

Operating Instructions Wireless Transmitter STC-Ethernet

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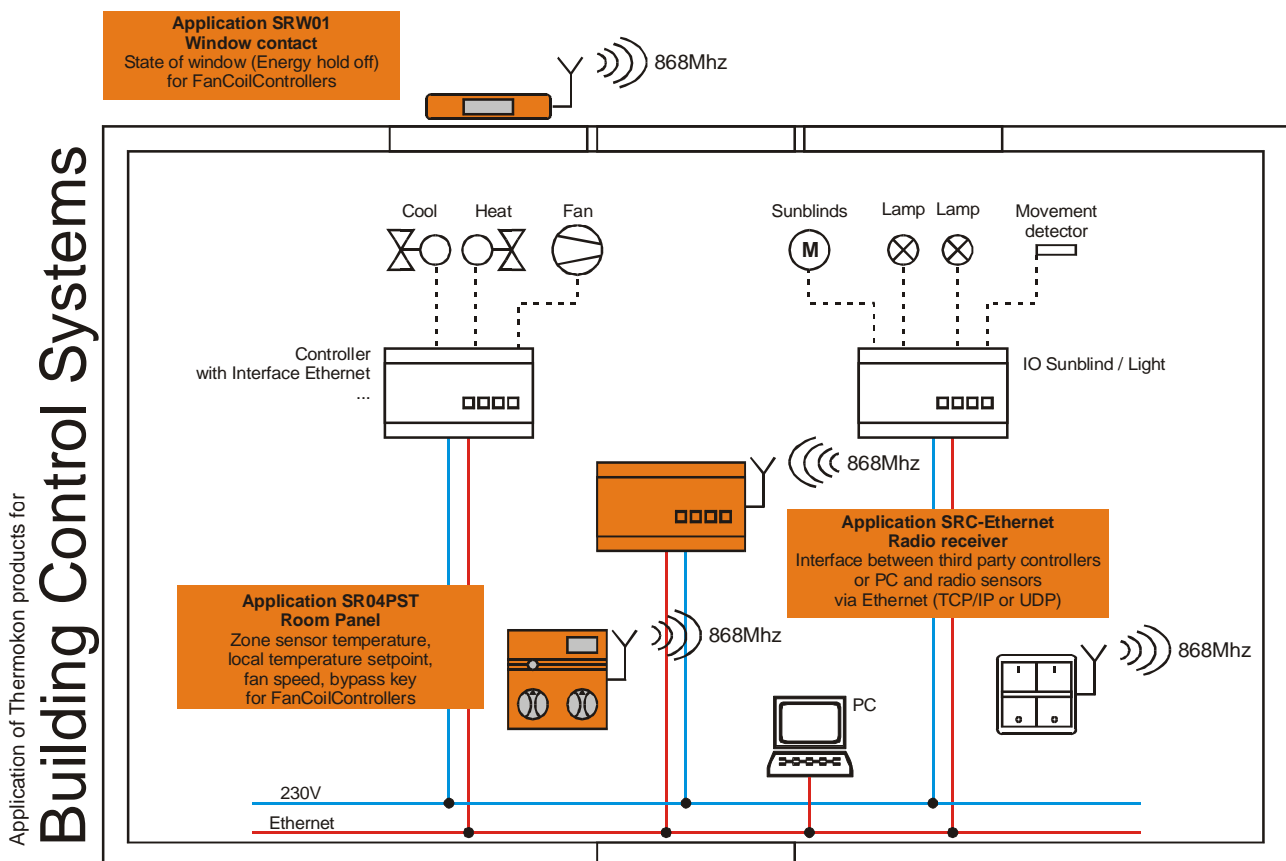
1 Introduction

1.1 Product Overview

The STC-Ethernet wireless receiver is designed for receiving and processing telegrams of Thermokon radio sensors belonging to the EasySens family as well as other devices, transferring measuring values based on the EnOcean standard. By means of this component it is possible to evaluate radio sensors by a PC or by an Ethernet capable controller via the Ethernet (see picture 1). The protocols TCP or UDP can be used.

A CD with the configuration software is supplied along with the device. The software provided enables the configuration of the IP-addresses, the learning-in of sensors to the receiver and diagnosis possibilities of the learned-in sensors.

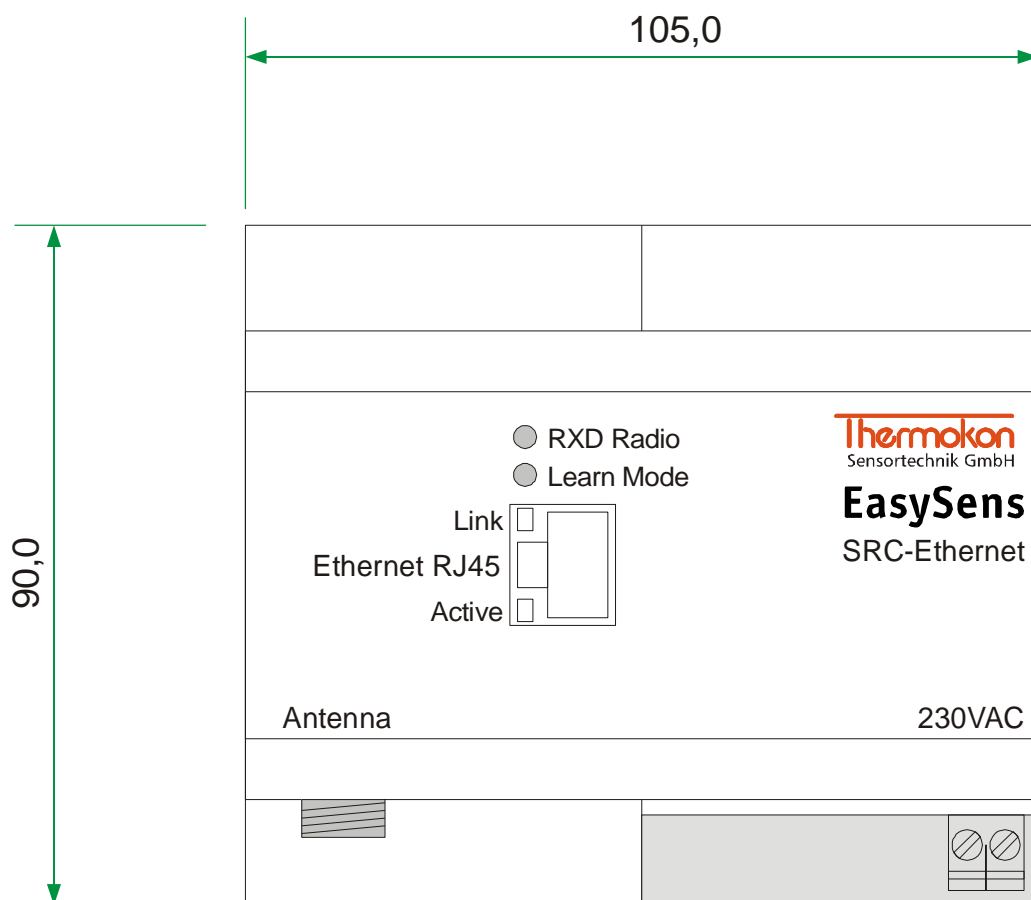
For the operation of the receiver, an additional external 868 MHz antenna with a FME-female connection is necessary. This antenna can be ordered separately as an accessory with different connection lengths (2,5m/10m/20m).



Picture 1-1: Schematic layout

1.2 Product Specification

Product:	Receiver for up to 30 radio sensor based on the EnOcean standard
Standard:	10/100 Base-T Ethernet (Auto detection)
Protocol:	TCP, UDP, IP, ARP, ICMP, Ethernet MAC
Power Supply:	230V AC 50/60Hz
Typical transmitting range:	30m in buildings with antenna
CE-conformity:	89/336/EWG Electromagnetical compatibility 73/23/EWG Low-voltage directive
EMV:	EN60730-1 (2000) Interference EN60730-1 (2000) Emitted interference
Product safety:	EN60730-1 Autom. electr. control units and controllers for domestic use and similar applications
Ambient temperature:	0...60°C
Rel. air humidity:	0...75%rH, not condensed
Store temperature:	-20...70°C



2 Installation

2.1 Hardware Installation

By means of a network cable (e.g. FTP CAT.5) the receiver can be connected to the Ethernet hub. If a point-to-point connection should be set-up, a connection by a crossover cable (e.g. FTP CAT.5e) is necessary.

Detailed information on the installation and mounting can be found in the STC-Ethernet data sheet.

2.2 Software Installation

For the installation of the wireless receiver the configuration software is needed. Therefore, the setup file "setup.exe" contained on the attached CD must be started. For the installation administrator rights are necessary. During the installation the screen instructions must be followed.

