

MRU 2



KONGSBERG



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THE ROLL AND PITCH MOTION SENSOR

This fifth generation MRU 2 is designed for high accuracy roll and pitch measurements in marine applications.

Typical applications

The MRU 2 is typically used for roll and pitch measurements in offshore riser monitoring systems, dynamic positioning systems, telecommunication antenna compensation systems and motion damping systems on high speed crafts.

This unit has to be mounted in a fixed direction relative to the ship and is best suited for applications with limited range in roll and pitch. If unlimited mounting orientation and/or unlimited mounting range is required, one of the MRU models with sensors in all three axis is recommended.

Function

The MRU 2 incorporates two highly accurate accelerometers and two Micro-Electro-Mechanical-Structures (MEMS) angular rate gyros. This unit achieves high reliability by using solid state sensors with no rotational or mechanical wear-out parts.

The unit is delivered with Windows based configuration and data presentation software. By configuring the unit with the vector between the MRU and the vessel Center of Gravity (CG), the MRU 2 will output accurate roll and pitch measurements even when it is mounted high up in the ship, like on the bridge. This is due to the capability to suppress the effect of horizontal

acceleration on the roll and pitch performance making this unit superior to inclinometers, pendulous devices and standard Vertical Reference Units.

Output variables

The MRU 2 outputs static and dynamic roll and pitch angles and corresponding angular rate vectors. The unit outputs surge and sway accelerations. Status of the MRU 2 is available online.

Digital I/O protocols

For this fifth generation MRU data is available through an Ethernet interface and serial lines enabling easy distribution of MRU data to multiple users on board the vessel. Output data are available on two individually configurable serial lines and Ethernet/UDP. Output variables are transmitted as IEEE 32-bit floats (recommended) or as scaled integers. In addition, ASCII-based NMEA 0183 proprietary sentences can be selected as data output protocols.

FEATURES MRU 2

- Outputs high accuracy roll and pitch measurements
- Suppression of horizontal acceleration when mounted off the vessel Center of Gravity (CG)
- Outputs on RS-232, RS-422 and Ethernet
- High output data rate (200 Hz)
- High reliability and no mechanical wear-out parts
- Small size, light weight and low power consumption
- Each MRU delivered with Calibration Certificate
- Selectable communication protocols in the Windows based MRU configuration software
- 2-year warranty



TECHNICAL SPECIFICATIONS

ROLL AND PITCH OUTPUT

Angular orientation range	±25°
Angular rate range	±100 °/s
Resolution roll, pitch	0.001°
Angular rate noise	0.1°/s RMS
Static ²⁾ accuracy	0.08° RMS
Dynamic ¹⁾ accuracy (for a ±5° amplitude)	0.1° RMS
Scale factor error	0.5 % RMS

SURGE AND SWAY ACCELERATION OUTPUT

Acceleration range	±30 m/s ²
Acceleration noise ²⁾	0.002 m/s ² RMS
Acceleration accuracy	0.01 m/s ² RMS

ELECTRICAL

Power requirements	10 to 36 V DC, max. 4.9 W
Serial ports:	
Com1	Bidirectional RS-422
Com2	Bidirectional RS-422 from junction box, user configurable RS-232, RS-422
Com3 & Com4	Input only, user configurable RS-232, RS-422
Analog channels (junction box)	# 4, ±10 V, 14 bit resolution
Ethernet ports	Three output and one input
Ethernet UDP/IP	10/100 Mbps
Digital output variables	24 (max), serial or Ethernet
Output data rate (max)	200 Hz
Timing	<1 ms

ENVIRONMENTAL SPECIFICATIONS

Temperature range	-5 °C to +55 °C
Humidity range, electronics	Sealed, no limit
Enclosure protection	IP-66
Vibration	IEC 60945/EN 60945

ELECTROMAGNETIC COMPATIBILITY

Compliance to EMCD, immunity/emission	IEC 60945/EN 60945
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OTHER DATA

MTBF (computed)	50000 h
Housing dimensions	Ø105 x 140 mm (4.134" x 5.525")
Material	Anodised aluminium
Weight	2.4 kg
Connector	Souriau 851-36RG 16-26S50

1) When the MRU is exposed to a combined two-axes sinusoidal angular motion with 10 minutes duration.

2) When the MRU is stationary over a 30-minute period.

Specifications subject to change without any further notice.