



# SIN.EQPR01X – SIN.EQPR02X

## OMS radio temperature sensor and OMS humidity and temperature sensor

### User Guide

Rev 1.0

# INDICE

1. SUMMARY .....	3
2. SCOPE OF DELIVERY .....	4
3. MONTAGE.....	5
3.1. Where to install .....	5
3.2. Characteristics .....	5
3.3. Open casing .....	5
3.4. Mounting plate .....	6
3.5. Circuit board .....	6
3.5.1. Remove the Circuit board.....	6
3.5.2. Configuration .....	6
3.5.3. Insert batteries .....	7
3.5.4. PCB mounting .....	7
3.6. Front Cover .....	7
4. CONFIGURATION .....	8
5. TELEGRAM DESCRIPTION .....	9
5.1. OMS radio temperature sensor .....	9
5.2. OMS humidity and temperature sensor .....	10
6. Error Flags .....	12
6.1. „Tamper“-Bit.....	12
6.2. „Battery low“-Bit.....	12
7. Options .....	13



# 1. SUMMARY

---

The SINAPSI radio temperature sensor SIN.EQPR01X/humidity and temperature sensor SIN.EQPR02X can be integrated into an existing wireless M-Bus OMS network and provides reliable temperature/humidity and temperature measurement data. The room temperature can be monitored wirelessly at any time. A further advantage of the temperature sensor is its easy assembly. The configuration can be done at the factory or local via dip switches. The battery life is up to 12 years for the temperature sensor and up to 10 years for the humidity and temperature sensor. The 2 AA batteries are easily replaceable and have a reverse polarity protection. With an optional sabotage contact the device can detect the release of the cover from the mounting plate and sends an alarm via radio to the receiver.



## 2. SCOPE OF DELIVERY

---

Equipment supplied:

- OMS radio temperature sensor/OMS humidity and temperature sensor with casing and mounting plate
- 2 AA-size alkaline batteries
- Mounting set consisting of 2 dowels (5mm) and 2 screws (3 x 30mm)
- Mounting instruction



## 3. MONTAGE

---

### 3.1. Where to install

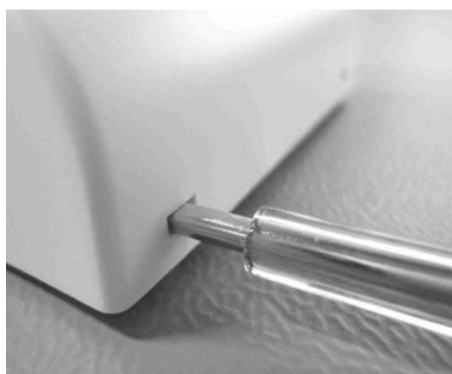
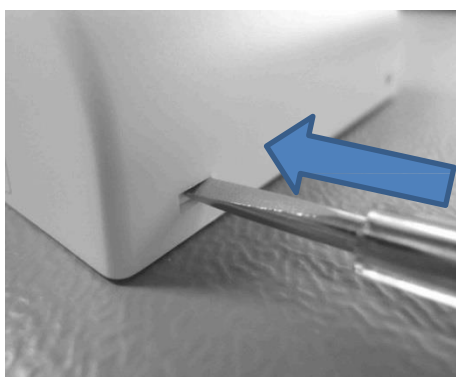
The OMS radio temperature sensor/humidity and temperature sensor should not be exposed to direct sunlight. Furthermore the sensor should not be mounted on an outside wall, near to an outer door or at a distance of less than 1 m to a heater. The distance from the floor should be at least 1,5m.

### 3.2. Characteristics

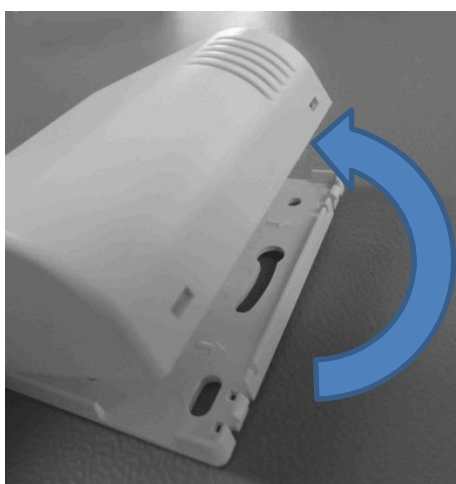
This device is designed for wall mounting.

