FURUNO

OPERATOR'S MANUAL

SATELLITE COMPASS

Model **SC-30**

FURUNO ELECTRIC CO., LTD.

www.furuno.com

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.
- 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

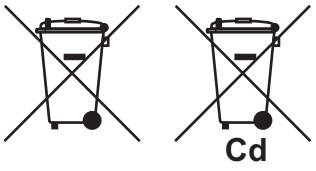
Discard this product according to local regulations for the disposal of industrial waste. For disposal in the USA, see the homepage of the Electronics Industries Alliance (http://www.eiae.org/) for the correct method of disposal.

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.

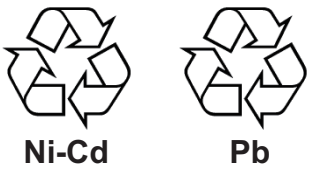
In the European Union

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.

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	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

⚠ WARNING

Do not open the equipment.

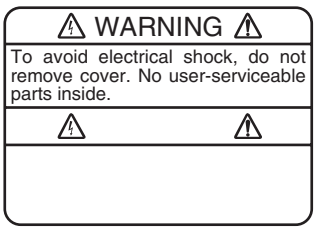
Only qualified personnel should work inside the equipment.

Do not disassemble or modify the equipment.

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.



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

Safety instructions for the installer

⚠ WARNING

Turn off the power at the switchboard before beginning the installation.

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

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

Connecting an incompatible power supply can cause fire or damage the equipment. The voltage rating appears on the inlet of power.

⚠ CAUTION

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

	Standard compass	Steering compass
SC-30	0.40 m	0.30 m

TABLE OF CONTENTS

FOREWORD

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®* 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 ±1.0°
- 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

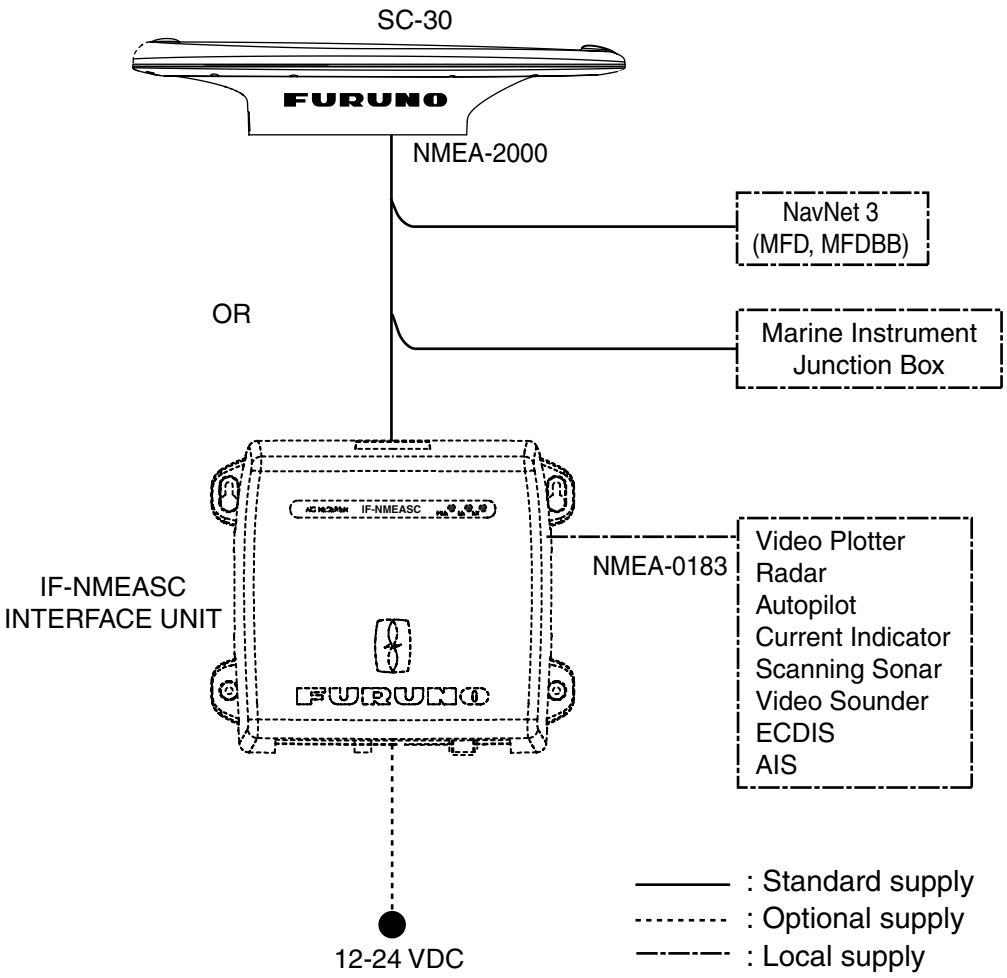
Program No.

2051586-03.**
** denotes minor modifications.

CE declaration

With regards to CE declarations, please refer to our website (www.furuno.com), 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 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-Repel-lent Fixture	OP20-36	004-380-830	4	
Cable Assy.	MJ-A10SPF0017-300C	000-166-890-10	1	30 m, ϕ8
	MJ-A10SPF0015-300C	000-166-892-10		30 m, ϕ10
	MJ-A10SPF0016-060C	000-166-887-10		6 m, ϕ8
	MJ-A10SPF0017-150C	000-166-889-10		15 m, ϕ8
	MJ-A10SPF0015-150C	000-166-891-10		15 m, ϕ10

