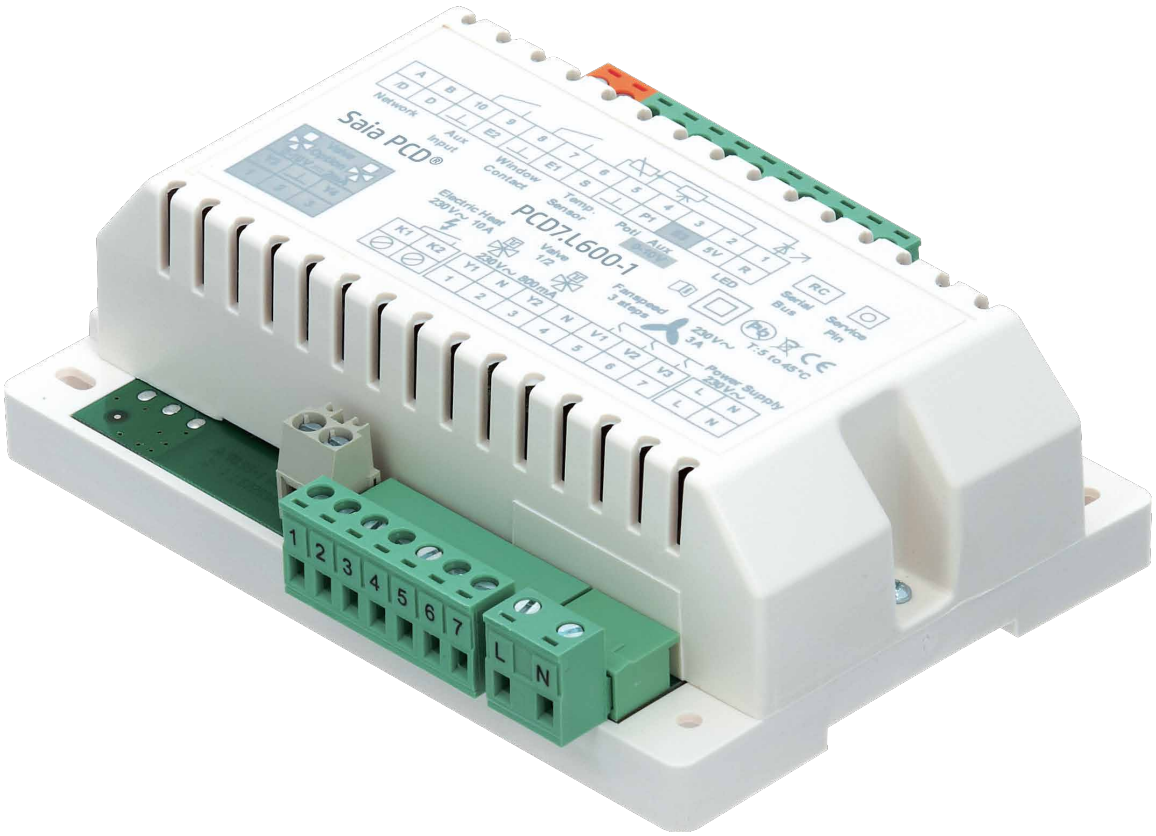
SAIA BURGESS CONTROLS



PCD7.L60x-1 room controllers starting with firmware version SV2.13

Document 27-628 | Version ENG07 | 2015-06-03

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0 Content

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0.1 Document History

Date	Version	Changes	Remarks
2013-10-15	EN01		- Contents overtaken from 27/608_EN03 - Addition of Firmware SV2.13 Functionalities
2013-10-18		3.2.8	- Hint to third party connector
2013-11-15		3.2.9	- Fixed errors in table
2014-03-14	EN02	overall	- Extension: fan speed function (FW SV3.00)
2014-07-02	EN03	Ch 2 & Ch 6	Shield of the S-Bus
2014-09-15	EN04	Ch 6.1.1	Registers and Flags max values
2014-11-13	EN05	Ch A2	PCD7.L666 don't work with IR
2014-11-20	EN06	Ch 6.1	The current consumtion values had been wrong
2015-06-03	ENG07	Ch A3	New phone number

0.2 Trademark and Brands

Saia PCD® and Saia PG5®
are registered trademarks of Saia-Burgess Controls AG.

Technical changes are subject to the state of technology

Published in Switzerland

1 Overview

1.1 Room automation solution with Serial S-Net or LonWorks®

The PCD7.L6xx room controllers, based on Serial S-Net or LonWorks® networks, are mainly used for HeaVAC applications with fan-coil devices, radiator/cooled ceiling combinations or VVS systems. The extension module for light and shade allows the electrical systems to be easily integrated in to 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.

Manufacturer-independent room control units

Operator devices with LonWorks® communication can be directly linked to LON room controllers. To connect EnOcean room components there is a receiver module that can be connected directly to the room controller via the internal RC bus. If the user control requirements should still not be met in terms of form, design or functionality, the system integrator can use the open interfaces to the automation station or analogue room control units to combine the room controller with third-party systems.

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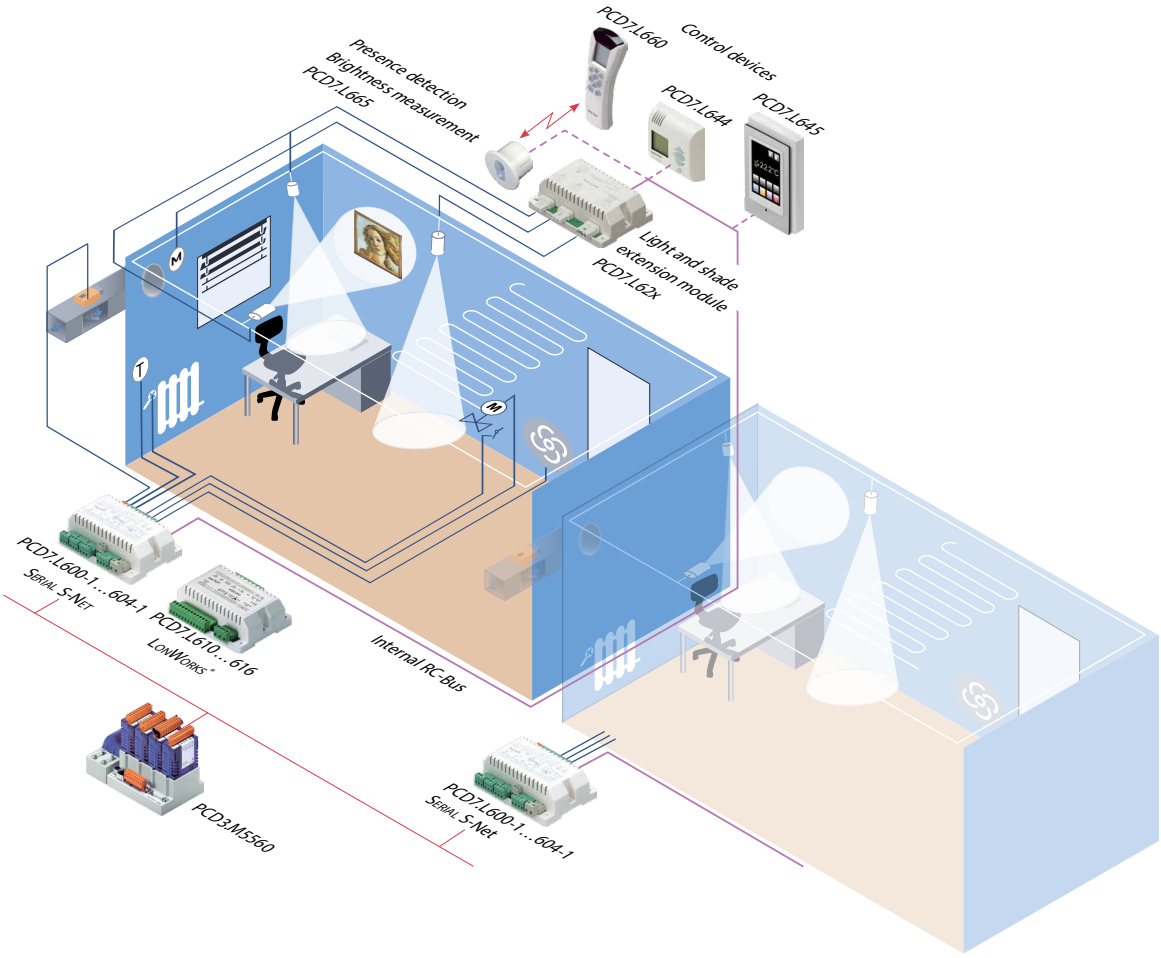
Features:

- Wide range of uses with parameter-driven application programs
- Room controllers for communication via Serial S-Net or LonWorks®
- Expansion modules for electrical systems
- Wide range of analogue, digital and mobile room control units
- Options to combine the basic controller with room control units from third-party providers



1.2 Possible uses for the PCD7.L60x-1 series

1.2.1 Standalone control with no communication

The controller regulates the room temperature without any connection to a bus system. Control is handled entirely by the individual room controller based on the specified default parameter settings.

The outputs are driven by a control algorithm depending on the measured temperature.

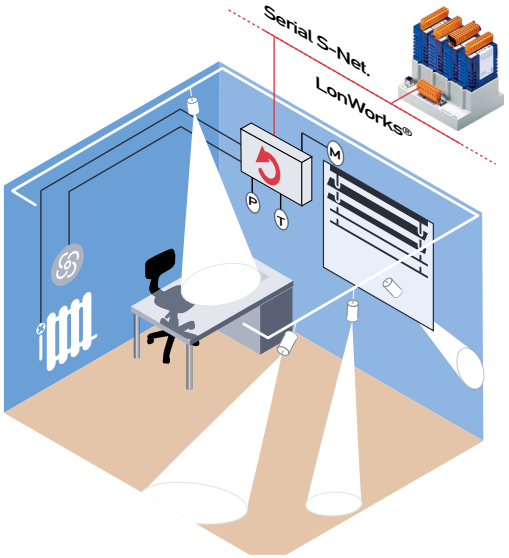
The default set-point setting of 21 °C can be modified by the set-point control (according to the device).

1.2.2 Standalone control with communication to the automation station

The controller is run as a slave station with a unique Bus address within a Serial S-Net, or LonWorks network. Control is handled by the individual room controller with its own control algorithm.

The control functions - time or event-driven - are passed to the individual room controller by the automation station via suitably configurable function objects or network variables. This supports individual parameterization and operation of the room controller. The device, and hence the control function, can also be influenced at any time via the PCD master station.

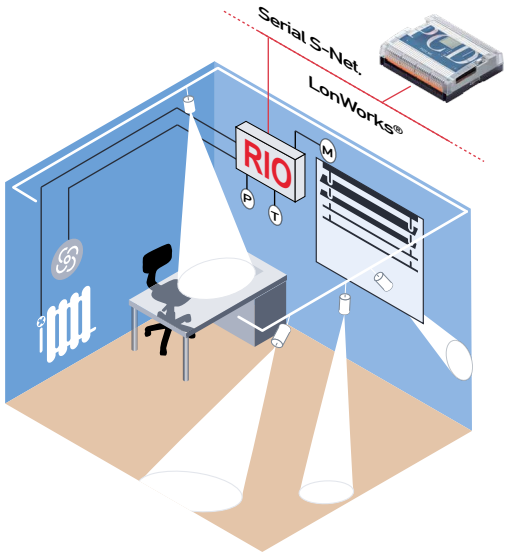
For parameterization, there is a function object available in the library for every room controller type. In the case of open network connections, this is handled via network variables or network objects.



1.2.3 External regulation and control via the automation station

The PCD master station handles all regulation and control tasks. The room controller itself is only used as a remote input/output unit. Regulation and control can then be adapted to requirements in a very flexible way.

For parameterization, RIO function objects are provided in the room controller library.



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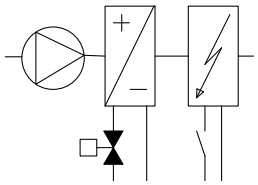
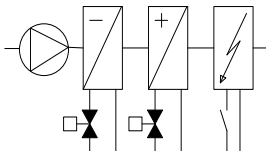
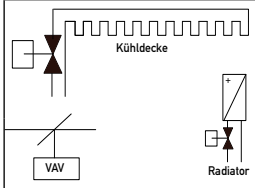
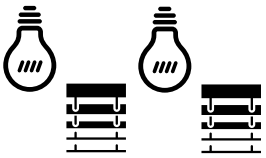
1.3 Application overview for the PCD7.L6xx series

Control of all standard heating/cooling systems, such as

- Radiator/cooled ceiling combinations
- Systems with a variable volume stream (VVS)
- Fancoil devices
- Communication-friendly with SBC Serial S-Net or LonWorks®
- Wide range of analogue, digital and mobile room control units
- Control of light and shade with optional expansion modules

Fan-Coil application (2-pipe) for heating, cooling or change-over					
Application	**Room controller**	**Fan**	**Valve**	**Valve cooling**	**Electric heating**
	PCD7.L600-1	3-step relay	230 V PWM 230 V 3-point	-	Relay up to 2 kW
	PCD7.L601-1	3-step relay	230 V PWM 230 V 3-point 0…10 V	-	Relay up to 2 kW
	PCD7.L603-1 PCD7.L604-1	3-step relay	24 V PWM 24 V 3-point 0…10 V	-	Relay up to 2 kW
Fan-Coil application (4-pipe) for heating, cooling					
	PCD7.L600-1	3-step relay	230 V PWM	230 V PWM	Relay up to 2 kW
	PCD7.L601-1	3-step relay	230 V PWM 0…10 V	230 V PWM 0…10 V	Relay up to 2 kW
	PCD7.L603-1 PCD7.L604-1	3-step relay	24 V PWM 0…10 V	24 V PWM 0…10 V	Relay up to 2 kW
VAV, cooled ceiling and radiator applications for heating and cooling					
	PCD7.L600-1	3-step relay	230 V PWM	230 V PWM	Relay up to 2 kW
	PCD7.L601-1	3-step relay	230 V PWM 0…10 V	230 V PWM 0…10 V	Relay up to 2 kW
	PCD7.L603-1 PCD7.L604-1	3-step relay	24 V PWM 0…10 V	24 V PWM 0…10 V	Relay up to 2 kW
Light and shade					
Application	**Expansion**	**Light**	**Shade**		
	PCD7.L620N	3x on/off lights	-	-	-
	PCD7.L621N	2x dimming lights	1× Blind 230 VAC	-	-
	PCD7.L622N	-	3× Blind 230 VAC	-	-
	PCD7.L624N	-	3× dimming lights	-	-

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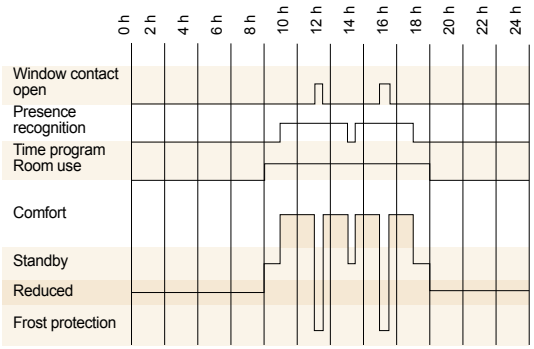
1.3.1 Operating modes

The 4 operating modes are set depending on the presence detector, window contact, and the specifications of the communications master.

Comfort	Standard, default operating mode for an occupied room.
Standby	Reduced operating mode when the premises are temporarily unoccupied.
Reduced	Reduced operating mode when the premises are unoccupied for a long period of time.
Frost Protection	The heating control is activated when the Temperature drops below 8 °C (e.g. when a window is open)



Example: Operating mode switchover

1.3.2 Commissioning

When room controllers are used in a S-Bus network, configuration is either by the PCS/PCD master, the PG5 programming tool, or dedicated PC software. Practical function blocks (FBoxes) simplify commissioning.

When room controllers are used in a LON network, configuration is facilitated by provision of a LonWorks® tool such as NL220 or LonMaker®.

Room controllers match the user profile for the Fan Coil Unit Object (8020) from LonMark®.

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1.3.3 Device overview and technical details of the room controller

PCD7 product line [1]	S-Bus				LonWorks®				eu.bac Cert
									
Inputs	**L600-1**	**L601-1**	**L603-1**	**L604-1**	**L610**	**L611**	**L614**	**L615**	**L616**
Digital inputs	1× window contact and 1× multi-functional	1× window contact and 1× multi-functional	1× window contact and 1× multi-functional	1× window contact and 1× multi-functional	4× multi-functional	4× multi-functional	4× multi-functional	4× multi-functional	4× multi-functional
Operating state response	Yes	Yes	Yes	Yes	Yes	Yes	Yes	---	Yes
Analogue inputs 0…10 VDC	---	1× 0…10 VDC	1× 0…10 VDC	1× 0…10 VDC	---	1× 0…10 VDC	1× 0…10 VDC	2× 0…10 VDC	1× 0…10 VDC
Temperature sensor	1× NTC 10 kOhm	1× NTC 10 kOhm	1× NTC 10 kOhm	1× NTC 10 kOhm	1× NTC 10 kOhm	1× NTC 10 kOhm	1× NTC 10 kOhm	2× NTC 10 kOhm	1× NTC 10 kOhm
Setpoint value adjuster (10 kOhm potentiometer)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	---	Yes
Outputs	**L600-1**	**L601-1**	**L603-1**	**L604-1**	**L610**	**L611**	**L614**	**L615**	**L616**
Digital outputs TRIAC (total max. 800 mA)	2× 230 VAC	2× 230 VAC	2× 24 VAC	2× 24 VAC	2× 230 VAC	2× 230 VAC	2× 24 VAC	4× 230 VAC	2× 230 VAC
Relay outputs 3-level	1× 230 VAC (3 A)	1× 230 VAC (3 A)	1× 230 VAC (3 A)	1× 230 VAC (3 A)	1× 230 VAC (3 A)	1× 230 VAC (3 A)	1× 230 VAC (3 A)	---	1× 230 VAC (3 A)
Relay outputs 1-level	1× 230 VAC (10 A)	1× 230 VAC (10 A)	1× 230 VAC (10 A)	1× 230 VAC (10 A)	1× 230 VAC (10 A)	1× 230 VAC (10 A)	1× 230 VAC (10 A)	2× 230 VAC (10 A)	1× 230 VAC (10 A)
Analogue outputs (total max. 2 mA)	---	2× 0…10 VDC	2× 0…10 VDC	2× 0…10 VDC	---	2× 0…10 VDC	2× 0…10 VDC	2× 0…10 VDC	2× 0…10 VDC
Analogue outputs with additional 24 VAC power supply [2]	---	---	Yes	Yes	---	---	Yes	---	—
Extension modules	**L600-1**	**L601-1**	**L603-1**	**L604-1**	**L610**	**L611**	**L614**	**L615**	**L616**
Light modules	Yes	Yes	Yes	Yes	---	Yes	---	Yes	---
Shade modules	Yes	Yes	Yes	Yes	---	Yes	---	---	---
Possible applications	**L600-1**	**L601-1**	**L603-1**	**L604-1**	**L610**	**L611**	**L614**	**L615**	**L616**
Electrical heating only	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2 pipes for heating or «Change over»	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2 pipes for cooling or «Change over» with electrical heating	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4 pipes for heating and cooling	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4 pipes for heating and cooling and electrical heating (secondary)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4 pipes for heating and cooling and electrical heating (primary)	---	---	---	---	Yes	Yes	Yes	Yes	Yes
2 × 2 pipes for heating, cooling or changeover	Yes	Yes	Yes	Yes	---	---	---	---	---
RIO	Yes	Yes	Yes	Yes	---	---	---	---	---
Direct control of outputs	---	---	---	---	Yes	---	Yes	---	Yes
Special functions	**L600-1**	**L601-1**	**L603-1**	**L604-1**	**L610**	**L611**	**L614**	**L615**	**L616**
Air quality control (CO_2)	Yes	Yes	Yes	Yes	---	---	Yes	---	Yes
Master / Slave	Yes	Yes	Yes	Yes	---	---	---	---	---

[1] Supply voltage: All controllers operate with 230 VAC, except the PCD7.L603-1 which operate with 24 VAC
[2] PCD7.L6x4-1: The total power consumption of the valve must be max. 7 W

Controlled valves and required I/O

Thermal valve:	1 digital output (Triac PWM)
0…10 V valve:	1 analogue output (0…10 VDC)
3-point valve:	2 digital outputs (Triac PWM)
6-way valve:	1 analogue output (0…10 VDC) ➞ can only be connected to one 6-way valve

Controlled motors and required I/O

VAV controller:	1 analogue output (0…10 VDC)
3-level fan:	1 relay output 3-level
Fan with variable rpm:	1 analogue output (0…10 VDC) ➞ with PCD7.L614…L616 devices only
Electric heating:	1 relay output 1-level

Communication with Serial S-Net	
Interface	RS-485, max. cable length 1200 m
Transmission rate	4800, 9600, 19'200, 38'400, 115'200 bit/s with automatic detection after restart
Protocol	S-Bus data mode (slave)
Addressing at commissioning time via S-Net or an external manual control device. Bus terminal resistors to be installed on site - integrated with L60x-1, software-activated	

Communication with LonWorks®	
Interface	FTT 10a
Transmission rate	78 kBit/s
Topology	Free topology max. 500 m; bus topology max. 2700 m
Number of LON nodes	max. 64 per segment, over 32'000 in a domain/according to LonMark® 8020 profilet

1.3.4 Phased-out room controllers

Item	Active since	Not recommended for new projects	Phased out (production ceased) valid until / Commercial Info
PCD7.L600	April 2007		Dez. 2012
PCD7.L601	April 2007		Dez. 2012
PCD7.L602			Aug. 2008
PCD7.L603	Sep. 2008		Dez. 2012
PCD7.L604	June 2009		Dez. 2012
PCD7.L610	April 2007		
PCD7.L611	April 2007		
PCD7.L614	June 2009		
PCD7.L615	June 2009		
PCD7.L616	June 2009		
PCD7.L600-1	Sept. 2012		
PCD7.L601-1	Sept. 2012		
PCD7.L603-1	Sept. 2012		
PCD7.L604-1	Sept. 2012		

2 Commissioning instructions

2.1 Safety instructions

To guarantee safe operation, the PCD7.L60x-1 devices should only be operated by qualified staff according to the details given in the operating instructions and in compliance with the technical data. Qualified staff are people familiar with the assembly, commissioning and operation of the devices and suitably trained for their job.

When using the system, the legal and safety regulations applicable to the specific type of use must also be observed.

The room controllers have undergone a comprehensive pre-delivery inspection, ensuring that they left the factory in perfect condition.

Before commissioning, the devices should be checked for damage arising from incorrect transport or storage.

Removal of the identification numbers will invalidate the warranty.

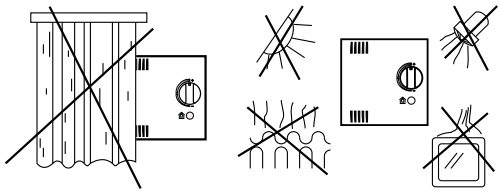
Please ensure that the limits specified in the technical data are not exceeded. Failure to do so may result in defects in the modules and the perpiherals connected to them. We can accept no responsibility for damage arising from improper deployment and use.

The plugs must never be inserted or removed with the power on. When installing or de-installing the modules, all components must be switched off.

Please read this manual carefully before assembling and commissioning the modules. This manual contains instructions and warnings that must be observed to assure safe operation.

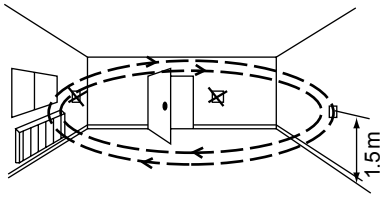
2.2 Assembly instructions

- The individual room controllers must only be installed and connected by an expert in accordance with the wiring diagram. Existing safety standards must also be observed.
- The individual room controller can only be used to regulate the temperature in dry, closed rooms. The maximum permissible relative humidity is 90%, non-condensing.
- Precise temperature measurement is subject to certain requirements as to the positioning of the temperature sensors. This applies both to the room control device itself and to the externally connected temperature sensor.
- The device can be mounted directly on the wall or flush-mounted within a pattress box.

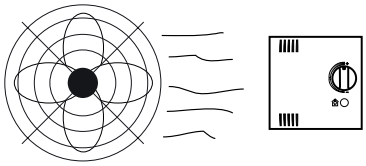


Avoid direct exposure to sunlight or light from powerful lamps.

Do not install next to heat sources such as heaters, refrigerators, lamps etc.



Do not install next to windows and doors because of draughts.

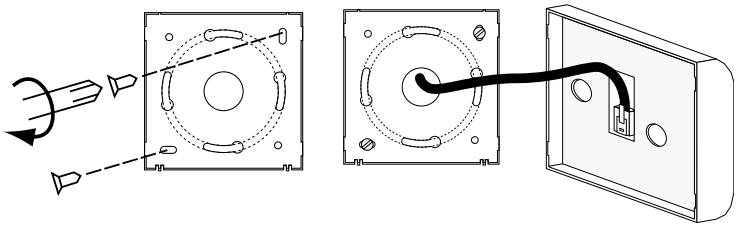


Do not located the control device/ compact room controller in the path of draughts from climate control or ventilation systems.

Please ensure

- that all wires are screwed down tight
- that the connecting plug is properly engaged
- that the ventilation slots are placed above and below (positioning)
- that the device is mounted horizontally.

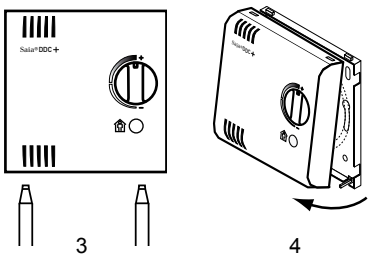
Mounting



1
Assembling the housing base

2
Wiring to the device

Removal



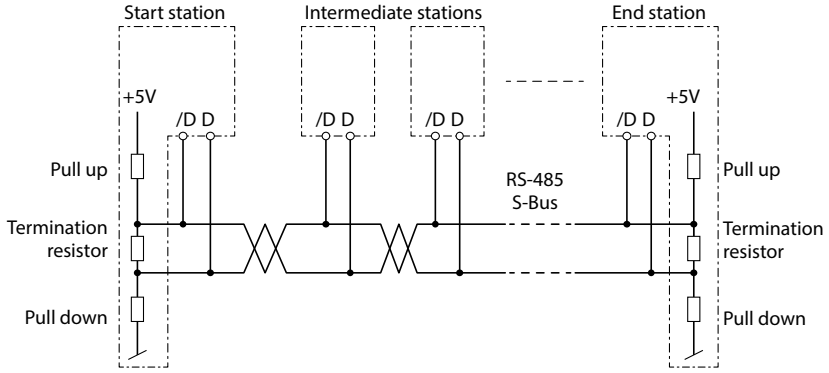
3
Unlocking

4
Remove the case

2

Bus terminating resistor and bus cable for serial S-Net (S-Bus/RS-485)

S-Bus cables must be installed as a line. Stub lines are not permitted and both ends of the cable must be terminated with a resistor (approx. 120 Ω) between the D and /D cables. The best signal quality is achieved using an active bus connection with a resistor to +5V and ground.



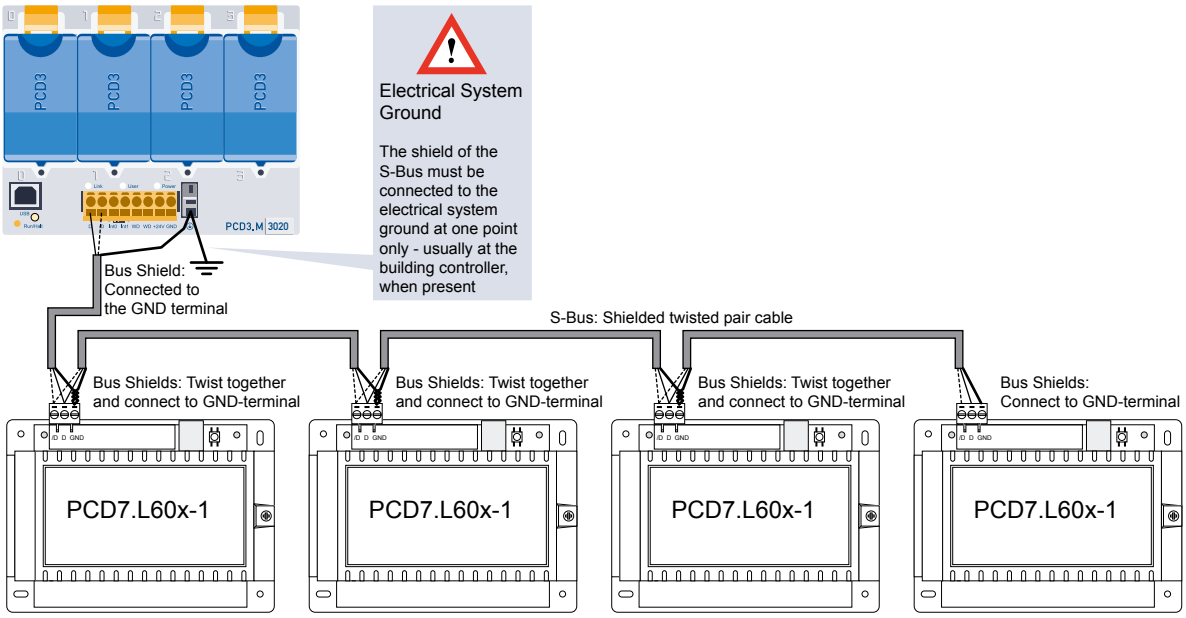
Schematic illustration of an S-Bus/RS-485 bus

With S-Bus controllers, the 111 configuration register can be used to activate the integrated active bus termination resistor or an external PCD7.T161 or PCD7.T162 termination box can be used.

Bus cable: a two-stranded twisted and shielded bus cable with cable strands of at least 0.5 mm^2 must be used. For additional information please refer to the S-Bus manual 26/739 (available on www.sbc-support.com).

S-Bus Shield Grounding Requirements

The shield on each S-Bus segment must be connected to electrical system ground at one point only, for example, at the Bus Master (PCD), as shown below:



To prevent problems on too big potential differences between the controllers, the shield of the S-Bus cable has to be wired to the GND clamp of the controllers.

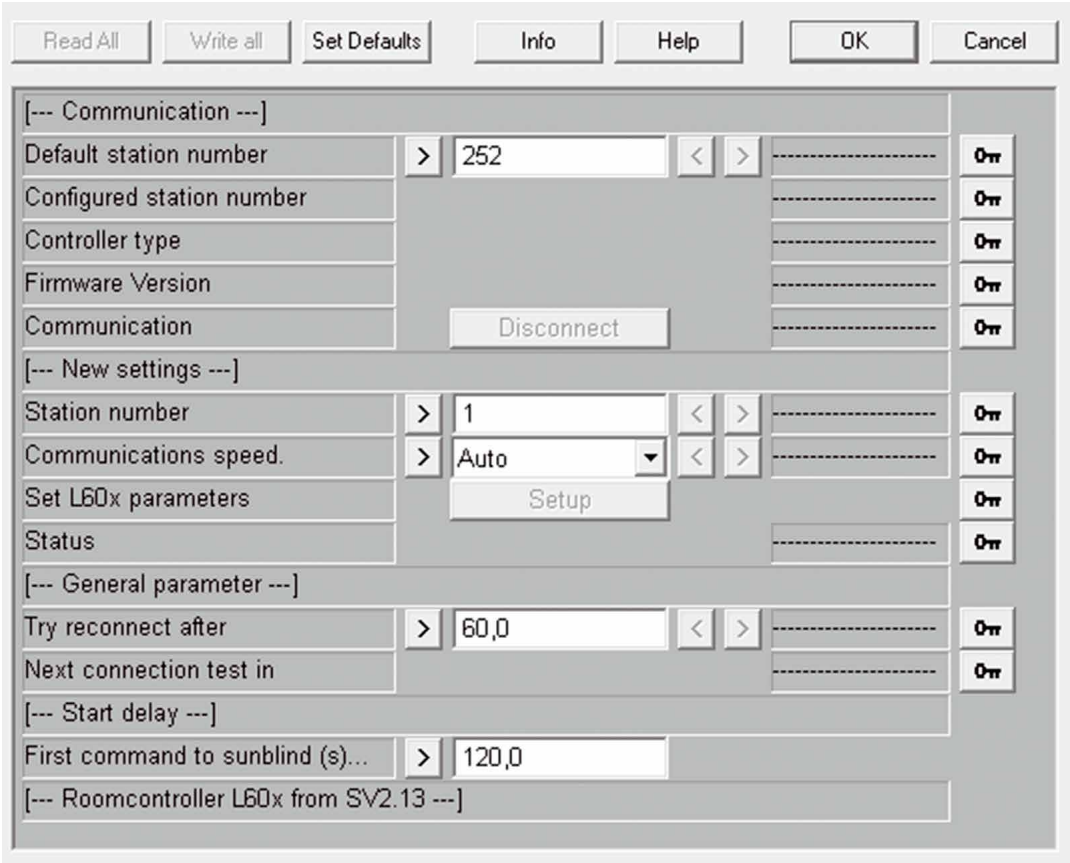
3 Function

3.1 Communication

3.1.1 Commissioning

3.1.1.1 Automatically detecting the Serial S-Net baudrate

After the current is switched on, the room controllers attempt to detect the baudrate on the S-Bus for themselves. During this time, the controller does not function. For this, it is necessary for the communication master to send telegrams on a cyclical basis. Where a Saia PCD is used, this task is handled by the «Setup» FBox from the «PCD7_L60x-1 room controller» group. Once the room controller has detected the baudrate, it stores this information. After a restart, it will begin by setting this baudrate. Only when the room controller cannot establish any communication with the last used baudrate does it restart baudrate detection.



The picture shows a SASI interface initialisation and the Setup FBox.

The activated Setup FBox makes cyclical attempts to establish a connection to station address 252 (see service pin on the room controller). As the service pin is not normally activated on any room controller, station address 252 is not present. The LED for the SASI S-Bus master FBox is then red.

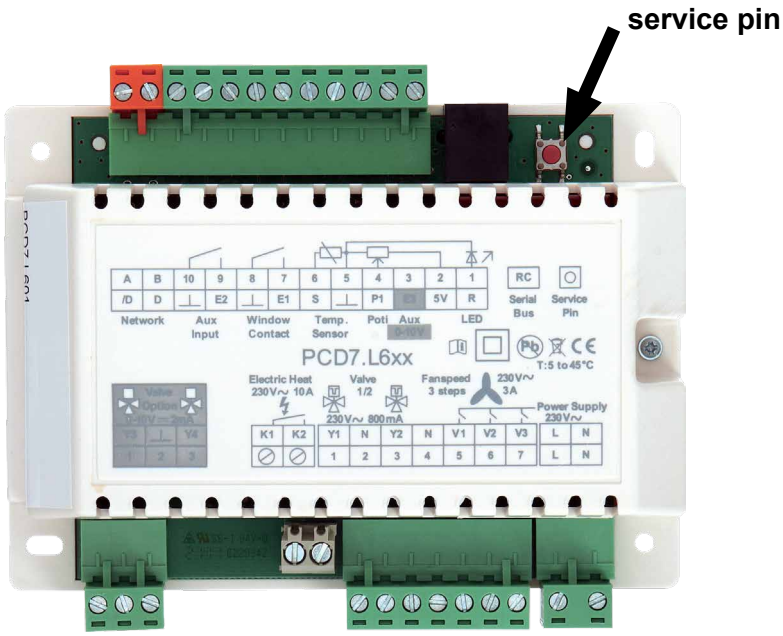
After successful commissioning of the room controllers, it is therefore advisable to deactivate the Setup FBox via the «Enable» input. If proper communication is established, the LED for the SASI S-Bus master FBox should stay green.

3.1.1.2 Setting the S-Bus service pin

When the «service pin» button is pressed, the room controller enables an additional station address 252 for a minimum of 15 minutes. The controller can use this address to communicate with the master independently of all other software components. Provided that the room controller is receiving telegrams via this address, the timer for time monitoring is restarted each time. Only when the timer expires (after 15 minutes) the station address 252 is deactivated.

Please note that two controllers cannot be activated at the same time via the service pin.

To terminate the timer prematurely, register 60 can also be manually set to 0, e.g. via the Setup FBox, a communication FBox or the debugger.



3.1.1.3 Setting the station address

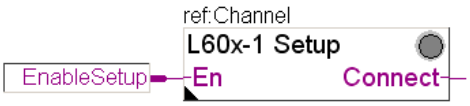
The station address can be parameterised via the Setup FBox or directly in register 110.

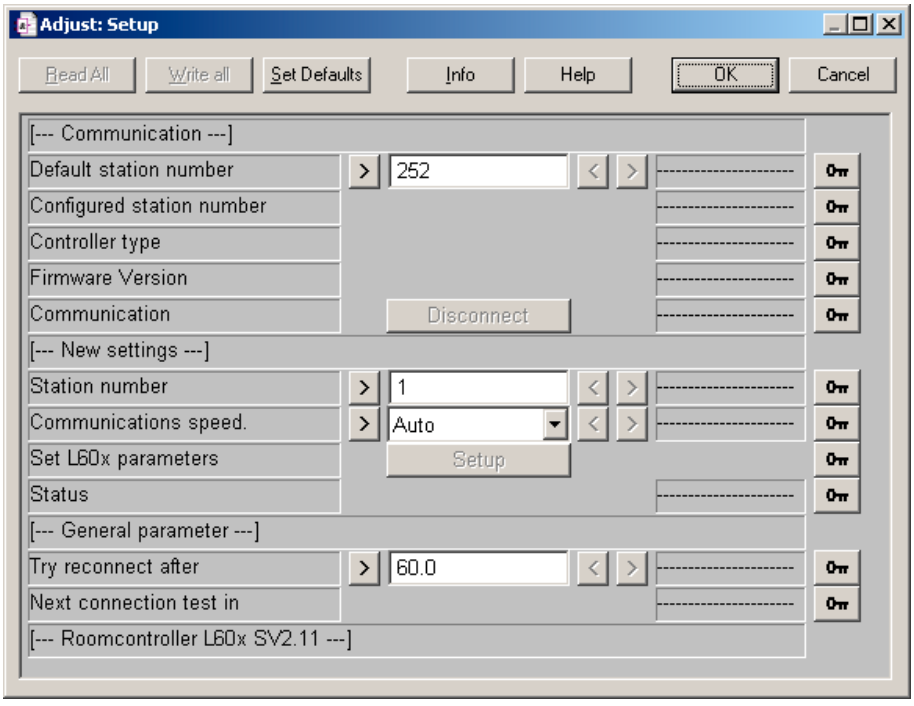
Example: Addressing using a PCD and FBoxes

- Activate station address 252 on the room controller by pressing the «service pin» button
- In the case of correct S-Bus communication, the Connect output on the FBox will be 'high'.
- Open Setup FBox, Adjust window.
- If communication is «online», the «controller typ» and the «firmware version» will be displayed.
- Enter a new station number, copy to the PCD and click the «setup» button.

