

Datasheet

SPRINT-Nav 500 / Lodestar-Nav 500

All-in-one Subsea Navigation



Description

SPRINT-Nav provides all-in-one navigation for subsea vehicles and survey operations by combining solid state dual Attitude Heading Reference System (AHRS) and Inertial Navigation System (INS) (and optional Lodestar AHRS only), a Syrinx Doppler Velocity Log (DVL) and a high accuracy pressure sensor in a single housing. The result is one of the smallest combined inertial navigation instruments on the market.

All onboard sensors are optimally integrated to provide seamless operation and unprecedented levels of performance compared with standalone instruments from different vendors.

The unit requires no calibration for all but the most demanding applications with ultra-tight mechanical alignment. SPRINT-Nav's inertial dual AHRS & INS algorithm capability is unique in the market and allows for automatic on-board integrity checking between algorithms and instantaneous INS start up with North alignment from the on-board AHRS. This capability allows for simultaneous use from one instrument,

e.g. AHRS plus DVL for ROV piloting, INS plus DVL for survey operations.

Tight beam-level DVL aiding for the on-board INS with optimal timing and use of proprietary QC metrics provides higher performance and more reliable navigation in demanding bottom-lock environments.

Export of SPRINT-Nav is simplified as compared to other separate DVL and INS units. For example, shipping from outside the USA does not require a re-export licence.

Each DVL transducer is fitted with a full depth rated water block to ensure protection of the internal components. SPRINT-Nav can be interfaced via a single connection and/or the internal sensors can be interfaced separately depending on requirements.

Continuous on-board data storage supports post-mission diagnostics and post-processing.

Applications Include

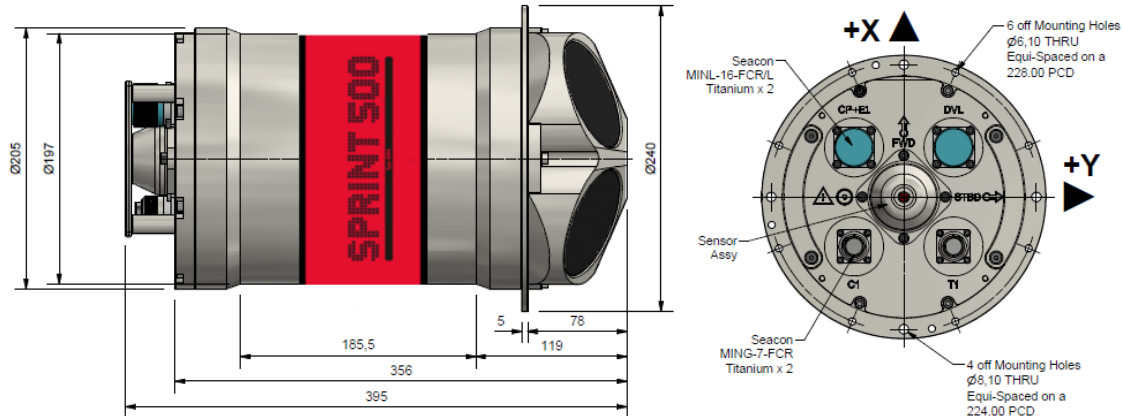
- Any subsea autonomous vehicle navigation and guidance including AUV, AIV, ROV, Towfish & ROTV
- Manned submersibles
- Survey and construction

Key Features

- All-in-one subsea navigation
- SPRINT-Nav provides dual concurrent AHRS, INS and DVL output capability for multi-use
- 0.1° (Lodestar) to <0.04° (SPRINT) secant latitude heading accuracy
- 0.01° roll and pitch accuracy
- 5 minute AHRS settling time
- Dual AHRS & INS algorithms allowing internal health check of orientation & instantaneous initialisation of INS with no alignment procedure
- Small form factor – easier mounting
- Proven long life inertial sensors from trusted long term US supplier
- Remote diagnostics and performance verification using on-board logging
- Lodestar-Nav AHRS can be remotely upgraded to SPRINT-Nav INS providing commercial and operational flexibility
- Fully water blocked DVL endcap protecting internal electronics
- 0.01% full scale removable pressure sensor module
- 0.4–175 m DVL operating range

Specifications

SPRINT-Nav 500 / Lodestar-Nav 500



Feature	SPRINT Lodestar	Type 8253-xxx Type 8084-xxx	Type 8253-xxx Type 8084-xxx
Depth Rating		4,000 metres	6,000 metres
Physical	Size (Diameter x Length)	Ø240 x 395 mm	Ø240 x 405 mm
	Weight in Air/Water*	23.9/13.1 kg	28.1/17.2 kg
	Mechanical Construction	Titanium	Titanium
	Connectors		2 x Seacon (MING-7-FCR)/2 x Seacon (MINL-16-FCL/L)
Performance	(SPRINT) Aided Inertial Navigation	Aiding Supported	USBL, Depth, DVL, Zero Velocity, Manual Position, LBL (range & position), GNSS
		USBL Aided	3.5 x precision improvement over USBL 5 x precision improvement over USBL when aided by Sonardyne Ranger 2 USBL
	USBL and DVL Aided	4 to 10 x precision improvement over USBL	
	DVL Aided Accuracy	0.06% position error for distance travelled	
	DVL Aiding Loss/Drift	0.6 m over 1 min, 2.4 m over 2 mins (CEP50)	
	Station Keeping	<1 m over 24 hours	
	LBL & DVL Aided Accuracy	3 cm confined area, 20 cm wide area (dynamic)	
	'Synthetic' LBL Aided Accuracy	<20 cm @ 200 m distance to single transponder	
	Orientation	AHRS/INS Heading Accuracy (Secant Latitude)	0.1° (Lodestar AHRS), 0.04° (SPRINT INS)
		AHRS/INS Roll and Pitch Accuracy	0.01°
AHRS/INS Settle Time		<5 minutes in dynamic conditions (AHRS), instantaneous (INS)	
DVL	DVL Bottom Velocity ±0.22 cm/s	DVL Long Term Accuracy ±0.12% ±0.1 cm/s	
	DVL Min/Max Altitude 0.4/175 m	DVL Velocity Range >10 m/s	
Pressure	Pressure Sensor	0.01% FS removable module	
Upgrades	Lodestar-Nav 500 AHRS can be remotely upgraded to SPRINT-Nav 500 INS		
Data/Comms	Onboard Data Storage	AHRS/INS 8 GB	DVL 32 GB
	Digital Ports/Protocol	up to 4 digital ports/RS232 or RS485	
	Other Ports	2 x Ethernet, 4 Triggers	
	Output Rate	Up to 100 Hz (INS/AHRS), Up to 25 Hz (DVL), Up to 15 Hz (pressure)	
	Output Telegrams	Industry standard AHRS/INS/DVL/pressure telegrams including acceleration/rotation rates and temperature**	
Environmental	Operating Temperature	-5 to 50°C	
	Storage Temperature	-25 to 55°C	
	Shock Rating	22 g, 11 ms half sine	
Power	Power Requirement	24 V dc, 15 W nominal, 35 W max	
	Power Pass Through	2 x for external aiding sensors (up to 3 A per sensor)	
	INS Battery Type/Life	Li-ion/5 minutes	

*Estimated Weights

** Specific outputs may be limited below quoted performance for reasons of export classification and control and should not be used as IMU data.