Manual

enocean®

PG5 FBox library for EnOcean

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0.1 Document versions

0

Edition	Published	Changed	Comments
EN01	2010-09-14	Whole document	- Manual created
EN02	2013-09-13	Whole document	- Logo and name changed
ENG03	2019-02-05	Chapter A	- New phone number (2015)

0.2 Brands and registered trademarks

Themokon®   Thermokon Sensortechnik GmbHAarstr. 6 | 35756 Mittenaar | Germany

Omnio®   omnio AG Gebäudesystemtechnik | Bächlistrasse 326 | CH-8426 Lufingen

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Technical modifications are based on the current technical status.

1   EnOcean overview with Saia PCD

This manual is intended to provide a brief overview of the planning, installation and commissioning.

Since SaiaBurgess Controls do not manufacture EnOcean devices, in this manual two systems from outside manufacturers are used, in order to demonstrate the use of the EnOcean FBox Library with the PG5 programming software.

The manual is divided up into the following topics:

- Concept   for EnOcean

- Planning   Instructions help to avoid mistakes in finding the place of assembly.

- Installation   Examples are intended to help with the wiring

- Commissioning   On the basis of the Omnio and Themokon products the application of the Saia PG5 EnOcean FBox Library is demonstrated step-by-step, clearly and briefly.

If you are missing specifications on the EnOcean devices, enquire of the particular manufacturer.

Because of modifications and additions to the EnOcean products, you must look for the latest EnOcean PG5 FBoxes and their detailed descriptions on the FBox Library Help pages.

A printed book is never as up to date as the software itself.

For Help und Support see Appendix Chap. A.5.1

The EnOcean devices described in this manual are trading items from the Thermokon and Omnio companies (for addresses, see Appendix).

1

Saia-Burgess stocks individual devices under its item numbers:

Thermokon		**Saia Burgess Controls**
SRC65-RS485	>	**Q.**SRC65-RS485
STC65-RS485	>	**Q.**STC65-RS485

Omnio		**Saia Burgess Controls**
APG03B-RS485-Eno	>	**AP**G03B-RS485-Eno
APG03B-RS485-Eno	>	**AP**G03B-RS485-Eno

Also, the Saia Burgess Controls item numbers are used in this manual.

1

1.1   Concept for EnOcean

With battery-free wireless technology, signals and values from control devices in buildings should reach the Saia PCD controls family and vice versa. In turn, they control the system parts.

Technology
The fundamental idea for the technology rests on a simple observation: When a sensor detects measurements, the power status changes at the same time.

A button is pressed and the temperature changes or the brightness of the lighting varies. These processes contain enough power to send wireless signals across a distance of up to 300 m.

The wireless technology which can send switching signals and measurements without the use of batteries basically consists of two components:

■ Firstly, the locally available ambient energy is transferred into electrical energy (energy harvesting),

■ then an extremely economical electronic system prepares the data for transmission and sends them to a special receiver unit in the form of short wireless signals.

The wireless protocol is focused on transmitting information at a low energy, high security level. In Europe, EnOcean operates at a frequency of 868 MHz.

1.2   Solution

Hardware Devices equipped with "EnOcean" battery-free wireless technology fulfil these desires. When the buttons are pressed, transmitter and receiver receive their power. Solar cells or batteries play a supporting role in the case of special devices.

The partner station is supplied with power by cable feeder. These transmitters and receivers are conducted to an RS-485 serial port on the Saia PCD via an RS-485 bus (shielded two-wire cable).
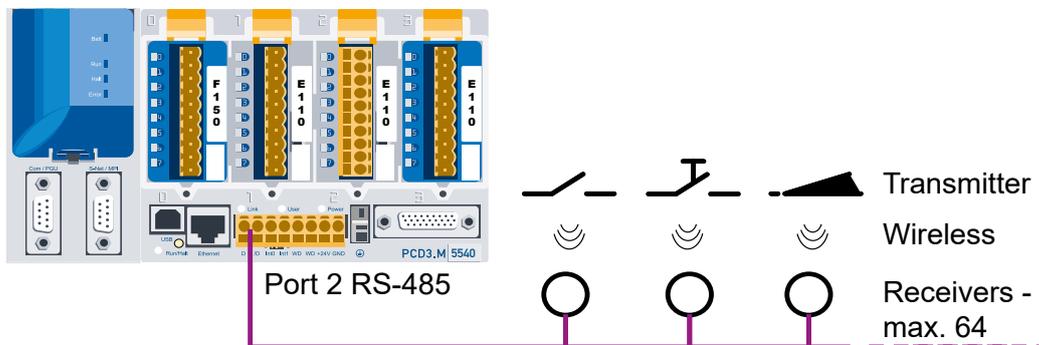
The number of transmitters per receiver is limited only by the distance and the reception quality.

1

Software

The Saia PCD processes the signals and/or values, via FBoxes per program specified. This program is created by the programmer, using the PG5 software package and the "EnOcean" Fupla Library available for it. With the help of a manufacturer-specific driver which is supplied in the "EnOcean" Fupla Library, and which has received a reference name from the programmer, other Fupla FBoxes can now access the driver through this reference name and do their job according to their particular function.

The following illustration shows an EnOcean button being processed by Fupla, which works on a group of lights in an office:
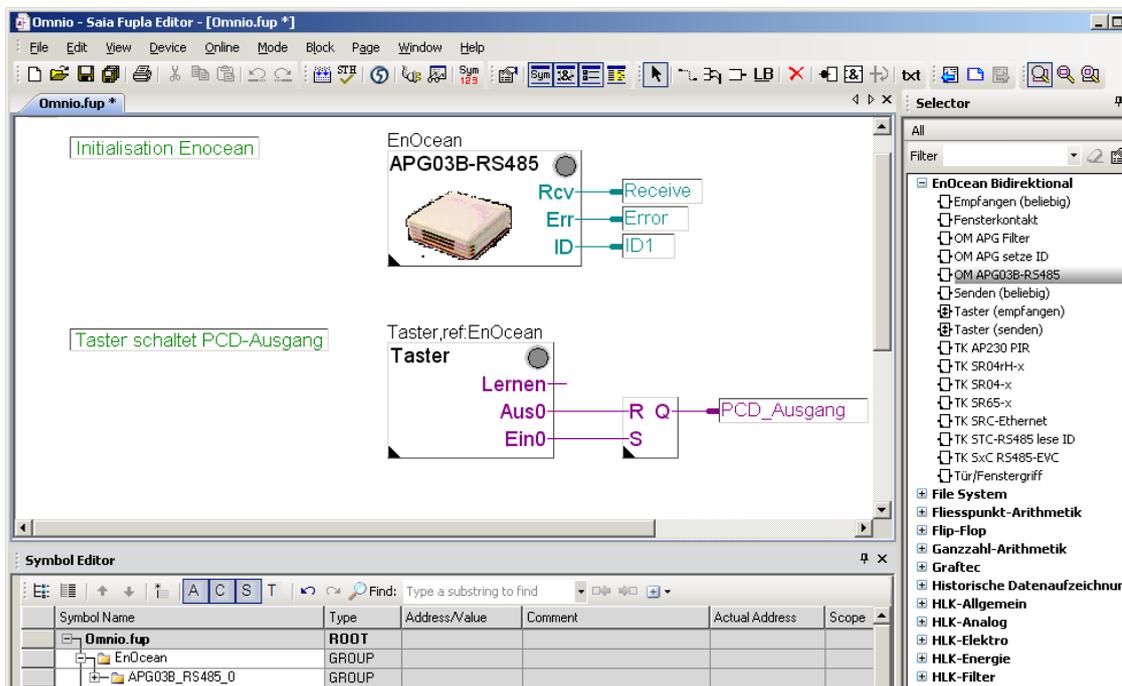
2 Guiding principles for planning

2.1 Planning

Here we have a wireless technology with very low signal intensity. That is why we must bear in mind that the range is reduced with regard to reception interferences caused by walls, roofs, equipment and furniture.

2

These items can influence the number of EnOcean gateways required.

As early as the planning stage, we must also take into consideration other materials which interfere with reception, especially in open-plan offices and rooms with partitions.

Up to 64 EnOcean gateways are supported on the same serial cable.

Only EnOcean gateways from the same manufacturer may be used on the same RS-485 cable.

Receiver and bidirectional transceiver, IP65 splashproof housing with external antenna Q.SRC65-RS485E + Q.STC65-RS485E

Receiver and bidirectional transceiver from Omnio, white plastic housing, for indoor assembly with built-in antenna APG03U-RS485 + APG03B-RS485

2.1.1 Number of devices by Gateway, Baudrate

We recommend the following number of EnOcean sensors per RS-485 bus not to exceed.

Number of Sensors	Baudrate
115	9600
230	19200
460	38400

These settings ensure that less than 1% of the messages lost due to collisions go (Adopted 2 / 3 of sensors send all 120s and the remaining 1 / 3 on only event). It is recommended to set the baud rate as high as possible (38400).)

2.2 Ranges

2.2.1 Natural interference sources

Since electromagnetic waves are involved in the wireless signals, the signal is attenuated between the transmitter and the receiver. That means that both the electrical and the magnetic field intensity are reduced in inverse proportion, in fact, to the square of the distance from transmitter and receiver ($E,H \sim 1/r^2$).

To this natural range limitation we can add other interference factors: metal parts, e.g., reinforcements in walls, metal heat insulation foils, and metal-reinforced, steam-cured heat protection glass reflect electromagnetic waves. That is why a "radio deadspot" is formed behind them.

Admittedly, radio waves can penetrate walls, but then the heat attenuation increases even more than with radiation in the free field.

Penetration of wireless signals:

Material	Penetration
Uncoated wood, plaster and glass	90%...100%
Brick and chipboard	65%...95%
Reinforced concrete	10%...90%
Metal and aluminium lamination	0%...10 %

2

In practice, this means that the materials used in the building play an important role in the assessment of the wireless range. Below are some recommended values, for evaluating the surrounding area:

Wireless range/penetration:

Intervisibility:
model. 30 m range in corridors and up to 100 m in sheds.

Plasterboard walls/wood:
model. 30 m range through a maximum of 5 walls

Brick partition walls/expanded concrete:
model 20 m range through a maximum of 3 walls

Reinforced concrete walls/ceilings:
model. 10 m range through a maximum of 1 ceiling

Water supply units and lift shafts should be regarded as barriers.

The angle at which the transmitted signal meets the wall is also important. The effective wall thickness and thus the signal attenuation alters with the angle. If possible, the signals ought to run vertically through the masonry. Recesses must be avoided.
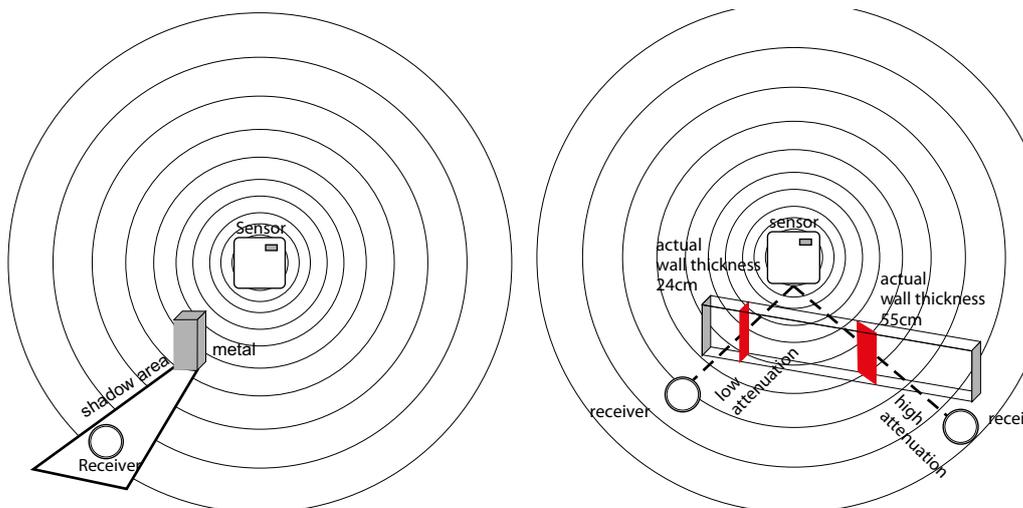
2.2.2   Other sources of interference

Devices which also function with high-frequency signals, e.g. computers, audio/video systems, electronic transformers and series transformers etc. are regarded as other sources of interference. The minimum distance from these devices should be 0.5 m.

