

H-LEVEL

**H-LEVEL**  
LIQUID LEVEL SYSTEM

SETTLEMENT  
GAUGES





## H-LEVEL LIQUID LEVEL SYSTEM

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

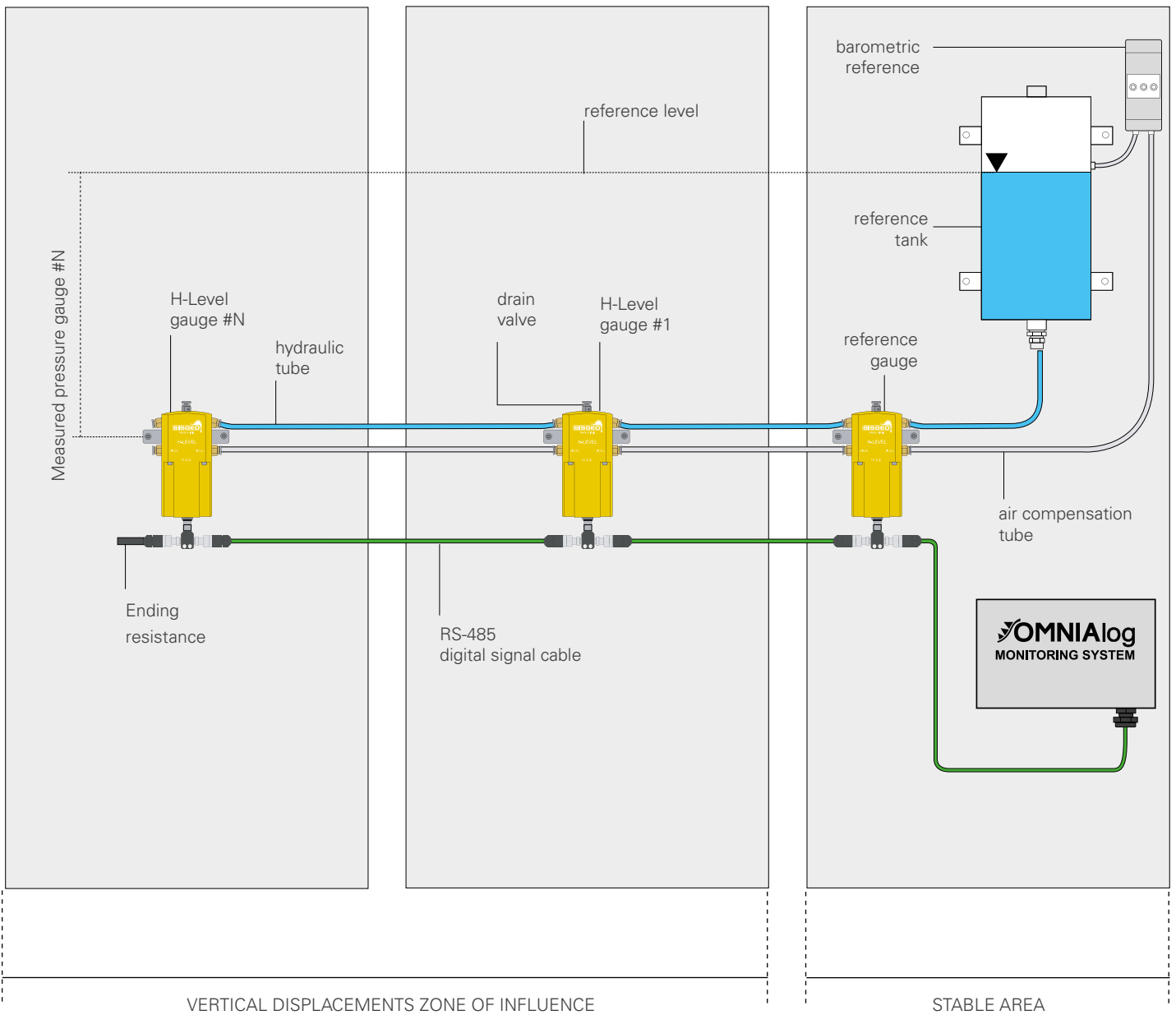
- Available with both digital or analogue output
- High accuracy and performance
- Automatic compensation for barometric pressure



