

ROTRONIC MANUAL

RMS Mini Wireless Data Logger



RMS Mini Wireless Data Logger	rotronic
E-M-RMS-MLOG-868-V1.1.3.docx	Instruction Manual

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Scope:

This manual is valid for the RMS mini wireless data logger from firmware version V1.x. The low-order digit of the firmware version stands for minor changes, e.g. correction of errors, that do not influence the main functionality of the device.

1 Overview

1.1 RMS System Overview

The Rotronic Monitoring System (RMS) is a network comprising various devices and the RMS Server software. The software is the heart of the system. It collects all measured data of the devices and saves it in the database. The individual devices work as input modules (data loggers) and as output modules (displays, analog outputs, switched outputs). The user can view the system data at any time on a PC, laptop or smart phone.

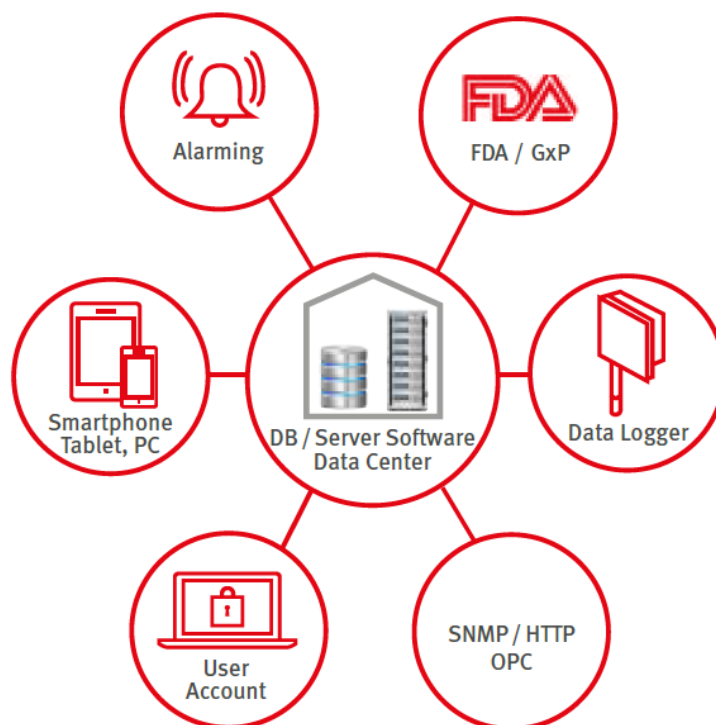


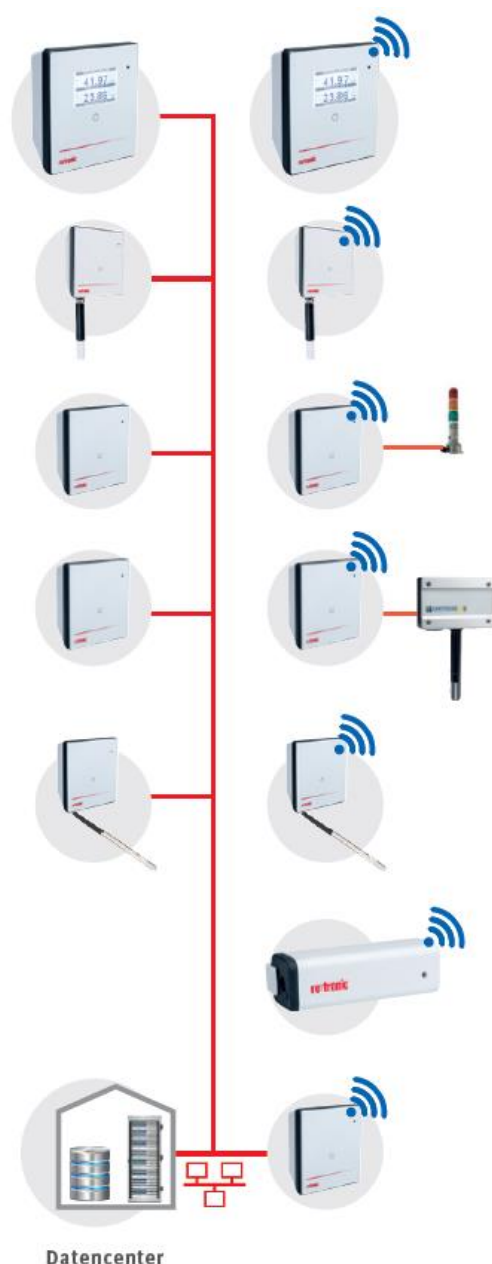
Figure 1: Schematic diagram of the RMS with the server software and database at the heart

