

IMO Compliant D/GPS Compass Solutions: HS80 and MX575C

Simrad's D/GPS compass solutions are designed to provide reliable heading, ROT (Rate of Turn), and position information to Simrad Autopilots and the MX Series of navigation and AIS transponder systems.

The Simrad HS80 and MX575C D/GPS compasses are type-approved to the latest IMO regulations including RAIM (Receiver Autonomous Integrity Monitoring). Both models deliver heading accuracy of better than 0.5° and provide sub-meter DGPS positioning accuracy. This level of accuracy is achieved in the MX575C by using the RTCM correction data supplied from its internal beacon demodulator or from SBAS. The HS80 accuracy simply comes from SBAS.

The heading (HDT) output rate is normally configured to 10 Hz output. Position output from 2, 5 and 10 Hz is available with the optional multi-hertz license in the Simrad-MX CDU.

TYPE APPROVALS:

Both the MX575C and HS80 have two IMO compliance certifications which is a big advantage for Simrad customers. A separate IMO compliant antenna is not required as the compasses meet both navigation and heading function approvals.

SUPPLEMENTARY SENSORS:

There are three supplementary sensors (gyro and two tilt sensors) that are integrated into the units main PCB. These sensors act to reduce the Real-Time Kinematic (RTK) search volume when computing GPS satellite positioning data. This helps improve heading start up and reacquisition times.

INTERFACE:

The HS80 is supplied with NMEA 2000 as the standard interface, but can be used as a NMEA 0183 device with an optional cable. The standard interface on the MX575C is NMEA 0183, but can also be used as a NMEA 2000 device with an optional adaptor.

KEY FEATURES

- Type-Approved as a primary positioning AND heading device
- Compatible with MX420 and MX5XX family of CDU's
- Stand-alone automatic operation (no black box required)
- Pitch, roll and heave as standard output
- Heading accuracy <0.5° RMS with GPS
- Heading updates 1-20 Hz
- Differential positioning accuracy of <1.0 m, 95% of the time
- GPS Position accuracy (no SA) <4.0m 95% confidence
- Fast start-up times
- Integrated DGPS source including WAAS, EGNOS (HS80 & MX575C), and Beacon (MX575C)
- Provision for external RTCM SC104 corrections
- 1 PPS output standard with MX575C
- NMEA 2000 interface with HS80 (standard), and NMEA 2000 adaptor with MX575C (optional)



HS80/MX575C

Technical specifications overleaf.



COMPARISON TABLE:

	System Description	DGPS Corrections from Beacon Stations	SBAS DGPS corrections	IMO Certification as Navigation Device*	IMO certification as Heading Device	NMEA 2000 Interface	NMEA 0183 Interface	USCG Certification as Navigation Device	1 PPS Output
MX575C 000-10747-001	IMO Compliant DGPS Compass	Yes (default setting)	Yes (can be set from MX display)	Yes	Yes	Optional adaptor is needed	Yes	Yes	Standard with power/data cable
HS80 000-10938-001	IMO Compliant GPS Compass	No	Yes (default)	Yes	Yes	Yes	Optional (Power/data cable is needed)	Yes	Optional with power/data cable

* IMO compliant display is needed in order to display RAIM information.

HS80/MX575C TECHNICAL SPECIFICATIONS:

GENERAL	
Item	Specification
GPS receiver type	L1, C/A code with carrier phase smoothing
Channels	Two 12-channel, parallel tracking (two 10-channel when tracking SBAS)
SBAS tracking	2-channel, parallel tracking
Update rate	1-20 Hz (position and heading)
Horizontal accuracy	< 1.0 m 95% confidence (DGPS) < 4.0 m 95% confidence (autonomous, no SA ²)
Heading accuracy	< 0.5° RMS Normal operation: GPS Coasting (no GPS): Gyro
Heave accuracy	< 30 cm RMS ³ Normal operation: GPS Coasting (no GPS): None
Pitch accuracy	< 1° RMS Normal operation: GPS Coasting (no GPS): Inertial sensor
Roll accuracy	< 1° RMS using accelerometer Normal operation: Inertial sensor Coasting (no GPS): Inertial sensor
Timing (1PPS) Accuracy	50 ns
Rate of turn	90°/s maximum
Cold start	< 60 s typical (no almanac or RTC)
Warm start	< 20 s typical (almanac and RTC)
Hot start	< 10 s typical (almanac, RTC, and position)
Heading fix	< 10 s typical (valid position)
Compass safe distance	75 cm (29.5 in) ⁴
Maximum speed	1,850 kph (999 kts)
Maximum altitude	18,288 m (60,000 ft)
Beacon Receiver (MX575C only)	
Frequency	285-325 KHz. 2-channel auto or manual selection (500 Hz steps)
Sensitivity	2.5 uV/m for 6 dB SNR @ 200 bps
Operating modes	Automatic, Database or Manual
Dynamic range	100 dB
Adjacent channel rejection	61 dB @ f+400 Hz
Channel spacing	500 Hz
Frequency offset tolerance	+5 Hz
Antenna type	H-Field
MSK rates	50, 100 and 200 bps
COMMUNICATION	
Item	Specification
Serial ports	1 RS-232 (full-duplex) 2 RS-422 (1 full duplex, 1 half duplex)
Baud rates	HS80: 4800, 9600, 19200, 38400, 57600, 115200 MX575C: 4800, 9600, 19200, 38400
Correction I/O protocol	RTCM SC-104
Data I/O protocol	NMEA 0183, NMEA 2000

POWER									
Input voltage	6 to 36 VDC								
Power consumption	3 W nominal								
Current consumption	<table border="0"> <tr> <td>HS80</td> <td>MX575C</td> </tr> <tr> <td>320 mA @ 9 VDC</td> <td>350 mA @ 9 VDC</td> </tr> <tr> <td>240 mA @ 12 VDC</td> <td>265 mA @ 12 VDC</td> </tr> <tr> <td>180 mA @ 16 VDC</td> <td>200 mA @ 16 VDC</td> </tr> </table>	HS80	MX575C	320 mA @ 9 VDC	350 mA @ 9 VDC	240 mA @ 12 VDC	265 mA @ 12 VDC	180 mA @ 16 VDC	200 mA @ 16 VDC
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320 mA @ 9 VDC	350 mA @ 9 VDC								
240 mA @ 12 VDC	265 mA @ 12 VDC								
180 mA @ 16 VDC	200 mA @ 16 VDC								
Power isolation	Isolated to enclosure								
Reverse polarity protection	Yes								
MECHANICAL									
Enclosure	UV resistant, white plastic, AES HW 600G, non-corrosive, self-extinguishing								
Dimensions	209.16 L x 668.54 W x 122.32 H (mm) 8.234 L x 26.320 W x 4.815 H (in)								
Weight	<table border="0"> <tr> <td>HS80</td> <td>MX575C</td> </tr> <tr> <td>2.131 kg (4.70 lb)</td> <td>2.44 kg (5.38 lb)</td> </tr> </table>	HS80	MX575C	2.131 kg (4.70 lb)	2.44 kg (5.38 lb)				
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ENVIRONMENTAL									
Operating temperature	-30°C to +70°C (-22°F to +158°F)								
Storage temperature	-40°C to +85°C (-40°F to +185°F)								
Humidity	95% non-condensing								
Vibration	IEC 60945								
EMC	FCC Part 15, Subpart B; CISPR22; IEC 60945 (CE)								
CERTIFICATIONS									
Heading Device:									
IMO Resolution MSC.116(73)	ISO 22090-3 Ed.1.0, 2004 incl. Corr. 1, 2005								
IMO Resolution A.694(17)	IEC 60945 Ed.4.0, 2002 incl. Corr.1, 2008								
IMO Resolution MSC.191(79)	IEC 61162-1 Ed.4.0 2010								
	IEC 61162-2 Ed.1.0, 1998								
	IEC 62288 Ed.1.0, 2008								
Navigation Equipment:									
IMO Resolution MSC.112(73)	IEC 61108-1 Ed.2.0 2003								
IMO Resolution MSC.114(73)	IEC 61108-4 Ed.1.0 2004								
IMO Resolution A.694(17)	IEC 60945 Ed.4.0, 2002 incl. Corr.1, 2008								
IMO Resolution MSC.191(79)	IEC 61162-1 Ed.4.0, 2010								
	IEC 62288 Ed.1.0, 2008								

¹Depends on multipath environment, number of satellites in view, satellite geometry, ionospheric activity, and use of SBAS

²Depends on multipath environment, number of satellites in view, satellite geometry, and ionospheric activity

³SIMRAD GPS proprietary

⁴IEC 60945 Standard

⁵Based on a 40 second time constant

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