Logmore Data Loggers

Data Sheet

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Logmore Data Logger 10+ (3-point calibrated)
Logmore Data Logger 20+ (3-point calibrated)
Logmore Data Logger 30+ (3-point calibrated)
Logmore Data Logger 40+ (3-point calibrated)
Logmore Data Logger 50+ (3-point calibrated)
Logmore Data Logger 60+ (3-point calibrated)

Product summary

A Logmore data logger monitors conditions and provides supply chain visibility together with Logmore Cloud services. Logmore combines the world's first QR data logger with a scalable software service infrastructure. Upload the data stored in a data logger's QR code by scanning the QR code with any smartphone or QR scanner. The usability of Logmore's dynamic QR code and effortless data upload substantially reduce the workload and waste footprint in logistics condition monitoring.

Main features of the QR data logger:

- Multiple sensors available: temperature, external temperature probe, humidity, shocks, light
- Sensor measurement data stored and encrypted locally
- Dynamic QR code for data upload
- Optimized power consumption to enable long lifetime
- Applicable for one-way shipments as well as multi-shipment use
- Data collected with any smartphone or other QR code reader directly to a secure cloud

Example applications:

- Cold chain monitoring
- Temperature control of pharmaceutical dry-ice shipments
- Fresh chain monitoring for perishables
- Shock monitoring for electronic and industrial equipment
- Parcel and product level condition monitoring
- Supply chain visibility via secure cloud platform
- Data analytics and risk assessments
- User alerting for a resilient supply chain

Check the service information and demo at https://www.logmore.com. Essential information on data logger functionality and usage can be found in Logmore Data Logger User Manual and at https://help.logmore.com.

Logger models

Logger 10/20/30/40/50/60

(M202, M252, M302, M402, M452 and M552)

Product name	Model number	Sensors
Logger 10 (Ambient temperature -30...+60 °C) IP67	M202	Temperature, ambient light Measurement interval: 15min Temp scale: -30...+60 °C Light: Logging disabled Battery life: Typically 4 years*
Logger 20 (Ambient temperature -30...+60 °C) IP65	M252	Temperature, humidity, ambient light Measurement interval: 15min Temp scale: -30...+60 °C Light: Logging disabled Humidity: 0...100RH% Battery life: Typically 4 years*
Logger 30 (Ambient temperature -30...+60 °C) IP65	M302	Temperature, humidity, ambient light, acceleration Measurement interval: 15min Temp scale: -30...+60 °C Light: interval 2h Humidity: 0...100RH% Acceleration: threshold 8g Battery life: Typically 4 years*
Logger 40 (Ambient temperature -25...+60 °C) IP67	M402	External temperature, ambient light (No internal temperature sensor) Measurement interval: 10min Temp scale: -100...+100 °C Light: disabled Acceleration: threshold 8g Battery life: Typically 2 years*
Logger 50 (Ambient temperature	M452	Temperature, External temperature, ambient light

-25...+60 °C) IP67		Measurement interval: 10min Temp scale: -100...+100 °C Light: interval 2h Battery life: Typically 2 years*
Logger 60 (Ambient temperature -25...+60 °C) IP65	M552	Temperature, External Temperature, humidity, ambient light, acceleration Measurement interval: 10min Temp scale: -100...+100 °C Light: interval 2h Humidity: 0...100RH% Acceleration: threshold 8g Battery life: Typically 2 years*

*Dependent on device configuration and environment, read more in the Battery section

Logger 10/20/30/40/50/60+ models with 3-point calibrated sensors

(M203, M253, M303, M403, M453 and M553)

