

Systems



Gyrocompass

Fast Facts

- Sensor element: high precision MEMS gyroscope
- Bias-Instability (BI): 0.63 °/h
- Angle Random Walk (ARW): 0.02 °/√h
- Energy consumption sensor element: ≈ 150 mW
- Energy consumption whole system: < 4 W
- Dimensions: 10 x 10 x 10 cm³

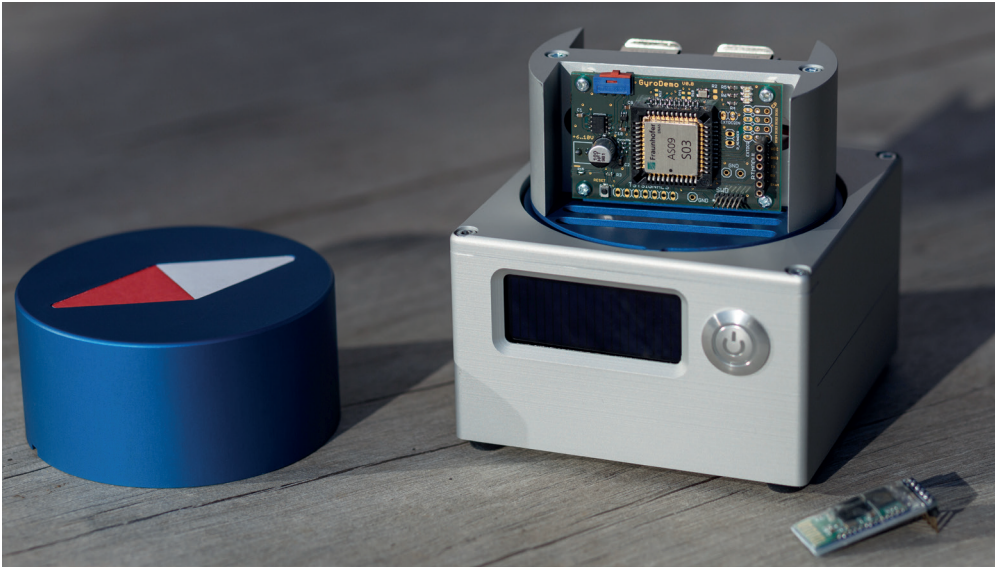
General Description

The main element of the gyrocompass demonstrator, which can also be referred to as a north finder, is a high-precision MEMS gyroscope, which can detect smallest angular rates ($\ll 15 \text{ }^\circ/\text{h} = 4.2 \text{ mdps}$ Earth rotation rate). Using a stepper motor located in the demonstrator, the angular rate sensor is aligned horizontally in steps of 90° . In each direction the sensor value is recorded. This procedure is also known as may-tagging. An implemented algorithm determines the geographical north and the north arrow on the lid is aligned accordingly. The compact, transportable system directly measures the rotational speed of the Earth, works independently of the magnetic field and does not require any satellite-based radio links (e.g. GPS).

Suggested Applications

- Measurement equipment alignment
- Ship / plane navigation
- Mining and deep drilling





Achievable angular accuracy at Chemnitz site (latitude of 50.8° North)

# Measurement Points	Measurement Time per Point	Attainable Accuracy
8	5 s	3°
72	5 s	1°

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All information contained
in this fact sheet is prelimi-
nary and subject to change.
Furthermore, the described
system is not a commercial
product.