

FURUNO

OPERATOR'S MANUAL

SC Setting Tool

(Applicable model: SC-33)

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.
- Windows and Visual C++ are a registered trademark of Microsoft Corporation in the United States and other countries.

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FOREWORD

Introduction

This manual provides how to setup the SATELLITE COMPASS™, using the SC setting tool.

The SC setting tool run on a commercially available PC which is connected to the SATELLITE COMPASS™ through the NMEA2000 network. Use this software for the initial setting after the installation, setting adjustment or performance check in the maintenance. This software is available for the SC-33.

This software can be downloaded from FURUNO Tech-Net.

Standards Used in this Manual

Display examples in this manual are taken from a the Windows®7 PC. Menus and settings may differ slightly depending on your operating system.

1. OPERATIONAL OVERVIEW

1.1 Minimum PC Requirements

The following table shows the minimum specifications required to run the SC setting tool:

Item	Requirements
CPU	1 GHz or more
RAM	1 GB for 32bit; 2 GB for 64bit
Screen Resolution	1280×720 or more
Operating System (OS)	Windows®7 (32 bit, 64 bit), Windows®10 (32 bit, 64 bit),
OS Language	English or Japanese
Interface	USB port (USB2.0 compatible)

1.2 Connection between PC and NMEA2000 Network

Connect the PC and SATELLITE COMPASS™ via the NMEA2000 network. Prepare a CAN-USB converter, and a drop cable for the converter (both items supplied locally), between the PC and the NMEA2000 backbone.

CAN-USB converter

Prepare either one of the following CAN-USB converters:

- Manufacturer: KVASER, Product name: USBcan II
- Manufacturer: LAWICEL AB, Product name: CANUSB

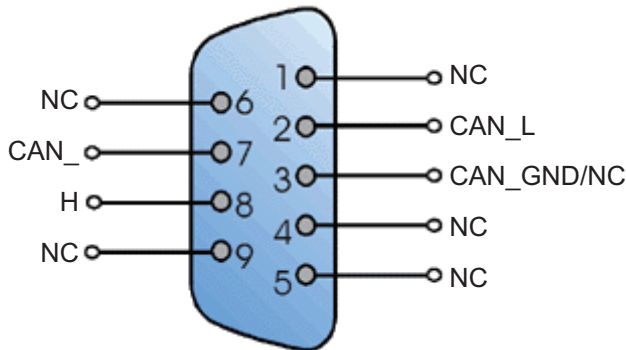
Note: A software driver is required to use the CAN-USB converter.

- For USB canII: Use the program CD supplied with the CAN-USB converter to install the driver. When you install the driver, select the appropriate driver according to the OS for your PC.
- For CANUSB: Download the driver for 32 bit OS from the following URL and install it. Even if you use the PC of a 64 bit OS, you should also install the driver for 32 bit OS.
<http://www.ftdichip.com/Drivers/D2XX.htm>

For detailed installation instructions, refer to the operator's manual of the CAN-USB converter or the official website of the manufacturer.

Drop cable

Prepare the drop cable (type: M12-05BFFM-010/020/060) between the CAN-USB converter and NMEA2000 backbone. Attach a D-SUB (9 pin) connector to the loose end of the drop cable, referring to the following table.



Pin No.	Signal	Color
1	NC	-
2	CAN_L	Blue
3	CAN_GND/NC	Drain
4	NC	-
5	NC	-
6	NC	-
7	CAN_H	White
8	NC	-
9	NC	-

Note: Red and black wires of the M12-05BFFM-010/020/060 cable are not used.

1.3 Destination to Save

Download the SC setting tool from FURUNO Tech-Net in advance and save the executable file of the SC setting tool (file name: "SC_Setting_Tool.exe") in the following location (folder). The SC setting tool does not require installation.

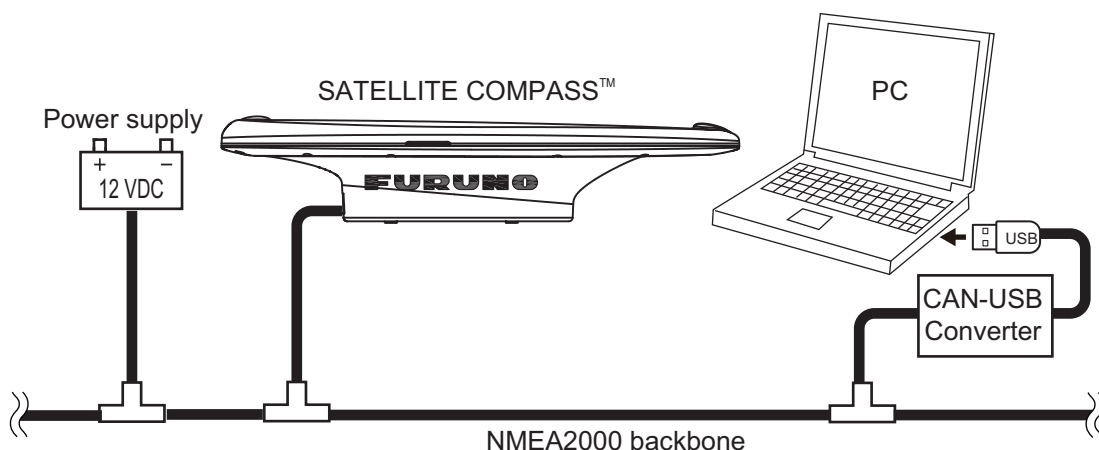
- For 32 bit OS: C:\Program Files\Furuno\SC_Setting_Tool
- For 64 bit OS: C:\Program Files(x86)\Furuno\SC_Setting_Tool

Note: Create a shortcut for the executable file as required.

