



LT-500 ATTITUDE HEADING REFERENCE SYSTEM

designed and built for the demanding and rough environment at sea





- Attitude Heading Reference System with 11 precision sensors
- True heading, magnetic heading, deviation, variation, roll, pitch, air pressure, and temperature
- Display and buttons for installation and service
- Simultaneous NMEA 0183 and NMEA 2000 data
- Configurable NMEA 0183 (enable/disable, talker ID, output rate)
- Easy configurable NMEA 2000 termination resistor (open or terminated)
- Easy configurable NMEA 0183 data rate (4800 or 38400 baud)
- Easy mount in any orientation without compromising the high performance
- Each unit is factory calibrated and functional tested over temperature prior to shipment
- Worldwide maritime certification

INSTALLATION PICTURES



LT-500 front view



LT-500 connector view



LT-500 bottom view



LT-500 side view

Introduction

The LT-500 Attitude Heading Reference System (AHRS) unit is a maritime navigation product from Lars Thrane A/S. The LT-500 AHRS unit is designed for the leisure as well as the professional maritime markets. The LT-500 unit meets all standards and certification requirements needed for worldwide maritime navigation equipment.

Performance

The LT-500 AHRS unit is a small, compact, and very advanced unit with 11 precision sensors. With the use of sensor-fusion and Kalman filtering, the LT-500 AHRS unit outputs: true heading¹, magnetic heading, deviation, variation¹, roll, pitch, air pressure, and temperature real-time, with high precision and resolution. The LT-500 AHRS unit includes advanced technologies such as:

- Kalman filtering & sensor fusion
- Calculation of magnetic variation based on the World Magnetic Model (WMM)
- Compensation for soft and hard iron (deviation)
- Built-in magnetometer calibration algorithm

The LT-500 AHRS unit is designed and built for the demanding and rough environment at sea and with an operational temperature range from -25°C to +55°C (-13°F to +131°F).

Installation and Navigation

The LT-500 AHRS is easy to mount with a single cable supporting NMEA 0183, NMEA 2000, and power. Without compromising the high performance, the LT-500 AHRS may be installed in any orientation. The LT-500 AHRS has a built-in user interface (display and buttons) for installation and service. Navigation output from the LT-500 AHRS is available in the user interface. The LT-500 AHRS supports automatic levelling (pitch and roll), used during the installation. To compensate for deviation the LT-500 AHRS must perform a figure 8-pattern calibration. Use the LT-Service Tool for optional configuration of the LT-500 AHRS. The LT-Service Tool is a PC program, which may run on any Windows PC.

More than 40 years of experience have been put into the design and construction of the advanced LT-500 AHRS, with an exceptional performance and specification level.

¹ If position and time is available from either NMEA 0183, NMEA 2000, or variation is manually entered during installation, the unit will output both magnetic heading and true heading. Otherwise, calculation of the magnetic variation based on the WMM model will not be possible, and the unit will only output magnetic heading.

INSTALLATION

DISPLAY AND CONTROL BUTTONS FOR INSTALLATION AND SERVICE



LEDS TO OBSERVE STATUS OF SENSOR

8-PIN OUTPUT CONNECTOR FOR NMEA 0183, NMEA 2000 & POWER

PERFORMANCE

DATA	ACCURACY	RESOLUTION	RANGE / COMMENTS
Heading ¹	Static: < 0.5° (rms) Dynamic: < 1.5° (rms)	0.1°	Heading is calculated with input from Sensor-fusion technology and Kalman filtering
Roll/Pitch	Static: < 0.5° (rms)	0.1°	±90°
Rate of turn	< 1°/s	0.1°/s	0 to 45°/s
Air Pressure	1 hPa	0.1 hPa	800 to 1100 hPa
Air Temperature ²	1°C (1.8°F) 2°C (3.6°F)	0.1°C (0.1°F)	0°C to +55°C (+32°F to +131°F) -25°C to 0°C (-13°F to +32°F)

1: The dynamic heading accuracy is specified with roll/pitch less than ±45° and ROT ≤ 45°/s

2: Environmental conditions will affect the measured air temperature (accuracy is specified as on-board sensor performance)

NMEA 0183		
SENTENCE	DESCRIPTION	RATE
4800 BAUD		
HCHDG	Heading and Magnetig Heading Variation	1 Hz
HCHDM ¹	Magnetic Heading	1 Hz
HCHDT	True Heading	10 Hz
HCROT	Rate of Turn	1 Hz
PFEC,GPatt	Attitude	1 Hz
WIMDA ²	Meteorological Composite	0.5 Hz
38400 BAUD		
HCHDG	Heading and Magnetic Heading Variation	10 Hz
HCHDM	Magnetic Heading	10 Hz
HCHDT	True Heading	10 Hz
HCROT	Rate of Turn	10 Hz
HCTHS	True Heading and Status	10 Hz
PFEC,GPatt	Attitude	10 Hz
WIMDA ²	Meteorological Composite	2 Hz
WIXDR ³	Transducer Measurements	2 Hz

NMEA 0183 sentences are configurable (enable/disable, talker ID, output rate). If position and time is available from either NMEA 0183, NMEA 2000, or variation is manually entered during installation, the unit will output both magnetic heading and true heading. Otherwise, calculation of the magnetic variation based on the WMM model will not be possible, and the unit will output only magnetic heading.