Example: Addressing with a PCD via the debugger

- This requires a gateway to be parameterised in the PCD hardware settings and the SASI master FBox.
- Activate station address 252 on the room controller by pressing the «service pin» button
- Connect S-Bus 252.
- Write Register 110 - new station number.
- Write Register 60 - 0.





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3.1.2 Procedure for device replacement

PCD7.L60x with PCD7.L60x-1 (from SV2.11) room controller

Because of the additional air quality control functionality of room controllers PCD7.L60x-1 (from FW version SV2.11) new configuration register for the controller outputs Y1–Y4 are needed. These Registers can only be configured with the new «HVC configuration» FBox.

This replaces the old configuration «valve drive Hz–Kh» from the old L60x config 2.1 FBox which for the PCD7.L60x room controller was needed (up to firmware version SV2.01).

In this description there are illustrated three possibilities how the exchange can be made, where upon in the first two variants it is possible to do the replacement without making change in the PG5 program on the site.

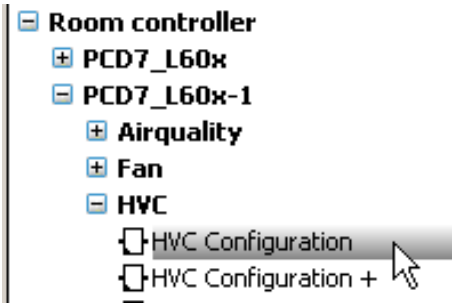
The exact description for setting of the S-Bus address and writing of the configuration parameter with the configuration FBox can be found in chapter 3.1 and 3.2 of the manual (26/854 Modular Room controller PCD7L6xx)

Case of application: **Replacement of defect room controller.**

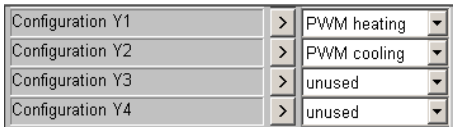
Procedure: **Pre-configuration of the room controller at the office**

A) Using existing old project in PG5

- Install the new FBox Library V2.6.446 (or newer) in PG5
- Place new L60x HVC configuration FBox in old project, compile project and download on the PCD



- Adjusting the S-Bus address of the controller with L60x setup FBox
- Adjusting the outputs Y1 to Y4 with the new L60x HVC configuration FBox (this adjustment replaces the old configuration «valve drive Hz–Kh»)

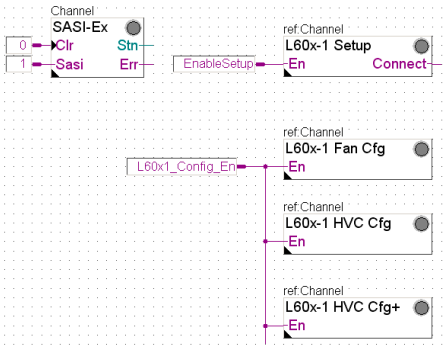


- Configure with the existing 2.1 config L60x FBox the old stored parameters

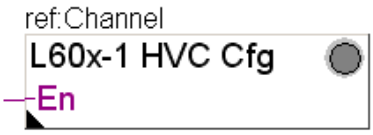
- Replace on site the old room controller with the new one

B) With a newly generated configuration program in the PG5.20

- Install the new FBox Library V2.6.446 (or newer) in PG5.20
- Setup FBox, new L60x HVC configuration FBox and if needed also L60x fan configuration FBox and L60x HVC + configuration FBox
- Compile project and download on PCD



- Adjusting the S-Bus address of the controller with L60x setup FBox
- Write to the L60x configurations FBoxes the required parameters to the room controller
- Replace on site the old room controller with the new one

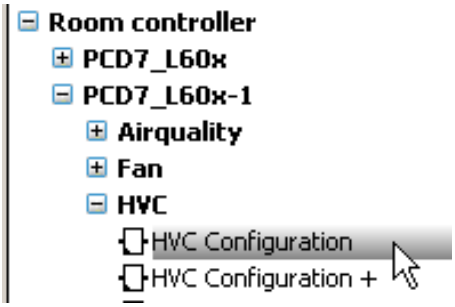


Case of application: **Project extension with new room controller.**

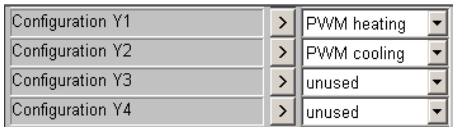
Procedure: **Configuration of the room controller on the site**

C) Using existing old project in PG5

- Replace on site the old room controller with the new one
- Install the new FBox Library V2.6.446 (or newer) in PG5
- Place new L60x HVC configuration FBox in old project, compile project and download on PCD



- Adjusting the S-Bus address of the controller with L60x setup FBox
- Adjusting the outputs Y1 to Y4 with the new L60x HVC configuration FBox (replaces the old configuration «valve drive Hz–Kh»)
- Configure with the existing 1.2 config L60x FBox the old stored parameter

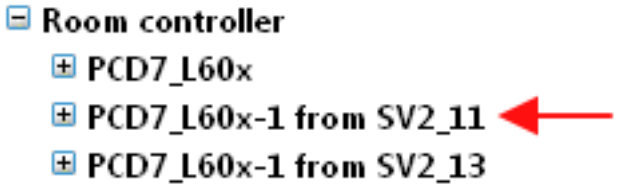


With A) and B) an exchange is possible without changing the PG5 program on the site

3.1.3 Compatibility

Compatibility of controller FW

PCD7.L60x-1 controller can be replaced with PCD7.L60x-1 controller with higher FW versions and could still be used with the present PCD7.L60x-1 FBoxes from the existing project, but of course in this case without the new implemented functionalities.



FBox selector

Compatibility of M/S functionality

The new functionalities of M/S connection can only be made with the new FBox Library from 2.6.522 Therefore on replacement of old controllers with M/S functionality should be made by using the old FBoxes (as described above).

Compatibility of extension modules

The light and sunblind switching with a controller with FW version SV2.13 or higher has to be used the new extension modules PCD7.L62xN.

The old controllers with FW version SV2.12 or older are compatible to the new extension modules PCD7.L62xN (but of course without dimming and rotation fuctions).

3.1.4 Online FBox

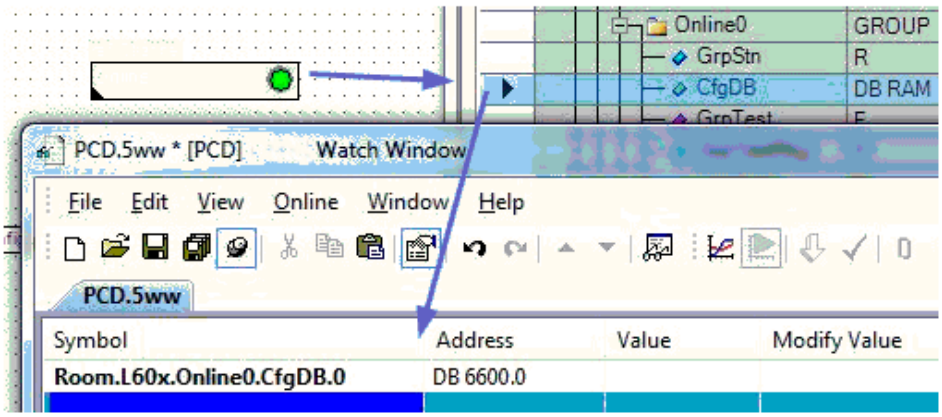
The option offers to search through the S-Bus for available station addresses. A list of station addresses reached is provided in a DB (ASCII format). This FBox is optional and can be used only once per channel.

The FBox searches through the S-Bus (determined via reference on the SASI FBox) with the command **test|run** whether the station addresses that are given with the parameters **from station address** to **to station address** can be reached. The run always searches through the given range and can be ended prematurely with the command **interrupt|run** .

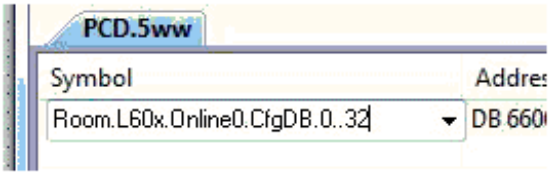
For this, the FBox reads out registers 200-204, beginning with the first station address. These registers provide key information in L60x and are not usually available with other S-Bus IO´s. If these registers can be read out with a read command, it is assumed from this that a L60x room controller was found and the station address is marked in the list with the text **-OK-**. If the call fails, the station address is marked in the list with the text **ERR!**. The station address that is tested now is obvious in the parameter **station address in processing** .

The list with the station address information is filed in a data block. This DB is created in the symbol editor automatically on placing of the FBox.
Perform the following steps to view the list:

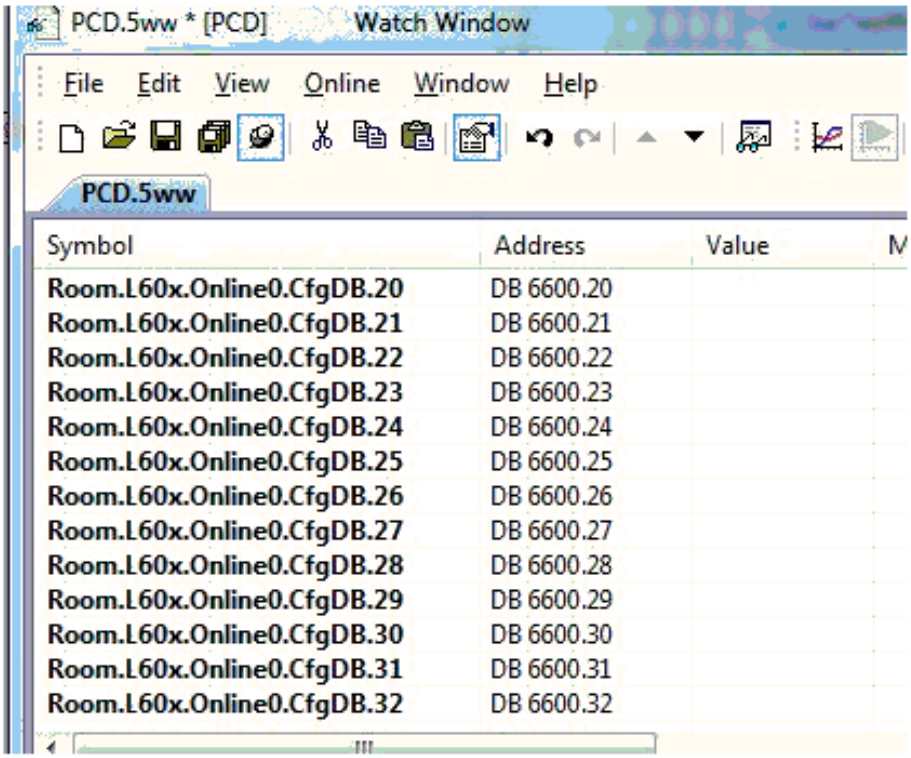
1. Open a WatchWindow, click on the FBox **online**; a group with the FBox symbols is opened and displayed in the symbol editor. There is a symbol with the name **CfgDB** in this group. Drag the symbol from the symbol editor into the WatchWindow



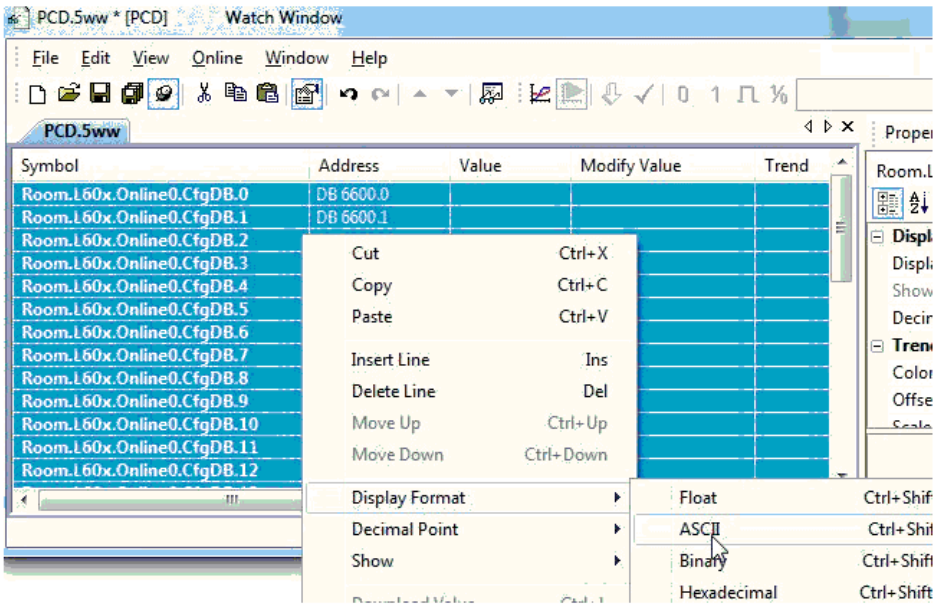
2. The entry in the WatchWindow ends with «.0» and represents the first element of the DB. The element no. 0 represents the station address 0. A separate entry must be displayed for each station address. Click into the field with the symbol name and add two periods (= marking for a range) and enter the last station address that is to be displayed directly behind without spaces; in the example, this is 32:



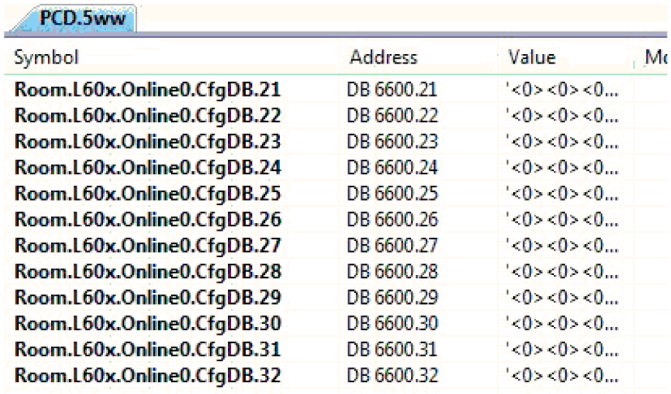
3. Close the entry; the WatchWindow now generates a separate entry automatically for each element of the DB (= every station address).



4. The information as to whether a station address was reached is filed in ASCII, which simplifies the ease of reading. In order to be displayed correctly in the WatchWindow, the depiction must now be adapted. Mark all entries (use, say, CTRL+A) and then right click to call up the context menu.
Select from the menu **display format|ASCII**.



5. If no test run has been executed, look at the earliest opportunity for zeroes in brackets, i.e. there is still no information for these station addresses.



PCD.5ww

Symbol	Address	Value	Mo
Room.L60x.Online0.CfgDB.21	DB 6600.21	'<0><0><0...	
Room.L60x.Online0.CfgDB.22	DB 6600.22	'<0><0><0...	
Room.L60x.Online0.CfgDB.23	DB 6600.23	'<0><0><0...	
Room.L60x.Online0.CfgDB.24	DB 6600.24	'<0><0><0...	
Room.L60x.Online0.CfgDB.25	DB 6600.25	'<0><0><0...	
Room.L60x.Online0.CfgDB.26	DB 6600.26	'<0><0><0...	
Room.L60x.Online0.CfgDB.27	DB 6600.27	'<0><0><0...	
Room.L60x.Online0.CfgDB.28	DB 6600.28	'<0><0><0...	
Room.L60x.Online0.CfgDB.29	DB 6600.29	'<0><0><0...	
Room.L60x.Online0.CfgDB.30	DB 6600.30	'<0><0><0...	
Room.L60x.Online0.CfgDB.31	DB 6600.31	'<0><0><0...	
Room.L60x.Online0.CfgDB.32	DB 6600.32	'<0><0><0...	

6. Now start a test run; for each station address in the stated range, the information will now be updated,
   '-OK-' for a station address with which a call could be set up successfully and
   'ERR!' if the call attempt failed.

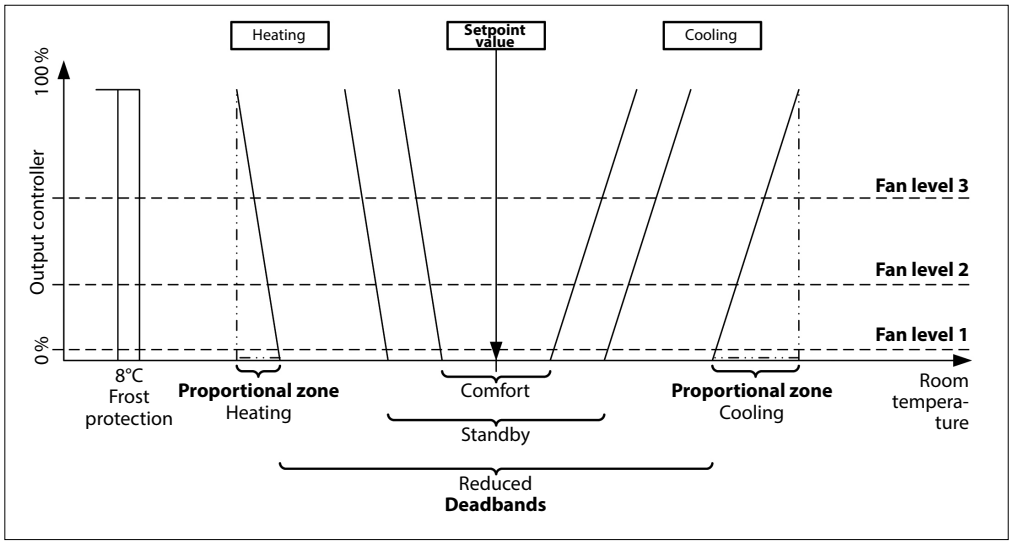
Room.L60x.Online0.CfgDB.25	DB 6600.25	'ERR!'
Room.L60x.Online0.CfgDB.26	DB 6600.26	'ERR!'
Room.L60x.Online0.CfgDB.27	DB 6600.27	'ERR!'
Room.L60x.Online0.CfgDB.28	DB 6600.28	'ERR!'
Room.L60x.Online0.CfgDB.29	DB 6600.29	'ERR!'
Room.L60x.Online0.CfgDB.30	DB 6600.30	'ERR!'
Room.L60x.Online0.CfgDB.31	DB 6600.31	'-OK-'
Room.L60x.Online0.CfgDB.32	DB 6600.32	'ERR!'

Tip: Store the WatchWindow, then you can at any time have an overview of the call status displayed, without having to repeat the steps.

The configuration FBoxes also update the information in this list! After a configuration, the lists of station addresses entered in the configuration FBox are always the latest versions. The station FBox is not essential and can be dispensed with; however, the list is not available without this FBox.

3.2 Control function description

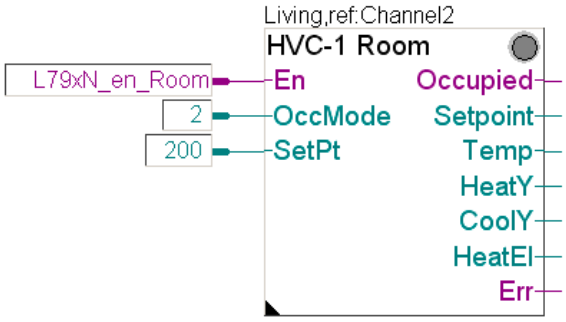
3.2.1 Operating mode



The room controller can work in one of the 4 operating modes «Frost protection», «Reduced», «Standby» or «Comfort». The operating mode depends on the window contact, a preset value and the presence sensor.

Window contact
If the window is open, the controller only works in «Frost protection» mode. For all other functions, the window must be closed. (See window contact)

OccMode
The Room FBox or register 36 can be used to select the operating mode.



Value	Mode	Description
0	«Comfort»	The controller works permanently in «Comfort» mode.
1	«Reduced»	Where no presence is detected, the controller is in «Reduced» mode. Where a presence is detected, «Comfort» mode is activated for a definable time. This time is configurable via the Config FBox or in register 0.
2	«Standby»	Where no presence is detected, the controller is in «Standby» mode. Where a presence is detected, the operating mode switches to «Comfort». Where no presence is detected any longer, «Standby» is reactivated.
5	«Permanently reduced»	The controller works permanently in «Reduced» mode. Presence detection is deactivated. This mode is suited e.g. to service activities where the room is occupied but the system does not need to be switched on.

3.2.2 Set-point

After a restart, the active base set-point (register 41) is initialised with the base set-point value from the configuration (register 37). The active base set-point can be changed any number of times by the communication function. The control set-point is made up of the active base set-point and any adjustment by the room control unit. Manual adjustment of the set-point (register 34) is only possible in Comfort and Standby modes. In «Reduced» operation, the controller works with the active base set-point alone.

Control set-point in Reduced operation:
Set-point = Active base set-point

Control set-point for Comfort and Standby modes:
Set-point = Active base set-point (register 41) + set-point adjustment (register 34)

3.2.3 Control parameters

The controller works with 2 independent PI controllers, one for heating and one for cooling. Each PI controller can be configured to the needs of the system with a proportional band and a run-down time. The dead zone between heating and cooling is dependent on the operating mode and can be parameterised separately for Comfort, Standby and Reduced operation.

Where the FBoxes are used, the parameters can be found in the HVC Config FBox. See section on «3.3.1.4 Control Parameters».

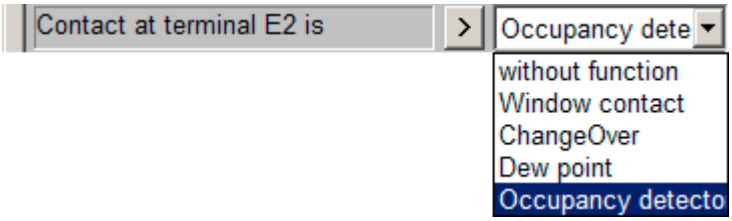
In all other cases, the settings can also be entered directly via the internal register in the controller. Please note that all configuration parameters are held in the controller EEPROM, and so cannot be written to cyclically.

Cooling:	Proportional band register 5, run-down time register 7
Heating:	Proportional band register 6, run-down time register 106
Dead zone Comfort	Register 2
Dead zone Standby	Register 3
Dead zone Reduced operation	Register 4

3.2.4 Detecting a presence

The room controller can detect a presence via an analogue or digital room control unit. Where built-in temperature sensors are used, presence can be indicated by a temporary short-circuit of the temperature sensor.

The digital input «E2 Aux Input» can also be configured as an input for external presence sensors. In this configuration is the Presence sensor button of the room operation unit is disabled and the E2 acts directly to the «Presence sensor» status.



In this configuration is the Presence sensor button of the room operation unit is disabled and the E2 acts directly to the «Presence sensor» status.

«Presence sensor» status is used in the effective occupancy mode determination for HVC (see 3.2.1 Operating mode) and can be link to «Pres detec by MS» from a multi-sensor (PCD7.L665 or PCD7.L666) by «Link PD and PB» to switch automatic light and sunblind functionalities (see 3.3.5.1 Light configuration FBox and 3.3.5.2 Sunblind configuration FBox).

«Pres detec by MS» can be link to «Presence sensor» button by «Link PD and PB» to control the user presence over the multi-sensor PCD7.L665 or PCD7.L666.

«Presence sensor» status stays at presence also when the operation mode will be switched in another mode (e.g. to permanently reduced).

The presence status can be set to unoccupied by:

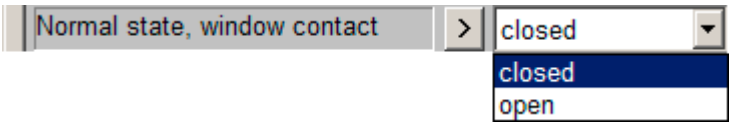
- Acting on the Presence sensor button
- Writing the value 1 in the register 22
- Write value 1 in the «Reset» input of the HVC Room FBox

With Operation mode in «Reduced» it is possible to configure a run-down time. At the end of this time switch the regulation from «Comfort» to «Reduced» mode.

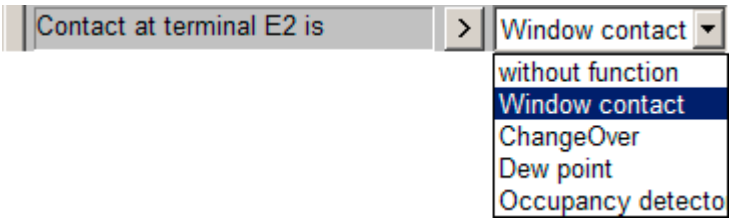
3.2.5 Normal state, Window contact

For room control to work, the window must be closed. The controller has a digital input «E1 Window Contact». This contact polarity is configurable via the Config FBox or in register 105.

(Where window closed: 0=contact closed, 1=contact open)



The digital input «E2 Aux Input» can also be configured as a second window contact in the Config FBox or in register 10 = 1. This contact polarity is also configurable via the Config FBox or in register 105.



Window contact switching over SBus (Register 33):

If the Window contact has to be switched over S-Bus, there is the possibility to write in the Register 33 of controller to switch additionally to E1 (or E2) the window state:

0 = Operation Normal

1 = Regulation deactivated but the protection against freezing remains activated

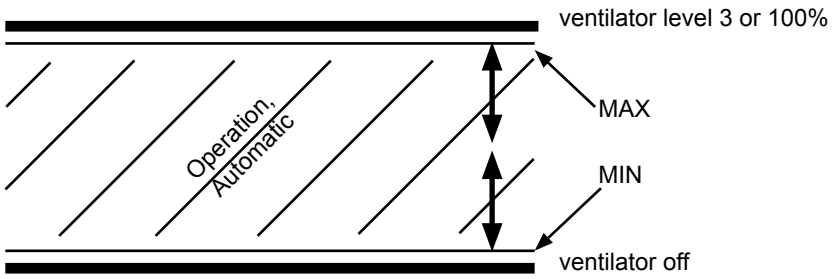
3.2.6 Fan

The room controller regulates the fan speed according to the heating/cooling output signal, a pre-selected value and manual intervention via a digital or mobile room control unit. From Controller FW Version SV3.00 it is also possible to drive variable fan speed motors beside the 3 step fan motors.

Min and Max Limitation

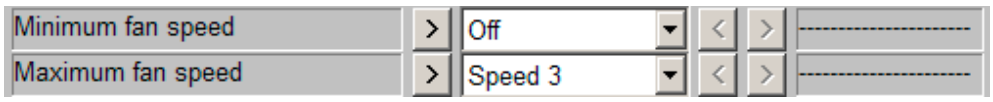
Pre-selection via the Config and Room FBoxes enables a minimum and maximum speed band to be set. Any automatic or manual change can only happen within these limits. Where MIN and MAX are set to the same value (incl. OFF), the fan runs permanently at the defined step level. The MIN and MAX settings can be entered in the Fan Room FBox or directly into register.

Fan speed

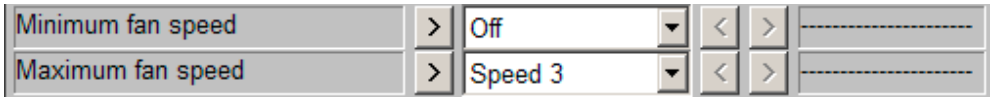


3 Step Fan Speed

Fan Config FBox



Fan Room 3 FBox, current MIN and MAX preset



The register contains both MAX and MIN settings, coded as decimals.

Register 63:	Configuration at restart
Register 64:	Current settings for ongoing operation

Example:

MAX = 3; MIN = 0:	Register content 30
MAX = 2; MIN = 2:	Register content 22

Variable fan speed (from SV3.00)

Fan config FBox
Register 98: Min Fan Configuration at restart
Register 99: Max Fan Configuration at restart

Fan Room Y FBox
Register 158: Min Fan Current settings for ongoing operation
Register 159: Max Fan Current settings for ongoing operation

3 Step Fan Speed

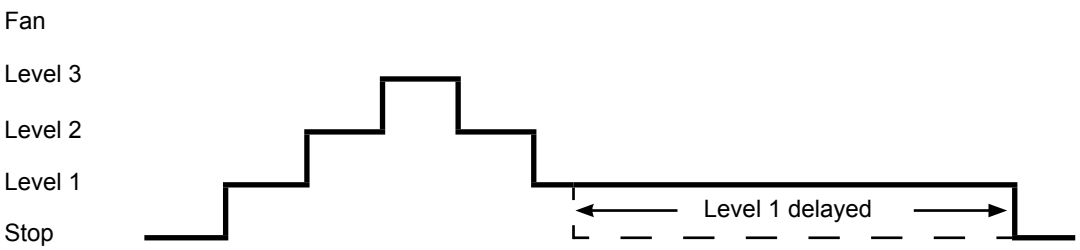
Fan Room 3 FBox, current fan speed

Fan speed	----------

The current fan speed is determined by the controller in «Automatic» mode and can be seen in the Fan Room 3 FBox or in register 52. Manual intervention is possible via a room control unit and will be displayed under «switch position» (register 24), or by writing directly into the register 32. The last change will be effective at all times.

Register 24	
0	Fan off
1	Fan step 1
2	Fan step 2
3	Fan step 3
4	Fan steps adjusted automatically by the controller

Step control



The system switches between steps automatically with no delay, until step 1 is deactivated. This deactivation is delayed by a configurable time. Settings are entered via the Config FBox or register 127, in 20-second steps.

Thresholds for the automatic function

In automatic mode, the controller switches the fans on and off according to the heating and cooling valve outputs. The first step starts up with an output signal greater than the parameter value «Fan step 1» from register 128*. The thresholds for steps 2 and 3 are parameterised in the Config FBox or in registers 16 and 17.

Step 1	Register 128*	configurable 0 ... 100 % default	1 %
Step 2	Register 16	configurable 0 ... 100 % default	33 %
Step 3	Register 17	configurable 0 ... 100 % default	66 %

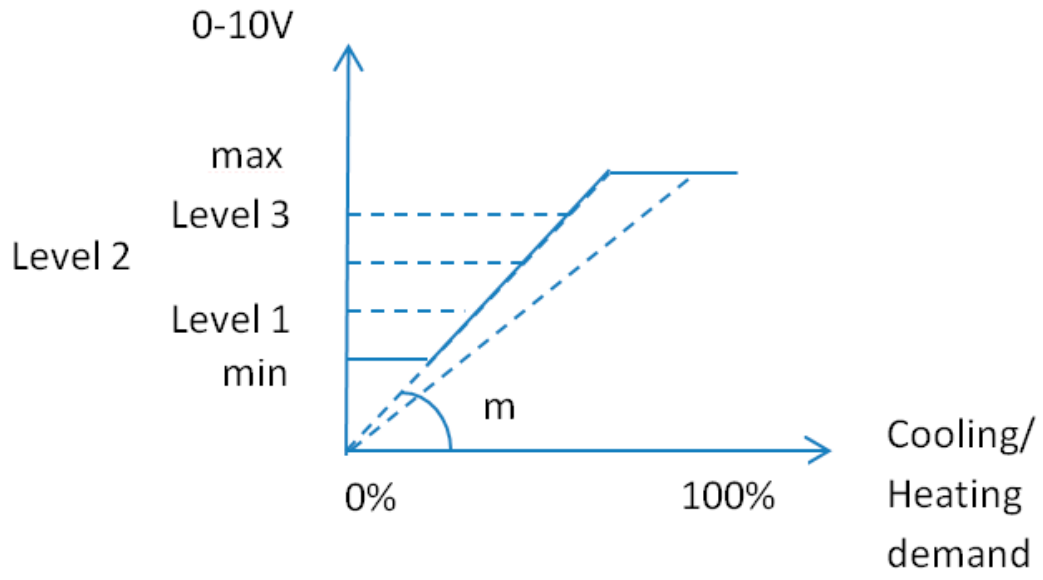
Functions for 3 step fan speed and Variable fan speed

Depending on the control variance (difference between set-point/actual values) and the parameters set, the controller will work in heating or cooling mode. A configuration parameter (register 101) can also be used to make ventilation independent from the mode. This allows to specify e.g. that the fan operate only on heating or the fan operate only cooling. And it is additionaly possible over a parameter (register 100) to enable a energy saving or noise reduction management for the fan. (see 3.3.3.1 Fan Configuration FBox).

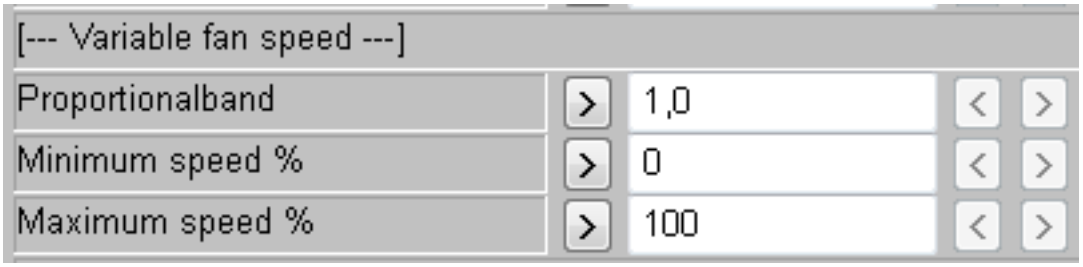
Variable fan speed (from SV3.00)

The current fan speed is determined by the controller in «Automatic» mode and can be seen in the Fan Room Y FBox or in register 68. Manual intervention is possible via a room control unit or by changing of min and max settings.

Proportionalband m



The variable Fan Speed loop output follows the regulation output value in heating and/or cooling mode with a factor: Variable Fan Speed signal = proportionalband m * Heating or Cooling Regulation Loop output demand



It can be adjusted in the Fan config FBox.

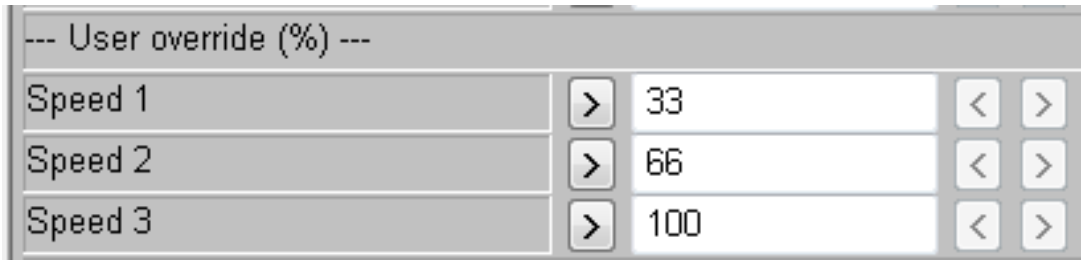
The power supply for the variable fan speed motor on the clamp V1 will be activated over the configuration of the OutputY3/Y4 as variable Fan Speed output.

This 230V output is activated and remains active (including during post ventilation delay) as the variable fan speed output is not zero.

Override by room control unit

By manual intervention over the room control unit it is possible override the variable fan speed output.

Over the Fan config FBox it is possible to define the output value for the 3 steps:

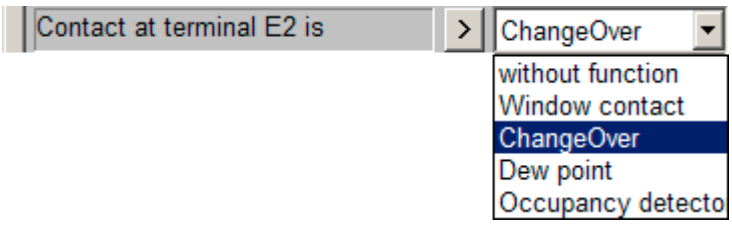


Speed 1 Register 115 configurable 0...100% default 33%
Speed 2 Register 116 configurable 0...100% default 66%
Speed 3 Register 117 configurable 0...100% default 100%

3.2.7 Change-over

With 2-tube change-over applications (see HVC configuration FBox), the controller needs information on whether heating or cooling mode is currently set. The controller can obtain this information via the S-Bus or the digital input E2. Where S-Bus is used, the information is written to the Room FBox or register 38.

Register 38: Heating=0, Cooling=1
Digital input E2: Heating = contact closed, Cooling = contact open



3.2.8 Light and Sunblind management

The PCD7.L60x-1 can be used with extension modules to drive light and sunblind. It is compatible with modules:

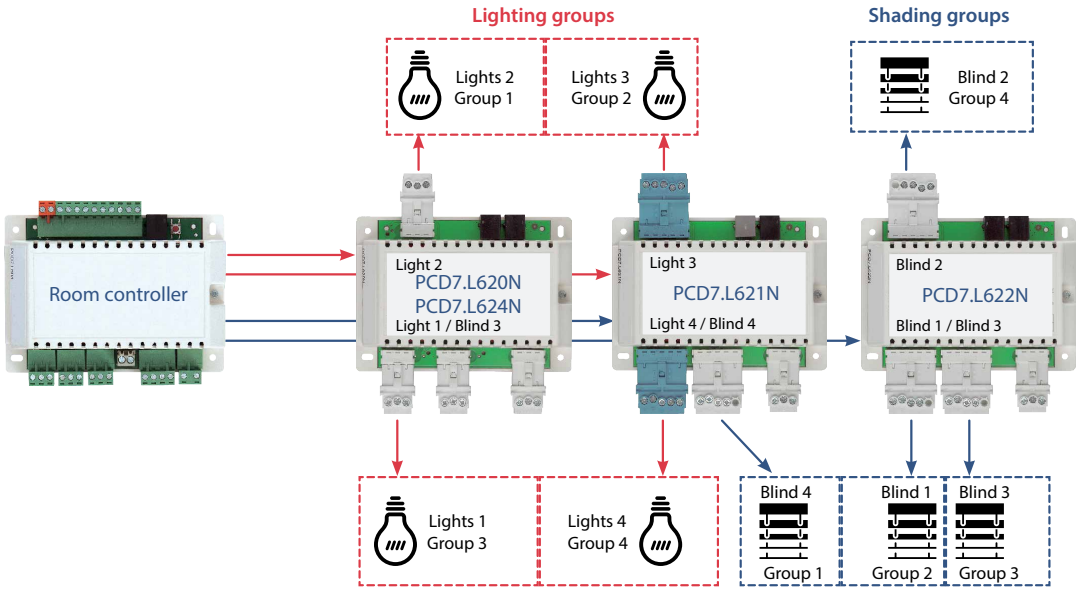
- PCD7.L620N: Extension module with 3 ON/OFF light outputs (L1, L2, L3)
- PCD7.L621N: Extension module with 2 dimming light outputs and 1 sunblind motor 230Vac output (L3, L4, S4)
- PCD7.L622N: Extension module with 3 sunblind motor 230 VAC outputs (S1, S2, S3)
- PCD7.L624N: Extension module with 3 dimming light outputs (L1, L2, L3)

The light and shade extension modules are controlled by using group commands. Four* independent groups for light and shade are available per controller. With the PCD7.L62xN extension modules it is possible to combine four independent outputs for light and shade. Each output can be assigned to one or more groups. The light groups can be switched on/off together or separately. The blinds of the shade groups can likewise be raised or lowered independently of one another.

