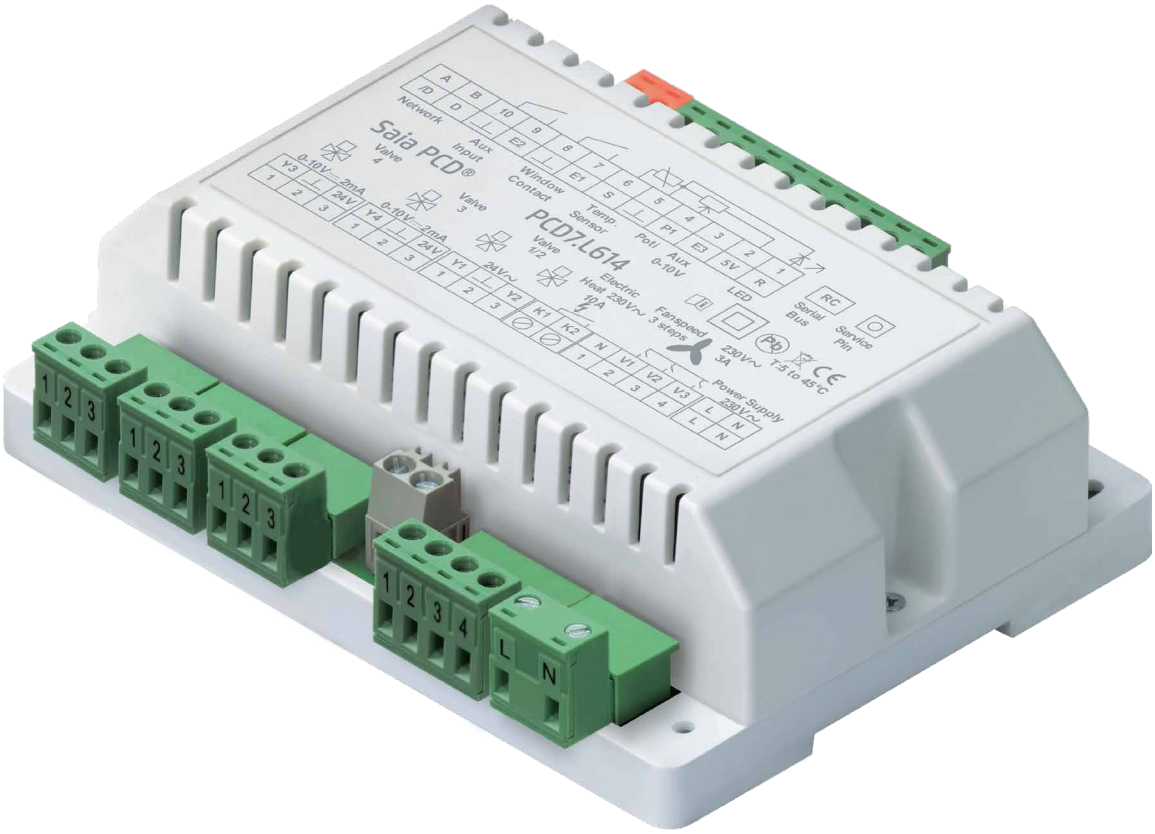

PCD7.L614 room controllers LON

Document 26-895; Edition ENG04 | 2016-01-07

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0 Content

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0.1 Document History

Date	Version	Changes	Remarks
2011-03-02	EN01		Inital version
2011-07-12	EN01		correction
2013-09-27	EN02		new logo and new company name
2015-01-29	EN03	4.2.3	control valves 3 and 4
2016-01-07	ENG04	div.	Divers small changes

0.2 About this manual

See the section in the appendix in relation to some of the terms, abbreviations and the references used in this manual.

This manual and the books referred to in the annex are not sufficient for a successful design of Lon. They serve only to basic education.
The training for the Certified System LON Integrator is offered the LonMark® country-specific organizations.

Every country has its LON Organization (LonMark®) for training courses for system integrators and certificates.
LonMark® International : http://www.lonmark.org
Country-specific e.g. : http://www.lonmark.de

0.3 Brands and trademarks

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

Technical modifications are based on the current state-of-the-art technology.

Published in Switzerland

1 Overview

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

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

1.1.1 Manufacturer-independent room control units

Control units with LonWorks® communication can be connected directly to the 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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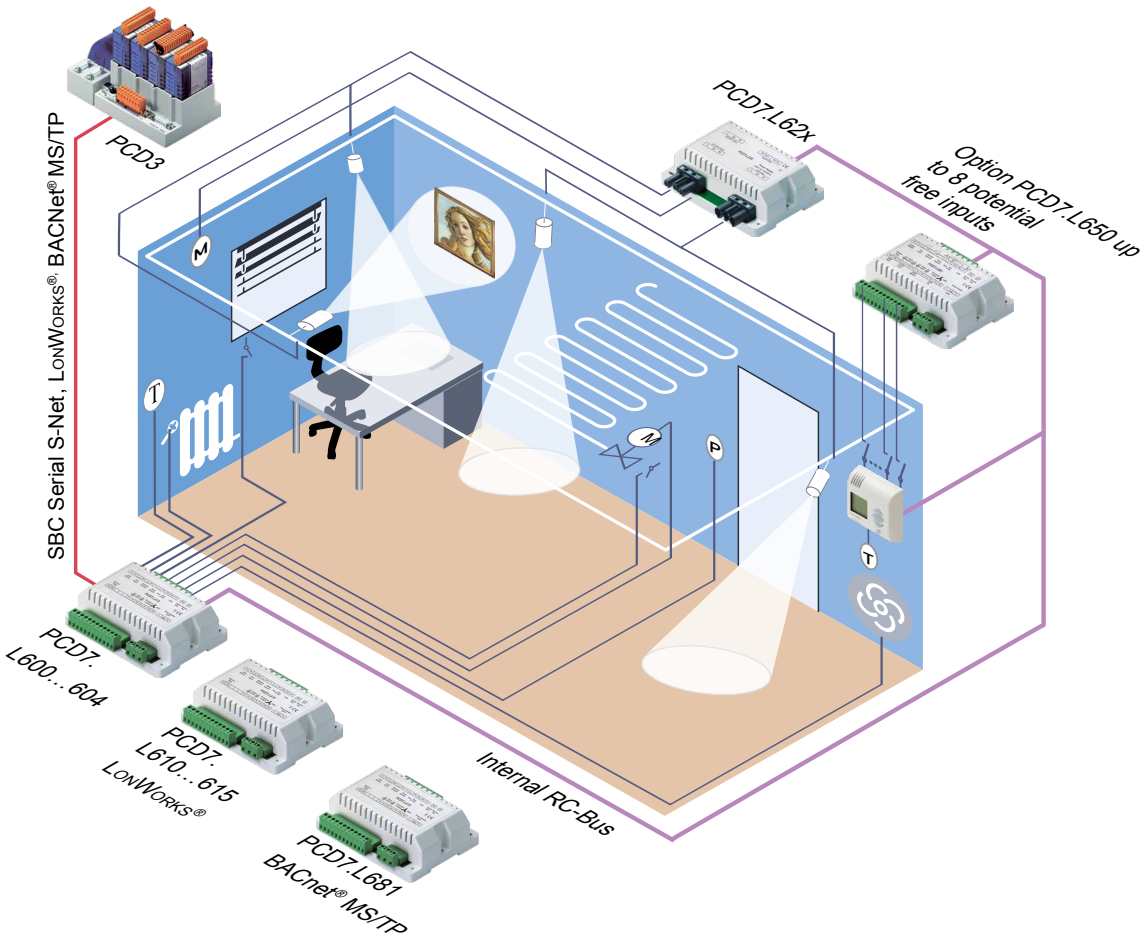
1.1.2 Features

- Wide range of uses with parameter-driven application programs
- Room controllers for communication via SBC Serial S-Net, LonWorks® or BACnet® MS/TP*
- 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



* in preparation

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1.2 Possible uses for the PCD7.L6xx 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.

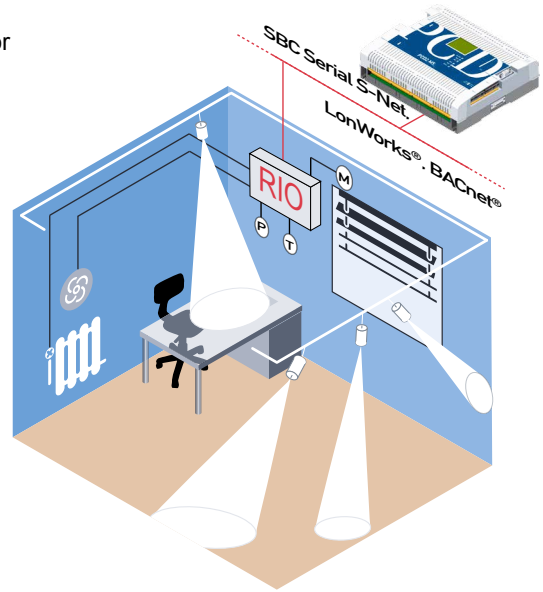
The default set-point setting of 21 °C can be modified by the set-point control (according to the device).

1.2.2 Standalone control with communication to the PLC

The controller is run as a slave station with a unique Bus address within a SBC Serial S-Net, LonWorks® or BACnet® 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 parameterisation and operation of the room controller. The device, and hence the control function, can also be influenced at any time via the Saia PCD® master station.

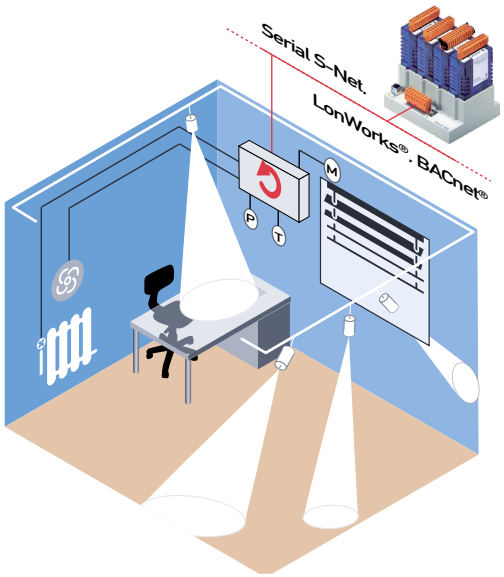
For parameterisation, there is a function object available in the library for every room controller type. In the case of open network connections, this is handled via network variables or network objects.



1.2.3 External regulation and control via the PLC

The Saia 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 parameterisation, RIO function objects are provided in the room controller library.



1.3 Application overview for the PCD7.L61x series

- Control of all standard heating/cooling systems, such as
- Radiator/cooled ceiling combinations
- Systems with a variable air volume (VAV)
- Fancoil devices
- Communication-friendly with SBC Serial S-Net or LonWorks®, or BACnet*
- Wide range of analogue, digital and mobile room control units
- Control of light and shade with optional expansion modules

Conformity table for PCD7.L61x range					
Name of the product PCD7.	**.L610**	**.L611**	**.L614**	**.L615**	**.L616**
Hardware					
Powersupply	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC
PWM	2× 230 VAC	2× 230 VAC	2× 24 VAC	4× 230 VAC	2× 230 VAC
0 - 10V	-	2×	2× with 24VAC supply	2×	2×
Fan 230V	3-step relay	3-step relay	3-step relay	2x 1-step relay	3-step relay
Electric heater (relay with pot. free contacts	1 relay	1 relay	1 relay	2 relay	1 relay
Applications					
Simple loop	X	X	X	X	X
Double loop	-	-	-	X	-
3 speeds fan	X	X	X	-	X
Variable speed fan	-	-	X	X	X
Frost guard mode	X	X	X	X	X
Air quality	-	-	X	-	X
Flow control	X	-	-	X	-
Blowing temperature limitation	X	X	X	-	X
Dew point	X	X	X	X	X
Direct control of outputs	X	-	X	-	X
Master/slave mode	X	X	X	X	X
Counting operation	-	-	X	-	X
Light	-	X	-	X	-
Shade	-	X	-	-	-

1.3.1 Operating modes

The 4 operating modes are set according to presence detection, the window contact and the instructions from the communication master

Comfort
Standard operating mode for when the room is occupied

Standby
Reduced operating mode used 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)

1.3.2 Commissioning

When the room controller is used in a SBC S-Bus network, configuration is either by the Saia PCD® PCS Master, the Saia PG5® programming tool, or dedicated PC software. Practical function blocks (FBoxes) simplify commissioning.

Where the room controller is used within a LON network, the configuration is set via a LonWorks® plug-in.

The room controller satisfies the user profile "FAN Coil Unit Object (8020)"LonMark®.

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1.3.3 Device overview and technical details of the room controller

SBC Serial S-Net	 PCD7.L600	 PCD7.L601		 PCD7.L604 *	
LonWorks®	 PCD7.L610	 PCD7.L611	 PCD7.L616	 PCD7.L614 *	 PCD7.L615 *
BACnet® MS/TP		 PCD7.L681 *			

Analogue inputs	Temperature sensor NTCA 010-040, Set-point potentiometer 10 kΩ | linear, 0…10 V			2 — —
Digital inputs	Main contact (e.g. window contact) Auxiliary contact selectable by user (e.g. presence, condensation, change-over…)			2 2
Analogue outputs	—	2×0…10 VDC		2
Digital outputs	2×Triac 230 VAC (10 mA…800 mA)		2×Triac 24 VAC (10 mA…800 mA)	4×Triac 230 VAC (10 mA…800 mA)
Relay outputs	3-step fan (4 connections) 230 VAC (3 A)			—
	Relays for electric heating: max. output 2 kW			2
Voltage supply	230 VAC with electronic fuse		24 VAC with electr. fuse	230 VAC with electr. fuse
Current consumption	approx. 100 mA			
Protection type	IP20			
Dimensions	132 × 95 × 45 mm			
Temperature range	5…45 °C, 80% RH			
!			The SBC S-Bus is electrically isolated.	The max. ouput power is 7 VA. For bigger valve loads, use the PCD7L603.

Communication with SBC Serial S-Net	
Interface Transmission rate Protocol	RS-485, max. cable length 1200 m, 128 .L60x room controllers on one Saia PCD® Master without repeater*. 4800, 9600, 19200, 38400, 115200 bit/s with automatic detection after restart SBC S-Bus data mode (slave)
Addressing at commissioning time via SBC S-Net or an external manual control device. Bus terminal resistors to be installed on site - integrated with L600, L601 and L604, software-activated	

Communication with LonWorks®	
Interface Transmission rate Topology Number of LON nodes	FTT10a 78 kBit/s Free topology max. 500 m; bus topology max. 2700 m max. 64 per segment, over 32000 in a domain/according to LonMark® 8020 profilet

Communication with BacNet® MS/TP	
Interface Transmission rate Protocol	RS-485, max. cable length 1200 m, 128 .L68x room controllers, without repeater* 9600, 19200, 38400, 78600 bit/s - factory setting 38400 bit/s BacNet® MS/TP

* in mixed operation with RS-485 standard transceivers, note the minimum impedance

** in preparation

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		
PCD7.L601	April 2007		
PCD7.L602			Aug. 2008
PCD7.L603	Sep. 2008		
PCD7.L604	June 2009		
PCD7.L610	April 2007		
PCD7.L611	April 2007		
PCD7.L614	June 2009		
PCD7.L615	June 2009		
PCD7.L616	June 2009		

2 Introductions

2.1 Lon networks characteristics

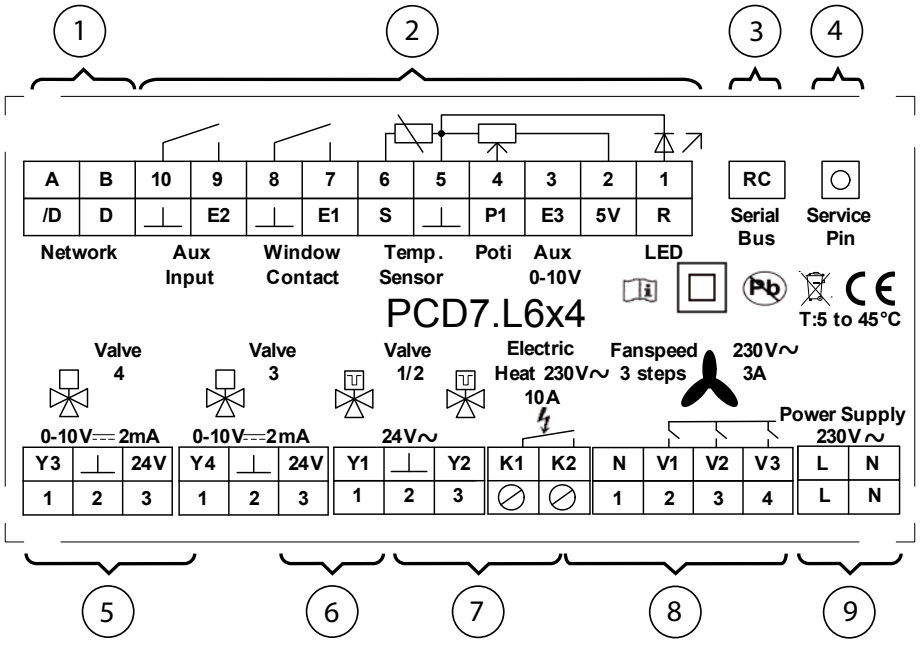
Program ID: 8F:FF:5B:55:01:04:04:80

Resource files: SBCScc with scope 5 – 8F:FF:5B:55:01:04:04:XX

Self documentation: PCD7L614 v101

2.2. Interface

Point	Desription
1	LON network
2	mixed input
3	serial bus (RJ9 connectors, either for room operation unit or extension devices)
4	push button (service pin)
5	terminals 0V-10V outputs:
6	electric heater outputs 230 VAC / 10 A
7	3 terminals for two 24 VAC valve outputs
8	4 terminals for three 230 VAC fan outputs
9	power input connector (230 VAC)



it's optional

3. Function

3.1 Safety Instructions

To guarantee safe operation, the PCD7.L6xx 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.

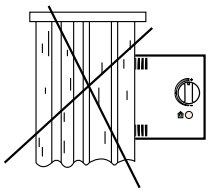
Please ensure that the limits specified in the technical data are not exceeded. Failure to do so may result in defects in the modules and the perpiherals connected to them. We can accept no responsibility for damage arising from improper deployment and use.

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

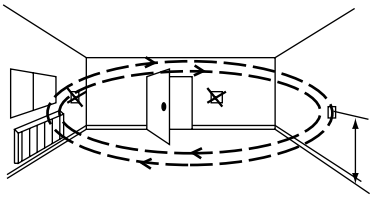
Please read this manual carefully before assembling and commissioning the modules. This manual contains instructions and warnings that must be observed to assure safe operation.

3.2 Assembly instructions

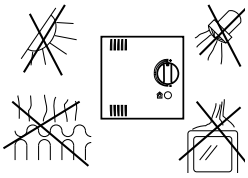
- The individual room controllers must only be installed and connected by an expert in accordance with the wiring diagram. Existing safety standards must also be observed.
- The individual room controller can only be used to regulate the temperature in dry, closed rooms. The maximum permissible relative 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 windows and doors because of draughts.