Product name	Model #	Calibration	Sensors
Logger 10+ (Ambient temperature -30...+60 °C) IP67	M203	3-point calibration, internal temperature sensor Calibration points: -20 Celsius 0 Celsius +20 Celsius	Temperature, ambient light Measurement interval: 15min Temp scale: -30...+60 °C Light: Logging disabled Battery life: Typically 4 years*
Logger 20+ (Ambient temperature -30...+60 °C) IP65	M253		Temperature, humidity, ambient light Measurement interval: 15min Temp scale: -30...+60 °C Light: Logging disabled Humidity: 0...100RH% Battery life: Typically 4 years*
Logger 30+ (Ambient temperature -30...+60 °C) IP65	M303		Temperature, humidity, ambient light, acceleration Measurement interval: 15min Temp scale: -30...+60 °C

			Light: interval 2h Humidity: 0...100RH% Acceleration: threshold 8g Battery life: Typically 4 years*
Logger 40+ (Ambient temperature -25...+60 °C) IP67		3-point calibration, external temperature sensor Calibration points: -70 Celsius -20 Celsius 0 Celsius	External temperature, ambient light (No internal temperature sensor) Measurement interval: 10min Temp scale: -100...+100 °C Light: disabled Acceleration: threshold 8g Battery life: Typically 2 years*
Logger 50+ (Ambient temperature -25...+60 °C) IP67			Temperature, External temperature, ambient light. Measurement interval: 10min Temp scale: -100...+100 celsius Light: interval 2h Battery life: Typically 2 years*
Logger 60+ (Ambient temperature -25...+60 °C) IP65	M553		Temperature, External Temperature, humidity, ambient light, acceleration Measurement interval: 10min Temp scale: -100...+100 celsius Light: interval 2h Humidity: 0...100RH% Acceleration: threshold 8g Battery life: Typically 2 years*

*Dependent on device configuration and environment, read more in the Battery section

Specification summary

Specifications summarized – **for full information check the dedicated datasheet section.**

Dimensions	61.7mm x 50.7mm x 7.7mm
Weight	Base model: 24g External temperature sensor: 33g
External sensor cable	950mm length, 1,8mm thick coaxial cable, RG178
Available sensors	Temperature, External temperature, humidity, ambient light, shock
Sensor specifications	**Temperature**: Full measurement range of sensor is -40.0...+125.0 °C. Measurement range –10.0 °C to +60.0 °C accuracy is typically +/-0.3 °C, maximum error +/-0.5 °C. Measurement range -30.0....-10.0 °C accuracy is typically +/-0.3....+/-0.55 °C, maximum error +/-0.5....+/-0.85 **External temperature:** -100 °C to +100 °C, Maximum error +/-0.5 °C **Humidity:** 20 to 80 %RH,, ±4%RH 0...20 and 80...100 %RH,, ±5%RH Recommended usage temperature -10 °C to +60 °C Recommended measurement humidity area 20%....80% **Ambient light**: Relative usage only, ±10% **Shock**: 1.125 to 16.0 g XYZ, 100/200Hz
Battery specification	280mAh CR2430 Lithium Coin
Internal memory capacity	Over 50 000 measurement slots
Measurement data in single QR-code	Typically thousands of measurements, depending on configuration. Rest of data on History pages, available through the device user interface
Measuring interval	10 sec ... >1 year (selectable per sensor) Default typically 15min