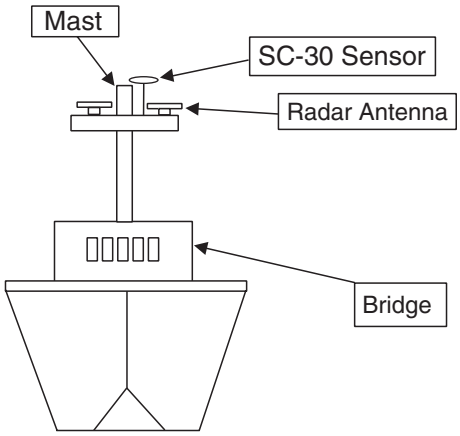
1.2 Mounting Considerations

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

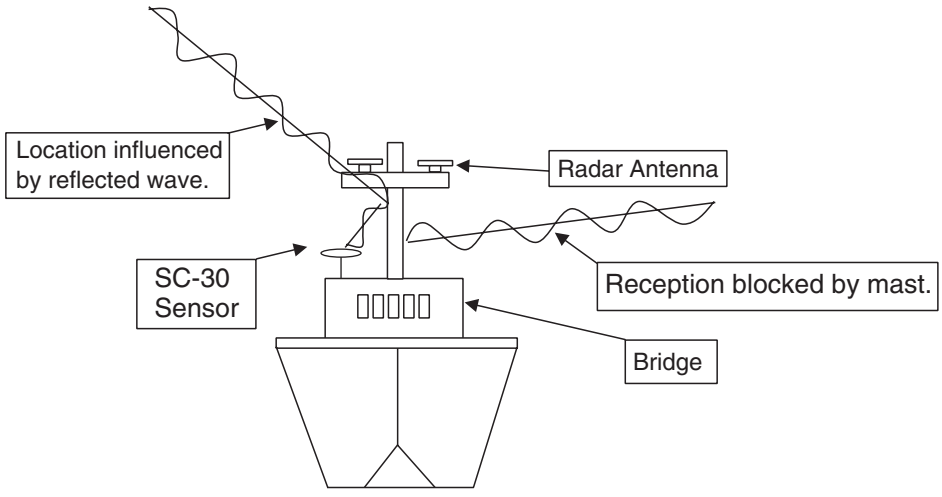
Like in the figure below, mount the SC-30 sensor above a radar mast. This provides an unobstructed path between the sensor and the satellite, regardless of vessel heading. Follow the procedure on the next page to choose an installation site.



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.



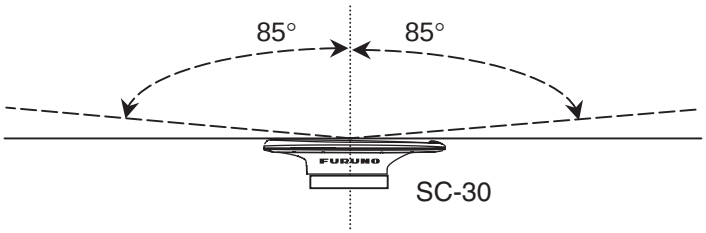
Problems associated with mounting sensor below a radar mast

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.

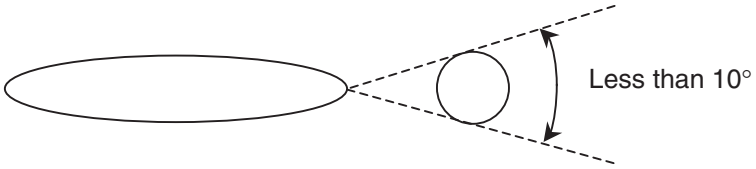
CONDITION 1: Locate the SC-30 away from masts that might prevent reception of the GPS signal

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



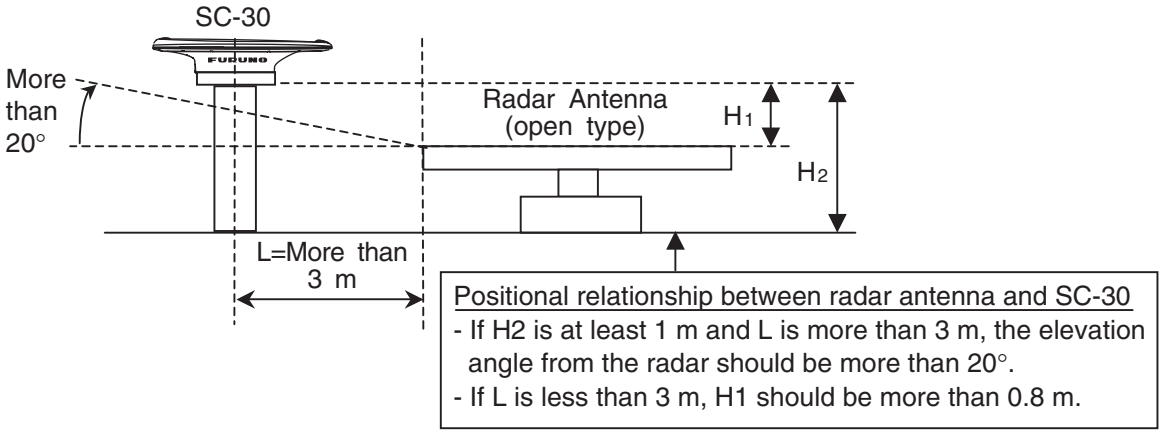
- If the above condition cannot be satisfied, separate the sensor so that the horizontal angle to the interfering object is less than 10°. Refer to the table below to determine minimum separation distance.

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

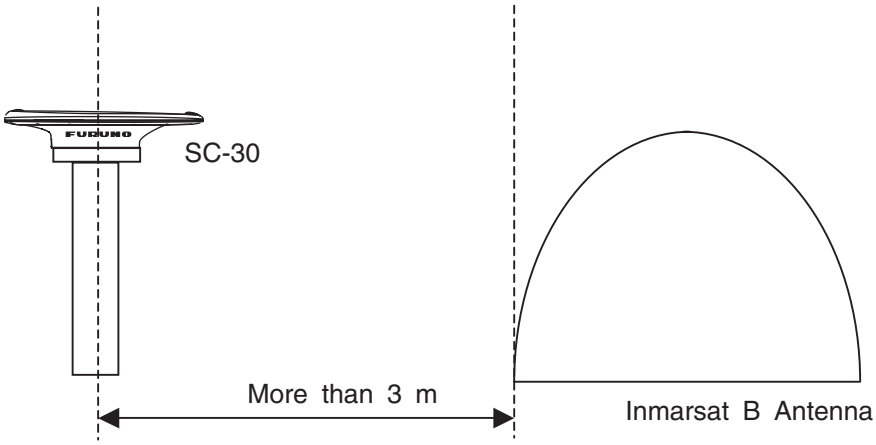


CONDITION 2: Locate the SC-30 out of Inmarsat and radar beams

- Locate the SC-30 more than 20° 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