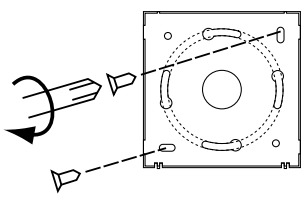


Do not install next to heat sources such as heaters, refrigerators, lamps etc.

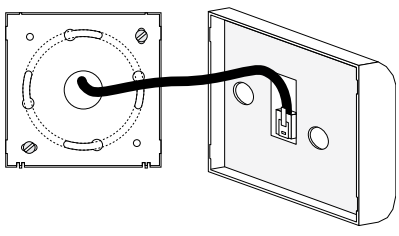
Please ensure

- 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

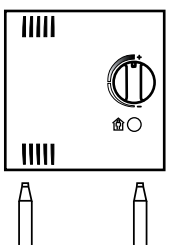


1. Assembling the housing base

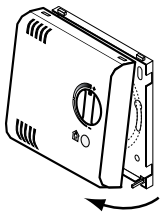


2 Wiring to the device

Removal



3Unlocking



4 Remove

4 Functionalities

4.1 Functional Block Overview

- **Node object** (see Ch 5.1)
- **sccFanCoil** object (see Ch 5.2)
- **Virtual Functional Block** (see Ch 5.3)

For detail description see chapter 5

4.2 Inputs / Outputs configuration

All modifications on configuration variables are not consider immediately or on the next execution of the control process loop. It is highly recommended to restart the device after the complete configuration to be sure to active all new configurations. This can be done by unplug and plug again the power supply connector or by the network.

4.2.1 Room operation unit

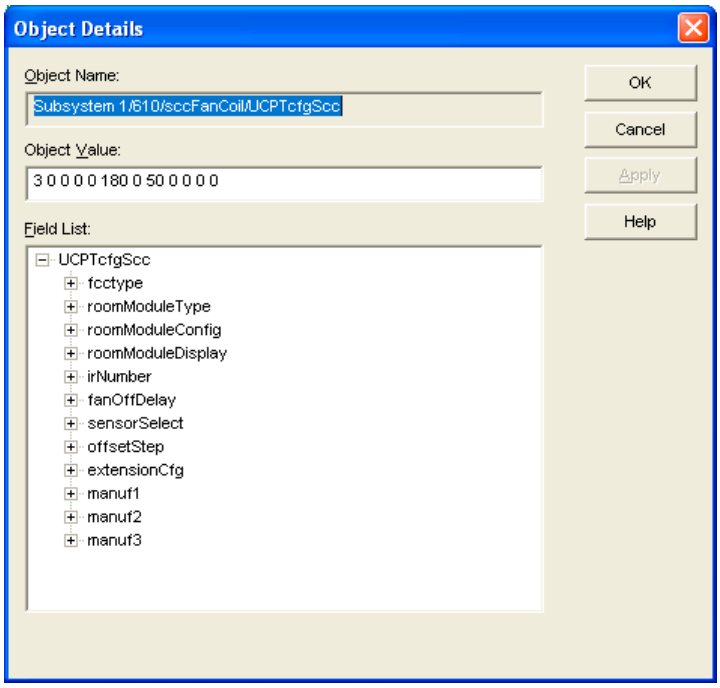
The PCD7.L614 can be used with a room local device to make available to the controller inputs needed for the regulation. The local device provides at the same time an interface for users to check and act on the process regulation (fitting of occupation, set point, ventilation…).

Remote operation unit used with the controller can be digital and plug on the “serial input”, or analogue and plug on standard inputs “S” to “L”. To learn more about these units, look at the document “Room controller unit PCD7.L61x, extension modules, accessories”.

HOW TO CONFIGURE THE ROOM SENSOR UNIT?

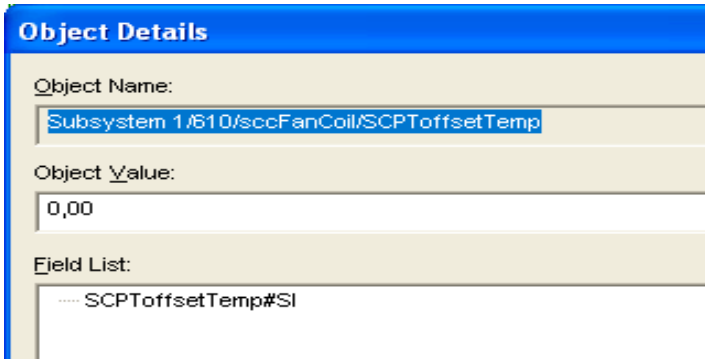
In the following description, only variables for room operation unit configuration are described.

nciCfgSrc	The main part of the configuration is done with this variable. It allows choosing the version of the device, analogue or digital, the room temperature origin and some other configuration especially for the offset.



.roomModuleType	To specify the technology of the room operation unit.	
	0	Digital, plugged on the serial bus (RJ9 connector)
	1	Analogue, plugged on analogue inputs S, P1, E3, 5V and L. In this case, you need to configure also the sensor temperature origin to analogue sensor (see nciCfgSrc.sensorSelect). To check the technology used on the room operation unit, you can look to the serial bus connector. For a digital one it is equipped with a RJ9 connector, on the analogue version this one is a RJ11 connector.
.romModuleConfig	Allow to not take in consideration value write in nviOccManCmd if the room operation unit is placed in unoccupied mode.	
	0	Function disabled
	1	Function enabled
.roomModuleDisplay	If the room operation unit is equipped with a LCD display, its displayed information can be changed with this variable	
	0	Display of the fan speed
	1	Display of the room operation unit temperature (updated each minute)
	2	Blink display of the actual calculated set point (with offset take in account)
	3	Display of the room temperature used for the regulation
	4	Displays the actual calculated set point (with a considered shift)

	.irNumber	For remote operation unit, a zone address needs to be configured in each one to be sure to act on the correct room controller. This variable allows defining which number for the room operation unit can be takes in account by the PCD7.L614. Its value is bordered from 0 to 30.	
		0	Universal receiver. Accept each remote control unit, whatever its number
		x (from 1 to 30)	Accept only orders and information from a remote control unit with the same zone address. This setting doesn't serve to configure the zone address into the remote operation unit. It is used only to consider orders with a number which match to this variable. To configure the remote operation unit and its zone address, refer to its own documentation.
	.sensorSelect	To specify the origin of the room temperature used by the regulator.	
		0	From the serial bus link
		1	From an analogue input. This one can be used for the S input configured with the correct setting (see table 3) or with an analogue room operation unit. If the specified origin delivers an invalid temperature, the regulator tries to consider automatically a new one's on others sources (network or serial bus).
	.offsetStep	To configure the value of one step offset. This value is in hundredth of °C and is bordered from 0 to 255 (0°C to 2.5°C)	

ncOffsetTemp (nciOffsetTemp)	Value of the offset applied by default on the temperature sensor selected with the nciCfgSrc.sensorSelect (analogue or digital sensor). This value is in °C and is bordered from -10°C to 10°C.
	

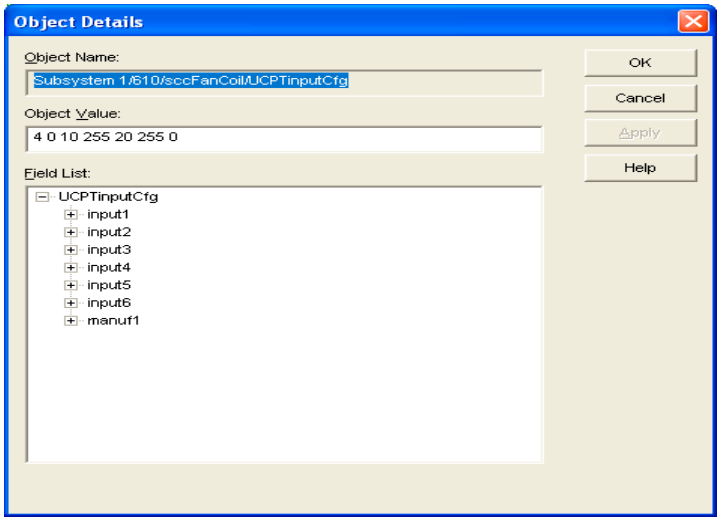
4.2.2 Analogue Inputs

In software configuration properties, inputs are named as “input1” to “input6”. To make the conformity between these names and these wrote on the device hood, you can use this table which described the type of inputs (such as analogue, digital …).

Table 1

Input	Pin	DIGITAL	NTC	0-10V	Internal code
Input 1	E2	×	×		Auxiliary contact, depend on its configuration
Input 2	E1	×			For window/door opening detection
Input 3	S		×		Sensor input for room temperature
Input 4	P1	×	×		Set point adjustment
Input 5	E3			×	Input 0-10 V
Input 6$	L	×			Led output for analogue room operation unit or presence detector input

ncInputCfg	The functionality associated to each input can be configured with this configuration property.



.Input1	Configuration of the input 1 (E2)
.Input2	Configuration of the input 2 (E1)
.Input3	Configuration of the input 3 (S).
.Input4	Configuration of the input 4 (P1)
.Input5	Configuration of the input 5 (E3)
.Input6	Configuration of the input 6 (L)
.manuf1	Not used

Functions are described in next parts of this document (chapter 4.3. Functions).

Values for each of these parameters are described into the next table.

Table 2

Function	ncInputCfg code	Updated variable	E2	E1	S	P1	E3	L
Not used	0xFF (255)							
Window	0	nvoWindow	×	×		×		×
Presence	1	nvoPresence	×	×		×		×
Dew point	2	nvoDewSensor	×	×		×		×
Change Over	3	nvoChgOver	×	×		×		×
Auxiliary contact (alarm status)	4	nvoAlarm	×					
Flow rate switch	5	nvoFlowControl	×	×		×		×
Auxiliary contact (information status)	6	nvoAuxContact	×					
Room temperature or return	10	nvoSpaceTemp			×			
Discharge air temperature	11	nvoDischairTemp	×		×			
Analog measurement 0-10V	20	nvoAnalogInput					×	
Counter 1	30	nvoCounter (1)	×	×				×
Counter 2	31	nvoCounter (2)	×	×				×
Counter 3	32	nvoCounter (3)	×	×				×
Using with an analogue room device*								
(nciCfgScc.roomModuleType = 1)								
Set point shift		nvoSetptOffset				×		
Occupancy state output								×
Default value			4	0	10	0xFF	20	0xFF

*: Such as PCD7.L63x (At the moment when this document is written, references PCD7.L631 and PCD7.L632 are available).To use this kind of room operation unit, you need to configure the nciCfgScc.roomModuleType to 1.

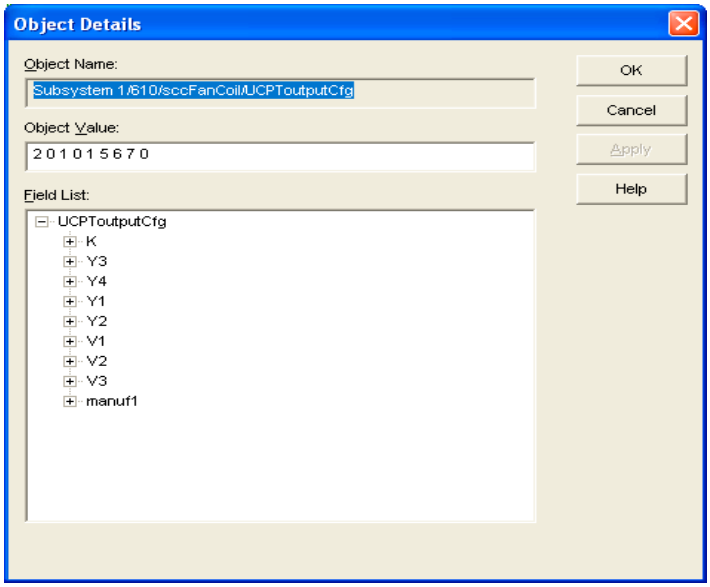
4.2.3 Analogue Outputs

Like each input, each output can be configured to be associated to one function. To choose this function, you need to respect the type of the output describe in the next table.

Table 3

Output	Pin	230 VAC	0…10 VDC	Switch	Internal description
K	K1-K2			×	Electric heater relay K
Y1	Y1	×			Triac on Y1
Y2	Y2	×			Triac on Y2
Y3	Y3		×		0…10 VDC on Y3
Y4	Y4		×		0…10 VDC on Y4
V1	V1	×			Fan speed V1
V2	V2	×			Fan speed V2
V3	V3	×			Fan speed V3

ncOutputCfg	The functionality associated to each output can be configured with this configuration property.



K	Configuration of the output K (cf K1-K2)
Y1	Configuration of the output Y1
Y2	Configuration of the output Y2
Y3	Configuration of the output Y3
Y4	Configuration of the output Y4
V1	Configuration of the output V1
V2	Configuration of the output V2
V3	Configuration of the output V3

Values for each of these parameters are described into the next table.

Table 4

Function	ncOutputCfg code	K	Y3	Y4	Y1	Y2	V1	V2	V3
Free	0xFF (255)	×	×	×	×	×	×	×	×
Control valve 1 – Reg1 – PWM*	0 or 1				×	×			
Control valve 2 – Reg2 – PWM*	0 or 1				×	×			
Electric heater	2	×							
Control valve 1 – Reg1 – 0…10 VDC*	0 or 1		×	×					
Control valve 2 – Reg2 – 0…10 VDC*	0 or 1		×	×					
Control valve 1 – Reg1 – 3 points**	3				×				
Control valve 2 – Reg2 – 3 points**	4				×				
Fan V1	5						×	×	×
Fan V2	6						×	×	×
Fan V3	7						×	×	×
Variable speed fan drive	8		×	×					
Variable speed fan power supply	9						×	×	×
Air shutter, 0…10 VDC	10		×	×					
Air shutter, digital	11				×	×	×	×	×
Default value		*2*	*0*	*1*	*0*	*1*	*5*	*6*	*7*

* Y1 or Y2 outputs with codes 0 and 1 configure both in PWM output (according to reg1 or reg2), with Y1 ≠ 3 or 4.

** If Y1 output configure as 3 points output, the value for Y2 is not taken into account. This is because Y2 is compulsorily dedicated to a 3 points valve.

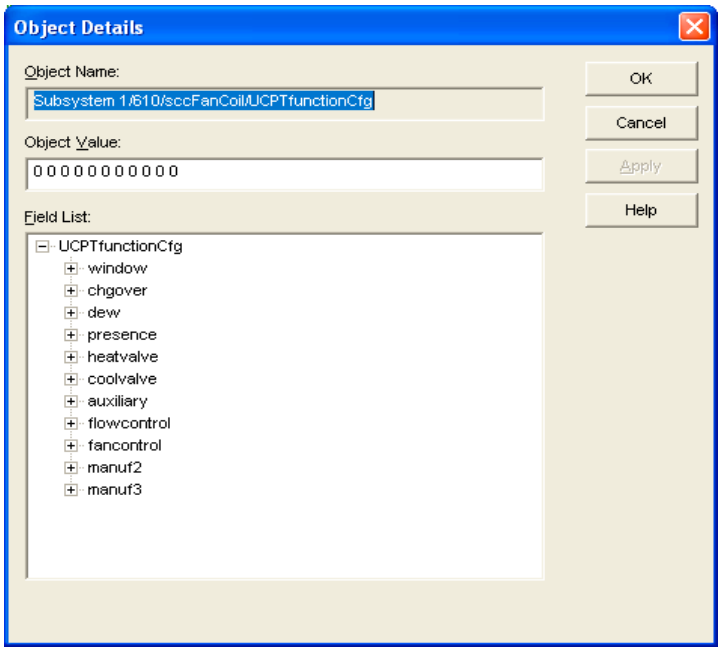
About valves usage:

- When switching from triac Y1 active to triac Y2 active, a downtime of 1 second is respected.

- When total closing or opening requests are done on 3 points valve (command to 0% or 100%), the valve cycle time is respected before to consider another command.

To adapt the PCD7.L614 to all kind of installation, you can change the polarity of each input or output. These configurations are not directly applied to inputs or outputs, but to the function associated with it. This is done with the configuration property **ncFunctionCfg**.

ncFunctionCfg	Allow to configure the polarity of each function associate to an input or output.



.window	0: Normally open (NO)	1: Normally closed (NC).
.chgover	0: Open for warm	1: Closed for warm.
.dew	0: Normally open (NO)	1: Normally closed (NC).
.presence	0: Open for occupied	1: Closed for occupied.
.heatvalve	0: Normally closed (NC)	1: Normally open (NO).
.coolvalve	0: Normally closed (NC)	1: Normally open (NO).
.auxiliary	0: Normally open (NO)	1: Normally closed (NC).
.flowcontrol	0: Normally open (NO)	1: Normally closed (NC).
.fancontrol*	0: Direct control	1: Inverse control.
.manuf2	Not used.	
.manuf3	Not used.	

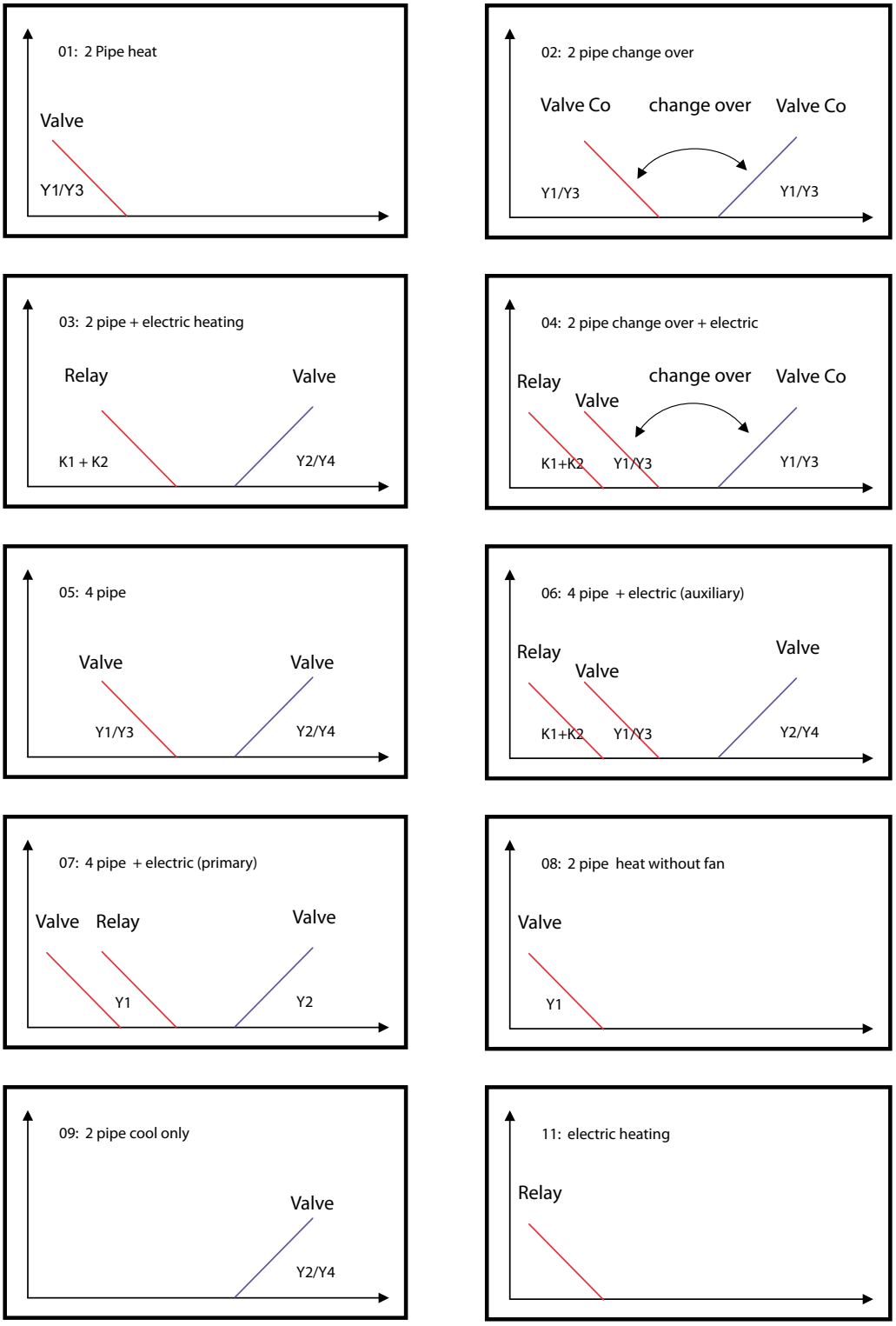
*: In direct control, the relay is activated to command the fan and deactivated to stop it. While for inverse control, the relay is not activated to command the fan and activated to stop it.

