The H-Level is the automatic liquid level system for accurate long-term monitoring of differential settlements in buildings, tunnels, and other civil structures.

It consists of a series of H-Level gauges that are hydraulically connected to a reference tank positioned in a stable location. Each H-Level gauge includes a high resolution pressure sensor that monitors the head of liquid resulting from the difference in elevation between the gauge and the reference tank.

The system is available in digital and analog version. The digital output allows fast and simple installation and reading. With OMNIAlog datalogger and digital gauges, you have the unique advantage to set-up the logging system just with one-click.

**APPLICATIONS**
- Buildings
- Tunnels
- Compensation grouting projects
- Excavations
- Historical structures
- Bridges

**FEATURES**
- Available with both digital or analogue output
- High accuracy and performance
- Automatic compensation for barometric pressure

Meet the essential requirements of the EMC Directive 2014/30/UE
The H-Level is an automatic system for the long-term monitoring of differential settlements in buildings, tunnels, and other civil structures. The system consists of a series of H-Level gauges that are hydraulically connected via fluid-filled tubing to a reference tank that is located in a stable location. A separate air-filled tube connects each gauge to an air intake located near the reference tank. Each H-Level gauge includes a high resolution pressure sensor that monitors the head of liquid resulting from the difference in elevation between the gauge and the reference tank. The gauges report a higher head of fluid (higher pressure) if settlement occurs and a lower head of fluid (lower pressure) if heave occurs.

The air-filled tube connected to each gauge eliminates error due to changes in barometric pressure. In addition, an H-Level gauge located near the reservoir is used as a reference i.e. for compensate thermal effects. If freezing temperatures are expected, a de-aired, anti-freeze liquid can be used in the tubing and reservoir.

The H-level monitoring system can be connected to the OMNIAlog data acquisition system where both pressure (level) and temperature are stored for processing.
## TECHNICAL SPECIFICATIONS

### PRODUCT CODES

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement principle</th>
<th>Range (1)</th>
<th>Gauge resolution</th>
<th>Gauge sensitivity (2)</th>
<th>Gauge accuracy (3)</th>
<th>Lin. MPE</th>
<th>Pol. MPE</th>
<th>Output signal</th>
<th>A/D converter</th>
<th>Offset temperature dependency (-20°C to +60°C)</th>
<th>Internal temperature sensor: (5)</th>
<th>Internal humidity sensor: (5)</th>
<th>On-board supply voltage monitor: (5)</th>
<th>Operating temperature range</th>
<th>Power supply</th>
<th>Power consumption</th>
<th>IP Class</th>
<th>Liquid and air tubes (OD / ID)</th>
<th>Signal cable</th>
<th>Cabling</th>
<th>Max. distance to datalogger (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0HLEV050D02</td>
<td>Digital H-Level gauge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt; ±0.01 mm / °C</td>
<td>Embedded on electronic board</td>
<td>Embedded on electronic board</td>
<td>Embedded on electronic board</td>
<td>-20°C to +70°C</td>
<td>8 - 28 V DC</td>
<td>6 mA @ 24 V - 8 mA @ 12 V</td>
<td>IP67</td>
<td>8 mm / 6 mm, polyamide</td>
<td>M12 male connector on sensor body</td>
<td>1000 m (for more information see F.A.Q. #77)</td>
<td></td>
</tr>
<tr>
<td>0HLEV100D02</td>
<td>capacitive ceramic pressure sensor</td>
<td>500 mm H₂O</td>
<td>infinite</td>
<td>±0.08% FS (&lt; ±0.40 mm H₂O)</td>
<td>±0.07% FS (&lt; ±0.35 mm H₂O)</td>
<td>±0.07% FS (&lt; ±0.70 mm H₂O)</td>
<td>RS-485, Modbus RTU protocol (4)</td>
<td>32 bit, precision 38-kSPS</td>
<td>&lt; ±0.01 mm / °C</td>
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</tr>
<tr>
<td>0HLEV050002</td>
<td>Analog H-Level gauge</td>
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<td></td>
<td></td>
<td></td>
<td>&lt; ±0.05 mm / °C</td>
<td>Thermistor</td>
<td>Thermistor</td>
<td>Thermistor</td>
<td>-20°C to +60°C</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>0HLEV100002</td>
<td>capacitive ceramic pressure sensor</td>
<td>500 mm H₂O</td>
<td>infinite</td>
<td>±0.20% FS (&lt; ±1.00 mm H₂O)</td>
<td>±0.15% FS (&lt; ±1.50 mm H₂O)</td>
<td>±0.15% FS (&lt; ±0.75 mm H₂O)</td>
<td>4-20 mA current loop (pressure), Ohm (temperature)</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>

(1) Other ranges available on request
(2) Sensitivity is a specific parameter different for every gauge. The sensitivity is calculated during gauge calibration test and inserted into the Calibration Report.
(3) MPE is the Maximum Permitted Error on the measuring range (FSR). In the Calibration Report, the accuracies of the gauge are calculated using both linear regression (≤ Lin. MPE) and polynomial correction (≤ Pol. MPE)
(4) RS485 not-optoisolated Modbus communication with RTU Protocol. Default output is “mm H₂O”. Sisgeo Modbus protocol manual is available for download on SISGEO web site.
(5) These sensors are installed on the internal electronic board to give information also in the event of instrument malfunction.
(6) For more information, refer to F.A.Q. section on Sisgeo website: https://www.sisgeo.com
PHYSICAL FEATURES

