# FURUNO

## *REMOTE DISPLAY*

# RD-33

## FURUNO ELECTRIC CO., LTD.

www.furuno.co.jp

**ECF**

**(Elemental Chlorine Free)**

The paper used in this manual
is elemental chlorine free.

# FURUNO ELECTRIC CO., LTD.

9-52 Ashihara-cho,
Nishinomiya, 662-8580, JAPAN

Telephone : +81-(0)798-65-2111
Fax        : +81-(0)798-65-4200

Pub. No. OME-44590-A

(YOTA) RD-33

FURUNO Authorized Distributor/Dealer

A : JAN. 2010

*00017318310*

# 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.
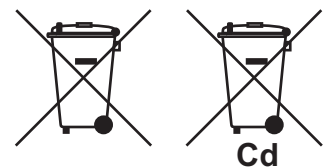
### In the USA

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.
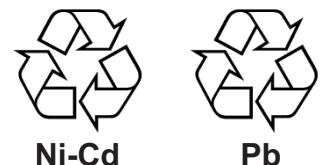
### In the other countries

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 open the equipment.**

Only qualified persons can work inside the equipment.

**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.

## *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-33 | 0.60 m | 0.40 m |

# TABLE OF CONTENTS

# FOREWORD

## A Word to the Owner of the RD-33 Remote Display

Congratulations on your choice of the FURUNO RD-33 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 main features of the RD-33 are as shown below.

- 4.3" color LCD is visible in direct sunlight (Nominal viewing distance: 0.6 m).
- Display the navigation data in digital, analog and graph formats.
- The design is consistent with NavNet 3D and FI-50, so there is uniformity in console installation.
- Fulfill the conversion function between CAN bus and NMEA 0183, so the RD-33 is in relay between existing equipments and CAN bus network.
- Alarm functions: Arrival/anchor watch, cross-track error, speed, water temperature, depth, alarm clock, trip distance, odometer, roll, pitch, wind speed, wind angle.
- The frequently used data screens are set to default. Also, you can customize the data screens.

## Program Number

| Program | Number/Version | Date of Change |
|---|---|---|
| **RD-33** | | |
| CPU Main | 2651010-01.xx | Jan. 2010 |
| CPU Boot | 2651011-01.xx | Jan. 2010 |
| CPU CAN LD | 2651012-01.xx | Jan. 2010 |

xx: minor change

# SYSTEM CONFIGURATION

**Single remote display**
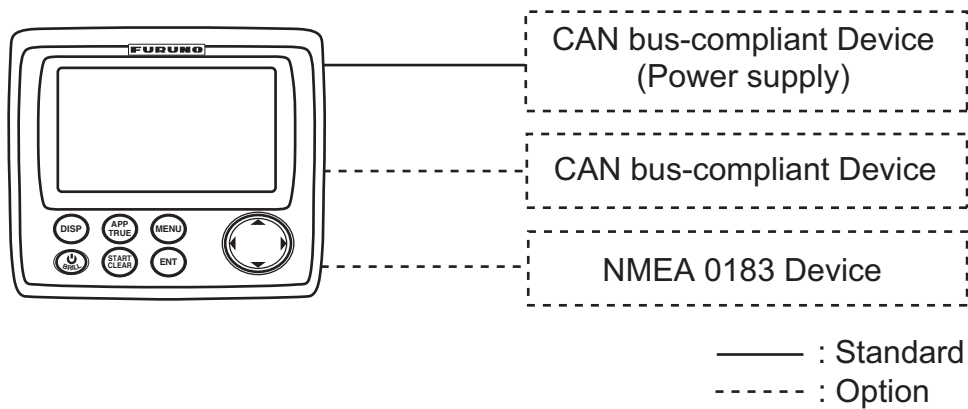


**RD-33 and NavNet 3D connection**
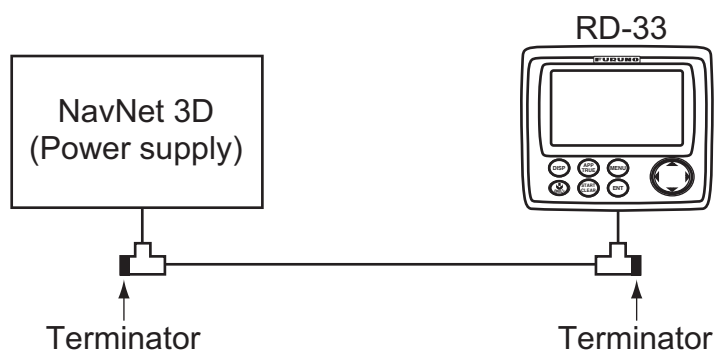


**RD-33 and FI-50 connection**

**Daisy chain connection**



FI-50 series
Instruments

RD-33          RD-33

Junction Box
FI-5002

12 VDC
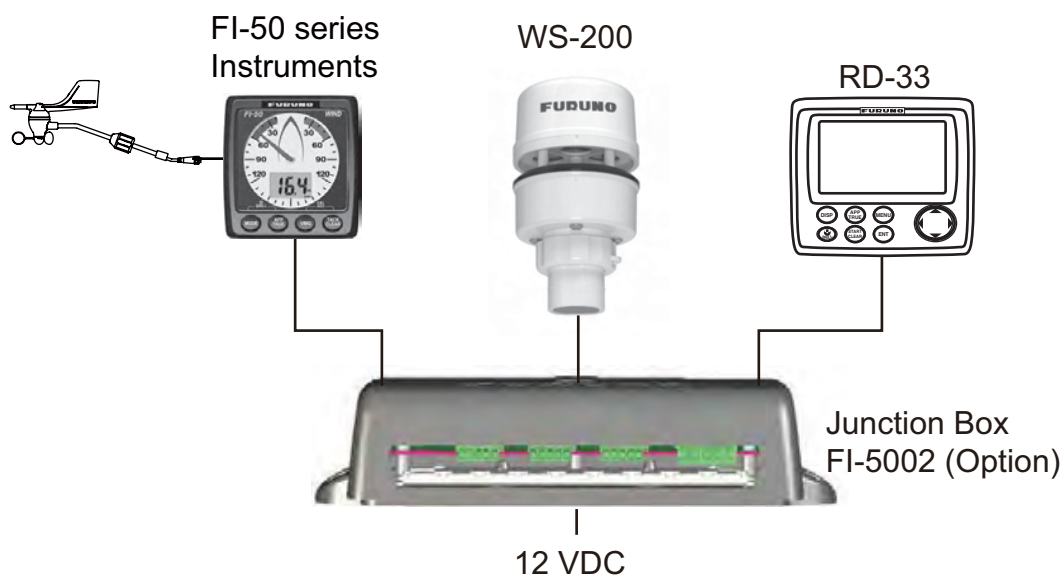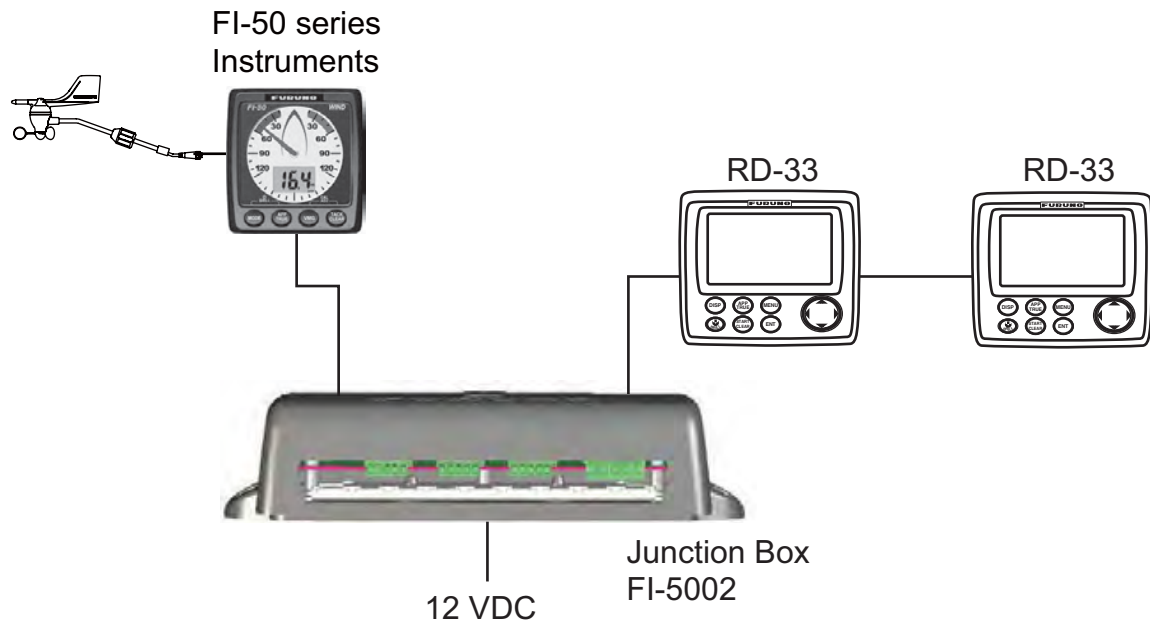
**NMEA 0183, RD-33 and CAN bus device connection**



FI-50 series
Instruments

RD-33

NMEA 0183

NMEA 0183
Device
(NavNet VX2 etc.)

Junction Box
FI-5002

12 VDC
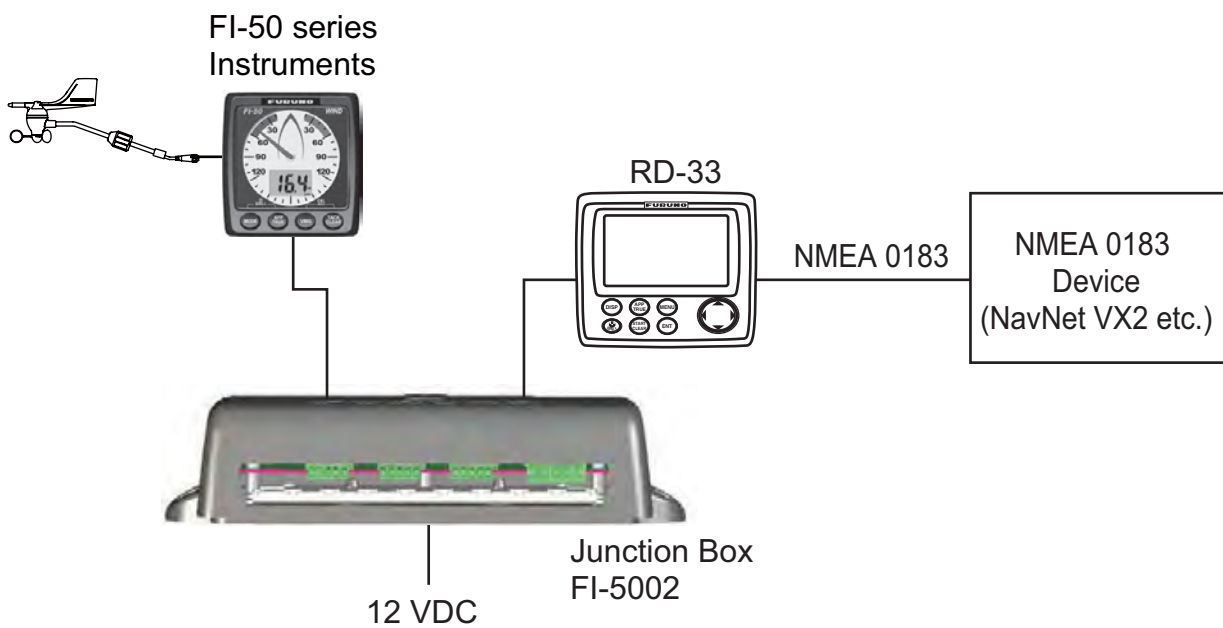
## Environmental category

| RD-33 | Protected from weather |
|---|---|
| FI-5002 | |

# 1. BASIC OPERATION

## 1.1 Controls
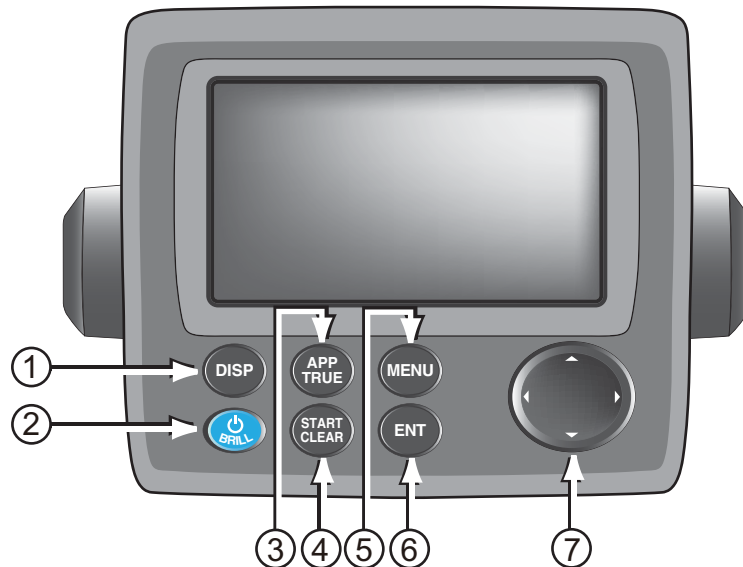


| No. | Control | Main description |
|-----|---------|------------------|
| 1 | **DISP** | **Short press:** Step through the seven data screens in the sequence of Display1 → Display2 → Display3 → Display4 → Display5 → Display6 → Display7 → Display1 → ... <br> **Long press:** Step through the screens in reverse order. |
| 2 | ⏻/**BRILL** | **Short press:** Turn on the power. Adjust the screen brilliance. <br> **Long press:** Turn off the power. |
| 3 | **APP/TRUE** | Switch the wind speed and direction between Apparent (APP) and True. |
| 4 | **START/CLEAR** | At the data screen for [Stopwatch], [Timer1 (or 2)], [Locked HDG] or [Locked BRG], <br> **Short press:** <br> • Start to count up/down the time. <br> • Stop the timer (to measure lap time). <br> • Display the locked heading/bearing. <br> **Long press:** Reset the value. |
| 5 | **MENU** | • Open/close the menu. <br> • Cancel last entry in menu operation and return one layer. |
| 6 | **ENT** | • Save selected menu option. <br> • Move down one layer when you save the menu option in the layer except undermost one. |
| 7 | **Cursorpad** | • Select the menu items and options. <br> • With the [Brill] window displayed, adjust the screen brilliance. (◀: Decrease, ▶: Increase) <br> • With the [Brill] window displayed, adjust the key dimmer. (▲: Increase, ▼: Decrease) |

**How to remove the hard cover**

Press here with thumb and
pull cover forward.
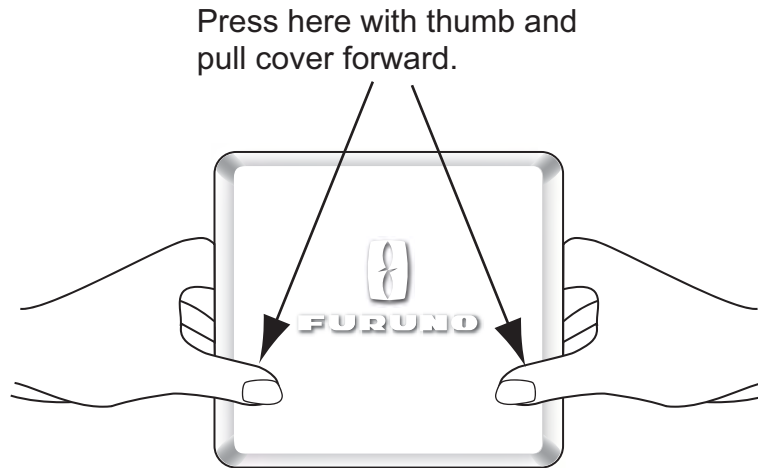
# 1.2 How to Turn On/Off the Power

**Turn on the power**

Press the 🔵 BRILL key to turn on the power. The start-up screen appears followed by the
last-used data screen.

```
RD-33 Booter(1) ver.XX.XX (build:YYYY/MM/DD)
Program No: 2651011-XX.XX
Initializing...
Waiting for update request from SIO...
Waiting for update request from CAN...
Expanding program...
Starting program.
```

```
RD-33 ver.XX.XX (build:YYYY/MM/DD)
Program No: 2651010-XX.XX
Unique Number: ZZZZZ(ZZZZZZ)
CAN bus Module ver. XX.XX
Initializing...
Self Test
 ROM     : OK
 RAM     : OK
Starting program.
```

XX.XX: Program version number
YYYY/MM/DD: Date

Last used data screen

**Turn off the power**

Press and hold down the 🔵 key until the screen turns off. The following count-down window appears until the power goes off.

Turn Off in 3s.

# 1.3 How to Adjust the Screen Brilliance/Key Dimmer

You can adjust the screen brilliance and key dimmer as follows:

1. Press the 🔵 key momentarily to show the [Brill] window.

```
Brill

LCD  ◄ Min     Max ►
 3   ██████████
KEY  ▼ Min     Max ▲
 5   █████████████
```
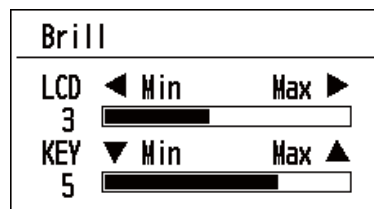
2. For the LCD brilliance, press the 🔵 key or use the Cursorpad (◄ or ►) to adjust.
   For the key brilliance, use the Cursorpad (▲ or ▼) to adjust.
3. Press the **MENU** key to close the window.

## 1.4 How to Step through the Data Screen

You can step through the seven data screens with the **DISP** key. When you press the **DISP** key momentarily, the screen changes in the sequence of Display1 → Display2 → Display3 → Display4 → Display5 → Display6 → Display7 → Display1 → ... The default screens are as shown below. For details, see sections 2.2 and 2.3.

Display1



The screen changes in reverse order with **DISP** key (long press).

**DISP** key (short press)

**DISP** key (short press)

Display2



Display7



Display3 **DISP** key (short press)



Display6 **DISP** key (short press)



Display4 **DISP** key (short press)



Display5 **DISP** key (short press)



**DISP** key (short press)
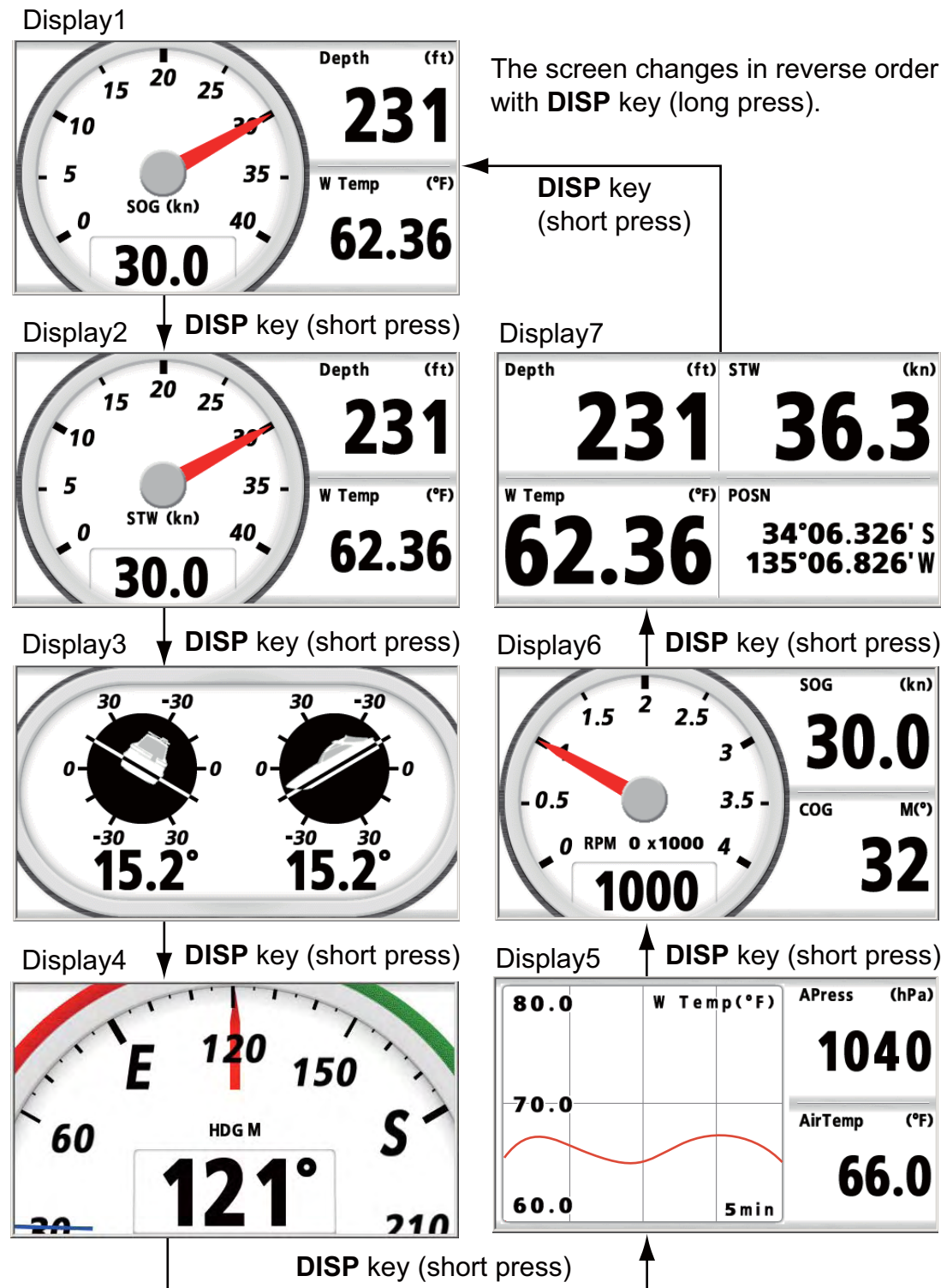
# 2. PROGRAMMED SCREEN

The RD-33 displays the data in three types; digital, analog and graph formats. Also, this equipment provides six programmed screen patterns which meets the purposes; [Fishing], [Sailing], [Ship], [Navigation], [Environment] and [Engine]. Availability of data depends on the sensors connected.

## 2.1 How to Set the Analog Screen Appearance

You can select the analog screen appearance from [A] and [B]. The font, background color, type of pointer (color, form), and so on differ between [A] and [B].
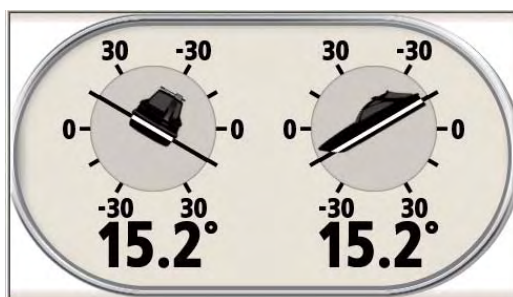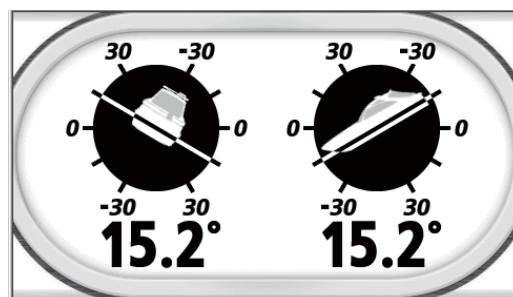


Example of [A]                              Example of [B]

1. Press the **MENU** key to open the menu.
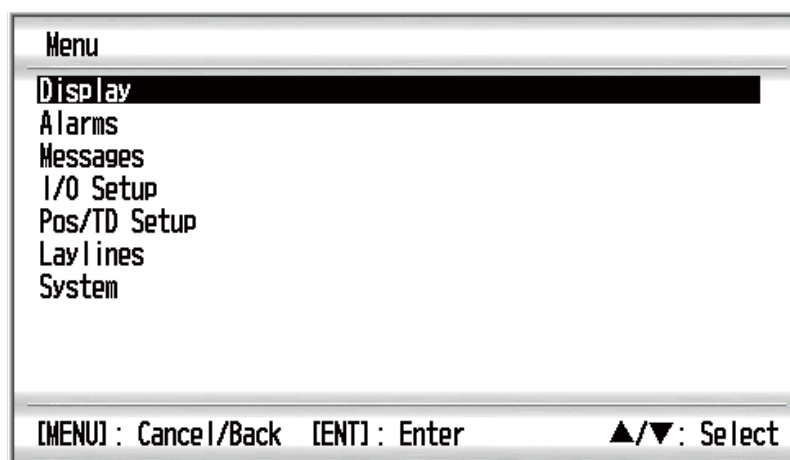
2. Use the Cursorpad (▲ or ▼) to select [Display] and press the **ENT** key.

```
Menu >Display
Graphic      : B
Display1     : Fishing
Display2     : Sailing
Display3     : Ship
Display4     : Navigation
Display5     : Environment
Display6     : Engine
Display7     : Custom Layout

[MENU] : Cancel/Back   [ENT] : Enter        ▲/▼ : Select
```
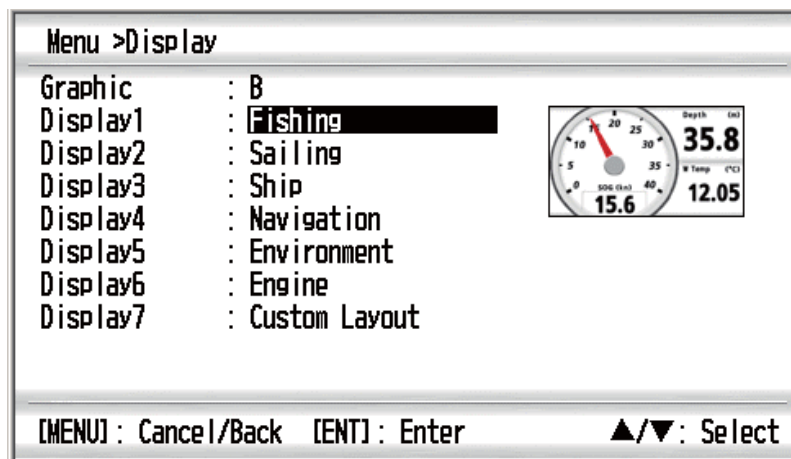
3. Use the Cursorpad (▲ or ▼) to select [Graphic] and press the **ENT** key.

```
A
B
```

4. Use the Cursorpad (▲ or ▼) to select [A] or [B] then press the **ENT** key.

5. Press the **DISP** key to close the menu and display the data screen.

## 2.2    How to Set the Programmed Screen

The RD-33 provides six programmed screens and each screen has four preset screens. You can select one of them as the data screen.

