FURUNO

INSTRUCTION MANUAL

SETTING AND ADJUSTMENTS

Model **FMD-3200/3200-BB/3300**

FCR-2119-BB/2129-BB/2139S-BB/

2819/2829/2839S/2829W/2839SW

This manual is solely for use by the installer. Under no circumstances shall this manual be released to the user.

The installer shall remove this manual from the vessel after installation.

This manual contains no password data. Obtain password data from FURUNO before beginning the installation.

FURUNO ELECTRIC CO., LTD.

INTRODUCTION

This manual shows how to setup ECDIS and chart radar after the installation. After setting, make a backup copy of configuration data onto a medium (PC, etc.).

Preparation

- PC (for the LAN connection)
- LAN cable

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1. INITIAL SETTING AND ADJUSTMENT

This chapter shows you how to enter the initial settings for the processor unit (EC-3000) of ECDIS and chart radar after the installation.

Each unit has a default IP address. Enter the initial settings (Equipment ID setting) and change the IP address on the [Basic Setting] menu (see section 1.2.), before connecting each unit and building the network. After entering the equipment ID(s), build the network and enter other settings. You can enter the settings of each unit all at one time by building the network.

1.1 How to Access the Common Installation Settings Menu

The initial settings for the ECDIS and chart radar are performed on the [Common Installation Setting] menu. The [Common Installation Setting] menu works with a web browser.

Note: For the "Firefox" browser, use the version 12.0 or after.

Access the common installation setting menu by either of the two methods shown below.

- Access on a laptop PC (LAN connection). See section 1.1.1.
  Note: To update the software (see section 1.11.), access the [Common Installation Setting] menu on a laptop PC (LAN connection).
- Access with the control unit RCU-024/025/026. See section 1.1.2.

1.1.1 How to access on the laptop PC (LAN connection)

1. Set the IP address and subnet mask of the PC according to the LAN port where the PC is connected.
   Note: For the sensor adapter, use the LAN2 port (sensor network).

| LAN port	IP address/ Subnet mask	Setting value
LAN1 (Gateway network)	IP address	192.168.31.200
	Subnet mask	255.255.255.0
LAN2 (Sensor network)	IP address	172.31.16.200
	Subnet mask	255.255.0.0

2. Connect the PC to the LAN1 or LAN2 port of the processor unit with a LAN cable.
   Note: It is possible to connect to the LAN1 or LAN2 port via a LAN hub. However, to operate from the [Basic Setting] menu, turn off all units except the unit to be set. Enter settings to processor units one by one.

3. Activate the web browser on the PC.

4. Enter the IP address on the address bar on the browser referring to the following table.

	Access point	Type	IP address
For the initial setting.	Gateway Network	ECDIS	192.168.31.66
		Chart radar	192.168.31.31
	Sensor Network	ECDIS	172.31.17.58
		Chart radar	172.31.16.21
For re-setting the unit	Gateway Network	ECDIS Chart radar	Enter the IP address of the gateway or sensor network according to the Equipment ID used in the system. See the Equipment ID list at the back of this manual.

When entering the IP address on the address bar, you are asked to enter ID and password.
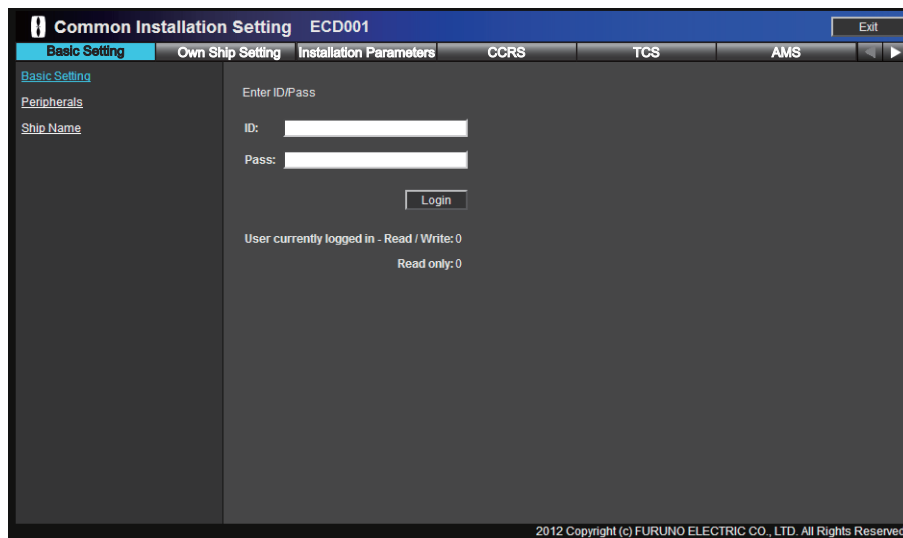
5. Enter the ID and password correctly to access the [Common Installation Setting] menu.

1.1.2 How to access with the control unit RCU-024/025/026

1. Click [ ] on the status bar then select [Settings]. The pop-up message shown below appears.

2. Click [OK] to show the [Settings] menu.

3. Click [SERVICE MODE] on the status bar, and then select [Service Login].
A dialog box for entry of password appears.

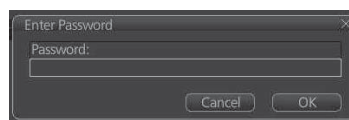4. Enter the password and click [OK]. [Service Mode] is shown at the bottom left position of the [Settings] window.
    For RCU-024: Use the keyboard on the control unit to enter the password.
    For RCU-025/026: Use the software keyboard on the display to enter the password.

5. Click [SERVICE MODE] on the status bar, and then select [Common Installation Setting] The message shown below appears.
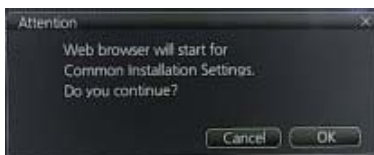
6. Click [OK] to activate the web browser and show the dialog box asking for ID and password.
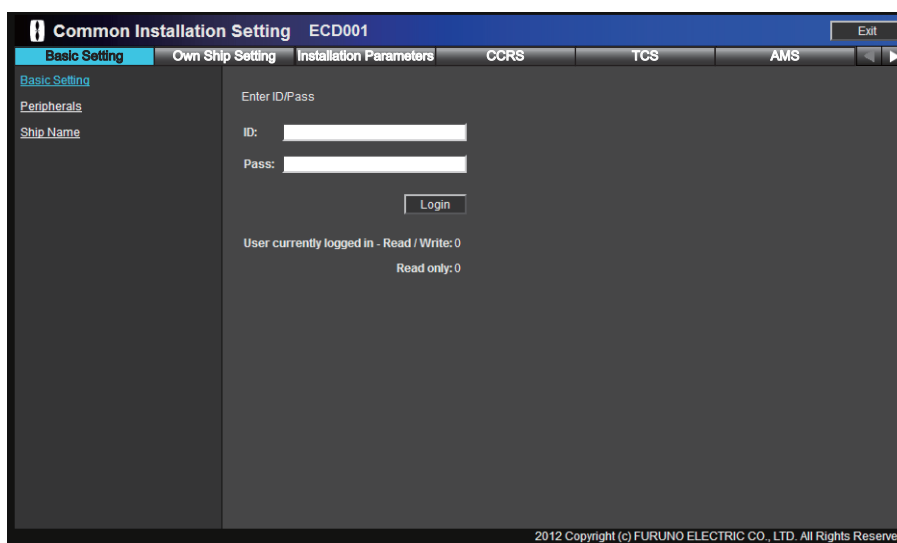
7. Enter the ID and password to access the common installation setting menu.

1.1.3 Contents of the common installation setting menu

Note: Click [Exit] to close and logout the [Common Installation Setting] menu. You can close and logout by clicking ⊠ on the web browser. However the menu can not be re-accessed for a while.

The selected tab is highlighted in blue on the tab bar. The view area and menu bar change according to the tab selected.

Click [◀ (or ▶)] at the tab bar to shift the tab to the left (or right).
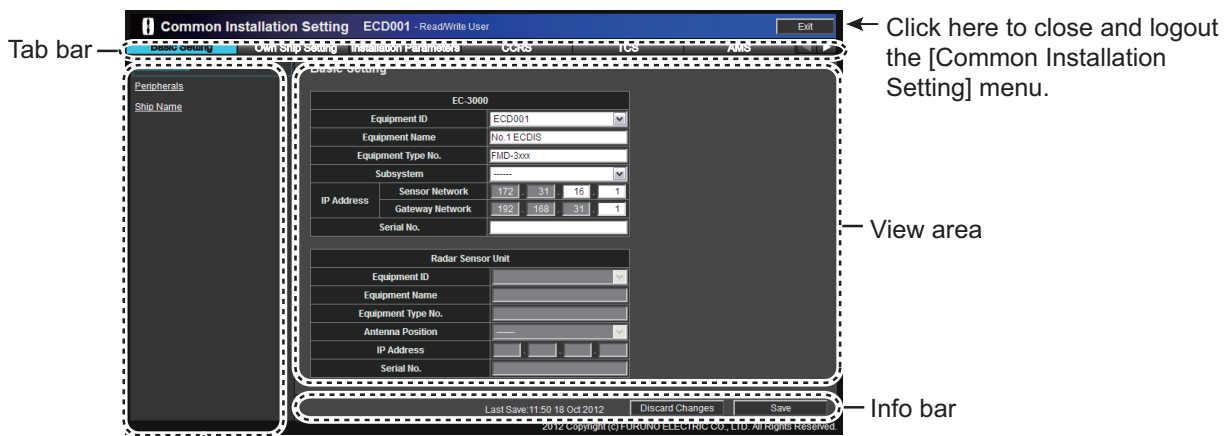
Note: When the tab is not shifted (by clicking [◀ (or ▶)]), clear the browser's cashe.
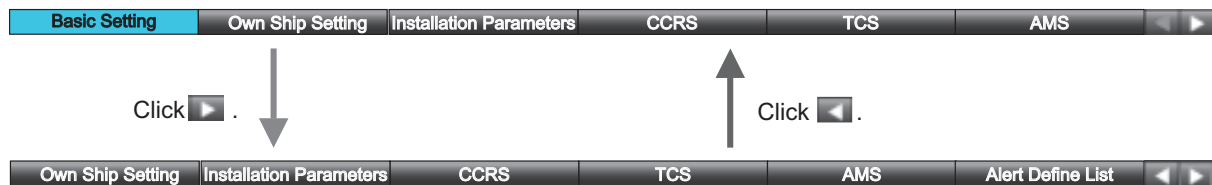
Tab name	Feature
Basic Setting	Sets the Equipment ID, monitor, printer, and own ship information.
Own Ship Setting	Enters the ship's parameter and sensor position.
Installation Parameters	Sets the system configuration and input/output data.
CCRS	Sets the priority of the sensors and NMEA sentences.
TCS	Sets the TCS. The TCS menu is shown for the ECDIS.
AMS	The AMS menu is not used.
Alert Define List	Sets the alerts.
Data Sharing*	Sets the interlocking system between units.
Save and Sync	Save and synchronize the settings. You can save settings to a medium.
Radar Installation*	Sets the radar installation parameters. The [Radar Installation] menu is shown for the chart radar.
System Monitor	Confirms the system condition.
Software Update	Updates the software.
Factory Test and Default	Performs the factory test; restores the default settings.
Conning	Configures the layout and data to show on the conning display.

*: Adjustment not required.

1.2 Basic Setting Menu

1. Access the [Common Installation Setting] menu and click [Basic Setting] on the tab bar.
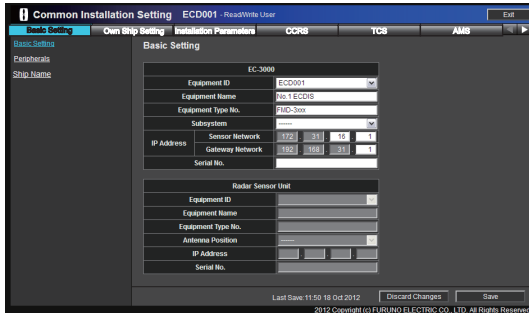
[Basic setting] menu
(ECDIS)
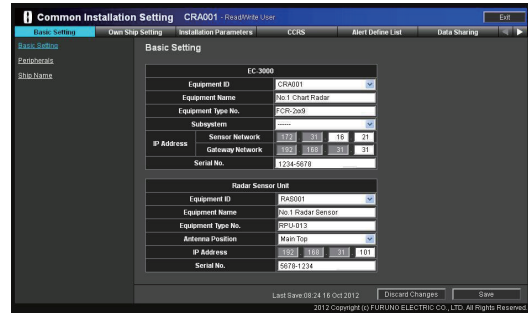
[Basic setting] menu
(char radar)

2. Select the Equipment ID of the processor unit from the [Equipment ID] pull-down list.
For the ECDIS: Setting range: "ECD001" to "ECD016"
For the chart radar: Setting range: "CRA001" to "CRA004". Do not select "CRA005" to "CRA010".
The [Equipment Name], [Equipment Type No.], and [IP Address] are automatically entered according to the Equipment ID. For details, see the Equipment ID list is at the back of this manual.
Note 1: For the first ECDIS, set [Equipment ID] to "ECD001". For the first chart radar, set [Equipment ID] to "CRA001".
Note 2: Assign a different Equipment ID to each processor unit.
Note 3: [Serial No.] is entered before shipment. If you delete [Serial No.] by mistake, click the box of [Serial No.] to enter the serial number of the processor unit (example: xxxx-xxxx).

3. Rename [Equipment Type No.] according to the type referring to the table as shown below.

Equipment Type No.	Type
FMD-3200	ECDIS, MU-190
FMD-3300	ECDIS, MU-231
FCR-2119	Chart radar, X-band, 12 kW, MU-190
FCR-2129	Chart radar, X-band, 25 kW, MU-190
FCR-2139S	Chart radar, S-band, 30 kW, MU-190
FCR-2819	Chart radar, X-band, 12 kW, MU-231
FCR-2829	Chart radar, X-band, 25 kW, MU-231
FCR-2839S	Chart radar, S-band, 30 kW, MU-231
FCR-2829W	Chart radar, X-band, 25 kW, MU-231, TR-down
FCR-2839SW	Chart radar, S-band, 30 kW, MU-231, TR-down

4. Set [Subsystem] to disconnect the sensor network between the units that comprise the network.
When disconnecting the sensor network: Set the value. Setting range: "A" to "Z".
Do not disconnect the sensor network: Keep the default setting ("---").

5. **For the chart radar**, select the Equipment ID of the radar processor unit from the [Equipment ID] pull-down list. Setting range: RAS001 (default setting), RAS002, RAS003, RAS004. Do not set to "RAS005" to "RAS010". **For the ECDIS**, go to step 8.

    The [Equipment Name], [Equipment Type No.], and [IP Address] are automatically entered according to the Equipment ID.

    Note: If "RPU-xxx" is entered to the [Equipment Type No.] automatically, change "RPU-xxx" to "RPU-013".

6. **For the chart radar**, select the antenna position from the [Antenna Position] pull-down list.

    Settings: Fore, Main Top, Main 2nd, Main 3rd, Aft, Port, Starboard.

7. **For the chart radar**, click the box of [Serial No.] to enter the serial number of the radar processor unit (example: xxxx-xxxx).

8. After entering the settings, click [Save] on the info bar. The system is rebooted automatically to save the configuration.

    To discard all changes, click [Discard Changes].

9. After the system reboot is completed, open the [Basic Setting] menu.

10. Click [Peripherals] on the menu bar.
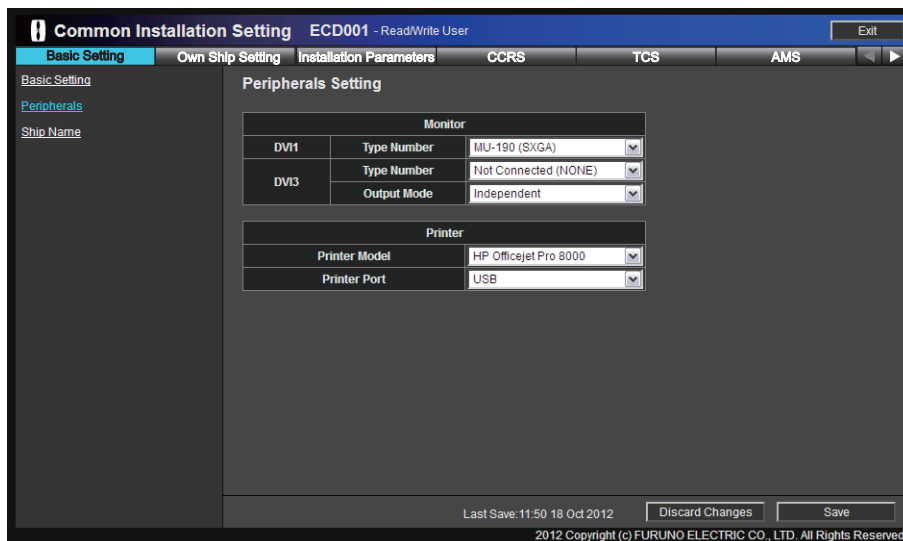
11. Select the monitor type connected to the DVI1 port from the [Type Number] pull-down list of DVI1.

