

# **FURUNO**

## **OPERATOR'S MANUAL**

### *SATELLITE COMPASS*

Model

**SC-30**

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# IMPORTANT NOTICES

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## 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.
- The following concern acts as our importer in Europe, as defined in DECISION No 768/2008/EC.
  - Name: FURUNO EUROPE B.V.
  - Address: Ridderhaven 19B, 2984 BT Ridderkerk, The Netherlands
- All brand and product names are trademarks, registered trademarks or service marks of their respective holders.

## How to discard this product

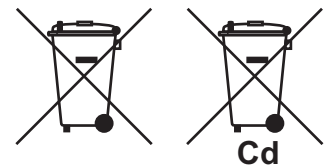
Discard this product according to local regulations for the disposal of industrial waste. For disposal in the USA, see the homepage of the Electronics Industries Alliance (<http://www.eiae.org/>) for the correct method of disposal.

## How to discard a used battery

Some FURUNO products have a battery(ies). To see if your product has a battery, see the chapter on Maintenance. Follow the instructions below if a battery is used. Tape the + and - terminals of battery before disposal to prevent fire, heat generation caused by short circuit.

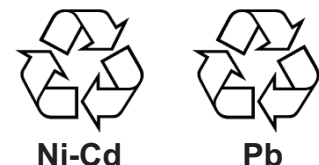
### In the European Union

The crossed-out trash can symbol indicates that all types of batteries must not be discarded in standard trash, or at a trash site. Take the used batteries to a battery collection site according to your national legislation and the Batteries Directive 2006/66/EU.



### In the USA

The Mobius loop symbol (three chasing arrows) indicates that Ni-Cd and lead-acid rechargeable batteries must be recycled. Take the used batteries to a battery collection site according to local laws.





### In the other countries

There are no international standards for the battery recycle symbol. The number of symbols can increase when the other countries make their own recycle symbols in the future.






# SAFETY INSTRUCTIONS

The operator and installer must read the applicable safety instructions before attempting to install or operate the equipment.

|  |   |
|--|---|
|  <b>WARNING</b> | Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. |
|  <b>CAUTION</b> | Indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.  |





|  |  |  |
|--|--|--|
|  Warning, Caution |  Prohibitive Action |  Mandatory Action |
|--|--|--|

## Safety instructions for the operator

|  |  |
|--|--|
|  <b>WARNING</b> |  |
|                | <b>Do not open the equipment.</b><br>Only qualified personnel should work inside the equipment.            |
|               | <b>Do not disassemble or modify the equipment.</b><br>Fire, electrical shock or serious injury can result. |




### **Warning Label**



A warning label is attached to the equipment. Do not remove the label. If the label is missing or illegible, contact a FURUNO agent or dealer about replacement.

|  |
|--|
|  <b>WARNING</b>  |
| To avoid electrical shock, do not remove cover. No user-serviceable parts inside.  |
|                  |
|  |

Name: Warning Label(1)  
Type: 86-003-1011-1  
Code No.: 100-236-231

## Safety instructions for the installer

|   |   |
|---|---|
|  <b>WARNING</b> |   |
|                 | <b>Turn off the power at the switchboard before beginning the installation.</b><br><br>Fire or electrical shock can result if the power is left on.   |
|                | <b>Be sure that the power supply is compatible with the voltage rating of the equipment.</b><br><br>Connecting an incompatible power supply can cause fire or damage the equipment. The voltage rating appears on the inlet of power. |

|   |  |                  |
|---|--|------------------|
|  <b>CAUTION</b> |  |                  |
|                  | <b>Observe the following compass safe distances to prevent interference to a magnetic compass:</b> |                  |
|   | Standard compass   | Steering compass |
| SC-30   | 0.40 m   | 0.30 m           |

# TABLE OF CONTENTS

---

- FOREWORD..... iv**
- SYSTEM CONFIGURATION ..... v**
- 1. MOUNTING ..... 1**
  - 1.1 Equipment Lists ..... 1
  - 1.2 Mounting Considerations ..... 2
  - 1.3 Mounting Procedure ..... 7
- 2. WIRING ..... 9**
  - 2.1 NMEA 2000 Network Connection ..... 9
- 3. NMEA 2000 I/O DATA ..... 10**
  - 3.1 Input Data ..... 10
  - 3.2 Output Data ..... 11
- 4. MAINTENANCE, TROUBLESHOOTING ..... 12**
  - 4.1 Preventive Maintenance ..... 12
  - 4.2 Fuse Replacement ..... 12
  - 4.3 Troubleshooting ..... 13
- SPECIFICATIONS ..... SP-1**
- PACKING LISTS ..... A-1**
- OUTLINE DRAWING ..... D-1**
- INTERCONNECTION DIAGRAM ..... S-1**

# FOREWORD

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## A Word to the Owner of the SC-30

Congratulations on your choice of the FURUNO SC-30 Satellite Compass. We are confident you will see why the FURUNO name has become synonymous with quality and reliability.

Since 1948, FURUNO Electric Company has enjoyed an enviable reputation for quality marine electronics equipment. This dedication to excellence is furthered by our extensive global network of agents and dealers.

This equipment is designed and constructed to meet the rigorous demands of the marine environment. However, no machine can perform its intended function unless installed properly. Please carefully read and follow the recommended procedures for installation.

Thank you for considering and purchasing FURUNO equipment.

## Features

The SC-30 Satellite Compass outputs highly accurate heading, GPS position data and speed and motion data for AIS, ECDIS, ARPA radar, autopilots, etc. Data is output in NMEA 2000<sup>®\*</sup> format, and with connection of the optional interface unit the data can be converted to NMEA 0183 format. Settling time is within three minutes and the follow-up performance is an excellent 45°/s.

- Heading accuracy of  $\pm 1.0^\circ$
- Perfect heading sensor for radar/ARPA, AIS, scanning sonar, etc.
- Outputs accurate heading, position, time, speed, course.
- Pitch and roll output in digital format for ship's motion correction
- Dual antenna system with three axis rate gyro and acceleration sensors
- Data can be output in NMEA 2000 format
- Free from regular maintenance
- Aesthetically pleasing antenna fits nicely on recreational boats

## Program No.

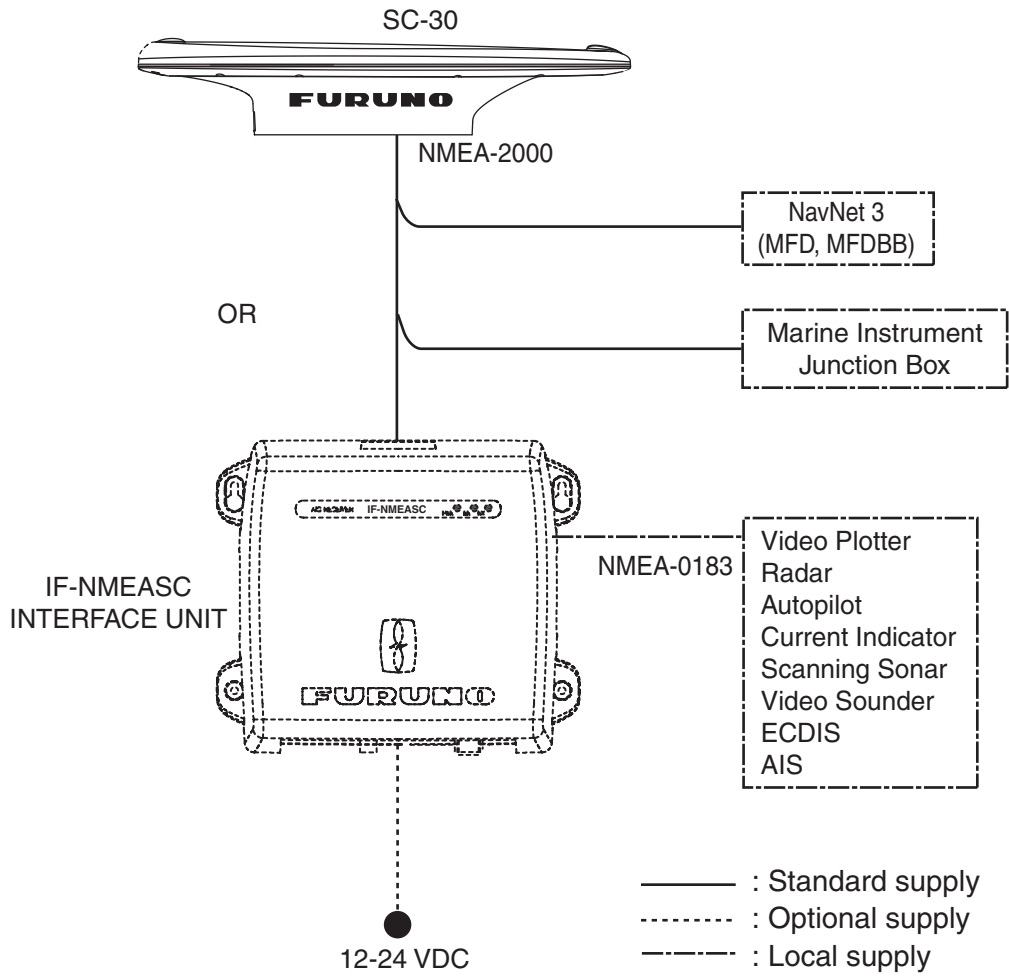
2051586-03.\*\*

\*\* denotes minor modifications.