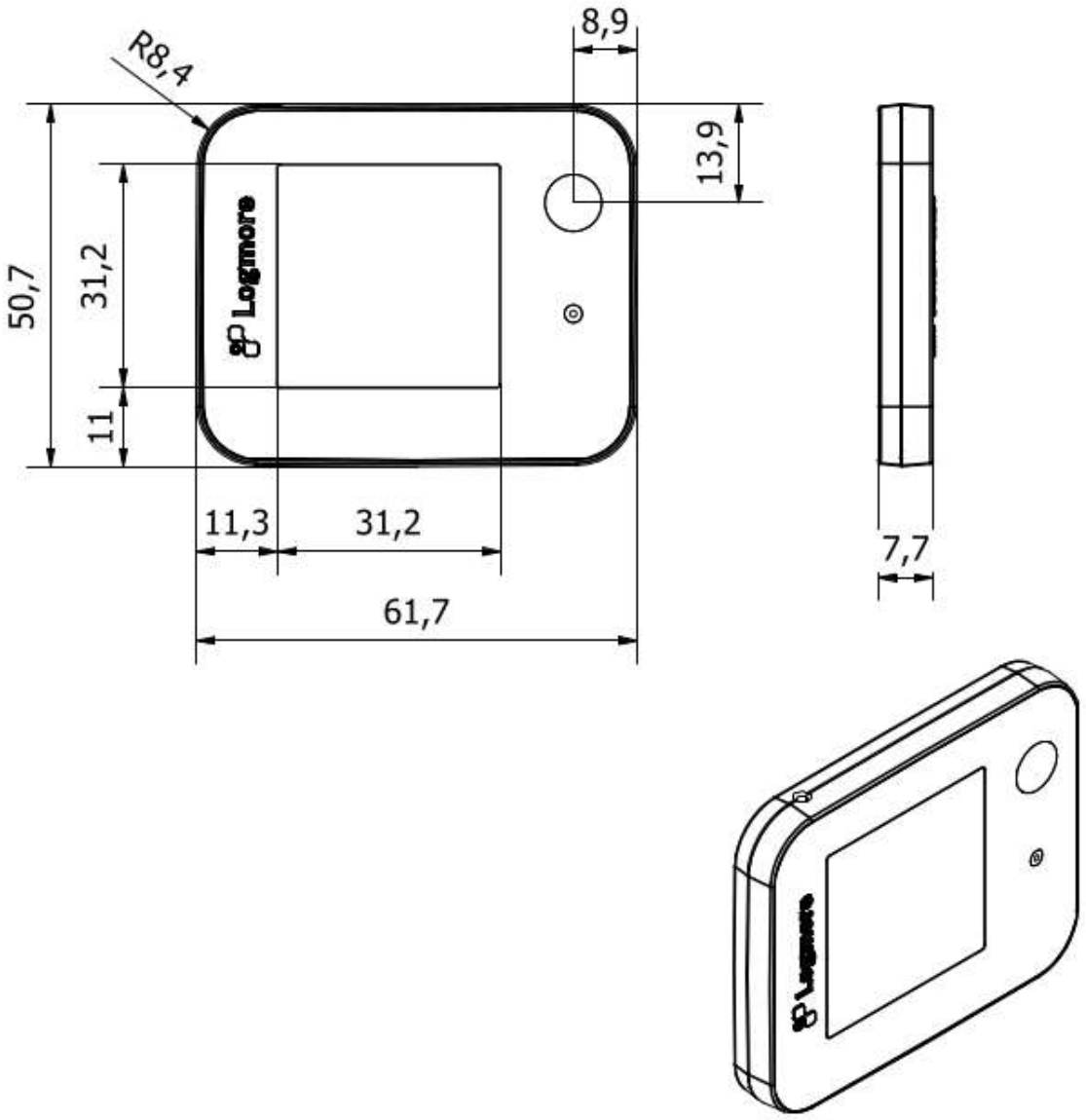
Display resolution	152 x 152 square pixels
Display technology	e-Paper
Real time clock accuracy	20 PPM
QR-code reading distance	Depends on the reading device. Typically 25cm (Smartphone, Normal laser scanner)

	Max 100cm (Tested with Galaxy S8, Camera zoomed, Bright environment)
Enclosure and external sensor protection class	IP67, with humidity sensor IP65
Allowed ambient temperature	-30.0 °C to +60 °C, -25.0 °C to +60 °C for the models with external temperature sensor
Logging temperature	Device -30.0 °C to +60 °C External temp. sensor -100 °C to +100 °C
Display update ambient temperature	2 °C to 49.0 °C (can be manually updated until 0 °C by the user, but this consumes more battery)
Certifications and calibration	CE, FCC, UK, NIST traceable, Sensor calibrations available via the web service.