    Note 1: For FCR-2xx9, do not select the options other than [MU-190 (SXGA)] or [MU-231 (UXGA)].

    Note 2: The DVI2 port outputs the display data same as the data of DVI1 port.

12. Select the monitor type connected to the DVI3 port from the [Type Number] pull-down list of DVI3.

    When the processor unit is not connected to the VDR or you do not use the dual display, select [Not Connected (NONE)].

13. For the dual display or VDR connection, select the display data to output from the DVI3 port from the [Output Mode] pull-down list. For the single display ECDIS or chart radar, go to the next step.

Setting option	Remarks
Clone	Outputs the display data same as the data of DVI1 port. For the ECDIS, the DVI1 port can switch the ECDIS and Conning display data. **Note:** When the chart radar is connected to a VDR, it is required to set to [Clone].
Independent	The DVI3 port outputs the conning display data. **Note:** Do not set to [Independent] in case of the chart radar.

14. Select the type of the printer from the [Printer Mode] pull-down menu.

Setting option	Remarks
HP Officejet Pro 8000	Connect the HP Officejet Pro 8000/8100 to LAN1 port or USB port, and then set the IP address of the printer to "192.168.31.241". For how to set the IP address of the printer, see the operator's manual of the printer.
HP Officejet Pro 8100	
HP Officejet 100 Mobile	Connect the HP Office jet 100 Mobile to the USB port of the processor unit.

Note: For no printer, set [Printer Mode] to [HP Officejet 100 Mobile].

15. Select the port that connects the printer from the [Printer Port] pull-down list.

Printer	Printer Port
HP Officejet 100 Mobile/Not Connected	USB
HP Officejet Pro 8000/HP Officejet Pro 8100	USB, Network

USB: Only the processor unit connected to the printer can print.

Network: The IP address of the printer is shown on the [Printer] screen.

Printer		
Printer Model	HP Officejet Pro 8000	
Printer Port	Network	
IP Address	192 . 168 . 31 . 241	

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16. Click [Ship Name] on the menu bar.
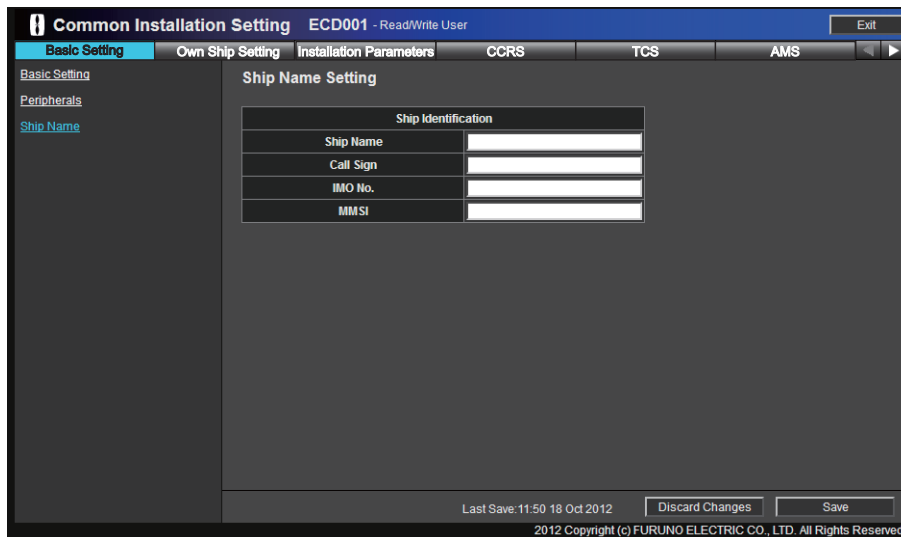
17. Enter your ship information. The data entered here is included in any printing.
Ship Name: Own ship's name.
Call Sign: Own ship's call sign
IMO No.: Own ship's IMO no.
MMSI: Own ship's ID
Note: ECDIS and chart radar can display own ship's data input from AIS, on the [Own Ship] page in the [Nav Status] menu. The data entered here is not reflected to the AIS data.

18. After entering the setting, click [Save] on the info bar. The system is rebooted automatically to save the configuration changes.
Note: If the monitor does not display images correctly after system reboot, reboot the monitor.

1.3 Own Ship Setting

Enter the information for ship parameters/CCRP, radar antenna, GPS sensor, AIS transponder, echo sounder (E/S), and SDME sensor. As for the symbol for sensors, there are six colors to show the priority: white (CCRP), cyan (radar), green (GPS), magenta (AIS), orange (E/S) and blue (SDME) in that order.
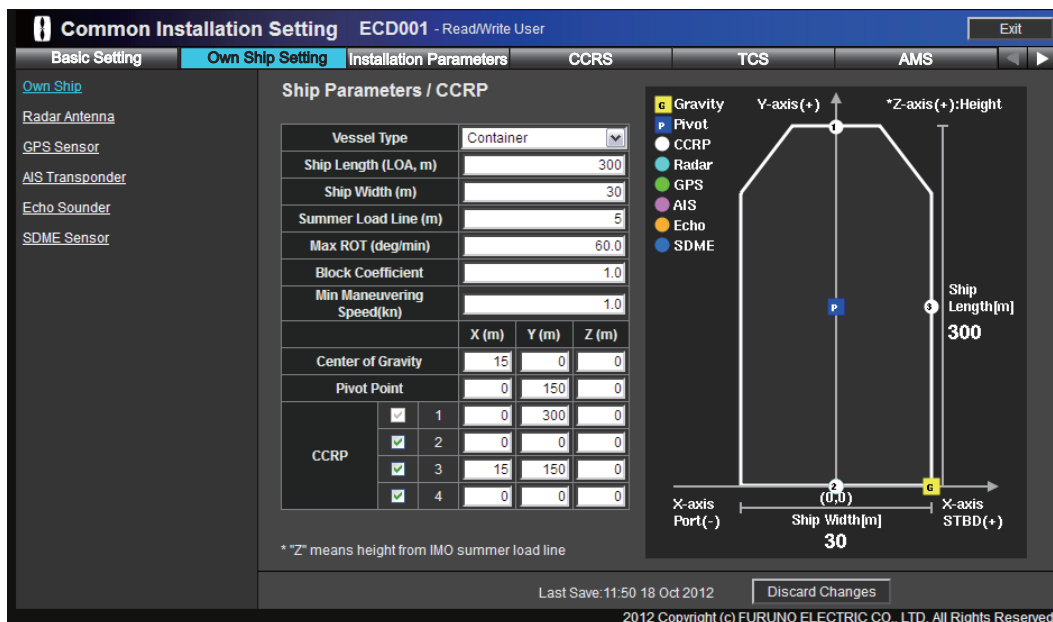
1. Access the [Common Installation Setting] menu and click [Own Ship Setting] on the tab bar.

2. Select the vessel type from the [Vessel Type] pull-down list.

3. Click the box of [Ship Length (LOA, m)] to enter own ship's length.

4. Click the box of [Ship width (m)] to enter own ship's width.

5. Click the box of [Summer Load Line (m)] to enter the distance between ship's bottom and the summer load line.

6. Click the box of [MAX ROT (deg/min)] to enter the max angular velocity.

7. Click the box of [Block Coefficient] to enter own ship's block coefficient.

8. Click the box of [Min Maneuvering Speed (kn)] to enter own ship's minimum maneuvering speed.
   The TCS is available when the vessel cruise at the setting speed or more. Also, the setting value is used for the threshold value of the "Low Speed Alarm".
   Note: Keep in mind the performance of the autopilot to set the own ship's minimum maneuvering speed.

9. Enter the gravity center of own ship in the boxes [X (m)], [Y (m)], and [Z (m)].

10. Enter the pivot point of own ship in the boxes [X (m)], [Y (m)], and [Z (m)].
    Approx. 80% of the ship's length is recommended for the pivot point of the ship. For example, the ship's length is 350 m, enter "280 m" to [Y (m)]. For TCS, the XTE is calculated on the value set at here.

11. Check the checkbox to activate the CCRP and enter the position data.
    You can enter up to 4 CCRP position data.
    Note: It is required to activate "CCRP1" and enter the position data.

12. Click [Radar Antenna] on the menu bar.
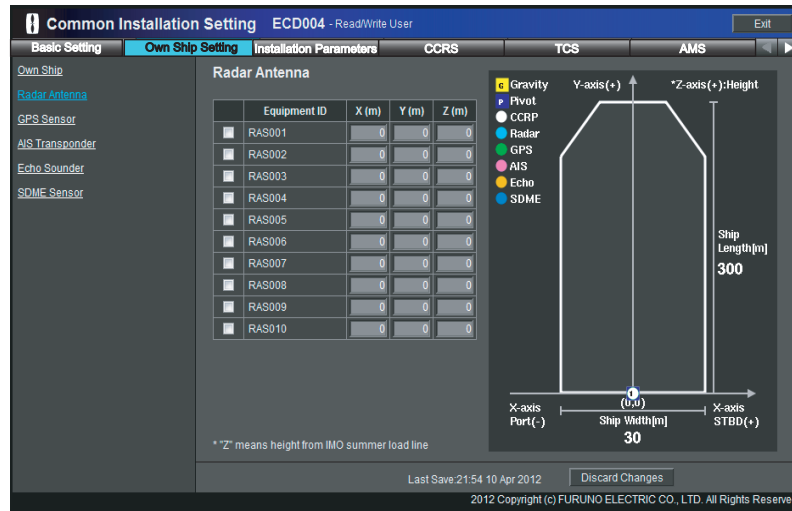
Note: When you set the value for [Antenna Position] on the [Basic Setting] menu, the setting value is shown at the left of [Equipment ID].

13. According to the number of radar antennas connected to the processor unit, check applicable checkbox to activate, and then enter the position data to the boxes [X (m)], [Y (m)], and [Z (m)].
For the chart radar, the value of [Z (m)] is reflected in the default setting on [MENU]→[1 CUSTOMIZE ECHO]→[9 CONDITION]→[2 STC ANT HEIGHT].
You can enter up to four radar antenna position data. Setting range: "RAS001" to "RAS004". Do not select "RAS005" to "RAS010".
Setup the radar antennas activated here on the [Installation Parameters] menu.

14. Enter the information for the GPS sensor, AIS transponder, echo sounder, and SDME sensor similarly.
Note: For the chart radar, "RAS001" (radar antenna), "GPS001" (GPS sensor), "AIS001" (AIS transponder), and "LOG001" (SDME sensor) are activated by default. Enter their position data.

1.4 Installation Parameters Menu

The [Installation Parameters] menu sets the signals and input data of the sensors. First, select the sensor data at the [Sensor Setting] window. Then select the sensor from which the units (radar sensor, MFD, ECDIS, radar, chart radar, and sensor adapter) obtain the sensor data.

Note: To save the configuration of the units, do the consistency check and then save the configuration data on the [Save and Sync] menu.

1.4.1 Sensor setting

1. Access the [Common Installation Setting] menu and click [Installation Parameters] on the tab bar.

2. Click [Sensor Setting] on the menu bar, then click [GPS Sensor].
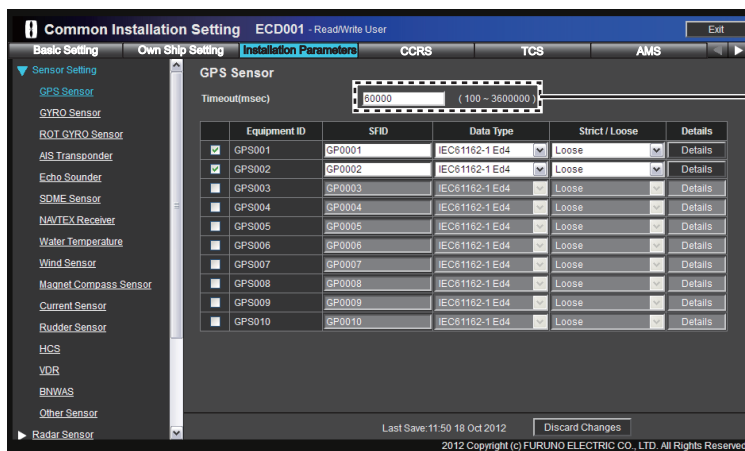
The time to timeout for receiving data. Keep the dafault setting.

3. Check applicable check boxes according to the number of GPS receivers connected.

4. Set the following items for the units activated at step 3.

Item	Remarks
SFID	Keep the default setting.
DATA Type	Sets the RX sentence data format. Setting options: [IEC 61162-1 Ed3], [IEC 61162-1 Ed4], [ASCII], [BINARY]. Do not select [ASCII] or [BINARY].
Strict/Loose	Sets the integrity of sentence data. [Strict]: Confirm the validity of checksum, then receive sentence. [Loose]: Receive sentence regardless of checksum invalidity.
Details	When the default setting of [Type No.] is different from the type no. of the connected equipment, enter the type no. of the connected equipment. For other setting options ([Sensor Name], [System Alert ID], and [Subsystem]), keep the default setting.

5. Set [Gyro Sensor], [ROT GYRO Sensor], [AIS Transponder], [Echo Sounder], [SDME Sensor], [NAVTEX Receiver], [Water Temperature], [Wind Sensor], [Magnet Compass Sensor], [Current Sensor], [Rudder Sensor], [HCS], [VDR], [BNWAS], and [Other Sensor] similarly.
    Note: Set only the sensors connected to each processor unit.
    For the chart radar, the default sensor unit settings are shown below.

Sensor	Equipment ID
GPS Sensor	GPS001
Gyro Sensor	GYO001
ROT GYRO Sensor	-----
AIS Transponder	AIS001
Echo Sounder	-----
SDME Sensor	LOG001
NAVTEX Receiver	-----
Water Temperature	-----
Wind Sensor	-----
Magnetic Compass Sensor	-----
Current Sensor	-----
Rudder Sensor	-----
HCS	-----
VDR	-----
BNWAS	-----
Other Sensor	-----

1.4.2 Processor unit configuration

1. Select [ECDIS] or [Chart Radar] on the menu bar.
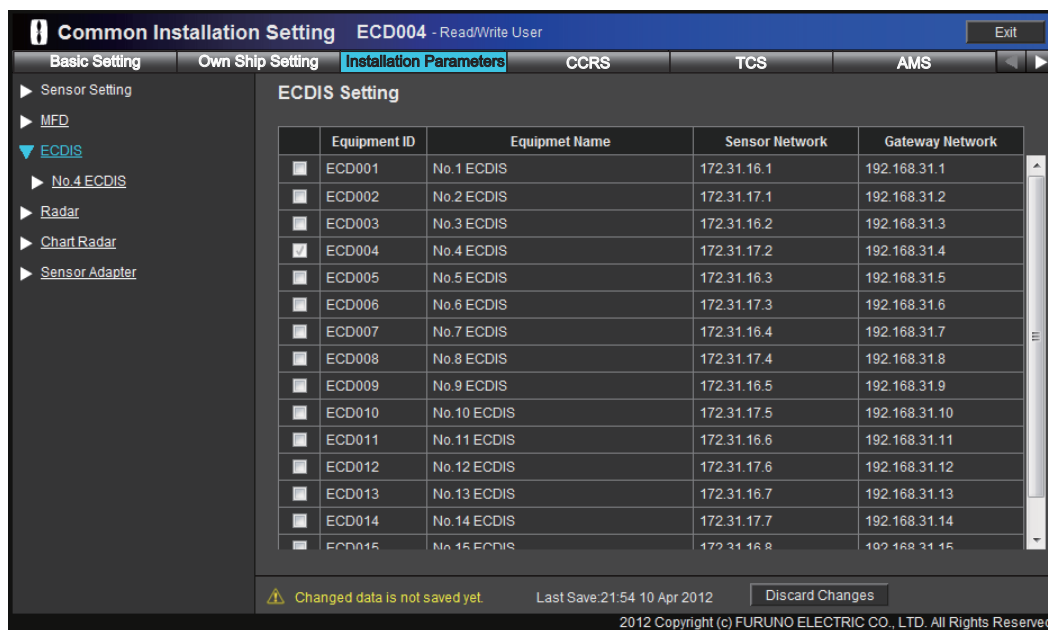
2. Check applicable checkbox to activate the corresponding processor unit. The Equipment ID checked on this step is shown on the menu bar.
   Each processor unit of ECDIS and chart radar has eight serial input/output, one digital input and four digital output ports.
   The maximum number of processor units that can be connected is shown below.
   Note: Do not check processor units not used, to prevent trouble. Check only the processor units to be used.