Meet the essential requirements of the EMC Directive 2014/30/UE

## OPERATING PRINCIPLE

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. SISGEO liquid mix is composed by 30% glycole and 70% water and can work up to -15°C. 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	0HLEV050D02	0HLEV100D02	0HLEV050002	0HLEV100002
Model	Digital H-Level gauge		Analog H-Level gauge	
Measurement principle	capacitive ceramic pressure sensor		capacitive ceramic pressure sensor	
Range <sup>(1)</sup>	500 mm H <sub>2</sub> O	1000 mm H <sub>2</sub> O	500 mm H <sub>2</sub> O	1000 mm H <sub>2</sub> O
Gauge resolution	0.002% FS		infinite (0.006% FS with OMNIAlog datalogger)	
Gauge sensitivity <sup>(2)</sup>	see Calibration Report		see Calibration Report	
Gauge accuracy MPE <sup>(3)</sup>	±0.07% FS (< ±0.35 mm H <sub>2</sub> O)	±0.07% FS (< ±0.70 mm H <sub>2</sub> O)	±0.15% FS (< ±0.75 mm H <sub>2</sub> O)	±0.10% FS (< ±1.00 mm H <sub>2</sub> O)
Gauge repeatability	±0.02% FS (< ±0.10 mm H <sub>2</sub> O)	to be defined	to be defined	to be defined
Gauge stability @ 4 days	±0.06% FS (< ±0.30 mm H <sub>2</sub> O)	to be defined	to be defined	to be defined
Output signal	RS-485, Modbus RTU protocol <sup>(4)</sup>		4-20 mA current loop (pressure), Ohm (temperature)	
A/D converter	32 bit, precision 38-kSPS		-	
Offset (10%FS) temp dependency (-20°C to + 60°C)	< ±0.01 mm / °C	< ±0.03 mm / °C	< ±0.04 mm / °C	< ±0.05 mm / °C
Span (90%FS) temp dependency (-20°C to + 60°C)	< ±0.03 mm / °C	< ±0.05 mm / °C	< ±0.09 mm / °C	< ±0.12 mm / °C
Internal temperature sensor: <sup>(5)</sup> - nominal range - accuracy (resolution)	Embedded on electronic board - 40°C to +125°C ±1°C within -10°C to +85°C (res. 0.01°C)		Thermistor -40°C +125°C ±0.5°C within 0°C to +50°C (res.0.1°C)	
Internal humidity sensor: <sup>(5)</sup> - measuring range - accuracy (resolution)	Embedded on electronic board 0 to 100% RH ±5% RH within 0 to 95% RH (res. 0.025% RH)		-	
On-board supply voltage monitor: <sup>(6)</sup> - measuring range - accuracy (resolution)	Embedded on electronic board 0 to 36 V ±5% FS (res. 0.01 V)		-	
Operating temperature range	-20°C to +70°C		-20°C to +60°C	
Power supply	stable 8 - 28 V DC		stable 10 - 30 V DC (suggested 24 V)	
Power consumption	7.5 mA@24Vdc, 11 mA @ 12 Vdc		max 20 mA	
IP Class	IP67		IP67	
Liquid and air tubes (OD / ID)	8 mm / 6 mm, polyamide		8 mm / 6 mm, polyamide	
Signal cable	OWE106IP0ZH		OWE106IP0ZH	
Cabling	M12 male connector on sensor body with 3-port T-shaped splitter for cable wiring		M12 male connector on sensor body	
Max. distance to datalogger <sup>(6)</sup>	1000 m (for more information see <a href="#">F.A.Q.#77</a> )		1000 m (for more information see <a href="#">F.A.Q.#77</a> )	

(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 the linear regression; the error reported is the maximum residual error on the FSR.

(4) RS485 not-optoisolated Modbus communication with RTU Protocol. Default output is "m H<sub>2</sub>O". Sisgeo Modbus protocol manual is available for download on SISGEO web site.

