters on black background.
4	MENU/ESC	• Open/close the menu. • Cancel last entry in menu operation and return one layer.
5	ENT	• Go back one layer when you save the menu option in the undermost layer. • Go up one layer when you save the menu option. • Long press to reset the trip distance when the [Trip DIST] screen is displayed with [Internal] mode.
6	BRILL ▲, ▼	• ▲: Increase the display brilliance. Move the cursor upward during MENU display. • ▼: Decrease the display brilliance. Move the cursor downward during MENU display. **Note:** Hold down ▲ or ▼ key to change the display brilliance rapidly.

How to remove the hard cover

Press here with thumb and
pull cover forward.
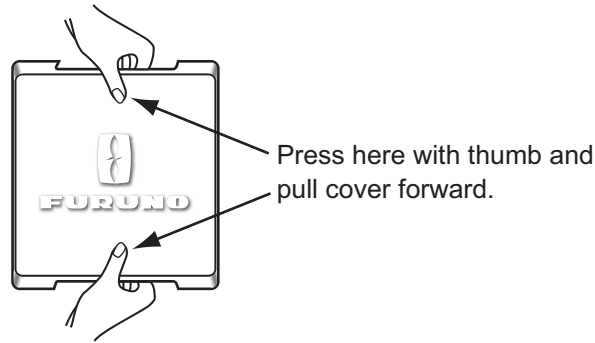
Remote controller RD-501
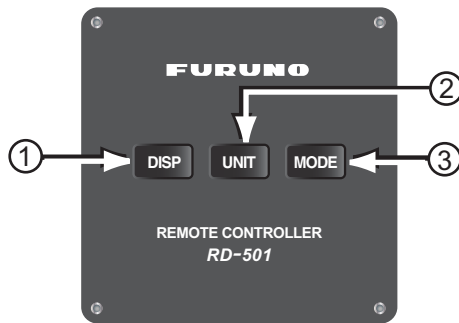
No.	Control	Description
1	DISP	• Switch the screen. • Return to the data screen during MENU display.
2	UNIT	Select the units of measurement (see section 2.10).
3	MODE	Select the scales/indications (see section 2.16).

Dimmer controller RD-502
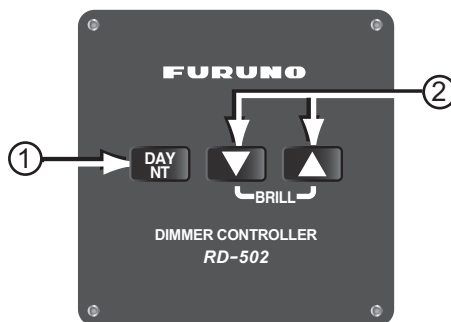
No.	Control	Description
1	DAY/NT	Switch the display between daytime use and nighttime use. Daytime: Black characters on white background. Nighttime: White characters on black background.
2	▼, ▲	▼: Decrease the display brilliance. ▲: Increase the display brilliance.

1.2   How to Turn On/Off the Power

Turn on the power

Press the **PWR** key to turn on the power. The initialization screen appears followed by the start-up screen. The start-up screen shows the unit name, serial number, program number and the results of the ROM and RAM check, OK or NG (No Good). If NG appears, contact your dealer.


```
Now Initializing ...




STARTER VERSION 2651006-XX.XX
BOOTER VERSION 2651007-XX.XX
```

XX.XX: Program version number

Initialization screen


```
UNIT Name      : RD-50
Serial No      : 6408-XXXX
Program No     : 2651008-XX.XX
ROM            : OK
RAM            : OK
```
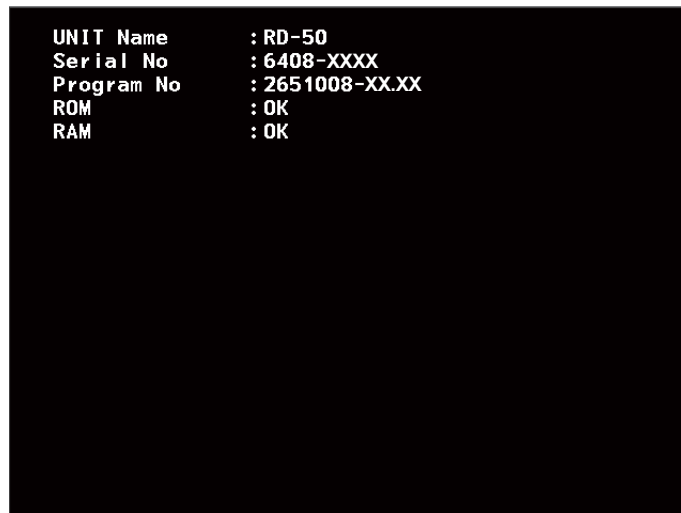
XXXX: Serial number
XX.XX: Program version number

Start-up screen

After the self-tests are completed, the last-used data screen (see section 1.4) appears.

Note 1: The screen refreshes slower in low temperature ambient.

Note 2: The view angle at nighttime is narrower than at daytime.

Turn off the power

Press the **PWR** key to turn off the power.

Note: When you turn off the power of a RD-50 in a daisy chain, the following RD-50s can not receive the sensor signals.

Case 1

RD-50: A (main) RD-50: B (sub) RD-50: C (sub)
Power OFF Power ON Power ON

12-24 VDC 12-24 VDC 12-24 VDC
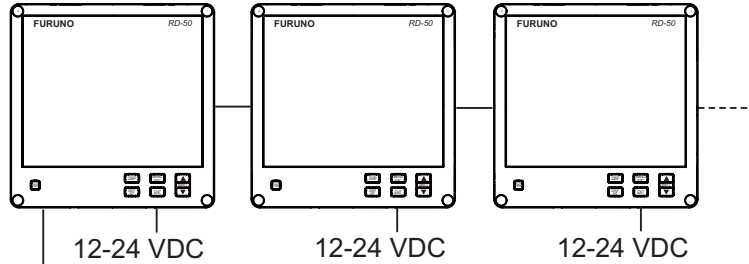
NMEA 0183
sensor signal

When you turn off the RD-50 A power, both RD-50 B and RD-50 C can not receive the sensor signal even though you turn on the power for RD-50 B and RD-50 C.

Case 2

RD-50: A (main) RD-50: B (sub) RD-50: C (sub)
Power ON Power OFF Power ON

12-24 VDC 12-24 VDC 12-24 VDC
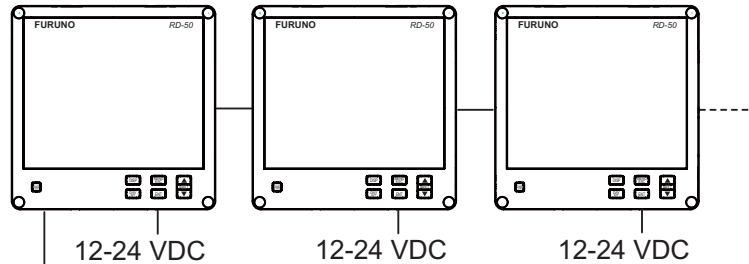
NMEA 0183
sensor signal

When you turn off the RD-50 B power, RD-50 C can not receive the sensor signal even though you turn on the power for RD-50 C.

Note: RD-50 (main) and RD-50 (sub) are set by the installer. See section 4.6.

1.3   How to Adjust Display Brilliance

To adjust the display brilliance, press ▼ or ▲ key. The setting range is 0 to 9. "0" is off and "9" is the brightest. Hold down ▼ or ▲ key to change the display brilliance rapidly.

Operation with RD-50 (main)

The RD-50 (main) simultaneously controls the display brilliance of the RD-50 (main) and the RD-50s (sub).

• Controls with ▼ key: Decrease the display brilliance.

• Controls with ▲ key: Increase the display brilliance.

Operation with RD-50 (sub)

Adjust the display brilliance of an RD-50 (sub) as follows to equalize brilliance with RD-50 (main).

• Controls with ▼ key: Decrease the display brilliance. (The variation is smaller than that of RD-50 (main) and RD-502 connected to RD-50 (main).)

• Controls with ▲ key: Increase the display brilliance. (The variation is smaller than that of RD-50 (main) and RD-502 connected to RD-50 (main).)

Note: When the display brilliance is 0, 1 or 9 on a main RD-50, this operation by RD-50 (sub) is not available.

Operation with RD-502

The RD-502 simultaneously controls the display brilliance of the RD-50 (main) and the RD-50s (sub).

• Controls with ▼ key: Decrease the display brilliance.

• Controls with ▲ key: Increase the display brilliance.

RD-50: A (main)   RD-50: B (sub)   RD-50: C (sub)   RD-50: D (main)   RD-50: E (sub)

12-24 VDC   12-24 VDC   12-24 VDC   12-24 VDC   12-24 VDC

NMEA 0183 sensor signal

RD-501   RD-501   RD-501   RD-501   RD-501
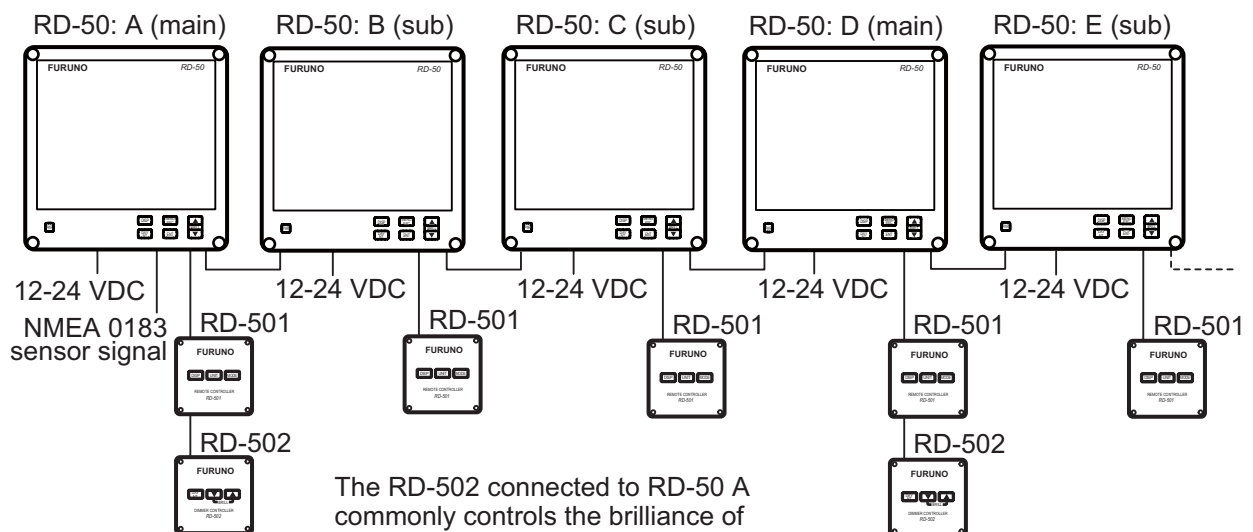
RD-502

RD-502

The RD-502 connected to RD-50 A commonly controls the brilliance of RD-50 A, RD-50 B and RD-50 C. The RD-502 connected to RD-50 D commonly controls the brilliance of RD-50 D and RD-50 E.

1.4 Data Screen

You can switch up to five data screens with the **DISP** key (three data screens in default setting). When you press the **DISP** key, the data screen changes in the sequence of DISP1 → DISP2 → DISP3 → DISP4* → DISP5* → DISP1 → ... Unregistered screens are skipped when you press the **DISP** key. The default screens are as shown below. For details, see section 2.2.

DISP1

UTC 01.JAN	**00:02**
POSN	35°22.7862'N 139°47.4529'E
SOG A **(kn)**	↑ **12.5**
TOTAL DIST (NM)	**11230.0**

UTC: Universal Time Coordinated

POSN: Ship's position (latitude and longitude)

SOG: Speed Over the Ground

TOTAL DIST: Total navigated Distance

↓ **DISP** key

DISP2

HDG T (deg)	**182.0**
DPTH DBK A **(m)**	**187.0**
WIND SPD T (m/s)	**14.9**
Water TEMP (°C)	**1.2**

HDG T: Heading True

DPTH DBK: Depth Below Keel

WIND SPD T: Wind Speed Theoretical (or True)

Water TEMP: Water Temperature

↓ **DISP** key

DISP3

SOG A

16.5 kn

DISP key

*: DISP4 and DISP5 are not displayed in default setting.

Data screens (default)

2. MENU

2.1 Menu Description

Below is the basic procedure for menu operation.

1. Press the **MENU/ESC** key to open the menu.

Menu   Currently selected menu

```
┌─────────────────┐  ┌─────────────────┐
│      MENU       │  │   Ship's Time   │
├─────────────────┤  ├─────────────────┤
│ Ship's Time     │  │ Source   :NAV EQUIP │
│ Trip DIST       │  │ Summer Time :OFF │
│ Display         │  └─────────────────┘
│ Scale Set Up    │
│ ▶ System        │
├─────────────────┤
│ [▲]/[▼]  : Select │
│ [ENT]    : Enter  │
│ [MENU/ESC]: Cancel│
│ [DISP]   : Exit   │
└─────────────────┘
```

Menu items and current settings

"▶" indicates additional menus.
Press ▼ key to see the menus.
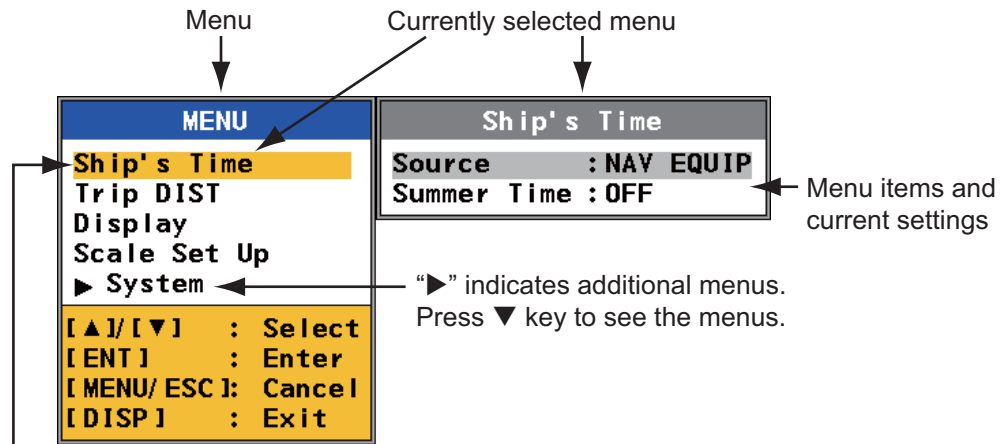
Cursor: Selected cursor is in orange.

Menu

2. Press ▲ or ▼ key to select a menu. The menu items in the right window change according to the menu selected.

3. Press the **ENT** key to switch the control to the menu items column.
   To switch the control from the menu items column to the menu column, press the **MENU/ESC** key.

4. Press ▲ or ▼ key to select a menu item and press the **ENT** key. A window with options for the related menu items appears.

```
┌─────────────────┐  ┌─────────────────┐
│   Ship's Time   │  │     Select      │
├─────────────────┤  ├─────────────────┤
│ Source   :NAV EQUIP │ Internal : 00:00 │
│ Summer Time :OFF │  │ External        │
└─────────────────┘  │ NAV EQUIP       │
                     ├─────────────────┤
                     │ [▲]/[▼]  : Select │
                     │ [ENT]    : Enter  │
                     │ [MENU/ESC]: Cancel│
                     │ [DISP]   : Exit   │
                     └─────────────────┘
```
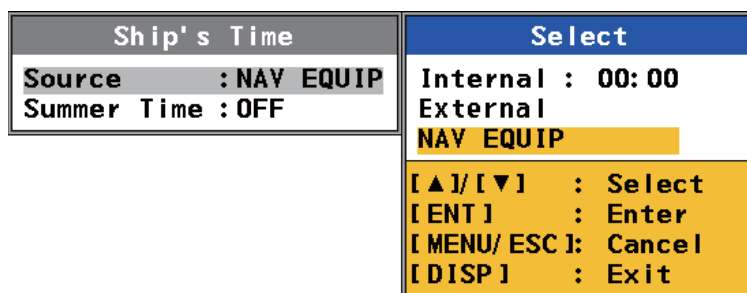
Example window

5. Press ▲ or ▼ key to select an option and press the **ENT** key. If the menu contains more layers, repeat this step. When the value setting window shown below appears, press ▲ or ▼ key to set the value and press the **ENT** key. To return one layer without saving settings, press the **MENU/ESC** key.
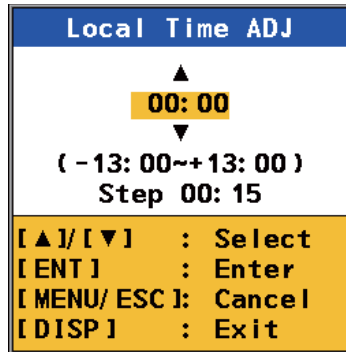
Example of value setting window

6. Press the **DISP** key to close the menu.

2.2 How to Customize the Data Screen

The RD-50 has three data screen types; [Graphic], [Digital] and [Graph]. You can select what data to display and the order to display it. Availability of data depends on the sensors connected.

1. Press the **MENU/ESC** key to open the menu.

2. Press ▲ or ▼ key to select [Display] and press the **ENT** key.

Scroll bar
(Indicates additional menu items. You can scroll the menu items by using ▲ or ▼ key.)
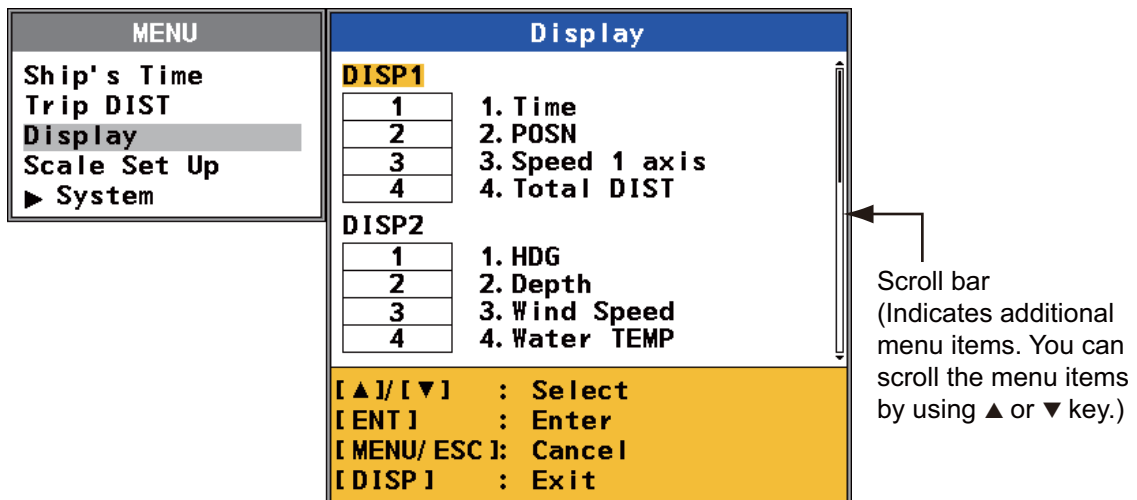
Display menu

3. Press ▲ or ▼ key to select [DISP1 (2, 3, 4 or 5)] and press the **ENT** key.
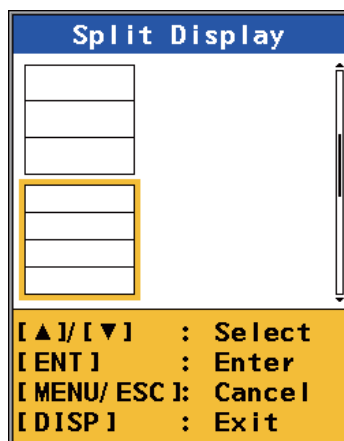
Split Display options

4. Press ▲ or ▼ key to select the screen division and press the **ENT** key. If you selected the no-split screen, go to step 5. If you selected the blank screen, go to step 8. For the other types, go to step 6.

No-split

Horizontal
two-way split

Horizontal
three-way split

Horizontal
four-way split

Horizontal/vertical
three-way split

Four-way split

Vertical
two-way split

Blank*
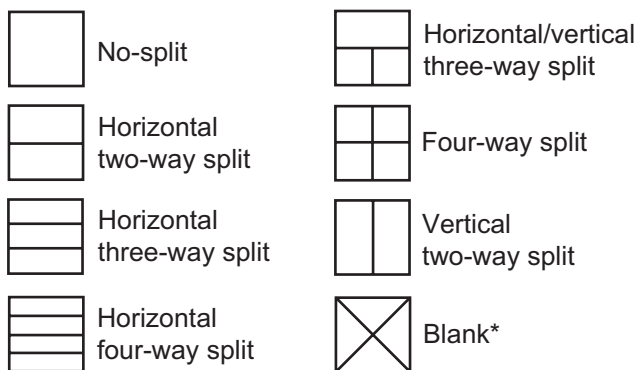
*: Can not select for the [DISP1] screen.

Screen division

5. Press ▲ or ▼ key to select [Graphic], [Digital] or [Graph] in the [DISP Mode] window then press the **ENT** key. The available menu items depend on the selected screen division.
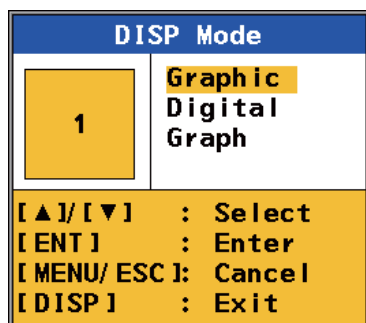
DISP Mode options   *Item options*

2-3
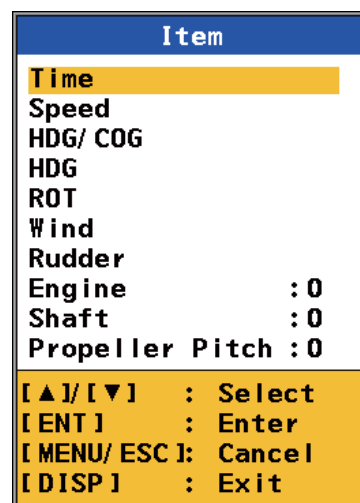
6. Press ▲ or ▼ key to select the item(s) in the [Item] window and press the **ENT** key. The available items depend on the screen division selected at step 4 or the DISP mode selected at step 5. For details, see the APPENDIX 2. If you selected [Engine], [Shaft] or [Propeller Pitch] in the [Graphic] or [Digital] menus, go to step 7. For the others, go to step 8.

7. Press ▲ or ▼ key to select the number of engines, shafts or propeller pitch and press the **ENT** key.

<div align="center">

SET

▲
0
▼
(0~9)

[▲]/[▼]	: Select
[ENT]	: Enter
[MENU/ESC]:	Cancel
[DISP]	: Exit

</div>
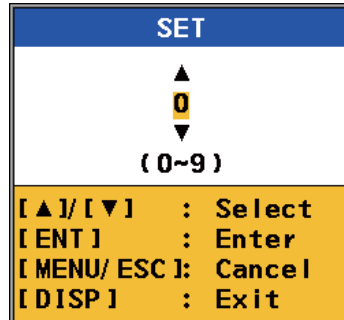
SET setting window

8. Press the **DISP** key to close the menu.

To switch the data screen, press the **DISP** key on the data screen. The mode changes in the sequence of DISP1 → DISP2 → DISP3 → DISP4 → DISP5 → DISP1 → ...
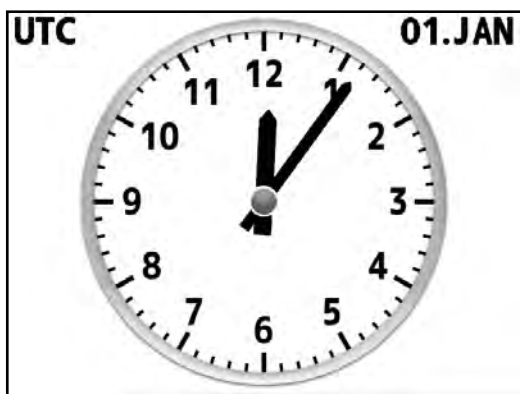
Split Display: No-split
DISP Mode: Graphic
Item: Time

Split Display: No-split
DISP Mode: Graphic
Item: HDG

Split Display: Horizontal four-way split
DISP Mode: Digital
Item: HDG, COG, Total DIST, Water TEMP

Split Display: Vertical two-way split
DISP Mode: Digital
Item: POSN, WPT

Split Display: Horizontal/vertical three-way split
DISP Mode: Digital
Item: Depth, Wind Direction, Wind Speed
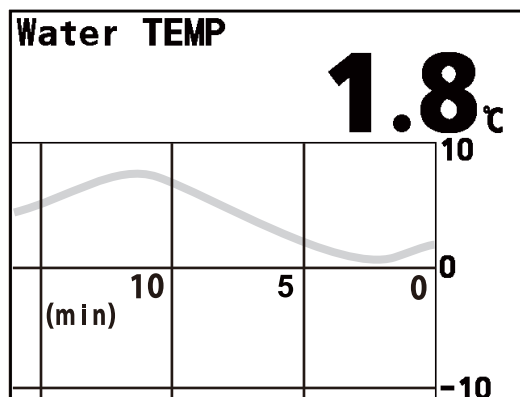
Split Display: No-split
DISP Mode: Graph
Item: Water TEMP Graph

Examples of data screen

2.3   How to Preset Scales/Indications

You can preset the scales/indications for time, ship's speed, HDG (heading)/COG (course over the ground) and wind speed/direction. You can change the scale/indication with the **MODE** key of the RD-501 (see section 2.16).

1.   Press the **MENU/ESC** key to open the menu.

2.   Press ▲ or ▼ key to select [Scale Set Up] and press the **ENT** key.

MENU	Scale Set Up
Ship's Time	**Unit**
Trip DIST	Mode
Display	Speed Graphic
Scale Set Up	Depth Graph
▶ System	Water TEMP Graph
	Rudder
	Engine/Shaft
	Digital on Graphic : ON
	Rudder Order Symbol : ON
	Direction Symbol : Arrows
	Symbol Location : Left

[▲]/[▼]   : Select
[ENT]   : Enter
[MENU/ESC]: Cancel
[DISP]   : Exit

Scale Set Up menu

3.   Press ▲ or ▼ key to select [Mode] and press the **ENT** key.

Display

DISP1
DISP2
DISP3
DISP4
DISP5

[▲]/[▼]   : Select
[ENT]   : Enter
[MENU/ESC]: Cancel
[DISP]   : Exit

Display options

4.   Press ▲ or ▼ key to select [DISP1 (2, 3, 4 or 5)], for which you preset the scales/indications, and press the **ENT** key.

DISP1

Time   : UTC
Speed   : Auto
HDG/COG : True
Wind   : True

[▲]/[▼]   : Select
[ENT]   : Enter
[MENU/ESC]: Cancel
[DISP]   : Exit

DISP1 (2, 3, 4, 5) options

5. Press ▲ or ▼ key to select [Time] and press the **ENT** key.

```
          Select
 UTC
 Ship's Time

 [▲]/[▼]     : Select
 [ENT]       : Enter
 [MENU/ESC]: Cancel
 [DISP]      : Exit
```
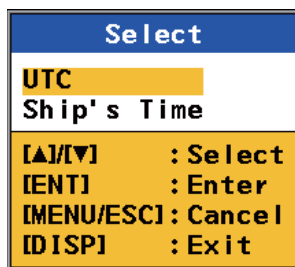
Time options

6. Press ▲ or ▼ key to select [UTC] or [Ship's Time] then press the **ENT** key.
   [UTC]: Universal time coordinated
   [Ship's Time]: Local time (For [Ship's Time], see section 2.14.)