Combination	The number of processor units (ECDIS)	The number of processor units (chart radar)	Total
Only ECDIS	16	-	16
ECDIS + Chart radar	8	4	12
Only Chart radar	-	4	4

3. Click [Serial Input/Output] of [No.1 ECDIS] or [No.1 Chart Radar] on the menu bar.

"Serial 01" and "Serial 02" can input/output at 38,400 bps. For the high-speed signal input such as AIS and Gyro, click [Details] to set the baud rate as 38,400 bps. The connector no. on the I/O board of the processor unit EC-3000 and the corresponding serial port no. are shown below.

Connector No.	Serial Port No.	Connector No.	Serial Port No.
J3	Serial 01	J7	Serial 05
J4	Serial 02	J8	Serial 06
J5	Serial 03	J9	Serial 07
J6	Serial 04	J10	Serial 08

4. Check the applicable checkboxes of [Serial No.] according to sensor connection.

5. Set the items referring to the table shown below.

Item	Remarks
Equipment ID	Select the Equipment ID from the pull-down list. The pull-down list options depend on the setting at [Sensor Setting].
Details	Confirms and sets the serial communication format. For the high-speed signal input such as AIS and Gyro, set the baud rate as 38,400 bps.
I/F monitor	Click [Start] to monitor the input signal sentences from the interface.
Output	Sets the output sentence formats from the serial port. **Note 1:** The ECDIS and chat radar can send NAV STATUS (ship's condition) and messages to an AIS transponder. Output the sentences VSD, ABM, and BBM, when an AIS transponder is connected. **Note 2:** Check the checkbox of "Output sentence whose destination corresponds with this sensor." to output the ACK sentence in response to the ALR sentence from the external sensor.
Filter	Activates or deactivates the input sentence filter.

6. Click [Digital Input] of [No.1 ECDIS] or [No.1 Chart Radar] on the menu bar.

7. Check the checkbox of [Channel No.].

8. Set the items referring to the table shown below.

Item	Remarks
Sensor Name	Enter an appropriate name that indicates sensor function.
Data Type	Sets the contact input. Setting range: NO (Normal Open), NC (Normal Close).
Data Category	Sets the data category. Settings: ALERT, ACK, BUZZER STOP, OPERATOR FITNESS, OTHER.
Details	Enter the interval to monitor the digital input to [Control Interval (sec)]. Setting range: 1 to 10 (sec). For other setting options ([Sensor Type No.], [Data name], and [Calibration Active]), keep the default settings.

9. Click [Digital Output] of [No.1 ECDIS] or [No.1 Chart Radar] on the menu bar.

10. Check the checkbox of [Channel No.].

11. Set the items referring to the table shown below.

Item	Remarks
Sensor Name	Enter an appropriate name that indicates sensor's function.
Data Type	Keep the default setting.
Data Category	Sets the data category. Settings: ALERT, ACK, BUZZER STOP, OPERATOR FITNESS, OTHER, TRANSFER.
Details	Enter the interval to monitor the digital output to [Control Interval (sec)]. Setting range: 1 to 10 (sec). For other setting options ([Sensor Type No.], [Data name], and [Calibration Active]), keep the default settings.

The pin no. of J11 on the I/O board of the processor unit and the corresponding input/output channel no. are shown below.

Pin No.	Direction	Channel No.	Contact Status
5, 6	Output	Channel 01	Normal Close
7, 8	Output	Channel 02	Normal Close
9, 10	Output	Channel 03	Normal Open
11, 12	Output	Channel 04	Normal Open
15, 16 or 14, 15	Input	Channel 01	Depended on the configuration.

12. Repeat the procedures from step 3 to enter the settings to another processor unit.

1.4.3 Sensor adapter configuration

A maximum of eight sensor adapter MC-3000S can be connected to the sensor network. In case of the redundant configuration, sixteen sensor adapters can be connected to the network. The MC-3000S can connect a max. ten additional units (MC-3010A/3020D/MC-3030D). Note that a maximum of five MC-3010A can be connected to MC-3000S.

1. Click [Sensor Adapter] on the menu bar.
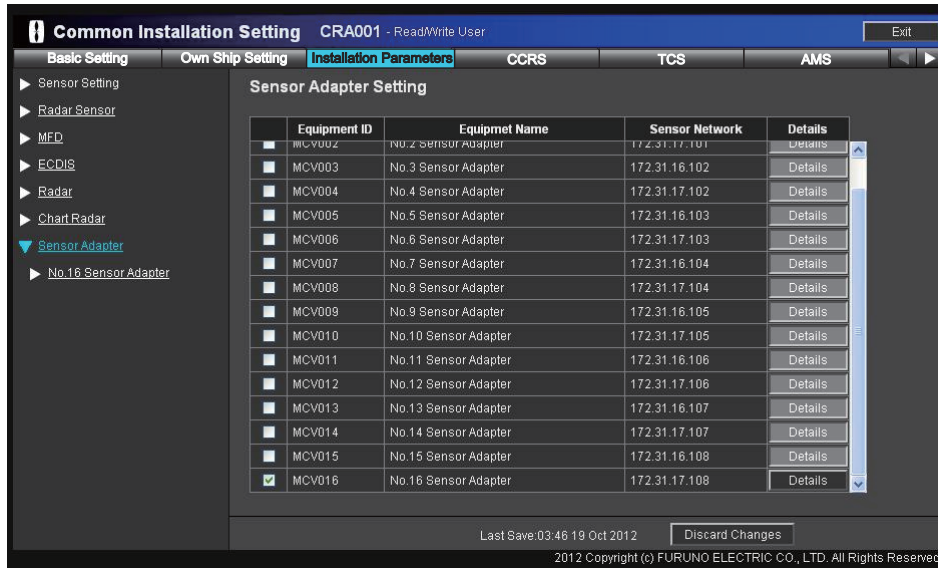
2. Check the check box of [MCV001] to activate.
    Note: For the ECDIS, [MCV016] is checked by default. If there is no No.16 sensor adapter, uncheck the box of [MCV016].

3. Click [Details] to display the window as shown below.
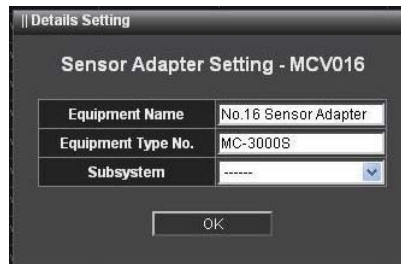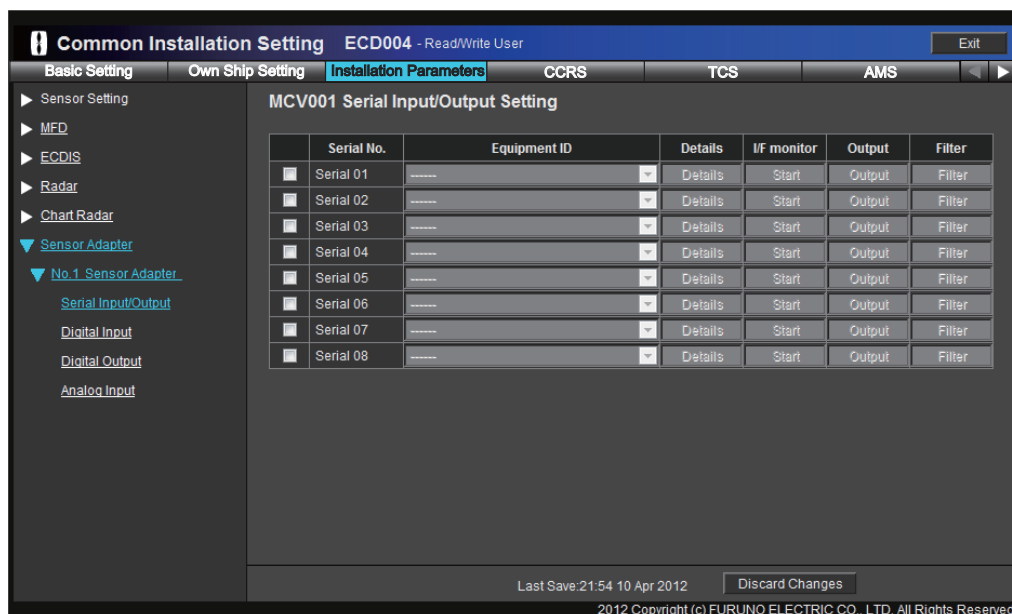

[Equipment ID]: Keep the default setting. [No.1 Sensor Adaptor] to [No.16 Sensor Adaptor] is shown in this field.
[Equipment Type No.]: Keep the default setting.
[Subsystem]: When disconnecting the sensor network: Set the value. Setting range: "A" to "Z". Do not disconnect the sensor network: Keep the default setting ("---").

4. Click [No.1 Sensor Adapter] on the menu bar.

The sensor adapter consists of four sub units: Serial Input/Output, Digital Input, Digital Output, and Analog Input.

5. Click [Serial Input/Output]. There are eight ports in the Serial Input/Output. "Serial 01" to "Serial 04" can input/output at 38,400 bps for the AIS and Gyro.
The connector no. on the MC-3000S board and the corresponding serial port no. are shown below.
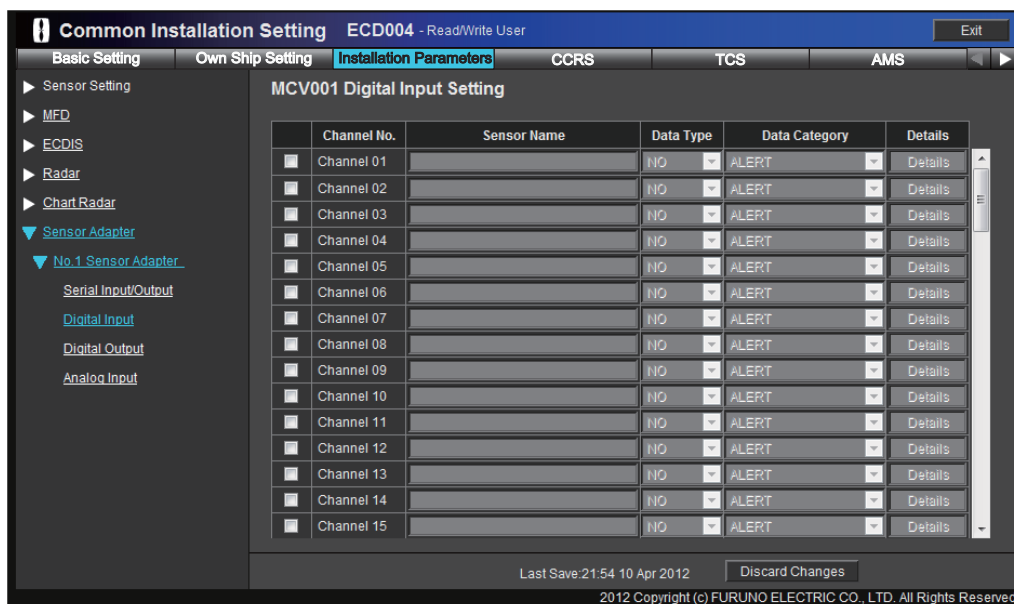
Connector No.	Serial Port No.	Connector No.	Serial Port No.
J4	Serial 01	J8	Serial 05
J5	Serial 02		Serial 06
J6	Serial 03	J9	Serial 07
J7	Serial 04		Serial 08

6. Set the items referring to the table shown below.

Item	Remarks
Equipment ID	Select the Equipment ID from the pull-down list. The pull-down list options change according to the setting at [Sensor Setting].
Details	Confirms and sets the serial communication format. For the high-speed signal input such as AIS and Gyro, set the baud rate as 38,400 bps.
I/F monitor	Click [Start] to monitor the input signal sentences from the interface.
Output	Sets the output sentence formats from the serial port. **Note 1:** The ECDIS and chart radar can send NAV STATUS (ship's condition) and messages to an AIS transponder. Output the sentences VSD, ABM, and BBM, when an AIS transponder is connected. For example, when No.1 and No.2 ECDIS send NAVSTATUS and message to the AIS transponder, enter the settings as shown below. **Note 2:** Check the checkbox of "Output sentence whose destination corresponds with this sensor." to output the ACK sentence in response to the ALR sentence from the external sensor.
Filter	Activates or deactivates the input sentence filter.

7. Click [Digital Input] on the menu bar.

"Channel 01" to "Channel 80" are shown on the display. Each sensor adapter MC-3020D has eight input ports. When one sensor adapter MC-3020D is connected to the MC-3000S, "Channel 01" to "Channel 08" can be used. When ten sensor adapters MC-3020D are connected, "Channel 01" to "Channel 80" can be used. The connector no. on the MC-3020D board and the corresponding serial port no. are shown below.

No.1 sensor adapter MC-3020D

Connector No.	Serial Port No.	Connector No.	Serial Port No.
J3	Serial 01	J5	Serial 05
	Serial 02		Serial 06
J4	Serial 03	J6	Serial 07
	Serial 04		Serial 08

No.2 sensor adapter MC-3020D

Connector No.	Serial Port No.	Connector No.	Serial Port No.
J3	Serial 09	J5	Serial 13
	Serial 10		Serial 14
J4	Serial 11	J6	Serial 15
	Serial 12		Serial 16

8. Check the checkbox of [Channel No.] to set the items referring to the table shown below.

Item	Remarks
Sensor Name	Enter an appropriate name that indicates sensor's function.
Data Type	Sets the contact input. Settings: NO (Normal Open), NC (Normal Close).
Data Category	Sets the data category. Setting range: ALERT, ACK, BUZZER STOP, OPERATOR FITNESS, OTHER.
Details	Enter the interval to monitor the digital input to [Control Interval (sec)]. Setting range: 1 to 10 (sec). For other setting options ([Sensor Type No.], [Data name], and [Calibration Active]), keep the default settings.

9. Click [Digital Output] on the menu bar.
    "Channel 01" to "Channel 80" are shown on the display. Each sensor adapter MC-3030D has eight input ports. When one sensor adapter MC-3030D is connected to the MC-3000S, "Channel 01" to "Channel 08" can be used. When ten sensor adapters MC-3030D are connected, "Channel 01" to "Channel 80" can be used.

    The connector no. on the MC-3030D board and the corresponding serial port no. are shown below.

No.1 sensor adapter MC-3030D

Connector No.	Serial Port No.	Connector No.	Serial Port No.
J3	Serial 01	J5	Serial 05
	Serial 02		Serial 06
J4	Serial 03	J6	Serial 07
	Serial 04		Serial 08

No.2 sensor adapter MC-3030D

Connector No.	Serial Port No.	Connector No.	Serial Port No.
J3	Serial 09	J5	Serial 13
	Serial 10		Serial 14
J4	Serial 11	J6	Serial 15
	Serial 12		Serial 16

10. Check the checkbox of [Channel No.] to set the items referring to the table shown below.

Item	Remarks
Sensor Name	Enter an appropriate name that indicates sensor's function.
Data Type	Keep the default setting.
Data Category	Sets the data category. Settings: ALERT, ACK, BUZZER STOP, OPERATOR FITNESS, OTHER, TRANSFER.
Details	Enter the interval to monitor the digital output to [Control Interval (sec)]. Setting range: 1 to 10 (sec). For other setting options ([Sensor Type No.], [Data name], and [Calibration Active]), keep the default settings.

11. Click [Analog Input] on the menu bar.

"Channel 01" to "Channel 15" are shown on the display. Each sensor adapter MC-3010A has three input ports. When one sensor adapter MC-3010A is connected to the MC-3000S, "Channel 01" to "Channel 03" can be used. When five sensor adapters MC-3010A are connected, "Channel 01" to "Channel 15" can be used. The connector no. on the MC-3010A board and corresponding serial port no. are shown below.

No.1 MC-3010A

Connector No.	Channel No.
J3	Channel 01
J4	Channel 02
J5	Channel 03

No.2 MC-3010A

Connector No.	Channel No.
J3	Channel 04
J4	Channel 05
J5	Channel 06

12. Check the checkbox of [Channel No.] to set the items referring to the table shown below.

Item	Remarks
Sensor Name	Enter an appropriate name that indicates sensor's function.
Data Type	Sets the input data type. Setting range: -10-10V, 0-10V, 4-20mA. **Note:** For [4-20mA], fix the jumper to the connector (J3 to J5). See the installation manual of ECDIS or chart radar.
Details	To display the analog input data on the conning display, click [Details] then check the check box of [Calibration Active]. Then, enter input voltage (or current) and the value to show on the conning display, for two points. **Note:** For [4-20mA], enter the value by the ampere (A). In the setting above, "0" is shown on the conning display when analog input is 0 V, and "120" is shown when analog input is 120 V.