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

2. Use the Cursorpad (▲ or ▼) to select [Display] and press the **ENT** key.

3. Use the Cursorpad (▲ or ▼) to select [Display1] and press the **ENT** key.

```
Fishing
Sailing
Ship
Navigation
Environment
Engine
Custom Layout
```
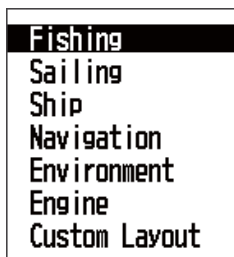
*Display options for [Display1]*

4. Use the Cursorpad (▲ or ▼) to select [Fishing], [Sailing], [Ship], [Navigation], [Environment] or [Engine] then press the **ENT** key. The data for these items are preset and arranged for general navigation purposes. See the table on page 2-4 for each menu item.
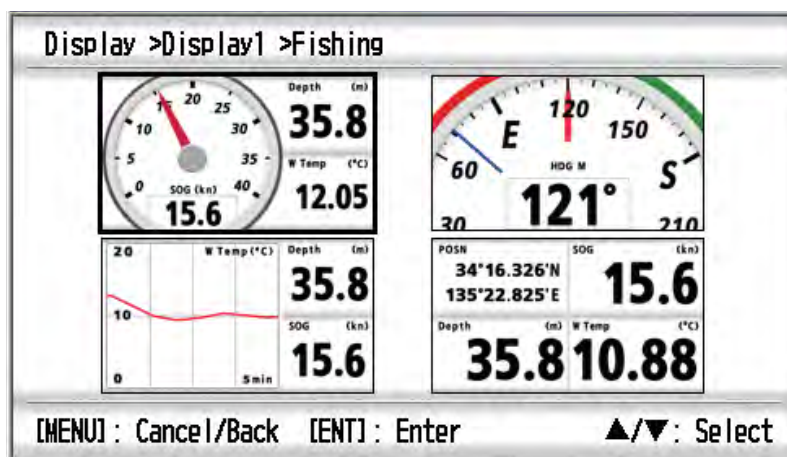
*E.g. [Fishing] screen*

**Note:** For [Custom Layout], see the next chapter.

5.  Use the Cursorpad to select the screen desired and press the **ENT** key.

6.  Select the screen for [Display2] to [Display7] in the same method.
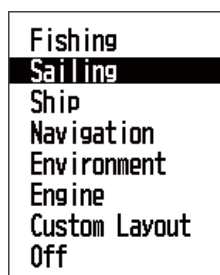


*Display options for [Display2] to [Display7]*
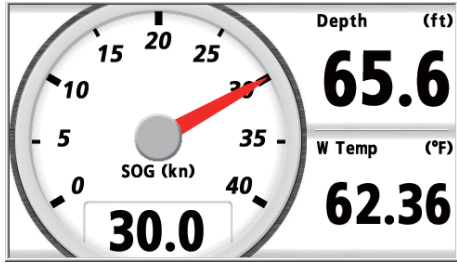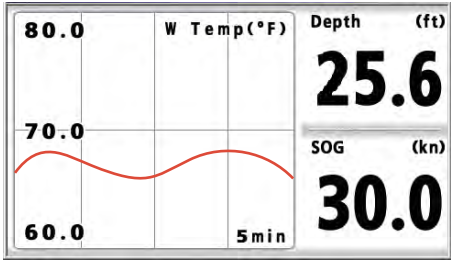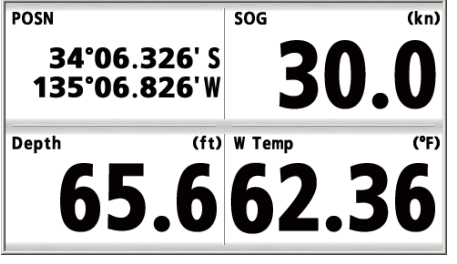
**Note:** If you selected [Off] on the [Display2] to [Display7], the data screen is skipped by pressing the **DISP** key.
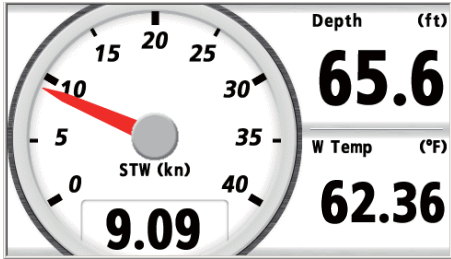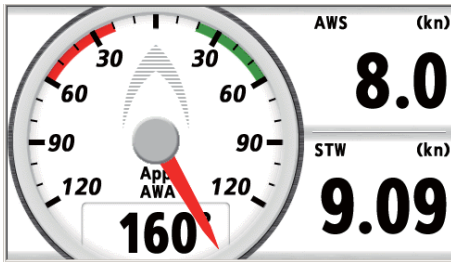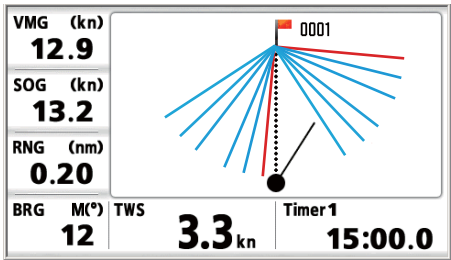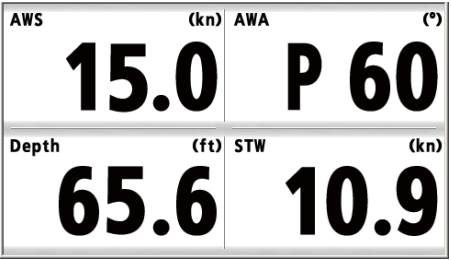
7.  Press the **DISP** key to close the menu and display the data screen.
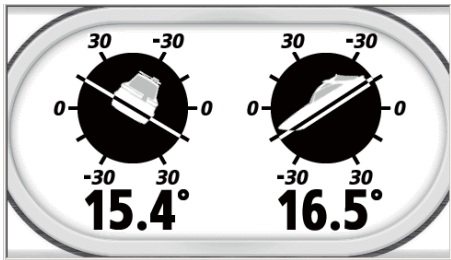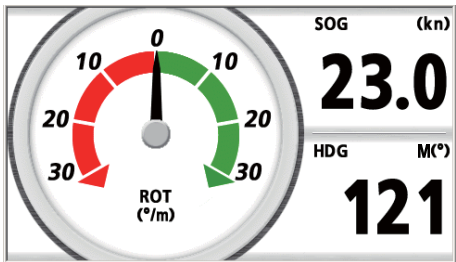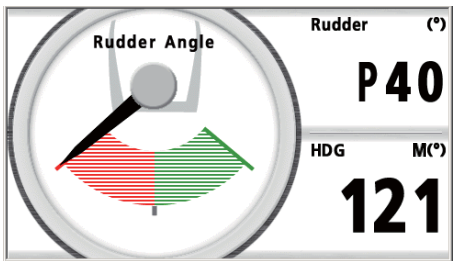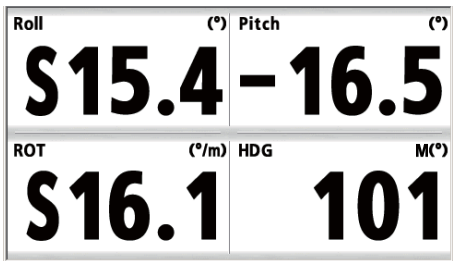
### Programmed screen patterns
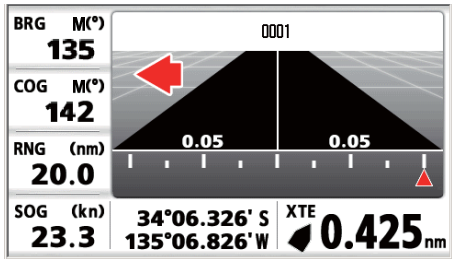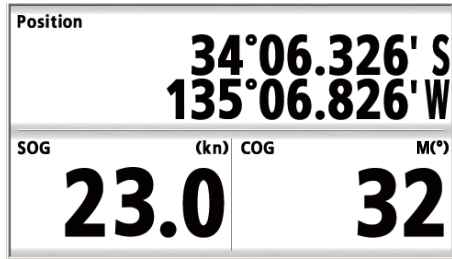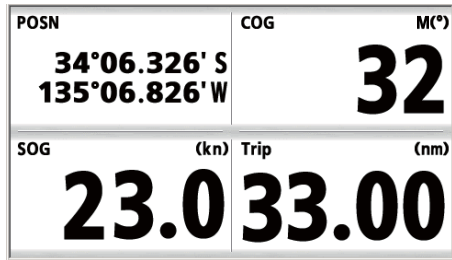
**Note:** For explanation of abbreviations shown on the screen, see APPENDIX 2.

| Menu item | Description | Screen |
|---|---|---|
| Fishing | The screen for fishing.<br><br>Pattern 1:<br>SOG (Analog meter for Speed Over the Ground),<br>Depth,<br>W Temp (Water temperature) | <br>Pattern 1 |
| | Pattern 2:<br>HDG (Heading meter)<br>(Blue line: COG) | <br>Pattern 2 |
| | Pattern 3:<br>W Temp (Water temperature graph),<br>Depth,<br>SOG (Speed Over the Ground) | <br>Pattern 3 |
| | Pattern 4:<br>POSN (Position),<br>SOG (Speed Over the Ground),<br>Depth,<br>W Temp (Water temperature) | <br>Pattern 4 |

| Menu item | Description | Screen |
|---|---|---|
| Sailing | The screen for sailing.<br><br>Pattern 1:<br>STW (Analog meter for Speed Through the Water),<br>Depth,<br>W Temp (Water temperature) | <br>Pattern 1 |
| | Pattern 2:<br>AWA (Analog meter for Apparent Wind Angle),<br>AWS (Apparent Wind Speed),<br>STW (Speed Through the Water) | <br>Pattern 2 |
| | Pattern 3:<br>VMG (Velocity Made Good),<br>SOG (Speed Over the Ground),<br>RNG (Range),<br>BRG (Bearing),<br>TWS (True Wind Speed),<br>Timer1 (Count down timer),<br>Laylines | <br>Pattern 3 |
| | Pattern: 4<br>AWS (Apparent Wind Speed),<br>AWA (Apparent Wind Angle),<br>Depth,<br>STW (Speed Through the Water) | <br>Pattern 4 |

| Menu item | Description | Screen |
|---|---|---|
| Ship | The screen for ship data.<br><br>Pattern 1:<br>Roll/Pitch (Analog meter for Roll and Pitch) | <br>Pattern 1 |
| | Pattern 2:<br>ROT (Analog meter for Rate Of Turn),<br>SOG (Speed Over the Ground),<br>HDG (Heading) | <br>Pattern 2 |
| | Pattern 3:<br>Rudder Angle (Analog meter for rudder angle),<br>Rudder (Rudder angle),<br>HDG (Heading) | <br>Pattern 3 |
| | Pattern 4:<br>Roll,<br>Pitch,<br>ROT (Rate Of Turn),<br>HDG (Heading) | <br>Pattern 4 |

| Menu item | Description | Screen |
|---|---|---|
| Navigation | The screen for navigation.<br><br>Pattern 1:<br>HDG (Heading meter)<br>(Blue line: COG) | <br>Pattern 1 |
| | Pattern 2:<br>BRG (Bearing),<br>COG (Course Over the Ground),<br>RNG (Range),<br>SOG (Speed Over the Ground),<br>Position (Latitude/Longitude),<br>XTE (Cross-track Error),<br>Highway screen | <br>Pattern 2 |
| | Pattern 3:<br>Position (Latitude/Longitude),<br>SOG (Speed Over the Ground),<br>COG (Course Over the Ground) | <br>Pattern 3 |
| | Pattern 4:<br>POSN (Position),<br>COG (Course Over the Ground),<br>SOG (Speed Over the Ground),<br>Trip (Trip distance) | <br>Pattern 4 |

| Menu item | Description | Screen |
|---|---|---|
| Environment | The screen for environment.<br><br>Pattern 1:<br>W Temp (Water temperature graph),<br>APress (Air pressure),<br>Air Temp (Air temperature) | <br>Pattern 1 |
| | Pattern 2:<br>Air Temp/HUMID (Analog meter for air temperature and humidity),<br>Air Temp (Air temperature),<br>HUMID (Humidity) | <br>Pattern 2 |
| | Pattern 3:<br>GW DIR (Analog meter for Ground Wind direction),<br>TWS (True Wind Speed),<br>GW DIR (Ground Wind direction) | <br>Pattern 3 |
| | Pattern 4:<br>Air Temp (Air temperature),<br>APress (Air pressure),<br>W Temp (Water temperature),<br>Chill (Wind chill temperature) | <br>Pattern 4 |

| Menu item | Description | Screen |
|---|---|---|
| Engine | The screen for engine.<br><br>Pattern 1:<br>RPM (Analog meter for Engine Revolutions Per Minute),<br>SOG (Speed Over the Ground),<br>COG (Course Over the Ground) | <br>Pattern 1 |
| | Pattern 2:<br>RPM (Analog meter for Engine Revolutions Per Minute),<br>Boost (Analog meter for engine boost pressure),<br>E Temp (Analog meter for engine temperature),<br>Volts (Analog meter for input voltage) | <br>Pattern 2 |
| | Pattern 3:<br>RPM (Engine Revolutions Per Minute),<br>Oil P (Engine oil pressure),<br>Boost (Engine boost pressure),<br>Oil (Engine oil temperature) | <br>Pattern 3 |
| | Pattern 4:<br>RPM (Engine Revolutions Per Minute),<br>Oil P (Engine oil pressure),<br>Oil (Engine oil temperature),<br>Boost (Engine boost pressure),<br>Coolant (Engine coolant pressure),<br>Volts (Input voltage) | <br>Pattern 4 |

## 2.3 How to Customize the Factory-preset Screen

You can change the settings of the factory-preset data screen.

**How to change the display item**

1. With the data screen displayed, press the **ENT** key. The screen changes as below.
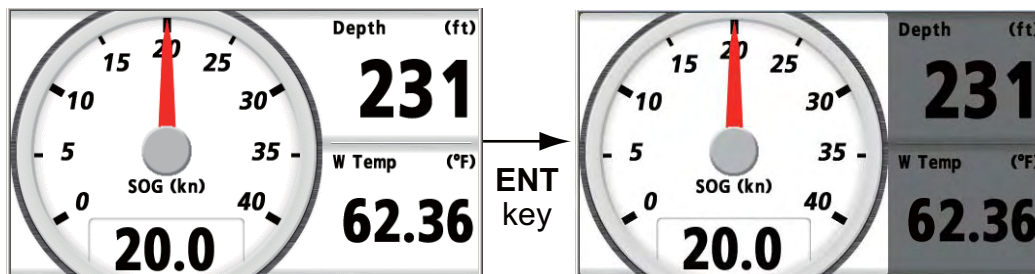


*E.g. [Fishing] screen pattern 1*

2. Use the Cursorpad to select the data box you want to change. The selected data box remains undarkened and the unselected data boxes darken.
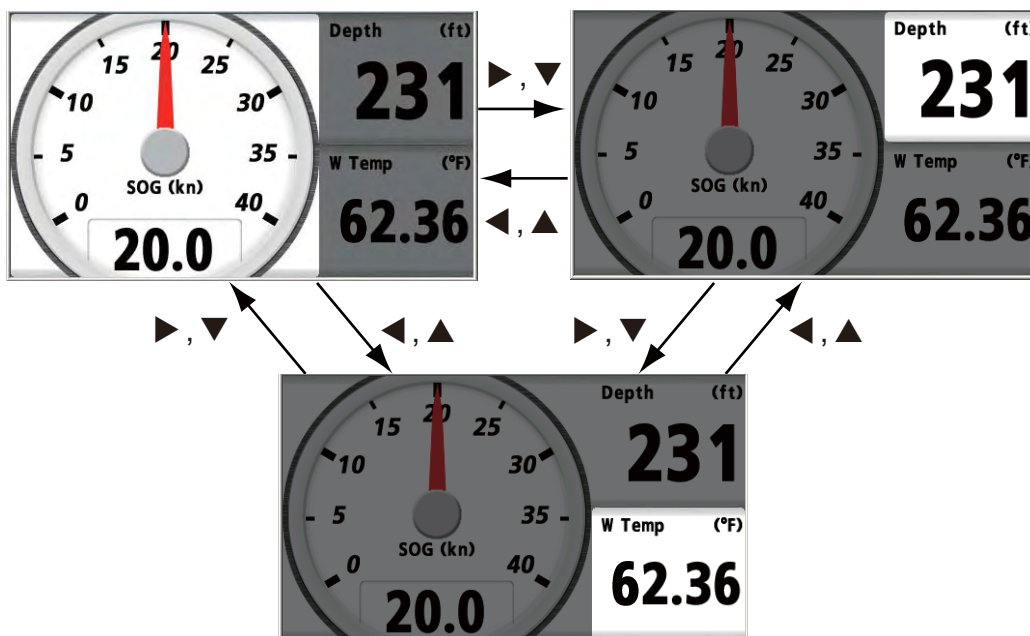


3. Press the **ENT** key.
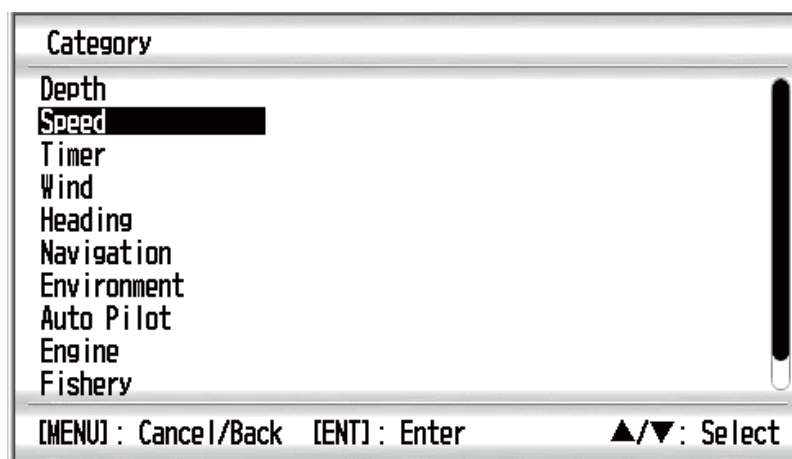
4. Use the Cursorpad (▲ or ▼) to select the category and press the **ENT** key. The category options screen, which differs depending on the selected category, appears.

```
Category >Speed

STW
STW MAX
STW AVG
SOG
SOG MAX
SOG AVG
VMG
Trip
Odometer


[MENU]: Cancel/Back   [ENT]: Enter        ▲/▼: Select
```
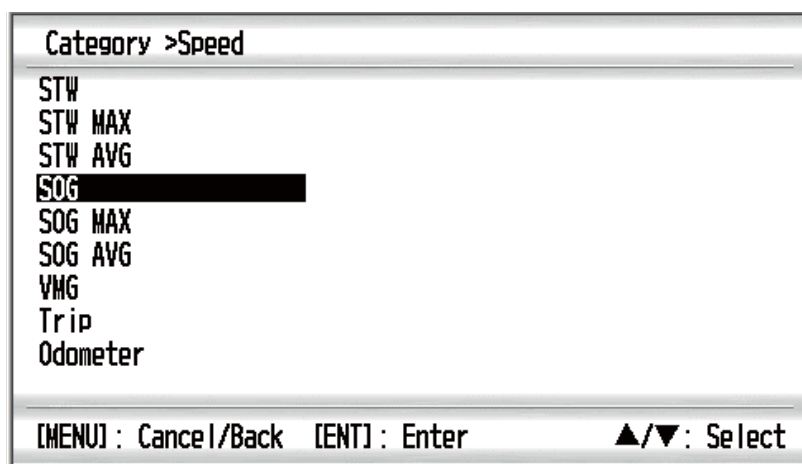
*Category options (e.g. [Speed] category)*

**Note 1:** If you selected [None] in the category list, the data screen is blank.

**Note 2:** For details of each category, see section 3.2.

**Note 3:** The available category and category options depend on the selected screen division. The unavailable category and category options are displayed in gray.

5. Use the Cursorpad (▲ or ▼) to select an option and press the **ENT** key.

```
Category >Speed >Style

Digital
Analog
Graph








[MENU]: Cancel/Back   [ENT]: Enter        ▲/▼: Select
```
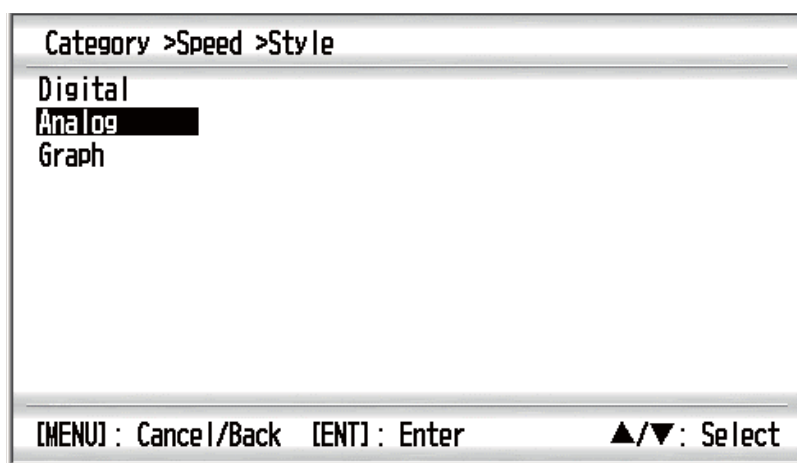
**Note:** Unavailable style options are displayed in gray.

6. Use the Cursorpad (▲ or ▼) to select [Digital], [Analog] or [Graph] then press the **ENT** key.

**How to change the properties**

1. With the data screen displayed, press the **ENT** key. For the no-split screen, go to step 3.

2. Use the Cursorpad to select the data box you want to change.

3. Press the **ENT** key long. The window for properties appears. The content differs according to the display item.
   **Note:** When there are no properties, the screen returns to the previous data screen.

**2-11**

*E.g. SOG properties window*

4. Use the Cursorpad (▲ or ▼) to select an option and press the **ENT** key.



Options window          Setting window
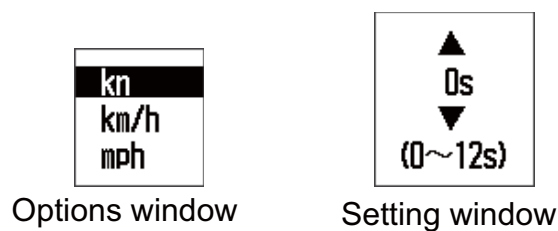
*Window examples*

5. Use the Cursorpad (▲ or ▼) to select an option or numeric value then press the **ENT** key.

6. Repeat steps 4 and 5 to set the other options if necessary.

7. Press the **DISP** key or the **MENU** key to close the menu and display the data screen.

**How to change the custom layout**

1. With the data screen displayed, press the **ENT** key long.



2. Do steps 4 to 5 at section 2.2.

# 3. CUSTOM SCREEN

You can arrange the data to display and show the data in the order desired. Availability of data depends on the sensors connected.

## 3.1 How to Customize the Screen

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

2. Use the Cursorpad (▲ or ▼) to select [Display] and press the **ENT** key.

3. Use the Cursorpad (▲ or ▼) to select [Display1 (2, 3, 4, 5, 6 or 7)] and press the **ENT** key.

```
Fishing
Sailing
Ship
Navigation
Environment
Engine
Custom Layout
```
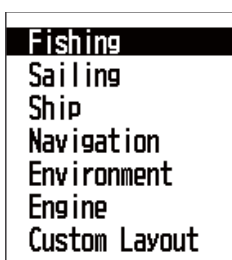
4. Use the Cursorpad (▲ or ▼) to select [Custom Layout] and press the **ENT** key.

```
Display >Display1 >Custom Layout




   ▢
   ▭    ▭

   ▭    ▭    ▭

   ▭

   ▦


[MENU] : Cancel/Back   [ENT] : Enter        ▲/▼ : Select
```
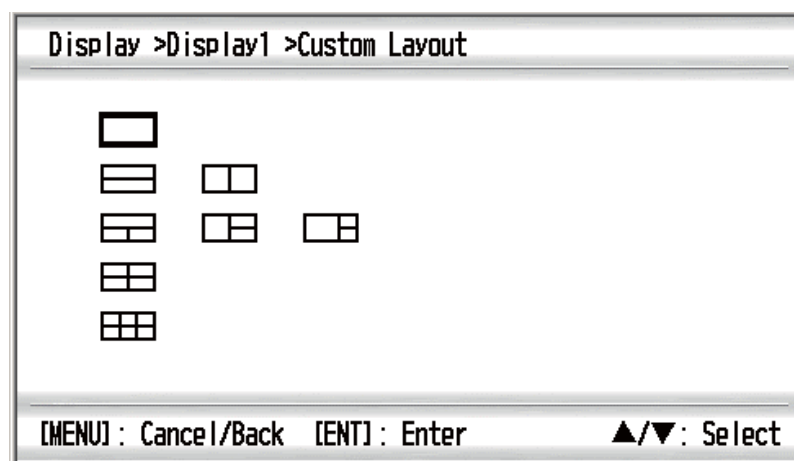
▢ No-split

▭ Horizontal two-way split          ▭ Vertical two-way split

▭ Horizontal/vertical three-way split 1     ▭ Horizontal/vertical three-way split 2     ▭ Horizontal/vertical three-way split 3

▦ Four-way split

▦ Six-way split

5.  Use the Cursorpad to select the screen division and press the **ENT** key. The option screen depends on the selected screen division.
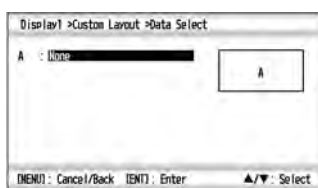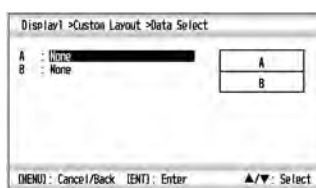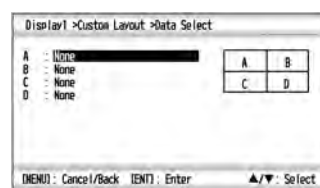


No-spilit          Horizontal two-way spilit          Four-way spilit

*Examples of option screen*

6.  Press the **ENT** key again with the cursor on [A].
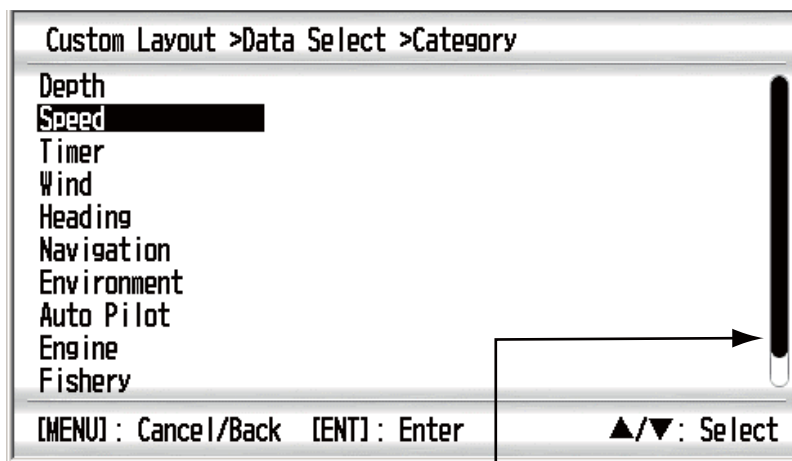


Scroll bar

7.  Use the Cursorpad (▲ or ▼) to select the category desired and press the **ENT** key. The scroll bar indicates additional categories. You can scroll through the categories by using the Cursorpad (▲ or ▼).The category options screen, which depends on the selected category, appears.
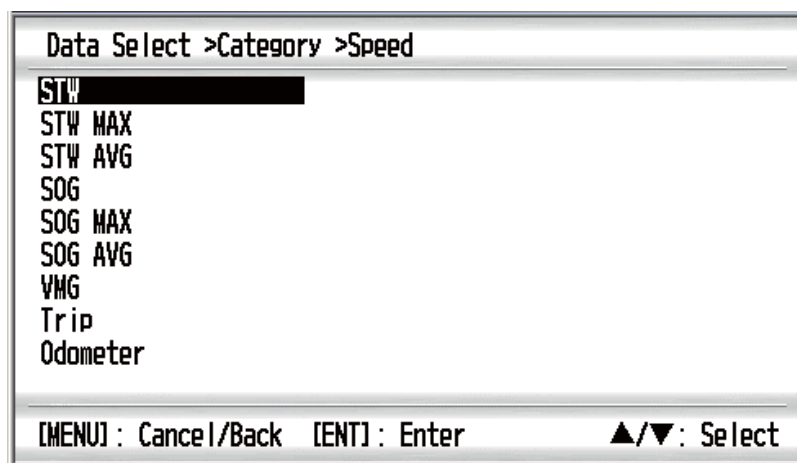


*Category options (e.g. [Speed] category)*

**Note 1:** If you selected [None], the data screen is blank.

**Note 2:** For details for each category, see the next section.

8.  Use the Cursorpad (▲ or ▼) to select an option desired and press the **ENT** key.

```
Category >Speed >Style
Digital
Analog
Graph




[MENU] : Cancel/Back   [ENT] : Enter        ▲/▼ : Select
```
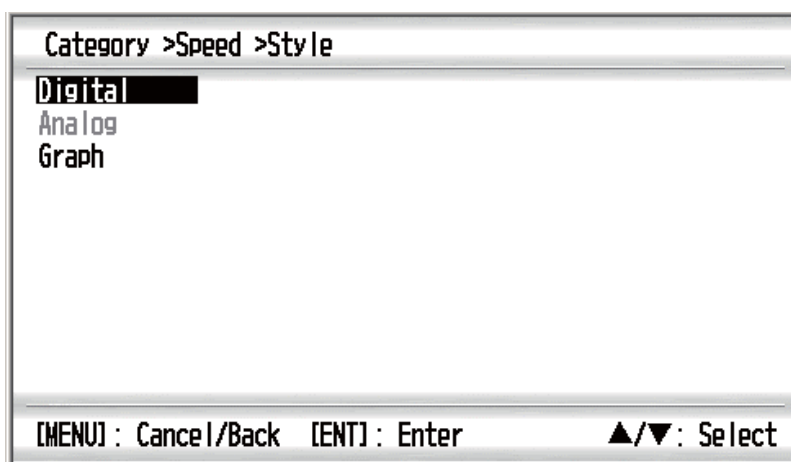
*Style options (e.g. [Speed] category)*

**Note:** The menu items in gray are not available.

9.  Use the Cursorpad (▲ or ▼) to select [Digital], [Analog] or [Graph] then press the **ENT** key. If you selected the no-split screen at step 5, go to step 12. For the other types, go to step 10.
    **Note:** The available style options depend on the selected screen division, category and category option. The unavailable style option is displayed in gray.

