

The ideal Heave, Roll and Pitch Sensor

In the well-known world class range of motion reference units from Kongsberg Seatex, MRU Z is the ideal sensor for applications requiring heave compensation.

Typical applications

Typical applications for the MRU Z model are real-time heave compensation of echo sounders and offshore cranes. The unit provides heave measurements to meet IHO standards.

Function

The cost-effective MRU Z model is specially designed for use in marine applications and is the ideal sensor for heave compensation of echo sounders. The unit incorporates 3-axis Micro-Electro-Mechanical-Structures (MEMS) sensors for both linear acceleration and angular rate. This unit achieves high reliability by using solid state sensors with no rotational or mechanical wear-out parts.

The unit is delivered with a Windows based configuration and data presentation software. By configuring the unit with the vector between the MRU and the measurement point (MP), the MRU Z will output accurate heave measurements in this point instead of where the MRU is mounted. Typical measurement point is the transducer head.

Each MRU Z unit is delivered with a Calibration Certificate stating that the unit is tested and found to be within the specifications. This unit has to be mounted in a fixed mounting direction with the connector pointing down.

Output variables

The MRU Z outputs heave position and velocity. Other outputs in addition are roll and pitch angles and corresponding angular rate vectors.



External inputs

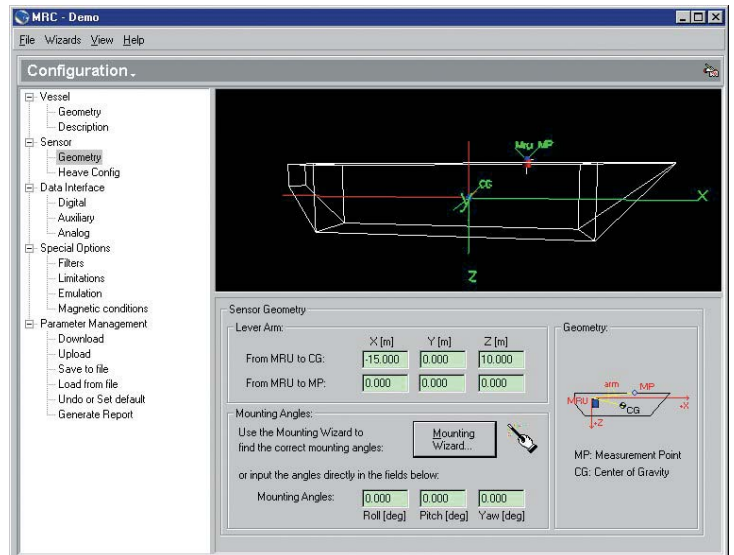
The MRU Z accepts input of external speed and heading information to compensate for drift in the measurements due to turning. In addition an external one second time pulse signal can be input to the unit for complete synchronisation of the MRU data with an external clock system (typical from a GPS system or other highly accurate time source).

Digital I/O protocols

For two way communication with the unit a proprietary binary serial protocol is used. Output variables are transmitted as IEEE 32 bit floats (recommended) or as scaled integers. In addition, ASCII-based NMEA 0183 proprietary sentences or different Echo Sounder formats can be selected as data output protocols.

Features

- Outputs real-time heave, roll and pitch measurements
- Outputs heave in a remote measurement point like the transducer head
- Accepts external inputs for compensation of drift in heave measurements due to turns
- Small size, light weight and low power consumption
- High reliability and no scheduled maintenance, no mechanical wear-out parts
- 2-years warranty
- High output data rate (100 Hz)
- Each MRU Z delivered with Calibration Certificate
- Selectable communication protocols in the Windows based MRU configuration software
- Delivers with transportation box, 3 meter configuration cable with 9-pin DSUB for connection to PC and manuals



Technical specifications

Roll and pitch output

Angular orientation range	45°
Angular rate range	±100°/s
Resolution roll, pitch	0.001°
Angular rate noise	0.1°/s RMS
Static** accuracy	0.1° RMS
Dynamic* accuracy (for a ±5° amplitude)	0.15° RMS
Scale factor error	0.4% RMS

Heave output

Output range	50m, adjustable
Periods	0 to 25 s
Dynamic accuracy (RMS)	5 cm or 5% whichever is highest

Acceleration output

Acceleration range	±40m/s ²
Acceleration noise**	0.01 m/s ² RMS

Electrical

Power requirements	12-30V DC, Max. 3 W
Analog channels	#4, ±10V, 14 bit resolution
Digital output variables	#16 (max) RS232 or RS422
Output data rate (max)	100Hz (10 ms)
Internal update rate	400 Hz (angular)

Environment

Temperature range	-5 to +55 °C
Humidity range	electronics sealed, no limit
Max vibration (operational)	0.5m/s ² (10-2000 Hz continuous)
Max vibration (non operational)	20m/s ² (0-2000 Hz continuous)
Max shock (non operational)	1000m/s ² (10ms peak)

Other data

MTBF (computed)	50000 h
Housing dimensions	Ø105x129 mm (4.134"x5.091")
Material	Anodised Aluminium
Weight	1.5 kg
Connector	Souriau 16-26

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

***) When the MRU is stationary over a 30 minutes period.

Specification subject to change without further notice



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