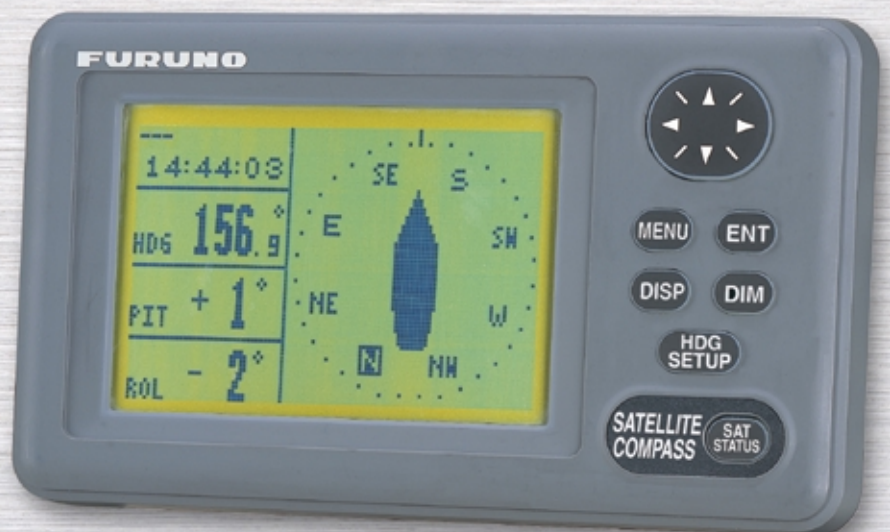


FURUNO®

Revolutionary heading sensor SATELLITE COMPASS

Model SC-120



- Heading information for ARPA, AIS, ECDIS, Scanning Sonar, VideoPlotter
- Heading accuracy $\pm 0.6^\circ$ exceeding IMO MSC.116(73) as a THD (Transmitting Heading Device)
- SOG, COG, ROT, pitch and roll
- Excellent follow-up rate of $25^\circ/\text{s}$ exceeding requirements of high speed craft ($20^\circ/\text{s}$)
- Data in IEC 61162-1; heading output in AD-10 format for high speed rate applications
- Clear 4.5" backlit monochrome LCD showing mimic compass rose with digital readouts
- Six display modes: Heading, Nav Data, Steering, Compass Rose, Set & drift and ROT mode



The future today with FURUNO's electronics technology.

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Catalogue No. N-844c

TRADE MARK REGISTERED
MARCA REGISTRADA

Accurate heading for AIS, ECD



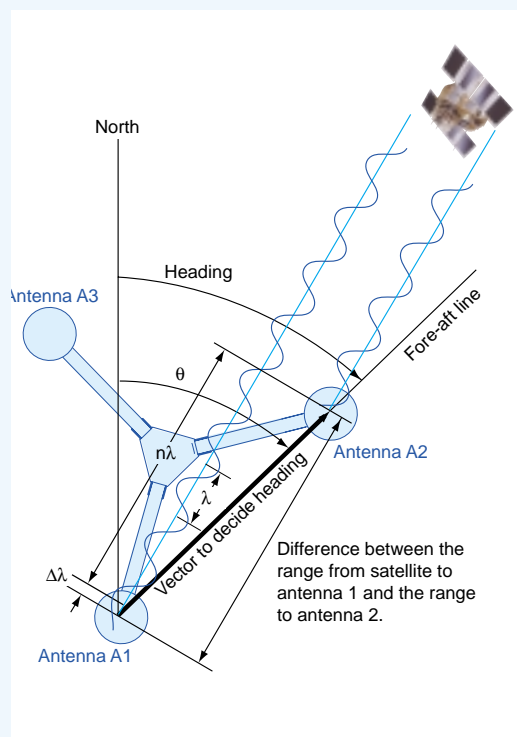
Compass Rose Mode

Actual size

Principle

Own 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(fores), 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 λ 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 own ship relative to north.



In reality, a 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 GPS signal is blocked by a tall building or under a bridge, the 3-axis vibrating-gyro rate sensors, in the processor unit, take 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.

AIS, RADAR plus GPS functions

The SC-120 is a revolutionary GPS-based compass designed for shipborne equipment needing a heading signal such as ARPA, AIS, ECDIS, Scanning Sonar, VideoPlotter, etc. This equipment also provides all of the necessary functions as the latest GPS navigator does. Fallback arrangement by 3-axis vibrating-gyro rate sensor provides accurate and continuous heading information when the satellite signals are blocked under bridge or satellites in view are reduced by a tall building. This also regulates the compass function when the ship is subject to pitching, rolling or yawing.

The SC-120 consists of 3 antennas on a rigid precision support, a processor unit, and a display unit. The tri-antenna system helps reduce the influence of ship's motion. There are no mechanical parts such as gimbals or rotating meter, thus the compass is free from routine maintenance.

