# User manual clima DL-110

Version 1.02

Moers, 18/11/14

# Content

# 1. Introduction

Thank you for choosing a spega product. This product has been designed and optimized for use in room automation. To familiarize yourself with the handling and functionality of the system, we would ask you to read this manual carefully. It contains information about the operation, assembly and parameterization of the system.

Please store this manual in a location which is easily accessible to all users!

## 1.1. Explanations of pictogrammes used

This guide uses pictogrammes as warning symbols to ensure the equipment is handled safely and works properly.

VOLTAGE: indicates immediate danger of harmful electric shock if disregarded. This could result in severe or fatal injuries to persons.

WARNING: indicates other immediate dangers if disregarded. This could result in severe or fatal injuries to persons.

CAUTION: indicates a source of danger which could lead to property or environmental damage if disregarded.

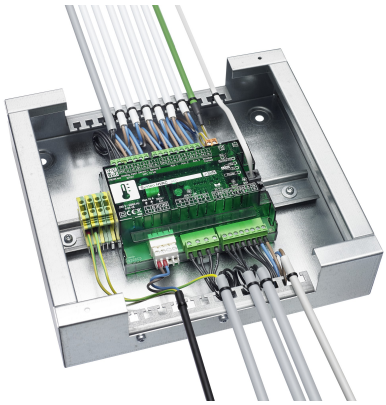
NOTE: indicates recommendations for use which must always be followed to ensure proper operation. Failure to observe these recommendations, however, will not result in damage to the equipment.

## 1.2. Use of manual

This manual is intended for all groups of persons involved in the planning, installation, commissioning and maintenance of the system. A overview of which chapter is relevant for which group of persons is shown below.

| | Introduction | Product description | Applications | Setting-up and configuring a device | General handling of the plug-ins | Device templates - interfaces |
|---|---|---|---|---|---|---|
| Owners | ✓ | | | | | |
| Planners | ✓ | ✓ | ✓ | | | |
| Electrical specialists | ✓ | ✓ | | | | |
| Systems integrators | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

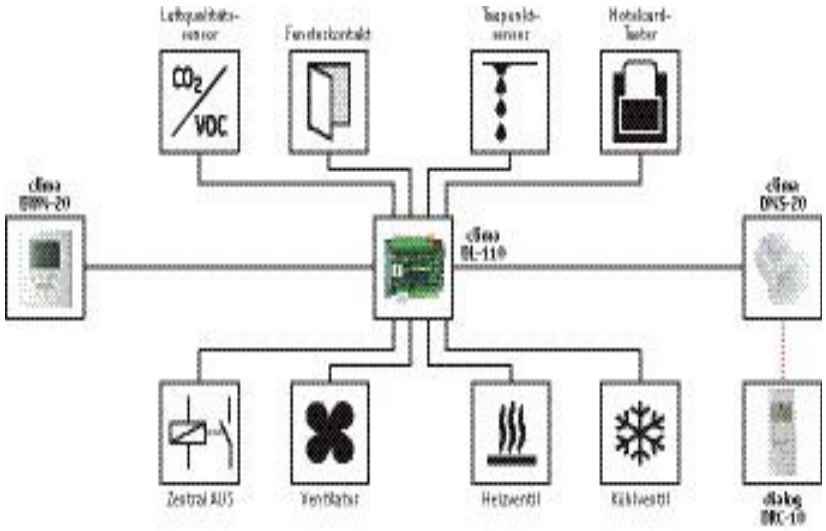
# 2. Product description



The clima DL-110 compact controller is designed as a universal room controller. The various extensions enable you to adapt clima DL-110 functions to your exact requirements.

It is ideal for controlling static heating and cooling systems as well as fan coils and façade ventilation systems.

To make the clima DL-110 even more flexible, it can be enhanced with various room control devices, with and without air humidity measurements, for temperature measurement and adjustment. It is also easy to connect a multisensor for occupancy detection and room brightness measurement and as a receiver for IR remote control.




The compact controller is configured using the LNS plug-ins available. We can also consider adaptations specific to individual customers, if desired.

## 2.1. Safety information

Please note the following safety information:

*The device function is determined by the application program. Only programs which have been by released by spega for the device may be loaded.*

*The system installer must ensure that the application program and the related parametrization conform to the wiring and intended application of the device.*

*The relevant standards, directives, requirements and regulations of the respective country must be observed when installing electrical equipment.*

## 2.2. Order information

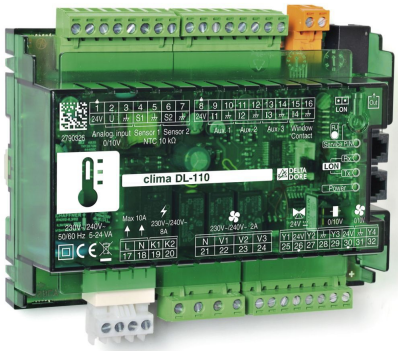
| Order number | Description |
|---|---|
| 331 110 | ***clima DL-110,*** Universal room controller |
| 934 520 | ***clima DWM-20,*** Wall module with temperature sensor, LC display, push buttons for setpoint and fan speed adjustment, pure white, compatible with room controller clima DL-110 |
| 934 521 | ***clima DWM-21,*** Wall module with temperature sensor, LC display, push buttons for setpoint adjustment, pure white, compatible with room controller clima DL-110 |
| 934 526 | ***clima DWM-21-rH,*** Wall module with temperature and humidity sensor, LC display, push buttons for setpoint adjustment, pure white, compatible with room controller clima DL-110 |
| 930 301 | ***clima DWM-01,*** Wall module with temperature sensor, pure white, compatible with room controller clima DL-110 |
| 934 311 | ***clima DWM-11-rH,*** Wall module with temperature and humidity sensor, pure white, compatible with room controller clima DL-110 |
| 934 120 W | ***clima DMS-20,*** Multisensor for suspended ceiling mounting, pure white, compatible with room controller clima DL-110 |

| | |
|---|---|
| 910 112 | ***dialog DRC-10,***<br>Infrared remote control with LC display, compatible with multisensors lumina MS4, lumina MS4/RC and clima DMS-20 |
| 930 001 | ***Connection cable RJ9 (length: 6m)***<br>RJ9 cable for connection wall modules DWM-01 / 11 (-rH), DWM-2x-(rH) or multisensor DMS-20 to universal controller DL-110 |
| 930 002 | ***Connection cable RJ9 (length: 8m)***<br>RJ9 cable for connection wall modules DWM-01 / 11 (-rH), DWM-2x-(rH) or multisensor DMS-20 to universal controller DL-110 |
| 930 003 | ***Connection cable RJ9 (length: 12m)***<br>RJ9 cable for connection wall modules DWM-01 / 11 (-rH), DWM-2x-(rH) or multisensor DMS-20 to universal controller DL-110 |
| 930 004 | ***Connection cable RJ9 (length: 20m)***<br>RJ9 cable for connection wall modules DWM-01 / 11 (-rH), DWM-2x-(rH) or multisensor DMS-20 to universal controller DL-110 |
| 930 005 | ***Connection cable RJ9 (length: 30m)***<br>RJ9 cable for connection wall modules DWM-01 / 11 (-rH), DWM-2x-(rH) or multisensor DMS-20 to universal controller DL-110 |
| 930 110 | ***clima DMB-10,***<br>Mounting box with cover, compatible with room controller clima DL-110 |
| 020 325 | ***clima A 24-T,***<br>Noiseless thermoelectric actuator with optical position indicator, with on/off control, closed when de-energised; matching valve adapters on request |
| 020 345 | ***clima A 24-10AC,***<br>Noiseless thermoelectric actuator with optical position indicator, continuous positioning via 0-10V AC, closed when de-energised; matching valve adapters on request |
| 020 346 | ***clima A 24-10DC,***<br>Noiseless thermoelectric actuator with optical position indicator, continuous positioning via 0-10V DC, closed when de-energised; matching valve adapters on request |

# 3. System devices

## 3.1. clima DL-110

### 3.1.1 Product description




The clima DL-110 is a universal room controller. It is suitable for controlling static heating/cooling systems (like radiators, heated/chilled ceilings, chilled beams) and fan coil systems. Here the usage of 2-pipes, 3-pipes and 4-pipes-system are supported.

Additionally wall modules with temperature sensor, humidity sensor and push buttons for setpoint and fanspeed adjustment can be connected as well as a multisensor for presence detection, for measurement of ambient brightness in rooms and as receiver for the infrared remote control with LC display dialog DRC-10.

An LNS plug-in for comfortable configuration is available.

#### Available inputs and outputs

The inputs and outputs listed in the following table can be freely configured.

| Type | Number | Usage |
|---|---|---|
| Analog input 0-10V | 1 | e.g. Air quality sensor |
| Analog input für NTC 10kOhm | 2 | Temperature sensor |
| Digital input for floating contacts | 4 | e.g. Window contact, dew point sensor, hotel card switch |
| Analog output 0-10V | 2 | e.g. Valve or damper actuator, fan |
| Digital output 24 VDC | 2 | e.g. Valve actuator (2-point and 3-point) |
| Fan output 230 VAC (max. 3-stage) | 1 | Fan |
| Switching output 230VAC | 1 | e.g. Heater battery, contactor (relay) for central-off |

#### Supported heating/cooling systems

The heating/cooling systems listed below are supported by clima DL-110. Thereby the required actuators can be freely assigned to the available outputs.

- Heating with radiator

- Heating with radiator, air quality control with VAV
- Heating with radiator, cooling and air quality control combined with VAV
- Cooling with chilled ceiling
- Cooling with chilled ceiling, air quality control with VAV
- Cooling with chilled ceiling, heating and air quality control combined with VAV
- Cooling with chilled ceiling, heating with radiator
- Cooling with chilled ceiling, heating with radiator, air quality control with VAV
- Heating and cooling with combined heated/chilled ceiling (2-pipe system)
- Heating and cooling with combined heated/chilled ceiling (2-pipe system), air quality control with VAV
- Heating and cooling with combined heated/chilled ceiling (4-pipe system, 4 valves)
- Heating and cooling with combined heated/chilled ceiling (4-pipe system, 4 valves), air quality control with VAV
- Heating and cooling with combined heated/chilled ceiling (4-pipe system, 3 valves)
- Heating and cooling with combined heated/chilled ceiling (4-pipe system, 3 valves), air quality control with VAV
- Heating and cooling with combined heated/chilled ceiling (4-pipe system, 6-way valve)
- Heating and cooling with combined heated/chilled ceiling (4-pipe system, 6-way valve), air quality control with VAV
- Cooling with fan coil
- Cooling with fan coil, air quality control with VAV
- Cooling with fan coil, heating and air quality control combined with VAV
- Cooling with fan coil with outdoor air damper (incl. air quality control)
- Cooling with fan coil, heating with radiator
- Cooling with fan coil, heating with radiator, air quality control with VAV
- Cooling with fan coil with outdoor air damper (incl. air quality control), heating with radiator
- Heating with fan coil
- Heating with fan coil, air quality control with VAV
- Heating with fan coil, cooling and air quality control combined with VAV
- Heating with fan coil with outdoor air damper (incl. air quality control)
- Heating and cooling with fan coil (2-pipe system)
- Heating and cooling with fan coil (2-pipe system), air quality control with VAV
- Heating and cooling with fan coil with outdoor air damper (2-pipe system), incl. air quality control
- Heating and cooling with fan coil (4-pipe system)
- Heating and cooling with fan coil (4-pipe system), air quality control with VAV
- Heating and cooling with fan coil with outdoor air damper (4-pipe system), incl. air quality control

*For supporting not listed heating/cooling systems please contact our support. Please find the contact information at the end of this data sheet.*

## 3.1.2 Technical Data

### Supply

| | |
|---|---|
| operating voltage, power | 230 - 240 VAC,<br>50/60 Hz, 3 - 34 VA |