If the PCD7.L621N extension module will be used in combination with the PCD7.L620N or PCD7.L624N on the same controller, the L3 output can only be driven in the same group. The same behavior exists with L1, L2 and L3 if the PCD7.L620N and PCD7.L624N will be connected on the same controller.

*with PCD7.L650 only two controllable groups

Example of the assignement of the module to the group



Output Specification

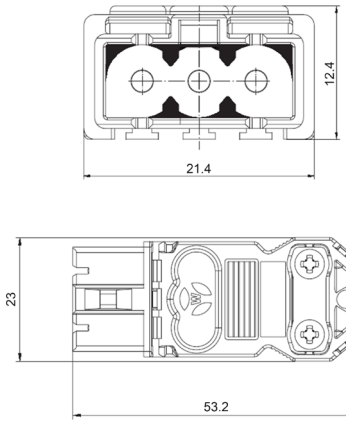
On/Off Light output	
230 VAC inrush current relay	2 A max
Starting current	< 60 A during 2 ms
Normally Opened contact	
Dimming Light output	
230 VAC inrush current relay	2 A max
Starting current	< 60 A during 2 ms
Normally Opened contact	
Command:	1…10 VDC - 3 mA maximum
Sunblind motor output	
230 VAC relay	2 A max on inductive or resistive load Peak current 4 A max (<20 ms)
Maximal Load for the whole module is 6 A.	

The PCD7.L62xN extension modules will be delivered without connectors. These Wieland connectors have to be ordered separately from another supplier.

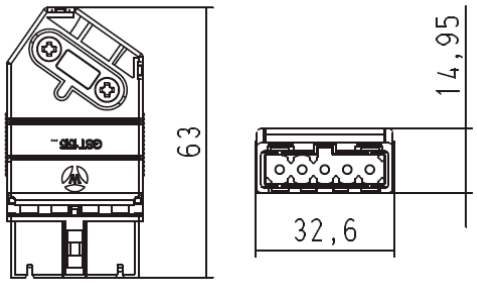
The Wieland connector reference numbers are:

Connector type	Order number
power	91.931.3053.0
on/off light	91.932.3053.0
dimming light	91.952.3453.0
sunblind	91.942.3053.0

These Wieland connectors will be supplied with terminal block covers. They have a contact protection and a cable strain relief.



Dimensions of 91.932.3053.0



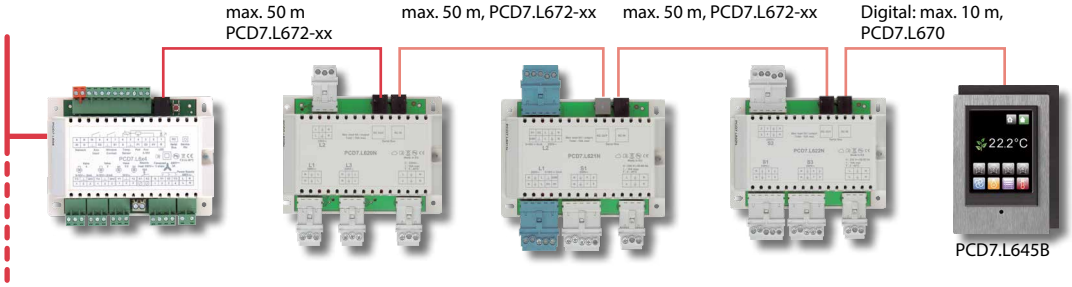
Dimensions of 91.952.3453.0

3

More informations are available on www.sbc-support.com

Bus connection cables:

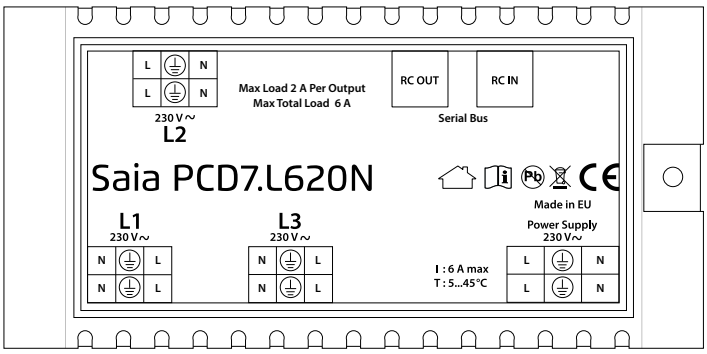
The PCD7.L62xN extension modules can be connected over a RJ-11/RJ-9 Bus cable (PCD7.L672-xx) to the PCD7.L60x-1 room controller.



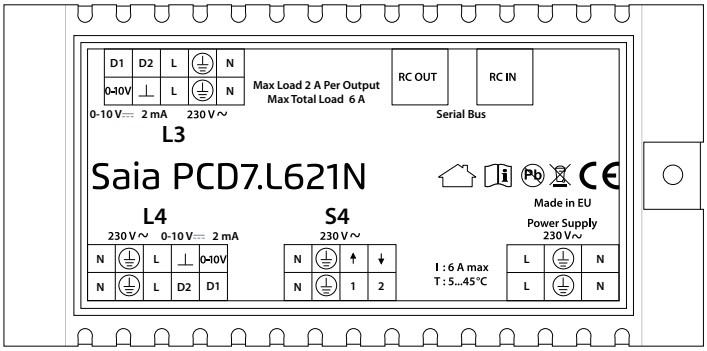
3

Connection diagrams

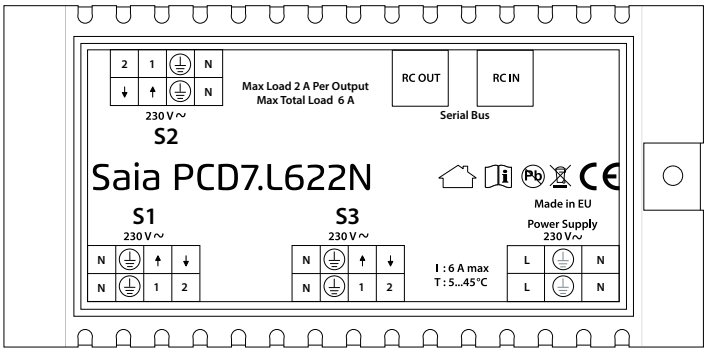
PCD7.L620N



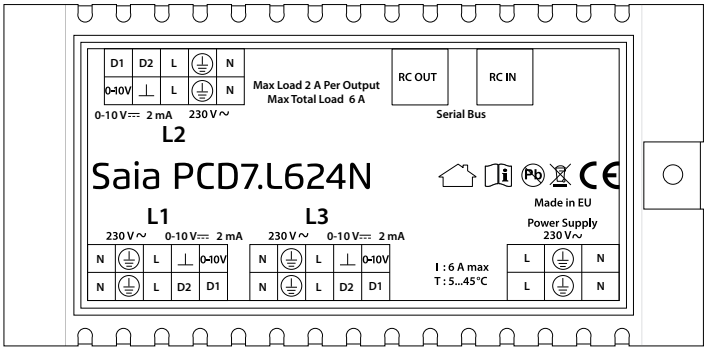
PCD7.L621N



PCD7.L622N



PCD7.L624N



3.2.8.1 Room operation unit for Light & Sunblind control

In the list below are listed the different combination possibilities of room operation unit which can be used for light and sunblind and where can be seen which of the new function is working with them.

Room operation unit	Light	Sunblind	Presence
PCD7.L644	Manual on/off and dimming	Manual up/down and rotation steps with short button press on arrows	Only button
PCD7.L645	Manual on/off and dimming	Manual up/down and rotation steps over a rotation button	Only button
PCD7.L644 or PCD7.L645 and external Presence sensor connected on E2	Manual on/off and dimming and automatic on/off	Manual up/down and rotation steps and automatic up/ down	Sensor and button
PCD7.L660 + PCD7.L665/6	Manual on/off and dimming and automatic on/off	Manual up/down and rotation steps over a rotation button and automatic up/down	Sensor and button
PCD7.L662 + PCD7.L666 + PCD7.L662-CT	Manual on/off and dimming and automatic on/off	Manual up/down and rotation steps over a rotation button and automatic up/down	Sensor and button
PCD7.L63x + PCD7.L665/6	Only automatic on/off	Only automatic up/down	Sensor and button
PCD7.L650 + PCD7.L642	Only manual on/off and only 2 groups	Only manual up/down and only 2 groups	Only button

If the sunblind translation will be controlled over the of room operation unit, the last rotation angle will be keeping if the sunblind will not be driven to the totally closed position.

Dimming lamps can only be commanded by long press on the buttons to 100% on or 0% off (exception PCD7.L645 and PCD7.L644 from SV3.7 also by short button press). But it is possible adapt the dimming ramp time in the Light configuration FBox.

More Information how to connect and use the different room operation unit can be found in the manual 26/859 «PCD7.L6xx room operation device» and the manual 27/605 «PCD7.L645B and PCD7.L645W Touch screen room operator unit».

3.2.9 Automatic Light and Sunblind control with multi-sensor

The light and sunblind can be switched automatically in function of the presence signal «Pres detec by MS» of the multi-sensor (PCD7.L665 or PCD7.L666) and the settings of the Light and Sunblind configuration FBoxes.

The automatic Light and Sunblind switching will only be controlled over «Pres detec by MS» (Register 80) state of the presence detection sent by multi-sensor.

Occupied status of «Pres detec by MS» relaunch the occupancy timer (Presence overtravel time Stand-by Register 81 or Presence overtravel time Reduced Register 82) and the «Pres detec by MS» status return to Unoccupied after no presence detection and the occupancy timer expire.

But «Pres detec by MS» can be link to «Presence sensor» button by «Link PD and PB» (Register 88)

Operating mode	Pres detec by MS	Sunblind	Lights
Reduced / permanent reduced	Unoccupied (1)	Close [1)]	Off [2)]
	Occupied (0)	Open [1)]	On [2)]
Comfort / standby	Unoccupied (1)	Close [1)]	Off [2)]
	Occupied (0)	Open [1)]	On [2)]

[1)] Depending on Pres detec to SB Reduced/Pres detec to SB StandBy (Register 93) → see 3.3.5.2 Sunblind configuration FBox

[2)] Depending on Pres detec to L Reduced/Pres detec to L StandBy (Register 91) and Lum level presence (Register 92) and Lum level light off (Register 96) → see 3.3.5.1 Light configuration FBox

3.2.9.1 Automatic Light switching

The automatic on/off light switching function can be configured by the parameters «Pres detec to L StandBy / Pres detec to L Reduced».

Switch on

When presence detection of the multi-sensor «Pres detec by MS» occurs, the luminosity level of the room is checked. If the «Lum in Lux» level is less than the parameter «Lum level presence» threshold, the lights are turned ON

Switch off

When the «Pres detec by MS» is occupied, the room luminosity is compared to the «Lum level light off» threshold. If the lights have been switching on by the luminosity level threshold (Lum Level Presence) and the luminosity level is higher than the «Lum level light off» value the lights are switching Off.

At the end of the presence detection, when the «Pres detec by MS» switch to unoccupied, the lights are switching Off.

The sensibility of the luminosity measuring of the multi-sensor needs to be adapted with the «Refection coefficient», depending on its room environment. The result of the effective luminosity level computation is given by the «Lum in Lux» and respects the following equation:

$$\text{Actual luminosity} = \frac{\text{Lum in Lux} \times 100}{\text{Refection coefficient}}$$

3.2.9.2 Manual light or sunblind command

If the user makes a manual command over the room operation unit for light or sunblind, this will disable the automatic light switch off function of the «Lum level light off» till the next presence detection, but the automatic presence detection function for light and sunblind are still active.

3.2.9.3 BMS command for occupancy mode

If the BMS occupancy command (OccMode Register 36) will be switched over the HVC Room FBox and no presence detection is used (or the PCD7.L644 is used for presence switching), the automatic function of light and sunblind has to be switched over the light and sunblind FBoxes.

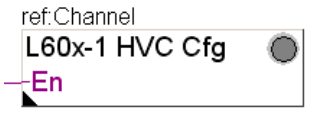
3.3 Configuration of the room controller

The L60x-1 room controllers have an integrated, parameterised control program. The parameters can be used to define the behaviour of the individual functions such as the room control unit, hardware, regulation and light and shade.

The settings can be entered manually via the «Config» FBoxes, or set via individual S-Bus registers. This constitutes configuration using the Config FBox. The associated registers and their values are shown in tables in the appropriate places.

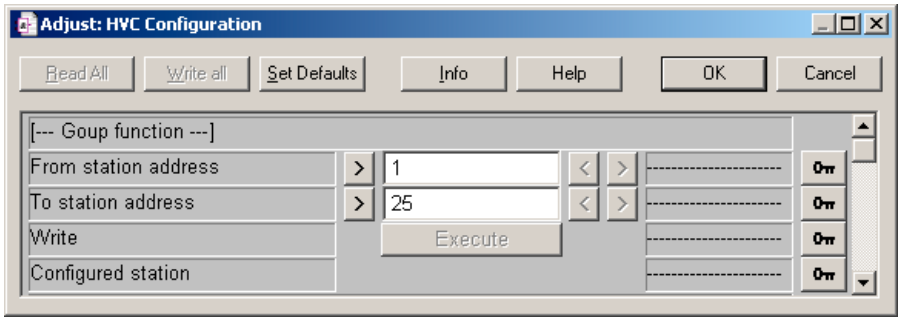
3

Use of the Configuration FBoxes

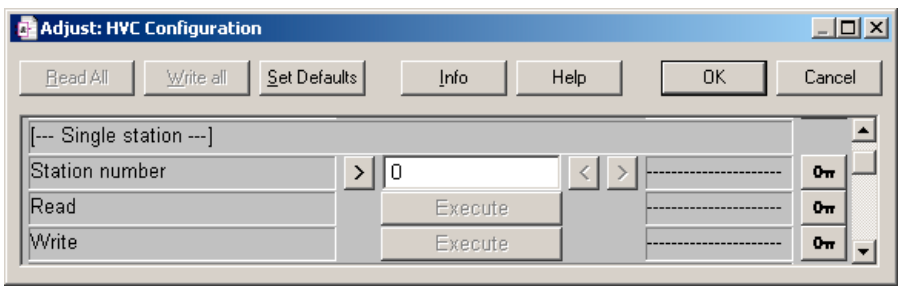


The configuration (read and write) of the room controller is performed online. It is also possible to configure a number of room controllers which have the same configuration on a single occasion, provided these are in a connecting address range (e.g. from address 123 to 167).

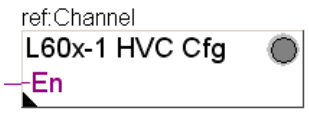
In the parameter group **[--- Group function ---]** , the parameters **from [station address]** and **to [station address]** determine a connected area for station addresses which is written to with the command **Write|Execute** with the settings. Depending on the prompt in the FBox **online** (see parameter **For communication error**) writing of the values is ended with the first communication error or continued with the next station address.



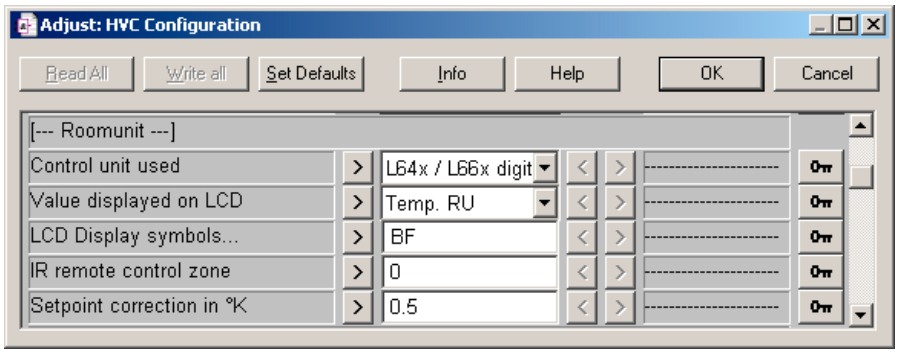
In the parameter group **[--- Single station ---]** an individual station address is contacted objectively, from which the room controller stated in the parameter **station address** can be read out or written into the room controller. This is done by the commands **Read|Execute** or **Write| Execute**.



3.3.1 HVC configuration FBox



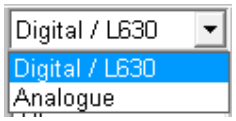
3.3.1.1 Roomunit



Control unit used (register 102)

Where PCD7.L63x analogue room control units are used, the «analogue» parameter must be selected. With control units with a serial interface, «digital» must be set.

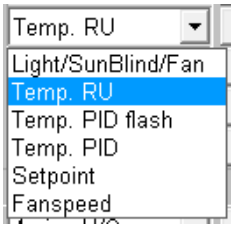
The only exception is the PCD7.L630



FBox entry	Value	Meaning
«Digital / 630»	0	Room control units with serial interface
«Analogue»	1	Analogue room control units connected to analogue inputs: S, GND, P1, 5 V and R. t

Value displayed on LCD (register 19)

The L644 room control unit can show information about the controller on their display. This parameter defines the display.



FBox entry	Value	Meaning
«Light/SunBlind/ FanSpeed»	0	active light or shade group (where selected) or fan speed: «Auto», 0, 1, 2 and 3
«Temperature»	1	Room temperature measured at the room control unit
«Temp. PID blink»	2	Room temperature used by the PI controller, blinkend
«Temp. PID»	3	Room temperature used by the PI controller
«Setpoint»	4	Room temperature setpoint used by the PI controller
«Fanspeed»	5	Active fanspeed level on main screen

The settings for «Temperature» and «Setpoint» are also usable for the PCD7.L645.

Configurable LCD display symboles for room control unit PCD7.644 and PCD7.L645

(starting with the firmware version: SV3.6 of the L644)

The configuration must be entered in hexadecimal form.
For example: «BF» when all displayelements must be activated.

First hexadezimal position				
	configuration forced by controller	fix to 0 (Reserved for further developments)	Display of the absolute set point temperature (only L644)	Light commands enablet
8	X			
9	X			X
A	X		X	
B	X		X	X

The display of the absolute set point temperature in the offset setting menu can only be made with 0.5 K steps. If other offset steps are needed, the effective setpoint can be displayed in the main screen and a barograph is available to set the setpoint steps.

Second hexadezimal position				
	Sunblind commands enable	Occupancy push button enable	Fan Speed adjustment	Set point adjustment
0				
1				X
2			X	
3			X	X
4		X		
5		X		X
6		X	X	
7		X	X	X
8	X			
9	X			X
A	X		X	
B	X		X	X
C	X	X		
D	X	X		X
E	X	X	X	
F	X	X	X	X

IR remote control zone (register 1)

Addressing of mobile infrared remote control.

The display on the PCD7.L660 remote control can be used to set an IR zone (0…30). In order for the controller to process commands from the IR remote control, this parameter must equal the IR zone set in the remote control itself. With parameter value == 0, commands are accepted from all IR zones.

Set-point step in K (register 104)

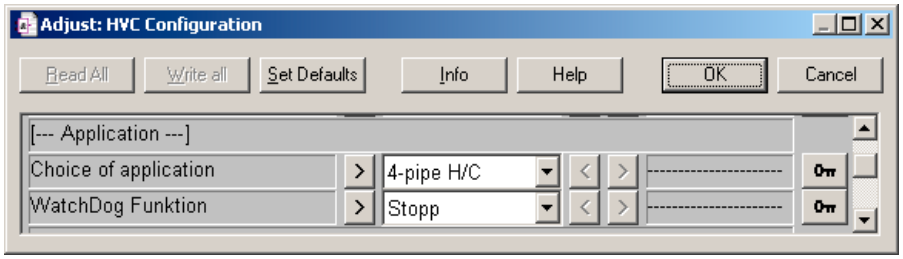
The room control unit can increase or decrease the room set-point for the controller in up to 6 steps. The absolute change in the set-point is defined by the number of steps set on the room control unit and this parameter for the difference per step.

Range of settings (default 0.5):

FBox 0...1 P

Registers 0...10 K/10

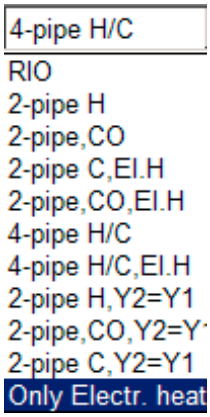
3.3.1.2 Application



Choice of application (register 9)

The regulation/control functions are dependent on the program selected. This register x. is used to define the program. The associated outputs Y1…Y4 are specified in the «Hardware» section. All outputs not used by the function can be freely used for RIO (remote input-output).

Application	Description	Terminals
V	Fan, 3-step	V1 to V3
Y1	Triac PWM output 0…100 %	Y1
Y2	Triac PWM output 0…100 %	Y2
Y3	Analogue 0…10 V output 0…100 %	Y3
Y4	Analogue 0…10 V output 0…100 %	Y4
P	Relay PWM output 0…100 %	K1/K2



(Table see next page)

Function	Value	Description of outputs	Outputs
RIO	0	The internal regulation and control functions are disabled. All outputs are controlled via the RIO FBox or via S-Bus registers.	none
2-pipe H	1	2-pipe heating application.	V, Y1(Y3)
2-pipe CO	2	2-pipe change-over application. Where ChangeOver input == 0, the controller is in heating mode, otherwise in cooling mode. (change-over register: 38)	V, Y1(Y3)
2-pipe C, El.H	3	2-pipe cooling application with electric reheating.	V, Y1(Y3), K
2-pipe CO, El.H	4	2-pipe change-over application with electric reheating. Where ChangeOver input = 0, the controller is in heating mode, otherwise in cooling mode. (change-over register: 38)	V, Y1(Y3), K
4-pipe H/C	5	4-pipe heating/cooling application. The heating valve is controlled via Y1(Y3), and the cooling valve via Y2(Y4).	V, Y1(Y3), Y2(Y4)
4-pipe H/C, El. H	6	4-pipe heating/cooling application with electric reheating. The heating valve is controlled via Y1(Y3), the electric heating via relay contacts K1/2 and the cooling valve via Y2(Y4). The electric heating works in sequence with the heating valve. (See control parameters)	V, Y1(Y3), Y2(Y4), K
2-pipe H, Y2=Y1	7	2-pipe heating application with 2 heating valves connected in parallel. The first heating valve is controlled via Y1(Y3), and the second heating valve via Y2(Y4).	V, Y1(Y3), Y2(Y4)
2-pipe CO, Y2=Y1	8	2-pipe change-over application with 2 valves connected in parallel. The first valve is controlled via Y1(Y3), and the second valve via Y2(Y4).	ttV, Y1(Y3), Y2(Y4)
2-pipe C, Y2=Y1	9	2-pipe cooling application with 2 valves connected in parallel. The first valve is controlled via Y1(Y3), and the second valve via Y2(Y4).	V, Y1(Y3), Y2(Y4)
Only Electr. heat	10	Electric heating application with relay contacts	K1/2 | V, K

The application selected determines the correct settings for the valve outputs and the function set for input E2 (see «Settings, hardware»).

Watchdog Funktion (Rgeister 112)

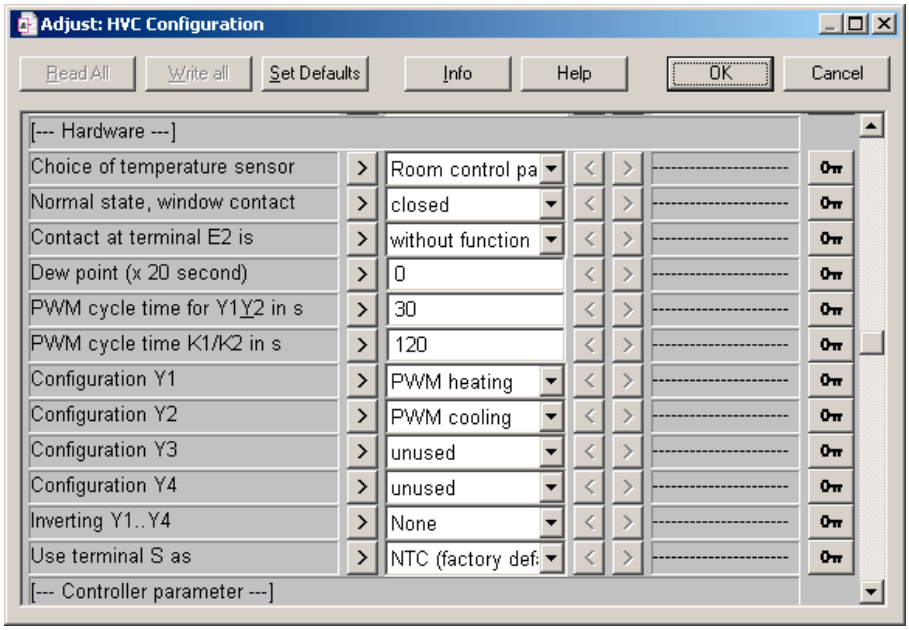
The behaviour of the communication WatchDog can be switched between «Stop regulation» (0) and «Restart controller» (1). The WatchDog cna be enableed or disabled in the HVC Room FBox (see 3.4.1.3 FBox parameters «HVC Room»).

Range of settings (default 0):

FBox 0...1

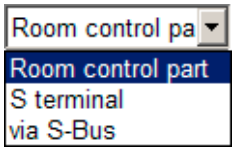
Registers 0...1

3.3.1.3 Hardware



Choice of temperature sensor (register 13)

The controller can derive the room temperature for control purposes from 3 different sources.

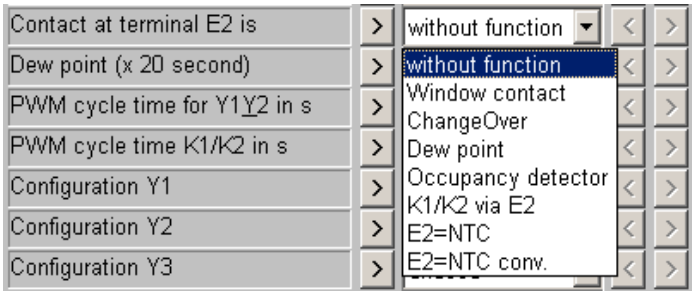


FBox entry	Value	Meaning
«Room control part»	0	The controller receives the room temperature from a digital room control unit.
«S Terminal»	1	The room temperature is measured at the analogue terminal S. - Analogue room control unit - External temperature sensor NTC 10 kΩ
«via S-Bus»	2	The room temperature is passed to the controller via S-Bus. (see register 30)

Contact at terminal E2 (register 10)

This parameter can be used to configure the function of the second digital input. The status can be read independently of the configuration in register 70.

Contact closed = 0, Contact open = 1



FBox entry	Value	Meaning
«Without function»	0	The contact has no effect on the control program. It can be used as a free digital input and processed via the Room FBox in the PCD.
«Window contact»	1	The input is used as a second window contact. For this to work, both contacts E1 and E2 must be closed. When one or both contacts are open, the controller moves into frost protection mode. The contact polarity should be noted here.
«ChangeOver»	2	The input is used to switch between heating/cooling mode in change-over applications. When the contact is closed, the controller works in heating mode, otherwise in cooling mode.
«Dew point»	3	An external dew point switch, together with the integrated dew point function, enables the controller to switch off the cooling function and prevent further condensation. When the contact is open, cooling is blocked within the program. If the contact is closed, cooling is enabled. (see register 39)
«Ocuppancy detector»	4	An external presence sensor enables the controller to switch into Comfort or unused/Standby mode. The internal presence status can be determined from register 35. For Comfort mode, the contact must be closed.
K1/K2 via E2	5	To drive the K1/K2 relay in function of the E2 input
E2=NTC	6	The input is used as additional temperatur input for an NTC10k temperatur sensor. The accuracy of this temperature measurement is not as high as the room operation unit (RJ-9) or the clamp «S». This sensor should not be used for the control loop.
E2=NTC conv.	7	The input is used as additional temperatur input with the conversion table for an NTC 5 kOhm to a NTC 10k Ohm temperatur sensor. The accuracy of this temperature measurement is not as high as the room operation unit (RJ-9) or the clamp «S». This sensor should not be used for the control loop.

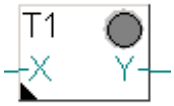
Note to configuration E2 as temperature sensor input

The accuracy of this temperature measurement is not as high as the room operation unit (RJ-9) or the clamp «S».

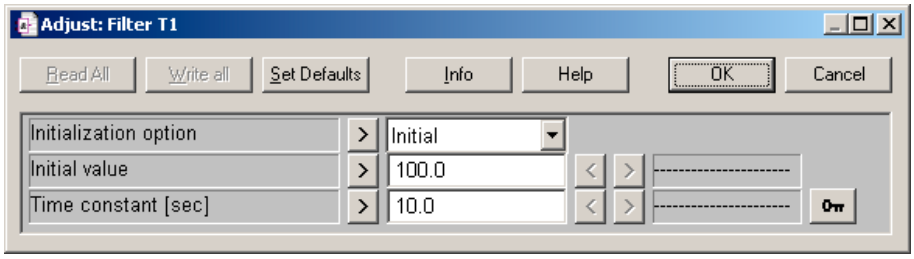
Therefore for temperature regulation the temperature sensor of the room operation unit (RJ-9) or the analogue input «S» should be used.

The Input E2 can only be used in the range from a NTC 5 kOhm to a NTC 10 kOhm temperature sensor.

To get a more stable value at lower temperatures (higher resistances) a filter-FBox (Filter T1) should be used.
This can be done by placing of «TempE2»-symbol from the «symbol editor» and connecting it with the «Filter T1» FBox.



The Filter «Time constant» should be set to 10 seconds to get a good result.



Dew point delay (register 113)

When E2 is configured as dew point, it has a timer before Authorizing again after the cool dew point alarm value is removal (→ register 39 = 0).

The inserted value in «Dew point (× 20 seconds)» gives the dew point delay by multiplied with a value of 20 sec.

With this feature can be avoided, that the cooling valve is always on and off when the conditions are around the dew point.

Range of settings: (default 0)
FBox 0…250 (×20 seconds)
Register 0…250 (×20 seconds)

Dew point configuration (register 114)

The effective direction of the dew-point switch at the input E2 can be inverted.

FBox entry	Value	Meaning
NC	0	At dew point recognition, the contact is open (Register 39 = 1) → Cooling will be locked
NO	1	At dew point recognition, the contact is closed (Register 39 = 0) → Cooling will be locked

PWM cycle time for Y1/Y2 in s(register 11)

PWM cycle time for the valve outputs Y1 and Y2 in seconds. Where Y1 and Y2 are used as a 3-point output, this parameter holds the motor running time.

Range of settings:
FBox 20...600 s
Registers 20...600 s

PWM cycle time for K1/K2 in (register 12)

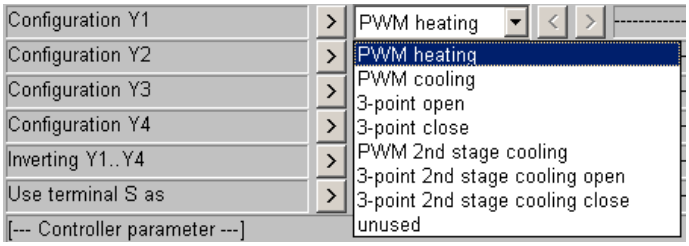
PWM cycle time for the relay contact output K1/K2 in seconds.

Range of settings:
FBox 60...600 s
Registers 60...600 s

Valve drive H/C (Register 192-195)

The heating/cooling output signal from the controller can be routed either to the Triac outputs Y1/Y2 or to the 0…10 V outputs Y3/Y4. The air quality output signal can be routed to the 0…10 V outputs Y3 or Y4. The 0…10 V outputs are available in the PCD7.L601-1, .L603 and .L604-1 controllers. The unused outputs can be used for RIO via FBoxes or registers.

Configuration Y1 (Register 192) and Y2 (Register 193)

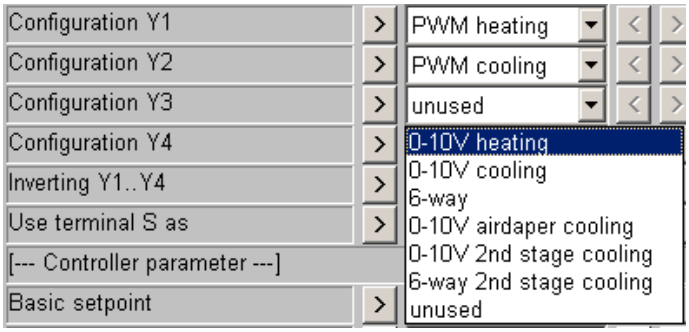


FBox entry	Value	Description
PWM heating	0	usable for example for a thermal valve
PWM cooling	1	usable for example for a thermal valve
3-point open	2	usable for example for a 3-point valve
3-point close	3	usable for example for a 3-point valve
PWM 2nd stage cooling	8	usable for example for a thermal valve
3-point 2nd stage cooling open	10	usable for example for a 3-point valve
3-point 2nd stage cooling close	11	usable for example for a 3-point valve
unused	255	output can be used for manual output control

Default value for Y1 = 0
Default value for Y2 = 1

If a 3-point valve has to be used it has to be configured a 2-pipe application (see chapter 3.3.1.2)

Configuration Y3 (Register 194) and Y4 (Register 195)



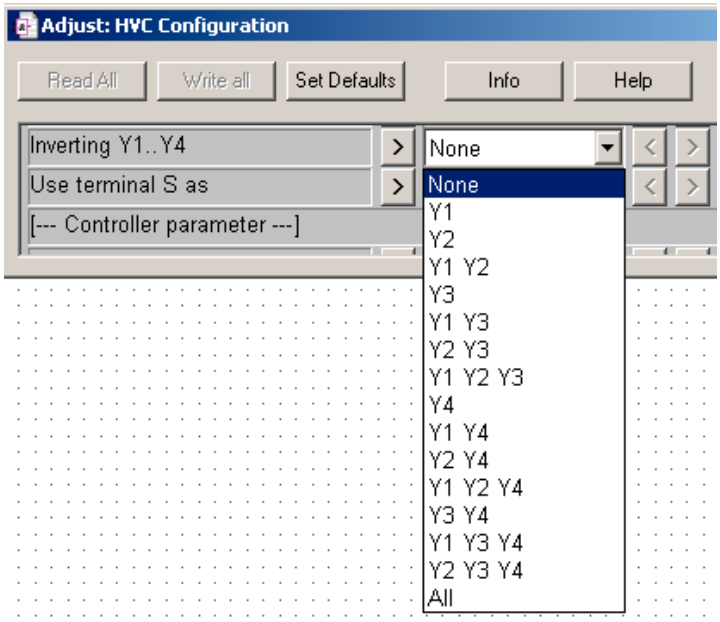
FBox entry	Value	Description
0-10V heating	4	usable for example for a 0-10 V valve
0-10V cooling	5	usable for example for a 0-10 V valve
6-way	6	usable for a 6-way valve
0-10V airdamper cooling	7	usable to control an air damper
0-10V 2nd stage cooling	9	usable for example for a 0-10 V valve
6-way 2nd stage cooling	12	usable for a 6-way valve
variable fan speed	13	usable for a variable fan speed motor
unused	255	output can be used for manual output control

Default value for Y3 = 255
Default value for Y4 = 255

If a 6-way valve has to be used it has to be configured a 2-pipe application (see chapter 3.3.1.2)

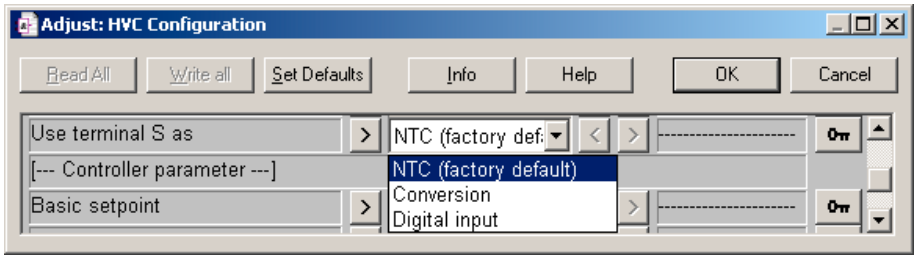
Inverting Y1…Y4 (Register 144)

Configuration for the inverting of the outputs



Up to FW Version SV2.12 this setting is not stored in the eeprom, after a power down it reset with the default value «None» (0).

Use terminal S as (Register 129)

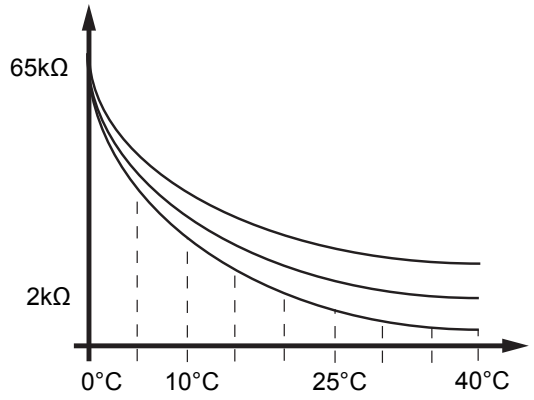


Terminal «S» can be configured as a NTC 10 k temperature input (default), conversion or as a digital input. The status is displayed in the HVC Room+ FBox.

«conversion»:
There is a configurable temperature table to set the relevant resistance value for 9 pre-defined temperature points from 0°C to 40°C. To obtain the best temperature resolution, is is advisable to use the full measurement range from 2 k to 65 kOhm. This is why a PT100 or PT1000 sensor cannot be used, as these have a smaller resistance change per °C.

This table can be adapted in the L60x-1 HVC config+ FBox.

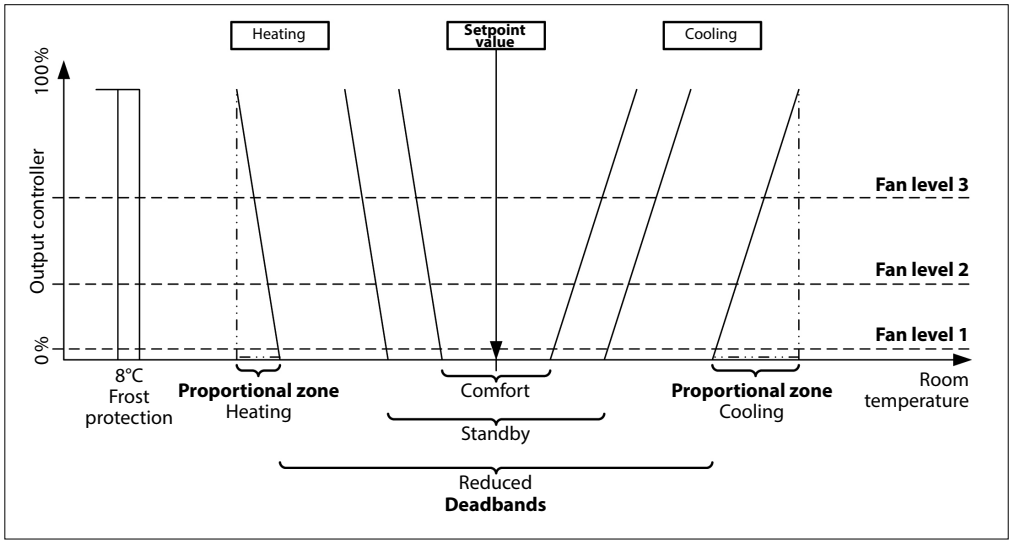
[--- NTC Conversion ---]				
... conversion 0 °C= x Ohm	>	32560	<	>
... conversion 5 °C= x Ohm	>	25340	<	>
... conversion 10 °C= x Ohm	>	19870	<	>
... conversion 15 °C= x Ohm	>	15700	<	>
... conversion 20 °C= x Ohm	>	12490	<	>
... conversion 25 °C= x Ohm	>	10000	<	>
... conversion 30 °C= x Ohm	>	8059	<	>
... conversion 35 °C= x Ohm	>	6535	<	>
... conversion 40 °C= x Ohm	>	5330	<	>



Up to FW Version SV2.11 these values are not stored in the EEPROM, after a power down they are reset to the default values.

