

## PG5 project example for room controllers PCD7.L60x



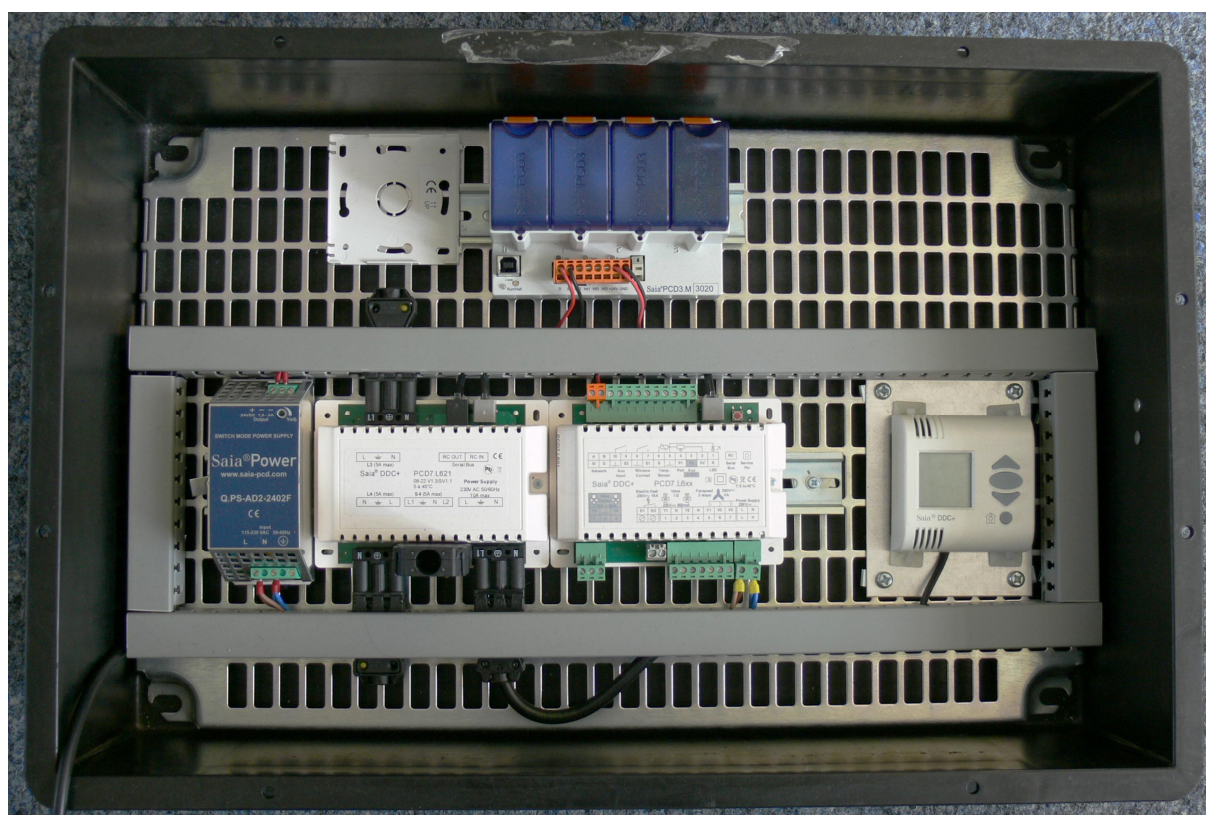
The PCD7.L6xx room controllers, based on Serial S-Net, are mainly used for HeaVAC applications with FanCoil devices, radiator/cooled ceiling combinations or VVS systems. The extension module for light and shade allows the electrical systems to be easily integrated into the room automation solution. Customer-specific operating concepts can be produced with the wide range of room control units. These room control units are connected to the room controller by cable, infra-red or wireless receivers.

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## Introduction

With the facility of an example, this document is intended to illustrate easy implementation of a control task with the help of a room controller from the PCD7.L60x series, the PCD7.L601. There will be implemented, in addition, the control of a PCD7.L621 Light & Shade module. And everything's controlled by a PCD7.L644 control unit.



More detailed information is contained in the PCD7.L60x room controller manual (26-854).