## CE declaration

With regards to CE declarations, please refer to our website ([www.furuno.com](http://www.furuno.com)), for further information on RoHS conformity declarations.

# SYSTEM CONFIGURATION



# 1. MOUNTING

## 1.1 Equipment Lists

### Standard supply

| Name                   | Type                 | Code No.    | Qty             | Remarks   |
|------------------------|----------------------|-------------|-----------------|---|
| Sensor                 | SC-30                | -           | 1               |   |
| Installation Materials | CP20-02900 NAVNET3   | 000-011-455 | 1<br>Select one | With cable MJ-A10SPF0016-060C (6 m) and Installation materials CP20-02901*  |
|                        | CP20-02910           | 000-011-459 |                 | With cable MJ-A10SPF0017-150C (15 m) and Installation materials CP20-02901* |
|                        | CP20-02920 IF-NMEASC | 000-011-461 |                 | With cable MJ-A10SPF0015-150C (15 m) and Installation materials CP20-02901* |
|                        | CP20-02901*          | 001-019-690 |                 | No cable  |
| Spare Parts            | SP20-01201           | 001-019-740 | 1               | Fuse FGBO 125V 1A, 3 pcs., (for use w/MJ-A10SPF0017-150C)                   |

\* See packing list at back of manual for details.

### Optional supply

| Name                   | Type               | Code No.       | Qty | Remarks                          |
|------------------------|--------------------|----------------|-----|----------------------------------|
| Interface Unit         | IF-NMEASC          | -              | 1   | See OME-72651, issued separately |
| Bird-Repellent Fixture | OP20-36            | 004-380-830    | 4   |                                  |
| Cable Assy.            | MJ-A10SPF0017-300C | 000-166-890-10 | 1   | 30 m, $\phi$ 8                   |
|                        | MJ-A10SPF0015-300C | 000-166-892-10 |     | 30 m, $\phi$ 10                  |
|                        | MJ-A10SPF0016-060C | 000-166-887-10 |     | 6 m, $\phi$ 8                    |
|                        | MJ-A10SPF0017-150C | 000-166-889-10 |     | 15 m, $\phi$ 8                   |
|                        | MJ-A10SPF0015-150C | 000-166-891-10 |     | 15 m, $\phi$ 10                  |

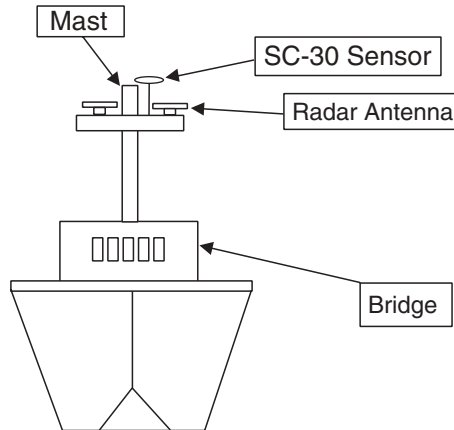
## 1.2 Mounting Considerations

In addition to the considerations described in this section, keep the length of the sensor cable in mind when selecting a mounting location.

### General considerations

#### ***Mount the sensor above radar mast***

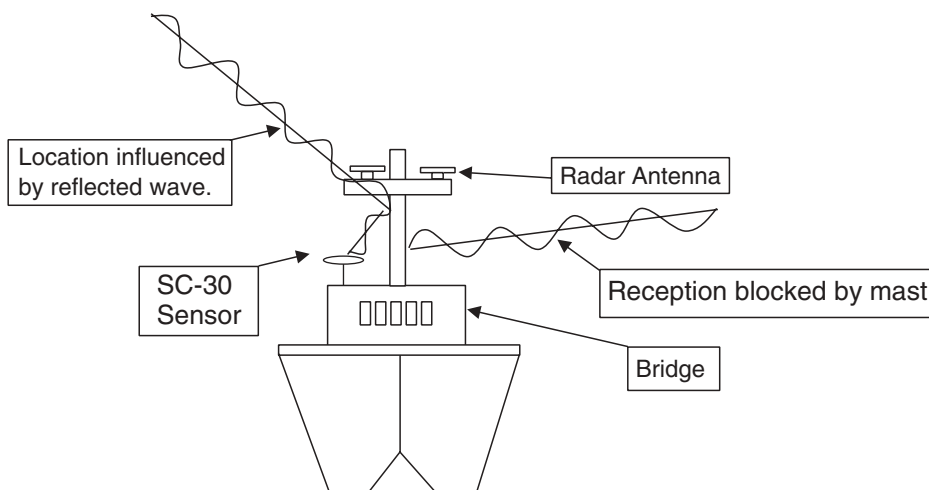
Like in the figure below, mount the SC-30 sensor above a radar mast. This provides an unobstructed path between the sensor and the satellite, regardless of vessel heading. Follow the procedure on the next page to choose an installation site.



*Sensor mounted above antennas and structures*

#### ***If sensor cannot be installed above radar mast***

If absolutely impossible to do otherwise, the sensor may be installed below a radar mast. However, certain guidelines must be followed to prevent the shading and multipath problems which occur as shown in the figure below. Follow the procedure on the next page to choose an installation site.



*Problems associated with mounting sensor below a radar mast*

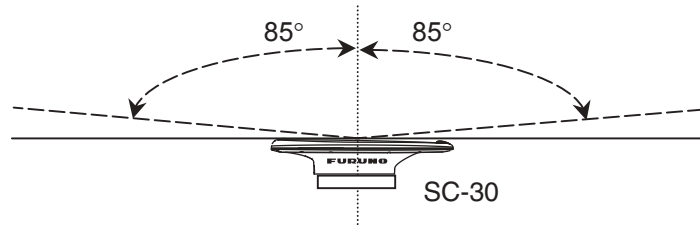


**Selecting the installation site**

The installation site must satisfy the four conditions described in this section. After choosing the site, determine installation height, following the procedure in the next section.

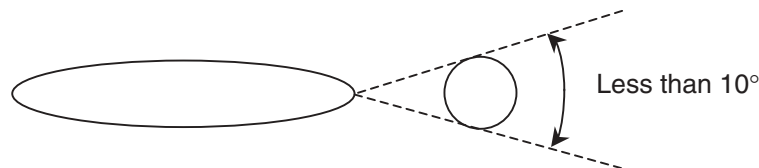
**CONDITION 1: Locate the SC-30 away from masts that might prevent reception of the GPS signal**

- Install the sensor where the field of view against zenith is at least  $\pm 85^\circ$ . The installation site should be as high as possible, above masts, etc. which might interfere with reception.



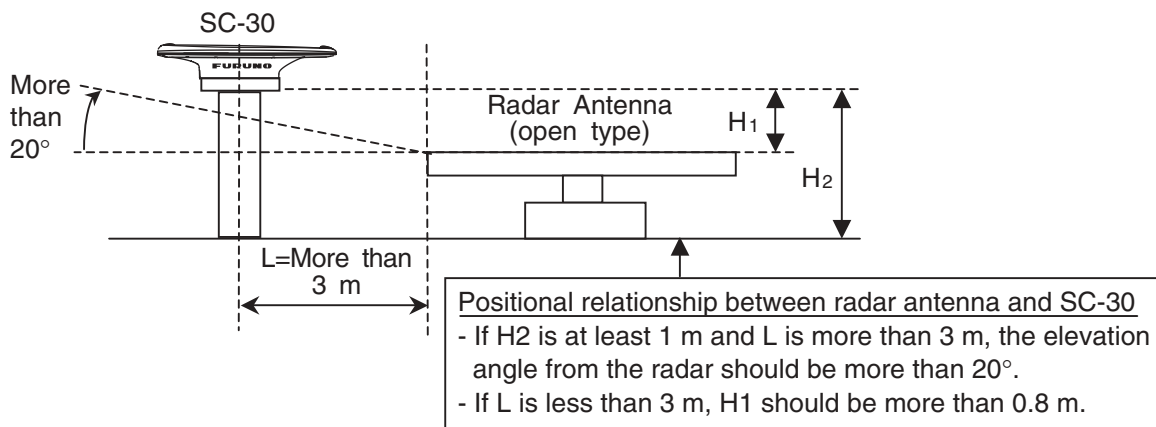
- If the above condition cannot be satisfied, separate the sensor so that the horizontal angle to the interfering object is less than  $10^\circ$ . Refer to the table below to determine minimum separation distance.

| Mast diameter | Min. separation distance |
|---------------|--------------------------|
| 10 cm         | 1.5 m                    |
| 30 cm         | 3 m                      |



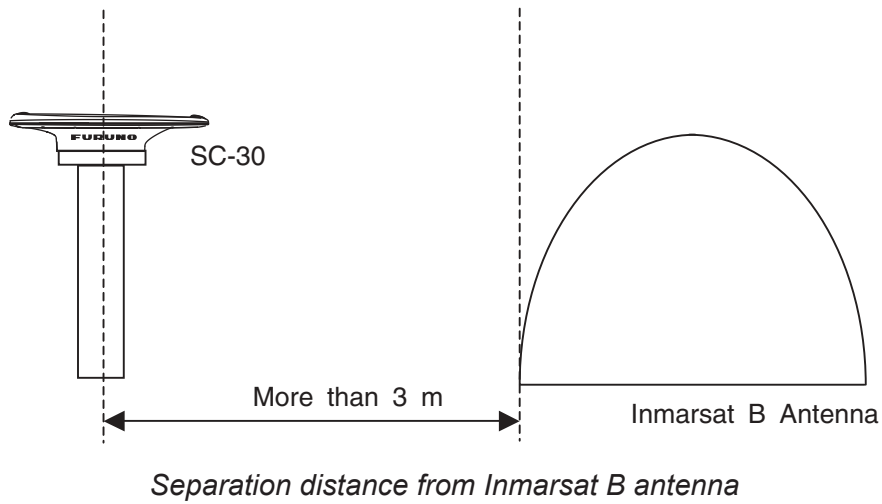
**CONDITION 2: Locate the SC-30 out of Inmarsat and radar beams**

- Locate the SC-30 more than  $20^\circ$  above the top of a radar antenna.
- Separate the SC-30 at least three meters from an open-type radar antenna.
- If the SC-30 absolutely cannot be separated at least three meters from an open-type radar antenna, install it at least 80 cm above the top of the radar antenna.
- Separate an Inmarsat B antenna from the SC-30 at least three meters.