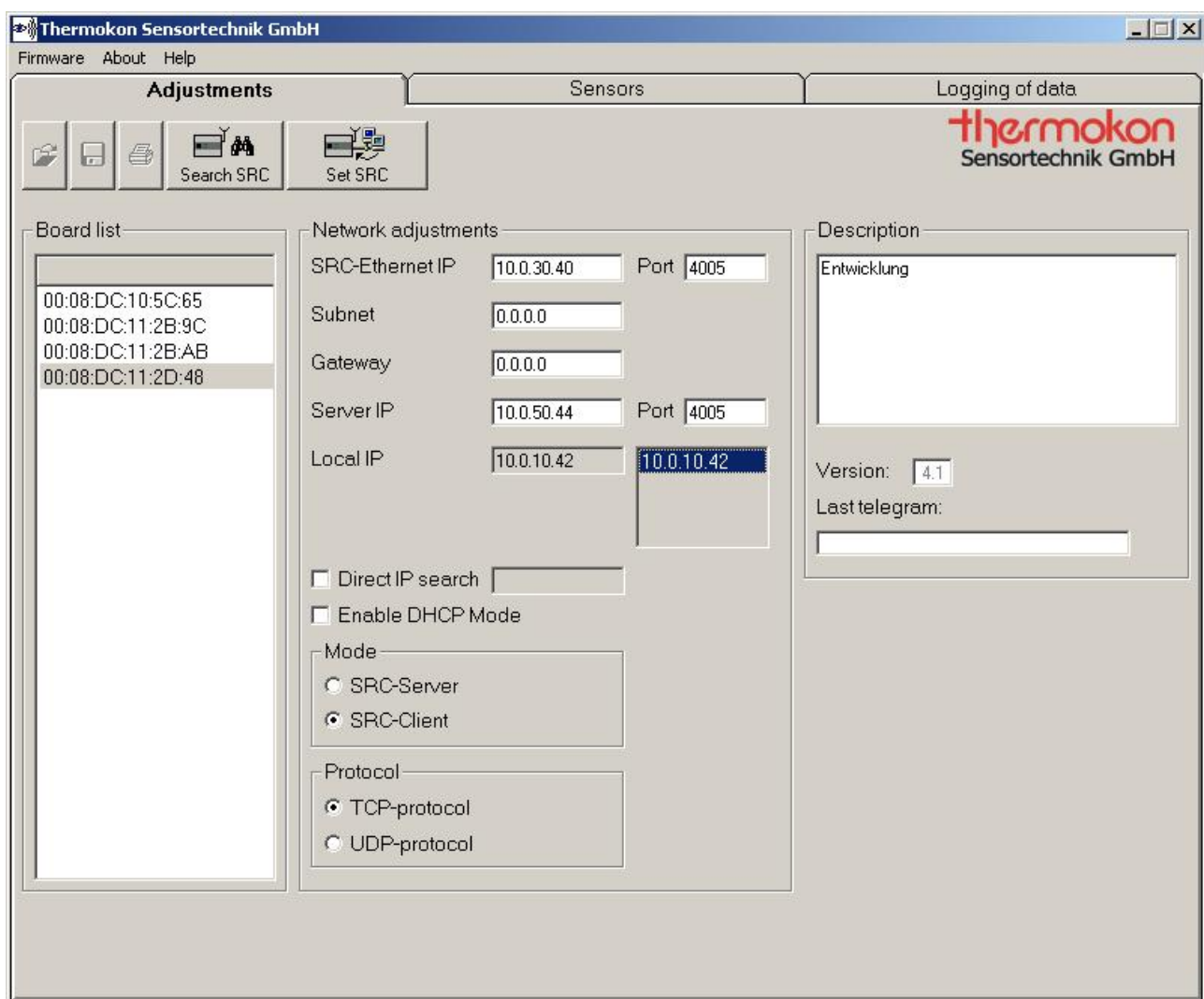
After a successful installation, the configuration software can be started via the start menu/programmes/Thermokon.

Operating systems supported: Windows9x; WindowsNT; WindowsMe; Windows2000;
 WindowsXP; WindowsServer

3 Configuration of Receiver

3.1 Software Specification

The configuration software mainly consists of three user interfaces (rider). In the first rider “adjustments” the wireless receivers currently connected to the Ethernet are displayed along with their corresponding IP-addresses. The second rider “sensors” is used for the configuration of the sensor addresses (sensor ID). In the third rider “logging of data” a simple diagnosis function is available by which sensors can be logged. Picture 3-1 shows the rider “adjustments” which is automatically activated after having started the program.





Picture 3-1: Rider "Adjustments"


3.2 General Notice

Opening and Saving of Different Data Formats

The configuration software produces up to three data formats.

1. For each wireless receiver a "*.dat" file is produced in the sub directory "Dat" of the configuration software. The file identification consists of "MAC_" and the MAC-address of the wireless receiver (MAC_XXXXXXXXXX.dat). In the dat-file user information on the receiver can be found.
2. The second file is an address default. By means of this default, network adjustments and sensor IDs can be stored in the rider "sensors" by means of the button  (see picture 3-1). The address default file is saved by the ending "*.adr" (name.adr). Additionally, the description of the wireless receiver as well as all sensor information including the sensor IDs are stored in the address default. The address default can be loaded by the button  (see picture 3-1). Thus, it is possible to transfer sensor IDs of one file to the radio receiver.
3. The third file is a log file (name.log). In this file with the ending "*.log" measuring values of logged sensors can be saved. Logging files can only be stored in the rider "logging of data".

Printing

By means of the button  the description of the wireless receiver and the sensor addresses to the respective channels with the ORG-bytes and the sensor information are printed in the rider "adjustments" and "sensors". In the rider "logging of data" the diagram of the screen window is printed by means of the printing button.

3.3 Menu

The menu consists of the points "Firmware", "About" and "Help".

In normal operations of the wireless receiver a new firmware is not essential. If an update of the firmware devices should become necessary, the current firmware file can be loaded to the radio receiver via the menu point "Firmware". In the menu „About“ information on the manufacturer and the products can be found. Help relating to the program can be called-off via the menu „Help“.

3.4 Adjustments

The construction of the rider "adjustments" is shown in picture 3-1. The individual functions are explained in the following chapters.

3.4.1 Automatic Search of Receiver

After having started the configuration software the program automatically scans the network for radio receivers. The result of the receivers found is shown in the "receiver list". If no receivers are displayed, the installation of the devices should be verified. The respective MAC-addresses of the radio receivers are displayed. After the browsing, the adjustments of the first device are shown as a standard. By clicking to the corresponding MAC-address in the receiver list the device is selected. The IP-adjustment of the device is displayed and can be changed. Via the button "Search SRC" the network scan for receivers is started manually.

3.4.2 Manual Scan for Receiver

In order to search a special wireless receiver with a known IP-address, the field "Direct IP search" must be activated. The requested IP can be entered and searched via the "SRC search" button.

The wireless receiver found before by means of the automatic search, are deleted from the receiver list and the wireless receiver with the requested IP address is displayed, provided it is existing in the network.

3.4.3 Network Adjustments

In the fields "SRC IP", "SRC Subnet", "Gateway", "Server IP" and "Port" the network address of the receiver can be configured.

The "SRC IP" is the network address of the wireless receiver. With connections via a router the subnet mask in the field "SRC Subnet" as well as the address of the corresponding router must be entered in the field "Gateway".

In the field „Server IP“ the target address to which the device should send the data is mentioned. In the fields "Port" the ports are entered over which the communication should be made. With a client and server connection, the ports of the receiver and the server must be identically. When having a connection via UDP, different ports must be set up. If for a later Ethernet data transfer an address should be allocated by the network server, the "DHCP Modus" must be activated. Via the option button "SRC-Client" and "SRC-Server" the required connection can be set up. By means of "UDP-Protocol" and "TCP-Protocol" the required protocol of the wireless receiver is selected.

If the configuration was changed, they must be transmitted to the device by means of the button "SRC update".

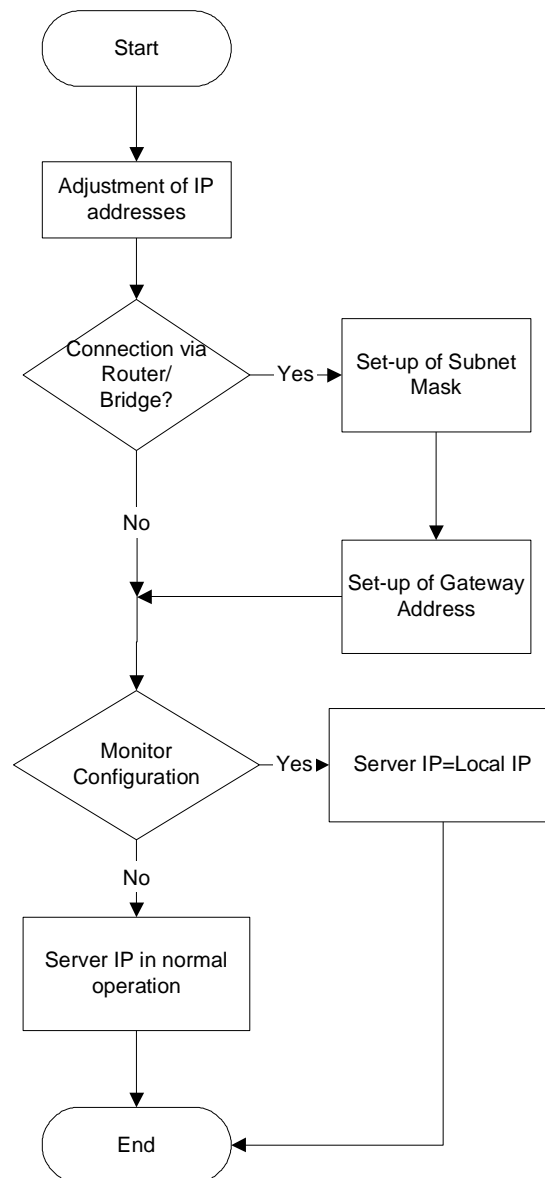
Attention: For learning-in sensors respectively for the logging of learned-in sensors, the IP-address of the local PC, on which the configuration software is installed, must be entered in the field "Server IP". Otherwise, no connection between the receiver and the configuration software can be set up. Later, this address is replaced by a target address of the Ethernet connection, to which the wireless sensor should send. The IP address of the local PC is displayed in the field "Local IP". If there are more than one network interface cards, chose the rigth one in the field next to „Local IP“.