13. To save the configuration, confirm the consistency of the configuration and save the configuration data on the [Save and Sync] menu.

1.4.4 Radar sensor configuration

Do the procedure here to connect a FAR-2xx7 series radar.

1. Click [Sensor Setting]→[Radar Sensor] on the menu bar.

2. Check the antenna no. (Equipment ID) of the FAR-2xx7 series radar sensor to activate the radar sensor. Do not duplicate the Equipment ID of a chart radar.
Note 1: Do not check "RAS005" to "RAS010".

Note 2: Set the antenna no. on the [INSTALLATION] menu of the radar. For details, see the installation manual of FAR-2xx7 series radar.
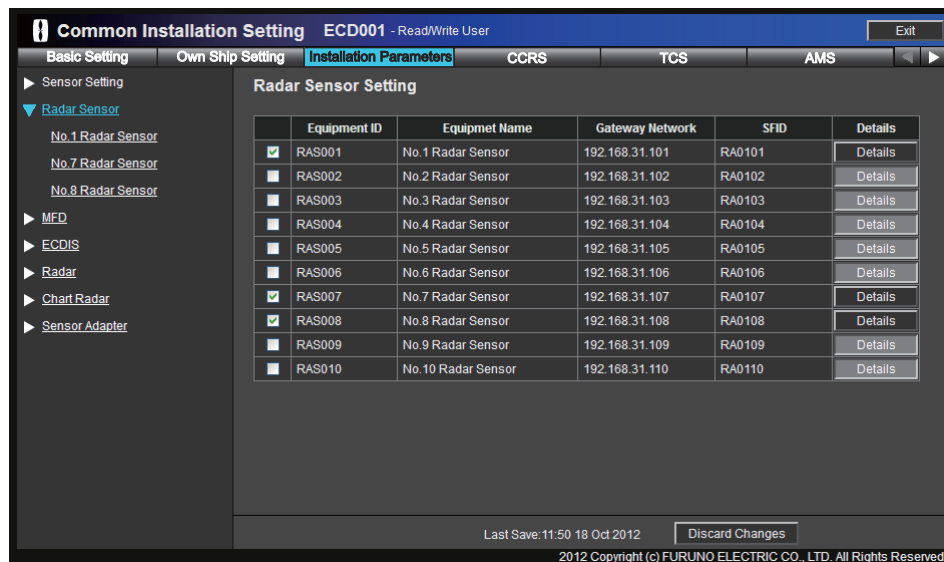
3. Perform the self test for FAR-2xx7 series radar sensor on the [System Monitor] menu to confirm that [SPU PROGRAM NO.] and [DIP SW] are as shown below.
SPU PROGRAM NO.: 0359204-03.50, or after
DIP SW: 1000 or 1001

1.5   CCRS Menu

1. Access the [Common Installation Setting] menu and click [CCRS] on the tab bar.
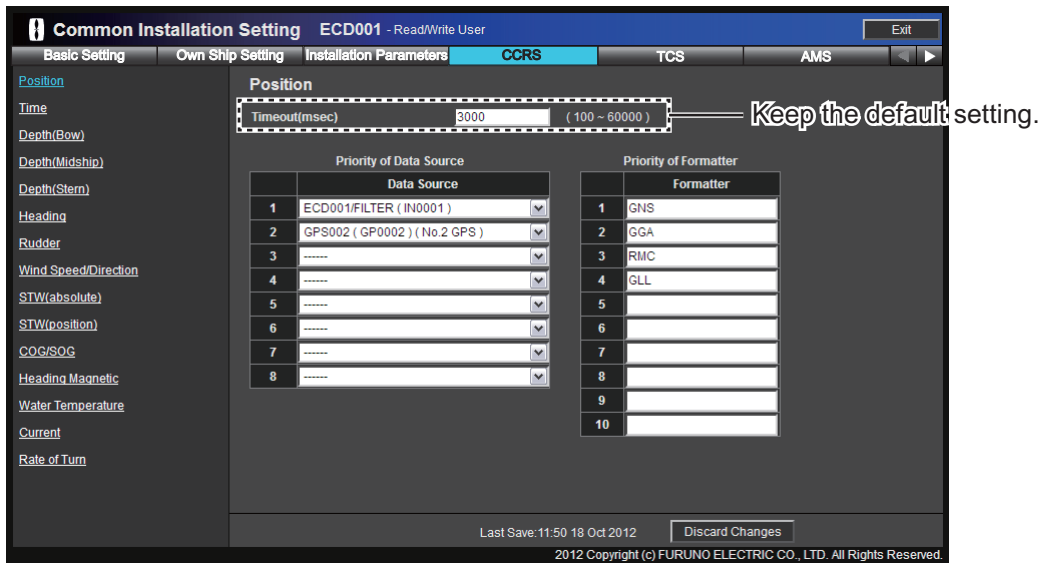
2. Select the data source in order of priority from the [Data Source] pull-down list. The Equipment ID checked at [Installation Parameters] menu are shown on the pull-down list.
    When entering the data source, the [Formatter] is automatically entered.
    Note: When more than two [Data Source] and [Formatter] are entered, the top-most entry has the highest priority.

3. Set [Time], [Depth(Bow)], [Depth(Midship)], [Depth(Stem)], [Heading], [Rudder], [Wind Speed/Direction], [STW(absolute)] (speed through water), [STW(position)] (speed through ground), [COG/SOG], [Heading Magnetic], [Water Temperature], [Current], and [Rate of Turn] similarly.
    Note: For the processor unit of the chart radar, the default data sources are as follows:

Item	Data Source	Remarks
Position	GPS001	
Time	GPS001	
Depth(Bow)	-----	
Depth(Midship)	-----	
Depth(Stem)	-----	
Heading	GYO001	
Rudder	-----	
Wind Speed/Direction	-----	
STW(absolute)	LOG001	Speed through water
STW(position)	LOG001	Speed through ground
COG/SOG	GPS001	
Heading Magnetic	-----	
Water Temperature	-----	
Current	-----	
Rate of Turn	-----	

1.6 TCS Menu

1.6.1 How to set the TCS for autopilot

1. Access the [Common Installation Setting] menu and click [Installation Parameters] on the tab bar.

2. Click [HCS] on the menu bar.

3. Check the checkbox of [HCS001].
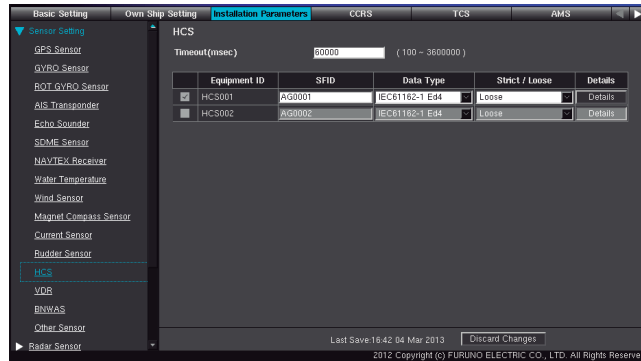
4. Open the [Serial Input/Output] setting window of the ECDIS processor unit connected to the autopilot.
   Note: Connect the autopilot to the ECDIS processor unit that has the TCS-compliant dongle.

5. Check the checkbox of the [Serial No.] (serial port no.) connected to the autopilot.

6. Select [HCS001] from the [Equipment ID] pull-down list of [Serial No.] checked at step 5.
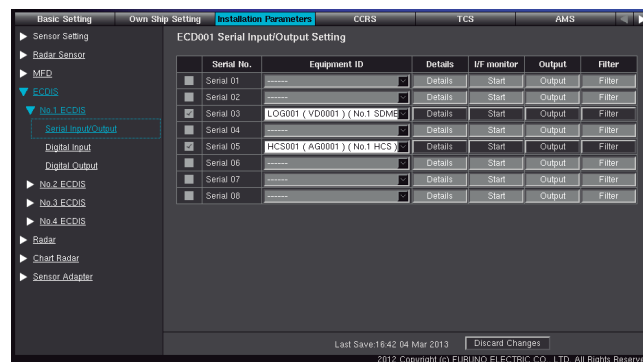
Example : Connect the autopilot to the serial port 5 of the No.1 ECDIS

7. Click [Output] to show the [Serial Output Setting] window.

8. Set [Data Source] to the Equipment ID of the ECDIS processor unit connected to the autopilot.

9. Enter the sentences shown below to [Formatter].
HTC, XTE, VBW, FRN

Data Source	Formatter
ECD001/ECDIS (EI0001)	HTC
ECD001/ECDIS (EI0001)	XTE
ECD001/ECDIS (EI0001)	VBW
ECD001/ECDIS (EI0001)	FRN

------	

10. Click [TCS] on the menu bar.

Basic Setting

ECDIS	Primary	ECD001
	Secondary	None
Autopilot	Manufacture	
	Model	

11. Set [Basic Setting] referring to the table shown below.

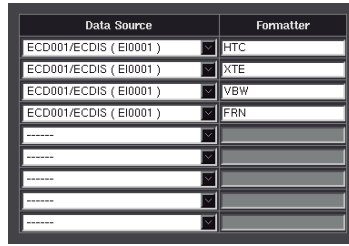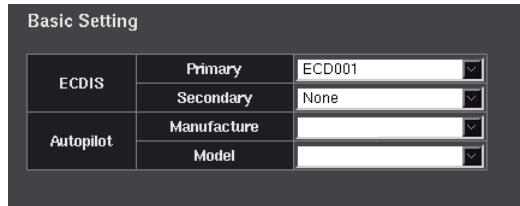| Setting Option		Remarks
ECDIS	Primary	Select the Equipment ID of the ECDIS processor unit connected to the autopilot.
	Secondary	Keep the default setting.
Autopilot	Manufacture	Enter the manufacturer of the autopilot.
	Model	Enter the type of the connected autopilot.

12. See section 1.3 to enter the information for ship parameters.

13. To save the configuration, confirm the consistency of the configuration and save the configuration data on the [Save and Sync] menu.
After saving the configuration, reboot the ECDIS processor unit connected to the autopilot to enable the [TCS] button in the Voyage navigation mode.

1.6.2 How to set the Navigation Parameter

When you active the TCS, set the Navigation Parameter. After setting the Navigation Parameter, the configuration can be copied to other processor units connected to the network.

1. Press **Ctl**, **Shift** and **t** key simultaneously on the control unit or keyboard.
A dialog box for entry of password appears.

Enter Password

Cancel   OK
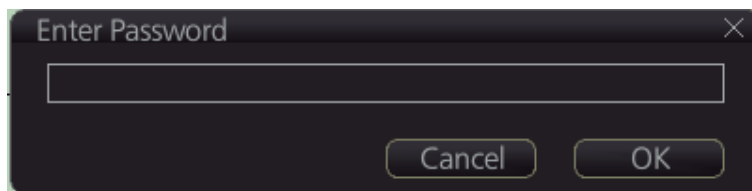
2. Enter the password and click [OK].
Note: The edit mode is enabled until you press **Ctl**, **Shift** and **t** key simultaneously or reboot the unit.

3. Click [Menu] to open the menu.

4. Click [Navigation Parameter] to show the [Navigation Parameter] setting window.

Setting												— ×

General
- Ship & Route Parameters
- **Navigation Parameter**
- TCS
- Cost Parameters

Sensor
- System / Local Select
- System Sensor Settings
- Local Sensor Settings
- Other Sensor Settings

DISP
Setting
- Basic Setting

Forwarding Distance | Function

Service State   ☐ Use different values for Port and Starboard

Delete   Add

No.	SPD kn	Radius NM	FWD DIST NM
1	20.0	0.20	0.059
2	1.1	0.02	0.001
3	1.1	0.02	0.001
4	1.1	0.02	0.001
5	1.1	0.02	0.001
6	1.1	0.02	0.001

Close   Save

5. Enter [SPD kn] (ship speed), [Radius NM] (turning radius) and [FWD DIST NM] (forwarding distance*).
    *: The distance the ship travels straight after the steering control is send to the autopilot.

6. When [FWD DIST NM] is deferent between port and starboard side, check the checkbox of "Use different values for Port and Starboard" and then enter each setting value.

Setting												— ×

General
- Ship & Route Parameters
- **Navigation Parameter**
- TCS
- Cost Parameters

Sensor
- System / Local Select
- System Sensor Settings
- Local Sensor Settings
- Other Sensor Settings

DISP
Setting
- Basic Setting

Forwarding Distance | Function

Service State   ☑ Use different values for Port and Starboard

Delete   Add   Delete   Add

No.	SPD kn	Radius NM	FWD DIST NM	No.	SPD kn	Radius NM	FWD DIST NM
1	20.0	0.20	0.059	1	20.0	0.20	0.059
2	1.1	0.02	0.001	2	1.1	0.02	0.001
3	1.1	0.02	0.001	3	1.1	0.02	0.001
4	1.1	0.02	0.001	4	1.1	0.02	0.001
5	1.1	0.02	0.001	5	1.1	0.02	0.001
6	1.1	0.02	0.001	6	1.1	0.02	0.001

Close   Save

7. Confirm the TCS is stopped and click [Save] to save the Navigation Parameter.
    Note: When you click [Save] while the TCS is activated, the TCS is force-quitted.

[Service State] button

When the TCS is activated, the [Service State] button is enabled on the [Navigation Parameter] setting window. The gain value is changed to minimum value and the XTE correction is invalid when you click the [Service State] button. Use the [Service State] button to adjust [FWD DIST NM].

Note: Use the [Service State] button while the ship is turning. The vessel may go off the route because the XTE correction is invalid.

[Service State] button

1. Enter the value comparable to the ship's length to [FWD DIST NM] on the [Navigation Parameter] setting window.
2. Activate the TCS and monitor any route.
3. When the vessel comes up to WOL, click the [Service State] button.
4. After the turn of the vessel, click the [Service State] button again.
   When the turn of the vessel goes long, raise the setting value of [FWD DIST NM].
   When the turn of the vessel goes sharp, lower the setting value of [FWD DIST NM].
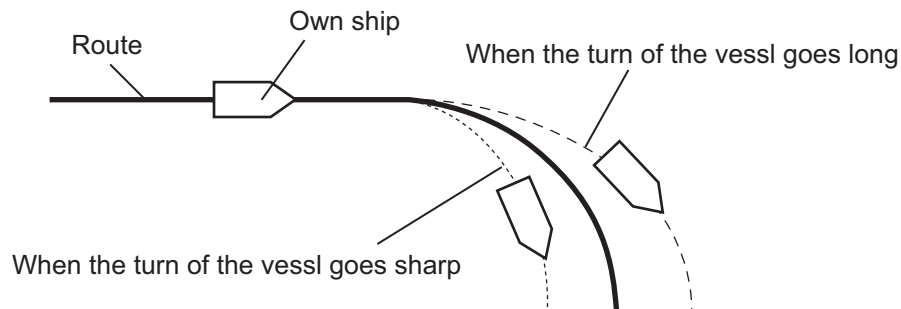
[Check Required] tab
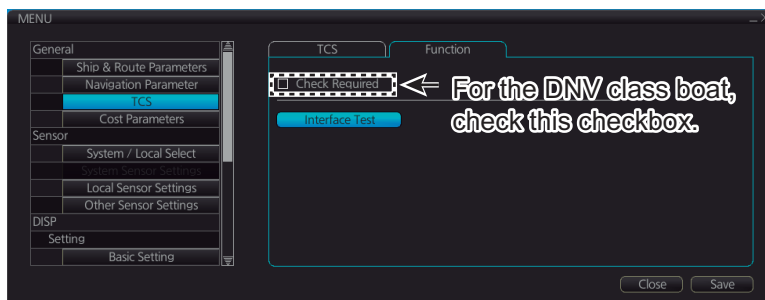
When you check the checkbox of "Check Required" on the [Function] tab of the [TCS] setting window, a route that is not checked for safe navigation can not be monitored. For the DNV class boat, check this checkbox.

Note: The route shown below can not be monitored regardless the setting of this checkbox.

• The route that have one waypoint or no waypoint.

• The route that have impossible turns.

How to confirm the connection between the ECDIS and autopilot

Confirm the connection between the ECDIS and autopilot by simulating the TCS function. When simulating the TCS function, the vessel can not turn.