### 3.3. Open casing

Before the casing is ready for wall mounting it has to be opened. The locks at the bottom of the casing must be released one after another. For that a slotted screwdriver is put into the upper part of the opening.



Repeat this process at the second lock. After that the front cover can be lifted from the mounting plate.



### 3.4. Mounting plate

The mounting plate is marked with UP and DOWN for the correct orientation. It can now be mounted on the wall with the help of the supplied dowels and screws.



The screw head may not extend beyond the edge of the mounting plate, otherwise the electronics can be damaged when closing the housing!

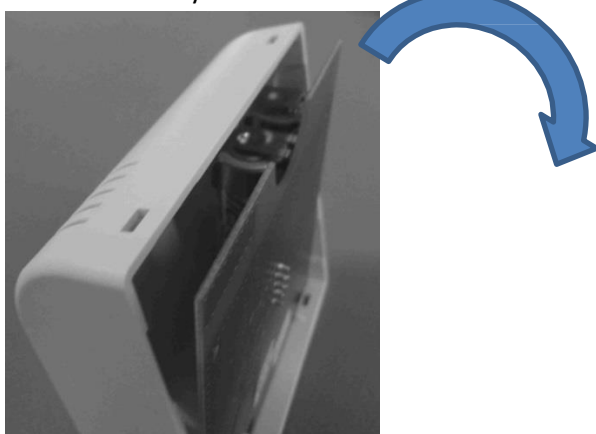


The long holes arranged in a circle at a distance of 60mm can be used for easy mounting on a flush-mounting or wall mount box.

### 3.5. Circuit board

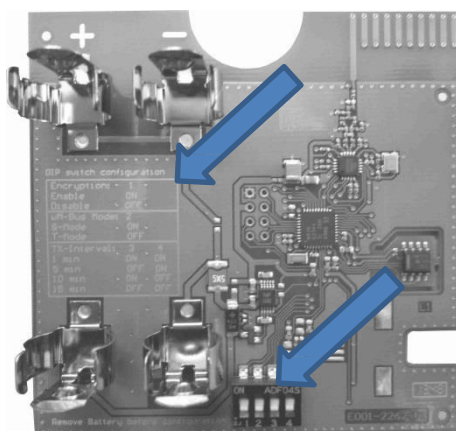
#### 3.5.1. Remove the Circuit board

Now the printed circuit board is tilted out of the front cover by pulling at the edge of the semicircular cavity.



#### 3.5.2. Configuration

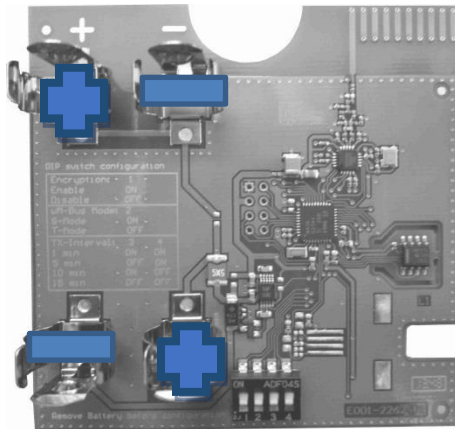
On the assembly side the desired operating parameters can be set by using the DIP switch. Information to the switch is located on the circuit board. If there is no DIP switch equipped, all parameters are programmed and cannot be configured subsequently. For further information about the configuration and the non-modifiable options of the device please have a look at the Chapters configuration and options.



Encryption	1	
Enable	ON	
Disable	OFF	
wM-Bus Mode	2	
S-Mode	ON	
T-Mode	OFF	
TX Interval	3	4
1 min	ON	ON
5 min	OFF	ON
10 min	ON	OFF
15 min	OFF	OFF

### 3.5.3. Insert batteries

Now the batteries will be inserted. Therefore it is important to secure the correct polarity. Here standard AA cells with a voltage of 1.5 V are used.



### 3.5.4. PCB mounting



Thereafter the circuit board with the batteries ahead is placed back into the front cover. Attention on the orientation! On the circuit board and on the label of the Front cover it is marked with arrows up.

### 3.6. Front Cover

As a last step, the front cover together with the electronics is clipped on the mounting plate. For that the front Cover is hinged to the upper edge of the mounting plate and then pressed firmly.