Therefore should up to FW SV2.11 only be used a NTC 10 k temperature sensor for the clamp S.

3.3.1.4 Control Parameters



[--- Controller parameter ---]				
Basic setpoint	>	22,0	<	>
Set point minimum	>	16,0	<	>
Set point maximum	>	28,0	<	>
Dead band comfort mode in °K	>	2,0	<	>
Dead band standby mode in °K	>	4,0	<	>
Dead band reduced mode in°K	>	6,0	<	>
Coasting comfort mode x10min	>	0	<	>

Basic setpoint (register 37)

After a restart, the active control set-point (register 41) is initialised with the base set-point value.

Range of settings: (default 22°C)
FBox 10…35°C
Registers 100…350°C/10

Set point minimum (Register 107)

The minimum limitation for the control set point.

Range of settings: (default 160)
FBox 10,0 … 40,0 °C
Register 100 … 400 %/10

Set point maximum (Register 108)

The maximum limitation for the control set point.

Range of settings: (default 280)
FBox 10,0…40,0°C
Register 100…400%/10

Dead band comfort mode in °K (register 2)

Range of settings: (default 2 K)
FBox 0…20K
Registers 0…200K/10

Dead band standby mode in °K (register 3)

Range of settings: (default 4 K)
FBox 1…20K
Registers 10…200K/10

Dead band reduced mode in °K (register 4)

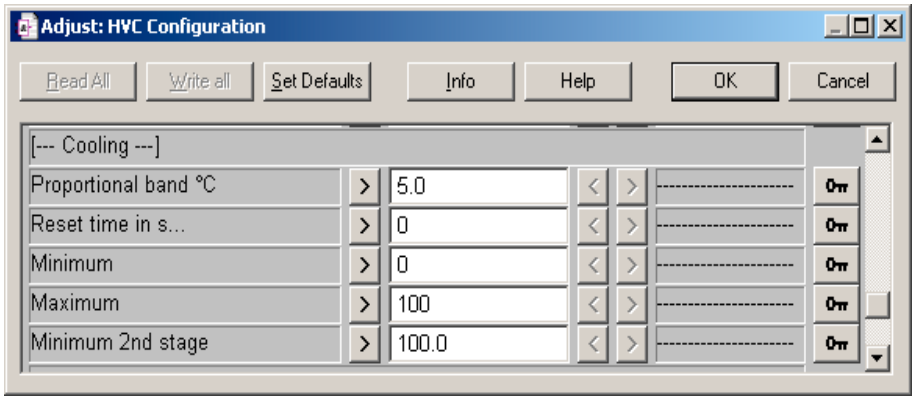
Range of settings: (default 6 K)
FBox 1…20K
Registers 10…200K/10

Coasting comfort mode ×10min (register 0)

Where the controller is working in unused mode, a presence alert causes it to switch to Comfort mode for a configurable period of time. At the end of this time, the controller automatically returns to unused mode.

Range of settings: (default 0 => 0 min)
FBox 0…240 × 10 min
Registers 0…240 × 10 min

3.3.1.5 Cooling



Proportional band (register 5)

Range of settings: (default 5 K)
FBox 0.5…10K
Registers 5…100K/10K

Reset time (register 7)

Run-down time for the heating PI controller in seconds. The value 0 blocks the integer portion.

Range of settings: (default 0s)
FBox 0…1000s
Registers 0…1000s

Minimum (Register 145)

After a restart, the minimum output value for cooling (CoolY) is limited.

Range of settings: (default 0%)
FBox 0…100%
Register 0…100%

Maximum (register 140)

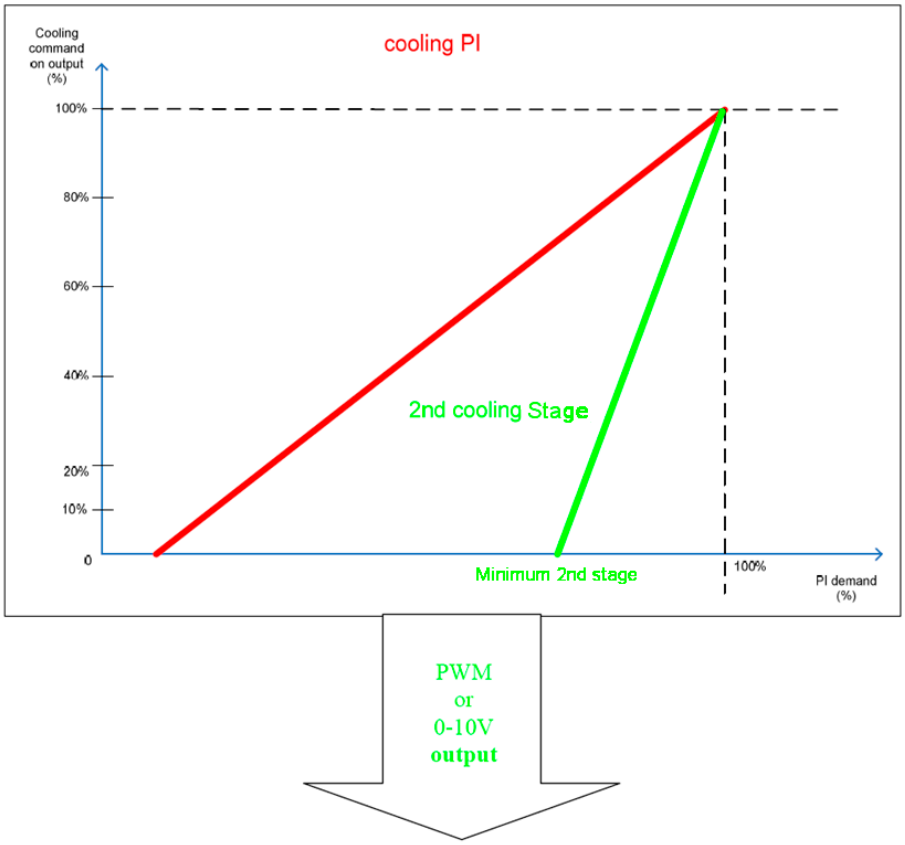
After a restert, the maximum output value for (CoolY) is limited.

Range of settings: (default 100%)
FBox 0…100%
Registers 0…100%

3

Minimum 2nd stage (Register 190)

If the demand of cooling reaches the «Minimum 2nd stage», then the second step of cooling will be activated as following:

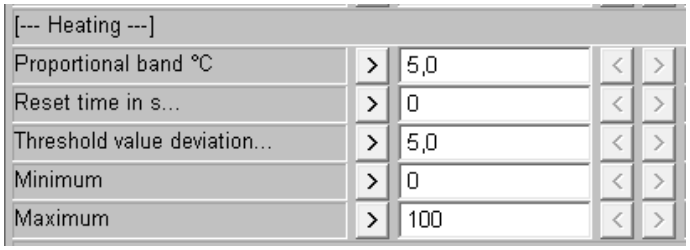


The second step of cooling will be activated if Cooling Demand > Minimum 2nd stage

The output for 2nd stage has to be configured in the valve drive settings (see 3.3.1.3 Hardware).

Range of settings: (default 1000)
FBox 0…100%
Register 0…1000%/10

3.3.1.6 Heating



Proportional band (register 6)

Range of settings: (default 5 K)
FBox 0.5…10K
Registers 5…100K/10K

Reset time (register 106)

Run-down time for the heating PI controller in seconds. The value 0 blocks the integer portion.

Range of settings: (default 0s)
FBox 0…1000s
Registers 0…1000s

Threshold value deviation ... (register 18)

The electric heating is controlled via the relay contact output. if the heating output Y2(Y4) reaches 100% and the variance (current set-point - current room temperature) exceeds this parameter, the electric heating is activated. In this case, the heating PI controller only works as a P-controller, to avoid long delays.

Range of settings: (default 5 K)
FBox 0…20K
Registers 0…200K/10

Minimum (Register 146)

After a restart, the minimum output value for heating (HeatY) is limited.

Range of settings: (default 0%)
FBox 0…100%
Register 0…100%

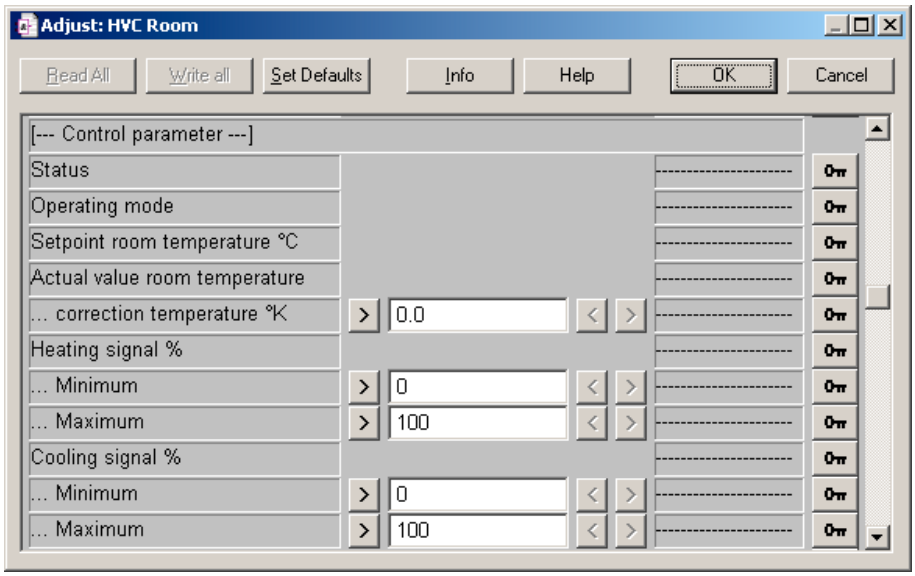
Maximum (register 141)

After a restert, the maximum output value for (CoolY) is limited.

Range of settings: (default 100%)
FBox 0…100%
Registers 0…100%

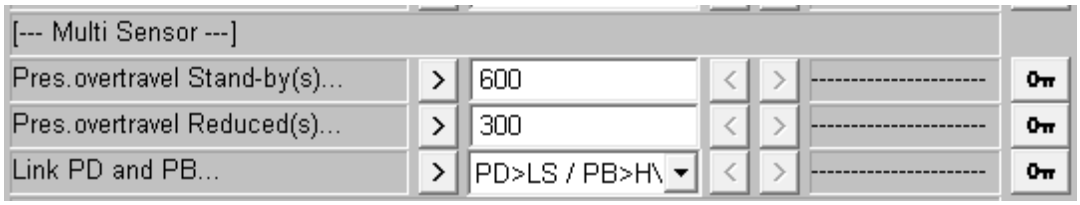
Actual values for limitations

The current values for the heating/cooling limitations are set in the HVC Room FBox (register 147 for cooling min., register 142 for cooling max., register 148 for heating min. and register 143 for heating max.)



3.3.1.7 Multi sensor

The presence detection of the multi senor (PCD7.L665 or PCD7.L666) can act on the lights control and on the sunblind control or on the «Presence sensor» button (→ on the HVC control) at different levels.



The occupied status of «Pres detec by MS» relaunch the occupancy timer (Presence overtravel time Stand-by or Presence overtravel time Reduced) and the «Pres detec by MS» status return to Unoccupied after no presence will be detected and the occupancy timer expire.

«Pres detec by MS» overtravel time Stand-by (Register 81)

Timer value to stay in presence occupied after no presence will be detected of the multi sensor in operating mode (Register 36) = Standby (2)

Range of settings: (default 600s)
FBox 90…43200s
Register 90…43200s

«Pres detec by MS» overtravel time Reduced (Register 82)

Timer value to stay in presence after no presence will be detected of the multi sensor in operating mode (Register 36) = Reduced (1)

Range of settings: (default 300s)
FBox 90…43200s
Register 90…43200s

Link PD and PB (**Register 88**)

Permits to establish a link between the «presence detection» of the multi sensor and the «Presence sensor» button of the room operation unit:

0 : no link between «Pres detec by MS» detection and «Presence sensor» button:

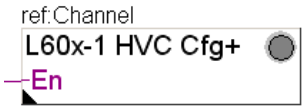
1 : - when «Pres detec by MS» (Register 80) = Occupied (0)
→ «Presence sensor» (Register 22) = Occupied (0)
- when «Pres detec by MS» (Register 80) = Unoccupied (1)
→ «Presence sensor» (Register 22) = Unoccupied (1)

2 : - when «Presence sensor» (Register 22) = Occupied (0)
→ «Pres detec by MS» (Register 80) = Occupied (0)
- when «Presence sensor» (Register 22) = Unoccupied (1)
→ «Pres detec by MS» (Register 80) = Unoccupied (1)

3 : combination of 1 and 2 models.

Default: 0

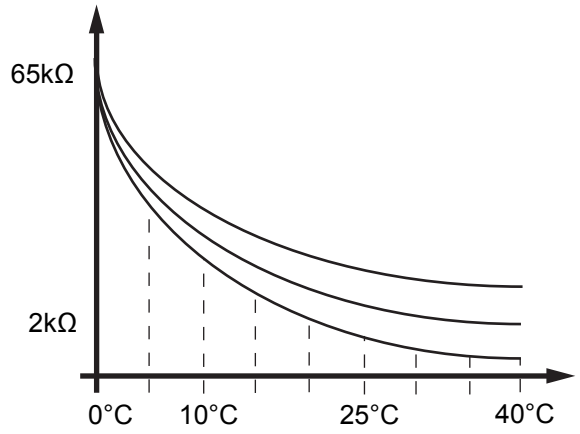
3.3.2 HVC+ Configuration FBox



3.3.2.1 NTC Conversion (Register 130 – 138)

[--- NTC Conversion ---]				
... 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	>	12490	<	>
... conversion 25 °C= x Ohm	>	10000	<	>
... conversion 30 °C= x Ohm	>	8059	<	>
... conversion 35 °C= x Ohm	>	6535	<	>
... conversion 40 °C= x Ohm	>	5330	<	>

When the Terminal «S» is configured as conversion or the input «E2» is configured as E2 = NTC conf. then there is a configurable temperature table to set the relevant resistance value for 9 pre-defined temperature points from 0°C to 40°C. To obtain the best temperature resolution, is is advisable to use the full measurement range from 2 k to 65 kOhm. This is why a PT100 or PT1000 sensor cannot be used, as these have a smaller resistance change per °C.



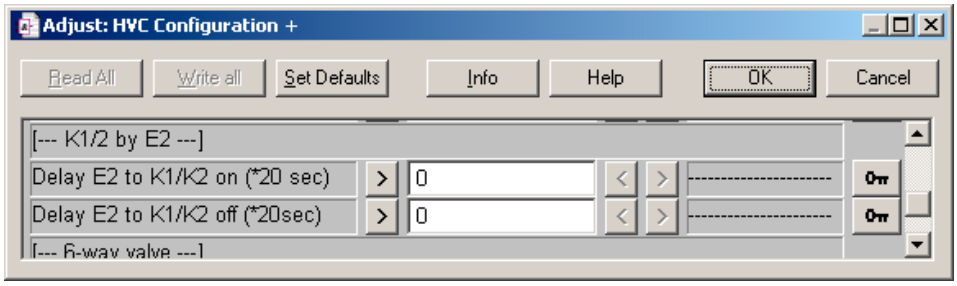
Up to FW Version SV2.11 these values are not stored in the eeprom, after a power down they are reset to the default values.

Therefore should up to FW SV2.11 only be used a NTC 10 k temperature sensor for the «clamp S» and «E2».

(See also 3.3.1.3 Hardware)

Range of settings:
FBox 2000…65000
Register 2000…65000

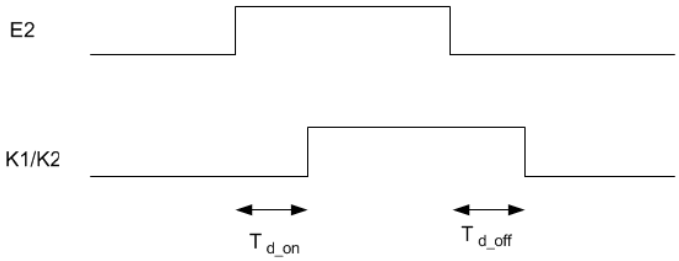
3.3.2.2 K1/K2 by E2



When the input E2 is configured as «K1/K2 via E2» (Register 10 = 5) this parameters will have an effect (See also 3.3.1.3 Hardware)

With this function it is also possible to drive the K1/K2 relay in function of the E2 input with a variable delayed switch-on and delayed switch-off time.

This function is for example particularly interesting for «card reader» application in a hotel.



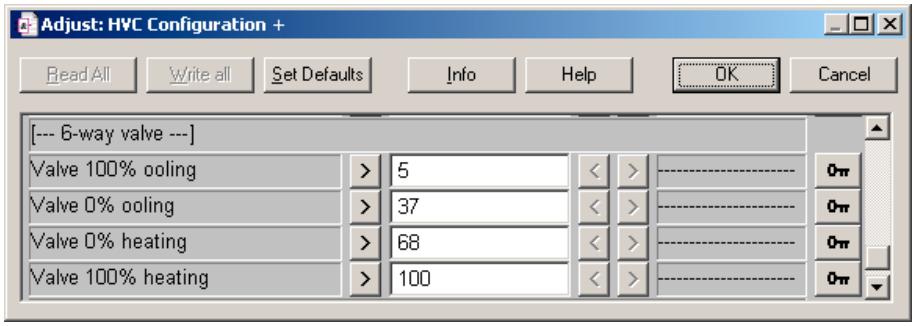
Delay E2 to K1/K2 on (*20 sec) (Register 66)

Range of settings: (default 0)
FBox 0…250 (×20 seconds)
Register 0…250 (×20 seconds)

Delay E2 to K1/K2 off (*20 sec) (Register 67)

Range of settings: (default 0)
FBox 0…250 (×20 seconds)
Register 0…250 (×20 seconds)

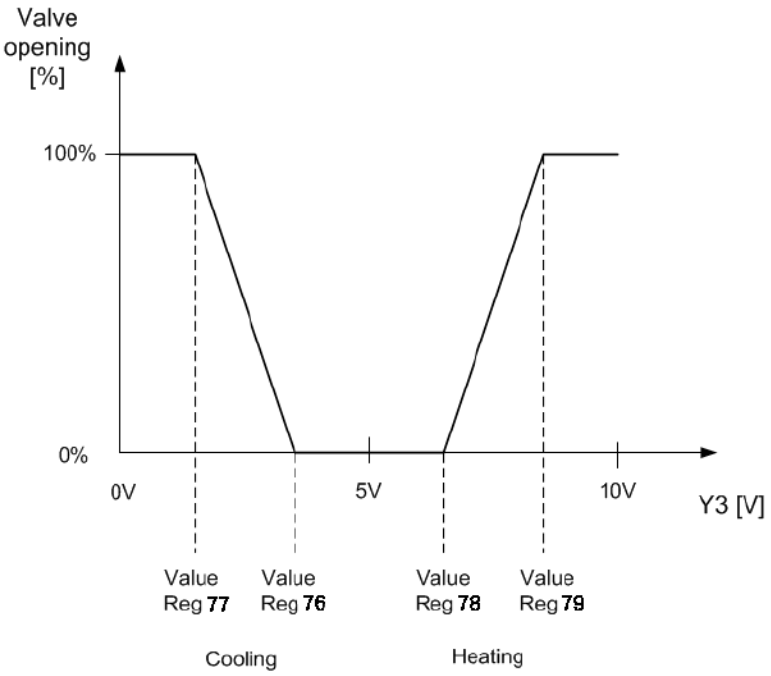
3.3.2.3 6-way valve



When the output Y3 or Y4 is configured as 6-way valve, it is possible to adjust over 4 register values the voltage-level of the cooling and heating curve. (See also 3.3.1.3 Hardware)

2 registers are used to define the cooling curve 0-100% and 2 register are used to define the heating curve 0-100%.

With this 4 adjustable registers it is possible to use a lot of different 6-way valve-types with the PCD7.L60x-1 controllers.



Valve 100% cooling (Register 77)

Voltage-level to apply for 100% cooling

Range of settings: (default 5)
FBox 0…100 V/10
Register 0…100 V/10

Valve 0% cooling (Register 76)

Voltage-level to apply for 0% cooling

Range of settings: (default 37)
FBox 0…100 V/10
Register 0…100 V/10

Valve 0% heating (Register 78)

Voltage-level to apply for 0% heating

Range of settings: (default 68)
FBox 0…100 V/10
Register 0…100 V/10

Valve 100% heating (Register 79)

Voltage-level to apply for 100% heating

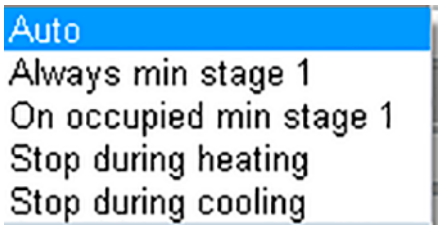
Range of settings: (default 100)
FBox 0…100 V/10
Register 0…100 V/10

3.3.3 Fan Configuration FBox

3.3.3.1 Fan

Fan mode (register 101)

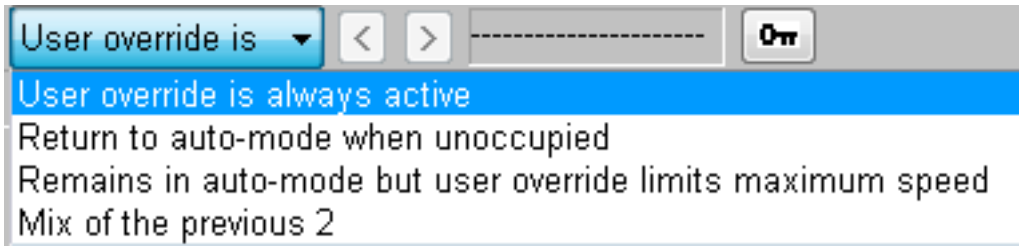
Fan control can fulfill other requirements independently of the application.



FBox entry	Value	Description
«Auto»	0	The fan is automatically controlled by the application, depending on the settings.
«Always min speed 1»	1	The fan always runs in minimum at step 1.
«Min speed 1 / if occupied»	2	The fan runs in minimum at step 1 when a presence is detected.
«Stop during heating»	3	The fan only runs in cooling mode.
«Stop during cooling»	4	The fan only runs in heating mode.

The value 1 or 2 could be usefull if an external temperatur sensor will be placed in the return air flow of the fancoil.

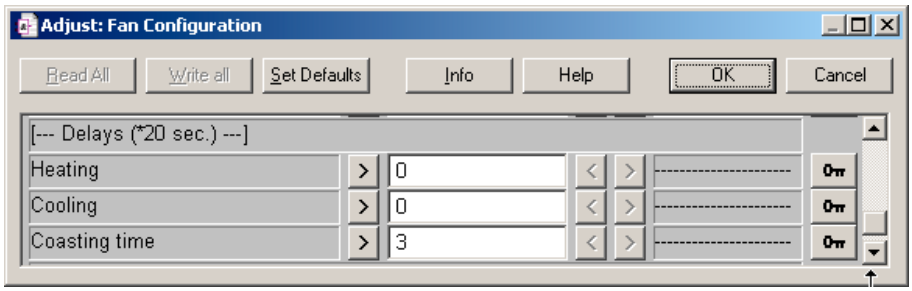
Energy saving and noise reduction management (register 100)



If a user fan speed level is selected, depending of this parameter, the effective fan speed will:

FBox entry	Value	Description
«User override is always active»	0	Stay always at the user selected fan speed level → full user control
«Return to auto-mode when unoccupied»	1	Go back to the Auto mode when the room occupancy switch to unoccupied → Energy saving
«Remains in auto-mode but user override limits maximum speed»	2	Stay in Auto mode but use user selected fan speed level as a maximum value → Noise reduction
«Mix of the previous 2»	3	Combined effects of values 1 & 2 → mix of energy saving and noise reduction.

3.3.3.2 Delays (*20 sec.)



This function can be used to get preheated or precooled air from the fan and to have a delayed switch off of the fan if an electrical heater will be used.

Heating (register 42)

Delay for fan-speed activation, when the heating valve becomes open.
This function can be used to get preheated air from the fan.

If you select in the config. FBox the «Application» a mode with «El. H» (electrical battery) the parameter for heating will be forced to 0.

Range of settings: (default 0)
FBox 0…250 (×20 seconds)
Register 0…250 (×20 seconds)

Cooling (register 42)

Delay for fan-speed activation, when the cooling valve becomes open.
This function can be used to get precooled air from the fan.

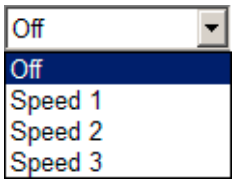
Range of settings: (default 0)
FBox 0…250 (×20 seconds)
Register 0…250 (×20 seconds)

Coasting time (×20 seconds) (register 127)

When valve setting 0% is reached, the fan runs at step 1 for the specified time ×20 seconds.

Range of settings: (default 3)
FBox 1…250 (×20 seconds)
Register 1…250 (×20 seconds)

3.3.3.3 3-speed fan



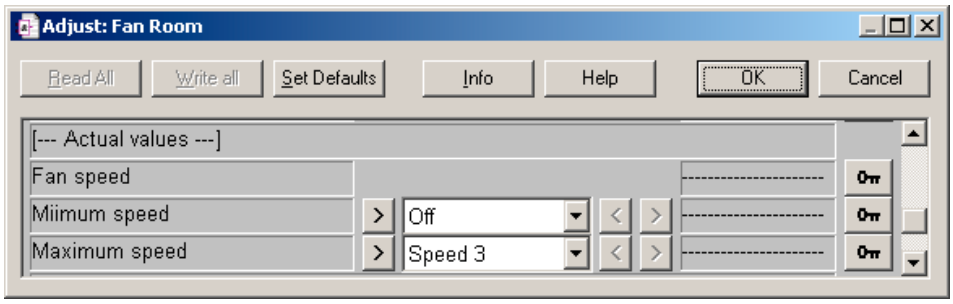
Minimum/ Maximum speed (register 63)

There are many reasons for limiting fan speed across the board. The minimum fan speed can be parameterised independently of the maximum level. If both values are equal, the fan always runs at the selected step level. For values Min = 0 and Max = 3, the controller selects the steps automatically without any restrictions. This parameter defines the behaviour after a restart without any manual intervention.

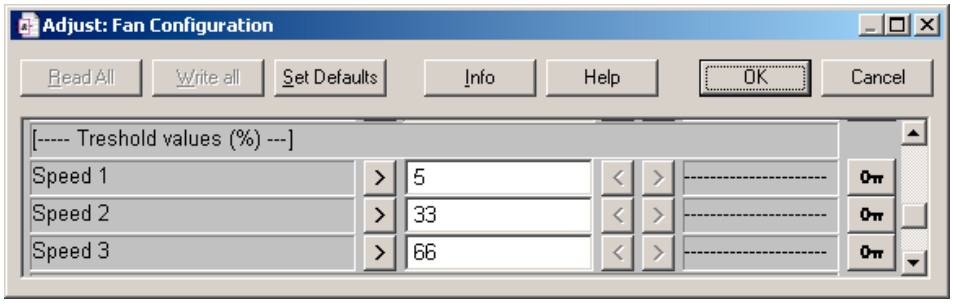
Range of settings (default 30):
FBox 0…3
Register decimal MAX¦MIN 0…33

Actual values for Fan-speed limitation

The current values for the Fan-speed limitation are set in the Fan Room FBox (register 64)



Treshold values (%)



Threshold value fan stage 1 (register 128)

The controller switches between fan steps according to the heating or cooling output signal. If a Y signal exceeds the parameter value «Fan step 1», the controller switches the fan to step 1. If the Y signal drops below the parameter value, the controller switches back to step 1.

Range of settings: (default 1%)
FBox 0…100%
Registers 0…100%

Threshold value fan stage 2 (register 16)

Threshold for switching to the third fan step.
(For operation, see fan step 1, with the difference that the controller switches back to step 1 when the Y signal falls below the configured value - 5%.)

Range of settings: (default 33%)
FBox 0…100%
Registers 0…100%

Threshold value fan stage 3 (register 17)

Threshold for switching to the third fan step.
(for operation, see fan step 2)

Range of settings: (default 66%)
FBox 0…100%
Registers 0…100%

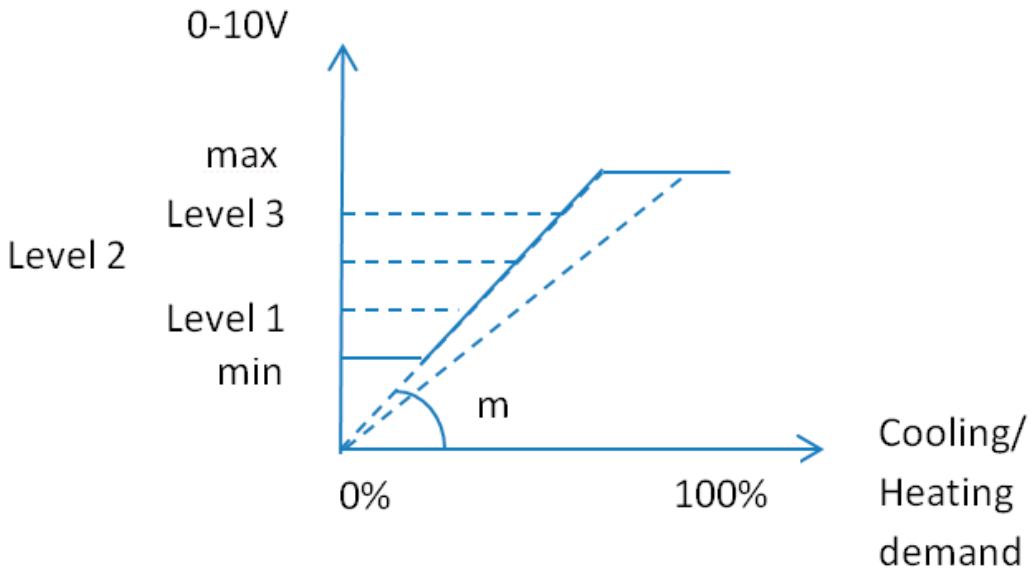
3.3.3.4 Variable fan speed

Proportionalband	>	1,0	<	>	----------	
Minimum speed %	>	0	<	>	----------	
Maximum speed %	>	100	<	>	----------	

Proportionalband

The variable Fan Speed loop output follows the regulation output value in heating and/or cooling mode with a factor: Variable Fan Speed signal = proportionalband m * Heating or Cooling Regulation Loop output demand

Range of settings: (default 10)
FBox 0,1…10
Register 1…100



Minimum speed % (Register 98)

Minimal variable Fan speed at restart

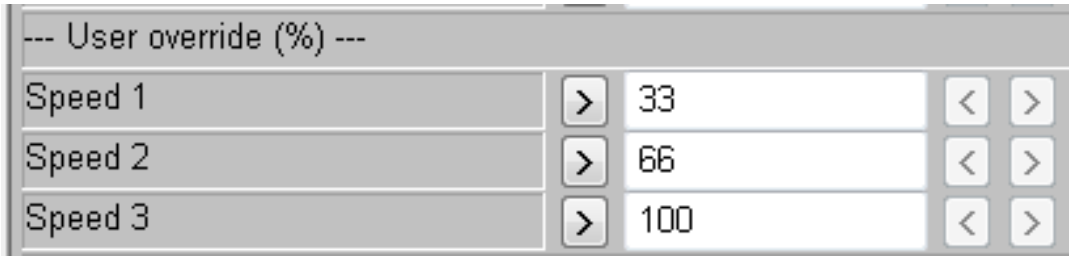
Range of settings: (default 0%)
FBox 0…100%
Register 0…100%

Maximum speed % (Register 99)

Maximal variable Fan speed at restart

Range of settings: (default 100%)
FBox 0…100%
Register 0…100%

User override (%)



By manual intervention over the room control unit it is possible override the variable fan speed output.

Speed 1 (Register 115)

Range of settings: (default 33%)
FBox 0…100%
Register 0…100%

Speed 2 (Register 116)

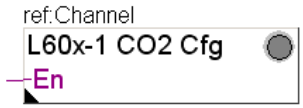
Range of settings: (default 66%)
FBox 0…100%
Register 0…100%

Speed 3 (Register 117)

Range of settings: (default 100%)
FBox 0…100%
Register 0…100%

Additional Information are availabe under chapter 3.2.6 Fan

3.3.4 CO_2 configuration FBox / Airquality management



With this setting can the following functionality be regulated over an air damper:

1) air quality (CO_2)
2) combined air quality and cooling

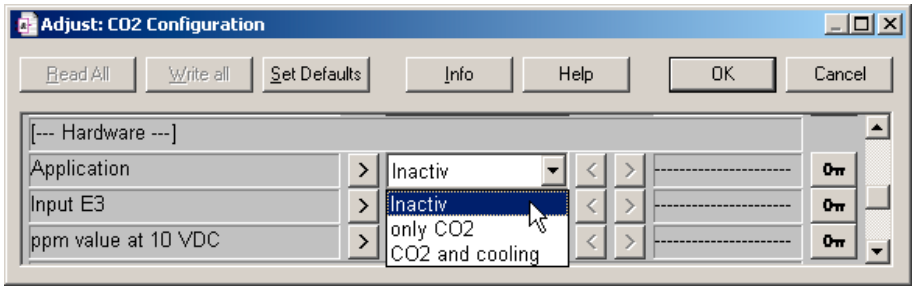
Operation

The air damper output for CO_2 regulation is physically connected to one of the 0-10V outputs (Y3 or Y4).
Cold is made with the command of the air damper and with a configurable 2nd stage on one of the two PWM outputs (Y1 or Y2) or on the 0-10V output which won't be used for CO_2 Regulation.

Air quality management will be active only in Occupied and Standby modes. In Unoccupied mode, the demand on the air damper will stay constant at the minimum value (min opening air damper → Reg 188).

3.3.4.1 Hardware

Application - Mode of activation of the air quality functionality (Register 196)

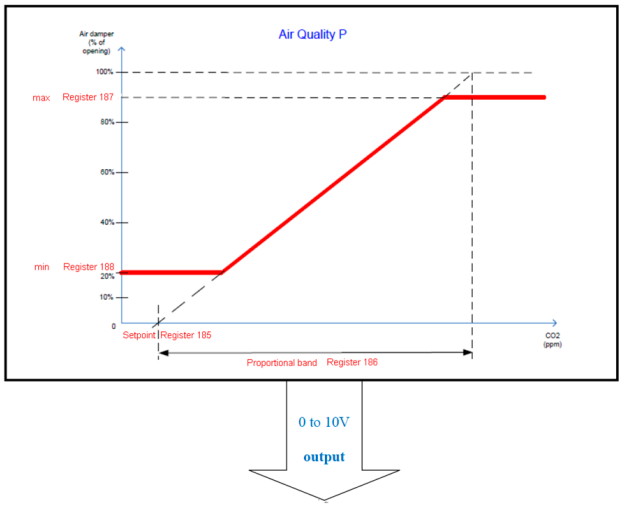


Fbox entry	In mode	Description
inactive	0	air quality inactive
only CO_2	1	only air quality active
CO_2 and cooling	2	air quality and cooling active

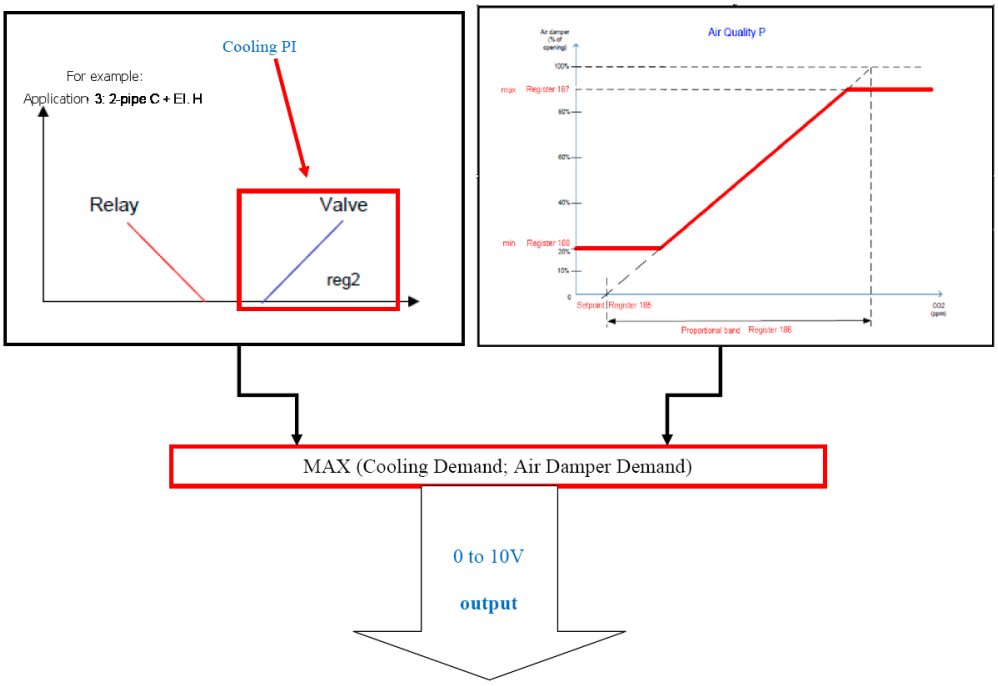
Default value = 0

In mode 0, air quality management is inactivated. Only cooling can act on dedicated 0-10V output. Temperature regulation will work as configured on PWM or 0-10V outputs.

In mode 1, only air quality demand can act on dedicated 0-10V output. Temperature regulation will work as it does at present on PWM outputs or on the 0-10V output which won't be used by CO_2 regulation.



In mode 2, air quality demand and cooling demand can act on dedicated 0-10V output. The maximum between air damper demand of opening and cooling demand will be applied on the output.