2

Finding the optimal device position with EPM100* field strength meter

A mobile field strength meter called the EPM100*is available; the installation engineer uses it to easily detect the optimal installation points for sensor and receiver. It may also be used to test faulty connections on previously-installed devices.

The field strength of wireless telegrams received and disruptive wireless signals are displayed in the 868 MHz band on the device.

Procedure for detecting the installation points for wireless sensor/receiver:

Person 1	operates the wireless sensor and creates wireless telegrams by pressing the keys.
Person 2	checks the field strength received from the display on the meter and thus calculates the optimal installation point.

*available from Thermokon

2.2.3   High-frequency emission on wireless sensors

Since the advent of cordless telephones and the use of wireless systems in residential buildings, the influential factors of radio waves on people living and working in a particular building have been vigorously debated. The lack of measurement results and long-term studies is often the cause of great uncertainty among supporters and among critics.

A measurement certificate from the Institute for Socio-ecological Research and Training (ECOLOG) has now confirmed that the high-frequency emissions from wireless switches and sensors with EnOcean technology are markedly lower than those from comparable conventional switches.

It must also be noted that conventional switches also emit electromagnetic fields because of the contact spark. In terms of the overall frequency range, the power flux density (W/m²) emitted is 100 times higher than with wireless switches. Also, because of the reduced wiring in wireless switches, potential exposure from the low-frequency magnetic fields emitted by the cable is reduced. If you compare the wireless emissions of the wireless switches with other high-frequency sources in the building, such as DECT telephones and base stations, the emissions fom those sources are 1500 times greater than those from the wireless switches.

2.3   Network

The EnOcean gateways are all connected to a Saia PCD by a two-wire cable with shielding. Up to 64 gateways may be connected to it, see Technical Data Sheet.

As the bus cable, a paired, preferably shielded T-wire cable, $1 \times 4 \times 0.8$ mm^2 is essential.

The gateways are connected in series to the RS-485 network cable. Feeder cables of a maximum length of 15 m are possible.

2
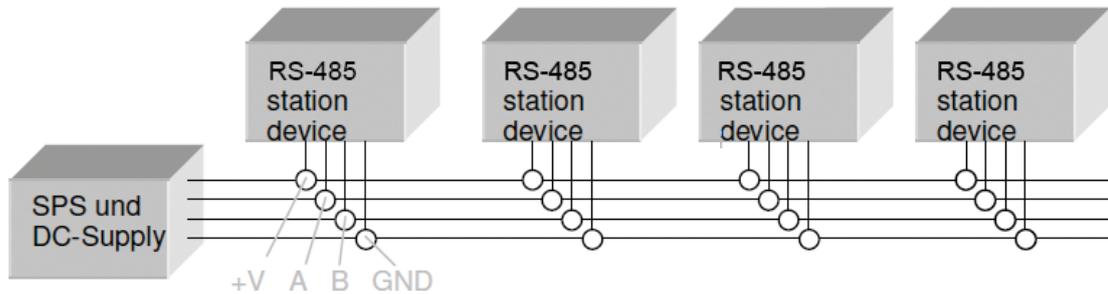
All the ends of the RS-485 network cables (including those on feeder cables) must be terminated by a 120 Ohm resistor. This is done by placing a jumper on the outermost devices. Communication problems result, if the RS-485 bus cable is not terminated by a resistor.

Pro EnOcean System (manufacturer) - one RS-485 interface

2.4   Installation

As already described in Range Planning, the range of the signal transfer can be affected by various sources of interference.

The following must, therefore, be carefully checked:

1. How must the EnOcean gateways be positioned?

2. Range measurements may be performed by a mobile EnOcean control and an EnOcean signal meter.

2

Thermokon EPM100 Mobile meter for measuring the field strength (RSSI) of EnOcean telegrams received and of sources of interference in the 868.3 MHz band. During the planning phase, it is used to determine the optimal installation points for transmitters and receivers.	
Thermokon EPM100 Mobile field-strength meter for determining the optimal installation points for transmitters and receivers. Displays the relevant data from the EasySens wireless telegrams.	

Thermokon (www.thermokon.de) supplies EnOcean wireless signal meters which allow you to roughly estimate the signal quality. You will find more detailed information here: http://www.thermokon.de/index.php?showMenu=37&contentID=61&showDown=50#50

2.5   Programming/initialisation

After the installation processes have been carried out, the Saia PG5 programming package with the EnOcean Fupla Library must be provided for creating programs.

Using this software package, the EnOcean gateway devices from the manufacturers, Omnio und Thermokon (as at June 2010), can be parameterised and commissioned.

3 Omnio System hardware and properties

3.1 General information on Omnio devices

The unidirectional APG03U-RS485 wireless gateway and the bidirectional APG03B-RS485 wireless gateway are flush-installable devices and serve as gateways between devices in the Ratio® wireless bus system (wireless sensors and wireless actuators based on the EnOcean technology) and devices such as PC, SPS and controller systems with RS-485 interface. All the wireless telegrams received error-free by the gateway from wireless transmitters are packaged in a telegram frame and issued on the RS-485 page. All PC/SPS telegrams received error-free by the gateway are sent out on the wireless page as EnOcean telegrams. Thus a bidirectional connection between PC/SPS systems and the wireless transmitters and receivers of the Ratio®wireless bus system can be achieved by means of the APG03B-RS485 wireless gateway.

3

3.1.1 The gateways have two operating modes.

In the "Direct" mode, all telegrams received are submitted to the RS-485 bus. In the "Filter" mode, only telegrams from transmitters taught-in in the gateway are submitted to the RS-485 bus. If the input filter is empty, the "Direct" mode is enabled and as soon as an ID is taught-in, the "Filter" mode is enabled.

3.1.2 Parameterising the devices

To set the communication parameters and the participant's address and to set the wireless transmitter IDs, there are two possibilities:

■ Using the "APG set ID" FBox contained in the PG5 EnOcean Library (see Chapter 5 " Commissioning").

■ The parameterisation software, provided free by the device manufacturer, which can be downloaded from the website www.omnio.ch. For the use of this software it is necessary to view the manufacturer's documents.

3.2 Omnio STC65-RS485

RS-485 bi-directional wireless gateway	

3

3.2.1 Technical data

Supply voltage	12…30 VDC or 12…24 VAC
Current consumption	max. 40 mA
Wireless module	TCM120
Wireless protocol	EnOcean Standard (PTM/STM/CTM)
Antenna	built-in
Connection	8-pin plug terminals for T-wire cable $1 \times 4 \times 0.8$ mm^2
Housing	ABS plastic, dimensions $80 \times 80 \times 25$ mm, weight 80 g
Protection degree	IP20
Operating temperature	-5 ˚C…+40 ˚C, rel. humidity (non-condensing) 5%…90 %
Interface	RS-485 multiple-access, master-slave transfer rate can be set by jumpers. All the parameters can be set by software commands. Built-in terminating resistance, can be enabled by jumper.
Protocols	RS-485 Eno (standard EnOcean protokol - implementation at RS-485 level) RS-485 modbus (in preparatory stage)

3.2.2 Connection terminals

Plug terminal block X1 (8-pin plug terminals for T-wire cable) $1 \times 4 \times 0.8$ mm^2)

PIN	Name	Remark
1	GND	Earth
2	B	B – RS-485 – data cable
3	A	A – RS-485 – data cable
4	+VDC/AC1	Power supply 12…24 VDC/AC1
5	- VAC2	Power supply AC negative pole/AC2

3.2.3   Controls/jumpers

Jumpers J1/J2 - baud rates The baud rate is set by Jumpers J1 and J2. This makes 4 different baud rates adjustable.

Baud rate	9600	19200	38400	57600
J1 Jumper	**on**	off	**on**	off
J2 Jumper	**on**	**on**	off	off

J3 Jumpers- terminating resistance By means of the J3 Jumper, the terminating resistance is enabled at 120 Ohm.

S3 button – teach-in mode and input filter You can switch between normal and teach-in mode with the S3 button.

Teach-in mode. If the S3 button is held down for two seconds, operation switches to teach-in mode. LED L3 shows this with a permanent light. If the S3 button is again held down for 2 seconds, operation switches back to normal mode and LED L3 goes out.

Delete input filter In normal mode, if the S3 button is held down for longer than 6 seconds, all the transmitter IDs in the input filter are turned off. LED L3 flashes. If the S3 button is then released, operation switches to teach-in mode and the permanent LED L3 is displayed. If the S3 button is again held down for 2 seconds, operation switches back to normal mode and LED L3 goes out. If the input filter has been turned off, the "Direct" mode is enabled. All telegrams received are submitted to the RS-485 bus. As soon as a transmitter has been taught-in to the gateways' input filter, the "Direct" mode is enabled. Only the telegrams highlighted in the input filter are still submitted to the RS-485 bus.

S4 button – Reset

When the S4 button is pressed, faults displayed by the LEDs are reset.

3.2.4 Display components

3

LED L1 power supply

LED L1 lights up - power supply correct.
LED L1 does not light up - no power supply applied or power supply unit in the
            gateway faulty.

LED L2 data communication

LED L2 flickers - data communication takes place on the RS-485 bus.
LED L2 does not light up - no data communication is enabled on the RS-485 bus.

Teach-in mode/input filter

LED L3 does not light up - normal mode is enabled.
LED L3 lights up - teach-in mode is enabled.
LED L3 flickers - input filter is turned off.

Fault display

Faults are displayed by cyclical flashing packages.
LED L4 off - no fault present.
LED L4 flashing packages with double flash - no ACK telegram received from the
            master.
LED L4 flashing packages with triple flash - the receive buffer is full - neither RMT
            nor RRT telegrams to the masterare/have been possible.
LED L4 flashing packages with quintuple flash - the input filter is full. Send appropriate
            telegram to master.

Miscellaneous messages

LED L5 may be freely used by the master.

3.3 Omnio APG03U-RS485-Eno

RS-485 unidirectional wireless gateway	

3.3.1 Technical data

Supply voltage	12…30 VDC or 12…24 VAC
Current consumption	max. 40 mA
Wireless module	TCM120
Wireless protocol	EnOcean Standard (PTM/STM/CTM)
Antenna	built-in
Connection	8-pin plug terminals for T-wire cable $1 \times 4 \times 0.8$ mm^2
Housing	ABS plastic, dimensions $80 \times 80 \times 25$ mm, weight 80 g
Protection degree	IP20
Operating temperature	-5°C…+40°C, rel. humidity (non-condensing) 5%…90 %
Interface	RS-485 multiple-access, master-slave transfer rate can be set by jumpers. All the parameters can be set by software commands. Built-in terminating resistance, can be enabled by jumper.
Protocols	RS-485 Eno (standard EnOcean protokol - implementation at RS-485 level) RS-485 modbus (in preparatory stage)

3.3.2 Connection terminals

Plug terminal block X1 (8-pin plug terminals for T-wire cable $1 \times 4 \times 0.8$ mm^2)

PIN	Name	Remark
1	GND	Earth
2	B	B – RS-485 – data cable
3	A	A – RS-485 – data cable
4	+VDC/AC1	Power supply 12-24 VDC/AC1
5	- VAC2	Power supply AC negative pole/AC2

3.3.3   Controls/jumpers

Jumpers J1/J2 - baud rates
The baud rate is set by Jumpers J1 and J2. This makes 4 different baud rates adjustable.