1.4 How to Start and Close the SC Setting Tool

1.4.1 How to connect a PC to the SATELLITE COMPASS™

1. Make the connections shown below.



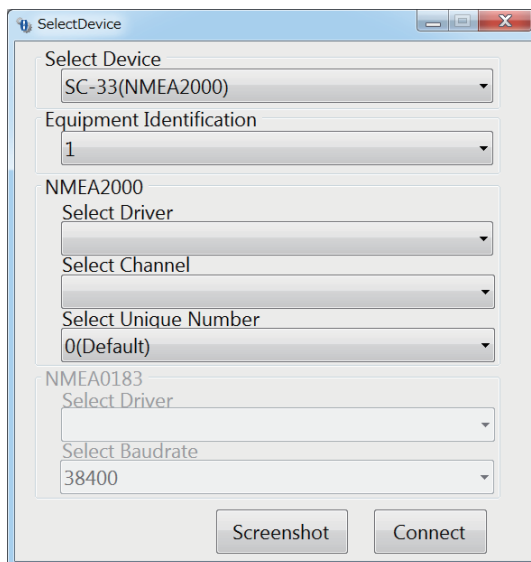
1. OPERATIONAL OVERVIEW

2. Turn the power on the SATELLITE COMPASS™ that you want to setup.

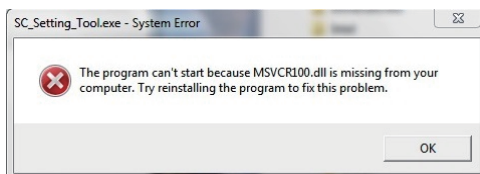
Note: When multiple SATELLITE COMPASS™ are connected in the same NMEA2000 network, the SC setting tool cannot find and connect to the SATELLITE COMPASS™ correctly. Disconnect all SATELLITE COMPASS™ except the unit to be setup. Other NMEA2000 devices do not need to be disconnected.

3. Activate the executable file of the SC setting tool (file name: "SC_Setting_Tool.exe") on your PC.

The [Select Device] dialog box appears.



Note: When the following message appears for the first time the SC setting tool is activated, install “Microsoft Visual C++® 2010 SP1 Redistributable Package (x86)”. The installer file (vc_redist_x86.exe) is supplied with the SC setting tool. For how to install, follow the on-screen installation instructions.

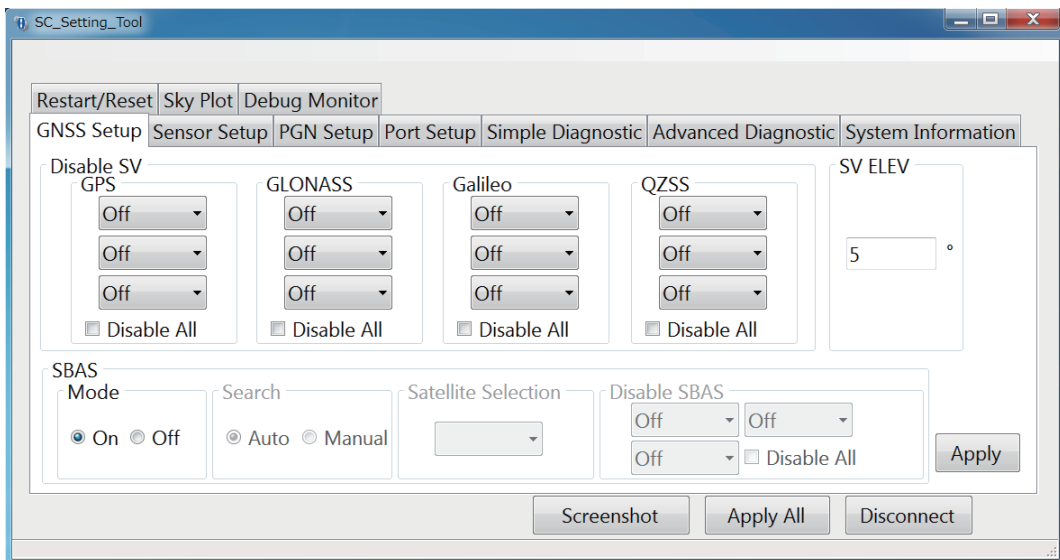


4. Set the following items, referring to the following table.

Menu Item		Remarks
Select Device		Select the model number to be connected.
Equipment Identification		Select the equipment ID of the SATELLITE COMPASS™ to be connected. The default equipment ID is “1”. For the initial setting, select “1”. If the equipment ID has been changed from the default, you should select the appropriate equipment ID, according to the setting on the [Sensor Setup] tab (see section 2.3).
NMEA2000	Select Driver	Select the driver type. Driver type depends the CAN-USB converter to be used. <ul style="list-style-type: none"> • For CANUSB: Select [CanUSB.dll]. • For USBcan II: Select [KVASER.dll].
	Select Channel	Select the channel name for CAN connection. The channel name shown in the drop down list changes according to the CAN-USB converter to be used.