1.   Click [Interface Test] button on the [Function] tab of the [TCS] setting window.
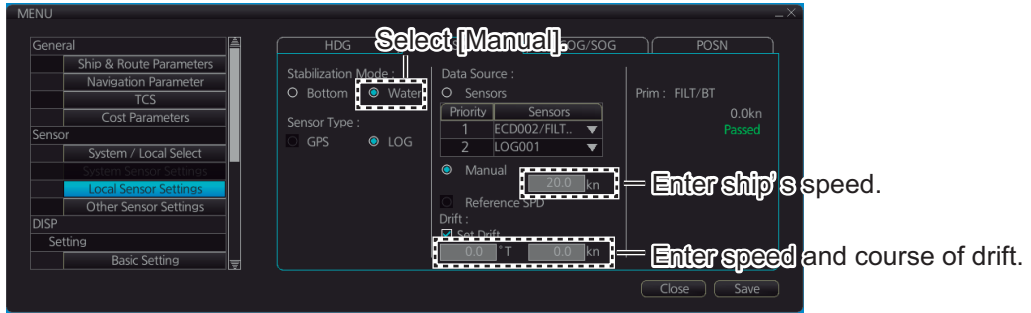

2.   Click [System/Local Select] on the menu.

3.   Select [Local Sensor], and then click Save button.
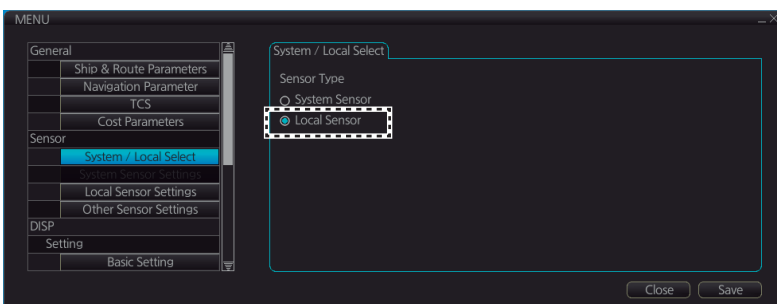
4.   Click [Local Sensor Setting] on the menu.

5.   Open the [SPD] tab to set [Stabilization Mode] to [Water].

6.   Set [Data Source] to [Manual] to enter any ship's speed value.

7. Check the checkbox of [Set Drift] to enter any speed and course of drift.

8. Open the POSN tab to set [Data Source] to [Manual].

9. Enter any position data on the dialog box shown below.
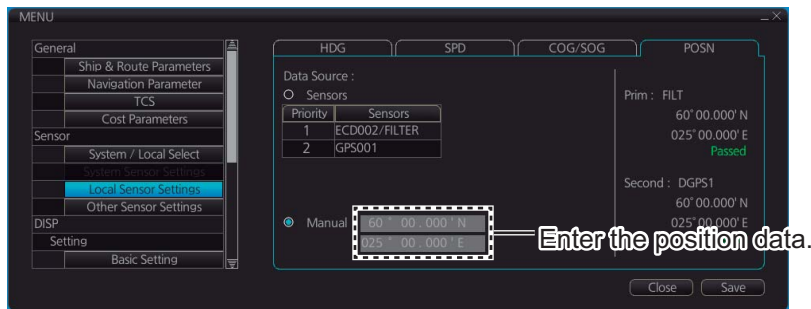
10. Click the [Save] button. According to the data that you entered, the information of the sensor information box is updated.
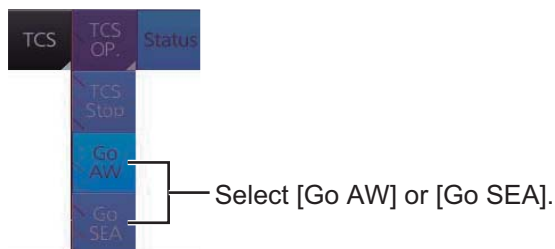

Example: Sensor information box

Note: For the heading data, use the data input from the heading sensor.

11. Monitor the route that the vessel is in the channel limit.

12. Click the [TCS] button on the instant access bar.

13. Click [TCS OP.] and select [Go AW] or [Go SEA].


Select [Go AW] or [Go SEA].

14. Change the steering mode of the autopilot to NAVI mode.

15. Confirm that [Go AW] or [Go SEA] appears at the [TC] column of the route information box.
[Go AW] or [Go SEA] appears: The connection between the ECDIS and autopilot is correct.
[Go AW] or [Go SEA] does not appears: Check the configuration and connection between the ECDIS and autopilot.


Confirm that [Go AW] or [Go SEA] appears.
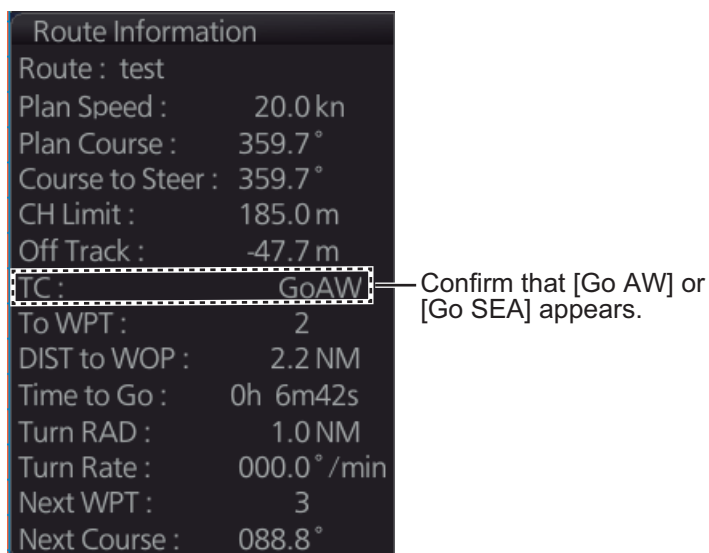
Example: Route information box

1.7 Alert Define List Menu

The digital output port of the processor unit and sensor adapter can output alerts when they occur on the ECDIS, or chart radar.

As an example of how to set this menu, the following procedure shows how to output the alert from the Digital Out CH1 in the processor unit of the first chart radar when the alert "526 TT CPA/TCPA" occurs on the first chart radar.

1. Access the [Common Installation Setting] menu and click [Alert Define List] on the tab bar.

2. Click [Chart Radar] on the menu bar.
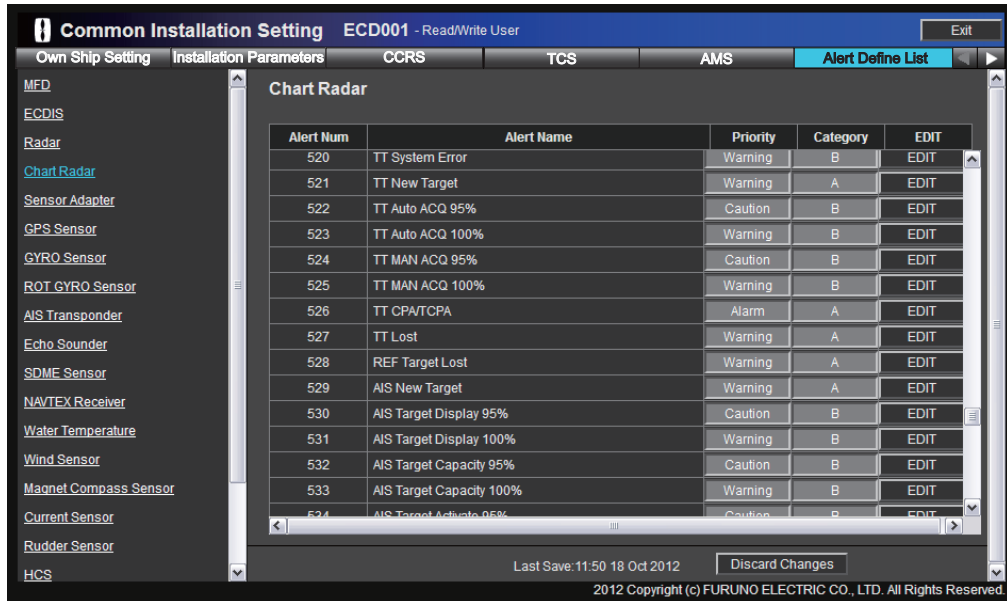
3. Click [EDIT] of "526 TT CPA/TCPA" alert.

4. Set [Digital Output Setting], [Output EID], and [CH] as shown below.
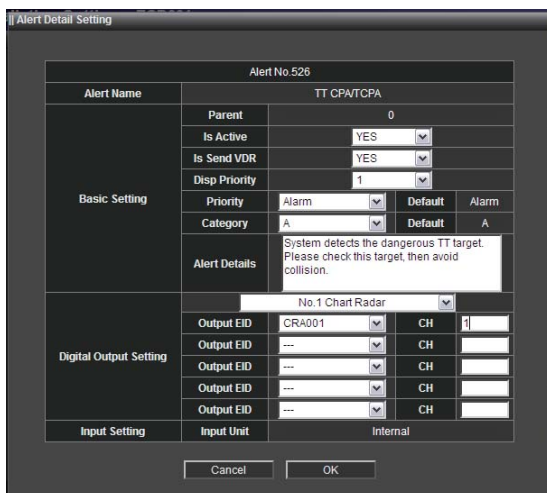
[Digital Output Setting]: No.1 Chart Radar
[Output EID]: CRA001
[CH]: 1

5. To save the configuration, confirm the consistency check and save the configuration data on the [Save and Sync] menu.

1.8 Data Sharing Menu

The [Data Sharing] menu is not used.

1.9 Save and Sync Menu

After completing the settings on the [Own Ship Setting], [Installation Parameters], [CCRS], and [Alert Define List] menus, confirm the consistency of the configuration and save it on this menu. By saving the configuration, the configuration data can be copied to other processor units connected to the network. The configuration data can be saved to a medium and loaded to a processor unit.

### 1.9.1 Consistency check and save the configuration

1. Access the [Common Installation Setting] menu and click [Save and Sync] on the tab bar.
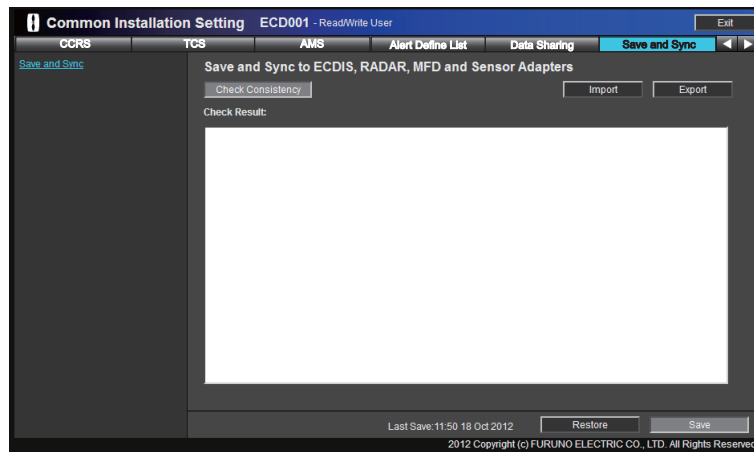
2. Click [Consistency Check] to confirm the consistency of the setting.
   Note: [Check Consistency] is inoperative if your have not entered settings on the [Own Ship Setting], [Installation Parameters], [CCRS], and [Alert Define List] menus.

   When the consistency check is completed, the result of the check is shown.
   If an inconsistency is detected, an error message appears. You can not save the configuration until the inconsistency is corrected. Check the setting and correct the inconsistency, then perform the consistency check again.

3. When the message "Check consistency completed, you can save data. Please push the "Save" button" is shown, click [Save] in the info bar.
   The pop-up message shown below appears.
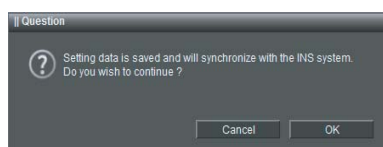
4. Click [OK] to save the configuration.
   If other processor units and sensor adapters are connected to the network, the confirmation message shown below appears. The message does not appear if a unit in the network is not powered. Click [OK] to save the configuration.
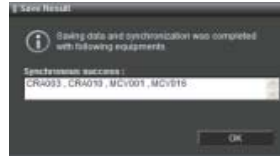
Note: If you did the consistency check and save after entering settings on [Own Ship Setting], reboot the unit.

5. After saving the configuration, confirm that the Equipment ID of all units are correct.
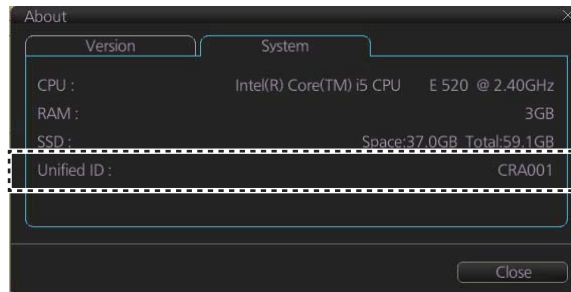
   • **Processor unit EC-3000**
     Check the Equipment ID of processor unit as shown below.

     1) Click the [?] button on the status bar.

     2) Click [About].

     3) Check [Unified ID] on the [System] tab.

   • **Radar processor unit and sensor adapter**
     If the Equipment ID of the radar processor unit or sensor adapter is not correct, the alert shown below appears.
   Radar processor unit: "Radar Processor COM Error"
     Sensor adapter: "Sensor Adapter * COM Timeout" (* = 1 to 16)

   If the Equipment ID is not correct, set the Equipment ID on the [Basic Setting] menu (see section 1.2). At this time, turn off all units except the unit to be set, or disconnect all LAN cables except the cable for PC.
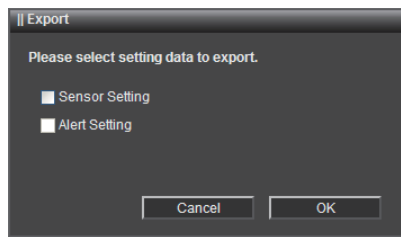
1.9.2 How to save the configuration data to a medium

You can save the configuration data to a medium (PC, USB memory, etc.). Set the medium and then do as follows:

1. Click [Export] at the upper right of the [Save and Sync] menu.
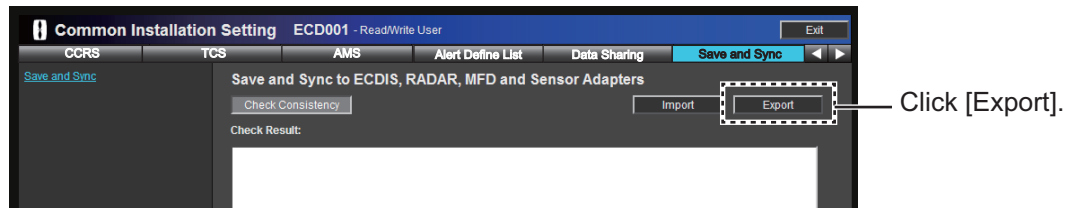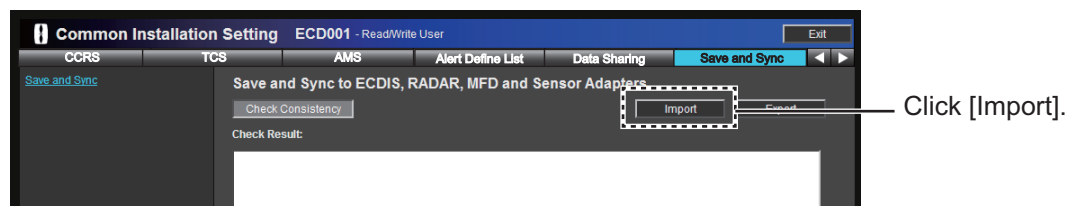

The window shown below appears.

2. Select the configuration data type that you want to save, and then click [OK].
   [Sensor Setting]: Save all configuration data set at [Common Installation Setting] menu.
   [Alert Setting]: No use.

3. Select where to save the configuration data.
   The file name "SettingFiles.tar" is created.

1.9.3 How to load the configuration data

You can load the configuration data from a medium (PC, USB memory, etc.). Set the medium and then do as follows:

1. Click [Import] at the upper right of the [Save and Sync] menu.

2. Select the configuration data file ("SettingFiles.tar").

3. Select the configuration data type that you want to load, and then click [OK].
   [Sensor Setting]: Load configuration data set at [Common Installation Setting] menu.
   [Alert Setting]: No use.