These parameters can only take values describe before.

4.3 Application configuration

This chapter describe the configuration and the functioning of the HVAC regulator.

To be adaptable to much kind of installations, the application type needs to be setup in first. This is defined in the configuration variable **nciCfgSrc.type**.
Supported application types are:



For change over state, valve is in cool mode when **nviChgOver.state = 1** and in heat mode when **nviChgOver.state = 0**.

In next parts of this chapter, basic functions are described. These allow a quick setup of the controller by focusing only on them which are necessarily used for integration. For each functions, variable for configuration are described in first, followed by input and output variables for using this one. Inputs and outputs configuration is mandatory before to start the regulator configuration (chapter “4.1. Inputs / Outputs configuration”).

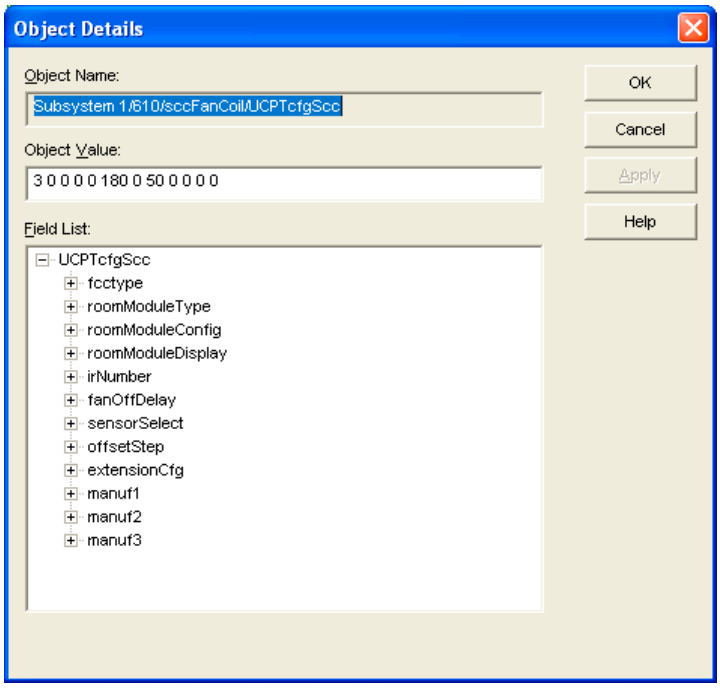
However, it is strictly recommended to configure all options and functions listed in this documentation to be sure to obtain the operation which you want.

4.3.1 Regulator configuration

For the configuration of the regulator part, main variable are listed below. These are used to configure which kind of installation the regulator has to managed, with basic parameters like set points, time cycle of valves or parameters for the PI regulator as the proportional band and the integral time.

In the following description, only variables for HVAC regulator configuration are described.

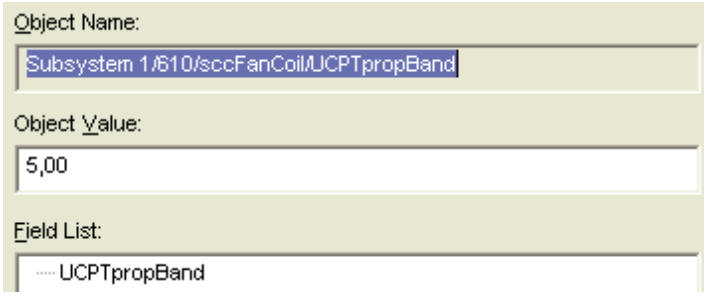
nciCfgSrc	Used to define the installation type and as the same time the duration of the post ventilation. Other parameters are used for the room operation unit configuration.

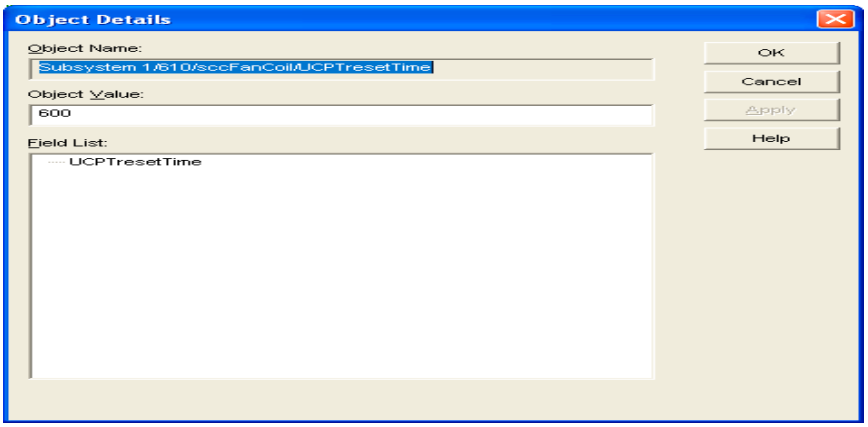


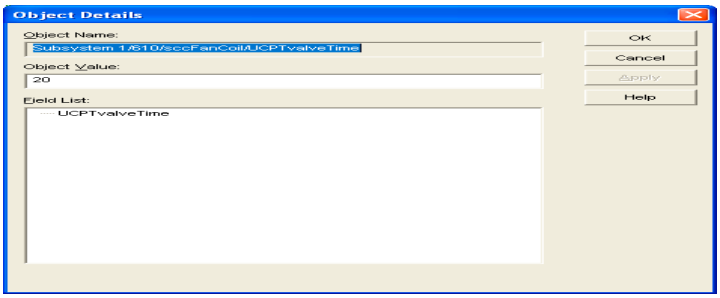
.fccType	To specify the installation type managed by the PCD7.L614.

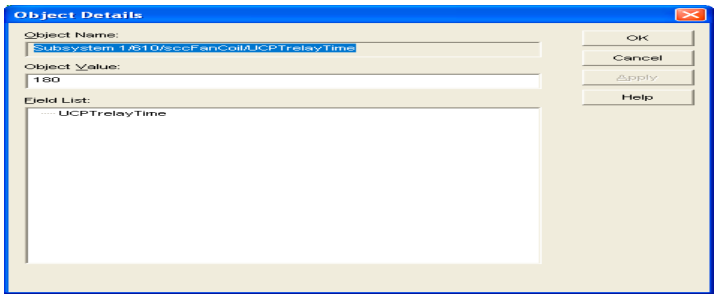
Type	Description	Ch-Over on Y1/Y3	Heat valve on Y1/Y3	Cool valve on Y2/Y4	Electric heater relay
01	2 pipe heat				
02	2 pipe change over				
03	2 pipe + electric heating				
04	2 pipe Change over + electric heating	primary			secon-dery
05	four pipe				
06	4 pipe + electric heating (aux heat)		primary		secon-dery
07	4 pipe + electric heating (prim heat)		second-ary		primary
08	2 pipe heat without fan				
09	2 pipe Cooling				
11	electric heating				
Remark: states for Reg1 and Reg2 can be viewed with **nvoOuputReg1** and **nvoOutputReg2.**					

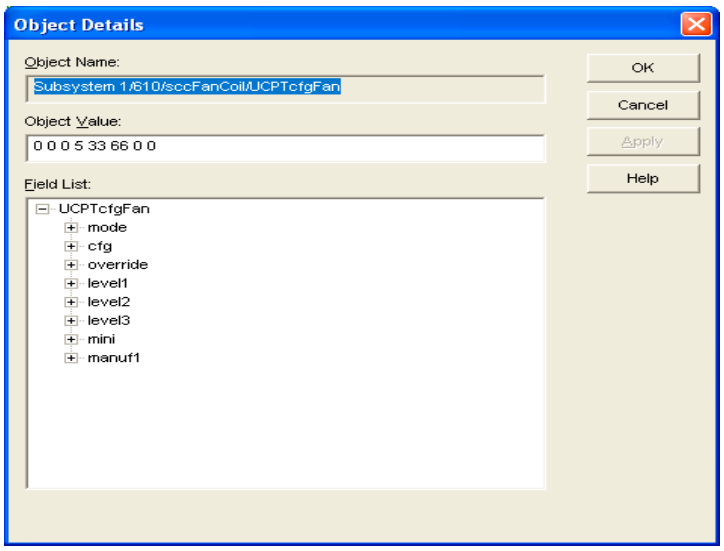
.fanOffDelay	Duration of the post ventilation function. It is used before to stop the fan, as well on a regulation order than on a user forcing. This value is in sec and is bordered from 0s to 255s.

ncPropBand	Value used in the PI regulator for the proportional part. This value is in °C and is bordered from 2°C to 20°C.
	

ncResetTime	Value used in the PI regulator for the integral part. To disable the integral part, setup this parameter to 0s. This value is in sec and is bordered from 60s to 6553s.
	

ncValveTime	Time used as the valve cycle time. It is applied to valves configured in PWM or 3 points mode (See Chapter “4.2.3. Analogue outputs”).In the case of a 3 points valve, this time needs to match to the opening time of the valve. This value is in sec and is bordered from 20s to 250s.
	

ncRelayTime	Time used for the PWM cycle of the electric heater. This value is in sec and is bordered from 100s to 250s.
	

nciCfgFan	Configuration of the ventilation. For this part, we will focus only on the fan mode. Other parameters for advanced configuration will be described in chapter “4.3.2. Ventilation output control”.	
		
	.mode	Defines the ventilator type managed by this room controller. 0: 3 speed fan. 1: Variable speed fan.

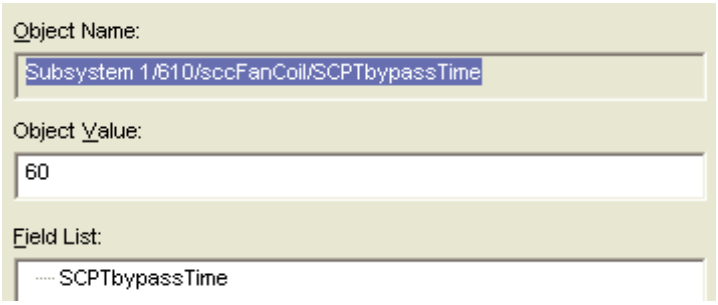
4.3.2 Occupancy mode management

The occupancy mode results from the synthesis of 3 information:

Base mode	Occupancy mode is sent by the BMS or a time schedule. This value has to be written in the **nviOccManCmd**.
Forcing mode	To use the forcing mode, you can write the occupation state by the network to the variable **nviOverrideOcc** or with a room operation device. The forcing value is copied out to the **nvoOccManCmd**, and considered during the **nciBypass-Time**. After that, the command is reset to the **nviOccManCmd** value.
Presence signal	Presence detector can be plugged on the RJ9 link (with a PCD7.L665 for example) or on screw terminals (see chapter “4.1.2. Analogue inputs”). The state of the sensor is displayed by the **nvoPresence**.

The effective occupation state is given by the variable **nvoEffectOccup** after the computation of these 3 modes. Details about this computation are given by the next table.

Base mode	Forcing mode	Presence signal	Effective occupation
nviOccManCmd	nviOverrideOcc or local control device (nvoOccManCmd)	nvoPresence	nvoEffectOccup
OC_NUL	OC_NUL	OC_NUL	OC_OCCUPIED
OC_NUL	OC_NUL	OC_OCCUPIED	OC_OCCUPIED
OC_NUL	OC_NUL	OC_UNOCCUPIED	OC_UNOCCUPIED
OC_NUL	OC_OCCUPIED	No effect	OC_OCCUPIED
OC_NUL	OC_UNOCCUPIED	OC_OCCUPIED	OC_OCCUPIED
OC_NUL	OC_UNOCCUPIED	OC_UNOCCUPIED or OC_NUL	OC_UNOCCUPIED
OC_OCCUPIED	OC_NUL	No effect	OC_OCCUPIED
OC_OCCUPIED	OC_OCCUPIED	No effect	OC_OCCUPIED
OC_OCCUPIED	OC_UNOCCUPIED	No effect	OC_UNOCCUPIED
OC_UNOCCUPIED	OC_OCCUPIED	No effect	OC_OCCUPIED
OC_UNOCCUPIED	No effect	OC_ OCCUPIED	OC_OCCUPIED
OC_UNOCCUPIED	OC_UNOCCUPIED or OC_NUL	OC_UNOCCUPIED or OC_NUL	OC_UNOCCUPIED
OC_STANDBY	OC_OCCUPIED	No effect	OC_OCCUPIED
OC_STANDBY	No effect	OC_ OCCUPIED	OC_OCCUPIED
OC_STANDBY	OC_UNOCCUPIED or OC_NUL	OC_UNOCCUPIED or OC_NUL	OC_STANDBY

nciBypassTime	Value of the time to maintain the forcing value passed by the room operation unit or written on **nviOverrideOcc**. The value 0 is interpreted as an unlimited forcing. This value is in minute and is bordered from 0min to 255min.
	

nviOccManCmd	The **nviOccManCmd** variable defines the operating mode sent by the BMS. Each time a new value of the **nviOccManCmd** variable is received:
	- nviOverrideOcc is cancelled (needs the value to be resent).
	- nviOccManCmd is copied on nvoOccManCmd (if OC_NUL, update with OC_OCCUPIED).
	- Forcing of the ventilation in Auto mode.

nviOverrideOcc	The **nviOverrideOcc** variable is used to force the occupation state by the network. This action can also be done with a room operation unit but the order is not written in this variable. In all cases, forcing value is copied into the **nvoOccManCmd**. In case option “Unoccupied disabled from room operation unit: **nciCfgSrc**. roomModuleConfig=1”, if user selects unoccupied mode from local device, the controller doesn’t consider information coming from the **nviOccManCmd** variable.

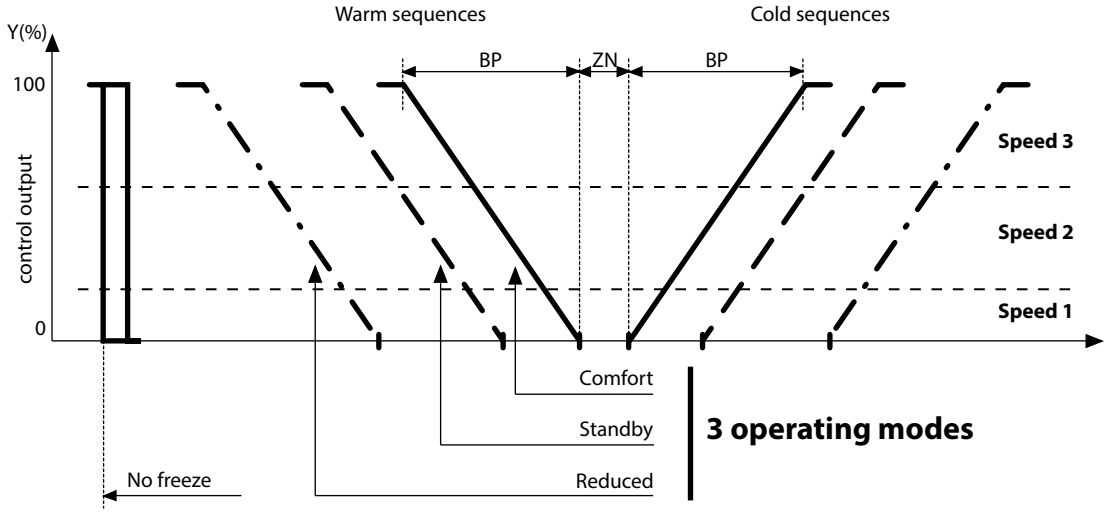
nviEffectOccup	Effective occupancy state of the controller used for the regulation. At power-up **nvoEffectOccup** is set to OC_OCCUPIED, due to states of **nviOccManCmd** and **nviOccSensor**.

nvoOccManCmd	Occupation state from the BMS. This value is over written when the occupancy state is forced by a room operation unit or by the **nviOverrideOcc**.

nvoPresence	The detection sets nvoPresence to OC_OCCUPIED during 5 minutes. Then nvoPresence is reset to OC_UNOCCUPIED. At power-up **nvoPresence** is set to OC_NUL.

4.3.3 Set point adjustment

The evolution of the set point depends principally of the effective occupancy of the room. You can view on the next figure set points for heating and cooling in each occupancy state.



We can identify 4 different cases for the computation of the set point: The three first are “Comfort”, “Standby” and “Reduced” mode and the last one is a specific application mode dedicated to the morning heating.

The effective occupancy state, **nvoEffectOccup**, is used to switch between three main operating modes.

Occupied (**nvoEffectOccup** = OC_OCCUPIED): Comfort operating mode

Stand by (**nvoEffectOccup** = OC_STANDBY): Stand by operating mode

Unoccupied (**nvoEffectOccup** = OC_UNOCCUPIED): Reduced operating mode

The last mode for Morning heating mode is activated by forcing the application mode with the **nviApplicMode** set to the correct value, **nviApplicMode**=HVAC_MRNG_WRMUP.