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1.2 Device Overview

All devices can be configured as wanted as modules of the system. The following table shows all basic types of the RMS devices. Almost all modules¹ have the following options:

- Interface: Ethernet / Wireless
- Housing: Wall housing / DIN top hat rail housing / Mini housing



Display Module

The display module can show any values from the RMS network. Humidity, temperature and switch states can be configured per software.

Standard Logger

Records the measured data of the digital HygroClip HCD or other RMS probes. Stored in the ring memory, the data are then sent to the server software.

Output Module

Provides two analogue voltage or current outputs or is also available as variant with two solid-state relays in order, for example, to switch alarm lamps.

Input Module

Records voltage or current signals from analogue devices such as particle counters, flow transmitters or CO2 probes. For example:

- HF5 transmitter (humidity & temperature)
- AF1 transmitter (air flow)
- CO2 transmitter (CO2)
- PF4 transmitter (differential pressure)

Temperature Logger

The loggers can be equipped with various temperature sensors (NTC, Pt100, Pt1000 or K-element). This offers the highest flexibility in use.

Mini Logger

Various parameters measured. A temperature logger with integrated or remote NTC sensor. A switch input in order, for example, to monitor door contacts. Also LUX measurement or analogue to digital converter.

Gateway

The gateway is the connecting element between Ethernet and wireless networks and forwards the data flow from the loggers to the data centre.

¹ Except for the Mini Logger

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1.3 *RMS Mini Data Logger*

The mini data logger carries out measurements in a fixed interval, saves all measured data and sends it to the database by radio link. Should the connection be lost, the logger stores the data intermediately to protect data integrity and fills up the data gaps when the connection has been restored. Depending on the variant, the mini data logger records various parameters: temperature, current, voltage, humidity, temperature & light or switch contact. The device uses a battery as the power supply.

The mini data logger provides the following basic functions:

- Measurement (temperature, temperature & humidity, current, voltage, light or switch contact)
- Recording of up to 10,000 data points
- Transfer of the recorded data to the RMS software
- Calibration and adjustment of the sensors (via the electronics)
- Firmware update

1.4 *Power Supply*

The mini data logger has one 3.6 V lithium thionyl chloride AA battery. The power supply of this battery suffices to carry out measurement and data storage and to operate the wireless interface.

Note on the batteries:

The AA batteries are lithium thionyl chloride batteries available in the industrial trade. All RMS input modules are designed for this type of battery. Only batteries of the same type or with identical characteristic values may be used as replacement batteries.

1.4.1 *Type of Battery*

Battery Specifications	
Article	RMS-BAT
Type	Li-SOCl ₂
Capacitance	2100 mAh
Voltage	3.6 V
Dimensions	AA (H: 50.3 mm, D: 14.55 mm)

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1.5 *Measured Parameters*

Depending on the version, the mini data logger has different inputs. The following table lists the main types:

RMS Mini Data Logger	
RMS-MLOG-T-868	Mini data logger, integrated temperature probe, °C, 868 MHz
RMS-MLOG-T10-868	Mini data logger, external NTC probe, °C, 868 MHz, NTC must be ordered separately
RMS-MADC-868-A	Mini data logger, 1 x analogue input, 0...20 mA, 868 MHz
RMS-MADC-868-V	Mini data logger, 1 x analogue input, 0...10 V, 868 MHz
RMS-MLOG-LGT-868	Mini data logger, integrated light sensor, 868 MHz
RMS-MDI-868	Mini data logger, 1 x digital input, 868 MHz
RMS-MLOG-B-868	Mini data logger, integrated temperature (°C) and humidity (%rh) probe, 868 MHz

1.6 *RTCC (Real Time Clock Calendar)*

The device has a real time clock calendar. The time is synchronized continuously when connected to the server.