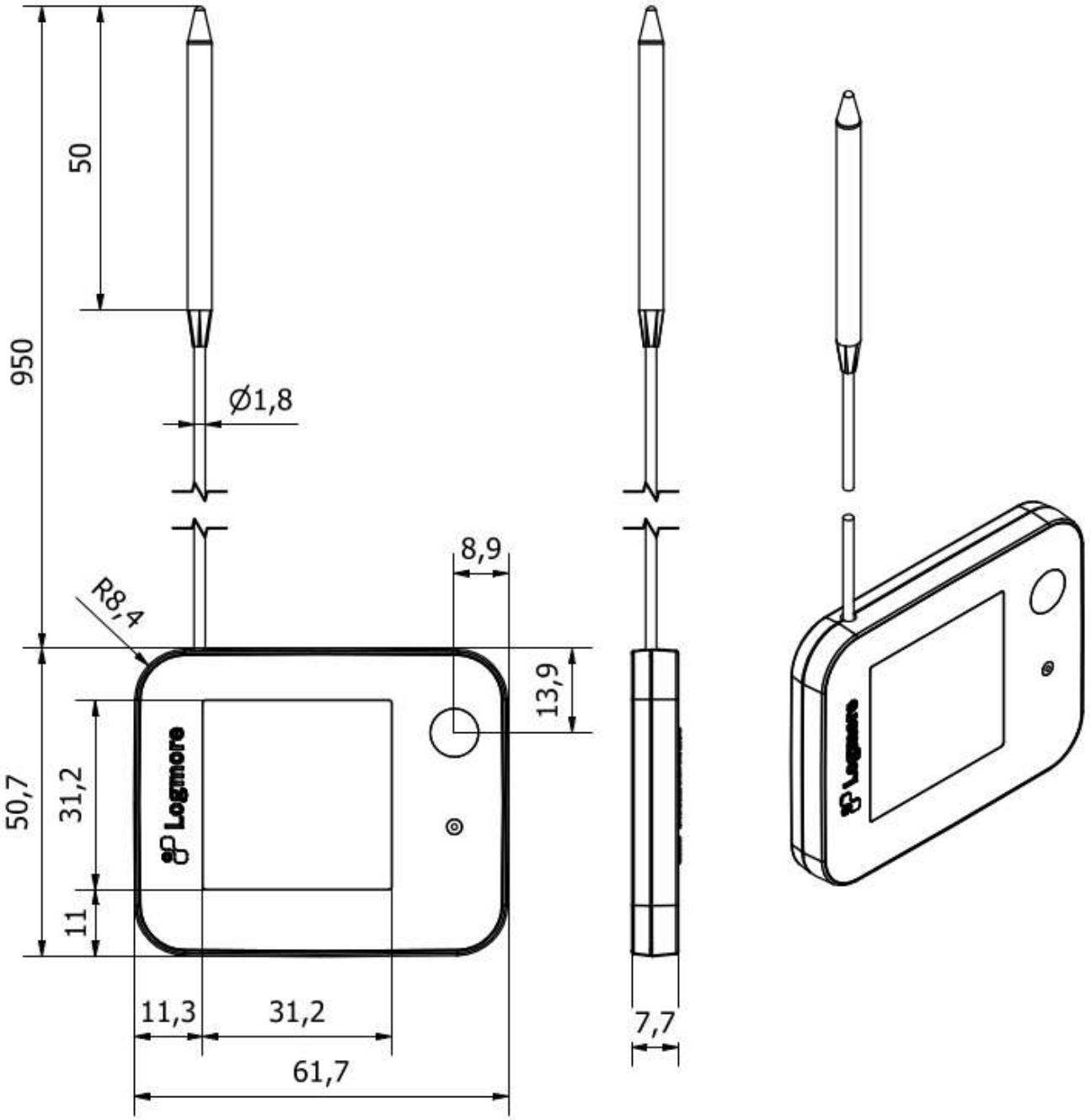
Device dimensions

All models share the same dimensions.