3.4.4 Description

In this text field a description of the wireless receiver can be entered, e.g. the mounting place of the wireless receiver. The current version of the wireless receiver is displayed in the field "Version". In the field "Telegram received", the latest telegram received of the current receiver is displayed. By means of this field, it can be recognized whether the local PC has set up a connection to the wireless receiver. If the server IP is unequal to the local IP, no connection between the local PC and the receiver was set up. Thus, the field "Telegram received" remains empty. It is not possible to learn-in sensor IDs or to logg them.

3.4.5 Summary

The flow diagram in picture 3-2 shows the operating steps which must be effected for the installation of the STC-Ethernet wireless receiver. After having installed the device, the network adjustments must be configured. If the sensor IDs should be set up and monitored by the local PC, the "Server IP" must be equal to the "Local IP" of the PC. If the sensor IDs are adjusted, the requested target address to which the wireless receiver should send, is entered to the "Server IP".

**Picture 3-2: Adjustment of IP addresses**

If all adjustments are successfully transferred, the sensors can be learned-in. As soon as a telegram is displayed in the field "Telegram received" in rider "Adjustments", the communication between local PC and wireless receiver is working smoothly and the sensors can be learned-in to the wireless receiver. This is done in the rider "Sensors" (see picture 3-3).

3.5 Sensors

The STC-Ethernet can be set into a Gateway mode by making a mark at “EnOcean Gateway” and by means of “Set”. In the Gateway mode all EnOcean telegrams received are transmitted.

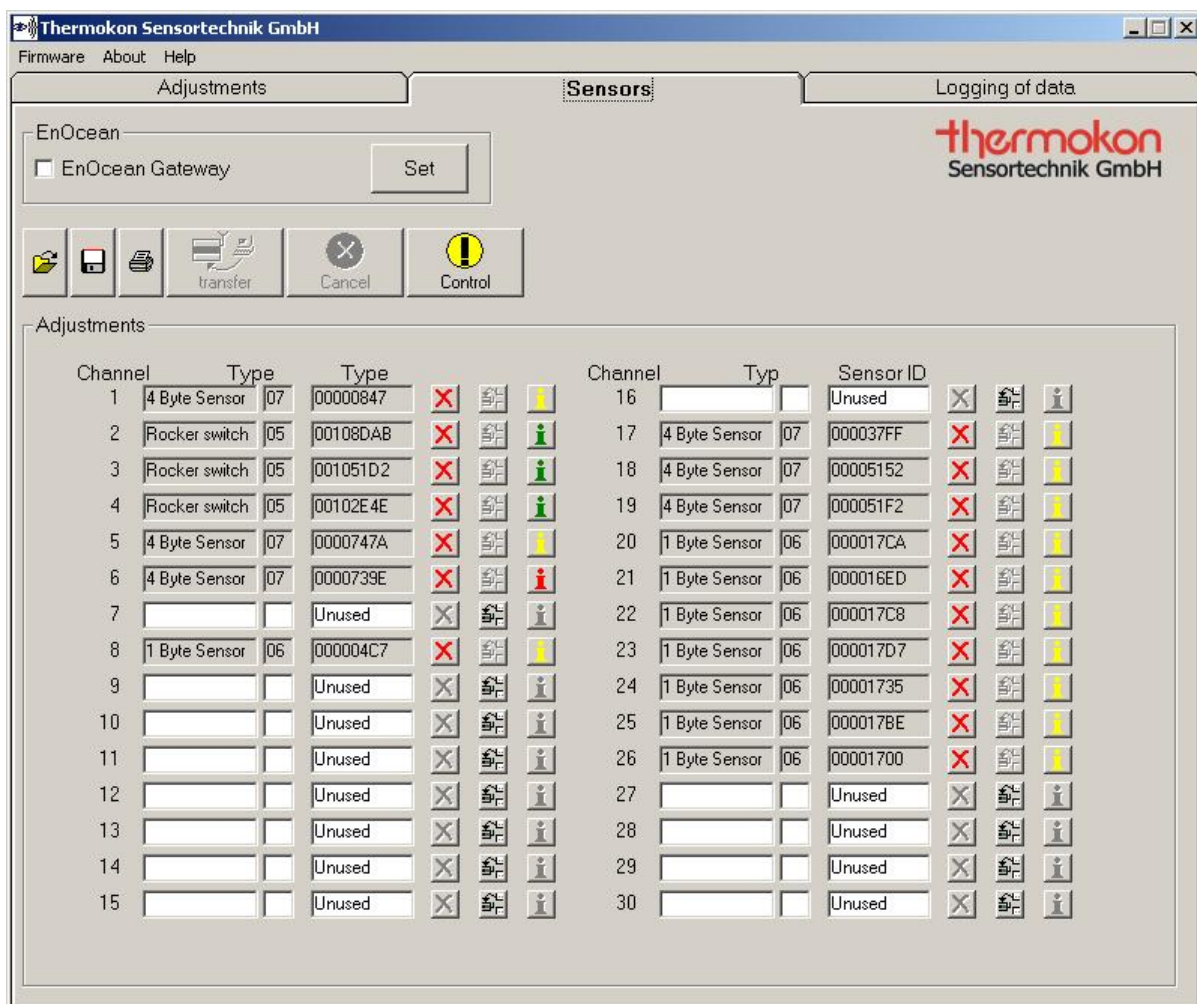
3.5.1 STC-Ethernet as Gateway

The STC-Ethernet can be operated as a Gateway. In the Gateway mode all EnOcean telegrams received are forwarded. The Gateway mode is possible for all device produced in 2007. For older devices a software version < 2.0 must be used and probably a voltage reset must be made on the device.

3.5.2 STC-Ethernet with Sensor ID Verification


The rider “Sensors” (picture 3-3) contains an overview of the 30 sensor channels of the receiver. One channel stands for a complete sensor including the different measuring values e.g. temperature, set point etc.

Channels occupied already are marked in grey. The type of sensor and the sensor ID is shown. Each sensor is clearly defined by its sensor ID and his type. The type of the sensor is displayed in the so-called ORG-Byte of the telegram.



Picture 3-3: Rider Sensors

3.5.3 Learning-in of Sensors

In total 30 sensor addresses can be saved per receiver. A sensor is learned-in via the „Learn symbol“ . The learn mode window is displayed (picture 3-4). In the window, the sensor type of the sensor that should be learned-in must be selected. At present, three types are distinguished: Rocker switch, 1 Byte Sensor and 4 Byte Sensor. For example Thermokon window contact SRW01 is a 1 Byte sensor whereas a Thermokon room operating panel SR04PST is a 4 Byte sensor.

The actual „learning-in“ of the sensor can be made in two ways: either „manually“ or by means of the „learn button“ at the sensor.

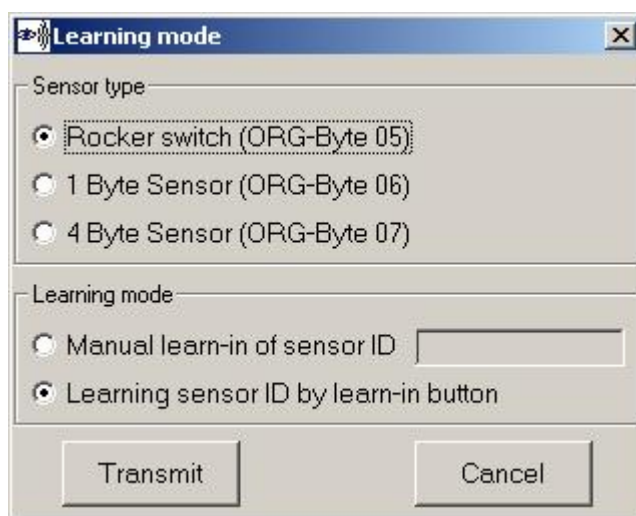
(Notice: With a radio key (e.g. Peha) a rocker of the key is actuated instead of the learn button.

3.5.3.1 Manual Learn-in of an Address

Select the sensor that should be learned-in in the learn mode window. Afterwards, mark learn-in procedure „Manual learn-in of sensor ID“ and enter the sensor ID. The sensor ID is 4 Byte long and must be mentioned in the hexadecimal format (e.g. 00005FAEh). Confirm by actuating the button „learn-in“. The sensor address is allocated to the chosen channel.


3.5.3.2 Learn-in of an Address by means of the Learn-in Button

Select the sensor type of the sensor that should be learned-in in the learn mode window. Afterwards, select the learn-in procedure „Learn-in of sensor ID via Learn-in button“ by means of the learn-in button“ and confirm by „Learn-in“. The receiver is put in the learn mode. As long as the receiver is in the learn mode, the status window is shown by a progress bar graph display and on the receiver the learn mode LED is lighting up. The receiver waits for a learn-in telegram of the sensor. Now, the learn-in button on the sensor must be actuated. With a successful receipt of a learn-in telegram, the sensor is allocated to the selected channel.




