

Datasheet

BOPNav Acoustic Transceiver

Description

The BOPNav System is a powerful enhancement to Sonardyne's Long and Ultra-Short Baseline (LUSBL) positioning system for drilling rigs in deep water. On very noisy vessels and when drilling in the deepest water, the performance of the vessel-mounted transceiver can suffer degradation due to low acoustic signal from the seabed transponders compared with the high ambient noise from the thrusters.

The BOPNav is mounted on the stack and electrically connected via the riser to the surface system Navigation Processor. Transponders are triggered by an interrogation signal from the surface as normal but the transponder replies are received at the BOPNAV unit as well as at the surface (see diagram A). Operating in this way dramatically improves the system redundancy and allows a number of signals to be lost at the surface without degrading the computed vessel position. In fact it allows the system to operate even if no transponder replies are detected at the surface at all.

A LUSBL system with Version 6 software is able to position both the vessel and the stack simultaneously. Interrogations can be transmitted from either the vessel transceiver or the BOPNav and transponder replies are received at both systems. This allows the stack to be positioned accurately for re-connection. In addition, if the BOPNav has two transducers, the orientation of the stack can be determined.

An additional feature of the BOPNav is that it can be used as a Responder. This allows the stack to be tracked during deployment, while it is still too high to have sight of the replies from the seabed transponders. It can also be used to locate itself over the stack in USBL mode without the need to deploy any transponders (see diagram B). Such a system is intended to provide a coarse position for temporary use while the transponder array is being deployed and calibrated.

BOPNav provides the following advantages:

Stable Position Fixes – The stability and reliability of the signals received at the BOPNav are improved because the ranges are relatively short and the noise level at the BOP is normally low. If the BOPNav receiver is combined with the surface receiver, system redundancy is greatly improved. This also allows good positioning to continue even after the loss of signals received at the surface.

Increased Update Rate – If the receipt of signals at the surface is disabled in favour of receipt at the BOPNav, the system does not need to wait for signals to return through the water column, saving time in the cycle and allowing an increase in the update rate.

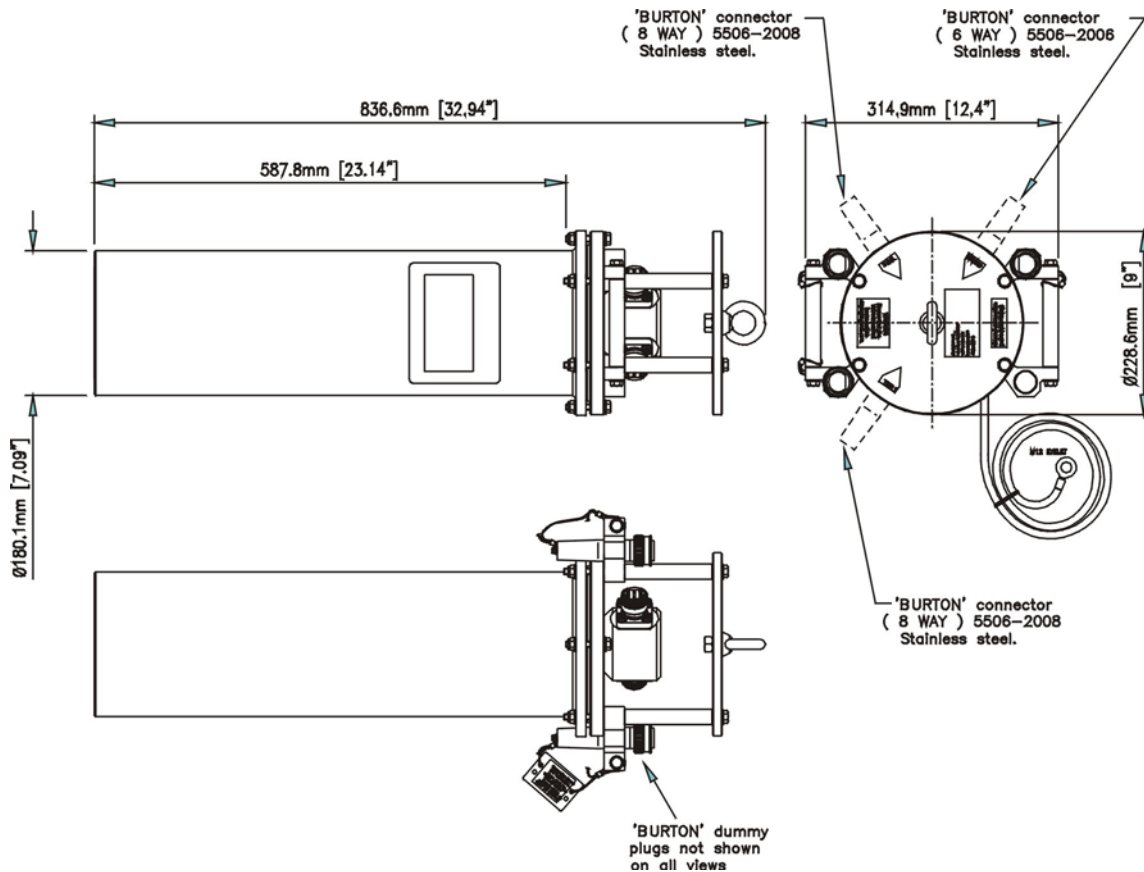
Conserves Transponder Battery Life – Again, if transponder reply signals are only received at the BOPNav, the power transponder level can often be reduced, so conserving battery power.

The BOPNav is enclosed in Stainless Steel housing. Two Acoustic Remote Transducers are used to provide additional redundancy and avoid any possible shielding by the riser. Both Transducers are connected to the BOPNav by armoured cables and are normally mounted on arms extended to the side of the BOP stack.

The BOPNav itself takes 24 V DC power from the BOP stack and this cable (optionally a PBOF - Pressure Balanced Oil Filled - cable) carries the comms lines (RS-485 half-duplex is standard) to the riser cable. Future enhancements will include internal Dual Axis Inclinometers and an interface for an external Dual Axis Inclinometer Module. When the external inclinometer module is mounted on the riser above the flex joint, this will allow the inclination of the riser, the BOP and the differential angle to be monitored over the comms link, providing an Electrical Riser Angle (ERA) function.

Specification

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Feature	Type 7985	Type 7985-081-5
Depth Rating	3,000 Metres	3,000 Metres
Operating Frequency	MF (18-36Khz)	MF (18-36kHz)
Transducer Beamshape	-	Semi-Directional
Typical Accuracy	0.1 to 0.25 Metres	-
Receiver Threshold	-	<95dB re 1 μ Pa
Source Level (Vertical)	-	200dB re 1 μ Pa @1m
Source Level (Horizontal)	-	185dB re 1 μ Pa
Pulse Length	-	4ms
Mechanical Construction	Uncoated 316 Stainless Steel	Uncoated 316 Stainless Steel
Weight in Air	59kg	19kg
Weight in Water	42kg	15kg