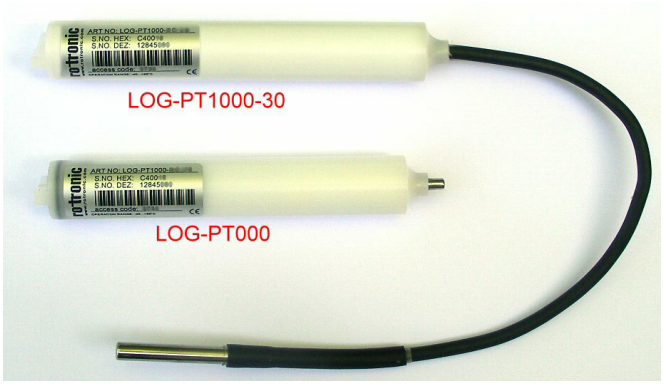
LOG-PT1000(-30) Wireless Temperature Data Logger



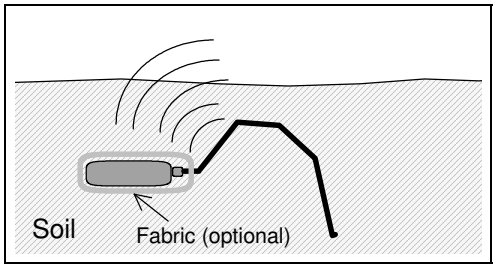
Handling

The logger consists of the electronics (housing: POM plastic, 20x160 mm) and the Sensor (Standards: 0 cm (LOG-PT1000) and 30 cm (LOG-PT1000-30)

If the enclosure must be opened (e.g. for battery replacement), please check the o-ring (sealing) very carefully! Use lubricant (to protect the o-ring) before reassembling.

We recommend to lubricate the enclosure additionally after reassembling and before using in the field (e.g. by Spray Vaseline). Please ensure, that no force affects the connector sensor<->logger in the field.

If required (as additional protection against smut), we recommend to use a small piece of fabric (like cotton) to cover the enclosure before putting under the soil. Do not cover the enclosure with plastic material, because of the risk of accumulating liquid water!



About the range: Optimal range (line of sight in open environment) could be up to 300 meters for loggers with separate antennas. If the sensor cable (like here) is used as antenna, a range of 100 meters is realistic. In this case the first 20 cm of the sensor cable are mostly important for the transmission. Hence in the picture on the right (a logger under soil) the cable is routed as a loop. Normally depths of 20-30 cm still allow a range of 10-30 meters. On request, special beam antennas with very high gain are available from us.

Please note: The devices are available with several different radio frequencies, depending on the local regulations of the country (e.g.: 433 MHz in Europe, parts of Africa and Asia, 905 MHz in USA and Canada, ...). It is in the responsibility of the user, not to use devices that are not allowed in the country of usage.

Technical Data

Logger: Temperature range: -40°C to +85°C. Radio transmission frequency: a) EC, parts of Africa and Asia): 433.92 MHz (harmonised frequency for license free operation within the EC, Switzerland, Norway, Iceland. (for other countries please check the local regulations. b) USA/Canada: 905 MHz. Effective emitted energy < 5mW

Memory: 2048kB (non volatile) Flash memory. Up to 400.000 measures: 1 measure typically uses 5.5 Bytes (Software Version 1.1, will be reduced to 2-3 Bytes in a following revision). Each HK-record (time stamp and optional HK-data) typically requires another 6 to 9 bytes. Since HK-values are recorded only after a selectable number of measures, (factory default is 6).
Example: 24 measures per day require 24*5.5 = 132 Bytes. Additionally 4 HK-records require additional 4 * 9 = 36 Bytes. Sum: 168 Bytes. Conclusion: 2048kB will be good for abt. 32 years (theroetically) without clearing the memory. The memory has a duty cycle of >100 000 clearing cycles.