Baud rate	9600	19200	38400	57600
J1 Jumper	**on**	off	**on**	off
J2 Jumper	**on**	**on**	off	off

J3 Jumpers- terminating resistance By means of the J3 Jumper, the terminating resistance is enabled at 120 Ohm.

S3 button – teach-in mode and input filter You can switch between normal and teach-in mode with the S3 button.

Teach-in mode.
If the S3 button is held down for two seconds, operation switches to teach-in mode. LED L3 shows this with a permanent light. If the S3 button is again held down for 2 seconds, operation switches back to normal mode and LED L3 goes out.

Delete input filter
In normal mode, if the S3 button is held down for longer than 6 seconds, all the transmitter IDs in the input filter are turned off. LED L3 flashes. If the S3 button is then released, operation switches to teach-in mode and the permanent LED L3 is displayed. If the S3 button is again held down for 2 seconds, operation switches back to normal mode and LED L3 goes out.

If the input filter has been turned off, the "Direct" mode is enabled. All telegrams received are routed to the RS-485 bus. As soon as a transmitter has been taught-in to the gateways' input filter, the "Direct" mode is enabled. Only the telegrams highlighted in the input filter are still routed to the RS-485 bus.

S4 button – Reset

When the S4 button is pressed, faults displayed by the LEDs are reset.

3.3.4   Display components

LED L1 power supply

LED L1 lights up - power supply correct.
LED L1 does not light up - no power supply applied or power supply unit in the
           gateway faulty.

LED L2 data communication

LED L2 flickers - data communication takes place on the RS-485 bus.
LED L2 does not light up - no data communication is enabled on the RS-485 bus.

Teach-in mode/input filter

LED L3 does not light up - normal mode is enabled.
LED L3 lights up - teach-in mode is enabled.
LED L3 flickers - input filter is turned off.

Fault display

Faults are displayed by cyclical flashing packages.
LED L4 off - no fault present.
LED L4 flashing packages with double flash - no ACK telegram received from the
           master.
LED L4 flashing packages with triple flash - the receive buffer is full - neither RMT
           nor RRT telegrams to the masterare/have been possible.
LED L4 flashing packages with quintuple flash - the input filter is full. Send appropriate
           telegram to master.

Miscellaneous messages

LED L5 may be freely used by the master.

4   Thermokon System hardware and properties

RS-485 uni-/bidirectional wireless gateways	

4.1   General information

The standards, data, instructions and descriptions below apply to Thermokon devices. The function also corresponds to a gateway.

In Chapter 4.2 and 4.3, the Thermokon devices differing from the general properties are described.

4.1.1   Norms and standards

EC conformity:	2004/108/EC Electromagnetic Compatibility R&TTE 1999/5/EC Radio and Telecommunications Terminal Equipment Directive
Product safety:	2001/95/EG Product safety
EMC:	EN61000-6-2: 2005 EN61000-6-3: 2007 ETSI EN301-489-3:2001 EN61000-3-2: 2006 EN61000-3-3: 1995+A1+A2
Product safety:	EN607301: 2002

The general approval for wireless operation applies to all EU nations and to Switzerland.

4.1.2   Technical data

General Information	
Supply voltage	15…24 VDC/24 VAC +/10 %
Power consumption	model. 0.6 W/1.5 VA
Antenna	External reception antenna with magnetic base (supplied)
Terminating resistance	120 Ohm, can be enabled by jumper
Terminal	Screw terminal max. 1.5 mm²
Housing	Lower part: PA6 material, white cover: PC material, water-clear colour
Protection degree	IP42 in accordance with EN60529
Ambient temperature	-20…60°C
Transport	-20…60°C/max. 70% relative humidity, non-condensing
Weight	110 g (excl. external battery)
Interface	RS-485 - EVC, multiple access communication, baud rate configurable (9600, 19200, 38400 or 115200 baud)

4.1.3   Safety note

Caution: Installation and assembly of electrical devices must be carried out only by a qualified electrician. Disconnect installation before removing cover (switch off protection).

The modules must not be used in connection with devices which serve human health or life-preserving purposes, directly or indirectly, or the use of which could cause risks to people, animals or property.

4

4.1.4   Assembly note

The module housing is prepared for direct flush installation. A separate external 868 MHz reception antenna (supplied) is essential for operation.

- The antenna with its magnetic base should be centrally assembled on a 180 mm × 180 mm metal plate (material: galvanised steel sheeting, see accessories).

- In rooms, the antenna should be assembled 1m underneath the ceiling.

- The antenna should face vertically downwards.

- Minimum distance from wall - 90 mm.

- Distance from other transmitters (e.g., GSM/DECT/ Wireless LAN/ EnOcean transmitter) should be at least 2 m.

- The antenna cable should be run inside the electrical installation duct.

- Crushing the cable must be avoided at all costs.

- The extension cable's minimum bending radius is 50 mm.

- While running the cable, the use of an extractor should be avoided, to prevent damage to the sleeving or the plug connections.

4.1.5   Electrical connection

The devices are designed for use on 24 VAC/DC. For making the electrical connections to the device, the manufacturer's technical data apply.

The devices must be operated at a constant operating voltage. Power surges/voltage peaks must be prevented by the customer while switching the supply voltage on/off.

4
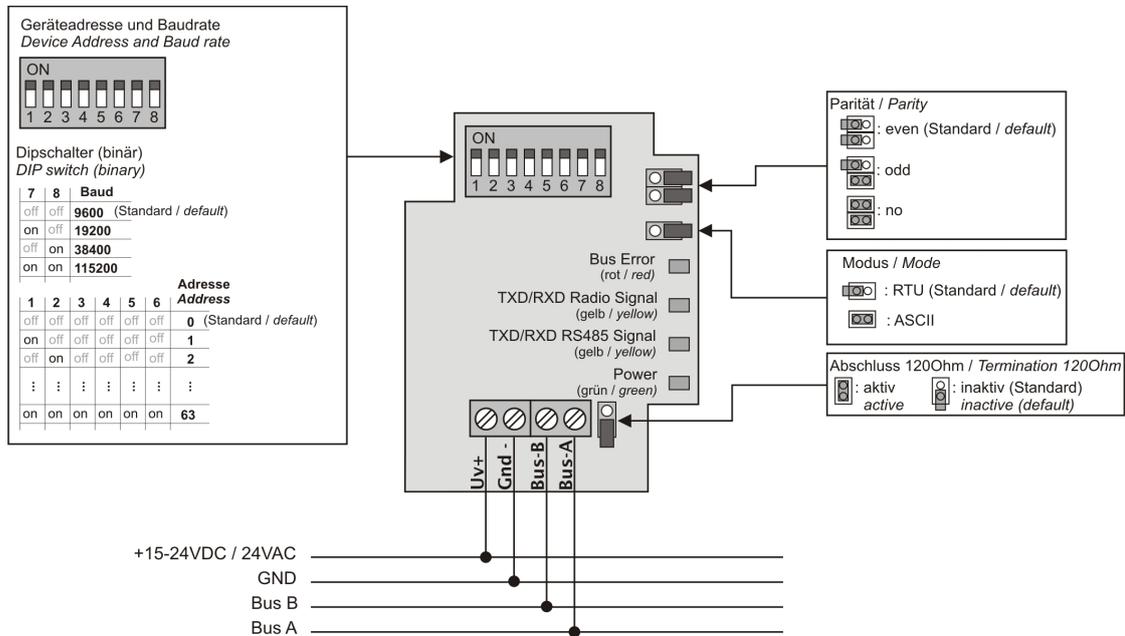
The RS-485 bus terminating resistance can be enabled by closing the "120 Ohm termination" jumper.

4.2 Thermokon SRC65-RS485

RS-485 uni-/bidirectional wireless gateways	

4.2.1 Application

Receiver for wireless sensors or buttons which are based on EnOcean wireless technology and controllers or control systems with RS-485 interface.

Direct transmission of all wireless telegrams received via serial telegrams to controllers or control systems.

Details of the communication protocol are described in the manufacturer's particular software documentation (see appendix).
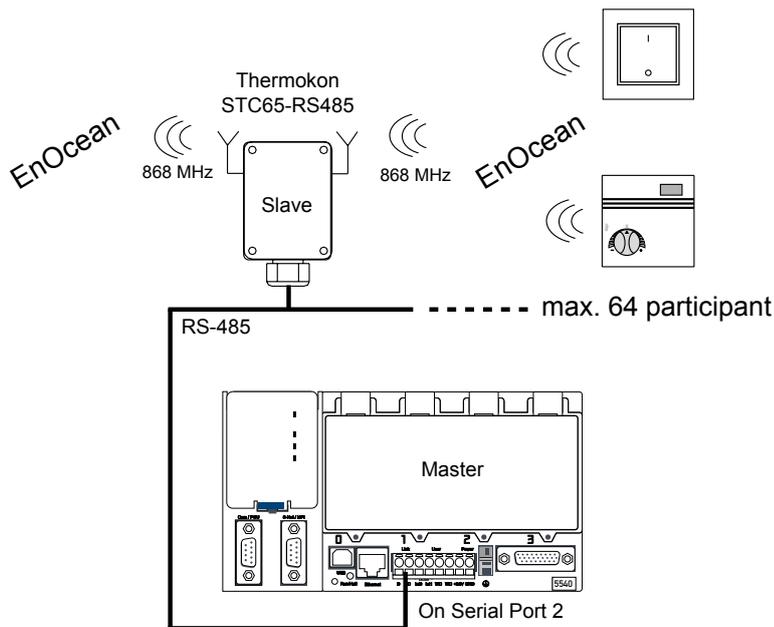
4.3   Thermokon SRC65-RS485

RS-485 uni-/bidirectional wireless gateways	

4.3.1   Application

Bidirectional gateway for sensors and actuators which are based on EnOcean wireless technology and controllers or control systems with RS-485 interface.

The STC65RS485 makes it possible to receive and transmit wireless telegrams which correspond to the EnOcean communications protocol.

Details of the protocol are described in the manufacturer's particular software documentation.
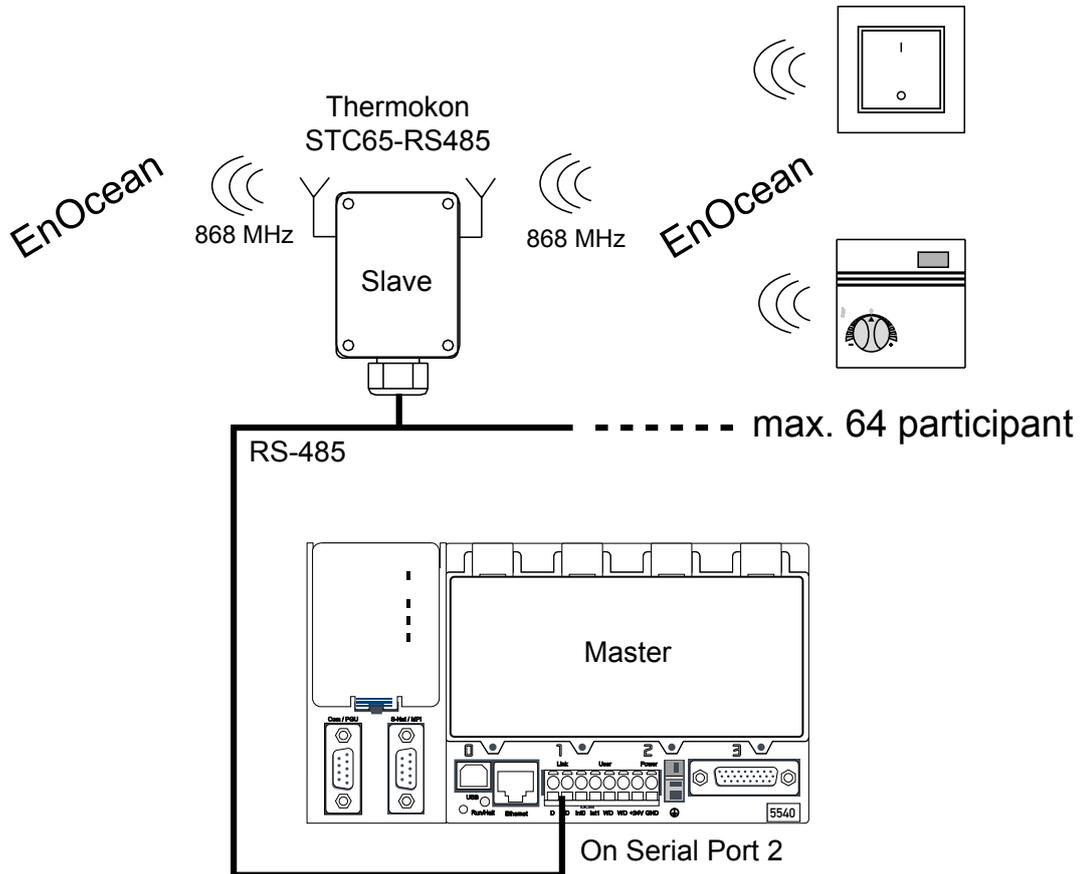
4.4 Device dimensions