10. Use the Cursorpad (▲ or ▼) to select [B (C, D, E or F)] and press the **ENT** key.

11. Repeat steps 7 to 10 to set the category and the style option for each split screen.

12. Press the **DISP** key to close the menu and display the data screen.

## 3.2    Options for Categories

See the table below for the options for each category.

| Category | Option | Description | Indication |
|---|---|---|---|
| Depth | Depth | Water depth | Depth |
| Speed | STW | Speed Through the Water | STW |
| | STW MAX | Maximum STW | STW MAX |
| | STW AVG | Average STW | STW AVG |
| | SOG | Speed Over the Ground | SOG |
| | SOG MAX | Maximum SOG | SOG MAX |
| | SOG AVG | Average SOG | SOG AVG |
| | VMG | Velocity Made Good: Velocity component to windward | VMG |
| | Trip | Trip distance | Trip |
| | Odometer | Total trip distance | Odo, Odometer |
| Timer (See section 3.5.) | Stopwatch | Count up timer | Stopwatch |
| | Timer1 (2) | Count down timer | Timer1, Timer2 |

| Category | Option | Description | Indication |
|---|---|---|---|
| Wind | Wind Speed | Apparent Wind Speed (AWS): Wind speed measured by wind transducer.<br>True Wind Speed (TWS): Wind speed calculated as if the ship is stationary. | AWS,<br>APP Wind SPD,<br>TWS,<br>True Wind SPD |
| | MAX TWS | Maximum True Wind Speed | MAX TWS |
| | Wind Angle | Apparent Wind Angle (AWA): Wind angle measured by wind transducer.<br>True Wind Angle (TWA): Wind angle calculated as if the ship is stationary. Both AWA and TWA are with the ship's bow as the reference direction. | AWA,<br>APP Wind Angle,<br>TWA,<br>True Wind Angle |
| | Low AWA | Low Apparent Wind Angle: Maximum angle of apparent wind at port side | Low AWA |
| | High AWA | High Apparent Wind Angle: Maximum angle of apparent wind at starboard side | High AWA |
| | Beaufort Wind | Beaufort wind speed: Wind speed according to wind force level | BFT,<br>Beaufort Wind |
| | Ground Wind | Ground wind direction: Wind direction measured with true north as the reference direction. True wind subtracted ship's movement from apparent wind. | GW DIR,<br>Ground Wind |
| Heading | Heading | Compass direction | HDG, Heading |
| | Heading AVG | Average heading | HDG AVG,<br>Heading AVG |
| | Locked HDG (See section 3.6.) | Use for navigating with heading locked.<br>Analog screen: The pointer indicates variation from the locked heading. The digital shows the locked heading or current heading.<br>Digital screen: Display the locked heading. | Locked HDG |
| | Next Tack | Heading on next tack: Heading against TWA (True Wind Angle) | TACK,<br>Next Tack |
| | COG | Course Over the Ground | COG |
| | CMG | Course Made Good: Direction from the starting point to the current point | CMG |
| | DMG | Distance Made Good: Distance from the starting point to the current point | DMG |
| | ROT | Rate Of Turn: Head angle change during one minute | ROT |

| Category | Option | Description | Indication |
|---|---|---|---|
| Navigation | BRG | Bearing from your ship to the destination waypoint | BRG |
| | Locked BRG (See section 3.6.) | Use for navigating with bearing for the destination waypoint locked. Analog screen: The pointer indicates variation from the locked bearing. The digital shows the locked bearing or current bearing. Digital screen: Display the locked bearing. | Locked BRG |
| | RNG | Distance from your ship to the destination waypoint | RNG |
| | XTE (See section 3.7.) | Analog screen: Display the highway screen with the cross-track error. Digital screen: Display the cross-track error. | XTE |
| | Waypoint No. | Waypoint number | WPT No. Waypoint No. |
| | Waypoint Name | Waypoint name | WPT Name, Waypoint Name |
| | Position | Position (latitude/longitude) of your ship | POSN, Position |
| | COG | Course Over the Ground | COG |
| | SOG | Speed Over the Ground | SOG |
| | Satellites | GPS (GNSS) satellite numbers for using position fixing | GPS SAT, Satellites |
| | Roll/Pitch* | Angle for right and left sway, back and forward sway of your ship | - |
| | Roll | Angle for right and left sway of your ship (S: Starboard upward, P: Port upward) | Roll |
| | Pitch | Angle for back and forward sway of your ship (+: The bow upward, -: The stern upward) | Pitch |
| | Destination | Destination position (latitude/longitude) | Dest, Destination |
| | ETA Time | Estimated Time of Arrival to destination | ETA Time |
| | ETA Date | Estimated date of arrival to destination | ETA Date |
| | TD | Position using the time difference (Loran C) | TD |
| | Laylines* | Two lines toward the right and left with reference to the ground wind around the destination waypoint | - |

| Category | Option | Description | Indication |
|---|---|---|---|
| Environment | Voltage | Input voltage | Volts, Voltage |
| | Time (See section 7.5.) | Current time | Time |
| | Date (See section 7.5.) | Current date | Date |
| | Water Temp | Water temperature | W Temp, Water Temp |
| | Air Temp | Air temperature | Air Temp |
| | Air Press | Air pressure | APress, Air Press |
| | Humidity | Humidity | HUMID, Humidity |
| | Wind Chill | Wind chill temperature | Chill, Wind Chill |
| | Dew Point | Dew point: Temperature at which steam starts to be waterdrop | Dew, Dew Point |
| Auto Pilot | Rudder Angle | Rudder angle (S: Starboard, P: Port) | Rudder, Rudder Angle |
| Engine | Instance (0, 1, 2, 3) | This option does not denote a specific data screen. This number indicates the engine number that appears on all engine data screens. | 0, 1, 2, 3 |
| | Fuel Info | Trip fuel used | Total, Fuel Info |
| | Fuel Rate | Fuel consumption per hour | Rate, Fuel Rate |
| | Engine RPM | Engine Revolutions Per Minute | RPM, Engine RPM |
| | Engine Trim | Engine trim angle | Trim, Engine Trim |
| | Boost | Engine boost pressure | Boost |
| | Engine Temp | Engine temperature | E Temp, Engine Temp |
| | Engine Hours | Total used hours of engine | Hours, Engine Hours |
| | Oil Press | Engine oil pressure | Oil P, Oil Press |
| | Oil Temp | Engine oil temperature | Oil, Oil Temp |
| | Coolant | Engine coolant pressure | Coolant |
| | Engine Load | Percent engine load | Load, Engine Load |

| Category | Option | Description | Indication |
|----------|--------|-------------|------------|
| Fishery | Current1 SPD | Current (tide) speed of first layer | CUR 1, Current1 SPD |
| | Current1 DIR | Current (tide) direction of first layer | CUR 1 DIR, Current1 DIR |
| | Current2 SPD | Current (tide) speed of second layer | CUR 2, Current2 SPD |
| | Current2 DIR | Current (tide) direction of second layer | CUR 2 DIR, Current2 DIR |
| | Current3 SPD | Current (tide) speed of third layer | CUR 3, Current3 SPD |
| | Current3 DIR | Current (tide) direction of third layer | CUR 3 DIR, Current3 DIR |
| None | - | Blank screen | |

*: Only for no-split screen

## 3.3 Data Screen

The following are the examples of data screens.

*No-split*
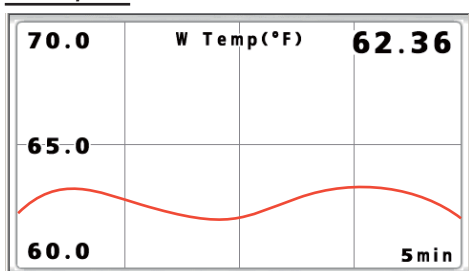


Environment - Water Temp - Graph

*No-split*
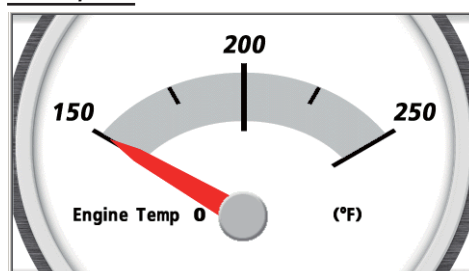


Engine - Engine Temp - Analog
(Instance (engine number): 0)

*Horizontal two-way split*
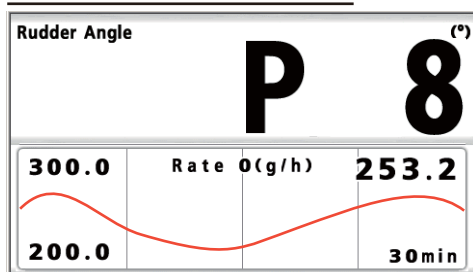


Auto Pilot - Rudder Angle - Digital
Engine - Fuel Rate - Graph

*Vertical two-way split*
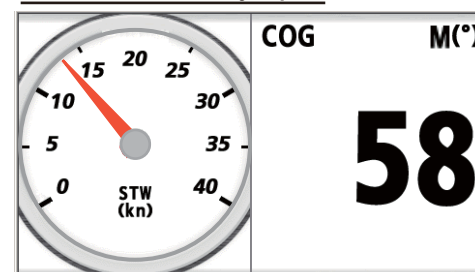


Speed - STW - Analog
Navigation - COG - Digital

*Horizontal/vertical three-way split 1*
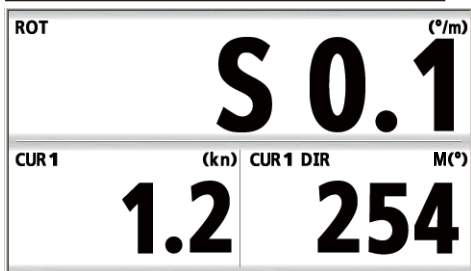


Heading - ROT - Digital
Fishery - Current1 SPD - Digital
Fishery - Current1 DIR - Digital

*Horizontal/vertical three-way split 2*
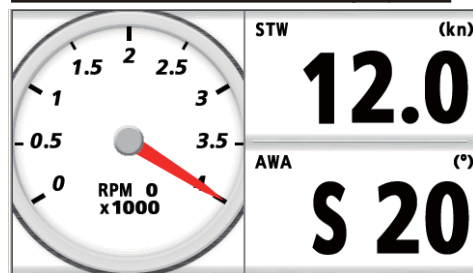


Engine - Engine RPM - Analog
Speed - STW - Digital
Wind - Wind Angle - Digital

*Horizontal/vertical three-way split 3*
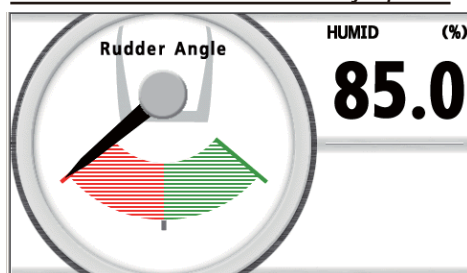


Auto Pilot - Rudder Angle - Analog
Environment - Humidity - Digital
None

*Four-way split*
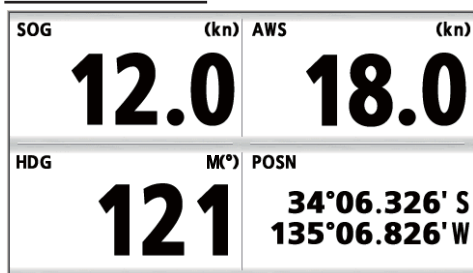


Speed - SOG - Digital
Wind - Wind Speed - Digital
Heading - Heading - Digital
Navigation - Position - Digital

*Six-way split*
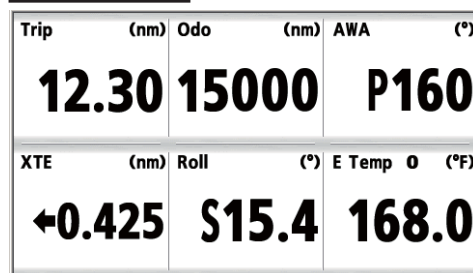


Speed - Trip - Digital
Speed - Odometer - Digital
Wind - Wind Angle - Digital
Navigation - XTE - Digital
Navigation -Roll -Digital
Engine - Engine Temp - Digital

## 3.4 How to Switch the Wind Mode and the Direction Mode

You can switch the wind mode and the direction mode as follows.

**Wind mode**



: Indication
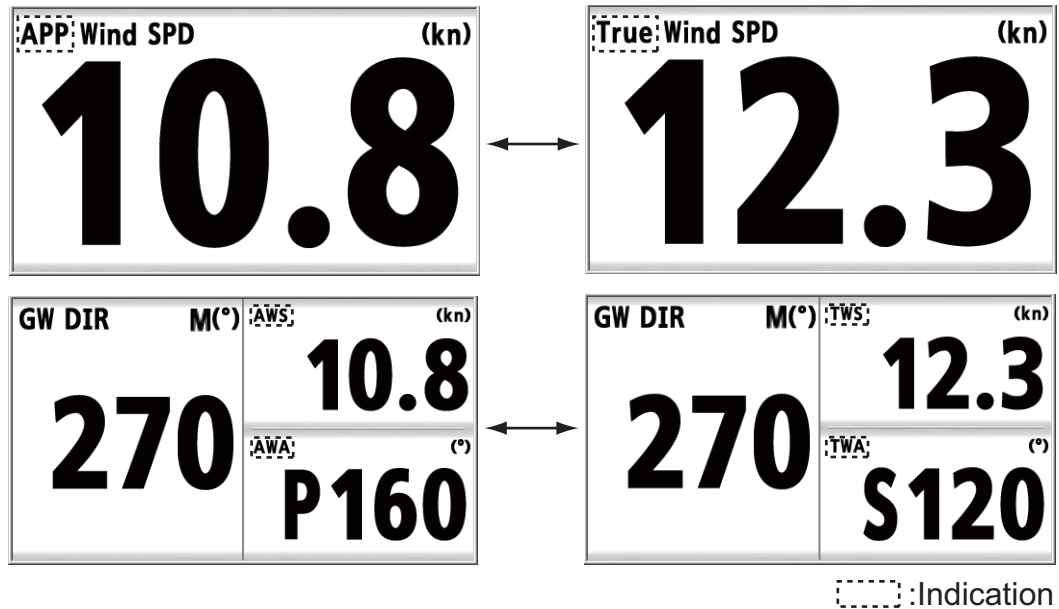
To switch the mode, press the **APP/TRUE** key.

**[APP]**: Apparent or relative wind. The wind direction relative to the ship's bow and the wind speed relative to the moving ship.
**[True]**: True or calculated wind. The wind direction relative to the ship's bow and the wind speed as if the ship is stationary.
**[AWS]**: Apparent Wind Speed. Wind speed measured by wind transducer.
**[TWS]**: True Wind Speed. Wind speed calculated as if the ship is stationary.
**[AWA]**: Apparent Wind Angle. Wind angle measured by wind transducer.
**[TWA]**: True Wind Angle. Wind angle calculated as if the ship is stationary.

**Direction mode**



Magnetic bearing mode          True bearing mode

: Indication
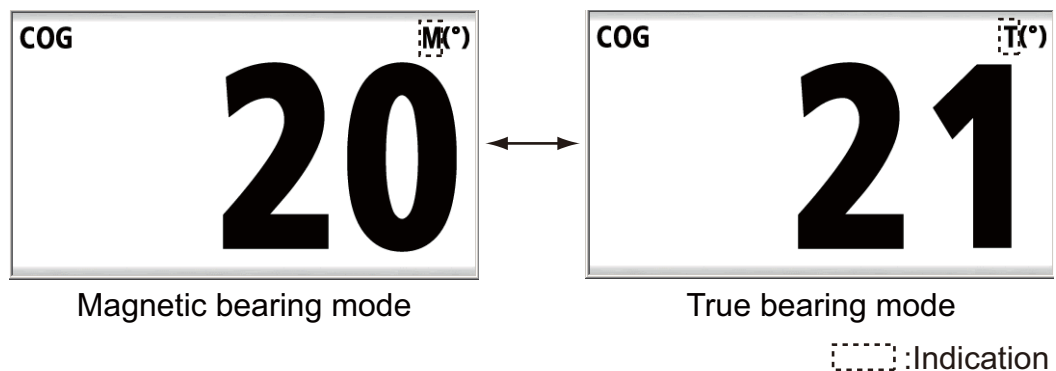
*E.g. [Heading] - [COG] screens*

1. With the data screen displayed, press the **ENT** key.



2. Press the **ENT** key long. The properties screen, which depends on the selected data screen, appears.
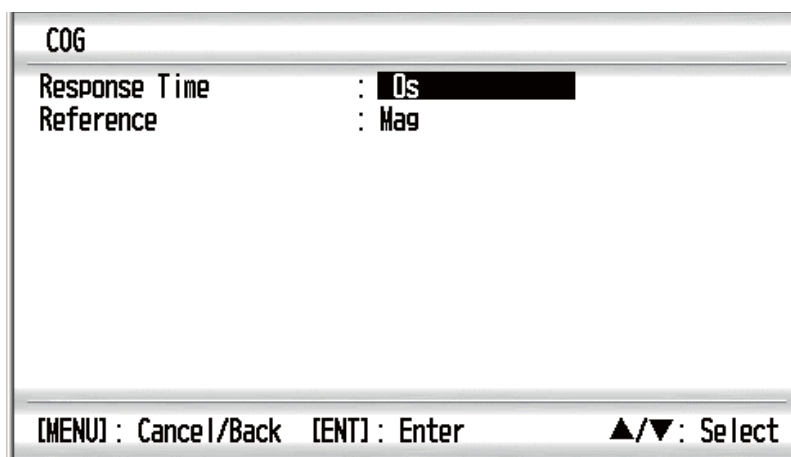


3. Use the Cursorpad (▲ or ▼) to select [Reference] and press the **ENT** key.



4. Use the Cursorpad (▲ or ▼) to select [True] or [Mag] then press the **ENT** key.
   **[True]**: The bearing measured using true North as the reference direction.
   **[Mag]**: Magnetic; The bearing measured with magnetic north as the reference direction.

5. Press the **DISP** key to close the menu and display the data screen.

# 3.5 Stopwatch and Timer

You can display the stopwatch or timer screen for no-split screen or horizontal/vertical three-way split 3 screen (⬜⊟) (see sections 3.1 and 3.2).

**[Stopwatch]**: Count up timer
**[Timer1 (2)]**: Count down timer

## Stopwatch

To start the timer, press the **START/CLEAR** key. To lap or stop the timer, press the **START/CLEAR** key. Though the time indication stops, the count is continued internally. To start the timer again, press the **START/CLEAR** key again.
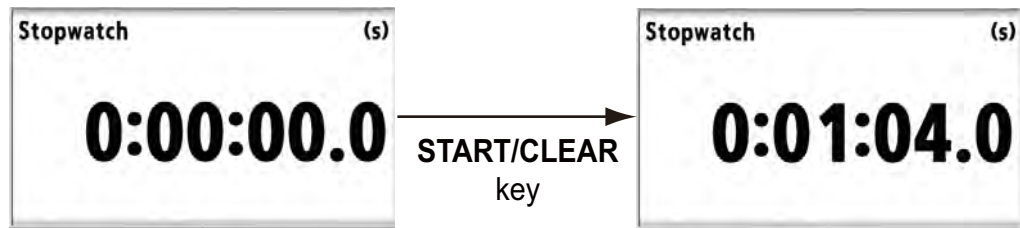


*[Stopwatch]: Count up timer*

## Timer1 (2)

Set the time with the Cursorpad (▼) (default is 15:00.0 (maximum)). To start the timer, press the **START/CLEAR** key. To lap or stop the timer, press the **START/CLEAR** key. Though the time indication stops, the count is continued internally. To start the timer again, press the **START/CLEAR** key again. When the remaining time is 10 minutes, the alarm sounds. Then the alarm sounds at the specified time. When the count is 0, the timer counts up the time.
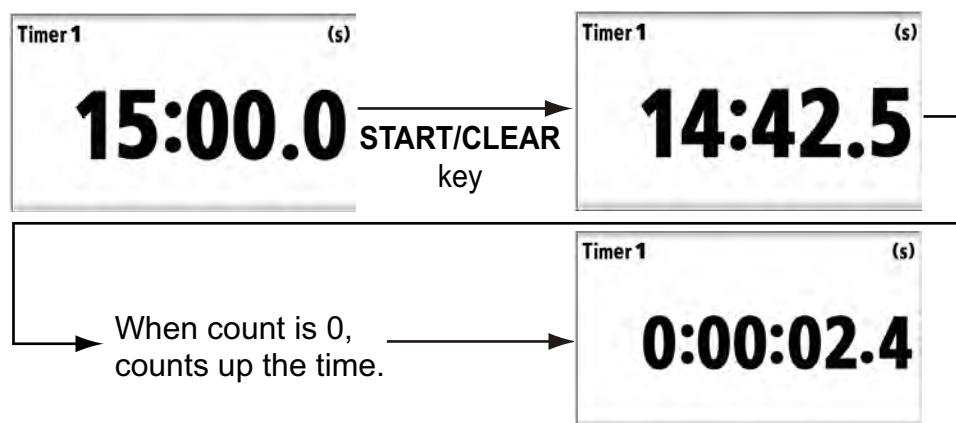


*[Timer1 (2)]: Count down timer*

## How to reset the value

For no-split screen: Press the **START/CLEAR** key long.

For horizontal/vertical three-way split 3 screen: Press the **ENT** key to select the screen for [Stopwatch] or [Timer1 (2)] and press the **START/CLEAR** key long.

After you press the **START/CLEAR** key long, one long beep sounds.

# 3.6 Locked HDG/BRG

## Analog screen

Lock the heading or bearing at desired angle and display the variation from the locked heading or bearing in the analog meter. This function is available for no-split screen and horizontal/vertical three-way split 3 (⬚) screen. To display the locked heading or locked bearing screen, select [Locked HDG] or [Locked BRG] on the [Heading] or [Navigation] category (see sections 3.1 and 3.2).

Press the **START/CLEAR** key to lock the heading or bearing. The pointer shows the variation of the ship's heading or bearing. To unlock the heading or bearing, press the **START/CLEAR** key.



Unlocked HDG                    Locked HDG

Locked heading (default)
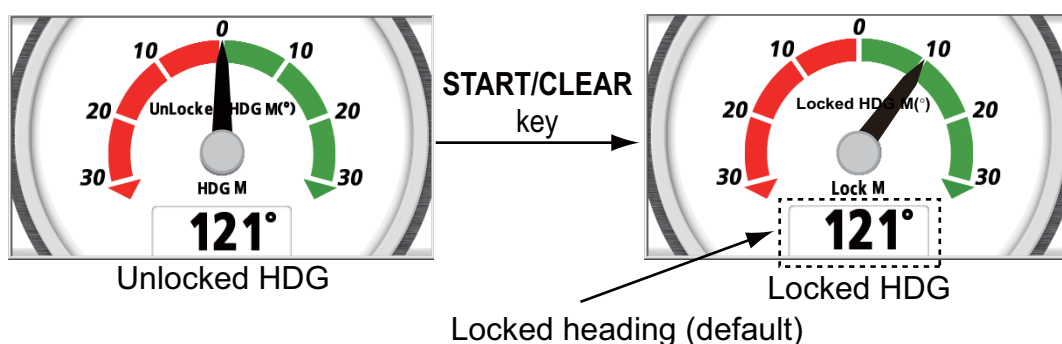
*E.g. [Locked HDG] - [Analog]*

**Note:** The digital angle indication is not displayed on the horizontal/vertical three-way split 3 screen.

The digital locked heading/bearing is the angle at the moment that the **START/CLEAR** key is pressed. The pointer shows the difference between the locked heading/bearing and the actual course.

To display the current heading or bearing at the bottom of the [Locked HDG] or [Locked BRG] screen, do the following:

1. With the [Locked HDG] or [Locked BRG] screen displayed, press the **ENT** key.
2. Press the **ENT** key long.
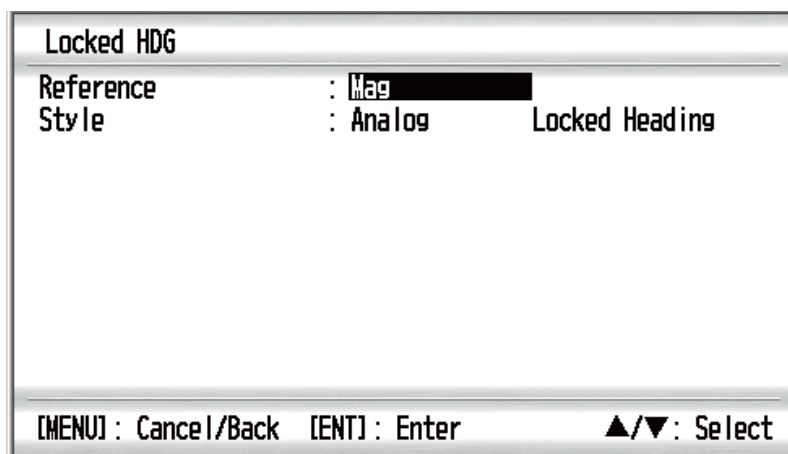


*E.g. [Locked HDG]*

3. Use the Cursorpad (▲ or ▼) to select [Style] and use the Cursorpad (▶) to move the cursor to the right.

4. Press the **ENT** key.



*E.g. [Locked HDG]*

5. Use the Cursorpad (▲ or ▼) to select [Current Heading] or [Current Bearing] then press the **ENT** key.

6. Press the **DISP** key to close the menu and display the data screen.

**Note 1:** See section 3.4 for instructions on changing the direction mode. If the heading or bearing is locked, it is unlocked when you change the direction mode.

**Note 2:** You can perform this operation in the [System] menu (see section 7.6).

### Digital screen

To display only the value for the locked heading or the locked bearing in zoomed format, change the analog format to digital format.

1. With the [Locked HDG] or [Locked BRG] screen displayed, press the **ENT** key.

2. Press the **ENT** key long.

3. Use the Cursorpad (▲ or ▼) to select [Style] and press the **ENT** key.

4. Use the Cursorpad (▲ or ▼) to select [Digital] and press the **ENT** key.

5. Press the **DISP** key to close the menu and display the data screen.



*E.g. [Locked HDG] - [Digital]*

# 3.7 Cross-Track Error

The cross-track error is displayed in the highway screen in analog format. The highway screen provides a graphic presentation of ship's progress toward a destination waypoint, with range and bearing to the destination waypoint, ship's course and speed, and the ship's position. Select [XTE] on the [Navigation] category (see sections 3.1 and 3.2).

**Analog screen**

Bearing to the destination waypoint

Destination waypoint name

Direction to steer
Appears on right or left side depending on the direction to steer;

▷ (Green): Steer right

◁ (Red): Steer left

Digital XTE (Cross-track error) indication

Ship's position
Speed over the ground
Range to the destination waypoint
Course over the gorund

Analog XTE scale and triangle mark
The red triangle mark shifts with ship's XTE.