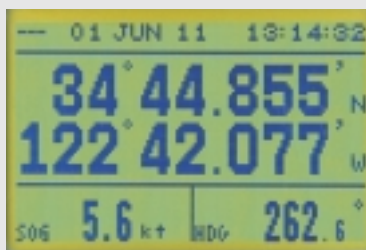
The performance is not affected by ship's speed, latitude, geomagnetism, etc. Settling time is almost instant and follow-up performance is excellent to 25°/s (SOLAS HSC Code requires 20°/s as minimum).

SOG (speed over ground), COG (course over ground) and ROT (rate of turn) are also displayed as well as the heading information and positional data. SOG is remarkably accurate by decoding the Doppler shift in the received satellite signals.

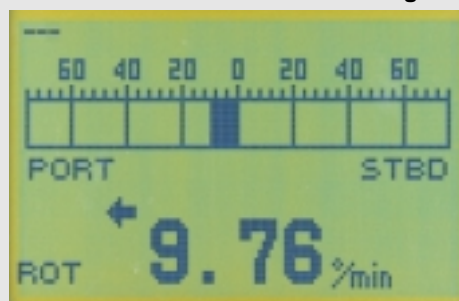
There are six display modes: Heading, Nav Data, Steering, Compass Rose, Set & Drift and ROT mode. The interface delivers true heading and course/speed over ground, Rate of turn as well as GPS fix, through 4 ports. The heading information is also taken out in AD-10 format at a high update of 25 ms to satisfy the high speed data required in special applications. When a water-tracking speedlog, such as DS-80, is connected, the SC-120 calculates set and drift (tide direction and speed) in the Set and Drift mode. The display helps radar operator to manually enter set and drift for accurate sea stabilization picture.



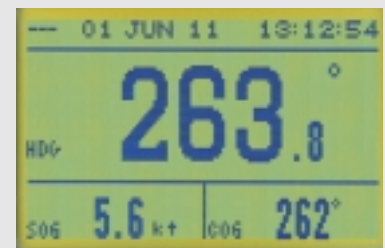
Steering Mode



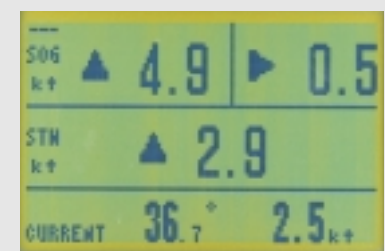
NAV Data Mode



ROT Mode



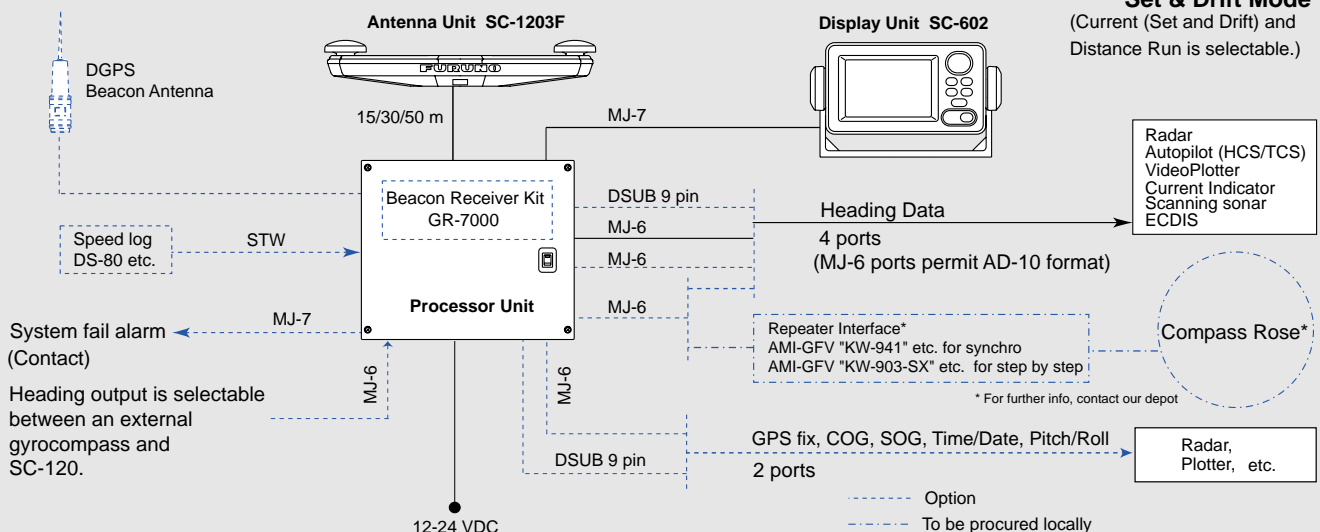
Heading Mode



Set & Drift Mode

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

Interconnection Diagram



SPECIFICATIONS OF SC-120

1. Accuracy

Heading: $\pm 0.6^\circ$ (95 % static accuracy)
(IMO THD MSC.116(73) static accuracy: $\pm 1.0^\circ \times \sec \text{Lat.}$)