7. Press ▲ or ▼ key to select [Speed] and press the **ENT** key.

```
          Select
 Auto
 SOG
 STW
 GPS

 [▲]/[▼]     : Select
 [ENT]       : Enter
 [MENU/ESC]: Cancel
 [DISP]      : Exit
```
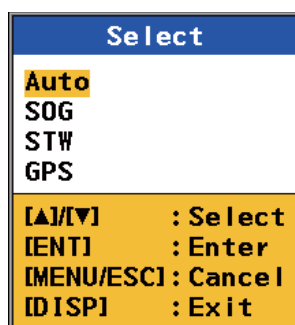
Speed options

8. Press ▲ or ▼ key to select [Auto], [SOG], [STW] or [GPS] then press the **ENT** key.
   [Auto]: The speed data is displayed in order of priority, SOG, STW and GPS. The SOG has the highest, while GPS has the lowest priority. That is, when SOG, STW and GPS data are available, the SOG data is displayed. If the SOG data is not available, the STW data is displayed. **A** appears at the upper-left corner of the screen when the [Auto] mode is active.
   [SOG], [STW]: The speed data from the doppler sonar, doppler log or speed log
   [GPS]: The data from the navigation equipment (SOG data from a GPS navigator)

9. Press ▲ or ▼ key to select [HDG/COG] and press the **ENT** key.

```
          Select
 True
 Magnetic

 [▲]/[▼]     : Select
 [ENT]       : Enter
 [MENU/ESC]: Cancel
 [DISP]      : Exit
```
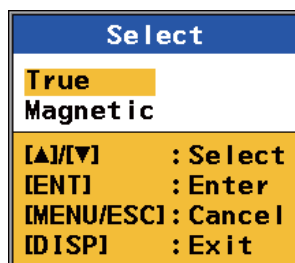
HDG/COG options

10. Press ▲ or ▼ key to select [True] or [Magnetic] then press the **ENT** key.
    [True]: The bearing measured with true North as the reference direction.
    [Magnetic]: The bearing measured with magnetic north as the reference direction.

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11. Press ▲ or ▼ key to select [Wind] and press the **ENT** key.
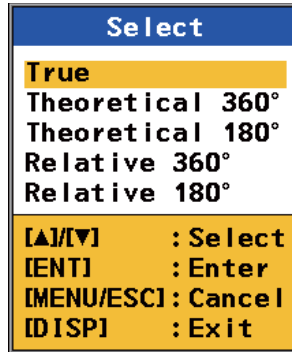
Wind options

12. Press ▲ or ▼ key to select [True], [Theoretical 360° (or 180°)] or [Relative 360° (or 180°)] then press the **ENT** key.

    [True]: The wind angle measured with true North as the reference angle and the wind speed as if the ship is stationary. "T" is displayed on the screen.

    [Theoretical 360°/180°]: Theoretical or calculated wind angle. The wind angle relative to the ship's bow and the wind speed as if the ship is stationary. The wind graphic scale for [Theoretical 360°] indicates 0° to 360°, for [Theoretical 180°] indicates 0° to 180° for port and starboard. "T" is displayed on the screen.

    [Relative 360°/180°]: Relative or apparent wind angle. The wind angle relative to the ship's bow and the wind speed relative to the moving ship. The wind graphic scale for [Relative 360°] indicates 0° to 360°, for [Relative 180°] indicates 0° to 180° for port and starboard. "R" is displayed on the screen.

    Note 1: The same abbreviation "T" is used for both [True] and [Theoretical 360°/180°].

    Note 2: The indication of the wind angle (port or starboard) is displayed at the bottom of the screen when you select [Theoretical 180°] or [Relative 180°].

13. Press the **DISP** key to close the menu.

2.4 How to Set the Speed Graphic Range

You can customize the astern and ahead speed scales for the speed graphic.

Astern SPD Scale: 5 kn
Ahead SPD Scale: 25 kn
Symbol Location*: Left (The pointer rotates clockwise as ship's speed increases.)
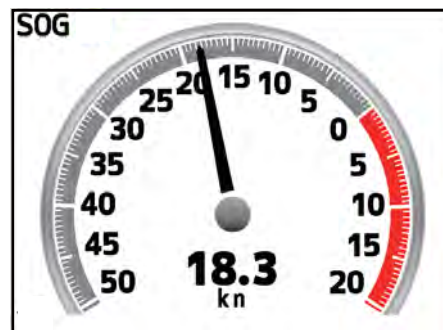
Astern SPD Scale: 20 kn
Ahead SPD Scale: 50 kn
Symbol Location*: Right (The pointer rotates counterclockwise as ship's speed increases.)

*: See section 2.12.

Examples of the speed graphic

1. Press the **MENU/ESC** key to open the menu.
2. Press ▲ or ▼ key to select [Scale Set Up] and press the **ENT** key.
3. Press ▲ or ▼ key to select [Speed Graphic] and press the **ENT** key.

```
     Display
  DISP1
  DISP2
  DISP3
  DISP4
  DISP5

 [▲]/[▼]    : Select
 [ENT]      : Enter
 [MENU/ESC]: Cancel
 [DISP]     : Exit
```
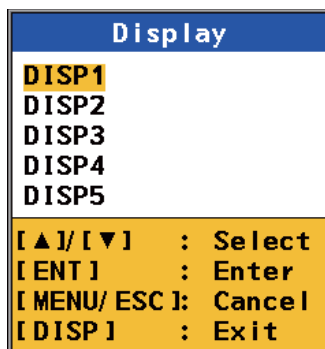
Display options

4. Press ▲ or ▼ key to select [DISP1 (2, 3, 4 or 5)], which shows the speed graphic screen, and press the **ENT** key.

```
                DISP1
 Astern SPD Scale :  5kn( 2.5m/s,  10km/h)
 Ahead SPD Scale  :25kn(12.5m/s,  50km/h)

 [▲]/[▼]    : Select
 [ENT]      : Enter
 [MENU/ESC]: Cancel
 [DISP]     : Exit
```

Speed Graphic Range options

5. Press ▲ or ▼ key to select [Astern SPD Scale] or [Ahead SPD Scale] then press the **ENT** key.
   [Astern SPD Scale]: Set the astern range. (The scale is red.)
   [Ahead SPD Scale]: Set the ahead range. (The scale is gray.)

```
                Select
  5kn( 2.5m/s,  10km/h)
 10kn( 5.0m/s,  20km/h)
 15kn( 7.5m/s,  30km/h)
 20kn(10.0m/s,  40km/h)
 25kn(12.5m/s,  50km/h)
 30kn(15.0m/s,  60km/h)
 35kn(17.5m/s,  70km/h)
 40kn(20.0m/s,  80km/h)

 [▲]/[▼]    : Select
 [ENT]      : Enter
 [MENU/ESC]: Cancel
 [DISP]     : Exit
```

Astern (Ahead) SPD Scale options

6. Press ▲ or ▼ key to select a range and press the **ENT** key.
   Note: You can not set the total range of astern scale and ahead scale more than 70 kn.
7. Repeat steps 5 and 6 to set the astern range or the ahead range.
8. Press the **DISP** key to close the menu.

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2.5 Depth Graph

You can customize the scale range, period for the horizontal axis and graph appearance for the depth graph.

Depth reference (See section 4.6.)

Range: 200 m
Period: 5 min
Painted Graph: ON

Range: 100 m
Period: 15 min
Painted Graph: OFF
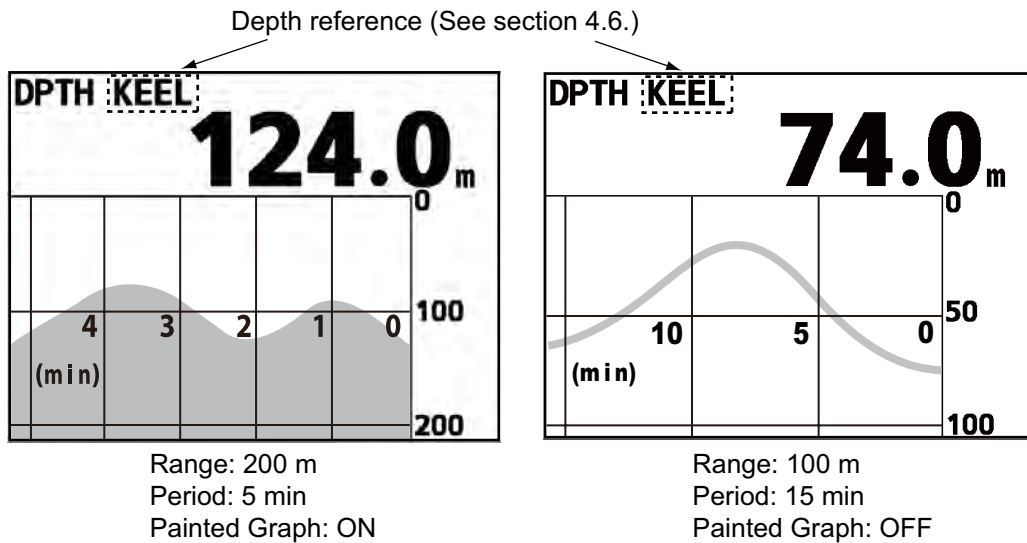
Examples of Depth Graph

1. Press the **MENU/ESC** key to open the menu.

2. Press ▲ or ▼ key to select [Scale Set Up] and press the **ENT** key.

3. Press ▲ or ▼ key to select [Depth Graph] and press the **ENT** key.
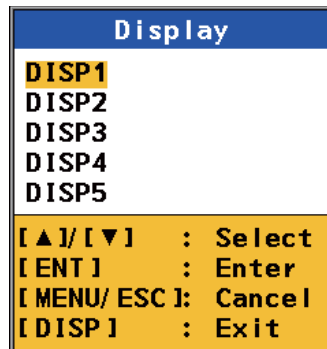
Display options

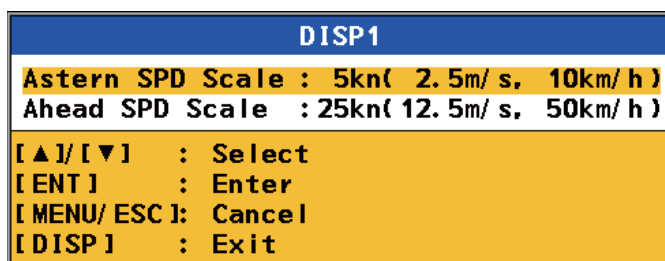4. Press ▲ or ▼ key to select [DISP1 (2, 3, 4 or 5)], which shows the depth graph, and press the **ENT** key.
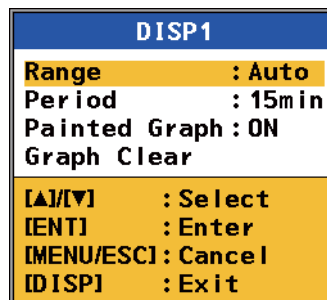
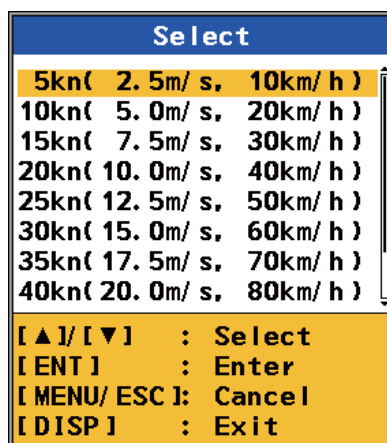*Depth Graph options*

5. Press ▲ or ▼ key to select [Range] and press the **ENT** key.
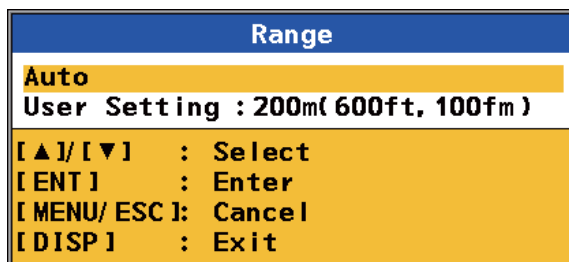
Range options

6. Press ▲ or ▼ key to select [Auto] or [User Setting] then press the **ENT** key. If you selected [Auto], go to step 8. If you selected [User Setting], the following window appears. Press ▲ or ▼ key to select range and press the **ENT** key.
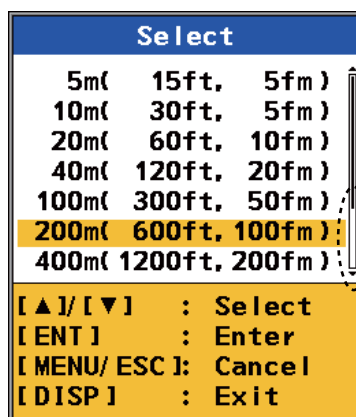
Scroll screen with ▼ key, to see other options.

User Setting options

[Auto]:

*   When the depth exceeds 100 m in the 100 m range, the range is automatically changed to 200 m.

*   When the depth becomes 80% or less of the range which is one rank lower than the current setting range, the range automatically goes down one rank. For example, when the depth comes to 32 m or less in the 100 m range, the range is automatically changed to 40 m.

*   When the depth drops-off to 1000 m in the 100 m range, the range is automatically changed to 1000 m.

7. Press the **MENU/ESC** key.

8. Press ▲ or ▼ key to select [Period] and press the **ENT** key.
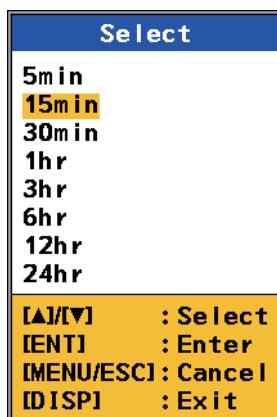
Period options

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9. Press ▲ or ▼ key to select the period for the horizontal axis and press the **ENT** key.

10. Press ▲ or ▼ key to select [Painted Graph] and press the **ENT** key.
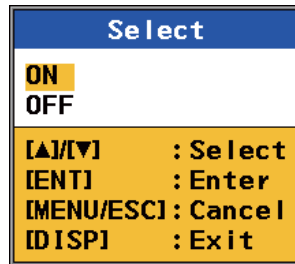
Painted Graph options

11. Press ▲ or ▼ key to select [ON] or [OFF] then press the **ENT** key.
    [ON]: Filled
    [OFF]: Line only

12. Press the **DISP** key to close the menu.

To clear the graph, select [Graph Clear] (see above step 5) → [Yes] then press the **ENT** key.

2.6 Water TEMP Graph

You can customize the scale range, period for the horizontal axis and graph appearance for the water temperature graph.
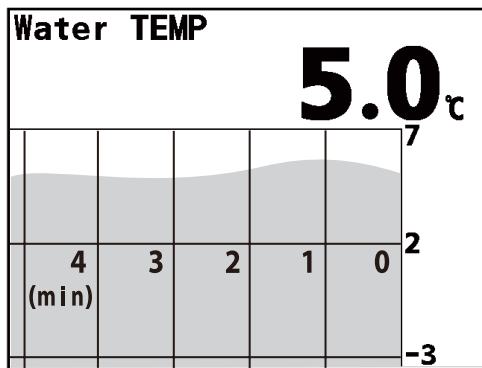
Range: 10 °C (20 °F)
Period: 5 min
Painted Graph: ON
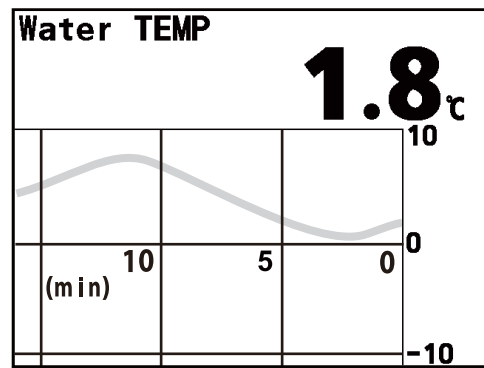
Range: 20 °C (40 °F)
Period: 15 min
Painted Graph: OFF

Examples of Water TEMP Graph

1. Press the **MENU/ESC** key to open the menu.

2. Press ▲ or ▼ key to select [Scale Set Up] and press the **ENT** key.

3. Press ▲ or ▼ key to select [Water TEMP Graph] and press the **ENT** key.

```
┌─────────────────────────┐
│       Display           │
├─────────────────────────┤
│ DISP1                   │
│ DISP2                   │
│ DISP3                   │
│ DISP4                   │
│ DISP5                   │
├─────────────────────────┤
│ [▲]/[▼]    : Select     │
│ [ENT]      : Enter      │
│ [MENU/ESC]: Cancel      │
│ [DISP]     : Exit       │
└─────────────────────────┘
```

Display options

4. Press ▲ or ▼ key to select [DISP1 (2, 3, 4 or 5)], which shows the water temp graph screen, and press the **ENT** key.

```
┌─────────────────────────┐
│        DISP1            │
├─────────────────────────┤
│ Range        : 10℃(20℉) │
│ Period       : 15min    │
│ Painted Graph: ON       │
│ Graph Clear             │
├─────────────────────────┤
│ [▲]/[▼]    : Select     │
│ [ENT]      : Enter      │
│ [MENU/ESC]: Cancel      │
│ [DISP]     : Exit       │
└─────────────────────────┘
```

Water TEMP Graph options

5. Press ▲ or ▼ key to select [Range] and press the **ENT** key.

```
┌─────────────────────────┐
│        Select           │
├─────────────────────────┤
│  5℃(10℉)                │
│  10℃(20℉)               │
│  20℃(40℉)               │
├─────────────────────────┤
│ [▲]/[▼]    : Select     │
│ [ENT]      : Enter      │
│ [MENU/ESC]: Cancel      │
│ [DISP]     : Exit       │
└─────────────────────────┘
```

Range options

6. Press ▲ or ▼ key to select [5°C (10°F)], [10°C (20°F)] or [20°C (40°F)] then press the **ENT** key.

7. Press ▲ or ▼ key to select [Period] and press the **ENT** key.

```
┌─────────────────────────┐
│        Select           │
├─────────────────────────┤
│ 5min                    │
│ 15min                   │
│ 30min                   │
│ 1hr                     │
│ 3hr                     │
│ 6hr                     │
│ 12hr                    │
│ 24hr                    │
├─────────────────────────┤
│ [▲]/[▼]    : Select     │
│ [ENT]      : Enter      │
│ [MENU/ESC]: Cancel      │
│ [DISP]     : Exit       │
└─────────────────────────┘
```

Period options

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8. Press ▲ or ▼ key to select the period for the horizontal axis and press the **ENT** key.

9. Press ▲ or ▼ key to select [Painted Graph] and press the **ENT** key.
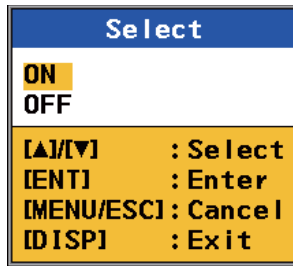
Painted Graph options

10. Press ▲ or ▼ key to select [ON] or [OFF] then press the **ENT** key.
    [ON]: Filled
    [OFF]: Line only

11. Press the **DISP** key to close the menu.

To clear the graph, select [Graph Clear] (see above step 5) → [Yes] then press the **ENT** key.

2.7 Rudder Graphic

2.7.1 How to set the range for rudder graphic and position for rudder

You can customize the rudder angle range and rudder position for the rudder graphic. The rudder order symbol can be shown or hidden.
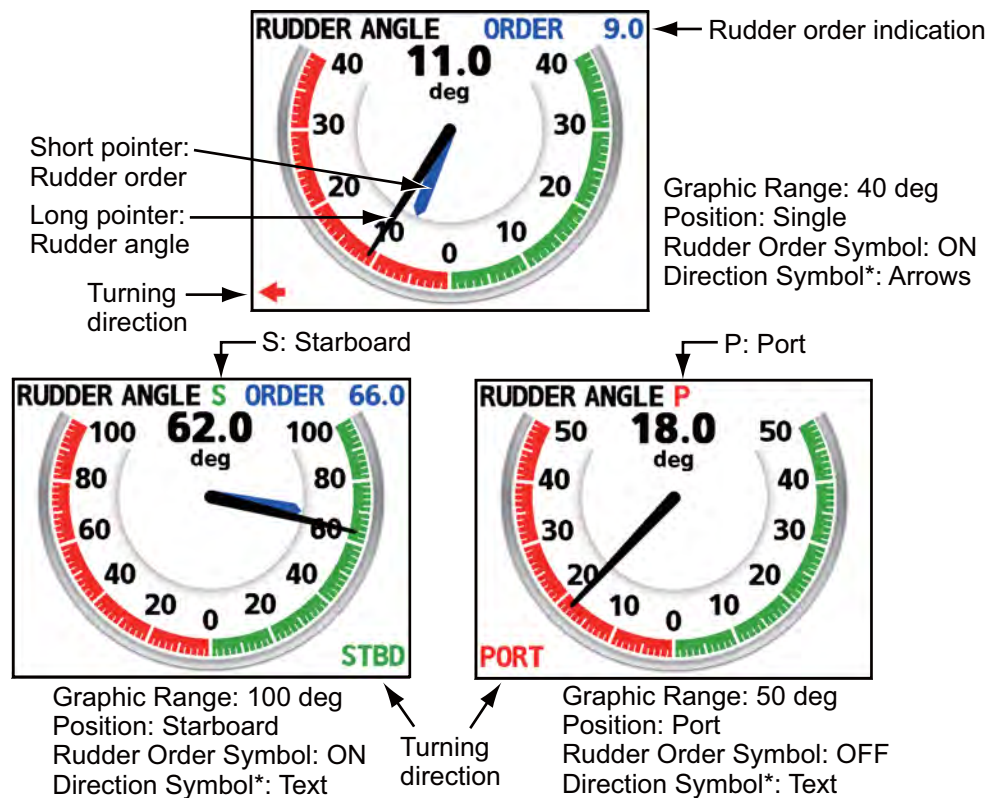
*: See section 2.11 for [Direction Symbol].

Examples of Rudder Graphic

1. Press the **MENU/ESC** key to open the menu.

2. Press ▲ or ▼ key to select [Scale Set Up] and press the **ENT** key.

3. Press ▲ or ▼ key to select [Rudder] and press the **ENT** key.

```
     Display
  DISP1
  DISP2
  DISP3
  DISP4
  DISP5

  [▲]/[▼]    : Select
  [ENT]      : Enter
  [MENU/ESC]: Cancel
  [DISP]     : Exit
```
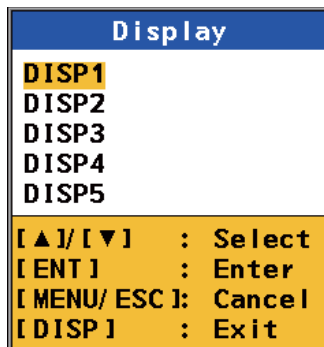
Display options

4. Press ▲ or ▼ key to select [DISP1 (2, 3, 4 or 5)], which you select for the rudder graphic screen, and press the **ENT** key.

```
        DISP1
  Graphic Range : 40deg
  Position      : Single

  [▲]/[▼]    : Select
  [ENT]      : Enter
  [MENU/ESC]: Cancel
  [DISP]     : Exit
```

Rudder options

5. Press ▲ or ▼ key to select [Graphic Range] and press the **ENT** key.

```
        SET
         ▲
       40deg
         ▼
      (40~180)
      Step 5deg

  [▲]/[▼]     : Select
  [ENT]       : Enter
  [MENU/ESC]: Cancel
  [DISP]      : Exit
```

Graphic Range setting window

6. Press ▲ or ▼ key to select range and press the **ENT** key.

7. Press ▲ or ▼ key to select [Position] and press the **ENT** key.
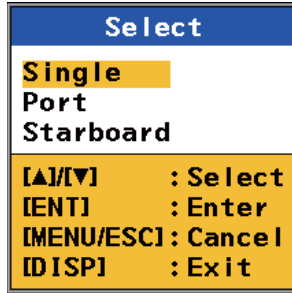
Position options

8. Press ▲ or ▼ key to select [Single], [Port] or [Starboard] then press the **ENT** key.
    [Single]: One rudder on the ship
    [Port]: Display the data for port rudder
    [Starboard]: Display the data for starboard rudder

9. Press the **DISP** key to close the menu.

2.7.2   Rudder order symbol

You can turn on/off the rudder order indication.

1. Press the **MENU/ESC** key to open the menu.

2. Press ▲ or ▼ key to select [Scale Set Up] and press the **ENT** key.

3. Press ▲ or ▼ key to select [Rudder Order Symbol] and press the **ENT** key.
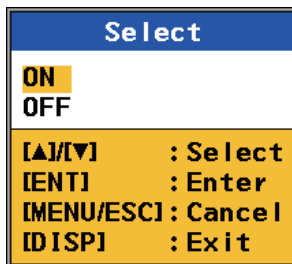
Rudder Order Symbol options

4. Press ▲ or ▼ key to select [ON] or [OFF] then press the **ENT** key.

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

2.8 Engine/Shaft Graphic

You can set the scale range for the engine/shaft graphic.
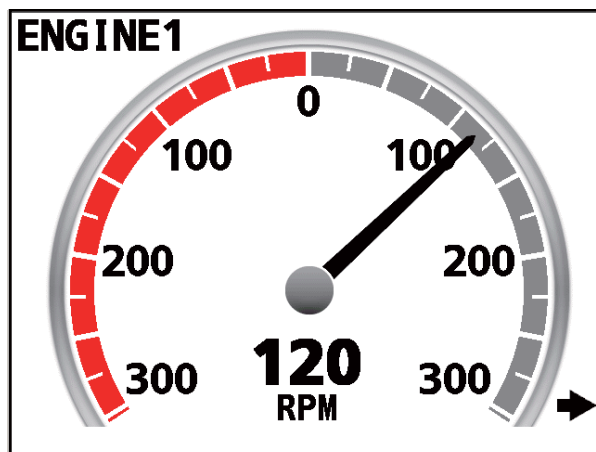
Example of Engine screen (in case of 300 RPM for display range)

1. Press the **MENU/ESC** key to open the menu.

2. Press ▲ or ▼ key to select [Scale Set Up] and press the **ENT** key.

3. Press ▲ or ▼ key to select [Engine/Shaft] and press the **ENT** key.

Display options

4. Press ▲ or ▼ key to select [DISP1 (2, 3, 4 or 5)], which shows the engine or shaft graphic screen, and press the **ENT** key.

Engine/Shaft options

5. Press ▲ or ▼ key to select the range and press the **ENT** key.

6. Press the **DISP** key to close the menu.

2.9 How to Show/Hide the Digital Indication

You can show/hide the digital indication on the graphic screen for speed, ROT, rudder, engine, shaft and propeller pitch.

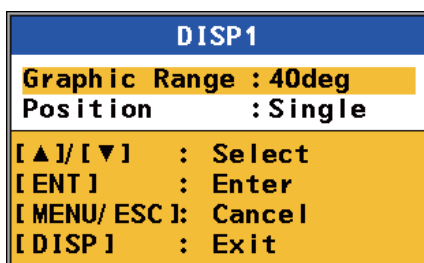Digital on Graphic: ON   Digital on Graphic: OFF
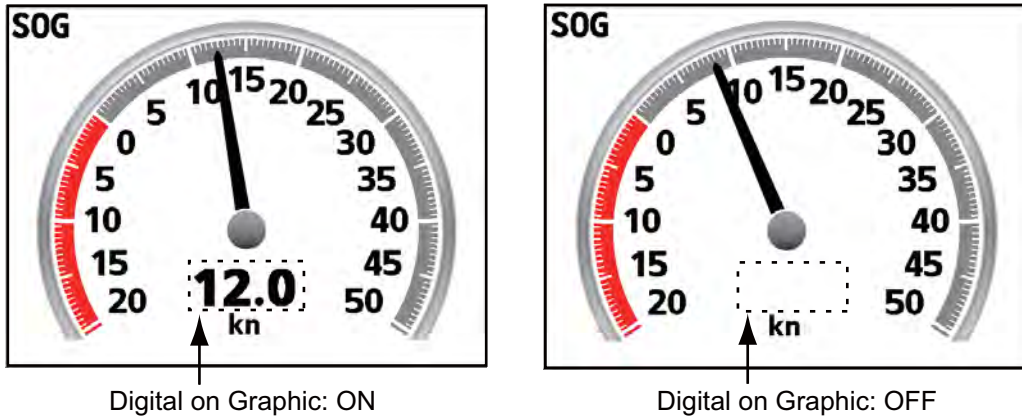
Digital indication ON/OFF

1. Press the **MENU/ESC** key to open the menu.
2. Press ▲ or ▼ key to select [Scale Set Up] and press the **ENT** key.
3. Press ▲ or ▼ key to select [Digital on Graphic] and press the **ENT** key.
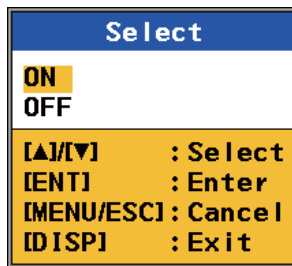
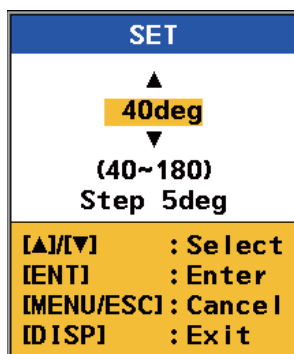*Digital on Graphic options*

4. Press ▲ or ▼ key to select [ON] or [OFF] then press the **ENT** key.
5. Press the **DISP** key to close the menu.

2.10 Units of Measurement

You can preset the units of measurement for ship speed, distance, depth, wind speed and water temperature. You can change these units with the **UNIT** key of the RD-501 (see section 2.16).