When the data for destination waypoint is not input, this mark indicates the direction of the ship with the top of the display indicating north. When the data for destination waypoint is input, this mark indicates the direction of the ship with reference to the destination waypoint.

*[XTE] - [Analog]*

**Digital screen**

To display only the digital XTE, select [Digital] on the style option.

Direction to steer
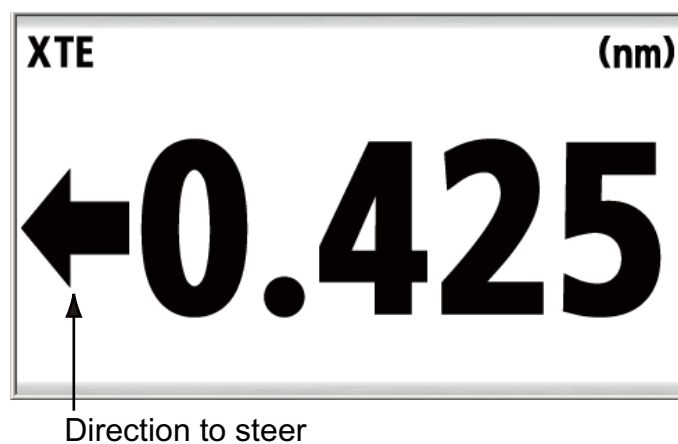
*[XTE] - [Digital]*

**How to change the unit**

You can select the XTE unit from nm, km or sm as follows:

1. With the data screen for XTE displayed, press the **ENT** key.
2. Press the **ENT** key long.

```
 XTE
 Unit      : nm
 Alarm     : On            0.025nm
 Style     : Analog




 [MENU]: Cancel/Back  [ENT]: Enter      ▲/▼: Select
```
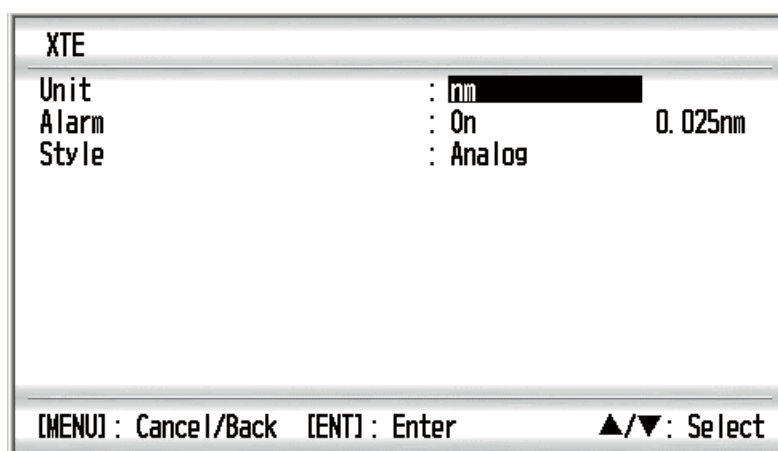
3. Use the Cursorpad (▲ or ▼) to select [Unit] and press the **ENT** key.
4. Use the Cursorpad (▲ or ▼) to select [nm], [km] or [sm] then press the **ENT** key.
5. Press the **DISP** key to close the menu and display the data screen.

**How to change the scale range**

You can change the scale range for analog XTE. With the data screen for XTE displayed, use the Cursorpad to change the scale range.
▲, ▶: Increase the numeric value.
▼, ◀: Decrease the numeric value.

| Unit | Scale range |
|------|-------------|
| nm | 0.2, 0.4, 0.8, 1.0, 2.0, 4.0, 8.0, 16.0 |
| km | 0.2, 0.4, 1.0, 2.0, 4.0, 10.0, 20.0, 30.0 |
| sm | 0.2, 0.4, 0.8, 1.0, 2.0, 4.0, 8.0, 16.0 |

**Note:** When the XTE exceeds the setting scale range, the red triangle mark on the highway screen flashes.

## 3.8 How to Switch the Digital Data for Heading and Wind Angle

You can switch the digital data on the analog screen as follows.

**Heading (Available for ☐, ☐☐, ☐☐, ☐☐)**

Use the Cursorpad (▶) to switch the digital data for heading. The digital data changes as follows. The data changes in reverse order with the Cursorpad (◀).
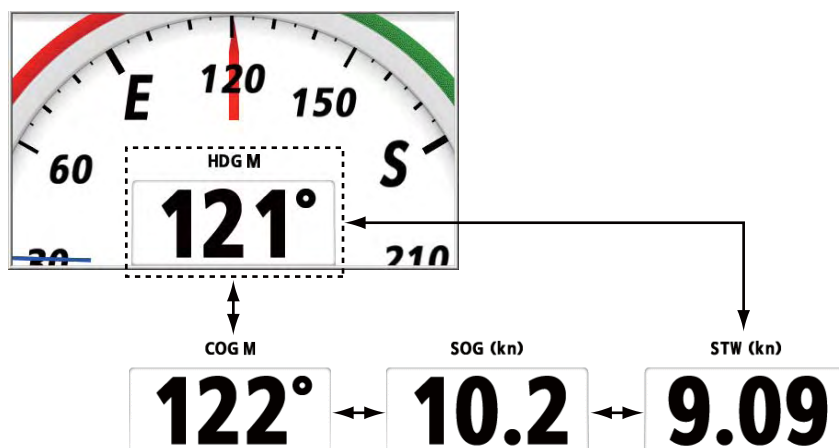
*E.g. Magnetic heading*

**Wind Angle (Available for ⬜▤)**

Use the Cursorpad (▶) to switch the digital data for wind angle. The digital data changes as follows. The data changes in reverse order with the Cursorpad (◀).
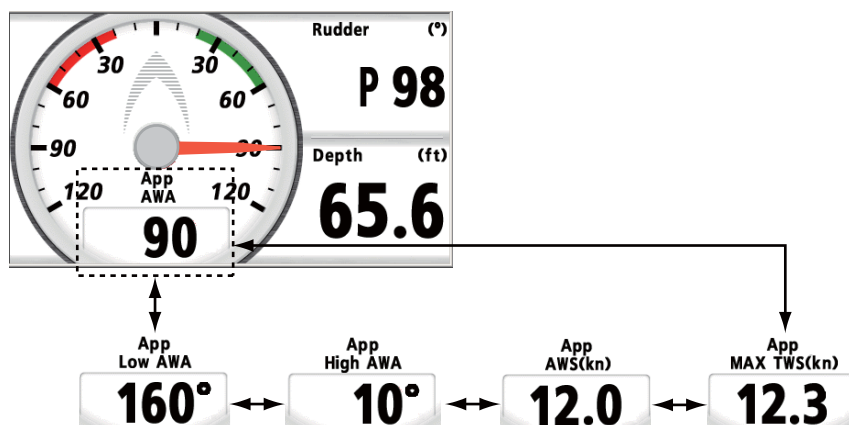


*E.g. Apparent wind*

# 3.9 How to Reset the Value

You can reset the value for the following options by pressing the **START/CLEAR** key long.

| Category | Option |
|----------|--------|
| Speed | STW MAX, STW AVG, SOG MAX, SOG AVG, Trip |
| Timer | Stopwatch, Timer1, Timer2 |
| Wind | MAX TWS, Low AWA, High AWA |
| Heading | Heading AVG, CMG*, DMG* |

*: Both are reset simultaneouslly.

When the value which you want to reset is displayed in the data screen, long press the **START/CLEAR** key. The value is reset after the one long beep.

**Note:** In the split screen, press the **ENT** key to activate the data box, then long press the **START/CLEAR** key.

# 4.   ALARMS

## 4.1   Overview

The RD-33 has 16 types of alarms as follows:

- Arrival/Anchor
- STW
- Time
- Roll
- Max True Wind Speed
- Low APP Wind Angle

- XTE
- Water Temperature
- Trip
- Pitch
- Low True Wind Speed

- SOG
- Depth
- Odometer
- Low Battery
- High APP Wind Angle

When the alarm activates, the audio alarm sounds and the alarm message appears. The alarm icon flashes at the upper-right corner of the screen.



Alarm icon (flashes)
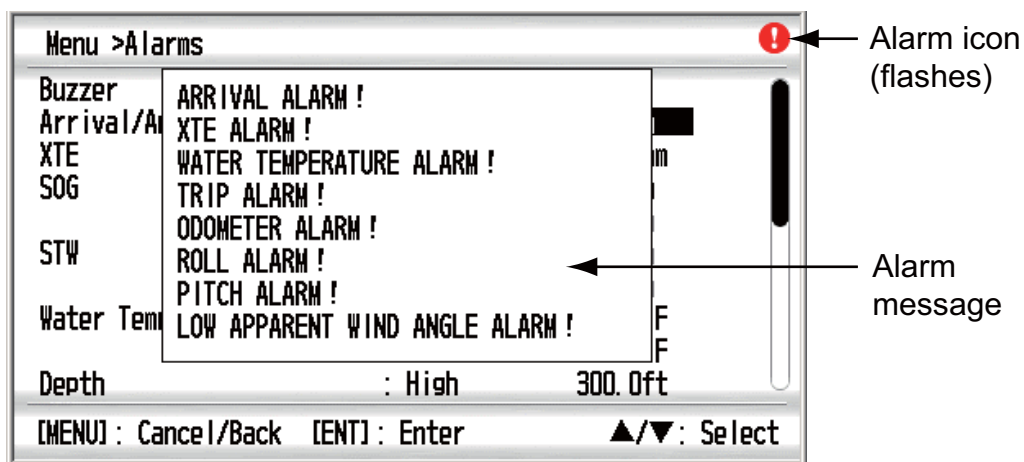
Alarm message

#### How to stop the audio alarm

When the audio alarm sounds, press any key to stop the audio alarm. The alarm message disappears. The alarm icon continuously flashes until the alarm status is cleared. When a new alarm occurs, the audio alarm sounds and the alarm message appears.

#### Alarm status

The alarm status window shows all currently violated alarms (max. ten). The list is updated. The alarm which is cleared from the alarm status is deleted from the list at the time. When there are no alarms, "No Message!" appears.

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

2. Use the Cursorpad (▲ or ▼) to select [Messages] and press the **ENT** key. All alarms currently violated are displayed.

```
Menu >Messages

ARRIVAL ALARM !
XTE ALARM !
WATER TEMPERATURE ALARM !
TRIP ALARM !
ODOMETER ALARM !
ROLL ALARM !
PITCH ALARM !
LOW APPARENT WIND ANGLE ALARM !


[MENU] : Cancel/Back   [ENT] : Enter          ▲/▼ : Select
```
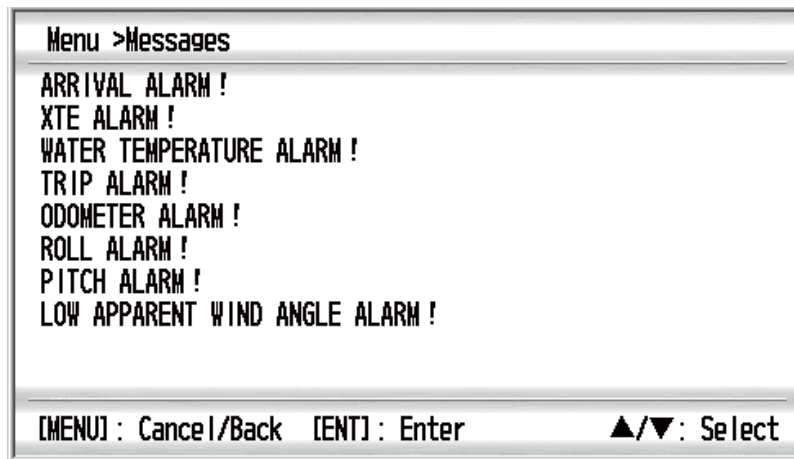
3. Press the **DISP** key to close the menu and display the data screen.

**Alarm category**

The alarm categories displayed on the alarm status are follows:

| Alarm category | Meaning | Reference |
|---|---|---|
| ARRIVAL ALARM! | Your ship enters the alarm zone centering on the destination waypoint. | 4.3.1 |
| ANCHOR WATCH ALARM! | Your ship is moving when your ship should be at rest. | |
| XTE ALARM! | Your ship is off its intended course. | 4.3.2 |
| SOG ALARM! | The SOG alarm is generated in one of the following conditions:<br>• Lower or higher than the SOG setting.<br>• Inside or outside of the SOG range setting.<br>• Equal to the SOG setting. | 4.3.3 |
| STW ALARM! | The STW alarm is generated in one of the following conditions:<br>• Lower or higher than the STW setting.<br>• Inside or outside of the STW range setting.<br>• Equal to the STW setting. | |
| WATER TEMPERATURE ALARM! | The water temperature alarm is generated in one of the following conditions:<br>• Lower or higher than the temperature setting.<br>• Inside or outside of the temperature range setting.<br>• Equal to the temperature setting.<br>• Vary more than the temperature setting within one minute (shear). | 4.3.4 |
| DEPTH ALARM! | The depth alarm is generated in one of the following conditions:<br>• Lower or higher than the depth setting.<br>• Inside or outside of the depth range setting.<br>• Equal to the depth setting. | 4.3.5 |

| Alarm category | Meaning | Reference |
|---|---|---|
| TIME ALARM! | The preset time arrives. | 4.3.8 |
| TRIP ALARM! | Your ship has traveled the trip distance setting or above. | 4.3.6 |
| ODOMETER ALARM! | Your ship has traveled the odometer distance setting or above. | |
| ROLL ALARM! | The right and left sway of your ship is equal to or exceeds the roll setting. | 4.3.7 |
| PITCH ALARM! | The backward and forward sway of your ship is equal to or exceeds the pitch setting. | |
| BATTERY ALARM! | The input voltage is the voltage setting or below. | 4.3.8 |
| MAX TRUE WIND SPEED ALARM! | The true wind speed is the max true wind setting or above. | |
| LOW TRUE WIND SPEED ALARM! | The true wind speed is the low true wind setting or below. | |
| HIGH APPARENT WIND ANGLE ALARM! | The wind angle from starboard is the high apparent wind angle setting or above. | |
| LOW APPARENT WIND ANGLE ALARM! | The wind angle from port is the low apparent wind angle setting or above. | |
| RAM ERROR! | RAM storage medium is error. | 8.2 |
| ROM ERROR! | ROM storage medium is error. | |

### How to open the [Alarms] menu

Open the [Alarms] menu as follows:

1.  Press the **MENU** key to open the menu.
2.  Use the Cursorpad (▲ or ▼) to select [Alarms] and press the **ENT** key.

```
 Menu >Alarms

 Buzzer                : Long
 Arrival/Anchor        : Off        0.50nm
 XTE                   : Off        --.---nm
 SOG                   : Off        10.0kn
                                    30.0kn
 STW                   : Off        10.0kn
                                    30.0kn
 Water Temperature     : Off        +60.00°F
                                    +80.00°F
 Depth                 : Off        15.0ft

 [MENU]: Cancel/Back   [ENT]: Enter       ▲/▼: Select
```
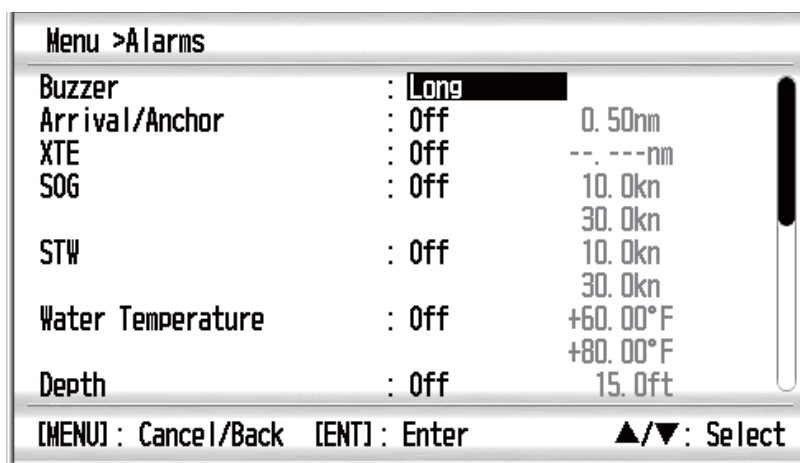
## 4.2 Audio Alarm Type

You can select the audio alarm type as follows:

1. Open the [Alarms] menu.

2. Use the Cursorpad (▲ or ▼) to select [Buzzer] and press the **ENT** key.

```
Short
Long
Continuous
```

3. Use the Cursorpad (▲ or ▼) to select [Short], [Long] or [Continuous] then press the **ENT** key.
   **[Short]**: One short beep
   **[Long]**: Three long beeps
   **[Continuous]**: Continuous long beeps until you press any key to acknowledge the alarm

4. Press the **DISP** key to close the menu and display the data screen.

## 4.3 How to Set the Alarms

### 4.3.1 Arrival/Anchor alarm

The arrival alarm and anchor alarm cannot be activated together.

**[Arrival]**: The arrival alarm alerts you that your ship enters the alarm zone centering on the destination waypoint.
**[Anchor]**: The anchor alarm alerts you that your ship is moving when your ship should be at rest.



[Arrival] alarm                [Anchor] alarm
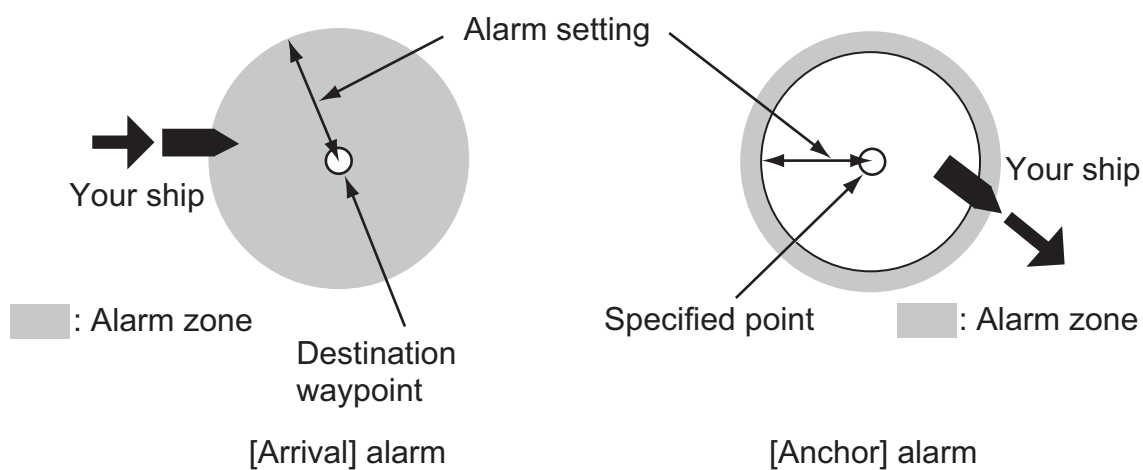
1. Open the [Alarms] menu.

2. Use the Cursorpad (▲ or ▼) to select [Arrival/Anchor] and press the **ENT** key.

```
Off
Arrival
Anchor
```

3. Use the Cursorpad (▲ or ▼) to select [Arrival] or [Anchor] then press the **ENT** key.
   When you do not set the arrival/anchor alarm, select [Off] and go to step 6.

4. Use the Cursorpad (▶) to move the cursor to the right and press the **ENT** key.

```
 ▲
00. 50nm
 ▼
```

5. Use the Cursorpad to set the value and press the **ENT** key. The circle with radius setting value is alarm zone.
   ▲, ▼: Change the figure.
   ◀, ▶: Move the cursor for digit.

6. Press the **DISP** key to close the menu and display the data screen.

## 4.3.2 XTE (Cross-Track Error) alarm

The XTE alarm alerts you when your ship is off its intended course (the line from the start point to the destination waypoint). This function is available when the start point and the destination waypoint are set on the navigation equipment connected.



1. Open the [Alarms] menu.
2. Use the Cursorpad (▲ or ▼) to select [XTE] and press the **ENT** key.

```
Off
On
```

3. Use the Cursorpad (▲ or ▼) to select [On] and press the **ENT** key. When you do not set the XTE alarm, select [Off] and go to step 6.

4. Use the Cursorpad (▶) to move the cursor to the right and press the **ENT** key.

```
 ▲
00. 025nm
 ▼
```
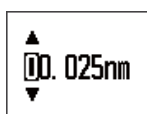
5. Use the Cursorpad to set the value and press the **ENT** key.

6. Press the **DISP** key to close the menu and display the data screen.

## 4.3.3 Speed (SOG/STW) alarm

The speed (SOG/STW) alarm alerts you when your ship's speed is lower or higher than the speed setting, is inside or outside of the speed range setting, or is equal to the speed setting.

1. Open the [Alarms] menu.

2. Use the Cursorpad (▲ or ▼) to select [SOG] or [STW] then press the **ENT** key.
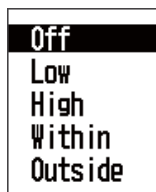
```
Off
Low
High
Within
Outside
```

3. Use the Cursorpad (▲ or ▼) to select [Low], [High], [Within] or [Outside] then press the **ENT** key. When you do not set the SOG/STW alarm, select [Off] and go to step 6.
   **[Low]**: Alarm occurs when your ship's speed is equal to or lower than the speed setting.
   **[High]**: Alarm occurs when your ship's speed is equal to or higher than the speed setting.
   **[Within]**: Alarm occurs when your ship's speed is equal to or within the speed range setting.
   **[Outside]**: Alarm occurs when your ship's speed is equal to or outside the speed range setting.

4. Use the Cursorpad (▶) to move the cursor to the right and press the **ENT** key.

```
▲
☐10. 0kn
▼
```

5. Use the Cursorpad to set the value and press the **ENT** key. If you selected [Within] or [Outside] at step 3, set the value for maximum and minimum speed.

| Menu >Alarms | | |
|---|---|---|
| Buzzer | : Long | |
| Arrival/Anchor | : Arrival | 0. 50nm |
| XTE | : On | 0. 025nm |
| SOG | : Within | 30. 0kn |
| | | 40. 0kn |
| STW | : Outside | 10. 0kn |
| | | 30. 0kn |
| Water Temperature | : Outside | +60. 00°F |
| | | +80. 00°F |
| Depth | : High | 300. 0ft |
| [MENU] : Cancel/Back   [ENT] : Enter      ▲/▼: Select | | |

Minimum speed for SOG
Maximum speed for SOG
Minimum speed for STW
Maximum speed for STW

To move the cursor from minimum item to maximum item, use the Cursorpad (▼).
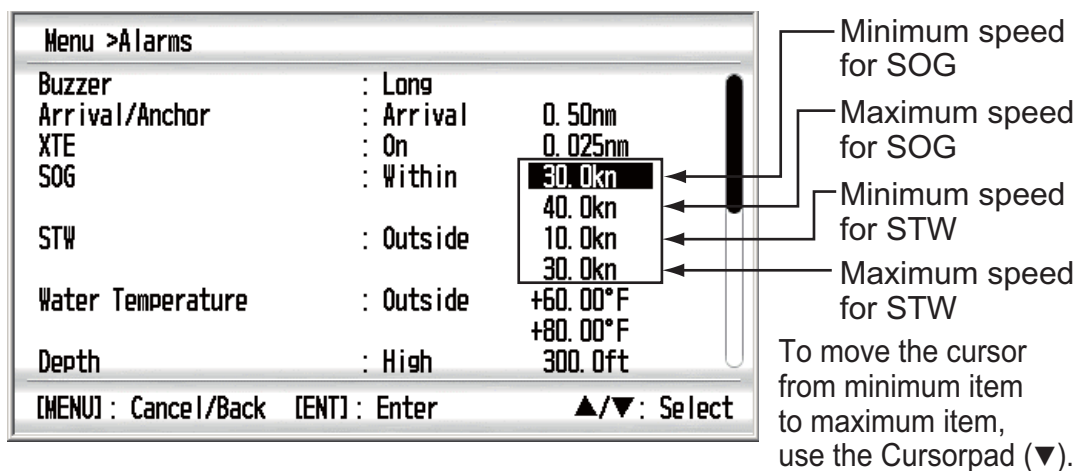
6. Press the **DISP** key to close the menu and display the data screen.

### 4.3.4 Water temperature alarm

The water temperature alarm alerts you when the water temperature is lower or higher than the temperature setting, is inside or outside of the temperature range setting, is equal to the temperature setting, or the water temperature varies more than the temperature setting within one minute (shear).

1. Open the [Alarms] menu.

2. Use the Cursorpad (▲ or ▼) to select [Water Temperature] and press the **ENT** key.

```
Off
Low
High
Within
Outside
Shear
```
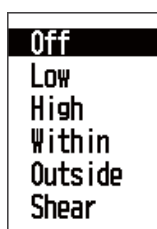
3. Use the Cursorpad (▲ or ▼) to select [Low], [High], [Within], [Outside] or [Shear] then press the **ENT** key. When you do not set the water temperature alarm, select [Off] and go to step 6.
   **[Low]**: Alarm occurs when the water temperature is equal to or lower than the temperature setting.
   **[High]**: Alarm occurs when the water temperature is equal to or higher than the temperature setting.
   **[Within]**: Alarm occurs when the water temperature is equal to or within the temperature range setting.
   **[Outside]**: Alarm occurs when the water temperature is equal to or outside the temperature range setting.
   **[Shear]**: Alarm occurs when the water temperature varies more than the temperature setting within one minute.

4. Use the Cursorpad (▶) to move the cursor to the right and press the **ENT** key.

```
▲
50. 00°F
▼
```
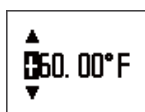
5. Use the Cursorpad to set the value and press the **ENT** key. If you selected [Within] or [Outside] at step 3, set the value for maximum and minimum temperature.
   ▲, ▼: Select [+] or [-]. Change the figure.
   ◀, ▶: Move the cursor for digit.

| Menu >Alarms | | |
|---|---|---|
| Buzzer | : Long | |
| Arrival/Anchor | : Arrival | 0. 50nm |
| XTE | : On | 0. 025nm |
| SOG | : Low | 10. 0kn |
| | | 40. 0kn |
| STW | : Off | 10. 0kn |
| | | 30. 0kn |
| Water Temperature | : Within | +50. 00°F |
| | | +80. 00°F |
| Depth | : High | 300. 0ft |
| [MENU] : Cancel/Back [ENT] : Enter ▲/▼ : Select | | |
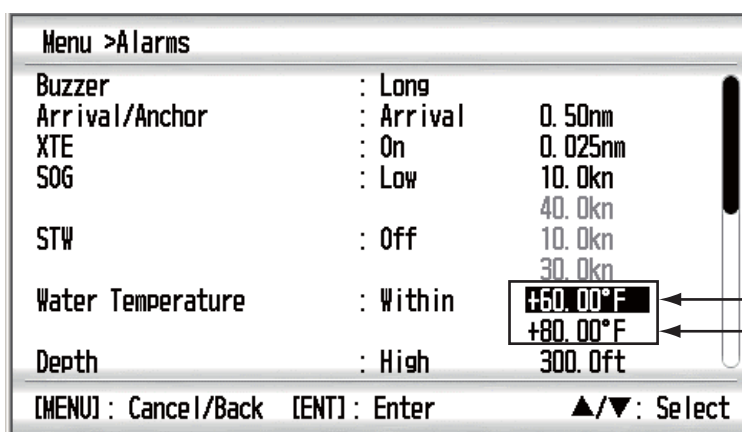
To move the cursor from minimum item to maximum item, use the Cursorpad (▼).

Minimum temperature
Maximum temperature

6. Press the **DISP** key to close the menu and display the data screen.

**4-7**

### 4.3.5 Depth alarm

The depth alarm alerts you when the depth is lower or higher than the depth setting, is inside or outside of the depth range setting, or is equal to the depth setting.