### Network

| | |
|---|---|
| LON | FTT TP/FT-10 (78kbps) |

### Inputs

| | |
|---|---|
| 1 x analog input | 0-10 V |
| 4 x digital input | for floating contacts |
| 2 x NTC sensors | NTC 10KOhm@25°C |

### Outputs

| | |
|---|---|
| 1 x 230 VAC | 8A, max. power 1.8 KW |
| 3 X 230 VAC | max. 2A each, for controlling fans |
| 2 x 24 VDC | for 2 two point thermal actuator<br>or 1 three point motorized actuator.<br>(All 24 VDC outputs must not draw more then max 0.8A!) |
| 2 x 0-10 VDC analog output | max. 2mA each |

### Extension connectors

| | |
|---|---|
| Connectors A and B | for connecting multi sensor and wall module |

### Housing

| | |
|---|---|
| Type of protection | IP 20 (EN 60529), IK05 (EN 50102), Fire: Class V2 |
| Dimensions (W x H x D) | 140 x 102 x 51.6 mm |

### Ambient conditions

| | |
|---|---|
| Operating temperature | 5°C ... +45°C |
| Storage temperature | -10°C ... +60°C |
| Operating Relative humidity | 20 ... 80% of RH (w/o condensation) |
| Installation height | up to 2000 m above sea level |

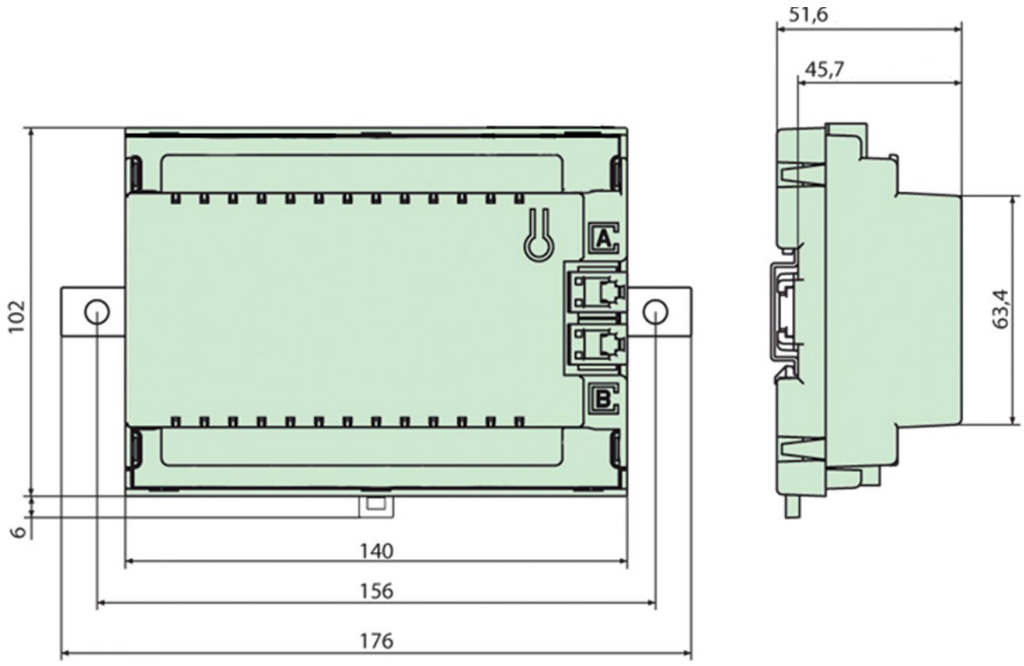
**CE-Conformity**

2004/108/EC Electromagnetic Compatibility
2006/95/EC Low voltage directive

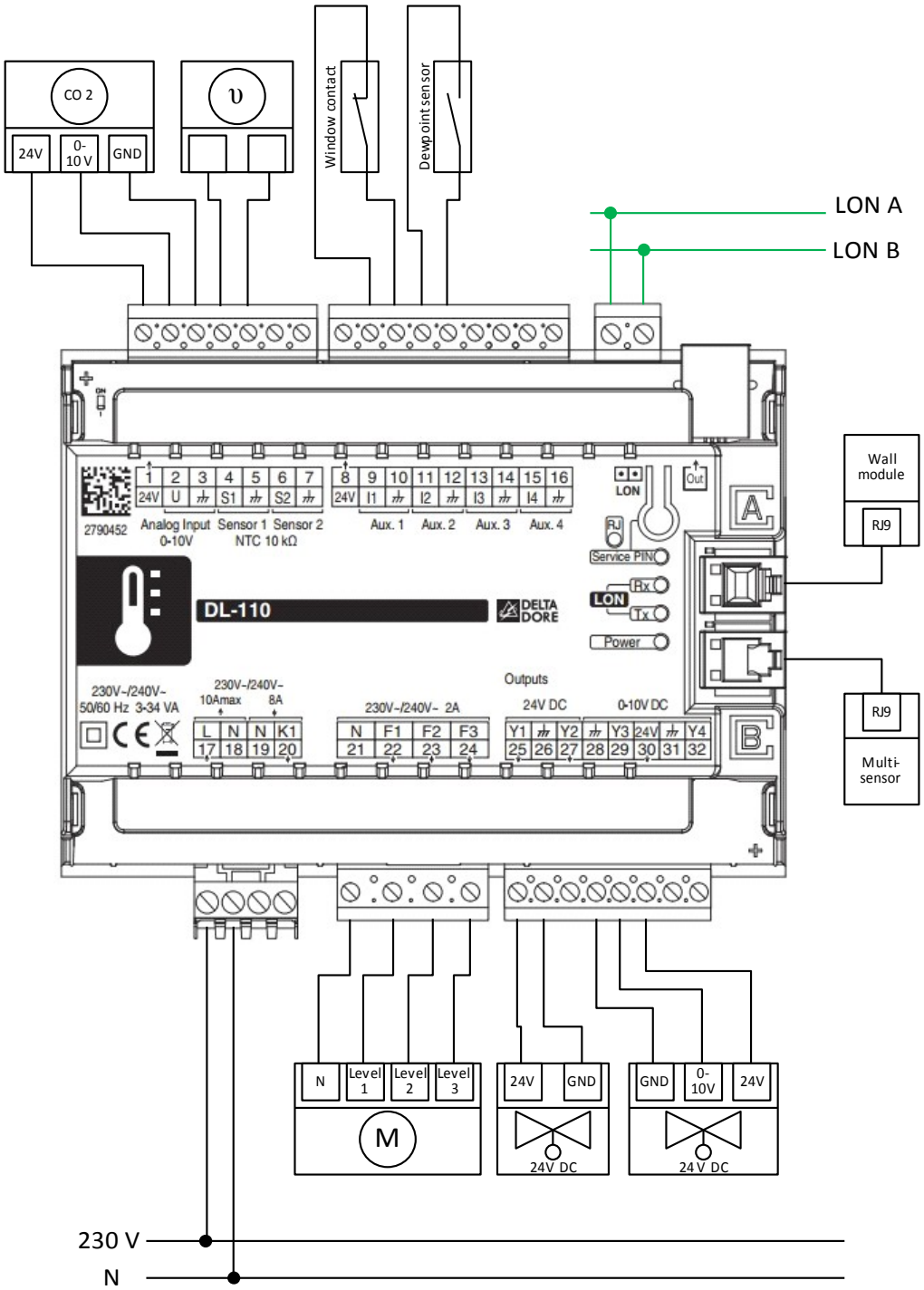
### 3.1.3 Mounting and connecting

The assembly of clima DL-100 is able in a switch cupboard or directly with 2 side flaps, e. g. , in the false ceiling. There is also the possibility to mount the device in the seperat available assembly box "clima DMB-10".

## Dimensions:



## Connections:




*Electrical devices must be assembled and installed by trained personnel only.*

*Please observe local standards, guidelines and regulations when planning and installing electrical devices.*

*Do not exceed device specifications.*

*The system installer has to take care that the correct application and the associated parameters are corresponding with the wiring and the intended use of the device.*

### 3.1.4 EMC-compliant cabling within the building

As a rule, all legal standards and directives governing the design of cabling must be observed. By adhering to the following information regarding cabling installed in buildings, devices may be protected against electromagnetic interference, particularly in the case of high EMC loads.

#### Laying of different cables

Motor cables, power supply cables and general feed cables for sub-distribution boards and system distributors are cables which may interfere with bus cables, extra-low-voltage cables and general signal lines and control cables. Consequently, both these categories of cable must always be laid separately. In cases where cable junctions cannot be avoided, the cables should ideally be laid at right angles to each other.

#### Selecting a bus cable

When selecting the LON bus cable the installation instructions for LON networks - the Echelon Wiring Guidelines - must be observed at all times. In addition, the use of twisted pairs for the cable types specified must be ensured. When using J-Y(St)Y or comparable cable types, we recommend the use of the green EIB cable.

Shielded cables have better EMC properties than non-shielded cables. A proper earthing system is a basic requirement for an EMC-compliant installation. It must be ensured that no equipotential bonding current can flow across the shields of data or bus cables.

#### Power supply lines

24V power supply lines must be designed such that the voltage drop on the line is no more than 2 volts. The maximum power consumption of all connected devices should be taken as a basis for this. Please note that both current-carrying conductors must be taken into account when calculating the line resistance. These supply lines must not be routed in the same cable together with mains cables.

#### Signal lines

Stranded pairs of cables must be used for connecting digital and analog sensors. These signal lines must not be routed in the same cable together with mains cables.

## *3.2. clima DWM-20 / 21 / 21-rH*

### 3.2.1 Product description

The devices clima DWM-20/21/21-rH are wall modules with temperature and optional humidity sensor for connecting directly to the universal room controller clima DL-110.

The wall modules have push-buttons for setpoint adjustment, fan speed (only DWM-20) and presence.

The LC display shows the room temperature, setpoint offset, fan speed (only DWM-20), occupancy state and window state.

## 3.2.2 Technical data

### Supply

| | |
|---|---|
| Operating voltage | Low voltage via communication port |

### Connections

| | |
|---|---|
| Communication port | RJ9 jack |
| Max. cable length for connection to room controller clima DL-110 | 30m |

### Display

| | |
|---|---|
| LCD | LCD with backlight |
| Displaying | Room temperature, setpoint offset, fan speed (only DWM-20), occupancy state and window state |

### Operation

| | |
|---|---|
| Push-buttons for | Setpoint adjustment, fan speed (only clima DWM-20), presence |

### Sensors

| | |
|---|---|
| Temperature measurement | NTC sensor 10 kOhm / 25°C |
| Relative humidity measurement | (only clima DWM-21-rH) |

### Housing

| | |
|---|---|
| Type of protection | IP 20 (EN 60529), Fire: Class V0 |
| Dimensions (W x H x D) | 91 x 84 x 24 mm |
| Installation | Wall mounting with 2 screws (max. diameter 3,5 mm), mounting hole spacing: 60 mm |

### Ambient conditions

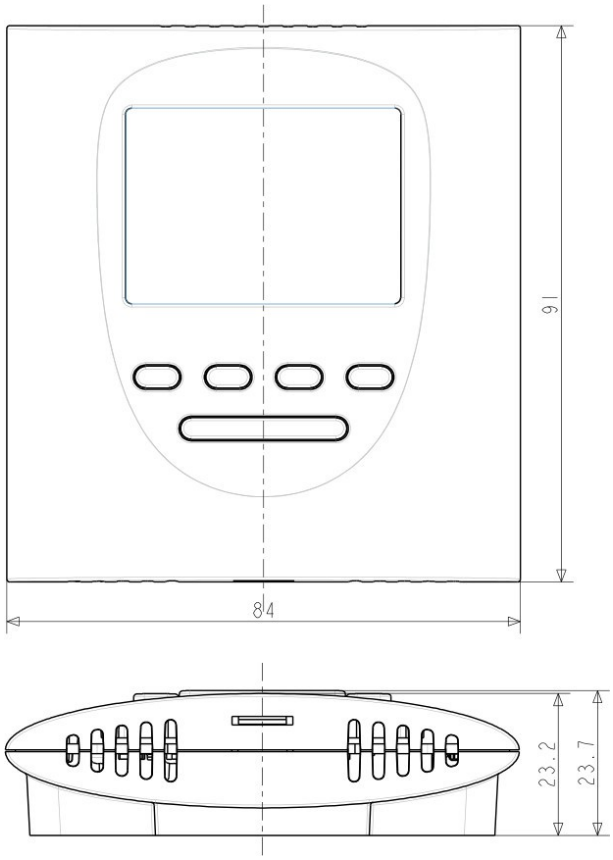
| | |
|---|---|
| Operating temperature | 0°C ... +40°C |
| Operating relative humidity | 20 ... 80% RH (w/o condensation) |
| Installation height | up to 2000 m above sea level |

**CE-Conformity**

2004/108/EC Electromagnetic Compatibility
2006/95/EC Low voltage directive

### 3.2.3 Mounting and connecting

#### Dimensions:




#### Connections:

The connection to the room controller clima DL-110 will do on both sides via the connecting cable RJ9 which can be ordered in various lengths.