1. Press the **MENU/ESC** key to open the menu.
2. Press ▲ or ▼ key to select [Scale Set Up] and press the **ENT** key.

3. Press ▲ or ▼ key to select [Unit] and press the **ENT** key.

```
        Display
  DISP1
  DISP2
  DISP3
  DISP4
  DISP5

  [▲]/[▼]   : Select
  [ENT]     : Enter
  [MENU/ESC]: Cancel
  [DISP]    : Exit
```

Display options

4. Press ▲ or ▼ key to select [DISP1 (2, 3, 4 or 5)], for which you preset the units of measurement, and press the **ENT** key.

```
         DISP1
  Speed      : kn
  Distance   : NM
  Depth      : m
  Wind Speed : m/s
  Water TEMP : ℃

  [▲]/[▼]    : Select
  [ENT]      : Enter
  [MENU/ESC] : Cancel
  [DISP]     : Exit
```

Unit options

5. Press ▲ or ▼ key to select [Speed], [Distance], [Depth], [Wind Speed] or [Water TEMP] then press the **ENT** key.

```
       Select
  kn
  m/s
  km/h

  [▲]/[▼]    : Select
  [ENT]      : Enter
  [MENU/ESC] : Cancel
  [DISP]     : Exit
```
Speed

```
       Select
  NM
  km

  [▲]/[▼]    : Select
  [ENT]      : Enter
  [MENU/ESC] : Cancel
  [DISP]     : Exit
```
Distance

```
       Select
  m
  ft
  fm

  [▲]/[▼]    : Select
  [ENT]      : Enter
  [MENU/ESC] : Cancel
  [DISP]     : Exit
```
Depth

```
       Select
  kn
  m/s
  km/h
  mph

  [▲]/[▼]    : Select
  [ENT]      : Enter
  [MENU/ESC] : Cancel
  [DISP]     : Exit
```
Wind Speed

```
       Select
  ℃
  ℉

  [▲]/[▼]    : Select
  [ENT]      : Enter
  [MENU/ESC] : Cancel
  [DISP]     : Exit
```
Water TEMP
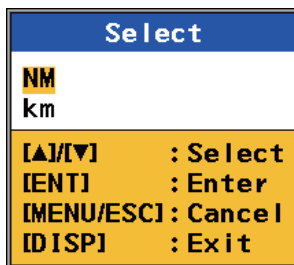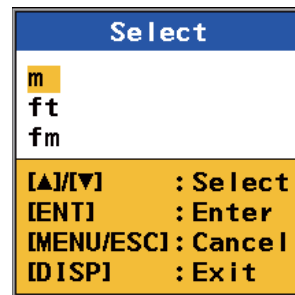
Speed, Distance, Depth, Wind Speed, Water TEMP options

6. Press ▲ or ▼ key to select each unit and press the **ENT** key.

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

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2.11 Direction Symbol

You can show the direction symbol by [Arrows] or [Text].
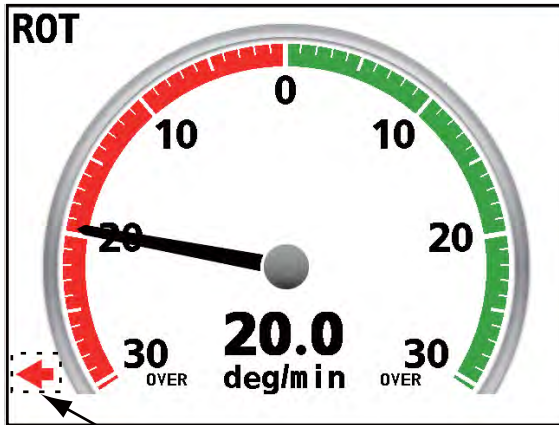
Direction Symbol: Arrows
(◀: Port, ▶: Starboard)
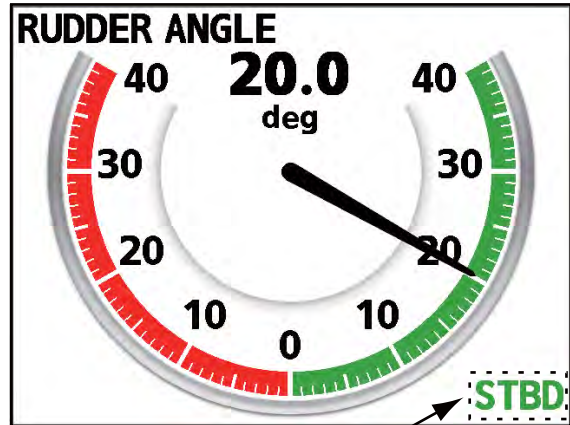
Direction Symbol: Text
(STBD: Starboard, PORT: Port)

Direction Symbol: Arrows/Text

1. Press the **MENU/ESC** key to open the menu.
2. Press ▲ or ▼ key to select [Scale Set Up] and press the **ENT** key.
3. Press ▲ or ▼ key to select [Direction Symbol] and press the **ENT** key.

Direction Symbol options

4. Press ▲ or ▼ key to select [Arrows] or [Text] then press the **ENT** key.
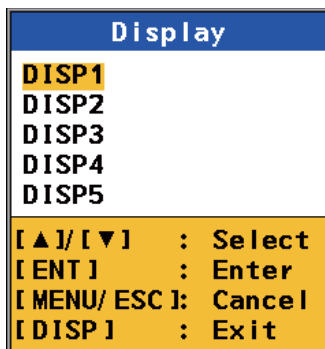5. Press the **DISP** key to close the menu.

2.12 Symbol Location

You can display the left-right reversal screen, including rotation direction, for the following graphic menus:

Speed, ROT, Wind (only for Theoretical/Relative 180°), Rudder, Engine, Shaft, Propeller Pitch
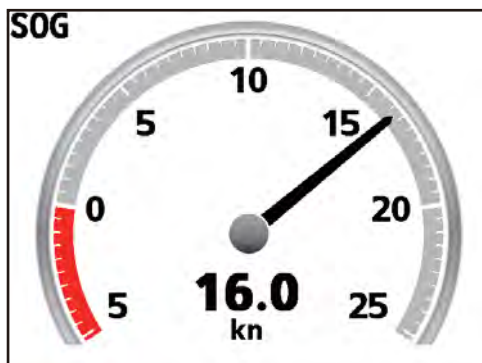
Symbol Location: Left
(The pointer rotates clockwise
as ship's speed increases.)

Symbol Location: Right
(The pointer rotates counterclockwise
as ship's speed increases.)

Symbol Location: Left/Right

When the arrow is displayed on the digital screen for the following menus, you can display the arrow in left-right reversal.

HDG/Speed 3 axis, Speed 2 (or 3) axis, ROT, Wind Direction, Rudder Angle, Rudder Angle Order
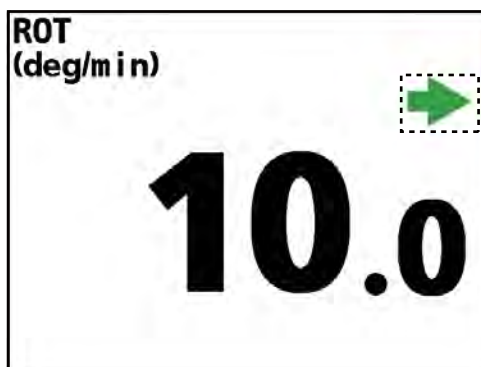
Symbol Location: Left

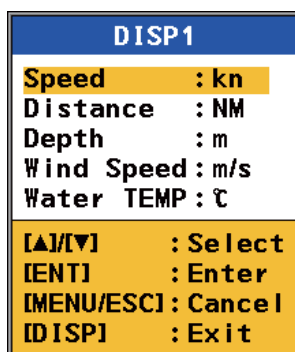Symbol Location: Right
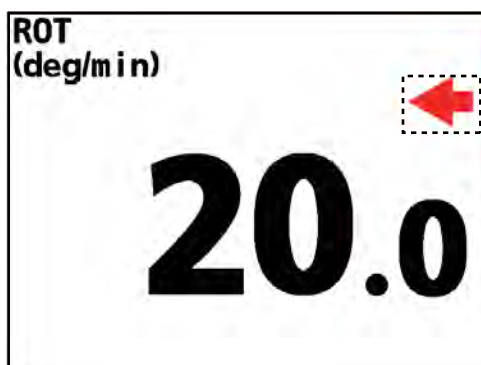
Symbol Location: Left

Symbol Location: Right

1. Press the **MENU/ESC** key to open the menu.

2. Press ▲ or ▼ key to select [Scale Set Up] and press the **ENT** key.

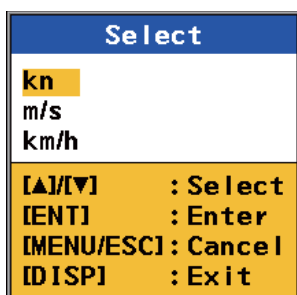3. Press ▲ or ▼ key to select [Symbol Location] and press the **ENT** key.

```
┌─────────────────────────┐
│        Select           │
├─────────────────────────┤
│ Left                    │
│ Right                   │
├─────────────────────────┤
│ [▲]/[▼]      : Select   │
│ [ENT]        : Enter    │
│ [MENU/ESC]   : Cancel   │
│ [DISP]       : Exit     │
└─────────────────────────┘
```
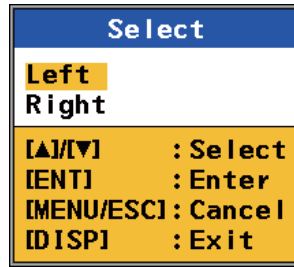
Symbol Location options

4. Press ▲ or ▼ key to select [Left] or [Right] then press the **ENT** key.

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

2.13   System Menu

There are five menus in the [System] menu: [Wind Average], [BRILL], [Speed Select], [TESTS] and [User RESET]. For [TESTS] and [User RESET] menus, see sections 3.3, 3.4 and 3.5.

[Wind Average]: Select the wind averaging time to smooth wind data. The longer the time setting, the more the data is smoothed. The shorter the time setting, the more the wind angle and speed fluctuate. To find the momentary wind angle and speed, select the shorter time. [No Averaging] does not smooth wind data and the measured value is always displayed.

```
┌─────────────────────────┐
│        Select           │
├─────────────────────────┤
│ No Averaging            │
│ 1min                    │
│ 2min                    │
│ 3min                    │
│ 5min                    │
│ 10min                   │
├─────────────────────────┤
│ [▲]/[▼]      : Select   │
│ [ENT]        : Enter    │
│ [MENU/ESC]   : Cancel   │
│ [DISP]       : Exit     │
└─────────────────────────┘
```
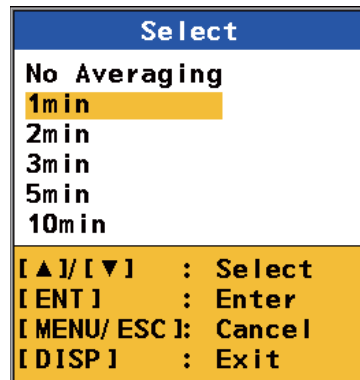
Wind Average options

[BRILL]: Set the key brilliance and the offset for the screen brilliance.

• **[Key BRILL]:** Set the key brilliance. [8] is the brightest.

```
┌─────────────────────────┐
│          SET            │
├─────────────────────────┤
│           ▲             │
│           2             │
│           ▼             │
│         ( 1~8 )         │
├─────────────────────────┤
│ [▲]/[▼]      : Select   │
│ [ENT]        : Enter    │
│ [MENU/ESC]   : Cancel   │
│ [DISP]       : Exit     │
└─────────────────────────┘
```
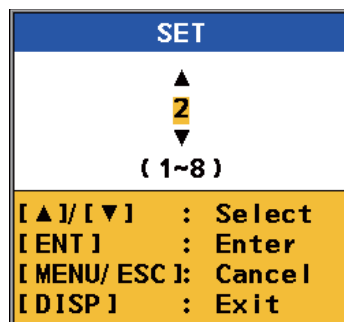
Key BRILL setting window

• **[BRILL OFFSET]:** Set the offset for screen brilliance for the RD-50 (sub) so that the screen brilliance between RD-50 (main) and RD-50 (sub) are the same. [-3] is the darkest and [3] is the brightest.
Note: This function is not available for the RD-50 (main). Main or sub is determined according to the mounting location when you install a RD-50.
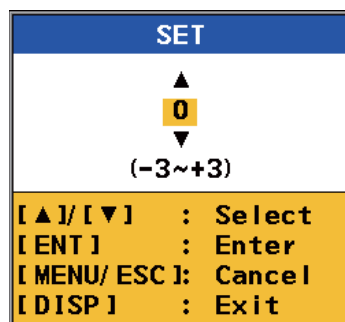
BRILL OFFSET setting window

[Speed Select]: Select the indication of the ship's speed for the speed graphic and speed 1 axis from [Forward-After] or [Vector].

[Forward-After]: Display the ship's speed for the direction of bow and stern. Text or arrow* indication appears (*: only for speed 1 axis).
[Vector]: Display the ship's speed taking into account current (tide) or wind, that is the ship's speed of the actual moving direction. The movement direction indicator is not displayed.
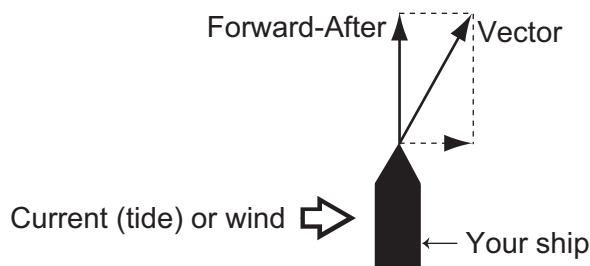
Note: Text indication: [Direction Symbol] → [Text] on the [Scale Set Up] menu (see section 2.11) → "FWD" or "AFT" appears on the screen.
Arrow indication: [Direction Symbol] → [Arrows] on the [Scale Set Up] menu → The up-arrow or down-arrow appears on the speed 1 axis (not for speed graphic) screen.

Speed Select options

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Text indication   Arrow indication

SOG   FWD

4.0
kn
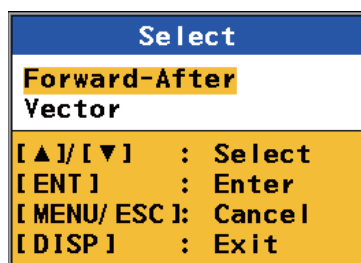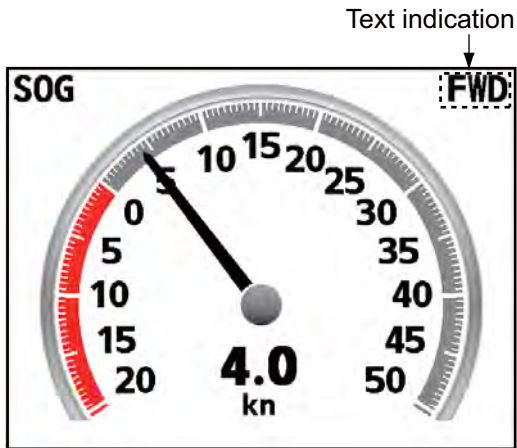
Display: Speed (Graphic)
Speed Select: Forward-After
Direction Symbol: Text

SOG
(kn)

21.5

HDG T
(deg)

245.0

Display: Speed 1 axis
Speed Select: Forward-After
Direction Symbol: Arrows

No indication   No indication

SOG

0.5
kn
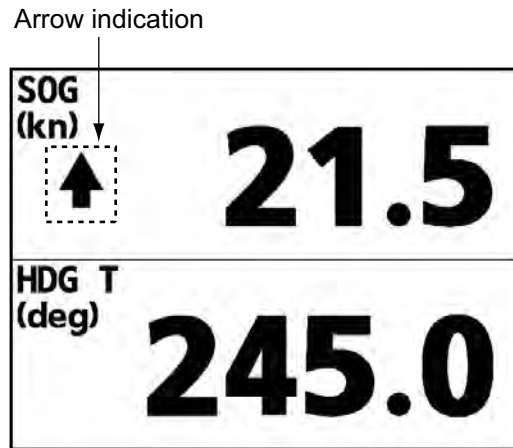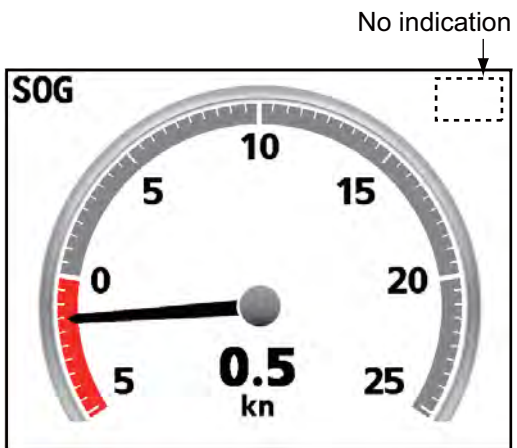
Display: Speed (Graphic)
Speed Select: Vector
Direction Symbol: Arrows/Text

SOG
(kn)

24.0

HDG T
(deg)

145.0
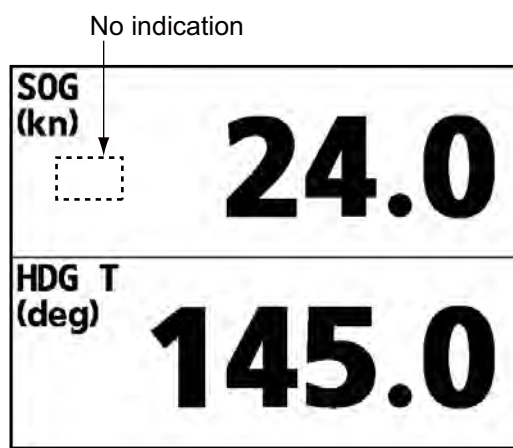
Display: Speed 1 axis
Speed Select: Vector
Direction Symbol: Arrows/Text

Speed Select: Forward-After/Vector

2.14 Time Setup

2.14.1 How to select the time source

You can select the time source from [Internal], [External] or [NAV EQUIP].

1. Press the **MENU/ESC** key to open the menu.

2. Press ▲ or ▼ key to select [Ship's Time] and press the **ENT** key.

```
          Ship's Time
   Source      :NAV EQUIP
   Summer Time :OFF

   [▲]/[▼]    : Select
   [ENT]      : Enter
   [MENU/ESC]: Cancel
   [DISP]     : Exit
```
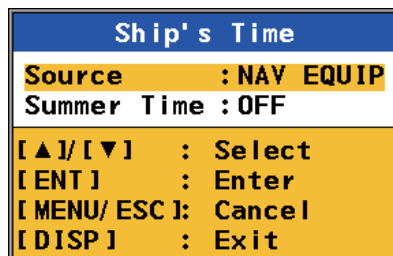
Ship's Time options

3. Press ▲ or ▼ key to select [Source] and press the **ENT** key.

```
            Select
   Internal :  00:00
   External
   NAV EQUIP

   [▲]/[▼]    : Select
   [ENT]      : Enter
   [MENU/ESC]: Cancel
   [DISP]     : Exit
```
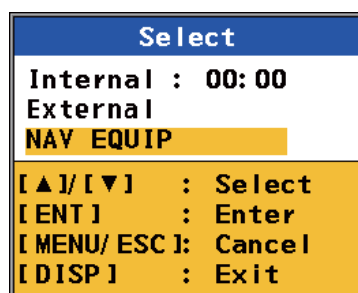
Source options

4. Press ▲ or ▼ key to select [Internal], [External] or [NAV EQUIP] then press the **ENT** key. If you selected [Internal], go to step 5. For the others, go to step 6.
    [Internal]: Display the local time using own RD-50 data which is set at step 5.
    [External]: Only for the RD-50 (sub). When you connect multiple RD-50s in a daisy chain, display the time using the RD-50 (main) data. In this case the RD-50 (main) should be set to [Internal] or [NAV EQUIP]. When you set the [Remote Dimmer] to [Main] on the [Service menu], this option is not available.
    [NAV EQUIP]: Display the time data from the navigational equipment.

5. For [Internal], press ▲ or ▼ key to set the time differences from UTC (Universal Time Coordinated) at 15 minutes intervals and press the **ENT** key.

```
        Local Time ADJ
              ▲
            00:00
              ▼
      (-13:00~+13:00)
         Step 00:15

   [▲]/[▼]    : Select
   [ENT]      : Enter
   [MENU/ESC]: Cancel
   [DISP]     : Exit
```
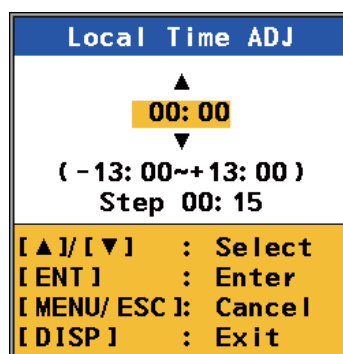
Internal setting window

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6. Press the **DISP** key to close the menu.

Example 1

The last RD-50 (main) is the source data.

The last RD-50 (main) is the source data.

Time data (ZDA) — RD-50 (main) — RD-50 (sub) — RD-50 (sub) ------- RD-50 (main) — RD-50 (sub) ----

[NAV EQUIP]　[Internal]　[External]　　　　　　[Internal]　　　[External]
UTC　　　　　Local <A>　 UTC　　　　　　　　 Local <B>　　　 Local <B>
　　　　　　　　　　　　　　　　　　　　　　　　(time differences
　　　　　　　　　　　　　　　　　　　　　　　　from ZDA)

Example 2

Time data (ZDA) — RD-50 (main) — RD-50 (sub) — RD-50 (sub) ----------

[NAV EQUIP]　[Internal]　[Internal]
UTC　　　　　Local <A>　 Local <B>
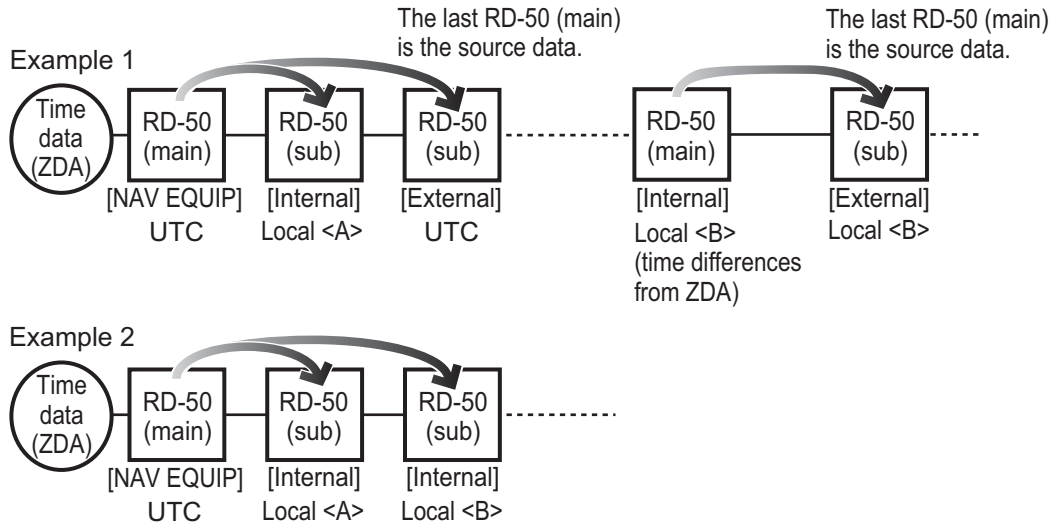
Examples for time source setting in the daisy chain connection

2.14.2　How to set the summer time

You can show the time in daylight saving time.

1. Press the **MENU/ESC** key to open the menu.
2. Press ▲ or ▼ key to select [Ship's Time] and press the **ENT** key.
3. Press ▲ or ▼ key to select [Summer Time] and press the **ENT** key.

```
        Select
 ON
 OFF

 [▲]/[▼]     : Select
 [ENT]       : Enter
 [MENU/ESC] : Cancel
 [DISP]      : Exit
```
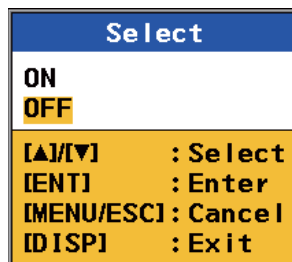
Summer Time options

4. Press ▲ or ▼ key to select [ON] or [OFF] then press the **ENT** key. Select [ON] to show daylight saving time.
5. Press the **DISP** key to close the menu.

2.15 Trip Distance

You can select the distance data for the trip distance, from [Internal] or [External]. Also, you can set the preset distance to display the trip distance.

1. Press the **MENU/ESC** key to open the menu.

2. Press ▲ or ▼ key to select [Trip DIST] and press the **ENT** key.

```
        Trip DIST
  Internal
  External

  [▲]/[▼]    : Select
  [ENT]      : Enter
  [MENU/ESC]: Cancel
  [DISP]     : Exit
```
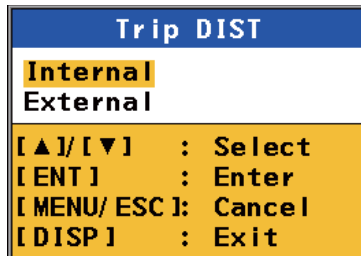
Trip DIST options

3. Press ▲ or ▼ key to select [Internal] or [External] then press the **ENT** key. If you selected [Internal], go to step 4. For [External], go to step 6.
   [Internal]: Display the trip distance which is counted up based on the inner setting of this equipment. See steps 4 and 5 for how to preset distance.
   [External]: Display the trip distance using data from external equipment.

4. For [Internal], press ▲ or ▼ key to select [SET] and press the **ENT** key.

```
         Internal
  SET    : 000000.0NM
  RESET

  [▲]/[▼]    : Select
  [ENT]      : Enter
  [MENU/ESC]: Cancel
  [DISP]     : Exit
```

Internal options

```
           SET
           ▲
      000000.0NM
           ▼
         (0~9)

  [▲]/[▼]    : Select
  [ENT]      : Enter
  [MENU/ESC]: Cancel
  [DISP]     : Exit
```
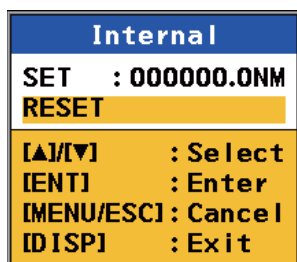
SET setting window

5. Set the preset distance. Press ▲ or ▼ key to set the value for the highest-order digit and press the **ENT** key. The cursor moves to the next digit. Repeat this step to set the value for ALL digits. To return the cursor to the upper digit, press the **MENU/ESC** key.
   Note: Be sure to enter ALL digits. Otherwise the setting is not saved.

   To reset the trip distance, select [RESET] and press the **ENT** key.

6. Press the **DISP** key to close the menu.

How to reset the trip distance at data screen

You can reset the trip distance by long-pressing the **ENT** key at the trip distance data screen.

Note: This operation is not available in the [External] mode.
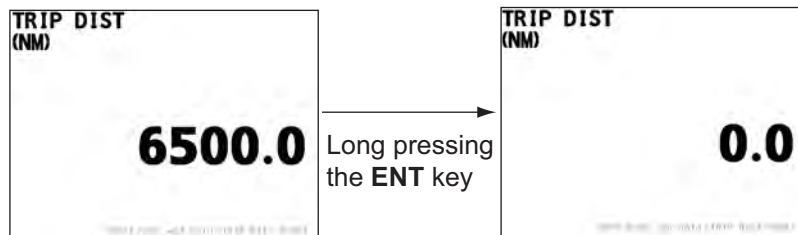
2.16 Operation with RD-501

You can change the scale/indication with the **MODE** key and the unit of measurement with the **UNIT** key.

Operation on the no-split screen

1. Press the **DISP** key to select the screen which you want to change the setting.
2. Press the **MODE** key or the **UNIT** key to select desired setting.

Operation on the divided screen

1. Press the **DISP** key to select the screen which you want to change the setting.
2. Press the **MODE** key or the **UNIT** key to display the cursor in yellow.
3. Press the **DISP** key to select the menu items which you want to change the setting.

