

SonoCollect 210/211



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Introduction	The SonoCollect 210/211 is a radio receiver for wireless M-Bus Mode T1, T2 and C1 resource meters, which is equipped with a GSM / UMTS modem and a data concentrator. A lithium battery pack assures operating times up to several years without an external power supply. Additionally, it can also be supplied by an external wall-plug mains power supply. The SonoCollect 210/211 is used in places where data from radio consumption meters (electricity, gas, water and heat) must be collected, stored and transmitted to a central station, whether there is power supply available or not.	Due to the water tight case with protection rating IP67 (only with internal antennas) and the operating temperature range of -20°C to +60°C the SonoCollect 210/211 can be used for non-weather protected outdoor installations (temperate climate). Using its built-in USB interface it is possible to connect the SonoCollect 210/211 to a Windows PC for configuration. The SonoReCon software is described in a separate document.
Important Considerations	 The specific purpose of the SonoCollect 210/211 is the collection and concentration of radio telegram data from wireless M-Bus Mode T1, T2 and C1 consumption meters in indoor and outdoor (temperate climate) applications. The version with internal antennas and an IP67 protection rating can be used in places which are temporarily flooded. The version with external antennas and an IP65 protection rating can be used in weather protected outdoor installations. The SonoCollect 210/211 may only be opened and operated by trained personnel. The SonoCollect 210/211 is not a calibrated measuring device. The transmitted meter counts and consumptions are of informative character only. If a fault occurs, do not try to repair the unit yourself. Attempts to do so will void the warranty. Refer all servicing to your supplier. Do not open the case of the device unless you would like to insert a SIM card, internally connect the USB cable or connect the battery connector. Do not touch any parts of the device at the interior of the case except the SIM card holder, the USB connector and the battery connector. 	 Install the SonoCollect 210/211 only at a safe place where there is no risk of damage by mechanical means (falling down) or chemicals (strong detergents). The warranty is void for devices showing any of the above-described damages. Do not use other battery packs as those specially made for the SonoCollect 210. Only battery packs with a 3-header connector may be used with the SonoCollect 210. The 2-header connector battery packs of the predecessor device may not be used. The first time you connect a SonoCollect 210/211 to a specific PC, this PC should be connected to the internet. The automatic USB driver installation for the SonoCollect 210/211 is searching the internet for the latest driver available and installs it accordingly.
Lithium Battery Safety Information	The lithium battery pack, which comes with the SonoCollect 210/211, is, according to the battery cell manufacturer, intrinsically safe, that is even	 Do not throw the battery pack into fire! Respect the operating temperature range of the battery pack (-20°C to +70°C)!



in case of an short-circuit the lithium battery cells will not cause a fire, explose or overheat above 150°C. Nevertheless, the following safety information must be respected at all times:

- No short-circuiting of the battery pack or • single cells!
- Do not connect the battery pack with inverted polarity! A description on the printed circuit board and the enclosed short manual are showing the correct polarity.
- Do not recharge the battery pack! •

- Very low ($< -5^{\circ}$ C) and very high (> +40°C) temperatures have a heavy negative impact on the battery lifetime!
- Do not ever heat the battery pack above . +99°C!
- Do not damage the battery cells! •
- Do not solder or weld on the battery cell • housing!
- Do not take the battery pack apart! Do not ٠ replace single battery cells of the battery pack!

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Items Supplied and Packaging Please ensure that the package contents are complete. These are as follows:

- 1 SonoCollect 210/211
- 1 USB cable
- 1 Short manual
- 1 CD with USB driver, reading software and documentation

The packaging can be reused or recycled. Please dispose properly of any packaging material no longer required. If you notice any transport damage during unpacking, please contact your supplier immediately.



To avoid risk of suffocation, keep packaging film away from children!

Operating Principle

The SonoCollect 210/211 is a radio receiver for M-Bus Mode T1, T2 and C1 consumption meters (electricity, gas, water and heat). The received radio telegrams of the consumption meters are stored into an internal, non-volatile memory which is capable of holding more than 58.000 telegrams. At predefined points of time the radio telegram data are transmitted over an internet connection established by the GSM / UMTS modem to a FTP server.