4. After loading the data, perform the consistency check and save the configuration data on the [Save and Sync] menu.

1.10 System Monitor Menu
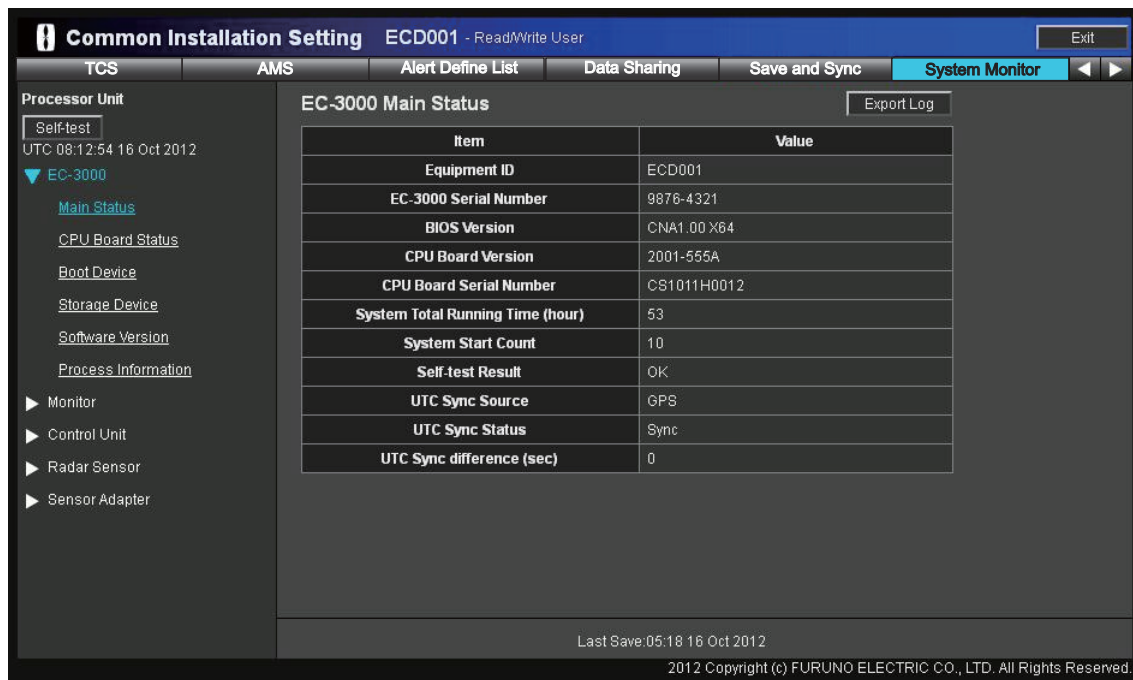
This menu displays system information of units as shown below.

- Processor unit (EC-3000)
- Monitor (Furuno make only)
- Control unit
- Radar processor unit
  Note: Click [Radar Sensor] → [Selftest] on the menu bar to display the information of the radar processor unit.
- Sensor adapter

Click [Export Log] to save the log data to a medium (PC, USB memory, etc).

1.11 Software Update Menu

Update the software of the processor unit EC-3000, radar processor unit RPU-013, and control unit RCU-024/025/026 on the [Software Update] menu. For the update of the sensor adapter, see section 2.3.

Note: To update the software, access the [Common Installation Setting] menu on the laptop PC (LAN connection). Updates can not be done from a control unit.
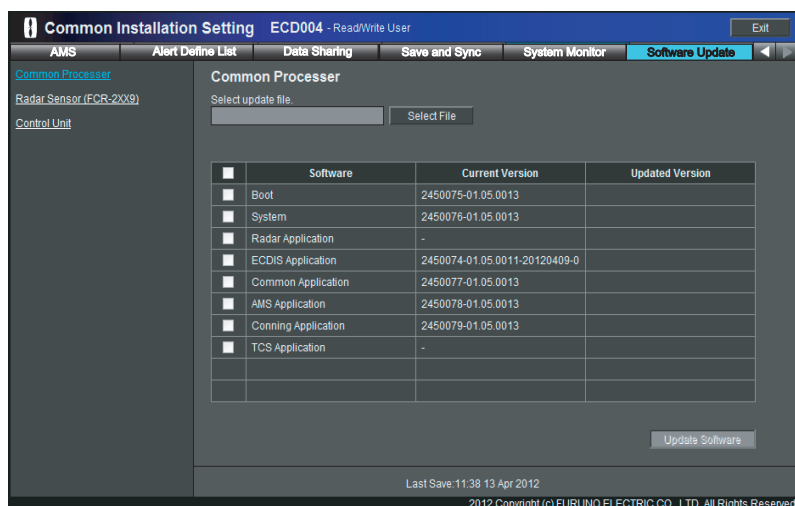

1. Connect the USB memory which has the update file to the PC connected to the LAN.

2. Access the [Common Installation Setting] menu on the laptop PC (LAN connection) and click [Software Update] on the tab menu.
   For the IP address of the unit to update its software, see the Equipment ID list at the back of this manual.

3. Select the unit to update its software from the menu bar.

4. Click [Select File] to select the update file from the USB memory, and then click [OK].
   The current software version and updated software version are displayed.

5. Check the checkbox of the software to update.

6. Click [Update Software]. A confirmation message appears.
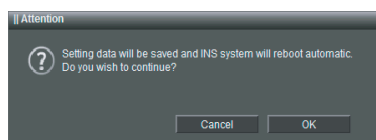
7. Click [OK] to update the software.
   The progress bar shows the update progress. After completing the update, the system is automatically rebooted.

8. **If connected to the gateway network**, the link is shown on the display after completing the system reboot. Click the link on the display to access the [Common Installation Setting] menu.
   If connected to the sensor network, enter the IP address of the sensor network to access the [Common Installation Setting] menu after completing the system reboot.
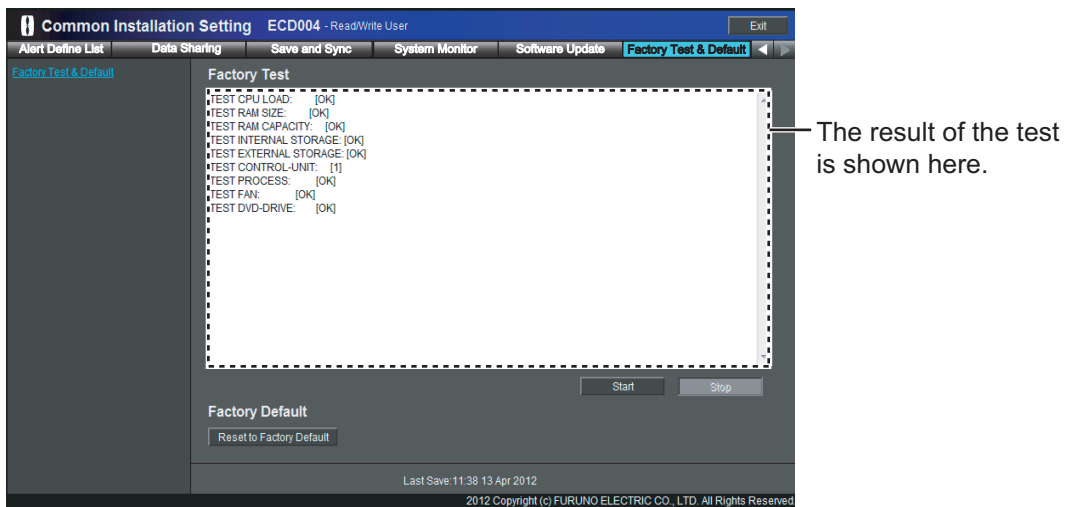
1.12   Factory Test & Default

The [Factory Test & Default] menu does the factory test to check operation and restores the system default settings.
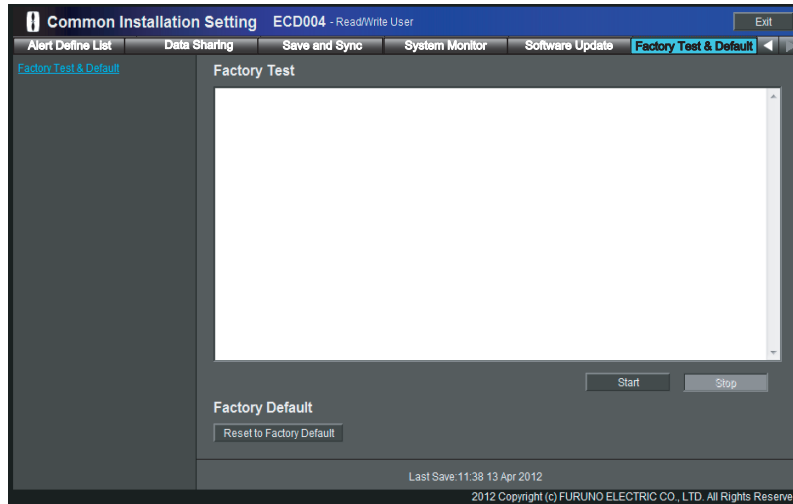
Factory Test

Click [Start] to perform the factory test. The result of the test is shown on the display.


The result of the test is shown here.

If "NG" appears, confirm the state of the unit on the [System Monitor] menu.

Factory Default

The factory default function restores all factory defaults (except the settings on the [Basic Setting] menu). In the default arrangement all processor units powered in the network are restored to default condition.

1. Click [Reset to Factory Default]. The following message appears on the screen.
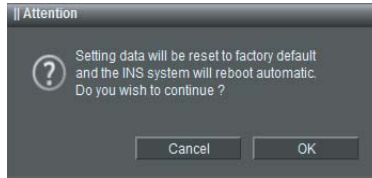
2. Click [OK] to restore the system to the default setting.
   The progress bar shows update progress. When the restoration is completed, the system is automatically rebooted.

3. **If connected to the gateway network**, the link is shown on the display after completing the system reboot. Click the link on the display to access the [Common Installation Setting] menu.
   If connected to the sensor network, enter the IP address of the sensor network to access the [Common Installation Setting] menu after completing the system reboot.

Note: When you restore the chart radar default, the initialization of the radar processor unit needs more time than the processor unit. After completing the system reboot of the processor unit, wait for about one minute until the system reboot is completed, and the communication between processor unit and radar processor unit is established. If the communication is not established, the alert "Radar Processor COM Error" appears and the [Antenna] button at the upper left of the display shows "NO RADAR". Do not use the unit until the alert is resolved and the [Antenna] button shows the current antenna selection (example: ANT-1(M)).

1.13   Radar Installation Menu

You can confirm the radar setting on the [Radar Installation] menu. For the details of the radar setting, see the installation manual for the chart radar.

1.14   Conning Menu

The [Conning] menu configures the layout and data to show on the conning display.

[Sheet 1] to [Sheet 4]: Four sets of conning displays can be prepared.

[Save/Import/Export]: You can save the conning display data to a medium and load it on the network.

[Copy from]: Copy a conning layout sheet to another sheet.

[Components]: Select the components to show on the conning display. The components are available in three sizes: [Small], [Medium], [Large]. The [Small] components occupy one block. The [Medium] components occupy two blocks. The [Large] components occupy three blocks. Check the size of the component to show on the [Components] window. Select the component and click it to show the component on the [Layout] window.

[Layout]: You can configure the layout and data to show on the conning display. The [Layout] window consists of 18 blocks (6 x 3). Drag and drop the components to configure the layout. Click ☒ to delete a component from the [Layout] window. To select the data source for a component, click ⬚ to display the advanced settings window. See the procedure on section 1.14.1.

1.14.1 How to select the data source

Click [...] on the advanced settings window (see section 1.14.2.) to display the [Data Source Select] window. Select the data source in the [Data Source Select] window to show the respective data on the conning display.
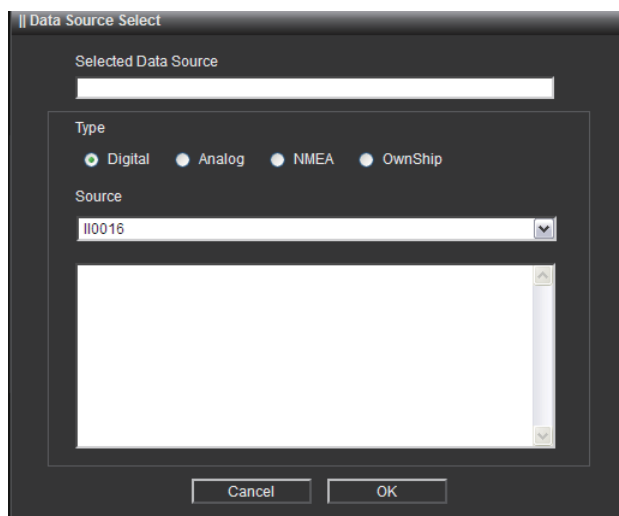
- [Selected Data Source]: For analog input data, enter the data source information in the [Selected Data Source] box. For analog input data, [Type] and [Source] are not used.
  Example: Analog,II001,4
  Analog…Analog input data is used.
  II001…The signal of the No.1 sensor adapter is used.
  4…Two analog units are connected to a sensor adapter, and the signal of CH1 from No.2 analog unit is used.

- Type: Select the data source type. Setting range: [Digital], [Analog], [NMEA], [Own Ship].

- Source: Select the data source unit from the pull-down list, and then select the channel no.

1.14.2 Advanced settings window

[Small] components (one block)

- **Compass**
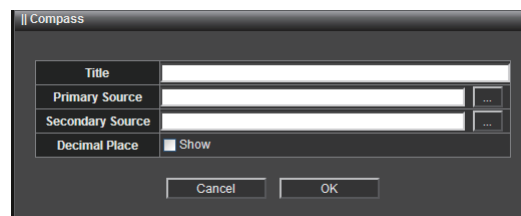
Title: Enter the title of the component.
Primary Source: Select the data source of the upper pointer.
Secondary Source: Select the data source of the lower pointer.
Decimal Place: Check the checkbox to show the value after decimal point.

- **Empty**

Title: Enter the title of the component.

- **Horizontal Bar**
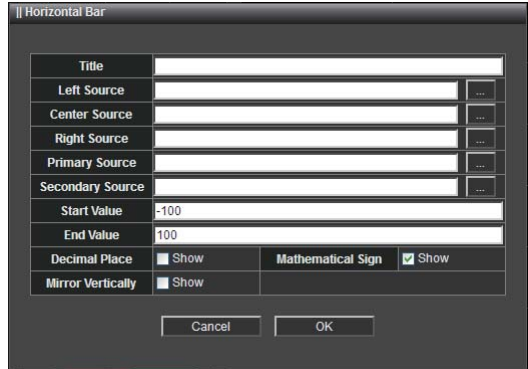
Title: Enter the title of the component.
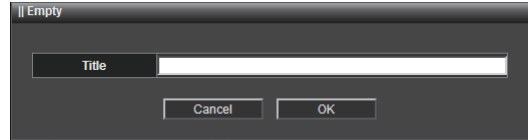Left Source: Select the data source of the value shown at the upper left of the bar.
Center Source: Select the data source of the value shown above the bar.
Right Source: Select the data source of the value shown at the upper right of the bar.
Primary Source: Select the data source of the green bar.
Secondary Source: Select the data source of the triangle below the bar.
Start Value: Set the minimum value of the bar.
End Value: Set the maximum value of the bar.
Mirror Vertically: Check the box to invert the position of the bar and value.

- **Horizontal Ruler**
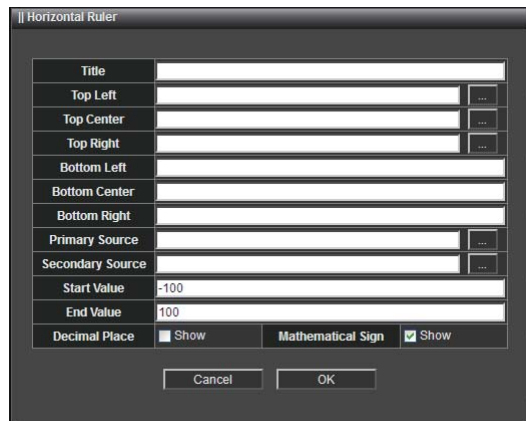
Title: Enter the title of the component.
Top Left: Select the data source of the value shown at the upper left of the bar.
Top Center: Select the data source of the value shown above the bar.
Top Right: Select the data source of the value shown at the upper right of the bar.
Bottom Left: Enter the text shown at the lower left of the bar.
Bottom Center: Enter the text shown below the bar.

Bottom Right: Enter the text shown at the lower right of the bar.
Primary Source: Select the data source of the indication shown with white triangle.
Secondary Source: Select the data source of the indication shown with gray triangle.
Start Value: Set the minimum value of the bar.
End Value: Set the maximum value of the bar.
Decimal Place: Check the checkbox to show the value after decimal point.
Mathematical Sign: Check the checkbox to show the minus sign (-) when the value is minus.

- **Numeric Data Display**
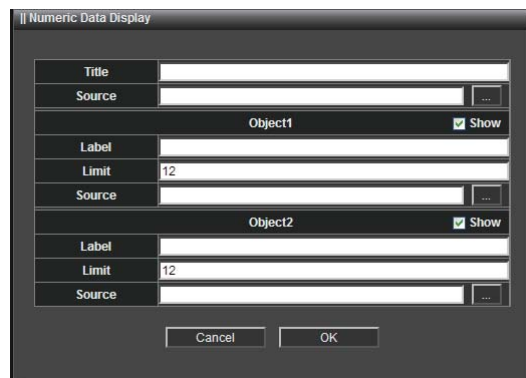
Title: Enter the title of the component.
Source: Select the data source same as [Object 1] or [Object 2] to show the abbreviated name of the data source unit.
Label: Enter the data name of [Object 1 (or 2)].
Limit: Set the digit number of the data of [Object 1 (or 2)].
Source: Select the data source of [Object 1 (or 2)].