Cursor (yellow) highlights currently selected menu item.
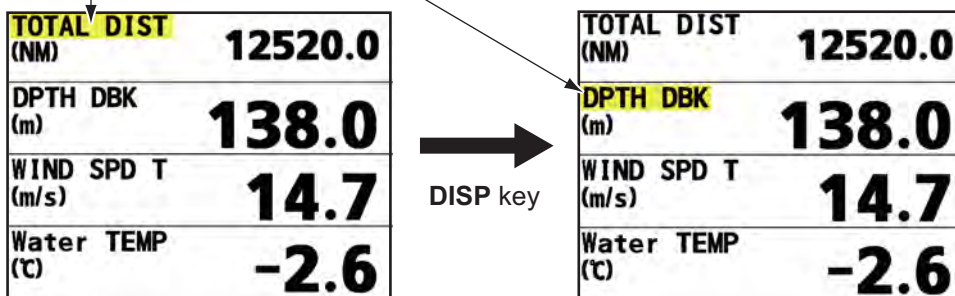
4. Press the **MODE** key or the **UNIT** key to change the setting.
5. Repeat steps 2 to 4 to change other settings.
6. Press the **DISP** key till the cursor (yellow) turns off.

3. MAINTENANCE, TROUBLE-SHOOTING

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.

3.1 Maintenance

Check the following points regularly to maintain performance:

- Check that connections on the rear panel are firmly tightened and free of dust.
- Check that the ground is free of rust and the ground wire is tightly fastened.
- Remove dust or dirt from the cabinet with a soft, dry cloth. For stubborn dirt, you can use water-diluted mild detergent. Clean the cabinet with a dry cloth after you use detergent. Do not use solvents like thinner, acetone or benzene to clean the unit. They can remove paint and indications.
- Wipe the LCD carefully to prevent scratching, using 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.

3.2 Life of the Parts

Fuse replacement

The fuse in the remote display protects the equipment from overcurrent and equipment fault. If the fuse blows, find the cause before you replace the fuse. Use the correct fuse supplied as spare parts. A wrong fuse can damage the equipment.

Fuse location (Rear panel: cable cover removed)

> ⚠ **WARNING**
>
> **Use the correct fuse.**
>
> A wrong fuse can damage the equipment and cause fire.

Type	Code No.	Remarks
FGMB 125V 2A PBF	000-157-479-10	12-24 VDC

LCD backlight life

The life of the LCD backlight, which provides the illumination for the LCD, is approximately 50,000 hours at 25°C (77°F) (ambient temperature). The actual number of hours depends on ambient temperature and humidity. The display brilliance cannot be raised when the backlight has worn out. When brilliance cannot be raised, have a qualified technician replace the backlight.

3.3 Diagnostic Test

The diagnostic test checks the system for correct operation.

1. Press the **MENU/ESC** key to open the menu.

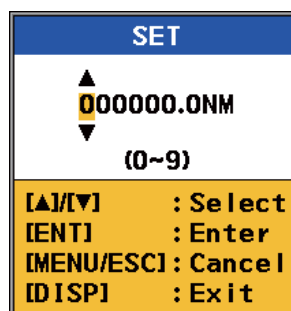2. Press ▲ or ▼ key to select [TESTS] and press the **ENT** key.
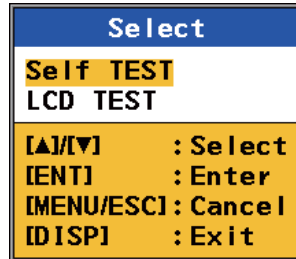
TESTS options

3. Press ▲ or ▼ key to select [Self TEST] and press the **ENT** key.
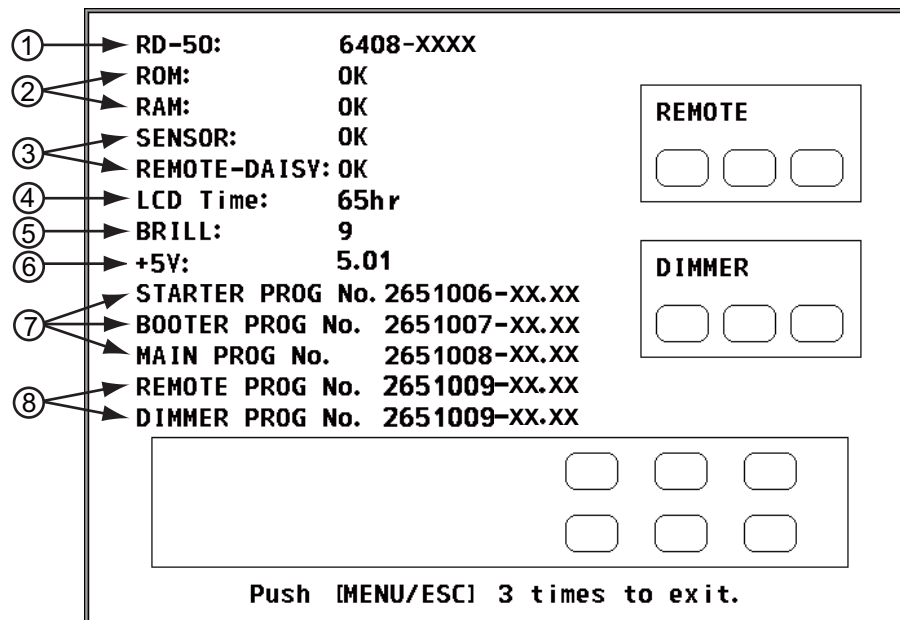
XXXX: Serial number
XX.XX: Program version number

Self TEST screen

Self test items

No.	Items	Description
1	Model name, serial number	The model name "RD-50" and its serial number are displayed.
2	ROM, RAM	The results of the ROM/RAM test are displayed as "OK" or "NG" (No Good). If any NG is displayed, contact your dealer.
3	Serial loopback test (SENSOR, REMOTE-DAISY)	A test jumper is required for this test. (The result is blank if no jumper is connected.) The result of the loopback test is displayed as "OK" or no indication (means NG). (Field technician only)

No.	Items	Description
4	LCD Time	The accumulative operation time of LCD (maximum: 999999 hours) is displayed.
5	BRILL	The current setting of brilliance is displayed.
6	+5V line voltage	The voltage of the +5V line is displayed.
7	Program version (STARTER, BOOTER, MAIN)	Each program number and its program version numbers are displayed.
8	Program version (REMOTE (RD-501), DIMMER (RD-502))	

4. Press each key for RD-50, RD-501 or RD-502 one by one. A key's on-screen location turns red if the key is normal. When you press the key again, red changes to white.

5. Press the **MENU/ESC** key three times to escape from the test.

6. Press the **DISP** key to close the menu.

3.4 LCD Test

1. Press the **MENU/ESC** key to open the menu.

2. Press ▲ or ▼ key to select [TESTS] and press the **ENT** key.

3. Press ▲ or ▼ key to select [LCD TEST] and press the **ENT** key.

4. Press the **ENT** (or **DISP**, **DAY/NT**) key repeatedly. The screen changes as follows.

Operating explanation   Black   White   Red

Green   Blue   6 tones of gray   6 tones of red

6 tones of green   6 tones of blue   Menu
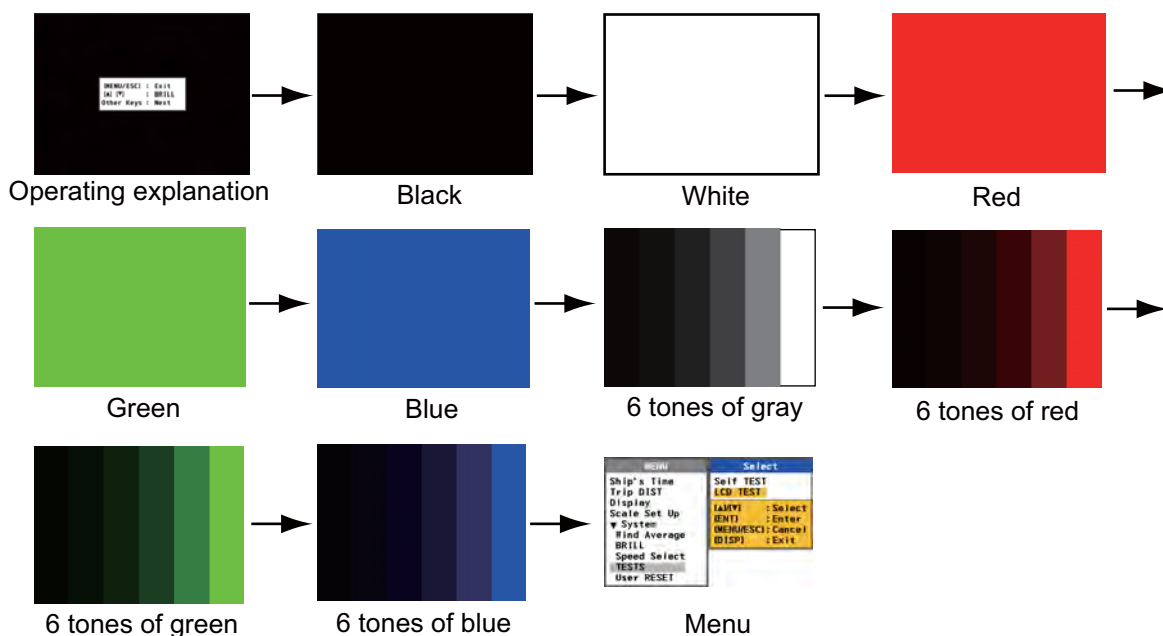
LCD TEST screen

5. Press the **DISP** key to close the menu.
   Note 1: You can cancel the test any time when you press the **MENU/ESC** key. The menu screen appears.
   Note 2: You can adjust the display brilliance with ▲ or ▼ key during the test.

3.5 How to Reset the User Settings

You can restore all settings except setting in the [Trip DIST] menu.

1. Press the **MENU/ESC** key to open the menu.

2. Press ▲ or ▼ key to select [User RESET] and press the **ENT** key.

```
         Select
Yes
No

[▲]/[▼]    :Select
[ENT]      :Enter
[MENU/ESC]:Cancel
[DISP]     :Exit
```
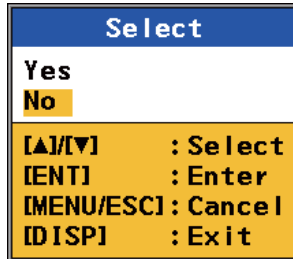
Use RESET options

3. Press ▲ key to select [Yes] and press the **ENT** key. The confirmation message appears.

```
   Are you sure?
Yes
No

[▲]/[▼]    :Select
[ENT]      :Enter
[MENU/ESC]:Cancel
[DISP]     :Exit
```
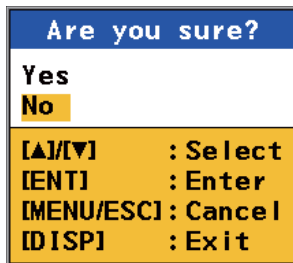
Confirmation options

4. Press ▲ key to select [Yes] and press the **ENT** key. The equipment restarts with the default settings.

3.6   Simulation Mode

A simulation mode, which shows internally generated navigation data, is provided to acquaint you with the features of the RD-50. "SIM" appears on the screen when the simulation mode is turned on.

1. While you hold down the **DISP** key, press the **PWR** key to turn on the power.

```
UNIT Name        :RD-50
Serial No        :6408-XXXX
PWB No           :26P0006-XX
Remote Dimmer    :Main
Depth Select     :Auto
Depth Position   :Single
L/L Digit        :4digit
Without Checksum :Enable
I/O Port
 Port1           :4800
 SIO Monitor
Sensor Out       :ON
LCD RESET
SIM              :OFF
Service RESET

[▲]/[▼]:Select
[ENT] :Enter
```
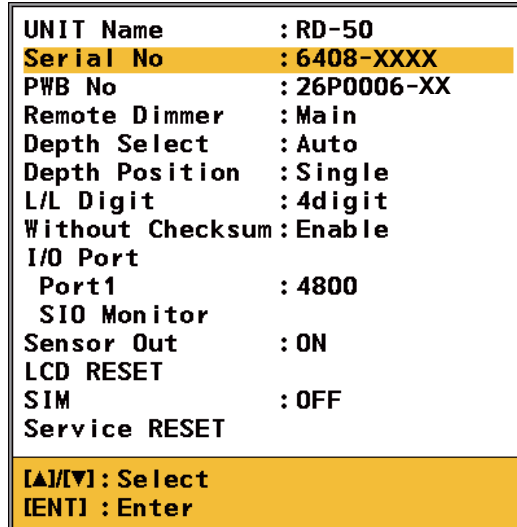
XXXX: Serial number
XX: Program version number

Service menu

2. Press ▲ or ▼ key to select [SIM] and press the **ENT** key.

```
        Select
ON
OFF

[▲]/[▼]      :Select
[ENT]        :Enter
[MENU/ESC]:Cancel
```
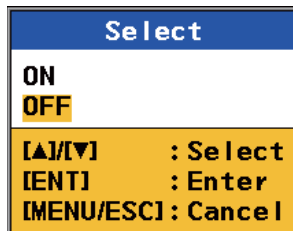
SIM options

3. Press ▲ or ▼ key to select [ON] and press the **ENT** key.

4. Press the **PWR** key to turn off the power.

5. Press the **PWR** key again to turn on the power. The simulation mode starts.
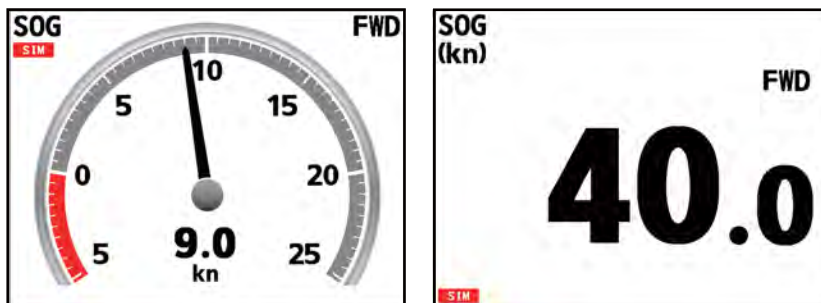
Examples of simulation screen

6. To stop the simulation mode, press the **PWR** key to turn off the power. Do step 1 to re-apply the power. Whenever you open the service menu, the [SIM] menu is set to [OFF].

7. Press the **PWR** key to turn off the power.

3.7 Parts Location and Parts List

Parts Location

RD-50
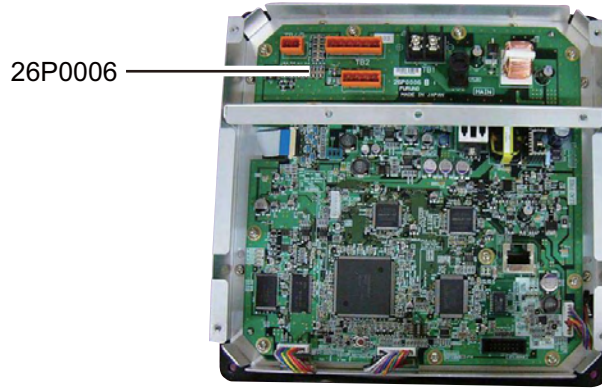
Rear cover opened

26P0006

LCD
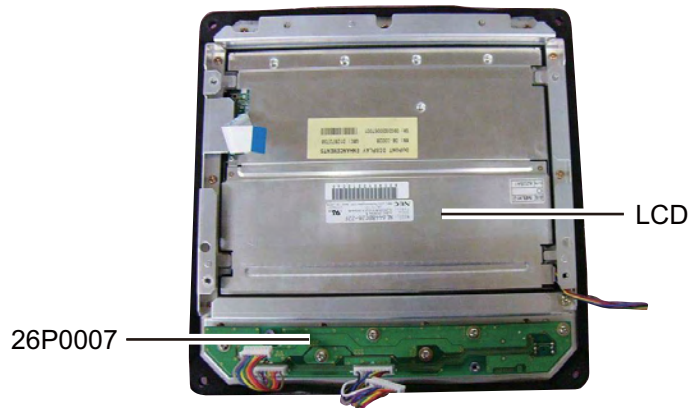
26P0007

26P0006 board removed

RD-501/502

RD-501: 26P0012A
RD-502: 26P0012B
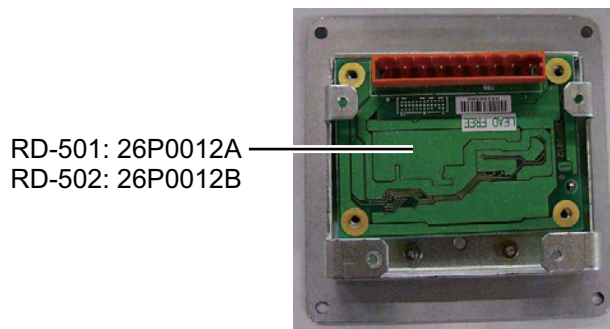
Cover opened

Parts List

ELECTRICAL PARTS

Model	RD-50
Unit	Remote display RD-50

PRINTED CIRCUIT BOARD	Code No.
26P0006, MAIN	001-092-250
26P0007, PNL	001-092-230
LCD	**Code No.**
NL6448BC26-22F	000-171-704-10

ELECTRICAL PARTS

Model	RD-501
Unit	Remote controller RD-501

PRINTED CIRCUIT BOARD	Code No.
26P0012A, RMT	001-092-320

ELECTRICAL PARTS

Model	RD-502
Unit	Dimmer controller RD-502

PRINTED CIRCUIT BOARD	Code No.
26P0012B, RMT	001-092-370

4. INSTALLATION

4.1 Equipment List

Standard supply

Name	Type	Code No.	Qty	Remarks
Remote Display	RD-50	-	1	
Installation Materials	CP26-01501*	-	1	
Accessories	FP26-00601*	-	1	
Spare Parts	SP26-00101	001-076-380-00	1	Fuse (2 pcs., FGMB 125V 2A PBF, 000-157-479-10)

Optional supply

Name	Type	Code No.	Remarks
Remote Controller	RD-501	-	CP26-01101*
Dimmer Controller	RD-502	-	CP26-01201*
Hanger	OP26-8	000-016-313-00	
Waterproof Box	DS-605	000-016-398-00	

*: See the Packing lists.

4.2 Installation of Remote Display

Mounting considerations

The remote display can be installed on a desktop, on the underside of a table, or flush mounted in a panel. When you select a mounting location, keep in mind the following points:

- The nominal viewing distance for the remote display is 1 m. Select a suitable mounting location considering that distance.
- Locate the remote display away from exhaust pipes and vents.
- Select an installation location that is well ventilated.
- Locate the remote display where shock and vibration are minimal.
- Locate the remote display away from equipment which generates the electromagnetic fields like a motor or generator.
- Allow enough maintenance space at the sides and rear of the remote display and leave enough slack in cables to facilitate maintenance and servicing.
- Observe the compass safe distances (see page ii) to prevent the interference to a magnetic compass.

Flush mounting

See the outline drawing in the back of this manual.

1. Make a cutout in the mounting location as shown in the illustration below.

2. Make four pilot holes for self-tapping screws (diameter: 5 mm) in the location indicated in the illustration below.

3. Insert the sponge to the remote display from the rear side.

4. Set the remote display to the cutout and fasten the remote display with four self-tapping screws (5x20).

5. Set a cosmetic cap to each fixing hole on the front panel. (See "How to set the cosmetic cap" on page 4-4.)
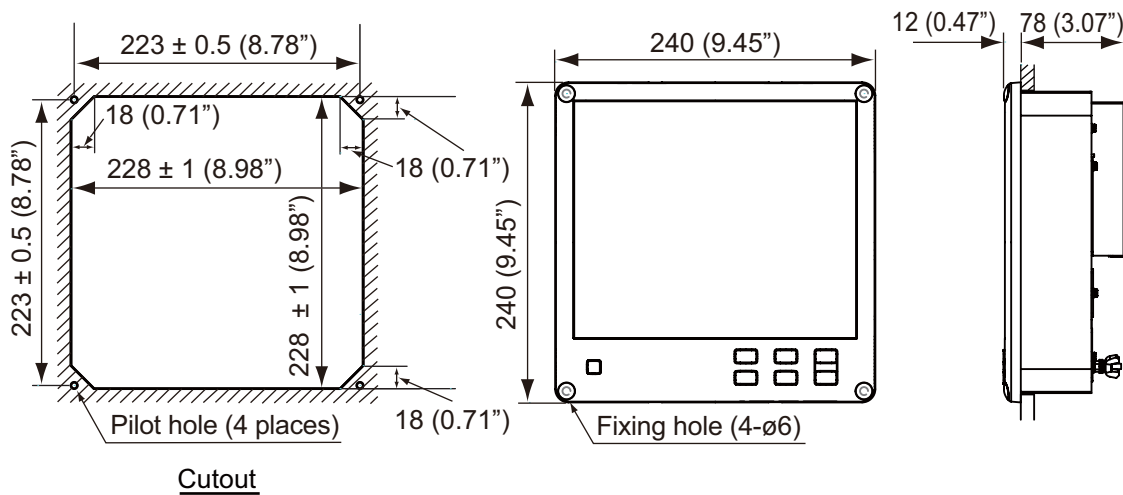
Cutout

Note: When you fasten the remote display to the cutout after you connect the cable to the remote display, first connect the cables referring to section 4.5.

Desktop or table underside mounting

The remote display can be mounted on a desktop or on the underside of a table using the optional hanger. See the outline drawing for details.

Hanger assembly (Type: OP26-8, Code No.: 000-016-313-00)

Name	Type	Code No.	Qty
Self-tapping screw	5x20	000-171-997-10	4
Binding head screw	M5x12	000-171-999-10	4
Hanger assy.	OP26-8-1	001-081-920-00	1

1. Remove the hanger mounting plate from the hanger assembly.

2. Fasten the hanger mounting plate to the remote display from the left side and right side with four binding head screws (M5x12).

Hanger mounting plate (left side)

Screw (M5x12)
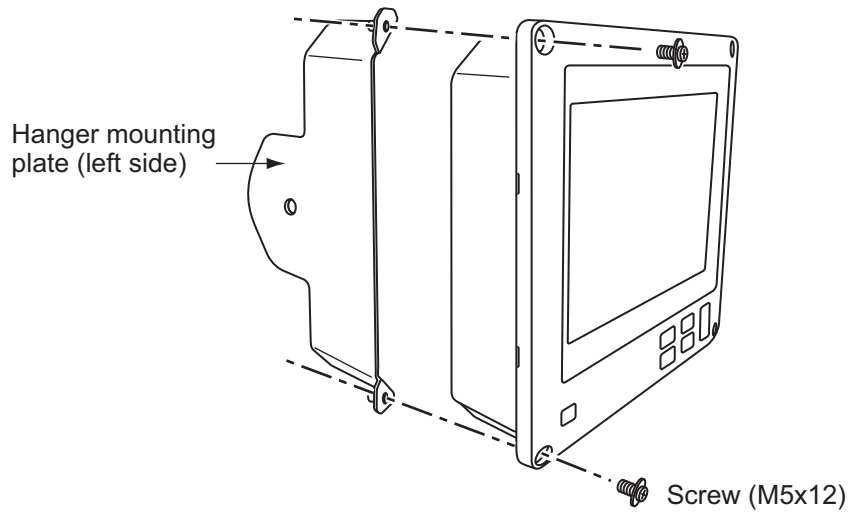
3. Make a four pilot holes for self-tapping screws (5x20) in the mounting location.

4. Fix the hanger to the mounting location with four self-tapping screws (5x20).

5. Insert a washer to each knob (right and left) and fix the washer to the remote display loosely.

6. Set the remote display to the hanger.

7. Tighten the knobs to fasten the hanger to the remote display.

8. Set a cosmetic cap to each fixing hole on the front panel. (See the following "How to set the cosmetic cap".)

Fixing hole (4-ø7)

190 ± 0.5 (7.48")

75 ± 0.5 (2.95")

40 (1.57")

288 ± 5 (11.34")

240 (9.45")

240 (9.45")

260 ± 5 (10.24")

51 ± 5 (2.01")   149 (5.87")

91 (3.58")

279 ± 5 (10.98")
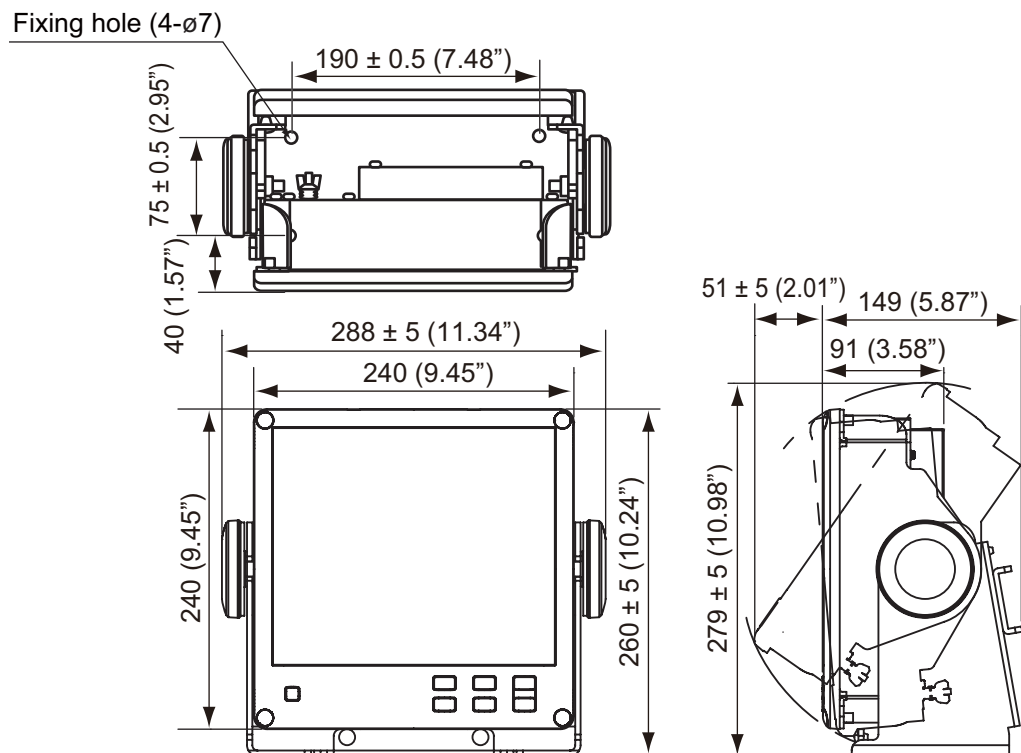
How to set the cosmetic cap

Set a cosmetic cap to each fixing hole on the front panel in reference to the following illustration.

Set cosmetic cap to hole so cap is flush with panel.
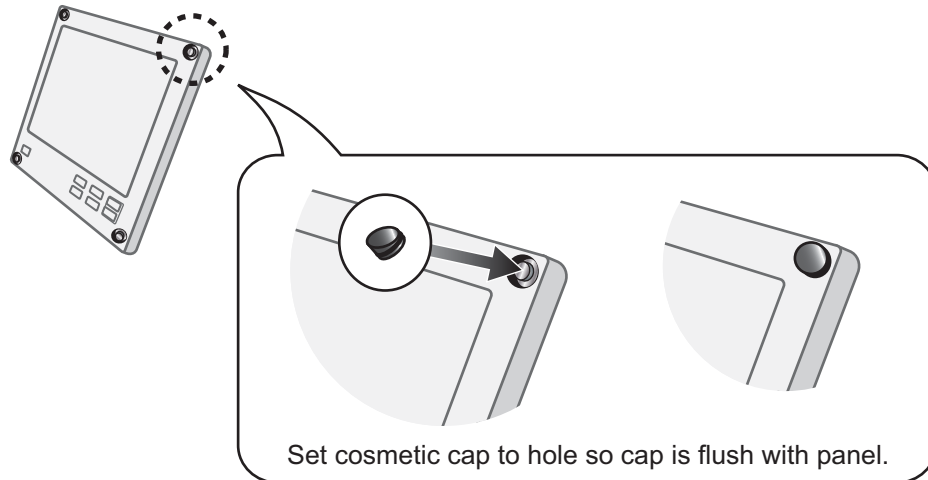
4.3 Installation of Remote Controller and Dimmer Controller

The optional remote controller RD-501 and dimmer controller RD-502 can be flush mounted in a panel. The size and the mounting procedure are shared by RD-501 and RD-502. For the mounting location, refer to the mounting considerations for the remote display in section 4.2.

