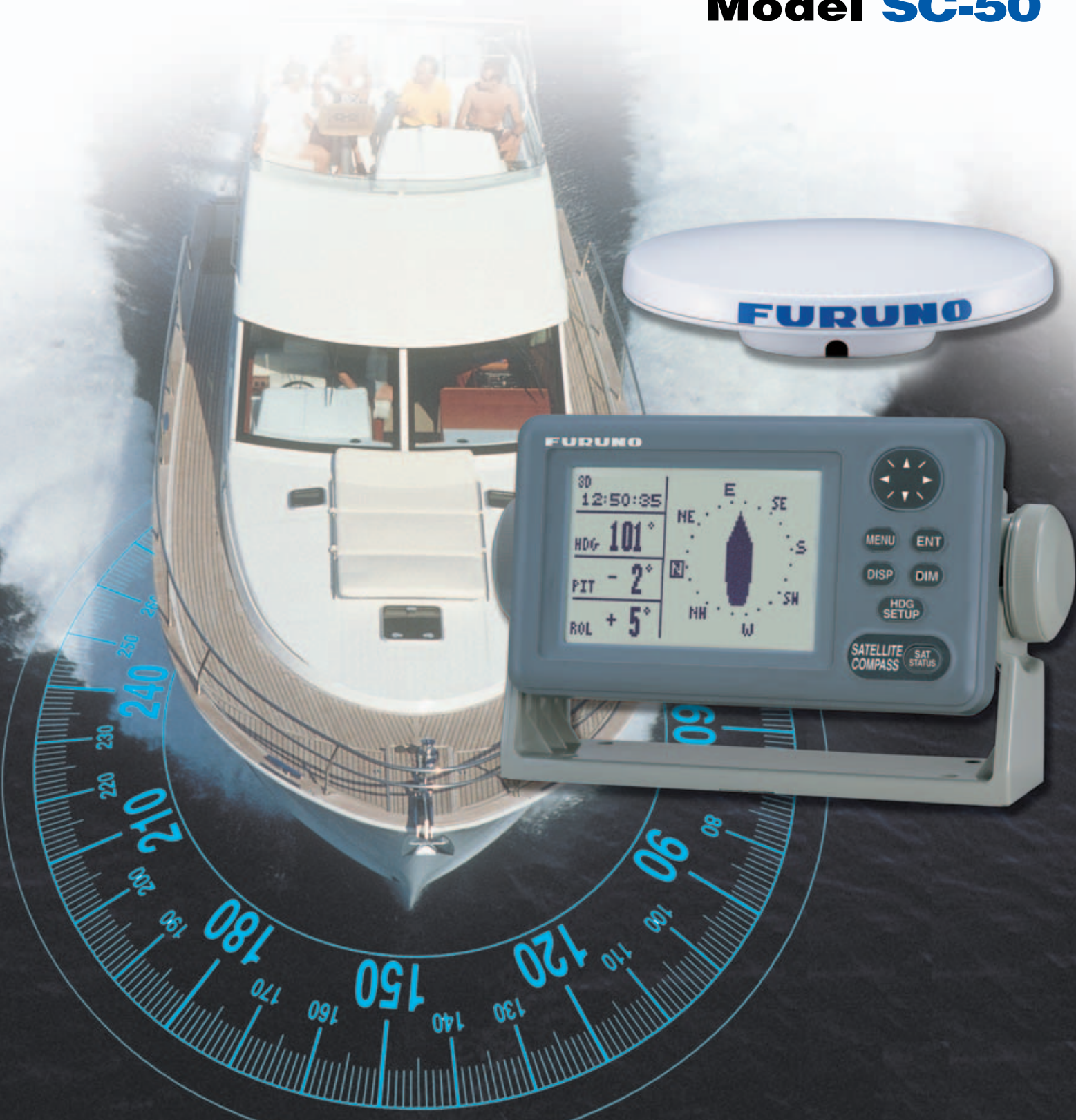


# FURUNO®

## Revolutionary heading sensor **SATELLITE COMPASS** Model **SC-50**

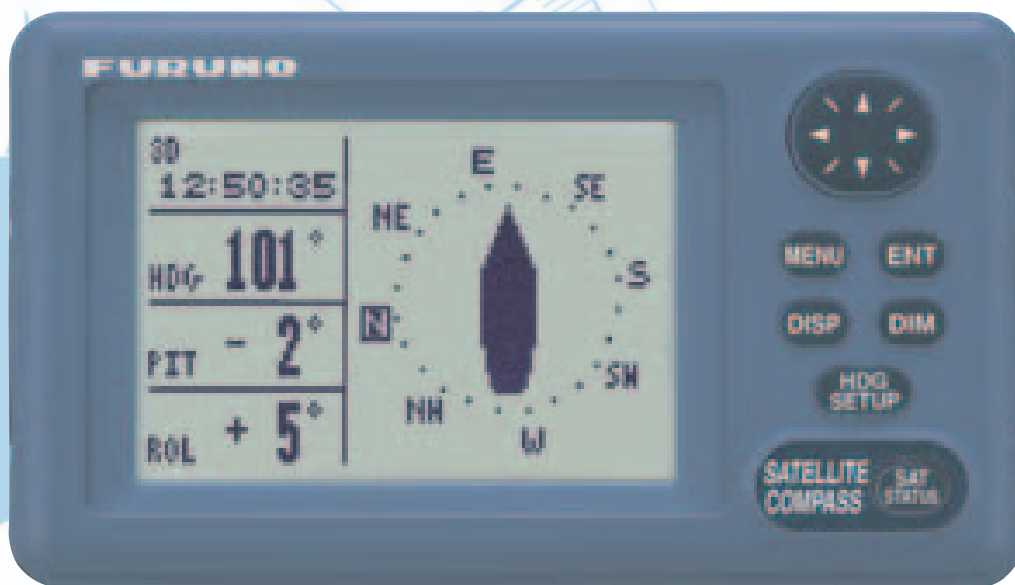


The future today with FURUNO's electronics technology.  
**FURUNO ELECTRIC CO., LTD.**  
9-52 Ashihara-cho, Nishinomiya City, Japan Phone: +81 (0)798 65-2111  
Fax: +81 (0)798 65-4200, 66-4622 URL: [www.furuno.co.jp](http://www.furuno.co.jp)

Catalogue No. N-859

TRADE MARK REGISTERED  
MARCA REGISTRADA

# Furuno's advanced GPS technology ensures data for AIS, ECDIS, Radar/ARPA and more.



Compass Rose Mode

- Provides highly accurate heading data for autopilot, radar, AIS, Sonar and plotting systems
- IMO MSC.116(73) type approved as a verified THD (Transmitting Heading Device)
- Rapid 45°/s follow-up rate greatly exceeds IMO High Speed Craft requirements 20°/s
- High accurate GPS, WAAS Data - SOG, COG, ROT, and L/L
- Precision Pitch/Roll Data in Analog and Digital formats for vessel stabilizers, sonar, etc..
- Multiple High Speed Heading Data Output in IEC 61162-1/2 (NMEA0183/HS)
- High Contrast 4.5" Silver Bright LCD
- 100% free of yearly or regular maintenance - No Recurring Costs
- Unique Tri-Antenna System improves system accuracy and reduces the effects of yaw, pitch and roll

The SC-50 is a new satellite compass that uses Furuno's advanced GPS technology. This satellite compass can be used for a wide range of applications for any type of vessel. Radar/ARPA, AIS, ECDIS, Scanning Sonar and Autopilots can utilize the functions