Menu Item		Remarks
NMEA2000	Select Unique Number	Assign a unique identification number to the PC (default setting: [0 (Default)]). Setup this menu item only when you connect multiple PCs in the same NMEA2000 network. Be sure to assign a different number to each PC.
NMEA0183	Select Driver	Not used. Reserved for future use.
	Select Baudrate	Not used. Reserved for future use.
Screenshot		Capture the screenshot of the [Select Device] dialog box (file format: bit map). When you click the [Screenshot] button, the file destination setting dialog box appears. Enter the file name and file location to save the screenshot.
Connect		Connect the SATELLITE COMPASS™ to be selected on the [Select Device] dialog box. The [SC_Setting_Tool] dialog box appears after clicking the [Connect] button.

5. Click the [Connect] button to connect the SATELLITE COMPASS™. The [SC_Setting_Tool] dialog box appears. All setting items on the [SC_Setting_Tool] dialog box are grayed out while connecting the SATELLITE COMPASS™. When the connection is established correctly, the current settings of the SATELLITE COMPASS™ are shown. For details about the [SC_Setting_Tool] dialog box and each setting item, see chapter 2.




Note: The SC setting tool may not show the setting items correctly due to the OS font size setting. For best performance, the OS font size should be “100%”. Set font size as follows:

- Windows®7: Click the desktop window. → Personalize → Display → Smaller
- Windows®10: Start → Setting → System → Display → Change the size of text, apps, and other items

1. OPERATIONAL OVERVIEW

1.4.2 How to close the SC setting tool

1. If the settings are not applied to the SATELLITE COMPASS™, click the [Apply] or [Apply All] button on the [SC_Setting_Tool] dialog box to apply the settings.
2. Click the [Disconnect] button to disconnect from the SATELLITE COMPASS™ and go back to the [Select Device] dialog box.
3. Click the close button () to close the SC setting tool.

1.5 How to Delete the SC Setting Tool

The SC setting tool does not require installation. Therefore, software uninstall procedure is not also required. To delete the SC setting tool, delete the executable file and folder for the SC setting tool. The folder location for the SC setting tool is shown as follows:

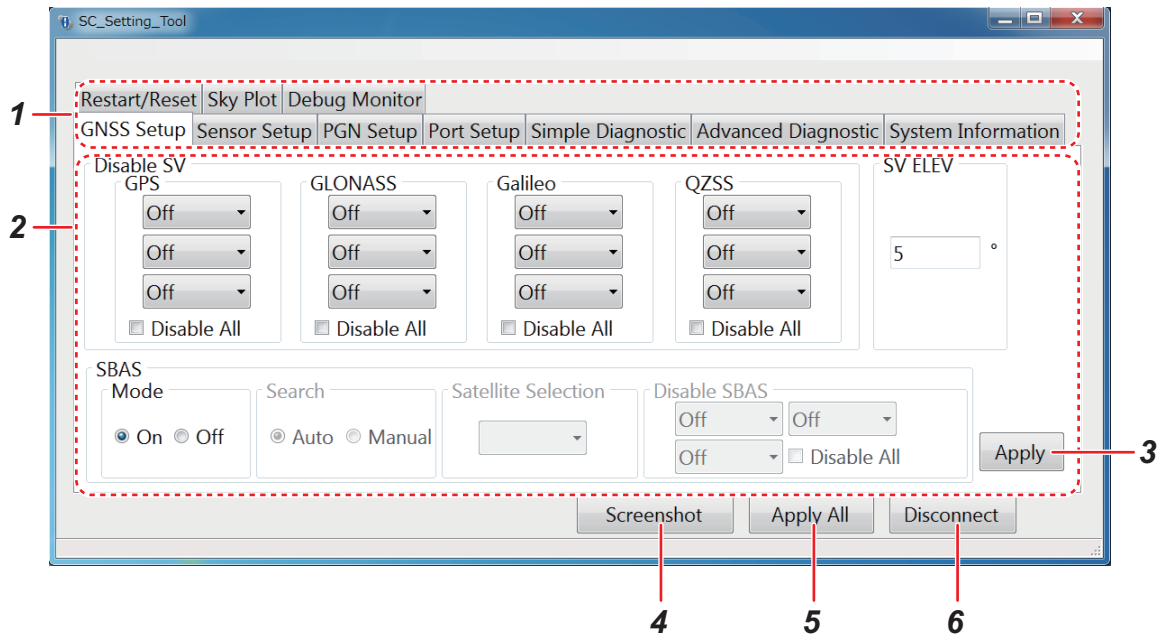
- For 32 bit OS: C:\Program Files\Furuno\SC_Setting_Tool
- For 64 bit OS: C:\Program Files(x86)\Furuno\SC_Setting_Tool

Note: If you created a short cut for the SC setting tool, delete the short cut file. The short cut file is no longer used when the SC setting tool is deleted.

2. HOW TO SETUP THE MENU

2.1 Display Layout

Note: If connection between the PC and SATELLITE COMPASS™ is interrupted or stopped (PC battery, cable connection issues, etc), some or all settings may not be applied to the SATELLITE COMPASS™. If this happens, reconnect and repeat the settings procedure.