## *3.3. clima DWM-01*

### 3.3.1 Product description

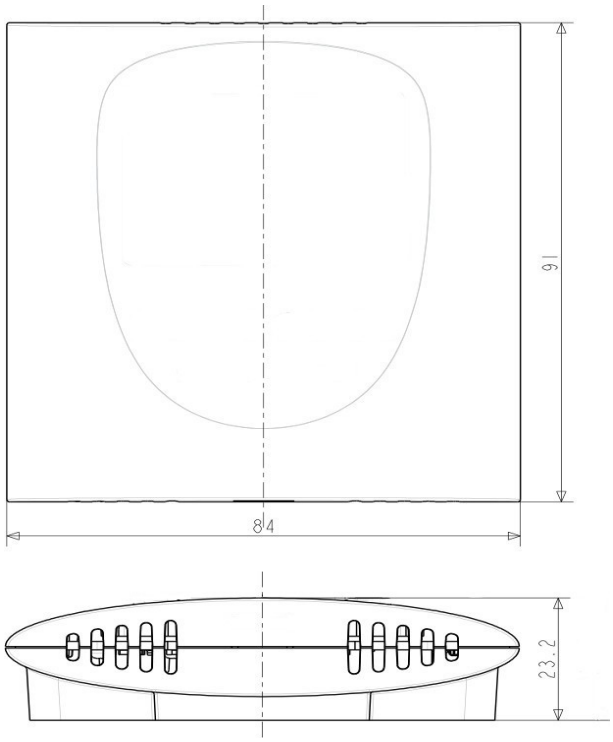
The wall module clima DWM-01 is a room temperature sensor in an elegant housing for connecting directly to the universal room controller clima DL-110.

### 3.3.2 Technical data

| | |
|---|---|
| **Connections** | |
| For temperature sensor | 2-pin terminal connection |
| Max. cable length for connection to room controller clima DL-110 | 30m with 2x0.8mm |
| **Sensors** | |
| Temperature measurement | NTC sensor 10 kOhm / 25°C |
| **Housing** | |
| Type of protection | IP 20 (EN 60529), Fire: Class V0 |
| Dimensions (W x H x D) | 91 x 84 x 24 mm |
| Installation | Wall mounting with 2 screws (max. diameter 3,5 mm), mounting hole spacing: 60 mm |
| **Ambient conditions** | |
| Operating temperature | 0°C ... +40°C |
| Operating relative humidity | 20 ... 80% RH (w/o condensation) |
| Installation height | up to 2000 m above sea level |
| **CE-Conformity** | |
| | 2004/108/EC Electromagnetic Compatibility |
| | 2006/95/EC Low voltage directive |

## 3.3.3 Mounting and connecting

### Dimensions:




### Connection:

The wall module clima DWM-01 is a room temperature sensor in an elegant housing for connecting with a 2-pin connector directly to the universal room controller clima DL-110.

## *3.4. clima DWM-11-rH*

### 3.4.1 Product description

The wall module clima DWM-11-rH is a room temperature and humidity sensor in an elegant housing for connecting directly to the universal room controller clima DL-110.

### 3.4.2 Technical data

**Supply**

| | |
|---|---|
| Operating voltage | Low voltage via communication port |

**Connections**

| | |
|---|---|
| Communication port | RJ9 jack |
| Max. cable length for connection to room controller clima DL-110 | 30m |

**Sensors**

| | |
|---|---|
| Temperature measurement | NTC sensor 10 kOhm / 25°C |
| Relative humidity measurement | |

**Housing**

| | |
|---|---|
| Type of protection | IP 20 (EN 60529), Fire: Class V0 |
| Dimensions (W x H x D) | 91 x 84 x 24 mm |
| Installation | Wall mounting with 2 screws (max. diameter 3,5 mm), mounting hole spacing: 60 mm |

**Ambient conditions**

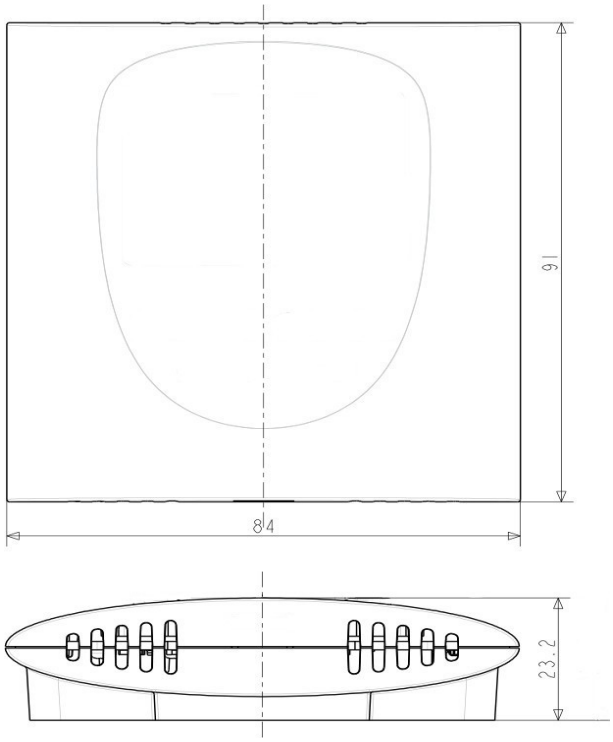
| | |
|---|---|
| Operating temperature | 0°C ... +40°C |
| Operating relative humidity | 20 ... 80% RH (w/o condensation) |
| Installation height | up to 2000 m above sea level |

**CE-Conformity**

2004/108/EC Electromagnetic Compatibility
2006/95/EC Low voltage directive

### 3.4.3 Mounting and connecting

#### Dimensions:




#### Connections:

The connection to the room controller clima DL-110 on both sides via the connecting cable RJ9 which can be ordered in various lengths.

## *3.5. clima DMS-20*

### 3.5.1 Product description

The multi sensor is a combination of occupancy sensor, light sensor and infrared remote control receiver.

The multi sensor transmits the telegrams of the infrared remote control dialog DRC-10 directly to the room controller clima DL-110.

The light sensor provides the basis of automatic lighting functions, such as constant light control or daylight switching.

With the optional infrared remote control dialog DRC-10 you can control lights, blinds and scenes. Additionally you can adjust the temperature setpoint and the fan speed.

## 3.5.2 Technical data

**Power supply**

| | |
|---|---|
| Operating voltage | Low voltage via communication port |

**Connections**

| | |
|---|---|
| Communication port | 1 x 9RJ jack |

**Presence detection**

| | |
|---|---|
| Detection range | 4m Ø at 2.5m installation height |

**Housing**

| | |
|---|---|
| Type of protection | IP 40 |
| dimensions | 43 x 56 mm (Ø x H) |
| Installation dimensions | 35 x 45 mm (Ø x H) |

**Ambient conditions**

| | |
|---|---|
| Operating temperature | 0 °C ... +40°C |

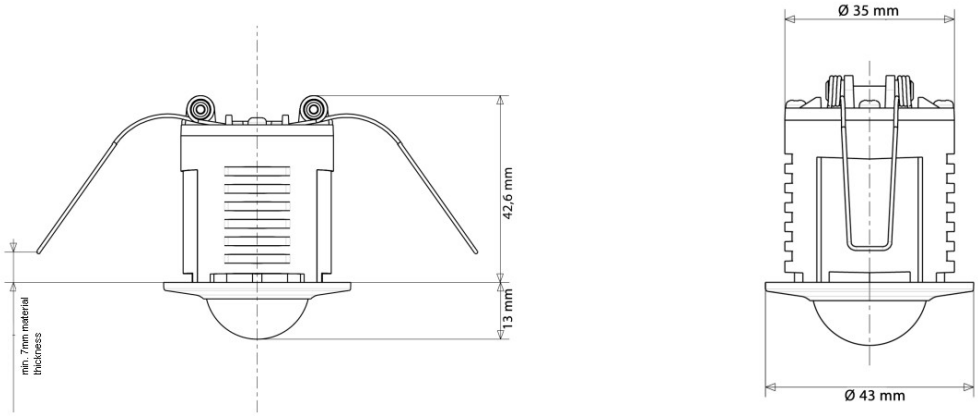
**CE-Conformity**

2004/108/EC Electromagnetic Compatibility

2006/95/EC Low voltage directive

## 3.5.3 Mounting and connecting

### Dimensions:




### Connections:

The connection to the room controller clima DL-110 on both sides via the connecting cable RJ9 which can be ordered in various lengths.

# *3.6. dialog DRC-10*

## 3.6.1 Product description

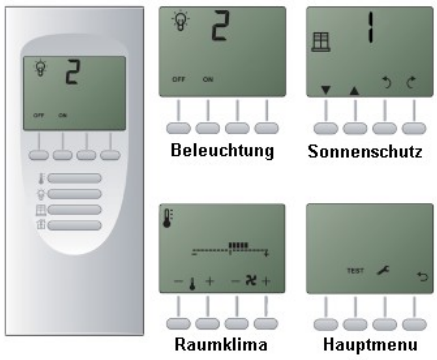
Infrared remote control for multi sensor types

- lumina MS4-EB
- lumina MS4-AP
- lumina MS4/RC-EB
- lumina MS4/RC-AP
- clima DMS-20

This remote control allows controlling of the following functions:

- Manual log on/off
- 4 Lighting groups (switched/dimmed), master control of all lighting groups
- 4 Blind groups, master control of all blind groups
- Adjustment of setpoint temperature
- Adjustment of fan speed
- Recall 3 scenes

## 3.6.2 Handling




Pressing a menu button opens a menu for controlling the lights, blinds, HVAC or scenes. The functions of the small push buttons are shown in the LC display.
The hidden maintenance menu for configuring the remote control will be shown, if you press and hold the buttons for HVAC and log on at the same time. After 4 lines are shown on the display press the buttons log on, blinds, lighting and HVAC one by one within 3 seconds.

Point the remote control roughly in the direction of the multi sensor and push the button you want to operate. Extreme brightness, other sources of infrared light and obstacles might reduce the operating range.

