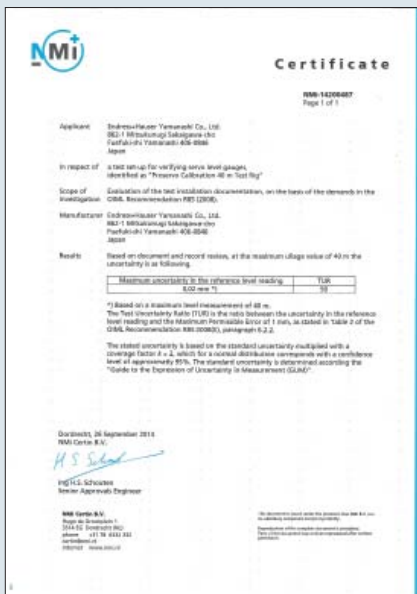


# Proservo calibration test rig

## Vertical accuracy test facility for servo tank gauging instruments



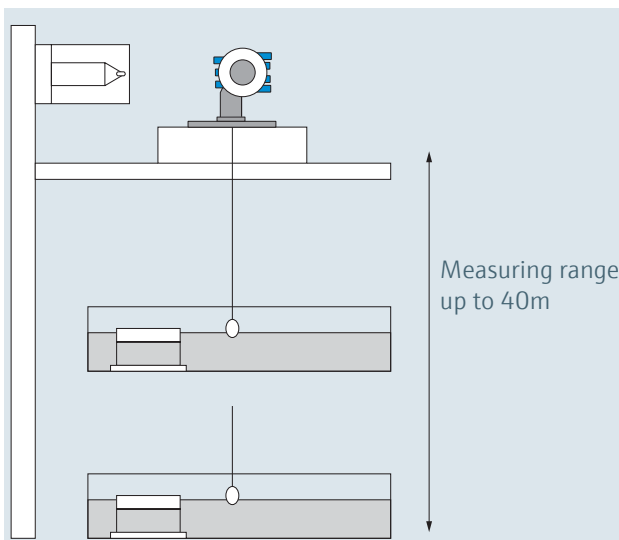
## Why do we need a 40m calibration rig?

### High accuracy measurement with one of the world's highest facilities and state-of-the-art technology

At Endress+Hauser Yamanashi, we test the accuracy of each level gauge prior to shipment. Recently there is more demand for longer-range accuracy testing due to an increase in large tanks, such as those used for LNG. With the new calibration test rig, we are able to perform accuracy testing and highly precise calibration of level gauges for installation in large LNG tanks.

The Proservo NMS series has acquired NMI certification and OIML (International Organization of Legal Metrology) certification as type approvals. It also conforms to the OIML R85 standard and API (American Petroleum Institute) Chapter 3.1B.

Along with the type approvals for the level gauge, the 40m calibration facility itself has acquired NMI certification as a calibration apparatus that can independently perform the accuracy calibration. As a result, in addition to the type approval, by performing the actual level measurement of each level gauge, and combining results of objective accuracy calibration, combine the results of objective accuracy calibration by carrying out actual level measurement of each level gauge, to significantly reduce the level of measurement uncertainty in operation.

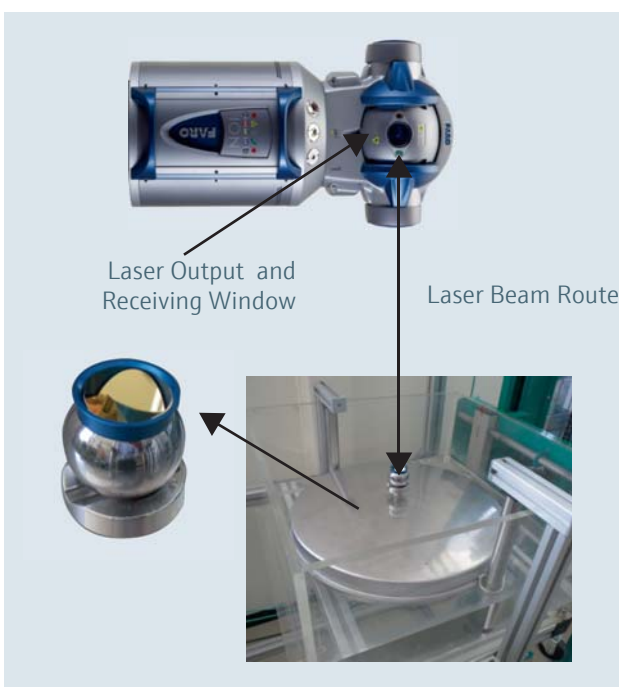


### Accuracy testing in the 40m calibration test rig

The installation of a water tank and water tank elevator, enables us to simulate an actual tank and carry out verification using water place of the actual liquid.

The accuracy test can be performed to an actual height of up to 40m

## Ultra-high-performance laser measuring device



A length measuring device that uses wavelength of a laser beam (laser tracker) is used for measuring the reference distance.

The device can perform 3-dimensional measurements accurately to within  $1\mu\text{m}$  (even with vibrating or shaking target).

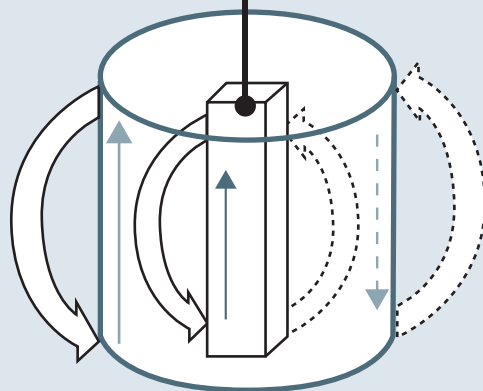
Three mirrors arranged at  $90^\circ$  angles placed inside the reflector, which reflect the laser beam back in the incident direction.

By placing the reflector on a float floating on the liquid surface, the distance from the liquid surface to the reflector is always constant.

## Structure and characteristics of the test rig

- Measuring range 40m: above ground section 8m, underground section 32m
- Constructing 3/4 of the measuring range underground provides temperature stability and counters vibration
- Laser length measuring device: minimum resolution 1 $\mu$ m or less
- NMI certification for test installation: Maximum uncertainty in the reference level reading of 0,02mm (at constant temperature)
- Urban Liner method for high vibration resistance and robustness
- Constant temperature and humidity in the entire installation by circulating full air conditioning system  
Temperature  $\pm 1.4^{\circ}\text{C}$  / Humidity  $< \pm 10\%$
- Able to test up to five level gauges simultaneously

Insulating wall 1: around the water tank elevator



Air Duct  
Switchable circulating direction



Insulation wall 2:  
Outside of insulating wall 1, vertical shaft in the underground part.  
Forced circulation inside each insulating wall

Device installation base



Water tank elevator



Underground stairs



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