4.4.1 Dimensions (mm)

Gehäuse
Enclosure

Stecker FME „m - male"
Connector FME „m - male"

Stecker FME „f- female"
Connector FME "f - female"

Externe Antenne
External Antenna
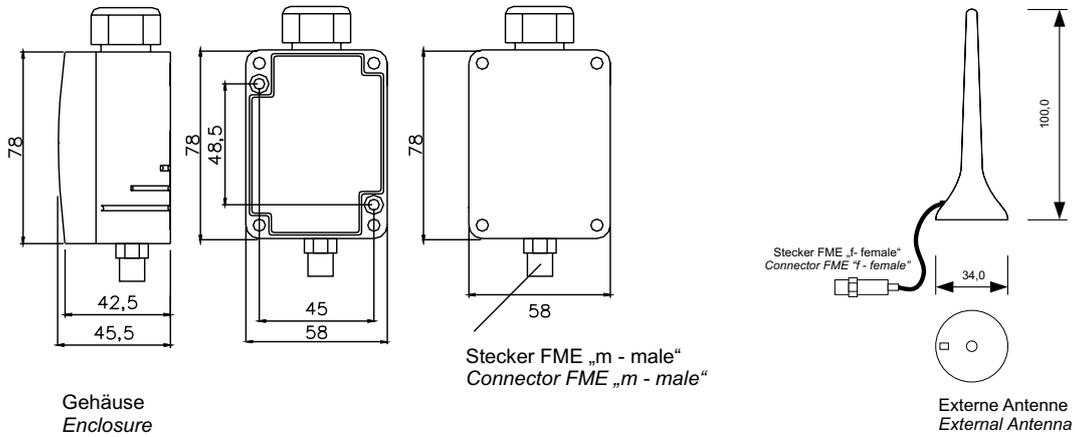
4.5 Accessories

4.5.1 Optional accessories

(D+S)   1 set (2 pieces each) plugs and screws

(ANT10)   Antenna extension cable 10 m

(ANT20)   Antenna extension cable 20 m

(AHA180)   Antenna bracket 180 mm x 180 mm

4.5.2 Dimensions of accessories (mm)

Antennen-Halterung
Antenna holding

(Platzierung Antenne)

(Mounting place of antenna)

Material: Eisenblech, magnetisch
Material: Iron, magnetic

Connector FME
"m - male"

Connector FME
"f - female"

Antennen-Verlängerungskabel
Antenna wire extension
ANT10: L=10m
ANT20: L=20m
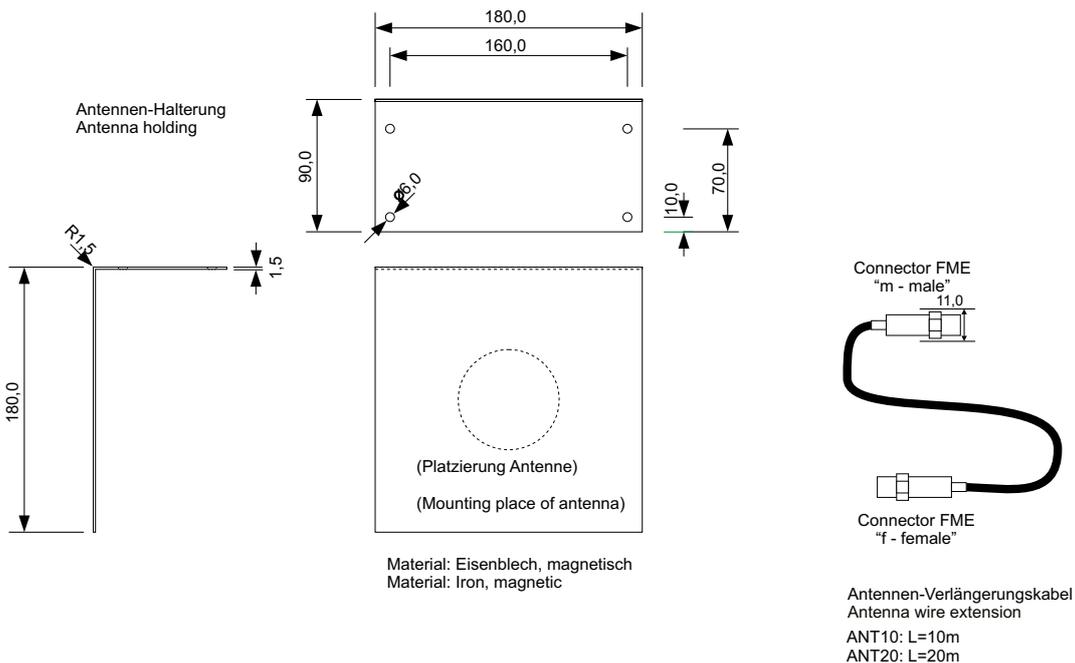
5   Commissioning/examples

In this chapter it is intended to show the commissioning of the two EnOcean systems in stages. The flow diagram shown further below displays the structure of this chapter. Of course, both systems may also be used simultaneously in a PCD. For this purpose, an RS-485 interface must be provided for each system.

Requirement:

PG5 1.4 from Version 300 | PG5 2.0 from Servie Pack 1 and the very latest EnOcean Fupla Library are installed on the computer.

5

The control used here in the sample project is a PCD3.M5540. Of course, another PCD control suited to EnOcean may also be used.

The EnOcean gateway is connected to Port 2 of the PCD3.M5540.

In the EnOcean Fupla Library, there are FBoxes additional to the standard EnOcean FBoxes, for incorporating the various EnOcean systems, such as, for example those of Omnio and Thermokon. The following pages are intended to show the application of these FBoxes from the EnOcean Library.

The following illustration shows the process for the sample program development.

5.1   → PG5 Projekt create „EnOceanToGo"

→ Which system?

5.2   → "Omnio" System   **5.4**   → "Thermokon" System

5.2.1 → Hardware Development   **5.4.1** → Hardware Development

→ PG5 SPM new CPU „Omnio"   → PG5 SPM new CPU „Thermokon"

→ New FUPLA file „EnOcean-Omnio"   → New FUPLA file „EnOcean-Thermokon"

→ Omnio Treiber- and Addressing Fbox → Thermokon driver Fbox

→ Build program and DnLd   → "Space control panel" Fbox insert for test purposes

5.2.2 → Gateway device addresses Specify online → Build program and download

→ Other gateways ? — Yes   **5.4.2** → Geräte-ID feststellen

→ No

5.2.3 → >1 Gateway on the bus — Yes → FBox „APG Filter" insert

→ No

5.3   → Insert "Buttons" Fbox for test purposes

→ Program DnLd + Test

→ Further program development

5.1   General information

In this commissioning description, it is intended to mention both EnOcean systems in the PG5 project.

Firstly, a new PG5 project called "EnOceanToGo" is being created for both systems.
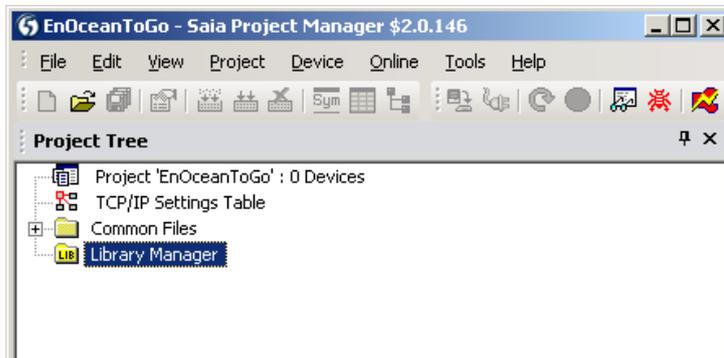
Next, this description concentrates on the Omnio system.

5.2 "Omnio" system commissioning

5.2.1 Hardware development
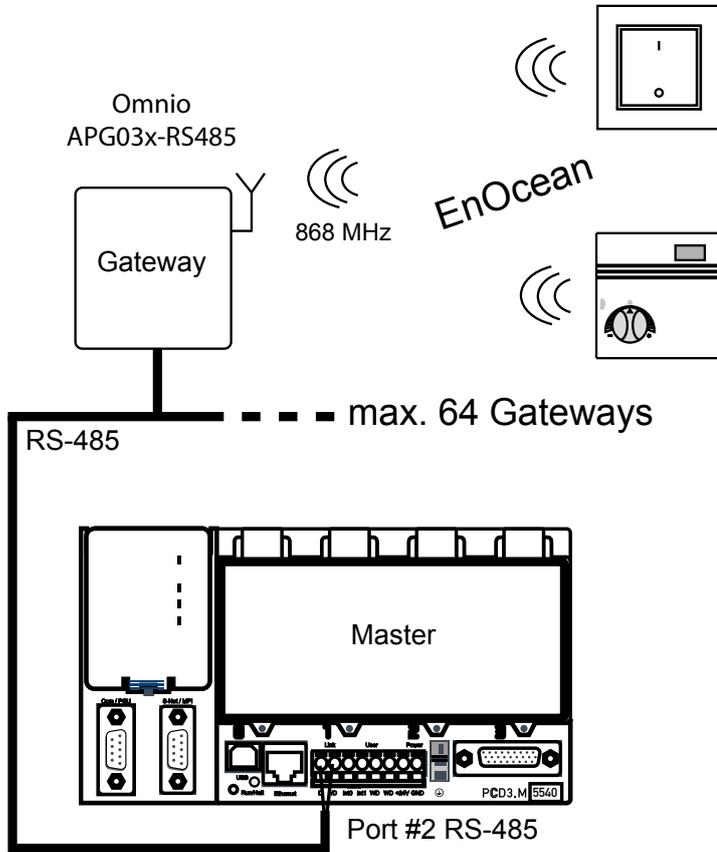
RS-485 EnOcean Network Wiring
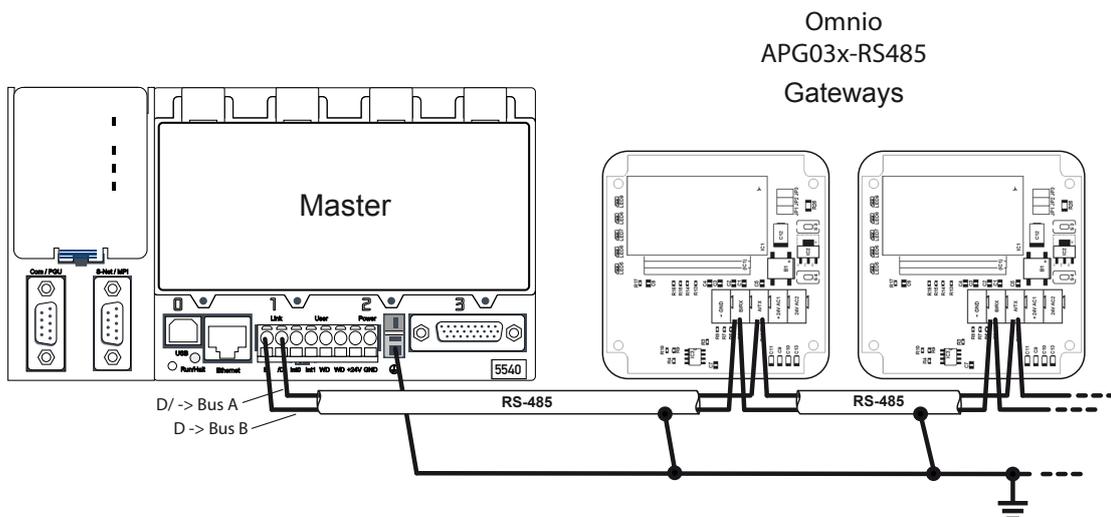
On the two outer devices, the terminating resistors <u>must</u> be connected to the cable. With the Omnio gateways, the J3 must be closed for that purpose. For the PCD control, it is necessary to consult the particular manual.