1.7 *Data Logging and Measurement Interval*

The values of every measurement are saved in the memory with the time-stamp. At a measurement interval of one minute, it is possible to save data of one month, which corresponds to 10,000 pairs of measured values. When the ring memory is full, the oldest values are overwritten.

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1.8 Indicator and Button

The device has a button and multicolour LED for use and indication of the operating state. The button is used to start the device or switch it off in battery mode. The LED indicates the device status and whether it was possible in the current measurement interval to carry out a valid measurement and send the data to the monitoring system.

LED Status Indicator

Pairing		
Trigger	Action	LED
1s press	Confirms pairing	1 x orange, the LED blinks orange for each channel searched.
	Gateway found	n x orange, the LED flashes orange when the pairing demand is open.
	Confirmed pairing	3 x green.
	Issue pairing (time out, no data recieved)	3 x red.
Remove pairing		
Trigger	Action	LED
8s press	Removes pairing, stops logging, and turns off device.	3 x red, the pairing information stored in the logger is deleted.
Device status update		
Trigger	Action	LED
1s press	Shows the current status	Green, see the ISM connection (below). 1 x orange, the measurement is good, no ISM connection. 2 x red, measurement failed.
Wireless range		
Trigger	Action	LED
1s press	Shows the current wireless status	4 x green, RSSI > -30dBm. 3 x green, RSSI > -60dBm. 2 x green, RSSI > -80dBm. 1 x green, RSSI <= -80dBm.

1.9 Interface

The logger is operated completely via the wireless interface.

1.10 Software Compatibility

The logger is designed for use with the RMS server software (local installation or Rotronic Cloud). The data logger can alternatively also be operated with the RMS configuration software (standalone software).

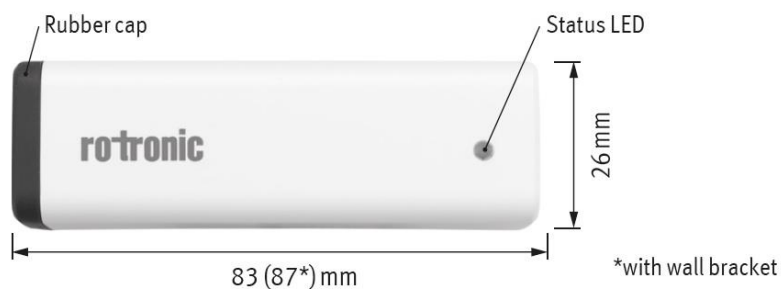
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2 Dimensions

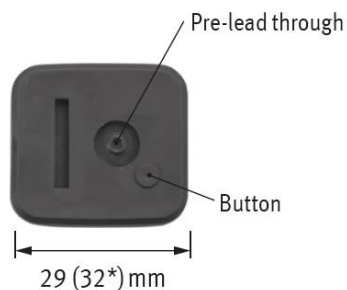
All dimensions are shown in Figure 2.

Dimensions / Connections

Top view



Rubber cap (front view)



Wall bracket

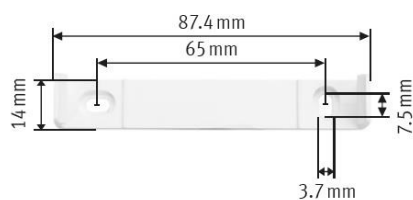


Figure 2: Dimensions of the housing

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3 Installation

The following instructions describe installation of the data logger step by step.

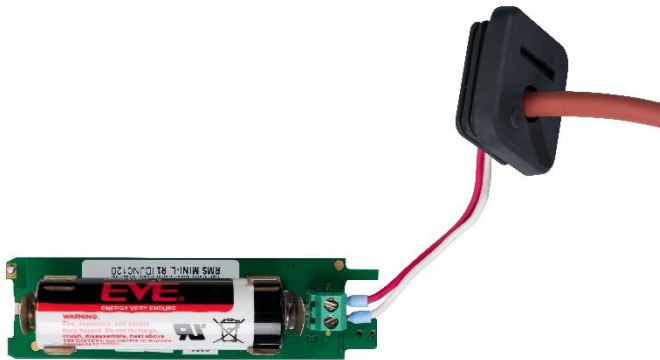
1	Insert the battery. Make sure it is inserted correctly. The poles are marked on the battery and on the electronics.	
2	Put on the housing cover.	
3	The wall bracket is fastened to the wall with screws. The screws may only protrude so far that the device can click into place properly when put on to the fastened cover.	
4	The housing is put in the wall bracket and clicked into place.	
5	The device can then be integrated into the server software. The procedure is described in the manual E-SM-RMS-WEB .	