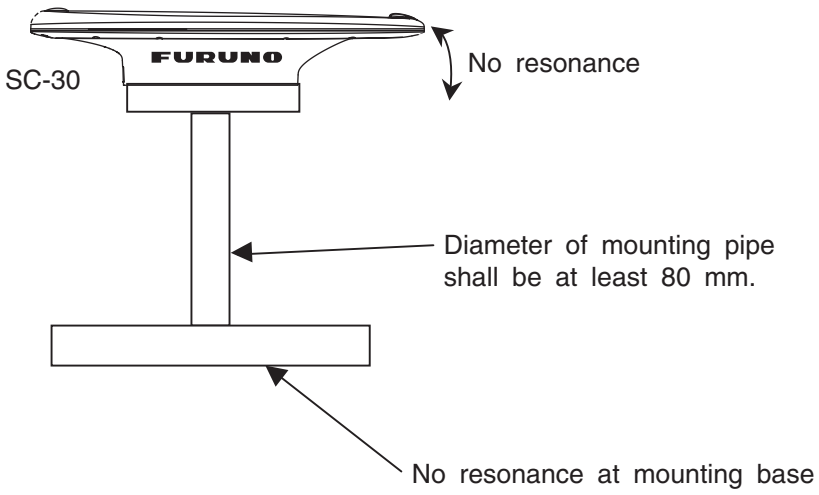
Separation distance from Inmarsat B antenna

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.

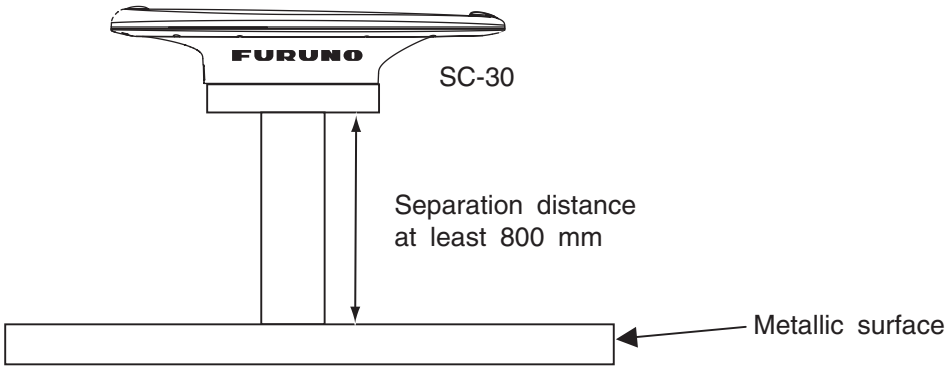


Installation height

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

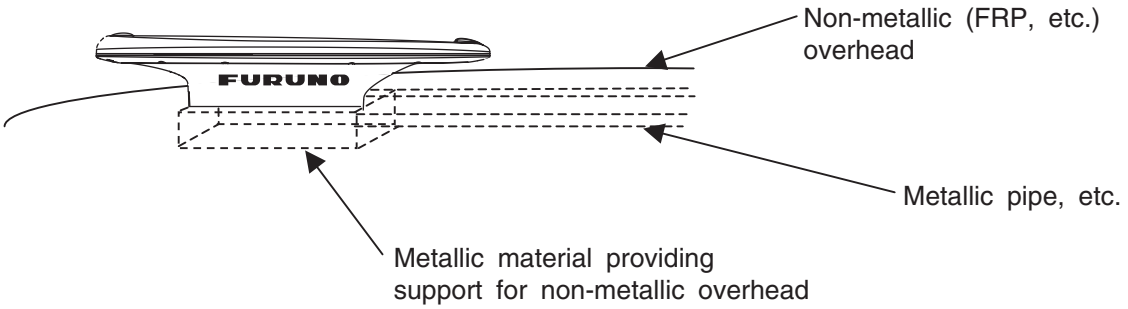
The deck is flat and metallic, or the area around the installation site is metallic

- 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.



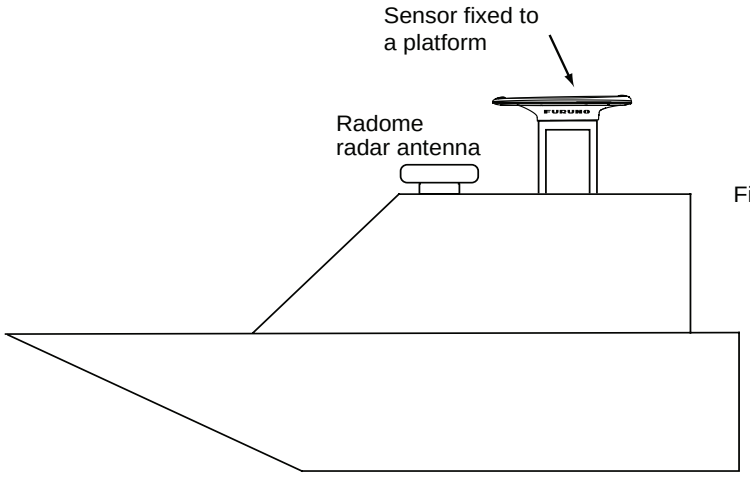
The deck is non-metallic (FRP, etc.) and there are no metallic objects around the installation site

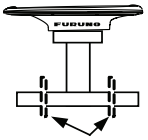
- If mounting surface is non-metallic and there is no radar or Inmarsat antenna in the vicinity, mount the SC-30 directly on the non-metallic surface. This can be done provided the metallic material support is smaller than the SC-30. If the SC-30 is to be fixed to a mounting pipe, choose a site where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