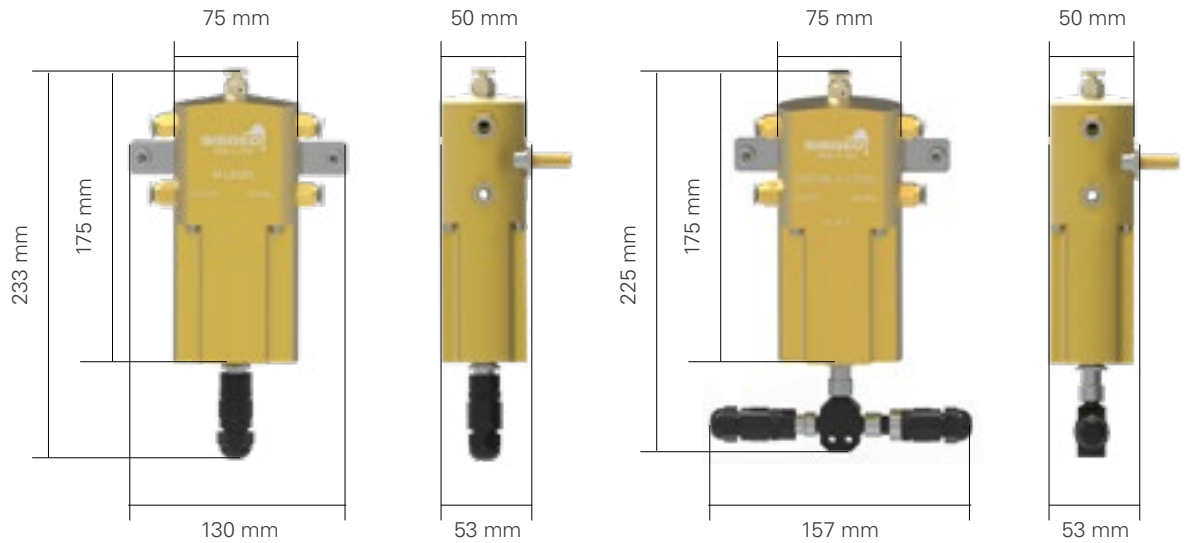
(5) These sensors are installed on the internal electronic board to give information also in the event of instrument malfunction.

(6) For more information, refer to F.A.Q. section on Sisgeo website: <https://www.sisgeo.com>



## PHYSICAL FEATURES

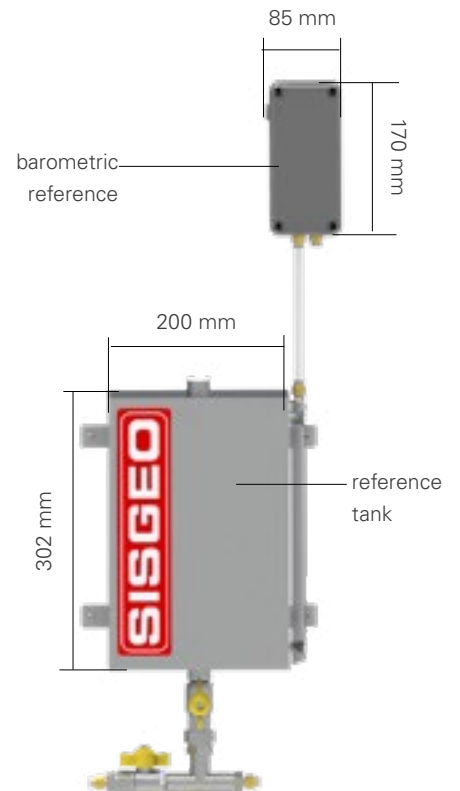
MODEL	Analog H-Level	Digital H-Level
Housing dimensions (WxHxD)	75 x 175 x 50 mm	75 x 175 x 50 mm
Overall dimensions (WxHxD) connectors included	130 x 233 x 53 mm	157 x 225 x 53 mm
Housing material	Anodized aluminum	Anodized aluminum