Since the SonoCollect 210 is getting all its operating power only from the lithium battery pack, it is not possible to enable the radio receiver permanently. Therefore, the user configures the SonoCollect 210 to enable the radio reception in fixed intervals of time for a certain duration. The radio telegrams received during this time are stored internally. For each consumption meter only the first received radio telegram at each reception is stored. Additionally received radio telegrams of one meter at one reception are discarded.



Also at configurable points of time the stored radio telegrams, which have not already been transmitted, are sent to the FTP server.



The maximum life time of the battery pack depends especially on these three parameters: frequency of the radio reception (e.g. once per hour, every 6 hours etc.), duration of the radio reception (e.g. 45 seconds, 90 seconds etc.) and the number of FTP data uploads per month (e.g. once per day, every 7 days etc.).

The frequency of the radio reception gives the timely resolution of the consumption values.

The duration of the radio reception should be adapted to the radio emission interval of the radio consumption meters. In general it is advised to use a 3.5 times longer radio reception interval than the radio emission interval to have an adequate security margin (example: radio consumption meters are sending every 8 seconds \rightarrow SonoCollect 210/211 radio reception duration > 40 seconds).

It is also possible to predefine a list of radio meters to receive. In this case the radio reception is shut down when all radio meters of that list are received which saves battery energy. This option is especially recommended if the number of radio meters to receive is low (e.g. less than 40 radio meters) and if there are a lot of other radio meters receivable. In this case only the demanded radio meters are stored (saves memory place) and the radio reception is shut down as soon as the last radio meter has been received (saves battery energy).

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Lifetime of the Lithium Battery Pack

As described in the previous chapter the lifetime of the lithium battery pack depends heavily on the configuration of the radio reception (interval and duration) and the frequency of the FTP data upload. Another parameter, which must also be taken into account, is the number of different consumptions meters received; since the number of stored radio telegrams has an impact on the duration of the FTP data upload. The tables below are giving an estimation of the lifetime to expect from the battery pack at different configurations:

10 radio meters

(Battery lifetime in years, radio reception duration 90 seconds each)

Reception interval	1 upload / month	2 uploads / month	4 uploads / month	15 uploads / month	31 uploads / month
1 hour	3.9	3.0	2.8	2.1	1.7
2 hours	5.7	5.3	4.8	3.1	2.0
4 hours	9.8	8.8	7.4	4.0	2.4
6 hours	10.0	10.0	9.1	4.4	2.5
12 hours	10.0	10.0	10.0	5.0	2.7
24 hours	10.0	10.0	10.0	5.3	2.8

100 radio meters

(Battery lifetime in years, radio reception duration 90 seconds each)

Reception interval	1 upload / month	2 uploads / month	4 uploads / month	15 uploads / month	31 uploads / month
1 hour	2.9	2.7	2.3	1.3	0.8
2 hours	5.1	4.5	3.6	1.7	0.9 a
4 hours	8.2	6.6	4.8	1.9	1.0 a
6 hours	10.0	7.9	5.4	2.0	1.0 a
12 hours	10.0	10.0	6.3	2.1	1.1 a
24 hours	10.0	10.0	6.8	2.2	1.1 a

Please note that the given battery lifetimes are estimated values and may not reflect the lifetime under specific operating conditions. Especially the following parameters have a heavy impact on the battery lifetime:

- Temperatures below -5°C or above +40°C diminish the battery lifetime.
- The quality of the GSM / UMTS network and whether a fast UMTS or only a slow GSM network is available determines the necessary time for a data upload. The longer the data upload takes the lower the battery lifetime.

It is pointed out here also that the variation in battery lifetime may be factor 4 or more under very bad conditions (bad GSM / UMTS network, low / high temperatures, etc.). This means the battery lifetime may be only 25% of the estimated battery lifetimes shown above.