## Application description

### **Structure**

The application example consists of a room controller unit PCD7.L601 working as Fan-Coil application (4-pipe) for heating and cooling. Supplementary there's used an expansion module for two Lights- and one Shade purpose PCD7.L621 and also a control unit PCD7.L644.

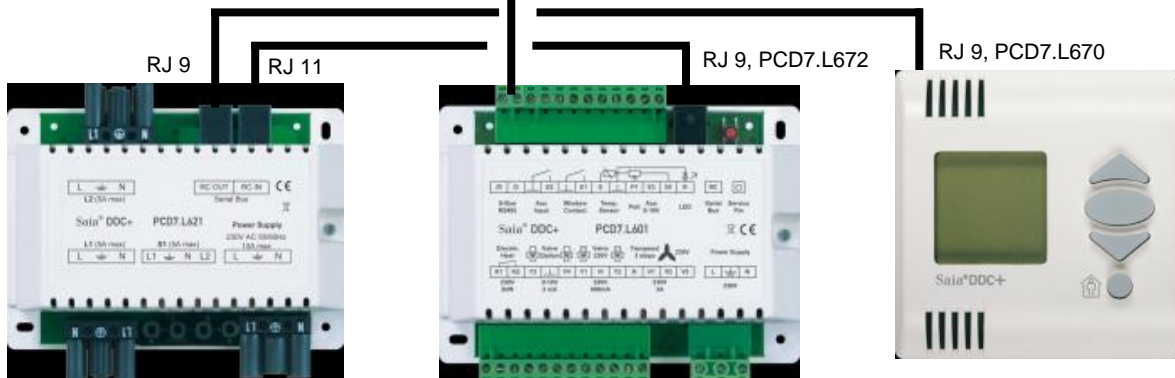
### **Window contact**

To allow energy savings, detecting is necessary of whether windows (or balcony doors) are closed. For this purpose a window contact sensor must be connected to the controller, which checks window position. If the window is open, all heating, cooling and air functions are inactivated and only frost protection mode remains active. Please also refer to the section "Troubleshooting" at the end of this document.

## Required Hardware



PCD3.M3020 CPU with battery module



PCD7.L621

Extension module to control  
 2 light-bands and 1 sun blind motor

PCD7.L601 Room-Controller

After configuration, this room  
 controller can also work  
 autonomously

PCD7.L644 Digital Room Operator Unit

Temperature sensor, function keys and  
 LCD display with programmable  
 functions for HVC, light & shade

Terminals on the single room controller are configured as follows:

Input E1	: window contact
Input E2	: without function
Input E3	: no function
Output V1, V2, V3	: 3 speed fan
Output Y1	: heating valve (PWM)
Output Y2	: cooling valve (PWM)
Output Y3	: free analogue output
Output Y4	: free analogue output

## Required Software

It is required as programming software PG5 2.0 with a valid licence.

This project can also be operated with other hardware. If so, the corresponding parameters must be adjusted in hardware and software configurations.

## Preparation of the project example

The demonstration project must be restored into PG5 2.0 and the PCD must be configured to communicate S-BUS Data Mode over the Onboard RS-485 terminal block. Configure this port as well as Master Gateway to access to the data of the extension module.

Device	
Type	Description
PCD3.M3020	CPU with 128 KBytes RAM, 4 I/O slots, USB, Profi-S-Net.

Onboard Communications	
Type	Description
RS-485/S-Net	RS-485 port for Profi-S-Bus or general-purpose communications (Terminalblock).
USB	Universal Serial Bus port, PGU or general-purpose.

Ethernet Protocols	
Section	Description
IP Transfer Protocols	FTP, HTTP Direct Protocols, ODM.
IP Protocols	DNS, SNMP, SNMP protocols.
HTTP Portal	HTTP Portal Communication For PCD Over Private Network.