Separation distances from radar antenna

## 1. MOUNTING

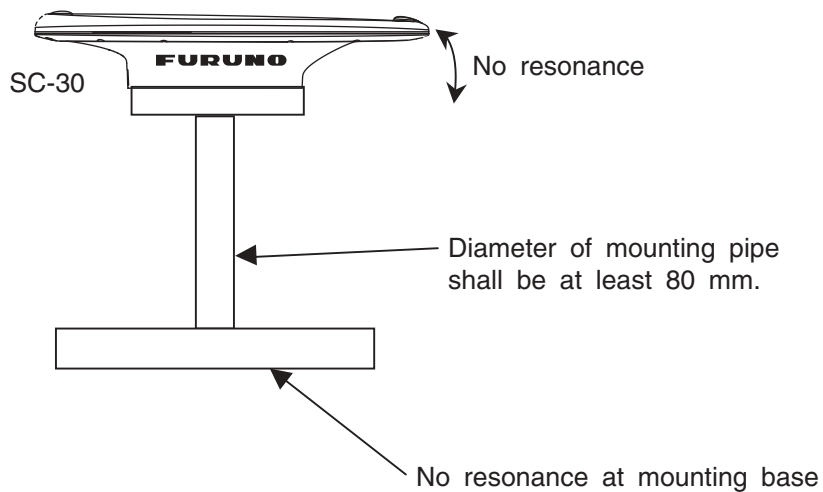


### **CONDITION 3: Locate the SC-30 away from communication (VHF, etc.) antennas**

Separate the SC-30 as far as possible from communication antennas.

### **CONDITION 4: Select a stable location, no resonance location by engine or waves**

Install the SC-30 in a stable location. The SC-30 contains highly sensitive GPS and angular speed sensors. Therefore, install it where shock, vibration, etc. are minimal.

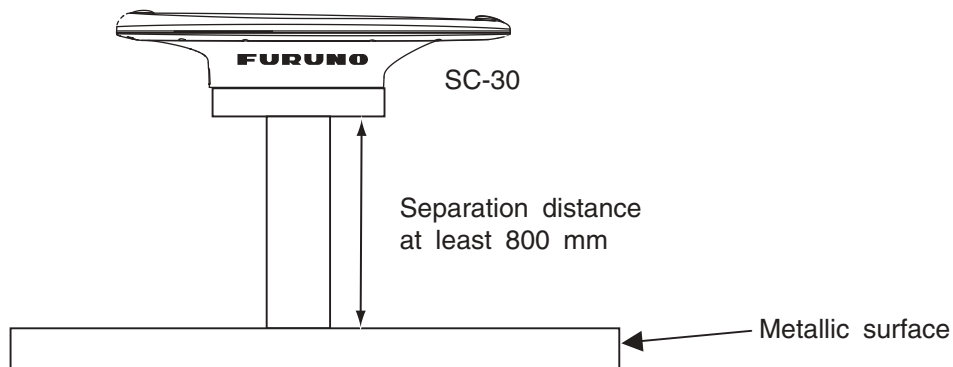


### **Installation height**

After choosing the installation site, determine the installation height, considering composition of the deck and surrounding area.

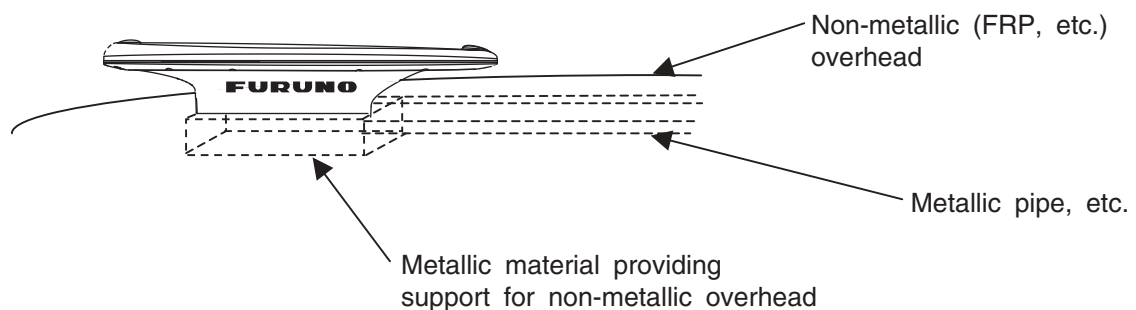
#### **The deck is flat and metallic, or the area around the installation site is metallic**

- If metallic surface is wider than the area of the top view of the SC-30, install the SC-30 at least 800 mm above the deck.



#### **The deck is non-metallic (FRP, etc.) and there are no metallic objects around the installation site**

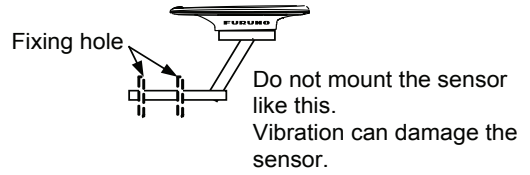
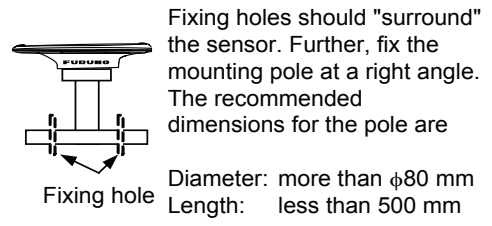
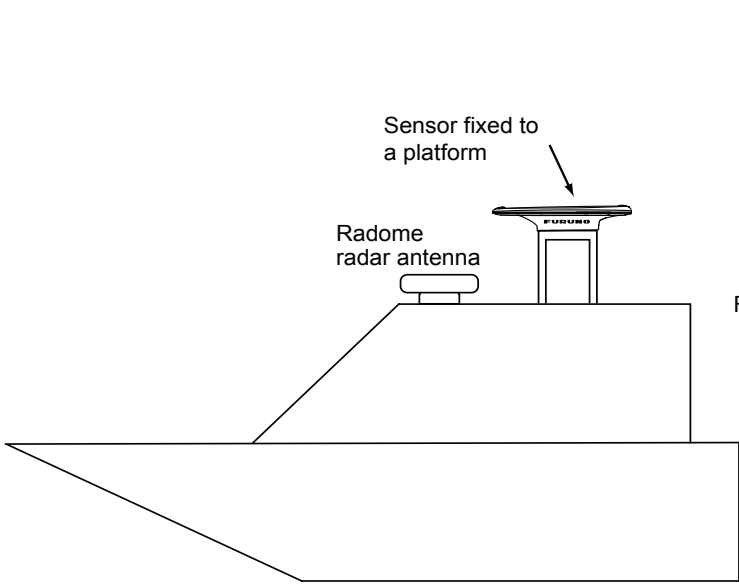
- If mounting surface is non-metallic and there is no radar or Inmarsat antenna in the vicinity, mount the SC-30 directly on the non-metallic surface. This can be done provided the metallic material support is smaller than the SC-30. If the SC-30 is to be fixed to a mounting pipe, choose a site where there is less vibration.



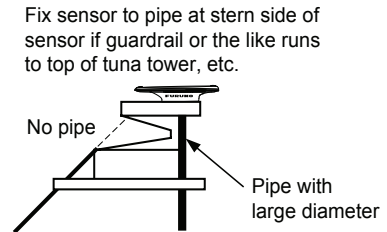
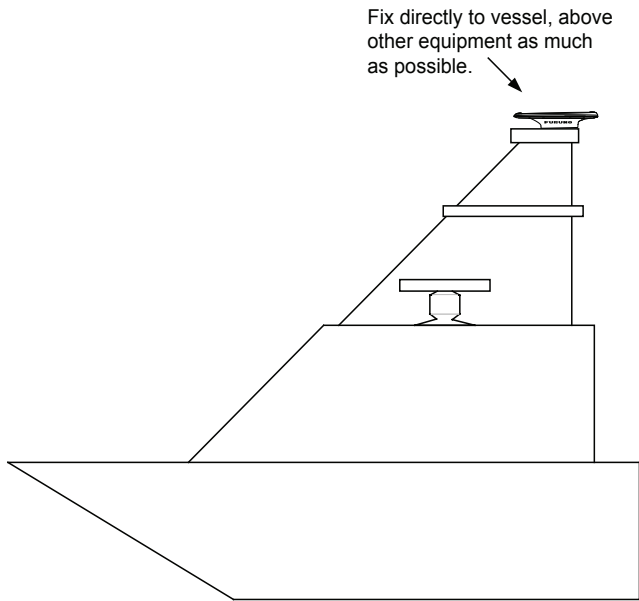
1. MOUNTING