If the OMS radio temperature sensor/ humidity and temperature sensor is equipped with a sabotage contact only two transmission cycles should elapse between the inserting of the batteries and the complete installation. Otherwise a permanent error in the telegram is transmitted.

## 4. CONFIGURATION

---

The configuration of the OMS in house radio temperature sensor/humidity and temperature sensors can be done via DIP switch or preset at the factory. If the sensor is ordered with a fixed configuration (see chapter options), the DIP switch is not equipped or has no function. Otherwise the functions are shown in a table below the battery at the PCB (between the battery holders). Before changing a configuration, the batteries should be removed. Then the configuration can be customized via the DIP switches. After that the batteries can be inserted again. The changes are applied with transmission of the next telegram or with the restart of the sensor.



Between taking out the batteries and re-insert should be at least 30 seconds to secure that the device has done a reboot safely.



## 5. TELEGRAM DESCRIPTION

### 5.1. OMS radio temperature sensor

The telegram has a specific basic structure (without checksum):

Field	Description	Value
L-Field	Length of telegram: 30 Byte	1Eh
C-Field	Type of telegram: SND_NR	44h
M-Field	Manufacturer ID: SIN = SINAPSI Srl	80h
M-Field	„SIN“ is identical with the part „Manufacturer ID“ of the serial number at the equipment indicator.	5Ch
A-Field	Serial number:	11h
A-Field	ID = e.g. 08154711	47h
A-Field	Identical with the part „Fabrication Number“ of the serial number at the equipment indicator.	15h
A-Field		08h
A-Field	Version: 1; Identical with the part „Fabrication Block“ of the serial number at the equipment indicator.	01h
A-Field	Type of device: Room sensor	1Bh
Ci-Field	Control field: „Response from Device“	7Ah
AccNo	Access number: e.g. 65. Is increased by 1 at each transmission with updated data	41h
Status	Status field: Normally 0. If recognizing sabotage the bit is set for a temporary error. Should the sabotage not be resolved within 2 transmissions the „Permanent error“ bit is set. In case of „battery empty“ the „LowPower“ and the „Permanent error“ bit are set.	00h
Config.Word	Configuration field: NNNNCCHb If encryption is deactivated then 00h, otherwise the number of encrypted blocks (e.g. 1 block = 10h).	00h
Config.Word	Configuration field: BAS0MMMMb If encryption is deactivated then 00h, otherwise encryption mode 5 (05h). If potential for synchronous release the S bit is set additionally.	00h
AES Ver.	AES verification	2Fh
AES Ver.	AES verification	2Fh
DR1	DIF: 0Ah = 4 Digit BCD coded	0Ah
DR1	VIF: 66h = temperature * 10 <sup>-1</sup> °C	66h
DR1	Value: e.g. 23,7°C	37h
DR1		02h
DR2	DIF: 02h = 16bit Integer / Binary	02h
DR2	VIF: FDh = Second extension table	FDh
DR2	VIFE0: 97h = Error Flags	97h
DR2	VIFE1: 1Dh = Standard Conform	1Dh
DR2	Normally 0000h. If recognizing a sabotage the „Tamper“ bit is set. In case „battery empty“ the „Battery low“ bit is set.	00h
DR2		00h

Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh



The telegram can be adapted to customers' requirements e.g. with an additional temperature profile. Changes in the telegram can lead to modified telegram lengths and to a different number of encrypted blocks.

## 5.2. OMS humidity and temperature sensor

The telegram has a specific basic structure (without checksum):