Onboard I/O Slots		
Slot	Type	Description
Slot 0		
Slot 1		
Slot 2		
Slot 3		

Properties	
<b>Onboard : RS-485/S-Net</b>	
<b>Serial S-Bus</b>	
Port Number Serial S-Bus	2
Enabled Serial S-Bus	No
Full Protocol (PGU) Serial S-Bus	Yes
<b>Serial S-Bus Master Gateway</b>	
Port Number Gateway	2
Use Serial S-Bus For Gateway	Yes
First S-Bus Station Serial S-Bus	0
Last S-Bus Station Serial S-Bus	253
<b>S-Bus Mode And Timing</b>	
S-Bus Mode	Data Mode
Baud Rate Serial S-Bus	38400 Baud
Response Timeout [ms]	0
Training Sequence Delay [ms]	0
Turnaround Delay [ms]	0
<b>Profi-S-Bus</b>	
Channel	2
Enabled Profi-S-Bus	No
Full Protocol (PGU) Profi-S-Bus	No
Slave	Yes
FDL Address	0
Use S-Net Configuration	No
S-Net File Name	
Baud Rate Profi-S-Bus	187.5 kBd
Bus Profile	S-Net
<b>Bus Parameters</b>	

Save the Device Configurator Settings and download these using following Online Settings:

The 'Online Settings [Device1]' dialog box is shown. The 'Select the channel' dropdown is set to 'S-Bus USB'. The 'Setup...' button is visible. The 'S-Bus USB' section is expanded, showing the following settings:

Channel Type	S-Bus USB
PGU	No
S-Bus station number	0
Auto Station	No
Usb serial number	<I don't care...>
Refresh USB list	(Scan)
Number of retries	3

At the bottom, there are 'Help', 'OK', and 'Cancel' buttons.

Build the project and Download it to into the PLC controller.

## Closer look at the user program

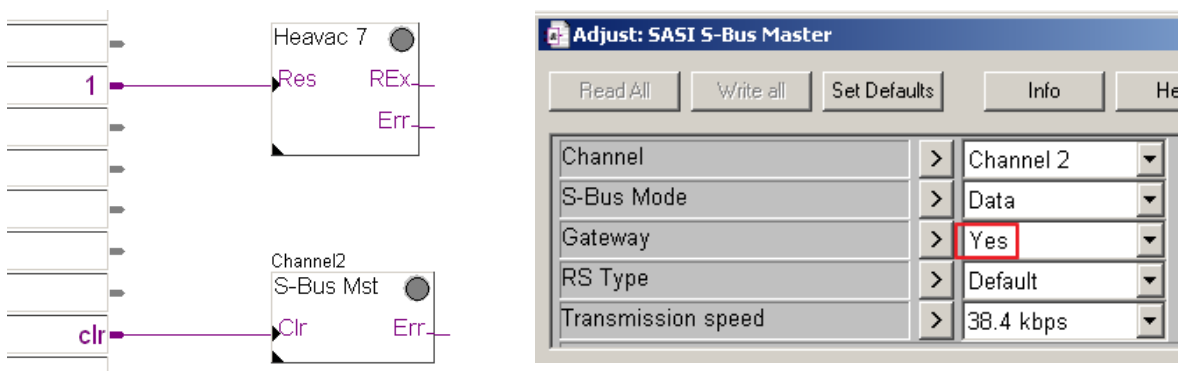
### Initialization

#### Heavac 7

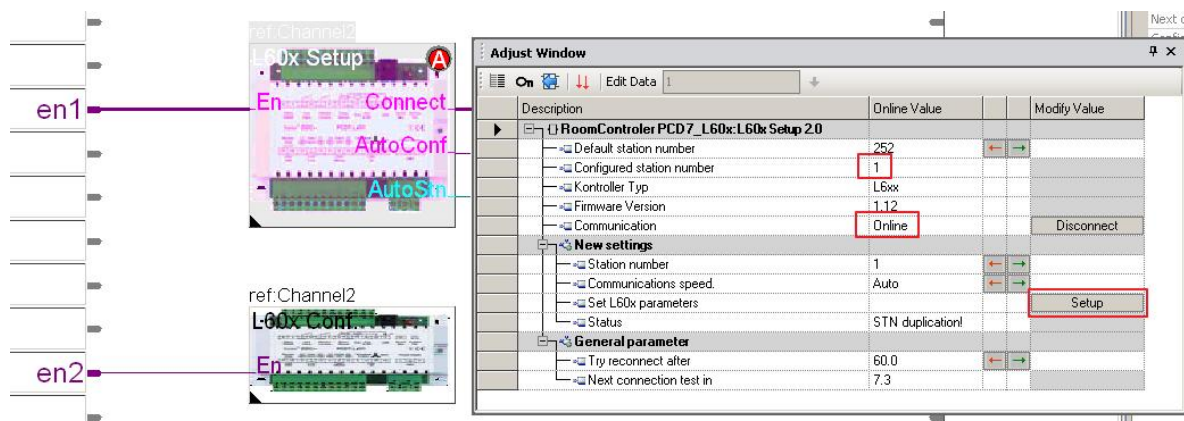
This FBox isn't specially configured.