If a valid set point is specified for the **nviSetpoint**, it is not directly take in account as the new set point value. It is used to change the central set point value to the **nviSetpoint** value for the occupied mode. An offset value is calculated with the following expression and considered only if the occupation state is set to occupied or standby. This offset is used to change the central set point value to the **nviSetpoint** value for the occupied mode

$$\text{BMSOffset} = \textbf{nviSetpoint} \frac{\text{nciSetpoints.occupied}_{\text{cool}} + \text{nciSetpoints.occupied}_{\text{heat}}}{2}$$

Occupied (nvoEffectOccup = OC_OCCUPIED) or
Bypass (nvoEffectOccup = OC_BYPASS) mode

- Warm set point = **nciSetpoints.occupied_heat** + **nvoSetptOffset** + BMSOffse
- Cold set point = **nciSetpoints.occupied_cool** + **nvoSetptOffset** + BMSOffset

Santdby (nvoEffectOccup = OC_STANDBY) mode

- Warm set point = **nciSetpoints.standby_heat** + **nvoSetptOffset** + BMSOffset
- Cold set point = **nciSetpoints.standby_cool** + **nvoSetptOffset** + BMSOffset

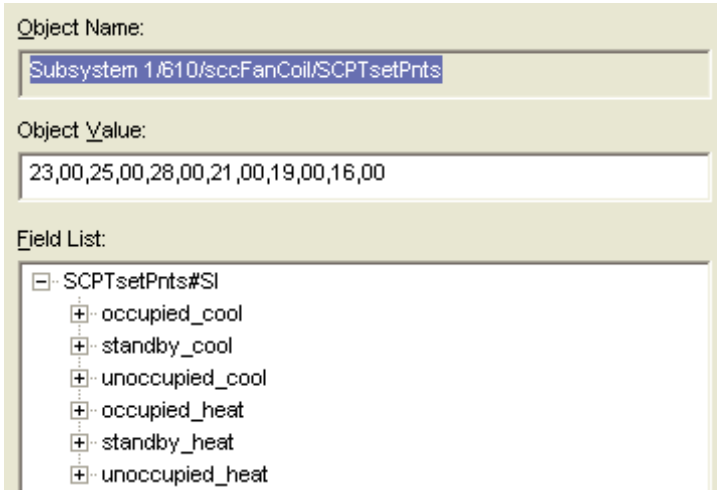
Unoccupied (nvoEffectOccup = OC_UNOCCUPIED) mode

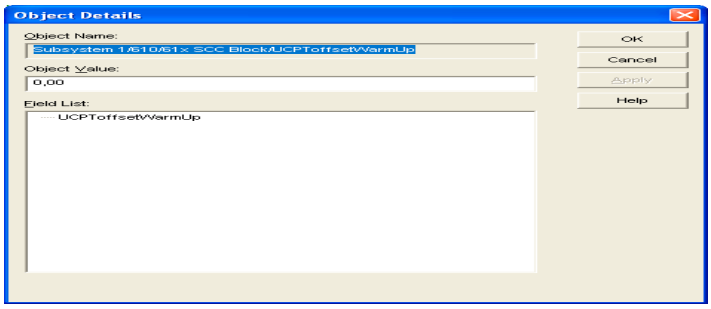
- Warm set point = **nciSetpoints.unoccupied_heat**
- Cold set point = **nciSetpoints.unoccupied_cool**

Specific morning heating application (nviApplicMode = HVAC_MRNG_WRMUP)

- Warm set point = **nciSetpoints.occupied_heat** + nvoSetptOffset + BMSOffset + ncOffsetWarmUp
- Cold set point = Not used, regulator in HVAC_MRNG_WRMUP supports only the HVAC_HEAT application mode.

For each occupation mode, the regulation dead zone is fixed between these 2 set points.

nciSetpoints	Values for the computation of the effective set point. All of these values are in °C and are bordered from 10°C to 35°C.
	

ncOffsetWarmUps	Offset value for the pre-warning mode HVAC_MRNG_WRMUP. This value is in °C and is bordered from -10°C to 15°C.
	

nviSetpoint	Set the central set point (middle of dead zone) in occupied mode. The regulator updates the heat and cool set point values with the BMSOffset compute in occupied mode and standby mode too. This value is in °C and is bordered from 5°C to 40°C.

nviSetptOffset	Offset value for the set point. It is considered only if the occupation state is set to Occupied or Standby. If this variable is bound and the controller is configured with an analogue room operation unit, Offset set point orders from the room operation unit are not considered. This value is in °C and is bordered from -10°C to 10°C.

nvoEffectSetpt	Value used by the regulator as effective set point. This value is in °C.

nvoSetptOffset	Actual offset considered for the computation of the effective set point. This value can be set by the user with the room operation unit or by the BMS with the **nviSetptOffset**. Only the last write of one of these two actions is taken in account. This value is in °C and is bordered from -10°C to 10°C.

4.3.4 Temperature

The temperature measurement may come from various devices:

- A temperature probe directly connected to the controller (on screw terminals).
- A remote controller or a room operation device directly connected to the controller via the RJ9 link.
- Other devices on the network.

The controller manages the following priorities:

0 Network variable if the variable **nviSpaceTemp** is valid (-10°C< Value <65°C).

1 Temperature sensor configured by default for the controller in the **nciCfgSrc. SensorSelect** (see chapter 4.1.1 Room operation unit).

2 If in addition of the default temperature sensor (RJ9 if **nciCfgSrc.SensorSelect** = 0 or analogue probe if **nciCfgSrc.SensorSelect** = 1) another probe (from type of the one which is **NOT** configured) is connected, its value can be used. It is considered with the last priority, only if invalid temperature is present on both temperature inputs with priority 0 and 1.

For an analogue sensor connected on screw terminals, the measure is filtered to be considered only if its value is comprise from 0°C to 90°C.

If the sensor temperature used is on the RJ9 link, its value will be sent periodically to the controller (depending on its variation). If this value is not received for more than 4 hours (250 minutes exactly), and the controller does not have another valid temperature, the **nvoSpaceTemp** is set to 327.67°C (invalid temperature) and the regulation is stopped.

If no measurement temperature is valid, the **nvoUnitStatus.in_alarm** variable is set to 1.

nviSpaceTemp	Variable used to receive a temperature from the BMS or from another device from the network. This value is in °C and is bordered from -10°C to 65°C.

nvoSpaceTemp	Temperature used by the controller for the regulation. It can be equal to the **nviSpaceTemp** or take its value for its default sensor more the value of the offset sensor (nciOffsetTemp). This value is in °C and is bordered from -10°C to 65°C.

4.3.5 Regulation in use

The computation of the control loop and the update of regulation variable are done every 10 seconds. However, to achieve fast response time for critical actions, the control loop execution is forced in the following cases:

- Modification of the fan speed (**nviFanSpeedCmd** or room operation device).
- Modification of the contact states (**nvoWindow** or **nviEnergyHoldOff**).

When the regulator is in used, it is possible to check regulation status and to act on them. For this, you have to use the following variables.

nviApplicMode	To act on the application mode. Following modes are supported by the device.	
	HVAC_NUL (-1)	not take in consideration.
	HVAC_AUTO (0)	the operating mode is determined by the controller.
	HVAC_HEAT (1)	warm mode forcing.
	HVAC_COOL (3)	cold mode forcing.
	HVAC_OFF (6)	controller stop, frost guard mode still active.
	HVAC_TEST (7)	test mode, used to force state outputs.
	HVAC_EMERG_HEAT (8)	warm emergency, used by the frost guard mode
	HVAC_FAN_ONLY (9)	fan only mode
	All others: warm mode forcing.	All others: warm mode forcing.

nviEnergyHoldOff	Used to enable or stop the control loop (see chapter 4.3.4).

nvoEnergyHoldOff	State of the control loop (see chapter 4.3.4).

nvoHeatCool	State of the effective application mode of the controller.

nvoOutputPrimary	State of output used for cooling (see chapter 4.1.3).

nvoHeatPrimary	State of output used for heating (see chapter 4.1.3).

nvoUnitStatus	State of the control loop.

4.4 Functions

All modifications on configuration variables are not consider immediately or on the next execution of the control process loop. It is highly recommended to restart the device after the complete configuration to be sure to active all new configurations. This can be done by unplug and plug again the power supply connector or by the network.

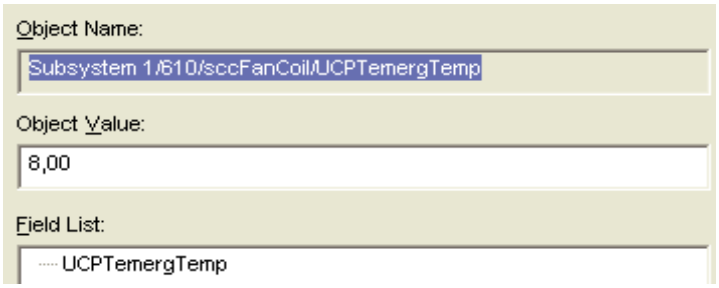
4.4.1 Frost-guard mode

This mode has the higher priority on any other mode or function and is always active.

If room temperature < Antifreeze limit (**nvoSpaceTemp** < **ncEmergTemp**), then the fan speed is set to its maximal value, heat valve and electric battery are forced to 100%.

When antifreeze actions are enabled, **nvoHeatCool** = HVAC_EMERG_HEAT.

This application mode is active as long as the room temperature is not higher than the antifreeze temperature more 1°C (hysteresis threshold).

ncEmergTemp	Variable to define the threshold for engaging the frost guard mode. This value is in °C and is bordered from 0°C to 20°C.
	

4.4.2 Ventilation output control

Ventilation can be used in automatic mode or in forced mode.

For automatic mode, the fan speed is managed by the regulator according to the use of heating and cooling outputs. When the regulation is in the dead zone, ventilation is stopped. If you want to force the speed fan to 1 in this zone used the **nciCfgFan**. override.

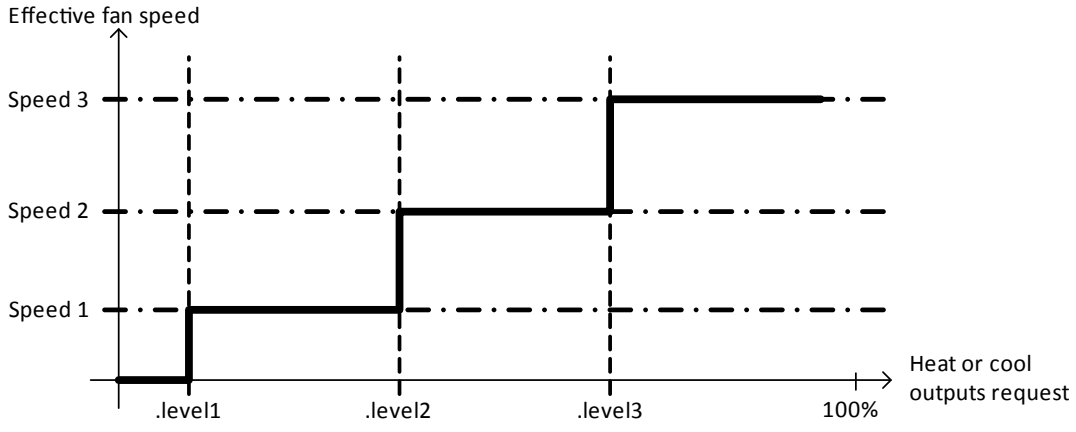
For forced mode, orders can be sent from the room operation unit or by the network, using the **nviFanSpeedCmd**. Orders sent can be viewed in the **nvoFanSpeedCmd** whereas the effective state of the fan is placed in the **nvoFanSpeed**.

Before to stop the ventilation, post ventilation is necessarily respected. During this time, the fan keeps in speed 1 during the time configured in the **nciCfgSrc.fanOffDelay**. This security can't be disabled but you can reduce its time to the minimal value, 10s.

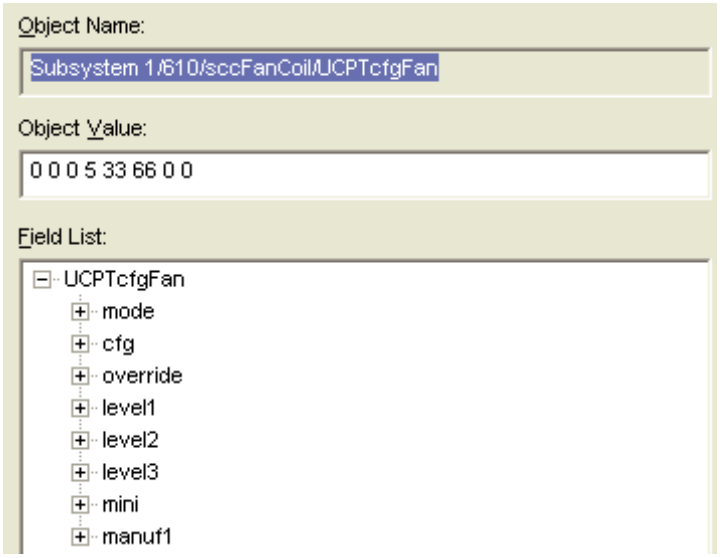
If the ventilation is forced to stop with the room operation unit, the regulation is stopped at the same time, unless it is in frost guard mode. The post ventilation time is still kept before to force the ventilation to stop.

It is possible to configure the controller for forcing speed 1 minimum even if the regulation is not in the dead zone by using the nciCfgFan.override. It is also possible to force ventilation to stop according to the application mode (heating and cooling) with the variable **nciCfgFan.cfg**.

In 3 speed fans mode, the fan shifts between its 3 gears depending on the regulation request in **nvoUnitStatus** (see chapter "4.3.5. Regulation in use"). Thresholds for engaging each speed are configurable with the **nciCfgFan.levelX**. The ventilation is switched off for 1s between each speed.



nciCfgFan	Allow to configure ventilation type and its use.



.mode	Ventilator type managed by this room controller.	
	0	3 speed fan mode.
	1	Variable speed fan mode.
.cfg	Used to disable the ventilation according to the application mode.	
	0	Normal operation.
	1	Ventilation is always forced to stop.
	2	Ventilation is forced to stop in warm mode.
	3	Ventilation is forced to stop in cold mode.
.override	Used to configure a minimal fan speed, depending on which override mode chosen in the next list.	
	0	No forcing.
	1	Mini V1 occupied and standby.
	2	Mini V1 occupied and standby unless stop is forced by local control device or by the nviFanSpeedCmd.
	3	Mini V1.
	4	Same as “2” but if ventilation is forced to stop and occupancy state is Unoccupied, ventilation is restarted in speed 1 for 5 minutes every 2 hours.
.level1	Threshold on regulation demand to switch the fan in speed 1 (considered in automatic mode only). This value is in % and is bordered from 0% to 100%.	
.level2	Threshold on regulation demand to switch the fan in speed 2 (considered in automatic mode only). This value is in % and is bordered from 0% to 100%.	
.level3	Threshold on regulation demand to switch the fan in speed 3 (considered in automatic mode only). This value is in % and is bordered from 0% to 100%.	
.mini	Minimum request on fan for a variable speed ventilation configuration. This value is in % and is bordered from 0% to 100%.	
.manuf1	Not used.	

nviFanSpeedCmd	Used to force the fan speed.

nvoFanSpeed	Display the effective fan speed.

nvoFanSpeedCmd	Display the fan speed forced by the room operation unit or by the **nviFanSpeedCmd**.

nviFanSpeedCmd, **nvoFanSpeed** and **nvoFanSpeedCmd** are based on the SNVT_switch format which is composed of 2 fields, “state” and “value”. These variables use the SNVT_switch in concordance with the next table.

State	Value	Description
-1	0	Auto
0	0	Stop
1	33	Speed 1
1	66	Speed 2
1	100	Speed 3

4.4.3 Change Over

Depending on the application configuration, one valve can be used in change over mode (see Reg 1 in chapter “4.3 Application configuration”). In this case, the valve can supply cold or warm depending on the change over state.

To manage the change over state 2 possibilities are available, the first is the network variable **nviChgOver** and the second is the input E2 in change over configuration (see chapter “4.2.2. Analogue inputs“). This state is displayed by the **nvoChgOver**.

nviChangeOver	To forced the state of the change over.

nvoChangeOver	Display the state of the change over. This variable is considered by the regulator to know in which case the Reg 1 can be used, for heating or for cooling.

nviChgOver and **nvoChgOver** are based on the SNVT_switch format which is composed of 2 fields, “state” and “value”. These variables use the SNVT_switch in concordance with the next table.

State	Value	Description
0	0	Warm mode
1	100	Cold mode

4.4.4 Window or door contact processing

The room controller embeds by default an input configured for window or door contact (input E1). It is used to detect an open window or door regardless of the contact polarity (managed with the **nciCfgFcc.Window**). In this case, the regulation is stopped (valve closed, fan and electric battery stopped) but frost guard mode is still active.

The detection of the open window can be done by two ways:

- Contacts plugged on the E1 input (see chapter “4.1.2. Analogue inputs”). In this case, the state of the contact is displayed by the **nvoWindow**.
- By the Lon network with the **nviWindowLoop** variable.

When a window opening is detected, the **nviEnergyHoldOff** is updated either with the **nvoWindow** or with the **nviLoopWind** on which is the latest updated. Usage of both ways at the same time is not advised, unless it is for a master/slave configuration (see chapter 4.3.15 Master / Slave).

The **nviEnergyHoldOff** variable and the window contact (**nvoWindow**) are used to determine if a window is opened.

In this mode, the regulator doesn’t allow fan speed forcing, doesn’t consider the room operation unit commands and stops (if configured), the small speed fan forcing into the dead zone.

When using a bidirectional room operation unit with a LCD display, an alarm is displayed on the screen.

The window contact input is filtered (debouncing).

nviEnergyHoldOff	Energy saving command. This command can be used with the window contact information.

nviLoopWind	Window contact information for looping when several controllers are present in the same room (see chapter “4.3.15. Master/Slave”).

nvoEnergyHoldOff	Result for computation of the opening window process control.

nvoWindow	Actual window contact state of the controller.

nviWindowLoop and **nvoWindow** are based on the SNVT_switch format which is composed of 2 fields, “state” and “value”. These variables use the SNVT_switch in concordance with the next table. These values are used for **nviEnergyHoldOff** and **nvoEnergyHoldOff** too.

State	Value	Description
0	0	Window closed, normal operation
1	100	Window open, control loop disabled

4.4.5 Auxiliary contact

The auxiliary contact, designated by the name E2, can be used like an alarm input or simply to make available the contact state on the network. This configuration is done by the **ncInputCfg** (see chapter “4.1.2. Analogue inputs”).

The contact state is displayed by the **nvoAuxContact**.

For the alarm contact mode, the state of the contact is still updated in the nvoAux-Contact and copied at the same time in the **nvoAlarm**. When the regulator switch in alarm state, the regulation is stopped (valve closed, fan and electric battery stopped) but speed fan forcing and frost guard mode are still active.

nvoAlarm	Alarm state of the regulator. This variable is used by the auxiliary contact in alarm contact mode and by the flow control function too.

nvoAuxContact	State of the auxiliary contact, according to its polarity configuration.

nvoAlarm is based on the SNVT_switch format which is composed of 2 fields, “state” and “value”. This variable uses the SNVT_switch in concordance with the next table. These values can’t be used for the **nvoAuxContact** due to the contact polarity. So **nvoAuxContact** is free of interpretation, regarding to its configuration in the installation.