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4 Electrical Connections

4.1 Battery

Lithium batteries of the type AA with 3.6 V are used, per section 1.4.1. Make sure they are inserted correctly. The poles are marked on the battery and on the electronics.



Picture 3: Inserted Battery, plus pole on the green sensor terminal side.

Note!

Not on all mini logger is the green terminal mounted on the PCB. Please insert the Battery + Pol in the direction to the rubber cover.

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5 Operation

This section describes all manipulations necessary for operation.

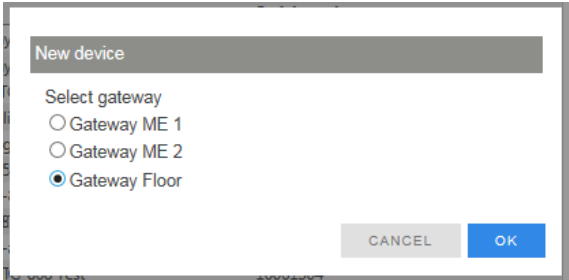
5.1 Default Configuration

The device does not have a wireless configuration on leaving the factory. It is assigned automatically when pairing the device in a system.

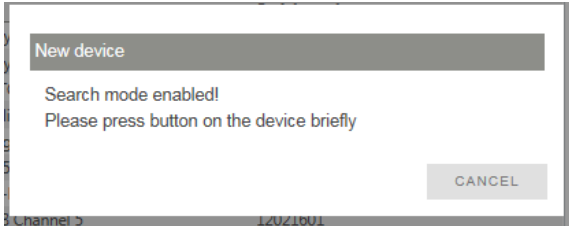
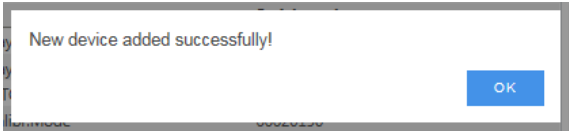
5.2 Integration in the RMS-WEB Software

To integrate the device in an RMS-WEB system, pairing mode must be enabled via the software on a gateway within wireless range. The search for the device is started by pressing a button. If it is possible for the device to connect with the gateway, this is shown by orange flashing. Pairing is then completed as described in the RMS-WEB software.

Integration of the Wireless Data Logger (Pairing) in 5 Steps.

1	Log into the RMS software / Cloud. Select <i>Extras > Setup > Devices > New Wireless Device</i> 
2	Select the gateway you want your wireless data logger to be connected to. The selected gateway then changes to pairing mode and flashes orange. 

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3	Press the button on the device to confirm. The wireless data logger stops flashing.   Button in the corner
4	Configure the device. RF-Logger <u>Device</u> Serial number 564512333 Name Office ONE Address 2 Interval [s] 60s Group Office ME <u>Measuring point 1</u> Name Office ONE, Temp Type Temperature CANCEL OK <i>Picture 4: RMS-MLOG-868 Temperature</i> RF-AnalogIn <u>Device</u> Serial number 71705420 Name RF Device Address 13 Interval [s] 60s Group Test PIJ <u>Measuring point 1</u> Name Type Analog Unit CANCEL OK <i>Picture 5: RMS-MDI-868 D-In</i>
5	Finish configuration. 