Flush mounting

1. Make a cutout in the mounting location (88 mm (width) x 76 mm (height)).

2. Make four holes of $\phi4$ in the locations indicated in the illustration below.

3. Set the remote controller or dimmer controller to the cutout. Insert four binding head screws (M3x12) from the front side then fasten the unit with four sets of flat washers, spring washers and hexagonal nuts from the rear side.

Fixing hole (4-ø4)
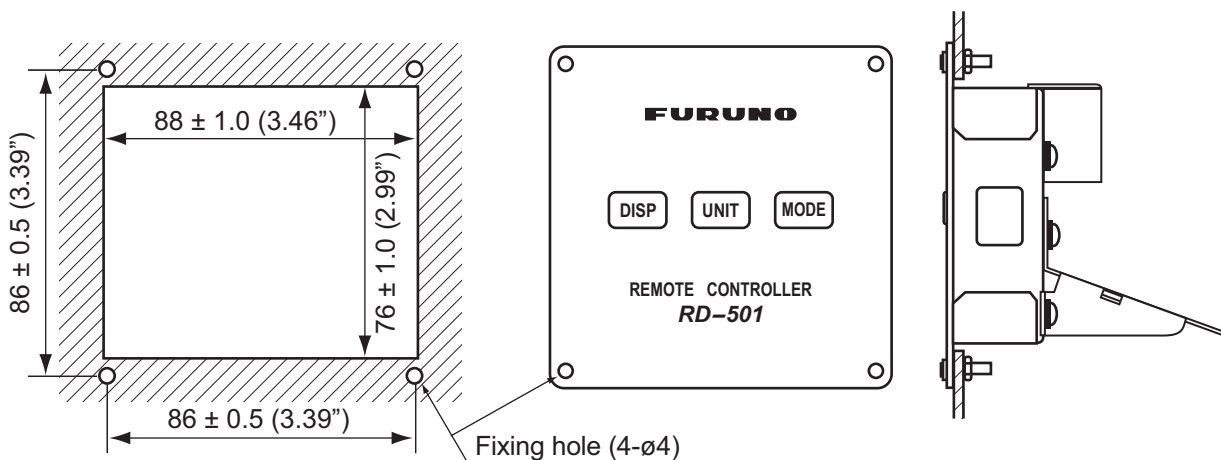
Note: When you fasten the remote controller or dimmer controller to the cutout after you connect the cable to the remote controller or dimmer controller, first connect the cables referring to section 4.5.

4.4 Installation of Remote Display with DS-605 (Waterproof Box)

For installation of the remote display on the wings of the bridge, use the optional waterproof box DS-605. Fix the DS-605 on the bulkhead and set the remote display therein.

Installation materials for DS-605 (Type: CP66-01731, Code No.: 001-082-660-00)

Name	Type	Code No.	Qty
Seal washer	03-001-3002-0 ROHS	300-130-020-10	4
Gasket	26-003-1605	100-355-310-10	1
Washer	26-003-1607	100-355-320-10	2
Cable gland washer*	For JIS F8801 25C	000-172-238-10	2
Cable gland inner gasket*	For JIS F8801 25C	000-171-892-10	1
Silicon rubber	S-8400W Aluminum tube 50G	000-158-483-10	1

*: Not for the RD-50 but for the DS-60.

Mounting considerations

The DS-605 has waterproofing protection of IP56. When you select a mounting location for the waterproof box, keep in mind the following points.

- Keep the unit away from electromagnetic field-generating equipment like motors and generators.
- For maintenance and checking purposes, leave enough space at the sides of the unit and leave slack in cables. Refer to page D-5.
- A magnetic compass will be affected if the waterproof box is too close to the magnetic compass. Observe the compass safe distances (see page ii) to prevent interference to a magnetic compass.

Mounting procedure

Note: Mount the DS-605 on the bulkhead so the cable glands and the drain hole are down.

1. Fix the DS-605 on the wings of the bridge.
    1) Insert the seal washer to four fixing holes.

2) Fix the DS-605 with four M10 bolts (dockyard supply).

340 (13.39")
62 (2.44")
176 ± 0.5 (6.93")

Fixing holes
4-ø12

Cable gland

310 ± 0.5 (12.20")

Note: Mount the unit so the cable glands are down.
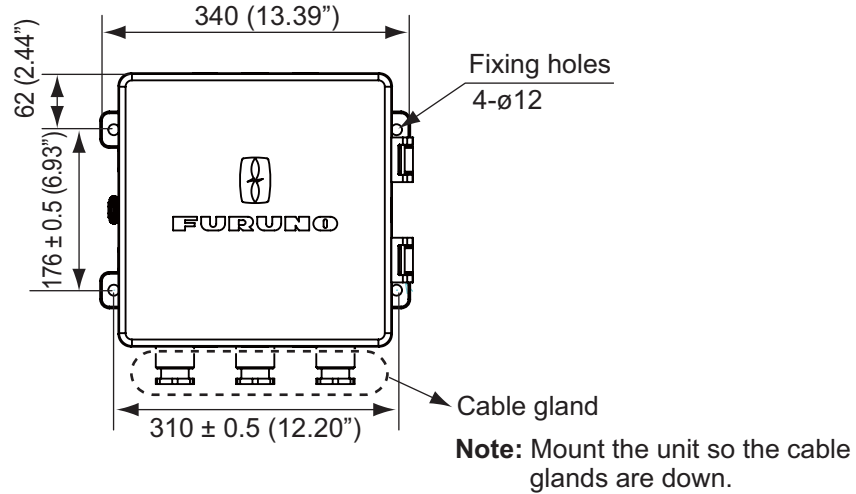
3) Apply silicon rubber to M10 bolts as shown below.

Apply silicon rubber.
M10 bolt
Seal washer
Nut
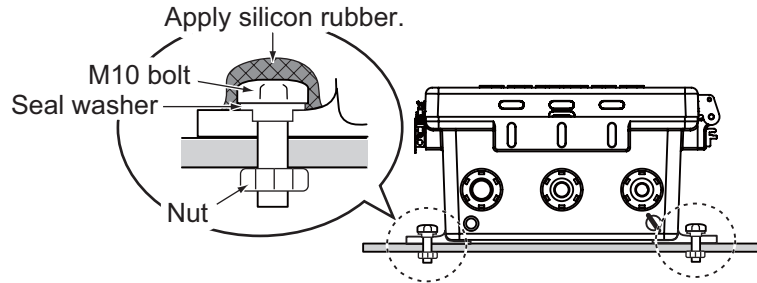
2. Connect the power cable and the sensor signal cable to the RD-50 through the cable glands for the DS-605.

1) Process the power cable and the sensor signal cable referring to the illustration below.

DPYCY-1.5

70
7
40
Armor
Vinyl sheath
M4
Vinyl tape
Fix armor by cable clamp.

TTYCYS-1

80 (for TB3)
7
35
Shield
130
Vinyl sheath
Vinyl sheath
Vinyl tape
Armor
Fold back and wrap internal shield and fix it by cable clamp.
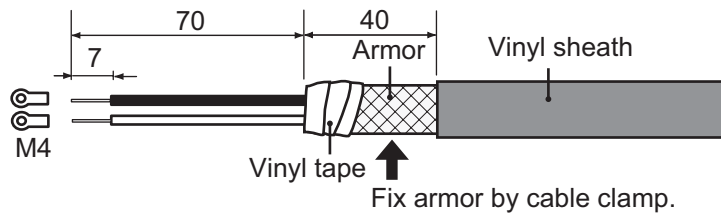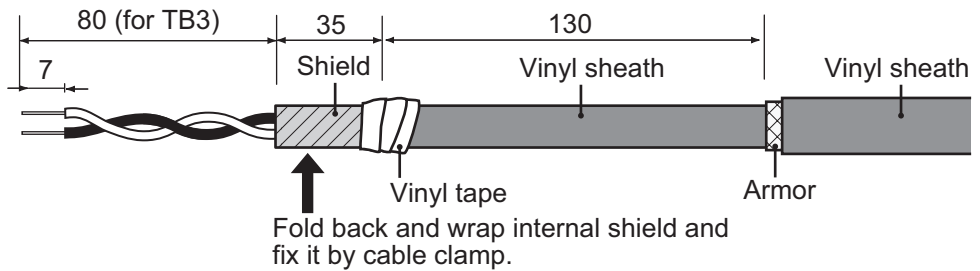
2) **For the power cable,** unfasten the clamping gland and remove washers and gasket from the DS-605. Discard the washers and gasket. Pass the clamping gland, washer (26-003-1607), gasket (26-003-1605) and washer (supplied as installation materials) onto the power cable, in that order.
Note: Do not use the washers and gasket which are removed from the cable gland of the DS-605.

3) **For the sensor signal cable,** unfasten the clamping gland and remove washers and gasket from the DS-605. Pass the clamping gland, washer, gasket and washer onto the the sensor signal cable, in that order.

4) Pass each cable through assigned cable gland.

Power cable   Sensor signal cable
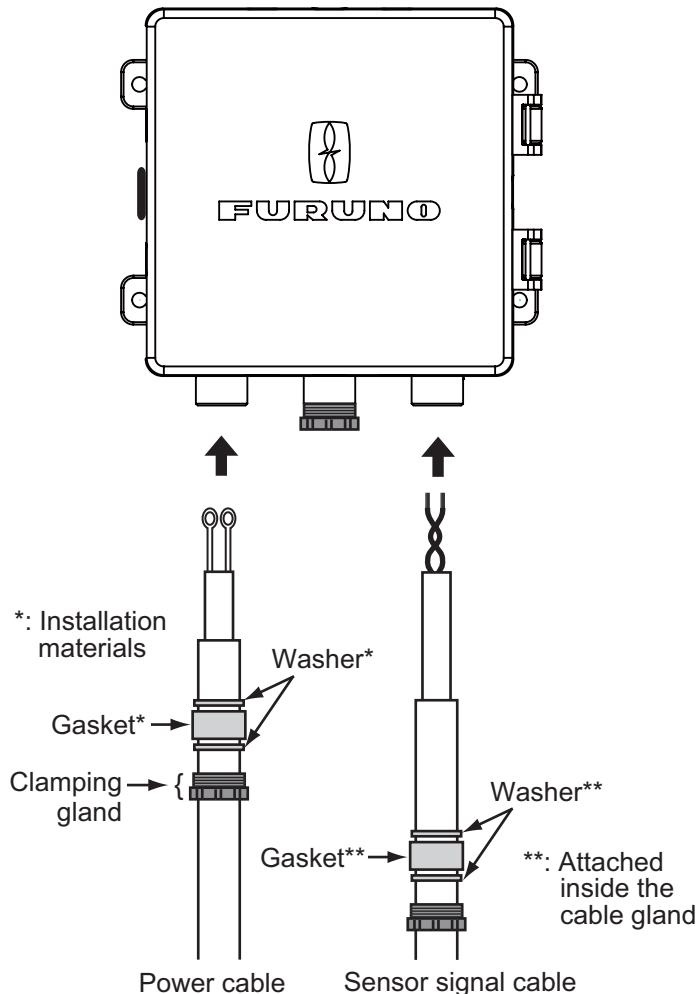
5) Put the flush mounting sponge to the flange from the rear side of the RD-50.

6) Open the front cover of the DS-605 and connect the ground wire attached inside the DS-605 to the ground terminal on the rear of the RD-50.

7) Connect the cables to the RD-50. Refer to section 4.5.

3. Remove each binding head screw from four corners of the DS-605 and set the RD-50 to the DS-605.

4. Apply silicon grease to the binding head screws and fix the RD-50 to the DS-605 with four binding head screws.

5. Tighten the clamping glands to fix the cables.

6. Apply the putty to the cable glands for waterproofing.

7. Connect the ground terminal for the DS-605 to the ground terminal on the hull with the IV-1.25 sq wire.

How to change orientation of the front cover of DS-605

The front cover of the DS-605 can be oriented up, down, right or left. To change the orientation of the front cover, do the following:

1. Remove eight screws from two hinges.
2. Remove two screws from the latch.
3. Remove the hinges and the hidden lids for fixing hole of latch in consideration of the opening direction.
   The hidden lids for fixing hole of latch are taped on each side.
4. Orient the front cover as desired and fix the hinges and latch.
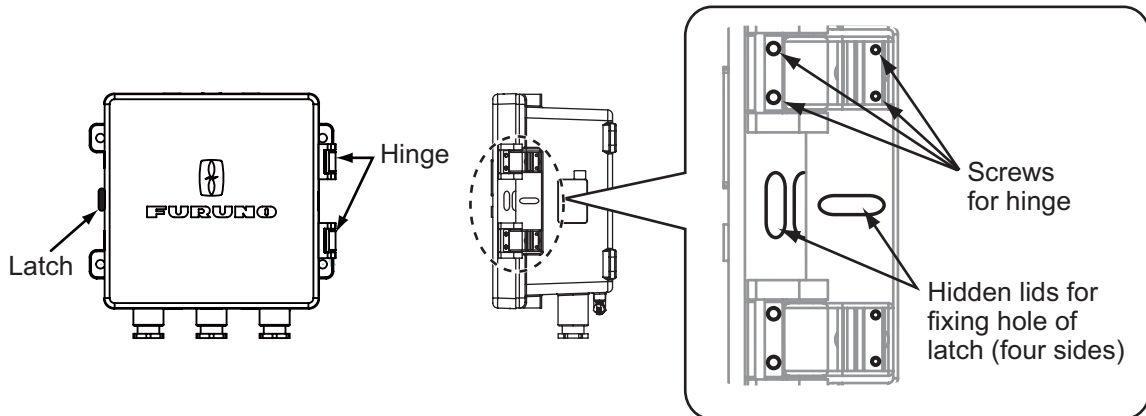
Note: Set the front cover so the FURUNO logo on the cover is right side up. The drain hole should be down.

4.5 Wiring

Interconnection

Refer to the interconnection diagram (page S-1) to connect cables.

Single remote display

Signal	TB2
RD1A	3
RD1B	4

TB1	
1	+
2	−

Sensor signal (NMEA 0183)
TTYCS-1, TTYCYS-1 (max. 30 m)

DPYCY-1.5, DPYC-1.5

12-24 VDC

IV-1.25 sq
To ground terminal on hull

Signal	RD-501	RD-50/TB-3	Signal
TD2A	1 ——— 1		RD2A
TD2B	2 ——— 2		RD2B
Vin	3 ——— 3		Vout
GND	4 ——— 4		GND

Dimmer controller RD-502

Remote controller RD-501

TTYCS-4

TTYCS-4

Signal	RD-502	RD-501	Signal
TD2A	1 ——— 6		RD2A
TD2B	2 ——— 7		RD2B
Vin	3 ——— 8		Vout
GND	4 ——— 9		GND
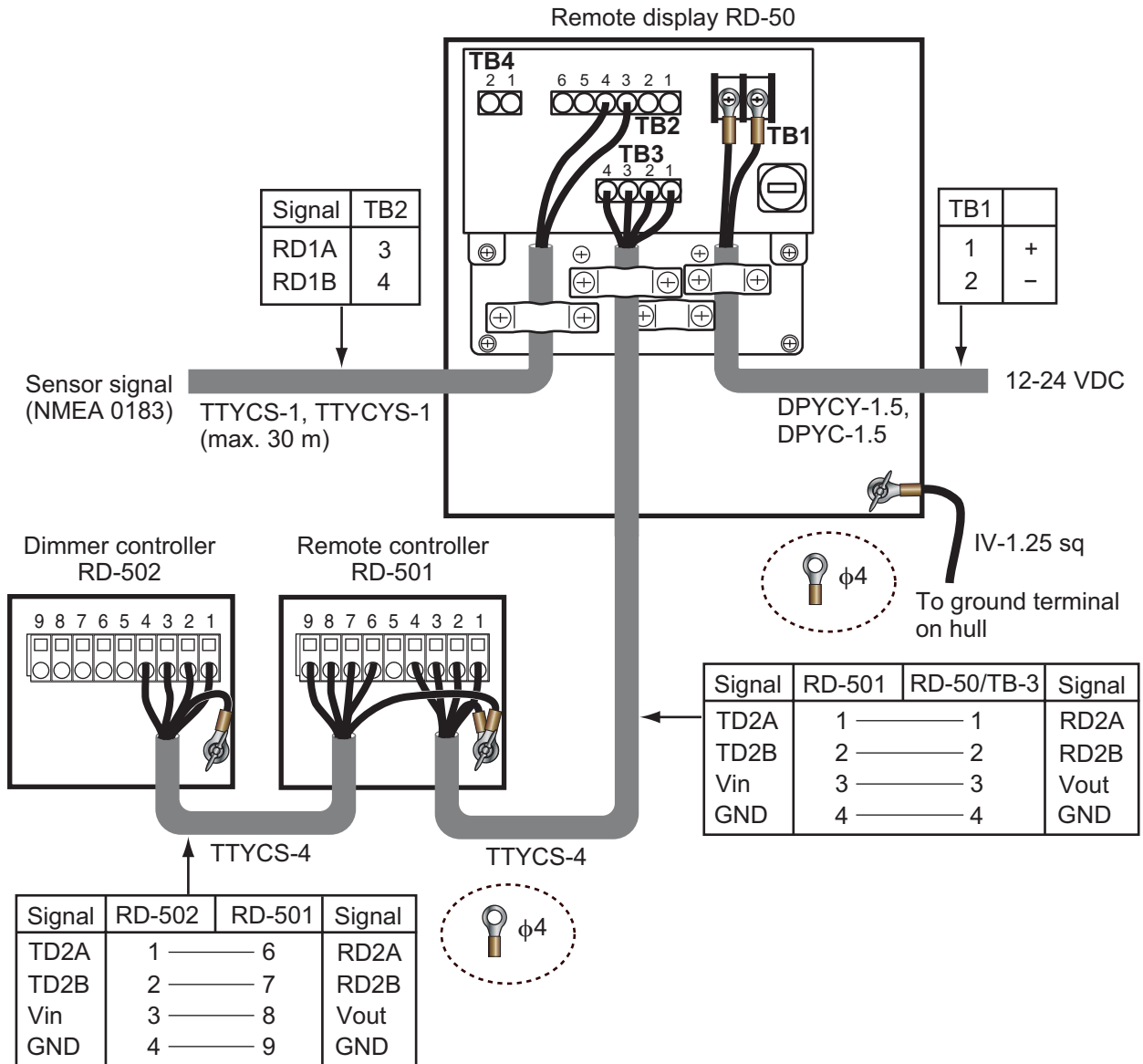
Example of multiple remote displays (daisy chain connection)

Pattern 1: Sensor signal and dimmer are commonly used. A total of 10 remote display units can be connected in a daisy chain. A maximum of nine sub remote display units can be connected.

RD-50 daisy chain

RD-50 and RD-20 combination daisy chain

RD-50: A (main)

RD-20: B (main)

RD-50: C (sub)

RD-20: D (sub)

RD-50: E (sub)

FURUNO RD-50

FURUNO RD-20

FURUNO RD-50

FURUNO RD-20

FURUNO RD-50

12-24 VDC

NMEA 0183 sensor signal

RD-501

12-24 VDC

RD-501

12-24 VDC

RD-501

12-24 VDC

RD-501

12-24 VDC

RD-501

FURUNO
REMOTE CONTROLLER RD-501

FURUNO
REMOTE CONTROLLER RD-501

FURUNO
REMOTE CONTROLLER RD-501

FURUNO
REMOTE CONTROLLER RD-501

FURUNO
REMOTE CONTROLLER RD-501

RD-502: a

RD-502: b

FURUNO
DIMMER CONTROLLER RD-502

FURUNO
DIMMER CONTROLLER RD-502

Brilliance for RD-50 C is controlled by RD-50 A or RD-502 a.

Brilliance for RD-20 D is controlled by RD-20 B or RD-502 b.

Remote display RD-50 (main)

TB4
2 1   6 5 4 3 2 1

TB2

TB3
4 3 2 1

Remote display RD-20 (sub)

12 11 10 9 8 7 6 5 4 3 2 1

Sensor

DC

DC

TTYCS-1

RD-50
TB2-#3/#4
or
TB3-#1/#2

FURUNO

DISP UNIT MODE

REMOTE CONTROLLER
RD-501

RD-501

FURUNO

DISP UNIT MODE

REMOTE CONTROLLER
RD-501

RD-501

RD-50 TB4		RD-20	
TD2A	1 —— 7	RD1A	
TD2B	2 —— 8	RD1B	

FURUNO

DAY/NT ▼ ▲
BRILL

DIMMER CONTROLLER
RD-502

RD-502

FURUNO

DAY/NT ▼ ▲
BRILL

DIMMER CONTROLLER
RD-502

RD-502

4-11

Pattern 2: Dimmer controller is commonly used. A total of 10 RD-50s can be connected in a daisy chain. A maximum of nine sub RD-50s can be connected.

Remote display RD-50 (main)   Remote display RD-50 (sub)   Remote display RD-50 (sub)

RD-501   RD-502
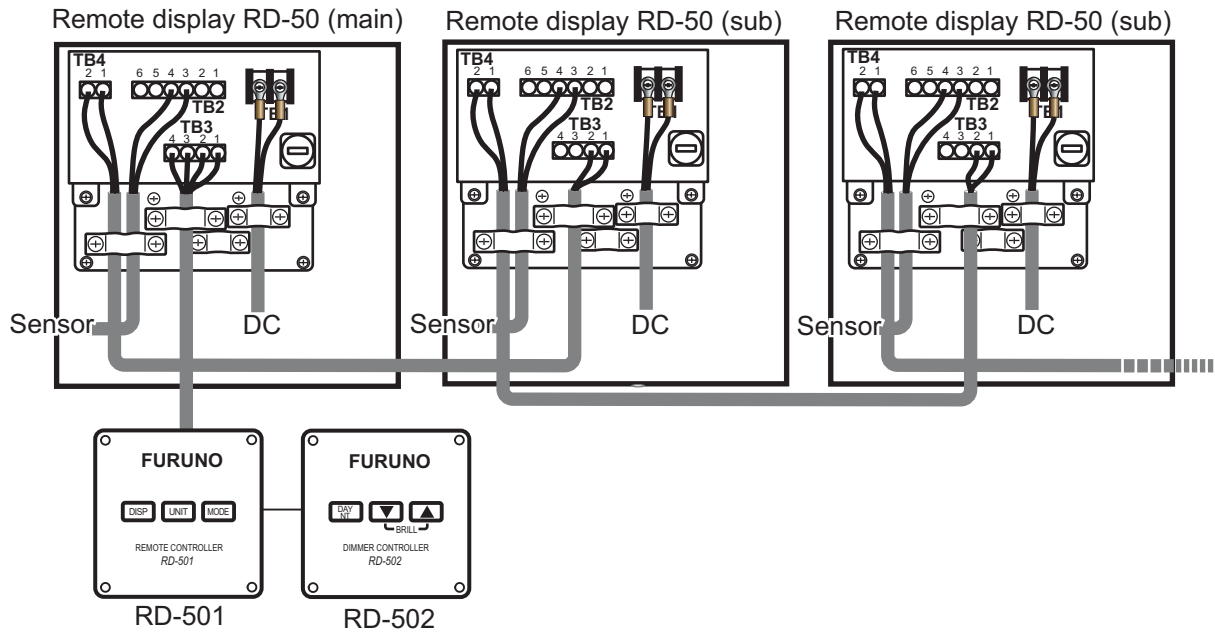
Connection of each unit

Process each cable referring to the illustrations below and on the next page.

Fabrication of RD-50 power cable DPYC-1.5 (indoor type)
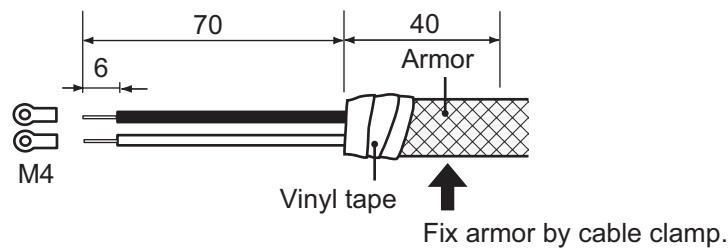
Fabrication of sensor signal cable TTYCS-1 (indoor type) / TTYCS-4
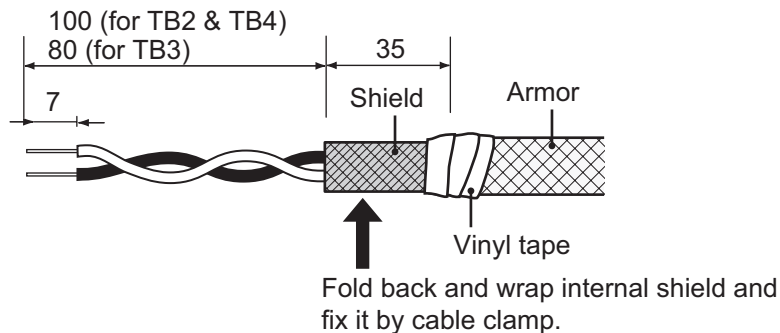
Fabrication of cable TTYCS-4 for RD-501/502, coming from RD-50
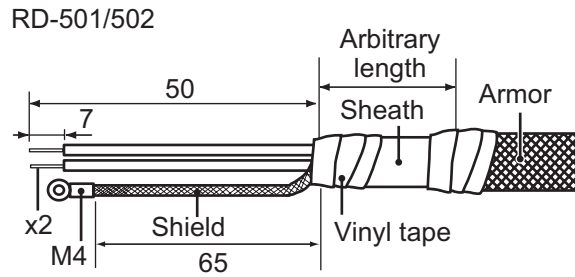
Fabrication of cable TTYCS-4 between RD-501 and RD-502
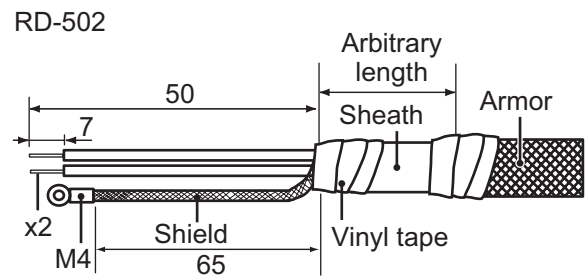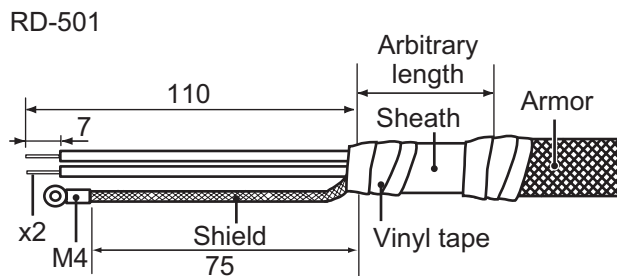
Connection of power cable

Connect the power cable to the TB1. Fix the armor of the cable by the cable clamp. See the illustration below.

DPYC(Y)-1.5

Fix the armor with the cable clamp.