1. Open the [Alarms] menu.
2. Use the Cursorpad (▲ or ▼) to select [Depth] and press the **ENT** key.
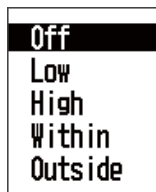


3. Use the Cursorpad (▲ or ▼) to select [Low], [High], [Within] or [Outside] then press the **ENT** key. When you do not set the depth alarm, select [Off] and go to step 6.
   **[Low]**: Alarm occurs when the depth is equal to or shallower than the depth setting.
   **[High]**: Alarm occurs when the depth is equal to or deeper than the depth setting.
   **[Within]**: Alarm occurs when the depth is equal to or within the depth range setting.
   **[Outside]**: Alarm occurs when the depth is equal to or outside the depth range setting.
4. Use the Cursorpad (▶) to move the cursor to the right and press the **ENT** key.
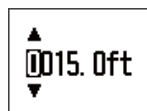


5. Use the Cursorpad to set the value and press the **ENT** key. If you selected [Within] or [Outside] at step 3, set the value for maximum and minimum depth.
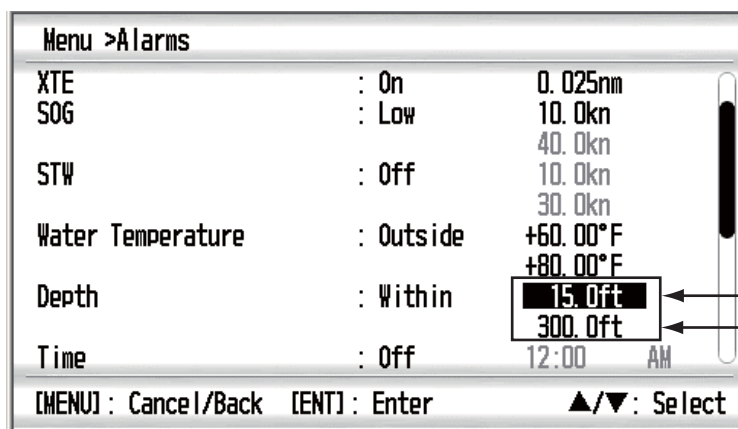


To move the cursor from minimum item to maximum item, use the Cursorpad (▼).

Minimum depth
Maximum depth

6. Press the **DISP** key to close the menu and display the data screen.

### 4.3.6 Trip/odometer alarm

The trip/odometer alarm alerts you when your ship has traveled the trip/odometer distance setting or above.

1. Open the [Alarms] menu.

2. Use the Cursorpad (▲ or ▼) to select [Trip] or [Odometer] then press the **ENT** key.

```
Off
On
```

3. Use the Cursorpad (▲ or ▼) to select [On] and press the **ENT** key. When you do not set the trip/odometer alarm, select [Off] and go to step 6.

4. Use the Cursorpad (▶) to move the cursor to the right and press the **ENT** key.

```
▲
00000nm
▼
```

5. Use the Cursorpad to set the value and press the **ENT** key.

6. Press the **DISP** key to close the menu and display the data screen.

## 4.3.7 Roll/pitch alarm

The roll alarm alerts you when the right and left sway of your ship is equal to or exceeds the roll setting. Set the starboard or port angle.

The pitch alarm alerts you when the backward and forward sway of your ship is equal to or exceeds the pitch setting. Set the backward or forward angle.

1. Open the [Alarms] menu.

2. Use the Cursorpad (▲ or ▼) to select [Roll] or [Pitch] then press the **ENT** key.

```
Off
On
```

3. Use the Cursorpad (▲ or ▼) to select [On] and press the **ENT** key. When you do not set the roll/pitch alarm, select [Off] and go to step 6.
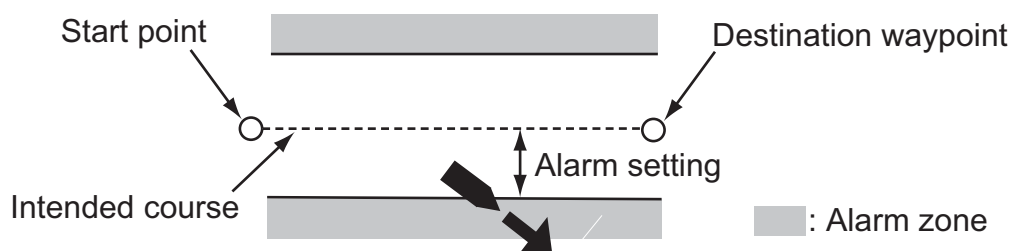
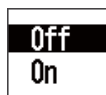4. Use the Cursorpad (▶) to move the cursor to the right and press the **ENT** key.

5. Use the Cursorpad (▲ or ▼) to set the value and press the **ENT** key.

6. Press the **DISP** key to close the menu and display the data screen.

### 4.3.8 Other alarms

The following are the other alarms.

| Menu item | Description | Remarks |
|---|---|---|
| Time | The time alarm alerts you when the preset time arrives. | Time data required. |
| Low Battery | The low battery alarm alerts you when the input voltage is the voltage setting or below. The setting range is 8.5 to 32.0 V. | |
| Max True Wind Speed | The max true wind speed alarm alerts you when the true wind speed is the max true wind setting or above. | |
| Low True Wind Speed | The low true wind speed alarm alerts you when the true wind speed is the low true wind setting or below. | |
| High APP Wind Angle | The high APP wind angle alarm alerts you when the apparent wind angle from starboard is the high apparent wind angle setting or above. | Set the starboard angle with reference to the heading. |
| Low APP Wind Angle | The low APP wind angle alarm alerts you when the apparent wind angle from port is the low apparent wind angle setting or above. | Set the port angle with reference to the heading. |

# 5. INPUT/OUTPUT SETUP

The RD-33 inputs and outputs the signal in NMEA 0183 and CAN bus format. CAN bus is the network system based on NMEA 2000.

## 5.1 Received Data Status

You can display all data input from the sensor. See the following table about the data.

| Depth | Depth |
|---|---|
| Speed | STW, SOG, Trip, Odometer |
| Wind | APP Wind Speed, True Wind Speed, APP Wind Angle, True Wind Angle |
| Heading | Heading, Variation, Deviation, COG, ROT |
| Navigation | BRG, RNG, XTE, Waypoint No., Waypoint Name, Lat, Lon, Satellites, Roll, Pitch, Destination Lat, Destination Lon, ETA Time, ETA Date, TD 1, TD 2 |
| Environment | Time, Date, Water Temp, Air Temp, Air Press, Humidity |
| Autopilot | Rudder Angle |
| Eigine (0) to (3) | Fuel Info, Fuel Rate, Engine RPM, Engine Trim, Boost, Engine Temp, Engine Hours, Oil Press, Oil Temp, Coolant, Engine Load |
| Fishery | Current1 (2 or 3) SPD, Current1 (2 or 3) DIR |

1. Press the **MENU** key to open the menu.
2. Use the Cursorpad (▲ or ▼) to select [I/O Setup] and press the **ENT** key.
3. Use the Cursorpad (▲ or ▼) to select [RX Data] and press the **ENT** key.

```
Menu >I/O Setup >RX Data
Depth          Depth           : 328ft
Speed          STW             : 20.0kn
               SOG             : 16.0kn
               Trip            :  8.63nm
               Odometer        : 12.30nm
Wind           APP Wind Speed  :  3.0kn
               True Wind Speed :  4.0kn
               APP Wind Angle  : P  1°
               True Wind Angle : S130°

[MENU] : Cancel/Back   [ENT] : Enter        ▲/▼ : Select
```
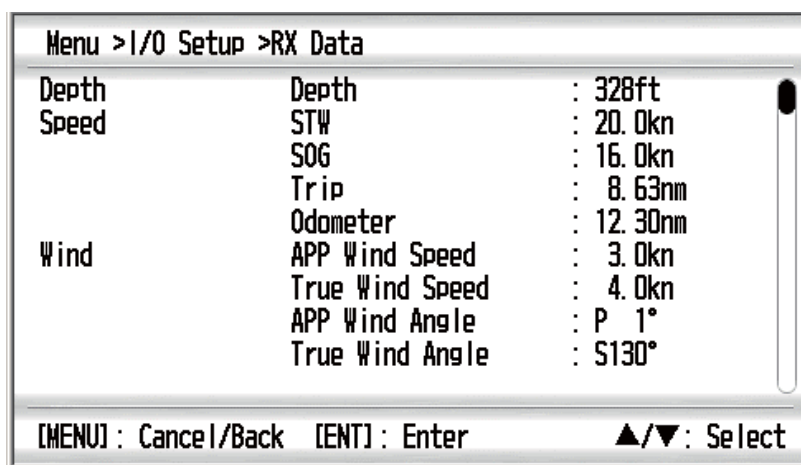
4. Use the Cursorpad (▲ or ▼) to see all data.
5. Press the **DISP** key to close the menu and display the data screen.

## 5.2 CAN bus Devices Status

You can display the status for up to 30 CAN bus devices connected. You can nick-name each device and these nicknames are used on the [Data Source] screen (see section 5.3).

1. Press the **MENU** key to open the menu.
2. Use the Cursorpad (▲ or ▼) to select [I/O Setup] and press the **ENT** key.
3. Use the Cursorpad (▲ or ▼) to select [CAN bus Devices] and press the **ENT** key.

```
Menu >I/O Setup >CAN bus Devices
Model          Manufacture        Nick Name

WS-200            1              WEATHER
FI-501            1              INSTRUMENT
GP-33             1              PLOTTER
SC-30             1              COMPASS



[MENU] : Cancel/Back   [ENT] : Enter        ▲/▼ : Select
```

Maker's code of CAN bus device       Can be nicknamed.
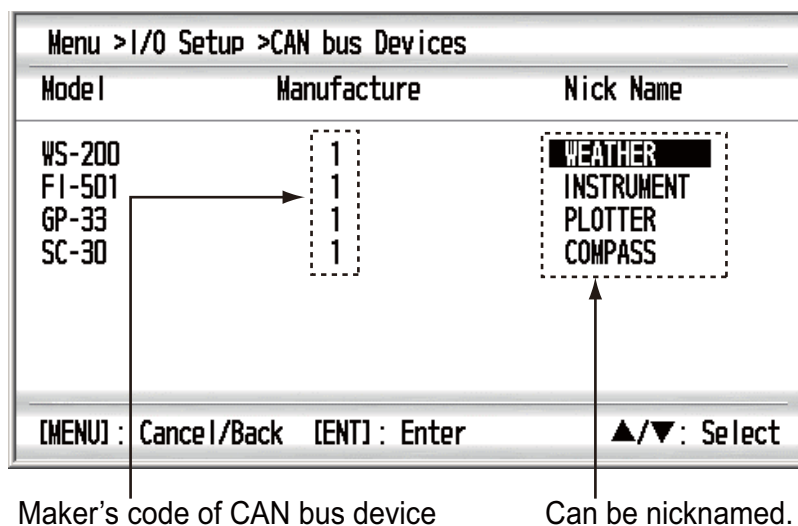
**How to nickname the CAN bus device**

1) Use the Cursorpad (▲ or ▼) to select the nickname desired and press the **ENT** key.

```
    ▲
AZ09&_#'-
    ▼
```
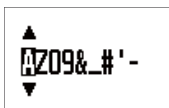
2) Use the Cursorpad to change the nickname. The available characters are "A to Z", "0 to 9", "&", "_", "#", " ' ", "-", ">" and " (space)". Set the nickname within 10 letters.
   ▲, ▼: Change the figure.
   ◄, ►: Move the cursor for digit.

3) Press the **ENT** key.

4. Press the **DISP** key to close the menu and display the data screen.

# 5.3    Data Source

Set the data source and the PGN transmitting.

## How to select the data source

You can select the data source to display on the screen when data of the same type is input from multiple sources. For example, you can select the position data from GPS navigation equipment or the position data from satellite compass when these two position data are input. The available data are the following:

- Position&SOG/COG
- Depth
- Date/Time
- Heading
- Water Temperature
- Roll/Pitch
- STW
- Wind

1. Press the **MENU** key to open the menu.
2. Use the Cursorpad (▲ or ▼) to select [I/O Setup] and press the **ENT** key.
3. Use the Cursorpad (▲ or ▼) to select [Data Source] and press the **ENT** key.
4. Use the Cursorpad (▲ or ▼) to select the item desired and press the **ENT** key. The list of the data source appears.



```
Menu >I/O Setup >Data Source
PGN TX              : Off
Position&SOG/COG    : SC-30
Heading             :
STW                 :
Depth               :
Water Temperature   :
Wind                : WS-200
Date/Time           : GP-33
Roll/Pitch          : SC-30

[MENU]: Cancel/Back   [ENT]: Enter        ▲/▼: Select
```
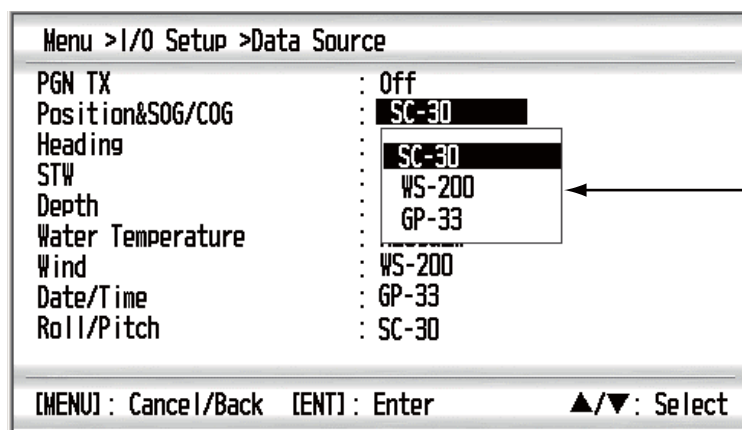
The list of the data source (nickname, see section 5.2)

5. Use the Cursorpad (▲ or ▼) to select the data source desired and press the **ENT** key.
6. Repeat steps 4 and 5 to set the other items if necessary.
7. Press the **DISP** key to close the menu and display the data screen.

## PGN transmitting

Transmit the input data selected as the data source in PGN format.

1. Press the **MENU** key to open the menu.
2. Use the Cursorpad (▲ or ▼) to select [I/O Setup] and press the **ENT** key.
3. Use the Cursorpad (▲ or ▼) to select [Data Source] and press the **ENT** key.
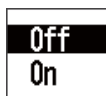4. Use the Cursorpad (▲ or ▼) to select [PGN TX] and press the **ENT** key.

```
Off
On
```

5. Use the Cursorpad (▲ or ▼) to select [On] and press the **ENT** key.

6.  Press the **DISP** key to close the menu and display the data screen.
    **Note:** When the other units on CAN bus network is set to [On] for PGN transmitting, set [Off] in this RD-33.

# 6. POSITION/TD SETUP, LAYLINES

You can display the position of your ship in latitude and longitude or Loran C TDs. Also, you can display the laylines which is the indication of navigation at yacht sailing.

## 6.1 Display Format for the Position of Your Ship

Set the display format for the position of your ship.

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

2. Use the Cursorpad (▲ or ▼) to select [Pos/TD Setup] and press the **ENT** key.
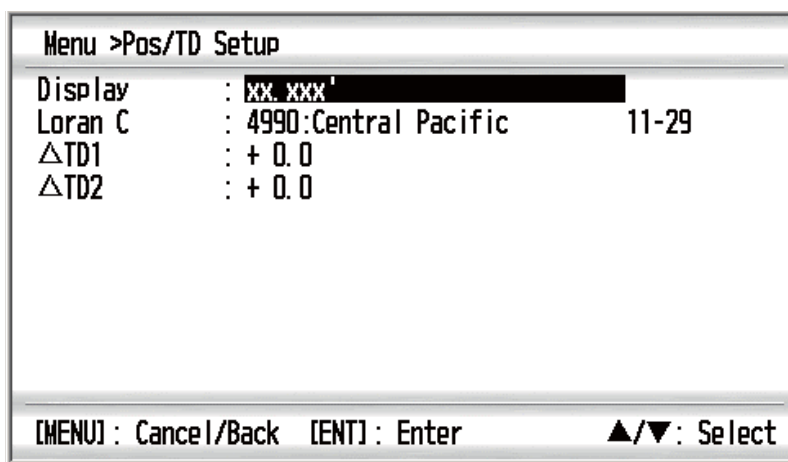
```
Menu >Pos/TD Setup
Display      : xx.xxx'
Loran C      : 4990:Central Pacific        11-29
△TD1         : + 0.0
△TD2         : + 0.0




[MENU] : Cancel/Back   [ENT] : Enter        ▲/▼ : Select
```

3. Use the Cursorpad (▲ or ▼) to select [Display] and press the **ENT** key.

```
xx.xxx'
xx'xx.x"
LC TD
```
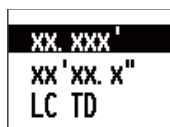
4. Use the Cursorpad (▲ or ▼) to select [xx.xxx'], [xx'xx.x''] or [LC TD] then press the **ENT** key. If you selected [xx.xxx'] or [xx'xx.x''], go to step 6.
   **[xx.xxx']**: Display latitude and longitude with no seconds.
   **[xx'xx.x'']**: Display latitude and longitude with seconds.
   **[LC TD]**: Display Loran C TDs.

5. If you selected [LC TD], do the following steps.

   1) Use the Cursorpad (▲ or ▼) to select [Loran C] and press the **ENT** key.



Menu >Pos/TD Setup

| Display | : LC TD |
|---|---|
| Loran C | : 4990:Central Pacific  11-29 | ← Slave station pair |

GRI code →

4990:Central Pacific
5930:Canadian East Coast
5970:Commando Lion (Korea)
5990:Canadian West Coast
7170:South Saudi Arabia
7930:Labrador Sea
7950:Eastern Russia
7960:Gulf of Alaska
7970:Norwegian Sea

[MENU]: Cancel/Ba        : Select

   2) Use the Cursorpad (▲ or ▼) to select the GRI (Group Repetition Interval) code desired and press the **ENT** key.

   3) Use the Cursorpad (▶) to move the cursor to the slave station pair field then press the **ENT** key.

   4) Use the Cursorpad (▲ or ▼) to select a slave station pair then press the **ENT** key. If you know the offset, do steps 5 to 7 to display the more detailed position data.

   5) Use the Cursorpad (▲ or ▼) to select [△TD1] and press the **ENT** key.

   6) Use the Cursorpad to set the offset and press the **ENT** key.

   7) Repeat steps 5 and 6 to set the offset for [△TD2].

6. Press the **DISP** key to close the menu and display the data screen.

## 6.2 Laylines

Laylines are the two lines toward the right and left with reference to the ground wind around the destination waypoint. You can display the past lines depending on the changing laylines.

If you selected [Laylines] as the data screen, the data for VMG, SOG, RNG, BRG, TWS, AWS and Timer1 are displayed with the analog laylines data.

**Note:** Laylines data is not available for split screen



Destination waypoint

WP0001

Laylines

COG line

Your ship's position
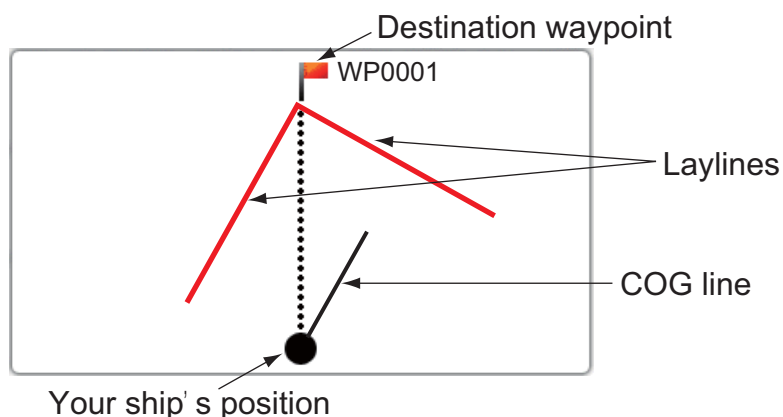
1. Press the **MENU** key to open the menu.

2. Use the Cursorpad (▲ or ▼) to select [Laylines] and press the **ENT** key.

```
Menu >Laylines

Upwind Angle Display      : 45°
Downwind Angle Display    : 30°
Past Line History         : On          6min




[MENU] : Cancel/Back   [ENT] : Enter          ▲/▼ : Select
```
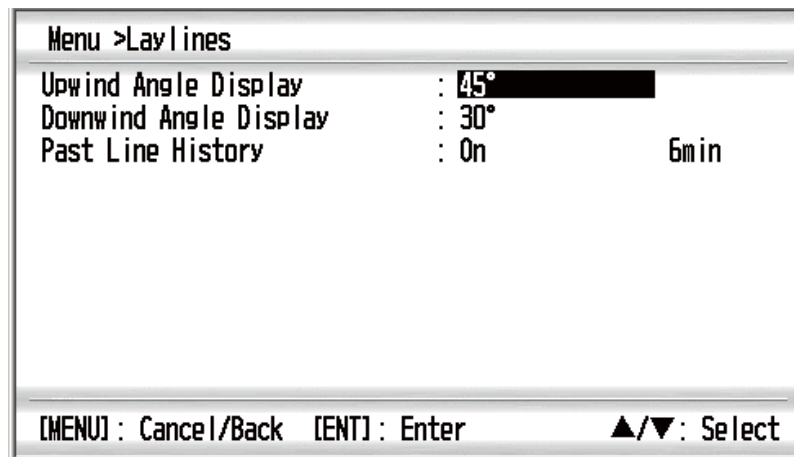
3. Use the Cursorpad (▲ or ▼) to select [Upwind Angle Display] and press the **ENT** key.

```
       ▲
      45°
       ▼
    (0~90°)
```
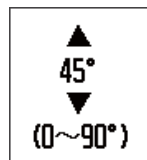
*Setting window for upwind*

4. Use the Cursorpad (▲ or ▼) to set the angle and press the **ENT** key.
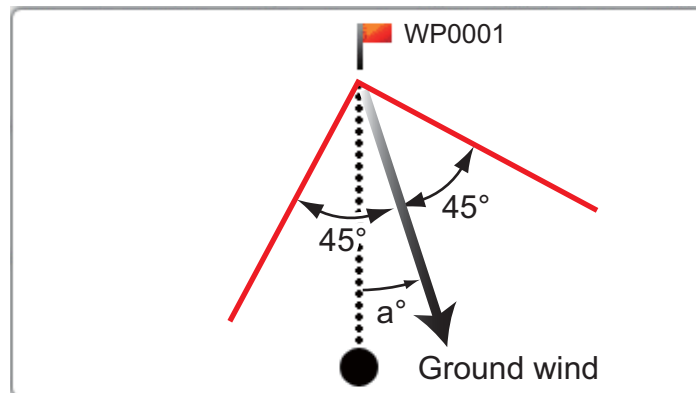


a° = Ground wind - BRG

5. Repeat steps 3 and 4 to set the angle for [Downwind Angle Display].

6. Use the Cursorpad (▲ or ▼) to select [Past Line History] and press the **ENT** key.

```
Off
On
```

7. Use the Cursorpad (▲ or ▼) to select [Off] or [On] then press the **ENT** key. If you selected [Off], go to step 10.
**[Off]**: Do not display the past laylines.
**[On]**: Display the past laylines.

8. Use the Cursorpad (▶) to move the cursor to the right and press the **ENT** key.

```
      ▲
    6min
      ▼
  (1~12min)
```
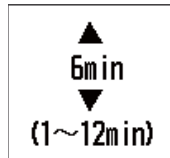
9. Use the Cursorpad (▲ or ▼) to set the time interval and press the **ENT** key. You can display the five past laylines per setting time interval.

10. Press the **DISP** key to close the menu and display the data screen. The past laylines are displayed in light blue.
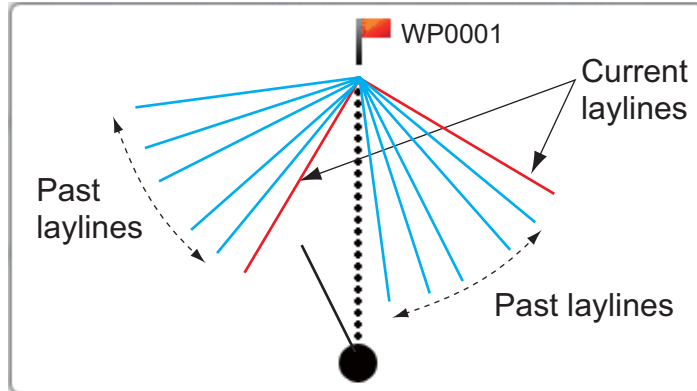
# 7. SYSTEM MENU

This chapter describes the [System] menu. For [Demo Mode], [Self Test] and [Factory Reset], see chapter 8.

## 7.1 Units of Measurement

You can set the units of measurement for depth, ship speed, distance, wind speed, water temperature, fuel and engine pressure.

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

2. Use the Cursorpad (▲ or ▼) to select [System] and press the **ENT** key.

```
Menu >System

Key Beep             : On
Language             : English
Units
Offset
Adjustment
Response Time
Scale Ranges
HDG/COG Ref          : Mag
Magnetic Variation   : Auto        E 0.0°
Locked Heading Display : Current Heading

[MENU]: Cancel/Back   [ENT]: Enter      ▲/▼: Select
```
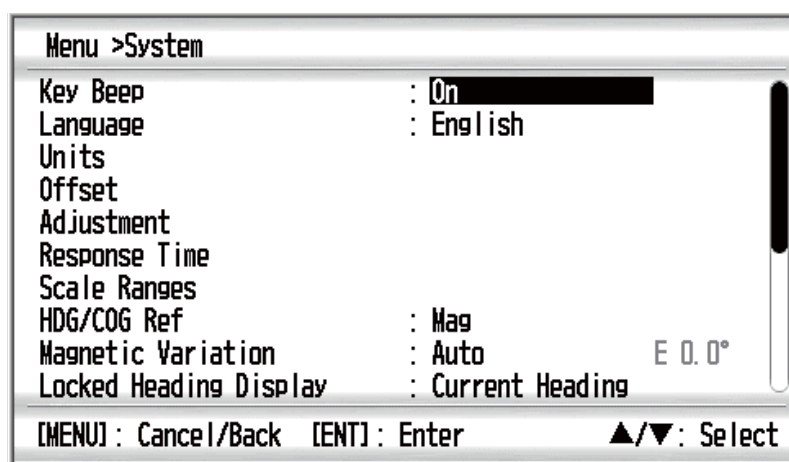
3. Use the Cursorpad (▲ or ▼) to select [Units] and press the **ENT** key.

```
Menu >System >Units

Depth                : ft
Speed                : kn
Distance             : nm
Wind Speed           : kn
Temperature          : °F
Fuel                 : g
Engine Pressure      : psi




[MENU]: Cancel/Back   [ENT]: Enter      ▲/▼: Select
```
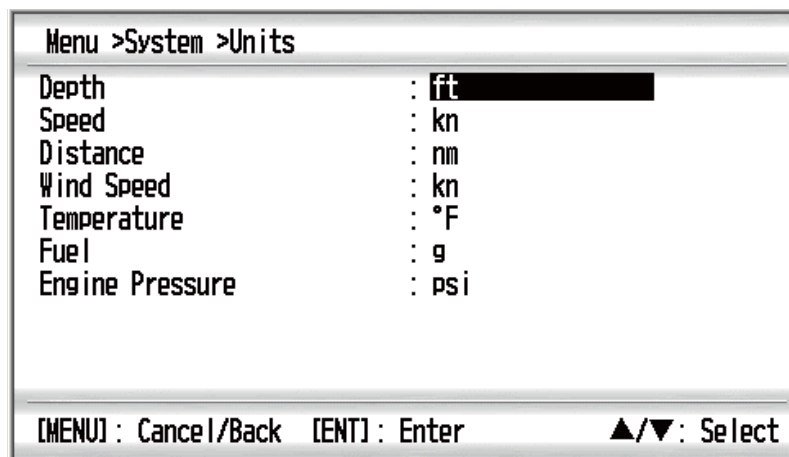
4.  Use the Cursorpad (▲ or ▼) to select [Depth], [Speed], [Distance], [Wind Speed], [Temperature], [Fuel] or [Engine Pressure] then press the **ENT** key.
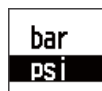
| m | kn | nm | kn |
| **ft** | **kn** | **nm** | **kn** |
| fa | km/h | km | m/s |
| pb | mph | sm | mph |
| Depth | Speed | Distance | Wind Speed |

| °C | I | bar |
| **°F** | **g** | **psi** |
| Temperature | Fuel | Engine Pressure |

5.  Use the Cursorpad (▲ or ▼) to select an option and press the **ENT** key.

6.  Press the **DISP** key to close the menu and display the data screen.

# 7.2    How to Set the Offset

**Offset for depth, wind angle and water temperature**

When there is an error of constant value for depth, wind angle or water temperature data, you can set the offset to eliminate an error. For example, enter -1.5 °F when the water temperature is always displayed at 1.5 °F higher than the actual temperature.