State	Value	Description
0	0	Alarm Off, normal operation
1	100	Alarm On, control loop disabled

4.4.6 Dew point

In cooling mode, dew may form on the cooling register. To prevent this, a dew sensor can be used with the regulator. When condensation is detected, the cold output of the regulator is forced to 0 but the control loop is still active. Computations of outputs are still done by the PI regulator; the ventilation follows the control process signal or the ventilation forcing parameters.

Two possibilities are offered by the regulator to get the dew point information:

- By analogue contacts configured in dew point mode. In this case, the contact polarity can be adjusted with the ncFunctionCfg (see chapter 4.1.2. Analogue inputs”).
- By the network with the nviDewSensor.

nviDewSenso	Dew point state given from the network, principally used in master/slave mode. Only the nviDewSensor.state is used and take in account only if nvoHeatCool=HVAC_COOL.

nvoDewSenso	Displayed the input state of the sensor plugged on analogue contact.

nvoAuxContact is based on the SNVT_switch format which is composed of 2 fields, “state” and “value”. This variable use the SNVT_switch in concordance with the next table.

State	Value	Description
0	0	Normal operation
1	100	Dew detection active

4.4.7 Flow control

To prevent damage on the fan coil, a flow controller needs to be used. If the fan stop due to a mechanical failure or if the filter is block, the controller can’t knows it unless with a flow controller. In the case, the regulation needs to be stop before to destroy your device.

The flow controller state is displayed by the nvoFlowControl. If it is activated for more than 2 minutes, the PCD7.L614 switch in alarm mode (nvoAlarm.state = 1) and the regulation is stop.

The alarm can be acknowledged only by a reset of the device or with the nviRequest using the object_request set to RQ_CLEAR_ALARM.

nvoAlarm	Alarm state of the regulator. This variable is used by the flow control function and by the auxiliary contact in alarm contact mode too.

nvoFlowControl	State of the flow controller used on an input configured for it (see chapter 4.2.1. Analogue inputs).

nvoAlarm and nvoFlowControl are based on the SNVT_switch format which is composed of 2 fields, “state” and “value”. These variables use the SNVT_switch in concordance with the next table.

State	Value	Description
0	0	Normal operation
1	100	Update nvoAlarm after 2 minutes

4.4.8 Actions of contacts on the process control loop

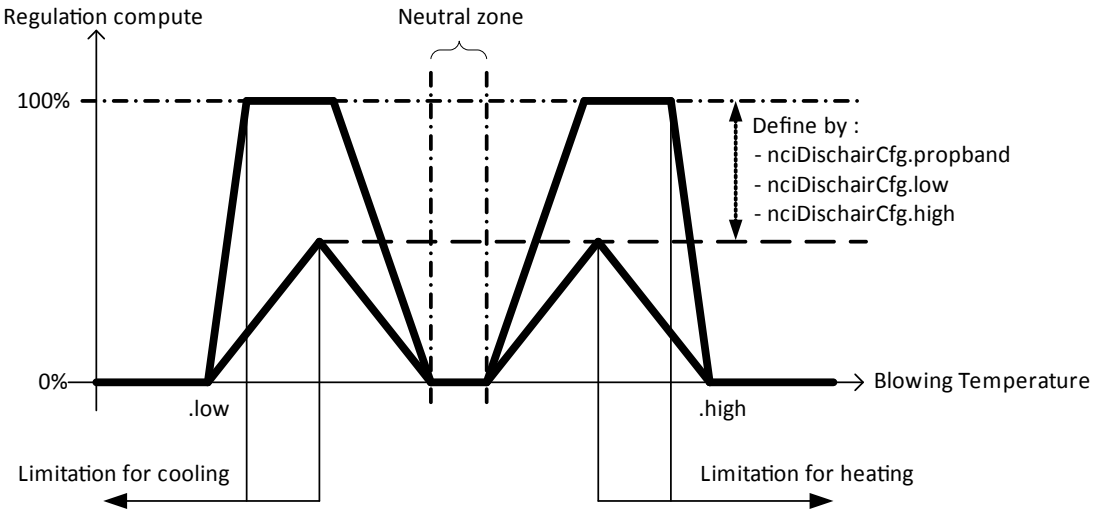
This table is a simply sum up of chapters “4.3.3. Change over” to “4.3.7. Flow control”.

Window	ncFunctionCfg.window	nvoWindow	Effect
contact “open”	0	{0 0}	Process control loop is active
contact “open”	1	{1 100}	Process control loop is stopped
contact “closed”	0	{1 100}	Process control loop is stopped
contact “closed”	1	{0 0}	Process control loop is active
Dew	**ncFunctionCfg.dew**	**nvoDewSensor**	
contact “open”	0	{0 0}	No effect
contact “open”	1	{1 100}	Warm process control only – cold mode is stopped
contact “closed”	0	{1 100}	Warm process control only – cold mode is stopped
contact “closed”	**1**	**{0 0}**	No effect
Change Over	ncFunctionCfg.chgover	nvoChgOver	
contact “open”	0	{0 0}	Warm mode
contact “open”	1	{1 100}	Cold mode
contact “closed”	0	{1 100}	Cold mode
contact “closed”	1	{0 0}	Warm mode
Auxiliary	ncFunctionCfg.auxiliary	nvoAuxContact	
contact “open”	0	{0 0}	No effect
contact “open”	1	{1 100}	No effect
contact “closed”	0	{1 100}	No effect
contact “closed”	1	{0 0}	No effect
FlowControl	ncFunctionCfg.flowcontrol	nvoFlowControl	
contact “open”	0	{0 0}	No effect
contact “open”	1	{1 100}	Update nvoAlarm after a 2 minutes delay
contact “closed”	0	{1 100}	Update nvoAlarm after a 2 minutes delay
contact “closed”	1	{0 0}	No effect
Alarm	ncFunctionCfg. auxiliary	nvoAlarm	
contact “open”	0	{0 0}	No effect
contact “open”	1	{1 100}	Stop process control
contact “closed”	0	{1 100}	Stop process control
contact “closed”	1	{0 0}	No effect

The **nvoAlarm** variable is not maintained in case of update from auxiliary input configured in alarm mode (see chapter “4.3.5 Auxiliary contact”). But if nvoAlarm is activated by nvoFlowControl, the alarm is maintained and reinitialized by device reset or with **nviRequest** = 0,RQ_CLEAR_ALARM.

4.4.9 Blowing temperature limitation

This function can be used to limit the temperature of the air blown by the device during the regulation. It permits to define two thresholds, one for warm air and one for the cold air. Each time the blowing temperature come up to these limits, valves or the electric heater are limited then stop when limits are reached. Limitations can be described with the next figure.

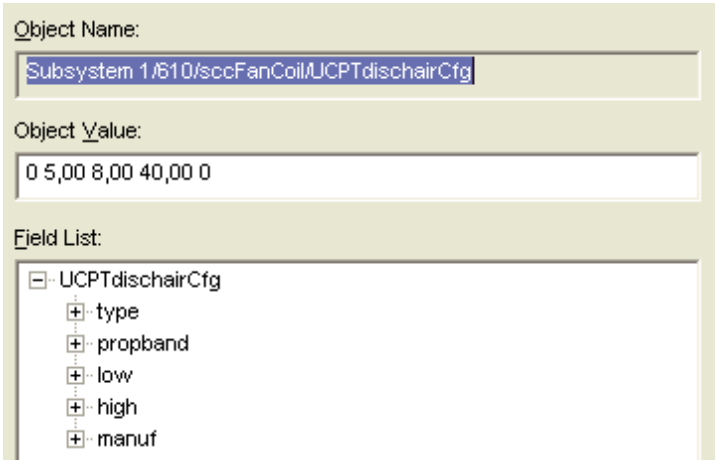


The blow limitation can only be used if a valid temperature is measured by the dedicated sensor, **nvoDischAirTemp** different of 327.67°C (see chapter 4.1.2. Analogue inputs"). In this case, the limitation can be applied on heating, cooling or both application modes with the **nciDischairCfg.type**.

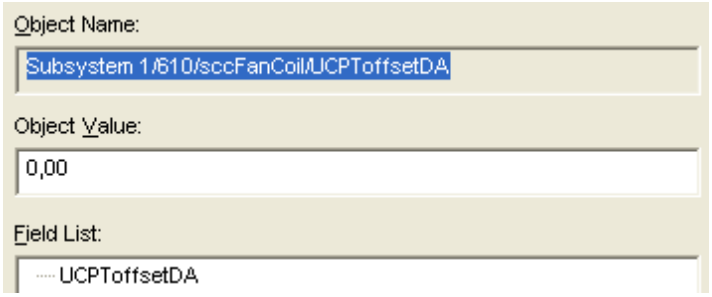
- - For cooling limitation: To limit the cold air temperature, the low limit needs to be used (nciDischairCfg.low). The limitation will passed by 3 states during the decrease of the dish air temperature.
    - nvoDischAirTemp > nciDischairCfg.low + nciDischairCfg.propband: The regulation works normally, no limitation applied.
    - nvoDischAirTemp < nciDischairCfg.low + nciDischairCfg.propband: Limitation of the cold output proportionally to the difference with the low limit
    - nvoDischAirTemp < nciDischairCfg.low: Cold output forced to 0%

- For heating limitation: To limit the warm air temperature, the high limit needs to be used (**nciDischairCfg.high**)
    - **nvoDischAirTemp** < **nciDischairCfg.high** - nciDischairCfg.propband: The regulation works normally, no limitation applied.
    - **nvoDischAirTemp** > **nciDischairCfg.high** - nciDischairCfg.propband: Limitation of the warm output proportionally to the difference with the high limit
    - **nvoDischAirTemp** > **nciDischairCfg.high**: Warm output forced to 0%

nciDischairCfg	Used to enable the blow limitation function and define level limitation used by this one.



.type	Define which limits are enabled for the blow limitation.	
	0	No limitation.
	1	Low limitation is active.
	2	High limitation is active.
	3	Both limitations are active.
.propband	Proportional band used to limit outputs before to force them to 0.	
.low	Value of the low limit. This value is in °C and is bordered from 0°C to 99°C.	
.high	Value of the high limit. This value is in °C and is bordered from 0°C to 99°C.	
.manuf1	Not used.	

ncOffsetDA	Offset use for the blowing air temperature sensor. This value is in °C and is bordered from -10°C to 10°C.
	

nvoDischAir-Temp	Temperature measure by the discharge air temperature sensor. This value is in °C and is bordered from 0°C to 90°C.

4.4.10 Management of the electric heater

The usage of the electric heater is limited, when its demand is under 85% it is always used as 100%.

If the manual command of the fan speed leads to a stop of the fan, the electric battery request is forced to zero. On the other hand, if the stop of the fan is caused by the forcing from the **nciCfgFan.cfg**, the electric battery is still used by the regulation.

The operation time for the electric heater is displayed by the **nvoElecCount**. This value is stored in the EEPROM memory of the device every 9 hours of functioning of the electric heater output. If a reset occurred, this value is reloaded from the EEPROM memory. To reset it, used the **nviRequest** with the value **nviRequest** = 0,RQ_OVERRIDE.

nvoElecCount	Electric heater operation time. This value is in hour and is bordered from 0 hour to 65535 hours.

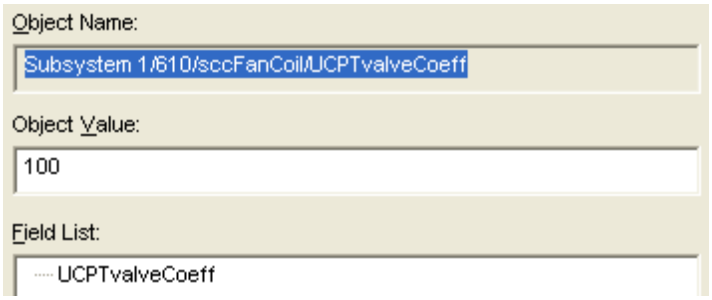
Integrity of the EEPROM memory is ensured for a maximum of 10 000 writing cycles.

4.4.11 Priority for action on valve output

In order to act with priority on valves as opposed to the ventilation, a multiplicative coefficient **ncValveCoeff** can be used. Updated values for outputs are limited to 100%.

If you don't want to use this action, simply keep the **ncValveCoeff** to its default value, 100%.

This action can be done only on valve outputs, not on the electric heater.

ncValveCoeff	Ratio to apply to heating and cooling outputs. This value is in percent and is bordered from 0% to 250%.
	

4.4.12 Air quality function

This function needs to be used with an air shutter. You can find more information about it in the section "4.3.13. Air shutter operation".

The air quality function is controlled by the **ncQaCfg.mode** parameter:

nvoAnalogInput:

0 Disabled

1 Activated and controlled by means of the air shutter.

Measurement of the auxiliary input voltage to determine the air quality:

nvoAnalogInput:

10V → High CO2 level

0V → Low CO2 level

Example: 10V: 2000ppm – 600 ppm objective (3V)

Calculation of the air quality as a function of the measured voltage, **nvoAnalogInput**, and of the air quality associated to 10V (**ncQaCfg.high**). 0V is considered to be 0ppm.

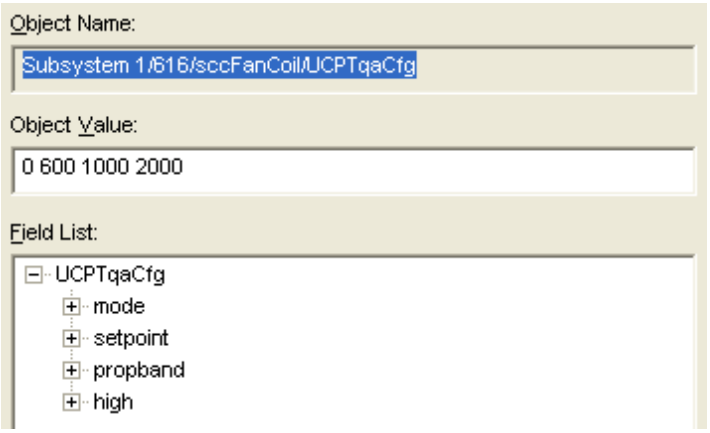
The regulation of the air quality depends of the effective occupancy of the room.

- Occupied or Standby mode: If the measured air quality is under the ncQaCfg.set-point value, calculation of an air quality percentage as a function of the difference and of a proportional band ncQaCfg.propband.

- Unoccupied: forced the air quality percentage to 0%.

This function can act on a 0-10v or an ON/OFF air shutter, regarding to inputs configuration.

4

ncQaCfg	Air quality configuration		
			
	.mode	Activation of the air quality function.	
		0	Disabled
		1	Activated, act on air shutter.
	.setpoint	Air quality setpoint for the regulation loop in the air quality function. This value is in ppm and is bordered from 0 to 20000.	
	.propband	Proportional band used by the air quality function for its regulation. This value is in ppm and is bordered from 0 to 10000.	
	.high	Calibration of the air quality sensor. This parameter corresponds to the air quality value for the maximal voltage value which can be applied on the 7.L614 (10V). This value is in ppm and is bordered from 0 to 20000.	

nvoAnalogInput	Actual voltage applied on the input configured as an analog measurement input. This value is in Volt and is bordered from 0V to 10V..

4.4.13 Air shutter operation

The air shutter can be driven in different ways according to the **ncOADamper.type** variable.

- 0-10V type shutter driven by the air quality function, **ncOADamper.type** = 1.

In this mode, the **ncQaCfg.mode** needs to be set to 1.

The result of the air quality process control is calculated in the band:

Low value	**ncOADamper.level1**
High value	**ncOADamper.level2**

The opening percentage, in **nvoOADamper**, is applied to the 0-10Voutput configured with the value 10 (see the 0-10V air shutter in the section “4.1.3. Analogue outputs”).

- Digital type shutter driven by the air quality function, **ncOADamper.type** = 2.

If the result of the air quality process control is lower than **ncOADamper.level1**, then the opening percentage is 0%.

If the result of the air quality process control is higher than **ncOADamper.level2**, then the opening percentage is 100%.

In all other cases, there is no change applied on the air shutter output.

The opening percentage, in **nvoOADamper**, is applied to the 0-10Voutput configured with the value 11 (see the 0-10V air shutter in the section “4.1.3. Analogue outputs”).

- Shutter depending on the occupancy mode, **ncOADamper.type** = 3.

If the occupancy mode **nvoEffectOccup** is OC_OCCUPIED, then the opening percentage is **ncOADamper.level1**.

If the occupancy mode **nvoEffectOccup** is OC_STANDBY, then the opening percentage is **ncOADamper.level2**.

In all other cases, the air shutter output is forced to 0%.

The opening percentage, in **nvoOADamper**, is applied to the 0-10Voutput configured with the value 10 (see the 0-10V air shutter in the section “4.1.3. Analogue outputs”).

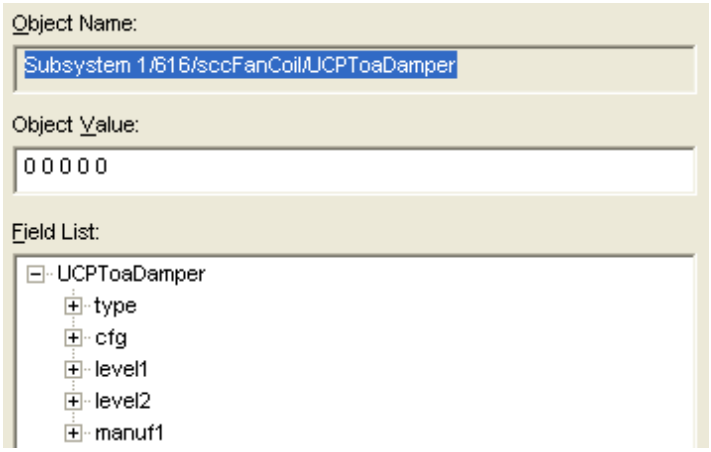
- Shutter depending on “process loop control” result, **ncOADamper.type**=4.

If the control result (warm or cold) is lower than **ncOADamper.level1**, then the opening percentage is 0%.

If the control result (warm or cold) is higher than **ncOADamper.level2**, then the opening percentage is 100%.

In all other cases, there is no change applied on the air shutter output.

nciDischairCfg	Used to enable the blow limitation function and define level limitation used by this one.



.type	Define the type of the air shutter and its driven mode.	
	0	**No limitation.**
	1	**Low limitation is active.**
	2	**High limitation is active.**
	3	**Both limitations are active.**
	4	**0-10V type shutter driven by process loop control.**
.cfg	Not used.	
.level1	**Value of the low limit. This value is in °C and is bordered from 0°C to 99°C.**	
.level2	**Value of the high limit. This value is in °C and is bordered from 0°C to 99°C.**	
.manuf1	Not used.	