Installation examples for a pleasure boat

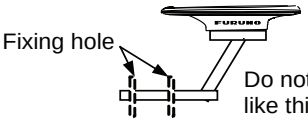
No tuna tower





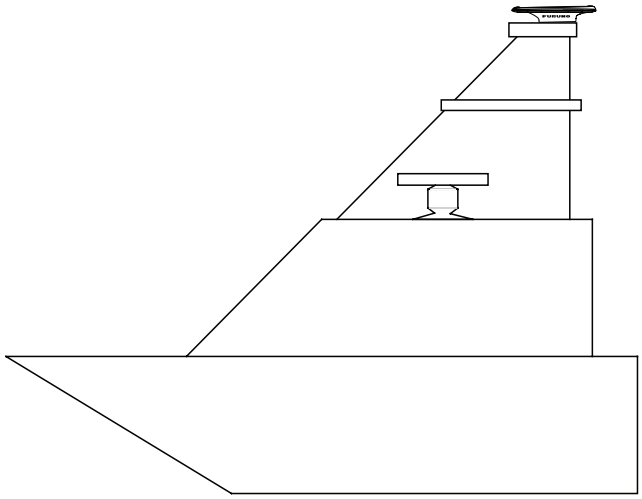
Fixing holes should "surround" the sensor. Further, fix the mounting pole at a right angle. The recommended dimensions for the pole are

Diameter: more than ϕ80 mm
Length: less than 500 mm

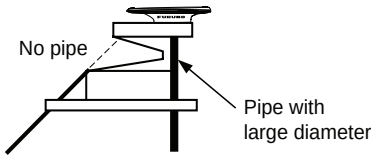


Do not mount the sensor like this.
Vibration can damage the sensor.

With tuna tower



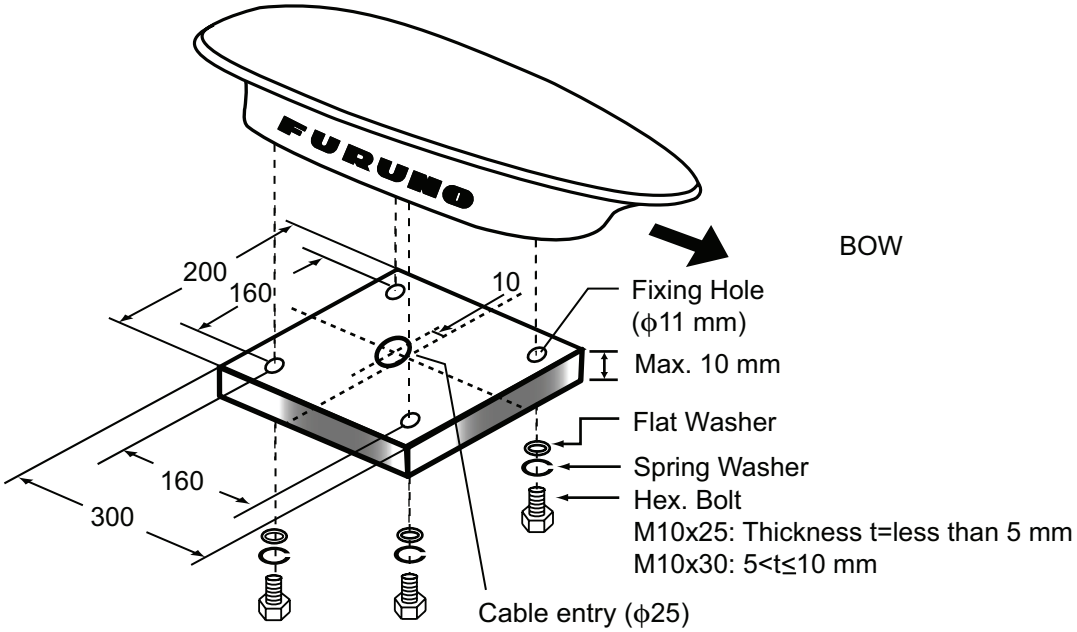
Fix sensor to pipe at stern side of sensor if guardrail or the like runs to top of tuna tower, etc.



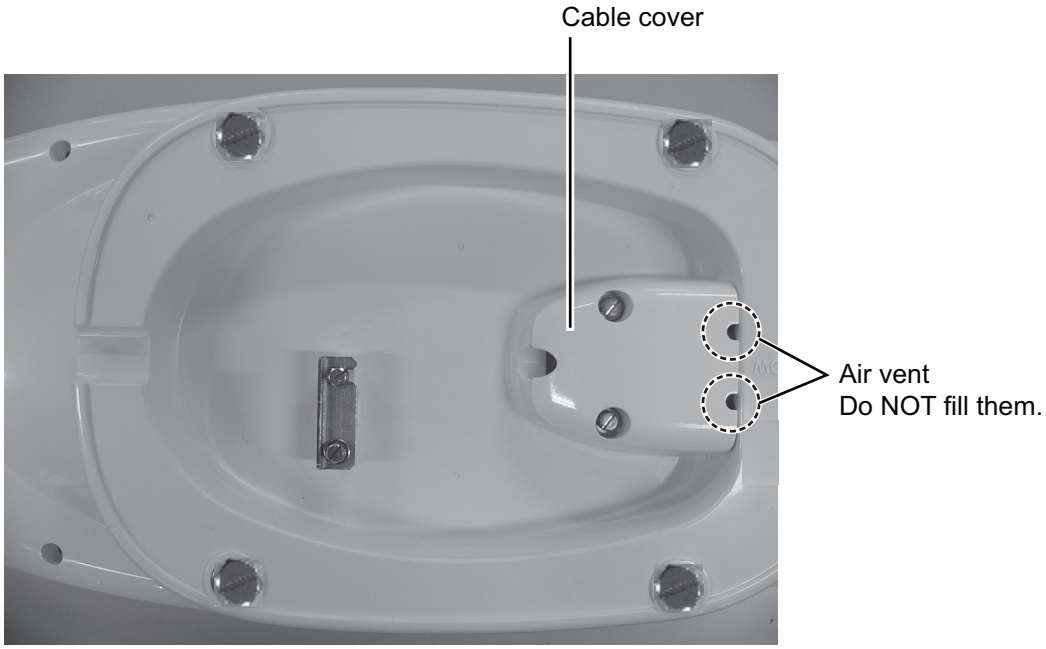
1.3 Mounting Procedure

"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.