Remaining Battery Capacity stored in the Battery Pack

The battery pack of the SonoCollect 210/211 contains a memory device where the calculated remaining battery capacity is stored. Therefore, it is possible to disconnect the battery pack from the SonoCollect 210/211 but still having the information about the remaining battery capacity. Since the remaining battery capacity of lithium batteries may not be measured but only estimated using specific algorithms, this calculated remaining battery capacity might under certain conditions not be 100% exact.

Operating Guide

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Additional Components

SIM Card

For using the SonoCollect 210/211 a SIM card of a GSM / UMTS mobile network provider is necessary. It is to verify that the radio network of the respective provider is available at the point of installation and that the signal strength of the network is sufficiently high. As a rule of thumb a signal strength of more than -100 dBm (or 35%) shown by the SonoReCon configuration software is necessary to have reliable data upload conditions. The SonoReCon configuration software has got a tool to measure the signal strength. Please consult the software manual for further information.

Additionally, the following parameters of the SIM card must be known, so that the SonoCollect 210/211 can be configured correctly:

- PIN of the SIM card
- APN of the GPRS network of the mobile network provider (access point name)
- User name and password for the APN of the mobile network (if necessary)

The SonoReCon configuration software contains a list of worldwide used APN for most mobile network providers. If the correct APN is not found there, the respective mobile network provider must be contacted.

Cost of the Mobile Network Connection

The monthly cost of the mobile connection of the SonoCollect 210/211 depends heavily on the tariff of the used SIM card and will only be roughly treated here.

In general, a data volume dependent tariff with small data blocks (e.g. 10 kB or 100 kB) or a flat rate tariff should be selected. The SonoCollect 210/211 usually transmits between 10 kB and 250 kB per FTP data upload. Usually, the monthly data amount is between 2...5 MB, therefore, a volume dependent tariff with an inclusive volume of 5 MB or 10 MB should be the best solution in most cases.

FTP Server

The received radio telegrams of the consumption meters are transmitted by the SonoCollect 210/211 to an FTP server. Therefore, an adequate FTP server must be provided. For configuring the FTP server connection, the SonoCollect 210/211 needs the following parameters:

- FTP server name
- User name and password for the FTP server
- Directory to which the received radio telegrams are uploaded
- FTP port number (usually always 21)

Start-Up

Opening the Case

1

- 1 SIM card holder
- 2 Battery connector
- 3 USB connector (internal)
- 4 USB / power connector
- (external, optional)5 Green LED -> external power supply connected
- Amber LED -> USB connected Green LED -> GSM / UMTS
- modem switched on LED on -> GSM / UMTS modem trying to attach to network Amber LED flashing -> GSM / UMTS modem attached to
- network 7 Red LED on -> device is starting-up Red LED flashing -> radio meter reception is on, one flash per received radio teleoram
- 8 GSM / UMTS antenna (internal)
- 9 Wireless M-Bus antenna (internal)

2

- 1 External USB or mains power connector (option)
- 2 External Wireless M-Bus or GSM / UMTS SMA antenna connector (option)

To start-up, the device the case must be opened by unlocking the four case screws on the backside of the device and by dividing the two case parts apart. Please be aware that only trained personnel may open and operate the SonoCollect 210/211.



Do not touch any parts of the device at the

By closing, the device case please be aware that

that the screws should be fastened carefully with

the screws should at first only be loosely and

crosswise screwed to not twist the case. After

low torque.

interior of the case except the SIM card holder,

the USB connector and the battery connector.

The protection rating IP67 of the case is only valid if the screws are fastened correctly. It is also important to not damage the screws by using a too high torque or by using inadequate tools.



The battery cable should not be squeezed between the two case parts.

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Insertion of the SIM Card

The SIM card is inserted as shown on the pictures beneath:



The SIM card should be inserted gently without using force. Please be sure that the card holder lid is correctly locked by pushing it until it snaps in (as indicated on the right most picture above).

Power Supply Connection

If the SonoCollect 210/211 device is equipped with, an external USB or mains power supply connector and you also have the mains power supply wall plug for the SonoCollect 210/211 you have to connect it as shown in the picture.