Device supply wiring

The gateway(s) is/are connected to the PCD as described in the following diagram.
The connection terminals are plugged in vertically to the circuit board (Note: pulling or plugging in is very sluggish).
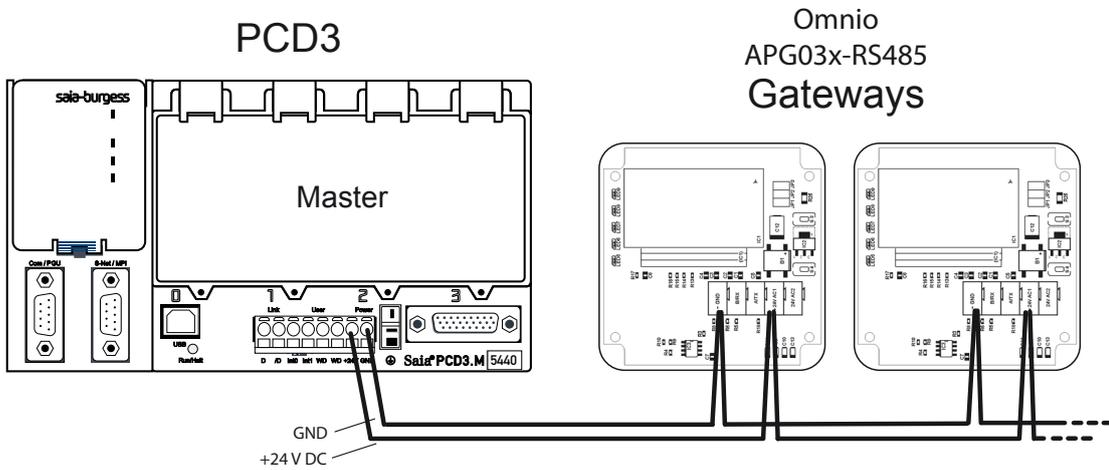
Feed either 24 VDC or AC (24 VDC in this case).

Setting baud rate
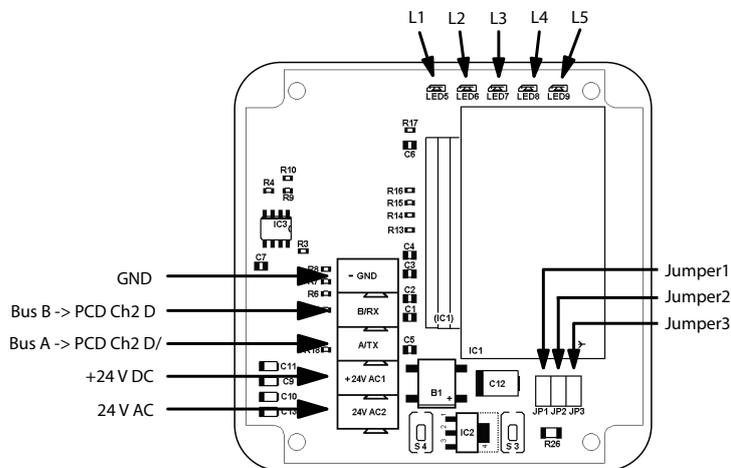
The baud rate may be set by two jumpers.

Baud rate	9600	19200	38400	57600
J1 Jumper	**on**	off	**on**	off
J2 Jumper	**on**	**on**	off	off

PG5 SPM new "Omnio" CPU

Next comes the program creation.

Creating the CPU named "Omnio".
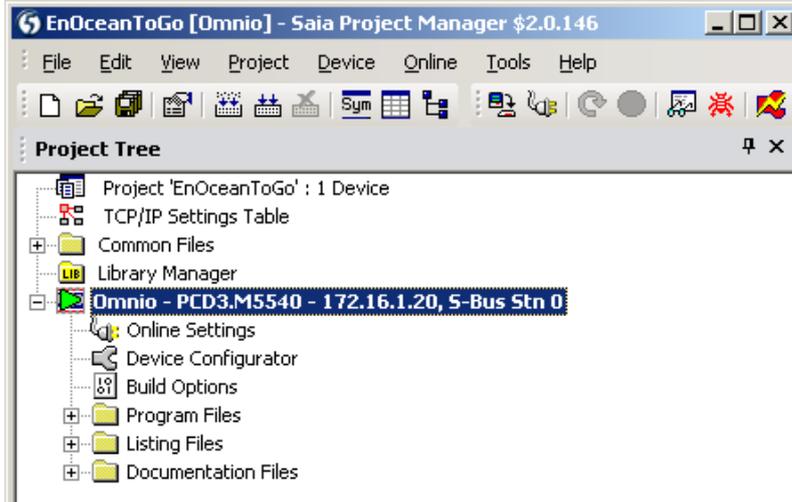
Create "Omnio" Fupla program.
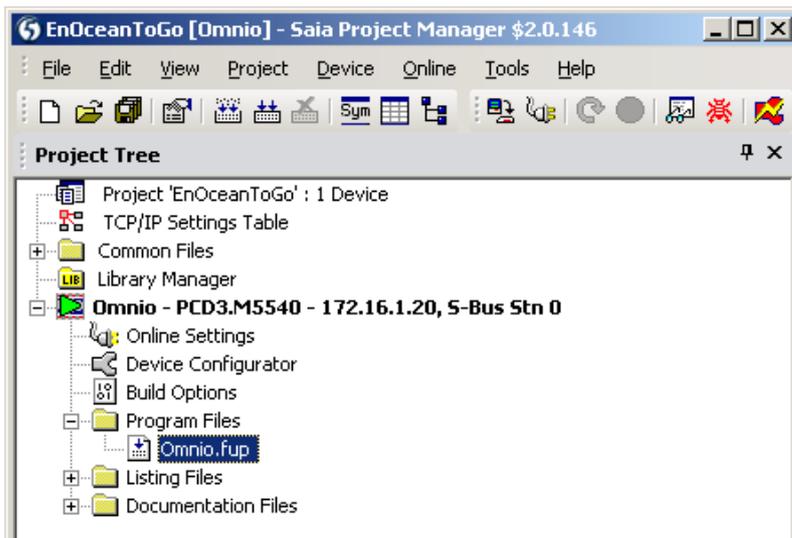
The adjoining illustration shows the Fupla page reproduction to be achieved for an Omnio system.
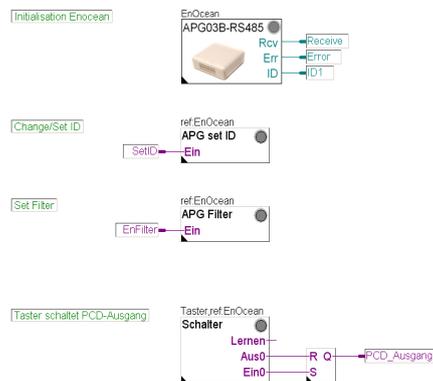
As mentioned previously, the EnOcean gateway bus is connected to Port 2 (orange PCD3 terminal) .

The PCD3's RS-485 interface must be initialised for the Omnio gateway bus.

For that purpose, the "APG03B-RS485" driver FBox must be inserted first in the Fupla. All the following EnOcean Omnio FBoxes must be referenced to this FBox!

5

The FBox's baud rate must match the baud rate set on the Omnio gateway device.

Address Gateways

On delivery, all the Omnio gateways have the address FFFFFF80h. If multiple Omnio gateways are operated in one network, the addresses must be adapted accordingly. This can be done with a tool from Omnio (www.omnio.ch) or with the "APG set ID" EnOcean FBox.

Preferably, the "APG set ID" FBox is also inserted in the same FUPLA page as the driver FBox.

A flag on the "APG set ID" FBox's "On" input makes it possible to switch it on or off during the PCD's RUN operation. Thus the Omnio gateway(s) is/are gradually given a new address.

The Omnio gateway participant number's possible range is between FF800000h and FFFFFF80h.

As it is possible to send a total of 128 wireless telegrams via each gateway, starting from the participant number, the participant address must differ from gateway to gateway by the value of 80h in each case.

Example of 5 gateways

Gateway	Participant number
1	FF800000h
2	FF800080h
3	FF800100h
4	FF800180h
5	FF800200h

> In order to prevent misuse, the participant number may be changed a maximum of 10 times, then no more.

The whole thing now looks roughly as follows:

At this point, there is the opportunity to test the whole thing and give its address to the gateway.

Compile program and load to the PCD.

5.2.2 Specify gateway device addresses online

The starting situation is as follows:

1. Only the gateway on which the change of address is to be executed is enabled (receiving power).

2. The program has been loaded to the PCD and is in RUN mode.

3. The Fupla program is displayed in the Fupla editor and switched to "online".

The default address for every Omnio gateway is FFFFF80.
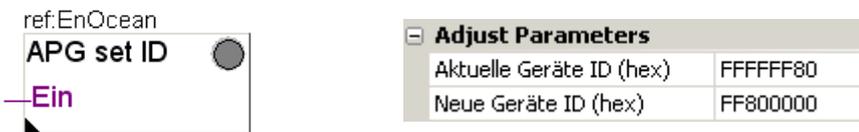
In order to submit a new address to the gateway with the "APG set ID" FBox, you must proceed as follows:

1. In the "APG set ID" FBox's "Old Device ID" field, the original address must be entered first of all.

2. The new address is entered in the New Device ID field.

3. By holding the S3 button-down for 3 seconds, place the Omnio gateway in "Learn mode".

4. The flag for the FBox's "En" input must be on "high" (Hint: double-click the flag).

5. The address is written in the FBox, using the "Execute" button.

6. After the successful write, the Omnio gateway must be switched back again from "Learn mode" to normal mode, by holding down the S3 button again for 3 seconds, and the flag must be switched off. Otherwise, the gateway will cease to respond to the transmitting sensors.

For other gateways, this section beginning at Chap. 5.2.2 must be repeated until all the gateways have been addressed.

5

5.2.3   More than one gateway on the bus

If more than one gateway is connected to the same bus, it is bound to result in telegram collisions, because one transmitter affects all the gateways at the same time (if it is within range). In order to prevent this, it is advisable to use the filter contained in each gateway. The transmitter IDs belonging to the filter are entered in its internal list.

In order to enable this filter and specify its transmitter list, the "APG Filter" FBox or the manufacturer's SW tool may be used.

The gateway ID is entered in the "Device Identifier ID" field. Then the IDs of the sensors received by this gateway may be entered in the table. If the "En" FBox input is set, the FBox will transfer the list to the gateway.