of this compass. The SC-50 uses GPS carrier frequency to determine heading and is not affected by ship's speed, latitude, geomagnetism, etc. Settling time is nearly instantaneous and the follow-up performance is excellent, achieving 45°/s (SOLAS HSC Code requires 20°/s as a minimum).

The SC-50 delivers GPS positioning, SOG (Speed Over Ground), COG (Course Over Ground) and ROT (Rate of Turn). SOG is remarkably accurate through decoding the Doppler shift in the received satellite signals. The information can be output in IEC61162-2 format at the high update rate up to 38.4 kbps to satisfy the high speed data-output requirements in special applications.

Precision roll and pitch data is output in both analog and digital formats to external equipment. For sonar or echo sounders, the SC-50 offers stable echo pictures by compensating the transmitted/received beams even in rough seas. Thus, the SC-50 can also function as a highly accurate motion sensor.

The SC-50 has a unique Set and Drift mode. When connected with a water-tracking speed log, such as the DS-80, it calculates set and drift (tide direction and speed) in the mode. The display helps a radar operator manually enter set and drift for the accurate sea stabilization pictures.

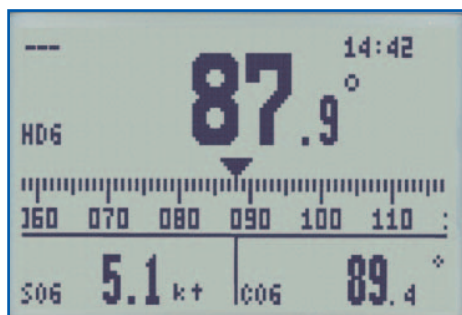
The SC-50 consists of Antenna Unit, Display Unit and Processor Unit. The stylish radome antenna accommodates three GPS antennas. The tri-antenna system helps reduce the influence of vessels' motions more than dual-antenna system.