GPS: 10 m (95 %)

DGPS: 5 m (95 %)

2. Follow-up

25°/s rate-of-turn

3. Settling time

4 min

4. Interface

Heading Output 3 ports: AD-10 or IEC 61162-1
1 port: NMEA 0183 (Ver 1.5/2.0) in RS-232C level
HDT, HDM, VTG, ZDA, GGA
AD-10 format: 25 ms data rate

COG, SOG, L/L Output 1 port: IEC 61162-1
1 port: NMEA 0183 in RS-232C
VTG, GGA, ZDA, GLL, ROT,
PFECatt including pitch, roll and yaw data
PFECGPatt (NMEA 0183 V 1.5/2.0)

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,
VLM for tide direction and speed

DGPS 1 port: RTCM SC-104 format in RS-232C: MSK, GGA

5. Receiver Type

Twelve discrete channels.

C/A code, all-in-view

L1 (1575.42 MHz)

6. Receive Freq

7. Display Unit

4.5-inch LCD (4 gray tones),

120 x 64 pixels

8. Display Mode

Steering, Nav Data, Compass
Rose, ROT, Heading and
Set and Drift modes

POWER SUPPLY

12-24 VDC, 15 W

EQUIPMENT LIST

Standard

- | | | |
|--|----------|--------|
| 1. Display Unit | SC-602 | 1 unit |
| 2. Antenna Unit | | |
| with 15 m Cable | SC-1203F | 1 unit |
| 3. Processor Unit | SC-1201 | 1 unit |
| 4. Standard Spare Parts,
Installation Materials | | 1 set |

Optional

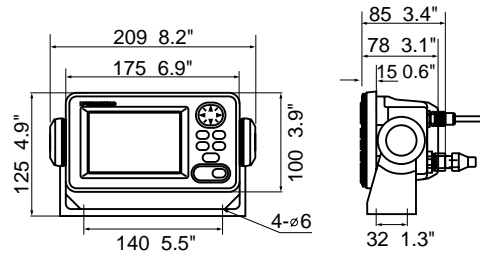
- | | |
|---|-----------------|
| 1. Beacon Receiver Kit | GR-7001-K |
| 2. Whip Antenna for Beacon Receiver Antenna | |
| | 1.2 m (FAW-1.2) |
| | 2.6 m (04S4176) |

- | | |
|-------------------------------------|---|
| 3. Data Cable for AD-10 | 5 m (MJ-A6SPF0003-050) |
| | 10 m (MJ-A6SPF0007-100) |
| 4. Interface Cable | 10 m (MJ-A6SPF0012-100) |
| 5. Antenna Cable | 30 m (CP20-01700),
50 m (CP20-01710) |
| 6. Flush Mount Kit for Display Unit | |
| | S type (OP20-17) |
| | F type (OP20-18/29) |

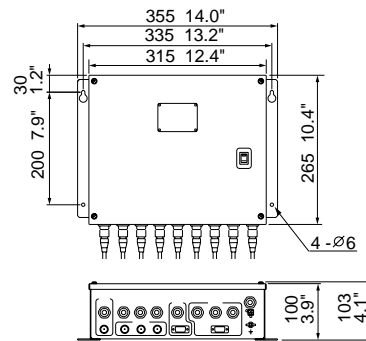
ENVIRONMENTAL

IEC 60945 for EMC, Vibration, Temperature

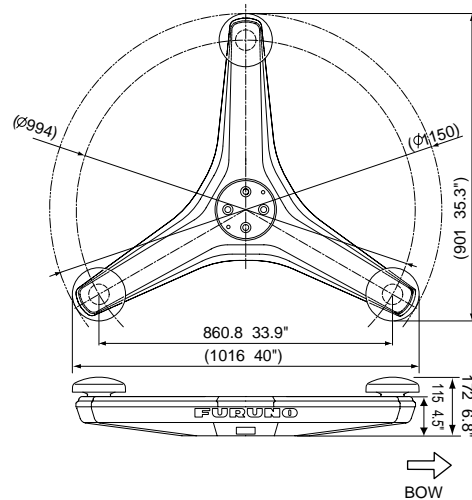
Display Unit 0.6 kg 1.3 lb



Processor Unit 3.6 kg 7.9 lb



Antenna Unit 6.8 kg 15.0 lb



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

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