

MRU RECALIBRATION



KONGSBERG



HOW AND WHEN TO RECALIBRATE THE MRU

A recalibration of the MRU is recommended due to changes in characteristics of the internal sensors over time and is therefore necessary in order to achieve the specified performance.

The need for recalibration depends on the MRU model and the application in which it is used.

General recommendations

Accuracy required by equipment using the MRU sensor decides recalibration interval of the MRU unit. This might vary depending on the application and must be considered for each of the devices using the MRU unit. For equipment requiring factory specification, Kongsberg Seatex recommend the following intervals:

Model	Interval
MRU 1, 2, 4, H & S	4 years
MRU E & D*	3 years
MRU 6, 5+, 5 & 3	2 years
MRU Z	1 year

**) For the MRU D model with serial numbers below 5320, a recalibration is recommended after one year from calibration date. For units with serial numbers from 5320 and above, a recalibration is recommended after three years from calibration date.*

The above mentioned recommendations are valid for applications where it is required that the roll and pitch measurements are within their specifications.

For applications where only the heave measurements are used, no recalibration is required to keep the heave measurements within the specifications, except for the MRU Z.

If the user application do not require the specified roll and pitch accuracy, the following table can be used to evaluate when recalibration is necessary due to operational requirements:

	2 years	3 years	4 years	6 years
MRU 5+	0.01°	0.016°	0.023°	0.035°
MRU 5	0.02°	0.037°	0.050°	0.090°
MRU E		0.05°	0.07°	0.11°
MRU H			0.05°	0.10°
MRU 3	0.08°	0.16°	0.24°	0.40°
MRU S			0.30°	0.42°
MRU 2			0.1°	0.13°
MRU D		0.35°	0.42°	0.56°

Calibration facilities and method

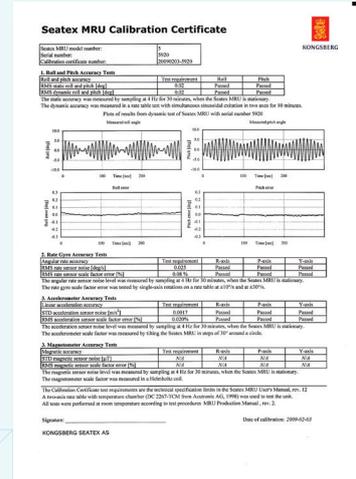
To achieve optimum performance and reliability of each MRU, three state-of-the-art two-axes calibration machines with an integral temperature chamber of Acutronic type are being used. The latest calibration machines have an inner axis rate stability better than 0.00003°, compared with the MRU 5 accuracy of 0.02°. The temperature chamber can test temperatures from -45° to +90° Celsius. The position accuracy is better than 3.00 arc-seconds. It also measures acceleration and force of gravity.

After 18 hours of data collection at different speeds, positions and temperatures, the machine performs a static and dynamic test of each MRU for final performance verification. The results from these tests are presented in the MRU Calibration Certificate, specially designed for Kongsberg Seatex MRU. The certificate is delivered with the unit and verifies that accuracy numbers as stated are correct.

VALIDITY OF MRU CALIBRATION CERTIFICATE

An individual Calibration Certificate is generated for each manufactured MRU. The certificate confirms performance for the MRU compared with test requirements valid for the specific type of MRU. The calibration date is printed on the Calibration Certificate. The certificate does not include an expiry date as the MRU will still be working even if there has been a long time since last calibration. However, the uncertainty whether the MRU is within its specification will increase over the years without a recalibration.

Recalibration of the MRU is recommended due to changes in the characteristics of the internal sensors over time, and is therefore necessary in order to achieve the specified performance. Exactly when a recalibration is required, will depend on the use user application (use of the unit, i.e. thermal cycling, vibration and shock).



MRU DISPATCH PROCEDURE

If a recalibration of an MRU is required, please follow these steps to ensure an efficient and smooth recalibration process:

1. Contact Customer Service department at Kongsberg Seatex by phone to +47 73 50 21 11 or by e-mail to km.support.seatex@kongsberg.com and ask for an RMA (Return Material Authorization). If you need a spare MRU during recalibration, please ask for a quote.
2. Fill out the RMA with serial number (s/n) and return the RMA to Customer Service.
3. You will receive an RMA number. Please attach the RMA to the MRU shipment.

MRU RECALIBRATION TURNAROUND

- In general the turnaround for complete service on MRUs units are 4 weeks after reception.
- Within five days after the arrival of an MRU, the unit has gone through an initial inspection.
- Calibration may uncover need for service that does not appear during static testing on arrival and thus delays should be expected. The unit must then undergo service followed by a new calibration cycle. Delivery time will be extended accordingly.



Specifications subject to change without any further notice.

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