Input E3 (Register 183)

Configuration of input E3

FBox entry	Value	Description
0-10 VDC	0	The value received in «airquality from S-Bus» will be used for the CO2 regulation
CO_2 Sensor	1	The physical value on input E3 will be used for the CO_2 regulation

Default value = 0

Air quality via S-Bus (Register 180)

Also adjustable in L60x-1 CO_2 Room FBox

The measured CO_2 concentration communicated by network (ppm). This value will be copied in to the variable Air quality ppm (Register 181)

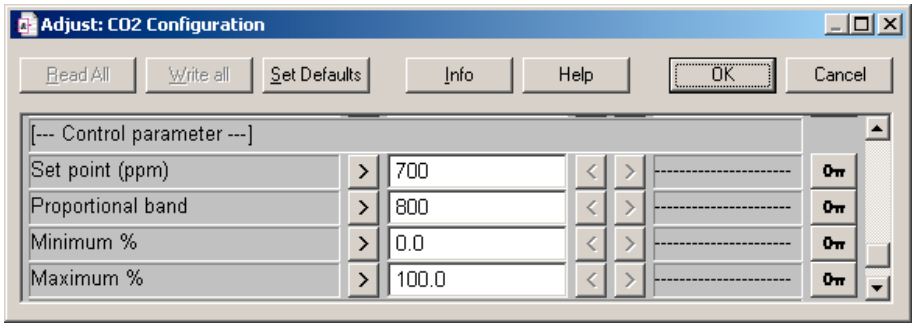
Range of settings:
FBox 0…30000ppm
Register 0…30000ppm

ppm value at 10 VDC (Register 184)

The CO_2 ppm value corresponding to the maximum 10 V voltage on input E3.
0 V on E3 means 0 ppm.

Range of settings: (default 2000)
FBox 0…30000ppm
Register 0…30000ppm

3.3.4.2 Control parameter



Set point (ppm) (Register 185)

The setpoint for the PI which manages the air quality (value in ppm).

Range of settings: (default 700)
FBox 0…30000ppm
Register 0…30000ppm

Proportional band (Register 186)

Proportional band for air quality regulation. This is the ppm variation value for which one the damper will be fully opened.

Range of settings: (default 800)
FBox 0…30000ppm
Register 0…30000ppm

Minimum % (Register 188)

The minimum opening value of the air damper. Its means that if the % demand value on air damper opening is equal or smaller than the value set in Minimum %, the percentage of opening of the air damper will be limited to Minimum %.
If occupancy mode is Unoccupied, the demand on the air damper will be constant at Minimum %.

Range of settings: (default 0)
FBox 0…100%
Register 0…1000%/10

Maximum % (Register 187)

The maximum opening value of the air damper. Its means that if the % demand value on air damper opening is equal or greater than the value set in **Maximum %**, the percentage of opening of the air damper will be limited to **Maximum %**.

Range of settings: (default 1000)
FBox 0…100%
Register 0…1000%/10

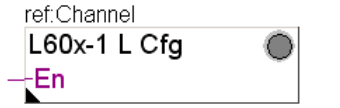
3.3.5 Light and sunblind configuration

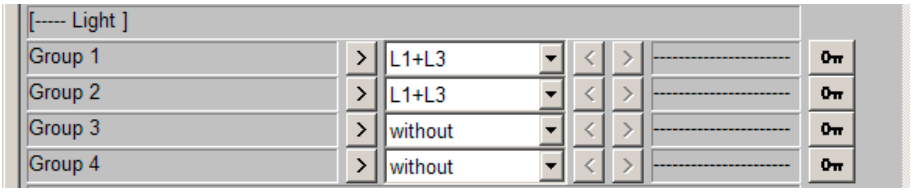
The room controllers can be extended with up to 3 hardware modules (PCD7.L620N ... PCD7.L624N) for light and shade. In the full configuration, 4 separate relay outputs are available for lighting control, and 4 outputs for controlling blinds. All 4 light bands can be assigned to up to 4 independent groups of lights. A blind control comprises a relay for «Up» and one for «Down». Each of the 4 blind outputs can be used to control up to 4 independent groups of blinds. It is immaterial whether an output is used in multiple groups, or not at all.

The function is controlled via a room control unit with display (PCD7.L644 or PCD7.L645), a mobile control unit with IR or wireless interface, a contact module PCD7.L650, and/or with the S-Bus master. Switchitng instructions are always given to the group and not to the individual output. This provides a high level of flexibility, e.g. on a North/South axis.

With the PCD7.L650 is the max. 2 groups which can be controlled and no dimming and sunblind rotation command is possible.

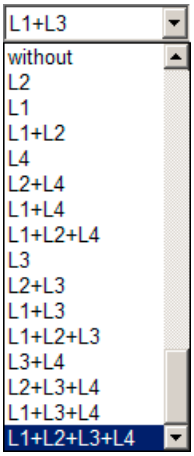
3.3.5.1 Light configuration FBox

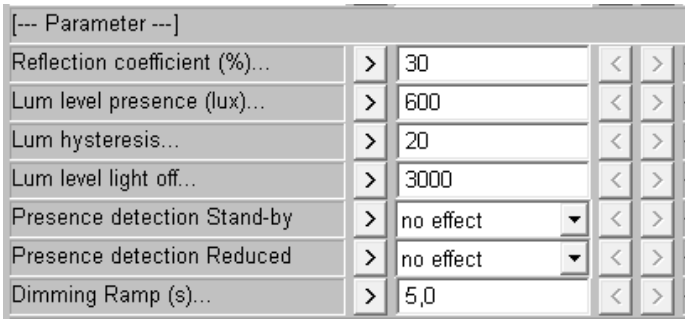




Group definition (register 120)

Each of the 4 groups of lights is parameterised individually. The individual lighting outputs are mapped to a group of lights via a combination table. With 4 lighting outputs, there are up to 15 combinations.
- Each output may only be assigned to one group.
- If a group is to be left empty, the setting «without» should be selected.





Automatic light switching

Refection coefficient (Register 87)

The sensibility of the luminosity sensor needs to be adapted with this parameter, depending on its room environment. The result of the effective luminosity level computation is given by the «Lum in Lux» and respects the following equation:

$$\textit{Actual luminosity} = \frac{\text{Lum in Lux} \times 100}{\text{Refection coefficient}}$$

The installer can select a factor (0 – 200 %, in 1 % step) to correct the measured luminosity. For example by selecting 50 %, the measure will be multiplied by 2.

Range of settings: (default 30%)
FBox 0…200%
Register 0…200%

Lum level presence (Register 92)

To define the luminosity threshold level to switch ON the lights on presence detection.

On occupancy detection of «Pres detec by MS» (Register 80) which switch from Unoccupied to Occupied, lights are turned ON if the «Lum in Lux» (Register 86) is less than this threshold when this is configured in the «Pres detec to L StandBy/ Pres detec to L Reduced» (Register 91)

Range of settings: (default 600 lux)
FBox 0…3000 lux
Registers 0…3000 lux

Lum hysteresis (Register 94)

With this parameter it is possible to filter the luminosity change.

If the luminosity changes with a step less than «lum hysteresis», the change is not taken in count.

Example: if «lum hysteresis» = 20 lux and if «Lum level presence» = 600, then if a new measured luminosity is 590 or 610 lux, it won't be taken in count. If the new measured luminosity is 580 or 620, it will be taken in count.

Range of settings: (default 20 lux)
FBox 0…255 lux
Registers 0…255 lux

Lum level light off (Register 96)

To define the high luminosity level threshold at presence «occupied» to switch light off.

When the room is occupied, the room luminosity is compared to this threshold. If the lights have been switching on by the low luminosity level threshold (Lum Level Presence) according to presence detection configuration (Pres detec to L) and the luminosity level is higher than this register value the lights are switching Off.

Range of settings: (default 3000 lux)
FBox 0…3000 lux
Registers 0…3000 lux

Pres detec to L Reduced/Pres detec to L StandBy (Register 91)

Associate the «Pres detec by MS» of the multi-sensor to a specific command model of the lights when the BMS occupancy «OccMode» (Register 36) is occupied (0) or standby (2) and when the «OccMode» is unoccupied (1) or off (5) for all the light groups.

Pres detec to L StandBy (bits 3, 2, 1 and 0):
Effect of presence detection on the lights when the BMS occupancy «OccMode» (Register 36) is occupied (0) or standby (2)

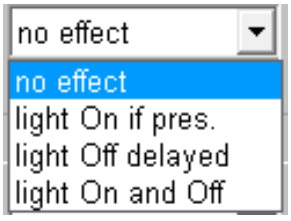
0 : no effect

1 : light is turned ON if presence

2 : light is turned OFF after timer has elapsed if no presence

3 : light is turned ON and OFF (combination of 1 and 2)

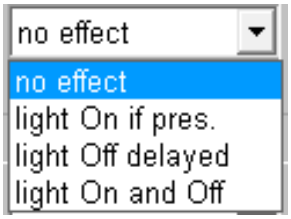
Default: 00



Pres detec to L Reduced (bits 7, 6, 5 and 4):

Effect of presence detection on the lights when the BMS occupancy «OccMode» (Register 36) is unoccupied (1) or off (5)

0 : no effect
1 : light is turned ON if presence
2 : light is turned OFF after timer has elapsed if no presence
3 : light is turned ON and OFF (combination of 1 and 2)
Default: 00



Default: 00h

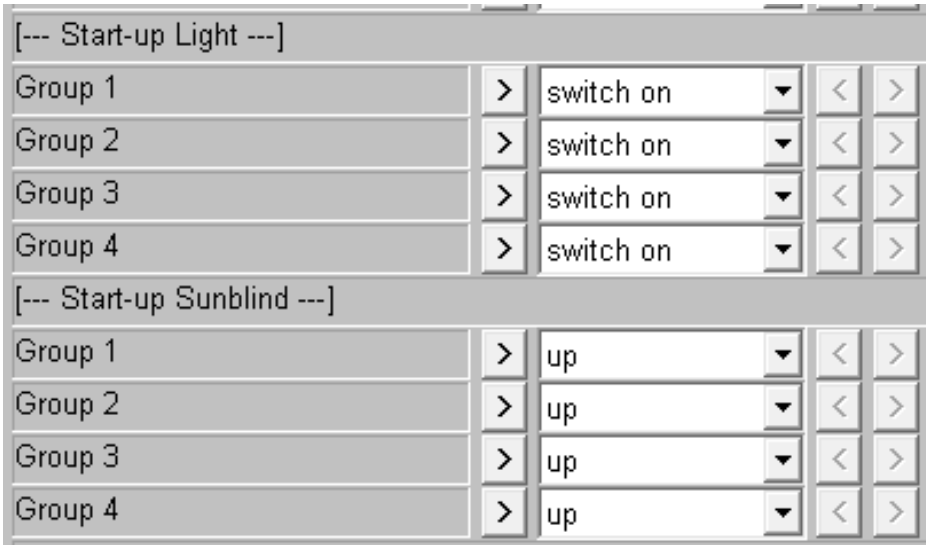
Dimming Outputs

Dimming ramp (Register 95)

To define the dimming speed on light up or light down command over room operation unit or SBus command.

Range of settings: (default 50 => 5s)
FBox 0.0…25 (0…25s)
Registers 0…250 (0…25s)

Start-up light Gx / Start-up sunblind Gx (Register 90)

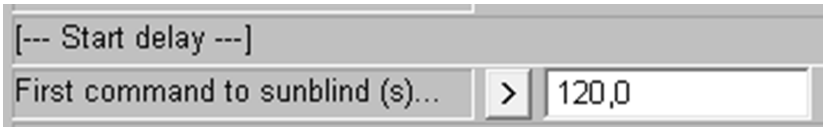


To choose the state of the lights groups (ON/OFF) and the state of the sunblind groups (UP/DOWN) at the reboot of the controller.

Bit [31,28] : SunBlind G1
value 2 : sunblind down
value 3 : sunblind up
Bit [27,24] : SunBlind G2
Bit [23,20] : SunBlind G3
Bit [19,16] : SunBlind G4
Bit [15,12] : Light G1
value 2 : switch on the light
value 3 : switch off the light
Bit [11,8] : Light G2
Bit [7,4] : Light G3
Bit [3,0] : Light G4
Default : 33332222h

To prevent that on a start-up of the PCD the sending of the sunblind FBox input values do not interfere the start-up procedure of the sunblind at reboot of the controller, it has to be set a «start delay» in the Setup FBox.

Setup FBox:



Calculation of this delay time:

2× «full translation time» + 5 s

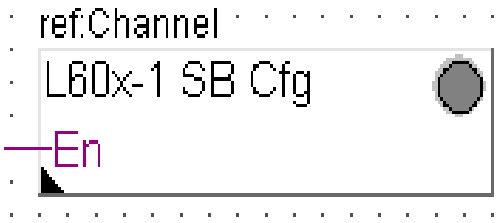
For this calculation, the sunblind with the biggest «full translation time» time has to be taken.

Reboot only on extension module

If only on the extension module happens a power off/on, the light outputs will be first switch On (to 100%), but if it is configured «switch off the light» after a short time the lights will be switching off immediately (or with decreasing ramp on dimming outputs).

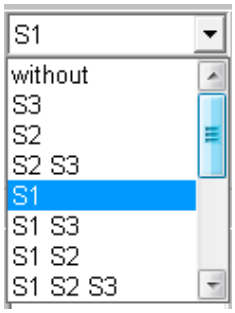
When only the extension modules losing the power, the sunblind will be driven to complete up position in fact that the position value is lost and the lights will be switched on for security reason.

3.3.5.2 Sunblind configuration FBox

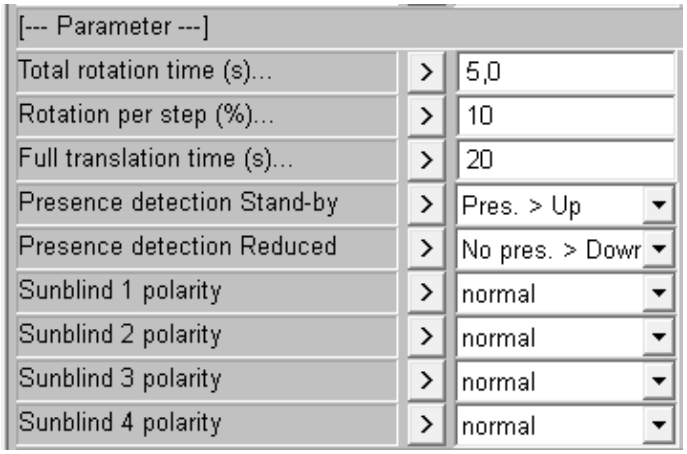


Group definition (register 120)

Each of the 4 groups of blinds is parameterised individually. The individual outputs are mapped to a group of blinds via a combination table. With 4 outputs, there are up to 15 combinations.



- Each output may only be assigned to one group.
- If a group is to be left empty, the setting «without» should be selected.



Sunblind rotation

Total rotation time (Register 161)

Total rotation time of the sunblinds 0 s to 25 s with 0,1 s step

Range of settings: (default 50 → 5s)
FBox 0,0…25 (0…25s),
Registers 0…250 (0…25s)

Rotation per step (Register 160)

Percent of the total rotation time for a short push for all the sunblinds.

When the user commands a sunblind rotation with a short push on down/up button (PCD7.L644) or a push on the rotation button (L645, L660 and L662),

$$\text{the sunblinds rotate during the time} = \frac{\text{Rotation per step}}{100} \times \text{Total rotation time}$$

Range of settings: (default 10%)
FBox 0…100%
Register 0…1000%/10

Sunblind translation :

A long-push on down/up button (PCD7.L644, PCD7.L645, PCD7.L660 and PCD7. L662) will start the activation of a down/up translation of the sunblinds. To stop the command the user can push the button a second time or he can let the sunblinds go to the complete opening or closing position.

Full translation time (Register 162)

Time of a complete translation for all the sunblinds. This register is the total time needed by the sunblinds to go fully UP to fully DOWN (or fully DOWN to fully UP).

0 to 2 min with 1 s resolution and 2 min to 6 min 30 s max with 2 s resolution.

From 0 to 120 : Translation Time = **Full translation time** seconds
From 121 to 255 :Translation Time = (**Full translation time** × 2) – 120 seconds

Range of settings: (default 20s)
FBox 0…120 => 0…120s / 121…255 => 122…390s
Registers 0…120 => 0…120s / 121…255 => 122…390s

Sunblind in functionality of presence signal

Pres detec to SB Reduced/Pres detec to SB StandBy (Register 93)

Associate the «Pres detec by MS» of the multi-sensor to a specific command model of the sunblinds when the BMS occupancy «OccMode» (Register 36) is occupied (0) or standby (2) and when the BMS occupancy is unoccupied (1) or off (5) for all the sunblind groups.

Pres detec to SB StandBy (bits 3, 2, 1 and 0):
effect of presence detection on the sunblinds when the BMS occupancy «Occ-Mode» (Register 36) is occupied (0) or standby (2)

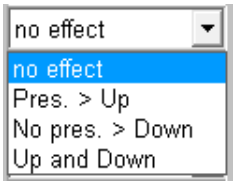
0 presence detection has no effect on the sunblinds

1 «presence detection mode»: when presence = occupied (0)
→ Sunblinds translation UP

2 «absence detection mode»: when presence = unoccupied (1) (after end of pre-defined time) → Sunblinds translation DOWN

3 combination of 1 and 2 models

Default: 00



Pres detec to SB Reduced (bits 7, 6, 5 and 4):
effect of presence detection on the sunblinds when the BMS occupancy «Occ-Mode» (Register 36) is is unoccupied (1) or off (5)

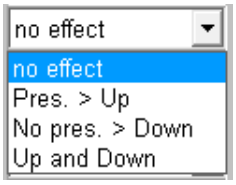
0 presence detection has no effect on the sunblinds

1 «presence detection mode»: when presence = occupied (0) → Sunblinds translation UP

2 «absence detection mode»: when presence = unoccupied (1) (after end of pre-defined time) → Sunblinds translation DOWN

3 combination of 1 and 2 models

Default: 0



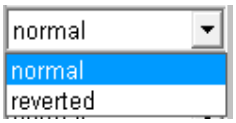
Sunblind x polarity (Register 163):

It can be choose a polarity for each sunblind output (1 to 4).

This could be helpful if a mistake in the wiring of the sunblind was made.

Bit 0 : inverting Sunblind 0 polarity
Bit 1 : inverting Sunblind 1 polarity
Bit 2 : inverting Sunblind 2 polarity
Bit 3 : inverting Sunblind 3 polarity

0: normal polarity, 1: reverted polarity



Change of parameters

If one of the following values will be changed, it has to be made a reboot of the controller that the sunblind drive to the initial position or the sunblinds has to be commanded to totally open position:

- **Total rotation time**
- **Rotation per step**
- **Full translation time**

3.4 Actual values

3.4.1 Concept

As a rule, the channel reference of the RS-485 interface and the S-Bus station address of the desired room controller are parameterised in the HVC Room FBox. The HVC Room FBox can then communicate with the room controller.
The «**L60x-1 ??? Room»** FBoxes can be attached to the HVC Room FBox. For this, an FBox name must also be configured in the HVC Room FBox and on the associated ??? Room FBoxes has to be used the same name.

The name must be unique within the project and every Room FBox need a name.

Each name may be assigned only once in the project.

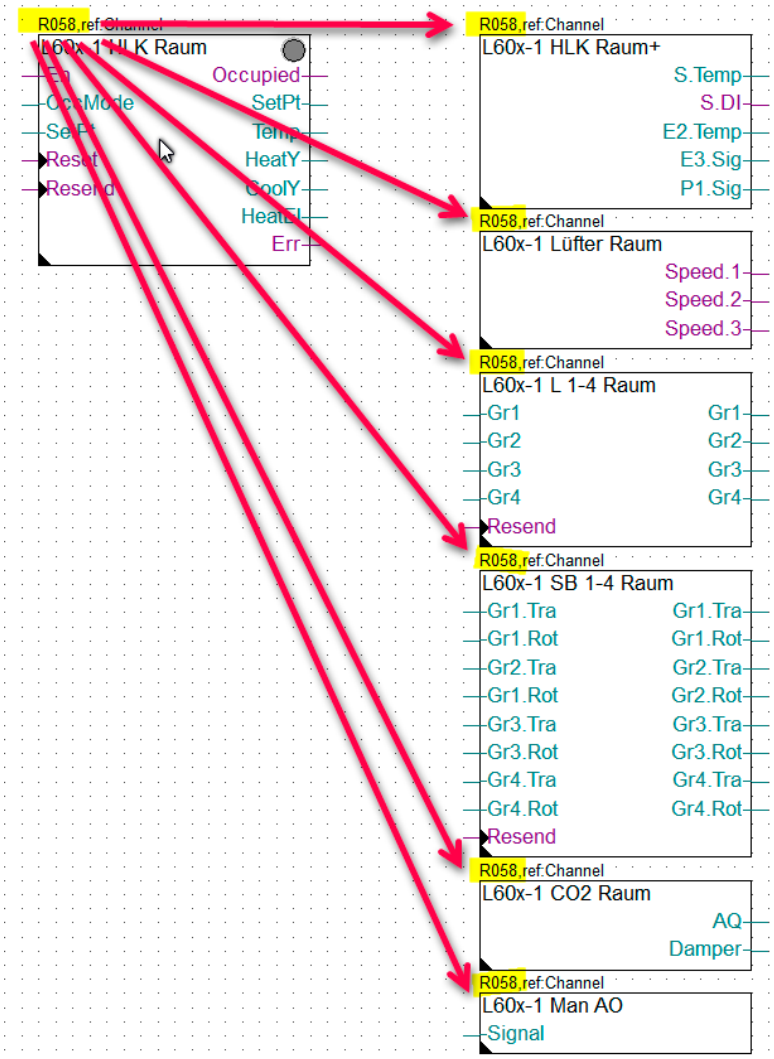
3.4.2 HVC Room FBox

The HVC Room FBox reads out all values (including fans, light, CO_2 etc.) from the room controller and provides only the most frequently needed values such as current mode and temperature control. All other values are stored internally in a DB and can be distributed by other boxes such as L**60x-1 room+, L60x-1 fans room, L60x-1 light room** etc. as necessary.

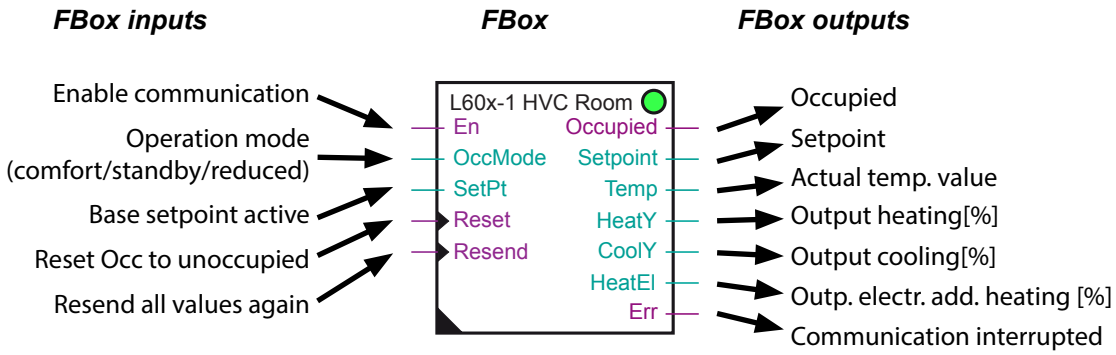
The breakdown into individual function FBoxes (room, fans, light etc.) facilitates more environmentally friendly handling of the resources, because often not all a room controller's functions/values are needed in the PCD/GLT.

The FBox **L60x-1 HVC room** must be placed upstream of all other **L60x-1 ??? Room** FBoxes, because these use the values read from the HVC room FBox and only write values into the room controller if be needed.

To simply configuration for related FBoxes it´s necessary to type in a FBox name. The name must be unique with FBox L60x-1 .



This FBoxes get the station number of the related room controller and also all parameters e.g. Master/Slave are from the FBox L60x-1 HVC Room.



3.4.2.1 FBox inputs «HVC Room»

En
FBox internal parameter to enable communication.

OccMode
Parameter to set a specific operating mode (register 36).

1	Reduced	The mode can be set to Comfort for a definable period via the room control unit or the communication function (see Function, setting, control parameter register 0). At the end of this time, the mode automatically switches back to Reduced operation.
2	Standby	When a presence is detected by a room control unit or the communication function, the controller switches to Comfort mode. Where no presence is detected, the controller switches directly back to Standby mode.
0	Comfort	The controller switches directly to Comfort mode. Position? → on the top
5	Permanent	The controller works permanently in «Reduced» mode. The «Reduced» Presence detection is deactivated. This mode is especially suitable to maintenance and service activities at times when the room is not in use. With on-demand systems, this makes it very easy to prevent the whole installation, including climate control, from switching on when not required.

SetPt, set-point
Active base set point (register 41) for cyclical calculation of control set point.
(See section on «Functionality»)

Resend
All HVC Room FBox values will be send to the controller on a 0/1 signal change on the «Resend» input

Reset
On a 0/1 signal change on the «Reset» input the following parameters will be switched to the default value:
- Presence to unoccupied
- Fan speed to auto
- set point offset to 0

This function could be useful to reset the user setting on room operator unit for example at the end of the day.
Or to switch only the presence to unoccupied after a OccMode change.

The Reset option to reset the set point offset and the fan speed should only be used if an room operator unit is used where no HW selector for this function is used → L644, L645, L660, L662

3.4.2.2 FBox outputs «HVC Room»

Occupied, presence
Parameter for detection of presence.

SetPt, control set point
Actual control set point taking account of any manual interventions and limitations.

Temp, actual value
Actual value as input signal to the two PI controllers for heating and cooling. The measurement point can be defined via the configuration. (See «Function, settings, hardware»).

HeatY, heating value
Control of heating value in in [%].

CoolY, cooling value
Control of cooling value in in [%].

HeatEl, electric heating
Control of electric reheating [%] on the floating relay contact K1/K2.

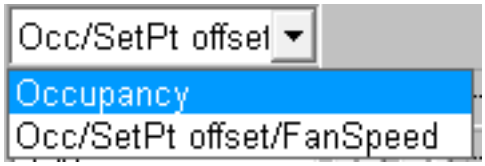
Err, error flag
FBox internal output for detecting communication errors. If a transmission with all telegram repeats fails completely, the FBox disables communication until the next attempt by the Setup FBox. The retry time is defined in seconds in the Setup FBox via the internal parameter «Pause after communication error».

A description of the L60x-1 HVC FBox settings can be found in the online help for PG5.

3.4.2.3 FBox parameters «HVC Room»

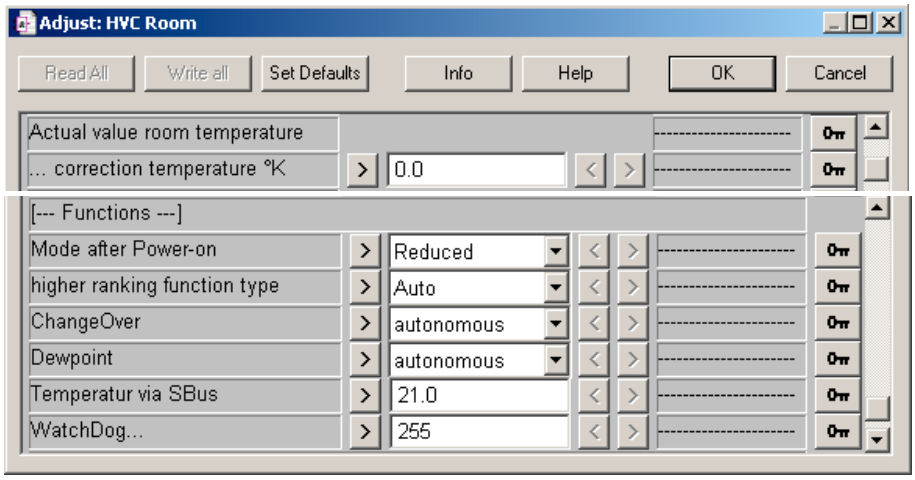
Reset option

With the reset option it is possible to choose what the effect of reset input is:



1) Occupancy:
   - Presence to unoccupied

2) Occ/SetPt offset/FanSpeed:
   - Presence to unoccupied
   - Fan speed to auto
   - set point offset to 0



Correction temperature °K (Register 8)

Offset for manual adjustment of temperature measurement. the parameter is only applicable if the temperature sensor is selected as «Room control part» or «S Terminal».

A predefined offset is already configured in the factory settings, but as common known, to get a better accuracy it is necessary to make a calibration for the different ambient- and installation-conditions on the commissioning.

3

Procedure:

1. Power-on of the controller.
2. After several hours of operation, the temperature has to be measured near to the lower air slots and to compare with the measured temperature of the controller.
3. The calibration can be set in the Room-FBox «correction temperature °K» or it can be written to register 8.

This parameter is only applicable if the temperature sensor is selected as «Room control part» or «S Terminal» (in the HVC configuration FBox).

Range of settings: (default 0)
FBox -10.0…+10.0 K
Register - 100…+100 K/10

Mode after Power-on (Register 25)

Selection of a user defined Operation Mode (OccMode) on power up.

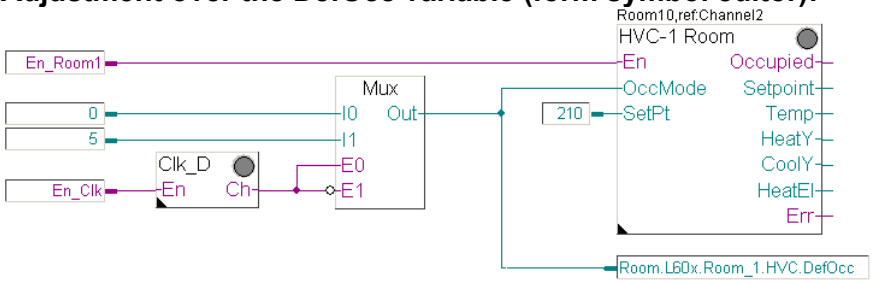
This is assistant when the Operation Mode of the controller will be changed over a timer clock (HVC-Clocks) or when the controller will be used in stand-alone (without S-Bus connection).

There are different possibilities to change this parameter:

1. **Adjustment in the Room-FBox:**

This can be useful if no timer clock is used for the changing of the operation mode.

2. **Adjustment over the DefOcc variable (form symbol editor):**



This can be useful if a timer clock or superior system is used for the changing of the operation mode.

3. **Adjustment over writing directly the Register 25**
   (for example with the PG5 Debugger)

   - value 0 = Comfort
   - value 1 = Reduced (Default)
   - value 2 = Standby
   - value 5 = Reduced Night

   This can be useful if the controller works in stand-alone (without S-Bus communication)

Restrictions:

This parameter will be stored in the EEPROM of the controller. Therefore it has to keep in mind, that 10’000 writing cycles must not exceed (same as for the other parameters in the config-FBox).

This means this parameter should only be written on a changed value and not too often.

If this parameter will be changed for example 4 times per day, the lifetime of this EEPROM parameter will be 7 years.

Higher ranking function type (Register 31)

Over this setting it is possible to set manually the operating mode of the module.

0	Auto	The operating mode is determined by the control parameters
1	Heat	Forcing of the heat mode
3	Cool	Forcing of the cold mode
6	Off	Stopping of the regulator
10	Manual	Manual forcing mode (for example for RIO mode when the values are transmitted by network)

Default value = Auto (0)

Watchdog adjustement

The communications watchdog is run automatically from the «Room» FBox. If communication between the Room FBox and the controller is interrupted for the pre-set time (value multiplied by 20 seconds), the controller performs the specified action (see Config FBox). A configured value of 255 deactivates the watchdog function (default).

A description of the L60x-1 HVC Room FBox settings can be found in the online help for PG5.

Multi sensor

Pres detec by MS (Register 80)

State of the presence detection sent by multi-sensor (PCD7.L665 or PCD7.L666).

The occupied status of «Pres detec by MS» relaunch the occupancy timer (Presence overtravel time Stand-by or Presence overtravel time Reduced) and the «Pres detec by MS» status return to Unoccupied after no presence will be detected and the occupancy timer expire.

«Pres detec by MS» can be link to «Presence sensor» button by “Link PD and PB»

0 : presence detected
1 : absence detected

Lum in Lux (Register 86)

Luminosity sent from the multi sensor (PCD7.L665 or PCD7.L666)

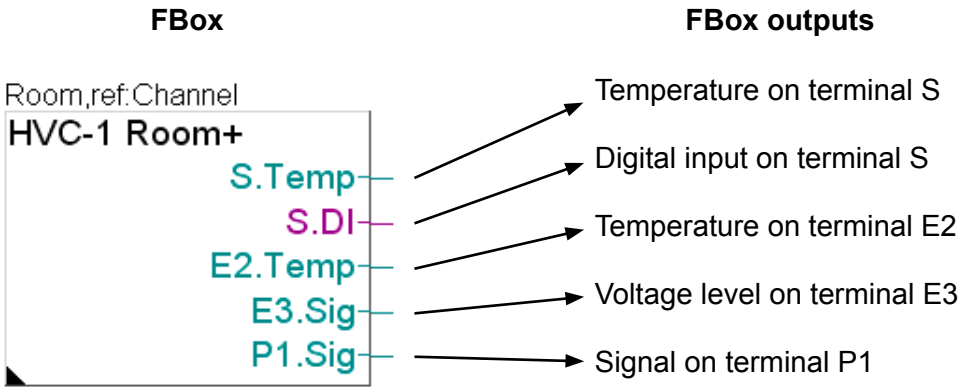
The correction factor value parameterized in «Refection coefficient» (in %) is already calculated in this register.

Unit: Lux

FBox 0…1024 lux
Register 0…1024 lux

3.4.3 HVC Room+ FBox

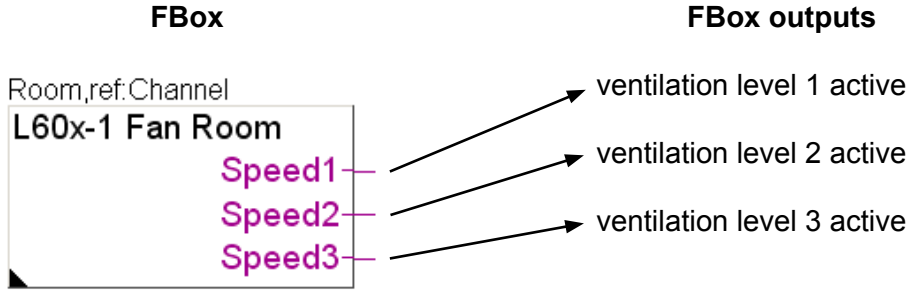
The HVC Room+ FBox can be used to read out additional controller inputs.



A description of the L60x-1 HVC Room+ FBox settings can be found in the online help for PG5.

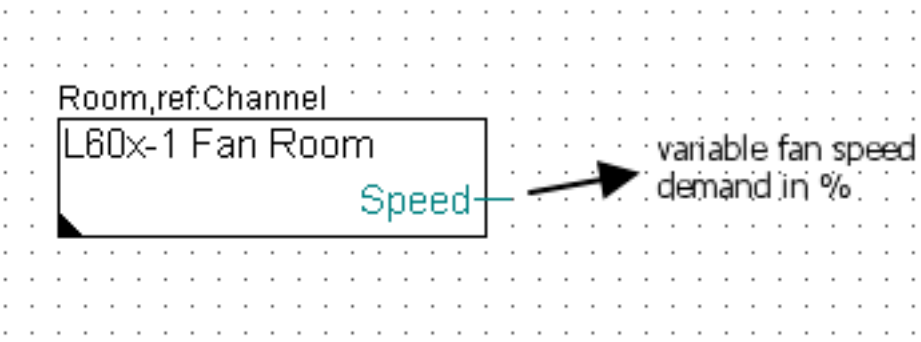
3.4.4 L60x-1 Fan Room 3 FBox

Control of the ventilation level of a 3 step fan-coil device via the non-floating outputs V1, V2 and V3 (230 VAC).



3.4.5 L60x-1 Fan Room Y FBox

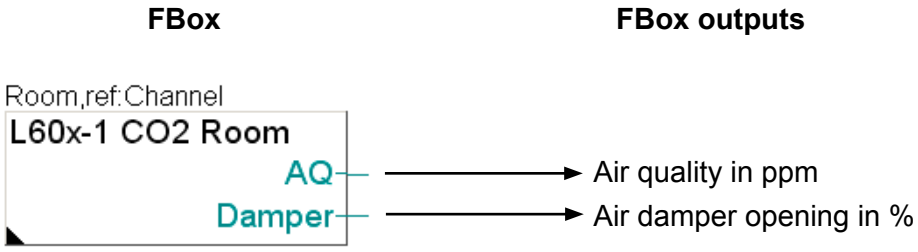
To control of a fan-coil device with variable fan speed (0-10V).



Additional Information are availabe under chapter 3.2.6 Fan

L60x-1 CO_2 Room FBox

The actual values of the CO_2 regulation are made with the following registers in the L60x-1 CO_2 Room FBox



Air quality via S-Bus (Register 180)

The measured CO_2 concentration communicated by network (ppm).

FBox 0…30'000 ppm
Register 0…30'000 ppm

3.4.5.1 FBox outputs «CO_2 Room»

Air quality ppm (Register 181)

The measured CO_2 concentration by the sensor connected to input E3 or received from network (ppm).

Air damper % (Register 189)

The demand of opening (in %) on the air damper.

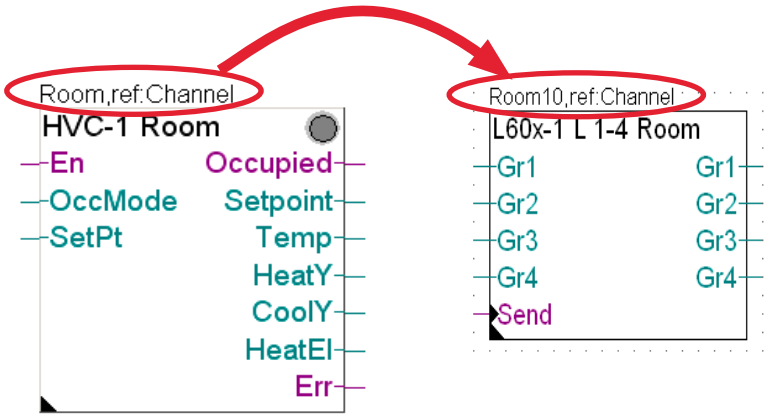
3.4.6 Light an Sunblind

3.4.6.1 L60x-1 Light 1-4 Room, light control

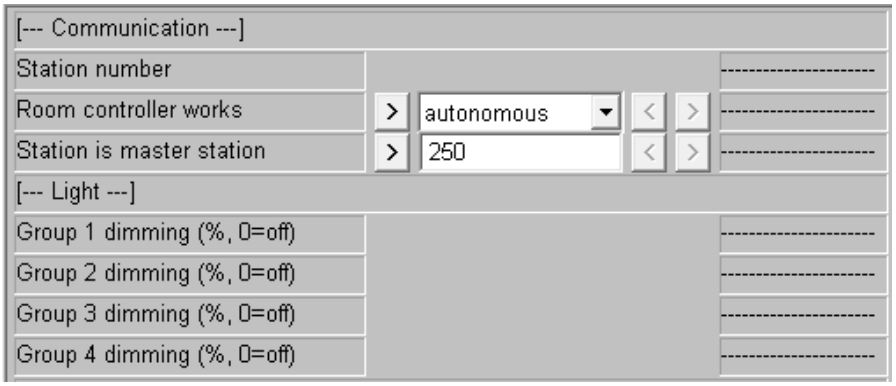
On/Off light

Room FBox ***Name***
z.B. «Room10»

L60x-1 Light 1-4 Room FBox ***Name***
z.B. «Room10»



The «L60x-1 L 1-4 Room»-Box can be used to switch up to 4 independent light groups. The individual light outputs are assigned to the groups in the configuration. See section on «3.3.5.1 Light configuration».