**Installation examples for a pleasure boat**

***No tuna tower***



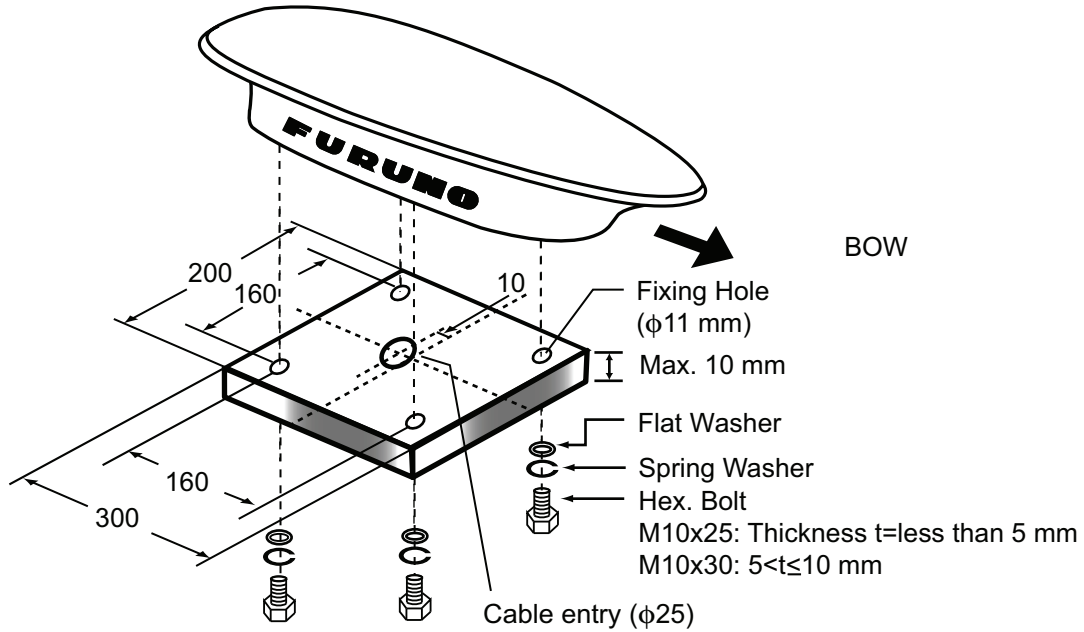
***With tuna tower***



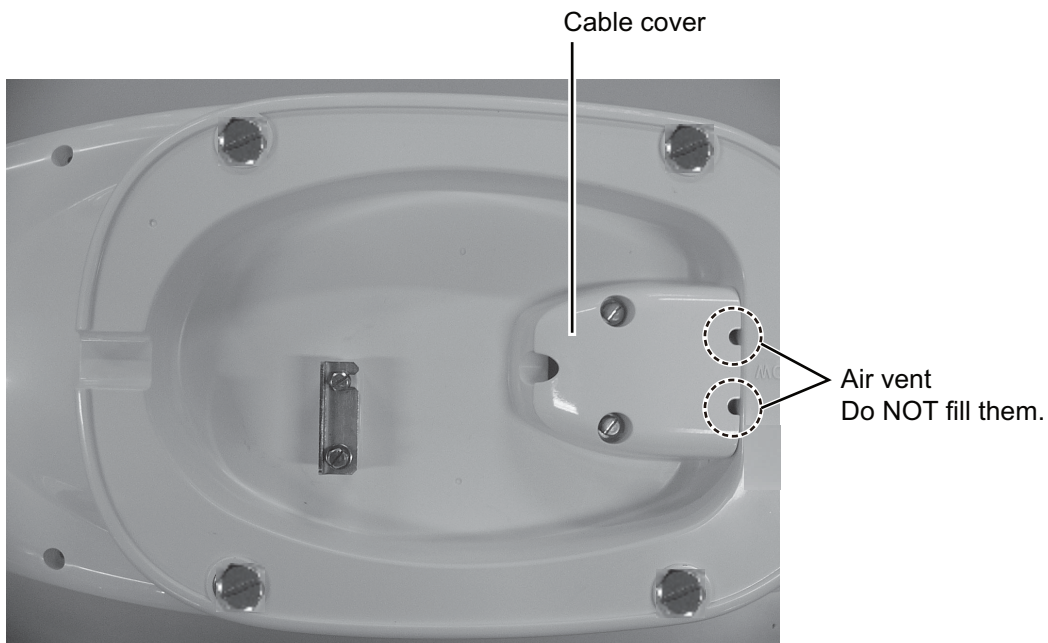
## 1.3 Mounting Procedure

"Bird-repellent fixtures" (option) can be attached to the sensor cover to prevent birds from alighting on the cover. If it is more convenient to attach them before mounting the sensor, do step 7 first.

1. As shown in the figure below, weld a platform (local supply) for which to mount the sensor. The thickness of the platform should be max. 10 mm.

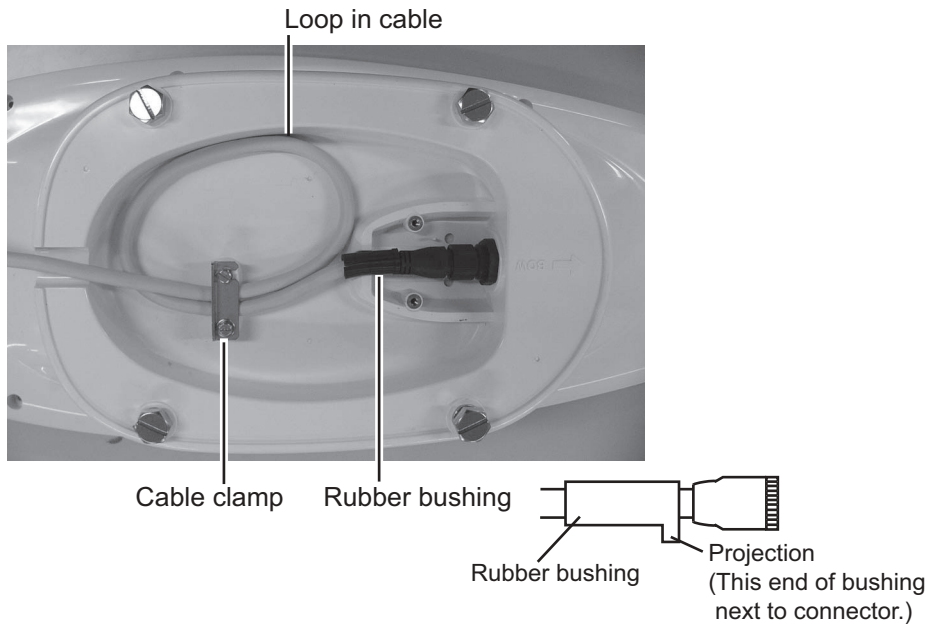


2. Open the cable cover on the underside of the sensor.

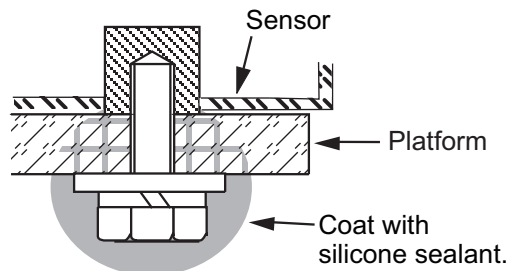


1. MOUNTING

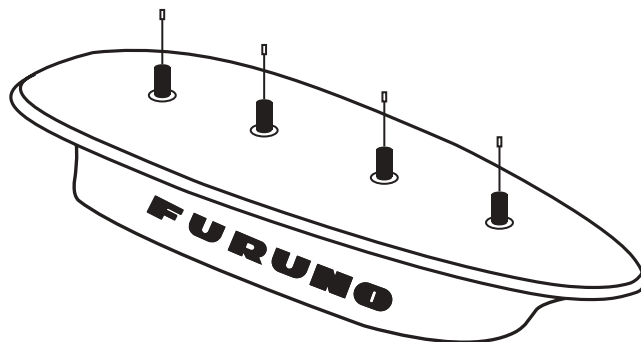
3. Slip the rubber bushing (supplied) onto the sensor cable at the location shown below. Attach the cable to the connector. Make a loop in the cable to prevent cable fatigue.



4. Tighten the cable clamp and close the cable cover.
5. Orient the sensor so the bow mark (on the underside of the narrower end) on its underside is facing the bow. Fasten the sensor to the platform with hex. bolts, spring washers and flat washers. Use M10x25 bolts if the thickness of the platform is less than 5 mm. For greater thickness use M10x30 bolts. The torque for the hex. bolts should be  $20 \pm 2$  Nm.
- Note:** For the sensor cable passed through the mounting pipe, fill the gap between the pipe and the cable with silicone sealant, for waterproofing. At this time, be careful not to fill the air vent on the cable cover (see the illustration at step 2) with silicone sealant.
6. Coat exposed parts of bolts and washers with silicone sealant.



7. If you have the optional "bird-repellent fixtures", attach them to the sensor similar to as shown in the figure below. (You may change the pattern as desired.)