1: If configured for magnetic heading only, HCHDM is transmitted with 10 Hz

2: Pressure (inHg, Bar) and Air Temperature (°C) only

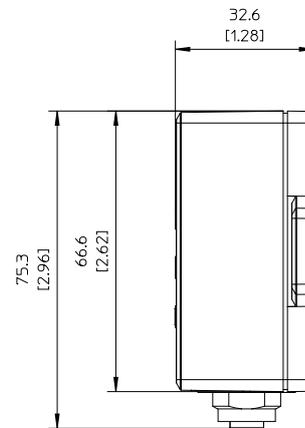
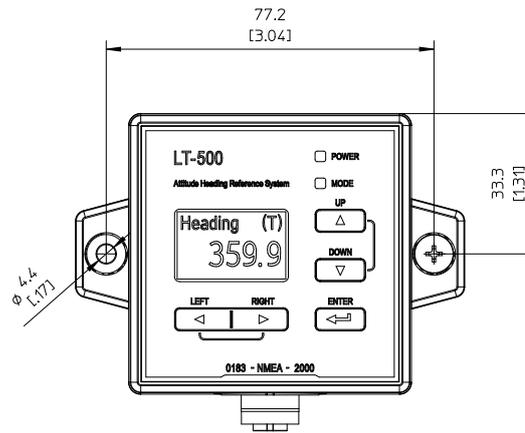
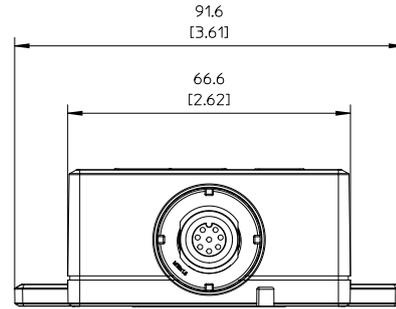
3: Pressure (Pa) and Temperature (°C)

NMEA 2000		
PGN	DESCRIPTION	RATE
PERIODIC PGNS		
126993	Heartbeat	< 0.1 Hz
127250	Vessel Heading	10 Hz
127251	Rate of Turn	10 Hz
127257	Attitude	10 Hz
127258	Magnetic Variation	1 Hz
130311	Environmental Parameters	2 Hz
130312	Temperature	0.5 Hz
130314	Actual Pressure	0.5 Hz
130316	Temperature, Extended range	0.5 Hz
RESPONSE TO REQUESTED PGNS		
126464	PGN List (Transmit and Receive)	-
126996	Product Information	-
OTHER PGNS		
059392	ISO Acknowledgement	-
059904	ISO Request	-
060928	ISO Address Claim	-
126208	NMEA Request/Command/Acknowledge	-

SPECIFICATIONS

LT-500 ATTITUDE HEADING REFERENCE SYSTEM

Certification and standards	CE, IEC 60945, IEC 60950, FCC, IC, RCM, RoHS NMEA 0183, NMEA 2000
Equipment class	Protected, according to IEC 60945
Weight	104 g (0.23 lbs)
Dimensions	91.6 x 75.3 x 32.7 mm (3.61 x 2.96 x 1.29 in)
Temperature, operational (ambient)	-25°C to +55°C (-13°F to +131°F)
Temperature, storage (ambient)	-30°C to +80°C (-22°F to +176°F)
Vibration, operational	IEC 60945 (sine) & Proprietary Maritime Random profile (240 h)
Vibration, survival	Proprietary Maritime Random profile (100 h)
Vibration, shock	Proprietary Maritime profile (60 g pk, 11 ms)
Waterproof rating	IP42
Humidity	95% non-condensing @ 40°C
Communication interface	8-pin female connector for NMEA 0183, NMEA 2000 and power
Input voltage	9-40 VDC
Power consumption	< 1 W
Load Equivalent Number (LEN)	2 (NMEA 2000)
Compass safe distance standard	0.3 m (1 ft)
Compass safe distance steering	0.3 m (1 ft)
Warranty	2 year
Maintenance	None



IN THE BOX

LT-500 AHRS	P/N: 51-100294
10 m Cable Multi 8-pin Simple-Cut (M)	P/N: 91-100172
Screw-in Conn. NMEA 2000 Micro-C (M)	P/N: 91-100174
Quick Installation Guide	P/N: 97-100226
Safety Instruction Sheet	P/N: 97-100459
Unit Test Sheet	P/N: 46-100376

ACCESSORIES

10 m Cable Multi 8-pin Simple-Cut (M)	P/N: 91-100172
30 m Cable Multi 8-pin Simple-Cut (M)	P/N: 91-100173
Screw-in Conn. NMEA-2000 Micro-C (M)	P/N: 91-100174



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