

# Proservo 40m calibration rig

## Vertical accuracy calibration facility for servo tank gauging instruments



**Calibration Laboratory Accreditation Certificate**  
Accreditation No: RCL00570

**Digital Copy**  
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**Endress+Hauser Yamanashi Co., Ltd.**  
562-1 Mitsuakumugi Sakaiyawa-cho Fuetuki-shi Yamanashi 406-0846 Japan

meets the following criteria. On the basis of this, Japan Accreditation Board (JAB) grants accreditation to the said calibration laboratory.

Applicable accreditation criteria : JIS Q 17025:2018 (ISO/IEC 17025:2017)  
Scope of accreditation : **Dimensional**  
**Thermodynamic**  
(As described in the appendix)  
Premises covered by accreditation : As described in the appendix.  
Empty date of accreditation : February 28, 2027

Initial accreditation February 14, 2023

*Y. Iizuka*  
Y. Iizuka, President  
**Japan Accreditation Board**

Issue No. : RCL00570-20230214



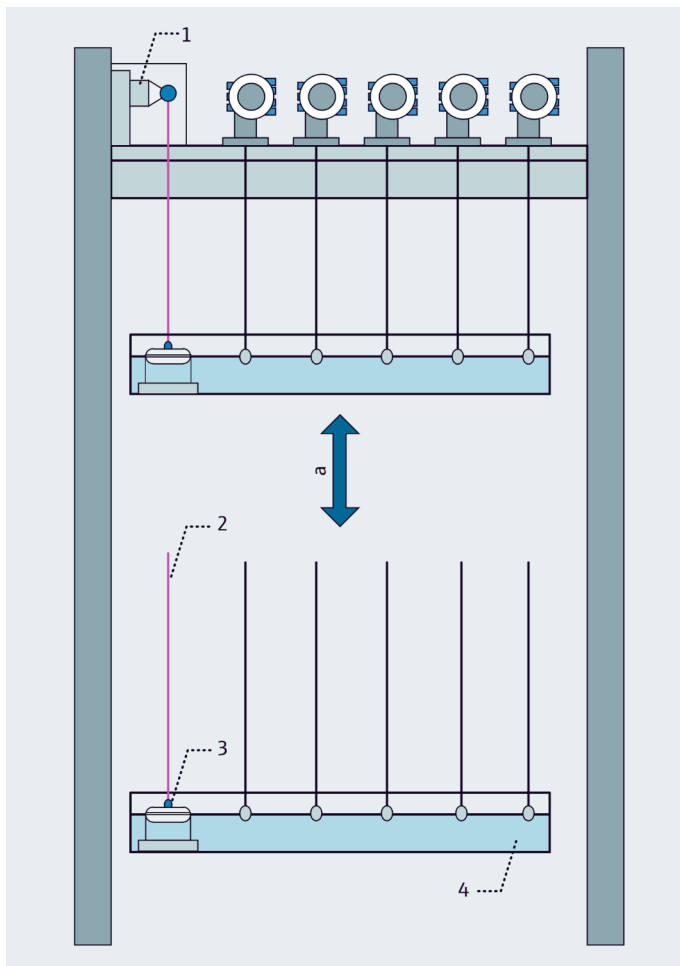
## High accuracy measurement with one of the world's highest facilities and state-of-the-art technology

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

At Endress+Hauser Yamanashi, we calibrate the accuracy of each level gauge prior to shipment. Recently there is more demand for longer-range accuracy calibration due to an increase in large tanks, such as those used for LNG. With the new calibration rig, we are able to perform accuracy calibration 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 40 m calibration facility itself has acquired NMI certification in the year of 2014 as a calibration apparatus that can independently perform the accuracy calibration. It is now possible to perform traceable calibration through acquiring ISO/IEC 17025 accreditation certificate for level measuring of NMS8x in February 2023. As a result, in addition to the type approval, we 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.



- a* Measuring range up to 40 m
- 1 Laser tracker
- 2 Laser beam route
- 3 Reflector on the float
- 4 Water tank

### Accuracy calibration in the 40 m calibration rig

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

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

### 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).

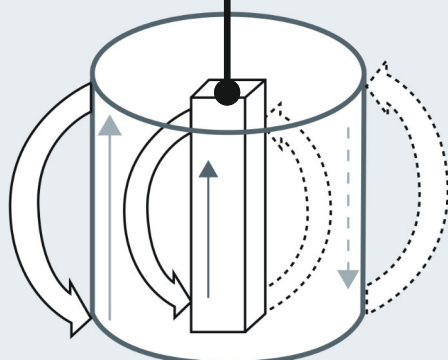
Three mirrors arranged at  $90^\circ$  angles are placed inside the reflector, which reflect the laser beam back in the incident direction.

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

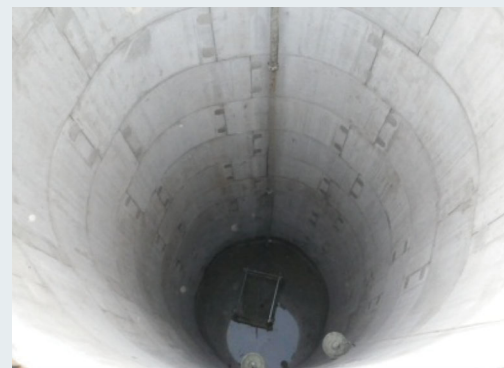
## Structure and characteristics of the calibration rig

- Measuring range 40 m: above ground section 8m, underground section 32 m
- Constructing 4/5 of the measuring range underground provides temperature stability and counters vibration
- Laser length measuring device: minimum resolution 1  $\mu\text{m}$  or less
- Installation: maximum uncertainty in the reference level reading of 0.02 mm (NMI certificate, at constant temperature)  
maximum uncertainty in the reference level reading of 0.26 mm (ISO/IEC 17025 certificate, 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  $\pm 1.4$  °C / Humidity  $< \pm 10$  %
- Able to calibrate up to five level gauges simultaneously

Insulating wall 1: around the water tank elevator



Air duct  
Switchable circulating direction

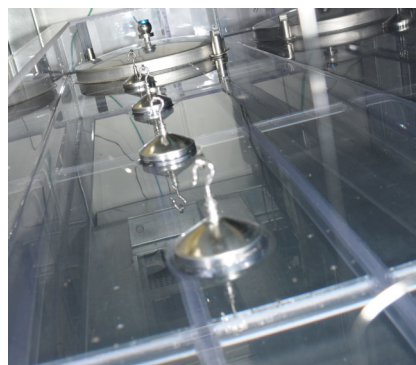


Insulating wall 2:  
Outside of insulating wall 1, vertical shaft in the underground part.  
Forced circulation inside each insulating wall

Device installation base



Water tank elevator



Underground stairs



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