#### Communication over Serial line

Configure in the **SASI Master** the Channel 2 as a Gateway Port. Therefore, the PG5 Online Debugger will be able to control directly the registers of the Room Controller Unit and the Extension Module for light and shade.



### Configuration of the Room Controller



These 2 FBoxes are unique in the user program of this project. In other projects, there could be programmed several profiles and configurations.

#### Setup the S-BUS address of the Room Controller

- Go online in Fupla
- Enable the L60x\_Setup with "en1"
- Open L60x\_Setup



- Operate the service pin on connected Room Controller. By default, each new room controller is delivered with S-BUS address 253
- Communication is set to "Online"
- If necessary, with "Setup" button, write new address into the controller

## Configure the EEPROM of the Room Controller(s)

- Enable the L60x\_Conf with "en2"
- Open L60x\_Conf
- The "Write" button, writes all adjusted parameters into the selected controller.

Description	Online Value	Modify Value
<b>RoomController PCD7_L60x: L60x Config 21</b>		
From station address	1	1
To station address	1	1
Read parameters...	---	Read out
Write parameters ...	OK	Write
Configured station	1	
Auto-configuration	active	

- Several Room Controllers could be adjusted at the same time.

Description	Online Value	Modify Value
<b>RoomController PCD7_L60x: L60x Config 21</b>		
From station address	1	1
To station address	20	20
Read parameters...	---	Read out
Write parameters ...	OK	Write
Configured station	1	
Auto-configuration	active	

Refer to picture below:

- Choose Roomunit
- Choose Application (also Remote is possible if you use the Controller as RIO)
- Choose your temperature sensor
- Define the status of the Window Contact (default is "closed". If no Window Contact is available, then construct a bridge circuit or set it to "open".)
- Set the Valve Drive for control the Valve (the outputs that are used for regulation)
- Set Light and Sunblind

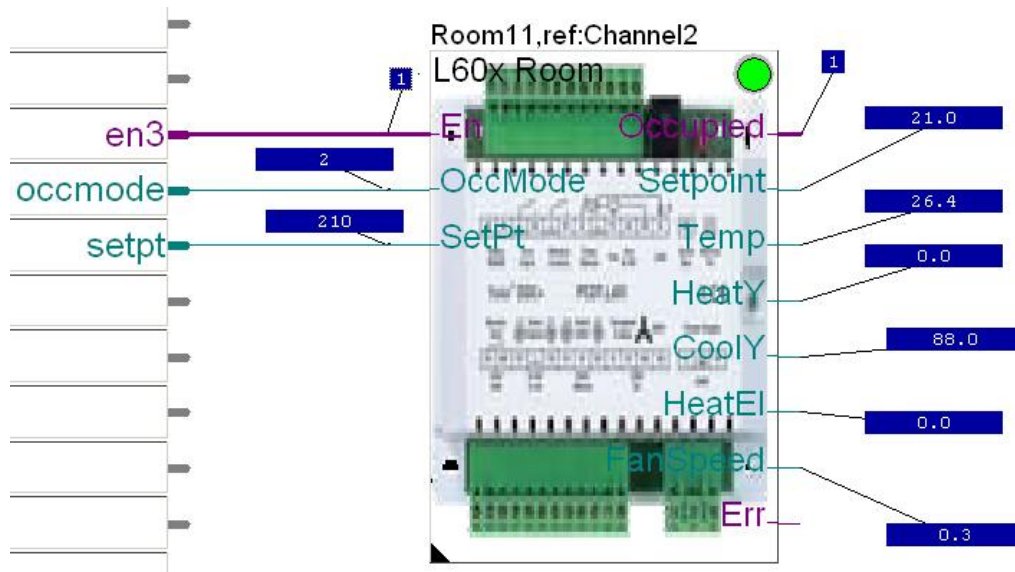
After configuration of the Room Controller devices, disable "en1" and "en2" of the Setup- and Configuration FBoxes.