Rear cover

Fix the armor within 4 mm from the edge of the cable fixing pedestal so that it does not contact the rear cover.
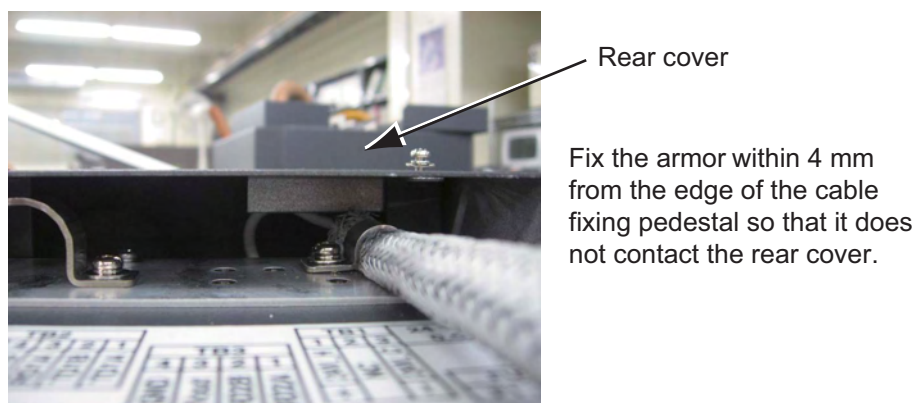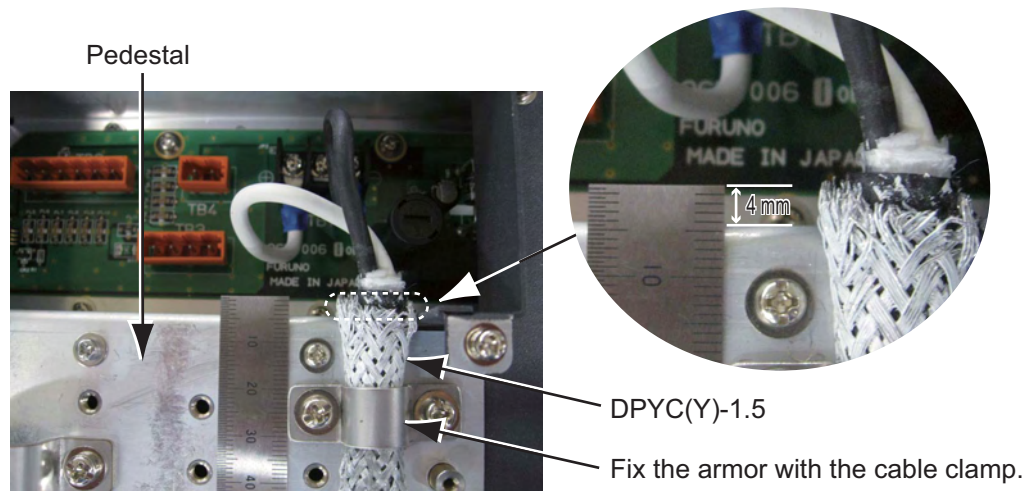
Connection of WAGO connector

Remove the WAGO connector from each unit and connect each cable core to the WAGO connector. See the interconnection diagram (page S-1). The terminal opener is attached inside the remote display at the location shown in the illustration below.
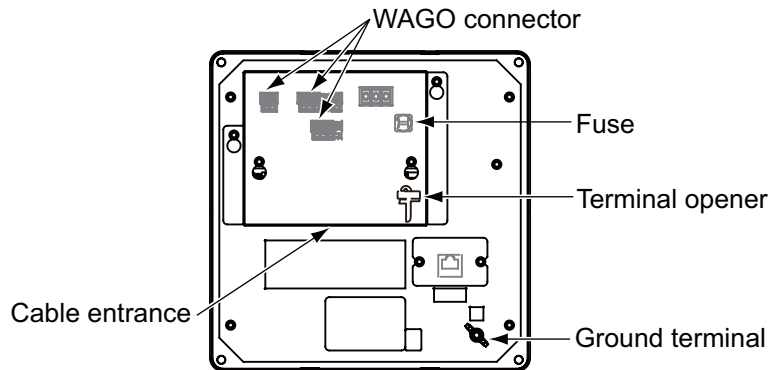
Remote display, rear panel
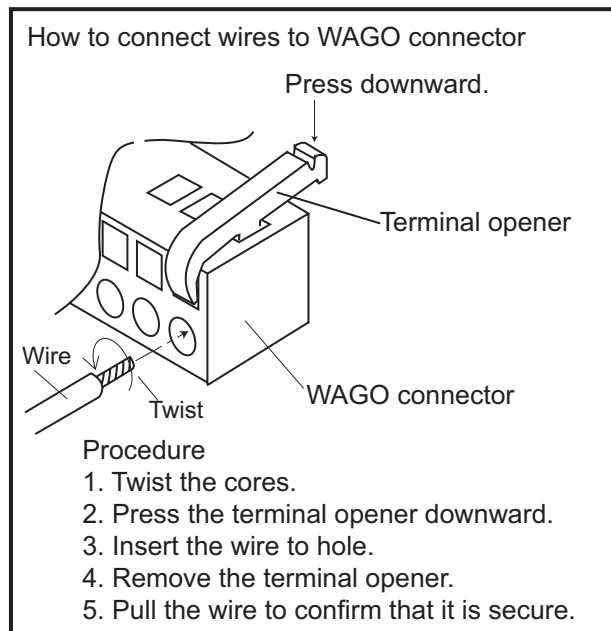
4.6   Adjustments

After wiring all units, initialize each remote display as follows:

1.   While you hold down the **DISP** key, press the **PWR** key to turn on the power.

```
UNIT Name       : RD-50
Serial No       : 6408-XXXX
PWB No          : 26P0006-XX
Remote Dimmer   : Main
Depth Select    : Auto
Depth Position  : Single
L/L Digit       : 4digit
Without Checksum: Disable
I/O Port
 Port1          : 4800
 SIO Monitor
Sensor Out      : ON
LCD RESET
SIM             : OFF
Service RESET

[▲]/[▼]:Select
[ENT] :Enter
```

XXXX: Serial number
XX: Program version number

Service menu

2.   Press ▲ or ▼ key to select a menu item and press the **ENT** key.

3.   Press ▲ or ▼ key to select an option and press the **ENT** key.

4.   Repeat steps 2 and 3 to set the menu items desired.

5.   Press the **PWR** key to close the service menu and turn off the power.

Service menu items

Menu	Description	Default
UNIT Name	For serviceman.	
Serial No		
PWB No		
Remote Dimmer	• [Main]: Set the unit which is connected to the dimmer controller in the daisy chain connection as the main unit. • [Sub]: Set the unit which is not connected to the dimmer controller in the daisy chain connection as a sub unit.	[Main]
Depth Select	Select the input sentence for depth from [Auto], [Keel (DBK)] (Depth below keel), [Transducer (DBT)] (Depth below transducer) or [Surface (DBS)] (Depth below surface). In the [Auto] mode, the highest priority data is [Keel (DBK)] and the lowest is [Surface (DBS)].	[Auto]
Depth Position	Select the mounting location of the transducer from [Single], [FWD] (forward) or [AFT] (after).	[Single]

Menu	Description	Default
L/L Digit	Select the number of digits to show after the decimal point for minute of latitude and longitude from [3digit] or [4digit].	[4digit]
Without Checksum	• [Enable]: Receive NMEA 0183 sentences with and without checksums. • [Disable]: Do not receive NMEA 0183 sentences that do not have checksums.	[Disable]
I/O Port	• [Port1]: Select baud rate setting from [4800] or [38400] according to the equipment connected. • [SIO Monitor]: Monitor the SIO input signal. For serviceman.	[4800]
Sensor Out	• [ON]: Share sensor signal, dimmer controller and time data in the daisy chain. Use for pattern 1 daisy chain (see pages 4-10 and 4-11). • [OFF]: Share dimmer controller and time data in the daisy chain. Use for pattern 2 daisy chain (see page 4-12).	[ON]
LCD RESET	For serviceman.	
SIM	Turn the simulation mode on or off.	[OFF]
Service RESET	For serviceman.	

4.7   JIS Cable Guide

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

JIS cable names may have up to 6 alphabetical characters, followed by a dash and a numerical value (example: DPYC-2.5). For core types D and T, the numerical designation indicates the *cross-sectional Area (mm^2)* of the core wire(s) in the cable. For core types M and TT, the numerical designation indicates the *number of core wires* in the cable.

1. Core Type

D   Double core power line

T   Triple core power line

M   1mm Multi core

TT   0.75mm twisted pair communications (1Q = quad cable)

2. Insulation Type

P   Ethylene Propylene

3. Sheath Type

Y   Vinyl

4. Armor Type

C   Steel

5. Shielding Type

Y   Corrosive resistant

6. Core Sheath

S   All cores in one sheath

-S   Individually sheathed cores

DPYC

TPYC

MPYC-5

TTYCS-4
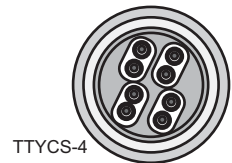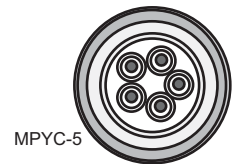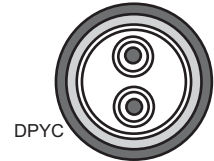
EX: DPYCYS - 1.5   MPYC - 5

Designation type —— Core Area (mm^2)   Designation type — # of cores

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

Type	Core Area	Diameter	Cable Diameter	Type	Core Area	Diameter	Cable Diameter
DPYC-1.5	$1.5mm^2$	1.56mm	11.7mm	TPYCY-1.5	$1.5mm^2$	1.56mm	14.5mm
DPYCY-1.5	$1.5mm^2$	1.56mm	13.7mm	TPYCY-2.5	$2.5mm^2$	2.01mm	15.5mm
DPYC-2.5	$2.5mm^2$	2.01mm	12.8mm	TPYCY-4	$4mm^2$	2.55mm	16.9mm
DPYCY-2.5	$2.5mm^2$	2.01mm	14.8mm	TPYCYS-1.5	$1.5mm^2$	1.56mm	15.2mm
DPYCYS-1.5	$1.5mm^2$	1.56mm	14.6mm				
DPYCYS-2.5	$2.5mm^2$	2.01mm	15.5mm				
MPYC-2	$1mm^2$	1.29mm	10.0mm				
MPYC-4	$1mm^2$	1.29mm	11.2mm				
MPYC-7	$1mm^2$	1.29mm	13.2mm				
MPYCY-12	$1mm^2$	1.29mm	19.0mm				
MPYCY-19	$1mm^2$	1.29mm	22.0mm				
TTYCS-1	$0.75mm^2$	1.11mm	10.1mm				
TTYCS-1Q	$0.75mm^2$	1.11mm	11.3mm				
TTYCS-4	$0.75mm^2$	1.11mm	16.3mm				
TTYCYS-1	$0.75mm^2$	1.11mm	21.1mm				

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APPENDIX 1 MENU TREE
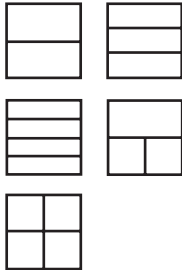
(MENU key)   ***Bold***: Default setting

```
├─ Ship's ──── Source ──────────────────── Internal (-13:00 - +13:00)
│  Time                                  ├─ External
│        │                               └─ NAV EQUIP
│        └─ Summer Time (ON, OFF)
│
├─ Trip ──── Internal ─────────────────── RESET
│  DIST   │                             └─ SET (000000.0NM - 999999.9NM)
│        └─ External
│
├─ Display ──── DISP1 - DISP5 (□, ⊟, ⊟, ☰, ⊞, ⊞, ◫, ⊠)*        *: See APPENDIX 2.
│
├─ Scale ──── Unit (DISP1 - DISP5) ──────── Speed (kn, m/s, km/h)
│  Set Up  │                              ├─ Distance (NM, km)
│        │                                ├─ Depth (m, ft, fm)
│        │                                ├─ Wind Speed (kn, m/s, km/h, mph)
│        │                                └─ Water TEMP (°C, °F)
│        │
│        ├─ Mode (DISP1 - DISP5) ────────── Time (UTC, Ship's Time)
│        │                                ├─ Speed (Auto, SOG, STW, GPS)
│        │                                ├─ HDG/COG (True, Magnetic)
│        │                                └─ Wind (True, Theoretical 360°/180°, Relative 360°/180°)
│        │
│        ├─ Speed Graphic ──────────────── Astern SPD Scale (5kn (2.5m/s, 10km/h))
│        │  (DISP1 - DISP5)              └─ Ahead SPD Scale (25kn (12.5m/s, 50km/h))
│        ├─ Depth Graph (DISP1 - DISP5) ── Range (Auto, User Setting)
│        │                                ├─ Period (5min, 15min, 30min, 1hr, 3hr, 6hr, 12hr, 24hr)
│        │                                ├─ Painted Graph (ON, OFF)
│        │                                └─ Graph Clear (Yes, No)
│        │
│        ├─ Water TEMP Graph ───────────── Range (5°C (10°F), 10°C (20°F), 20°C (40°F))
│        │  (DISP1 - DISP5)              ├─ Period (5min, 15min, 30min, 1hr, 3hr, 6hr, 12hr, 24hr)
│        │                                ├─ Painted Graph (ON, OFF)
│        │                                └─ Graph Clear (Yes, No)
│        │
│        ├─ Rudder (DISP1 - DISP5) ──────── Graphic Range (40deg - 180deg)
│        │                                └─ Position (Single, Port, Starboard)
│        ├─ Engine/Shaft (DISP1 - DISP5) ── (100RPM, 150RPM, 200RPM, 250RPM, 300RPM,
│        │                                   400RPM, 500RPM, 750RPM, 1000RPM)
│        │
│        ├─ Digital on Graphic (ON, OFF)
│        ├─ Rudder Order Symbol (ON, OFF)
│        ├─ Direction Symbol (Arrows, Text)
│        └─ Symbol Location (Left, Right)
│
└─ System ──── Wind Average (No Averaging, 1min, 2min, 3min, 5min, 10min)
         ├─ BRILL ────────────────────── Key BRILL (1 - 8, 2)
         │                             └─ BRILL OFFSET (-3 - +3, 0)
         ├─ Speed Select (Forward-After, Vector)
         ├─ TESTS (Self TEST, LCD TEST)
         └─ User RESET (Yes, No)
```

APPENDIX 2 SCREEN DIVISION

The screen can be divided as shown below in the [Display] menu.

Screen division	Display form	Display item
	Graphic	Time, Speed, HDG/COG, HDG, ROT, Wind, Rudder, Engine, Shaft, Propeller Pitch
	Digital	Time, POSN, HDG/Speed 3 axis, Speed 3 axis, Speed 2 axis, Speed 1 axis, HDG, COG, WPT, Trip DIST, Total DIST, Depth, ROT, Wind Speed, Wind Direction, Rudder Angle, Rudder Angle Order, Water TEMP, Engine, Shaft, Propeller Pitch
	Graph	Depth Graph, Water TEMP Graph
	Digital	Time, POSN, Speed 1 axis, HDG, COG, WPT, Trip DIST, Total DIST, Depth, ROT, Wind Speed, Wind Direction, Rudder Angle, Rudder Angle Order, Water TEMP, Engine, Shaft, Propeller Pitch
	Digital	Time, POSN, Speed 1 axis, HDG, COG, WPT, Trip DIST, Total DIST, Depth, ROT, Wind Speed, Wind Direction, Rudder Angle, Rudder Angle Order, Water TEMP, Engine, Shaft, Propeller Pitch
	Graph	Depth Graph, Water TEMP Graph
*	-	-

*: Can not select for the [DISP1] screen.

APPENDIX 3 LIST OF TERMS

The following table shows the terms used in the RD-50.

Term	Meaning
A	Automatic
AFT	After
AH	Ahead
ANGLE	Angle
AS	Astern
BRILL	Brilliance
COG	Course Over the Ground
DAY	Day
DBK	Depth Below Keel
DBS	Depth Below Surface
DBT	Depth Below Transducer
deg	degree
DIR	Direction
DISP	Display
DIST	Distance
DPTH	Depth
ENGINE	Engine
ENT	Enter
EQUIP	Equipment
ESC	Escape
fm	fathom
ft	feet
FWD	Forward
GPS	Global Positioning System
HDG	Heading
hr	Hour
I/O	Input/Output
KEEL	Keel
km/h	Kilometer/hour
km	kilometer
kn	knot
LCD	Liquid Crystal Display
L/L	Latitude/Longitude
m	Meter
MAG	Magnetic: The bearing measured with magnetic north as the reference direction.
MAIN	Main
min	minute
mph	Miles per hour
m/s	Meter/second
NAV	Navigation

Term	Meaning
NG	No Good
NM	Nautical Mile
No.	Number
NT	Night
ORDER	Rudder Angle Order
OVER	Over
PITCH	Pitch
P/PORT	Port/Port Side
POSN	Position
PROG	Program
PWB	Printed Writing Board
PWR	Power
R	Relative: Relative or apparent wind. The wind direction relative to the ship's bow and the wind speed relative to the moving vessel.
RAM	Random Access Memory
REMOTE	Remote
RESET	Reset
ROM	Read Only Memory
ROT	Rate of Turn
RPM	Revolutions Per Minute
RUDDER	Rudder
SENSOR	Sensor
SHAFT	Shaft
SIM	Simulation
SIO	Serial Input Output
S-OUT	Sensor Out
SPD	Speed
SOG	Speed Over the Ground
STW	Speed Through the Water
S/STBD	Starboard/Starboard Side
SUB	Sub
SURFACE	Surface
T	Theoretical: Theoretical or calculated wind. The wind direction relative to the ship's bow and the wind speed as if the ship is stationary. True: The bearing measured using true North as the reference direction and the wind speed as if the ship is stationary.
T	True: The bearing measured using true North as the reference direction.
TEMP	Temperature
TIME	Time
TOTAL	Total
TRANSDUCER	Transducer
UNIT	Unit
UTC	Universal Time Coordinated
WIND	Wind
WPT	Waypoint

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APPENDIX 4 DIGITAL INTERFACE

Input/output sentences

BWC, BWR, DBK, DBS, DBT, DPT, GGA, GLL, GNS, HDG, HDM, HDT, HTC, HTD, MTW, MWV, RMB, RMC, ROT, RPM, RSA, VBW, VHW, VLW, VTG, VWR, VWT, WPL, ZDA

Data reception

Data is received in serial asynchronous form in accordance with the standard referenced in IEC 61162-1.

The following parameters are used:

- Baud rate
  Input: 4800 bps, IEC 61162-1-2
  Output: Same as above. Baud rate fixed at 38400 bps for RD-50.

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

Start bit	D0	D1	D2	D3	D4	D5	D6	D7	Stop bit

Data bits
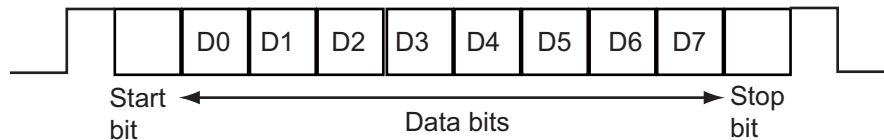
Data sentences: Input/output

BWC - Bearing and distance to waypoint

$--BWC, hhmmss.ss, llll.ll, a, yyyyy.yy, a, x.x, T, x.x, M, x.x, N, c--c, a*hh<CR><LF>
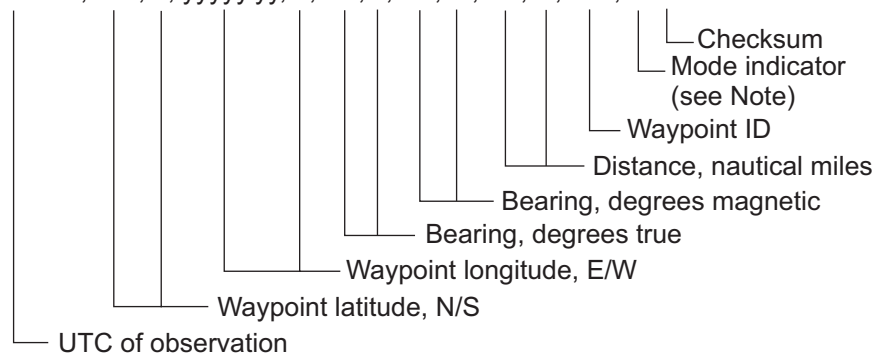
Checksum
Mode indicator (see Note)
Waypoint ID
Distance, nautical miles
Bearing, degrees magnetic
Bearing, degrees true
Waypoint longitude, E/W
Waypoint latitude, N/S
UTC of observation

Note: Positioning system Mode indicator:
    A=Autonomous, D=Differential, E=Estimated (dead reckoning),
    M=Manual input, S=Simulator, N=Data not valid
The Mode indicator field shall not be a null field.

BWR - Bearing and distance to waypoint - rhumb line

$--BWR, hhmmss.ss, llll.lll, a, yyyyy.yyy, a, x.x, T, x.x, M, x.x, N, c--c, a*hh<CR><LF>

- Checksum
- Mode indicator (see Note)
- Waypoint ID
- Distance, nautical miles
- Bearing, degrees magnetic
- Bearing, degrees true
- Waypoint longitude, E/W
- Waypoint latitude, N/S
- UTC of observation

Note: Positioning system Mode indicator:
A=Autonomous, D=Differential, E=Estimated (dead reckoning),
M=Manual input, S=Simulator, N=Data not valid
The Mode indicator field shall not be a null field.

DBK - Depth below keel

$--DBK, x.x, f, x.x, M, x.x, F*<CR><LF>

- Water depth, fathoms
- Water depth, m
- Water depth, feet

DBS - Depth below surface

$--DBS, x.x, f, x.x, M, x.x, F*hh<CR><LF>

- Checksum
- Water depth, fathoms
- Water depth, m
- Water depth, feet

DBT - Depth below transducer

$--DBT, x.x, f, x.x, M, x.x, F*hh<CR><LF>

- Checksum
- Water depth, fathoms
- Water depth, m
- Water depth, feet

DPT - Depth

$--DPT, x.x, x.x, x.x*hh<CR><LF>

- Checksum
- Maximum range scale in use
- Offset from transducer, in meters
- Water depth relative to transcducer, in meters

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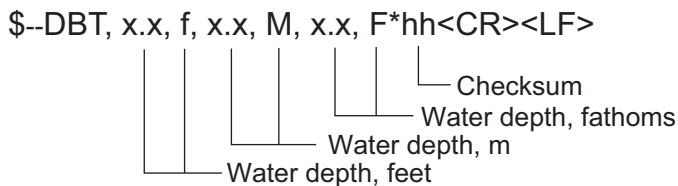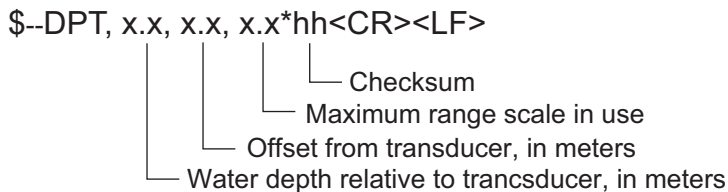
GGA - Global positioning system (GPS) fix data

$--GGA, hhmmss.ss, llll.lll, a, yyyyy.yyy, a, x, xx, x.x, x.x, M, x.x, M, x.x, xxxx*hh<CR><LF>

- Checksum
- Differential reference station ID, 0000-1023
- Age of differential GPS date
- Units of geoidal separation, m
- Geoidal separation
- Units of antenna altitude, m
- Antenna altitude above/below mean sea level (geoid)
- Horizontal dilution of precision
- Number of satellites in use, 00-12, may be different from the number in view
- GPS quality indicator
- Longitude, E/W
- Latitude, N/S
- UTC of position

GLL - Geographic position

$--GLL, llll.lll, a, yyyyy.yyy, a, hhmmss.ss, A, a*hh<CR><LF>

- Checksum
- Mode indicator (see Note 1 and 2)
- Status (see Note 2), A=data valid, V=data invalid
- UTC of Position
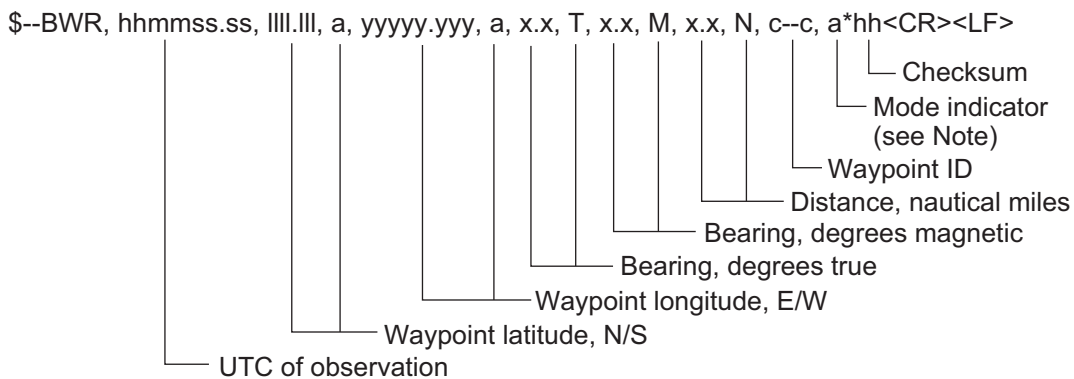- Longitude, E/W
- Latitude, N/S
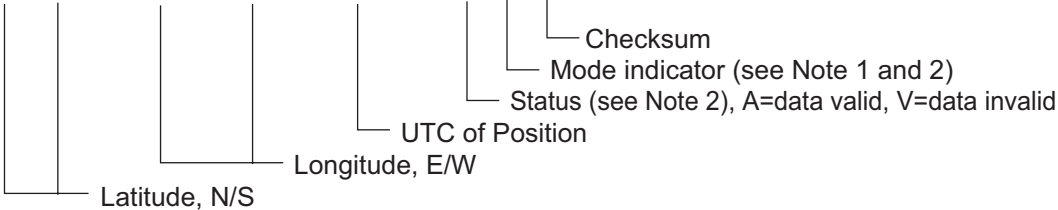
Note 1: Positioning system mode indicator:
    A=Autonomous, D=Differential, E=Estimated (dead reckoning),
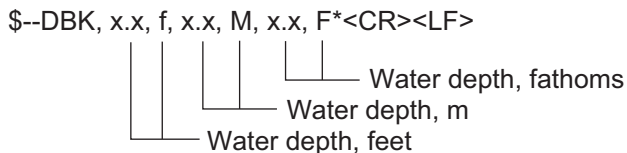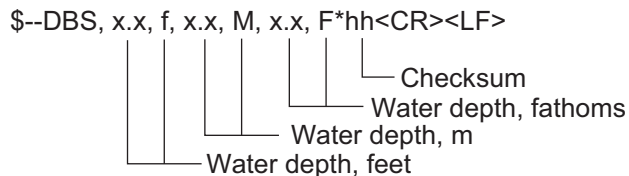   M=Manual input, S=Simulator, N=Data not valid
Note 2: The mode indicator field supplements the status field (field 6). The status field should be set to V=invalid for all values of operating mode except for A=Autonomous and D=Differential. The positioning system mode indicator and status fields should not be null fields.

GNS - GNSS fix data

$--GNS, hhmmss.ss, llll.lll, a, yyyyy.yyy, a, c--c, xx, x.x, x.x, x.x x.x, x.x*hh<CR><LF>

- Checksum
- Differential reference station ID
- Age of differential data
- Geoidal separation, m
- Antenna altitude, m, re:mean-sea-level (geoid)
- HDOP
- Total number of satellites in use, 00-99
- Mode indicator (see Note)
- Longitude, E/W
- Latitude, N/S
- UTC of position
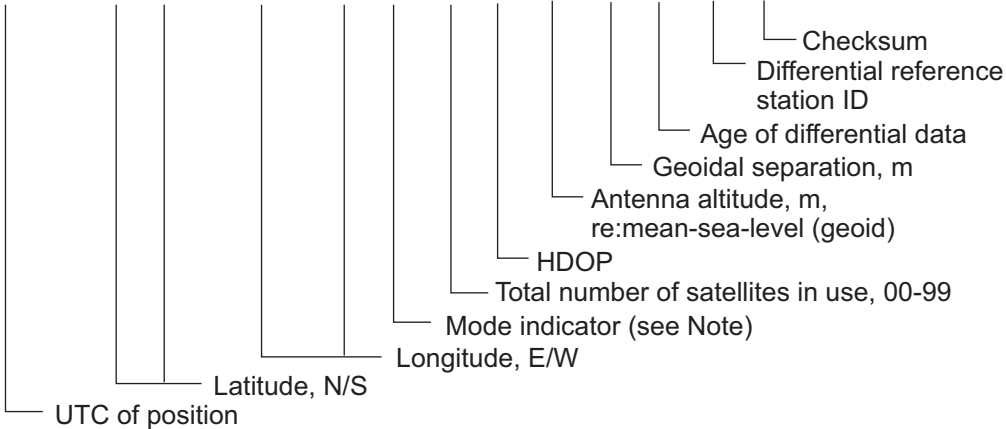
Note: N=No fix, A=Autonomous, D=Differential, P=Precise, R=Real Time Kinematic, F=Float RTK, E=Estimated Mode, M=Manual Input Mode, S=Simulator Mode

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HDG - Heading, deviation and variation

$--HDG, x.x, x.x, a, x.x, a*hh<CR><LF>

```
            │    │    │    │   └─ Checksum
            │    │    │    └───── Magnetic variation, degrees E/W
            │    │    └────────── Magnetic deviation, degrees E/W
            └──────────────────── Magnetic sensor heading, degrees
```

HDM - Heading magnetic

$--HDM, x.x, M*hh<CR><LF>
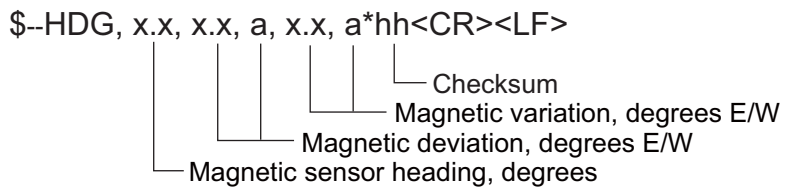
```
            │    │   └─ Checksum
            │    └───── Heading, degrees magnetic
```

HDT - Heading true

$--HDT, x.x, T*hh<CR><LF>
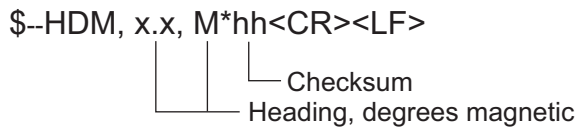
```
            │    │   └─ Checksum
            │    └───── Heading, degrees true
```
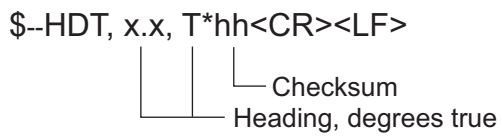
HTC - Heading/Track control command, **HTD - Heading/Track control data**

```
                                           ┌─ Sentence status (see Note 7)
$--HTC, A, x.x, a, a, a, x.x, x.x, x.x, x.x, x.x, x.x, x.x, a, a*hh<CR><LF>
$--HTD, A, x.x, a, a, a, x.x, x.x, x.x, x.x, x.x, x.x, x.x, a, A, A, A, x.x, *hh<CR><LF>
                                                        └─ Vessel heading, degrees
                                                     ┌─ Off-track status ┐
                                                     │   (see Note 5)    │
                                                  ┌─ Off-heading status ─┤  A = within limits
                                               ┌─ Rudder status ─────────┤  V = limit reached
                                               │                            or exceeded
                                            └─ Heading reference in use, T/M
                                          └─ Commanded track (see Note 4 and 6) degrees
                                        └─ Commanded off-track limit (see Note 5), n.miles (unsigned)
                                      └─ Commanded heading-to-steer (see Note 6), degrees
                                    └─ Commanded rate of turn for heading changes, °/min
                                  └─ Commanded radius of turn for heading changes, n.miles
                                └─ Commanded off-heading limit, degrees (unsigned)
                              └─ Commanded rudder limit, degrees (unsigned)
                            └─ Turn mode (see Note 3) R=radius controlled,
                                               T=turn rate controlled,
                                               N=turn is not controlled
                          └─ Selected steering mode (see Note 2)
                        └─ Commanded rudder direction, L/R=port/starboard
                      └─ Commanded rudder angle, degrees
                    └─ Override (see Note 1), A=in use, V=not in use
```

Note 1: Override provides direct control of the steering gear. In the context of this sentence override means a temporary interruption of the selected steering mode. In this period steering is performed by special devices. As long as field "override" is set to "A", both fields "selected steering mode" and "turn mode" should be ignored by the heading/track controller and its computing parts should operate as if manual steering was selected.