*Caution: Please remove any protective lid between battery and contacts before first use!*

## 3.6.3 Technical data

**Supply**

| | |
|---|---|
| operating voltage | 2 x 1,5V AAA Type battery, LR03 Alkaline (included) |

**Housing**

| | |
|---|---|
| Type of protection | IP30 |
| Colour | Pure white |
| Dimensions (H x W x D) | 145 x 61 x 20 mm |

**Ambient conditions**

| | |
|---|---|
| Operating temperature | -5°C ... +45°C |
| Relative humidity | Max 93% (w/o condensation) |
| Installation height | up to 2000 m above sea level |

**CE-Conformity**

2004/108/EC Electromagnetic Compatibility

2006/95/EC Low voltage directive

# *3.7. Connecting cable RJ9*

## 3.7.1 Product description

The cable is designed in various lengths for easy and user-friendly connection of the following devices to the clima DL-110.

- clima DWM-20 / 21 / 21-rH
- clima DWM-01 / 11-rH
- clima DMS-20

## 3.7.2 Technical data

**Connector**

| | |
|---|---|
| RJ9 | on both ends |
| Length | 6m, 8m, 12m, 20m, 30m |

# *3.8. clima DMB-10*

## 3.8.1 Product description

The mounting box with DIN rail for mounting the LON universal room controller clima DL-110 is made of zinc plated sheet steel with additional space for fuse terminal block, coupling relays etc.

Strain reliefs on both sides allow fixing the cables with cable ties.

The cover ensures protection class IP40

## 3.8.2 Technical data

| | |
|---|---|
| **Housing** | |
| Protection class | IP 40 |
| Dimensions (H x W x D) | 70 x 275 x 255 mm |
| Mounting | Wall mounting with 4 screws,<br>mounting hole spacing: 220 x 200 mm |

## *3.9. clima A24-10 AC and A24-10DC*

### 3.9.1 Product description

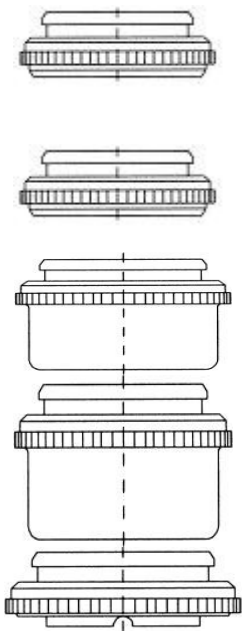
The actuator A24-10xx is a noiseless and maintenance-free continuous electro-thermal actuator that is suitable for connection to clima RCM CC, clima RO-CC, clima AA4-10V, clima AA8-10V or clima FCB-10V. The control signal is a 0-10V analog signal.

The drive has an optical level indicator, so that at any time the valve position can be read.

By using different adapters (sold separately) is suitable to use the actuator for all common types of valves:

| **Order number:** | **Valve Brand:** | **Specification:** | **Picture:** |
|---|---|---|---|
| *VA80* | *Heimeier, Herb, Onda, Oeven-trop (M30x1,5), Schlösser ab 93* | *M30x1,5* | |
| *VA50* | *Honeywell, Brauckmann, Reich, Landis&Gyr, MNG* | *M30x1,5* | |
| *VA50H* | *Böhnisch* | *M30x1,5* | |
| *VA78* | *Danfoss RA* | | |
| *VA26* | *Giacomoni* | | |

*Other adapters on request*



## 3.9.2 Technical data

**Power supply**

| | |
|---|---|
| Operating voltage (020 345) | 24 VAC |
| Operating voltage (020 346) | 24 VDC |
| Current input | typ. 80 mA (1920 mW) |
| | max.250 mA (6000mW) |

**Connections**

| | |
|---|---|
| Actuator connection | Cable end open |

**Drive data**

| | |
|---|---|
| Travel range | 3 mm |
| Operating time | < 3 minutes |
| Force | 90 Nm |

**Housing**

| | |
|---|---|
| Type of protection | IP 20 (DIN 40050 / IEC 144) |
| Dimensions | 48 x 43 mm (B x D) |
| Type/location of installation | Installation of radiator valves or heat cycle |

**Ambient conditions**

| | |
|---|---|
| Operating temperature | -5°C ... +45°C |
| Storage temperature | -25°C ... +55°C |
| Transportation temperature | -25°C ... +70°C |
| Rel. humidity | 5% .. 93% (without condensation) |
| Installation height | up to 2000 m above sea level |

**Standards / guidelines**

| | |
|---|---|
| Device safety | acc. to EN 50 090-2-2 |
| Certification | CE |

### 3.9.3 Mounting and connecting

- The device is designed for mounting on radiator - valves or manifolds.
- The assembly of the valve by simply place it on the optional valve adapter. The optional valve adapter is screwed onto the valve body.
- The cable is connected via screw terminals.

*The circuits of the inputs must meet the requirements for safety extra-low voltage (SELV)*

*The installation and assembly of electrical equipment may only be performed by a qualified electrician.*

*Relevant standards, guidelines, rules and regulations of the respective country must be observed in the planning and construction of electric installations.*

*The specification must be met.*

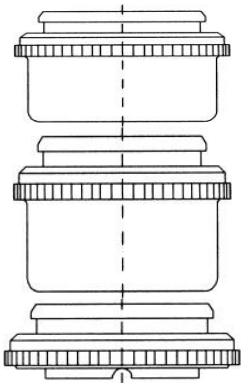
# *3.10. clima A24-T*

## 3.10.1 Product description

The actuator A24-T is a noiseless and maintenance-free continuous electro-thermal actuator that is suitable for example for connection to clima FCB-24 or clima AA8 and clima AA4 actuators.

The drive has an optical level indicator, so that at any time the valve position can be read.

By using different adapters (sold separately) is suitable for the actuator for all common types of valves:

| **Order number:** | **Valve brand:** | **Specification:** | **Picture:** |
|---|---|---|---|
| *VA80* | *Heimeier, Herb, Onda, Oeven-trop (M30x1,5), Schlösser ab 93* | *M30x1,5* |  |
| *VA50* | *Honeywell, Brauckmann, Reich, Landis&Gyr, MNG* | *M30x1,5* |  |
| *VA50H* | *Böhnisch* | *M30x1,5* |  |
| *VA78* | *Danfoss RA* | | |
| *VA26* | *Giacomoni* | | |

*Other adapters on request*

## 3.10.2 Technical data

**Power supply**

| | |
|---|---|
| Operating voltage | 24V AC / DC ±10% |
| Current input | typ. 80mA (1920mW)<br>max. 250mA (6000mW) |

**Connections**

| | |
|---|---|
| Actuator connection | Cable end open |

**Drive Data**

| | |
|---|---|
| Travel range | 3 mm |
| Operating time | < 3 minutes |
| Force | 90 Nm |

**Housing**

| | |
|---|---|
| Type of protection | IP 20 (DIN 40050 / IEC 144) |
| Dimensions | 48 x 43 mm (B x D) |
| Type/location of installation | Installation of radiator valves or heat cycle |

**Ambient conditions**

| | |
|---|---|
| Operating temperature | -5°C ... +45°C |
| Storage temperature | -25°C ... +55°C |
| Transportation temperature | -25°C ... +70°C |
| Rel. humidity | 5% .. 93% (without condensation) |
| Installation height | up to 2000 m above sea level |

**Standards / guidelines**

| | |
|---|---|
| Device safety | acc. to EN 50 090-2-2 |
| Certification | CE |

### 3.10.3 Mounting and connecting

- The device is designed for mounting on radiator - valves or manifolds.
- The assembly of the valve by simply place it on the optional valve adapter. The optional valve adapter is screwed onto the valve body.
- The cable is connected via screw terminals.

*The circuits of the inputs must meet the requirements for safety extra-low voltage (SELV)*

*The installation and assembly of electrical equipment may only be performed by a qualified electrician.*

*Relevant standards, guidelines, rules and regulations of the respective country must be observed in the planning and construction of electric installations.*

*The specification must be met.*

# 4. Applications

Using the clima DL-110 application you can capture and control a wide selection of various sensors and actuators. The software is divided into logical objects in accordance with LonMark™ Interoperability Guidelines.

| Application | Objects | | |
|---|---|---|---|
| SC331110EC_02 | 1 x LightSensor | 1 x OccupancySensor | 2 x TempSensor |
| | 1 x AirQualitySensor | 1 x RelHumSensor | 1 x CommandModule |
| | 4 x BinaryInput | 8 x Switch | 1 x ScenePanel |
| | 1 x OccupancyCtrl | 1 x DewPointCalc | 1 x SpaceComfortCtrl |
| | 1 x ThermoCtrl | 8 x HvacActuator | |

## Application data

You can select the desired application in the spega device template manager. All the required application files, resource files and plug-ins for the relevant project will be loaded.

| Application | SC331110EC_02 |
|---|---|
| Software files | SC331110EC_02.APB |
| | SC331110EC_02.NXE |
| | SC331110EC_02.XIF |
| | SC331110EC_02.XFB |
| Resource Files | econtrol2 Resource files version 1.09 required |
| Plug-ins | Device plug-in clima DL-110, object plug-ins |

*The software complies with LonMark™ Interoperability Guidelines. When using LNS-based integration tools we recommend the use of the resource files listed.*

## 4.1. Hardware support

The clima DL-110 room controller can be used for a variety of applications. The device features digital and analogue inputs and outputs, a fan stage output for controlling corresponding actuators using up to three stages, as well as a 230V switching output.

The various connection options are summarised in the table below:

| Type | Quantity | Use |
|---|---|---|
| 0-10V analogue input | 1 | e.g. air quality sensor |
| Analogue input for NTC 10kOhm | 2 | Temperature sensor |
| Digital input for floating contacts | 4 | e.g. window contact, dew point sensor, hotel key card switch |

| | | |
|---|---|---|
| 230VAC switching output | 1 | e.g. heating register, contactor (relay) for Master Off |
| 230 VAC fan stage output (max. 3 stages) | 1 | e.g. for activating a 3-stage fan |
| 24 VDC digital output | 2 | e.g. valve actuator (2-point and 3-point) |
| 0-10V analogue output | 2 | e.g. valve actuator, damper actuator, fan |

In addition, the device offers the option of connecting external modules using 2 RJ9 sockets and incorporating them into the room control system. The following modules are available for this purpose:

| Module | Description |
|---|---|
| clima DWM-20 | Wall module with temperature sensor, LC display and push buttons for adjusting the target temperature and fan stage |
| clima DWM-21 | Wall module with temperature sensor, LC display and push buttons for adjusting the target temperature |
| clima DWM-21-rH | Wall module with temperature and air humidity sensor, LC display and push buttons for adjusting the target temperature |
| clima DWM-11-rH | Wall module with temperature and air humidity sensor |
| clima DMS-20 | Multisensor for slot installation |

The modules are connected using a cable assembly with RJ9 connectors on both sides.

The following module combinations are supported:

| Connection A | Connection B | Description |
|---|---|---|
| Multisensor | Wall module | All functions of the multisensor and wall module can be used |
| not used | Wall module | The wall module can be fully utilised |
| Multisensor | not used | The multisensor can be fully utilised |
| Multisensor | Multisensor | The multisensor on connection A can be fully utilised Only the occupancy sensor can be evaluated by the multisensor on connection B. This occupancy sensor is linked via an "OR" function to the occupancy sensor of the multisensor on connection A. An existing IR manual remote control can only be evaluated via the multisensor on connection A. |

# 5. Creating and configuring the clima DL-110

## 5.1. Equip the unit

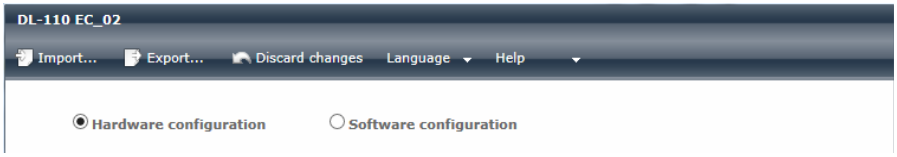
To use a clima DL-110 device for your project, you must first install the e.control plug-in setup program either from the CD or from the Internet. The setup program contains the application files, LNS plug-ins and the user manual. More information on how to install and use the plug-ins is given in the chapter entitled "spega e.control plug-ins".