The Fupla page now looks as follows:
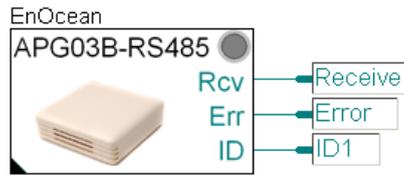
As soon as this "APG Filter" FBox has also been programmed and is running in the PCD, you must proceed as follows:

Fupla editor > online > "APG filter" FBox opened = "Adjust Window":

By pressing the "Execute" button on the "Write filter table" row, the table is transferred to the gateway. On pressing the "Read filter table" button, the saved filter table is read out.

If you wish to switch the filter off, the "List" item may be switched to Disabled. This "offline parameter" is transferred to the "online parameters" by the green arrow key and switched to Disabled by pressing the "Write filter table" button on the gateway.

5.2.4   Program first "Buttons" operator control panel.

For this purpose, the "Buttons" FBox is accepted by the program. A PCD outlet should be connected in conjunction with an "RS model flip- flop" FBox.

Does the FBox reference match the driver FBox?

A PCD outlet should be connected in conjunction with an "RS model flip- flop" FBox.
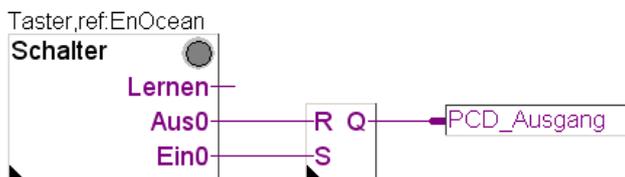
The circuit alters the PCD output status each time the button is pressed.

Chapter 5.4 continued

5.3   "Thermokon" system commissioning

5.3.1   Hardware development
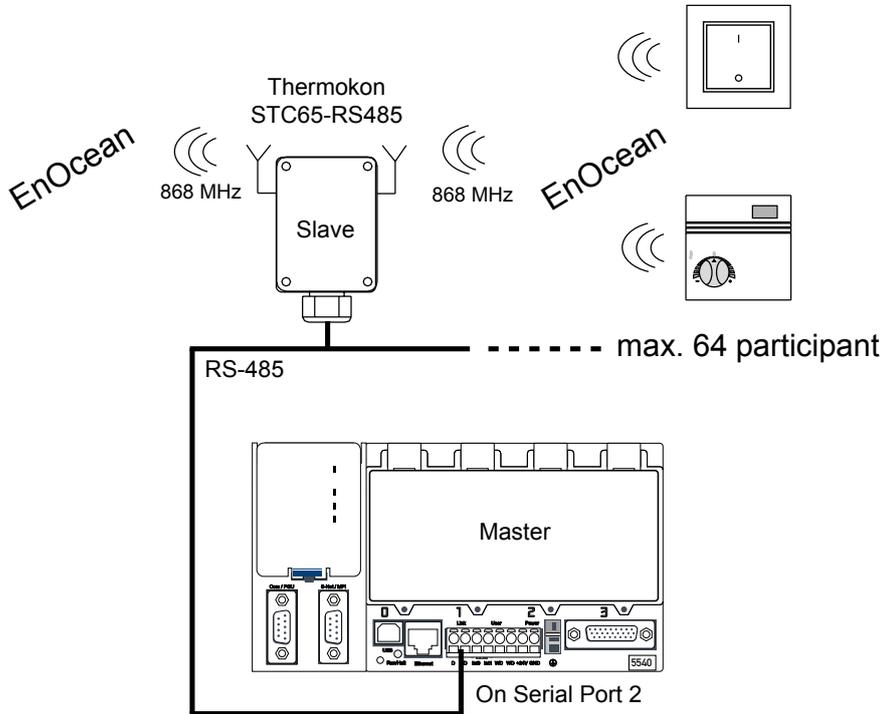
In this example, a Thermokon STC65-RS485 space control panel with transmitting facilities is used.

RS-485 EnOcean Network Wiring
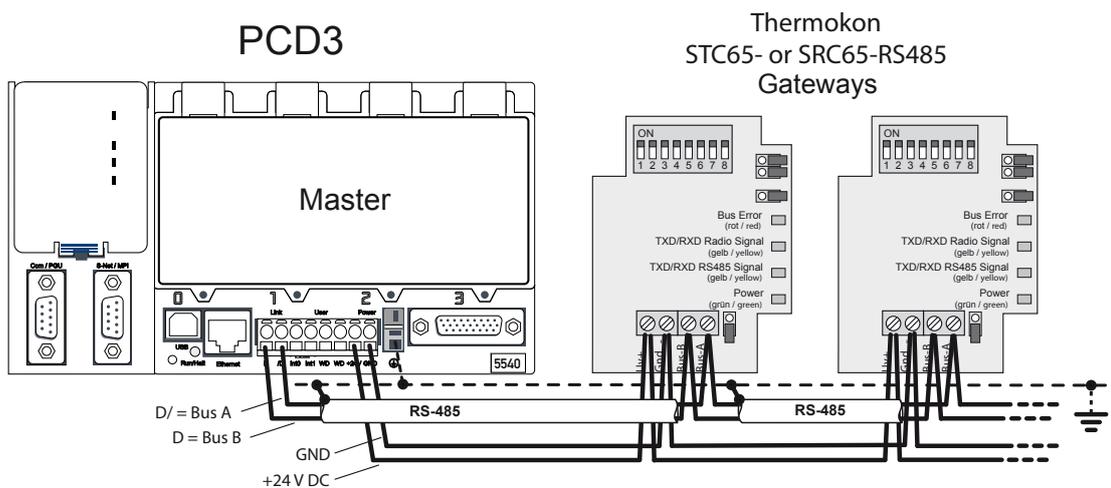
In the devices, the bus terminating resistors must be placed on the ends of the bus (see Chap. 4.1.5 and relevant PCD hardware manual). Alternatively, the PCD7.T160 termination boxes from Saia Burgess Controls may be used.

The baud rate and the device address are set by the DIP switches.

The same communication parameters must also be set in the driver FBox.

Adjust Parameters	
Kommunikation seriell	
Schnitstelle	Port 2
Baudrate	38.400
Parität	Ohne (N)
Empfangen	
LiveCheck Zeitfenster, Min	60

5

PG5 SPM new "Thermokon" CPU

Next comes the program creation.

Creating the CPU named "Thermokon".
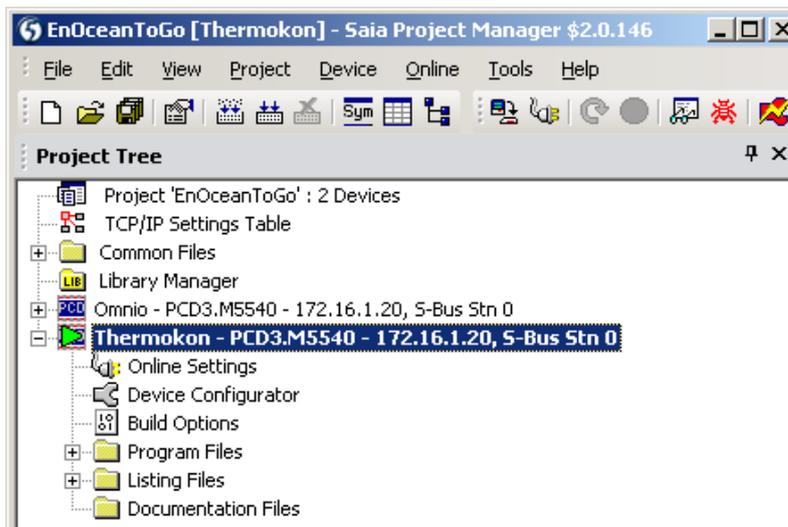
Create "Thermokon" Fupla program.
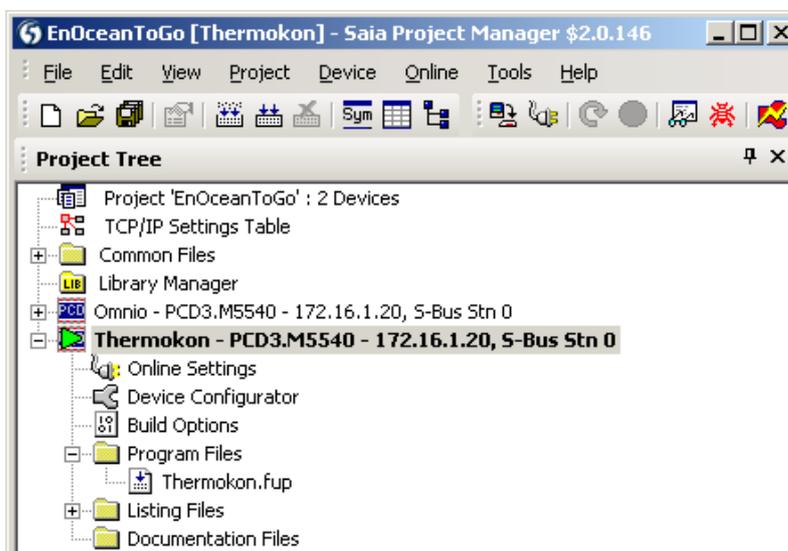
In the example, the EnOcean gateway is connected on Port 2 (orange PCD3 terminal).

The PCD3's RS-485 interface must be the first to be initialised for the Thermokon gateway. For this purpose the "SxC-RS-485 EVC" driver FBox must be used before the following EnOcean FBoxes. They must be referenced to the driver FBox! In this case, "EnOcean".

FBox "SxC RS-485 EVC" is responsible for the interface initialisation and communication for the gateways.

5

Adjust Parameters	
Kommunikation seriell	
Schnitstelle	Port 2
Baudrate	38.400
Parität	Ohne (N)
Empfangen	
LiveCheck Zeitfenster, Min	60

If "STC RS-485 EVC" bidirectional gateways are also used, the FBox of the same name is also required. Using this box, it is also possible to determine the devices' ID.

Adjust Parameters	
Thermokon Geräteadresse	0

The "Thermokon device address" is the address set on the DIP switch inside the device (default 0).

The initialisation of the Thermokon bus system is displayed in the following illustration.

The PCD's baud rate must match the baud rate set on the gateway!

5.3.2   More than one gateway on the bus

With the Thermokon gateway it is not possible to define a filter. But since the Thermokon gateway distributes each telegram three times at different intervals, it is much less probable that telegrams should be lost. The LED named "Error" on the Thermokon gateway indicates whether the bus is currently busy. This is not a transfer error.

Programme first "SR04PST space control panel" operator control panel

For this purpose the "SR04PST" FBox is accepted by the program and the FBox outputs are transferred to empty PCD outputs, for testing purposes.
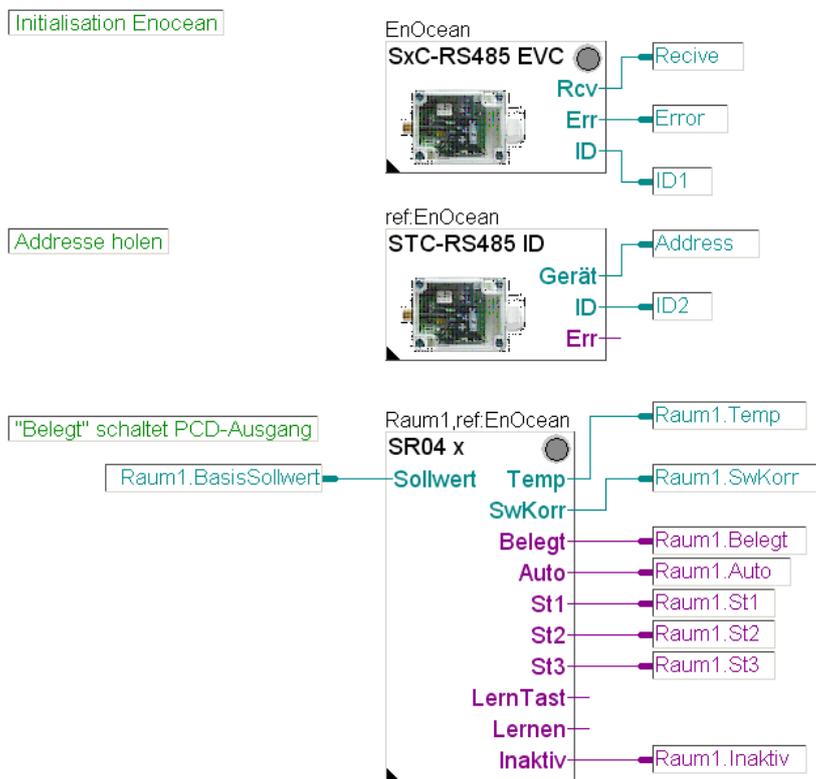
Does the FBox reference match the driver FBox (EnOcean)?