Note 2: All steering modes represent steering as selected by a steering selector switch or by a preceding HTC sentence. Priority levels of these inputs and usage/acceptance of related fields are to be defined and documented by the manufacturer.

Selected steering modes may be:
M=Manual steering. The main steering system is in use.
S=Stand-alone (heading control). The system works as a stand-alone heading controller. Field "commanded heading to steer" is not accepted as an input.
H=Heading control. Input of commanded heading to steer is from an external device and the system works as a remotely controlled heading controller. Field "commanded heading to steer" is accepted as an input.
T=Track control. The system works as a track controller by correcting a course received in the field "commanded track". Corrections are made based on additionally received track errors (e.g. from sentence XTE, APB, ...).
R=Rudder control. Input of commanded rudder angle and direction from an external device. The system accepts values given in fields "commanded rudder angle" and "commanded rudder direction" and controls steering by the same electronic means as used in modes S, H or T.

Note 3: Turn mode defines how the ship changes heading when in steering modes S, H or T according to the selected turn mode values given in fields "commanded radius of turn" or "commanded rate of turn". With turn mode set to "N", turns are not controlled but depend upon the ship's manoeuverability and applied rudder angles only.

Note 4: Commanded track represents the course line (leg) between two waypoints. It may be altered dynamically in a track-controlled turn along a pre-planned radius.

Note 5: Off-track status can be generated if the selected steering mode is "T".
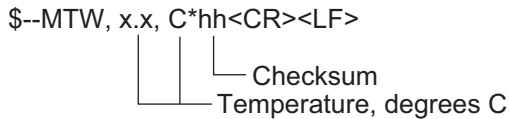
Note 6: Data in these fields should be related to the heading reference in use.

Note 7: This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings. This field should not be null.
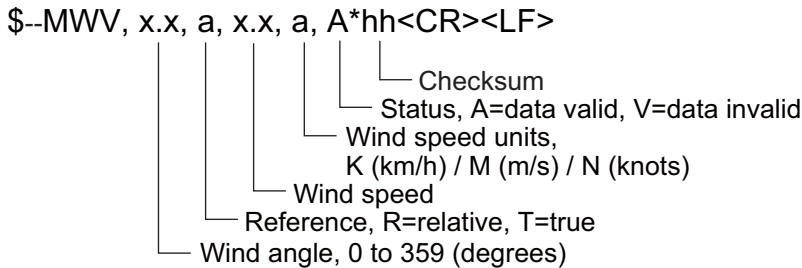R=Sentence is a status report of current settings (use for a reply to a query).
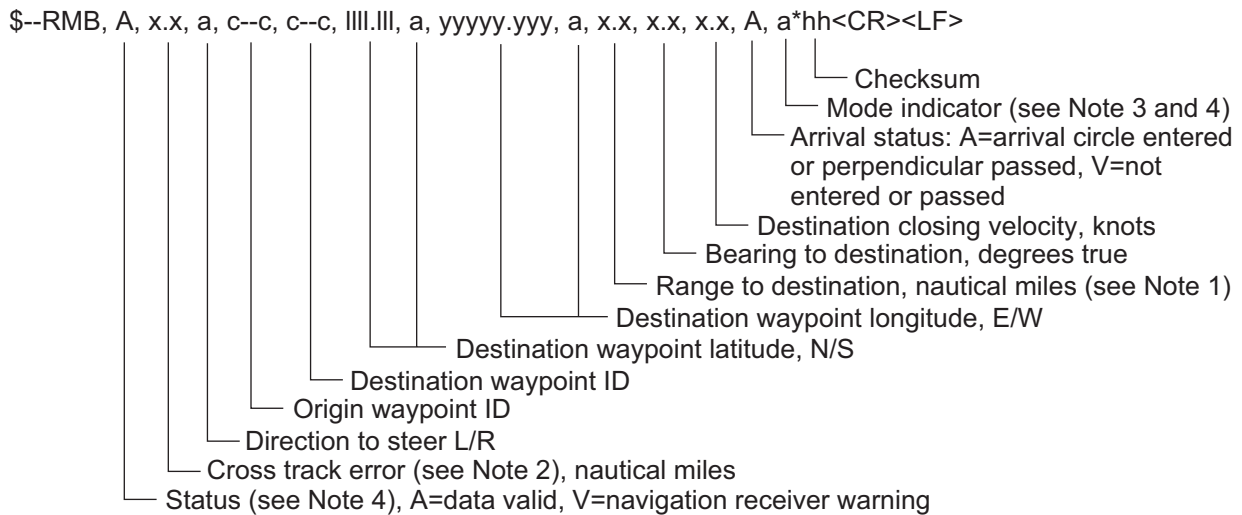C=Sentence is a configuration command to change settings. A sentence without "C" is not a command.

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MTW - Water temperature

$--MTW, x.x, C*hh<CR><LF>
                    └── Checksum
              └────── Temperature, degrees C

MWV - Wind speed and angle

$--MWV, x.x, a, x.x, a, A*hh<CR><LF>
                          └── Checksum
                     └────── Status, A=data valid, V=data invalid
                  └───────── Wind speed units,
                               K (km/h) / M (m/s) / N (knots)
              └──────────── Wind speed
          └─────────────── Reference, R=relative, T=true
      └─────────────────── Wind angle, 0 to 359 (degrees)

RMB - Recommended minimum navigation information

$--RMB, A, x.x, a, c--c, c--c, llll.lll, a, yyyyy.yyy, a, x.x, x.x, x.x, A, a*hh<CR><LF>
                                                                        └── Checksum
                                                                    └────── Mode indicator (see Note 3 and 4)
                                                                └────────── Arrival status: A=arrival circle entered
                                                                             or perpendicular passed, V=not
                                                                             entered or passed
                                                            └────────────── Destination closing velocity, knots
                                                       └─────────────────── Bearing to destination, degrees true
                                                   └───────────────────── Range to destination, nautical miles (see Note 1)
                                              └──────────────────────── Destination waypoint longitude, E/W
                                     └─────────────────────────────── Destination waypoint latitude, N/S
                          └── Destination waypoint ID
                     └── Origin waypoint ID
                 └─── Direction to steer L/R
             └─── Cross track error (see Note 2), nautical miles
          └── Status (see Note 4), A=data valid, V=navigation receiver warning

Note 1: If range to destination exceeds 999.9 nautical miles, display 999.9.
Note 2: If cross track error exceeds 9.99 nautical miles, display 9.99.
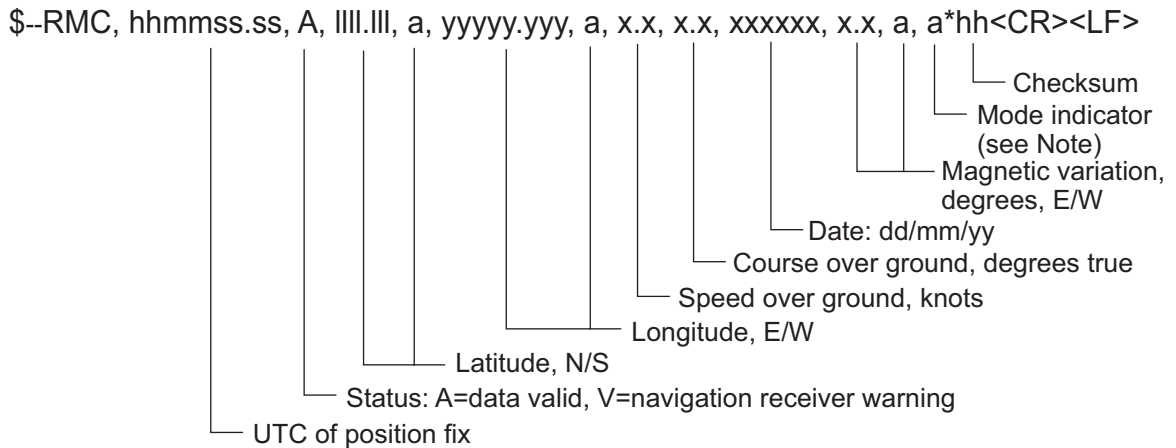Note 3: Positioning system mode indicator:
         A=Autonomous, D=Differential, E=Estimated (dead reckoning),
         M=Manual input, S=Simulator, N=Data not valid
Note 4: The positioning system mode indicator field supplements the status field (field No. 1),
which should be set to V=invalid for allvalues of Mode indicator except for A=Autonomous
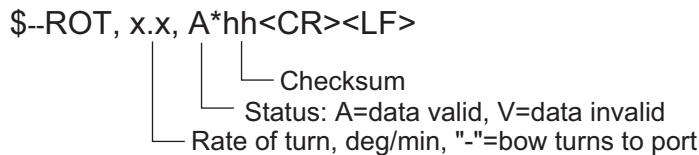and D=Differential. The positioning system mode indicator and status fields should not be
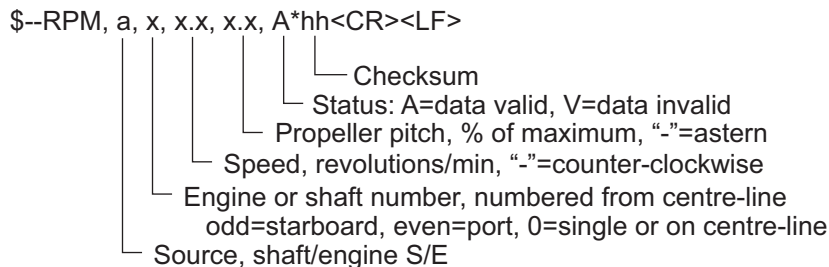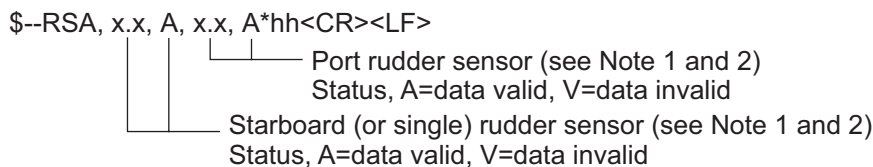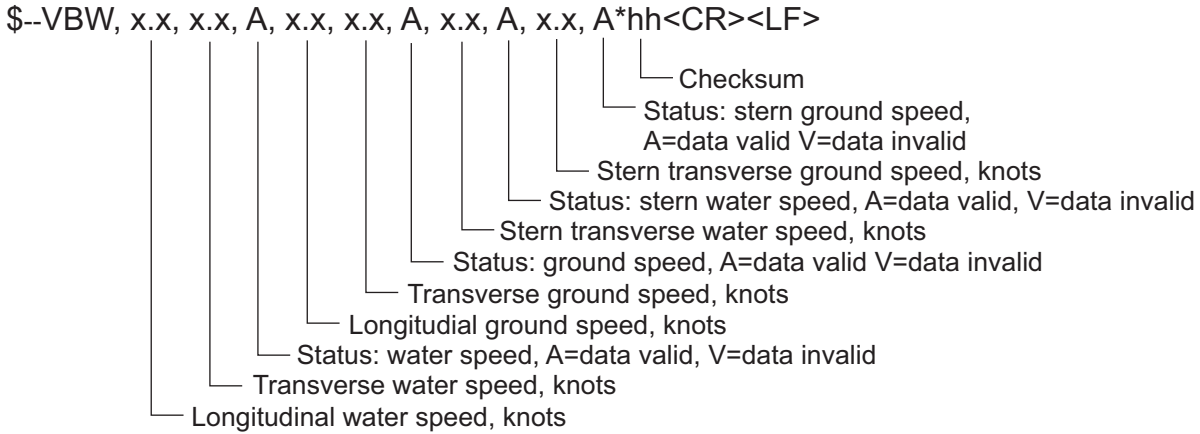null fields.

RMC - Recommended minimum specific GPS data

$--RMC, hhmmss.ss, A, llll.lll, a, yyyyy.yyy, a, x.x, x.x, xxxxxx, x.x, a, a*hh<CR><LF>

- Checksum
- Mode indicator (see Note)
- Magnetic variation, degrees, E/W
- Date: dd/mm/yy
- Course over ground, degrees true
- Speed over ground, knots
- Longitude, E/W
- Latitude, N/S
- Status: A=data valid, V=navigation receiver warning
- UTC of position fix

Note: A=Autonomous, D=Differential, E=Estimated (dead reckoning), M=Manual input,
      S=Simulator, N=Data not valid

ROT - Rate of turn
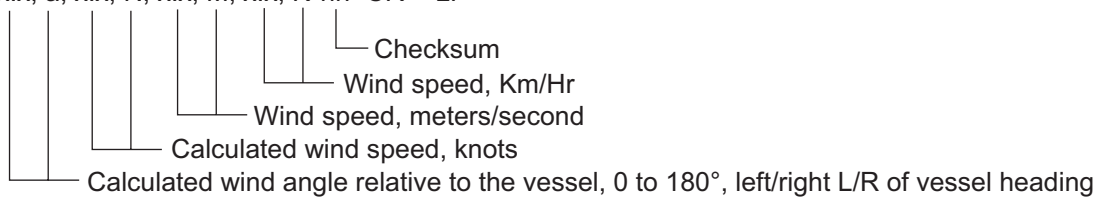
$--ROT, x.x, A*hh<CR><LF>

- Checksum
- Status: A=data valid, V=data invalid
- Rate of turn, deg/min, "-"=bow turns to port

RPM - Revolutions

$--RPM, a, x, x.x, x.x, A*hh<CR><LF>

- Checksum
- Status: A=data valid, V=data invalid
- Propeller pitch, % of maximum, "-"=astern
- Speed, revolutions/min, "-"=counter-clockwise
- Engine or shaft number, numbered from centre-line
      odd=starboard, even=port, 0=single or on centre-line
- Source, shaft/engine S/E

RSA - Rudder sensor angle

$--RSA, x.x, A, x.x, A*hh<CR><LF>

- Port rudder sensor (see Note 1 and 2)
- Status, A=data valid, V=data invalid
- Starboard (or single) rudder sensor (see Note 1 and 2)
- Status, A=data valid, V=data invalid

Note 1: Relative measurement of rudder angle without units, "-"=bow turn
to port. Sensor output is proportional to rudder angle but not necessarily 1:1.
Note 2: The status field should not be a null field.

AP-11

VBW - Dual ground/water speed

```
$--VBW, x.x, x.x, A, x.x, x.x, A, x.x, A, x.x, A*hh<CR><LF>
```

- Checksum
- Status: stern ground speed, A=data valid V=data invalid
- Stern transverse ground speed, knots
- Status: stern water speed, A=data valid, V=data invalid
- Stern transverse water speed, knots
- Status: ground speed, A=data valid V=data invalid
- Transverse ground speed, knots
- Longitudial ground speed, knots
- Status: water speed, A=data valid, V=data invalid
- Transverse water speed, knots
- Longitudinal water speed, knots

VHW - Water speed and heading

```
$--VHW, x.x, T, x.x, M, x.x, N, x.x, K *hh<CR><LF>
```

- Checksum
- Speed, km/h
- Speed, knots
- Heading, degrees magnetic
- Heading, degrees true
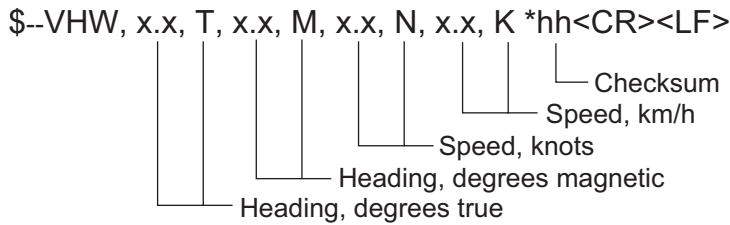
VLW - Dual ground/water distance

```
$--VLW, x.x, N, x.x, N, x.x, N, x.x, N*hh<CR><LF>
```

- Checksum
- Ground distance since reset, nautical miles
- Total cumulative ground distance, nautical miles
- Water distance since reset, nautical miles
- Total cumulative water distance, nautical miles
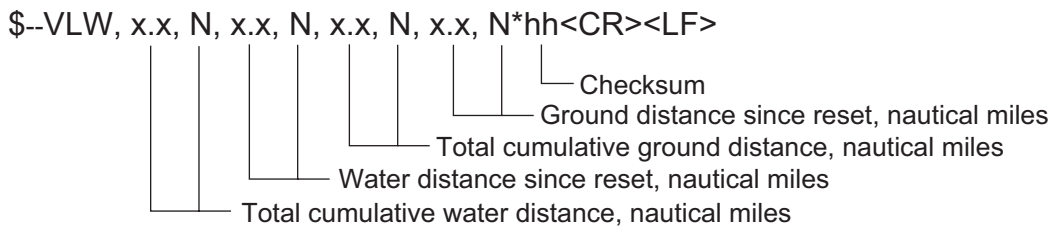
VTG - Course over ground and ground speed
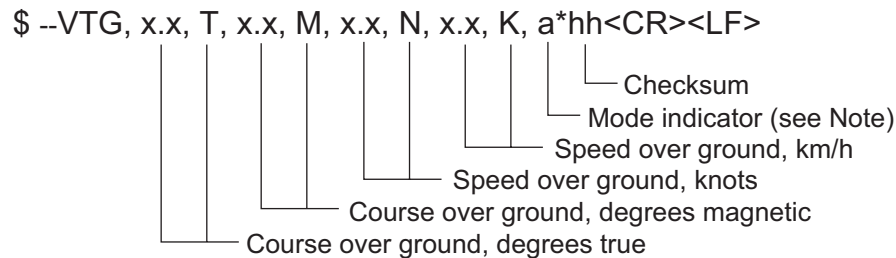
```
$ --VTG, x.x, T, x.x, M, x.x, N, x.x, K, a*hh<CR><LF>
```

- Checksum
- Mode indicator (see Note)
- Speed over ground, km/h
- Speed over ground, knots
- Course over ground, degrees magnetic
- Course over ground, degrees true

Note: A=Autonomous, D=Differential, E=Estimated (dead reckoning), M=Manual input, S=Simulator, N=Data not valid

VWR - Relative (Apparent) wind speed and angle

$--VWR, x.x, a, x.x, N, x.x, M, x.x, K*hh<CR><LF>

- Checksum
- Wind speed, Km/Hr
- Wind speed, meters/second
- Measured wind speed, knots
- Measured wind angle relative to the vessel, 0 to 180°, left/right L/R of vessel heading
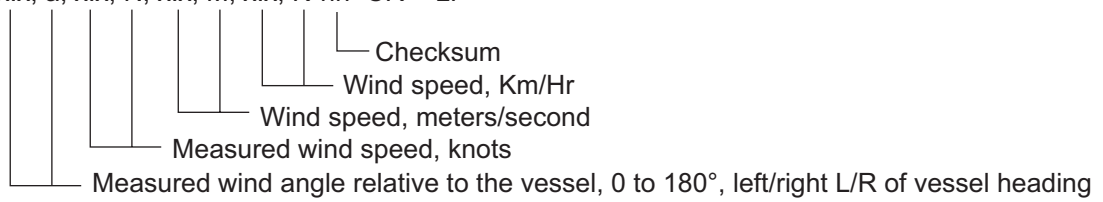
VWT - True wind speed and angle

$--VWT, x.x, a, x.x, N, x.x, M, x.x, K*hh<CR><LF>

- Checksum
- Wind speed, Km/Hr
- Wind speed, meters/second
- Calculated wind speed, knots
- Calculated wind angle relative to the vessel, 0 to 180°, left/right L/R of vessel heading

WPL - Waypoint location

$--WPL, llll.lll, a, yyyyy.yyy, a, c--c*hh<CR><LF>

- Checksum
- Waypoint identifier
- Waypoint longitude, E/W
- Waypoint latitude, N/S
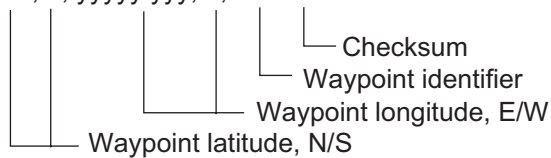
ZDA - Time and date

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

- Checksum
- Local zone minutes, 00 to +59
- Local zone hours, 00 to ±13 h
- Year (UTC)
- Month, 01 to 12 (UTC)
- Day, 01 to 31 (UTC)
- UTC
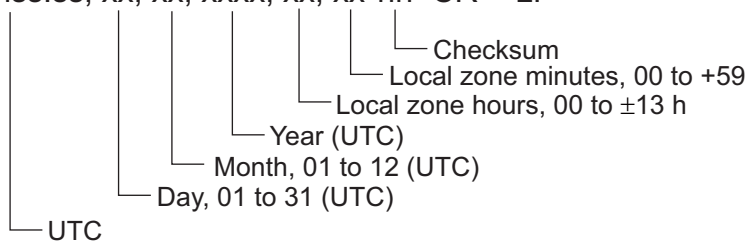
Serial Interface

Baud rate is selectable from 4800 bps and 38400 bps. Complies with IEC 61162-2.

Input port (RD-A, RD-B)

Photo Coupler

```
┌──────────────┐
│              │◄──────── RD-A
│    PC400     │◄──────── RD-B
│              │◄──────── GND
└──────┬───────┘
       ▼
```
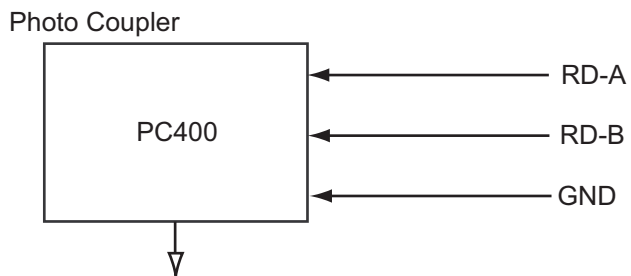
Logical High: A-B> +0.2V
Logical Low: A-B< -0.2V

Output port (TD-A, TD-B)

RS485 Transceiver

```
┌──────────────┐
│              │────────► TD-A
│  SN65LBC176  │────────► TD-B
│              │────────► GND
└──────┬───────┘
       ▼
```

Logical High: A-B> +0.2V
Logical Low: A-B< -0.2V

AP-14
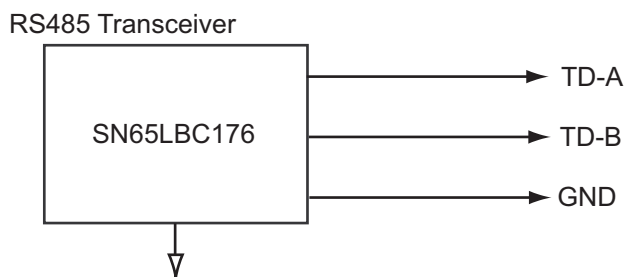
SPECIFICATIONS OF REMOTE DISPLAY
RD-50

1   REMOTE DISPLAY

1.1	Display type	8.4-inch color LCD, 640x480 dots
1.2	Picture color	256 colors
1.3	Data indication	Ship's speed, Course, Heading, Trip, Depth, Rate of turn, Wind direction/speed, Rudder angle, Engine/shaft RPM, Propeller pitch, Water temperature, Waypoint, Ship's position, Date/time
1.4	Remote control	Remote controller (option) required
1.5	Remote dimmer	Dimmer controller (option) required
1.6	Interface	
	Remote control	Serial 1 port, 38,400 bps, 5 VDC output (for remote/dimmer controller)
	Sensor	NMEA0183 Ver1.5/2.0/3.0, Input: 1 port
	Daisy chain (for RD-50)	Output: 1 port, 38,400bps
1.7	Data sentences	BWC, BWR, DBK, DBS, DBT, DPT, GLL, GNS, HDG, HDT, HDM, HTC, HTD, MTW, MWV, RMB, RMC, ROT, RPM, RSA, VBW, VHW, VLW, VTG, VWR, VWT, WPL, ZDA

2   REMOTE CONTROLLER (OPTION)

2.1	Control button	DISP, UNIT, MODE
2.2	Interface	Serial, Input: 1 port, Output: 1 port, 38,400bps 5 VDC input (supplied from remote controller) 5 VDC output (for dimmer controller)

3   DIMMER CONTROLLER (OPTION)

3.1	Control button	DAY/NT, BRILL (▲/▼)
3.2	Interface	Serial, Output: 1 port, 38,400bps 5 VDC input (supplied from remote display or remote controller)

4   POWER SUPPLY

12-24 VDC: 1.0-0.5 A

5   ENVIRONMENTAL CONDITION

5.1	Ambient temperature	
	Remote display	-25°C to +55°C
	Remote/Dimmer controller	-15°C to +55°C
5.2	Relative humidity	95% at 40°C
5.3	Degree of protection	IP22, IP56 (optional waterproof box required)
5.4	Vibration	IEC 60945

6   UNIT COLOR

N2.5

FURUNO

付属品表
ACCESSORIES

CODE NO.	001-081-910-00			26AC-X-9501 -0
TYPE	FP26-00601			1/1

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	フィルタークリーナー LCD CLEANING CLOTH	120 / 85	02-155-1082-1 CODE NO. 100-332-651-10	1	
2	ネジ キャップ CAP	φ13 / 6	26-003-1508-1 CODE NO. 100-356-091-10	4	

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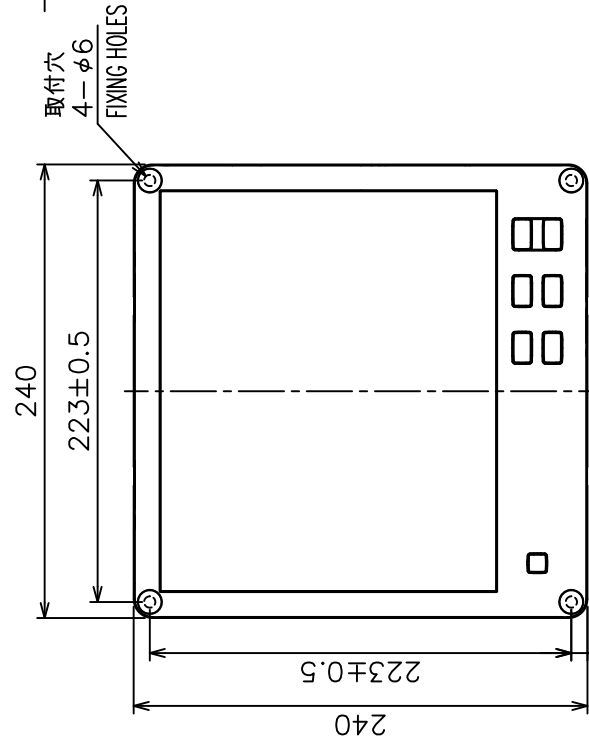(略図の寸法は、参考値です。) DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO .,LTD.

