

# Datasheet

## Lodestar GyroUSBL



### Description

Lodestar GyroUSBL combines a Sonardyne 6<sup>th</sup> (6G®) generation high performance HPT USBL transceiver and a Lodestar Attitude and Heading Reference System (AHRS) / Inertial Navigation System (INS) in the same mechanical assembly.

With the AHRS / INS in fixed mechanical alignment to the USBL's acoustic array, the Lodestar GyroUSBL can be quickly deployed without need for a USBL calibration to determine the alignment of the ship's motion sensors to the acoustic transceiver. For certain applications, this can enable significant savings in vessel time and operational costs.

The HPT transceiver component of the instrument utilises the latest Sonardyne Wideband®2 signal processing and is fully compatible with other products in the new Sonardyne 6G equipment range.

Lodestar is tightly integrated into the USBL system providing power and communications to the HPT transceiver and embedded highly accurate time-stamping of all motion and acoustic data.

This enables unparalleled precision and accuracy of position estimation by removing many of the sources of error associated with all USBLs such as lever arm offsets, pole bending, and ship flexing.

In addition, because many of the system parameters are now fixed, no USBL calibration is required during installation so the system is easier to install and set-up. Precision of better than 0.3% of slant range is achievable out of the box, or a one-off calibration can push this figure to

less than 0.1% of slant range, depending on array type.

Manufactured in Aluminium-Bronze the Lodestar GyroUSBL is ideally suited for short term temporary installations on vessels of opportunity using through-hull or over-the-side poles. It is also ideal for permanent installation on flexible stem tubes.

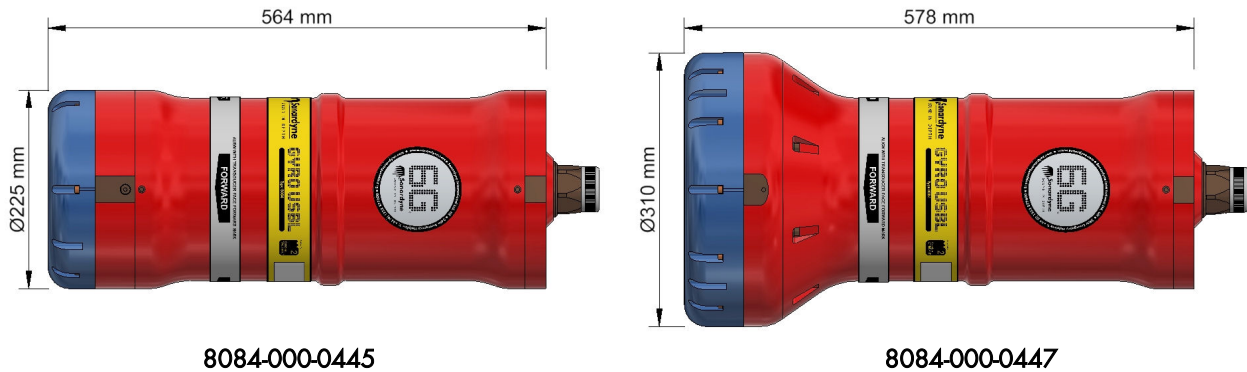
In case of operational damage to the USBL transducer array, all electronics are robustly protected behind a double-sealed, pressure-resistant bulkhead. This ensures that if the transducer face is breached, the Lodestar and acoustic transceiver do not flood.

### Key features

- Integrated Sonardyne 6G Wideband 2 USBL transceiver and Lodestar AHRS / INS offering high performance
- Available in two versions; standard and deepwater optimised
- Calibration free offering rapid set-up
- Class leading system precision and accuracy.
- Sonardyne Marksman LUSBL, DP-INS and Ranger 2 USBL compatible
- Water-blocked transducer array protects electronics in the event of damage
- Compatible with Sonardyne's through-hull, over-the-side and stem tube deployment systems
- Ethernet connectivity

# Specifications

## Lodestar GyroUSBL


**8084-000-0445**
**8084-000-0447**

Features	Type 8084-000-0445	Type 8084-000-0447
Operational Frequency	MF (19–34 kHz)	MF (19–34 kHz)
Transceiver Operating Range	Up to 7,000 Metres	Up to 7,000 Metres
Performance Acoustic Coverage	Up to $\pm 90^\circ$	Up to $\pm 90^\circ$ optimised for deep water (Depending on frequency of operation)
Range Accuracy	Better than 15 mm	Better than 15 mm
Positioning	All transceivers tested to better than	All transceivers tested to better than
Repeatability	0.1% of slant range 1 Drms	0.07% of slant range 1 Drms
Transmit Source	SL = dB re 1 uPa @ 1 m	200 dB
Level	Tone Equivalent Energy (TEE)*	206 dB

### Specifications Common to all Variants

Heading	Range	0-360°	0-360°
	Accuracy	0.04 to 0.1° secant latitude	0.04 to 0.1° secant latitude
	Settle Time	<5 minutes	<5 minutes
	Follow-up Speed	500° / second	500° / second
	Resolution	0.01°	0.01°
Pitch & Roll	Range	$\pm 180^\circ$ (No physical limit)	$\pm 180^\circ$ (No physical limit)
	Accuracy	0.01°	0.01°
	Resolution	0.01°	0.01°
Heave	Range	$\pm 99$ m	$\pm 99$ m
	Accuracy (Real Time)	5 cm or 5% (Whichever the greater)	5 cm or 5% (Whichever the greater)
	Resolution	0.01 m	0.01 m
Electrical		+48 V dc Max 160 W	+48 V dc Max 160 W
Communication		RS485, baud rate switchable, Ethernet 100 Mbps	RS485, baud rate switchable, Ethernet 100 Mbps
Environmental	Operating Temperature	-5 to 40°C	-5 to 40°C
	Storage Temperature	-20 to 45°C	-20 to 45°C
Dimensions; Length x Diameter		602 x 225 mm	626 x 310 mm
Weight in Air/Water**		51/28.5 kg	64/38 kg

Note: The absolute accuracy of the system is dependent upon the beacon source level, vessel noise, water depth, mechanical rigidity of the transceiver deployment machine, SV knowledge and proper calibration of the total system using CASIUS

\*TEE – WBv2+ signals are 4x the duration of Sonardyne tone signals (WBv1 & WBv2 are 2x).

The TEE figure shows the operational performance when comparing wideband and tone systems.

\*\*Estimated Weights.