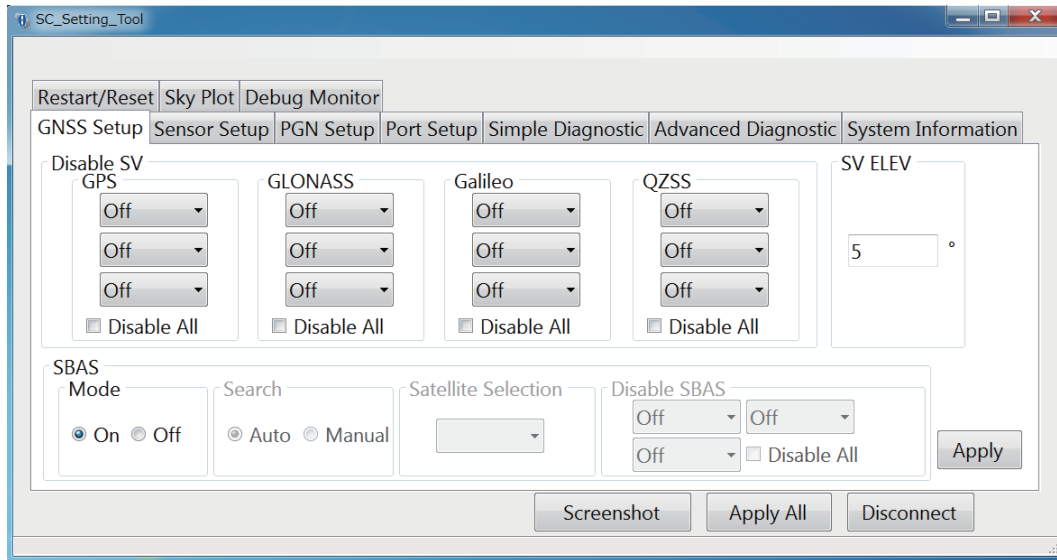
No.	Name	Remarks
1	Tab buttons	Settings items available in the "View Area" change depending on the tab selected. For tab details, see the following sections. Note: The following tabs are not used. You can open the tab, however all setting items are grayed out and cannot be adjusted. <ul style="list-style-type: none"> • [Port Setup] tab • [Advanced Diagnostic] tab • [System Information] tab • [Restart/Reset] tab • [Debug Monitor] tab
2	View Area	Setting items and setting values are displayed according to the selected tab. Settings which have not yet been applied to the SATELLITE COMPASS™ are highlighted in blue; items which cannot be adjusted appear in gray.
3	[Apply] button	Click this button to apply the settings on the current displayed tab. The [Apply], [Apply All] and [Disconnect] buttons are grayed out while applying the settings.
4	[Screenshot] button	Capture a screenshot of the [SC_Setting_Tool] dialog box (file format: bit map). When you click the [Screenshot] button, the file destination setting dialog box appears. Enter the file name and file location to save the screenshot.
5	[Apply All] button	Click this button to apply the settings on all tabs. The [Apply], [Apply All] and [Disconnect] buttons are grayed out while applying the settings.

2. HOW TO SETUP THE MENU

No.	Name	Remarks
6	[Disconnect] button	Disconnect from the SATELLITE COMPASS™ and go back to the [Select Device] dialog box.

2.2 [GNSS Setup] Tab

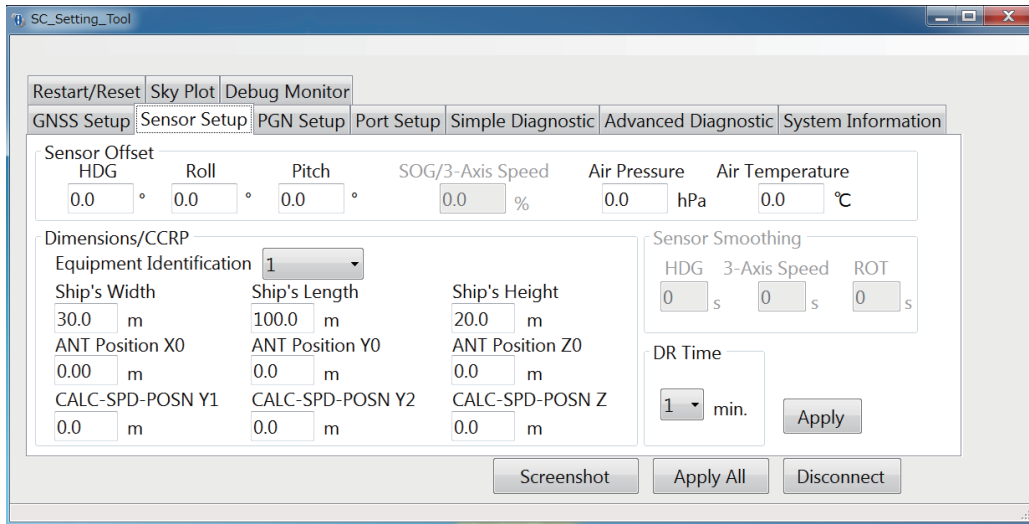
You can disable (ignore) satellites and adjust the elevation mask from the [GNSS Setup] tab.