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

2.  Use the Cursorpad (▲ or ▼) to select [System] and press the **ENT** key.

3.  Use the Cursorpad (▲ or ▼) to select [Offset] and press the **ENT** key.

```
Menu >System >Offset

Depth                     : + 0.0ft
Wind Angle                : +  0°
Water Temperature         : + 0.0°F




[MENU]: Cancel/Back   [ENT]: Enter          ▲/▼: Select
```

4.  Use the Cursorpad (▲ or ▼) to select [Depth], [Wind Angle] or [Water Temperature] then press the **ENT** key.

| ▲ | ▲ | ▲ |
| ⊞00.0ft | ⊞000° | ⊞00.0°F |
| ▼ | ▼ | ▼ |
| Depth | Wind Angle | Water Temperature |

*Setting window*

5.  Use the Cursorpad (▲ or ▼) to select [+] or [-] then use the Cursorpad (▶) to move the cursor to the right.

6.  Use the Cursorpad (▲ or ▼) to set the value and use the Cursorpad (▶) to move the cursor to the next digit. Repeat this step to set the value for other digits if necessary. When the displayed data is smaller than the actual value, set the plus value. When the displayed data is larger than the actual value, set the minus value.

7.  Press the **ENT** key to save the setting and close the setting window. To close the window without saving, press the **MENU** key (instead of the **ENT** key).

8.  Press the **DISP** key to close the menu and display the data screen.

**Offset for STW and wind speed**

When there is an error of proportional rate for STW or wind speed data, you can set the offset to eliminate an error. For example, enter 0.91 when the STW is always displayed at 10% faster than the actual speed.

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

2.  Use the Cursorpad (▲ or ▼) to select [System] and press the **ENT** key.

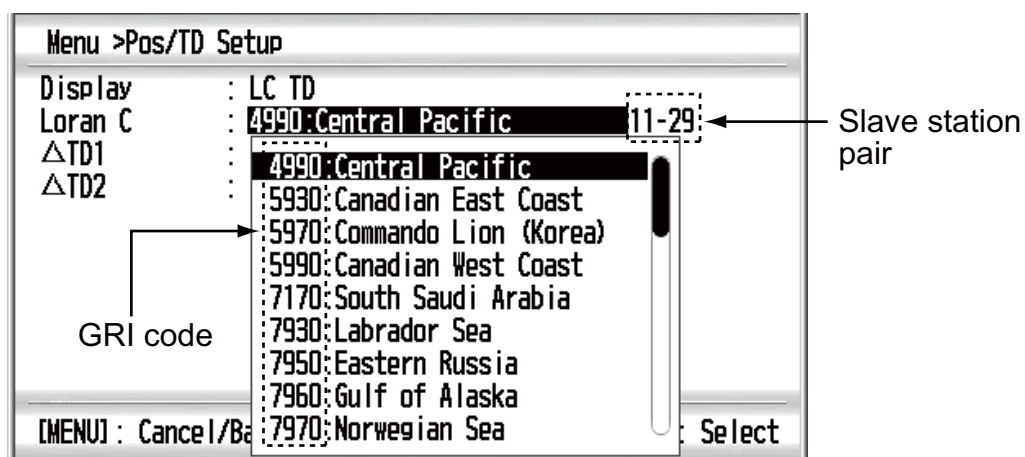3.  Use the Cursorpad (▲ or ▼) to select [Adjustment] and press the **ENT** key.

```
Menu >System >Adjustment
 STW                      : 1.00
 Wind Speed               : 1.0




 [MENU] : Cancel/Back   [ENT] : Enter      ▲/▼ : Select
```
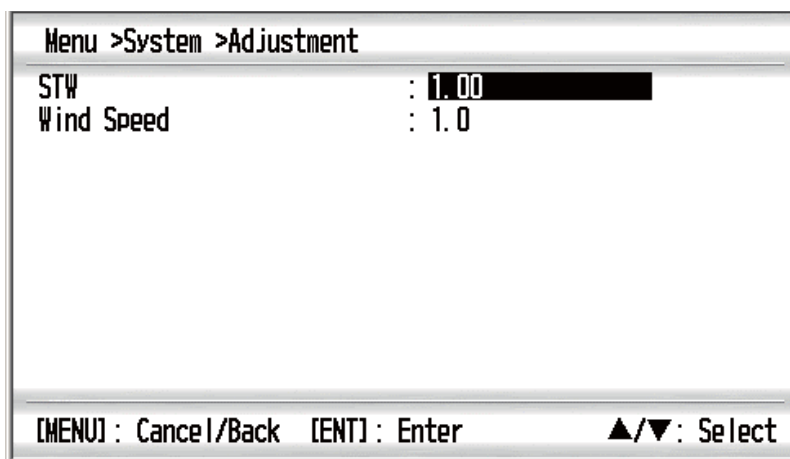
4.  Use the Cursorpad (▲ or ▼) to select [STW] or [Wind Speed] then press the **ENT** key.

5.  Use the Cursorpad (▲ or ▼) to set the value and use the Cursorpad (▶) to move the cursor to the next digit. Repeat this step to set the value for other digits if necessary (setting range for [STW]: 0.30 - 2.50, setting range for [Wind Speed]: 0.3 - 2.5). When the displayed data is smaller than the actual value, set the value which is larger than 1.0. When the displayed data is larger than the actual value, set the value which is smaller than 1.0. The value "1" means no offset.

6.  Press the **ENT** key to save the setting and close the setting window. To close the window without saving, press the **MENU** key (instead of the **ENT** key).

7.  Press the **DISP** key to close the menu and display the data screen.

# 7.3 Response Time

You can set the response time for each data as follows. The input raw data is averaged by the response time.

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

2. Use the Cursorpad (▲ or ▼) to select [System] and press the **ENT** key.

3. Use the Cursorpad (▲ or ▼) to select [Response Time] and press the **ENT** key.

```
Menu >System >Response Time
Depth                    :  3s
STW                      :  0s
SOG                      :  0s
VMG                      :  3s
Wind Speed               :  3s
Wind Angle Pointer       :  4s
Heading                  :  0s
COG                      :  0s


[MENU] : Cancel/Back   [ENT] : Enter        ▲/▼ : Select
```

4. Use the Cursorpad (▲ or ▼) to select the menu item desired and press the **ENT** key.

```
        ▲
        0s
        ▼
     (0~12s)
```
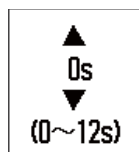
5. Use the Cursorpad (▲ or ▼) to set the value and press the **ENT** key to save the setting. To close the window without saving, press the **MENU** key (instead of the **ENT** key). The setting range is 0 - 12 seconds. The higher the setting, the slower the response of the display. "0" second means no average.

6. Press the **DISP** key to close the menu and display the data screen.

# 7.4 Scale Range

You can set the scale range for the analog meter.
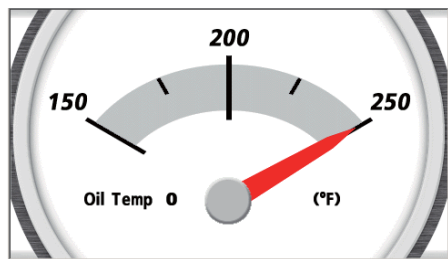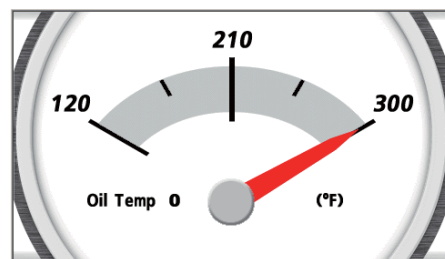


Engine Oil Temperature: 150-250°F          Engine Oil Temperature: 120-300°F

*Example screens*

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

2. Use the Cursorpad (▲ or ▼) to select [System] and press the **ENT** key.

3. Use the Cursorpad (▲ or ▼) to select [Scale Ranges] and press the **ENT** key.
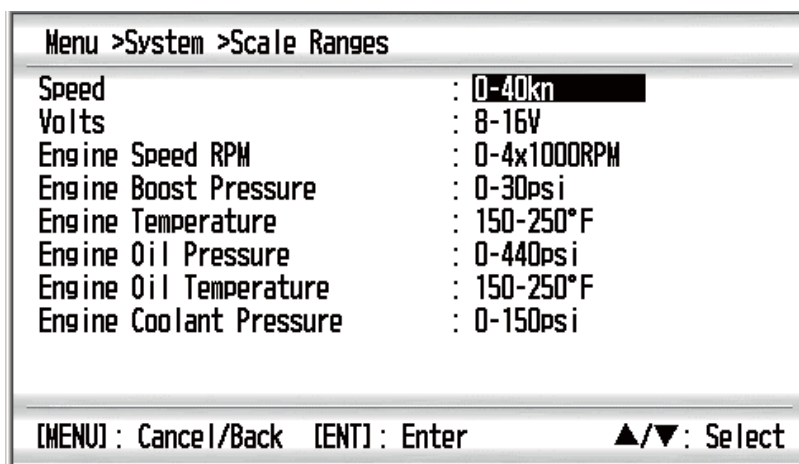
```
Menu >System >Scale Ranges
  Speed                  : 0-40kn
  Volts                  : 8-16V
  Engine Speed RPM       : 0-4x1000RPM
  Engine Boost Pressure  : 0-30psi
  Engine Temperature     : 150-250°F
  Engine Oil Pressure    : 0-440psi
  Engine Oil Temperature : 150-250°F
  Engine Coolant Pressure: 0-150psi


 [MENU]: Cancel/Back  [ENT]: Enter        ▲/▼: Select
```

4. Use the Cursorpad (▲ or ▼) to select the menu item desired and press the **ENT** key.

5. Use the Cursorpad (▲ or ▼) to select an option and press the **ENT** key.

| Menu item | Option |
|---|---|
| Speed | kn: 0-20kn, 0-40kn, 0-80kn<br>km/h: 0-40km/h, 0-80km/h, 0-160km/h<br>mph: 0-20mph, 0-40mph, 0-80mph |
| Volts | 8-16V, 16-32V |
| Engine Speed RPM | 0-4x1000RPM, 0-6x1000RPM, 0-8x1000RPM |
| Engine Boost Pressure | psi: 0-30psi, 0-70psi, 0-150psi, 0-360psi, 0-440psi<br>bar: 0-2bar, 0-5bar, 0-10bar, 0-25bar, 0-30bar |
| Engine Temperature | °F: 150-250°F, 120-300°F<br>°C: 60-120°C, 50-150°C |
| Engine Oil Pressure | psi: 0-30psi, 0-70psi, 0-150psi, 0-360psi, 0-440psi<br>bar: 0-2bar, 0-5bar, 0-10bar, 0-25bar, 0-30bar |
| Engine Oil Temperature | °F: 150-250°F, 120-300°F<br>°C: 60-120°C, 50-150°C |
| Engine Coolant Pressure | psi: 0-30psi, 0-70psi, 0-150psi, 0-360psi, 0-440psi<br>bar: 0-2bar, 0-5bar, 0-10bar, 0-25bar, 0-30bar |

6. Press the **DISP** key to close the menu and display the data screen.

# 7.5 Setting for Time and Date

**Display format for time and date**

You can select the display format for time and date.

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

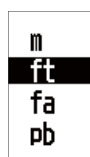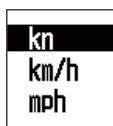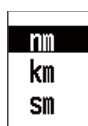2. Use the Cursorpad (▲ or ▼) to select [System] and press the **ENT** key.

3. Use the Cursorpad (▲ or ▼) to select [Time Display] or [Date Display] then press the **ENT** key.



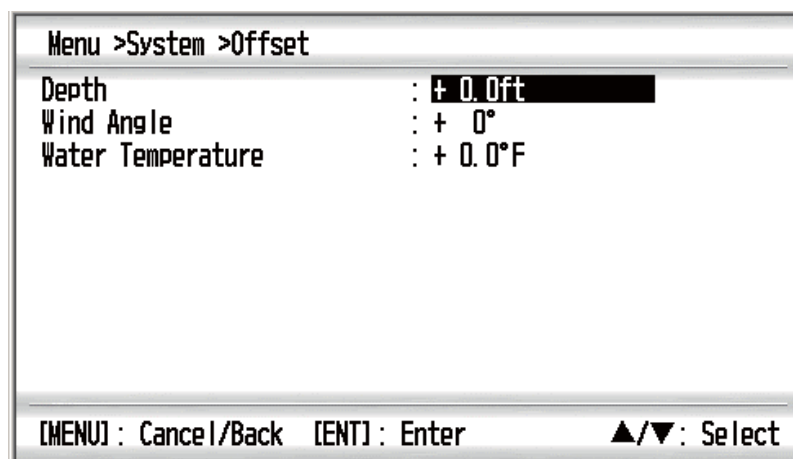Time Display      Date Display

4. Use the Cursorpad (▲ or ▼) to select an option and press the **ENT** key.

5. Press the **DISP** key to close the menu and display the data screen.
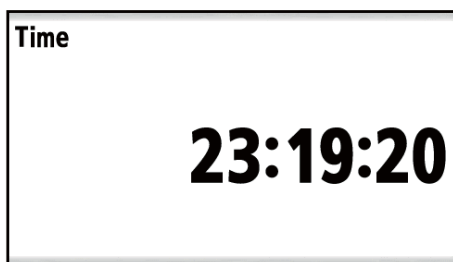


Time Display: 24Hour      Time Display: 12Hour
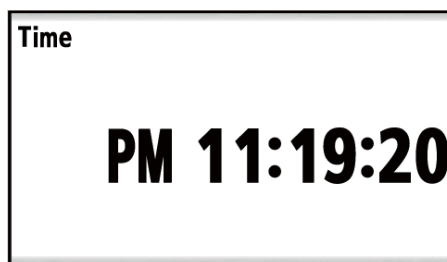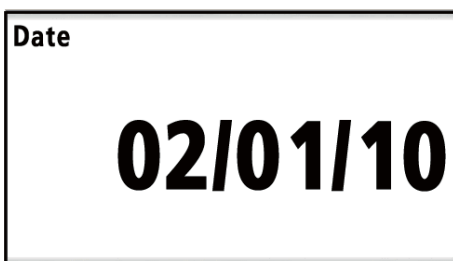


Date Display: MM/DD/YY      Date Display: DD/MMM/YY

*Screen examples*

## Time difference

You can set the time differences from UTC (Universal Time Coordinated) at 15 minutes intervals to show the local time.

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

2. Use the Cursorpad (▲ or ▼) to select [System] and press the **ENT** key.

3. Use the Cursorpad (▲ or ▼) to select [Time Offset] and press the **ENT** key.

4. Use the Cursorpad (▲ or ▼) to set the time and press the **ENT** key. The setting range is -14:00 - +14:00.

5. Press the **DISP** key to close the menu and display the data screen.

## Daylight saving time

You can show the time in daylight saving time.

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

2. Use the Cursorpad (▲ or ▼) to select [System] and press the **ENT** key.

3. Use the Cursorpad (▲ or ▼) to select [Daylight Saving Time] and press the **ENT** key.
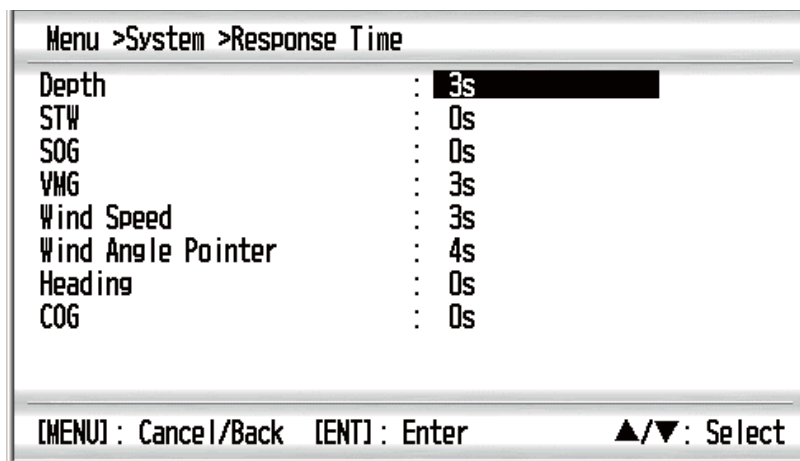
4. Use the Cursorpad (▲ or ▼) to select [On] and press the **ENT** key.

5. Press the **DISP** key to close the menu and display the data screen.

# 7.6 Other menu items

This section describes the menu items not previously described.

**[Key Beep]**: When a key is pressed, a beep sounds. You can turn on or off this beep.

**[Language]**: English and other languages are available.

**[HDG/COG Ref]**: You can display the bearing in true or magnetic. [True] is the bearing measured using true North as the reference direction. "T" is displayed on the screen. [Mag] is the bearing measured with magnetic north as the reference direction. "M" is displayed on the screen.

**[Magnetic Variation]**: If you selected [Mag] on the previous menu item [HDG/COG Ref], set the option of the [Magnetic Variation]. The location of the magnetic north pole is different from the geographical north pole. This causes a difference between the true and magnetic north direction. This difference is called magnetic variation, and varies with respect to the observation point on earth. Your unit is preprogrammed with all the earth's magnetic variation. If you selected [Auto], the programmed value is used to display magnetic bearing. However, you can enter variation manually to improve accuracy, referring to the latest navigation chart. Select [Manual] and press the **ENT** key. Use the Cursorpad (▶) to move the cursor to the right and enter the variation.

**[Locked Heading Display]**: At the [Locked HDG] analog screen, set the digital heading indication method.
[Current Heading]: Display the current heading.
[Locked Heading]: Display the locked heading at the moment that the **START/CLEAR** key is pressed.

**[Locked Bearing Display]**: At the [Locked BRG] analog screen, set the digital bearing indication method. (Bearing: From your ship to the destination waypoint)
[Current Bearing]: Display the current bearing from your ship to the destination waypoint.
[Locked Bearing]: Display the locked bearing at the moment that the **START/CLEAR** key is pressed.

This page is intentionally left blank.

# 8. MAINTENANCE, TROUBLESHOOTING

```
┌─────────────────────────────────┐
│           NOTICE                │
├─────────────────────────────────┤
│ Do not apply paint, anti-corrosive │
│ sealant or contact spray to plastic │
│ parts or equipment coating.     │
│                                 │
│ Those items contain products that can │
│ damage plastic parts and equipment │
│ coating.                        │
└─────────────────────────────────┘
```

## 8.1   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 grounding point 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 tissue paper and an LCD cleaner. 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.

### LCD life

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

## 8.2 Troubleshooting

This section provides simple troubleshooting procedures which the user can follow to restore normal operation. If you cannot restore normal operation, do not check inside the unit. Have a qualified technician check the equipment.

| Symptom | Remedy |
|---|---|
| You cannot turn on the power. | • Check that the power cable is firmly fastened.<br>• Check for damaged power cable and connector. |
| No picture appears. | Press the 🔵BRILL key several times to adjust the screen brilliance. |
| There is no response when a key is pressed. | Turn off and on the power then operate the key. If you do not get a response, the key is damaged. Contact your dealer for instructions. |
| No data appears. | Check that the connectors of sensors are firmly fastened. |

## 8.3 Test

The test checks the system for correct operation.

1.  Press the **MENU** key to open the menu.
2.  Use the Cursorpad (▲ or ▼) to select [System] and press the **ENT** key.
3.  Use the Cursorpad (▲ or ▼) to select [Self Test] and press the **ENT** key.

System Test
LCD Test
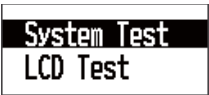
4.  Use the Cursorpad (▲ or ▼) to select [System Test] and press the **ENT** key.

Menu >System >Self Test >System Test

① ROM : OK    RAM : OK    CNT:3 ← ④
② 0183 : --
③ CPU Main: 2651010-XX.XX
   CPU Boot: 2651011-XX.XX    CPU CAN LD: 2651012-XX.XX

Push [MENU] 3 times to exit.
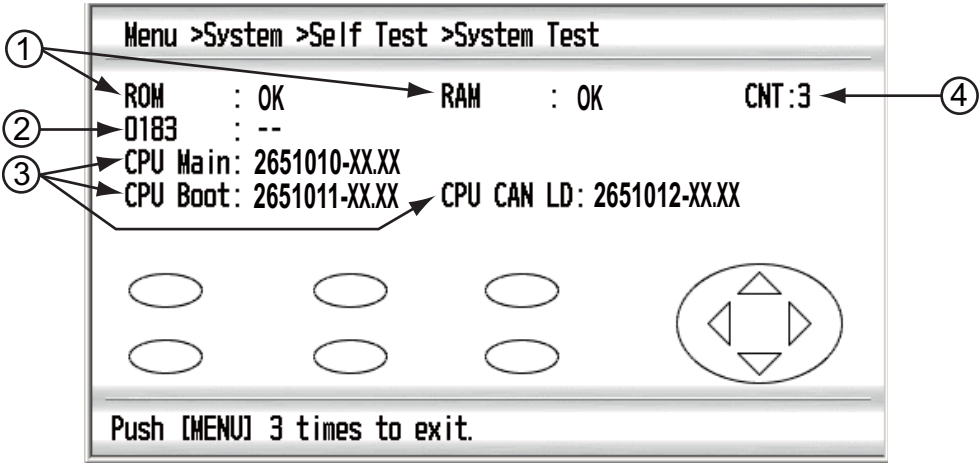
XX.XX: Program version number

*System Test items*

| No. | Items | Description |
|---|---|---|
| 1 | 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. |
| 2 | 0183 | The result of the port NMEA 0183 is displayed as "OK" or "NG". Port NMEA 0183 requires a special connector to test it. When a special connector is not connected, "--" is shown. If any NG is displayed, contact your dealer. |
| 3 | Program version (CPU Main, CPU Boot, CPU CAN LD) | Each program number and program version number are displayed. |
| 4 | CNT | The number of times for diagnostic test is displayed. |

5. Press each key or arrow one by one. A key's or arrow's on-screen location turns to red if the key or arrow is normal. When you press a key or arrow again, red turns to white.

6. Press the **MENU** key three times to escape from the system test.

7. Use the Cursorpad (▲ or ▼) to select [LCD Test] and press the **ENT** key to execute the LCD test. The red pattern appears.

8. Press the **ENT** key continuously. The screen changes as follows.



Red → Green → Blue

16 tones of red → 16 tones of green → 16 tones of blue

White → Black → 16 tones of gray
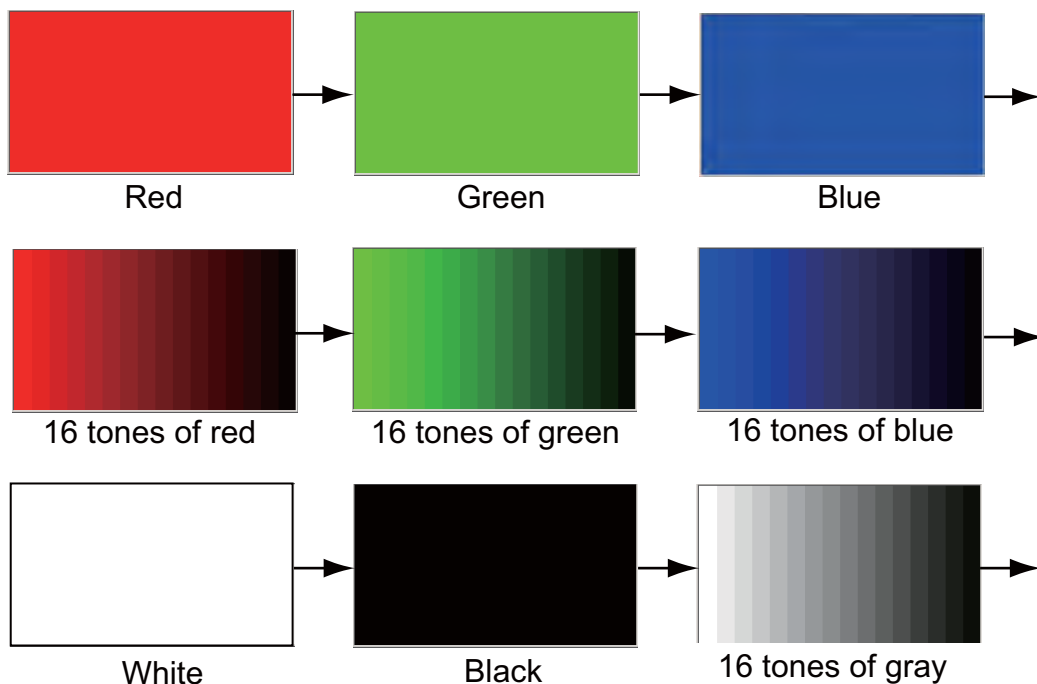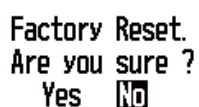


[System] menu

9. Press the **DISP** key to close the menu and display the data screen.

## 8.4 Factory Reset

You can restore all settings as follows:

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

2. Use the Cursorpad (▲ or ▼) to select [System] and press the **ENT** key.

3. Use the Cursorpad (▲ or ▼) to select [Factory Reset] and press the **ENT** key.

4. Use the Cursorpad (▲ or ▼) to select [On] and press the **ENT** key. The confirmation message appears.

```
Factory Reset.
Are you sure ?
   Yes  No
```

5. Use the Cursorpad (◄) to select [Yes] and press the **ENT** key. The equipment restarts with the default settings. The [Installation] menu screen appears.

## 8.5 Demo Mode

A demo mode, which shows internally generated navigation data, is provided to acquaint you with the features of the RD-33. "SIM" (simulation) appears on the screen when the demo mode is turned on.

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

2. Use the Cursorpad (▲ or ▼) to select [System] and press the **ENT** key.

3. Use the Cursorpad (▲ or ▼) to select [Demo Mode] and press the **ENT** key.

4. Use the Cursorpad (▲ or ▼) to select [On] and press the **ENT** key.

5. Press the **DISP** key to close the menu and display the data screen.

# 9. INSTALLATION

## 9.1 Equipment List

### Standard supply

| Name | Type | Code No. | Qty | Remarks |
|---|---|---|---|---|
| Remote Display | RD-33 | - | 1 | |
| Installation Materials | CP20-03300 | - | 1 | • CP20-03310*<br>• M12-05BM+05BF-060 |
| Accessories | FP20-01200* | 001-087-250 | 1 | |

*: See page A-1.