Picture 3-4: Learn mode window

3.5.3.3 Learn-in of Addresses by an Address Default


By means of an address default, it is possible to load sensor addresses stored to the configuration software. This function can be used for changing receivers without having to learn-in the allocated sensors again. By means of the button  in the rider "Sensors", address defaults are loaded. The addresses loaded are marked by white. After having

loaded an address default, all buttons are activated, except of the button  and


the button . By means of the abort button the address default loaded is warped

again. If an address default should be transferred, the button  must be actuated.


3.5.2 Set-up of an Address Default

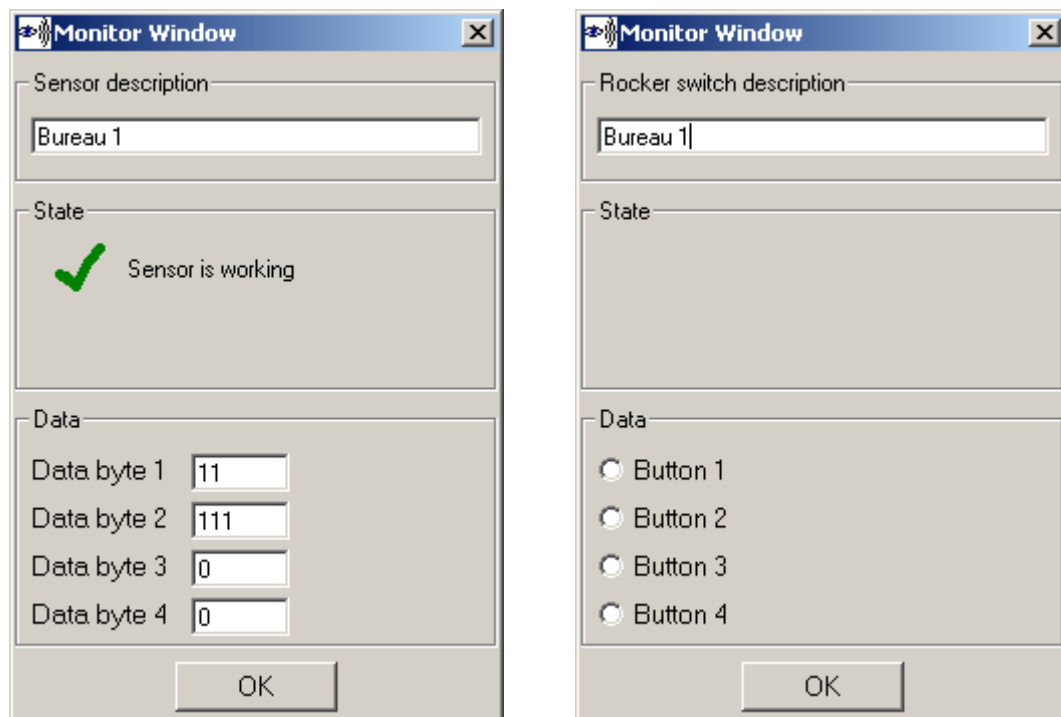
By means of the button  an address default can be stored in the riders "Adjustments" and "Sensors". The address default contains the network information of the radio receiver as well as the sensor information with the sensor IDs.

3.5.3 Clearing of Sensors

In order to clear a sensor address, it must be clicked on the "Clear button"  behind the sensor that should be deleted. If the inquiry is confirmed, the address of the sensor is erased.

3.5.4 Additional Information on Sensor

By means of the button "Info"  a monitor window is opened. Here, a description of the respective sensor can be put in, e.g. installation place or function. The information is automatically stored in the dat-file. As for a sensor, the field "status" shows whether the sensor is still sending. If the sensor is sending at this moment, but has failed from time to time, an error message occurs in the monitor window. This message can be deleted by means of the reset button. Furthermore, the data of the sensor are shown in the monitor window. With a radio module the respective button actuated is shown. The meaning respectively the occupancy of the data byte differs from manufacturer to manufacturer. Thus it is indicated in the product specified data sheets. The monitor window is shown in picture 3-5.



Picture 3-5: Monitor window for sensor and wireless button module

By means of the “Info“-button in the rider “Sensors“ it can be recognized whether a sensor is still sending. However, this only works if the monitor timer is active.

Info button is blue: Monitor timer not active

Info button is green: Sensor is transmitting

Info button is yellow: Sensor is transmitting, failed from time to time

Info button is red: Sensor is not transmitting

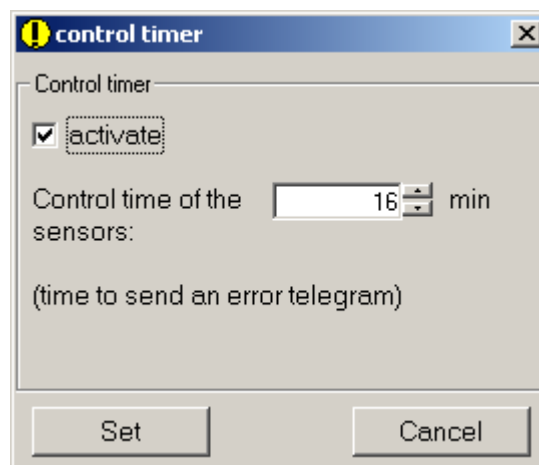
3.5.5 Monitor Timer

By means of the monitor timer it is possible to monitor sensors. A time interval, in which the sensor must send, can be adjusted in order to avoid a time error telegram. If the sensor does not send within this time interval, a time error telegram is sent which is displayed on the monitor window.

The minimum monitor time amounts to 16 minutes, the maximum monitor time is 255 minutes.

Attention: Take care of the cyclically transmission interval of a sensor (with Thermokon devices it amounts to approx. 15 min as a standard). If the same is greater than the monitor timer, a time error telegram is sent, although the sensor is still sending.

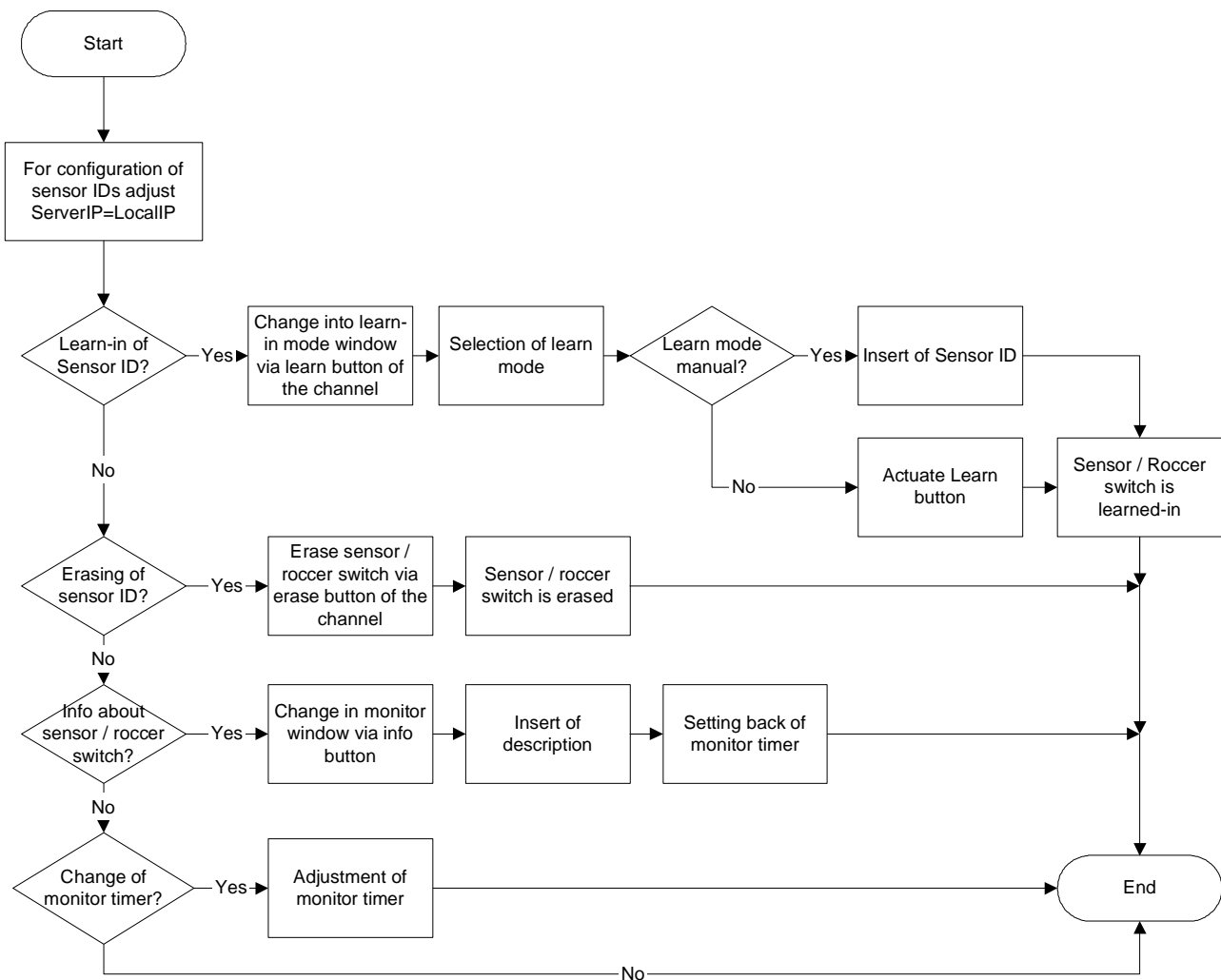
In picture 3-6 the monitor window is shown.