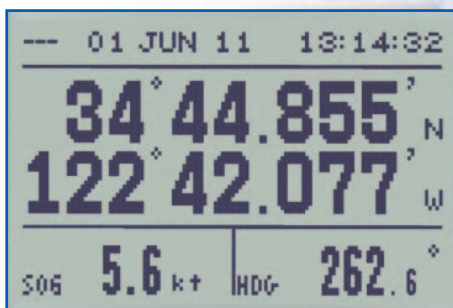
Processor Unit



# s highly accurate heading



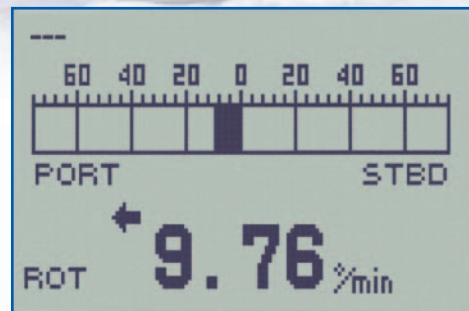
Steering Mode



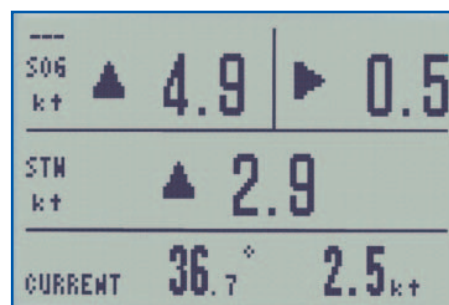
NAV Data Mode



Heading Mode



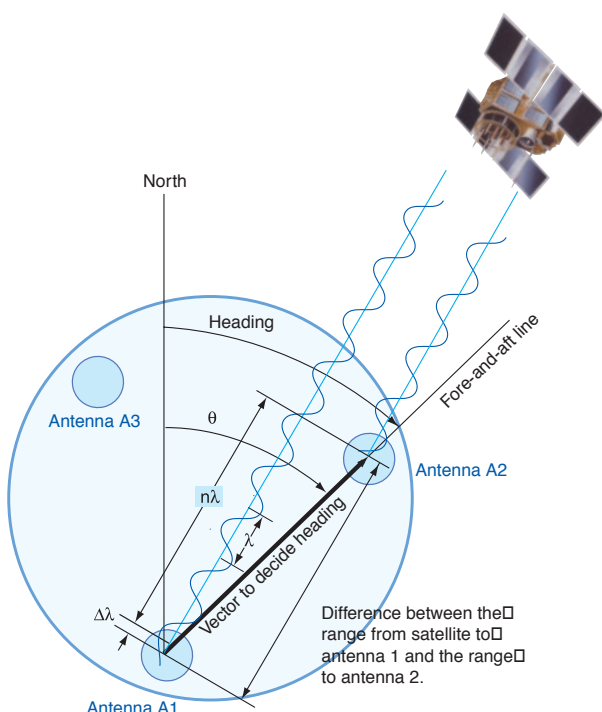
ROT Mode



Set & Drift Mode

(Current (Set and Drift) and Distance Run is selectable.)

## Principle



With the SC-50, a ship's heading is determined by decoding the phase data in the GPS carrier frequency.

In principle, a pair of antennas A1(ref) and A2(fore), each connected with an associated GPS engine and processor, are installed along the ship's fore-aft line. The GPS systems at A1 and A2 calculate the range and azimuth to the satellite.

The difference in range between A1 and A2 is  $\Delta\lambda + n\lambda$  where  $\lambda$  is 19 cm and  $n^*$  is automatically found during the initialization stage. A fraction of a carrier wavelength,  $\Delta\lambda$ , is processed by Furuno's advanced kinematic technology in geographical survey, thus determining a vector (range and orientation) A1 to A2, i.e., heading of ship relative to north.

In reality, the third antenna is added to reduce the influence of pitch, roll and yaw, and five satellites are used to process 3D data (by 3rd sat), to reduce clock derived error (by 4th sat), and to calculate  $n$  in initial stage (by 5th sat).

If the GPS signal is blocked by a tall building or under a bridge, the 3-axis vibrating-gyro rate sensors in the processor unit take the place of the satellite until all five satellites are in view. The rate sensors also contribute to regulating the heading data against pitch, roll and yaw together with the third antenna (A3 in the illustration).

\*Ambiguity "n" is resolved by LAMBDA algorithm developed by Prof. Teussen, Delft University of Technology, The Netherlands.