- **Rudder**
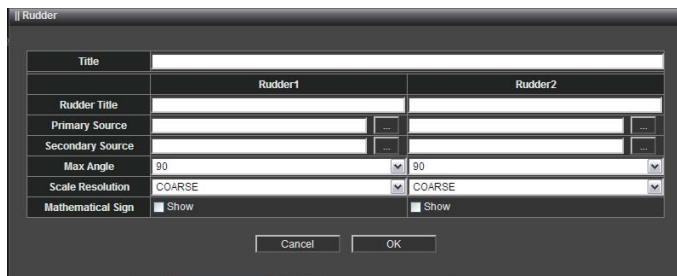
Title: Enter the title of the component.
Rudder Title: Enter the title of the [Rudder 1 (or 2)] indicator.
Primary Source: Select the data source of the long pointer of [Rudder 1 (or 2)] indicator.
Secondary Source: Select the data source of the long pointer of [Rudder 1 (or 2)] indicator.
Max Angle: Set the maximum rudder angle of [Rudder 1 (or 2)] indicator.
Scale Resolution: Select the scale resolution.
Mathematical Sign: Check the checkbox to show the minus sign (-) when the value is minus.

- **Watch Alarm**
Note: This component can not be used. Do not select it.

1-43

[Medium] component (two blocks.)

• **Azimuth Propulsion**
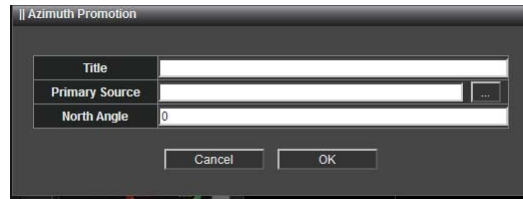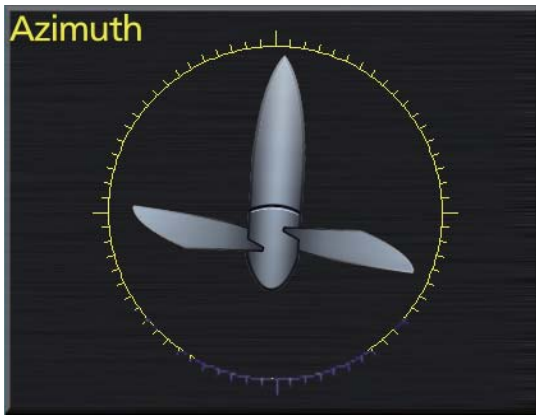
Title: Enter the title of the component.
Primary Source: Select the data source of the azimuth propulsion.
North Angle: Enter the north angle relative to the screen.

• **Dial Meter**
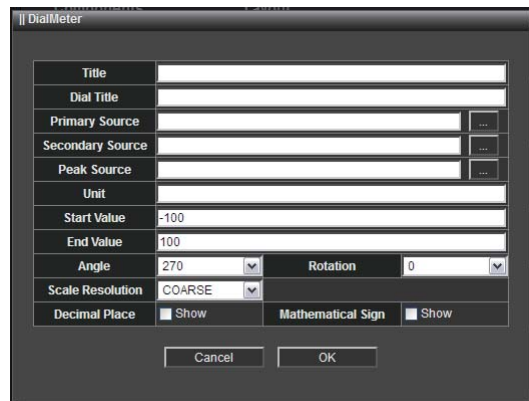
Title: Enter the title of the component.
Dial Title: Enter the text to show above the indicator.
Primary Source: Select the data source of the long pointer of the indicator.
Secondary Source: Select the data source of the outer pointer of the indicator.
Peak Source: Select the data source of the short pointer of the indicator.
Unit: Set the unit of the data.
Start Value: Set the minimum value of the indicator.
End Value: Set the maximum value of the indicator.
Angle: Define the extent of the dial.
Rotation: It can be rotate the direction of the indicator. Normally, set to "0".
Scale Resolution: Select the scale resolution.
Decimal Place: Check the checkbox to show the value after decimal point.
Mathematical Sign: Check the checkbox to show the minus sign (-) when the value is minus.

• **Drift And Radius**
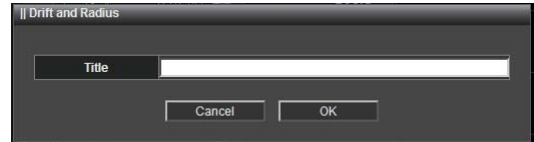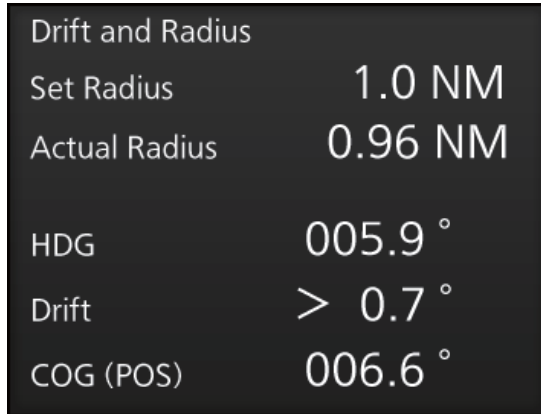
Title: Enter the title of the component.

• **Dual Dial Meter**

Title: Enter the title of the component.

Dial Title: Enter the title to show above [Dial Meter 1 (or 2)] indicator.

Primary Source: Select the data source of the long pointer of [Dial Meter 1 (or 2)] indicator.

Secondary Source: Select the data source of the outer pointer of [Dial Meter 1 (or 2)] indicator.

Peak Source: Select the data source of the short pointer of [Dial Meter 1 (or 2)] indicator.

Unit: Set the unit of the data.

Start Value: Set the minimum value of the [Dial Meter 1 (or 2)] indicator.

End Value: Set the maximum value of the [Dial Meter 1 (or 2)] indicator.

Angle: Define the extent of the dial.

Rotation: It can be rotate the direction of the [Dial Meter 1 (or 2)] indicator. Normally, set to "0".

Scale Resolution: Select the scale resolution of [Dial Meter 1 (or 2)] indicator.

Decimal Place: Check the checkbox to show the value after decimal point.

Mathematical Sign: Check the checkbox to show the minus sign (-) when the value is minus.

• **Graph**

Title: Enter the title of the component.
Type: Set the graph type. [(2x)Time/Y-graph]: The [Primary (Y1)] and [Secondary (Y2)] are used as Y-coordinate for two independent graphs. The time is used as the X-coordinate for both graphs. [(1x)X/Y-graph]: The [Primary (Y1)] input is used for the X-coordinate and the [Secondary (Y2)] for the Y-coordinate.
Label Source: Select the data source same as [Primary (Y1)] or [Secondary (Y2)] to show the abbreviated name of the data source unit.
Label: Enter the title of [Primary (Y1)] and [Secondary (Y2)] graph.
Source: Select the data source of [Primary (Y1)] and [Secondary (Y2)].
Unit: Set the unit used in [Primary (Y1)] and [Secondary (Y2)] graphs.
Scale | range: Set the display range of the Y-coordinate. Three display ranges can be entered.
Time Span: Set the display range of the X-coordinate.
Sample Interval: Set the interval of [Primary (Y1)] and [Secondary (Y2)] graph plot.
Scale Resolution: Select the scale resolution of [Dial Meter 1 (or 2)] indicator.
Decimal Place: Check the checkbox to show the value after decimal point.
Mathematical Sign: Check the checkbox to show the minus sign (-) when the value is minus.
Secondary (Y2) Scale: Check the check box to show the value input from the data source of [Secondary (Y2)].

• **Next Leg**

Next Leg	WPT No. 2
Next Radius	0.3 NM
Next Course	009.8 °
Next Leg Distance	3.2 NM
Next Leg Time	0:11:19
Remaining Distance	42.9 NM
Remaining Time	5:27:11

• **Pitch And Roll**
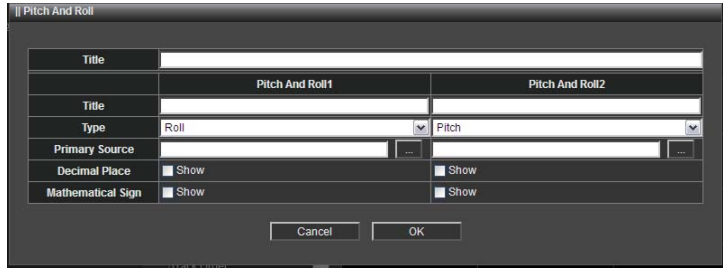
Title: Enter the title of the component.
Title (Pitch And Roll 1 / Pitch And Roll 2): Enter the text shown above [Pitch And Roll 1 (or 2)] indicator.
Type: Select the object to show in the [Pitch And Roll 1 (or 2)]. Setting range: [Roll], [Pitch].
Primary Source: Select the data source of [Pitch And Roll 1 (or 2)] indicator.
Decimal Place: Check the checkbox to show the value after decimal point.
Mathematical Sign: Check the checkbox to show the minus sign (-) when the value is minus.

• **Position Local Time**
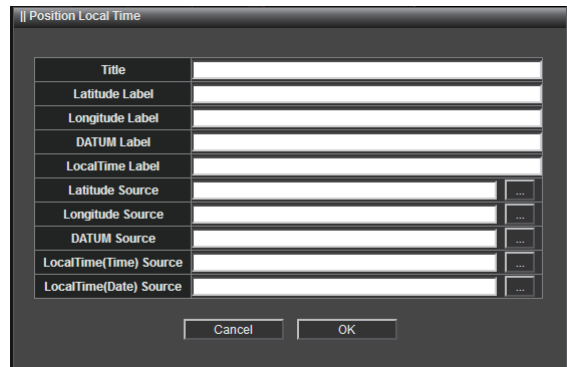
Title: Enter the title of the component.
Latitude Label: Enter the text to show at the left of the latitude value.
Longitude Label: Enter the text to show at the left of the longitude value.
DATUM Label: Enter the text that indicates the datum.
Local Time Label: Enter the text to show at the left of the time information.
Latitude Source: Select the data source of the latitude.
Longitude Source: Select the data source of the longitude.
DATUM Source: Select the data source of the datum.
Local Time (Time) Source: Select the data source of the time information.
Local Time (Date) Source: Select the data source of the date information.

- **Track Order**

Title: Enter the title of the component.

- **Two Dimension Plotter**

Title: Enter the title of the component.
Source (X): Select the data source of the X-coordinate value.
Source (Y): Select the data source of the Y-coordinate value.
Label (Y): Enter the title of the Y-coordinate.
Unit (Y): Set the unit of the Y-coordinate.
Symbol: Select the plot mark.
Time Span: Enter the time span for the plotter screen.
Sample Interval: Enter the sample interval for the plotter screen.
Max Value (X): Enter the maximum value of the X-coordinate.
Max Value (Y): Enter the maximum value of the Y-coordinate.
Axis Point (X): Enter the axis point of X-coordinate.
Axis Point (Y): Enter the axis point of Y-coordinate.
Axis Type: Select the axis type. [Under Left]: The axis point is located at the under left of the screen. [Center]: The axis point is located at the center of the screen.
Tick Table: Check the checkbox to show the tick label.

• **Vertical Bar**

Title: Enter the title of the component.

Top Label: Enter the text to show above the bar.

Bottom Label: Enter the text to show below the bar.

Primary Source: Select the data source of the green bar.

Secondary Source: Select the data source of the triangle indicator.

Start Value: Set the minimum value of the bar.

End Value: Set the maximum value of the bar.

Decimal Place: Check the checkbox to show the value after decimal point.

Mathematical Sign: Check the checkbox to show the minus sign (-) when the value is minus.

Mirror Horizontally: Check the checkbox to invert the position of the bar and value horizontally.

• **Wind Direction**

Title: Enter the title of the component.

True: Select the data source of the true wind direction.

Relative: Select the data source of the relative wind direction.

Unit: Set the unit of the wind direction and wind speed.

Decimal Place: Check the checkbox to show the value after decimal point.

Log: Select the data source of the wind direction and speed.

[Large] component (three blocks)

• **Present Leg**

Route	✱✱✱
Present Leg	WPT No. ✱✱✱
Plan Course	✱✱✱.✱ °
Course to Steer	✱✱✱.✱ °
Channel Limit	✱✱✱✱.✱ m
Off Track	✱✱✱✱.✱ m
Distance to WOP	✱✱✱✱✱.✱ NM
Time to Go	✱✱d✱✱h✱✱m✱✱s
Turn Radius	✱✱✱✱✱.✱ NM
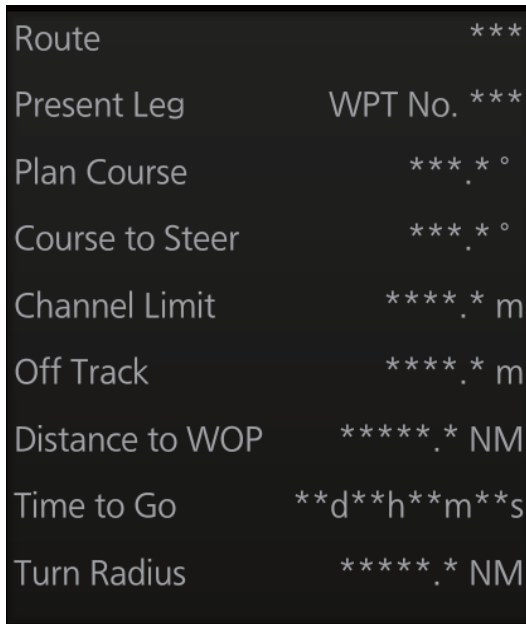
• **Doppler Log**
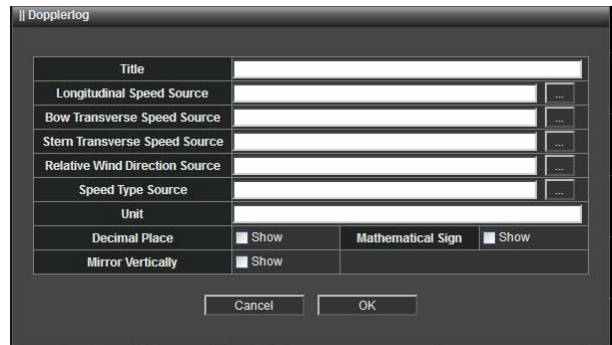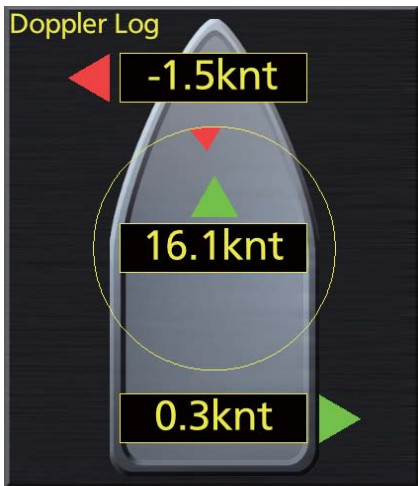
Title: Enter the title of the component.
Longitudinal Speed Source: Select the data source of own ship's speed of the bow stern direction.
Bow Transverse Speed Source: Select the data source of own ship's speed in the horizontal direction at the bow.
Stern Transverse Speed Source: Select the data source of own ship's speed in the horizontal direction at the stern.
Speed Type Source: Select the data source same as [Longitudinal Speed Source] to show the abbreviated name of the data source unit.
Unit: Set the unit of the ship's speed.
Decimal Place: Check the checkbox to show the value after decimal point
Mathematical Sign: Check the checkbox to show the minus sign (-) when the value is minus.
Mirror Vertically: Check the checkbox to invert the display vertically.

- **Alert**
  Note: This component is not available. Do not select it.

1.15 The Network Transmission Setting Between ECDIS and Radar

Connect the ECDIS and radar (FAR-2xx7/FCR-2xx9 series) with the LAN cable to show the radar echo and TT symbols on the ECDIS chart display, or show the ECDIS route and user chart symbol on the radar display.

For non-Furuno radar, the ECDIS chart display can not show the radar echo. The TT symbol can be shown on the ECDIS chart display by connecting the ECDIS and radar by serial interface.

Note: Confirm that the SPU board program version of the FAR-2xx7/FCR-2xx9 series is version "03.50" or after.