Adjust Window			
Edit Data			
Description	Online Value		Modify Value
<b>RoomController PCD7_L60x:L60x Config 2.1</b>			
From station address	250		
To station address	250		
Read parameters...	---		Read out
Write parameters ...	---		Write
Configured station	-1		
Auto-configuration	active		
<b>Roomunit</b>			
Control unit used	L64x / L66x digital		
Value displayed on LCD	Temp. RU		
IR remote control zone	0		
Setpoint correction in °K	0.5		
<b>Application</b>			
Choice of application	4-pipe H/C		
<b>Hardware</b>			
Choice of temperature sensor	Room control part		
Correction temperature °K	0.0		
Normal state, window contact	open		
Contact at terminal E2 is	without function		
PWM cycle time for Y1&Y2 in s	30		
PWM cycle time K1/K2 in s	120		
Valve drive Hz - Kh	PwM Y1/Y2		
Fan mode	Auto		
Minimum fan speed	Off		
Maximum fan speed	Speed 3		
Coasting time (x 20 seconds)	3		
<b>Controller parameter</b>			
Basic setpoint	22.0		
Dead band comfort mode in °K	2.0		
Dead band standby mode in °K	4.0		
Dead band reduced mode in °K	6.0		
Cooling - proportional band °C	5.0		
Cooling reset time in s...	0		
Heating - proportional band °C	5.0		
Heating reset time in s...	0		
Threshold value fan stage 2	33		
Threshold value fan stage 3	66		
Threshold value deviation...	5.0		
Coasting comfort mode x10min	0		
<b>Light</b>			
Group 1	L3		
Group 2	L4		
Group 3	without		
Group 4	without		
<b>Sunblind</b>			
Group 1	S4		
Group 2	without		
Group 3	without		
Group 4	without		
<b>FWV1.08</b>			
WatchDog Funktion	Stopp		
LCD Display symbols...	BF		
Threshold value fan stage 1	5		
Limitation cooling	100		
Limitation heating	100		
Clamp S used for	Default NTC		
... conversion 0 °C= x Ohm	32560		
... conversion 5 °C= x Ohm	25340		
... conversion 10 °C= x Ohm	19870		
... conversion 15 °C= x Ohm	15700		
... conversion 20 °C= x Ohm	12400		

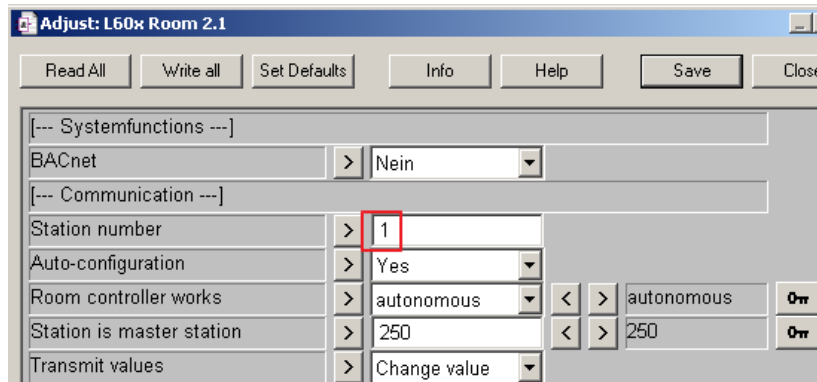
## Configuration of the Room FBox

- give the Room FBox a name and reference it to the communication Channel



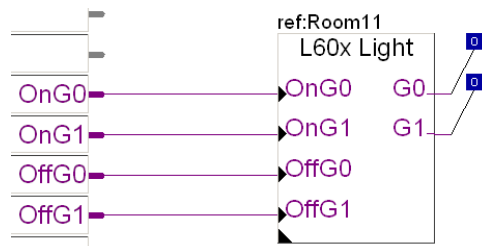
in the example, the single Room Controller is in Stand-By mode, the Setpoint is 21°C and the room is occupied.