Group switching command (Register 122)

The Register 122 command the on/off light and sunblind.

Over the FBox inputs can every light group be switched independently on or off.

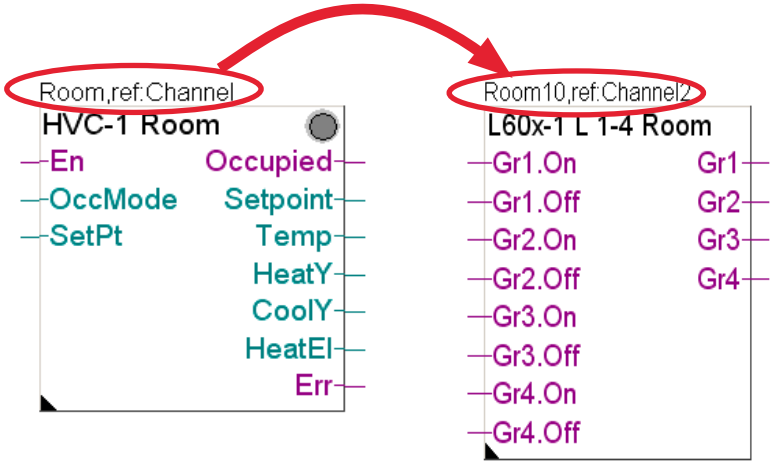
Command the on/off light and sunblind. Furthermore this variable can command the light dimming groups (set to 100%) instead of Dimming G1 (Register 150), Dimming G2 (Register 151), Dimming G3 (Register 152) and Dimming G4 (Register 153).

3

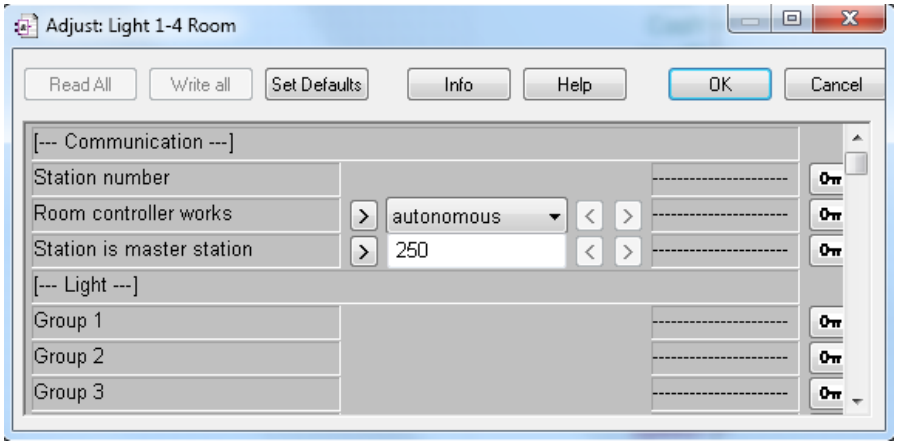
Dimming light

Room FBox ***Name***
z.B. «Room10»

L60x-1 Light 1-4 Room FBox ***Name***
z.B. «Room10»



The «L60x-1 L 1-4 Room»-Box can be used to switch up to 4 independent light groups. The individual light outputs are assigned to the groups in the configuration. See section on «3.3.5.1 Light configuration».



Dimming light inputs

It can be command the dimming of light outputs associated to a group number from 1 to 4. (0…100%, 1% step).

Writing to FBox inputs:

Input value range: 0…1000 = 0…100% but only 1% steps will be executed

0 = light off
1000 = light max. on

Writing to Register:

Dimming Gx (Register 150 - 153)

Input value to apply for dimming on light group x (%). Furthermore, this variable can command ON/OFF light group x (0% or 100%) instead of “Group switching command” (Register 122)

Resend input

A positive edge on the «Send» input triggers all inputs again to writes their value to the controller.

This could be useful if for example at the evening the lights should be switched off and on the Fbox input is written 0 but due to manual commands the lights are on. In this case the lights can be switched off only over a command on the «Send» input.

After a communication error (or power off) the dimming FBox input values will not be resend. This prevents to have a conflict with startup configuration for light (3.3.5.1 Light configuration FBox).

But it is possible to send these values over the resend input.

Dimming light outputs

Feedback Dimming Gx (Register 154 - 157)

Output with feedback value for dimming lights group x from dimming light add-on modules (%). The value feedback corresponds to the lights group number x of dimming add-on modules.

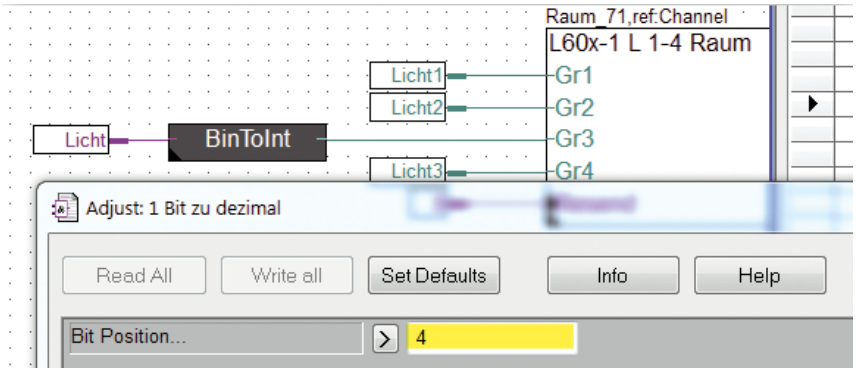
For correct feedback same light outputs should not be configured in different groups.

FBox outputs:

0 = light off
100.0 = light max. on

Switching On/Off light over integer value:

If only binary signals should be used in the PG5 program to switch the on/off lamps over the L60x-1 L 1-4 Room FBox on/off, it could be used the BinToInt FBox to set before the corresponding input of the light FBox that convert a binary value into an Integer value. In the «Bit Position» settings it has to be set the value 4, that the output value is higher than 1% and the L/N contacts of the dimming connector will be powered.

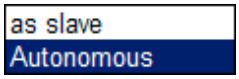


Light Master /Slave operation

In the FBox, Light master/slave operation can be defined independently of the Room FBox. If the FBox is configured as a slave, the Light outputs are passed to the slave after a change of value on the master.

«Room controller works»

Defines if the outputs work as standalone light control → «Autonomous» or as slave from another extension module → «as slave»



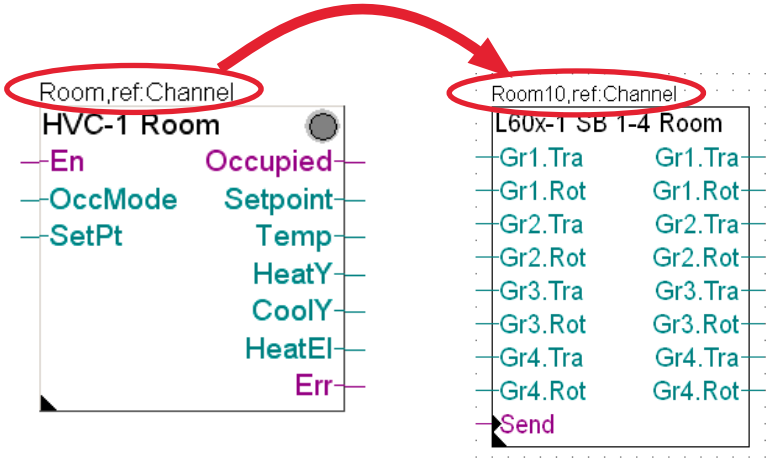
«Station is master»

Defines the master station address for ‘Slave’ operation 1…250

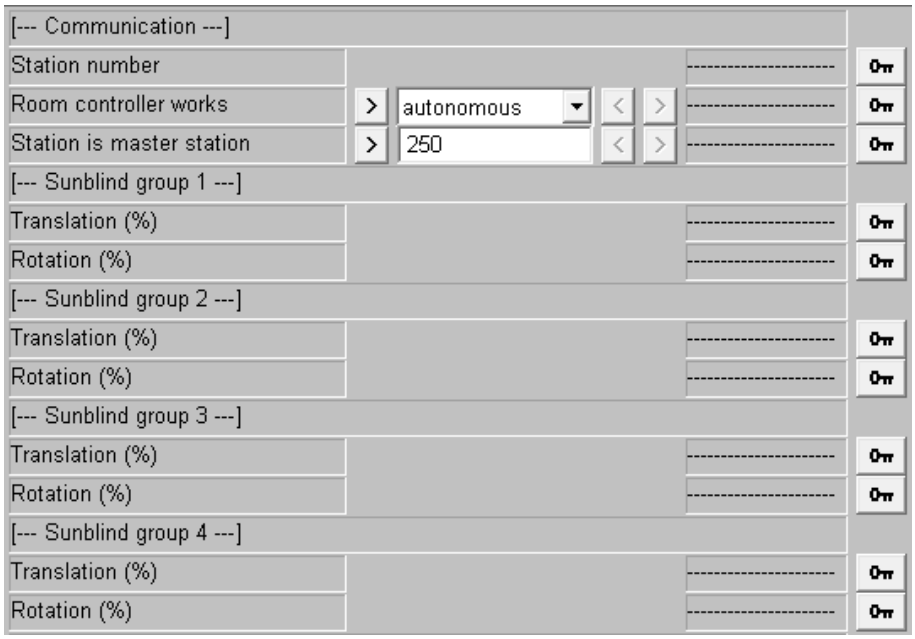
3.4.6.2 L60x Sunblind 1-4 Room, blind control

Room FBox ***Name***
z.B. «Room10»

L60x-1 SB 1-4 Room FBox ***Name***
z.B. «Room10»



The «L60x SB 1-4 Room»-FBox can be used to switch up to 4 independent blind groups. The individual up/down outputs are assigned to the groups in the configuration. See section on «Function, settings, blinds»



Translation Gx / Rotation Gx (Register 164 - 167)

It can be command the translation and rotation of sunblinds associated to a group number from 1 to 4. (0-100%, 10% step).

Writing to FBox inputs:

Translation:

Input value range: 0 - 1000 = 0 -100% but only 10% steps will be executed
0 = sunblind translation complete down
1000 = sunblind translation complete up

Rotation:

Input value range: 0 - 1000 = 0 -100% but only 10% steps will be executed
0 = sunblind rotation totally closed
1000 = sunblind totally open

Writing to Register:

Examples: by writing 0xAA (Hexadecimal), the sunblinds will be driven to 100% of opening in translation and 100% in rotation (totally open).

By writing 0x50, the sunblinds will be driven to 0% of opening in translation and 50% in rotation.

By writing 0x00, the sunblinds will be driven to 0% of opening in translation and 0% in rotation (totally closed).

Feeedback Translation Gx / Rotation Gx (Register 168 - 171)

It can be read the feedback of a sunblind translation and rotation actual position for group number 1 to 4. (0-100%, 10% step).

For correct feedback same sunblind outputs should not be configured in different groups.

FBox outputs:

Translation:
0 = sunblind translation complete down
100.0 = sunblind translation complete up

Rotation:
0 = sunblind rotation totally closed
100.0 = sunblind totally open

Resend input

A positive edge on the «Send» input triggers all inputs again to writes their value to the controller.

This could be useful if for example at the evening the sunblinds should be closed and on the Fbox input is written AA but due to manual commands the sunblind is not closed. In this case the sunblinds can be closed only over a command on the «Send» input.

After a communication error (or power off) the sunblind FBox input values will not be resend. This prevents to have a conflict with startup configuration for light (3.3.5.1 Light configuration FBox).

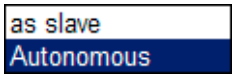
But it is possible to send these values over the resend input.

Sunblind Master /Slave operation

In the FBox, Blind master/slave operation can be defined independently of the Room FBox. If the FBox is configured as a slave, the Blind outputs are passed to the slave after a change of value on the master.

«Room controller works»

Defines if the outputs work as standalone sunblind control → «Autonomous» or as slave from another extension module → «as slave»

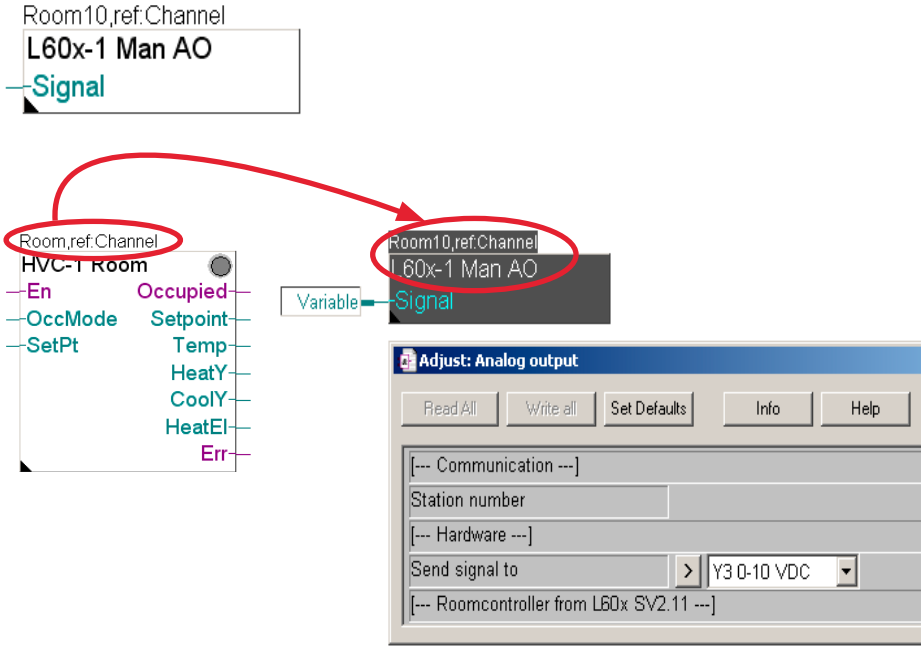


«Station is master»

Defines the master station address for ‘Slave’ operation 1…250

3.5 Manual Output control

3.5.1 L60x-1 analog output FBox



3.5.1.1 Concept

As a rule, the channel reference of the RS-485 interface and the S-Bus station address of the desired room controller are parameterised in the HVC FBox. The HVC FBox can then communicate with the room controller.

The «L60x-1 Man AO» FBoxes can be attached to the HVC FBox. For this, an FBox name must also be configured in the HVC Room FBox and on the associated «L60x-1 Man AO» has to be used the same name. NOTE: The name must be unique within the project.

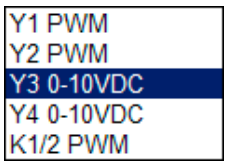
3.5.1.2 Analogue outputs

The «L60x-1 Man AO» can be used for remote control (RIO) of outputs not used by the selected application. See sections on «3.3.1.2 Application» and «3.3.1.3 Hardware».

The value range for the «Signal» input is 0…1000%/10

3.5.1.3 Definition of output

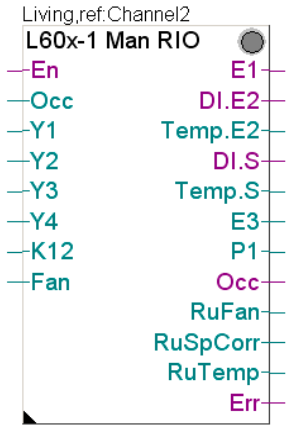
Defines the output to be controlled.



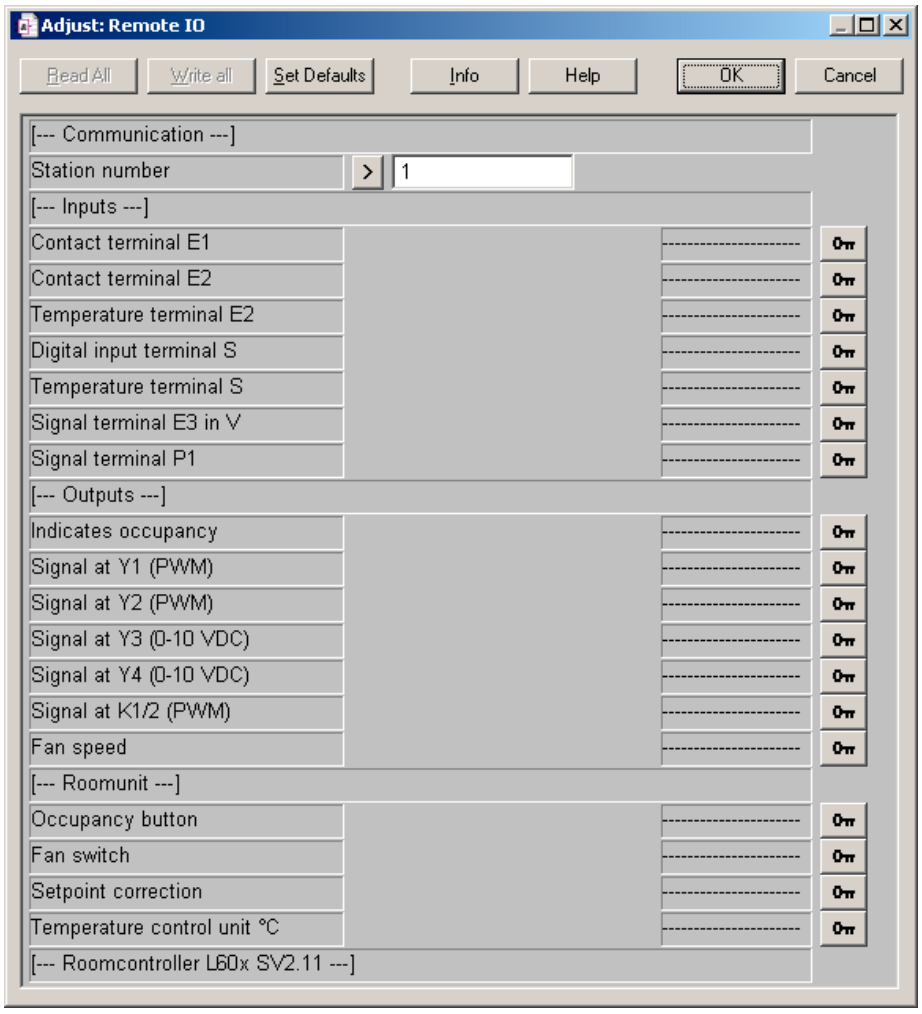
All outputs are basically analogue outputs. Outputs Y3 and Y4 work proportionally with 0…10 V. The switching elements such as Triac (Y1 and Y2) and the relay contact output (K1/K2) are pulse-width modulated (PWM). The cycle time is entered in the hardware settings. values between 0.1 and 99.9 define the pulse/pause ratio. A value of 0 switches off a PWM output permanently, while 100.0% keeps it switched on.

Regarding the maximim output power for 24 V-Outputs of the controller PCD7.L604-1, attention should be paid to the technical data of the PCD7.L604-1 in chapter 6.2.5

3.5.2 L60x-1 Remote IO FBox



Instead of standalone control operation, internal regulation and control can also be completely disabled. The outputs are then dependent only on the communication master. For this RIO (Remote Input-Output) operation, the RIO FBox is provided.

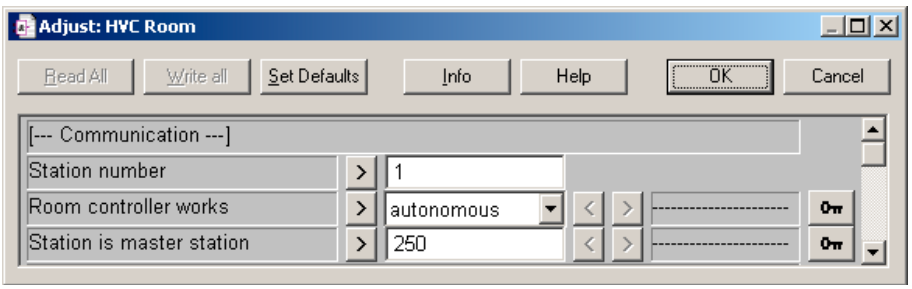


The RIO FBox switches the room controller into manual mode. This deactivates all independent control functions and the values at the FBox inputs are sent to the room controller.

This FBox reads out all values (including, light, CO_2 etc.) from the room controller and provides only the most frequently needed values such as inputs and outputs. All other values are stored internally in a DB and can be distributed by other boxes such as **L60x-1 room+**, **L60x-1 light room** etc. as necessary.

The FBox **L60x-1 remote I/O** must be placed upstream of all other **L60x-1 ??? room** FBoxes, because these use the values read from the Fbox and only write values into the room controller if be needed. This also reduces the bus load because, on a value change, all FBoxes write only the changed value into the room controller.

3.6 Master/Slave mode



3.6.1 Concept

In master/slave operation, it is possible to use one (master) room controller to control other (slave) controllers remotely. For this, the master simply uses the outputs from the slaves to control conditions in the room.

Master/slave operation is generally implemented via the HVC FBoxes. The master/slave system used here is then so flexible that a Room FBox only has to be told which S-Bus station address is the master for this room controller. Many controllers can also be chained together. This allows e.g. a slave to be the master for another device etc. A typical application would be in rooms that can be divided in different ways, e.g. meeting rooms in conference facilities.

The master controller transmits its output signals for heating valve, cooling valve, electric reheating and fan speed to the slave. The hardware configuration in the slave then decides in turn which outputs should actually be used.

The ***ChangeOver, air damper output (R189)*** and ***second stage cooling output (R191)*** will not be sent to the slave. Simultaneously, the room controller is set internally to ***manual mode*** and thus loses its independent control function.

The window contact, dew point signal and presence signal on input E2 of the slaves can act on the master. In the HVC Room FBox it is possible to choose which of these signals from slave controllers should acting on the whole M/S system. (These settings can be parameterized before downloading the PG5 program to the PCD)

The presence and set point adjustment of the room control unit can be adjusted in M/S mode only via the master room control unit.

After a configuration change of E2 input of the slave has the En-input of HVC Room FBox from the slave to be disabled/enabled that this register will be actualized in the FBox table.

In the HVC Room FBox will also be displayed when on one of the slave room controllers is one of these 3 signal active. This could be helpful to find why the control function is «off».

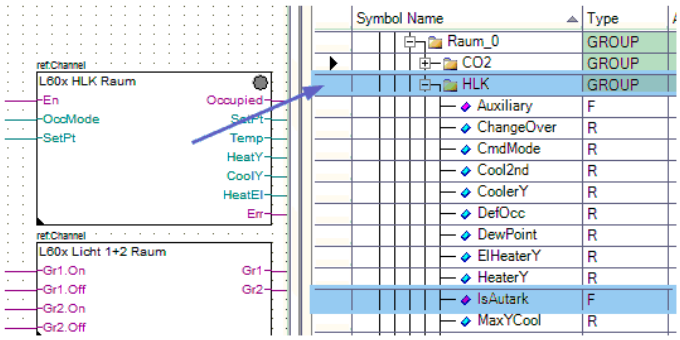
M/S for Light or Sunblind

In the L60x-1 Sunblind 1-4 Room FBox and L60x-1 Light 1-4 Room FBox it can select a different Master station than in the HVC Room FBox, therefore it is possible to make another M/S combination for the Lights than for the temperature control.

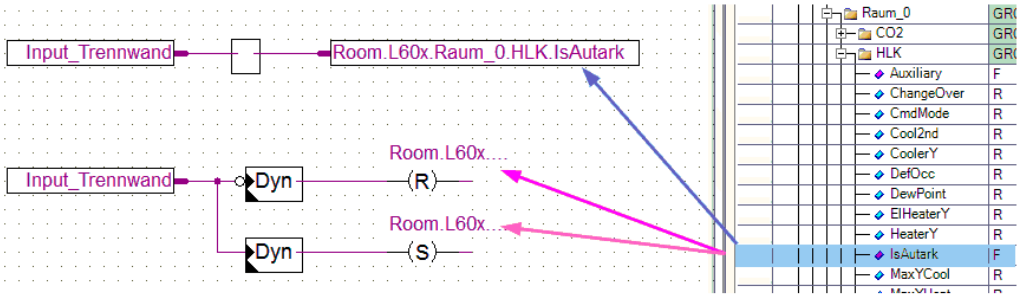
3.6.2 Example to use Master/Slave in PG5 program

To change the parameter **room controller is working** through the user program, proceed as follows:

1. Clicking on the FBox opens the corresponding group with all FBox symbols in the symbol editor. Under this, there is also a symbol with the name **IsAutark**. For independent functioning, this must be set to 1 and for slave functionality to 0.



2. The symbol **IsAutark** can now be dragged into an output connector. If the switch can be made only through the door contact, this can be written directly (in the above example). If the switch must be made only once on changing the door contact, the contact plan-module must be processed with leading edges and set/reset (in the example below). In this way, it is possible if need be to change the current mode independent/as slave at a higher level.



3.6.3 Master/Slave parameters

The «Room controller working» parameter is used to define the operating mode as Master = «standalone» or Slave = «as slave».

In «as slave» mode, the master station address also has to be entered.

In the «Master» function, the parameter «Master station is station» has no meaning.

4 Example applications

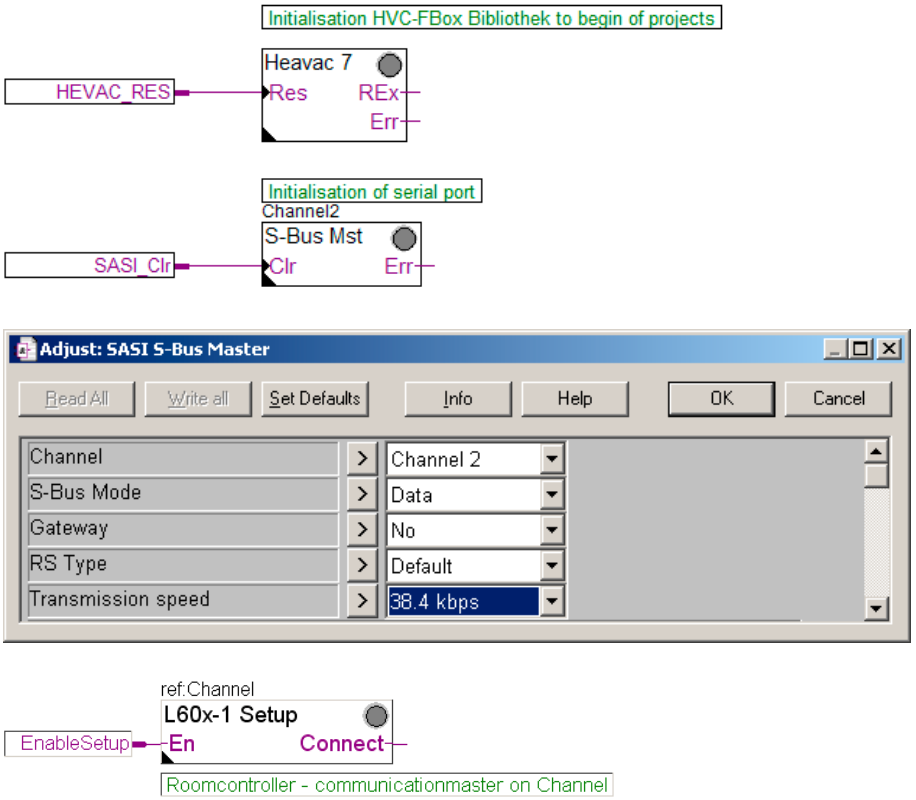
4.1 General

The programming of the PCD7.L60x-1 product family presented here uses the SBC «RoomControler PCD7_L60x-1» FBox family. The library is supplied free of charge and can be obtained from Saia Burgess Controls in Murten.

System requirements

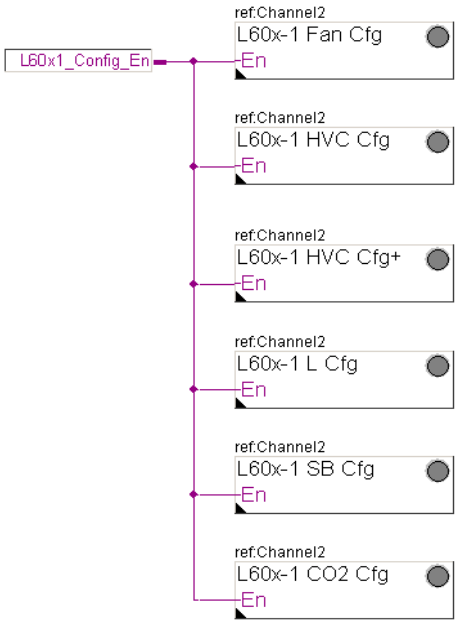
- Saia PCD1, PCD2, PCD3 or PCS1
- PG5 2.0 or higher
- Application FBox library, HLK-Init, HeaVAC initialisation
- Standard FBox library, communication, SASI master
- User FBox library, RoomController PCD7_L60x-1

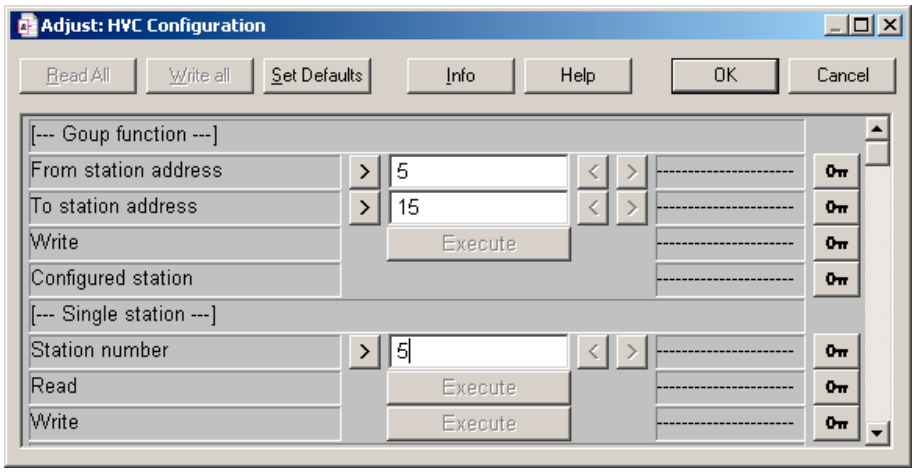
4.2 Initialisation



At the start of a project, the Heavac library and the serial interface need to be initialised. The picture shows the configuration for a PCD3 using the integrated serial RS-485 interface «Channel2».

4.3 Configuration





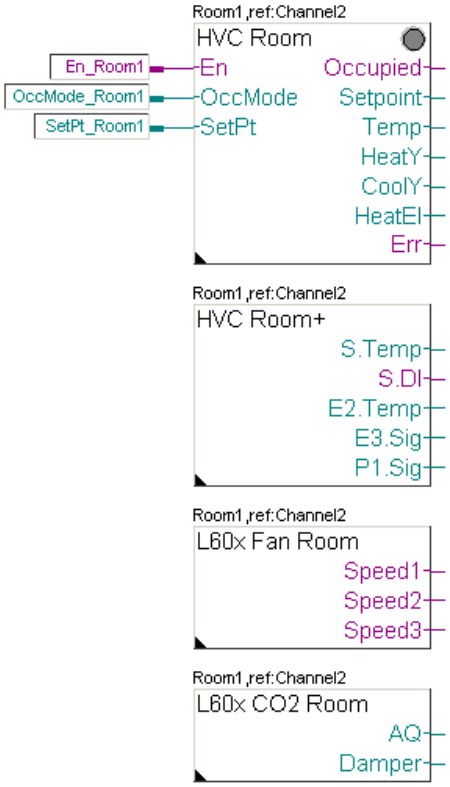
The configuration (read and write) of the room controller is performed online. It is also possible to configure a number of room controllers which have the same configuration on a single occasion, provided these are in a connecting address range (e.g. from address 123 to 167).

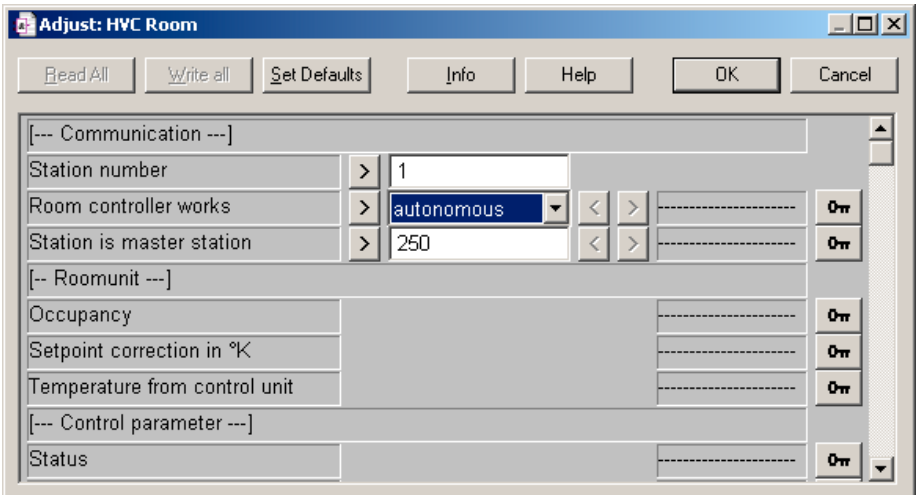
In the parameter group **[--- Group function ---]** , the parameters **from [station address]** and to [station address] determine a connected area for station addresses which is written to with the command **Write|Execute** with the settings. Depending on the prompt in the FBox online (see parameter **For communication error**) writing of the values is ended with the first communication error or continued with the next station address.

In the parameter group **[--- Single station ---]** an individual station address is contacted objectively, from which the room controller stated in the parameter **station address** can be read out or written into the room controller. This is done by the commands **Read|Execute** or **Write|Execute**.

When writing, whether automatically or manually, all parameters are stored directly in the room controller's EEPROM. The previous settings are then lost.

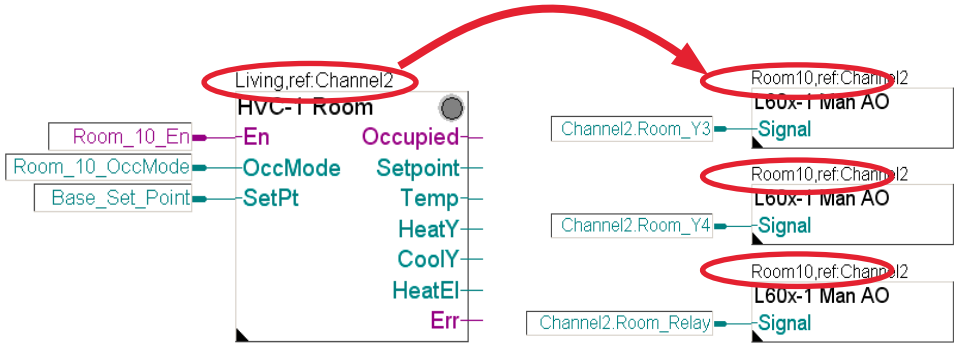
4.4 Function





For communication with a room controller, one Room FBox per room controller is required. The room controller can then operate standalone (as a master) or as a slave.

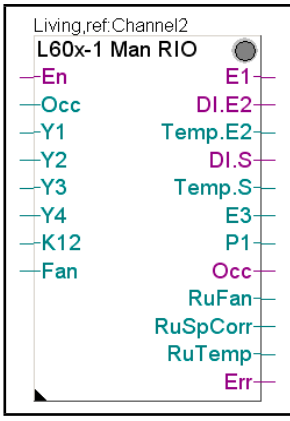
4.5 Control of free outputs



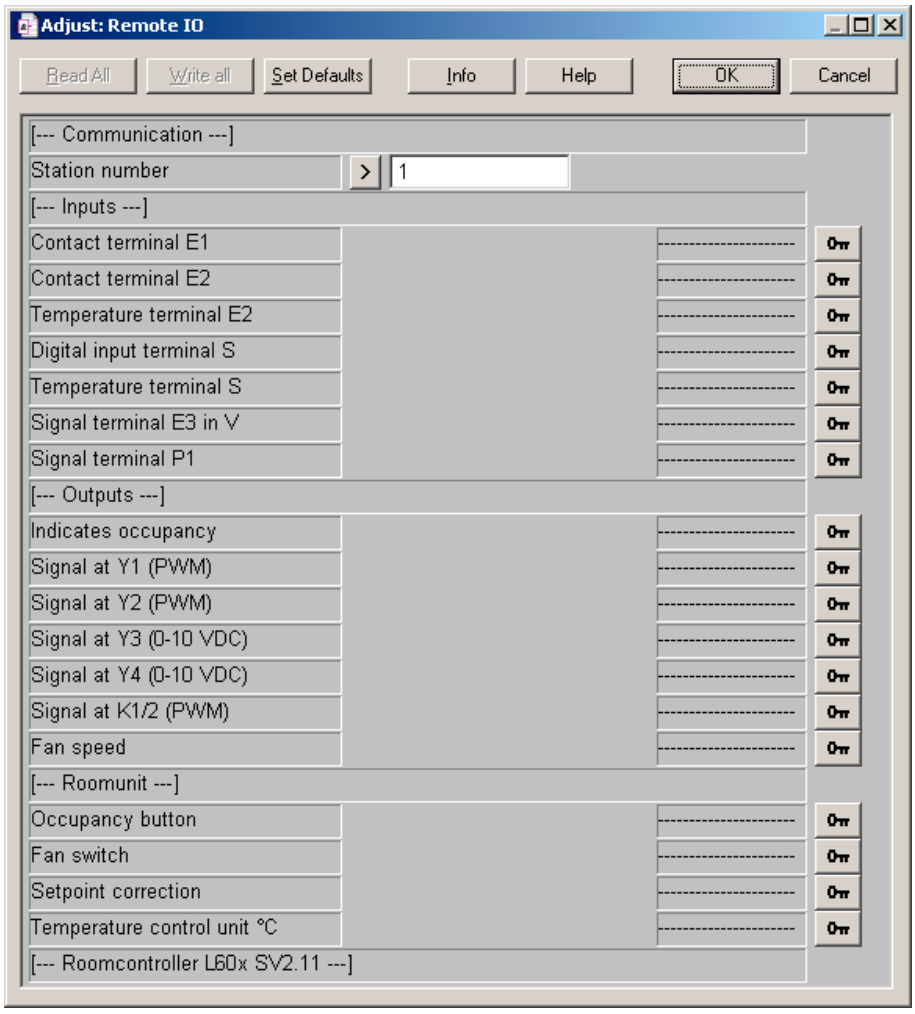
Free outputs, i.e. outputs not used by the selected application (see configuration), can be controlled at will via the PCD. This requires the use of a HVC Room FBox with a unique FBox name. The outputs are passed to the HVC Room FBox by the analogue output FBoxes. The HVC Room FBox is entered into the analogue output FBox as a reference. (See also «3.5 Manual Output control».)