If the device ID is known, it must be entered in the "SR04 x" FBox under Device ID, as a hex number. If the ID is not known, the program must be loaded to the PCD and the number read off in RUN mode, at the SxC-RS485 FBox "ID" ouput, online in the Fupla, and then entered.

General	
(Name)	Raum1
Reference	EnOcean
Comment	GebäudeA, 1.Stock, Nord
Adjust Parameters	
Geräte ID (hex)	F34A
Auswahl Gerätetyp	...
Sollwert	
Korrektur minimum	-3.0
Korrektur maximum	3.0
Temperatur	
Kalibrierung	0.0
Static Symbols	
Advanced Info	

5.3.3 Specify gateway device ID online

Since, in fact, every EnOcean FBox must be parameterised with a device ID of the appropriate transmitter and the transmitter's device ID must thus be read off from the particular driver FBox in PCD RUN mode and entered manually in the appropriate FBox, a mechanism has been implemented which is called "Teach Mode". The FBox's learn mode can be enabled in RUN mode.

The starting situation is as follows:

1. Only the gateway of which the ID is to be acquired is enabled (receiving power).

2. The program has been loaded to the PCD and is in RUN mode.

3. The Fupla page with the FBox is displayed in the Fupla editor and switched to "online".

4. No errors are displayed except for the "SR04 x" FBox LED. If, in fact, they are, please remedy them before continuing.

Firstly, an adjustment must be made in the Adjust window[*] of the "SR04 x" FBox.

[*] As a reminder: Adjust window > click FBox with the right mouse button and, with the left mouse button, click the "Adjust Parameters... " option in the menu that appears.

The FBox is intended for multiple device models. So that it functions correctly, the "PST" entry must be selected under " Device Model Selection" for the "SR04PST" Thermokon device used in this example.
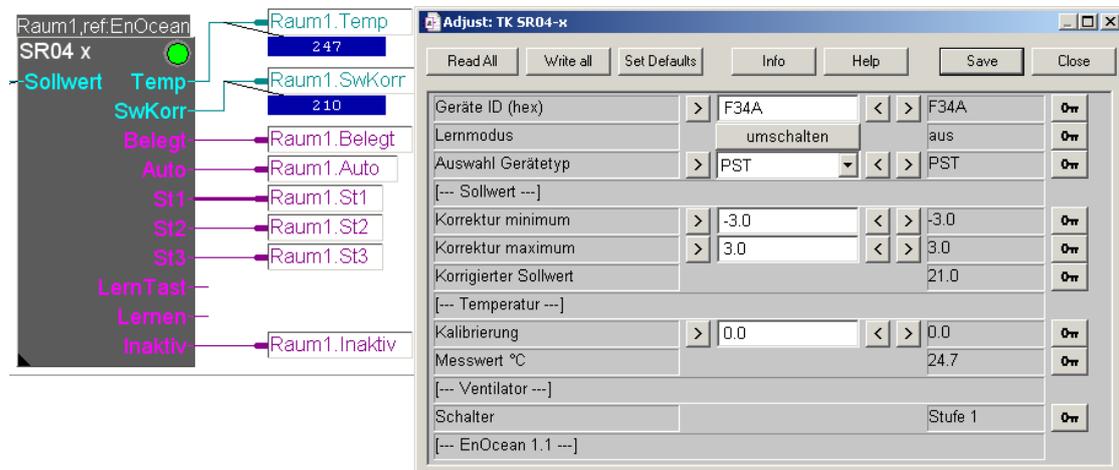
Next, the "Learn Mode" is enabled by the "Switch" button.

After it has been enabled, the FBox driver tries to automatically detect the device which is to be linked to the FBox in learn mode. In order to do that, it is essential to send 1 telegram approx. every second with the operator control panel (switch and space operator control panel). This can be done by rhythmically pressing the rocker switch or the learn button on the device button. If, within 5 seconds, the driver FBox detects 3 telegrams with the same device ID at an interval of approx. 1 second, this device ID is automatically transferred to the FBox in learn mode and the learn mode is terminated.

If it has not been possible to detect this automatically, for example, because of over-heavy wireless traffic or the telegrams been speeded up out of rhythm, the ID must be entered manually and the learn mode terminated.

5.4   Compile program and load to PCD

Thus the whole thing can be examined clearly and easily.

5.5   Further program development

Other devices can be accepted by the program. Care must be taken to ensure that the reference for the driver FBox and the particular device ID in hex form are not forgotten.

5

5.6   General EnOcean FBoxes

From this point on, the general EnOcean FBoxes used in the example are described.

5.6.1   Buttons
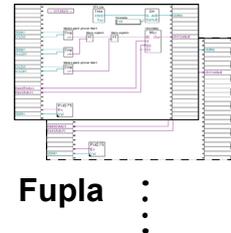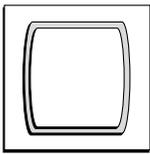
5.6.2   SW button
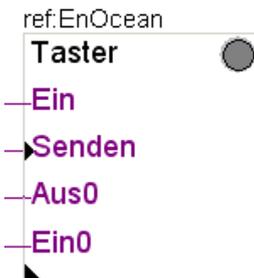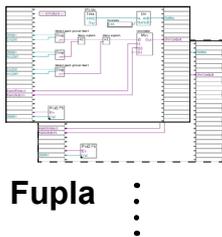
5.6.5   AP 230 PIR
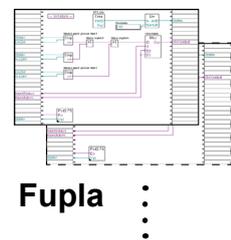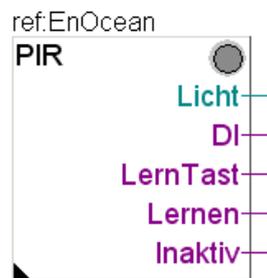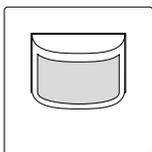
For the

5.6.3   Door/window contact (handle)
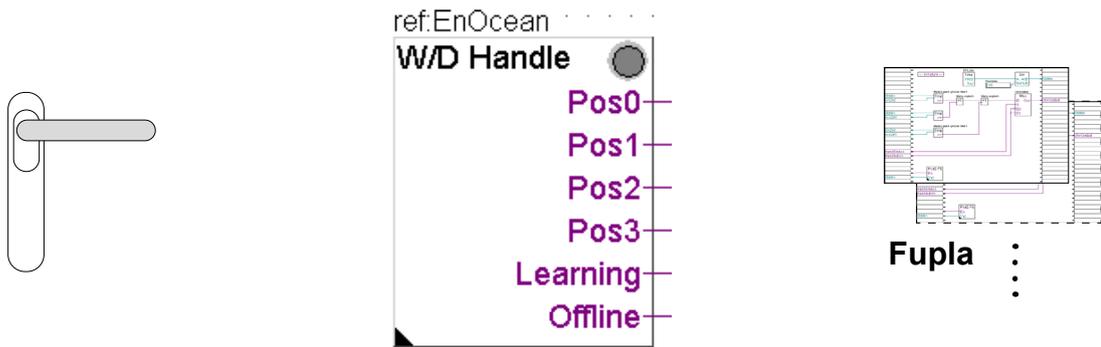
Fupla

5

Online

If the handle FBox has not yet been initialised, items 0, 1 and 2 are set to high, as the handle position is transferred only in the case of action. When idle, it does not transmit any signal. As soon as the handle is pressed once, it regains the correct position.

By pressing the toggle switch in the adjustment window, the FBox is set to "Learn Mode". If the handle is now pressed a few times (approx. 4 times) the address is imported and the " Learn Mode" automatically reset to OFF. Of course, the address can also be entered in the FBox. As a rule, there is a sticker with the ID on every EnOcean device.

5.6.4   SR04PST space control device

Online

The data from this space control device are transferred every 100 ms (EnOcean standard).

Online If you set the device to "Learn Mode", you can speed up recognition by pressing the Presence button (about four times). As soon as the device has been recognised, "Learn Mode" is set to OFF again.

This FBox can be used for various space control panels. The module model may be selected in the FBox. This can usually be seen on a sticker inside the housing, together with the ID.

5.6.5   RFFA Sensortec space sensor
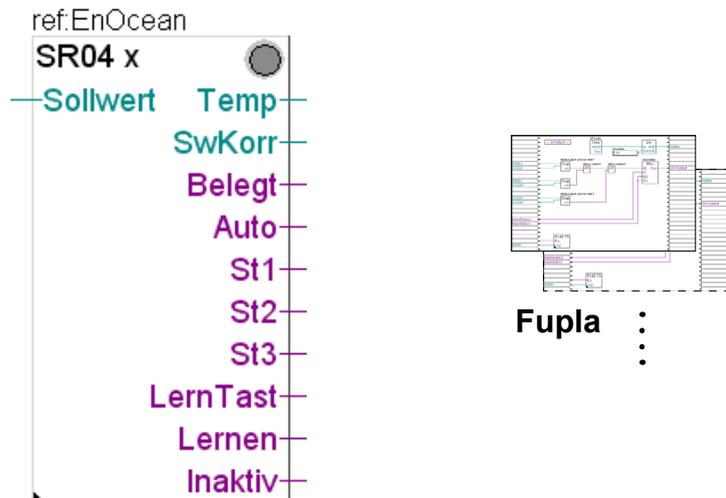
This space sensor still does not have its own FBoxes. It can, however, be operated by the SR04x FBox. It delivers, however, only one room temperature - all the other outputs are not in use. This room sensor also transmits every 100 ms.

Online For the learn mode there is one button inside the housing. As soon as the ID has been recognised, the "Learn Mode" is set to OFF. The ID can be read off in the inside of the housing and entered directly in the FBox under device ID (hex).

6 Software

Saia Burgess Controls programming software PG5

The PG5 programming software with the "EnOcean" FBox Library from Saia Burgess Controls makes communication even more convenient, thanks to support from bidirectional transceivers. Not only can information be received but switching and set point commands can also be executed.

This technology can be easily and efficiently incorporated in the Saia Burgess Controls world of automation. With one or more EnOcean® couplers installed independently in the building, wireless room control panels can be transferred to the automation level without any difficulty.

Features

■ Communication via RS-485 und connection to a maximum of 64 couplers.

■ Many commercially-available EnOcean® components are supported.

■ The communications driver also supports bidirectional communication.

■ Function object library for suitable EnOcean® components.

■ Intuitive engineering and easy commissioning.

■ Event-controlled communication, no stressing of network resulting from polling.