Menu Item		Remarks
Disable SV	GPS	You can ignore satellites by specifying the satellite number with each positioning system (GPS, GLONASS, Galileo, QZSS). A maximum of three satellites can be registered to be ignored. When you check the [Disable All] checkbox, all satellites of selected positioning system are ignored. In this case, the drop down list for selecting the satellite number is grayed out.
	GLONASS	
	Galileo	
	QZSS	
SV ELEV		Adjust the elevation mask angle. This equipment does not track satellites with an elevation angle lower than the angle set here. A higher elevation mask angle increases the positioning accuracy, but the number of the available satellites may be decreased and the equipment may not be able to obtain an accurate position fix.
SBAS	Mode	Enable/disable correction from SBAS (Satellite-based Augmentation System). <ul style="list-style-type: none"> • [On]: Enable correction from SBAS. • [Off]: Disable correction from SBAS.
	Search	Not used. Reserved for future use.
	Satellite Selection	Not used. Reserved for future use.
	Disable SBAS	Not used. Reserved for future use.

2.3 [Sensor Setup] Tab

Enter the ship's information and installation location of the SATELLITE COMPASS™ and adjust the sensor offset values on the [Sensor Setup] tab.



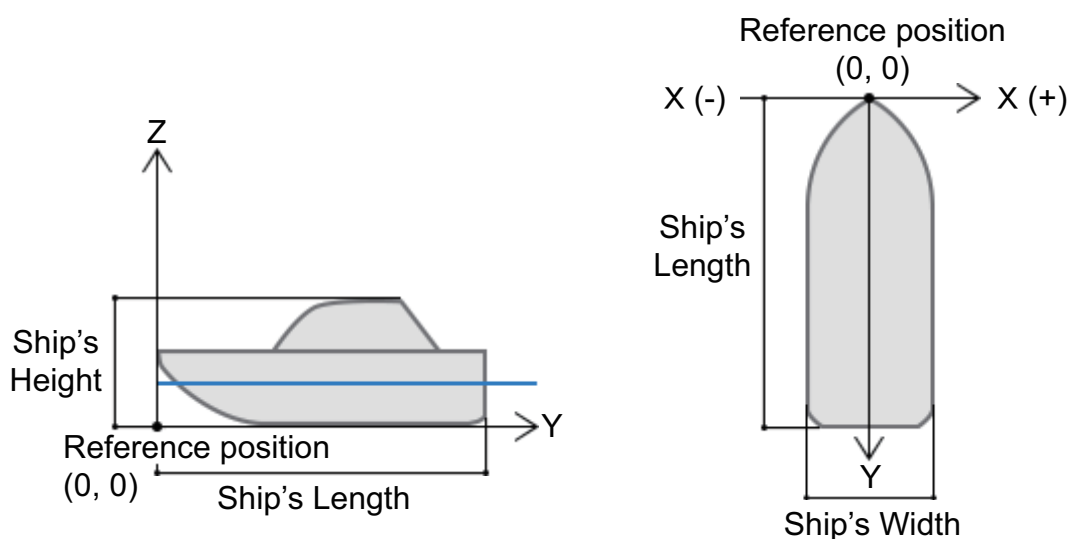
Menu Item		Remarks
Sensor Offset	HDG	Offset the heading angle. When the heading angle is skewed right, enter a negative value. When the heading angle is skewed left, enter a positive value,
	Roll	Offset the roll angle.
	Pitch	Offset the pitch angle.
	SOG/3-Axis Speed	Not used. Reserved for future use.
	Air Pressure	Offset the air pressure value.
	Air Temperature	Offset the air temperature value.
Dimensions/ CCRP	Equipment Identification	Assign the equipment ID of the SATELLITE COMPASS™. When multiple SATELLITE COMPASS™ are connected in the same NMEA2000 network, be sure to assign a different equipment ID to each SATELLITE COMPASS™. Note: The equipment ID is required to connect with the PC (SC setting tool). When you change the equipment ID, record the equipment ID information for each SATELLITE COMPASS™.
	Ship's Width	Set the ship's width.
	Ship's Length	Set the ship's length.
	Ship's Height	Set the ship's height.
	ANT Position X0	Set the port-starboard (Lateral) location of the SATELLITE COMPASS™. Enter a negative value for port-side, positive value for starboard-side. The center of the vessel is "0 m".
	ANT Position Y0	Set the bow-stern (Longitudinal) location of the SATELLITE COMPASS™. Calculated from the center of the bow.
ANT Position Z0	Set the height of the SATELLITE COMPASS™, from the bottom of the ship.	

2. HOW TO SETUP THE MENU

Menu Item		Remarks
Dimensions/ CCRP	CALC-SPD-POSN Y1	Set the bow-stern location for calculating the 3-axis speed. Ship's speed can be measured at two locations in addition to the antenna position. Enter the backward distance from the reference position (center of the bow) to the position where you want to measure the ship's speed. Normally, enter the bow position (Y1) and stern position (Y2). Note: In the default setting, Y1 and Y2 are entered as follows: <ul style="list-style-type: none"> • Y1: 0 m (bow position) • Y2: 20 m (20 m backward from bow position) Enter the appropriate value according to the ship's size, to improve the accuracy of the 3-axis speed.
	CALC-SPD-POSN Y2	
	CALC-SPD-POSN Z	Set the height for calculating the 3-axis speed. Enter the distance from the bottom of the ship to the position where you want to measure the ship's speed. For example, enter the draft value when you want to measure the speed at draft position.
Sensor Smoothing	HDG	Not used. Reserved for future use.
	3-Axis Speed	Not used. Reserved for future use.
	ROT	Not used. Reserved for future use.
DR Time		When the SATELLITE COMPASS™ cannot receive the signal from the satellite, the SATELLITE COMPASS™ keeps outputting the heading data to use dead reckoning for the time set here. If the signal from the satellite cannot be retrieved within the time set here, the SATELLITE COMPASS™ stops outputting the heading data.