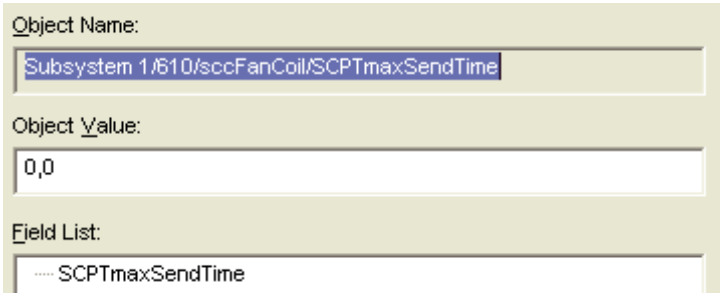
nvoOADamper	Value applied on the output configured as an air shutter. This value is in % and is bordered from 0% to 100%.

4.4.14 Forced variable propagation

To control the network load, it is possible to configure a heart bit value for the propagation of some variables. With this function, variables can be propagated even if their values haven't change. This heartbeat is applied to:

- **nvoEffectOccup**
- **nvoHeatCool**
- **nvoWindow**
- **nvoAuxContact**

This function is mainly used in Master / Slave mode
(see chapter "4.4.18 Master / Slave").

nciSndHrtBt	Heartbeat value for propagation of associated variables. This value is in sec and is bordered from 0s to 6553s.
	

4.4.15 Electric heater limitation / Load shedding

It is possible to limit the electric battery power by using **nviEconEnable**. The power limitation can be used to reduce its consumed power or to stop it.

- if nviEconEnable.state = 0, no power limitation.
- if nviEconEnable.state = 1, power is limited to nviEconEnable.value.
- if nviEconEnable.state = 0xFF (Auto), load shedding if the temperature difference is lower than nviEconEnable.value (expressed in tenth of degree).

nviEconEnable	Used to manage the load shedding for the electric heater. It is based on the SNVT_switch format which is composed of 2 fields, “state” and “value”. These variables use the SNVT_switch in concordance with the next table.			
	State	Value	Load shedding	Format
	0	0	No load shedding	/
	1	X	Electric heater output limited to X%	Percent – %
	1	0	Electric heater stopped	Percent – %
	0xFF	X	Electric heater stopped if temperature difference < 0,1.X°C	Tenth of °C
	0xFF	0	Electric heater stopped if set point is reached	Tenth of °C

4.4.16 Direct control of outputs

It is possible to directly control the outputs Y1, Y2, Y3, Y4 and the contact of K1–K2, with the variables **nviOverY1**, **nviOverY2**, **nviOverY3**, **nviOverY4** and **nviOverRelay**, in 2 ways:

- Setting the code 0xFF into the configuration variable **nciOutputCfg** for the relevant output.
- Setting the variable **nviApplicMode** to HVAC_TEST, this disables the process control.

Direct control can't be used with PWM or 3 points output properties. They can only be forced to active or inactive, not to X%.

If an output is not used by the application type configuration (value of the nciCfgSrc. fccType), it isn't be forced in standard mode. Application mode needs to switch to HVAC_TEST or output needs to be configured as unused output too.

nviOverRelay, **nviOverY1** and **nviOverY2** are based on the SNVT_switch format which is composed of 2 fields, "state" and "value". These variables use the SNVT_switch in concordance with the next table.

nviOverRelay	To force the state of electric heater contact		
	State	Value	Description
	0	0	Output is disable
	1	100	Output is enable

nviOverY1	To force the state of the valve Y1.		
	State	Value	Description
	0	0	Output is disable
	1	100	Output is enable

nviOverY2	To force the state of the valve Y2		
	State	Value	Description
	0	0	Output is disable
	1	100	Output is enable

nviOverY3	To force the state of the valve Y3. This value is in Volt and is bordered from 0V to 10V.		
	State	Value	Description
	0	0	Output is disable
	1	100	Output is enable

nviOverY4	To force the state of the valve Y4. This value is in Volt and is bordered from 0V to 10V.		
	State	Value	Description
	0	0	Output is disable
	1	100	Output is enable

4.4.17 Counting operation

The controller is provided with 3 inputs which can be configured as counting inputs. When one is configured as the counting input number X (1, 2 or 3), a pulse on this input will increment the associated counter with the value of the **ncCounterCfg.pulseX**. Counter values are stored every seven hours in the EEPROM memory.

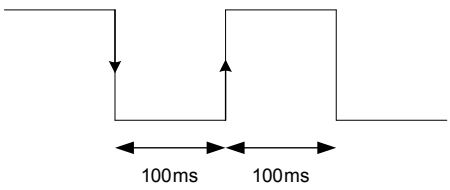
The last modified counter value can be read in the **nvoCounter** variable. It displayed the counter number (nvoCounter.num field), the number of tenths of thousands (**nvoCounter.value1** field) and the number of units (**nvoCounter.value2** field).

The value of each of these counters can be initialized by the nviCounterInit which is used like the **nvoCounter** (num, value1 and value2 fields) com. The value1 is bordered from 0 to 32000 and the value2 is bordered from 0 to 9999. The **nviCounterInit** can also be used to select the counter displayed in the **nvoCounter** by using on invalid value for the field value2 (superior to 9999).

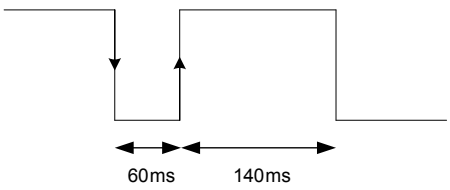
Electrical signal specification

The detection occurs on the leading and trailing edges. Low and high levels must last 100ms minimum for a reliable counting on the E1, E2 and L inputs.

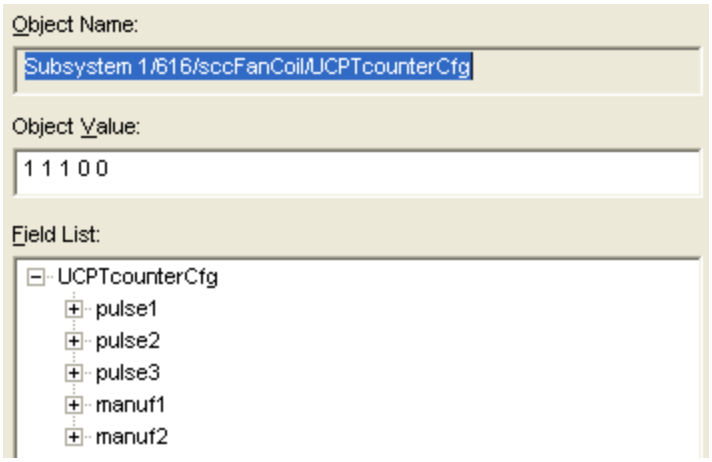
Signal OK: 200ms period



Signal Not OK: 200ms period



ncCounterCfg	Counters configuration.



.pulse1:	Incrementation step for counter 1. This value has no unit and is bordered from 1 to 255.
.pulse2:	**Incrementation step for counter 2. This value has no unit and is borered from 1 to 255.**
.pulse3:	Incrementation step for counter 3. This value has no unit and is borered from 1 to 255.
.manuf1:	Not used.
.manuf2:	Not used.

nviCounterInit and **nvoCounter** are based on the UNVT_meter format which is composed of 3 fields, “num”, “value1” and “value2”. These variables use the UNVT_meter in concordance with the next table.

nviCounterInit	Used for counter initialization or to read the actual value of one counter (displayed in the nvoCounter).			
	Num	Value1 – tenths of thousands	Value2 - units	Description
	1	X	X	Initialized the counter 1 with the associated value
	2	X	X	Initialized the counter 1 with the associated value
	3	X	X	Initialized the counter 1 with the associated value
	X	X	> 10 000	Displayed the value of the counter X in the nvoCounter

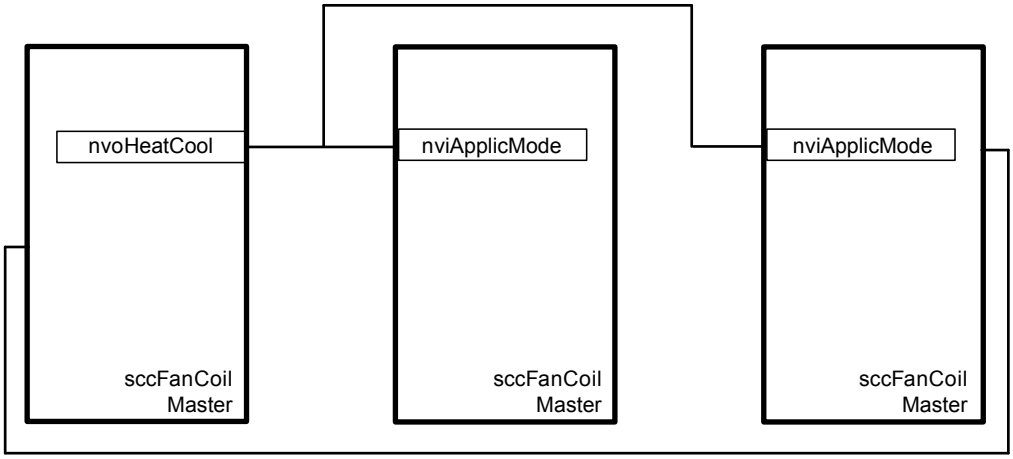
nvoCounter	Actual value of the last counter updated.			
	Num	Value1 – tenths of thousands	Value2 - units	Description
	1	X	X	Initialized the counter 1 with the associated value
	2	X	X	Initialized the counter 1 with the associated value
	3	X	X	Initialized the counter 1 with the associated value
	X	X	> 10 000	Displayed the value of the counter X in the nvoCounter

4.4.18 Master / Slave

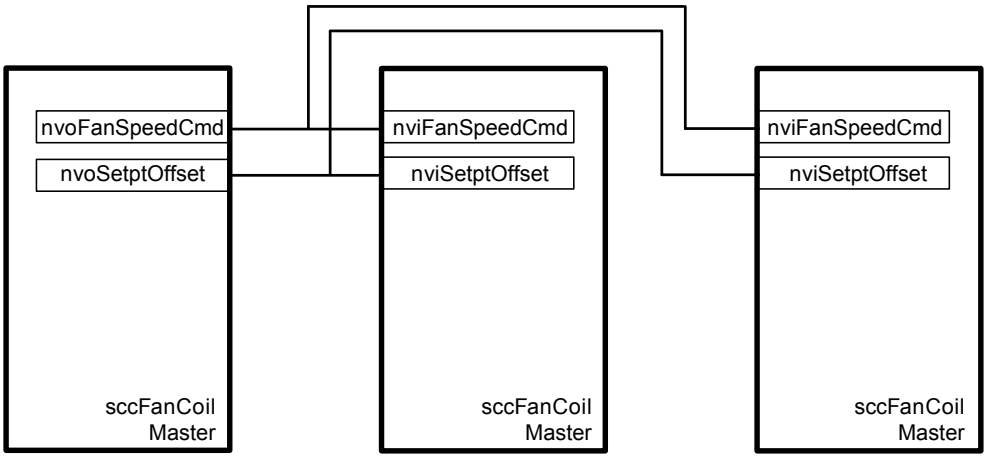
When several controllers are installed in the same room, it is necessary to have a consistency in the operation of these controllers. At this end, a controller will be defined as the « master » and this master will send at least the operating mode to the other controllers defined as the “slaves”:
nvoHeatCool will be sent to the slaves to update **nviApplicMode**.

The other bindings will depend on the user control devices which are used (one or several room devices or infrared or radio remote controllers in the same room).

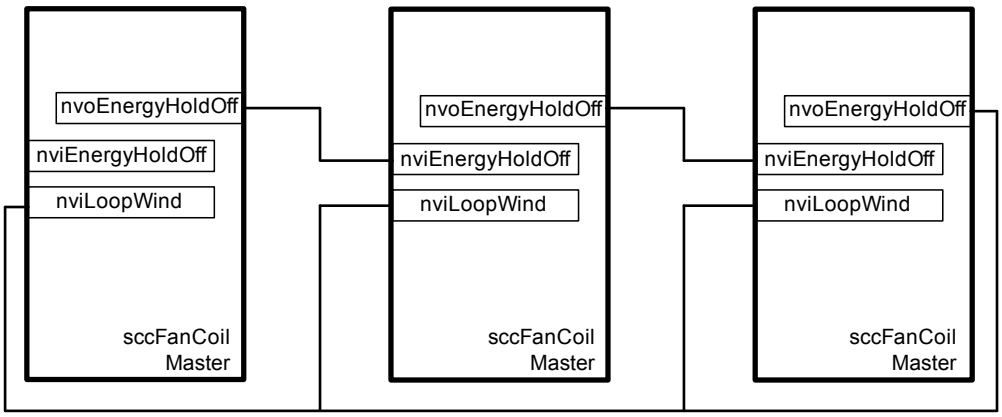
Application mode master/slave links:



Fan speed command and set point offset master/slave links:



Window master/slave links:



Automatic master/slave system

It is possible to active an automatic master/slave system by using explicit variables by setting the variable **ncKarnoCfg.cfg** to 1.

At this end, one must program in each controller a device number, a zone and the number of the associated master. If the master is stand-alone, the master number will be its device number.

The master will transmit information on the network to other controllers:

- Operating mode
- Set point offset
- Fan speed forcing
- Occupancy mode (occupied / unoccupied / standby)
- Window synthesis state

Each controller configured as a slave and which did not receive a command during 20 minutes resets in default mode the following commands:

- Operating mode = HVAC_AUTO
- Fan speed = AUTO
- Occupancy mode = OC_OCCUPIED
- Set point offset = 0

Commands are sent from the master to slaves each 10 seconds. As slaves also have a process control cycle time of 10 seconds, it can happen a 10 seconds delay between the action on the device and the synchronization of all slaves.

All controllers must be in the configured mode (factory mode) and in the same network domain when a network configuration tool is used, check that this tool lets the device in the above mode, otherwise the master / slave system will no longer work when a network configuration tool is used for the installation, the network domain 5 must not be used for the operation of the automatic master / slave mechanism. This would lead to network communication errors and addressing problems.

4.4.19 Controller configuration with configuration room device

To configure the controller, it is possible to connect a configuration box to the RJ9 connector.

Parameters that can be read:

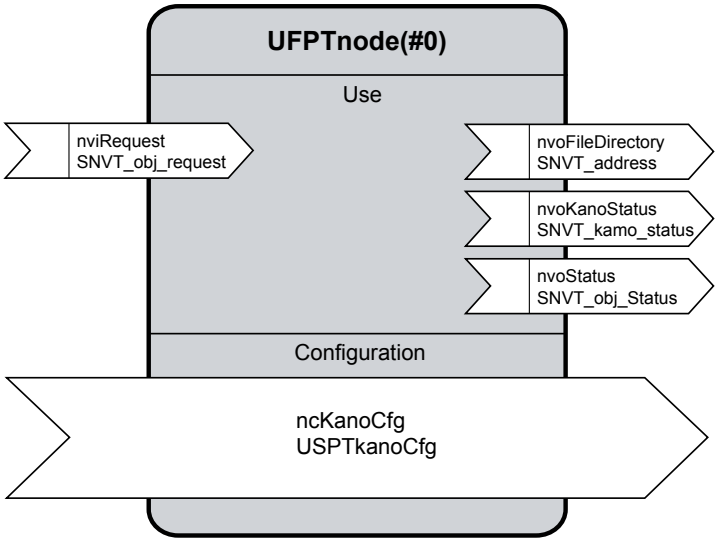
Code	Description	Values
01	Occupancy mode	0: OC_UNOCCUPIED 1: OC_OCCUPIED 2:
02	Actual set point	
03	Reference temperature	Temperature used for control loop
04	Fan speed	Stop Speed 1 Speed 2 Speed 3
05	Offset	
06	Operating mode	0: Warm 3: Cold
07	Output percentage	
09	Summary window	0: Closed 1: At least 1 open
11	Change over state	0: Inactive 1: Active
13	Auxiliary control	0: Close 1: Open
14	Window contact	0: Close 1: Open

Parameters that can be write:

Code	Description	Values
01	Occupancy mode	0: OC_UNOCCUPIED 1: OC_OCCUPIED
02	Set point: middle point between warm and cold set point	Initiates shift of the 4 “standby” and “occupied” values
03	Measured temperature	
04	Fan speed	Off Stop Speed 1 Speed 2 Speed 3
05	Offset	
07	Forcing output	(+/- 100%, pas de 10%)
08	Configuration of the window contact	0: Normally open (NO) 1: Normally closed (NC)
11	Change over	0: Inactive 1: Active
12	Installation configuration	See nciCfgSrc.fcctype
15	Origin temperature	See nciCfgSrc.sensorSelect

5. Functional blocks and variables

5.1. Node Object

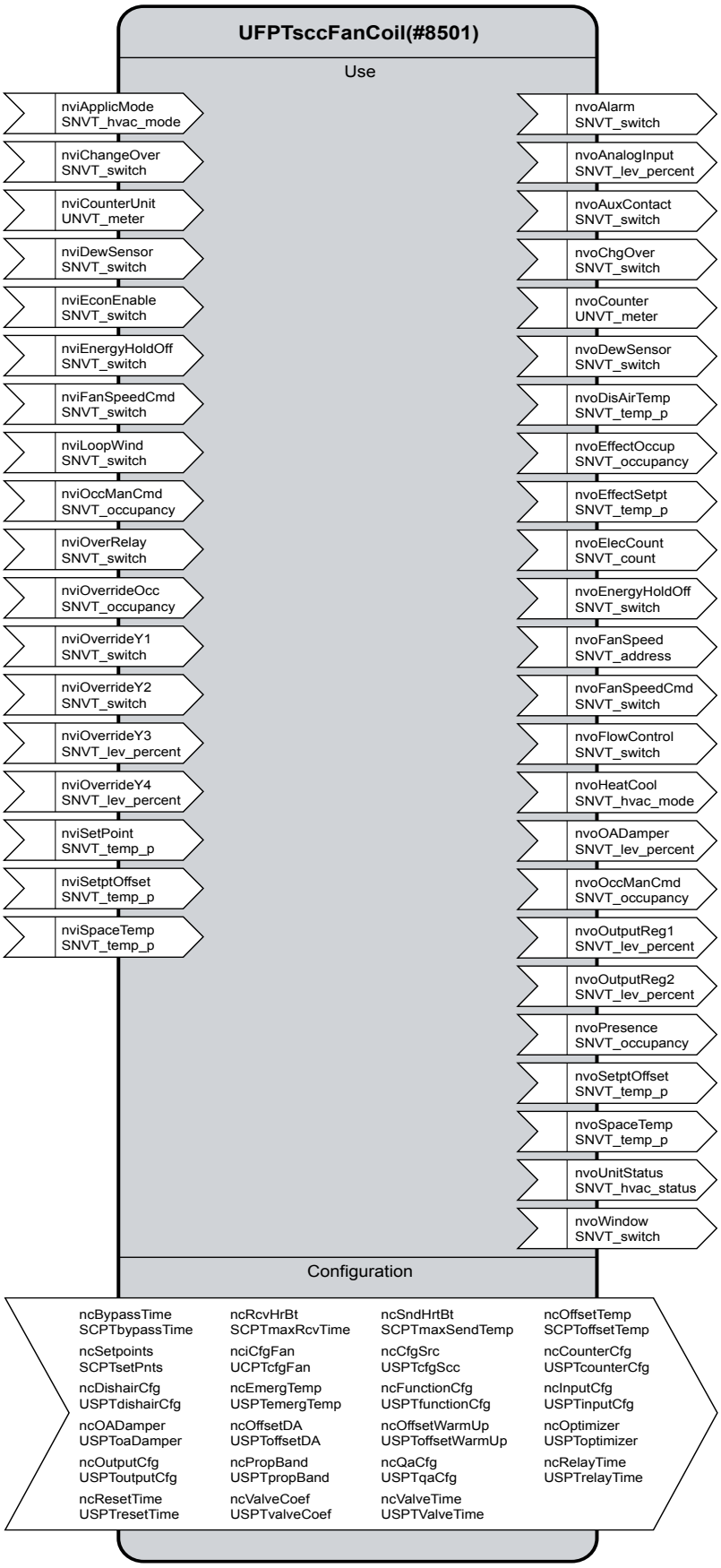


Configuration variable	Type	Description
ncKarnoCfg*	UCPTkarnoCfg { Unsigned short **cfg** Unsigned short **number** Unsigned short **group** Unsigned short **maitre** Unsigned short **manuf0** }	Internal Configuration – not used and doesn't have to change. **.cfg (2)**: used to enable the automatic master/ salve mode **0**: Normal operation **1**: Automatic master/slave mode **.number (0)**: not used **.group (0)**: not used **.maitre (0)**: not used **.manuf0 (0)**: not used *Default :* *{2 0 0 0 0}*

Input variable	Type	Description
nviRequest	SNVT_obj_request	Node status request. Only Node (#0) requests are authorised with type RQ_NORMAL, RQ_UPDATE_STATUS and RQ_REPORT_MASK. Specific manufacturer process on following requests: ■ RQ_PROGRAM: Set the RF receiver connected to the RJ9 input in its programming mode. ■ RQ_OVERRIDE: Reset time counter for electrical battery.

