


Bandwidth modulation and centre wavelength shift of a single FBG for simultaneous water level and temperature sensing

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ABSTRACT

A diaphragm-based hydrostatic level transducer with the use of a single Fibre Bragg grating (FBG) is presented for simultaneous measurement of water level and temperature. In order to distinguish the mismatch between water level and temperature sensitivity, a bandwidth modulation and centre wavelength shift measurement technique was introduced. The change in bandwidth is sensitive towards water level variations with a sensitivity of 0.0015 nm/cm. Meanwhile, the change of centre wavelength is sensitive towards water level and temperature variations, with sensitivities of 0.0008 nm/cm and 0.0365 nm/°C, respectively. By expressing the obtained sensitivities in a matrix equation approach, simultaneous water level and temperature measurement can be predicted accurately.

KEYWORDS: Fibre Bragg grating (FBG); Simultaneous water level and temperature; Water level sensor; Temperature sensor

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