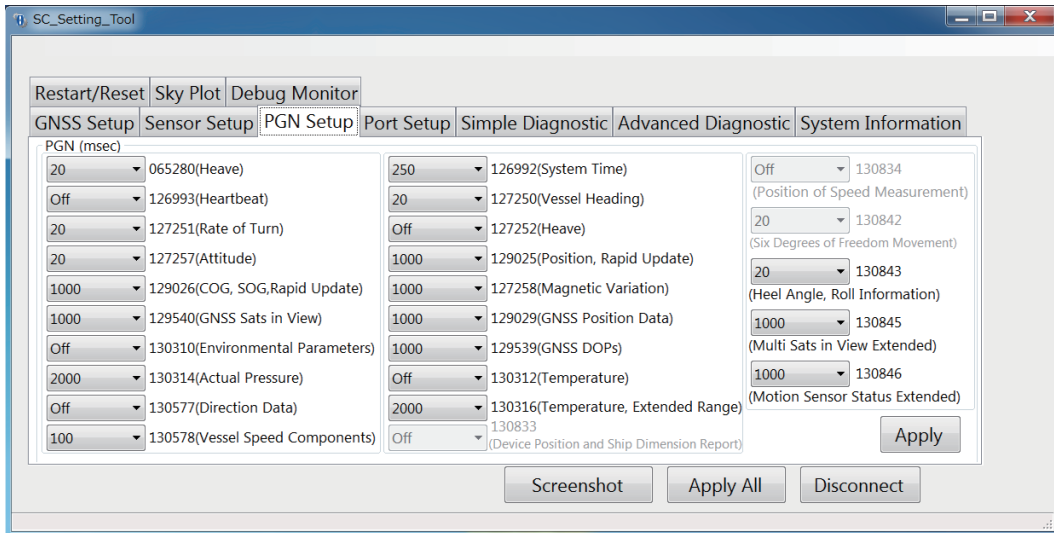
Reference position

The reference position for installation location and calculating position of the 3-axis speed is shown in the following figure:



2.4 [PGN Setup] Tab

You can enable/disable PGN output from the SATELLITE COMPASS™ and adjust transmission rate on the [PGN Setup] tab.



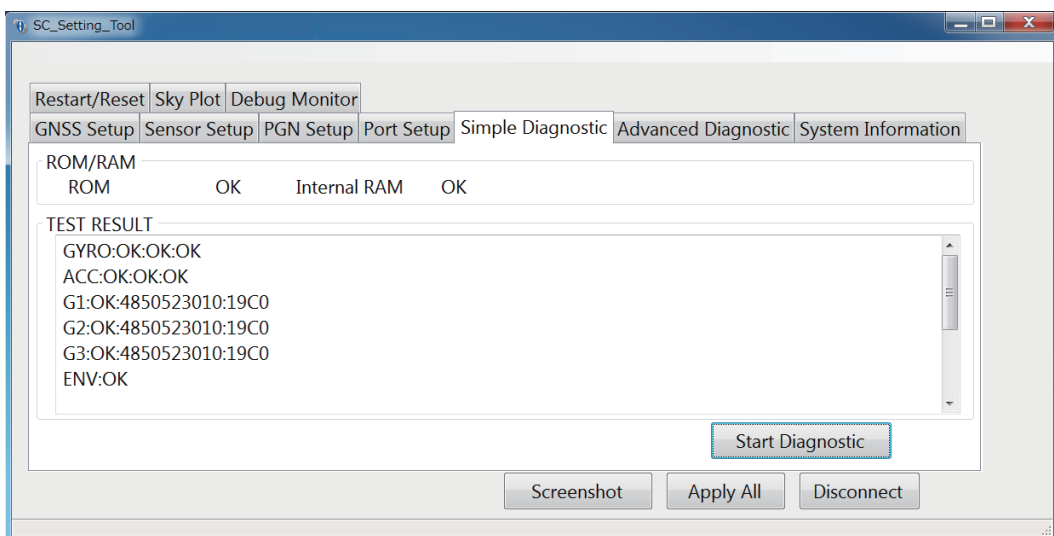
How to set the transmission rate

All PGNs that the connected SATELLITE COMPASS™ can output are shown on the [PGN Setup] tab. Unavailable PGNs are grayed out and the setting cannot be adjusted.

When you change the transmission rate, click the drop down list for the PGN to be set and select the appropriate value. If you want to disable the PGN, select [Off]. The setting range changes according to the PGN. For the setting range of each PGN, see "MENU TREE" on page AP-1.

2.5 [Simple Diagnostic] Tab

You can perform the simple diagnostic test on the [Simple Diagnostic] tab.



