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gO Measurement-System

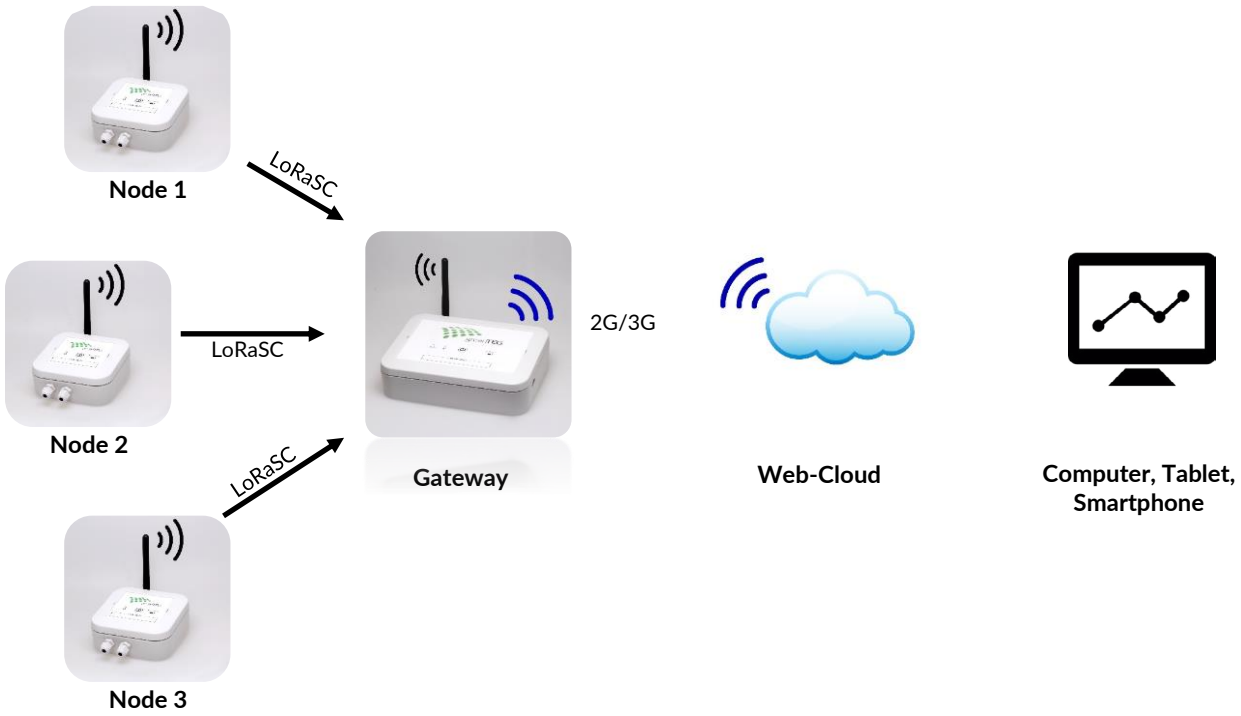
For the assessment of U-value, humidity and further parameters

gO is a portable, robust and weather-proof cloud-based measurement system which has been specially designed for temporary measurements under difficult circumstances. The gO measurement-system consists of up to 16 sensor nodes, which are connected via LoRaSC radio link (868/915MHz) to the gateway. Therefore, it is possible to use the system in situations where no WiFi or mobile connection is available. The gateway is connected to the internet via a global 2G/3G-module and transmits all measured data in real-time to the cloud.

The modular and user configurable set-up of the gO measurement-system is the perfect solution for quick and accurate measurements over several days with the possibility of real-time monitoring.