First you must create a device template in your LNS project. For this you have the spega e.control device template manager, which can be run as a plug-in on your project. The clima DL-110 device can be found in the category "Universal room controllers". Here you can choose from a list of all available device templates. Select the desired template and accept it for your project. You can then set up the device in the usual way using the corresponding device template.

## 5.2. Configuration of the device

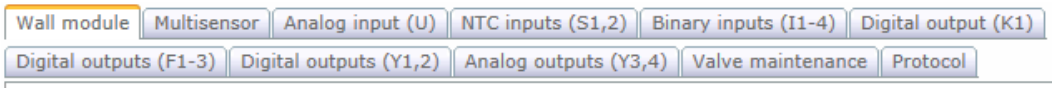
A convenient device plug-in is available for starting up the clima DL-110. The device plug-in is used for making the relevant settings for using the hardware as well as for calling up the object plug-ins.

You can choose between the hardware and software configurations on the start screen of the device plug-in.




### Hardware configuration

The sensors and actuators connected are configured and parameterised by selecting the "Hardware configuration".




The tabs are assigned to the following groups:

- Configuration of the modules

| | |
|---|---|
| Wall module | This is where all settings for the wall module connected to the RJ9 terminal "B" can be made. |
| Multisensor | This is where all settings for the multisensors connected via the RJ9 terminals "A" and "B" can be made. |

- Configuration of the inputs

| | |
|---|---|
| Analog input (U) | This is where the settings for the "U" input terminal on the clima DL-110 can be made. |

| | |
|---|---|
| NTC inputs (S1, 2) | This is where the settings for input terminals "S1" and "S2" can be made. |
| Binary inputs (I1-4) | This is where the settings for input terminals "I1" to "I4" can be made. |

- Configuration of the outputs

| | |
|---|---|
| Digital output (K1) | This is where the settings for a 230V actuator connected to output terminal "K1" can be made. |
| Digital outputs (F1-F3) | This is where multiple-step fans or 2-point drives with a 230V power supply can be parameterised, which are connected to output terminals "F1" to "F3". |
| Digital outputs (Y1, 2) | This is where 24V actuators with 2-point or 3-point control can be parameterised, which are connected to output terminals "Y1" to "Y2". |
| Analog outputs (Y3, 4) | This is where analog actuators with a 0-10V or a 2-10V signal can be parameterised, which are connected to output terminals "Y3" to "Y4". |

The setting options available on the individual tabs are described in detail under "Configuration of the hardware".

## Software configuration

You can switch directly to the relevant object plug-ins by selecting "Software configuration". This initiates a full start-up of the system.

The individual objects are grouped according to their basic functionality:


- Sensors

  This is where all objects used for capturing sensors are listed. Objects with an assigned input which, according to the hardware configuration, is not in use, are hidden.

- Controllers

  The control objects available can be called up and parameterised.

- Actuators

  This is where all objects used for activating the outputs are listed. Objects with an assigned output which, according to the hardware configuration, is not in use, are hidden.

The setting options available on the individual tabs are described in detail under "Configuration of the software".

## 5.3. Configuration of the hardware

The configuration of the hardware is divided into the available modules, the sensors and the actuators.

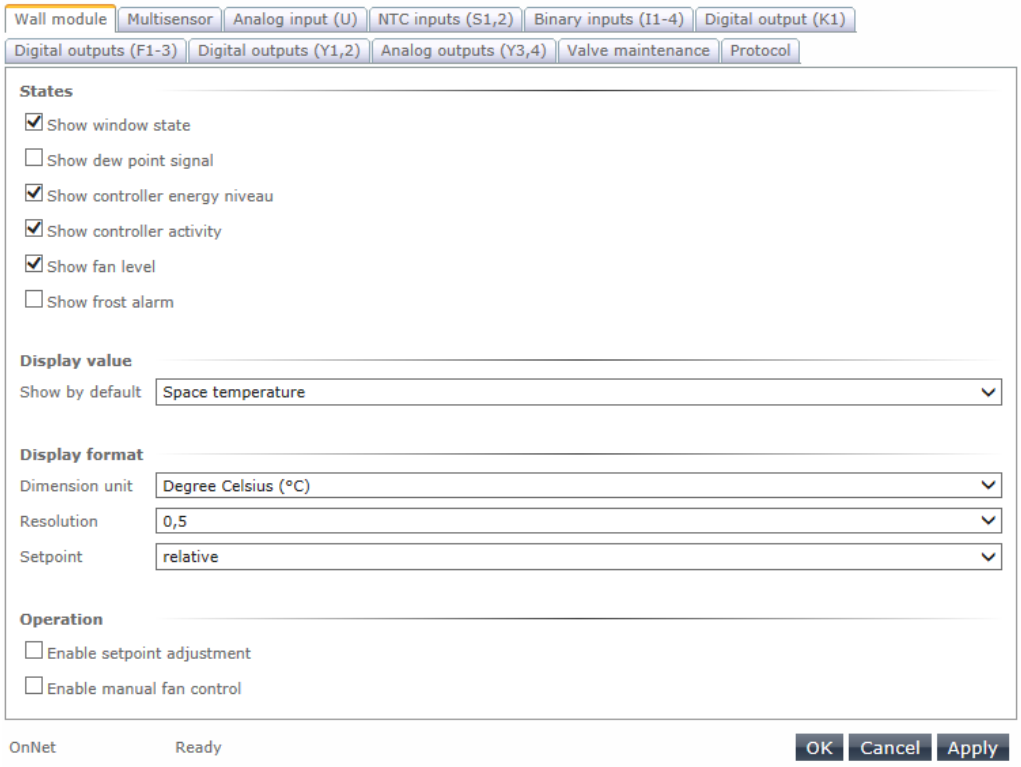
### 5.3.1 Modules

#### Wall module

The wall modules available are listed in the table below. The system automatically detects what type of wall module is connected.

| Module | Description |
|---|---|
| clima DWM-20 | Wall module with temperature sensor, LC display and push buttons for adjusting the temperature setpoint and fan stage |
| clima DWM-21 | Wall module with temperature sensor, LC display and push buttons for adjusting the temperature setpoint |
| clima DWM-21-rH | Wall module with temperature and relative humidity sensor, LC display and push buttons for adjusting the temperature setpoint |
| clima DWM-11-rH | Wall module with temperature and relative humidity sensor |

The configuration options on the "Wall module" tab, as described below, apply only to wall modules with an LCD display.

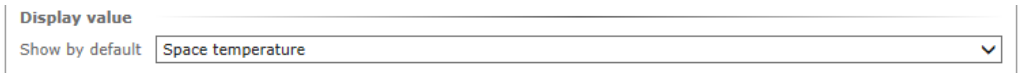


## States

Selecting the individual states activates their respective display screens.

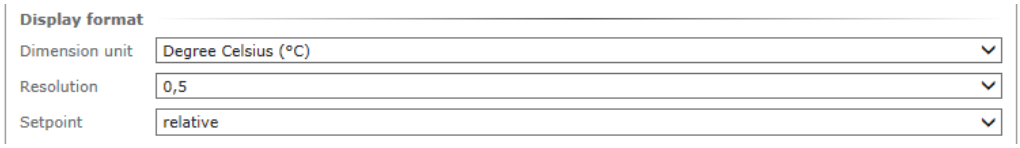

## Display value

With regard to the value shown on the display, it is possible to choose between the space temperature and setpoint temperature.




## Display format

Once the display value has been chosen the display format can also be adjusted. The unit of measurement, resolution and setpoint display can be defined.




*Dimension unit:*

Temperature values can be displayed either in Celsius (°C) or in Fahrenheit (°F).

*Resolution:*

The following resolutions can be used to display the temperature:

- 0.1
- 0.5
- 1.0 (decimal places are not shown)

*Setpoint:*

If the setpoint has been specified for the value shown, then you must also specify for the setpoint display whether relative or absolute values are to be shown.

## Operation

With wall modules featuring push buttons, setpoint adjustment control and manual fan control are possible. Activating the setpoint adjustment also activates the setpoint bar. The fan levels are displayed independently of any manual fan control options; this is activated or deactivated under "States".

## Object assignment:

The input values are processed via the following objects and output via their network variables:

| Input | Object |
|---|---|
| Space temperature | CommandModule |
| Relative humidity | RelHumSensor* |
| Setpoint adjustment | CommandModule |
| Manual fan control | CommandModule |
| Presence signalisation | CommandModule |

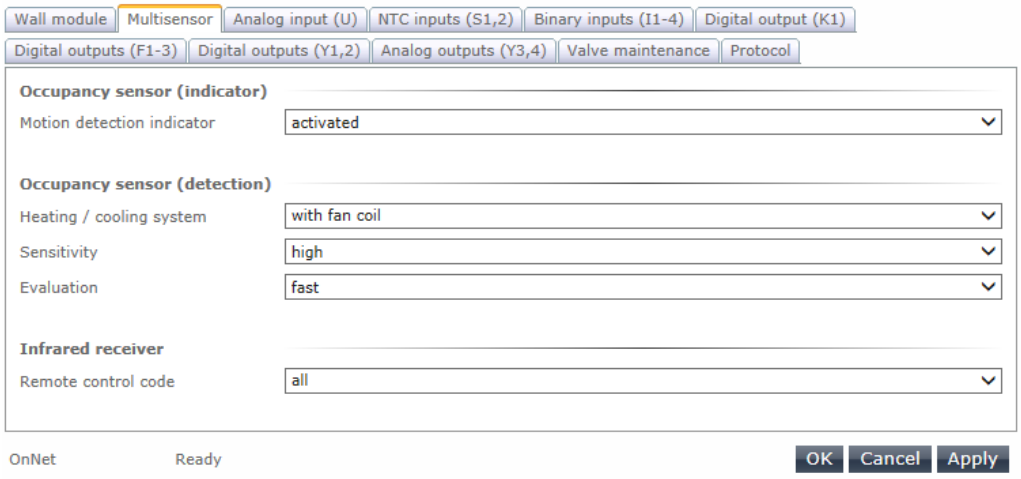
** if no relative humidity sensor is parameterised on the U input port*

The states and values displayed are received via network variables on the following objects:

| Display | Object |
|---|---|
| Space temperature | CommandModule |
| Setpoint | CommandModule |
| States | CommandModule |
| Occupancy | CommandModule |
| Fan levels | CommandModule |

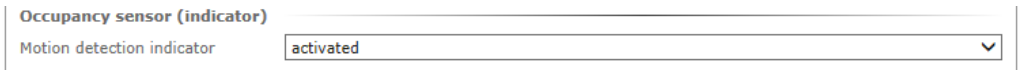
## Multisensor

Any multisensor connected can be parameterised on the "Multisensor" tab. If a room controller with 2 multisensors is being used, the settings apply to both multisensors. With the second multisensor only occupancy is detected by the room controller. The signals from both multisensors are linked by the room controller via an "OR" function and output as a status signal. The signals from the IR remote control are received on the first multisensor alone (channel A).



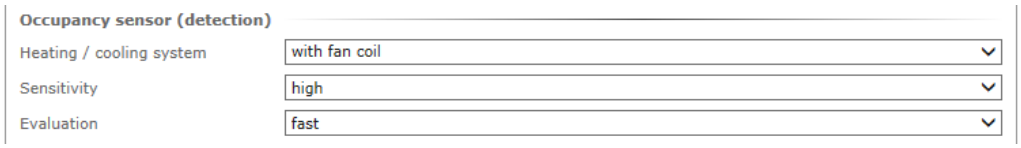

## Occupancy sensor (indicator)

The LED for the motion detection indication can be activated or deactivated. The setting only affects the multisensor's LED indication. This does not affect operation of the occupancy sensor.