8. Fix the sensor cable to the pipe at suitable intervals with the cable ties (supplied).

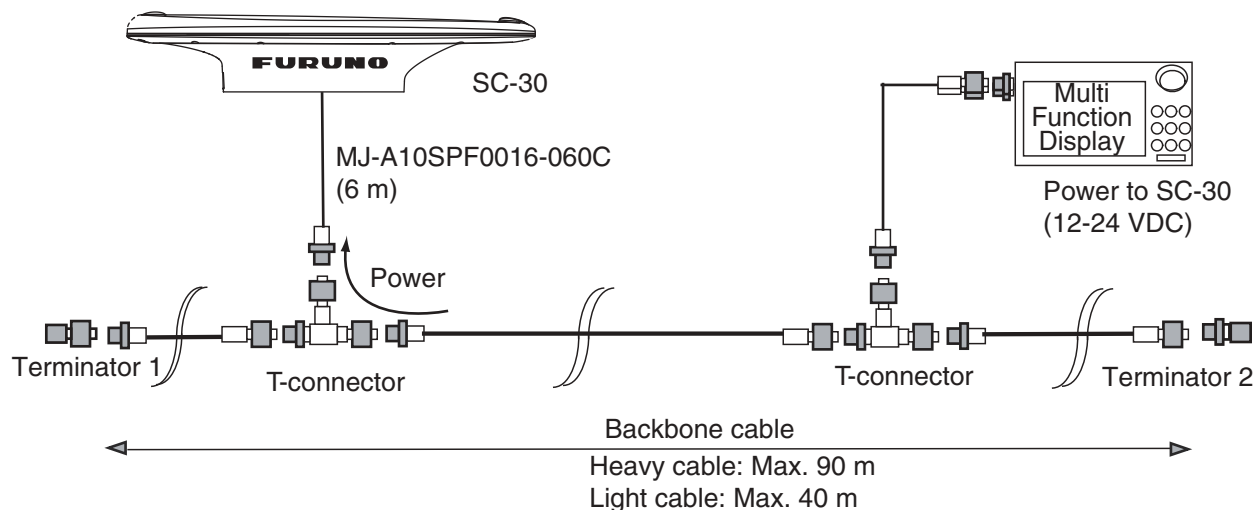
# 2. WIRING

## 2.1 NMEA 2000 Network Connection

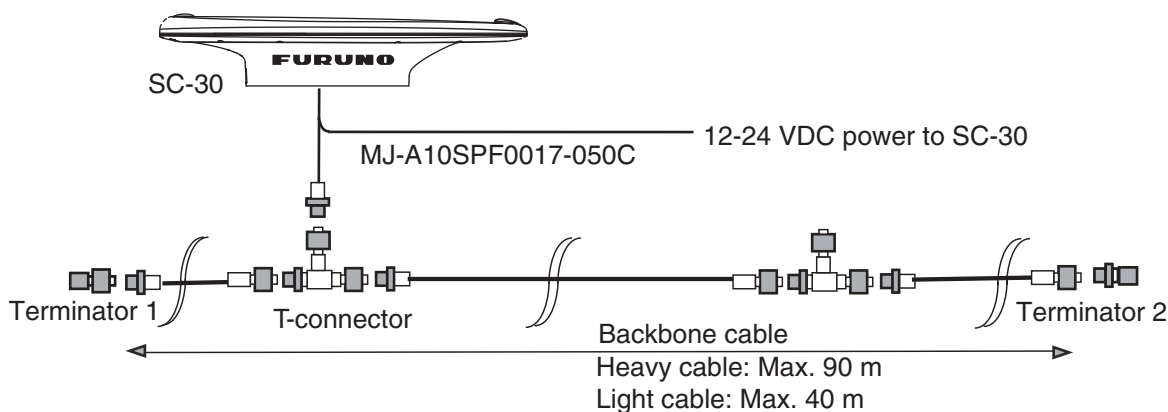
The SC-30 connects to the devices in an NMEA 2000 network with a drop cable, which is connected to a backbone cable w/T-type connectors. The backbone cable can be light or heavy type. Attach a terminator at both ends of the backbone cable. Use a Micro-C connector to connect to the devices. We recommended that power from the NMEA 2000 network be input at the center of the backbone cable. For connection to the IF-NMEA SC Interface Unit, see its operator's manual.

Use DeviceNet Micro-C type T-connector (5 pin), cable and terminator.

### Power to SC-30 supplied from NMEA 2000 network



### Power to SC-30 not supplied from NMEA 2000 network



# 3. NMEA 2000 I/O DATA

The SC-30 handles the NMEA 2000 I/O data sentences listed below. The LEN (Load Equivalency Number) is 10. (LEN is the amount of current a device draws from the NMEA 2000 network. 1 LEN = 50mA.)

## 3.1 Input Data

| Name                        | PGN<br>(Parameter<br>Group No.) | Remarks   |        |        |   |
|-----------------------------|---------------------------------|---|--------|--------|---|
| ISO Acknowledgement         | 059392                          |   |        |        |   |
| ISO Request                 | 059904                          | Request for one-time transmission of asterisk-marked PGN in the output data table on the next page.   |        |        |   |
| ISO Address Claim           | 060928                          |   |        |        |   |
| NMEA-Request Group Function | 126208                          | Request for transmission of transmitting interval and one-time transmission of asterisk-marked PGN in the output data table on the next page. |        |        |   |
| NMEA-Command Group Function |                                 | Standard PGN sentences and their changeable fields  |        |        |   |
|                             |                                 | Name  | PGN    | Field  | Remarks   |
|                             |                                 | Vessel Heading  | 127250 | #5     | 0 or 1 (default 0)<br>0: true bearing<br>1: magnetic bearing. |
|                             |                                 | COG & SOG, Rapid Update   | 129026 | #2     | Setting is mutually changed.                                  |
|                             |                                 | GNSS Control Group Function   | 129538 | #6     | 0 or 1 (default 1)<br>0: WAAS off<br>1: WAAS on               |
|                             |                                 | The PGNs below are FURUNO proprietary PGN, and various settings can be adjusted by them.  |        |        |   |
|                             |                                 | Name  |        |        | PGN   |
|                             |                                 | FURUNO GNSS Control Status  |        |        | 130817  |
|                             |                                 | Heading and Attitude Sensor Control Status  |        |        | 130818  |
|                             | Motion Sensor Control Status    |   |        | 130819 |   |



## 3.2 Output Data

| Name                               | PGN<br>(Parameter<br>Group No.) | Output Interval | Remarks  |
|------------------------------------|---------------------------------|-----------------|--|
| ISO Acknowledgement                | 059392                          | *               |  |
| ISO Address Claim                  | 060928                          | *               |  |
| Heave                              | 065280                          | 100 ms          | FURUNO proprietary sentence                                      |
| NMEA-Acknowledge<br>Group Function | 126208                          | *               |  |
| PGN List                           | 126464                          | *               |  |
| System Time                        | 126992                          | 1 s             |  |
| Product Information                | 126996                          | *               |  |
| Vessel Heading                     | 127250                          | 100 ms          |  |
| Rate of Turn                       | 127251                          | 100 ms          |  |
| Attitude                           | 127257                          | 100 ms          | This PGN does not follow standard<br>transmission interval (1s). |
| Magnetic Variation                 | 127258                          | 1 s             |  |
| Position, Rapid Update             | 129025                          | 100 ms          |  |
| COG & SOG Rapid Up-<br>date        | 129026                          | 250 ms          |  |
| GNSS Position Data                 | 129029                          | 1 s             |  |
| Time & Date                        | 129033                          | *               |  |
| GNSS Sats In View                  | 129540                          | 1 s             |  |
| Motion Sensor Status               | 130820                          | 1 s             | FURUNO proprietary sentence                                      |
| Multi Sats in View                 | 130826                          | 1 s             | FURUNO proprietary sentence                                      |

\*PNG transmitted once only when requested.

# 4. MAINTENANCE, TROUBLE-SHOOTING

This chapter provides the information for keeping your unit in good working order.

| <b>NOTICE</b>   |
|---|
| <p><b>Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts of the equipment.</b></p> <p>Those items contain organic solvents that can damage coating and plastic parts, especially plastic connectors.</p> |

## 4.1 Preventive Maintenance

Regular maintenance is important for good performance. Following the procedures in the table below will help maintain performance.

### Preventive maintenance

| Item    | Check point  | Remedy  |
|---------|--|---|
| Cabling | <ul style="list-style-type: none"> <li>• Visually check cabling for signs of wear and damage.</li> <li>• Check that connector is firmly fastened.</li> </ul> | <ul style="list-style-type: none"> <li>• Replace damaged cables.</li> <li>• Reconnect cable if it has loosened.</li> </ul>                                |
| Cover   | Cleanliness of cover   | Dust can be removed with a soft cloth. Do not use chemical based cleaners to clean the cover, as they can remove paint and markings and deform the cover. |

## 4.2 Fuse Replacement

Two 1A fuses are contained in the fuse holder in the power cable MJ-A10SPF0017-xxx, which is used when supplying power to the SC-30 directly from the power source. If heading data is not being output, first check the SC-30's breaker at the power source and the check if a fuse in the power cable has blown. If it has blown, find out the cause before replacing the fuse. If it blows again after replacement, request service.

| Item | Type                  | Code No.       |
|------|-----------------------|----------------|
| Fuse | FGBO-A, 125A, 1A, PBF | 000-157-847-10 |

## 4.3 Troubleshooting

### **Heading is not output**

#### ***Check installation site:***

- Check for interfering objects near the antenna.
- Check the installation site and mounting base for vibration.
- Check for antenna of radar, radio equipment, etc. near the installation site.