## REFERENCE TANK

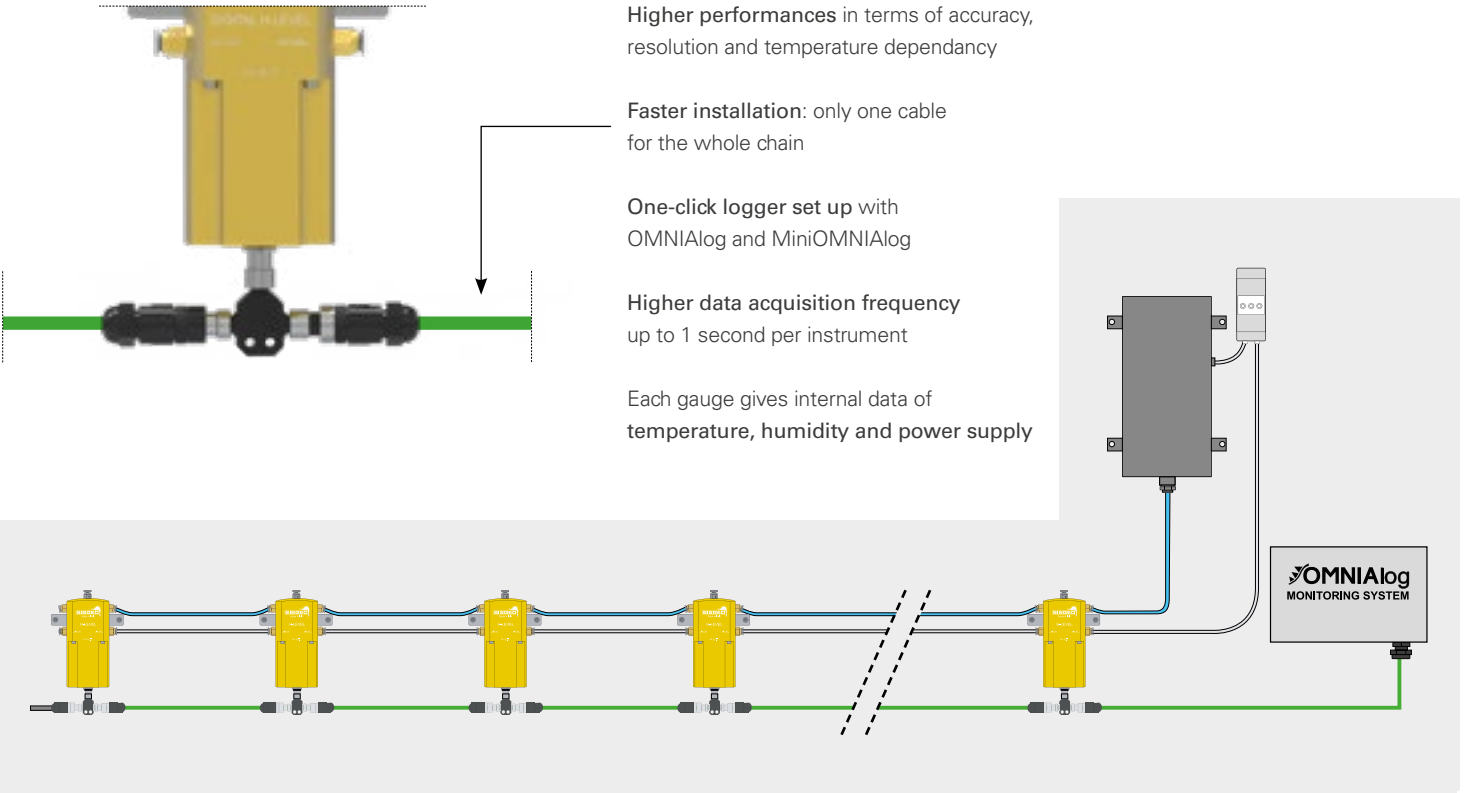
Fluid in the reference tank establishes the reference level for all the gauges in the system. Barometric pressure is transmitted to the system through a secondary enclosure that is fitted with a membrane filter and dessiccant to eliminate humidity.