Please note the connector indicators on plug and connector. Do not use force to connect the power supply but turn the connector gently until it slips in. You may then use the fitting screw to fasten the connector in place. Here again, screw it on gently without using force.

It is only possible to connect either the external power supply or the external USB cable for configuring the device without opening the case.



Do not use any other power supply than the SonoCollect 210/211 wall-plug power supply.

External Antenna Connection

If the SonoCollect 210/211 device is equipped with an external antenna connectors, for either a Wireless M-Bus antenna or a GSM / UMTS antenna or both you have to screw on the respective antenna or antenna cable gently on the respective SMA type connector. The connectors are marked with GSM / UMTS or wM-Bus. Do not use force to screw on the antennas. If you are using a tool, be sure to tighten the screws only a little.



Battery Pack Connection The cable of the battery pack is connected as shown in the picture below.

Do not invert the polarity of the connector (see picture and description on the printed circuit board).

For configuring the SonoCollect 210/211, it is not necessary to connect the battery pack, since it is also supplied by the USB interface.





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USB Connection

For configuring the SonoCollect 210/211, the device must be connected to the USB port of a Windows PC or notebook. The accompanying USB cable can be used for the internal USB connector.

If the SonoCollect 210/211 device is equipped with an external USB or mains power, supply connector and you have also got the external SonoCollect 210/211 USB cable you can connect the USB interface using the external connector.

Please note the indicators on plug and connector. Do not use force to connect the power supply but turn the connector gently until it slips in. You may then use the fitting screw to fasten the connector in place. Here again, screw it on gently without using force.

It is only possible to connect either the external power supply or the external USB cable for configuring the device without opening the case.

Please note that you may only connect the internal or the external USB interface. Connecting both USB interfaces (internal and external) at the same time may damage your PC/notebook.

The first time you are connecting a SonoCollect 210/211 device to your PC / notebook it is necessary to install the appropriate USB driver (if it is not already present on your PC / notebook). For this procedure, an internet connection is necessary.



Additional information referring to the configuration software and the installation of the USB driver can be found in the SonoReCon software manual.

Installation

Usually, the SonoCollect 210/211 is at the beginning configured using its USB interface. That is, all relevant configuration parameters like SIM card parameters, FTP server and radio reception parameters are set. Additionally, the SIM card is inserted.

After that the SonoCollect 210/211 is transported to the point of installation; without battery pack connected. On site, the battery is connected and the case is closed.

By closing, the device case please be aware that the screws should at first only be loosely and crosswise screwed to not twist the case. After that the screws should be tightened carefully with low torque. The protection rating IP67 of the case is only valid if the screws are tightened correctly.

It is also important to not damage the screws by using a too high torque or by using inadequate tools.

The battery cable should not be squeezed between the two case parts.

For best radio reception, the SonoCollect 210/211 should be placed as close as possible to the resource meters to receive. There should not be any conducting or metal device at 5 cm (even better 10 cm) around the SonoCollect 210/211.

This may disturb the radio reception. The SonoCollect 210/211 should not be placed close to devices causing electromagnetic interference, like radios, television sets, audio equipment, cell phones etc.

The SonoCollect 210/211 is fixed to a plane wall using its case screw holes.