#### ***Check connections:***

##### 1. NMEA-2000 bus connection

- Check that the connector on the SC-30 is tightly connected.
- Check that no stress is applied to the cable and that a loop has been made with the cable to prevent cable stress.
- Check that terminators (120 ohm) are attached at each end of the NMEA 2000 network.
- Check that the input voltage to the SC-30 is 12-24 VDC.
- Check that all devices connected to the NMEA 2000 bus are within the current capacity of the bus.
- Check that the cable (MJ-A10SPF0016-060C (6m)) is used. (If power is fed through a trunk line, the feeder cable shall be no longer than 6 m).
- If power to the SC-30 is fed directly from the ship's mains, check breaker switch on mains switchboard and fuse in power cable.

##### 2. IF-NMEASC interface unit connection:

See the IF-NMEASC's operator's manual.

### **Heading output stops often. Position and GPS-related items are output but heading is not.**

- Check for interfering object near the SC-30.
- Check installation site for vibration.
- Check if antenna of radar, radio equipment, etc. is near the installation site.

### **Equipment in NMEA 2000 network malfunctions when SC-30 is connected**

- Check that terminators (120 ohm) are attached at each end of the NMEA 2000 network.
- Check that the input voltage to the SC-30 is 12-24 VDC.
- Check that all devices connected to the NMEA 2000 bus are within the current capacity of the bus.
- Check that the cable (MJ-A10SPF0016-060C (6m)) is used. (If power is fed through a trunk line, the feeder cable shall be no longer than 6 m).

### **Heading is output normally in fine wather but is not output in bad weather**

- Check the installation site for vibration.

#### 4. MAINTENANCE, TROUBLESHOOTING

##### **Autopilot jerks suddenly**

- Check for interfering objects near the SC-30.
- Check the installation site and mounting base for vibration.
- Check if antenna of radar, radio equipment, etc. is near the installation site.
- Check operation at the autopilot:
  - Confirm that the rudder angle can be recognized by the operator when heading output is stopped.  
Minimally, the buzzer should sound.
  - Confirm that rudder does not jerk violently when heading output is resumed. For example, check that setting for rudder angle limit is suitable.

## SPECIFICATIONS OF SATELLITE COMPASS SC-30

### 1 GENERAL

|     |                    |                        |
|-----|--------------------|------------------------|
| 1.1 | Frequency          | L1 1575.42MHz          |
| 1.2 | Heading accuracy   | 0.5° rms               |
| 1.3 | Heading resolution | 0.1°                   |
| 1.4 | Follow-up          | 45°/sec rate-of turn   |
| 1.5 | Heave accuracy     | 30cm                   |
| 1.6 | Settling time      | 3 minutes approx.      |
| 1.7 | Position accuracy  | 10m, WAAS adjusted: 3m |
| 1.8 | I/O port           | NMEA2000               |

### 2 INTERFACE UNIT

|     |                       |  |
|-----|-----------------------|--|
| 2.1 | I/O port              |  |
|     | NMEA2000              | Input: time, position, speed, heading, heave, others<br>Output: offset heading |
|     | USB                   | for maintenance program  |
| 2.2 | Output port           |  |
|     | AD-10                 | 1 port   |
|     | IEC61162-1            | 2 port   |
|     | Analog                | 1 port   |
| 2.3 | Output interval       |  |
|     | Heading, Heave        | 25ms, 100ms, 200ms, 1sec, 2sec   |
|     | Speed, Position, Time | 1sec, 2sec   |

### 3 POWER SUPPLY

|     |                   |                       |
|-----|-------------------|-----------------------|
| 3.1 | Satellite compass | 12-24 VDC: 0.4-0.23 A |
| 3.2 | Interface unit    | 12-24 VDC: 1.0-0.6 A  |

### 4 ENVIRONMENTAL CONDITIONS

|     |                      |                |
|-----|----------------------|----------------|
| 4.1 | Ambient temperature  |                |
|     | Satellite compass    | -25°C to +70°C |
|     | Interface unit       | -15°C to +55°C |
| 4.2 | Relative humidity    | 95% at 40°C    |
| 4.3 | Degree of protection |                |
|     | Satellite compass    | IP56           |
|     | Interface unit       | IP20           |
| 4.4 | Bearing vibration    | IEC 60945      |

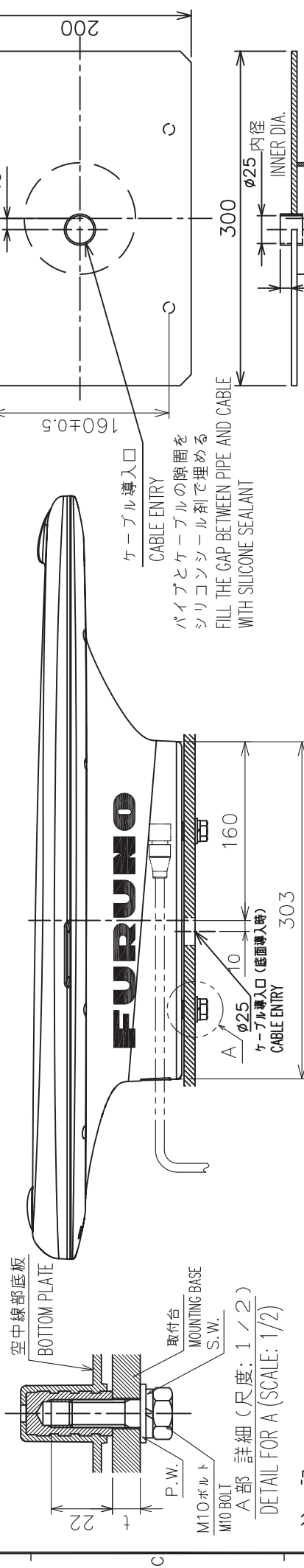
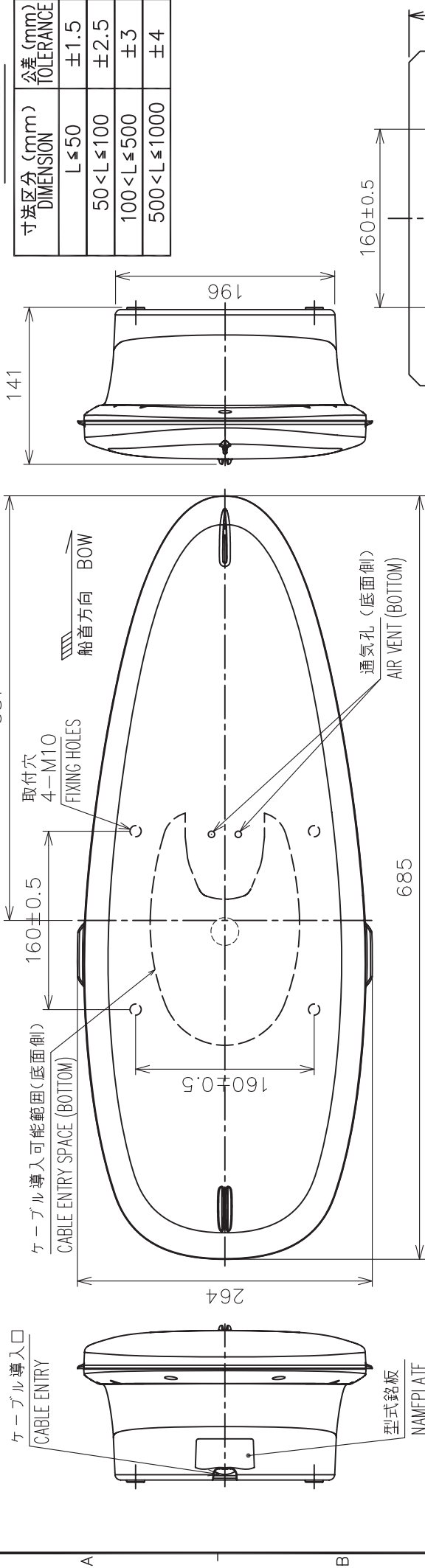
### 5 COATING COLOR

|     |                   |      |
|-----|-------------------|------|
| 5.1 | Satellite compass | N9.5 |
| 5.2 | Interface unit    | N2.5 |



表1 TABLE 1

| 寸法区分 (mm)<br>DIMENSION | 公差 (mm)<br>TOLERANCE |
|------------------------|----------------------|
| $L \leq 50$            | $\pm 1.5$            |
| $50 < L \leq 100$      | $\pm 2.5$            |
| $100 < L \leq 500$     | $\pm 3$              |
| $500 < L \leq 1000$    | $\pm 4$              |