Regarding the maximum output power for 24 V outputs of the PCD7.L604-1 controller, attention should be paid to the technical data PCD7.L604-1 in chapter 6.2.5 .

4.6 RIO (Remote IO)



Instead of standalone control operation, internal regulation and control can also be completely disabled. The outputs are then dependent only on the communication master. For this RIO (Remote Input-Output) operation, the RIO FBox is provided.

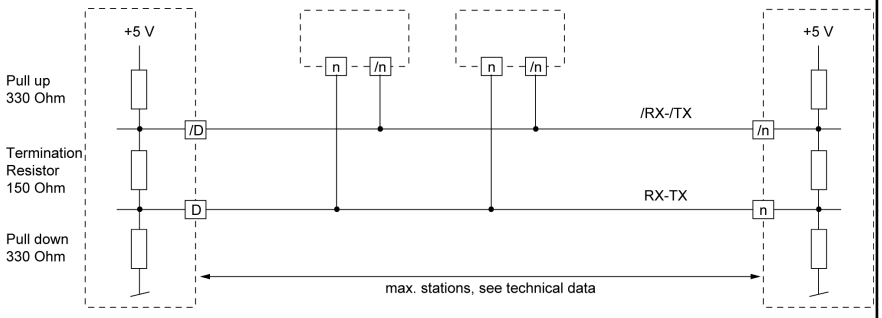


Regarding the maximum output power for 24 V outputs of the PCD7.L604-1 controller, attention should be paid to the technical data PCD7.L604-1 in chapter 6.2.5 .

5 Register usage

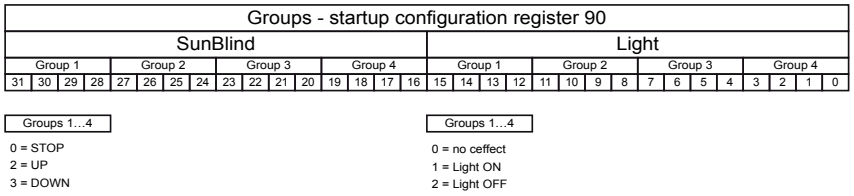
This section describes the register usage on the room controllers. Detailed knowledge of this is not required to use the FBoxes. Rather, the section is aimed at interested persons and programmers.

5.1 Registers, configuration

Registers	Value	Description
Communication		
14		S-Bus telegrams, defines a minimum time for the room controller to wait before responding to a request telegram from the master. Unit: [ms/2000] Range: 100…2300 default: 2000
15		S-Bus baudrate; as the controller works with automatic baudrate detection, this parameter has no effect in practice. (73=4800; 36=9600; 18=19'200; 9=38'400; 21=115'200)
40		Communication watchdog register.
	255	no monitoring
	0	control stop / controller reset (action regarding configuration register 112)
	1...254	Counter decremented by with each program cycle (20s). The S-Bus master has to load the register on a cyclical basis. (By entering of the value «1» effect a stop/reset of the controller in max. time of 20 seconds)
60		Time, in 20-second steps, during which a further S-Bus station address 252 is activated. The time is initialised to 15 minutes by operating the service pin. Every successful communication within the period restarts the time for another 15 minutes. When the counter runs down to 0 or the register is manually set to 0, address 252 is deactivated again.
110		S-Bus station address
111		Active RS-485 Bus termination. RS-485 leads must be connected as lines. Stubs are not allowed, and both ends of the line must be «closed off» with a resistor (approx. 150 Ω) between strands D and /D. The best signal quality is achieved with an active Bus connection with a resistor between +5V and GND.  The active Bus termination can be switched on and off via the Configuration register.
	0	No Bus connection (default setting)
	1	Active Bus connection enabled

Registers	Value	Description
112		Configuration of the watchdog
	0	Watchdog is stopping the regulation (closing all valves and stops fan speed)
	1	Watchdog is resetting the controller (closing all valves and stops fan speed)
General		
74		This is only a read register, it can not be written. Controller Type:
	1	PCD7.L60x-1
	2	PCD7.L79x
75		Software version (read only): E.g. 108 means Version 1.08
126		32-bit register for storing any type of information. This is a free register available to the user for 'Read' and 'Write' use. As the information is permanently stored in EEPROM, it cannot be written to cyclically. The content has no effect on the control program. It is possible to store a version number or the last commissioning date in it.
Room control unit		
1		To address mobile IR room control units, an IR zone can be defined. Factory setting=0
	0	No zone defined. Commands are accepted from all IR control units.
	1…30	Zone address
19		Value shown in the LCD display.
	0	Fan speed, or if selected active Group of Light or Sunblind
	1	Temperature in the room control unit
	2	Actual value of PI controller, flashing
	3	Actual value of PI controller
	4	Control set-point (= base set-point + displacement)
	5	Fanspeed
20		Configuration room control unit PCD7.L644 and PCD7.L645: 1 = function enabled / 0 = function disabled
	0	Set point adjustment
	1	Fan Speed adjustment
	2	Occupancy push button enable
	3	Sunblind commands enable
	4	Light commands enable
	5	Display of the absolute set point temperature
	6	fix to 0 (Reserved for further developments)
	7	1 = configuration forced by controller / 0 = local parameter active
102		Control unit used
	0	Where room units with a serial interface (PCD7.L64x, .L661, .L663) are used, the connection is made via the RC socket.
	1	Where the PCD7.L63x room units or a manufacturer-independent solution are used, the control elements are connected to the analogue inputs «S» and «P1» on the room controller.

Registers	Value	Description
104		Manual set-point adjustment on the room control unit in up to +/- 6 steps. [K/10 and step] Range: 0…10 (=0…1.0 K/step), Default: 5
Function		
9		Application selection. Default:5 The valve outputs for heating/cooling are defined via register 103 under the heading «Hardware». TRIAC-PWM , TRIAC-3-point and 0…10 V are available. All outputs not used by the application can be controlled via the communication function (RIO operation).
	0	RIO operation; all outputs can be controlled via the Bus.
	1	2-tube heating, heating valve: Y1(Y3)
	2	2-tube change-over, valve: Y1(Y3) Register 38 defines the control mode 'Heating' or 'Cooling'. Depending on the hardware setting, it is controlled by contact input E2 or the S-Bus.
	3	2-tube cooling and electric heating. Cooling valve: Y1(Y3), electric heating: Relay contacts K1/K2
	4	2-tube change-over and electric heating. In Heating mode the heating register and the electric heating work in sequence. Change-over valve: Y1(Y3), electric heating: relay contacts K1/K2. Register 38 defines the control mode 'Heating' or 'Cooling'. Depending on the hardware setting, it is controlled by contact input E2 or the S-Bus.
	5	4-tube heating/cooling. Heating valve: Y1(Y3) Cooling valve: Y2(Y4)
	6	4-tube heating/cooling with electric heating. In Heating mode the heating register and the electric heating work in sequence. Heating valve: Y1(Y3) Cooling valve: Y2(Y4), electric heating: Relay contacts K1/K2
	7	2-tube heating with 2 valve outputs controlled in parallel Heating valve 1: Y1(Y3) Heating valve 2: Y2(Y4)
	8	2-tube change-over with 2 valve outputs controlled in parallel Valve 1: Y1(Y3) Valve 2: Y2(Y4)
	9	2-tube cooling with 2 valve outputs controlled in parallel Cooling valve 1: Y1(Y3) Cooling valve 2: Y2(Y4)
	10	Electric heating Relay contacts K1/K2
88		Link PD and PB. Default: 0 Permits to establish a link between the «Presence sensor» button and the presence detection of the multi senor:
	0	No link between «Pres detec by MS» detection and «Presence sensor» button
	1	- when «Pres detec by MS» (Register 80) = Occupied (0) → «Presence sensor» (Register 22) = occupied (0) - when «Pres detec by MS» (Register 80) = Unoccupied (1) → «Presence sensor» (Register 22) = unoccupied
	2	- when «Presence sensor» (Register 22) = Occupied (0) → «Pres detec by MS» (Register 80) = Occupied (0) - when «Presence sensor» (Register 22) = Unoccupied (1) → «Pres detec by MS» (Register 80) = Unoccupied

Registers	Value	Description
	3	combination of 1 and 2 models
90		Start-up light Gx / Start-up sunblind Gx. Default: 33332222h Command the light and sunblind at the start-up of the device.
		SunBlind G1, Bit [31,28]
	0	stop the sunblind
	2	sunblind down
	3	sunblind up
		SunBlind G2, Bit [27,24], dito
		SunBlind G3, Bit [23,20], dito
		SunBlind G4, Bit [19,16], dito
		Light G1, Bit [15,12]
	0	unchanged the ligh
	2	switch on the light
	3	switch off the light
		Light G2, Bit [11,8], dito
		Light G3, Bit [7,4], dito
		Light G4, Bit [3,0], dito
		
91	first hexa-decimal digit	Pres detec to L Reduced/Pres detec to L StandBy. Default: 00 Associate the «Pres detec by MS» of the multi-sensor to a specific command model of the lights when the BMS occupancy (OccMode Register 36) is occupied (0) or standby (2) and when the BMS occupancy is unoccupied (1) or off (5) for all the light groups. Pres detec to L StandBy (bits 3, 2, 1 and 0): effect of presence detection on the lights when the BMS occupancy (OccMode Register 36) is occupied (0) or standby (2)
	0	no effect
	1	light is turned ON if presence
	2	light is turned OFF after timer has elapsed if no presence
	3	light is turned ON and OFF (combination of 1 and 2)
	second hexa-decimal digit	Pres detec to L Reduced (bits 7, 6, 5 and 4): effect of presence detection on the lights when the BMS occupancy (OccMode Register 36) is unoccupied (1) or off (5)
	0	no effect
	1	light is turned ON if presence
	2	light is turned OFF after timer has elapsed if no presence
	3	light is turned ON and OFF (combination of 1 and 2)

Registers	Value	Description
93	first hexa-decimal digit	Pres detec to SB Reduced/Pres detec to SB StandBy. Default: 00 Associate the «Pres detec by MS» of the multi-sensor to a specific command model of the sunblinds when the BMS occupancy (OccMode Register 36) is occupied (0) or standby (2) and when the BMS occupancy is unoccupied (1) or off (5) for all the sunblind groups. Pres detec to SB StandBy (bits 3, 2, 1 and 0): effect of presence detection on the sunblinds when the BMS occupancy (OccMode Register 36) is occupied (0) or standby (2)
	0	presence detection has no effect on the sunblinds
	1	«presence detection mode» : when presence = occupied (0) → Sunblinds translation UP
	2	«absence detection mode» : when presence = unoccupied (1) (end of predefined time) → Sunblinds translation DOWN
	3	combination of 1 and 2 models
	second hexa-decimal digit	Pres detec to SB Reduced (bits 7, 6, 5 and 4): effect of presence detection on the sunblinds when the BMS occupancy (OccMode Register 36) is is unoccupied (1) or off (5)
	0	presence detection has no effect on the sunblinds
	1	«presence detection mode» : when presence = occupied (0) → Sunblinds translation UP
	2	«absence detection mode» : when presence = unoccupied (1) (end of predefined time) → Sunblinds translation DOWN
	3	combination of 1 and 2 models
Hardware		
8		Offset to adjust the room temperature when using an analogue sensor on terminal S or a digital room control unit. Where the room temperature is picked up by the Bus, the adjustment parameter has no effect. Unit: [K/10] Range: -100…+100 (= -10.0…+10.0 K), default: 0
10		Function of aux. contact on terminal E2. Default:0 The contact status can be determined independently of the function using register 70. 1 = Contact open, 0 = Contact closed.
	0	No regulation/control function.
	1	Second window contact
	2	Change-over between Heating and Cooling mode. 1=Cooling (contact open), 0=Heating (contact closed), see register 38.
	3	Dew point; when condensation is detected, the cooling function is disabled. 1=Condensation (contact open), 0=Normal (contact closed), see register 39.
	4	Presence contact. The current presence status can be seen from register 35. Note: A closed contact (reg.70=0) indicates a presence (reg.35=1) 1=No presence (contact open), 0=Presence (contact closed), see register 35.
	5	K1/K2 via E2 To drive the K1/K2 relay in function of the E2 input
	6	E2=NTC The input is used as additional temperatur input for an NTC10k temperatur sensor. The accuracy of this temperature measurement is not as high as the room operation unit (RJ-9) or the clamp «S». This sensor should not be used for the control loop.

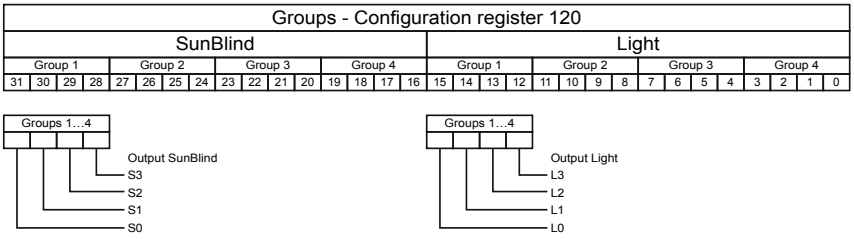
Registers	Value	Description
	7	E2=NTC conv. The input is used as additional temperatur input with the conversion table for an NTC 5kOhm to a NTC 10 kOhm temperatur sensor. The accuracy of this temperature measurement is not as high as the room operation unit (RJ-9) or the clamp «S». This sensor should not be used for the control loop.
11		PWM cycle time for TRIAC outputs Y1/Y2. Where the TRIACs are used as a 3-point output, this parameter is used to set the motor running time. Unit:[seconds] Range: 20…+600 seconds, default: 30 s
12		PWM cycle time for relay contact output K1/K2. Unit:[seconds] Range: 60…+600 seconds, default: 120 seconds
13		Selection of room temperature sensor.
	0	Digital or mobile room control unit.
	1	Analogue temperature measurement with sensor on terminal S
	2	Room temperature picked up by S-Bus in register 30
63		3 Step Fan - min/max limits. The register is coded as a decimal as MAX¦MIN. The MAX and MIN limits can be set within the range [0…3]. The programmer must ensure that MAX is always greater than or equal to MIN. If MIN and MAX are equal, the fan always runs at the selected step level. Example: 30: MAX = step 3; MIN = step 0, the fan can be used without restriction 21: MAX = step 2; MIN = step 1, the fan can switch between steps 1 and 2.
100		Energy saving and noise decreasing settings
	0	User override is always active
	1	Return to auto-mode when unoccupied
	2	Remains in auto-mode but user override limits maximum speed
	3	Mix of the previous 2
101		Fan mode
	0	Automatic
	1	Always minimum Fan step 1
	2	On occupation minimum Fan step 1
	3	Fan off in Heating mode.
	4	Fan off in Cooling mode.
105		Window contact polarity.
	0	When the window is closed, the window contact is also closed.
	1	When the window is closed, the window contact is open.
114		Dew point contact polarity
	0	At dew point recognition, the contact is open → Cooling will be locked
	1	At dew point recognition, the contact is closed → Cooling will be locked
129		Configuration of the S clamp
	0	Default NTC (factory curve)
	1	Conversion (calculated by NTC table)
	2	Digital input

Registers	Value	Description
		Conversion table (resistance at specific temperature) for new NTC. Limited range: [2000…65'000 Ohm] Impedance NTC for :
144		Configuration for the inverting of the outputs Bit 0: inverting output PWM Y1 Bit 1: inverting output PWM Y2 Bit 2: inverting output 0-10 V Y3 Bit 3: inverting output 0-10 V Y4 0 = no inverting, 1 = inverting
163		Sunblind polarity. Default: 0 Configuration for the polarity of each sunblind output (1 to 4). Bit 0: inverting Sunblind 0 polarity Bit 1: inverting Sunblind 1 polarity Bit 2: inverting Sunblind 2 polarity Bit 3: inverting Sunblind 3 polarity 0 = normal polarity, 1= reverted polarity
183		Configuration of the input E3
	0	Auxiliary 0-10V signal
	1	CO_2 sensor
184		CO_2 concentration corresponding to 10V Units : ppm Range: 0...30'000, default: 2000
192		configuration output Y1, default: 0
	0	PWM heating
	1	PWM cooling
	2	3-point open
	3	3-point close
	8	PWM second stage cooling
	10	3-point second stage cooling open
	11	3-point second stage cooling close
	255	unused
193		configuration output Y2, default: 1
	0	PWM heating
	1	PWM cooling
	2	3-point open
	3	3-point close
	8	PWM second stage cooling
	10	3-point second stage cooling open
	11	3-point second stage cooling close
	255	unused

Registers	Value	Description
194		configuration output Y3, default: 255
	4	0-10V heating
	5	0-10V cooling
	6	6-way
	7	0-10V air damper cooling
	9	0-10V cooling second step
	12	6-way second stage cooling
	13	variable fan speed
	255	unused
195		configuration output Y4, default: 255
	4	0-10V heating
	5	0-10V cooling
	6	6-way
	7	0-10V air damper coolin
	9	0-10V cooling second step
	12	6-way second stage cooling
	13	variable fan speed
	255	unused
196		Mode of activation of the air quality
	0	air quality inactive
	1	only air quality active
	2	air quality and cooling active
Control parameters		
0		Run-down time in Comfort mode in 10-minute steps. Range: 0…24 = 0…240 minutes, default: 0 = 0 minutes
2		Neutral zone in «Comfort» mode, unit:[K/10] Range: 0…200 (=0…1.0 K/step), Default: 20
3		Neutral zone in «Standby» mode, unit:[K/10] Range: 10…200 (=1…1.0 K/step), Default: 40
4		Neutral zone in «Reduced» mode, unit:[K/10] Range: 10…200 (=1…1.0 K/step), Default: 60
5		Proportional band for cooling, unit:[K/10] Range: 5…100 (=0,5...10,0 K), default: 50
7		Run-down time for cooling, unit: [seconds]. A value of 0 disables the integer portion, pure P control. Range: 0…1000 seconds, default: 0
6		Proportional band for heating, unit:[K/10] Range: 5…100 (=0,5..10,0 K), default: 50
16		Threshold for fan step 2. Where a Y heating or cooling signal exceeds the threshold, the fan switches to step 2. When the signal drops at least 5% below the threshold, the controller switches back to step 1. Unit: [%] Range: 0…100%, default: 33

Registers	Value	Description
17		Threshold for fan step 3. Where a Y heating or cooling signal exceeds the threshold, the fan switches to step 3. When the signal drops at least 5% below the threshold, the controller switches back to step 2. Unit: [%] Range: 0…100%, default: 66
18		Control variance in electric heating. When the Y heating signal reaches 100% and the current control variance is greater than the value set, the electric heating switches on and the controller works proportionally without the integer portion. Unit: [K/10] Range: 0…200 (0…20,0 K), default: 50
37		Base set-point for initialising the controller after a restart, unit [°C/10] Range: 100…350 (= 10.0…35.0 °C), default: 22
42		Delayed activation of Fan-Speed for heating, unit: [20x seconds] Range: 0…250, default: 0 s
43		Delayed activation of Fan-Speed for cooling, unit:[20x seconds] Range: 0…250, default: 0 s
81		«Pres detec by MS» overtravel time Stand-by Timer value to stay in presence ON after no presence detection of the multisensor when Operating mode (Register 36) = Standby (2) Unit:[seconds] Range: 90…43'200, default: 600 s
82		«Pres detec by MS» overtravel time Reduced Timer value to stay in presence ON after no presence detection of the multisensor when Operating mode (Register 36) = Reduced (1) Unit:[seconds] Range: 90…43'200, default: 300 s
97		Proportionalband of variable fan speed regulation loop Unit: [1/10] Range: 1…100, default: 10
98		Variable fan speed minimum limitation Unit: [%] Range: 0...100, default 0%
99		Variable fan speed maximum limitation Unit: [%] Range: 0...100, default 100%
106		Run-down time for heating, unit: [seconds]. A value of 0 disables the integer portion, pure P control. Range: 0…1000 seconds, default: 0
115		Level speed 1 of the variable (0-10V) ventilator Unit: [%] Range: 0...100, default 33%
116		Level speed 2 of the variable (0-10V) ventilator Unit: [%] Range: 0...100, default 66%
117		Level speed 3 of the variable (0-10V) ventilator Unit: [%] Range: 0...100, default 66%
128		Threshold for fan step 1 Where a Y heating or cooling signal exceeds the threshold, the fan switches to step 1. When the signal drops at least 5% below the threshold, the controller switches off the fan. Unit: [%] Range: 0…100%, default: 1

Registers	Value	Description
		Conversion table (resistance at specific temperature) for new NTC. Limited range: [2000 …65'000 Ohm] Impedance NTC for :
130		T= 0.0 °C = ... Ohm
131		5.0 °C = ... Ohm
132		10.0 °C = ... Ohm
133		15.0 °C = ... Ohm
134		20.0 °C = ... Ohm
135		25.0 °C = ... Ohm
136		30.0 °C = ... Ohm
137		35.0 °C = ... Ohm
138		40.0 °C = ... Ohm
140		Valve limit for cooling (CoolY) Range: 0…100%, default: 100
141		Valve limit for heating (HeatY) Range: 0…100%, default: 100
185		Setpoint for the air quality regulation Units : ppm Range: 0...30'000, default: 700
186		Proportional band for air quality regulation Units : ppm Range: 0...30'000, default: 800
187		max opening air damper Units : 0,1% Range: 0...1000, default: 1000
188		min opening air damper Units : 0,1% Range: 0...1000, default: 0
190		Minimum % of cooling to activate the second stage Units : 0,1% Range: 0...1000, default: 1000

Registers Value		Description
Light and shade		
87		Lum level presence Luminosity level threshold on presence detection, in lux. According to presence detection configuration (Pres detec to L), lights are turned ON or not. Unit:[lux] Range: 0…3000, default: 600 lux
92		Lum hysteresis Value of luminosity change filtering. If the luminosity changes with a step less than «lum hysteresis», the change is not taken in count. Unit:[lux] Range: 0…255, default: 20 lux
94		Lum hysteresis Value of luminosity change filtering. If the luminosity changes with a step less than «lum hysteresis», the change is not taken in count. Unit:[lux] Range: 0…255, default: 20 lux
95		Dimming ramp To define the dimming speed on light up or light down command over room operation unit or S-Bus command. Unit:[s] Range: 0…250, default 5s
96		Lum level light off High luminosity level threshold at presence to switch light off, in lux. Unit:[lux] Range: 0…3000, default: 3000 lux
120		The outputs for light and shade are controlled indirectly via group commands. There are 4 independent groups available for light and 4 for shade. Each output can be individually assigned to a group using this register. It is possible for an output to occur in every group or in none. All combinations are possible. A group definition for 4 outputs comprises 4 bits. Each bit represents one of the 4 outputs. A «1» bit indicates that the associated output should respond to commands for this group. A «0» bit excludes the output from the group. 
160		Rotation per step Percent of the total rotation time for a push on the rotation button a short push on L644 for all the sunblind. Unit: [%] Range: 0…100%, default: 10%

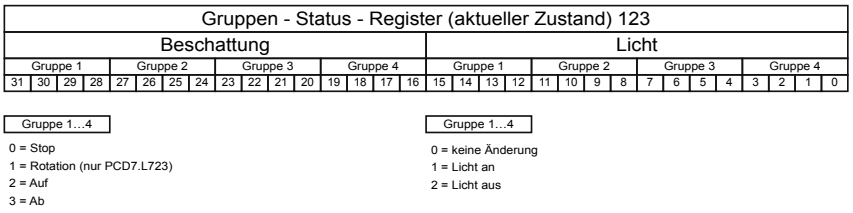
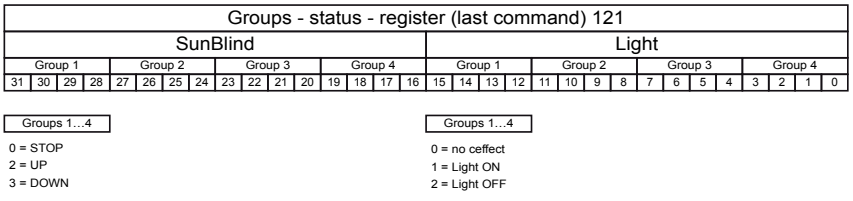
Registers Value		Description
161		Total rotation time Total rotation time of the sunblinds 0 s to 25s with 0,1s step Unit:[seconds/10] Range: 0…250 (0…25s), default: 50
162		Full translation time Time of a complete translation for all the sunblinds. This register is the total time needed by the sunblinds to go fully UP to fully DOWN (or fully DOWN to fully UP). 0 to 2min with 1s resolution and 2min to 6min 30s max with 2s resolution. From 0 to 120 : Translation Time = «Full Translation Time» seconds From 121 to 255 : Translation Time = («Full Translation Time» *2 – 120)seconds Unit: [seconds] Range: 0…120 (0…120s) / 121…255 (122…390s) /, default: 20s

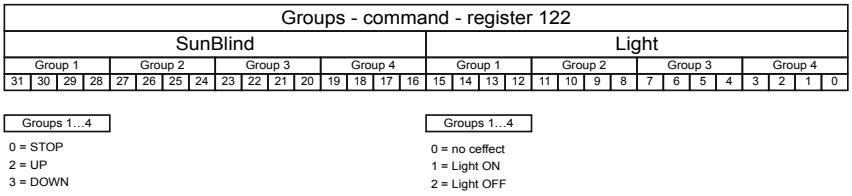
5.2 Registers, actual values

This table gives the register address, information on the type of access allowed (R=Read, W=Write), and a description.

Registers		Description
Room control unit		
21	R	Manual set-point adjustment in K
22	R/W	Presence sensor 0=Presence, 1=No presence
23	R	Temperature measurement from the digital room control unit in the range 5…36.5 °C
24	R	Manual pre-selection of fan speed 0=off, 1…3 fan steps, 4=automatic
Regulation and control parameters		
30	R/W	Bus room temperature. See Configuration register 13.
31	R/W	Control mode, default 0=automatic, 1=heating, 3=cooling, 5=frost protection, 6=off, 10=manual, 2/4 not used
33	R/W	To switch window contact over SBus 0 = Operation Normal 1 = Regulation deactivated but the protection against freezing remains activated
34	R/W	Offset for set-point adjustment in «Comfort» and «Standby» mode. Unit [K/10] Range: -30…+30 (=-3.0…+3.0 K)
41	R/W	Set-point. After a restart, the set-point is initialised to the base set-point in configuration register 37.
50	R	Effective control actual value
51	R	Current control mode 0=automatic, 1=heating, 3=cooling, 5=frost protection, 6=off, 10=manual
54	R	Effective control set-point
64	R/W	3 step Fan - min/max limits. The register is coded as a decimal as MAX¦MIN. The MAX and MIN limits can be set within the range [0 … 3]. The programmer must ensure that MAX is always greater than or equal to MIN. If MIN and MAX are equal, the fan always runs at the selected step level. Example: 30: MAX = step 3; MIN = step 0, the fan can be used without restriction 21: MAX = step 2; MIN = step 1, the fan can switch between steps 1 and 2.
142	R/W	Actual valve-limitation cooling Range: 0…100%, default: 100
143	R/W	Actual valve-limitation heating Range: 0…100%, default: 100
158	R/W	Variable fan speed - minimum limitation Range: 0…100%, default: 0%
159	R/W	Variable fan speed - maximum limitation Range: 0…100%, default: 100%
Analogue inputs		
53	R	Window contact (E1) status independent of the contact polarity set (see Hardware configuration register 105) 0=contact E1 closed, 1=contact E1 open
69	R	Temp. Value from sensor on input E2, if Register 10 = 6 or 7 Range 0...400, step 0.1°C

Registers		Description
70	R	Aux. contact (E2) status. (See Hardware configuration register 10) 0=contact E2 closed, 1=contact E2 open
71	R	Temp. Sensor clamp (S) value Input temperature from the S clamp, if the configuration of the S clamp-Register 129 = 0 or 1 (Default NTC or Conversion) Range 0…400, step 0.1 °C
72	R	Voltage input 0...10 V (E3) for optional use via S-Bus. Value of the aux 0-10 V Range: 0…1000, step 0.01V
73	R	Clamp (S) status, if the configuration of the S clamp- Register 129 = 2 (Digital input). 0=contact S closed, 1=contact S open
Actual values		
32	R/W	Forced fan speed 0=stop, 1…3=fan steps 4=automatic
36	R/W	Operating mode - default 0 The controller works permanently in «Comfort» mode. The room control unit no longer has any effect. 1 The controller works in «Reduced» mode. If the controller detects a presence, «Comfort» mode is activated for a configurable period (see register 0). 2 The controller works in «Standby» mode. According to whether a presence is detected, the controller switches between «Comfort» and «Standby» mode. 5 The controller works permanently in «Reduced» mode. Presence detection has no effect.
38	R/W	Change-over status. (See Configuration register 10) 0=Heating, 1=Cooling
39	R/W	Dew point status. (See Configuration register 10) 0=dry, 1=condensation
52	R	Current fan step of regulation 0=stop, 1…3= fan steps
59	R	Current operating mode 0=«Comfort» 1=«Reduced» 2=«Standby»
68	R	Current variable fan speed of regulation
80	R	Pres detec by MS State of the presence detection sent by Multi-sensor 0 : presence detected 1 : absence detected
85	R	Run time for relay contact output K1/K2. Unit [minutes] (Re-initialised if the value after a restart is > 65,000)
86	R	Lum in Lux Luminosity sent from a multisensory PCD7.L665 or PCD7.L666 It takes in count the correction factor value given by «Refection coefficient» (%) Unit: [Lux], range: 0…1024, step 2 Lux
118	R/W	Variable Fan Speed requested needed for Master/Slave Units: %
180	R/W	CO2 concentration communicated on the network Units : 1ppm
181	R	CO2 concentration used by the regulation Units : 1ppm
189	R	% of activation on the air damper Units : 0,1%
191	R	% of activation on the second stage for cooling Units : 0,1%
Outputs		

Registers		Description
45	R/W	Manual control of Y3 (0…10 V) where the output is not used by the application. (See Configuration register 103) Or control of the valve Y3 in the application selection «RIO» (see HW configuration registers 9) Unit: [%], range: 0…100 (0…100% = 0…10 V)
46	R/W	Manual control of Y4 (0…10 V) where the output is not used by the application. (See Configuration register 103) Or control of the valve Y4 in the application selection «RIO» (see HW configuration registers 9) Unit: [%], range: 0…100 (0…100% = 0…10 V)
47	R/W	Manual control of Y1 (PWM) where the output is not used by the application. (See Configuration register 103). Or control of the valve Y1 in the application selection «RIO» (see HW configuration registers 9) Unit: [%], range: 0…100
48	R/W	Manual control of Y2 (PWM) where the output is not used by the application. (See Configuration register 103). Or control of the valve Y2 in the application selection «RIO» (see HW configuration registers 9) Unit: [%], range: 0…100
49	R/W	Manual control of K1/2 (PWM) where the output is not used by the application. (See Configuration register 103). Or control of the relais K1/2 in the application selection «RIO» (see HW configuration registers 9) Unit: [%], range: 0…100
56	R/W	Manual control of the heating valve in «Manual» mode (see register 31 and configuration register 103) Unit: [%], range: 0…100%
57	R/W	Manual control of the cooling valve in «Manual» mode (see register 31 and configuration register 103) Unit: [%], range: 0…100%
58	R/W	Manual control of electric reheating in «Manual» mode (see register 31 and configuration register 103) Unit: [%], range: 0…100%
139	R/W	Force the fan speed if the application selection is RIO (see Hardware Configuration-register 9) Unit: [%], range: 0…100%
Light and shade		
123	R	Current status of group switches. 
121	R	Last switching command to the groups. 

Registers		Description
122	S	Group switching command 
150		Dimming G1 Input value to apply for dimming on light group 1 (%). Furthermore, this variable can command ON/OFF light group 1 (0% or 100%) instead of Register 122
151		Dimming G2 Input value to apply for dimming on light group 2 (%). Furthermore, this variable can command ON/OFF light group 2 (0% or 100%) instead of Register 122
152		Dimming G3 Input value to apply for dimming on light group 3 (%). Furthermore, this variable can command ON/OFF light group 3 (0% or 100%) instead of Register 122
153		Dimming G4 Input value to apply for dimming on light group 4 (%). Furthermore, this variable can command ON/OFF light group 4 (0% or 100%) instead of Register 122
154		Feedback Dimming G1 Output with feedback value for dimming lights group 1 from dimming light add-on modules (%)
155		Feedback Dimming G2 Output with feedback value for dimming lights group 2 from dimming light add-on modules (%)
156		Feedback Dimming G3 Output with feedback value for dimming lights group 3 from dimming light add-on modules (%)
157		Feedback Dimming G4 Output with feedback value for dimming lights group 4 from dimming light add-on modules (%)
164		Translation G1 / Rotation G1 Command the translation and the rotation of sunblinds associated to GROUP number 1. Bit 7 to 4 : % of rotation (0 to 10 with 10% step) Bit 3 to 0 : % of translation (0 to 10 with 10% step)
165		Translation G2 / Rotation G2 Command the translation and the rotation of sunblinds associated to GROUP number 2. Bit 7 to 4 : % of rotation (0 to 10 with 10% step) Bit 3 to 0 : % of translation (0 to 10 with 10% step)
166		Translation G3 / Rotation G3 Command the translation and the rotation of sunblinds associated to GROUP number 3. Bit 7 to 4 : % of rotation (0 to 10 with 10% step) Bit 3 to 0 : % of translation (0 to 10 with 10% step)
167		Translation G4 / Rotation G4 Command the translation and the rotation of sunblinds associated to GROUP number 4. Bit 7 to 4 : % of rotation (0 to 10 with 10% step) Bit 3 to 0 : % of translation (0 to 10 with 10% step)

Registers		Description
168		Feeedback Translation G1 / Rotation G1 Feedback of sunblind translation and rotation actual position for group number 1. (0-100%, 10% step) Bit 7 to 4 : % of rotation (0 to 10 with 10% step) Bit 3 to 0 : % of translation (0 to 10 with 10% step)
169		Feeedback Translation G2 / Rotation G2 Feedback of sunblind translation and rotation actual position for group number 2. (0-100%, 10% step) Bit 7 to 4 : % of rotation (0 to 10 with 10% step) Bit 3 to 0 : % of translation (0 to 10 with 10% step)
170		Feeedback Translation G3 / Rotation G3 Feedback of sunblind translation and rotation actual position for group number 3. (0-100%, 10% step) Bit 7 to 4 : % of rotation (0 to 10 with 10% step) Bit 3 to 0 : % of translation (0 to 10 with 10% step)
171		Feeedback Translation G4 / Rotation G4 Feedback of sunblind translation and rotation actual position for group number 4. (0-100%, 10% step) Bit 7 to 4 : % of rotation (0 to 10 with 10% step) Bit 3 to 0 : % of translation (0 to 10 with 10% step)

6 Technical data

6.1 Room controllers with Serial S-Net

PCD7.L60x-1 Technical overview

Type	Description
PCD7.L600-1	230 VAC room controller with 2 Triac outputs, relay for electric heating and 3-step fan control
PCD7.L601-1	230 VAC room controller with 2 Triac outputs, 2 outputs 0…10 V, relay for electric heating and 3-step fan or variable fan speed control
PCD7.L603-1	24 VAC room controller with 2 Triac outputs, 2 outputs 0…10 V, relay for electric heating with 3-step fan or variable fan speed control (230 VAC)
PCD7.L604-1	230 VAC room controller with 2 Triac outputs, 2 outputs 0…10 V incl. 24 VAC supply, relays for electric heating with 3-step fan or variable fan speed control (230 VAC)

Environmental:

Operating temperature: +5°C to +45°C

Storage Temperature: -20°C to +70°C

Relative Humidity: +20% to +90% Non-condensing

Altitude < 2000 m

6.1.1 Performance data for Serial S-Net

PCD	PCD3.M5340
Resources	90 Roomcontrollers with all Room FBoxes (Fan, CO_2, Light and Sunblind)
Registers	approx. 8500 (=> 50% of max)
Flags	approx. 3200 (=> 25% of max)
Data blocks	9
Program	0.9 Mbytes (=> 90% of max!)
Interface	Channel 2, 38400 baud
Program cycles	app. 66 cycles \ seconds
Communication cycle	7.2 seconds

At a communication rate of 38’400 baud, communication for all Room FBoxes takes approx. 80 ms. Only when the PCD program takes longer than 80 ms per PCD cycle does this value have to be used as a basis for estimating the communication cycle.

Communication cycle =
«80 ms per HVC Room FBox» × «Number of HVC Room FBox»

On M/S mode is the cycle time higher due the write commands. If light or sunblind will be switched in M/S mode, it is recommended to connect not more than 20 room controller on 1 S-Bus interface, that the cycle time is lower than 2 seconds.

If only the HVC FBoxes will be used the resource usage is approx. the half and the communication cycle is approx. 3 times less.

Recommendation to fit for most projects:

Install max. 25 room controllers on max. 4 interface depending if M/S mode will be used and to the application. Not too much room controllers on one S-Bus interface also help to debug the network easier.

6.1.2 Electrical load on Serial S-Net

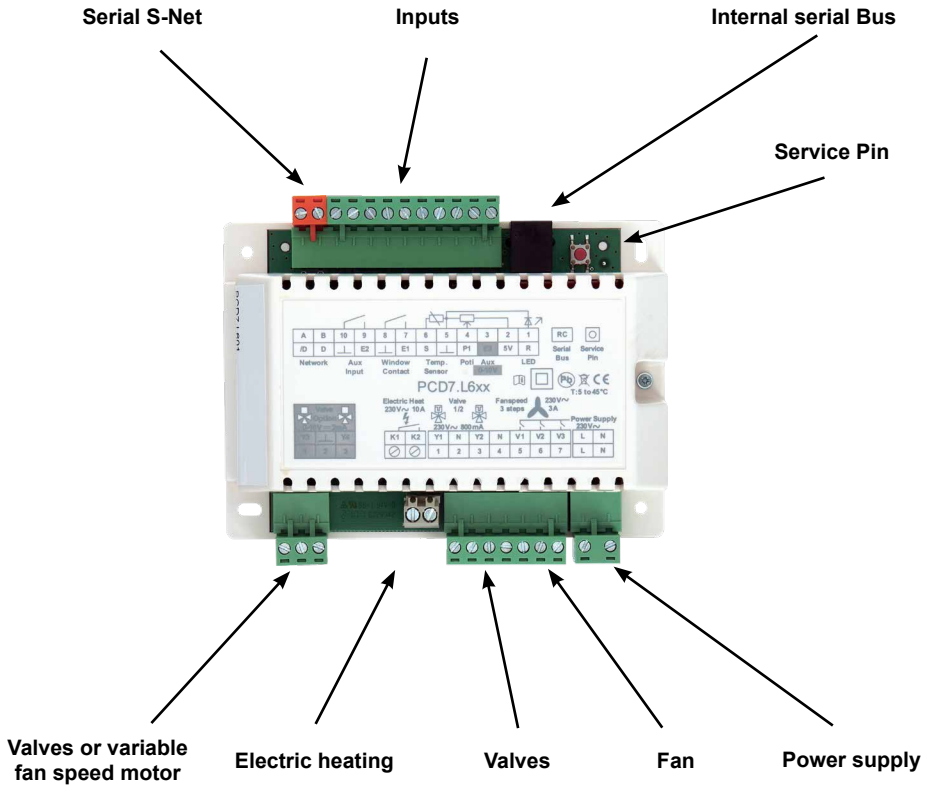
Limited by the electrical load on the Serial S-Net system, a segment (without repeater) can have no more than 32 PCD controls or
31 PCD7.L60x room controllers with hardware version 1.1 and older, or
248 room controller with hardware version 1.2 and newer connected to it.