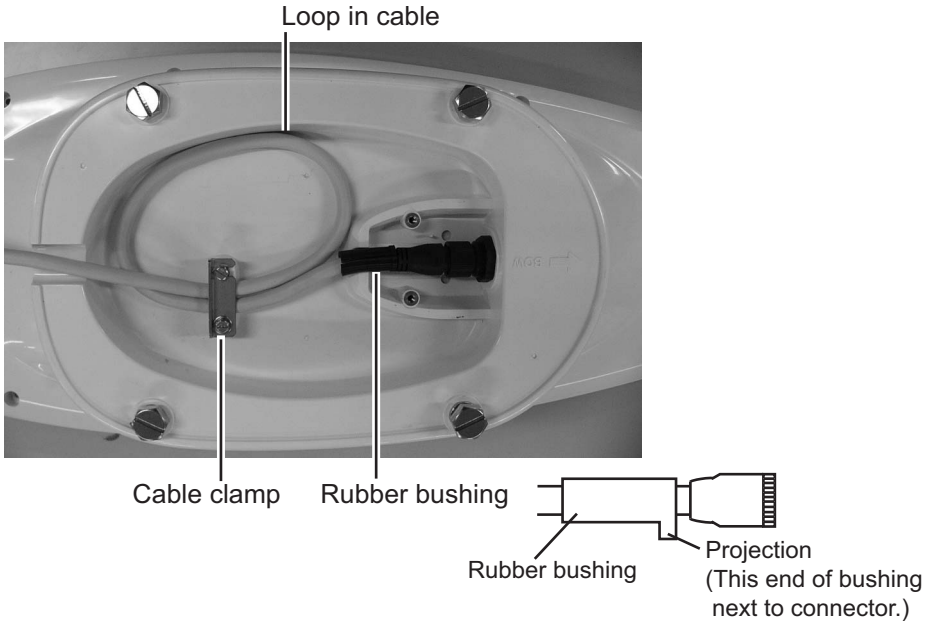
1. As shown in the figure below, weld a platform (local supply) for which to mount the sensor. The thickness of the platform should be max. 10 mm.



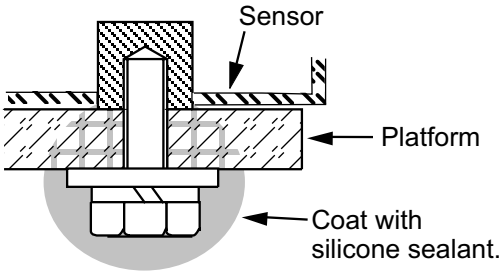
2. Open the cable cover on the underside of the sensor.



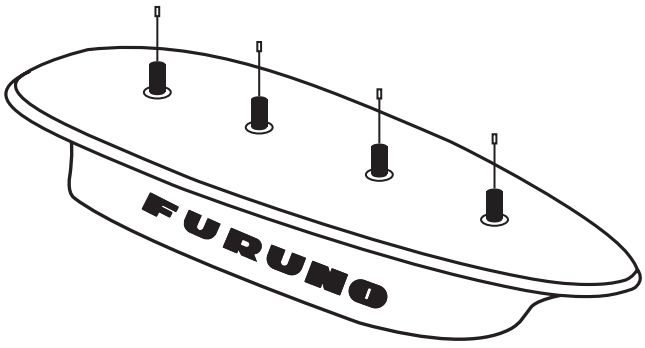
3. Slip the rubber bushing (supplied) onto the sensor cable at the location shown below. Attach the cable to the connector. Make a loop in the cable to prevent cable fatigue.



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±2Nm.
   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).