## Occupancy sensor (detection)

Occupancy detection by the multisensor can be adapted to the conditions of the room. The type of heating/cooling system is taken into account here and the sensitivity and type of evaluation of the multisensor adjusted accordingly.




*Heating/cooling system:*

To ensure the best possible occupancy evaluation, the system takes into account whether the heating/cooling is operating with or without a fan coil.

*Sensitivity:*

The level of sensitivity for occupancy detection can be adapted to the ambient conditions using the following 4 settings:

- high
- middle
- low

- very low

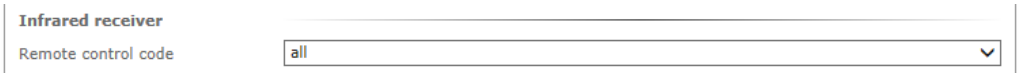
*Evaluation:*

It is possible to switch between fast and slow evaluation for occupancy detection.

## Infrared receiver

Using the *dialog DRC-10* infrared remote control, local setpoint adjustments, manual fan level selection and manual presence signalisation are possible. Up to 4 lighting groups and 4 sunblind groups can also be operated. In addition, up to 3 room utilisation types (scenes) can be controlled.

A specific infrared channel can be specified for infrared remote control evaluation. All codes are received if the "all" setting is chosen.




Where 2 multisensors are used on an individual room controller, evaluation of the infrared remote control is performed solely on the multisensor which is connected to the "A" socket.

## Object assignment

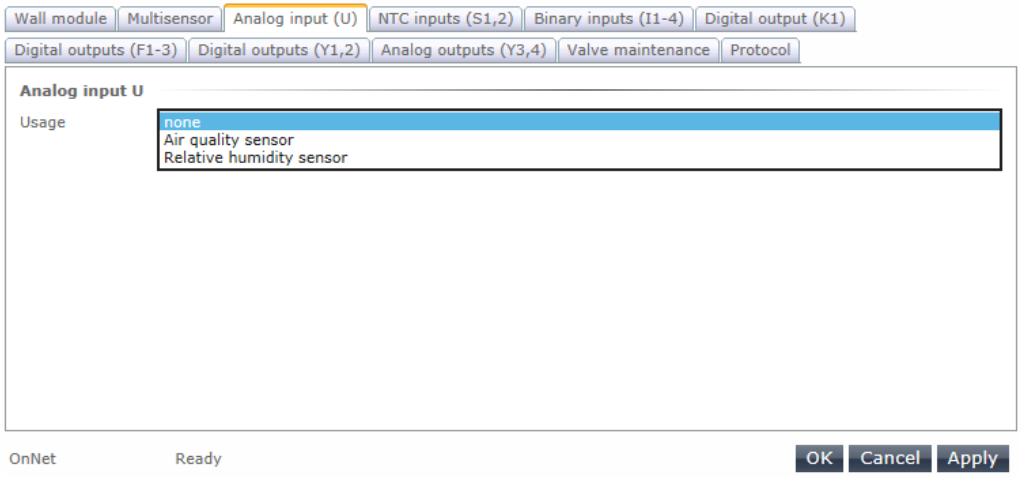
The input values are processed via the following objects and output via the network variables:

| **Input** | | **Object** |
|---|---|---|
| Occupancy detection | | OccupancySensor |
| Brightness | | LightSensor |
| IR receiver | Presence signalisation | CommandModule |
| | Setpoint adjustment | CommandModule |
| | Manual fan control | CommandModule |
| | Lighting group "1" | Switch [0] |
| | Lighting group "2" | Switch [1] |
| | Lighting group "3" | Switch [2] |
| | Lighting group "4" | Switch [3] |
| | Lighting group "all" | Switch [0] - [3] |
| | Sunblind group "1" | Switch [4] |
| | Sunblind group "2" | Switch [5] |
| | Sunblind group "3" | Switch [6] |
| | Sunblind group "4" | Switch [7] |
| | Sunblind group "all" | Switch [4] - [7] |
| | Scene "1" | ScenePanel |
| | Scene "2" | ScenePanel |
| | Scene "3" | ScenePanel |

## 5.3.2 Inputs

### Analog input (U)

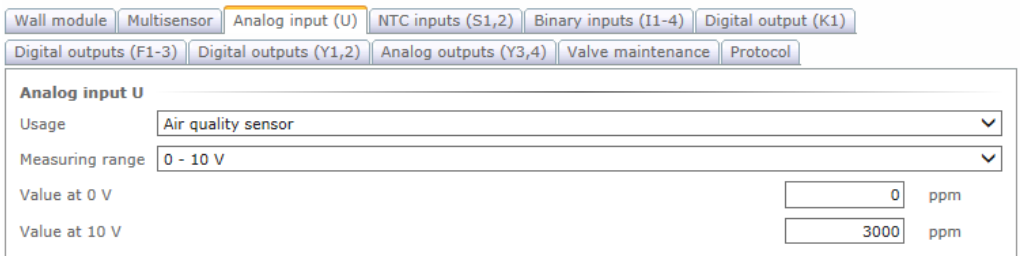
An active relative humidity or air quality sensor can be integrated via the individual room controller's analog input.




*Usage:*

Depending on the sensor connected, it is possible to assign a use for the input on the "Analog input (U)" tab.

### Air quality sensor



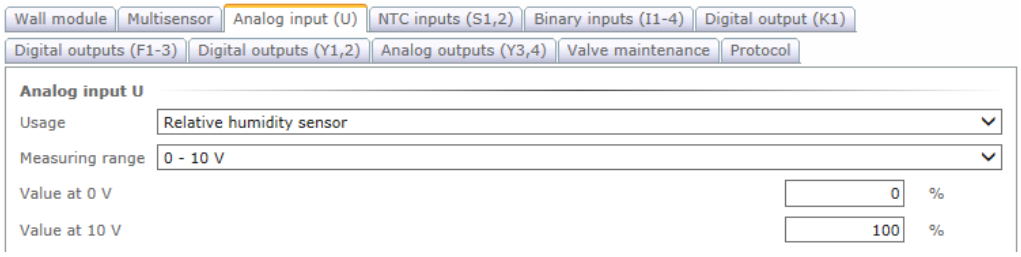

*Measuring range:*

The settings "0-10V" and "2-10V" are available for the measuring range. A measuring range which is appropriate for the connected sensor's specifications should be chosen.

*Value at xV:*

The measured value is output in "ppm" unit and must be adapted to the measuring range of the sensor connected.

### Relative humidity sensor



*Measuring range:*

The settings "0-10V" and "2-10V" are available for the measuring range. A measuring range which is appropriate for the connected sensor's specifications should be chosen.

*Value at xV:*

The measured value is output in "%" unit and must be adapted to the measuring range of the sensor connected.

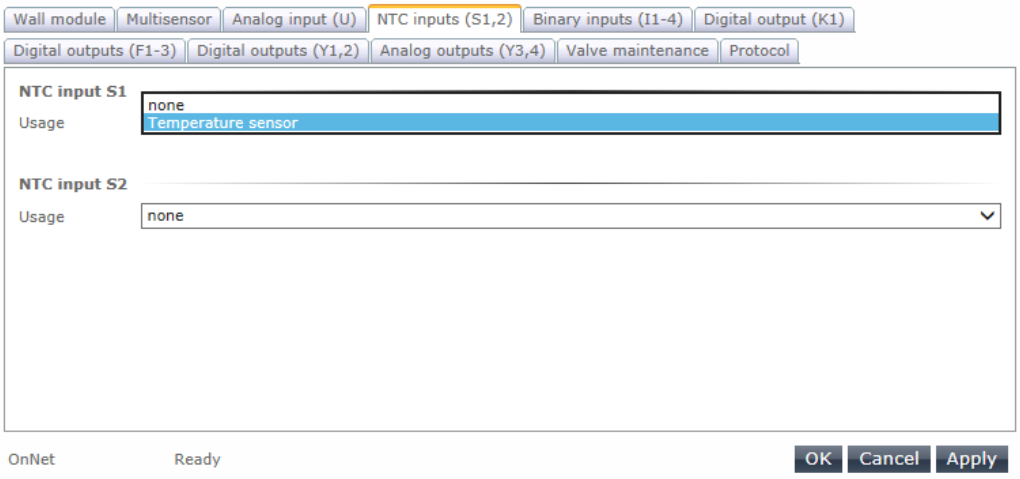
## Object assignment

The input values are processed via the following objects and output via their network variables:

| Input | Object |
|---|---|
| Air quality | AirQualSensor |
| Relative humidity | RelHumSensor |

## NTC inputs (S1, 2)

NTC thermistors for measuring the room temperature can be used via both S1 and S2 inputs on the room controller.




*Usage:*

They can be set for use as a room temperature sensor for both inputs independently of one another.

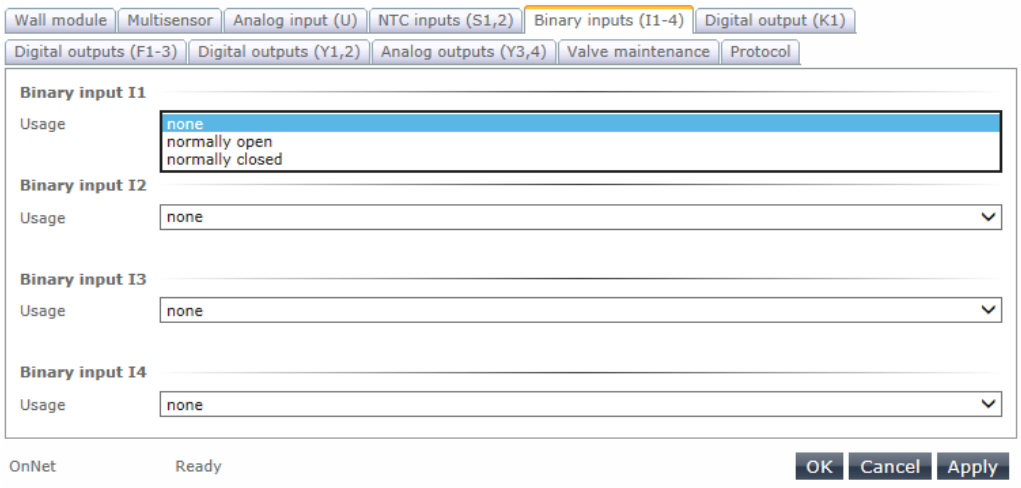
## Object assignment

The input values are processed via the following objects and output via the network variables:

| Input | Object |
|---|---|
| NTC input S1 | TempSensor [0] |
| NTC input S2 | TempSensor [1] |

## Binary inputs (I1-4)

Individual room controllers have 4 binary inputs.




*Usage:*

The inputs can be used independently of one another as normally closed or normally open contacts.

### Object assignment

The input values are processed via the following objects and output via their network variables:

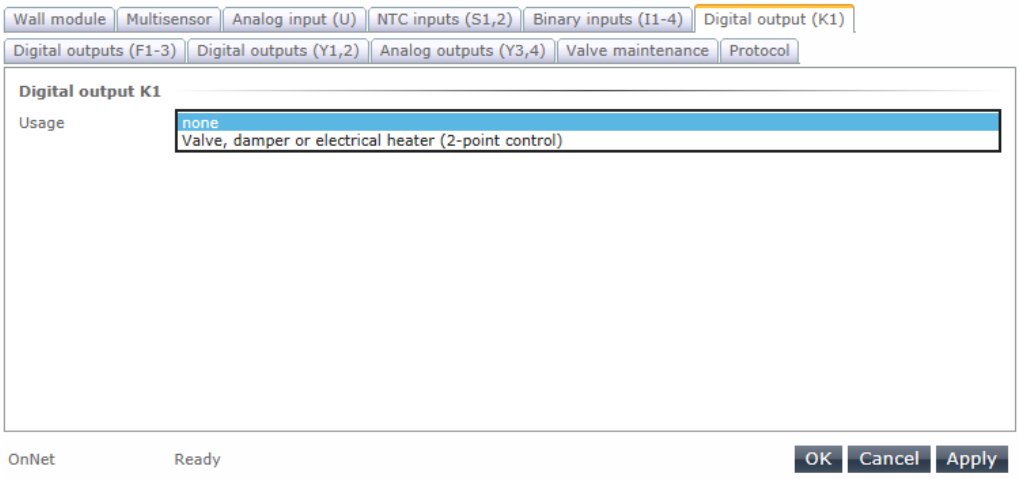
| Input | Object |
|---|---|
| Binary input I1 | BinaryInput [0] |
| Binary input I2 | BinaryInput [1] |
| Binary input I3 | BinaryInput [2] |
| Binary input I4 | BinaryInput [3] |

## 5.3.3 Outputs

### Choice of the use

#### Digital output (K1)

Digital output K1 on the individual room controller offers a 230V switching output.




