



Gyrocompass: Dynamic North Finding



Permanently North Finding Gyrocompass

Due to the use of modern fibre-optic gyroscopes, the MWD Compass registers the earth's rate of rotation, e.g. during boring process in spite of shocks and vibration.

There are no mechanically driven parts in the unit. Therefore the heading as well as the roll and pitch angle can be acquired during the pipe jacking process: **Measurement While Drilling**. The device can also be modified for other applications.

Special features

- △ High precision north finding measurement due to three fibre-optic gyroscopes
- △ After settling time, the heading can be read out continuously
- △ Determination of absolute position and attitude in 3D-coordinates
- △ Waterproof housing IP 68
- △ Suitable for operation with construction machinery

Typical applications

- △ Underground construction (tunneling, mining, etc.)
- △ Guidance of construction machines



Description

The north finding unit is used amongst other things in pipe jacking in order to perform curved drives. The system permits the absolute positioning of the TBM in 3D-coordinates by means of the dead-reckoning method.

The gyrocompass provides the attitude relative to north and gravity. The north finder comprises three fibre-optic gyros and three acceleration sensors implemented in strap-down-technology without moving parts. These sensors identify movement in all three dimensions independently from each other. The integrated digital signal processor calculates the attitude based upon the sensor values. Vibration is compensated by means of a Kalman filter.

Thus all attitude values can be read out during drilling process. The integrated gyroscopes are extremely robust and maintenance-free.

The north finding unit takes approx. 3 minutes from start-up to the output of the first value and subsequently runs with permanent readout.

Heading, pitch and roll angles can be accessed via CAN bus.

Technical Data

△ Heading accuracy:	1 mrad (1 sigma)
△ Start-up time:	3 min to the first value
△ North finding region:	+/- 70° lat. (within specified accuracy)
△ Acceptable settling movement:	any
△ Measurement range (roll, pitch):	+/- 180°
△ Accuracy (roll, pitch):	+/- 1 mrad
△ Resolution (roll, pitch):	0.1 mrad
△ Data output interface:	CAN bus, other interfaces available
△ Supply voltage:	+ 18 .. + 30 VDC
△ Power consumption:	45 W @ 24 VDC
△ Battery buffer:	2 x 9.6 Ah/ 12 VDC
△ Housing protection class:	IP 68 @ 5 m depth of immersion
△ Dimensions (L x W x H):	540 x 240 x 200 mm
△ Weight:	16 kg
△ Operating temperature range:	- 10° C .. + 50° C

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