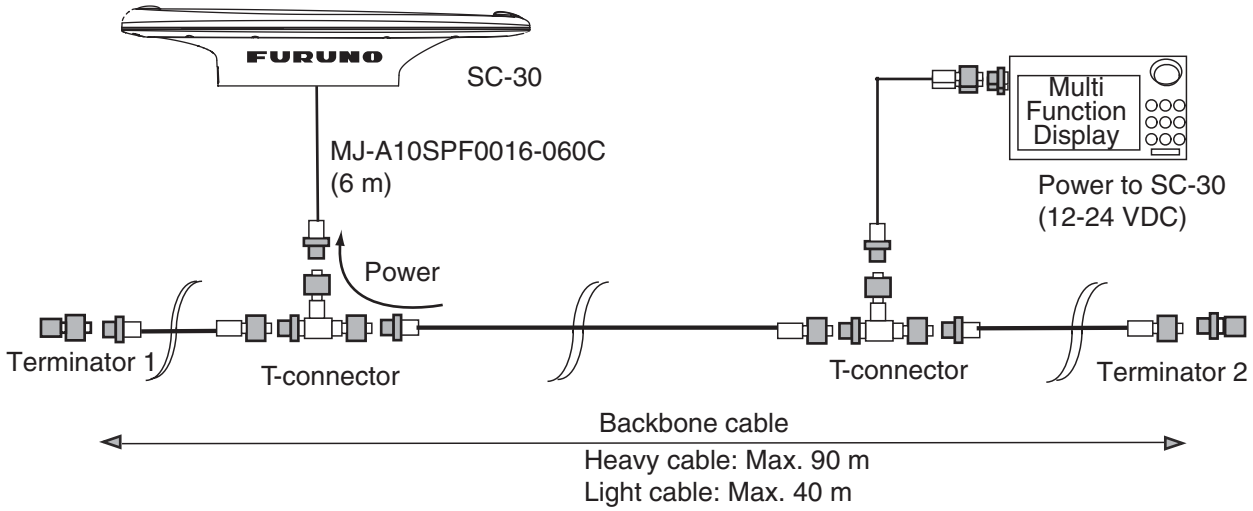
2. WIRING

2.1 NMEA 2000 Network Connection

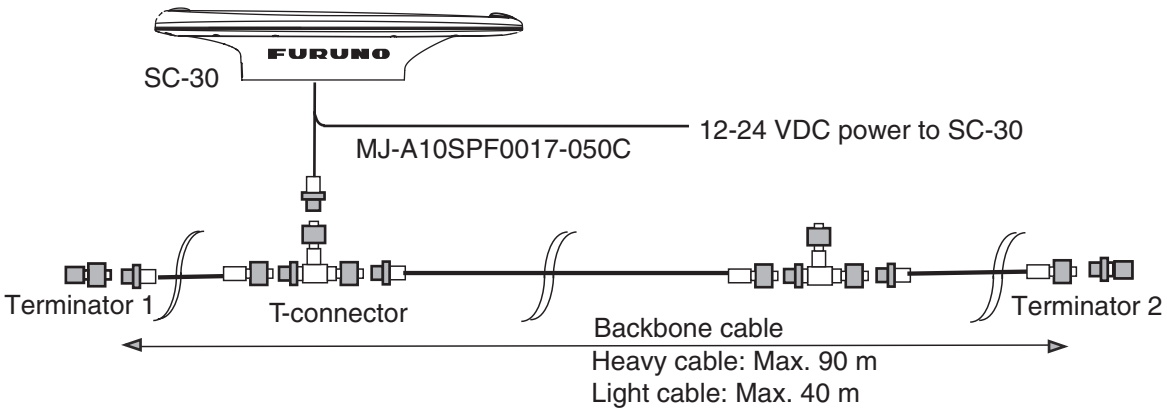
The SC-30 connects to the devices in an NMEA 2000 network with a drop cable, which is connected to a backbone cable w/T-type connectors. The backbone cable can be light or heavy type. Attach a terminator at both ends of the backbone cable. Use a Micro-C connector to connect to the devices. We recommended 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

<table>
<tr><th>Name</th><th>PGN (Parameter Group No.)</th><th colspan="4">Remarks</th></tr>
<tr><td>ISO Acknowledge-ment</td><td>059392</td><td colspan="4"></td></tr>
<tr><td>ISO Request</td><td>059904</td><td colspan="4">Request for one-time transmission of asterisk-marked PGN in the output data table on the next page.</td></tr>
<tr><td>ISO Address Claim</td><td>060928</td><td colspan="4"></td></tr>
<tr><td>NMEA-Request Group Function</td><td rowspan="13">126208</td><td colspan="4">Request for transmission of transmitting interval and one-time transmission of asterisk-marked PGN in the output data table on the next page.</td></tr>
<tr><td>NMEA-Command Group Function</td><td colspan="4">Standard PGN sentences and their changeable fields</td></tr>
<tr><td></td><td>Name</td><td>PGN</td><td>Field</td><td>Remarks</td></tr>
<tr><td></td><td>Vessel Heading</td><td>127250</td><td>#5</td><td rowspan="2">0 or 1 (default 0)
0: true bearing
1: magnetic bearing.
Setting is mutually changed.</td></tr>
<tr><td></td><td>COG & SOG, Rapid Update</td><td>129026</td><td>#2</td></tr>
<tr><td></td><td>GNSS Control Group Function</td><td>129538</td><td>#6</td><td>0 or 1 (default 1)
0: WAAS off
1: WAAS on</td></tr>
<tr><td></td><td colspan="4">The PGNs below are FURUNO proprietary PGN, and various settings can be adjusted by them.</td></tr>
<tr><td></td><td colspan="3">Name</td><td>PGN</td></tr>
<tr><td></td><td colspan="3">FURUNO GNSS Control Status</td><td>130817</td></tr>
<tr><td></td><td colspan="3">Heading and Attitude Sensor Control Status</td><td>130818</td></tr>
<tr><td></td><td colspan="3">Motion Sensor Control Status</td><td>130819</td></tr>
</table>

3.2 Output Data

Name	PGN (Parameter Group No.)	Output Interval	Remarks
ISO Acknowledgement	059392	*	
ISO Address Claim	060928	*	
Heave	065280	100 ms	FURUNO proprietary sentence
NMEA-Acknowledge 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 transmission interval (1s).
Magnetic Variation	127258	1 s	
Position, Rapid Update	129025	100 ms	
COG & SOG Rapid Update	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.

NOTICE

Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts of the equipment.

Those items contain organic solvents that can damage coating and plastic parts, especially plastic connectors.

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	• Visually check cabling for signs of wear and damage. • Check that connector is firmly fastened.	• Replace damaged cables. • Reconnect cable if it has loosened.
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.

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 ruddle 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
		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

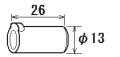
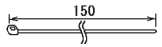
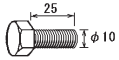
5.1	Satellite compass	N9.5
5.2	Interface unit	N2.5

FURUNO

CODE NO.	001-019-690-00	20BA-X-9401 -1
TYPE	CP20-02901	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｹｰﾌﾞﾙﾌﾞｯｼｭ CABLE RUBBER BUSH		20-030-1105-2 CODE NO. 100-340-192-10	1	
2	ｺﾝﾍﾞｯｸｽ CONVEX		CV-150N CODE NO. 000-162-186-10	3	
3	平座金 FLAT WASHER		M10 SUS316L M10 SUS316L CODE NO. 000-167-416-10 000-147-299-00	4	
4	ﾊﾞﾈ座金 SPRING WASHER		M10 SUS316L M10 SUS316L CODE NO. 000-167-389-10 000-147-303-00	4	
5	六角ﾎﾞﾙﾄ HEXAGONAL HEAD BOLT		M10X25 SUS316L CODE NO. 000-162-959-10	4	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

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

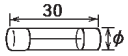
FURUNO ELECTRIC CO ., LTD.