# SPECIFICATIONS OF SC-50

## 1. Accuracy

Heading	±1.0° (95% static accuracy) (IMO THD MSC.116(73) static accuracy: ±1.0° x secant Lat.)
GPS Fix	10 m (95%)
DGPS Fix	5 m (95%)
WAAS Fix	3 m (95%)

## 2. Follow-up

45°/s rate-of-turn

## 3. Settling time

3 min

## 4. Interface

Number of ports	5 ports in AD-10 or 10 ports in IEC 61162-1/-2
10 ports*	* can be utilized in menu selection AD-10 only
1 port	
Serial data sentence	25, 100, 200 ms, 1, 2 s data rate: HDT, HDM(Heading), ROT(Rate of turn) ATT(Pitch and Roll) 1, 2 s data rate: VHW(Heading), VTG, VBW(SOG), GGA, GLL, GNS(L/L), ZDA(UTC), VDR( Set and Drift)
Log Output	1 port: 200/400 p/nm (closure)
Alarm Output	1 port: Alarm signal (closure signal)
Heading Input	1 port: Backup Heading (AD-10/IEC 61162-1) HDT, HDG, HDM, VBW, VHW, VLW 1 port: RTCM SC-104 format Twelve discrete channels. C/A code, all-in-view L1 (1575.42 MHz)
DGPS Input	Monochrome LCD, 4.5" diagonal 95 (W) x 60 (H)mm, 120 x 64 pixels

## 5. Receiver Type

## 6. Receive Freq

## 7. Display Unit

## 8. Display Mode

## POWER SUPPLY

12-24 VDC, 15 W

## ENVIRONMENTAL

IEC 60945 for EMC, Vibration, Temperature

## EQUIPMENT LIST

### Standard

1. Display Unit SC-502	1 unit
2. Antenna Unit SC-303 with 15 m cable	1 unit
3. Processor Unit SC-501	1 unit

### Option

1. Antenna Cable, 30 m CP20-01700, 50 m CP20-01710	
2. Flush Mount Kit S type CP20-17, F type CP20-29	

### Display Unit

0.55 kg 1.2 lb

### Flush Mount Kit F type

### Flush Mount Kit S type

### Processor Unit

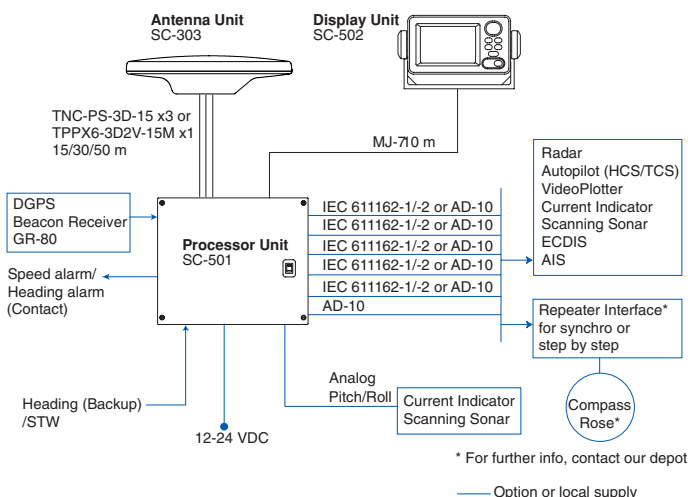
4.2 kg 9.3 lb

### Antenna Unit

SC-303

4.2 kg 9.3 lb

## Interconnection Diagram



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

**FURUNO U.S.A., INC.**  
Camas, Washington, U.S.A.  
Phone: +1 360-834-9300 Telefax: +1 360-834-9400

**FURUNO (UK) LIMITED**  
Denmead, Hampshire, U.K.  
Phone: +44 2392-230303 Telefax: +44 2392-230101

**FURUNO FRANCE S.A.**  
Bordeaux-Mérignac, France  
Phone: +33 5 56 13 48 00 Telefax: +33 5 56 13 48 01

**FURUNO ESPANA S.A.**  
Madrid, Spain  
Phone: +34 91-725-90-88 Telefax: +34 91-725-98-97

**FURUNO DANMARK AS**  
Hvidovre, Denmark  
Phone: +45 36 77 45 00 Telefax: +45 36 77 45 01

**FURUNO NORGE A/S**  
Ålesund, Norway  
Phone: +47 70 102950 Telefax: +47 70 127021

**FURUNO SVERIGE AB**  
Västra Frölunda, Sweden  
Phone: +46 31-7098940 Telefax: +46 31-497093

**FURUNO FINLAND OY**  
Espoo, Finland  
Phone: +358 9 4355 670 Telefax: +358 9 4355 6710

04032/5KS Printed in Japan