Picture 3-6: Monitor Timer

3.5.6 Summary

The operating steps for configuration of sensors are shown in the flow diagram in picture 3-7. For configuring sensor IDs, the server IP must be equal to the local IP, as otherwise no connection between PC and receiver can be set up. To learn-in the sensor IDs, the type of the sensor must be entered. Afterwards, the sensor can be learned-in by the learn-in procedure. The finish of the sensor learning-in is made via the erase button of the respective channel. Information on the sensor and its status can be displayed via the information button.

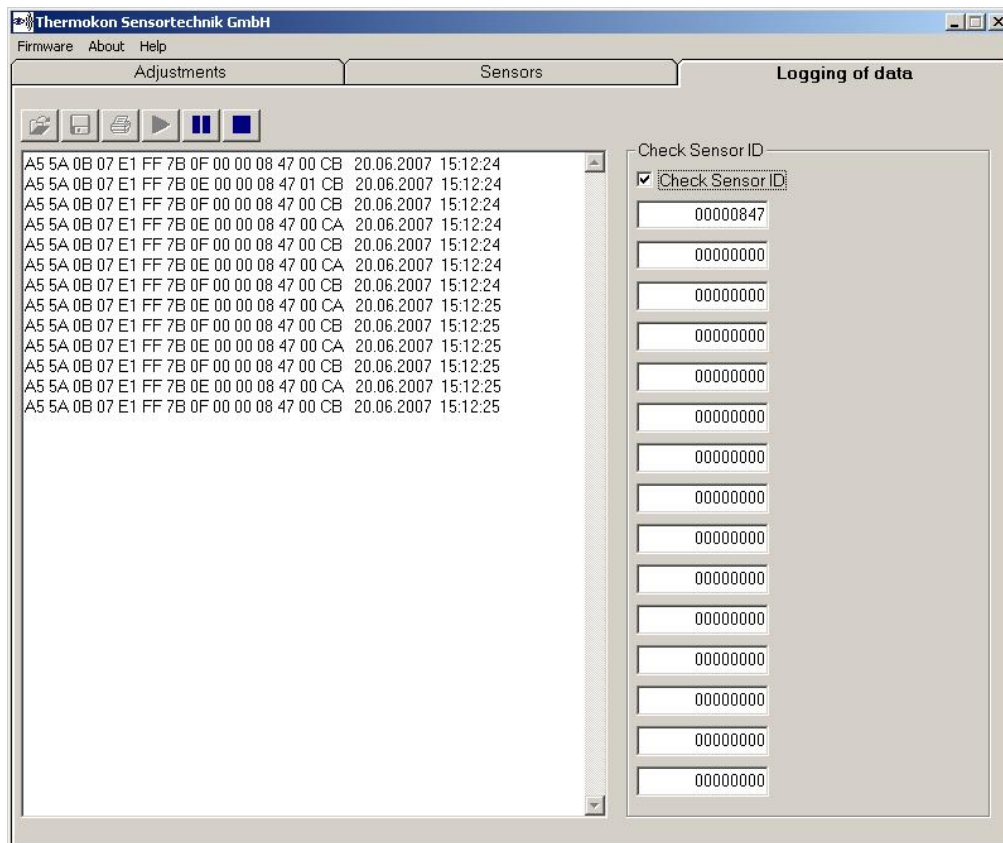


Picture 3-7: Learning-in of Sensors

3.6 Logging of Data

3.6.1 STC-Ethernet as Gateway

All EnOcean telegrams received are shown. In the installation path the file „Log_data.txt“ is produced. The EnOcean telegrams indicated are saved in this file. By activating „Check Sensor ID“ up to 15 EnOcean - Sensor ID's can be filtered.



Picture 3-8: Log-mode

3.6.2 STC-Ethernet with Sensor ID Verification

The software has a diagnosis function for connected sensors by which measuring values respectively statuses can be logged and saved. The same is done in the rider „Data Logging“ see Picture 3-9: Rider „Logging of Data“. There are 3 logging modes.

3.6.3 Logging Modes

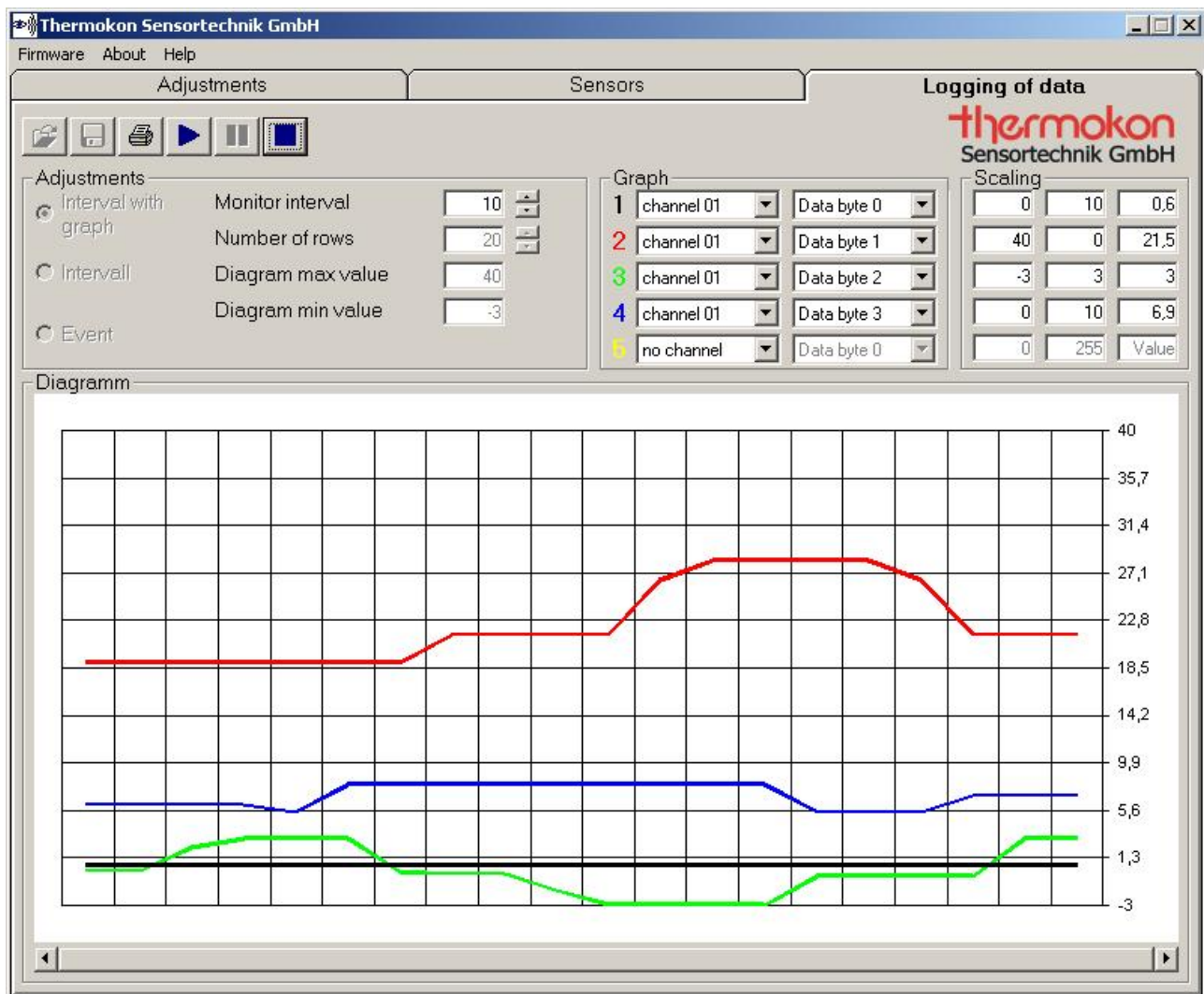
There are three different options for logging:

Interval with graph – 5 sensor data are cyclically (monitor interval) saved and displayed in a diagram.

1. Interval with graph – Sensor data are cyclically (monitor interval) saved and shown in the diagram.
2. Interval – Sensor data are cyclically (monitor interval) saved.
3. Event – Sensor data are logged upon telegram receipt of a selected sensor.

3.6.4 Interval with Graph

In total 5 measuring values can be logged. The allocation of the measuring values is made via the selection of the respective channel and the corresponding data byte.



Picture 3-9: Rider „Logging of Data“

Example:

With a room sensor type SR04PST e.g. the multiple contact switch is transferred in data byte 3 and the temperature set point in data byte 2. A detailed description of the respective data bytes can be found in the product data sheets. Channel 01 (for the corresponding sensor) and data byte 2 (for the corresponding setpoint).

Scaling

In the two fields behind the selection of the data bytes, the measuring value for each graph can be scaled differently. The result is shown in the third field.

Example: Scale the measuring range -20 to $+60^{\circ}\text{C}$ for an outdoor temperature sensor.

Monitor Interval

In the field "Monitor interval" it is indicated in seconds in which interval the data are logged. This monitor interval is the same for all 5 measuring values.

Diagram scaling

It is possible to scale the diagram. For this there is a min and a max value possible.

3.6.5 Interval

In the logging mode "Interval" it is determined whether a sensor shall be logged by setting a mark at the respective channel. A logging of all sensors is possible.