QR Logger enclosure (without external temperature)



QR Logger enclosure (with external temperature)

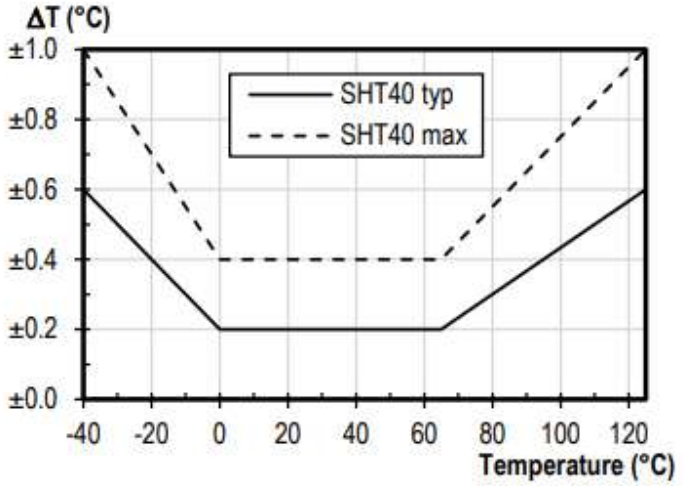


Sensor specifications

Humidity and Temperature sensor inside the Logger

Sensor: Senserion SHT4x

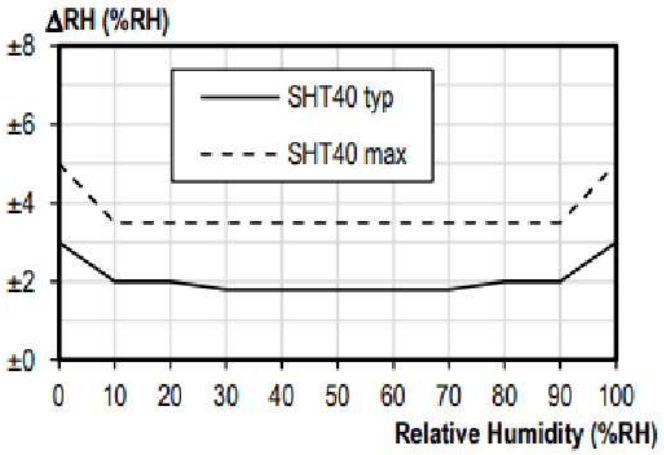
Measurement range Temperature: -40.0 °C to + 125.0 °C
Typical Temperature accuracy error: +/-0.2 °C
Maximum Temperature accuracy error: See paragraph

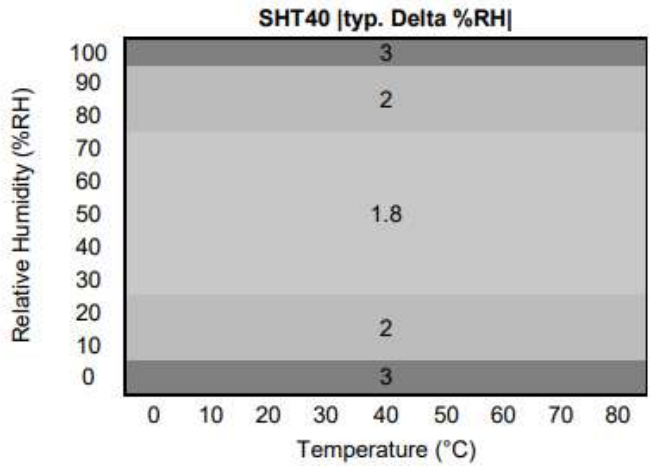


Measurement range Humidity: 0.0 to 100.0 %RH

Typical Humidity accuracy error: ±2 %RH (+20...+60 °C)

Maximum Humidity accuracy error: See paragraph (+25 °C)





Calibration: Every SHT4x is individually tested and calibrated and is identifiable by this component's unique serial number. Individual certificate available for each Logger at the Logmore web service.