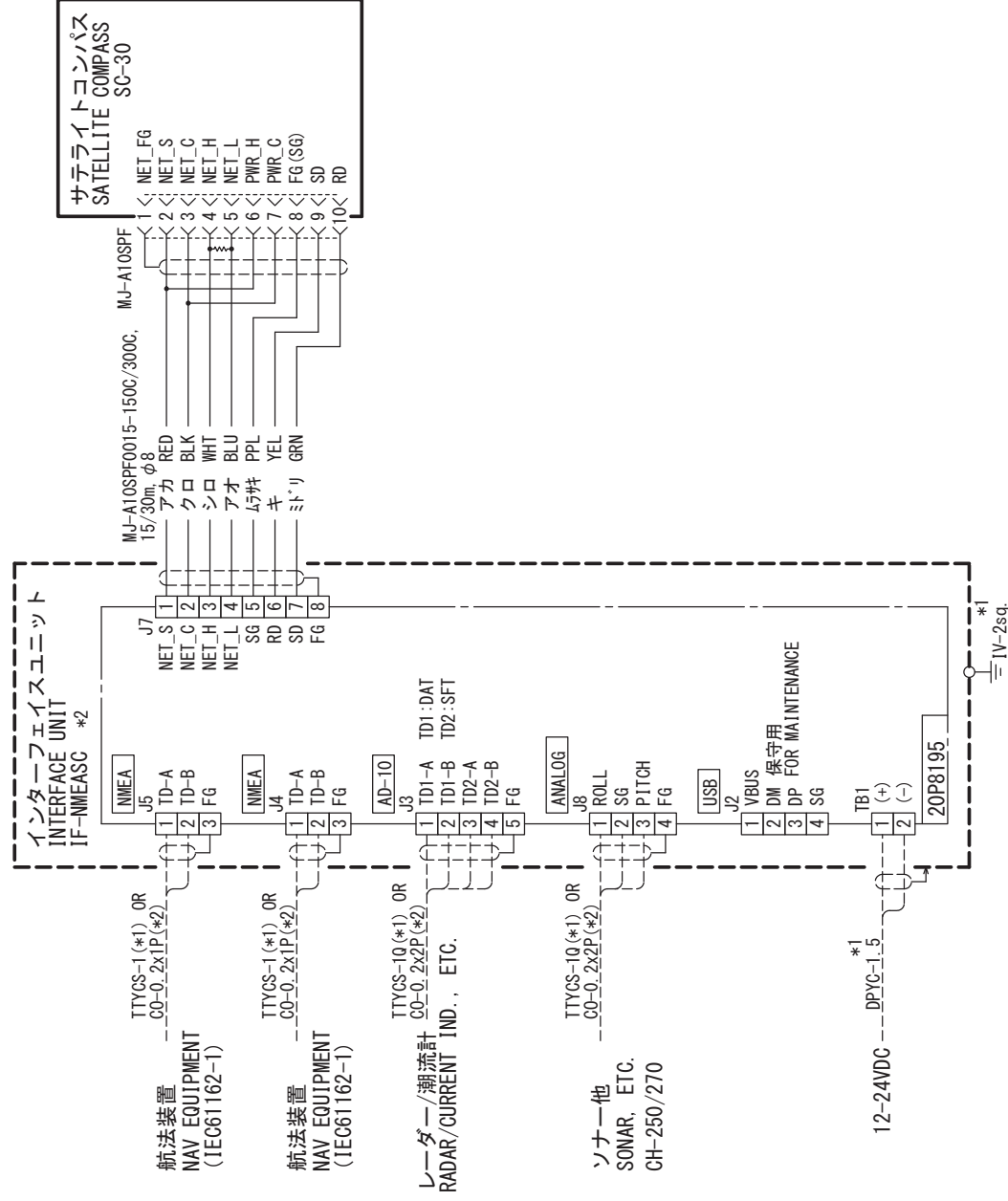
注記

- 指定外の寸法公差は表1による。
- 取付用ネジはM10ボルトを使用のこと。  
ネジ長さは板厚tに応じて、25 ( $t \leq 5$ ) または30 ( $5 < t \leq 10$ ) とする。

NOTE

- TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
- USE M10 BOLTS FOR FIXING THE UNIT.  
SCREW LENGTH: 25 ( $t \leq 5$ ) OR 30 ( $5 < t \leq 10$ ). t: THICKNESS OF MOUNTING BASE.

|          |             |                                    |               |                   |
|----------|-------------|------------------------------------|---------------|-------------------|
| DRAWN    | 18/Aug/2014 | I. YAMASAKI                        | TITLE         | SC-30             |
| CHECKED  | 18/Aug/2014 | H. MAKI                            | 名称            | サテライトコンパス         |
| APPROVED | 1/Sep/2014  | H. MAKI                            | 外寸図           |                   |
| SCALE    | 1/5         | 質量はケーブルを含まず。<br>kg MASS W/O CABLE. | NAME          | SATELLITE COMPASS |
| DWG.No.  | C7265-G01-B | REF.No.                            | 20-030-100G-3 | OUTLINE DRAWING   |



C

注記

- \* 1) 造船所手配。
- \* 2) オプション。

NOTE

- \*1: SHIPYARD SUPPLY.
- \*2: OPTION.

- CO-0, 2x1P: CO-SPEVV-SB-C 0, 2x1P, φ8, 5
- CO-0, 2x2P: CO-SPEVV-SB-C 0, 2x2P, φ10, 5

|          |             |             |               |                         |
|----------|-------------|-------------|---------------|-------------------------|
| DRAWN    | 15/Sep/2017 | T. YAMASAKI | TITLE         | SC-30                   |
| CHECKED  | 15/Sep/2017 | H. MAKI     | 名称            | サテライトコンパス               |
| APPROVED | 15/Sep/2017 | H. MAKI     |               | 相互結線図                   |
| SCALE    | MASS        | kg          | NAME          | SATELLITE COMPASS       |
| DWG. No. | C7265-C01-E | REF. No.    | 20-030-5000-3 | INTERCONNECTION DIAGRAM |



# FURUNO Worldwide Warranty for Pleasure Boats (Except North America)

This warranty is valid for products manufactured by Furuno Electric Co. (hereafter FURUNO) and installed on a pleasure boat. Any web based purchases that are imported into other countries by anyone other than a FURUNO certified dealer may not comply with local standards. FURUNO strongly recommends against importing these products from international websites as the imported product may not work correctly and may interfere with other electronic devices. The imported product may also be in breach of the local laws and mandated technical requirements. Products imported into other countries as described previously shall not be eligible for local warranty service.

For products purchased outside of your country please contact the national distributor of Furuno products in the country where purchased.

This warranty is in addition to the customer's statutory legal rights.

## 1. Terms and Conditions of Warranty

FURUNO guarantees that each new FURUNO product is the result of quality materials and workmanship. The warranty is valid for a period of 2 years (24 months) from the date of the invoice, or the date of commissioning of the product by the installing certified dealer.

## 2. FURUNO Standard Warranty

The FURUNO standard warranty covers spare parts and labour costs associated with a warranty claim, provided that the product is returned to a FURUNO national distributor by prepaid carrier.

The FURUNO standard warranty includes:

- Repair at a FURUNO national distributor
- All spare parts for the repair
- Cost for economical shipment to customer

## 3. FURUNO Onboard Warranty

If the product was installed/commissioned and registered by a certified FURUNO dealer, the customer has the right to the onboard warranty.

The FURUNO onboard warranty includes

- Free shipping of the necessary parts
- Labour: Normal working hours only
- Travel time: Up to a maximum of two (2) hours
- Travel distance: Up to a maximum of one hundred and sixty (160) KM by car for the complete journey

## 4. Warranty Registration

For the Standard Warranty - presentation of product with serial number (8 digits serial number, 1234-5678) is sufficient. Otherwise, the invoice with serial number, name and stamp of the dealer and date of purchase is shown.

For the Onboard Warranty your FURUNO certified dealer will take care of all registrations.

## 5. Warranty Claims

For the Standard Warranty - simply send the defective product together with the invoice to a FURUNO national distributor. For the Onboard Warranty – contact a FURUNO national distributor or a certified dealer. Give the product's serial number and describe the problem as accurately as possible.

Warranty repairs carried out by companies/persons other than a FURUNO national distributor or a certified dealer is not covered by this warranty.

## 6. Warranty Limitations

When a claim is made, FURUNO has a right to choose whether to repair the product or replace it.

The FURUNO warranty is only valid if the product was correctly installed and used. Therefore, it is necessary for the customer to comply with the instructions in the handbook. Problems which result from not complying with the instruction manual are not covered by the warranty.

FURUNO is not liable for any damage caused to the vessel by using a FURUNO product.

The following are excluded from this warranty:

- a. Second-hand product
- b. Underwater unit such as transducer and hull unit
- c. Routine maintenance, alignment and calibration services.
- d. Replacement of consumable parts such as fuses, lamps, recording papers, drive belts, cables, protective covers and batteries.
- e. Magnetron and MIC with more than 1000 transmitting hours or older than 12 months, whichever comes first.
- f. Costs associated with the replacement of a transducer (e.g. Crane, docking or diver etc.).
- g. Sea trial, test and evaluation or other demonstrations.
- h. Products repaired or altered by anyone other than the FURUNO national distributor or an authorized dealer.
- i. Products on which the serial number is altered, defaced or removed.
- j. Problems resulting from an accident, negligence, misuse, improper installation, vandalism or water penetration.
- k. Damage resulting from a force majeure or other natural catastrophe or calamity.
- l. Damage from shipping or transit.
- m. Software updates, except when deemed necessary and warrantable by FURUNO.
- n. Overtime, extra labour outside of normal hours such as weekend/holiday, and travel costs above the 160 KM allowance
- o. Operator familiarization and orientation.

FURUNO Electric Company, March 1, 2011

## FURUNO Warranty for North America

FURUNO U.S.A., Limited Warranty provides a twenty-four (24) months LABOR and twenty-four (24) months PARTS warranty on products from the date of installation or purchase by the original owner. Products or components that are represented as being waterproof are guaranteed to be waterproof only for, and within the limits, of the warranty period stated above. The warranty start date may not exceed eighteen (18) months from the original date of purchase by dealer from Furuno USA and applies to new equipment installed and operated in accordance with Furuno USA's published instructions.