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

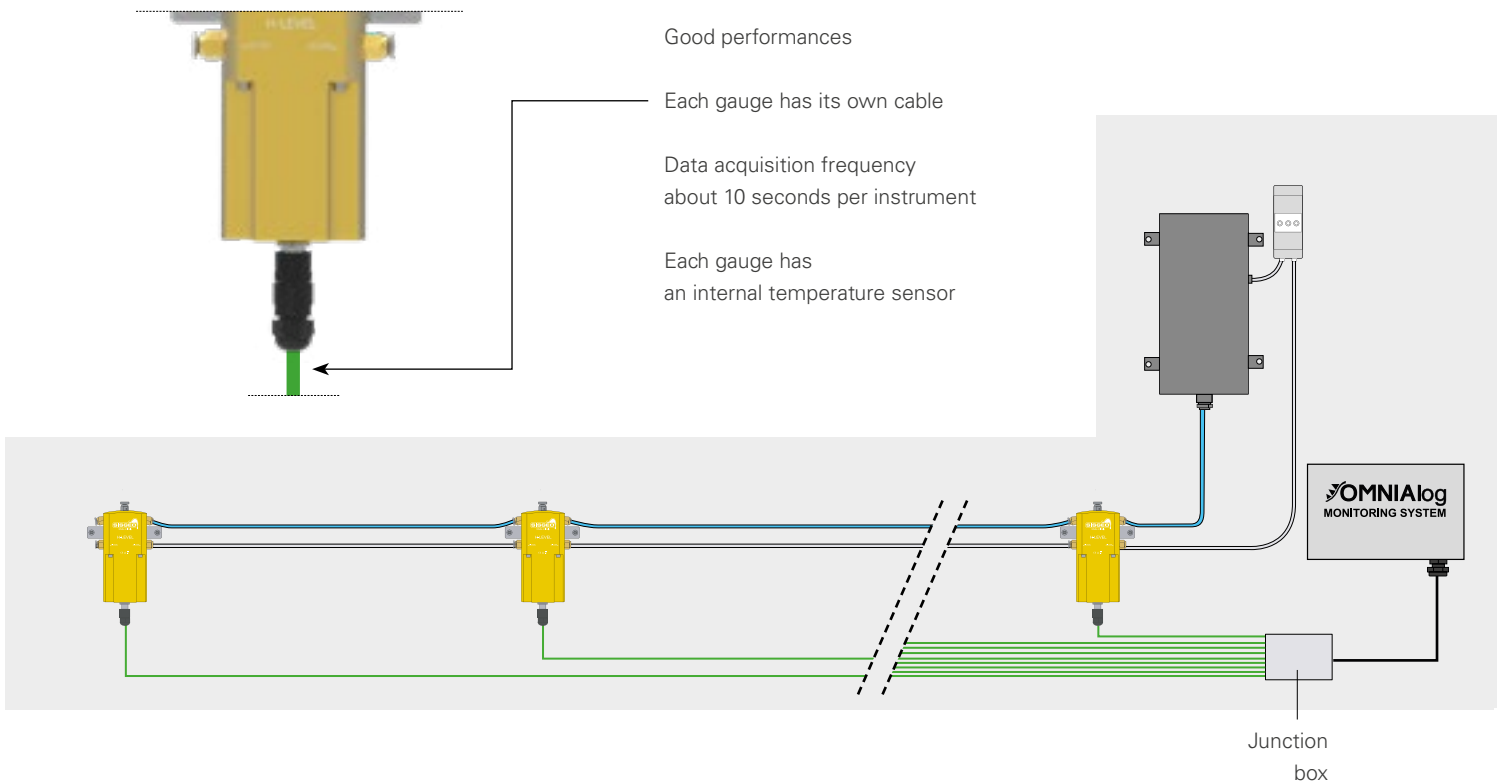


## DIGITAL Vs. ANALOGUE