

## Datasheet

# Lodestar – Subsea AHRS and AAINS



### Description

Lodestar is a solid state Attitude and Heading Reference System (AHRS) and Acoustically Aided Inertial Navigation System [AAINS]. The unit is comprised of 3 high grade, high reliability, commercially available, Ring Laser Gyros (RLG) and 3 accelerometers. A Sonardyne developed gyrocompass algorithm runs in the background even when used as an AAINS.

Lodestar AHRS can be supplied to suit subsea applications at any depth. With the supplied battery back up capability, the unit is able to continue running the AHRS and AAINS algorithms during vehicle power brown-outs.

The Lodestar AHRS algorithm outputs precise heading, roll, pitch and heave estimation in dynamic conditions without the need for external aiding inputs or vessel manoeuvres.

Lodestar is the core component in any Sonardyne AAINS system. It directly interfaces to aiding sensors such as a USBL or LBL transceivers, a

DVL, a GNSS receiver, a pressure sensor and a sound speed sensor (SSS).

### Applications Include

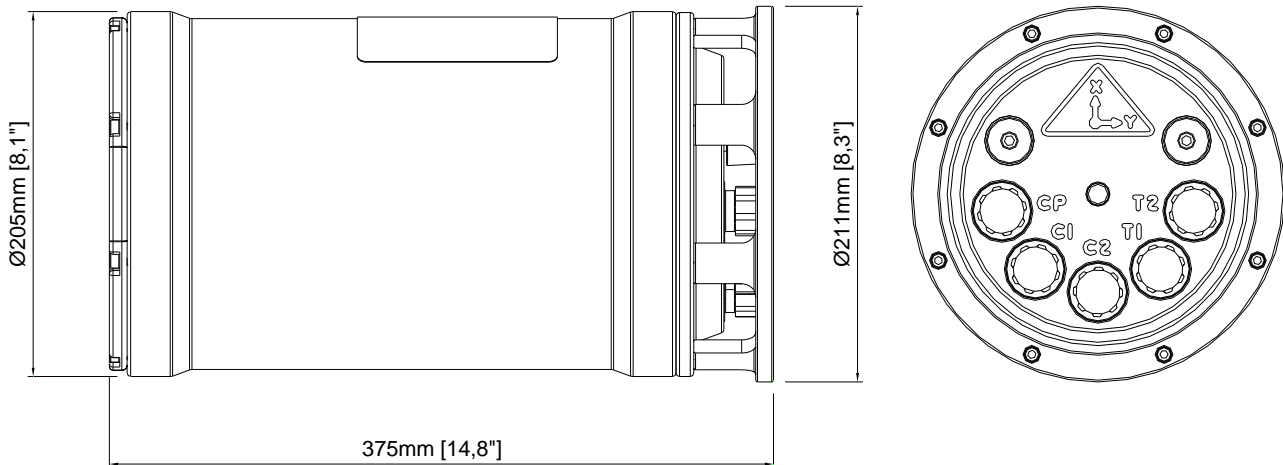
- An optimised USBL system: The directly coupled precise attitude data complements the precision of advanced USBL systems.
- As a precise position input to DP systems using AAINS, a USBL system and one or more seabed reference beacons for operations in excess of 2000m.
- As a positioning system for an ROV, aided by a combination of position estimates from a topside USBL system, vehicle mounted DVL, pressure, sound speed and LBL transceiver.
- Multi-beam Surveys.

### Key Features

- Single box solution for motion sensor, gyrocompass and AAINS systems
- 0.1° secant latitude heading accuracy (gyrocompassing)
- 0.01° roll and pitch accuracy
- <5 minute settling time
- 5cm / 5% heave accuracy
- Fast follow up speed of 500° / sec
- MTBF RLG >300,000 hours  
MTBF Lodestar >50,000 hours
- Choice of depth ratings: 1,000, 3,000 and 5,000 metres
- Surface version available
- Transport approved rechargeable Li-Ion battery back up as standard
- Minimum internal memory of 8GB (expandable to 32GB) allows post processing of a 2 day mission
- Ethernet interface
- AAINS capability

## Specifications

### Lodestar – Subsea AHRS and AAINS



Feature		Type 8084-000-1110	Type 8084-000-3110	Type 8084-000-5310
Depth Rating		1,000 metres	3,000 metres	5,000 metres
Physical	Size	211 mm Dia. x 375 mm	214 mm Dia. x 405 mm	205 mm Dia. x 409 mm
	Weight in Air / Water	14.0 kg / 3.0 kg	22 kg / 8 kg	39 kg / 28 kg
	Mechanical Construction	Anodised Aluminium	Anodised Aluminium	Super Duplex S/Steel

#### Specifications Common To All Type 8084 Subsea Lodestar Units.

Attitude	Heading	Range	0-360°
		Accuracy	0.1° secant latitude
		Settle Time	<5 minutes
	Roll & Pitch	Follow Up Speed	500° / second
		Resolution	0.01°
		Range	±180° (No physical limit)
Heave	Accuracy	0.01°	
	Resolution	0.01°	
	Range	±99 m	
	Accuracy (Real Time)	5 cm or 5% (whichever the greater)	
Environmental	Bandwidth	User selectable	
	Resolution	0.01 m	
	Operating Temperature	-10°C to +55°C	
	Shock Rating Operational	22 g, 11 ms half sine	
	Power Requirement	24 / 48 V DC, 15 W nominal, 35 W max	
Digital Output	Back Up Battery Type / Life	Li-Ion / 2 hours	
	Data Storage	8GB internal memory (expandable to 32GB)	
	Number of Digital Ports/Protocol	4 Digital Ports / RS232 or RS485	
AAINS	Other Ports	1 × Ethernet	
	Navigation Error – scenario and aiding dependant		
	Navigation Error (Free Inertial)	Typically 10 m, 4 minutes after loss of aiding	
	Maximum Acceleration	2.5 g or 10.0 g	