Magnetrons and Microwave devices will be warranted for a period of 12 months from date of original equipment installation.

Furuno U.S.A., Inc. warrants each new product to be of sound material and workmanship and through its authorized dealer will exchange any parts proven to be defective in material or workmanship under normal use at no charge for a period of 24 months from the date of installation or purchase.

Furuno U.S.A., Inc., through an authorized Furuno dealer will provide labor at no cost to replace defective parts, exclusive of routine maintenance or normal adjustments, for a period of 24 months from installation date provided the work is done by Furuno U.S.A., Inc. or an AUTHORIZED Furuno dealer during normal shop hours and within a radius of 50 miles of the shop location.

A suitable proof of purchase showing date of purchase, or installation certification must be available to Furuno U.S.A., Inc., or its authorized dealer at the time of request for warranty service.

This warranty is valid for installation of products manufactured by Furuno Electric Co. (hereafter FURUNO). Any purchases from brick and mortar or web-based resellers that are imported into other countries by anyone other than a FURUNO certified dealer, agent or subsidiary may not comply with local standards. FURUNO strongly recommends against importing these products from international websites or other resellers, as the imported product may not work correctly and may interfere with other electronic devices. The imported product may also be in breach of the local laws and mandated technical requirements. Products imported into other countries, as described previously, shall not be eligible for local warranty service.

For products purchased outside of your country please contact the national distributor of Furuno products in the country where purchased.

### WARRANTY REGISTRATION AND INFORMATION

To register your product for warranty, as well as see the complete warranty guidelines and limitations, please visit [www.furunousa.com](http://www.furunousa.com) and click on "Support". In order to expedite repairs, warranty service on Furuno equipment is provided through its authorized dealer network. If this is not possible or practical, please contact Furuno U.S.A., Inc. to arrange warranty service.

FURUNO U.S.A., INC.  
**Attention: Service Coordinator**  
4400 N.W. Pacific Rim Boulevard  
Camas, WA 98607-9408  
Telephone: (360) 834-9300  
FAX: (360) 834-9400

Furuno U.S.A., Inc. is proud to supply you with the highest quality in Marine Electronics. We know you had several choices when making your selection of equipment, and from everyone at Furuno we thank you. Furuno takes great pride in customer service.

## Declaration of Conformity

[SC-30]

- Bulgarian (BG)** С настоящото Furuno Electric Co., Ltd. декларира, че гореспоменат тип радиосъоръжение е в съответствие с Директива 2014/53/ЕС.  
Цялостният текст на ЕС декларацията за съответствие може да се намери на следния интернет адрес:
- Spanish (ES)** Por la presente, Furuno Electric Co., Ltd. declara que el tipo de equipo radioeléctrico arriba mencionado es conforme con la Directiva 2014/53/UE.  
El texto completo de la declaración UE de conformidad está disponible en la dirección Internet siguiente:
- Czech (CS)** Tímto Furuno Electric Co., Ltd. prohlašuje, že výše zmíněné typ rádiového zařízení je v souladu se směrnicí 2014/53/EU.  
Úplné znění EU prohlášení o shodě je k dispozici na této internetové adrese:
- Danish (DA)** Hermed erklærer Furuno Electric Co., Ltd., at ovennævnte radioudstyr er i overensstemmelse med direktiv 2014/53/EU.  
EU-overensstemmelseserklæringens fulde tekst kan findes på følgende internetadresse:
- German (DE)** Hiermit erkläre die Furuno Electric Co., Ltd., dass der oben genannte Funkanlagentyp der Richtlinie 2014/53/EU entspricht.  
Der vollständige Text der EU-Konformitätserklärung ist unter der folgenden Internetadresse verfügbar:
- Estonian (ET)** Käesolevaga deklareerib Furuno Electric Co., Ltd., et ülalmainitud raadioseadme tüüp vastab direktiivi 2014/53/EL nõuetele.  
ELi vastavusdeklaratsiooni täielik tekst on kättesaadav järgmisel internetiaadressil:
- Greek (EL)** Με την παρούσα η Furuno Electric Co., Ltd., δηλώνει ότι ο προαναφερθέντας ραδιοεξοπλισμός πληροί την οδηγία 2014/53/ΕΕ.  
Το πλήρες κείμενο της δήλωσης συμμόρφωσης ΕΕ διατίθεται στην ακόλουθη ιστοσελίδα στο διαδίκτυο:
- English (EN)** Hereby, Furuno Electric Co., Ltd. declares that the above-mentioned radio equipment type is in compliance with Directive 2014/53/EU.  
The full text of the EU declaration of conformity is available at the following internet address:
- French (FR)** Le soussigné, Furuno Electric Co., Ltd., déclare que l'équipement radioélectrique du type mentionné ci-dessus est conforme à la directive 2014/53/UE.  
Le texte complet de la déclaration UE de conformité est disponible à l'adresse internet suivante:
- Croatian (HR)** Furuno Electric Co., Ltd. ovime izjavljuje da je gore rečeno radijska oprema tipa u skladu s Direktivom 2014/53/EU.  
Cjeloviti tekst EU izjave o sukladnosti dostupan je na sljedećoj internetskoj adresi:
- Italian (IT)** Il fabbricante, Furuno Electric Co., Ltd., dichiara che il tipo di apparecchiatura radio menzionato sopra è conforme alla direttiva 2014/53/UE.  
Il testo completo della dichiarazione di conformità UE è disponibile al seguente indirizzo Internet:
- Latvian (LV)** Ar šo Furuno Electric Co., Ltd. deklarē, ka augstāk minēts radioiekārta atbilst Direktīvai 2014/53/ES.  
Pilns ES atbilstības deklarācijas teksts ir pieejams šādā interneta vietnē:

|                 |   |
|-----------------|---|
| Lithuanian (LT) | Aš, Furuno Electric Co., Ltd., patvirtinu, kad pirmiau minėta radijo įrenginių tipas atitinka Direktyvą 2014/53/ES.<br>Visas ES atitikties deklaracijos tekstas prieinamas šiuo interneto adresu:   |
| Hungarian (HU)  | Furuno Electric Co., Ltd. igazolja, hogy fent említett típusú rádióberendezés megfelel a 2014/53/EU irányelvnek.<br>Az EU-megfelelőségi nyilatkozat teljes szövege elérhető a következő internetes címen:   |
| Maltese (MT)    | B'dan, Furuno Electric Co., Ltd., niddikjara li msemmija hawn fuq-tip ta' tagħmir tar-radju huwa konformi mad-Direttiva 2014/53/UE.<br>It-test kollu tad-dikjarazzjoni ta' konformità tal-UE huwa disponibbli f'dan l-indirizz tal-Internet li ġej:               |
| Dutch (NL)      | Hierbij verklaar ik, Furuno Electric Co., Ltd., dat het hierboven genoemde type radioapparaat conform is met Richtlijn 2014/53/EU.<br>De volledige tekst van de EU-conformiteitsverklaring kan worden geraadpleegd op het volgende internetadres:                 |
| Polish (PL)     | Furuno Electric Co., Ltd. niniejszym oświadcza, że wyżej wymieniony typ urządzenia radiowego jest zgodny z dyrektywą 2014/53/UE.<br>Pełny tekst deklaracji zgodności UE jest dostępny pod następującym adresem internetowym:                                      |
| Portuguese (PT) | O(a) abaixo assinado(a) Furuno Electric Co., Ltd. declara que o mencionado acima tipo de equipamento de rádio está em conformidade com a Diretiva 2014/53/UE.<br>O texto integral da declaração de conformidade está disponível no seguinte endereço de Internet: |
| Romanian (RO)   | Prin prezenta, Furuno Electric Co., Ltd. declară că menționat mai sus tipul de echipamente radio este în conformitate cu Directiva 2014/53/UE.<br>Textul integral al declarației UE de conformitate este disponibil la următoarea adresă internet:                |
| Slovak (SK)     | Furuno Electric Co., Ltd. týmto vyhlasuje, že vyššie spomínané rádiové zariadenie typu je v súlade so smernicou 2014/53/EÚ.<br>Úplné EÚ vyhlásenie o zhode je k dispozícii na tejto internetovej adrese:  |
| Slovenian (SL)  | Furuno Electric Co., Ltd. potrjuje, da je zgoraj omenjeno tip radijske opreme skladen z Direktivo 2014/53/EU.<br>Celotno besedilo izjave EU o skladnosti je na voljo na naslednjem spletnem naslovu:  |
| Finnish (FI)    | Furuno Electric Co., Ltd. vakuuttaa, että yllä mainittu radiolaitetyyppi on direktiivin 2014/53/EU mukainen.<br>EU-vaatimusten mukaisuusvakuutuksen täysimittainen teksti on saatavilla seuraavassa internetosoitteessa:  |
| Swedish (SV)    | Härmed försäkrar Furuno Electric Co., Ltd. att ovan nämnda typ av radioutrustning överensstämmer med direktiv 2014/53/EU.<br>Den fullständiga texten till EU-försäkran om överensstämmelse finns på följande webbadress:  |

## Online Resource

[http://www.furuno.com/en/support/red\\_doc](http://www.furuno.com/en/support/red_doc)









**ECF**

**(Elemental Chlorine Free)**  
The paper used in this manual  
is elemental chlorine free.

**FURUNO ELECTRIC CO., LTD.**

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