VERSION

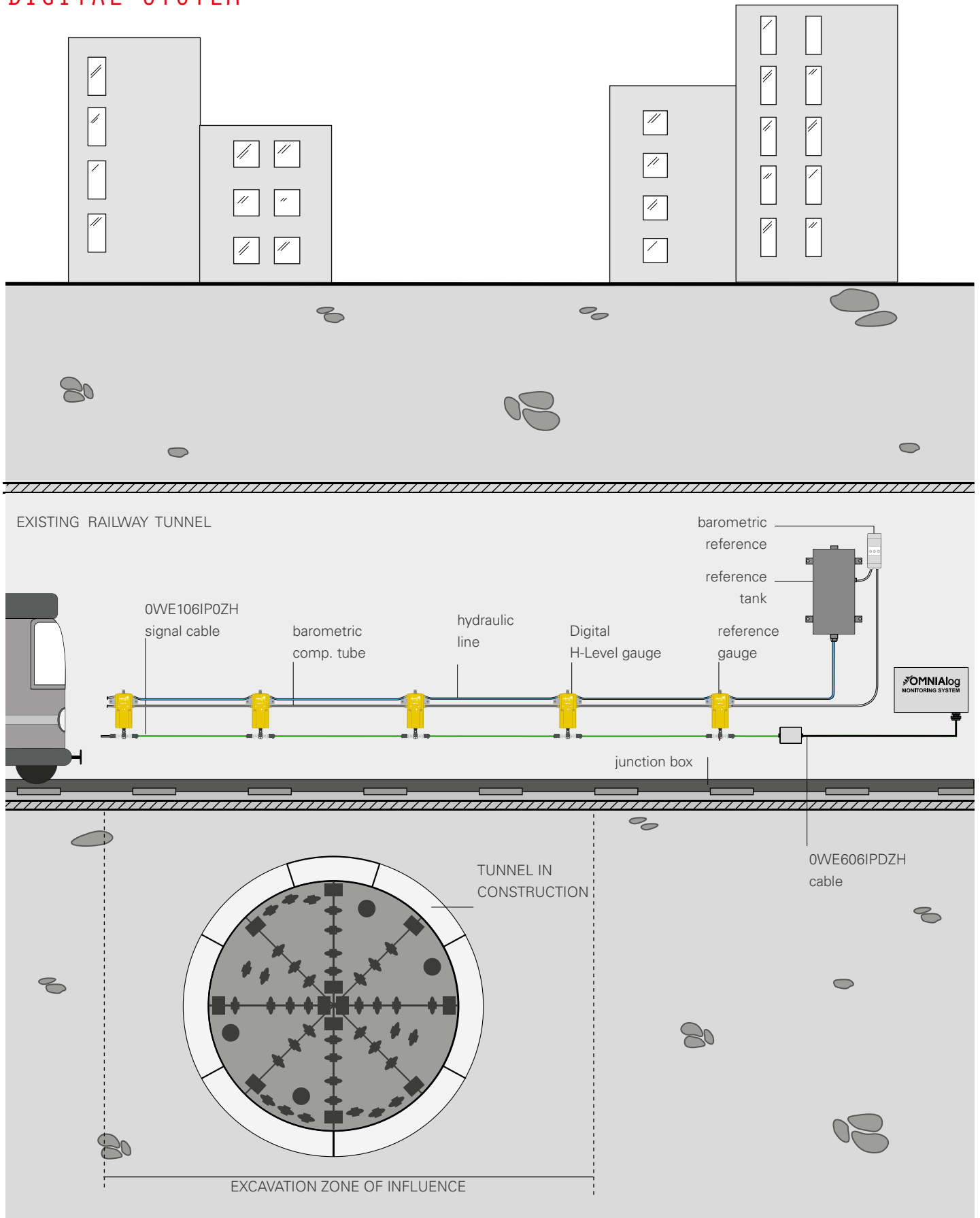
### DIGITAL OUTPUT (Suitable for complex monitoring systems)