For the calibration, Senserion uses transfer standards, which are subject to a scheduled calibration procedure. The calibration of the reference, used for the calibration of the transfer standards, is NIST traceable through an ISO/IEC 17025 accredited laboratory

Default display resolution for Temperature

Range	Resolution
-31.0 °C to -25.0 °C	1 °C
-25.0 °C to +7.0 °C	0.2 °C
+7.0 °C to +30.0 °C	0.5 °C
+30.0 °C to +61.0 °C	1 °C

Default display resolution for Humidity

Range	Resolution
1%RH to 100%RH	3 %RH

3-point Calibration (on Logger 10+/20+/30+ models)

For the calibration, Logmore uses transfer standards, which are subject to a scheduled calibration procedure. The calibration of the reference, used for the calibration of the transfer standards, is NIST traceable through an ISO/IEC 17025 accredited laboratory

Maximum uncertainty of the Calibration reference equipment according of EN12830 on class 0.5 is +/-0.25K

Default calibration points

Calibration point	Accuracy Class according EN12830
-20.0 °C	0.5 (+/-0.5 °C)
0 °C	0.5 (+/-0.5 °C)
+20 °C	0.5 (+/-0.5 °C)

In specific demand of ISO/IEC 17025 accredited laboratory calibration for each device, please contact sales@logmore.com .

Ambient light sensor

Sensor: LTR-308ALS-01

Absolute accuracy: ±10%

Measurement range: 0 (Completely dark) to 32 767 (Direct sunlight)

Sensor does not measure lux or other absolute brightness units. Light sensor is meant for comparable and approximate measurements for applications such as package/container opening monitor or digital seal.

Notice: Measurement interval on light sensor is 15 minutes as default. This means that when light conditions change, the maximum time to notice that can be 15 minutes (for example, when somebody opens a box and closes it immediately, it can not be recognized in case it happens within the 15min interval between two measurements.) Please note that in the standard device configuration the ambient light sensor is disabled, in order to optimize power consumption and battery life.

Resolution: Default scale for reading

Step	Data Value	Meaning

0	0	Dark, no visibility
1	1	Dark, Human eye can see shapes
2	3	Dim, Human eye can see shapes and colors
3	7	Low indoor lightning
4	10	Normal indoor lightning
5	100	Normal indoor lightning, bright
6	500	Bright, Outdoor daylight

Shock sensor

Sensor: BMA400 or MC3630

Measurement range: Selectable 2/4/8/16g, default range area 16 g
(Measures shocks between 0...16 g)

Trigger value: Configurable 1.125 to 16.0 g in 0.125 g steps
(Default trigger value 8 g)

Measurement time after trigger: configurable 0.1 to 20 seconds, (Default 5 seconds)

Measurement frequency after trigger: 100-200Hz (depends selected power consumption, default 100Hz, low power)

Measurement start delay after trigger: 5ms/10ms (depends selected power consumption, default 10ms, low power)

Shock timestamp time resolution: ±1 minutes

Axis directions: See image

Shock sensor will give indication of shock when the threshold trigger limit is exceeded.

Example:

When a package drops and acceleration is bigger than 8g trigger level (default), the sensor gives an alarm to the processor. If the package mass is big enough to keep acceleration for 10ms (default), the values of each axis will be stored and recorded for 5 seconds (default).

Because the results depend on the external force, impact and mass of the package, it is recommended that the overall solution will be tested and validated by the customer.

External temperature sensor

Sensor: High accuracy digital temperature sensor

Measurement range: -100.0 °C to +100.0 °C

(Notice QR Logger with external probe maximum operating ambient temperature is 60 °C and minimum ambient temperature is -25 °C. See Technical Specifications)

Absolute accuracy: Typical ±0.4 °C, maximum uncertainty at any point ±0.5 °C

Calibration: Tested ±0.5 °C at range (–100.0 °C to +100.0 °C).

NIST traceable 1-point calibration on 0 °C. 3-point calibration at request. Individual certificate available and calibration report for each Logger at the Logmore cloud service.