26AC-X-9501

FURUNO

工事材料表
INSTALLATION MATERIALS

CODE NO.	001-081-900-00			26AC-X-9403 -1
TYPE	CP26-01501			1/1
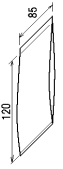
番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ケーブルクランプ (2) CABLE CLAMP (2)	12 / 41	26-003-1528-0 CODE NO. 100-355-110-10	1	
2	フラッシュマウスポンジ FLUSH MOUNTING SPONGE	239 / 239	26-003-1532-0 CODE NO. 100-355-200-10	1	
3	+バインド タッピンネジ TAPPING SCREW	20 / 5	5X20 SUS304 CODE NO. 000-171-997-10	4	

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.

26AC-X-9403

FURUNO

工事材料表
INSTALLATION MATERIALS

CODE NO.	001-077-000-00	26AC-X-9402 -1
TYPE	CP26-01201	1/1

DIMMER CONTROLLER
RD-502

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS / CODE NO.	数量 Q'TY	用途/備考 REMARKS
1	コンベ゛ックス CABLE TIE	150	CV-150B / 000-167-183-10	2	
2	圧着端子 CRIMP-ON LUG	21 9	FV2-4 / 000-157-247-10	1	
3	圧着端子 CRIMP-ON LUG	26 10	FV5.5-4(LF) / 000-166-744-10	1	
4	六角ナット 1シュ HEXAGONAL NUT	2 6	M3 SUS304 / 000-167-477-10	4	
5	ミガキ丸平座金 FLAT WASHER	φ7	/ 000-167-453-10	4	
6	バネ座金 SPRING WASHER	6	M3 SUS304 / 000-167-404-10	4	
7	+ハ゛インド コネシ゛ BINDING HEAD SCREW	12 φ3	M3X12 SUS304 / 000-171-998-10	4	

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.

26AC-X-9402

FURUNO

工事材料表
INSTALLATION MATERIALS

CODE NO.	001-076-990-00	26AC-X-9401 -1
TYPE	CP26-01101	1/1

REMOTE CONTROLLER
RD-501

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS / CODE NO.	数量 Q'TY	用途/備考 REMARKS
1	コンベ゛ックス CABLE TIE	150	CV-150B / 000-167-183-10	4	
2	圧着端子 CRIMP-ON LUG	21 9	FV2-4 / 000-157-247-10	1	
3	圧着端子 CRIMP-ON LUG	26 10	FV5.5-4(LF) / 000-166-744-10	2	
4	六角ナット 1シュ HEXAGONAL NUT	2 6	M3 SUS304 / 000-167-477-10	4	
5	ミガキ丸平座金 FLAT WASHER	φ7	/ 000-167-453-10	4	
6	バネ座金 SPRING WASHER	6	M3 SUS304 / 000-167-404-10	4	
7	+ハ゛インド コネシ゛ BINDING HEAD SCREW	12 φ3	M3X12 SUS304 / 000-171-998-10	4	

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.

26AC-X-9401

FURUNO

取付穴寸法図
CUTOUT DIMENSIONS

228±1

228±1

223±0.5

C18

223±0.5

4－取付穴
PILOT HOLES

電源端子
POWER TERMINAL

ヒューズ
FUSE

LAN

アース端子
GND TERMINAL

型式銘板
NAMEPLATE

背面
REAR VIEW

WAGOコネクタ
CONNECTOR

ケーブル導入口
CABLE ENTRY

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

#150

78

12

取付穴 4－φ6
FIXING HOLES

240

223±0.5

223±0.5

240

8.5

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 ） 取付用ネジはバインド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 BIND TAPPING SCREWS ϕ5x20 FOR FIXING THE UNIT.

DRAWN	1/Sep/09	T.YAMASAKI
CHECKED	1/Sep/09	T.TAKENO
APPROVED	15/Sep/09	R.Esumi

SCALE	1/4	MASS	2.1	±10% kg

DWG.No. C4453-G02- A

REF.No. 26-003-102G-2

TITLE RD-50

名称 リモートディスプレイ（埋込装備）

外寸図

NAME REMOTE DISPLAY (FLUSH MOUNT)

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

電源端子
POWER TERMINAL

ヒューズ
FUSE

LAN

アース端子
GND TERMINAL

WAGOコネクタ
CONNECTOR

型式銘板
NAMEPLATE

ケーブル導入口
CABLE ENTRY

背面
REAR VIEW

#150

149

91

51±5

279±5

35°

5°

#80

260±5

240

288±5

240

#80

190±0.5

4-φ7
取付穴

75±0.5

40

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）　取付用ネジはバインド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 BIND TAPPING SCREWS φ5x20 FOR FIXING THE UNIT.

DRAWN	1/Sep/09	I.YAMASAKI
CHECKED	1/Sep/09	T.TAKENO
APPROVED	15/Sep/09	R.Esumi

TITLE	RD-50
名称	リモートディスプレイ（卓上装備）

外寸図

REMOTE DISPLAY (TABLETOP MOUNT)

NAME

OUTLINE DRAWING

| SCALE | 1/4 | MASS | 3.3 | ±10%
kg |

DWG.No. C4453-G01-A

REF.No. 26-003-101G-2

FURUNO ELECTRIC CO., LTD.

FURUNO

FURUNO ELECTRIC CO., LTD.

取付穴寸法図
CUTOUT DIMENSIONS

86±0.5
88±1
76±1
86±0.5

4-φ4

アース端子
GND TERMINAL

コネクタ
CONNECTOR

ケーブル導入口
CABLE ENTRY

#150

75

43

25

3

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

96
86±0.5
96
86±0.5

4-φ4 取付穴
FIXING HOLES

FURUNO

REMOTE CONTROLLER
RD-501

DISP UNIT MODE
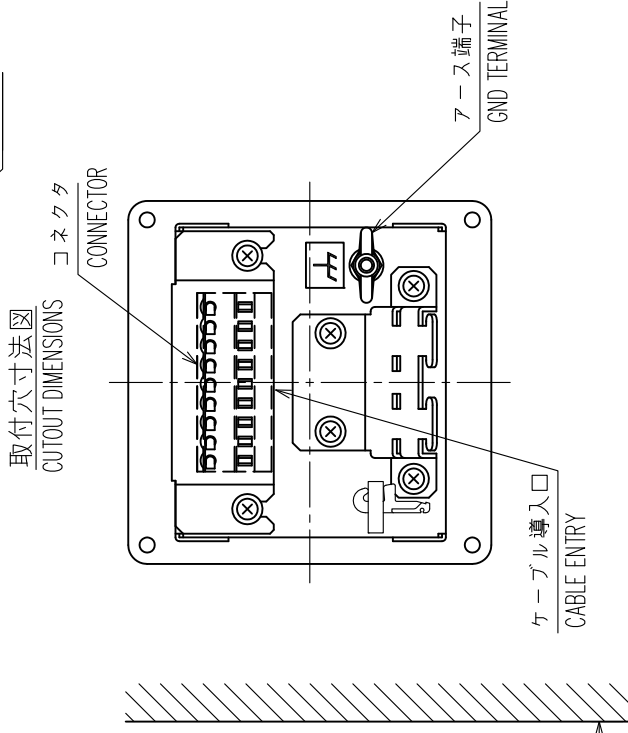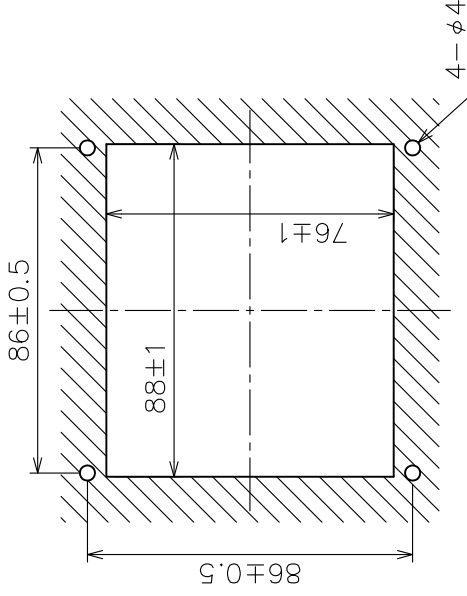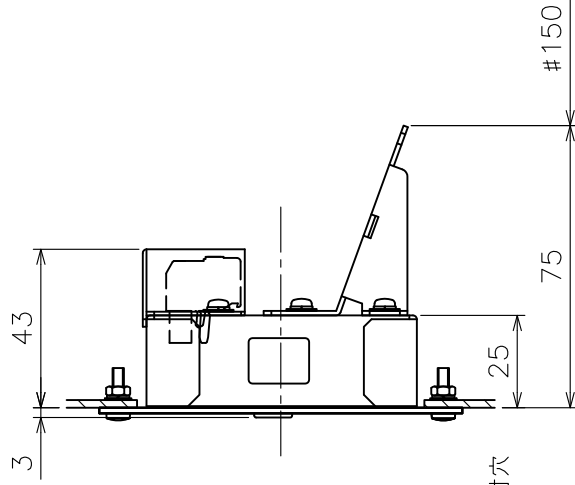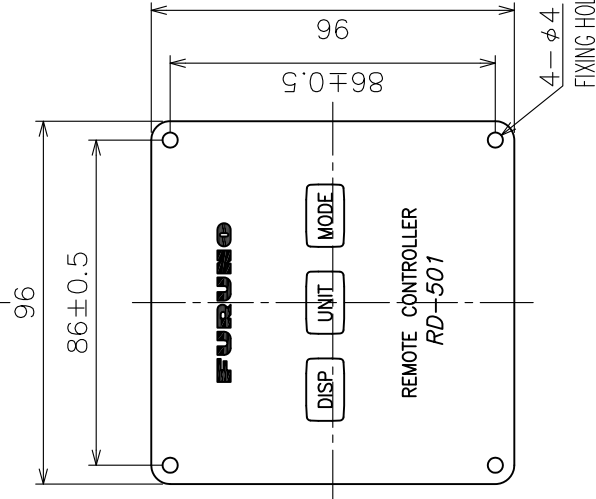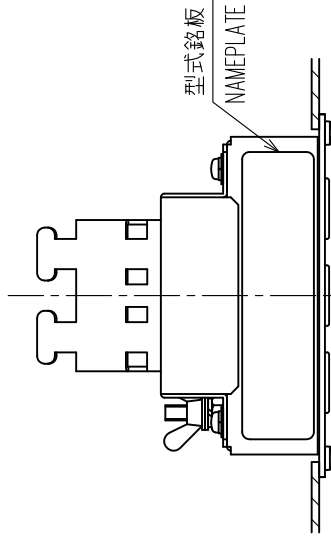
注記 1） 指定外の寸法公差は表1による。
2） #印寸法は最小サービス空間寸法とする。
3） 取付にはM3×12バインドルネジ、M3平座金／バネ座金／ナット
を使用のこと。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. # MINIMUM SERVICE CLEARANCE.
3. USE BINDING SCREWS M3x12 AND M3 P.W./S.W./ NUTS FOR FIXING THE UNIT.

DRAWN	25/May/09	T.YAMASAKI		TITLE	RD-501
CHECKED	26/May/09	T.TAKENO		名称	リモート操作部（埋込装備）
APPROVED	9/Jun/09	R. Esumi	RD-50		外寸図
SCALE	1/2	MASS	0.38 ±10% kg	NAME	REMOTE CONTROLLER (FLUSH MOUNT)
DWG.No.	C4453-G03-B		REF.No.	26-003-200G-3	OUTLINE DRAWING

FURUNO

取付穴寸法図
CUTOUT DIMENSIONS

86±0.5
88±1
76±1
86±0.5
4-φ4

コネクタ
CONNECTOR

アース端子
GND TERMINAL

ケーブル導入口
CABLE ENTRY

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

#150
75
43
25
3

型式銘板
NAMEPLATE

96
86±0.5
96
86±0.5

BRILL
DAY NT
DIMMER CONTROLLER RD-502

4-φ4 取付穴
FIXING HOLES
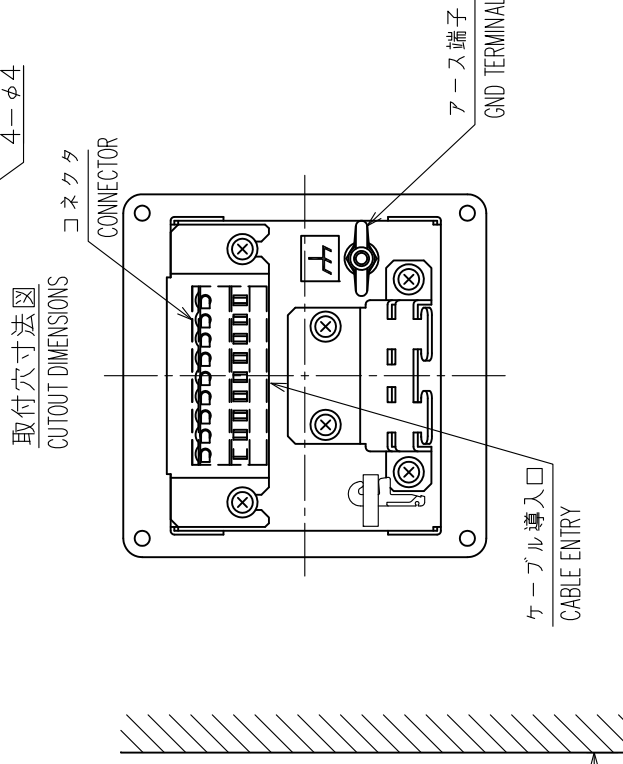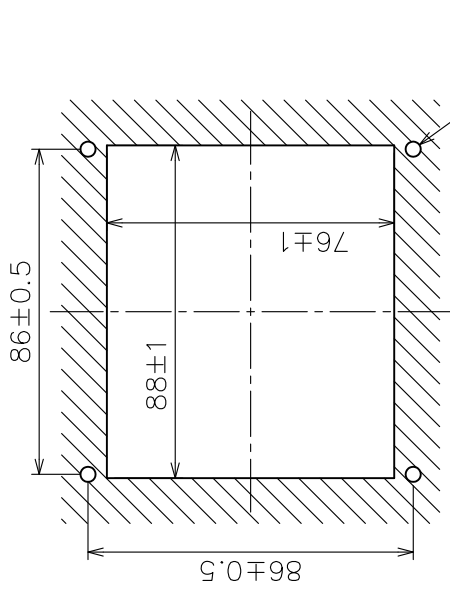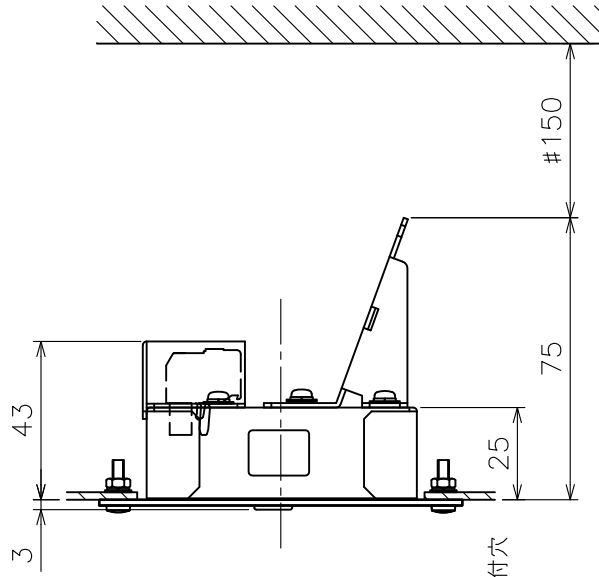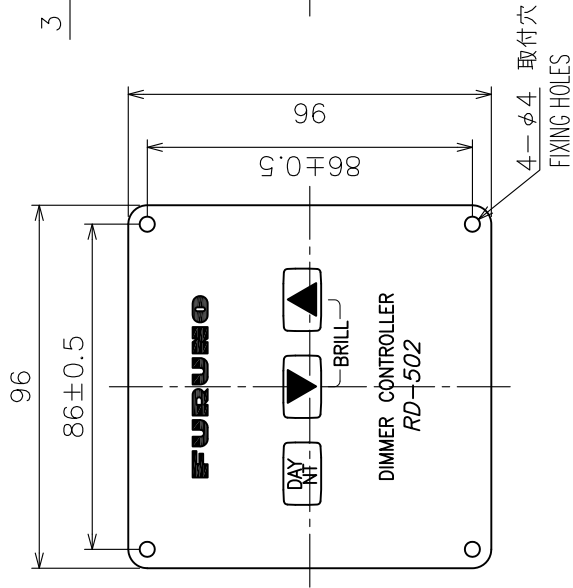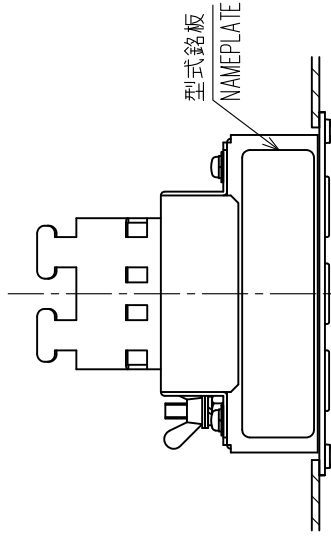
注記 1） 指定外の寸法公差は表1による。
2） #印寸法は最小サービス空間寸法とする。
3） 取付はM3×12バインドハ゛インドネジ、M3平座金/バネ座金/ナット
を使用のこと。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. # MINIMUM SERVICE CLEARANCE.
3. USE BINDING SCREWS M3x12 AND M3 P.W./S.W./ NUTS FOR FIXING THE UNIT.

DRAWN	26/May/09	T.YAMASAKI			
CHECKED	26/May/09	T.TAKENO		TITLE	RD-502
APPROVED	9/Jun/09	R.Esumi	RD-50	名称	調光器 （埋込装備）
SCALE	1/2	MASS	0.38 kg ±10%		外寸図
				NAME	DIMMER CONTROLLER (FLUSH MOUNT)
DWG.No.	C4453-G04-C	REF.No.	26-003-250G-4		OUTLINE DRAWING

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扉 上（下）開閉図（尺度：1/12）
OPENING THE LID UP/DOWN (SCALE:1/12)

180°

337±5
341
296±5
#100
#100
463±5
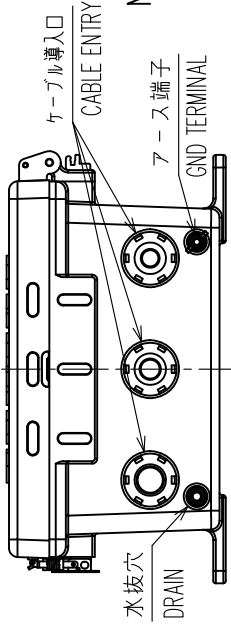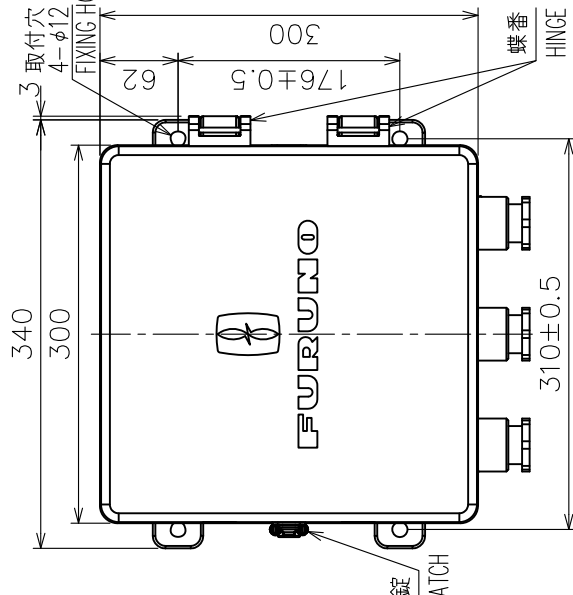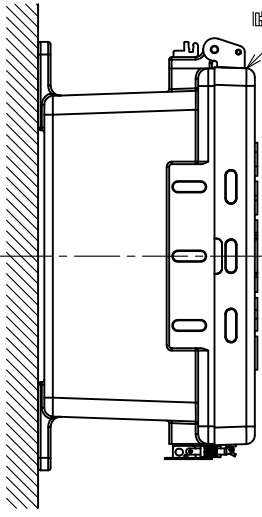
扉 右（左）開閉図（尺度：1/12）
OPENING THE LID LEFT/RIGHT (SCALE:1/12)

317±5
340
180°
317±5
463±5
#100
#100

DS-600/RD-50

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

174
341
#350

3 取付穴 4-φ12
FIXING HOLES

62
300
176±0.5

蝶番
HINGE

ケーブル導入口
CABLE ENTRY

アース端子
GND TERMINAL

340
300
310±0.5

扉 LID

FURUNO

水抜穴
DRAIN

錠
LATCH

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE M10 BOLTS FOR FIXING THE UNIT.
4. EXCHANGE THE POSITION OF LATCH/HINGE TO CHANGE THE LID DIRECTION.

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）取付ネジはM10ボルトを使用のこと。
4）錠と蝶番の取付位置を入れ替えて、扉の開閉方向を変更出来ます。

DRAWN	7/Sep/09	T.YAMASAKI	TITLE	DS-605
CHECKED	7/Sep/09	T.TAKENO	名称	防水箱
APPROVED	15/Sep/09	R.Esumi		外寸図

DS-60, RD-50
質量は指示器本体を含みます。
MASS W/O DISPLAY UNIT

SCALE	1/6	MASS	7.0	kg	NAME	WATERPROOF BOX
DWG.No.	C7264-G05-C			REF.No.	66-027-104G-0	OUTLINE DRAWING

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1) NMEAデータを共有する場合　　TO USE NMEA DATA JOINTLY
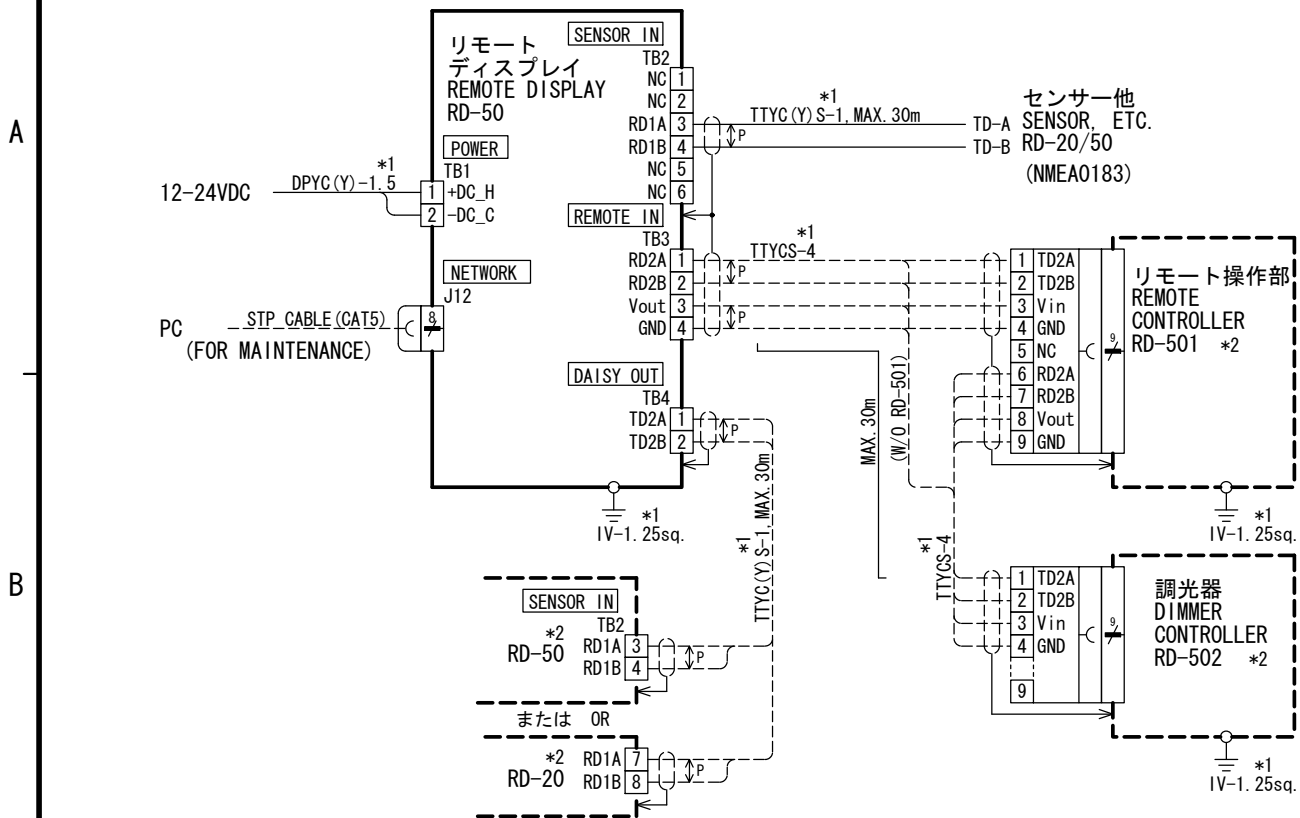
2) 調光制御のみを共有する場合　　TO USE DIMMER CONTROL ONLY JOINTLY
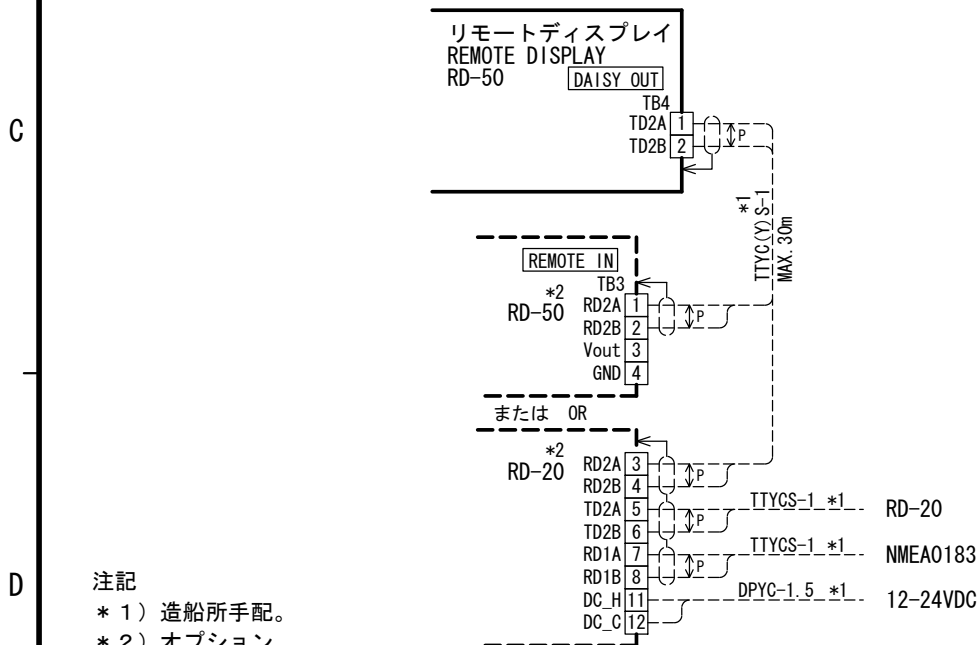
注記
＊1）造船所手配。
＊2）オプション。

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

DRAWN	24/Sep/09 T. YAMASAKI		TITLE	RD-50
CHECKED	24/Sep/09 T. TAKENO		名称	リモートディスプレイ
APPROVED	26/Oct/09 R. Esumi			相互結線図
SCALE	MASS kg		NAME	REMOTE DISPLAY
DWG. No. C4453-C01- A	REF. No. 26-003-0001-0			INTERCONNECTION DIAGRAM

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