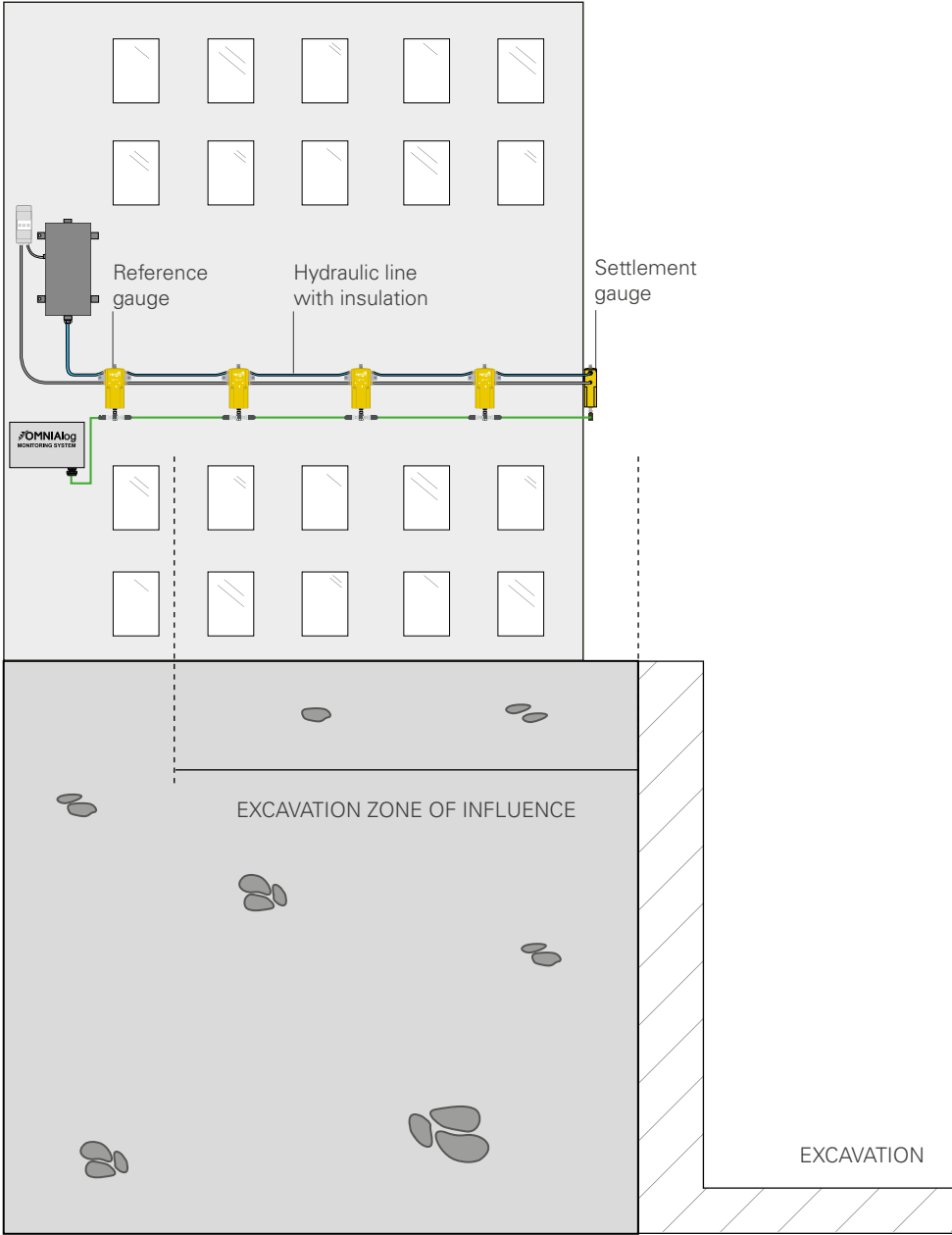
### ANALOG OUTPUT (Suitable for simple monitoring systems)