2. HOW TO SETUP THE MENU

Simple diagnostic test

Click the [Stat Diagnostic] button on the [Simple Diagnostic] tab to start the simple diagnostic test. The simple diagnostic test checks the performance of the SATELLITE COMPASS™. The following table shows the test result of the simple diagnostic test:

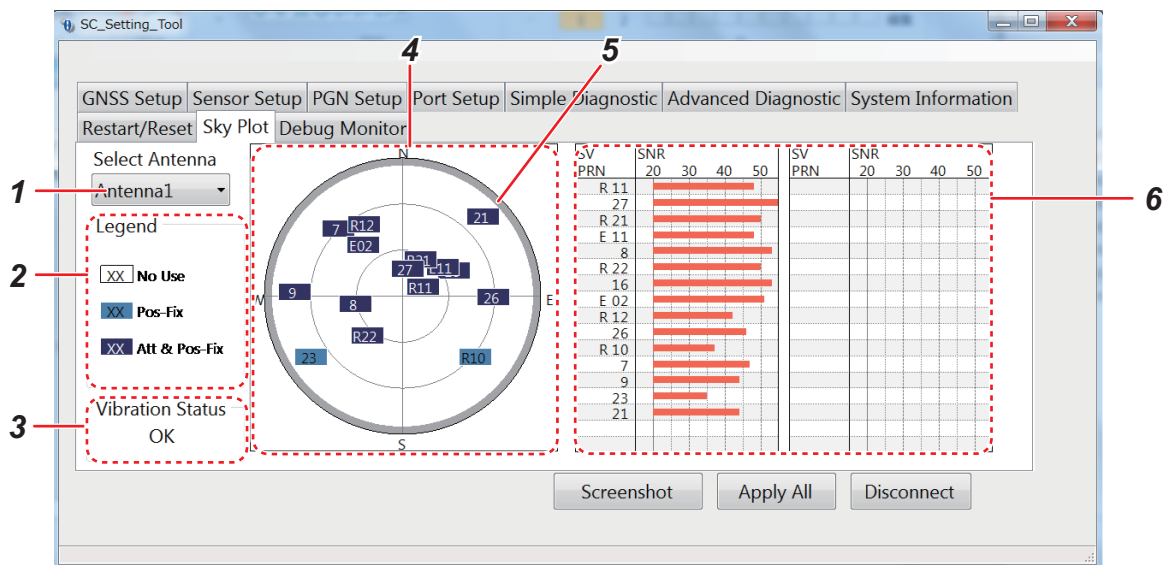
Test Result		Remarks
ROM/RAM	ROM	ROM test result (OK or NG).
	Internal RAM	Internal RAM test result (OK or NG).
TEST/RESULT	GYRO	Gyro sensor test result (OK or NG). From left: X-axis, Y-axis, Z-axis test result
	ACC	Acceleration sensor test result (OK or NG). From left: X-axis, Y-axis, Z-axis test result
	G1	Memory test result for GNSS core 1 to 3 (OK or NG) and version information.
	G2	
	G3	
	ENV	Air pressure sensor test result (OK or NG).
	MAG	Magnetic sensor test result (OK or NG).
	ANT	The software version of the SATELLITE COMPASS™ and software released date (yyyy/mm/dd/hh/mm).
	MT	Operating time of the MAIN board (unit: hour).
	ST	Operating time of the SUB_IMU board (unit: hour).

2.6 [Sky Plot] Tab

The [Sky Plot] tab shows the available satellites and their elevation.

Note: The following PGNs should be output from the SATELLITE COMPASS™ to show the information on the [Sky Plot] tab.

- PGN: 127250 (Vessel Heading)
- PGN: 130845 (Multi Sats in View Extended)
- PGN: 130846 (Motion Sensor Status Extended)

