



# MuST Fiber Bragg Gratings Leveling Meter Sensor



- High resolution
- Fast measurement, real-time readings
  - Up to 10 measurement cells in one single cable
- 250 mm to 500 m Spacing between the measurement points
  - Maximum distance 5 km
- Available in single-ended or double-ended configurations
  - Insensitive to corrosion
- Immune to electromagnetic fields
  - Easy to install
  - Long lifetime

SMARTEC SA

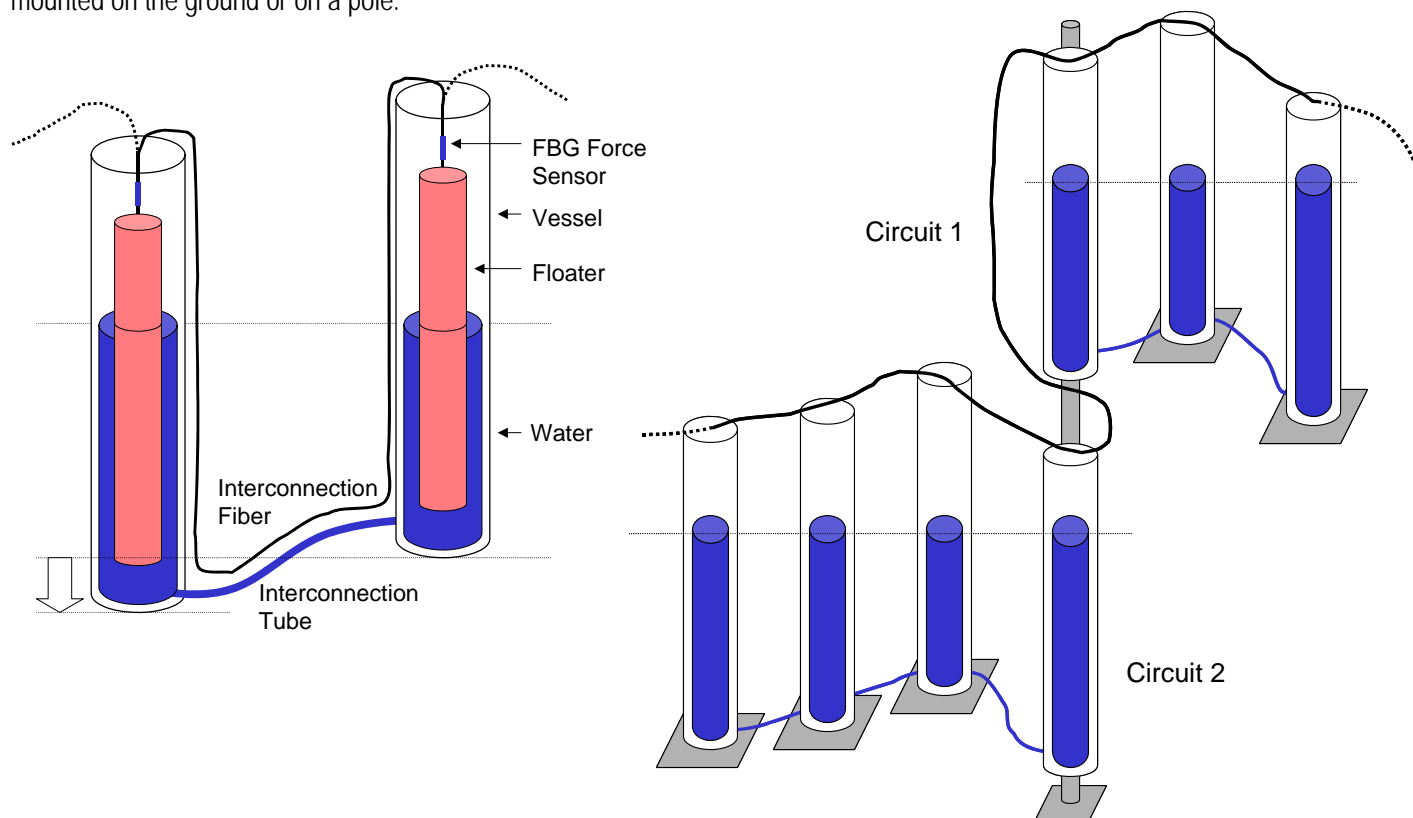
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## Description

The MuST leveling system is a multi-point sensor designed for measuring vertical displacements at different locations along one single cable line. The sensing elements are Fiber Bragg Gratings that record the changes of the water levels of connected vessels by measuring the hanging force of a cylindrical floater. The wavelength shifts of a Fiber Bragg Grating can be measured with SMARTEC's MuST reading units that calculates it back into the actual vertical displacement.. A reference grating is used to cancel the effects of temperature

The sensor network is composed of a number of vessels which are interconnected with hydraulic tubes. This ensures that the water is leveled in all vessels. A vertical displacement of one vessel will cause a change in the water volume of the cylinder. This produces a change in the length of the floater that is immersed and therefore of the hanging force. If the area to be monitored presents large height changes, it is possible to separate the tube network in separate circuits and use common points to obtain a global mapping of the vertical displacements. The Measurement sensors are also interconnected with an optical fiber cable. Each fiber can support up to 10 measurement points. All sensors are measured simultaneously and in real-time (response time approx. 1s). The sensors can be quickly and easily installed without affecting the construction schedule. It can be mounted on the ground or on a pole.



## Technical characteristics

Measurement range	250 mm
Resolution	0.1 mm
Precision	0.2 mm
Operating Temperature	-30°C to +60°C
Size	500 mm x 100 mm x 100 mm
Weight	1.4 kg (excluding cables)
Connecting cable protection options	Standard cable with protecting tube (recommended for embedding or surface mounting in protected conditions); stainless steel protecting tube (recommended in harsh conditions or for length longer than to 50m); Simple cable without protecting tube (recommended for laboratory conditions).