EXAMPLE OF UNDERGROUND MONITORING DURING TUNNEL EXCAVATION  
DIGITAL SYSTEM



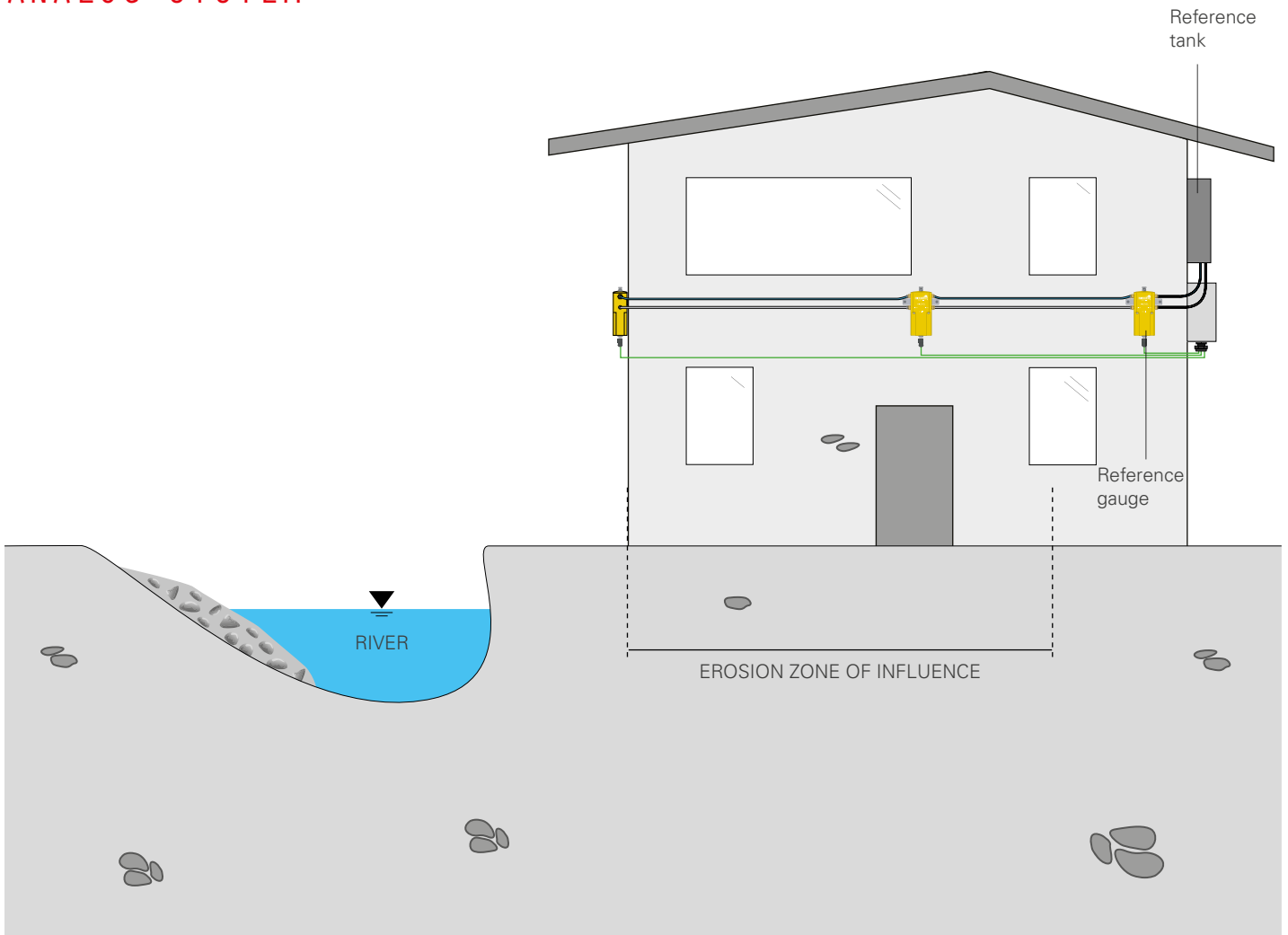
EXAMPLE OF BUILDING MONITORING IN DEEP EXCAVATION  
DIGITAL SYSTEM





# EXAMPLE OF SIMPLE BUILDING MONITORING ANALOG SYSTEM

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## ACCESSORIES AND SPARE PARTS

### LIQUID AND AIR TUBE OTUNY060800

Polyamide tube for both hydraulic and barometric compensation lines.  
OD 8 mm, ID 6 mm.

### WATER-GLYCOL MIX 1000GL30000

Recommended fluid for H-Level circuit. It is a mixture of 30% glycol and 70% water, chemically inert, allowing operation up to -15 °C. Available in 12 liters and 25 liters tanks.

### GAUGE REMOVAL KIT OHLEVKITTB2

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

### SATURATION DEVICE OD422SAT200

Saturation device for H-Level hydraulic circuit, capacity 20 liters, max pressure 5 bars, power supply 230V only. Highly recommended.

### TUBES SPLICING KIT OHLEVKITJN2

10 hydraulic connections to joint liquid and air tubes.

### DIGITAL CABLE OWE606IPDZH

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

### SIGNAL CABLE OWE106IPOZH

6-wire, 24-AWG cable, with aluminium/ polyester shield and LSZH jacket. 5mm diameter.

### DIGITAL JUNCTION BOX OEPD023IPID

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

### DIGITAL CONNECTORS KIT (SPARE) OEC0N05T3K

Kit composed by three complete "T" shaped digital connectors, including three female and three male 5-pins M12 connectors.

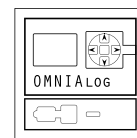
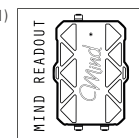
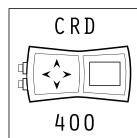
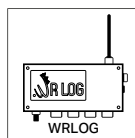
### RESISTANCE ENDING DEVICE OETERMRESIO

Termination resistance with connector, needed to close each digital H-Level chain. For more detail see [F.A.Q.#076](#) on SISGEO web site.

### RESISTANCES KIT (SPARE) OERESIKIT00

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.

## READABLE BY



(1) Only for analogue version

Refer to separate datasheets for further information

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### 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](mailto:assistance@sisgeo.com)