

# Technical note on MRU Re-calibration and validation

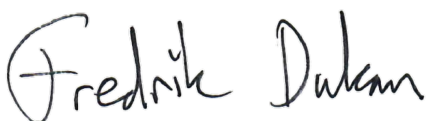
This note applies to

- MRU types: Compact, Marine, Subsea and Ex
- MRU models: 3000, 6000 and 9000

The Norwegian Subsea MRU calibration certificate is valid for 4 years, and full product specification is maintained in this period under normal operating conditions.

## Notes:

1. We do not normally advise re-calibration of the MRU during its lifetime.
2. The specified heave accuracy of 5 cm / 5% is maintained over the MRU's lifetime, also without re-calibration.
3. The specified accuracy in roll & pitch for a given model is usually met over the MRU's lifetime under normal operating conditions as Norwegian Subsea uses only validated sensors with exceptional stability.
4. Re-calibration and validation of the MRU every 4<sup>th</sup> year is recommended only if the customer requires full product specification after expiration of a valid calibration certificate.
5. The lifetime accuracy in roll & pitch, without re-calibration and under normal operating conditions, not exceed
  - 0.1 degrees for the 3000 model
  - 0.05 degrees for the 6000 model
  - 0.02 degrees for the 9000 model
6. Thus, selecting a more accurate model than initially required may extend the calibration intervals or remove the need for re-calibration.
7. The computed MTBF (mean time between failure) for a NORSUB MRU Marine is 100 000 hours, but actual lifetime depends on use, vibrations, and temperature. An MRU lifetime of 10 years or more under normal continuous operation can be expected.



Fredrik Dukan

CEO