- give it the corresponding S-BUS address

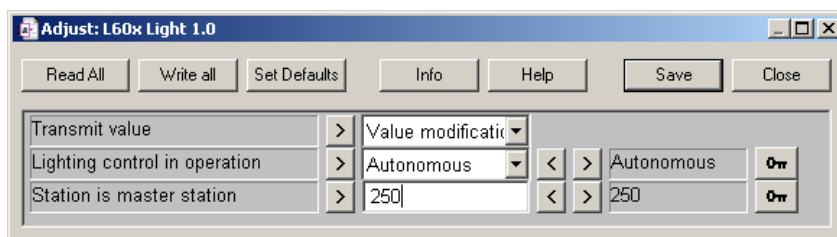


- in operation, the "en3" must be set all the time

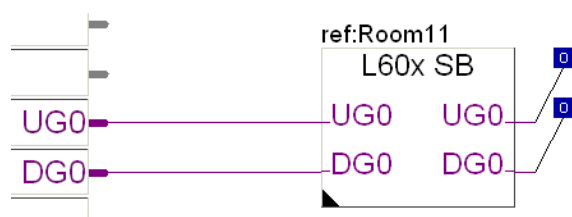
## Configuration of the Light FBox



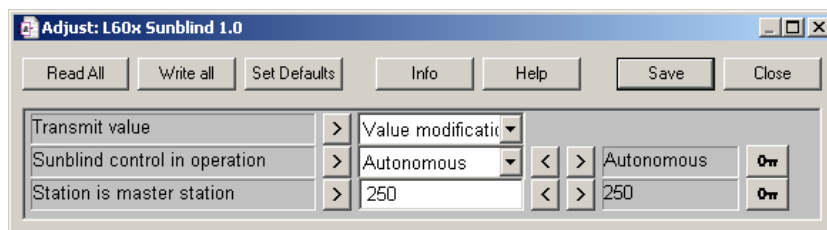
Can also work as „Slave“ if control is done by a PLC or another Room Controller



## Configuration of the Shade FBox



Can also work as „Slave“ if control is done by a PLC or another Room Controller



## Operation of single room control

The controller has four **operating modes**:

### **Comfort mode ( OccMode=0 ) :**

The controller works permanently in comfort mode. The occupancy function on the control panel is ignored.

### **Reduced ( OccMode=1 ) :**

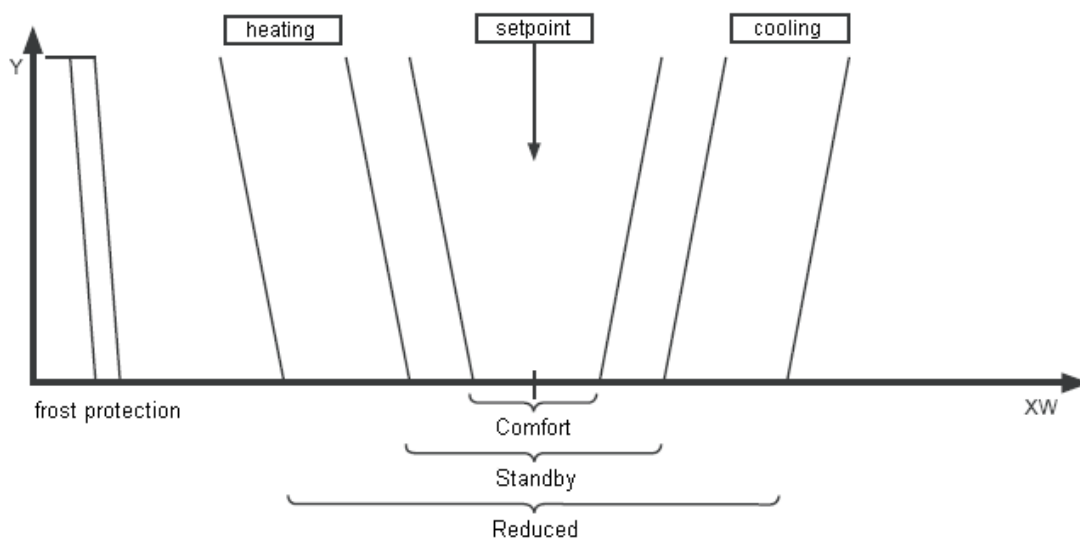
The controller works in reduced mode. Through an occupancy signal, the controller switches to comfort mode for an adjustable period. This time is adjusted in the configuration F-Box under "Running comfort mode x10min".