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Replacement of the Battery Pack	To replace the battery pack the SonoCollect 210 must be dismounted from the wall. Afterwards, the case is to be opened and the battery connector must be pulled off. The battery pack, including the lower case part, the tightening and the case screws are replaced completely. Only the upper case part with the printed circuit board is not replaced.	The complete lower case part including the battery pack is then sent in to the distributor for recycling. For the transport of the battery pack, the shipping package must be provided with a Lithium battery warning sticker. The complete amount of lithium of the battery pack is below 20 g.
Troubleshooting	 Should the SonoCollect 210/211 not work as described in this document, please check the list of possible error causes below for a solution: While connecting the SonoCollect 210/211 to a PC, the operating system shows a warning message of an unknown USB device. Apparently, the USB driver of the device is not installed. Please be sure that your PC / notebook is connected to the internet so it is possible to automatically install or update the respective USB device driver. Please make also sure that you have got all necessary rights on the operating system to install or update USB device drivers. While connecting the external power supply to the SonoCollect 210/211 the green LED indicating mains power supply is not on. Please check the wall-plug for being correctly inserted and for having the correct voltage. Check if you have correctly inserted the connector. 	 While connecting the USB interface (external or internal) the yellow LED indicating USB power supply is not on and there is no USB connection. Please check that the USB connector of your PC / notebook is enabled. The SonoCollect 210/211 is not uploading files to the FTP server Check if your upload parameters are correct. Check if you have got enough GSM / UMTS signal strength at the place of installation (better than -100 dBm or 35%). Use the appropriate function of the SonoReCon configuration software. Check the upload protocol in the SonoReCon software to verify at which point the upload has terminated. Check if the SIM card is configured for data connections, if the SIM card has still got enough available data volume, if the SIM card PIN is not blocked (use a cell phone), if a GSM / UMTS network is available.
Care and Maintenance	 Clean the SonoCollect 210/211 only if the case is closed (water tight). Clean the device only with a soft cloth, moistened with mild soapy water. Never use strong detergents or hard brushes. Disconnect the battery pack if you plan to not use the SonoCollect 210/211 for a longer period of time. 	
Disposal	The SonoCollect 210/211 must not be disposed together with the domestic waste. All users are obliged to hand in all electrical or electronic devices, regardless of whether or not they contain toxic substances, to ensure a disposal in environmentally acceptable manner.	

Therefore, return the device at the end of its lifetime to the manufacturer.

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Specifications

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General			
Name	SonoCollect 210/211		
Application	Radio receiver with data concentrator and GSM / UMTS modem		
Installation	Non-weather protected indoor or outdoor installations (temperate climate)		
Wireless M-Bus receiver / t	ransmitter		
Radio operation modes	T1, T2, C1 according to EN13757-4		
Receiving frequency	868.95 MHz		
Receiver band width	200 kHz		
Receiving range	Depending on environment up to 400 m (outdoor) or up to 30 m (indoor)		
Transmission frequency	868.30 MHz		
Options	Internal standard antenna Internal high-performance antenna (hp) External standard antenna (ext) External high-performance antenna (hp ext)		
GSM modem			
GSM operation modes	GPRS, EDGE, UMTS / HSPA+ quad band GPRS quad band EDGE penta band UMTS / HSPA+		
Data transmission	FTP		
Options	Internal GSM antenna External GSM Antenna (gsm) Antenna diversity (gsm2) (Usage of two GSM antennas for better reception in difficult installation conditions)		
Data logger			
Memory	16 MB FLASH (> 58.000 radio telegrams)		
Configuration	Radio reception configurable from 1 minute to 24 hours 3 different configuration profiles Different configuration for mains power supply and battery power supply		
Filters	Telegram address (1000 addresses max.) Manufacturer code in telegram Device type code in telegram		
Other			
Configuration	USB 2.0 full speed internal interface or USB 2.0 full speed external interface (option con) Remote configuration Remote firmware update		
Power supply	Lithium battery pack (SonoCollect 210: with memory to memorize remaining capacity) or Mains (SonoCollect 211: option con + wall-plug, batteries in stand-by)		
Operating conditions	-20 °C to +60 °C 10 % to 95 % humidity		
Storage conditions	-30°C to +70 °C		
Protection rating	IP67 or IP65 according to option		
Dimensions	195 x 130 x 170 mm (approximately)		
Weight	850 g (approximately)		
Approvals			
Directives / norms	RED Directive 2014/53/EU • EN 300 220-2 V3.1.1 • EN 300 328 V2.1.1 • EN 301 489-1 V2.1.1 • EN 301 489-3 V2.1.1 • EN 301 489-3 V2.1.1 ROHS Directive 2011/65/EU • EN 50581:2013-02		
Test laboratory	Bureau Veritas Consumer Products Services Germany GmbH European Compliance Laboratory (ECL) Thurn-und-Taxis-Straße 18 D-90411 Nürnberg Germany		



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