### Optional supply

| Name | Type | Code No. | Remarks |
|---|---|---|---|
| Junction Box | FI-5002 | - | |
| Cable Assy. | FI-50-CHAIN-0.3M | 000-166-949-11 | CAN bus, w/0.3 m cable, connector at both ends |
| | FI-50-CHAIN-1M | 000-166-950-11 | 1 m |
| | FI-50-CHAIN-5M | 000-166-951-11 | 5 m |
| | FI-50-CHAIN-10M | 000-166-952-11 | 10 m |
| | FI-50-CHAIN-20M | 000-166-953-11 | 20 m |
| Cable Assy. | MJ-A6SPF0003-020C | 000-154-029-10 | For NMEA 0183, w/2 m cable, connector at one end 6P |
| | MJ-A6SPF0003-050C | 000-154-054-10 | 5 m |
| | MJ-A6SPF0003-100C | 000-168-924-10 | 10 m |
| | MJ-A6SPF0003-150C | 000-159-643-10 | 15 m |
| Cable Assy. | M12-05BM+05BF-010 | 000-167-962-11 | CAN bus, w/1 m cable, connector at both ends |
| | M12-05BM+05BF-020 | 000-167-963-11 | 2 m |
| | M12-05BM+05BF-060 | 000-167-964-11 | 6 m |
| Micro T-connector | SS-050505-FMF-TS001 | 000-168-603-10 | For CAN bus network |
| Mini/Micro T-connector | NC-050505-FMF-TS001 | 000-160-507-10 | |

# 9.2    Installation

## 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, remember the following points:

• The nominal viewing distance for the display unit is 0.6 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 using the template.
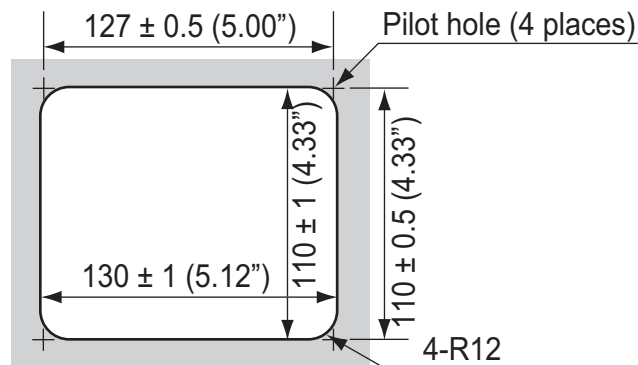


2.    Make four pilot holes for self-tapping screws (3x20) in the mounting location.

3.    Remove the hanger assembly from the remote display. Discard the hanger assembly.

4.    Remove the front panel from the remote display by unfastening the catches at the rear of the panel by hands, in the order shown in the figure below.
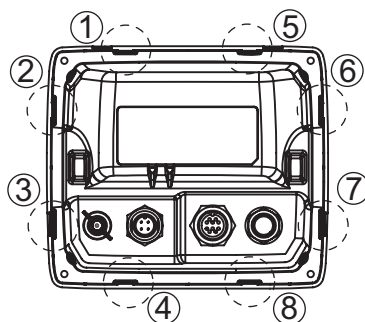
5.  Attach the F mount cushion (supplied as accessories) to the remote display from the rear side.

6.  Connect the cable connectors (see section 9.3).

7.  Set the remote display to the cutout and fasten it with four self-tapping screws (supplied as installation material; 3x20).

8.  Set the front panel to the remote display.
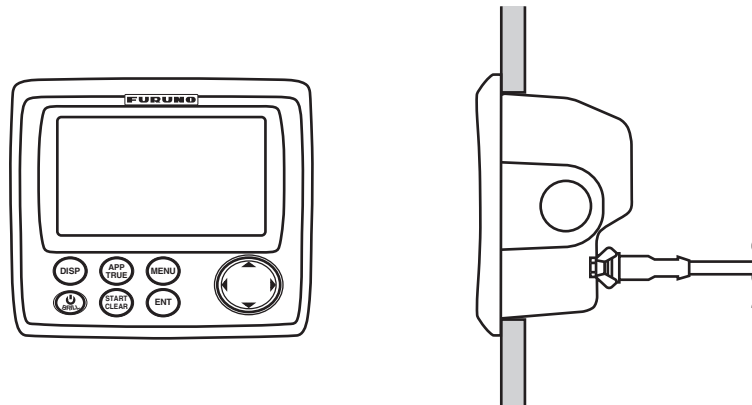
**Note:** When you remove the remote display from the flush mounting location, use the panel remover (supplied as accessories) to remove the panel as shown below.
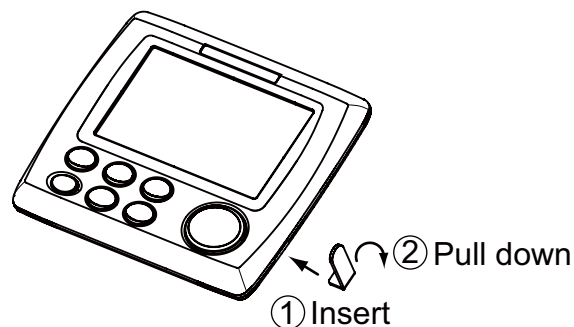
## Desktop or table underside mounting

See the outline drawing in the back of this manual.

1.  Make four pilot holes for self-tapping screws (5x20) in the mounting location.

2.  Remove the hanger assembly from the remote display.

3.  Connect the cable connectors (see section 9.3).

4.  Fix the hanger to the mounting location with four self-tapping screws (supplied as installation material; 5x20).

5.  Set the remote display to the hanger.

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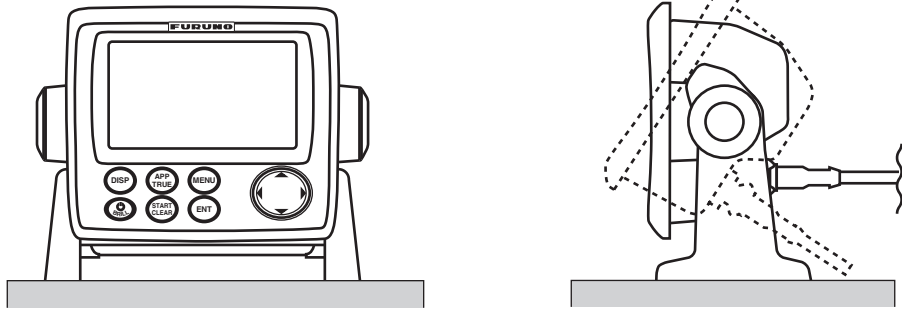


## 9.3 Wiring

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

**Note:** The remote display power is supplied through CAN bus. When the sensor signal is input or output only from the NMEA 0183 device without the CAN bus device, connect the 12-24 VDC power from the ship's switch board to the male connector of the CAN bus port.

**Interconnection**



NMEA port

| Pin | Signal | Wire color |
|-----|--------|------------|
| 1 | TD-A | White |
| 2 | TD-B | Black |
| 3 | RD-A | Yellow |
| 4 | RD-B | Green |
| 5 | NC | |
| 6 | FG | Shield |

RD-33 (rear)

For CAN bus (5P Female)   For CAN bus (5P Male)   For NMEA 0183

Inner dia. φ4

IV-1.25sq
To ground
terminal on hull

FI-50-CHAIN-xxM
(0.3 m, 1 m, 5 m, 10 m, 20 m)
or
M12-05BM+05BF-0xx
(1 m, 2 m, 6 m)

MJ-A6SPF0003-xxxC
(2/5/10/15 m)

NMEA 0183 Device

CAN bus device (e.g. NavNet 3D)   The device which supplies power

CAN bus

| Pin | Signal | Wire color | PWR |
|-----|--------|------------|-----|
| 1 | FG | Drain | |
| 2 | NET-S | Red | + |
| 3 | NET-C | Black | − |
| 4 | NET-H | White | |
| 5 | NET-L | Blue | |

**Connection between remote display and junction box**

For serviceman: See "Furuno CAN bus Network Design Guide" (TIE-00170-X) for details about CAN bus network.

RD-33 (rear)

M12-05BM+05BF-0xx
(1 m, 2 m, 6 m)

Connect to
CN2 - CN5.

FI-5002
Power cable (2 m)

Side view

White    Black

⊕        ⊖

12 VDC

Power switchboard

12 VDC

CN3 - CN5
DROP

CN2
BACKBONE

MC connector

Top view

Fix cable with
supplied cable ties.

JUNCTION BOX FI-5002 (option)
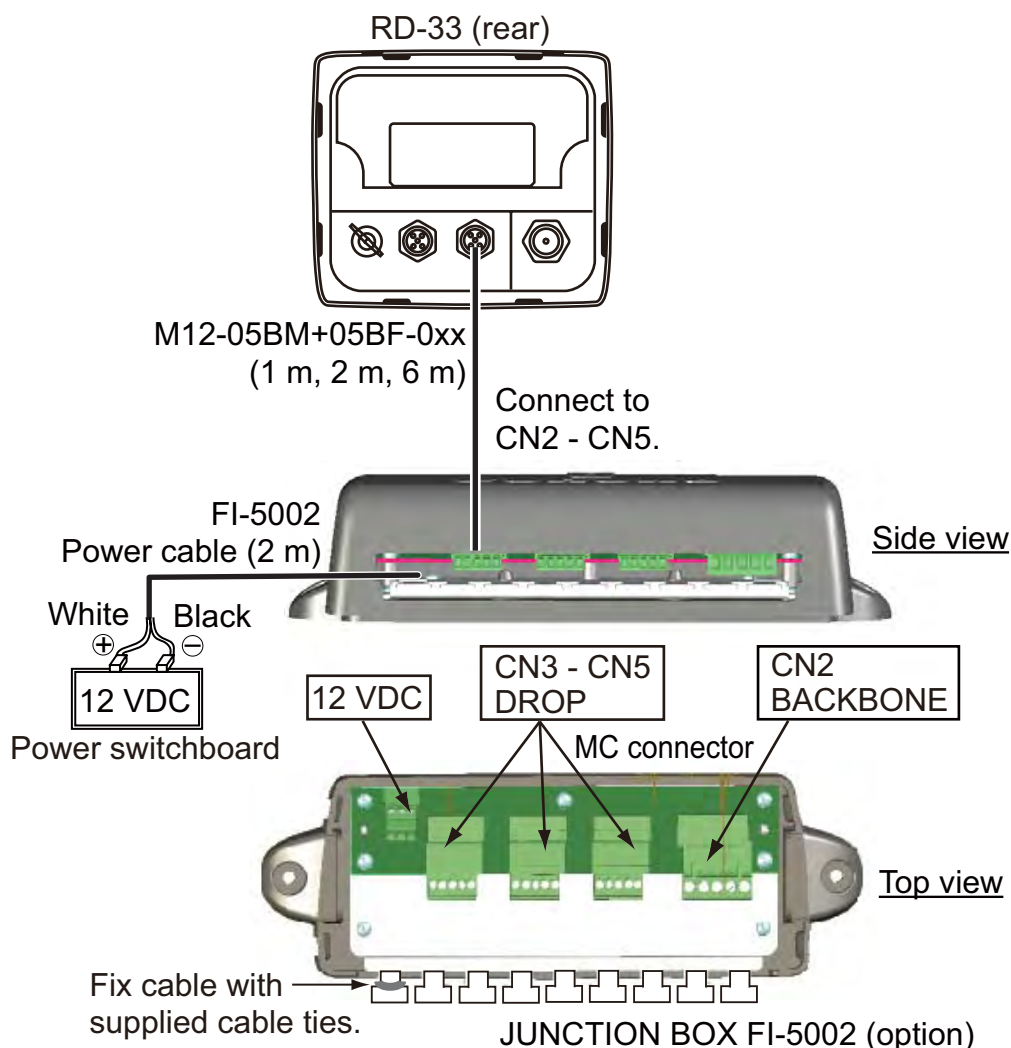
**Fabrication of cable M12-05BM+05BF-060 and connection to MC connector**

Drain wire

Sheath

6 mm

Cable Fabrication
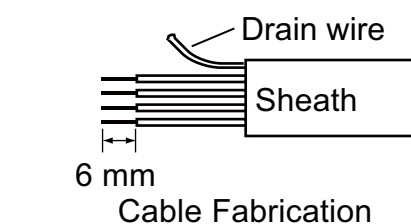
| Wire | Conn. Pt. |
|------|-----------|
| Drain | 1 |
| Red | 2 |
| Black | 3 |
| White | 4 |
| Blue | 5 |

Screw

Core

Twist

MC connector
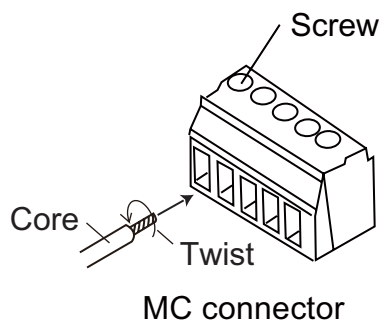
How to insert cores:
1. Twist the cores.
2. Unfasten the screw with
   Philips head screwdriver.
3. Set the core to hole.
4. Tighten the screw.
5. Pull the wire to confirm connection.

**Terminator**

• Connection to the backbone cable

RD-33

NavNet 3D
(Power supply)

↑
Terminator

↑
Terminator
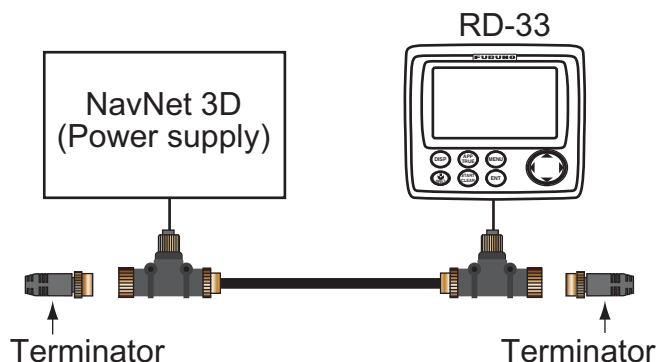
Furuno CAN bus terminators are available with the following part numbers. The terminator should be attached at each end of the backbone cable.

| Parts name | Type | Code Number | Remarks |
|---|---|---|---|
| Male terminator | LTWMN-05AMMT-SL8001 | 000-160-508-10 | Mini connector |
| Female terminator | LTWMN-05AFFT-SL8001 | 000-160-509-10 | Mini connector |
| Male terminator | LTWMC-05BMMT-SL8001 | 000-168-604-10 | Micro connector |
| Female terminator | LTWMC-05BFFT-SL8001 | 000-168-605-10 | Micro connector |

• Connection to the Junction box FI-5002
The FI-5002 has two terminal resistors (R1, R2).

1) When no backbone cable is connected, R1 and R2 are set to ON position.

2) When one backbone cable is connected, either R1 or R2 is set to ON position.

3) When two backbone cables are connected, R1 and R2 are set to OFF position.

FI-50 series
Instruments

WS-200

RD-33

CN2-CN5

FI-5002

12 VDC
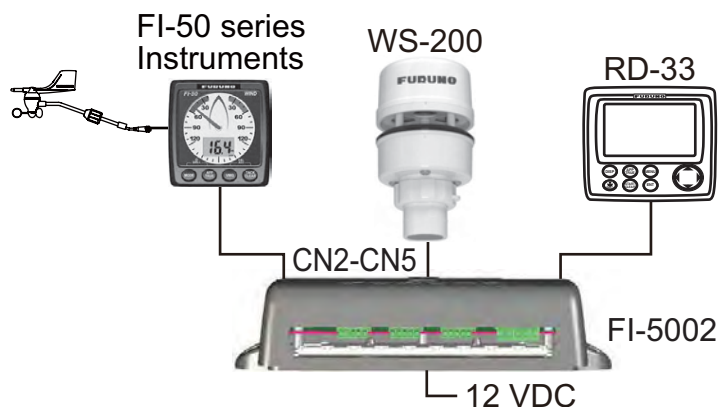
Internal Terminators in FI-5002

┌ Jumper block setting ─
: Resistor is disconnected. (OFF)     : Resistor is connected. (ON)

R2  R1

CN1

CN3 CN4 CN5 CN2

CN2          CN2

CN3    CN4    CN5
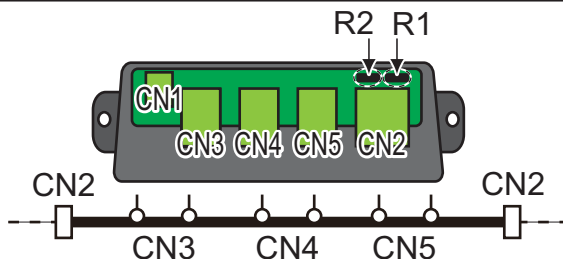
# 9.4 Adjustments

After you install the remote display, initialize the remote display as follows:

1. Press the [BRILL] key to turn on the power.

```
Installation
Language      : English
Depth         :      English
Speed         :      Français
Distance      :      Español
Wind Speed    :      Deutsch
Temperature   :      Italiano
Fuel          :      Português
Engine Pressure :    Dansk
Time Offset   :      Svenska
Demo Mode     :      Norsk
[MENU]: Cancel/Back  [ENT]: Suomi    ▲/▼: Select
```
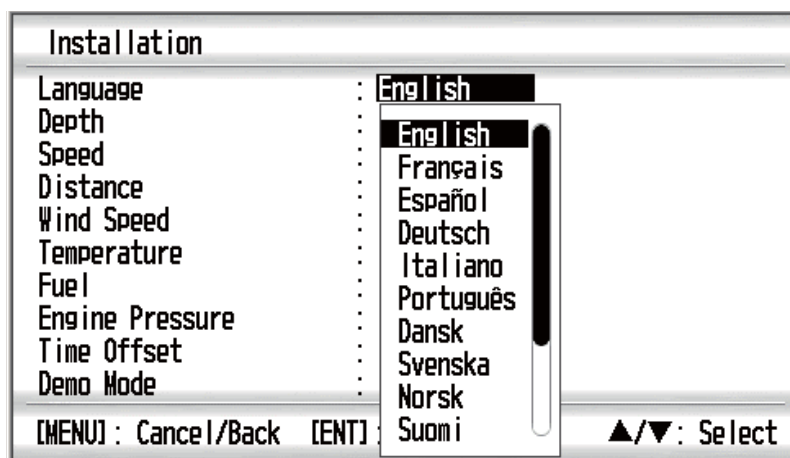
2. Press the **ENT** key with the cursor on [English]. The menu for units of measurement appears.
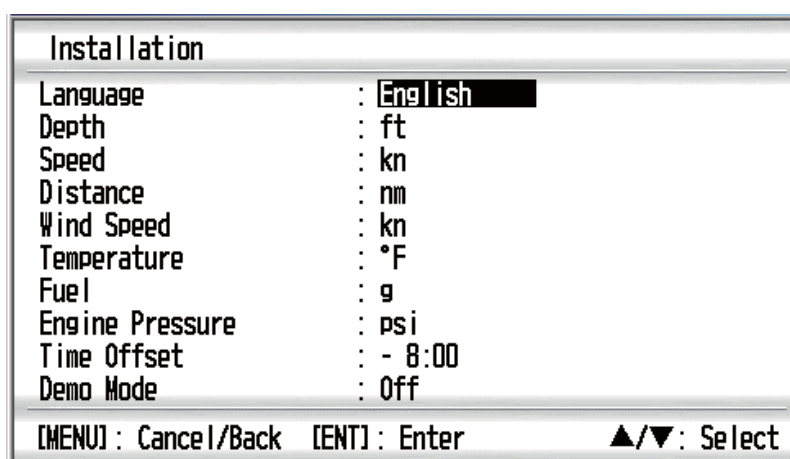
```
Installation
Language        : English
Depth           : ft
Speed           : kn
Distance        : nm
Wind Speed      : kn
Temperature     : °F
Fuel            : g
Engine Pressure : psi
Time Offset     : - 8:00
Demo Mode       : Off
[MENU]: Cancel/Back  [ENT]: Enter    ▲/▼: Select
```

3. Use the Cursorpad (▲ or ▼) to select the menu item desired and press the **ENT** key.

```
m
ft
fa
pb
```
Depth

```
kn
km/h
mph
```
Speed

```
nm
km
sm
```
Distance

```
kn
m/s
mph
```
Wind Speed

```
°C
°F
```
Temperature

```
l
g
```
Fuel

```
bar
psi
```
Engine Pressure

```
▲
- 8:00
▼
(-14:00~+14:00)
```
Time Offset*
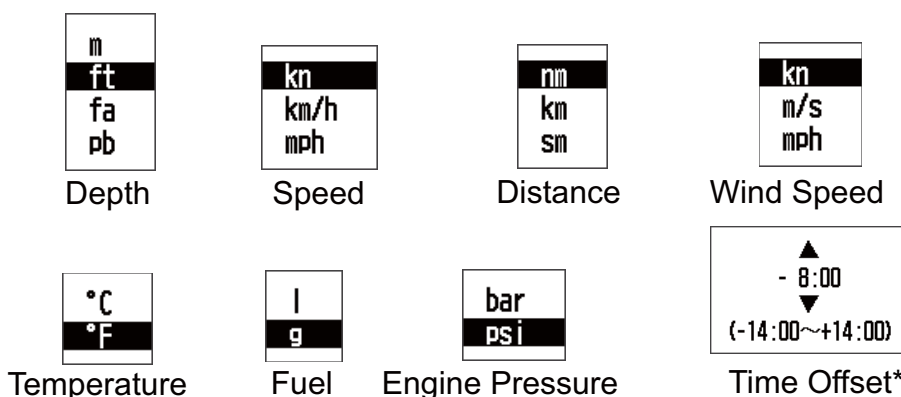
\*: Set the difference between UTC (Universal time coordinated) and local time.

4. Use the Cursorpad (▲ or ▼) to select an option and press the **ENT** key.

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

**9-7**

## 9.5    Input/Output Signal

The RD-33 inputs and outputs the signal in NMEA 0183 and CAN bus format.

**Input signal**

| Data | Port | Sentence, PGN (Title) |
|---|---|---|
| Depth | CAN bus | 128267 (Water depth) |
| | NMEA 0183 | DPT>DBT>DBS>DBK |
| STW (Speed Through the Water) | CAN bus | 128259 (Speed, Water referenced), 130577 (Direction data) |
| | NMEA 0183 | VHW>VBW |
| SOG (Speed Over the Ground) | CAN bus | 128259 (Speed, Water referenced), 130577 (Direction data) |
| | NMEA 0183 | VTG>RMC>RMA>VBW |
| Wind speed and angle (Apparent) | CAN bus | 130306 (Wind data) |
| | NMEA 0183 | MWV(A)>VWR |
| Wind speed and angle (True) | CAN bus | 130306 (Wind data) |
| | NMEA 0183 | MWV(T)>VWT |
| Heading (True) | CAN bus | 127250 (Vessel heading), 130577 (Direction data) |
| | NMEA 0183 | HDT(T)>PFEC,Gpatt(T)>VHW(T)> HDG(M,V,D) |
| Heading (Magnetic) | CAN bus | 127250 (Vessel heading), 130577 (Direction data) |
| | NMEA 0183 | HDG(M,V,D)>HDM(M)>VHW(M) |
| Course (True) | CAN bus | 129026 (COG & SOG, Rapid Update), 130577 (Direction data) |
| | NMEA 0183 | VTG>RMC>RMA |
| Course (Magnetic) | CAN bus | 129026 (COG & SOG, Rapid Update), 130577 (Direction data) |
| | NMEA 0183 | VTG |
| ROT (Rate of Turn) | CAN bus | 127251 (Rate of Turn) |
| | NMEA 0183 | ROT |
| BRG (Bearing, True) | CAN bus | 129284 (Navigation data) |
| | NMEA 0183 | APB>RMB(T)>BWC(T)>BWR(T) |
| BRG (Bearing, Magnetic) | CAN bus | 129284 (Navigation data) |
| | NMEA 0183 | APB>BWC(M)>BWR(M) |
| RNG (Range) | CAN bus | 129284 (Navigation data) |
| | NMEA 0183 | RMB>BWC>BWR |
| XTE (Cross-Track Error) | CAN bus | 129283 (Cross-Track Error) |
| | NMEA 0183 | XTE>APB>RMB |
| WP Number | CAN bus | 129284 (Navigation data), 129285 (Navigation-Route/WP information |
| | NMEA 0183 | - |

| Data | Port | Sentence, PGN (Title) |
|------|------|----------------------|
| WP Name | CAN bus | 129285 (Navigation-Route/WP information |
| | NMEA 0183 | RMB>APB>BWC>BWR>ZTG |
| Longitude/Latitude | CAN bus | 129029 (GNSS Position data), 129025 (Position, Rapid Update) |
| | NMEA 0183 | GNS > GGA > RMC > RMA > GLL |
| Longitude/Latitude for way-point | CAN bus | 129284 (Navigation data) |
| | NMEA 0183 | RMB > BWR > BWC |
| Number of acquired satellites | CAN bus | 129029 (GNSS Position data) |
| | NMEA 0183 | GNS>GGA |
| Pitch/Roll | CAN bus | 127257 (Attitude) |
| | NMEA 0183 | PFEC,GPatt |
| ETA Time&Date | CAN bus | 129284 (Navigation data) |
| | NMEA 0183 | ZTG |
| Time difference | CAN bus | 130052 (Loran C TD data) |
| | NMEA 0183 | GLC >GTD |
| Date | CAN bus | 126992 (System time), 129033 (Time & Date) |
| | NMEA 0183 | ZDA>RMC |
| Time | CAN bus | 126992 (System time), 129033 (Time & Date) |
| | NMEA 0183 | ZDA>RMC |
| Water temperature | CAN bus | 130310 (Environmental Parameters), 130311 (Environmental Parameters) |
| | NMEA 0183 | MTW > MDA |
| Temperature | CAN bus | 130310 (Environmental Parameters) |
| | NMEA 0183 | MDA |
| Atmosphere | CAN bus | 130310 (Environmental Parameters), 130311 (Environmental Parameters) |
| | NMEA 0183 | MDA |
| Humidity | CAN bus | 130310 (Environmental Parameters), 130311 (Environmental Parameters) |
| | NMEA 0183 | MDA |
| Rudder | CAN bus | 127245 (Rudder) |
| | NMEA 0183 | RSA |
| Engine | CAN bus | 127497 (Trip Parameters, Engine), 127488 (Engine Parameters, Rapid Update), 127489 (Engine Parameters, Dynamic) |
| | NMEA 0183 | - |
| Current (tide) | CAN bus | - |
| | NMEA 0183 | CUR > VDR |

**Note 1:** >: The priority of the left sentence is higher than the one of right sentence.

**Note 2:** CAN bus>NMEA 0183

**Output signal**

| Data | Port | Sentence, PGN (Title) |
|---|---|---|
| Depth | CAN→0183 | 128267→DPT |
| | 0183→CAN | DPT>DBT>DBS>DBK→128267 |
| STW (Speed Through the Water) | CAN→0183 | 128259, 130577→VHW |
| | 0183→CAN | VHW→128259 |
| SOG (Speed Over the Ground) | CAN→0183 | 128259, 130577→VTG, RMC |
| | 0183→CAN | VTG>RMC>RMA→128259, 129029 |
| Wind speed and angle (Apparent)*1 | CAN→0183 | 130306→MWV(A) |
| | 0183→CAN | MWV(A)>VWR→130306 |
| Wind speed and angle (True)*1 | CAN→0183 | 130306→MWV(T) |
| | 0183→CAN | MWV(T)>VWT→130306 |
| Heading (True)*2 | CAN→0183 | 127250, 130577→HDT, VHW(T) |
| | 0183→CAN3 | HDT>PFEC,Gpatt>VHW(T)→127250 |
| Heading (Magnetic)*2 | CAN→0183 | 127250, 130577→HDG, VHW(M) |
| | 0183→CAN | HDG>HDM>VHW(M)→127250 |
| Variation | CAN→0183 | 127250, 127258→HDG, RMC |
| | 0183→CAN | HDG→127250 |
| Deviation | CAN→0183 | 127250→HDG |
| | 0183→CAN | HDG→127250 |
| Course (True)*2 | CAN→0183 | 129026, 130577→VTG, RMC |
| | 0183→CAN | VTG(T)>RMC>RMA→129026 |
| Course (Magnetic)*2 | CAN→0183 | 129026, 130577→VTG |
| | 0183→CAN | VTG(M)→129026 |
| ROT (Rate of Turn) | CAN→0183 | - |
| | 0183→CAN | - |
| BRG (Bearing, True) | CAN→0183 | - |
| | 0183→CAN | - |
| BRG (Bearing, Magnetic) | CAN→0183 | - |
| | 0183→CAN | - |
| RNG (Range) | CAN→0183 | - |
| | 0183→CAN | - |
| XTE (Cross-Track Error) | CAN→0183 | 129283→XTE |
| | 0183→CAN | XTE>APB>RMB→129283 |
| WP Number/Name | CAN→0183 | - |
| | 0183→CAN | - |
| Longitude/Latitude | CAN→0183 | 129025>129029→RMC |
| | 0183→CAN | GNS>GGA>RMC>RMA>GLL →129029 |
| Longitude/Latitude for destination waypoint | CAN→0183 | - |
| | 0183→CAN | - |

| Data | Port | Sentence, PGN (Title) |
|---|---|---|
| Number of acquired satellites | CAN→0183 | - |
| | 0183→CAN | GNS>GGA→129029 |
| Pitch/Roll | CAN→0183 | - |
| | 0183→CAN | - |
| ETA Time&Date | CAN→0183 | - |
| | 0183→CAN | - |
| Time difference | CAN→0183 | - |
| | 0183→CAN | - |
| Date | CAN→0183 | 126992, 129033→RMC |
| | 0183→CAN | ZDA>RMC→126992 |
| Time | CAN→0183 | 126992, 129033→RMC |
| | 0183→CAN | ZDA>RMC→126992 |
| Water temperature | CAN→0183 | 130310, 130311→MTW |
| | 0183→CAN | MTW > MDA→130311 |
| Temperature | CAN→0183 | - |
| | 0183→CAN | - |
| Atmosphere | CAN→0183 | - |
| | 0183→CAN | MDA→130311 |
| Humidity | CAN→0183 | - |
| | 0183→CAN | MDA→130311 |
| Rudder | CAN→0183 | 127245→RSA |
| | 0183→CAN | RSA→127245 |
| Engine | CAN→0183 | - |
| | 0183→CAN | - |
| Current (tide) | CAN→0183 | - |
| | 0183→CAN | - |

*1: Apparent>True, *2: True>Magnetic

This page is intentionally left blank.