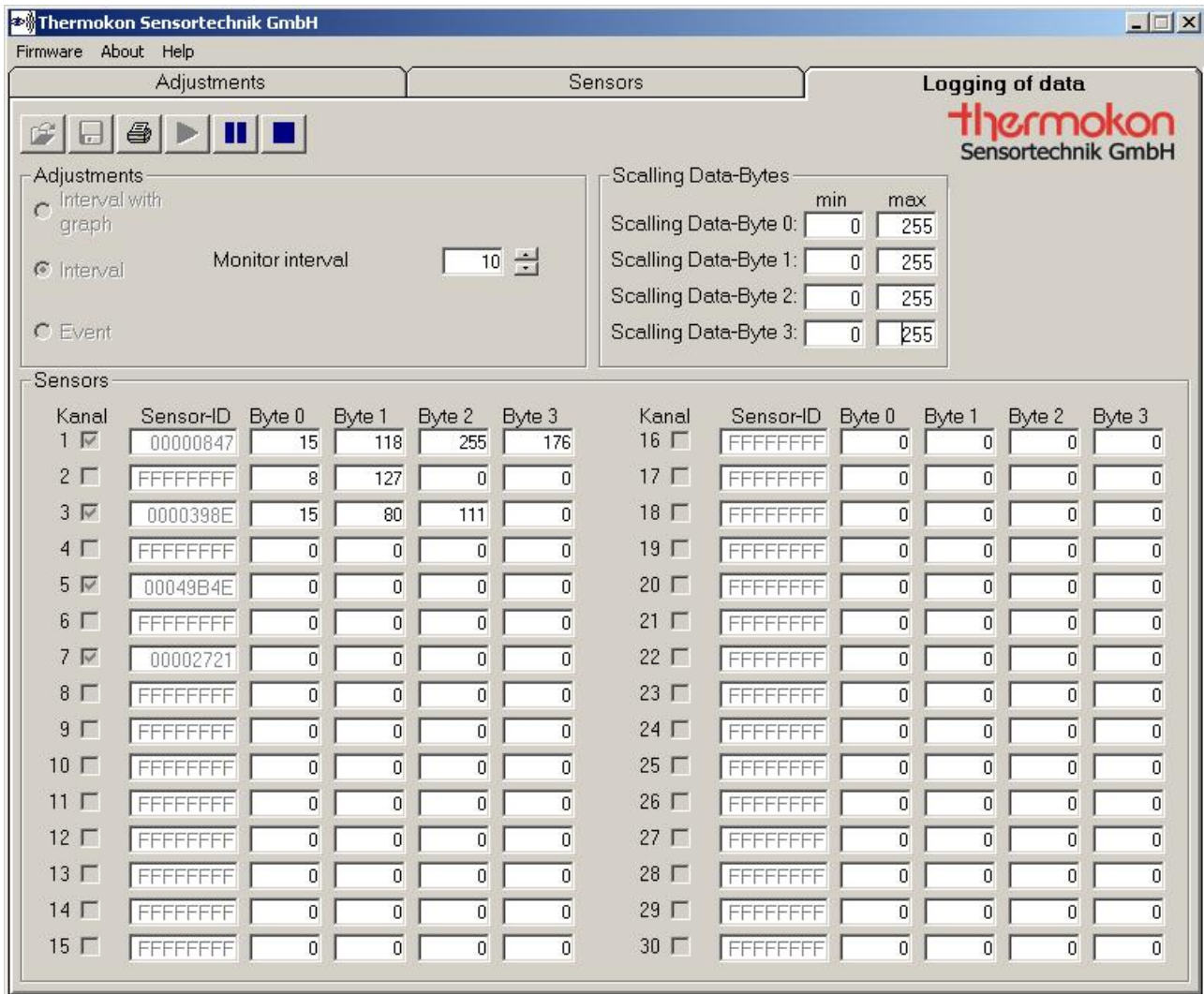
Scaling

For each data byte a scaling can be input.

Example: Scale a measuring range of -20°C to $+60^{\circ}\text{C}$ e.g. for an outdoor temperature sensor.

Monitor Interval

In the field "Monitor Interval" it is mentioned in seconds in which interval data shall be logged. This monitor interval is the same for all measuring values.



The screenshot shows the 'Thermokon Sensortechnik GmbH' software window. The 'Adjustments' tab is active, and the 'Logging of data' section is set to 'Interval'. The 'Monitor interval' is set to 10. The 'Scaling Data-Bytes' section shows four scaling ranges, each with a 'min' value of 0 and a 'max' value of 255. The 'Sensors' section displays a table of 32 channels (Kanal 1 to 30, plus 16 to 30) with their respective Sensor-ID and Byte 0 to Byte 3 values.

Kanal	Sensor-ID	Byte 0	Byte 1	Byte 2	Byte 3
1	00000847	15	118	255	176
2	FFFFFFFF	8	127	0	0
3	0000398E	15	80	111	0
4	FFFFFFFF	0	0	0	0
5	00049B4E	0	0	0	0
6	FFFFFFFF	0	0	0	0
7	00002721	0	0	0	0
8	FFFFFFFF	0	0	0	0
9	FFFFFFFF	0	0	0	0
10	FFFFFFFF	0	0	0	0
11	FFFFFFFF	0	0	0	0
12	FFFFFFFF	0	0	0	0
13	FFFFFFFF	0	0	0	0
14	FFFFFFFF	0	0	0	0
15	FFFFFFFF	0	0	0	0
16	FFFFFFFF	0	0	0	0
17	FFFFFFFF	0	0	0	0
18	FFFFFFFF	0	0	0	0
19	FFFFFFFF	0	0	0	0
20	FFFFFFFF	0	0	0	0
21	FFFFFFFF	0	0	0	0
22	FFFFFFFF	0	0	0	0
23	FFFFFFFF	0	0	0	0
24	FFFFFFFF	0	0	0	0
25	FFFFFFFF	0	0	0	0
26	FFFFFFFF	0	0	0	0
27	FFFFFFFF	0	0	0	0
28	FFFFFFFF	0	0	0	0
29	FFFFFFFF	0	0	0	0
30	FFFFFFFF	0	0	0	0

Picture 3-10: Interval

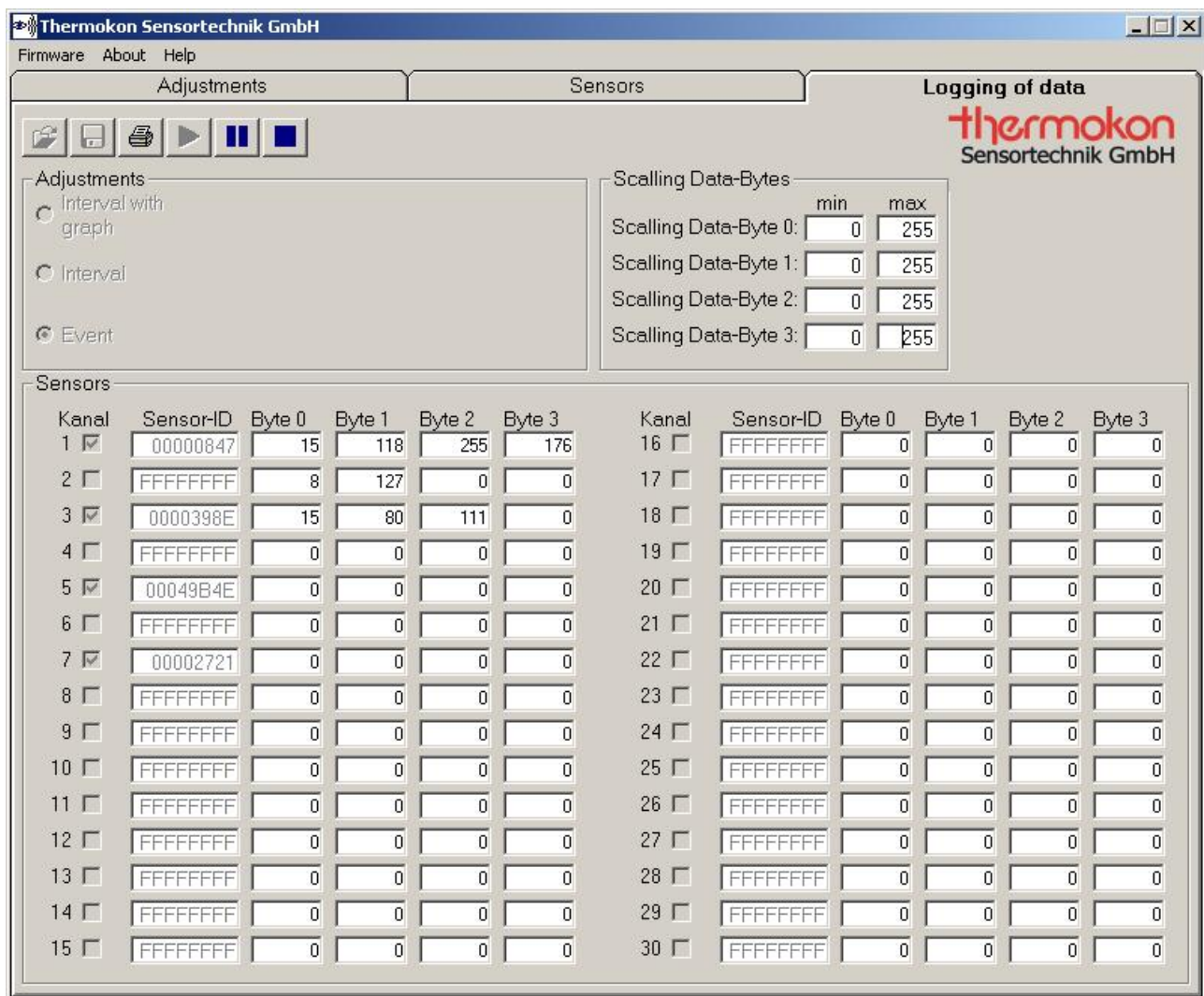
3.6.6 Event

In the logging mode “Event“ it is determined whether a sensor is logged by setting a hook at the respective channel. A logging of all sensors is possible. It is logged if a telegram of a sensor is received. By “Event Logging” the sending interval of the sensor can be verified.