Areas of application

- U-value measurement in compliance with the ISO 9869
- Monitoring of humidity and temperature inside as well as outside.
- Building moisture measurements
- Dew point temperature monitoring on the wall surface (AW-value)



Overview of sensor nodes and measuring configurations

Sensor nodes

Sensor node type 1

1x combined heatflux / surface temperature sensor

1x ambient air temperature sensor

Sensor node type 2

1x surface temperature sensor

1x ambient air temperature sensor

Sensor node type 3

1x combined humidity / ambient air temperature sensor

Typical applications and measuring configurations

Application	Required no. gateways	Required no. sensor nodes type 1	Required no. sensor nodes type 2	Required no. sensor nodes type 3
U-value assessment under ISO 9869 compliance (1 building element)	1	1 (Inside)	1 (Outside)	-
U-value assessment under ISO 9869 compliance (2 building element)	1	2 (Inside)	2 (Outside)	-
Dew point detection (mould detection)	1	-	1 (Inside)	1 (Indoor)
U-value and dew point detection (mould detection)	1	1 (Inside)	1 (Inside)	1 (Indoor)
Room-temperature monitoring (3 measuring points)	1	-	-	3 (Indoor)

Any personalised combination of up to sixteen nodes per gateway is possible.

Base station

- Battery powered
  (power supply operation possible)
- 2-7 days battery life[1] (rechargeable)
- Portable (wireless)
- Worldwide 2G/3G internet connection
- Weatherproof
- Battery level indicator
- Connection status indicator
- Robust enclosure
- Connection with up to 16 measuring nodes possible (more upon request)

Product name	**Gateway**
Article number	A-257611
Dimensions (l x w x h) [mm x mm x mm]	175 x 155 x 45 (with folded antenna)
Weight [g]	ca. 650
IP-Rating (enclosure)	minimum IP44 (weatherproof, splash water)
Operational temperature range [°C]	-20 to +60
Battery	2 – 7 days battery life (internal battery), expandable with external power bank
Power supply	USB-C charger (A-001162) (mains operation possible) or power bank
Wireless connection to the measuring nodes	LoRaSC-protocol (868 / 915 MHz)
Internet connection	2G/3G mobile communication quad band (globally)

[1] Battery life will be increased from 2 (Oct.) to 7 days (Jan. 2018) through software updates affecting the energy efficiency.

Measuring Node

- Battery powered
- Up to 7 days battery life (rechargeable)
- Portable (wireless)
- Long wireless range
  (over several km or floors)
- Weatherproof
- Battery level indicator
- Connection status indicator
- Robust enclosure

Product name	**Sensor node**		
Article number	A-257658 (type 1)	A-257453 (type 2)	A-257517 (type 3)
Sensor type	• combined heatflux / surface temperature sensor • ambient air temperature sensor	• surface temperature sensor • ambient air temperature sensor	• combined humidity and ambient air temperature sensor
Dimensions (l x w x h) [mm x mm x mm]	100 x 120 x 40 (with folded antenna)		
Weight [g]	ca. 250		
IP-Rating (enclosure)	minimum IP44 (weatherproof, splash water)		
Operational temperature range [°C]	-20 to +60		
Battery	7 days battery life (internal battery), expandable with external power bank		
Power supply	USB-C charger (A-001162) (mains operation possible) or power bank		
Wireless connection to the gateway	LoRaSC-protocol (868 / 915 MHz)		
Transmitting power	Up to 20 dBm (100 mW)		
Sensor inputs	2 (factory-configured)		

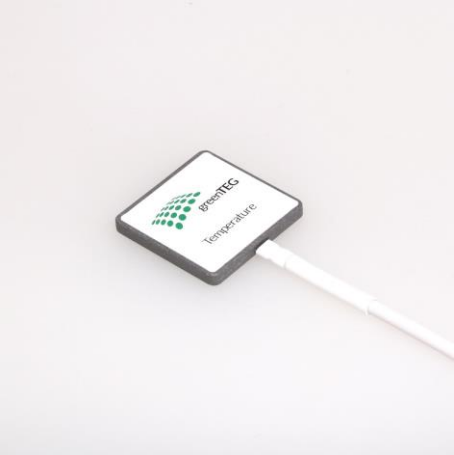
Ambient air temperature sensor

- Highest accuracy
- Robust steel case
- Simple mounting per clip
- Very low energy consumption