Output variable	Type	Description
nvoFileDirectory	SNVT_address	---
nvoKarnoStatus	UNVT_karno_status { Unsigned long **n_version** Unsigned short **a_minversion** Unsigned short **a_majversion** Unsigned short **manuf0** Unsigned short **manuf1** Unsigned short **manuf2** }	Manufacturer Variable **.n_version**: Loaded NeuronChip application version. **.a_minversion**: Minor Atmel version. **.a_majversion**: Major Atmel version (Doesn't change, only for control). **.manuf0**: Not used. **.manuf1**: Not used. **.manuf2**: Not used.
nvoStatus	SNVT_obj_status	Node status. **nvoStatus** is sent as answer to **nviRequest** and after reset.

5.2. sccFanCoil



*** WARNING:**
Variables marked with a "*" are stored in EEPROM. Its integrity is ensured for a maximum of 10 000 writing cycles.

Configuration variable	Type	Description
ncByPassTime*	SCPTbypassTime SNVT_time_min	Duration in minutes of the forcing restart of the occupancy mode. **0**: no restart *Units: minute Default: 60 Range: 0..250*
nciRcvHrtBt*	SCPTmaxRcvTime SNVT_time_sec	*Not used.*
nciSndHrtBt*	SCPTmaxSendTime SNVT_time_sec	Heartbeat period only applies to variables: **nvoOccManCmd** **nvoHeatCool** **nvoPrimContact** **nvoAuxContact** *Units: sec Default: 0 Range: 0..6553*
ncOffsetTemp*	SCPToffsetTemp SNVT_temp_p	Measurement offset of the probe connected to the controller (analogue probe or digital room operation unit) for the room temperature. *Units: °C Default: 0 Range: -10...10*
ncSetpoints*	SCPTsetPnts SNVT_temp_setpt	Value of a warm or a cold set point according to the occupancy modes. It can have the following values : **.occupied_cool (23)** **.standby_cool (25)** **.unoccupied_cool (28)** **.occupied_heat (21)** **.standby_heat (19)** **.unoccupied_heat (16)** *Unit: °C* *Default: {23,00 25,00 28,00 21,00 19,00 16,00}* *Range : 10..35*

5

Configuration variable	Type	Description
ncCfgFan*	UCPTcfgFan UNVT_cfg_fan { Unsigned short .. .. **mode** .. **cfg** .. **override** .. **level1** .. **level2** .. **level3** .. **mini** .. **manuf1** }	Configurations of fan forcing and 3 fan speed start thresholds **.mode (0** 0: 3-speed ventilation 1: Variable speed ventilation (0-10V) **.cfg (0)** 0: normal 1: no ventilation 2: no ventilation in warm mode 3: no ventilation in cold mode **.override (0)** 0: no override 1: if not unoccupied, fan speed 1 minimum 2: if not unoccupied, fan speed 1 minimum, but stop is author ized 3: fan speed 1 minimum, all modes 4: same as 2, but systematic restart each 2 hours **.level1 (5)**: Request on regulation to go to Speed 1 *Unit: %* *Range: 0..100* **.level2 (33)**: Request on regulation to go to Speed 2 *Unit: %* *Range: 0..100* **.level3 (66)**: Request on regulation to go to Speed 3 *Unit: %* *Range: 0..100* **.mini (0)**: Not used **.manuf1 (0)**: Not used *Default:* *{0 0 0 5 33 66 0 0}*

5

Configuration variable	Type	Description
nciCfgSrc*	UCPTcfgScc UNVT_cfg_scc { Unsigned short .. .. **fcctype** .. **roomModuleType** .. **roomModuleConfig** .. **roomModuleDisplay** .. **irNumber** .. **fanOffDelay** .. **sensorSelect** .. **offsetStep** .. **extensionCfg** .. **manuf1** .. **manuf2** .. **manuf3** }	.fcctype (3): See detailed description chapter “4.2.1. Regulator configuration”. For the default value, the controller is configured in 2 pipes cold – 2 wires mode. .roomModuleType (0) 0: digital room operation unit (on RJ9 input) 1: analogue room operation unit (on screw terminals) .roomModuleConfig (0): Lock unoccupied mode from room operation unit 0: Function disabled 1: Function enabled .roomModuleDisplay (0): Type of display of the room device. 0: fan speed 1: room operation unit temperature 2: actual calculated set point flashing 3: room temperature used for the regulation 4: indicator of actual calculated value (with a considered shift) .irNumber (0): Number of the associated remote controller. 0: the controller accepts the commands from any remote controller. n (n≠0): the controller accepts the commands from the remote controller with the number n only. *Unit: int* *Range : 0..30* .fanOffDelay (180): Duration of the post-ventilation. *Unit: sec* *Range : 10..255* .sensorSelect (0): Selection of the temperature source. 0: room operation unit (RJ9 connector) 1: analogue probe (screw terminals) 2: network probe (master/slave mode)

5

Configuration variable	Type	Description
		.offsetStep (50): Value of the set point shift step. Unit: hundredth of °C Range: 0..255 .extensionCfg (0): Not used, reserved for further development .manuf1 (0): Not used .manuf2 (0): Not used .manuf3 (0): Not used *Default: {3 0 0 0 0 180 0 50 0 0 0 0}*
ncCounterCfg*	UCPTcounterCfg UNVT_dishair_cfg { Unsigned short .. .. **pulse1** .. **pulse2** .. **pulse3** .. **manuf1** .. **manuf2** }	Counters configuration. **.pulse1 (1)**: Incrementation step for counter 1. *Unit: int* *Range : 1..255* **.pulse2 (1)**: Incrementation step for counter 2. *Unit: int* *Range : 1..255* **.pulse3 (1)**: Incrementation step for counter 3. *Unit: int* *Range : 1..255* **.manuf1 (0)**: Not used. **.manuf2 (0)**: Not used. *Default: { 1 1 1 0 0}*
nciDischairCfg*	UCPTdischairCfg UNVT_dishair_cfg { Unsigned short **type** SNVT_temp_p **prop-band** SNVT_temp_p **low** SNVT_temp_p **high** Unsigned short **manuf** }	Configuration of the blow temperature limitation mode. **.type (0)** **0**: disabled **1**: low limit **2**: high limit **3**: low and high limit **.propband (5)**: Proportional band used. *Unit: °C* **.low (8)**: Value of the low limit. *Unit: °C* *Range : 0..90* **.high (40)**: Value of the high limit. *Unit: °C* *Range : 0..90* **.manuf(0)**: Not used *Default: {0 5,00 8,00 40,00 0}*
ncEmergTemp*	UCPTemergTemp SNVT_temp_p	*Value of the no freeze temperature.* *Unit: °C* *Default: 8* *Range: 0..20*

5

Configuration variable	Type	Description
ncFunctionCfg*	UCPTfunctionCfg { Unsigned short .. .. **window** .. **chgover** .. **dew** .. **presence** .. **heatvalve** .. **coolvalve** .. auxiliary .. **flowcontrol** .. **fancontrol** .. **manuf2** .. **manuf3** }	Input / output polarity configuration **.window (0):** **0**: normally open (NO) **1**: normally closed (NC) **.chgover (0):** **0**: open for warm **1**: closed for warm **.dew (0):** **0**: normally open (NO) **1**: normally closed (NC) **.presence (0):** **0**: open for occupied **1**: closed for occupied **.heatvalve (0):** **0**: normally closed (NC) **1**: normally open (NO) **.coolvalve (0):** **0**: normally closed (NC) **1**: normally open (NO) **.auxiliary (0):** **0**: normally open (NO) **1**: normally close (NC) **.flowcontrol (0):** **0**: normally open (NO) **1**: normally closed (NC) **.fancontrol (0):** **0**: direct control **1**: reverse control **.manuf2(0)**: Not used **.manuf3(0)**: Not used *Default:* *{0 0 0 0 0 0 0 0 0 0 0}*
ncInputCfg*	UCPTinputCfg { Unsigned short .. .. **input1** .. **input2** .. **input3** .. **input4** .. **input5** .. **input6** .. **manuf1** }	Input function configuration, see table 2 in chapter “4.2.3. analog Inputs“. **.input1 (4)**: Configuration of the input E2 **.input2 (0)**: Configuration of the input E1 **.input3 (10)**: Configuration of the input S **.input4 (255)**: Configuration of the input P1 **.input5 (20)**: Configuration of the input E3 **.input6 (255)**: Configuration of the input L **.manuf1 (0)**: Not used *Default: {4 0 10 255 20 255 0}*

5

Configuration variable	Type	Description
ncOADamper*	UCPToaDamper { Unsigned short .. .. **type** .. **cfg** .. **level1** .. **level2** .. **manuf1** }	Air shutter configuration **.type (0)**: Define the type of the air shutter and its driven mode. **0**: disabled **1**: 0-10V type shutter driven by air quality **2**: Digital type shutter driven by air quality **3**: 0-10V type shutter driven by occupancy **4**: 0-10V type shutter driven by process loop control **.cfg (0)**: Not used. **.level1 (0)**: Usage depending on the ncOADamper.type, see chapter “4.4.13. Air shutter operation“. *Unit: % Default: 0 Range: 0..100* **.level2 (0)**: Usage depending on the ncOADamper.type, see chapter “4.4.13. Air shutter operation“. *Unit: % Default: 0 Range: 0..100* **.manuf1 (0)**: Not used. *Default: { 0 0 0 0 0}*
ncOffsetDA*	UCPToffsetDA SNVT_temp_p	Measurement offset of the probe connected to the controller for measuring the blow temperature. *Unit: °C Default: 0 Range: -10..10*
ncOffsetWarmUp*	UCPToffsetWarmUp SNVT_temp_p	Set point offset for the pre-warming mode HVAC_MRNG_WRMUP, enabled by nviApplicMode. *Unit: °C Default: 0 Range: -10..10*
ncOptimizer*	UCPToptimizer { Unsigned short **mode** Unsigned long **timer** Unsigned short **heatprop** Unsigned short **coolprop** SNVT_temp_p **offset** Unsigned short **manuf1** Unsigned short **manuf2** }	Not used.
ncOutputCfg*	UCPToutputCfg { Unsigned short .. .. **K** .. **Y3** .. **Y4** .. **Y1** .. **Y2** .. **V1** .. **V2** .. **V3** .. **manuf1** }	Output function configuration, see table 4 in chapter “4.2.3. analog Outputs” **.K (2)**: Configuration of outputs K1-K2. **.Y3 (0)**: Not used **.Y4 (1)**: Not used **.Y1 (0)**: Configuration of the output Y1. **.Y2 (1)**: Configuration of the output Y2. **.fan1 (5)**: Configuration of the output V1. **.fan2 (6)**: Configuration of the output V2. **.fan3 (7)**: Configuration of the output V3. **.manuf1 (0)**: Not used *Default: { 2 0 1 0 1 5 6 7 0}*

Configuration variable	Type	Description
ncPropBand*	UCPTpropBand SNVT_temp_p	Value of the proportional band used by the control loop. *Unit: °C* *Default : 5* *Range: 2..20*
ncQaCfg*	UCPTqaCfg { Unsigned short **mode** Unsigned long .. .. **setpoint** .. **propband** .. **high** }	Air quality configuration **.mode (0)**: Define the type of the air shutter and its driven mode. **0**: Disabled. **1**: Activated, act on air shutter. **.setpoint (600)**: Air quality setpoint for the regulation loop in the air quality function. *Unit: ppm* *Default: 600* *Range: 0..20000* .**propband (1000)**: Proportional band used by the air quality function for its regulation. *Unit: ppm* *Default: 1000* *Range: 0..10000* **.high (2000)**: Calibration of the air quality sensor. This parameter corresponds to the air quality value for the maximal voltage value which can be applied on the PCD7.L614 (10V). *Unit: ppm* *Default: 2000* *Range: 0..20000* *Default: {0 600 1000 2000}*
ncRelayTime*	UCPTrelayTime Unsigned short	alue of the PWM cycle time of the K relay *Unit: sec* *Default: 240* *Range: 100. .250*
ncResetTime*	UCPTresetTime SNVT_time_sec	alue of the integral time. The value 0 disables the integral. *Unit: sec* *Default: 600* *Range: 60..6553*
ncValveCoeff*	CPTvalveCoeff Unsigned short	Coefficient to apply to the valve control output. *Unit: %* *Default: 100* *Range : 0..250*
ncValveTime*	UCPTvalveTime Unsigned short	Value of the valve cycle time for PWM or 3 points valves *Unit: sec* *Default: 20* *Range : 20..250*

<table>
<tr><th>Input variable</th><th>Type</th><th>Description</th></tr>
<tr><td>nviApplicMode</td><td>SNVT_hvac_mode</td><td>Operating mode of the controller.
-1,HVAC_NUL: not take in consideration.
0, HVAC_AUTO: the operating mode is determined by the controller.
1, HVAC_HEAT: warm mode forcing.
2, HVAC_MRNG_WRMUP: overwarming mode.
3, HVAC_COOL: cold mode forcing.
6, HVAC_OFF: controller stop, no freeze mode.
7, HVAC_TEST: test mode.
8, HVAC_EMERG_HEAT: warm emergency.
9, HVAC_FAN_ONLY: fan only mode
All others: warm mode forcing.
Default: HVAC_AUTO</td></tr>
<tr><td>nviChgOver*</td><td>SNVT_switch</td><td>Change over mode command.
<table><tr><th>State</th><th>Value</th><th>Description</th></tr><tr><td>0</td><td>0</td><td>Warm</td></tr><tr><td>1</td><td>100</td><td>Cold</td></tr></table>Default: {0,0 0}
Remark: this variable is stored in EEPROM. So the number of write cycles is limited.</td></tr>
<tr><td>nviCounterInit*</td><td>UNVT_meter
{
Unsigned short ..
.. num
.. value1
. value2
}</td><td>Counters definition.
.num: Counter number, 1 to 3.
.value1: Ten of thousands value
Unit: Ten of thousand
Range: 0..32000
.value2 (0): Value
Range: 0..9999</td></tr>
<tr><td>nviDewSensor</td><td>SNVT_switch</td><td>State of the dew point sensor. Only the nviDewSensor.state is used and take in account only if nvoHeatCool=HVAC_COOL.
<table><tr><th>State</th><th>Value</th><th>Description</th></tr><tr><td>0</td><td>0</td><td>Normal operation</td></tr><tr><td>1</td><td>100</td><td>Force cooling output to 0%</td></tr></table>Default: {0,0 0}</td></tr>
<tr><td>nviEconEnable</td><td>SNVT_switch</td><td>Energy saving management.
<table><tr><th>State</th><th>Value</th><th>Description</th></tr><tr><td>0</td><td>0</td><td>Normal operation</td></tr><tr><td>1</td><td>0-100%</td><td>Percentage of electric heating limited to Value %</td></tr><tr><td>0xFF</td><td>0 – 255°C</td><td>Electric heater stopped if temperature difference < Value</td></tr></table>Default: {0,0 0}</td></tr>
</table>

<table>
<tr><td>nviEnergyHoldOff</td><td>SNVT_switch</td><td>Energy saving command. This command can be used with the window contact information.
<table><tr><th>State</th><th>Value</th><th>Description</th></tr><tr><td>0</td><td>0</td><td>Normal operation</td></tr><tr><td>1</td><td>100</td><td>Stop controller</td></tr></table>Default: {0,0 0}</td></tr>
<tr><td>nviFanSpeed-Cmd</td><td>SNVT_switch</td><td>Fan speed command.
5 states exist: stop, speed 1, speed 2, speed 3, AUTO. In the AUTO mode, the control loop determines the speed among the 4 other states.
<table><tr><th>State</th><th>Value</th><th>Description</th></tr><tr><td>0</td><td>0</td><td>Stop</td></tr><tr><td>1</td><td>0</td><td>Stop</td></tr><tr><td>1</td><td>33</td><td>Speed1</td></tr><tr><td>1</td><td>66</td><td>Speed2</td></tr><tr><td>1</td><td>100</td><td>Speed3</td></tr><tr><td>0xFF</td><td>0</td><td>AUTO</td></tr></table>The fan speed value is expressed in % of the maximum speed.
Default: {0,0 -1} : AUTO</td></tr>
<tr><td>nviLoopWind</td><td>SNVT_switch</td><td>Window contact information for looping when several controllers are present in the same room (refers to master / slave operation).
<table><tr><th>State</th><th>Value</th><th>Description</th></tr><tr><td>0</td><td>0</td><td>Normal operation</td></tr><tr><td>1</td><td>100</td><td>Stop controller</td></tr></table>Default: {0,0 -1}</td></tr>
<tr><td>nviOccManCmd</td><td>SNVT_occupancy</td><td>Occupancy mode of the controller. A modification of this value cancels the forcing value.
The value OC_NUL is processed as OC_OCCUPIED.
Default: OC_NUL
Range: OC_OCCUPIED,
OC_UNOCCUPIED,
OC_NUL,
OC_STANDBY,
OC_BYPASS</td></tr>
<tr><td>nviOverRelay</td><td>SNVT_switch</td><td>Forcing of the electric heater relay. See chapter “4.3.16 Direct control of outputs” to see conditions.
<table><tr><th>State</th><th>Value</th><th>Description</th></tr><tr><td>0</td><td>0</td><td>K contact close</td></tr><tr><td>1</td><td>100</td><td>K contact open</td></tr></table>The value field is not used.
Default : {0,0 0}</td></tr>
<tr><td>nviOverrideOcc</td><td>SNVT_occupancy</td><td>Occupancy forcing command, from a room operation unit or another control device (refer to nviOccManCmd also).
Default: OC_NUL
Range : OC_OCCUPIED,
OC_UNOCCUPIED,
OC_NUL</td></tr>
</table>