Field	Description	Value
L-Field	Length of telegram 46 Byte	2Eh
C-Field	Type of telegram: SND_NR	44h
M-Field	Manufacturer-ID: SIN = SINAPSI Srl	B0h
M-Field	„SIN“ is identical with the part „Manufacturer ID“ of the serial number at the equipment indicator.	5Ch
A-Field	Serial number:	11h
A-Field	ID = e.g. 08154711	47h
A-Field	Identical with the part „Fabrication Number“ of the serial number at the equipment indicator.	15h
A-Field		08h
A-Field	Version: 2; Identical with the part „Fabrication Block“ of the serial number at the equipment indicator.	02h
A-Field	Type of device: Room sensor	1Bh
Ci-Field	Control field: „Response from Device“	7Ah
AccNo	Access number: e.g. 65. Is increased by 1 at each transmission with updated data.	41h
Status	Status field: Normally 0. If recognizing sabotage the bit is set for a temporary error. Should the sabotage not be resolved within 2 transmissions the „Permanent error“ bit is set. In case of „battery empty“ the „LowPower“ and the „Permanent error“ bit are set.	00h
Config.Word	Configuration field: NNNNCCHb If encryption is deactivated then 00h, otherwise the number of encrypted blocks (e.g. 1 block = 10h).	00h
Config.Word	Configuration field: BAS0MMMMb If encryption is deactivated then 00h, otherwise encryption mode 5 (05h). If potential for synchronous release the S bit is set additionally.	00h
AES Ver.	AES verification	2Fh
AES Ver.	AES verification	2Fh
DR1	DIF: 0Ah = 4 Digit BCD coded	0Ah
DR1	VIF: 66h = temperature * 10 <sup>-1</sup> °C	66h
DR1	Value: e.g. 23,7°C	37h
DR1		02h
DR2	DIF: 0Ah = 4 Digit BCD coded	0Ah



DR2	VIF: FBh = First extension table	FBh
DR2	VIFE: 1Ah = relative humidity * 10 <sup>(-1)</sup> %	1Ah
DR2	Value: e.g. 37,8%	78h
DR2		03h
DR3	DIF: 02h = 16Bit Integer / Binary	02h
DR3	VIF: FDh = Second extension table	FDh
DR3	VIFE0: 97h = Error Flags	97h
DR3	VIFE1: 1Dh = Standard Conform	1Dh
DR3	Normally 0000h. If recognizing a sabotage the „Tamper“ bit is set. In case „battery empty“ the „Battery low“ bit is set.	00h
DR3		00h
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh
Fill	Fill byte	2Fh



## 6. Error Flags

---

### 6.1. „Tamper“-Bit

When the device starts, after inserting the batteries and the housing is closed within two transmission periods, the „tamper“-bit, which displays manipulation, remains reset. When the housing is opened, the device immediately sends a telegram in which the „tamper“-bit is set in the error flag field. With further transmissions, this bit remains set. To delete the error bit, the batteries must be removed. The device should be left lying without batteries for 5 minutes, to discharge the capacity of the circuit board completely. After that, the device can be installed again, as described in chapter 3.

### 6.2. „Battery low“-Bit

When the booster, permanently installed on the device, detects a low battery, the „battery low“-bit is set in the error flag field of the telegram. This error bit can only be reset with a restart of the device. To delete the error bit, the batteries have to be removed. The device should be left lying without batteries for 5 minutes, to discharge the capacity of the circuit board completely. After that, the device can be installed again, as described in chapter 3.

## 7. Options

The OMS in house radio temperature sensor/humidity and temperature sensor provides a lots of configuration options. Some of these can be set via DIP switch on the circuit board. Others can only be configured during manufacturing.

Parameter	Description	DIP switch position
wM-Bus mode	As wM-Bus mode currently mode S1-m and mode T1 are implemented. Other modes available on request.	2
Transmission interval	The transmission interval can be configured in 2-second pulses from 2 – 65534. A pre-selection (60s; 300s; 600s; 900s) is available via the DIP switches.	3 / 4
Address	The address of SINAPSI elektronik products always contains the manufacturer „SIN“, an ongoing serial number, version 1 and the type of device 1Bh (Room sensor).	
AES enable	Encryption function. Is available via DIP switch.	1
AES key	The AES key is deposited via Flash during manufacturing. Std. key is 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F.	
Sync.	Synchronized transmission of telegrams.	
Tamper	Sabotage contact. The response to the tamper switch can be enabled or disabled. The device can be delivered with or without equipped sabotage contact.	
Config	Configuration. The configuration option via DIP switch can be enabled or disabled. The device can be delivered with or without equipped sabotage contact.	
Supply	The device can be supplied with 2x 1,5V AA cells or a 3,6V AA lithium cell. For the 3,6V lithium cell there is only 1 battery holder equipped.	

The configuration of the parameters which are not registered in the column „DIP switch position“, can only be done at the factory during manufacturing. For that the desired variations has to be communicated in the order.

If the DIP switch is not equipped or the configuration options via the Config parameter are disabled, all parameters are set at the manufacturing process.