C7265-M01-B

FURUNO

CODE NO.	001-019-740-00	20BA-X-9301 -0 1/1
TYPE	SP20-01201	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	QUANTITY SPARE	REMARKS/CODE NO.
1	ﾋｭｰｽﾞ FUSE		FGBO-A 125V 1A PBF			3	000-155-847-10

MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	C7265-P01-A	1/1

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

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

FURUNO

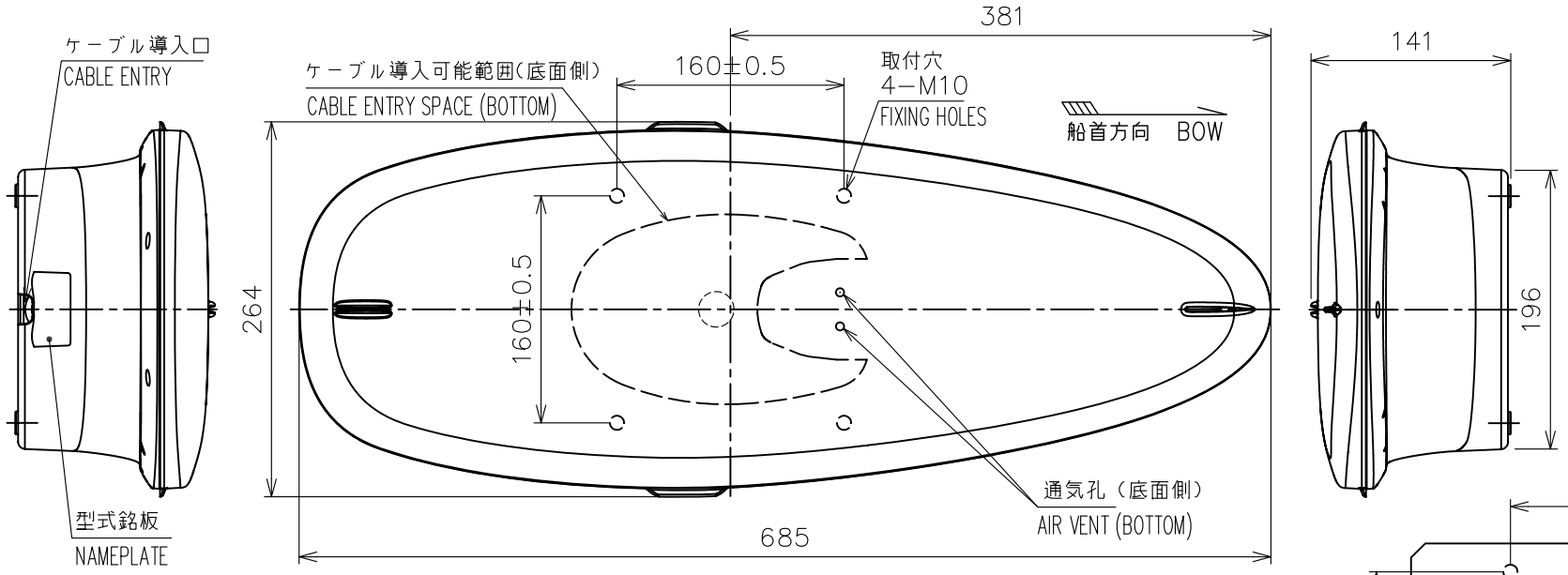
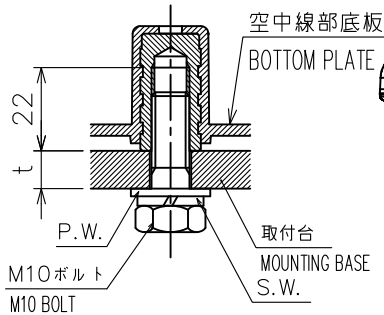
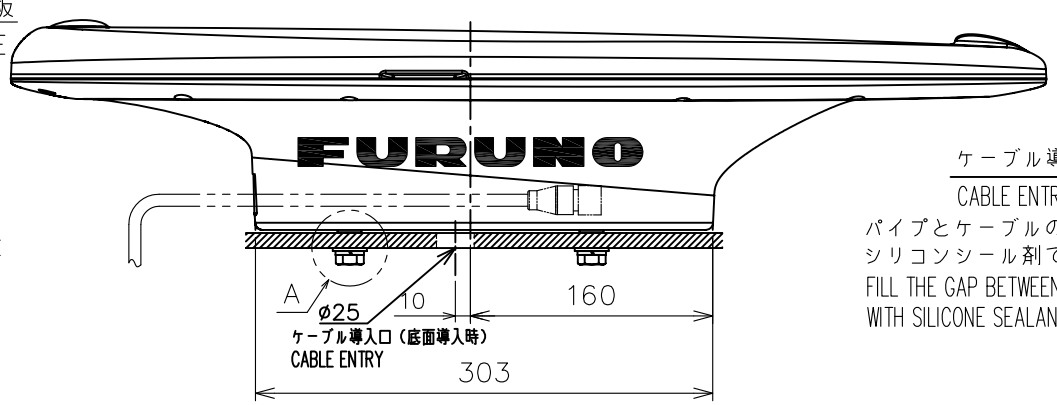


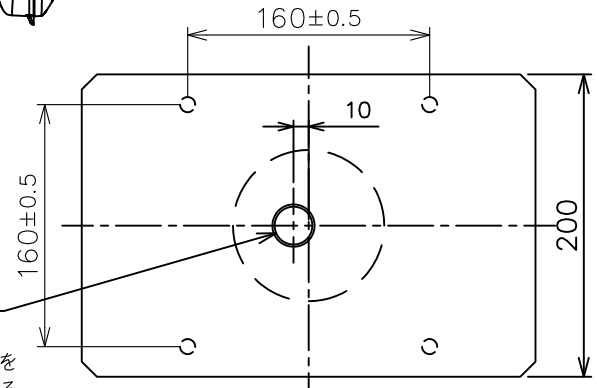
表1 TABLE 1

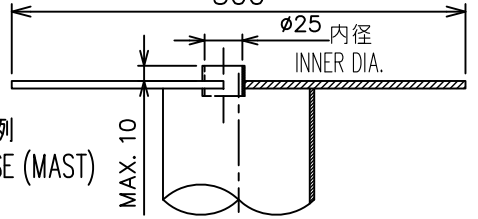
寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3
500<L≦1000	±4



A部 詳細（尺度: 1／2）
DETAIL FOR A (SCALE: 1/2)







取付台（マスト）製作例
EXAMPLE OF MOUNTING BASE (MAST)

注 記
1） 指定外の寸法公差は表1による。
2） 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≦5）または30（5<t≦10）とする。