Product name	**Digital ambient air temperature sensor**
Article number	Included in A-257658 (type 1) and A-257453 (type 2)
Material	Chromium-Nickel-Steel
Dimensions covering (d x l) [mm]	5 x 50
Cable length [mm]	450
IP-Rating (enclosure)	minimum IP44 (weatherproof, splash water)
Operational temperature range [°C]	-50 to +80
Accuracy [°C]	+/- 0.1
Resolution [°C]	0.01

Surface temperature sensor

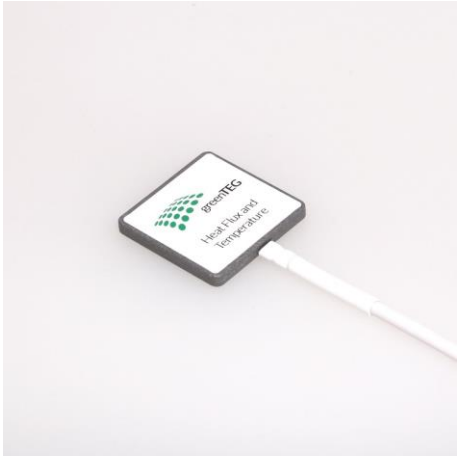
- Highest accuracy
- Robust, low-noise design
- Simple removable mounting
- Very low energy consumption



Product name	**Digital surface temperature sensor**
Article number	Included in A-257453 (type 2)
Material	Thermally conductive polymer
Dimensions (l x w x h) [mm]	30 x 30 x 3.3
Cable length [mm]	450
IP-Rating	minimum IP44 (weatherproof, splash water)
Operational temperature range [°C]	-50 to +80
Accuracy [°C]	+/- 0.1
Resolution [°C]	0.01

Combined heat flux and surface temperature sensor

- High-resolution heat flux measurement
- Highest accuracy
- Robust, low-noise design
- Simple removable mounting
- Very low energy consumption
- Integrated surface temperature sensor



Product name	Combined heatflux / surface temperature sensor
Article number	Included in A-257658 (type 1)
Material	Thermally conductive polymer
Dimensions (l x w x h) [mm]	30 x 30 x 3.3
Cable length [mm]	450
IP-Rating	minimum IP44 (weatherproof, splash water)
Operating temperature range [°C]	-50 to +80
Accuracy temperature measurement [°C]	+/- 0.1
Resolution temperature sensor [°C]	0.01
Accuracy heatflux measurement [%]	+/- 3
Resolution heatflux sensor [W/m^2]	0.09
Measurable heatflux range [kW/m^2]	+/- 35
Min./Avg.[2] heatflux sensor sensitivity [µV/(W/m2)]	10 / 20

[2]Only a reference point

Combined humidity and ambient air temperature sensor

- High-resolution humidity measurement
- Robust steel case
- Simple mounting per clip
- Very low energy consumption
- Integrated ambient air temperature sensor

Product name	**Combined humidity and ambient air temperature sensor**
Article number	Included in A-257517 (type 3)
Material	Chromium-Nickel-Steel
Dimensions covering (d x l) [mm]	5 x 45
Cable length [mm]	450
IP-Rating	minimum IP44 (weatherproof, splash water)
Operational temperature range [°C]	-50 to +80
Accuracy temperature measurement [°C]	+/- 0.3
Humidity measuring range [%]	0 - 100 RH
Accuracy humidity measurement [%]	+/- 2 RH

Cloud based analysis and control software

Overview main functions and features

- Real time data monitoring
- Real-time status indicator of the measuring nodes and the gateway
- Personal login account
- Combination of the sensors for U-value, R-value and AW-value assessment
- Status indicator for U-value measurement regarding the ISO compliance
- After the measurement all data is presented in a structured report
- csv-measurement data can be downloaded
- Simple data management and cost control
- Highest data security
- Works with any internet-ready device
- Continuous updates and maintenance