Scaling

For each data byte a scaling can be input.

Example: Scale the measuring range -20°C to $+60^{\circ}\text{C}$ for an outdoor temperature sensor.




Picture 3-11: Event


3.6.7 Start

To start the logging function, the "Start button"  must be actuated. The actual value of the chosen channel is shown in the diagram.

3.6.8 Break


If the logging should be interrupted or proceeded any further at a later point of time, the "Break button"  must be actuated.

3.6.9 Stop

In order to stop the recording, the "Stop button"  must be actuated. After the logging was stopped, an inquiry whether the data shall be saved is shown. By means of the logging file, it is possible to import the values saved into a spreadsheet. As for a separator, a semicolon is used.

In the break or stop mode the diagram can be scrolled.

3.6.10 Store

The data can be saved via the store button  in the rider „Logging of data“. It is only possible to save data in a logg file if the logging procedure is stopped. By means of the logg file, it is possible to import the saved values in a table calculation. A semicolon is used as a separator of the column.

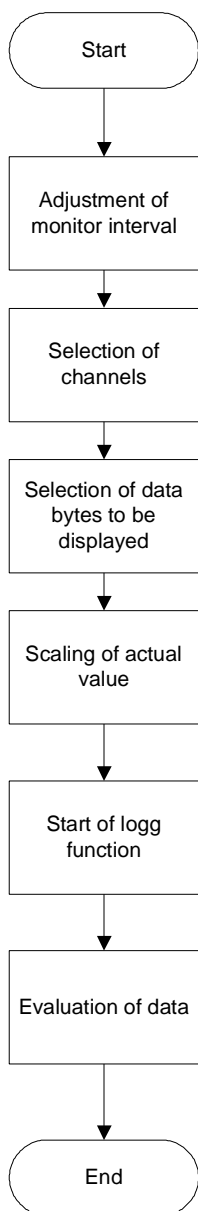
Notice: At maximum 1000 values are saved and displayed in the configuration software. Bigger data quantities are intermediately stored in a temporary directory. In the configuration software the 1000 values are deleted and the diagram starts again with 0. When storing the logg file, all measuring values, logged so far, are saved.

3.6.11 Logging File

By means of the logging file, it is possible to import the values saved into a spreadsheet. As for a separator, a semicolon is used. In the logging file it is recognisable when a telegram was received respectively logged. If the sensor shall not send, the same is saved in the field time error telegram by a 1.

3.6.12 Summary

In picture 3-9 the flow diagram for logging of data is displayed. First, adjust the requested logg interval in the monitor interval. Afterwards select the channels and the data bytes that should be displayed. The acutal value can also be scaled for an easier interpretation. The scaled value is not shown in the diagram however.



Picture 3-12: Logging function

4 Application of Radio Receiver

The STC-Ethernet wireless receiver receives radio telegrams of sensors (temperature sensors, wireless keys etc.) based on the EnOcean standard and transfers the same to TCP or UDP capable devices such as PC or controller. One of the basic functions is that switch and control commands respectively measuring values are passed on to the corresponding actuators. Furthermore the possibility is given to visualize sensor information on the PC.

For communication the PC or an Ethernet capable controller must set up a connection via the Ethernet to the wireless receiver. If the connection was set up successfully, the data can be processed.

After the receiver is configured, an application software is needed for data communication. Following it is exemplarily shown how a PC builds up a connection to the receiver and how it evaluates data by means of a Visual Basic 6 project.

The complete code for setting-up a connection and the code for receiving data are included on the configuration CD of the radio receiver.

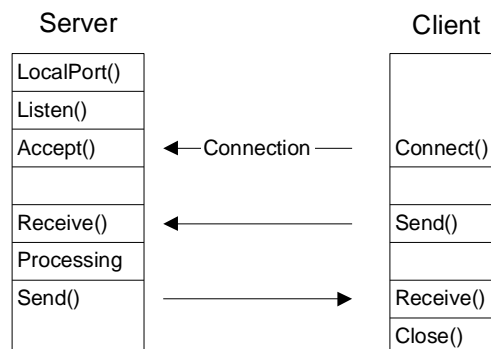
4.1 Connection Set-Up

A connection can be set up for all IP implementations via a standard window interface „Winsock“. For setting-up a connection, this interface requires the respective IP-addresses and ports of the devices that should communicate with each other.

The radio receiver can be run in the following mode:

1. Use of TCP-protocols
 - o Server-Client
 - o Client-Server
2. Use of UDP-protocols
 - o Server-Client
 - o Client-Server

The principle of a Server-Client connection is shown in picture 4-1. The TCP protocol is used.



Picture 4-1: Server-Client Connection

4.1.1 Server-Client by TCP

The wireless receiver is configured in the client mode and a connection should be set-up via the TCP protocol:

' Start server	
Public Sub Form_Load()	'Load of form (program request)
1. Winsock1(0).LocalPort = 4002	'Set port
2. Winsock1(0).Listen	'Wait for a connection to SRC
End Sub	
' Take new connection	
3. Public Sub Winsock1_ConnectionRequest(Index As Integer, ByVal requestID As Long)	
If Winsock1(0).RemoteHostIP = "10.0.20.3" Then	'Approval of a SRCCClient; "SRC_IP"
4. Load Winsock1(1)	'Load of connection
5. Winsock1(1).Accept requestID	'Acception of connection
End If	
End Sub	

1. Setting of local port of the server
2. Set server in a waiting mode
3. If the client is sending data the function Winsock1_ConnectionRequest is called off in the server
4. The server initializes the connection by means of the command „Load“
5. Server accepts connection to the client
6. Connection is set up

The connection remains valid until it is not closed by the command „Winsock1(Index).Close“. After the connection is set up, data can be communicated.

4.1.2 Client-Server by TCP

For the Client-Server mode a direct connection between server (wireless receiver) and the client (application) is set up by the command „Connect“. This can be done via the following program lines.

```
' Set-up of Client-Server connection
Private Sub Form_Load()
    Winsock1.Connect "10.0.20.3", "4002"
End Sub
```

'Load of form (program request)
'Set-up of connection; "SRC_IP", "SRC_Port"

4.1.3. Connection Set-up by UDP-Protocol

In order to set up a connection to the wireless receiver in the UDP mode, the IP address as well as the port of the wireless receiver must be advised to the Winsock interface. By the command „Bind“ the local port is communicated to the interface. Please make sure that the port addresses of the local devices and the remote devices (wireless receiver) are different.

```
'Load of connection
Private Sub form_load()

Winsock1.RemoteHost = "10.0.20.3"
Winsock1.RemotePort = "4002"
Winsock1.Bind 4003

End Sub
```

'Remote IP
'Remote Port
'Integration of UDP connection by local port

4.2 Receipt of Data

4.2.1 Data receipt by TCP-Protocol

Data are received in the server- and client mode by the event „Winsock_DataArrival“ .

```
' Receiving of data
Public Sub Winsock1_DataArrival(Index As Integer, ByVal bytesTotal As Long)

Dim client As String
    Winsock1(Index).GetData client

End Sub
```

'Storing of data received in client

The data received are read with the command „Winsock1.Getdata“ and stored for further process in the variable „client“. In the example program the code for a server-client connection is mentioned.

4.2.2 UDP-Protocol

In general the UDP-Protocol can be used as the TCP-Protocol. However, the data received cannot be displayed without another programming code. After the definition of the variables „testdat“ and „client“ the field „getd“ is also new dimensioned.

The data received are read with the command “Winsock1.GetData” and stored for further process in the variable „getd“.

The telegram is stored bitwise in getd (Byte 0 to 28). By means of a for-loop the telegram is joined together and stored as a whole in „testdat“.

By means of the command „Chr“ the value of „getd(i)“ is converted into an ASCII sign.

```
'Data receipt
Private Sub Winsock1_DataArrival(ByVal bytesTotal As Long)

Dim testdat                                'Definition of variable testdat
Dim client                                'Definition of variable client
ReDim getd(0 To 28) As Byte                'New dimensioning of getd

Winsock1.GetData getd                      'Storing of data received in getd
  For i = 0 To 27                          'Joining together of individual data received to a telegram
    client = Chr(getd(i))
    testdat = testdat + client
  Next i

End Sub
```

4.3 Evaluation of Telegram

The wireless receiver sends two different telegrams. The first one is the data telegram for evaluation of sensors. The second one is a time error telegram. If the monitor timer is activated and no radio telegram was received within an interval, a time error telegram will be produced and sent.

4.3.1 Data Telegram

In table 4-1 the Ethernet data telegram is shown. This telegram includes the measuring values of the sensors received by the wireless receiver. The first two byte (0;1) consist of the preamble. The next byte (2) consists of a „Header identification“ and the length of the telegram from the 3. byte. In the byte 3 „ORG“-Byte it is shown which sensor type is concerns. A wireless key has the identification „05“, a 1 Byte Sensor (e.g. a window contact) has „06“ and a 4 byte sensor (e.g a room operating panel or a temperature sensor) has the identification „07“. A sensor is clearly defined via his Org-Byte and his sensor ID.

