

MRU E



KONGSBERG



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THE EXTENDED TEMPERATURE MOTION SENSOR

This fifth generation roll, pitch and heave motion sensor is specially designed for use in marine applications that require an extended temperature range. The MRU E is designed to operate at ambient temperatures from -25 to +70 °C and to be installed on open decks, inside cabinets or on bulkheads.

Typical applications

For direct mounting of the MRU under the helideck centre to measure 3-axes linear accelerations together with roll, pitch and heave. The MRU E is typically used in a Helideck Monitoring System where the helideck is location separate from the accommodation and the hull. The MRU E meets HCA requirement to measure helideck acceleration and calculate Motion Severity Index (MSI).

Function

The MRU E is produced and calibrated in order to perform accurately at ambient temperatures from -25 to +70 °C. The unit incorporates three highly accurate accelerations and three Micro-Electro-Mechanical-Structures (MEMS) angular rate gyros. This unit achieves high reliability by using solid state sensors with no moving parts and the proven MRU electrical and mechanical construction.

Variables output

The MRU E outputs roll, pitch and heave together with linear acceleration in 3-axes.

External inputs

The MRU E accepts input of external speed and heading information on separate serial lines or Ethernet for improved accuracy in heave, roll and pitch during turns and accelerations. For time synchronization the MRU accepts 1-second time pulse (1PPS) input.

Digital I/O protocols

For this fifth generation MRU data is available through an Ethernet interface enabling easy distribution of MRU data to multiple users on board the vessel. Output protocols for commonly used survey equipment are available on two individually configurable serial lines and Ethernet/UDP.

FEATURES MRU E

- Outputs real-time heave, roll, pitch and linear acceleration measurements
- Outputs on RS-232, RS-422 and Ethernet
- High output data rate (200 Hz)
- Each MRU delivered with Calibration Certificate
- No limitation in mounting orientation
- Lever arm compensation to two individually configurable monitoring points
- Meets IHO special order requirements
- Small size, light weight and low power consumption
- Selectable communication protocols in the Windows based MRU configuration software
- 2-year warranty



TECHNICAL SPECIFICATIONS

ROLL AND PITCH OUTPUT

Angular orientation range	±180°
Angular rate range	±100 °/s
Resolution roll, pitch	0.001°
Angular rate noise	0.1°/s RMS
Static ²⁾ accuracy	0.05° RMS
Dynamic ¹⁾ accuracy (for a ±5° amplitude)	0.05° RMS
Scale factor error	0.2 % RMS

HEAVE OUTPUT

Output range	±50 m, adjustable
Periods (real-time)	0 to 25 s
Periods (delayed)	0 to 50 s
Dynamic accuracy (real-time)	5 cm or 5 %, whichever is highest
Dynamic accuracy (delayed)	3 cm or 3 %, whichever is highest

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. 12 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

Specifications subject to change without any further notice.

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	-25 to +70 °C
Humidity range, electronics	Sealed, no limit
Enclosure protection	IP-66
Vibration	IEC 60945/EN 60945

ELECTROMAGNETIC COMPATIBILITY

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

MTBF ³⁾ (computed)	50000 h
Housing dimensions	Ø 105 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.

3) Computed at +25 °C ambient temperature. Operation at higher ambient temperatures will give a lower MTBF value and reduced lifetime on the MRU.