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Analog H-Level</th>
<th>Digital H-Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing dimensions (WxHxD)</td>
<td>75 x 175 x 50 mm</td>
<td>75 x 175 x 50 mm</td>
</tr>
<tr>
<td>Overall dimensions (WxHxD) connectors included</td>
<td>130 x 233 x 53 mm</td>
<td>157 x 225 x 53 mm</td>
</tr>
<tr>
<td>Housing material</td>
<td>Anodized aluminum</td>
<td>Anodized aluminum</td>
</tr>
</tbody>
</table>

PHYSICAL FEATURES

PRODUCT CODE 0HLEV27SERB
- Material: stainless steel (tank), plastic (barometric ref.)
- Tank dimensions (WxHxD): 200 x 302 x 102 mm
- Tank capacity: about 6 litres
- Barometric ref. dimensions (WxHxD): 85 x 170 x 66 mm

REFERENCE TANK

Fluid in the reference tank establishes the reference level for all the gauges in the system. Barometric pressure is transmitted to the system through a secondary enclosure that is fitted with a membrane filter and dessicant to eliminate humidity.
DIGITAL Vs. ANALOGUE VERSION

DIGITAL OUTPUT (Suitable for complex monitoring systems)

Higher performances in terms of accuracy, resolution and temperature dependancy

Faster installation: only one cable for the whole chain

One-click logger set up with OMNIAlog and MiniOMNIAlog

Higher data acquisition frequency up to 1 second per instrument

Each gauge gives internal data of temperature, humidity and power supply

ANALOG OUTPUT (Suitable for simple monitoring systems)

Good performances

Each gauge has its own cable

Data acquisition frequency about 10 seconds per instrument

Each gauge has an internal temperature sensor
EXAMPLE OF UNDERGROUND MONITORING DURING TUNNEL EXCAVATION
DIGITAL SYSTEM

EXISTING RAILWAY TUNNEL

TUNNEL IN CONSTRUCTION

EXCAVATION ZONE OF INFLUENCE

0WE106IPQZH
signal cable
barometric
comp. tube
hydraulic line
Digital H-Level gauge
junction box
barometric reference
tank
reference gauge

0WE606IPDH
reference
cable
EXAMPLE OF BUILDING MONITORING IN DEEP EXCAVATION DIGITAL SYSTEM

Reference gauge
Hydraulic line with insulation
Settlement gauge

EXCAVATION ZONE OF INFLUENCE

EXCAVATION
EXAMPLE OF SIMPLE BUILDING MONITORING ANALOG SYSTEM
### Accessory and Spare Parts

**Liquid and Air Tube**
**0TUN060800**
Polyamide tube for both hydraulic and barometric compensation lines. OD 8 mm, ID 6 mm.

**Water-Glycerine Mix**
**1000L1GL000**
Recommended fluid for H-Level circuit. It is a mixture of 50% glycerine and 50% water, chemically inert, allowing operation up to -20 °C. Available in 12 liters and 25 liters tanks.

**Hydraulic Circuit Insulation**
**1000COPE300**
Insulated protective tube for hydraulic tubing. Recommended when tubing is exposed to large temperature excursions. 3m length.

**Tube Slicing Kit**
**OHLEYKITJN2**
10 hydraulic connections to joint liquid and air tubes.

**Digital Junction Box**
**0EPD0231PID**
Junction box for chains of digital H-Levels, composed by IP67 plastic box, wiring electronic board and 3 cable glands.

**Digital Cable**
**0WE6061PDZH**
LSZH cable to connect the digital instruments chain from junction box up to OMNIAlog datalogger.

**Resistance Ending Device**
**0ETERMRESI0**
Termination resistance with connector, needed to close each digital H-Level chain. For more detail see FAQ #076 on SISGEO web site.

**Resistances Kit (Spare)**
**0ERESIKIT00**
Kit composed by one 120 Ohm, two 240 Ohm, three 360 Ohm and four 480 Ohm resistance ending devices. The M12 5-pin connector allows the connection to SISGEO digital gauges. Check compatibility with old digital gauges with your Sales Representative.

**Resistance Splicing Kit**
**0HLEVKITJN2**
Kit to be used in case of H-Level gauge removal from an existing circuit. Composed by two 10cm tubes with hydraulic connections.

**Signal Cable**
**0WE1061POZH**
6-wire, 24-AWG cable, with aluminium/polyester shield and LSZH jacket. 5mm diameter.

**Hydraulic Connections**
**10**
10 hydraulic connections to joint liquid and air tubes.

**Kit to be used in case of H-Level gauge removal from an existing circuit.**
Composed by two 10cm tubes with hydraulic connections.

**Junction Box**
**0EPD023IPID**
Junction box for chains of digital H-Levels, composed by IP67 plastic box, wiring electronic board and 3 cable glands.

**Kit to connect digital instruments chain from junction box up to OMNIAlog datalogger.**

**LSZH cable to connect the digital instruments chain from junction box up to OMNIAlog datalogger.**

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### Readable by

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Fax +39 02 95762011
INFO@SISGEO.COM

**Additional Support**
SISGEO offers customers e-mail and phone assistance to ensure proper use of instruments and readout and to maximize performance of the system.

For more information, please refer to the FAQ pages on our website or email us: assistance@sisgeo.com

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