You can find details in the instruction manual for the RMS server software: **E-SM-RMS-WEB**

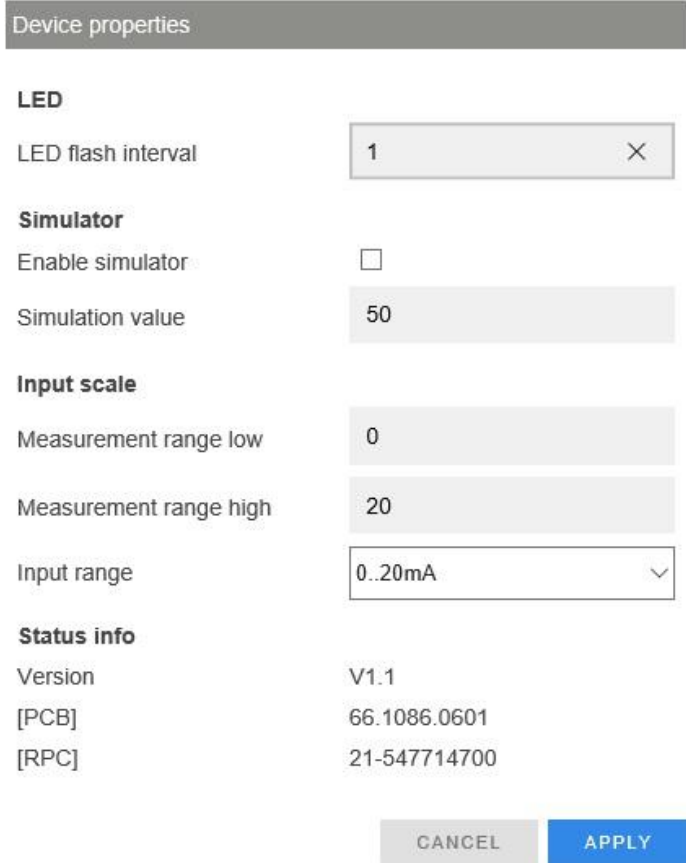
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5.3 *Function Overview*

Overview of the main software functions of the device

► Measurement	The measured data are sent to the RMS server software at the set interval directly after the measurement.
► Adjustment	Adjustment is possible in device properties on all temperature MLOG devices: NTC Device properties LED LED flash interval 1 NTC Nominal value 10000 B-constant 3380 Simulator Enable simulator ☐ Simulation value 23 Status info Version V1.1 [PCB] 66.0000.0000 [RPC] 9-512656507 CANCEL APPLY <i>Picture 6: RMS-MLOG-868 Adjustment</i>

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► Scaling	Rotronic MADC's are scaleable: Input scale in device properties  <i>Picture 7: RMS-MADC-868-A Scaling</i>
► Save measured data	The measured values of every measurement are saved in the internal ring memory (10,000 pairs of measured values). If the data cannot be sent to the server software directly, they are kept in the device and then sent later as soon as the connection to the server software has been restored.
► Firmware update	The firmware of the device can be updated directly via the RMS server software.

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6 Maintenance

Even the best technology needs regular maintenance. This chapter describes the most important points.

6.1 *Battery Replacement*

The batteries (see chapter 1.4.1 for the type of battery) of RMS devices typically last 3 years. The device shows automatically when the battery needs to be replaced.

- LED flashes red
- System message in the RMS server software

The following steps are necessary to replace the battery:

- Take the device out of the wall bracket.
- Remove the old battery and insert a new one.

The time setting of the data logger is synchronized automatically after the battery replacement.

Important:

- The battery life depends on the ambient temperature. Low or high temperatures can lead to a shorter battery life.

6.2 *Firmware Update*

The firmware can be updated with the RMS server software. Firmware updates are available for downloading on the ROTRONIC website.