For FAR-2xx9, FCR-2xx9 series

1. Turn on the DIP SW (S4) on the SPU board of FAR-2xx7 and FCR-2xx9 series.

2. To connect two radar antennas, change the antenna number of second radar antenna to "2" and set the IP address and subnet mask as shown below.
   IP address: 192.168.031.102
   Subnet mask: 255.255.255.0

3. Do one of the two procedures below according to the radar connected.

   ### For FAR-2xx7 series

   1) Open [MENU]→[INITIALIZE]→[8. OTHERS]→[5. INS] menu → select [LAN].
   2) Open [MENU]→[INITIALIZE]→[6. TT PRESET]→[2. TT DATA OUTPUT] menu → select [TTM], [TRUE] and [4800].

   ### For FCR-2xx9 series

   Open [MENU]→[9 RADAR INSTALLATION]→[4 TT PRESET]→[1 TTM/TTD PREFERENCE] menu → select [TRUE].

4. Open the [Own Ship Setting] menu on the ECDIS to select [Radar Antenna] on the menu bar.

5. For one radar antenna, check "RAS001". For two radar antennas, check "RAS001" and "RAS002".

For non-Furuno radar

1. Open [Installation Parameters]→[Sensor Setting]→[Other Sensor] menu on the ECDIS.

2. Check "OTR001" and enter "OTR001" to [SFID].

	Equipment ID	SFID	Data Type	Strict / Loose	Details
☑	OTR001	OTR01	IEC61162-1 Ed4	Loose	Details
☐	OTR002	OTR02	IEC61162-1 Ed4	Loose	Details
☐	OTR003		IEC61162-1 Ed4	Loose	Details
☐	OTR004		IEC61162-1 Ed4	Loose	Details
☐	OTR005		IEC61162-1 Ed4	Loose	Details
☐	OTR006		IEC61162-1 Ed4	Loose	Details
☐	OTR007		IEC61162-1 Ed4	Loose	Details
☐	OTR008		IEC61162-1 Ed4	Loose	Details
☐	OTR009		IEC61162-1 Ed4	Loose	Details
☐	OTR010		IEC61162-1 Ed4	Loose	Details

3. Select [Serial Input/Output] of the processor unit you want to set on the menu bar.

4. Check the serial port to receive the TT symbol data and select "OTR001" from the [Equipment ID] pull-down list.
The example shown below indicates that the [Serial 08] port of [ECD001] receives the TT symbol data.

2. SETTING FOR SENSOR ADAPTER

The default Equipment ID of the sensor adapter is "MCV016". Set the individual Equipment ID before connecting to the network.

Connect the sensor adapter to the processor unit after setting the Equipment ID. Then enter the other settings of the sensor adapter from the [Common Installation Setting] menu on the processor unit.

2.1 How to Set the Equipment ID

1. Set the IP address and subnet mask of the PC as shown below.
    IP address: 172.31.16.200
    Subnet mask: 255.255.0.0

2. Connect the laptop PC to the sensor adapter with the LAN cable.

3. Activate the web browser on the PC and enter the default IP address of the sensor adapter: "172.31.17.108".

4. Access the [Common Installation Setting] menu and click [Basic Setting] on the tab bar.

5. Select the Equipment ID from the pull-down list. The [Equipment Name], [Equipment Type No.] and [IP Address] are automatically entered according to the Equipment ID.
    Setting range: "MCV001" to "MCV016"

6. Click the box of [Serial No.] to enter the serial no. of the sensor adapter (example: xxxxxx).

7. Set [Subsystem] to disconnect the sensor network between the units that comprise the network.
    When disconnecting the sensor network: Set the value. Setting range: "A" to "Z".
    Do not disconnect the sensor network: Keep the default setting ("---").

8. After entering the setting, click [Save] on the info bar. The system is rebooted automatically to save the configuration.
    If you want to discard the entry, click [Discard Changes].

How to restore the default Equipment ID

When you can not define the Equipment ID of the sensor adapter, restore the default and set the Equipment ID again.

1. Turn on the No. 8 segment of the DIP switch S10 on the board in the MC-3000S.

2. Turn on the sensor adapter.
   The Equipment ID of the sensor adapter turns to default "MCV016", and the IP address is set to "172.31.17.108".

3. See "How to set the Equipment ID" to set the Equipment ID of the sensor adapter.

4. Turn off the No. 8 segment of the DIP switch S10 on the board in the MC-3000S.

2.2 How to Save the Log File

The log file of the sensor adapter can be saved to a medium (PC, USB memory, etc.). The log file is used to check the status of the sensor adapter.

1. Connect the PC to the sensor adapter with the LAN cable.

2. Activate the web browser and enter the following address in the address bar.
   "http://172.31.xx.xxx/cgi-bin/logall.cgi"
   "172.31.xx.xxx" is the IP address of the sensor adapter where to save the log file.

3. After entering the address, the window to save the log file appears. Save the log file to the PC.

2.3 How to Update the Firmware (MC-3000S)

This section shows you how to update the firmware program of the sensor adapter MC-3000S.

Preparation

- PC that has a LAN port

  Windows XP® is recommended. Disable the firewall and set the IP address and subnet mask of the PC as shown below.
  IP address: 172.31.16.200
  Subnet mask: 255.255.0.0

- LAN cable

- Binary file for update
  2450080-xxxxxxxx_mc_cs_boot.bin   Boot program
  2450081-xxxxxxxx_mc_cs_mainpg.bin   Main program
  2450082-xxxxxxxx_mc_cs_maint.bin   Maintenance program
  2450084-xxxxxxxx_mc_io_mainpg.bin   Main program (analog, digital input,
                                            and digital output board)

  (xxxxxxxx: program version)

2.3.1   How to activate the maintenance program

1. Turn off all sensor adapters.

2. Connect the applicable MC-3000S to the PC with the LAN cable.

3. Turn on the No. 6 of the DIP-SW (S10) on the MC-CS board (24P0114).

4. Turn on the sensor adapter MC-3000S.

5. The maintenance program activates after about 30 seconds. At this time, the IP address of MC-3000S is changed to "172.31.17.108".
    Confirm that the LED (CR 74) on the MC-CS board lights 3 times and goes off for a while repeatedly.

2.3.2   How to confirm the firmware program version

1. Activate the maintenance program of the sensor adapter MC-3000S.

2. Activate the command prompt of Windows®.

3. Enter "telnet 172.31.17.108" on the command prompt.

4. Enter the user name and password correctly.

```
C:¥telnet 172.31.17.108   ⇐ Enter the telnet command.
Trying 172.31.17.108...
Connected 172.31.17.108
Escape character is '^]'.

MC_CS_MAINTENANCE login:  ⇐ Enter the user name.
Password:    ⇐ Enter the user password.
```

5. Enter "/usr/sbin/version" on the command prompt to confirm the program version. The program version is shown on the command prompt.

```
~$ /usr/bin/version  ⇐ The command to confirm the program version.
MC C/S BOOTLOADER-1st : 2450080-01.01 ⎫ Boot program
MC C/S BOOTLOADER-2nd : 2450080-01.01 ⎭
MC C/S MAIN           : 2450081-01.01   Main program
MC C/S MAINTENANCE    : 2450082-01.01   Maintenance program
~$ exit    ⇐ After the confirmation the program version, enter "exit".
```

Note: The image shown above is an example. The program version number may be different.

6. After confirming the program version, enter "exit" to finish the telnet command.

2.3.3 How to update the firmware program

1. Delete the version number from the firmware binary file name.

Example：<u>2450081</u>-<u>01010088</u>_mc_cs_mainpg.bin

                 ↑   ↑

         Program number   Version number

⬇ Delete the version number from the file name.

Example：<u>2450081</u>_mc_cs_mainpg.bin

2. Activate the maintenance program of the sensor adapter MC-3000S.

3. Activate the command prompt of Windows®.

4. Change the current directory to the directory where the firmware binary program is saved.
   In the example shown below, binary file is saved at `C:¥update`.

```
C:          ⇐ The command to change the current drive
cd ¥update  ⇐ The command to change the current directory
```

Note: Change the current directory to the one where the binary file is saved.

5. Enter "ftp 172.31.17.108" on the command prompt.
   Confirm that "220-MC3000_CS_MAINTENANCE" is shown.

6. Enter the user name and password.

```
ftp 172.31.17.108     ⇐ Enter the ftp command.
Connected to 172.31.17.108.
220- MC3000_CS_MAINTENANCE   ⇐ Confirm that this massage appears.
220 MC_CS_MAINTENANCE FTP server (Version 6.4/OpenBSD/Linux-ftpd-0.17) ready.
Name (172.31.17.108:tanaka-toshihisa): ⇐ Enter the user name.
331 Password required for root.
Password : ⇐ Enter the password.
```

7. After the login, enter "dir".
   The file names that are saved in the sensor adapter are displayed. Confirm that the file names shown below are shown on the display.

```
Name (172.31.17.108:tanaka-toshihisa):  ⇐ Enter the user name.
331 Password required for root.
Password :  ⇐ Enter the password.
230 User root logged in.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> dir    ⇐ Enter "dir".
200 PORT command successful.
150 Opening ASCII mode data connection for '/bin/ls' .
crw-r--r--   1 root    root    90,    2 Sep 30  2011 2450080_mc_cs_boot.bin
crw-r--r--   1 root    root    90,    4 Sep 30  2011 2450081_mc_cs_mainpg.bin
crw-r--r--   1 root    root    90,    6 Sep 30  2011 2450082_mc_cs_maint.bin
crw-r--r--   1 root    root    90,   12 Sep 30  2011 2450084_mc_io_mainpg.bin
drwr-xr-x    2 root    root          0 Sep 30  2011 backup
226 Transfer complete                              Check these file names.
ftp>
```

8. Enter "bin", and then enter "hash".

9. Enter the command to transfer the firmware program.
   Example: put 24500810_mc_cs_mainpg.bin

10. When you transfer other program, enter the command to transfer the program.

11. Enter "bye" to finish updating the firmware program.

```
ftp> bin   ⇐ Enter necessarily.
200 Type set to I.
ftp> hash   ⇐ Enter necessarily.
Hash mark printing on (1024 bytes/hash mark).
ftp> put 2450081_mc_cs_mainpg.bin ⇐ The command to transfer the firmware program.
local: 2450081_mc_cs_mainpg.bin remote: 2450081_mc_cs_mainpg.bin
200 PORT command successful.
150 Opening BINARY mode data connection for '2450081_mc_cs_mainpg.bin'.
#################################
....
#################################
226 Transfer complete.
10888576 bytes sent in 87.84 secs (121.1 kB/s)
ftp> bye   ⇐ The command to finish the ftp command.
221 Goodbye
```

12. Confirm the firmware program version (see section 2.3.2.).

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APPENDIX 1 EQUIPMENT ID List

Equipment ID	Equipment Name	Gateway Network	Sensor Network	Remarks
MFD001	No.1 MFD	192.168.31.51	172.31.16.51	
MFD002	No.2 MFD	192.168.31.52	172.31.17.51	
MFD003	No.3 MFD	192.168.31.53	172.31.16.52	
MFD004	No.4 MFD	192.168.31.54	172.31.17.52	
MFD005	No.5 MFD	192.168.31.55	172.31.16.53	
MFD006	No.6 MFD	192.168.31.56	172.31.17.53	
MFD007	No.7 MFD	192.168.31.57	172.31.16.54	
MFD008	No.8 MFD	192.168.31.58	172.31.17.54	
MFD009	No.9 MFD	192.168.31.59	172.31.16.55	
MFD010	No.10 MFD	192.168.31.60	172.31.17.55	
MFD011	No.11 MFD	192.168.31.61	172.31.16.56	
MFD012	No.12 MFD	192.168.31.62	172.31.17.56	
MFD013	No.13 MFD	192.168.31.63	172.31.16.57	
MFD014	No.14 MFD	192.168.31.64	172.31.17.57	
MFD015	No.15 MFD	192.168.31.65	172.31.16.58	
MFD016	No.16 MFD	192.168.31.66	172.31.17.58	Default setting for processor unit (ECDIS)
ECD001	No.1 ECDIS	192.168.31.1	172.31.16.1	
ECD002	No.2 ECDIS	192.168.31.2	172.31.17.1	
ECD003	No.3 ECDIS	192.168.31.3	172.31.16.2	
ECD004	No.4 ECDIS	192.168.31.4	172.31.17.2	
ECD005	No.5 ECDIS	192.168.31.5	172.31.16.3	
ECD006	No.6 ECDIS	192.168.31.6	172.31.17.3	
ECD007	No.7 ECDIS	192.168.31.7	172.31.16.4	
ECD008	No.8 ECDIS	192.168.31.8	172.31.17.4	
ECD009	No.9 ECDIS	192.168.31.9	172.31.16.5	
ECD010	No.10 ECDIS	192.168.31.10	172.31.17.5	
ECD011	No.11 ECDIS	192.168.31.11	172.31.16.6	
ECD012	No.12 ECDIS	192.168.31.12	172.31.17.6	
ECD013	No.13 ECDIS	192.168.31.13	172.31.16.7	
ECD014	No.14 ECDIS	192.168.31.14	172.31.17.7	
ECD015	No.15 ECDIS	192.168.31.15	172.31.16.8	
ECD016	No.16 ECDIS	192.168.31.16	172.31.17.8	
RAD001	No.1 Radar	192.168.31.21	172.31.16.11	
RAD002	No.2 Radar	192.168.31.22	172.31.17.11	
RAD003	No.3 Radar	192.168.31.23	172.31.16.12	
RAD004	No.4 Radar	192.168.31.24	172.31.17.12	
RAD005	No.5 Radar	192.168.31.25	172.31.16.13	
RAD006	No.6 Radar	192.168.31.26	172.31.17.13	
RAD007	No.7 Radar	192.168.31.27	172.31.16.14	
RAD008	No.8 Radar	192.168.31.28	172.31.17.14	
RAD009	No.9 Radar	192.168.31.29	172.31.16.15	
RAD010	No.10 Radar	192.168.31.30	172.31.17.15	

Equipment ID	Equipment Name	Gateway Network	Sensor Network	Remarks
CRA001	No.1 Chart Radar	192.168.31.31	172.31.16.21	Default setting for processor unit (Chart radar)
CRA002	No.2 Chart Radar	192.168.31.32	172.31.17.21	
CRA003	No.3 Chart Radar	192.168.31.33	172.31.16.22	
CRA004	No.4 Chart Radar	192.168.31.34	172.31.17.22	
CRA005	No.5 Chart Radar	192.168.31.35	172.31.16.23	
CRA006	No.6 Chart Radar	192.168.31.36	172.31.17.23	
CRA007	No.7 Chart Radar	192.168.31.37	172.31.16.24	
CRA008	No.8 Chart Radar	192.168.31.38	172.31.17.24	
CRA009	No.9 Chart Radar	192.168.31.39	172.31.16.25	
CRA010	No.10 Chart Radar	192.168.31.40	172.31.17.25	
RAS001	No.1 Radar Sensor	192.168.31.101	-	Default setting for radar processor unit
RAS002	No.2 Radar Sensor	192.168.31.102	-	
RAS003	No.3 Radar Sensor	192.168.31.103	-	
RAS004	No.4 Radar Sensor	192.168.31.104	-	
RAS005	No.5 Radar Sensor	192.168.31.105	-	Do not Select.
RAS006	No.6 Radar Sensor	192.168.31.106	-	
RAS007	No.7 Radar Sensor	192.168.31.107	-	
RAS008	No.8 Radar Sensor	192.168.31.108	-	
RAS009	No.9 Radar Sensor	192.168.31.109	-	
RAS010	No.10 Radar Sensor	192.168.31.110	-	
MCV001	No.1 Sensor Adapter	-	172.31.16.101	
MCV002	No.2 Sensor Adapter	-	172.31.17.101	
MCV003	No.3 Sensor Adapter	-	172.31.16.102	
MCV004	No.4 Sensor Adapter	-	172.31.17.102	
MCV005	No.5 Sensor Adapter	-	172.31.16.103	
MCV006	No.6 Sensor Adapter	-	172.31.17.103	
MCV007	No.7 Sensor Adapter	-	172.31.16.104	
MCV008	No.8 Sensor Adapter	-	172.31.17.104	
MCV009	No.9 Sensor Adapter	-	172.31.16.105	
MCV010	No.10 Sensor Adapter	-	172.31.17.105	
MCV011	No.11 Sensor Adapter	-	172.31.16.106	
MCV012	No.12 Sensor Adapter	-	172.31.17.106	
MCV013	No.13 Sensor Adapter	-	172.31.16.107	
MCV014	No.14 Sensor Adapter	-	172.31.17.107	
MCV015	No.15 Sensor Adapter	-	172.31.16.108	
MCV016	No.16 Sensor Adapter	-	172.31.17.108	Default setting for sensor adapter (ECDIS only)