Example of a driver circuit in PG5 Fupla editor
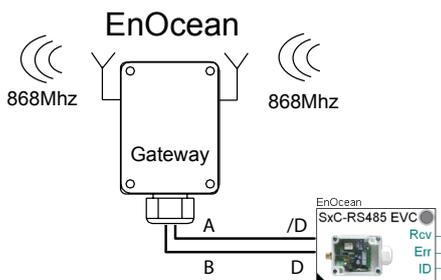
Example of a logical connection of an FBox to a space control panel.
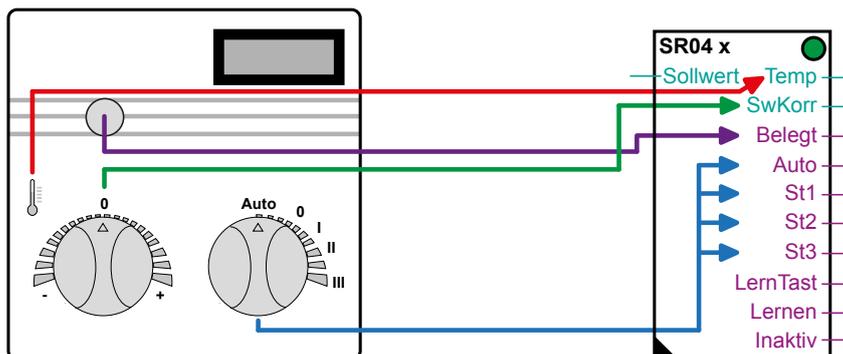
6.1   PG5 software version

The Saia Burgess Controls "EnOcean" Fupla Library functions from the PG5 1.4 Version 300 | PG5 2.0 from Servie Pack 1

6.2   "EnOcean" Fupla Library

The following EnOcean FBoxes are available (as at June 2010):
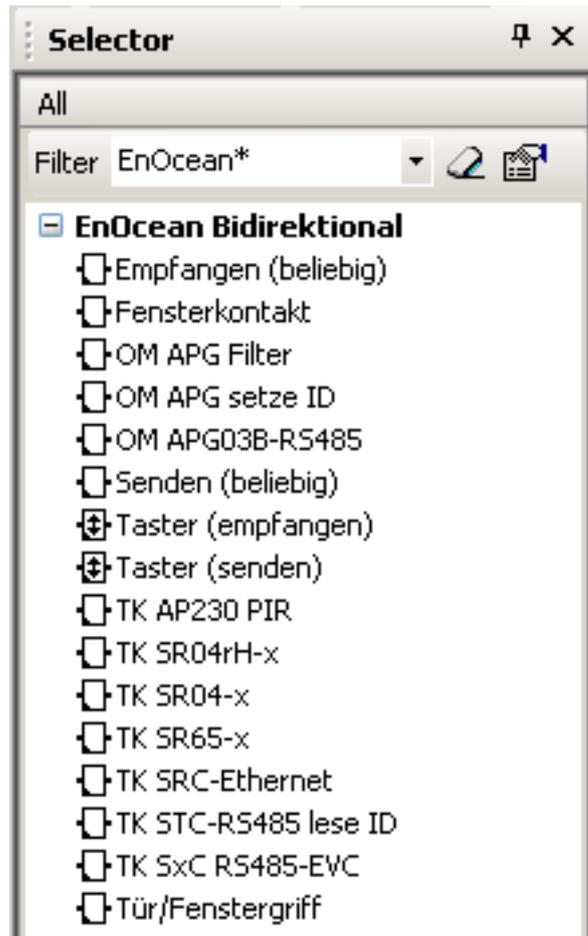
"OM..." stands for Omnio devices and "TK..." for Thermokon. All the others are general EnOcean-FBoxes.

Below is a brief overview of the EnOcean FBoxes.

6.2.1　FBoxes overview

FBox Group	Description	Fupla FBox
EnOcean general	**Receiving (user-defined)** This FBox will receive any telegram from the ID-specified device.	ref:EnOcean Empfang ● Empfang Typ Org Data0 Data1 Data2 Data3 Status Lernen Inaktiv
EnOcean general	**Window contact** Battery-free window-wireless contact for monitoring status of windows or doors.	ref:EnOcean Fenster ● Kontakt LernTast Lernen Inaktiv
EnOcean general	**Switch (receive)** Battery-free wall-mounted or hand-held switch for operating lights, blinds, doors etc.	ref:EnOcean Taster ● Lernen Aus0 Ein0
EnOcean general	**Switch (transmit)** Functionally, this FBox corresponds to a real EnOcean switch, with one or two rocker switches, to send a switch command to an EnOcean device.	ref:EnOcean Taster ○ —Ein →Senden —Aus0 —Ein0

6

FBox Group	Description	Fupla FBox
EnOcean general	**Transmit (user-defined)** This FBox transmits telegrams via a transceiver specified by device ID.	ref:EnOcean Senden Ein Senden Typ Org Data0 Data1 Data2 Data3 Status
EnOcean general	**Door/window handle** Battery-free window handle radio contact for monitoring status of windows and doors. EnOcean standard-based communication with the receiver by means of wireless telegrams.	ref:EnOcean T/F Griff Pos0 Pos1 Pos2 Pos3 Lernen Inaktiv
Omnio	**APG03B-RS485** Driver FBox for switching from Omnio EnOcean receivers to the PCD via an RS-485 serial interface.	EnOcean APG03B-RS485 Rcv Err ID
Omnio	**APG set ID** Allocating a new basic ID for a receiver/transceiver	ref:EnOcean APG set ID Ein
Omnio	**APG Filter** Set or read the filter table for an Omnio receiver/transceiver.	ref:EnOcean APG Filter Ein
Thermokon	**TK SRC-Ethernet** Communications driver FBox This box must be placed in front of the other EnOcean FBoxes. The FBox reference name connects the Send/Receive FBoxes with this driver FBox.	EnOcean SRC-Ethernet En Rcv Err ID IP ????
Thermokon	**TK STC-RS485 read ID** FBox for reading the device ID of the bidirectional STC-RS485 EVC gateway.	EnOcean SxC-RS485 EVC Rcv Err ID

6

FBox Group	Description	Fupla FBox
Thermokon	**TK SxC RS485-EVC** Driver FBox for switching Thermokon EnOcean receivers to the PCD via a serial interface.	ref:EnOcean STC-RS485 ID Gerät ID Err
Thermokon	**TK AP230 PIR** Wireless movement sensor.	ref:EnOcean PIR Licht DI LernTast Lernen Inaktiv
Thermokon	**TK SR04-x** Space sensor for temperature control. Built-in temperature sensor, rotary knob for setting target value, rotary knob for selecting fan speed and Presence button.	ref:EnOcean SR04 x Sollwert Temp SwKorr Belegt Auto St1 St2 St3 LernTast Lernen Inaktiv
Thermokon	**TK SR04-x** Space sensor for temperature control. Built-in humidity and temperature sensor, rotary knob for setting target value and Presence button.	ref:EnOcean SR04rH x Sollwert Temp Feuchte SwKorr Belegt LernTast Lernen Inaktiv
Thermokon	**TK SR65-x** Outdoor sensor connection for measuring temperature or for use as a digital input.	ref:EnOcean SR65 x Temp Batt DI LernTast lernen Inaktiv
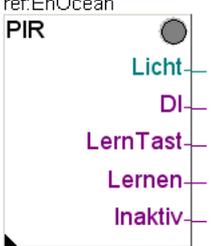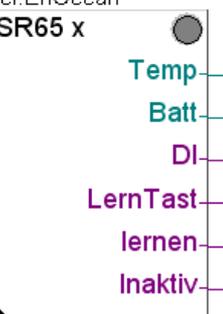
6.3   Program development

An EnOcean Fupla file might look as follows (in Omnio System example):

Description	per FUPLA file	Fupla FBox
Per serial RS-485, one driver FBox for switching from Omnio EnOcean receivers to the PCD. FBox reference name: EnOcean	1x	
For commissioning purposes		
Allocating a new basic ID for a receiver/transceiver. FBox reference for driver: EnOcean	1x	
Set or read filter table for an Omnio receiver/transceiver. FBox reference for driver: EnOcean	1x	
During operation		
EnOcean buttons	per device	
other FBoxes for EnOcean devices	user-defined	…
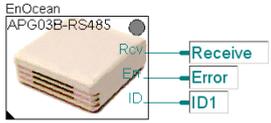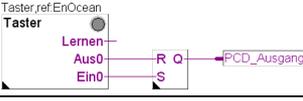
The FBoxes shown in this table support the Omnio products. For other manufacturers such as Thermokon, the structure is similar (see Chap. 5.3).

One RS-485 interface per EnOcean-System (manufacturer).

7 Troubleshooting

Symptom	Possible cause	Solution
An error is displayed in the "Init" FBox, each time an EnOcean participant is sent.	Bad communication. The D and D connections could be wrongly executed.	Check wiring and correct if necessary.
Not every signal is recognised.	Distance between sensor and gateway too great.	Reduce distance.
	Insufficient power for transfer.	Better lighting from solar cell, possibly extra battery
	Distance from sensor parts too great (e.g., window contact)	Check/improve sensor installation
	Telegram collision, if a sensor is in the receiving range of multiple receivers	Switch on filter on the receiver
Many errors on the Init FBox	Terminal resistors missing on the bus.	Check bus and terminate.
	Telegram collision	Switch on filter on the receiver.
	RS-485 cable poorly shielded or not twisted	Check cable and replace.

7

A   Appendix

A.1   Icons

![i icon]	This symbol refers the reader to additional information, either in this manual, in another manual, or in technical documents on this topic. There are no direct references to such documents.
![ESD icon]	This icon warns the reader that parts may be damaged if touched, through electrostatic discharge. **Recommended:** At least touch the system's negative terminal (PGU plug housing) before coming into contact with the electronic components. It is even better to wear an earthed wristband connected to the system's negative terminal.
![! icon]	This icon indicates instructions which must be followed strictly.
![Classic icon]	Explanations next to this icon apply only to the Saia PCD Classic series.
![xx7 icon]	Explanations next to this icon apply only to the Saia PCD xx7 series.

A

A.2   Abbreviations

PG5	Product name of programming software Generation 5
Fupla	Editor function plan (PG5 component)
FBox	Function box in Fupla
EnOcean	
SPM	Saia Project Manager (PG5 component)
OM	stands for Omio, the manufacturer
TK	stands for Thermokon, the manufacturer

A.3   Individual proofs

(1   extract from Wikipedia. Search term EnOcean

A.4   Statutory regulations

The transmitters must not be used in connection with devices which serve human health or life-preserving purposes, directly or indirectly, or the use of which could cause risks to people, animals or property. Do not carelessly leave packaging material lying around, as plastic films/bags etc. can become a dangerous toy for children.

These operating instructions are an integral part of the product and of our conditions of guarantee. They must be given to the user. The devices' technical specifications cannot be modified without prior notice being given. The products may be sold and marketed without registration or charges in the countries of the European Union, Switzerland, Croatia and Romania.

Old devices

Do not throw out with the household rubbish. The device contains electrical parts, which must be disposed of as electronic scrap. The housing consists of recyclable plastic.

A

A.5   Company addresses

A.5.1   Address for Saia-Burgess Controls AG

Contact

Saia-Burgess Controls AG
Bahnhofstrasse 18
3280 Murten, Switzerland

Telephone switchboard   +41 26 580 30 00

Telephone SBC Support   +41 26 580 31 00

Fax   +41 26 580 34 99

Support

E-mail Support: support@saia-pcd.com

Support site: www.sbc-support.com

SBC site: www.saia-pcd.com

International representations &
SBC sales companies: www.saia-pcd.com/contact

Repair

Postal address for customers to return products in Switzerland:

Saia-Burgess Controls AG
After sales service
Bahnhofstrasse 18
3280 Murten, Switzerland

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A.5.2 Omnio

omnio AG | Gebäudesystemtechnik
Bächlistrasse 326 | CH-8426 Lufingen | Switzerland

Phone   +41 44 876 00 41
fax   +41 44 876 05 29

e-mail: info@omnio.ch
website: www.omnio.ch

A.5.3 Thermokon

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Phone   +49 (0) 27 72/65 01-0
fax   +49 (0) 27 72/65 01-400

e-mail: email@thermokon.de
website: www.thermokon.de

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