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7 Technical Specifications

General	
Device type	RMS Mini Data Logger
Measured parameters	• Temperature RMS-MLOG-868 • Temp ext. NTC² RMS-MLOG-T10-868 & T10-0002 • Temp + Humidity RMS-LOG-B-868 coming soon • Light RMS-MLOG-LGT-868 • Voltage RMS-MADC-868-V • Current RMS-MADC-868-A • Switch contact RMS-MDI-868
Accuracy (with integrated temperature sensor)	$\pm 0.4\text{ }^{\circ}\text{C}$ @ $25\text{ }^{\circ}\text{C}$ / $\pm 1.5\text{ }^{\circ}\text{C}$ @ $0\ldots 70\text{ }^{\circ}\text{C}$ $\pm 3.5\text{ }^{\circ}\text{C}$ other temperature range
Accuracy ² (with external temperature sensor)	Measurement error electronic: $\pm 0.03\text{ }^{\circ}\text{C}$ @ $25\text{ }^{\circ}\text{C}$ Measurement error Sensor: Depending on sensor
Accuracy (humidity & temperature)	Temperature: $\pm 0.5\text{ }^{\circ}\text{C}$ @ $23\text{ }^{\circ}\text{C}$ Relative humidity: $\pm 3\%$ ($0\ldots 100\text{ }\%$ rh)
IP protection class	IP65
Range of application & Accuracy	• Temperature $-30\ldots 85\text{ }^{\circ}\text{C}$ ($\pm 0.4\text{ }^{\circ}\text{C}$ @ $23\text{ }^{\circ}\text{C}$ / $\pm 1.5\text{ }^{\circ}\text{C}$ @ $0\ldots 70\text{ }^{\circ}\text{C}$) • Temp ext. NTC $-30\ldots 85\text{ }^{\circ}\text{C}$ depends on the probe • Temp + Humidity $-40\ldots 85\text{ }^{\circ}\text{C}$ @ $23\text{ }^{\circ}\text{C}$ ($\pm 0.5\text{ }^{\circ}\text{C}$) / $0\ldots 100\text{ }\%$RH ($\pm 3\%$) • Light $0.05\ldots 3000\text{ lux}$ ($-3.5\ldots 10\text{ lux}$ @ 10 lux) • Voltage $0\ldots 10\text{ VDC}$ ($\pm 0.1\text{ V}$ @ $23\text{ }^{\circ}\text{C}$) • Current $0\ldots 20\text{ mA}$ or $4\ldots 20\text{ mA}$ (Shunt 110 Ohm) $\pm 0.2\text{ mA}$ • Switch contact $< 15\text{ kOhm}$ for 0, $> 500\text{ kOhm}$ for logical 1
Storage and transport conditions	$-40\ldots 30\text{ }^{\circ}\text{C}$ / $0\ldots 95\text{ }\%$ RH
Data memory	10,000 measured values
Interfaces	Wireless 868 MHz
Wireless range	20..50 m, 30m indoors
Transmitting power	14dBm (25mW)

Power supply	
Supply voltage	Battery
Polarity protection	Yes

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Battery life	Up to 3 years (at 23°C and interval of 1 minute)
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Start Time and Measurement Interval	
Start time	Wireless logger: 1 s (typical)
Measurement interval	10 s to 15 min.

Housing Specifications	
Housing material	ABC
Dimensions	83 x 29 x 29 mm
Weight	100 g

Conformity	
EMC directives	EMV directive 2014/30/EU RED 2014/53/EU EN 61326-1 EN 61000-6-2 EN 300 220-1 EN 300 220-2 EN 301 489-1 EN 301 489-3 EN 62479
Soldering material	Lead free (RoHS Directive 2011/65/EU)
FDA / GAMP directives	FDA CFR21 Part 11 / GAMP5

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8 Accessories

8.1 RMS Accessories

Order Code	Description
RMS-GW-868	Gateway, LAN to 868 MHz
AC1321	Mounting kit with Allen key and mounting cone
RMS-NPK	Network planning kit: wireless dongle, RMS mini logger
T10-xxxx	Different types of NTC sensors: - T10-0001: -196...-90°C - T10-0002: -80...150°C - T10-0003: -80...120°C - T10-0004: -50...120°C

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9 Additional Documents

Document Name	Contents
E-IM-RMS-WEB	Instruction Manual: System Installation
E-SM-RMS-WEB	Instruction Manual: System Startup
E-OM-RMS-WEB	Instruction Manual: System Operation
E-M-RMS-GW-868	Instruction Manual: Gateway
E-M-RMS-LOG	Instruction Manual: Data Logger

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10 Document Version

Version	Date	Notes
V1_0	October 2016	First version
V1_1	November 2016	Technical specifications updated
V1.1.1	May 2017	1.4.1: Type of battery: update. 1.8: Indicator and button: update. 8: Technical specifications: update.
V1.1.2	July 2017	1.4.1: Battery Picture to xxx*M* 1.3: Product Type: RMS-MLOG for (Humidity) in text & table 3: Pictures, button in the corner 5.2: Button description 5.3: Added adjustment example 8: Technical specification update
V1.1.3	February	1.4.1: Battery Update 7: technical specifications