HK-data: Internally the battery voltage and internal temperature can be recorded. The internal temperature is only calibrated on demand. Calibrated accuracy is +/- 1°C in the range -20°C to +40°C. The battery voltage is measured with a resolution of 1 mV.

Sensor: „PT1000 1/3 DIN“: Platinum based temperature sensor, accuracy at 0°C: +/- 0.1°C. Internal resolution: 0.01°C. Range: -90°C to +90°C. Typical accuracy < +/- 0.2°C in the range -20°C to +40°C. Long term stability: < +/- 0.02°C / year. The sensor is connected in 4-wire technology. Sensor cable possible from 20 cm to 1 meter, factory default is 20 cm. Cable: PUR (Polyurethane) .Sensor cover: POM or optional Stainless Steel. Optional Sensor with Connector: „Hirschmann M8, IP68“. Sensor: Male, Logger: Female.

Battery: SB-AA11 from www.vitzrocell.com :

- 3.6 Volt Lithium (Li-SoCl2), 2400mAh.
- Max. Pulse load: <20 mA
- Size: AA with solder terminal
- Low self discharge rate (less than 1% after 1 year of storage at +20“C)
- Non flammable
- Non restricted for transport

The battery can be replaced by the user. Similar types of battery are available from all major battery production companies. A word about the battery voltage: The voltage is around 3.4-3.6 V at 20°C, but „drops down“ to 3.1-3.3°C at -40°C. The battery voltage does not significantly reflect the remaining power of the battery, the „temperature drops“ show this better.

Calculation the battery capacity

4 main factors impact the battery capacity/lifetime:

- Constant load: about 10µA for the current version Mode „Sleeping“ with periodically checking the radio. So 1 mAh is good for ca. 100 hours of „Sleeping“
- Pulse load: about 9mA for 0.2 seconds per measure, so 1 mAh is good for ca. 2000 measures
- Self discharge: about 10% after 10 years
- Temperature cycles: difficult to predict, could be up to 50% (worst case)

As a rough estimation: Theoretically 2400 mAh are good for >25 years of „Sleeping“ or >4000000 measures (this is almost 500 years for 1 measure per hour), if no self discharge is assumed. Practically we normally calculate only with 1/3 of the capacity (the rest is for spare): For 1 measure per hour each year requires 5 mAh, with the rest of 2400 mAh / 3 = 800 mAh still almost 8 years of operation should be possible. Hence we would recommend to replace the battery with these settings after 5 years or later, if „temperature drops“ for cold phases rises significantly.

Compliance informations (only for USA/Canada):

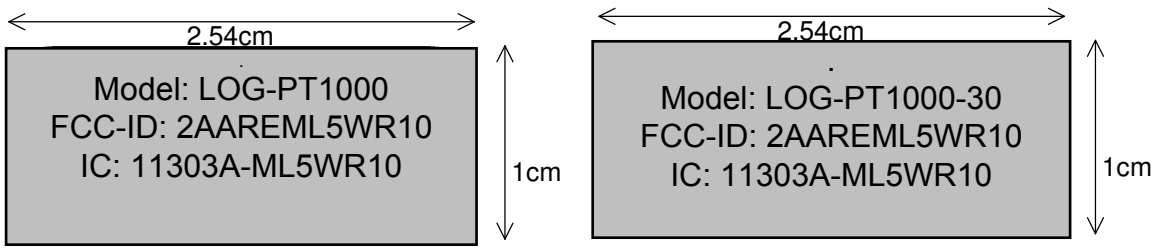
a) User Information according to FCC 15.21:
Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

b) Part 15 Statement according FCC 15.19/RSS Gen Issue 3 Sect. 7.1.3
This device complies with Part 15 of the FCC Rules and with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

LOG-PT1000: FCC-ID 2AAREML5WR10 / IC Certification No IC: 11303A-ML5WR10

LOG-PT1000-30: FCC-ID 2AAREML5WR10 / IC Certification No IC: 11303A-ML5WR10



(Labels respecitvely assembled over battery screw cap)