### **Standby ( OccMode=2 ) :**

The controller works in standby mode and switches to comfort mode in case of occupancy. If occupancy is no longer detected, the controller switches back to standby mode.

### **Permanently reduced ( OccMode=5 ) :**

The controller is permanently in reduced mode. Occupancy detection is disabled.

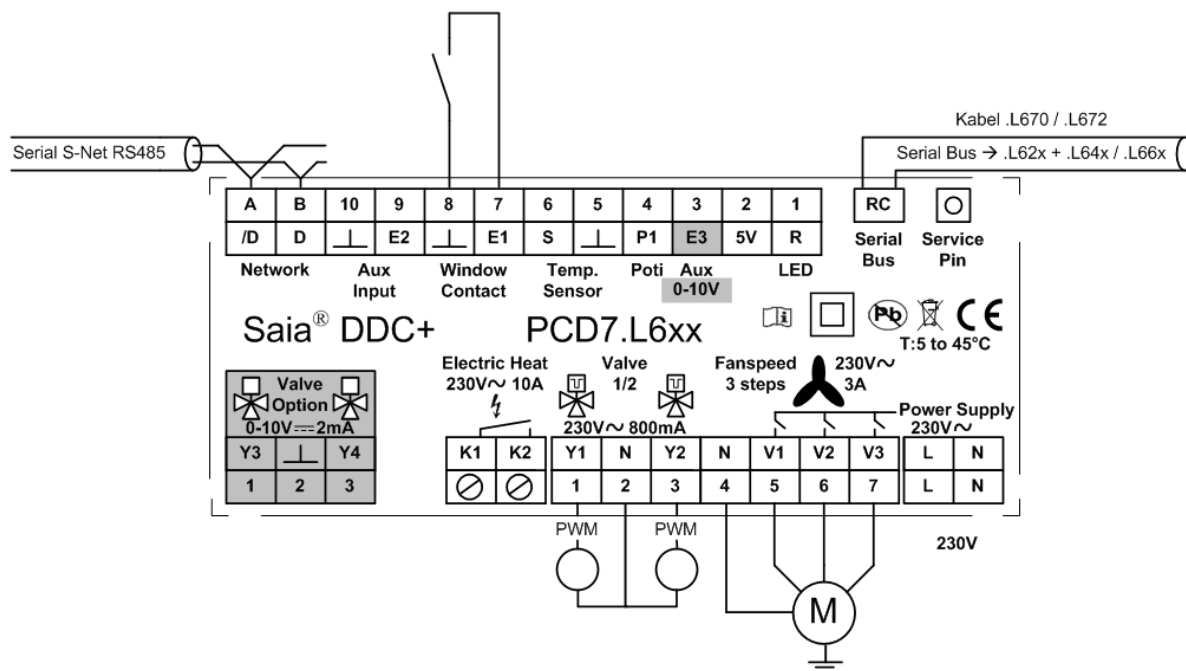


The basic setpoint defines the room setpoint. This can be adapted within the prescribed limits via the setpoint potentiometer. The current control setpoint is the value "Soll\_Temp" (SetPt).

Depending on the choice of operating mode, room temperature is adjusted according to the control set point. At the same time, the maximum deviations (dead band in the Config F-Box) set for the current operating mode are taken into account.

Opening the window contact switches off normal control function and activates frost protection.

## Connection diagram



## Troubleshooting

Here's a list of the most useful FAQs about PCD7.L60x (out of the SAIA TCS "FAQs" collection)

- Why is the heating output not high, even if the lower limit has been reached? The FBox status shows "Frost protection". *FAQ #100959*
- Points to be considered when using the Room controllers L60x in "Stand alone Mode". *FAQ #101514*
- Why is the PCD7.L60x occupancy output switching from 1 to 0 when changing a setpoint value? *FAQ #101455*
- Why does the PCD7.L60x Room controller not work correctly in "Master/Slave" mode? *FAQ #101506*
- Why is the output K 1/2 switched off in intervalls even if the commanded output signal is 100%? *FAQ #101265*
- Why can't I control the PCD7.L60x "Fan Speed" output in RIO mode? *FAQ #101264*