Default Display Resolution

Range	Resolution
-100.0 °C to -60.0 °C	0.5 °C
-60.0 °C to -25.0 °C	1 °C
-25.0 °C to +15.0 °C	0.5 °C
+15.0 °C to +30.0 °C	1 °C
+30.0 °C to +100.0 °C	2 °C

3-point Calibration (on Logger 40+/50+/60+ models)

For the calibration, Logmore uses transfer standards, which are subject to a scheduled calibration procedure. The calibration of the reference, used for the calibration of the transfer standards, is NIST traceable through an ISO/IEC 17025 accredited laboratory

Maximum uncertainty of the Calibration reference equipment according of EN12830 on class 0.5 is +/-0.25K

Default calibration points

Calibration point	Accuracy Class according EN12830
-70.0 °C	0.5 (+/-0.5 °C)
-20.0 °C	0.5 (+/-0.5 °C)
0 °C	0.5 (+/-0.5 °C)

In specific demand of ISO/IEC 17025 accredited laboratory calibration for each device, please contact sales@logmore.com .

Standard configuration

The standard configuration is factory set.

All sensors (Check logger model to ensure availability of respective sensors)

Setting	Value
Base time unit, all models	15 minutes
Temperature logging interval	1 (1 x 15 minutes)
Temperature sensor resolution	See sensor specification
External probe logging interval	1 (1 x 10 minutes)
External Temperature sensor resolution	See sensor specification
Humidity logging interval	1 (1 x 15 minutes)
Humidity sensor resolution	See sensor specification
Ambient light logging interval	1 (1 x 15 minutes)
Ambient light sensor resolution	See sensor specification
Shock logging mode	3 (X/Y/Z values)
Shock threshold	8 g
Shock measuring time	5 seconds
Display update interval	1 (1 x 15 minutes)

Display full draw	Every 200th draw
Top text	Temperature in °C and F

Display

Technology: e-Paper

Resolution: 152 x 152 square pixels

Active area: 27.51 mm x 27.51 mm (1.54” diagonal)

Display refresh interval: configurable 10 seconds ... >1 year

Display working temperature:. 0.2 °C to 50.0 °C (refreshing is blocked when outside of this temperature range, display automatically continues refreshing once the temperature is within the range)

Display areas

Text area (1)

Physical area: 28.0 mm x 2.2 mm

Max length 19 characters.

If longer 20th and next characters are dropped from the displayed text.

Default: Temperature (°C) Temperature (F)

Logger serial number and sensor types (2)

Physical area: 25.1 mm x 2.2 mm

Sensor types: Icons to indicate what kind of sensors include on device
Serial number: #<serial 8 digits> (eg. #00123456)

Dynamic QR code (3)

Physical area: 25.3 mm x 25.3 mm

Dynamically changing QR code containing measurement and meta data.

Battery

Each QR Logger uses an internal coin cell battery as its energy source.

Low battery

When the battery runs out (voltage limit of 2.0 V) QR Logger will stop logging and updating the screen. Latest screen stays visible as the e-paper screen doesn't require any power when not being refreshed. Some energy is preserved in the battery so in warm conditions (~ 20 °C) reading the full history is possible (using the multi-use button and history mode) as long as there is enough energy left in the battery.

Battery specification

Battery used in the Logger is a normal widely used "Lithium Coin" battery with the following specifications:

Battery type	CR2430 Lithium
Chemical system	Lithium Manganese Dioxide (Li/MnO2)
Nominal Voltage	3.0 V
Energy capacity*	235 mAh (to 2.0 volts)
Typical Li Content*	0.080 grams
Allowed ambient temperature	-30.0 °C to +60.0 °C

Battery cannot be changed nor charged. More information about the battery lifetime available in the Logmore data logger user manual.

Casing material

The material name: CYCOLOYTM FR RESIN C6600.
The material is a blend of polycarbonate and acrylonitrile butadiene styrene (PC+ABS).

The case window is made of polycarbonate.

The button and the sealing material: Kraiburg THERMOLAST® K TPU.

Serial Number

Each data logger device has a unique serial number that cannot be changed. Serial number is also visible on the display.

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