

M-Log5W-Hygroclip Wireless Temperature/Humidity Data Logger



Handling

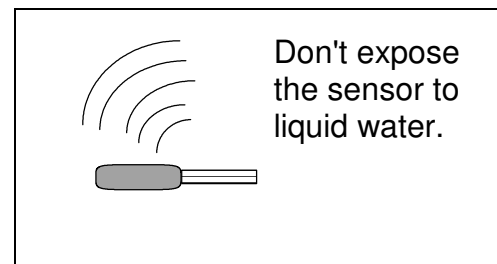
The logger consists of the electronics (housing model dependent: Stainless Steel or Plastic, 20x120 mm) and the HydroClip2 sensor (very high precision sensor, integrated or separate cable) from Rotronic AG. The sensor head can be replaced, different variants are available.

Important: The sensor is protected against dust and can withstand condensed water, but should not be exposed to liquid water.

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.

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 (if applicable) is used as antenna, a range of 100 meters is realistic, for plastic housings with internal antenna, 30 meters are realistic. In the 2nd case the first 20 cm of the sensor cable are mostly important for the transmission. On request, special beam antennas with very high gain are available from us.



Technical Data

Logger: Temperature range: -40°C to +60°C (+85°C for short times). Radio transmission frequency: 433.92 MHz (harmonised frequency for license free operation within the EC, Switzerland, Norway, Iceland. (for other countries please check the local regulations. Technically 433.92 MHz is available for Europe (including Russia), Africa and China)). Effective emitted energy < 5mW.

Memory: 512-2048kB (non volatile) Flash memory. Up to 100.000-400.000 measures: 1 measure typically uses 5.5 Bytes per value (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, 2 values per day require $24 * 5.5 * 2 = 264$ Bytes. Additionally 4 HK-records require additional $4 * 6.9 = 36$ Bytes. Sum: ca. 300 Bytes per day. Conclusion: 2048kB will be good for (theoretically) ca. 20 years 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: Any type of HygroClip2 (replaceable and calibrated) from ROTRONIC AG (www.rotronic.de). The sensor range is 0-100% rH and -50°C to +100°C. For the accuracies and extended temperature ranges contact ROTRONIC (please note: the logger itself is only designed for temperatures from -40°C to +60°C (+85°C for short times)). Optionally the sensor can be connected in 4-wire technology. Sensor cables are possible from 20 cm to 1 meter.

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.

About the battery voltage: The voltage is around 3.4-3.6 V at 20°C, but „drops down“ to 3.1-3.3 V at -40°C. The battery voltage does not significantly reflect the remaining power of the battery, the „temperature drops“ show this better, as described below.

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 10mA for 1.7 seconds per measure, so 1 mAh is good for ca. 210 measures
- Self discharge: about 10% after 10 years
- Temperature cycles: difficult to predict, could be up to 50% (worst case) for harsh environments like high mountain sites.

As a rough estimation: Theoretically 2400 mAh are good for >25 years of „Sleeping“ or > 500000 measures (this is almost 60 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 in total 130 mAh (42 mAh for the measures and 88mAh for „Sleeping“), with the rest of 2400 mAh / 3 = 800 mAh still more than 6 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.