Limited by the Bus cycle time, a maximum of 60 room controllers (hardware version 1.2) should be used in one segment.

Number of PCD systems on a Serial S-Net line:

Number of PCD controls	Number of room controllers Hardware version 1.1	Number of room controllers Hardware version 1.2
1	31	0
1	16	60
1	0	60
16	16	0
16	8	60
16	0	60
31	1	0
31	0	8
32	0	0

6.1.3 Technical overview of room controllers PCD7.L600-1 - .L604-1

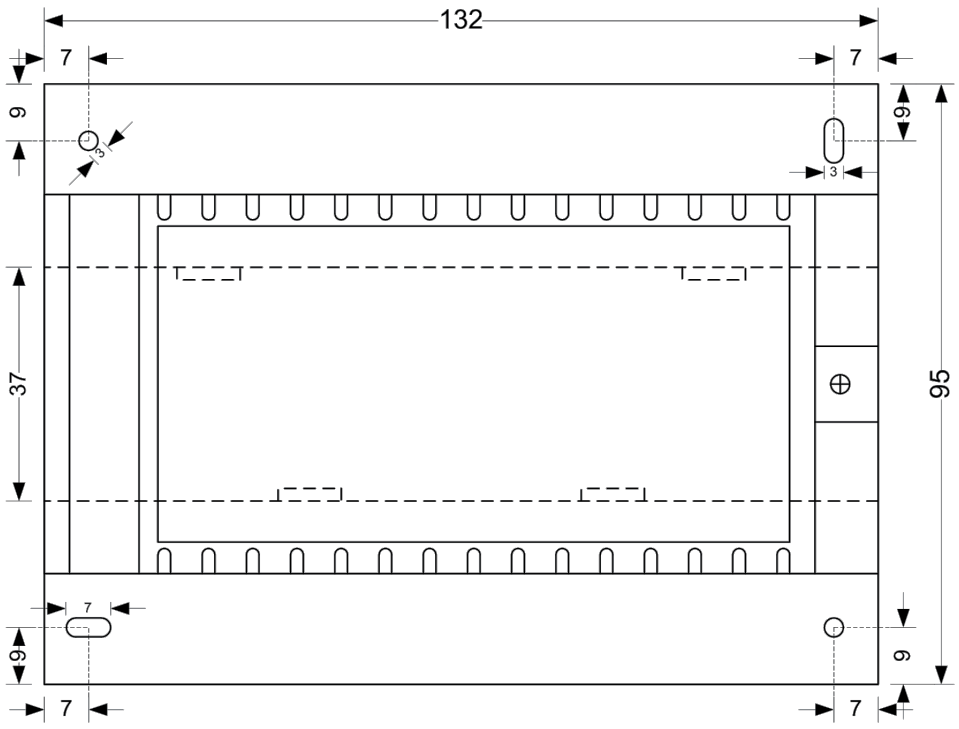


Designation	Terminal	Description
Power supply	L,N	Power consumption of 10…130 mA (depending on type), without current to Triac outputs Y1/Y2. An external fuse is needed.
Outputs		
Fan	N,V1,V2,V3	230 VAC, 3 A (AC3) max. for direct control of a 3-step fan.
Valves Y1/Y2	Y1,N,Y2	Triac outputs, 10…800 mA for Y1+Y2 to control valves with PWM signal or one 3-point valve (open/close). Can be configured via the HVC Config FBox or the configuration registers.
Valves Y3/Y4	Y3,GND,Y4	Constant voltage outputs 0…10 V, 2 mA max. to control valves, cooled ceilings or variable air volume (VAV) systems or variable fan speed motor. Can be configured via the HVC Config FBox or the configuration registers.
Electric heating	K1,K2	Floating relay contact 230 VAC, 10 A max. to control an electric heating unit using a PWM signal. Can be configured via the HVC Config FBox or the configuration registers.

Inputs		
Window contact	E1, window contact	Digital input for floating contacts. When the window is open, the controller automatically switches to «Frost protection» mode. The contact polarity (make/break) can be set in a configuration register. See description of Config FBox or registers
Additional input	E2, aux input	Additional digital input for floating contacts. The control function of the aux. input can be set in the configuration. It can be configured as inactive, as a 2nd window contact, a presence sensor, dew point monitor or change-over contact. See description of HVC Config FBox or registers
Voltage input	E3, Aux 0…10 V	Voltage input 0…10 V for CO_2 sensor or optional use via S-Bus.
Temperature sensor	S, temp sensor	Input for a temperature sensor NTC 10 KΩ; or Conversion or a Digital Input; the temperature/ resistance curve is documented in the technical data. Depending on the configuration, this input is intended to measure the room temperature when an analogue room control unit is used. Otherwise, it is available as Digital Input or another type of temperature sensor. See description of HVC Config FBox or registers.
Potentiometer	P1, Poti	Input for a potentiometer, 10 kOhm linear. This input can be used to adjust the room set-point in conjunction with an analogue room control unit. Otherwise, it is available for any other use. See description of HVC Config FBox or registers
Voltage output	5V	Voltage output 5V to supply the potentiometer on terminal P1.
Operating status	R, LED	Voltage output 5 V, 2 mA max. When the controller is working in Comfort mode, the output is set to HIGH (5V), otherwise LOW (0 V), e.g. to connect a LED with a series resistance of 1.5 kOhm
Communication		
Communication	/D, D	Serial S-Net, slave, data mode
Interface		RS-485, max. cable length 1200 m, depending on cabletype and baudrate.
Transmission rate		4800, 9600, 19'200, 38'400, 115'200 bit/s with automatic detection after restart
Serial bus	RC	Internal data bus for the extension modules and a digital room control unit.

All inputs can be read by the S-Bus via a Room FBox or via registers independently of the application.
Outputs not used by the application can be freely controlled via S-Bus as RIOs.

6.1.4 Dimensions of room controllers PCD7.L600-1 - .L604-1

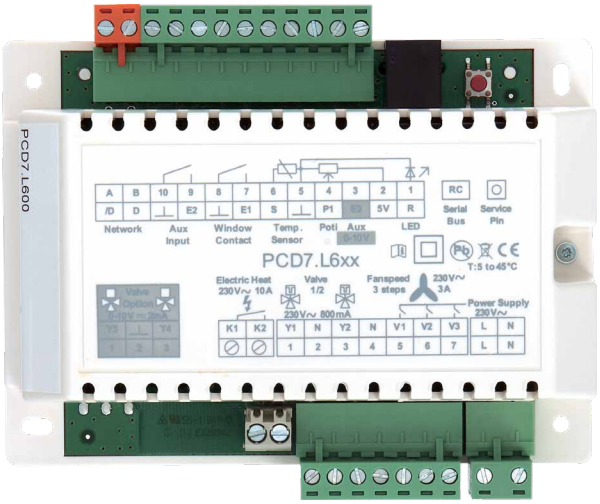


6

6.2 Type description

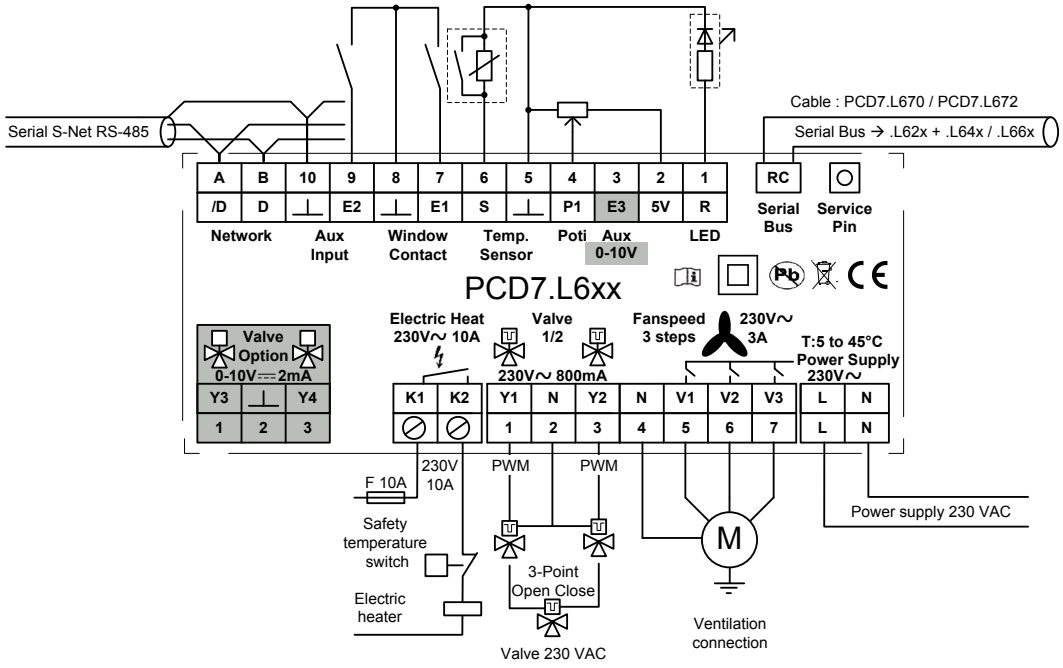
6.2.1 Technical data for PCD7.L600-1

230 VAC room controller with 2 Triac outputs, relay for electric heating and 3-step fan control



Designation	Terminal	Description
Power supply	L,N	230 VAC +10%/-15%, approx. 12 mA without current to Triac outputs Y1/Y2. An external fuse is needed.
Outputs		
Fan	N,V1,V2,V3	230 VAC, 3 A (AC3) max. for direct control of a 3-step fan.
Valves	Y1,N,Y2	Triac outputs 230 VAC, 10…800 mA for Y1+Y2 to control valves with PWM signal or one 3-point valve.
Electric heating	K1,K2	Floating relay contact 230 VAC, 10 A max.
Inputs		
Window contact	E1, window contact	Digital input for floating contacts.
Additional input	E2, aux input	Additional digital input for floating contacts.
Temperature sensor	S, temp sensor	Input for a temperature sensor NTC 10 kΩ.
Potentiometer	P1, Poti	Input for a set-point potentiometer, 10 kΩ linear.
Voltage output	5 V	Voltage output 5 V to supply the potentiometer on terminal P1.
Operating status	R, LED	Voltage output 5 V, 2 mA max. Comfort mode = HIGH (5 V), otherwise LOW (0 V).
Communication		
Communication	/D, D, GND	Serial S-Net, slave, data mode
Interface		RS-485
Transmission rate		4800, 9600, 19'200, 38'400, 115'200 bit/s with automatic detection after restart
Serial bus	RC	Internal data bus for the extension modules and a digital room control unit.

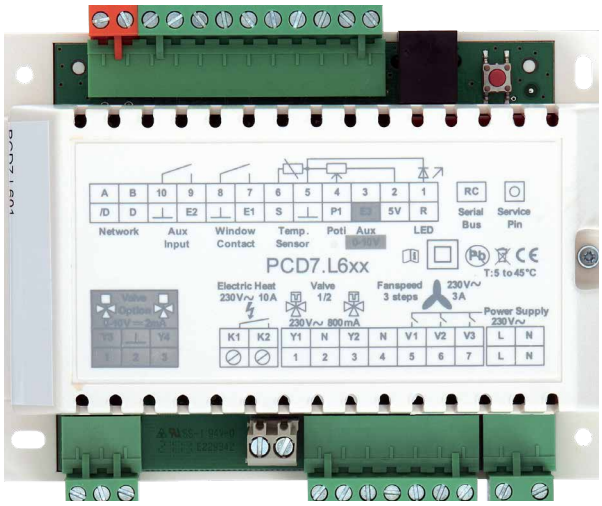
For a detailed description of the inputs/outputs, see «General technical specification».



Schema: PCD7.L600-1

6.2.2 Technical data for PCD7.L601-1

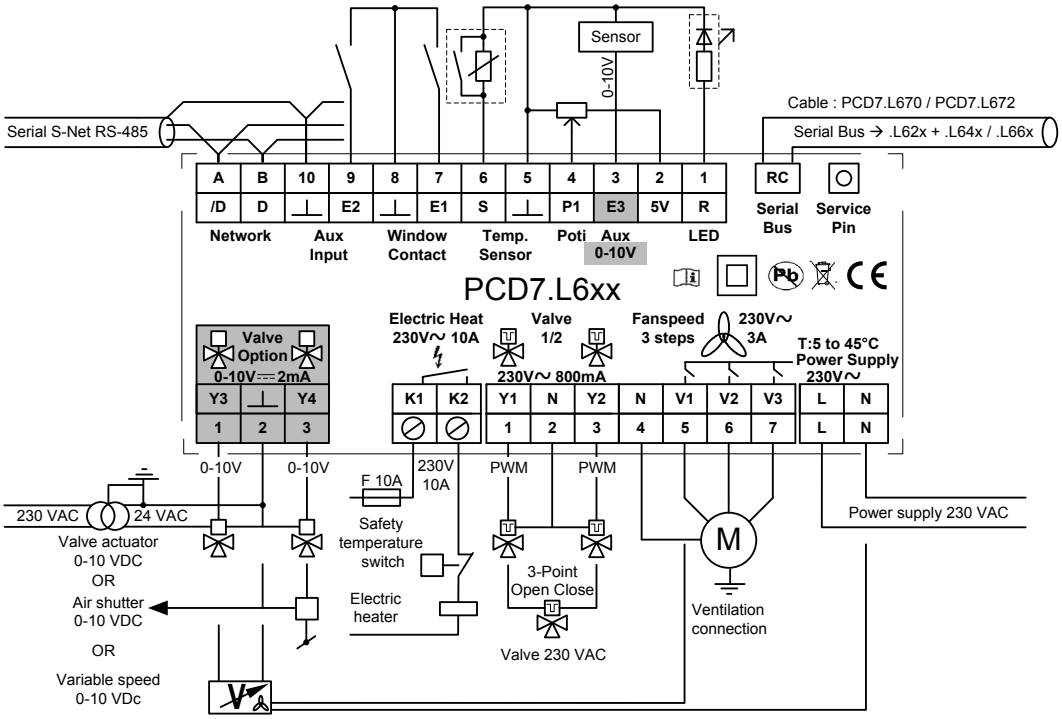
230 VAC room controller with 2 Triac outputs, 2 outputs 0…10 V, relay for electric heating and 3-step fan control



Designation	Terminal	Description
Power supply	L,N	230 VAC +10%/-15%, approx. 12 mA without current to Triac outputs Y1/Y2. An external fuse is needed.
Outputs		
Fan	N,V1,V2,V3	230 VAC, 3 A (AC3) max. for direct control of a 3-step fan.
Valves Y1/Y2	Y1,N,Y2	Triac outputs 230 VAC, 10…800 mA for Y1+Y2 to control valves with PWM signal or one 3-point valve.
Valves Y3/Y4	Y3,GND,Y4	Constant voltage outputs 0…10 V, 2 mA max. to control 2 valves or to control a variable fan speed motor.
Electric heating	K1,K2	Floating relay contact 230 VAC, 10 A max.
Inputs		
Window contact	E1, window contact	Digital input for floating contacts.
Additional input	E2, aux input	Additional digital input for floating contacts.
Voltage input	E3, Aux 0…10 V	Voltage input 0...10 V for optional use via S-Bus.
Temperature sensor	S, temp sensor	Input for a temperature sensor NTC 10 kΩ.
Potentiometer	P1, Poti	Input for a set-point potentiometer, 10 kOhm linear.
Voltage output	5 V	Voltage output 5 V to supply the potentiometer on terminal P1.

Operating status	R, LED	Voltage output 5 V, 2 mA max. Comfort mode = HIGH (5 V), otherwise LOW (0 V).
Communication		
Communication	/D, D, GND	Serial S-Net, slave, data mode
Interface		RS-485
Transmission rate		4800, 9600, 19'200, 38'400, 115'200 bit/s with automatic detection after restart
Serial bus	RC	Internal data bus for the extension modules and the room control unit.

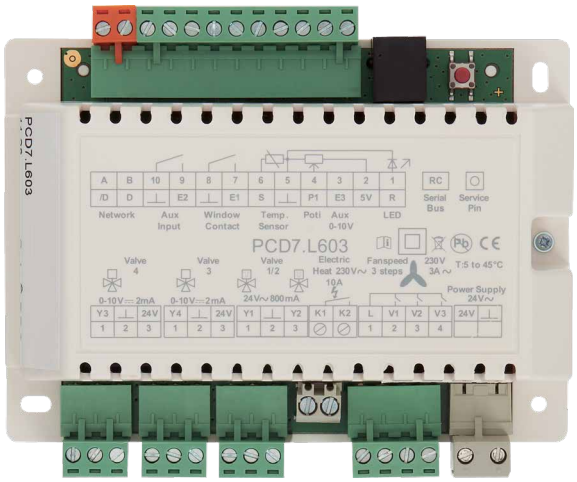
For a detailed description of the inputs/outputs, see «General technical specification».



Schema: PCD7.L601-1

6.2.3 Technical data for PCD7.L603-1

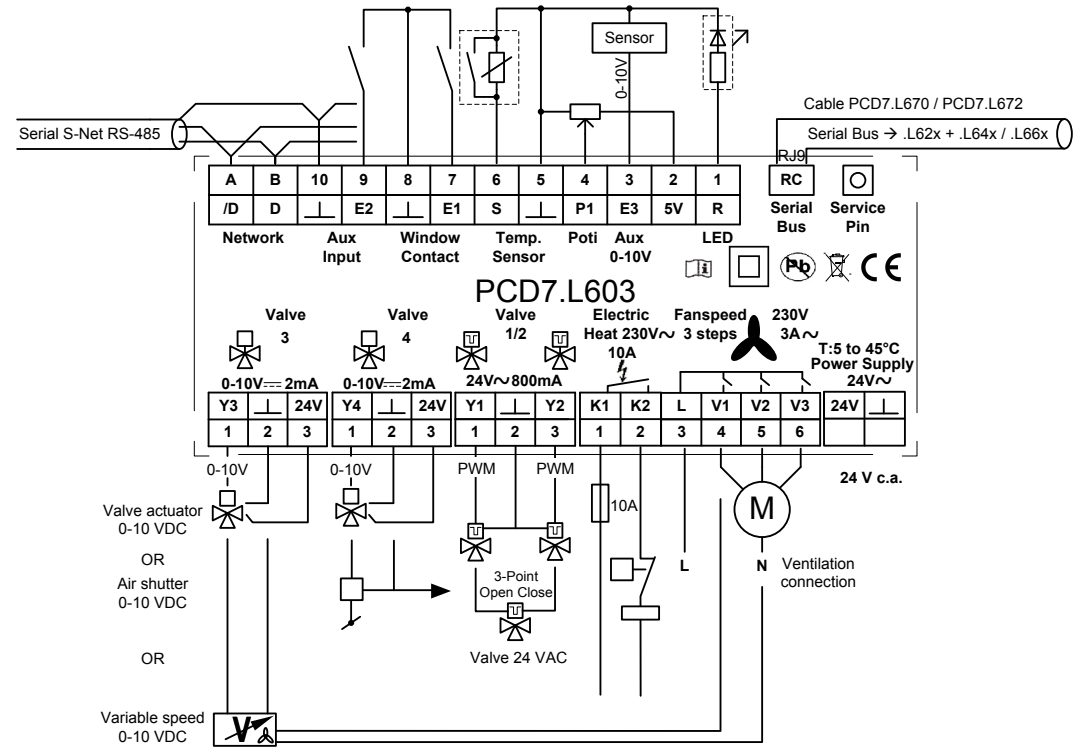
24 VAC room controller with 2 Triac outputs, 2 outputs 0...10 V, relay for electric heating and 3-step fan control (230 VAC)



Designation	Terminal	Description
Voltage supply	24 V	24 VAC ±10%, approx. 130 mA without current to Triac outputs Y1/Y2. An external fuse is needed.
Power supply to valves	24 V	24 VAC
Outputs		
Fan	L, V1, V2, V3	Sep[arate supply to relay contacts 230 V, 3 A (AC3) max. via contact L. For direct control of a 3-step fan.
Valves Y1/Y2	Y1, Y2	Triac outputs 24 VAC, 10…800 mA for Y1+Y2 to control valves with PWM signal or one 3-point valve.
Valves Y3/Y4	Y3, Y4, GND, 24 VAC	Constant voltage outputs 0…10 V, 2 mA max. to control 2 valves or to control a variable fan speed motor, incl. 24 V valve supply.
Electric heating	K1,K2	Floating relay contact 230 VAC, 10 A max.
Inputs		
Window contact	E1, window contact	Digital input for floating contacts.
Additional input	E2, aux input	Additional digital input for floating contacts.
Voltage input	E3, Aux 0…10 V	Voltage input 0…10 V for optional use via S-Bus.
Temperature sensor	S, temp sensor	Input for a temperature sensor NTC 10 kΩ.
Potentiometer	P1, Poti	Input for a set-point potentiometer, 10 kΩ linear.
Voltage output	5 V	Voltage output 5 V to supply the potentiometer on terminal P1.
Operating status	R, LED	Voltage output 5 V, 2 mA max. Comfort mode = HIGH (5 V), otherwise LOW (0 V).
Communication		
Communication	/D, D, GND	Serial S-Net, slave, data mode
Interface		RS-485

Transmission rate		4800, 9600, 19˙200, 38˙400, 115˙200 bit/s with automatic detection after restart
Serial bus	RC	Internal data bus for the extension modules and the room control unit.

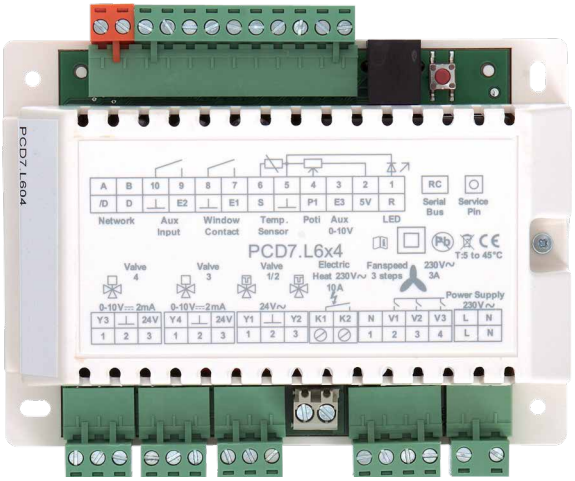
For a detailed description of the inputs/outputs, see «General technical specification».



Schema: PCD7.L603-1

6.2.4 Technical data for PCD7.L604-1

230 VAC room controller with 2 Triac outputs, 2 outputs 0...10 V incl. 24 VAC supply, relays for electric heating and 3-step fan control (230 VAC)

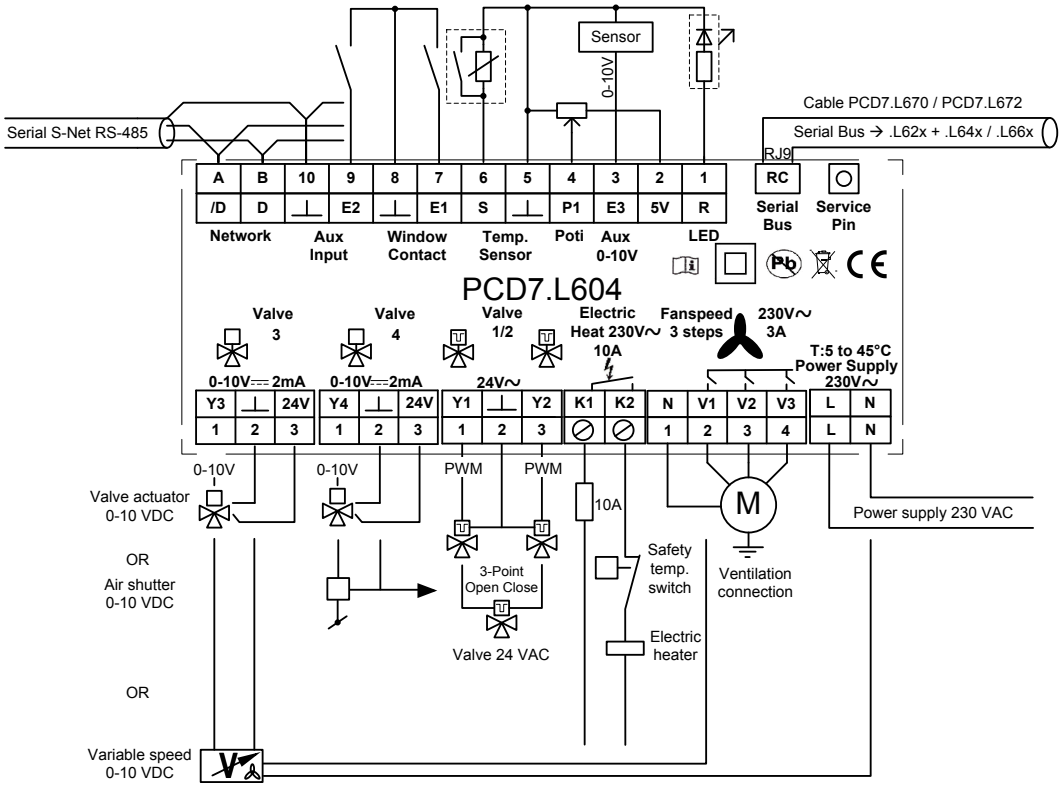


Designation	Terminal	Description
Power supply	L, N	230 VAC +10%/-15%, approx. 25 mA without current to Triac outputs Y1/Y2. An external fuse is needed.
Power supply to valves	24 V	24 VAC
Outputs		
Fan	N, V1, V2, V3	230 VAC, 3 A (AC3) max. for direct control of a 3-step fan.
Valves Y1/Y2	Y1,Y2	Triac outputs, 24 VAC to control valves with PWM signal or one 3-point valve. Maximum output power for 24 V outputs (together with valve supply) is 7 VA.*
Valves Y3/Y4	Y3,Y4, GND, 24 VAC	Constant voltage outputs 0…10 V, 2 mA max. to control 2 valves or to control a variable fan speed motor, incl. 24 V valve supply.*
Electric heating	K1,K2	Floating relay contact 230 VAC, 10 A max.
Inputs		
Window contact	E1, window contact	Digital input for floating contacts.
Additional input	E2, aux input	Additional digital input for floating contacts.
Voltage input	E3, Aux 0…10 V	Voltage input 0...10 V for optional use via S-Bus.
Temperature sensor	S, temp sensor	Input for a temperature sensor NTC 10 kΩ.
Potentiometer	P1, Poti	Input for a set-point potentiometer, 10 kΩ linear.
Voltage output	5 V	Voltage output 5 V to supply the potentiometer on terminal P1.
Operating status	R, LED	Voltage output 5 V, 2 mA max. Comfort mode = HIGH (5 V), otherwise LOW (0 V).
Communication		
Communication	/D, D, GND	Serial S-Net, slave, data mode
Interface		RS-485
Transmission rate		4800, 9600, 19'200, 38'400, 115'200 bit/s with automatic detection after restart
Serial bus	RC	Internal data bus for the extension modules and the room control unit.

*On-board power supply

Use	Used to power both 24 VAC-Triac outputs and the 24 VAC outputs
Voltage	24 VAC; -15 %/+35 %; 50 Hz
Power	max. 7 VA for all 24 V outputs together

For a detailed description of the inputs/outputs, see «General technical specification».

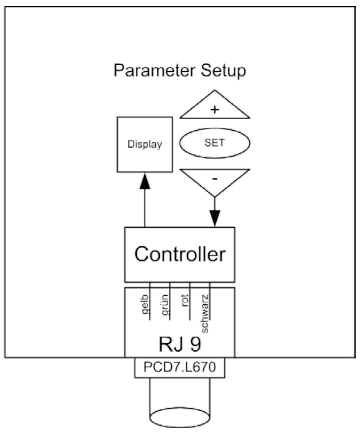


Schema: PCD7.L604-1

The overall power consumption of the valves have to be a maximum of 7 W. This should be noted particularly for applications where multiple valves are considered to be controlled simultaneously. If the accumulated power consumption of the valves in the planned configuration is beyond 7 W, there are two possibilities: the use of valves with low power consumption or the use of the 24 VAC version of the controller (PCD7.L603-1) with a extern transformer.

6.3 Parameterisation tools

6.3.1 Manual parameterisation tool PCD7.L679



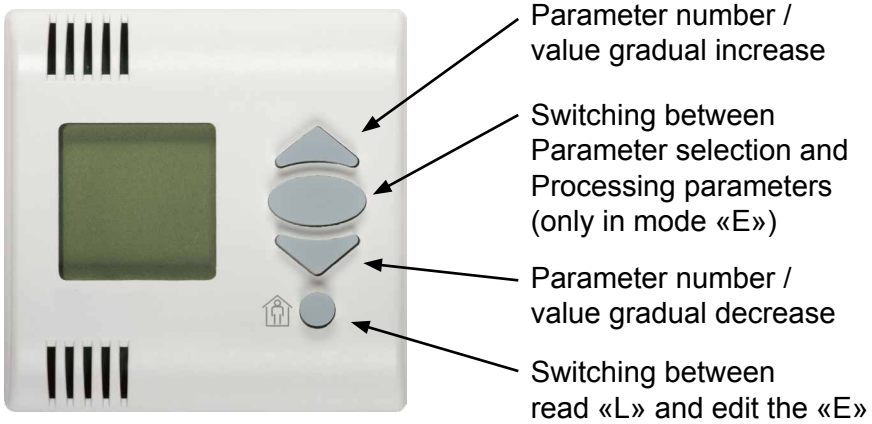
Local parameterisation aid in the form of a room control unit with RC-Bus interface to read and modify some specific parameters. The PCD7.L679 communicates directly with the room controller and can be used for parameterisation anywhere there is no available network connection to a higher-level control system.

Pin allocation

Interface	Terminal	Description
Serial bus	RC	The PCD7.L679 is connected to the room controller with the PCD7. L670 directly to the controller, or where extension modules are used for light and shade, to the last module. The PCD7.L670 connecting cable is preconfigured at both ends and is 10 m long. The maximum length between the room controller and the room control unit must not exceed 11m.

Configuration

The parameters are selected by entering a letter and a numeric code. Parameters in group «L» can be read, while parameters in group «E» can also be modified. The module starts up when it is connected to the the room controller in the read group with the first parameter, and display shows «L.01».



The small round button is used to switch between reading end editing parameters. The arrow keys are used to select the desired parameter. The parameter is retrieved with the oval key. Pressing the key again returns to the parameter selection menu.

Parameter description valid for:

PCD7.L600-1
PCD7.L601-1
PCD7.L603-1
PCD7.L604-1

Read parameters	
L.01	Occupancy: 0=Absent, 1=present
L.02	Current set-point
L.03	Current temperature (actual)
L.04	Current fan speed: OFF, AUTO, 1, 2, 3
L.05	Set-point adjustment+/-3.0 °C, resolution 0.5 °C
L.06	Not used
L.07	Not used
L.08	Window contact polarity: 0: Make contact, 1: Break contact
L.09	Status of window contact: 0: All windows closed, 1: Window(s) open
L.10	Not used
L.11	Change-over status: 0:Heat, 1:Cool
L.12	Application mode (see cap. 3.2.2)
L.13	Contact on terminal E2: 0:Contact closed, 1:Contact open
L.14	Window contact status on terminal E1: 0:Contact closed, 1:Contact open according to contact polarity, cf. L/E.08
L.15	Selection of room temperature sensor: 0: Digital or mobile room control unit. 1: Analogue temperature measurement with sensor on terminal S 2: Room temperature received from network
L.16	Not used
L.17	Not used
L.18	Network address [1 … 250]
L.19	Not used
L.20	RS-485 Bus baud rate when controller restarted: 21 115’000 baud 9 38’400 baud 18 19’200 baud 36 9600 baud 73 4800 baud (All other values cause communication errors) See section on Communication
L.21	Not used
L.23	Not used
L.24	Not used
L.25	Measurement on terminal E3: 0.0 V…10.0 V
L.26	Not used
L.27	Not used
L.28	Not used
L.29	Not used
L.30	Not used

Edit parameters	
E.01	Occupancy: 0=Absent, 1=present
E.02	Not used
E.03	Temperature (actual): +/-10 K adjust., resolution 1 °C
E.04	Fan speed: OFF, AUTO, 1, 2, 3
E.05	Set-point adjustment: +/-3.0 °C, resolution 0.5 °C
E.06	Not used
E.07	Not used
E.08	Window contact polarity: 0: Make contact, 1: Break contact
E.09	Not used
E.10	Not used
E.11	Not used
E.12	Application mode (see cap. 3.2.2) (Value 11-20 not defined)
E.13	Not used
E.14	Not used
E.15	Selection of room temperature sensor: 0: Digital or mobile room control unit. 1: Analogue temperature measurement with sensor on terminal S 2: Room temperature received from network (other values undefined)
E.16	Not used
E.17	Not used
E.18	Network address [1…250] → first the service pin has to be pushed
E.19	Not used
E.20	Not used
E.21	Not used
E.23	Not used
E.24	Not used
E.25	Measurement on terminal E3: (for actual value, see L.25)
E.26	Not used
E.27	Not used
E.28	Not used
E.29	Not used
E.30	Not used

A Annex

A.1 Icons

	In manuals, this symbol refers the reader to further information in this manual or other manuals or technical information documents. As a rule there is no direct link to such documents.
	This symbol warns the reader of the risk to components from electrostatic discharges caused by touch. **Recommendation:** Before coming into contact with electrical components, you should at least touch the Minus of the system (cabinet of PGU connector). It is better to use a grounding wrist strap with its cable permanently attached to the Minus of the system.
	This sign accompanies instructions that must always be followed.
	Explanations beside this sign are valid only for the Saia PCD Classic series.
	Explanations beside this sign are valid only for the Saia PCD xx7 series.

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A.2 Order codes

	Type	Description	
	Room controllers		
Serial S-Net	PCD7.L600-1	230 VAC room controller with 2 Triac outputs, relay for electric heating and 3-step fan control	
	PCD7.L601-1	230 VAC room controller with 2 Triac outputs, 2 0…10 V outputs, relays for electric heating and 3-step fan or variable fan speed control	
	PCD7.L603-1	Room controller 24 VAC with 2 triac outputs, 2 outputs 0…10 V, relays for electrical heater and control 3-state fan speed (230 VAC) or variable fan speed	
	PCD7.L604-1	Room controller 230 VAC with 2 Triac outputs, 2 outputs 0…10 V, incl. 24 VAC (7 W) supply, relay for electric heater and 3-stage fan speed control or variable fan speed	
LonWorks®	PCD7.L610	230 VAC room controller with 2 Triac outputs, relay for electric heating and 3-step fan control	
	PCD7.L611	230 VAC room controller with 2 Triac outputs, 2 outputs 0…10 V, Relays for electric heating and 3-step fan control	
	PCD7.L614	Room controller 230 VAC with 2 Triac outputs, 2 outputs 0…10 V, incl. 24 VAC (7 W) supply, relay for electric heater and 3-stage fan speed control	
	PCD7.L615	Double room controller 230 VAC for radiator/cooling ceiling combinations and VAV applications, 4 triac outputs, 2 × 0…10 V outputs, 2 relays for electric heater and autonomous interfaces for digital room control units	
	PCD7.L616	Room controller, 230 VAC, to control air quality with 2 TRIAC outputs, 2 0...10 V outputs, 1 relay for electric heating, 3-stage fan control and 1 interface for a digital room control unit	
	Extension modules for light and shade		
	PCD7.L620N	Extension module to control 3 on/off light -bands	
	PCD7.L621N	Extension module to control 2 dimming light-bands and 1 blind motor	
	PCD7.L622N	Extension module to control 3 blind motors	
	PCD7.L623N	Extension module to control 3 dimming light-bands	
	Room control units		
Ana-logue	PCD7.L630	Temperature sensor	
	PCD7.L631	Temperature sensor and set-point setting	
	PCD7.L632	Temperature sensor, set-point setting, presence sensor and LED	
Digital	PCD7.L640	Temperature sensor and set-point setting	
	PCD7.L641	Temperature sensor, set-point setting, presence sensor and LED	
	PCD7.L642	Temperature sensor, set-point setting, presence sensor, LED and fan control	
	PCD7.L644	Temperature sensor, function keys and LCD display for HeaVAC and light and shade functions	
Remote control	PCD7.L660	IR remote control with LCD display, temperature sensor and wall mounting for fixed use	
	PCD7.L661	IR receiver	
	PCD7.L662	Wireless remote control with LCD display, temperature sensor and wall mounting for fixed use	
	PCD7.L663	Wireless receiver	
	PCD7.L665	IR (infra-red) receiver with multi-sensor for presence and brightness for PCD7.L660	
	PCD7.L666	Wireless receiver with multi-sensor for presence and brightness for PCD7.L662	

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Extension modules to connect third-party devices	
PCD7.L650	Extension module to connect up to 8 external contacts for light&shade
PCD7.L651	Wireless receiver to connect EnOcean room control devices

Accessories	
PCD7.L662-CT	Configuration tool for linking PCD7.L666 to PCD6.L662
PCD7.L670	Connecting cable for room control units, RJ9/RJ9, 10 m
PCD7.L670-30	Connecting cable for room control units, RJ9/RJ9, 30 m
PCD7.L670-50	Connecting cable for room control units, RJ9/RJ9, 50 m
PCD7.L671	Connecting cable for room control units, RJRJ11/cord, 10 m
PCD7.L672	Connecting cable for room controller/extension modules, RJ11/RJ9, 0.3 m
PCD7.L672-10	Connecting cable for room controller/extension modules, RJ11/RJ9, 10 m
PCD7.L672-50	Connecting cable for room controller/extension modules, RJ11/RJ9, 50 m
PCD7.L673	Set of connecting cables for digital room control units, 3 × RJ-9 and 1 × RJ-11, length 11 m
PCD7.L679	Manual control unit for room controller configuration

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A.3 Contact

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