In total 4 data bytes are received (bytes 4-7). The sensor ID is stored in the following 4 bytes.

In the status byte the status of the devices and the telgrams is mentioned.

Each sensor is saved in a channel of the wireless receiver. It is shown in the 13 byte of the telegram. The contents of the data byte is depending on the device and is thus described in the respective data sheets of the sensors. The telegram is transfered in the ASCII form.

Byte	Description	Value
0	Preamble	“A5”
1	Preamble	“5A”
2	H_SEQ length	“0B”
3	ORG	„05“/“06“/“07“
4	Data byte3	e.g. radio key
5	Data byte2	e.g. potentiometer
6	Data byte1	e.g. temperature
7	Data byte0	e.g. digital inputs
8	Sensor ID_Byte3	Addressbyte 3
9	Sensor ID_Byte2	Addressbyte 2
10	Sensor ID_Byte1	Addressbyte 1
11	Sensor ID_Byte0	Addressbyte 0
12	Status	e.g. Repeater
13	Channel	„00“-„1D“

Table 4-1: Data Telegram of Radio Receiver

4.3.2 Time Error Telegram

This telegram is sent from the wireless receiver to the application, if the monitor timer is exceeded. This function must be actuated and adjusted in the configuration software of the wireless receiver. As a standard this function is deactivated. In table 4-2 the time error telegram is shown. After the preamble the telegram is marked as a time error telegram. Via the „ORG“-Byte and the sensor ID the failed sensor is shown. In the byte „Monitor timer“ it is indicated whether the sensors were inspected to a failure. The interval of the monitor timer is shown in byte 5. If the sensor failed from time to time, the same is marked in byte 6 and the current status of the sensor is marked in byte 7. Byte 12 is free and in byte 13 the channel of the sensor is stored. The time error telegram is transferred in ASCII signs.

Thus, telegrams can be directly displayed at the PC monitor.

Byte	Description	Hex
0	Preamble	"A5"
1	Preamble	"5B"
2	Time error	"98"
3	ORG	"05"/"06"/"07"
4	Monitor timer	On: "F0"; Off: "FF"
5	Monitor interval	„0A ... FF“
6	Sensor failure from time to time	No: "00"; Yes: "01-FF"
7	Current sensor status	Failed: "01"; OK: "00"
8	Sensor ID_Byte3	Addressbyte 3
9	Sensor ID_Byte2	Addressbyte 2
10	Sensor ID_Byte1	Addressbyte 1
11	Sensor ID_Byte0	Addressbyte 0
12	reserved	"00"
13	Channel	"00"- "1D"

Table 4-2: Time Error Telegram of Wireless Receiver

5 Transmit function

The STC-Ethernet could send telegrams. It possible to send on 127 different addresses. The data-bytes and org-byte is free choose able to send.

5.1 Read Address of STC-Transmitter module

The EnOcean-Address varies und must be read from STC-Ethernet with command 0xAB 0x58.

Example:

Read EnOcean address of STC-Ethernet:

A5 5A AB 58 00 00 00 00 00 00 00 00 03

Response telegram:

A5 5A 8B 98 FF ED 90 80 00 00 00 00 1F

The address of STC-Ethernet:

FF ED 90 80

ID_BYTE0 could be selected between 0x80 and 0xFF, that means telegrams could be send on 127 different addresses.

5.2 Transmit telegram

To send a telegram following telegram structure must be used:

Byte	Bit7Bit0			Beschreibung
0	SYNC_BYTE1 (A5 Hex)			Start
1	SYNC_BYTE0 (5A Hex)			
2	(6B Hex)			Transmit-Telegram
3	TYPE			Telegram type (ORG-Byte)
4	DATA_BYTE3			Data bytes 0...3
5	DATA_BYTE2			
6	DATA_BYTE1			
7	DATA_BYTE0			
8	ID_BYTE3			32-Bit TCM -ID
9	ID_BYTE2			
10	ID_BYTE1			
11	ID_BYTE0 (+ 0...127)			
12	STATUS (4Bit)	T-C (2 Bit)	RP-C (2 Bit)	State and repeater counter
13	CHECKSUM			Checksum of bytes 2 - 12

Example: STC-Ethernet should send a switch command:
A55A6B50000000FFED908530EC

5.3 Response telegram

STC-ETHERnet sends a response telegram, to check if the transmit telegram was ok and sended out.

Telegram correctly sended:

A5 5A 8B 58 00 00 00 00 00 00 00 00 00 E3
(58 Hex ist he acknowledge of the telegram)

6 Trouble Shooting

- If no wireless receivers are found, please proceed as follows:
 - Search the wireless sensors again by means of the button "Search SRC"
 - End the configuration software and restart it
 - Verify whether the device is connected correctly
 - Verify your network cable
 - Get yourself informed via the corresponding IP address available in the network
 - The IP address must be clearly defined network wide
 - Do not start the software twice (parallelly) on the PC
 - Only one connection between application software and wireless receiver can be set up.
- Receiver is found, but no connection is set up:
 - Actuate the requested wireless receiver in the receiver list
 - Verify the server IP – the server IP is the address to which the radio receiver sends data.
 - In order to adjust the sensor IDs and to logg them, the local IP must equal to the server IP
 - If there are more than one network interface cards please chose the righth card in the field next to "Local IP"
 - Only one connection between application software and wireless receiver can set up
- If no sensor is received and not all telegrams arrived, please check the following:
 - Verify the radio transmissstion path between sensor and receiver
 - If the antenna cable is damaged (crimped, crushed, plug ragged, plug damaged)
 - Change cable
 - Antenna plug connection is not screwed smoothly
 - Screw antenna plug connection correctly
 - 868 MHz jammer (weather station,headphones etc.)
 - Enlarge distance between antenna and jammer
 - Too many sensors are sending within one second
 - Reduce sending intervals
- Wireless receiver cannot be read out
 - Verify version of the configuration software
 - The configuration software with version from 2.0 is only working for SRC-Ethernet – devices which have been produced from 2007 (see product label)
 - Devices produced before 2006 must be operated by version < 2.0
 - Make a voltage reset on the device

Please also see our „Information on wireless sensors“ in our product data sheets.

7 Glossary

- 10/100 Base-T Ethernet
 - Transmission speed in MBit/s and type of Ethernet network
- ARP (Address Resolution Protocol)
 - Identification of the IP-address of a MAC-address
- Auto detection
 - Device recognizes type and network speed of the network by itself
- Client
 - Devices using services of a server
 - DHCP (Dynamic Host Configuration Protocol)
 - Dynamic allocation of a IP-address
- Gateway
 - Connection of different networks with different protocols
 - Relates to the insert of the address of a network in an existing router
- Hub
 - Connects different network participants star-shaped
- ICMP (Internet Control Message Protocol)
 - Transmission of status and error information
 - See also Ping
- IP (Internet-Protocol)
 - Protocol for transferring data in the internet
- IP-Address
 - Address for a device connected to an IP network
- Channel
 - Corresponds to a complete sensor including different measuring values, e.g. temperature, set point etc.
- MAC (Media Access Control)
 - Unchangable physical address of a network component
 - Unique address

- ORG-Byte
 - Part of the EnOcean radio telegram
 - Indicates the type of a sensor
 - ORG-Byte 05: Key
 - Peha key
 - ORG-Byte 06: 1 Byte Sensor
 - Thermokon window contact SRW01
 - ORG-Byte 07: 4 Byte Sensor
 - Thermokon room operating panel SR04
- Ping
 - Diagnostic medium for verification of a network device
 - Ping IP-address
- Port
 - Interface
- Remote
 - Device to which a connection should be set up
- Router
 - Connection of networks
 - Decision on passing on the packets via the IP address
- Sensor ID
 - Unique address along with the ORG-Byte for a sensor
- Server
 - Makes the interface of the network available
- Subnet
 - Division of the IP addresses in subnetworks
 - Allocation of IP addresses to subnetworks / Definition of subnetwork is made by indication of an IP address and a net mask
 - The net mask determines the bits of the IP address being the same for all subnetworks
 - Subnetworks must be connected via a router

- TCP (Transmission Control Protocol)
 - Protocol to save data transfer which will be added to the IP protocol
- UDP (User Datagram Protocol)
 - Connectionless protocol for fast data transmission
 - Without safety measures
- Winsock
 - Standard interface for all IP implementations under Windows

8 Changes

Version 1.3

- Two different logging modes (chapter 3.6.6):
 1. Interval – Sensor data are saved cyclically (monitor interval)
 2. Event – Sensor data are logged upon telegram receipt of the selected sensor (only one channel can be logged)

Version 1.52

- Scaling of the diagram in the logging window

Version 1.6

- three logging modes are possible
 1. Interval with graph – 5 sensor data are cyclically saved (monitor interval) and are displayed in a diagram
 2. Interval – Sensor data are cyclically saved (monitor interval)
 3. Event – Sensor data are logged upon telegram receipt of the selected sensor
- Choseable network interface card

Version 2.0

- Gateway-Mode
 - All EnOcean data received are transmitted
 - In the installation path of the SRC-Ethernet the file "Log_data.txt" is produced
 - All data received are attached to the file "Log_data.txt" during the logging