# APPENDIX 1 MENU TREE

MENU key

*Bold*: Default setting

─ Display ─┬─ Graphic (A, *B*)
　　　　　　├─ Display1 (*Fishing*, Sailing, Ship, Navigation, Environment, Engine, Custom Layout)
　　　　　　├─ Display2 (Fishing, *Sailing*, Ship, Navigation, Environment, Engine, Custom Layout, Off)
　　　　　　├─ Display3 (Fishing, Sailing, *Ship*, Navigation, Environment, Engine, Custom Layout, Off)
　　　　　　├─ Display4 (Fishing, Sailing, Ship, *Navigation*, Environment, Engine, Custom Layout, Off)
　　　　　　├─ Display5 (Fishing, Sailing, Ship, Navigation, *Environment*, Engine, Custom Layout, Off)
　　　　　　├─ Display6 (Fishing, Sailing, Ship, Navigation, Environment, *Engine*, Custom Layout, Off)
　　　　　　└─ Display7 (Fishing, Sailing, Ship, Navigation, Environment, Engine, *Custom Layout*, Off)
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　│
　　　　　　　　　　　　　　　　　　　　　　　　　　Screen division
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　│
　　　　　　　　　　　　　　　　　　　　　　　　　　　Data select
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　│
　　　　　　　　　　　　　　　　　　　　　　　　　　　Category

─ Alarms ─┬─ Buzzer (Short, *Long*, Continuous)
　　　　　　├─ Arrival/Anchor (*Off*, Arrival, Anchor)
　　　　　　├─ XTE (*Off*, On)
　　　　　　├─ SOG (*Off*, Low, High, Within, Outside)
　　　　　　├─ STW (*Off*, Low, High, Within, Outside)
　　　　　　├─ Water Temperature (*Off*, Low, High, Within, Outside, Shear)
　　　　　　├─ Depth (*Off*, Low, High, Within, Outside)
　　　　　　├─ Time (*Off*, On)
　　　　　　├─ Trip (*Off*, On)
　　　　　　├─ Odometer (*Off*, On)
　　　　　　├─ Roll (*Off*, On)
　　　　　　├─ Pitch (*Off*, On)
　　　　　　├─ Low Battery (*Off*, On)
　　　　　　├─ Max True Wind Speed (*Off*, On)
　　　　　　├─ Low True Wind Speed (*Off*, On)
　　　　　　├─ High APP Wind Angle (*Off*, On)
　　　　　　└─ Low APP Wind Angle (*Off*, On)

─ Messages (Currently violated alarms are displayed.)

─ I/O ────┬─ RX Data
　Setup　　├─ CAN bus Devices
　　　　　　├─ Data Source
　　　　　　└─ Wiring Info.

(Continued on next page)

(Continued from previous page)

```
— Pos/TD ——— Display (xx.xxx' , xx' xx.x" , LC TD)
  Setup    ├── Loran C (List of Loran-C chains and pairs of slave stations)
           ├── △TD1 (Offset: -99.9 - +99.9; +0.0)
           └── △TD2 (Offset: -99.9 - +99.9; +0.0)

— Laylines ——— Upwind Angle Display (0 - 90°; 45°)
           ├── Downwind Angle Display (0 - 90°; 30°)
           └── Past Line History (Off, On; 1 - 12min; 6min)

— System ——— Key Beep (Off, On)
         ├── Language (English, Others)
         ├── Units ——————— Depth (m, ft, fa, pb)
         │              ├── Speed (kn, km/h, mph)
         │              ├── Distance (nm, km, sm)
         │              ├── Wind Speed (kn, m/s, mph)
         │              ├── Temperature (°C, °F)
         │              ├── Fuel (l, g)
         │              └── Engine Pressure (bar, psi)
         │
         ├── Offset ——————— Depth (-99.9ft - +99.9ft; 0.0ft)
         │              ├── Wind Angle (-179° - +180°; 0°)
         │              └── Water Temperature (-99.9°F - +99.9°F; 0.0°F)
         │
         ├── Adjustment ——— STW (0.30 - 2.50; 1.00)
         │              └── Wind Speed (0.3 - 2.5; 1.0)
         │
         └── Response ——— Depth (0 - 12s; 3s)
             Time      ├── STW (0 - 12s; 0s)
                       ├── SOG (0 - 12s; 0s)
                       ├── VMG (0 - 12s; 3s)
                       ├── Wind Speed (0 - 12s; 3s)
                       ├── Wind Angle Pointer (0 - 12s; 4s)
                       ├── Heading (0 - 12s; 0s)
                       └── COG (0 - 12s; 0s)
```

(Continued on next page)

(Continued from previous page)

Scale Ranges ——— Speed (0-20kn, *0-40kn*, 0-80kn)
      ├─ Volts (*8-16V*, 16-32V)
      ├─ Engine Speed RPM (*0-4x1000RPM*, 0-6x1000RPM, 0-8x1000RPM)
      ├─ Engine Boost Pressure (*0-30psi*, 0-70psi, 0-150psi, 0-360psi, 0-440psi)
      ├─ Engine Temperature (*150-250°F*, 120-300°F)
      ├─ Engine Oil Pressure (0-30psi, 0-70psi, 0-150psi, 0-360psi, *0-440psi*)
      ├─ Engine Oil Temperature (*150-250°F*, 120-300°F)
      └─ Engine Coolant Pressure (0-30psi, 0-70psi, *0-150psi*, 0-360psi, 0-440psi)

- HDG/COG Ref (True, *Mag*)
- Magnetic Variation (*Auto*, Manual)
- Locked Heading Display (Current Heading, *Locked Heading*)
- Locked Bearing Display (Current Bearing, *Locked Bearing*)
- Time Offset (-14:00 - +14:00; *-8:00*)
- Daylight Saving Time (*Off*, On)
- Time Display (12Hour, *24Hour*)
- Date Display (DD/MMM/YY, *MM/DD/YY*)
- Demo Mode (*Off*, On)
- Self Test (*System Test*, LCD Test)
- Factory Reset (*Off*, On)

# APPENDIX 2 LIST OF TERMS

The following table shows the terms used in the RD-33.

| Term | Meaning |
|------|---------|
| A(ir) Press | Air Pressure |
| Air Temp | Air Temperature |
| APP | Apparent: Aapparent or relative wind. The wind direction relative to the ship's bow and the wind speed relative to the moving vessel. |
| AVG | Average |
| AWA | Apparent Wind Angle |
| AWS | Apparent Wind Speed |
| BFT | Beaufort Wind |
| BRG | Bearing |
| CMG | Course Made Good |
| CNT | Count |
| COG | Course Over the Ground |
| CUR | Current |
| Dest | Destination |
| DIR | Direction |
| DMG | Distance Made Good |
| ETA | Estimated Time of Arrival |
| E Temp | Engine Temperature |
| g | gallon |
| GW | Ground Wind |
| HDG | Heading |
| HUMID | Humidity |
| Info | Information |
| l | liter |
| Lat | Latitude |
| Lon | Longitude |
| M | Magnetic |
| MAX | Maximum |
| min | minute(s) |
| No. | Number |
| Odo | Odometer |

| Term | Meaning |
|------|---------|
| Oil P | Oil Pressure |
| P | Port |
| POSN | Position |
| psi | Pound per square inch |
| RNG | Range |
| ROT | Rate Of Turn |
| RPM | Revolutions Per Minute |
| S | Starboard |
| s | second(s) |
| SAT | Satellite |
| SOG | Speed Over the Ground |
| SPD | Speed |
| STW | Speed Through the Water |
| STWAVG | Speed Through the Water Average |
| STWMAX | Speed Through the Water Maximum |
| T | True: True wind. The wind direction relative to the ship's bow and the wind speed as if the ship is stationary. |
| T | True: True bearing. The bearing measured using true North as the reference direction. |
| TD | Time difference: Position in Loran C |
| Temp | Temperature |
| TWA | True Wind Angle |
| TWS | True Wind Speed |
| VMG | Velocity Made Good |
| WPT | Waypoint |
| W Temp | Water Temperature |
| XTE | Cross-track Error |

# FURUNO

## SPECIFICATIONS OF REMOTE DISPLAY
## RD-33

### 1  GENERAL

| | | |
|---|---|---|
| 1.1 | Display type | 4.3-inch color LCD, 480 x 272 dots (WQVGA) |
| 1.2 | Picture color | 256 colors |
| 1.3 | Display mode | Data, Graph, Graphic |
| 1.4 | Data indication | Ship's speed, Course, Heading, Trip, Depth, Wind direction/speed, Navigate information, Environmental information, Rudder angle, Engine's information |
| 1.5 | Language | Chinese, Danish, English, Finnish, French, German, Greek, Italian, Japanese, Norwegian, Portuguese, Spanish, Swedish, Thai |

### 2  INTERFACE

| | | |
|---|---|---|
| 2.1 | Number of ports | CAN bus: 2 ports, NMEA 0183: 1 port |
| 2.2 | Serial I/O | NMEA0183 Ver3.0 (current loop) |
| | Input data sentences | APB,BWR,BWC,CUR,DBS,DBT,DBK,DPT,GGA,GLC,GLL,GNS, GTD,HDG,HDM,HDT,MTW,MDA,MWV, RMA,RMB,RMC,ROT, RSA,VBW,VHW,VTG,VWR,VWT,XTE,VDR,XTE,ZDA,ZTG |
| | Output data sentences | DPT,HDG,HDT,MTW,MWV,RMC,RSA,VHW,VTG,XTE |
| 2.3 | CAN bus PGN | |
| | Input | 059392/904, 060928, 065286, 126208/992, 127245/250/257/258/488/489/497, 128259/267/275, 129025/029/033/285, 130306/310/311, 130577 |
| | Output | 059392/904, 060928, 126208/464/992/996, 127245/250, 128259/267, 129026/029/283, 130306/311/822 |

### 3  POWER SUPPLY

15 VDC: LEN6 (Connected to CAN bus)
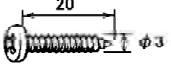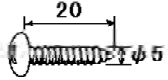
12-24 VDC: 0.2-0.1 A (LEN6) (Not connected to CAN bus)

### 4  ENVIRONMENTAL CONDITION

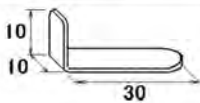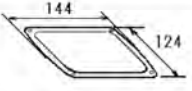| | | |
|---|---|---|
| 4.1 | Ambient temperature | -15°C to +55°C |
| 4.2 | Relative humidity | 93% at 40°C |
| 4.3 | Degree of protection | IP56 |
| 4.4 | Vibration | IEC 60945 |

### 5  UNIT COLOR

N2.5

A-1

**FURUNO**

| CODE NO. | 001-087-240-00 | 20BE-X-9401 -0 |
|---|---|---|
| TYPE | CP20-03310 | 1/1 |

## 工事材料表
### INSTALLATION MATERIALS

GP-33/RD-33

| 番号<br>NO. | 名称<br>NAME | 略図<br>OUTLINE | 型名／規格<br>DESCRIPTIONS | | 数量<br>Q'TY | 用途／備考<br>REMARKS |
|---|---|---|---|---|---|---|
| 1 | +ナベ タッピンネジ 1シュ<br>SELF-TAPPING SCREW | 20<br>φ3 | 3X20 SUS304 | | 4 | |
| | | | CODE NO. | 000-163-884-10 | | |
| 2 | +トラスタッピンネジ 1シュ<br>SELF-TAPPING SCREW | 20<br>φ5 | 5X20 SUS304 | | 4 | |
| | | | CODE NO. | 000-162-608-10 | | |

**FURUNO**

| CODE NO. | 001-087-250-00 | 20BE-X-9501 -1 |
|---|---|---|
| TYPE | FP20-01200 | 1/1 |

## 付属品表
### ACCESSORIES

GP-33/RD-33

| 番号<br>NO. | 名称<br>NAME | 略図<br>OUTLINE | 型名／規格<br>DESCRIPTIONS | | 数量<br>Q'TY | 用途／備考<br>REMARKS |
|---|---|---|---|---|---|---|
| 1 | パネルリムーバー<br>PANEL REMOVER | 10<br>10<br>30 | 19-028-3124-1 | | 1 | |
| | | | CODE NO. | 100-340-471-10 | | |
| 2 | F_MOUNT CUSHION<br>F_MOUNT CUSHION | 144<br>124 | 20-032-1064-1 | | 1 | |
| | | | CODE NO. | 100-357-181-10 | | |

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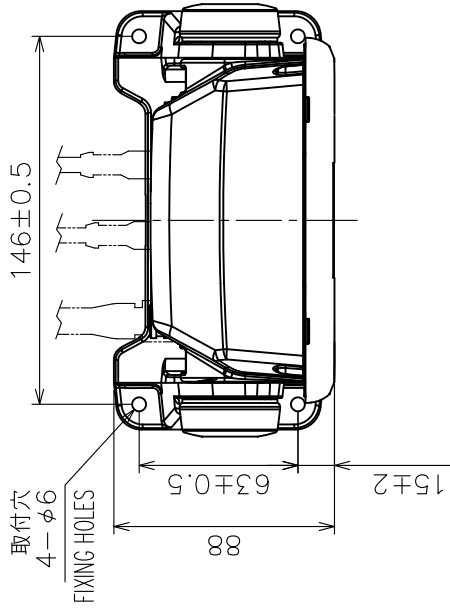　（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）
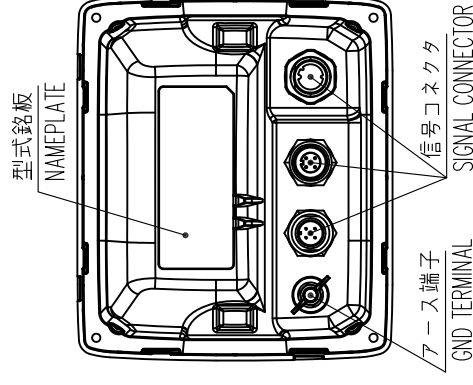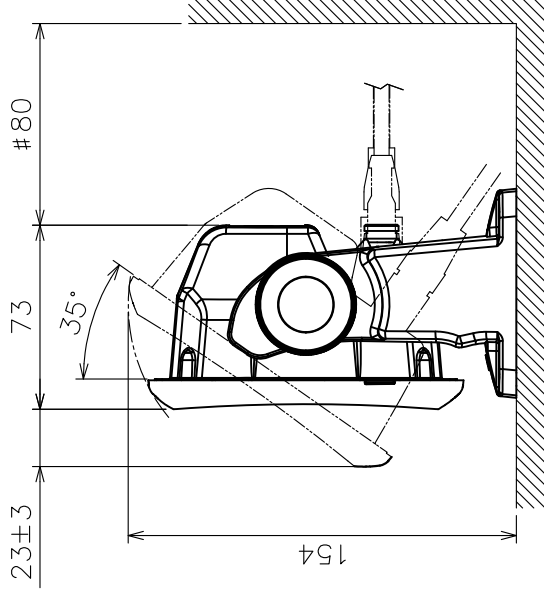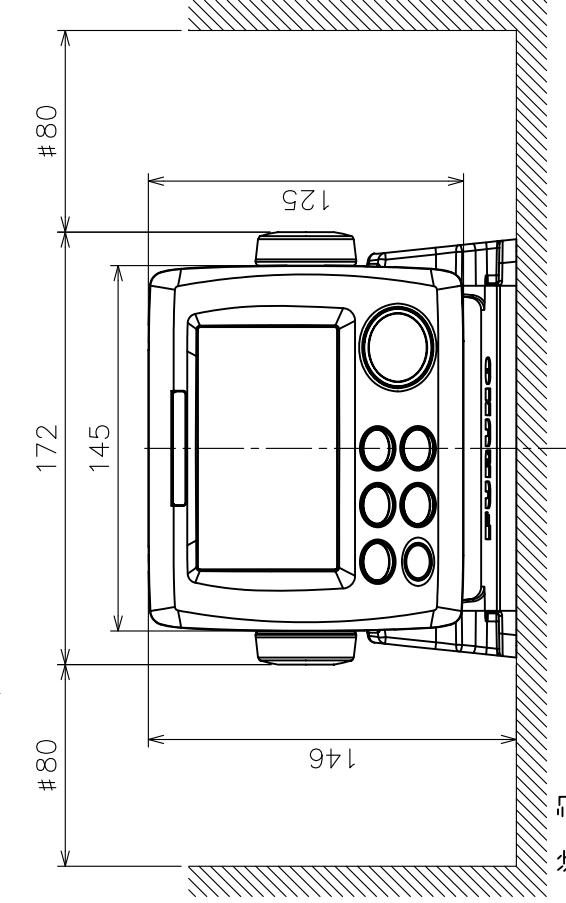
FURUNO ELECTRIC CO ., LTD.

# FURUNO

# FURUNO ELECTRIC CO., LTD.

表 1 TABLE 1

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

型式銘板
NAMEPLATE

信号コネクタ
SIGNAL CONNECTOR

アース端子
GND TERMINAL

取付穴
4－φ6
FIXING HOLES

146±0.5

63±0.5

15±2

88

#80

73

35°

23±3

154

#80

125

172

145

#80

146

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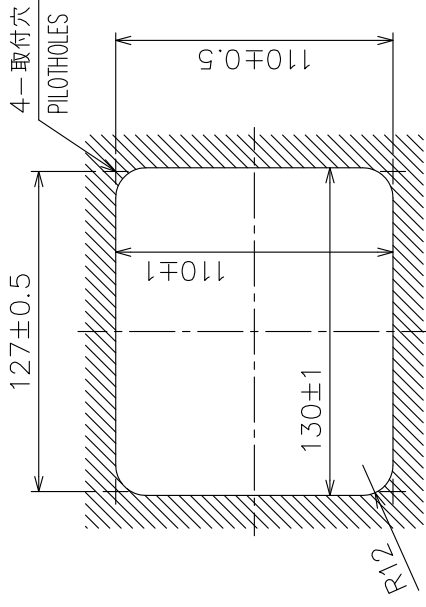2） #印寸法は、最小サービス空間寸法とする。
3） 取付用ネジはトラススタッピンネジ呼び径5×20を使用のこと。

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

| DRAWN | 11/Nov/09 | T.YAMASAKI | | | | TITLE | RD-33 |
|---|---|---|---|---|---|---|---|
| CHECKED | 13/Nov/09 | T.TAKENO | | | | 名称 | リモートディスプレイ（卓上装備） |
| APPROVED | 11/Dec/09 | R.Esumi | | | | | 外寸図 |
| SCALE | | MASS 0.7 | ±10% kg | 質量はケーブルを含みます。<br>MASS W/O CABLE. | | NAME | REMOTE DISPLAY (TABLETOP MOUNT) |
| DWG.No. | C4459-G01-A | | 4 | REF.No. | 26-006-100G-1 | | OUTLINE DRAWING |

FURUNO

取付穴
PILOTHOLES
4-取付穴

110±0.5
127±0.5
110±1
130±1
R12

取付穴寸法図
CUTOUT DIMENSIONS

型式銘板
NAMEPLATE
信号コネクタ
SIGNAL CONNECTOR
アース端子
GND TERMINAL

表1 TABLE 1

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

#80
61
12
#40
125
#40
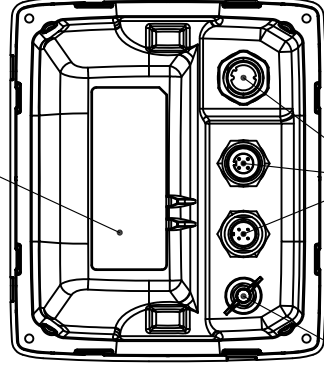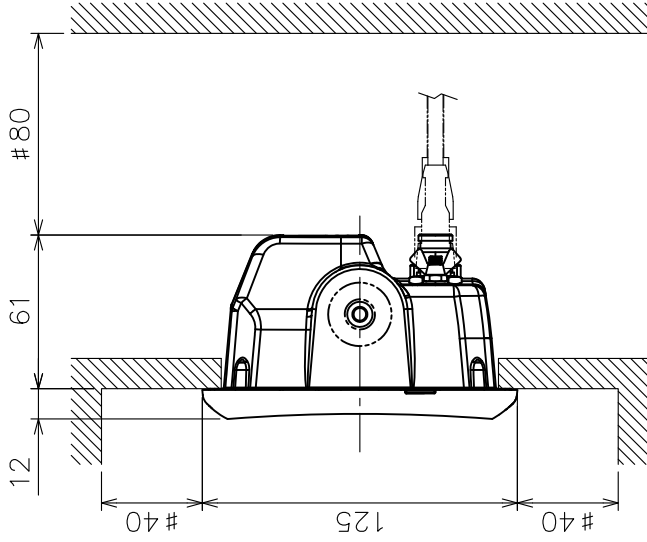
取付穴
4-φ3.5
FIXING HOLES
110
127
145
#40
#40
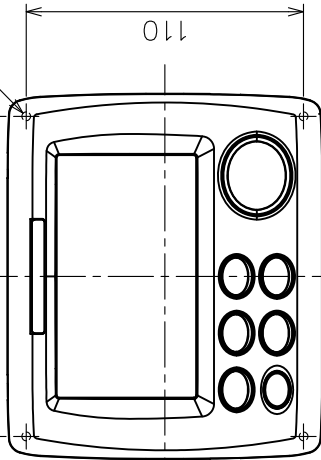
注 記
1) 指定外寸法公差は表1による。
2) #印寸法は、最小サービス空間寸法とする。
3) 取付用ネジはタッピンネジ呼び径3×20を使用のこと。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS φ3x20 FOR FIXING THE UNIT.

| DRAWN | 11/Nov/09 | T.YAMASAKI |
|---|---|---|
| CHECKED | 13/Nov/09 | T.TAKENO |
| APPROVED | 11/Dec/09 | R.Esumi |

TITLE RD-33
名称 リモートディスプレイ（埋込装備）
外寸図
NAME CONTROL UNIT (FLUSH MOUNT)
OUTLINE DRAWING

SCALE  MASS 0.59 kg 質量はケーブルを含みます。
MASS W/O CABLE.
DWG.No. C4459-G02-A
REF.No. 26-006-1110G-1

FURUNO ELECTRIC CO., LTD.

FURUNO ELECTRIC CO., LTD.

FURUNO

航法装置
NAV EQUIPMENT

リモートディスプレイ
REMOTE DISPLAY
RD-33

MJ-A6SPF  MJ-A6SPF0003, 2/5/10/15m, φ6

| NMEA | | |
| J104 | | |
| TD-A | 1 | シロ WHT |
| TD-B | 2 | クロ BLK |
| RD-H | 3 | キ YEL |
| RD-C | 4 | ミドリ GRN |
| NC | 5 | |
| FG | 6 | |

*1
IV-1.25sq.

リモートディスプレイ
REMOTE DISPLAY
RD-33

| CAN bus | SHIELD | J101 |
| | NET-S | |
| | NET-C | |
| | NET-H | |
| | NET-L | |
| 1 | 2 | 3 | 4 | 5 |

| CAN bus | SHIELD | J102 |
| | NET-S | |
| | NET-C | |
| | NET-H | |
| | NET-L | |
| 1 | 2 | 3 | 4 | 5 |

LTW12-05BFFM -SL8000

LTW12-05AMMM -SR7000

リモートディスプレイ
REMOTE DISPLAY RD-33
または OR
ネットワーク機器
NETWORK DEVICE

| CAN bus | SHIELD |
| | NET-S |
| | NET-C |
| | NET-H |
| | NET-L |
| 1 | 2 | 3 | 4 | 5 |

LTW12-05BFFM -SL8000

CAN-BUS NETWORK

T-コネクタ *2
T-CONNECTOR
SS050505-FMF
NC050505-FMF
-TS001 (LIGHT)
-TS001 (HEAVY)

| SHIELD | |
| NET-S | |
| NET-C | |
| NET-H | |
| NET-L | |
| 1 | 2 | 3 | 4 | 5 |

RD-33

| CAN bus | SHIELD | J101 |
| | NET-S | |
| | NET-C | |
| | NET-H | |
| | NET-L | |
| 1 | 2 | 3 | 4 | 5 |

LTW12-05BFFM -SL8000
M12-05BM+05BF. 6m, φ6

Micro-C

| 1 | 2 | 3 | 4 | 5 |

FI-50-CHAIN 0.3m φ6
0.3/1/5/10/20m
*2

選択
SELECT

M12-05BFFM, 1/2/6m, φ6 (*2)
M12-05BM+05BF. 6m, φ6 (*4)
アカ RED
クロ BLK
シロ WHT
アオ BLU

*3
12-24VDC (+)
(-)

同上 DITTO

ジャンクションボックス
JUNCTION BOX
FI-5002 *2

| CN1 12VDC | 1 | (+) |
| | 2 | (-) |
| | 3 | SHIELD |

| CN3 DROP_U | SHIELD | 1 |
| | NET-S | 2 |
| | NET-C | 3 |
| | NET-H | 4 |
| | NET-L | 5 |

| CN3 DROP_L | SHIELD | 1 |
| | NET-S | 2 |
| | NET-C | 3 |
| | NET-H | 4 |
| | NET-L | 5 |

| CN2 BACKBONE_U | SHIELD | 1 |
| | NET-S | 2 |
| | NET-C | 3 |
| | NET-H | 4 |
| | NET-L | 5 |

| CN2 BACKBONE_L | SHIELD | 1 |
| | NET-S | 2 |
| | NET-C | 3 |
| | NET-H | 4 |
| | NET-L | 5 |

| CN4 DROP_U | SHIELD | 1 |
| | NET-S | 2 |
| | NET-C | 3 |
| | NET-H | 4 |
| | NET-L | 5 |

| CN4 DROP_L | SHIELD | 1 |
| | NET-S | 2 |
| | NET-C | 3 |
| | NET-H | 4 |
| | NET-L | 5 |

| CN5 DROP_U | SHIELD | 1 |
| | NET-S | 2 |
| | NET-C | 3 |
| | NET-H | 4 |
| | NET-L | 5 |

| CN5 DROP_L | SHIELD | 1 |
| | NET-S | 2 |
| | NET-C | 3 |
| | NET-H | 4 |
| | NET-L | 5 |

同上 DITTO
同上 DITTO
同上 DITTO

12VDC
FI-5002-POWERCABLE. 2m, シロ WHT
(VV-SA0. 75x2C) クロ BLK

接続箱
JUNCTION BOX
CAN bus NETWORK
(BACKBONE)

接続箱
JUNCTION BOX
CAN bus NETWORK
(BACKBONE)

注記
* 1) 造船所手配。
* 2) オプション。
* 3) CAN busネットワークを使用しないとき。
* 4) コネクタプラグを切断して接続のこと。

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: WHEN CAN bus NETWORK IS NOT USED.
*4: CONNECT WIRES AFTER CONNECTOR PLUG REOVED.

| DRAWN | 25/Dec/09 | T. YAMASAKI |
| CHECKED | 25/Dec/09 | T. TAKENO |
| APPROVED | 21/Jan/10 | R ESumi |
| SCALE | | MASS | kg |
| DWG. No. | C4459-C01- A | REF. No. | 26-002-5000-0 |

| TITLE | RD-33 |
| 名称 | リモートディスプレイ |
| | 相互結線図 |
| NAME | REMOTE DISPLAY |
| | INTERCONNECTION DIAGRAM |

A

B

C

1    2    3    4

# INDEX

This page is intentionally left blank .