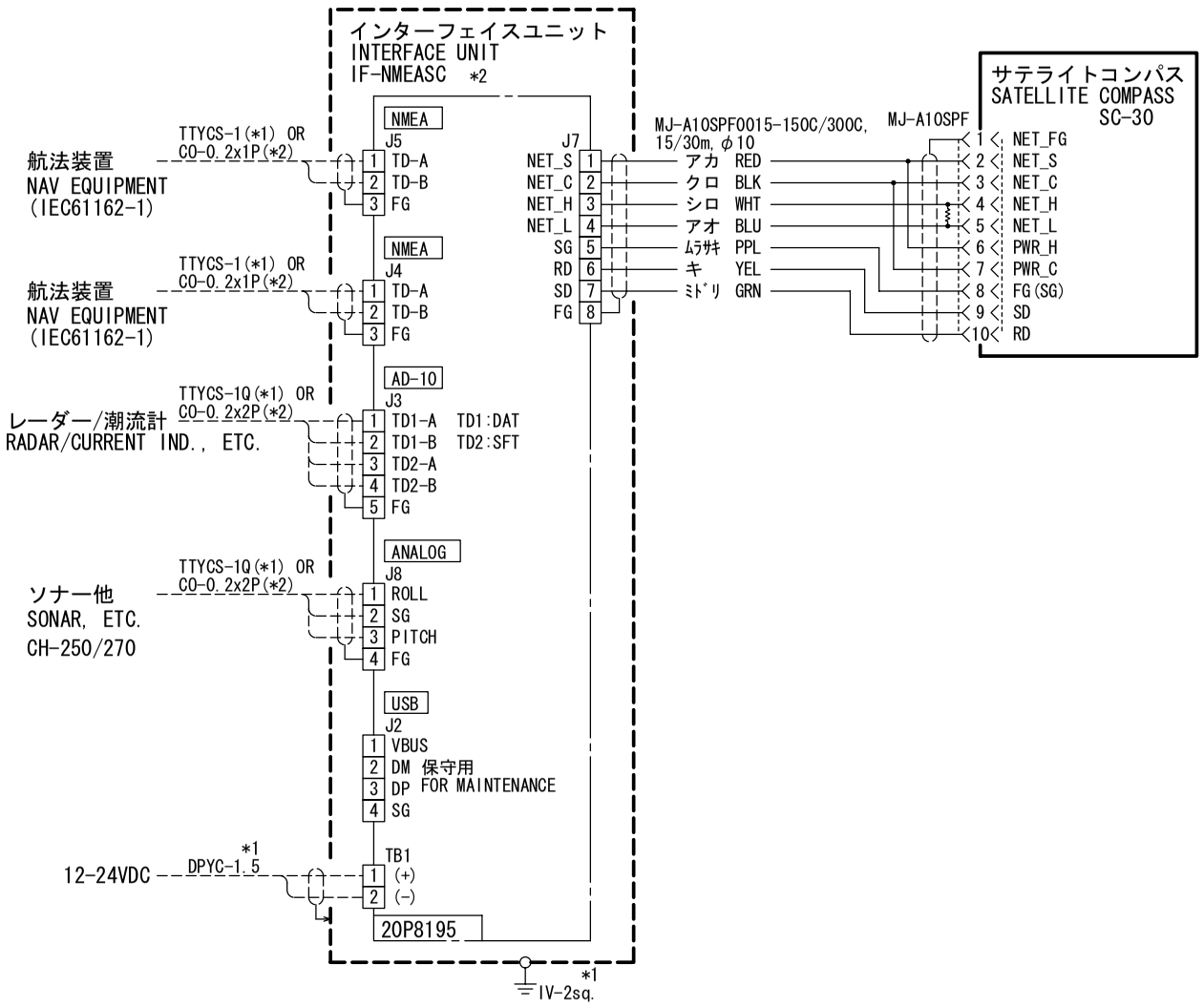
NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. USE M10 BOLTS FOR FIXING THE UNIT.
SCREW LENGTH: 25 (t≦5) OR 30 (5<t≦10). t: THICKNESS OF MOUNTING BASE.

DRAWN 18/Aug/2014 T.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	MASS 2.5 ±10% kg 質量はケーブルを含まず。 MASS W/O CABLE.	NAME	SATELLITE COMPASS
DWG.No. C7265-G01- B	REF.No. 20-030-100G-3		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

D-1

FURUNO



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 20/May/09 T.YAMASAKI			TITLE SC-30
CHECKED 20/May/09 T.TAKENO			名称 サテライトコンパス
APPROVED 15/Sep/09 R.Esumi			相互結線図
SCALE	MASS kg		NAME SATELLITE COMPASS
DWG.No. C7265-C01- D	REF.No. 20-030-5000-1		INTERCONNECTION DIAGRAM

S-1

FURUNO ELECTRIC CO., LTD.

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 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.

FURUNO ELECTRIC CO., LTD.
9-52 Ashihara-cho, Nishinomiya, 662-8580, Japan
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www.furuno.co.jp

Publication No. DOCQA0193

Declaration of Conformity

CE 0560

We FURUNO ELECTRIC CO., LTD.

(Manufacturer)

9-52 Ashihara-Cho, Nishinomiya City, 662-8580, Hyogo, Japan

(Address)

declare under our sole responsibility that the product

SATELLITE COMPASS SC-30

(Model name, type number)

is in conformity with the essential requirements as described in the Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment (R&TTE Directive) and satisfies all the technical regulations applicable to the product within this Directive

IEC 60945 Ed.4.0:2002 EMC related items
EN 300 440-1 V1.5.1: 2009 Spurious related items
IEC 60950-1 Ed. 2.0: 2005 Safety related items
IEC 60950-1 Ed. 2.0 A1: 2009 Safety related items

(title and/or number and date of issue of the standard(s) or other normative document(s))

For assessment, see

- Statement of Opinion No: 09214235 issued by Telefication, The Netherlands

On behalf of Furuno Electric Co., Ltd.

Nishinomiya City, Japan
January 27, 2011

(Place and date of issue)

Takahiko Kusuda
Manager, QMS Secretariat
Quality Assurance Department

(name and signature or equivalent marking of authorized person)

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

FURUNO ELECTRIC CO., LTD.

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

・FURUNO Authorized Distributor/Dealer

 Printed in Japan

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(ETMI) SC-30

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