<table>
<tr><td>nviOverY1</td><td>SNVT_switch</td><td>Forcing of theY1 valve. See chapter “??? 4.3.16. Direct control of outputs” to see conditions.
<table>
<tr><th>State</th><th>Value</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>Y1 output inactive</td></tr>
<tr><td>1</td><td>100</td><td>Y1 output active</td></tr>
</table>
The value field is not used.
Default : {0,0 0}</td></tr>
<tr><td>nviOverY2</td><td>SNVT_switch</td><td>Forcing of theY2. See chapter “4.3.16. Direct control of outputs” to see conditions.
<table>
<tr><th>State</th><th>Value</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>Y2 output inactiven</td></tr>
<tr><td>1</td><td>100</td><td>Y2 output active</td></tr>
</table>
The value field is not used.
Default : {0,0 0}</td></tr>
<tr><td>nviOverY3</td><td>SNVT_lev_percent</td><td>Forcing of theY3. See chapter “4.3.16. Direct control of outputs” to see conditions.
Unit: V Default: 0 Range : 0..10</td></tr>
<tr><td>nviOverY4</td><td>SNVT_lev_percent</td><td>Forcing of theY4. See chapter “4.3.16. Direct control of outputs” to see conditions.
Unit: V Default: 0 Range : 0..10</td></tr>
<tr><td>nviSetpoint</td><td>SNVT_temp_p</td><td>Sets the central set point (middle of dead zone). The regulator updates the heat and cool set points values.
Unit: °C
Default: 327.67
Range : 5..40</td></tr>
<tr><td>nviSetptOffset</td><td>SNVT_temp_p</td><td>Value of the temperature offset for the temperature set point. This offset is taken into account only if the occupancy mode is set to occupied or standby.
The value 327.67 (0x7FFF) is not valid and is processed as 0.
Unit: °C
Default: 0
Range : -10..10</td></tr>
<tr><td>nviSpaceTemp</td><td>SNVT_temp_p</td><td>Value in °C used by the control loop and transmitted by the network. It is used in priority if a binding on this variable exists.
The value 327.67 (0x7FFF) is interpreted as invalid value and is not processed.
Unit: °C
Default: 327.67
Range : -9.99..64.99</td></tr>
</table>

<table>
<tr><th>Output variable</th><th>Type</th><th>Description</th></tr>
<tr><td>nvoAlarm</td><td>SNVt_switch</td><td>Alarm input state – error flow control

<table>
<tr><th>State</th><th>Value</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>Alarm Off, normal operation</td></tr>
<tr><td>1</td><td>100</td><td>Alarm On, control loop disabled</td></tr>
</table>

Default: {0,0 0}</td></tr>
<tr><td>nvoAnalogInput</td><td>SNVT_lev_percent</td><td>Actual voltage applied on the input configured as an analog measurement input.

Unit: V Default: 0 Range: 0..10</td></tr>
<tr><td>nvoAuxContact</td><td>SNVT_switch</td><td>State of the auxiliary contact.

<table>
<tr><th>State</th><th>Value</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>Closed contact (check polarity)</td></tr>
<tr><td>1</td><td>100</td><td>Opened contact (check polarity)</td></tr>
</table>

Default: {0,0 -1}</td></tr>
<tr><td>nvoChgOver</td><td>SNVT_switch</td><td>Change over switch state.

<table>
<tr><th>State</th><th>Value</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>Change over in warm mode</td></tr>
<tr><td>1</td><td>100</td><td>Change over in cold mode</td></tr>
</table>

Default: {0,0 -1}</td></tr>
<tr><td>nvoCounter</td><td>UNVT_meter
{
Unsigned short num
Unsigned long value1
Unsigned long value2
}</td><td>Counters value.
.num: Counter number
.value1: Ten of thousands value
Unit: Ten of thousand
Range: 0..32000
.value2 (0): Units value
Unit: Unit Range: 0..9999</td></tr>
<tr><td>nvoDewSensor</td><td>SNVT_switch</td><td>Dew point sensor value.

<table>
<tr><th>State</th><th>Value</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>Normal operation</td></tr>
<tr><td>1</td><td>100</td><td>Dew detection active</td></tr>
</table>

Default: {0,0 -1}</td></tr>
<tr><td>nvoDischAir-Temp</td><td>SNVT_temp_p</td><td>Discharge air temperature.
Unit: °C Default: 327.67</td></tr>
<tr><td>nvoEffectOccup</td><td>SNVT_occupancy</td><td>Actual occupancy state of the controller.
Calculated from nviOccManCmd, nviOverrideOcc and nvoPresence.

<table>
<tr><th>Value</th><th>Description</th></tr>
<tr><td>0</td><td>OC_OCCUPIED</td></tr>
<tr><td>1</td><td>OC_UNOCCUPIED</td></tr>
<tr><td>3</td><td>0C_STANDBY</td></tr>
</table>

Default : OC_OCCUPIED</td></tr>
</table>

<table>
<tr><td>nvoEffectSetpt</td><td>SNVT_temp_p</td><td>Value of the actual calculated temperature set point.

Unit: °C Default: 21</td></tr>
<tr><td>nvoElecCount</td><td>SNVT_time_hour</td><td>Electric heater operation time
Unit: hour Default: 0 Range: 0..65535</td></tr>
<tr><td>nvoEnergyHold-Off</td><td>SNVT_switch</td><td>Energy saving command. This command can be used with the window contact information

<table><tr><th>State</th><th>Value</th><th>Description</th></tr><tr><td>0</td><td>0</td><td>Normal operation</td></tr><tr><td>1</td><td>100</td><td>Control loop disabled (but freeze protection remains active)</td></tr><tr><td>0xFF</td><td>0</td><td>Normal operation</td></tr></table>Default: {0,0 0}</td></tr>
<tr><td>nvoFanSpeed</td><td>SNVT_switch</td><td>Actual fan speed value.
<table><tr><th>State</th><th>Value</th><th>Description</th></tr><tr><td>0</td><td>0</td><td>Stop</td></tr><tr><td>1</td><td>33</td><td>Speed 1</td></tr><tr><td>1</td><td>66</td><td>Speed 2</td></tr><tr><td>1</td><td>100</td><td>Speed 3</td></tr></table>Value of the fan speed in % of the maximum speed.

Default: {0,0 0}</td></tr>
<tr><td>nvoFanSpeed-Cmd</td><td>SNVT_switch</td><td>Fan speed command. See nviFanSpeedCmd.

Default: {0,0 -1}</td></tr>
<tr><td>nvoFlowControl</td><td>SNVT_switch</td><td>Flow rate detector switch state.

<table><tr><th>State</th><th>Value</th><th>Description</th></tr><tr><td>0</td><td>0</td><td>Normal operation</td></tr><tr><td>1</td><td>100</td><td>Update nvoAlarm after 2 minutes</td></tr></table>Default: {0,0 -1}</td></tr>
<tr><td>nvoHeatCool</td><td>SNVT_hvac_mode</td><td>Actual operating mode of the controller.

<table><tr><th>Value</th><th>Description</th></tr><tr><td>1</td><td>HVAC_HEAT</td></tr><tr><td>3</td><td>HVAC_COOL</td></tr><tr><td>6</td><td>HVAC_OFF</td></tr><tr><td>7</td><td>HVAC_TEST</td></tr><tr><td>8</td><td>HVAC_EMERG_HEAT</td></tr><tr><td>9</td><td>HVAC_FAN_ONLY</td></tr></table>Default: HVAC_OFF</td></tr>
<tr><td>nvoOADamper</td><td>SNVT_lev_percent</td><td>Not used.</td></tr>
</table>

<table>
<tr><td>nvoOccManCmd</td><td>SNVT_occupancy</td><td>Summary of occupation order of controller and network.

<table><tr><th>Value</th><th>Description</th></tr><tr><td>-1</td><td>OC_NULL</td></tr><tr><td>0</td><td>OC_OCCUPIED</td></tr><tr><td>1</td><td>OC_UNOCCUPIED</td></tr><tr><td>3</td><td>OC_STANDBY</td></tr></table>
Default: OC_OCCUPIED</td></tr>
<tr><td>nvoOutputReg1</td><td>SNVT_lev_percent</td><td>Process control output for Reg1

Unit: % Default: 0 Range: 0..100</td></tr>
<tr><td>nvoOutputReg2</td><td>SNVT_lev_percent</td><td>Process control output for Reg2

Unit: % Default: 0 Range: 0..100</td></tr>
<tr><td>nvoPresence</td><td>SNVT_occupancy</td><td>Presence detection input state (digital input on screw terminals or multisensor on RJ9 input).

<table><tr><th>Value</th><th>Description</th></tr><tr><td>-1</td><td>OC_NULL</td></tr><tr><td>0</td><td>OC_OCCUPIED</td></tr><tr><td>1</td><td>OC_UNOCCUPIED</td></tr></table>
Default : OC_NUL</td></tr>
<tr><td>nvoSetptOffset</td><td>SNVT_temp_p</td><td>Value of the temperature offset for the temperature set point. It is used for master / slave operation.
Unit: °C Default: 0 Range: -10..10</td></tr>
<tr><td>nvoSpaceTemp</td><td>SNVT_temp_p</td><td>Value of the measured room temperature used by the control loop.
Unit: °C Default: 327.67 Range: -9.99°C..64.99°C</td></tr>
<tr><td>nvoUnitStatus</td><td>SNVT_hvac_status</td><td>Controller status, comprising the following fields :
.mode (6): the operating mode.
See details in
nvoHeatCool.
.heat_ouput_primary (0):
the warm valve operating value.
Unit: % Range: 0..100

.heat_output_secondary (0):
the electric battery operating value
Unit: % Range: 0..100

.cool_output_primary (0):
the cold valve operating value
Unit: % Range: 0..100

.econ_output (0): not used

.fan_output (0): fan speed
Unit: % Range: 0..100

.in_alarm (0): error (0: no error)

Default : {HVAC_OFF,0,0,0,0,0,0}</td></tr>
</table>

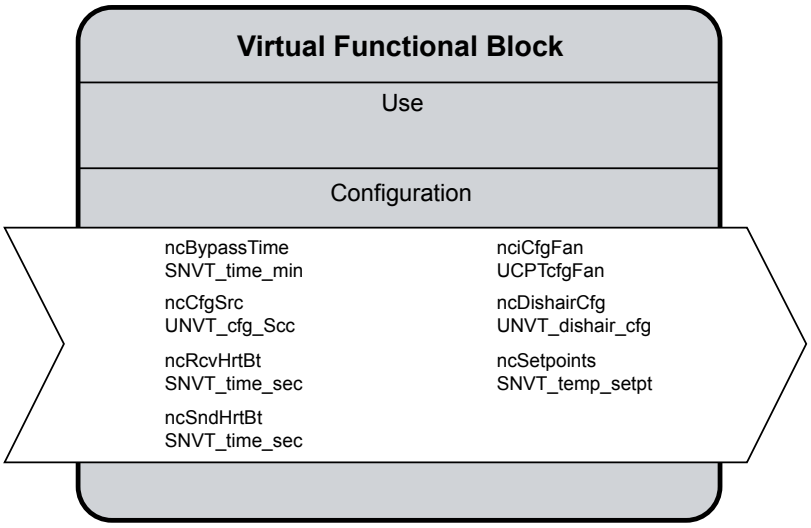
<table>
<tr>
<td>nvoWindow</td>
<td>SNVT_switch</td>
<td>Window contact information used by the control loop.

<table>
<tr><th>State</th><th>Value</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>Window closed</td></tr>
<tr><td>1</td><td>100</td><td>Window open</td></tr>
</table>

Default : {0,0 -1}</td>
</tr>
</table>

Variables marked with a “*” are stored in EEPROM. Its integrity is ensured for a maximum of 10 000 writing cycles.

5.3. Virtual Function Block

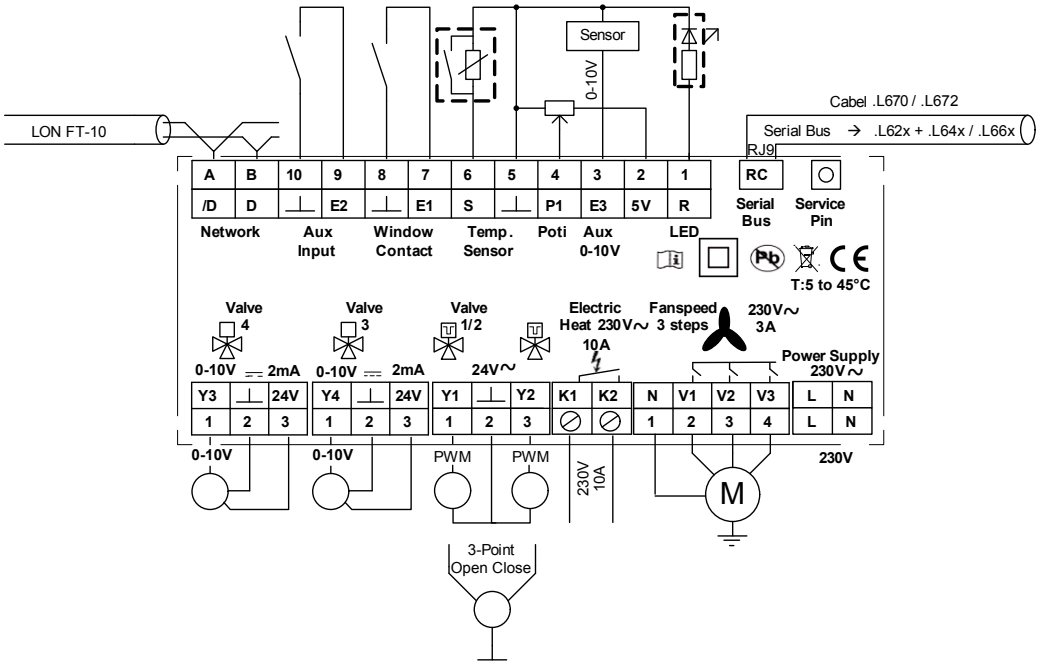


Configuration variable	Type	Description
nciBypassTime*	SCPTbypassTime SNVT_time_min	Same as nciBypassTime in the sccFanCoil functional block but in configuration network variable version.
nciCfgFan*	UCPTcfgFan UNVT_cfg_fan	Same as nciCfgFan in the sccFanCoil functional block but in configuration network variable version.
nciCfgSrc*	UCPTcfgScc UNVT_cfg_scc	Same as ncCfgSrc in the sccFanCoil functional block but in configuration network variable version.
nciDischairCfg*	UCPTdischairCfg UNVT_dishair_cfg	Same as ncDishairCfg in the sccFanCoil functional block but in configuration network variable version.
nciRcvHrtBt*	SCPTmaxRcvTime SNVT_time_sec	Not used.
nciSetpoints*	SCPTsetPnts SNVT_temp_setpt	Same as nciSetpoints in the sccFanCoil functional block but in configuration network variable version.
nciSndHrtBt*	SCPTmaxSendTime SNVT_time_sec	Same as ncSndHrtBt in the sccFanCoil functional block but in configuration network variable version.

6 Technical data

Power supply	L, N	230 VAC, +10% / –15%, approx. 25 mA without current to TRIAC outputs Y1/Y2 and fan and without 24 VAC. An external fuse is required.
Ouputs	**Terminal**	
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, 24 VAC to control 2 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, GND, 24V	Constant voltage outputs 0…10 V, 2 mA max. to control 2 valves, incl. 24 VAC valve supply.
Electric heating	K1, K2	Floating relay contact 230 VAC, 10 A max.
Inputs	**Terminal**	
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 input	E3, aux 0...10V	Voltage Input 0…10 V for optional use
Voltage output	5V	Voltage output 5 V to supply the potentiometer on terminal P1
Operating status	L, LED	Voltage output 5 V, 2 mA max. Comfort mode = HIGH (5 V), otherwise LOW (0 V)
Communication	**Terminal**	
Communication	A, B	Connection for FFT-10 Lon Network
Serial bus	RC	Internal data bus for the extension modules and a digital room operation unit

Note
For a detailed description of the inputs/outputs, see “General technical specification”.



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			
SBC Serial S-Net	**PCD7.L600**	230 VAC room controller with 2 Triac outputs, relay for electric heating and 3-step fan control	
	PCD7.L601	230 VAC room controller with 2 Triac outputs, 2 outputs 0…10 V, relays for electric heating and 3-step fan control	
	PCD7.L603*	24 VAC room controller with 2 Triac outputs, 2 outputs 0…10 V, relays for electric heating with 3-step fan control (230 VAC)	
	PCD7.L604*	230 VAC room controller with 2 Triac outputs, 2 outputs 0…10 V, incl. 24 VAC supply (7W), relays for electric heating and 3-step fan control	
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*	230 VAC room controller with 2 Triac outputs, 2 outputs 0…10 V, incl. 24 VAC supply (7W), relays for electric heating and 3-step fan control	
	PCD7.L615*	Dual 230 VAC room controller for radiator/cooled ceiling combinations and VAV applications, 4 Triac outputs, 2 outputs 0…10 V, 2 relays for electric heating and independent interfaces for digital room control devices	
	PCD7.L616	Room controller, 230 VAC, to control air quality with 2 TRIAC outputs, 2 outputs 0…10 V, 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.L620	Extension module to control 2 light bars	
	PCD7.L621	Extension module to control 2 light bars and 1 blind motor	
	PCD7.L622	Extension module to control 3 blind motors	
	PCD7.L623	Extension module to control 2 blind motors 24 VAC with blade movement	
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.L643	Temperature sensor, function keys and LCD display for HeaVAC functions	
	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.L664	Optional wall mounting for mobile use	
	PCD7.L665	IR (infra-red) receiver with multi-sensor for temperature, presence and brightness for PCD7.L660	
	PCD7.L666	IR and wireless receiver with multi-sensor for temperature, presence and brightness for PCD7.L660/L662	
Expansion modules to connect third-party devices			

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Type	Description	
PCD7.L650	Expansion module to connect up to 8 external contacts for light&shade	
PCD7.L651*	Wireless receiver to connect EnOcean room control devices	

Accessories

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 × RJ9 and 1 × RJ11, length 11 m
PCD7.L679	Manual control unit for room controller configuration

* in preparation

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A.3 Contact

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Switzerland

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SBC site: ..... www.saia-pcd.com
International Represetatives &
SBC Sales Companies: ..... www.saia-pcd.com/contact

Postal address for returns from customers of the Swiss Sales office

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