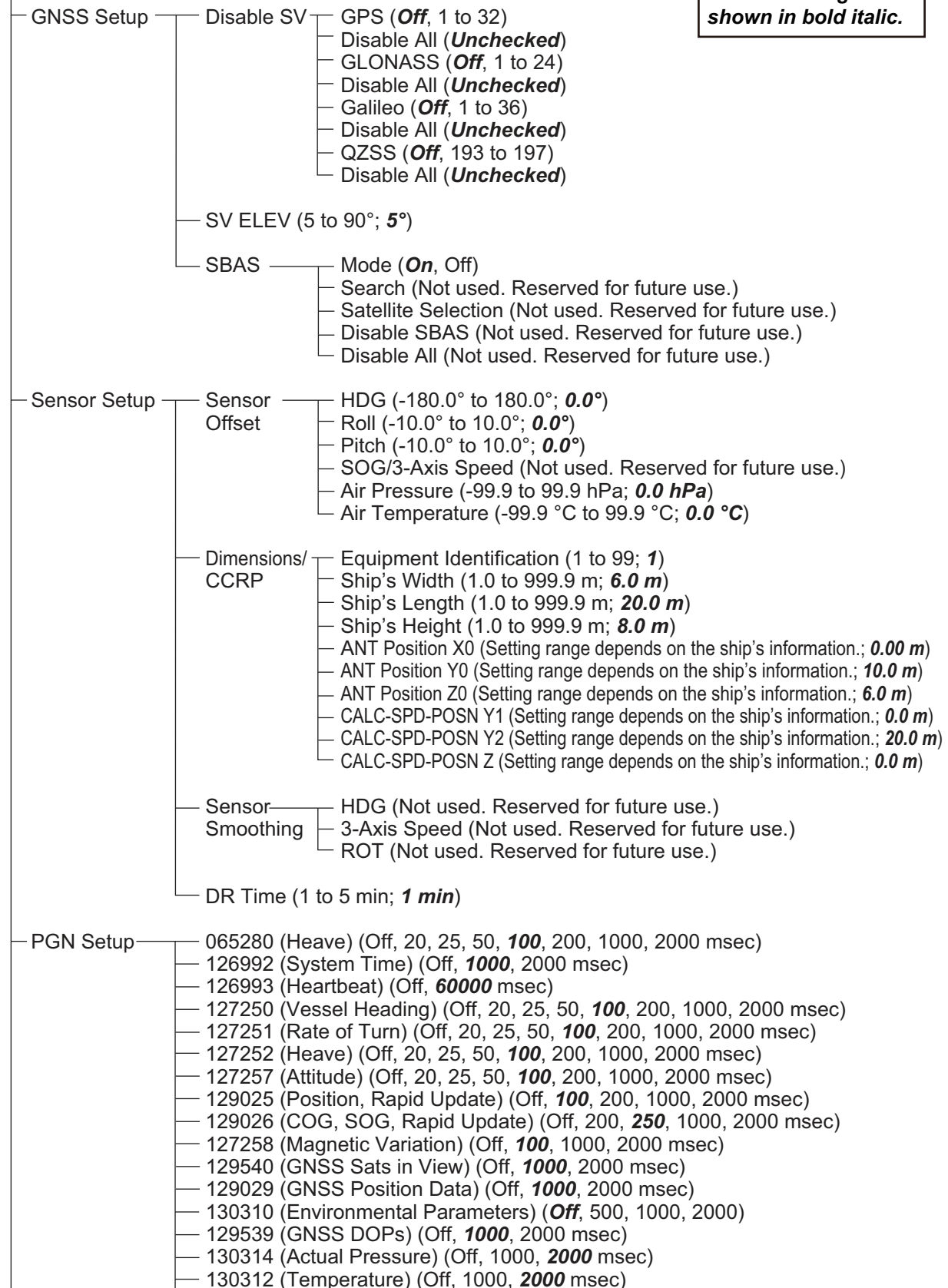


No.	Name	Remarks
1	Select Antenna	Select the antenna number to show the satellite information ([Antenna 1] to [Antenna 4]). Note: [Antenna 1] and [Antenna 2] are available for SC-33. However you can select [Antenna 3] and [Antenna 4], the satellite information is not displayed.
2	Legend	The legend of the satellite location for positioning: <ul style="list-style-type: none"> • [No Use]: Not used for positioning. • [Pos-Fix]: Used for positioning fix only. • [Att & Pos Fix]: Used for attitude and positioning fix.
3	Vibration Status	The vibration and impact test result (OK or NG). This test result indicates that the installation location is appropriate or not.
4	Satellite location	Shows the available satellites and their elevation, which are detected by the sensor selected at [Select Antenna]. When the satellite position is overlapped, the satellite whose elevation angle is the most highest is displayed on other satellite. The center of the circle indicates the own ship position and elevation angle "90°". The satellite number for each positioning system shows as follows: <ul style="list-style-type: none"> • GPS: 1 to 32 • GLONASS: R01 to R24 • Galileo: E01 to E36 • QZSS: 193 to 197
5	Elevation mask angle	Gray shaded area indicates area for the elevation mask that is set at [SV ELEV] on the [GNSS Setup] tab. The equipment does not track the satellite in this area.
6	Receiver signal level	Shows the SNR (signal-to-noise ratio) with the bar graph format, in descending order of the elevation angle. When the SNR is 40 or higher, the reception environment is good condition.

APPENDIX 1 MENU TREE

[SC_Setting_Tool] dialog box

Default settings are shown in bold italic.



①

②

- ①
 - ②
 - 130577 (Direction Data) (Off, 20, 25, 100, 200, **1000**, 2000 msec)
 - 130316 (Temperature, Extended Range) (Off, 1000, **2000** msec)
 - 130578 (Vessel Speed Components) (Off, 200, **250**, 1000, 2000 msec)
 - 130833 (Device Position and Ship Dimension Report) (Not used.)
 - 130834 (Position of Speed Measurement) (Not used.)
 - 130842 (Six Degrees of Freedom Movement) (Not used.)
 - 130843 (Heel Angle, Roll Information) (Off, 20, 25, 50, **100**, 200 msec)
 - 130845 (Multi Sats in View Extended) (Off, **1000** msec)
 - 130846 (Motion Sensor Status Extended) (Off, **1000** msec)
 - Port Setup (Not used. Reserved for future use.)
 - Simple Diagnostic- Start Diagnostic (Shows the simple diagnostic test results.)
 - Advanced Diagnostic (Not used. Reserved for future use.)
 - System Information (Not used. Reserved for future use.)
 - Restart/Reset (Not used. Reserved for future use.)
 - Sky Plot (Shows the available satellites and their elevation.)
 - Debug Monitor (Not used. Reserved for future use.)

ECF

(Elemental Chlorine Free)

The paper used in this manual
is elemental chlorine free.

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