*Usage:*

The digital switching output can be used for the 2-point activation of a valve, damper or electrical heater. A detailed description on configuring it for this use is given in the chapter entitled "Parameterisation of output use".

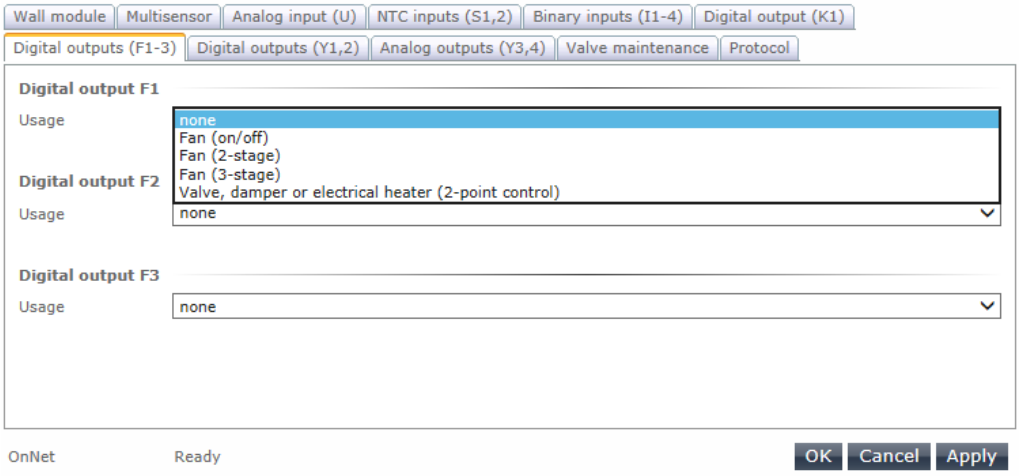
#### Object assignment

The output is controlled using the network variable of the related object:

| Output | Object |
|---|---|
| Digital output K1 | HvacActuator [0] |

## Digital outputs (F1 - 3)

Digital outputs F1 to F3 can be used to activate 230V (2A) actuators and fans.




*Usage:*

The individual digital outputs have a number of applications. It should be noted that not all applications can be set on each channel. A detailed description on configurations for individual uses is given in the chapter entitled "Parameterisation of output use".

*NOTE: In terms of the usage "Fan (2-stage)" the following output is required for activation; for the usage "Fan (3-stage)" both the following outputs are required. The relevant outputs are automatically blocked in the plug-in and no further application can be set.*

### Object assignment

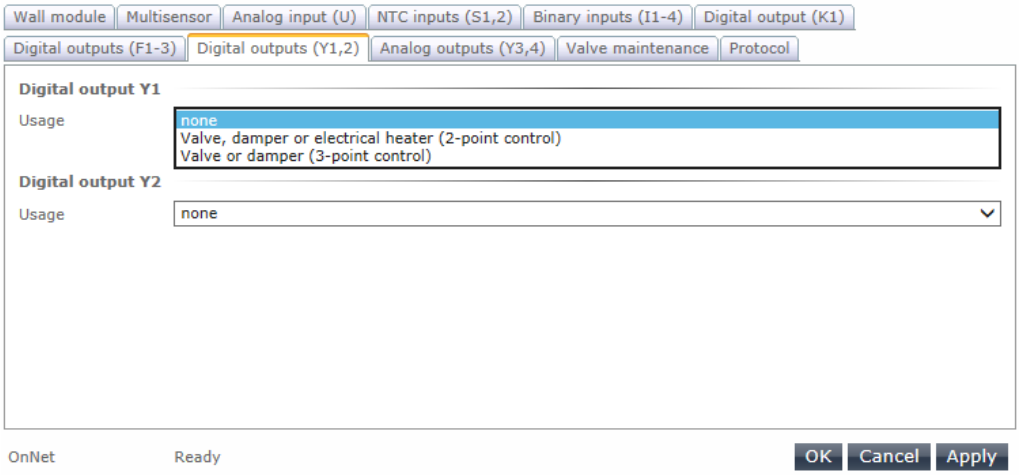
The outputs are controlled using the network variable of the related object, regardless of the usage. If the usage requires several digital outputs, these outputs are controlled by one object:

| Usage | Outputs | Objects |
|---|---|---|
| Fan (on/off) | Digital output F1 | HvacActuator [1] |
| | Digital output F2 | HvacActuator [2] |
| | Digital output F3 | HvacActuator [3] |
| Valve, damper or electrical heater (2-point control) | Digital output F1 | HvacActuator [1] |
| | Digital output F2 | HvacActuator [2] |
| | Digital output F3 | HvacActuator [3] |
| Fan (2-stage) | Digital outputs F1* and F2 | HvacActuator [1] |
| | Digital outputs F2* and F3 | HvacActuator [2] |
| Fan (3-stage) | Digital outputs F1*, F2 and F3 | HvacActuator [1] |

* *the usage is set on this channel*

## Digital outputs (Y1, Y2)

Digital outputs Y1 and Y2 can be used to activate valves with a control voltage of 24V DC.




*Usage:*

Both digital outputs have different applications. It should be noted that not all applications can be set on each channel. A detailed description on configurations for individual uses is given in the chapter entitled "Parameterisation of output use".

*NOTE: Both digital outputs are required for the application "Valve or damper (3-point control)". The Y2 digital output is automatically blocked in the plug-in and no further application can be set.*

### Object assignment

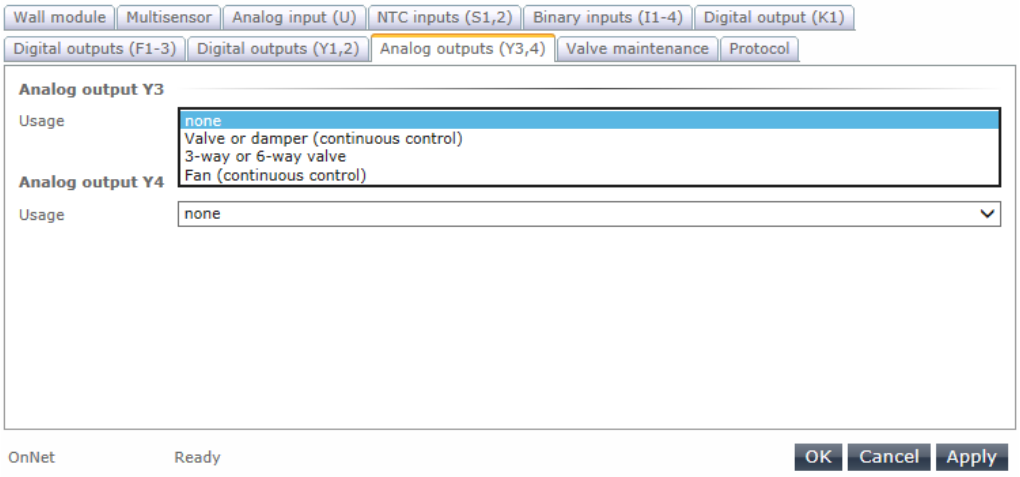
The outputs are controlled using the network variable of the related object, regardless of the usage. If the usage requires several digital outputs, these outputs are controlled by one object:

| Usage | Outputs | Objects |
|---|---|---|
| Valve, damper or electrical heater (2-point control) | Digital output Y1 | HvacActuator [4] |
| | Digital output Y2 | HvacActuator [5] |
| Valve or damper (3-point control) | Digital outputs Y1* and Y2 | HvacActuator [4] |

** the usage is set on this channel*

## Analog outputs (Y3, Y4)

With analog switching outputs Y3 and Y4 valves and fans with a control voltage of 0-10V and 2-10V can be controlled.




*Usage:*

Both analog outputs have a number of uses.

- Valve or damper (continuous control)
- 3-way or 6-way valve
- Fan (continuous control)

A detailed description on configurations for individual uses is given in the chapter entitled "Parameterisation of output use".

### Object assignment

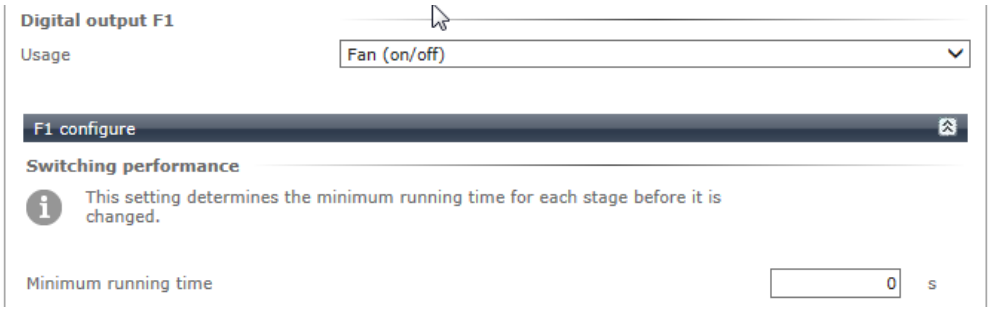
The outputs are controlled using the network variable of the related object:

| Output | Object |
|---|---|
| Analog output Y3 | HvacActuator [6] |
| Analog output Y4 | HvacActuator [7] |

# Parameterization of the output using

## Fan (on/off)

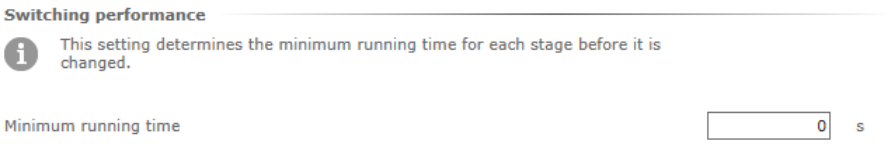
The following settings can be made:




### Switching performance

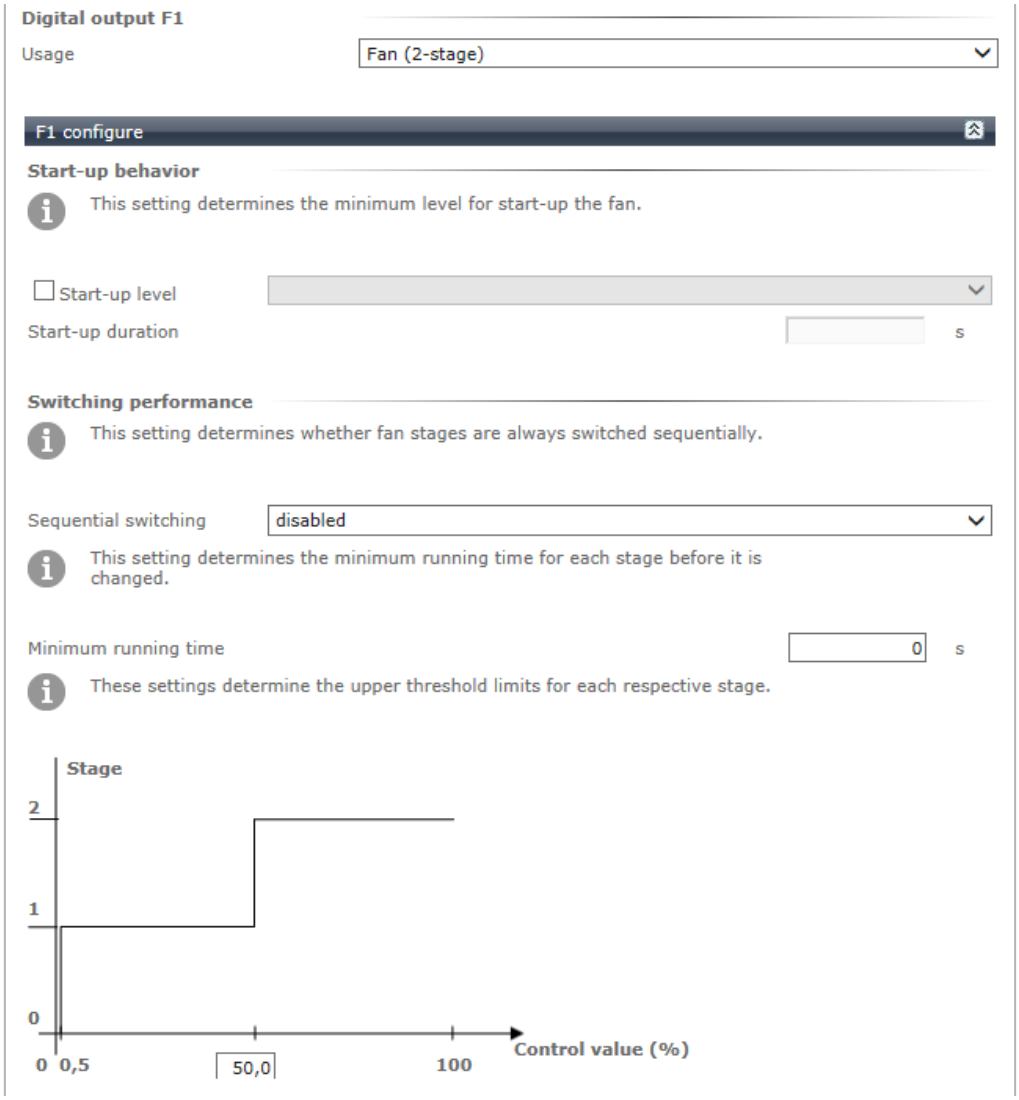
*Minimum running time:*

Stipulating a minimum running time ensures the fan remains switched on for at least the period of time specified.



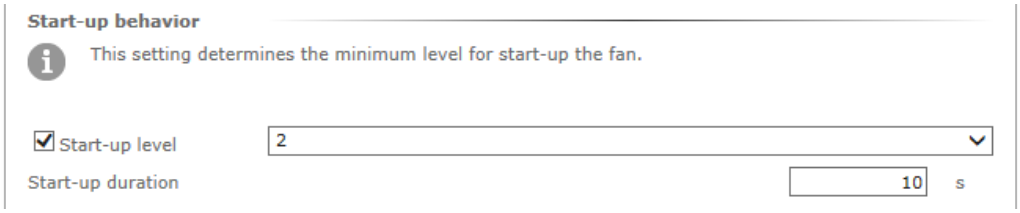
## Fan (2-stage)

The following settings can be made:



## Start-up behavior

The start-up behavior determines how the fan responds when it is switched on. It is only executed if the required activation setting is lower than the parameterised start-up setting.




*Start-up level:*

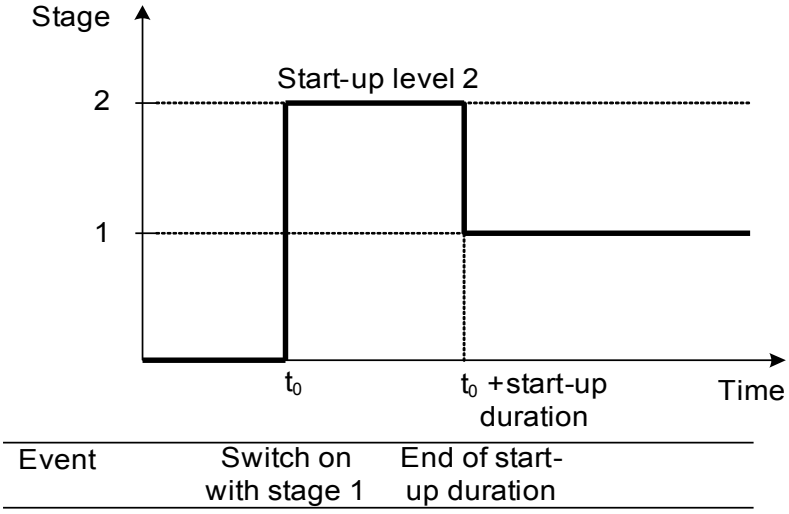
By parameterising the start-up setting you can stipulate which minimum setting is activated when the fan is switched on. With a lower fan setting, therefore, the fan is activated at the start-up setting for the parameterised start-up time.


*Start-up duration:*

Once the start-up time has elapsed the fan is activated at the lower activation setting requested. The parameterised minimum running time does not affect the validity of the start-up time.

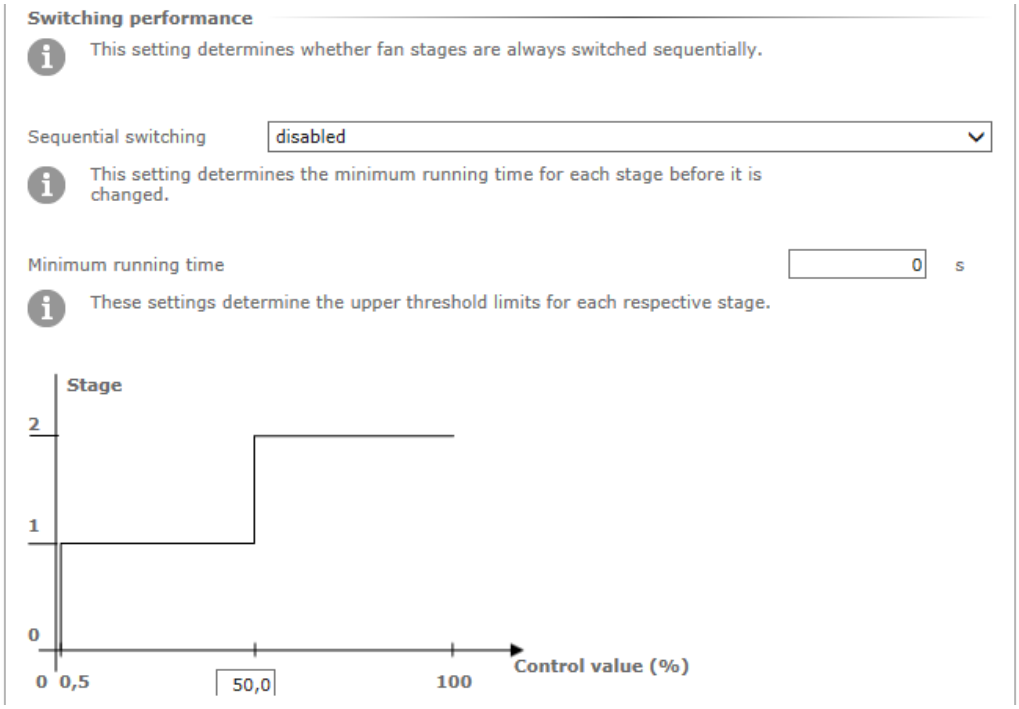

**Example:**

In the following figure stage 1 has been selected as the activation setting. By specifying a start-up setting of 2 the fan is activated for the start-up time period for stage 2. Once the start-up time has elapsed the fan is automatically activated at the activation setting requested. If stage 2 is specified as the activation setting, the start-up behaviour is not taken into consideration, as the minimum setting for start-up has already been reached.



## Switching performance

The switching performance function is used for specifying whether the fan is to be used for sequential operation, as well as for the minimum time period in which a stage remains activated. The switching threshold between the setting stages can also be parameterised.

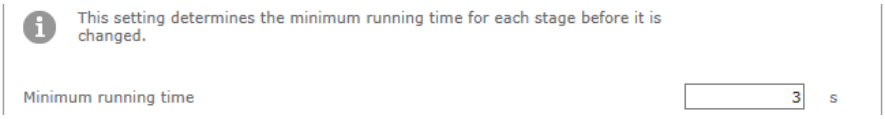



*Sequential switching:*

If sequential switching is selected, a stage change across several stages is always executed in such a way that each intermediate stage is actuated.

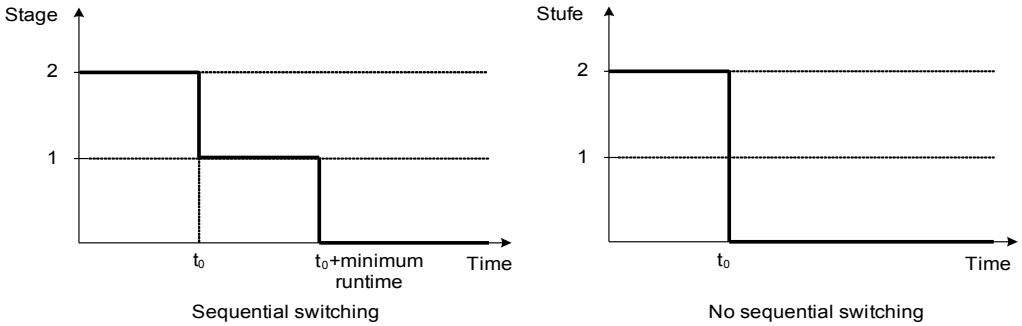

*Minimum running time:*

The minimum running time is used to specify the minimum time period in which a stage remains activated. It is only possible to switch to the next higher or lower stage once the minimum running time has expired. The validity of the start-up time triggered on activation is not affected by the parameterised minimum running time.



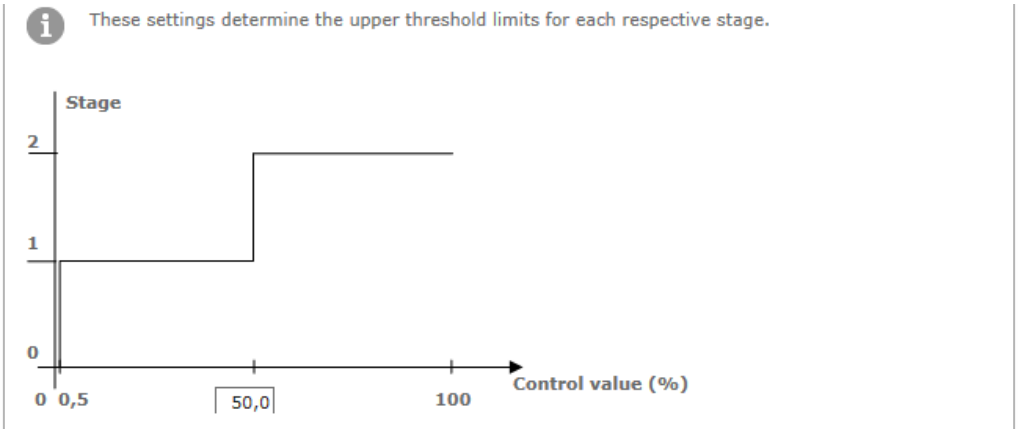
**Example:**

In the figure below the fan is switched from stage 2. With sequential switching, fan stage 1 is run for the minimum running time when the fan is shut down. If no sequential switching is selected the fan is switched off directly.



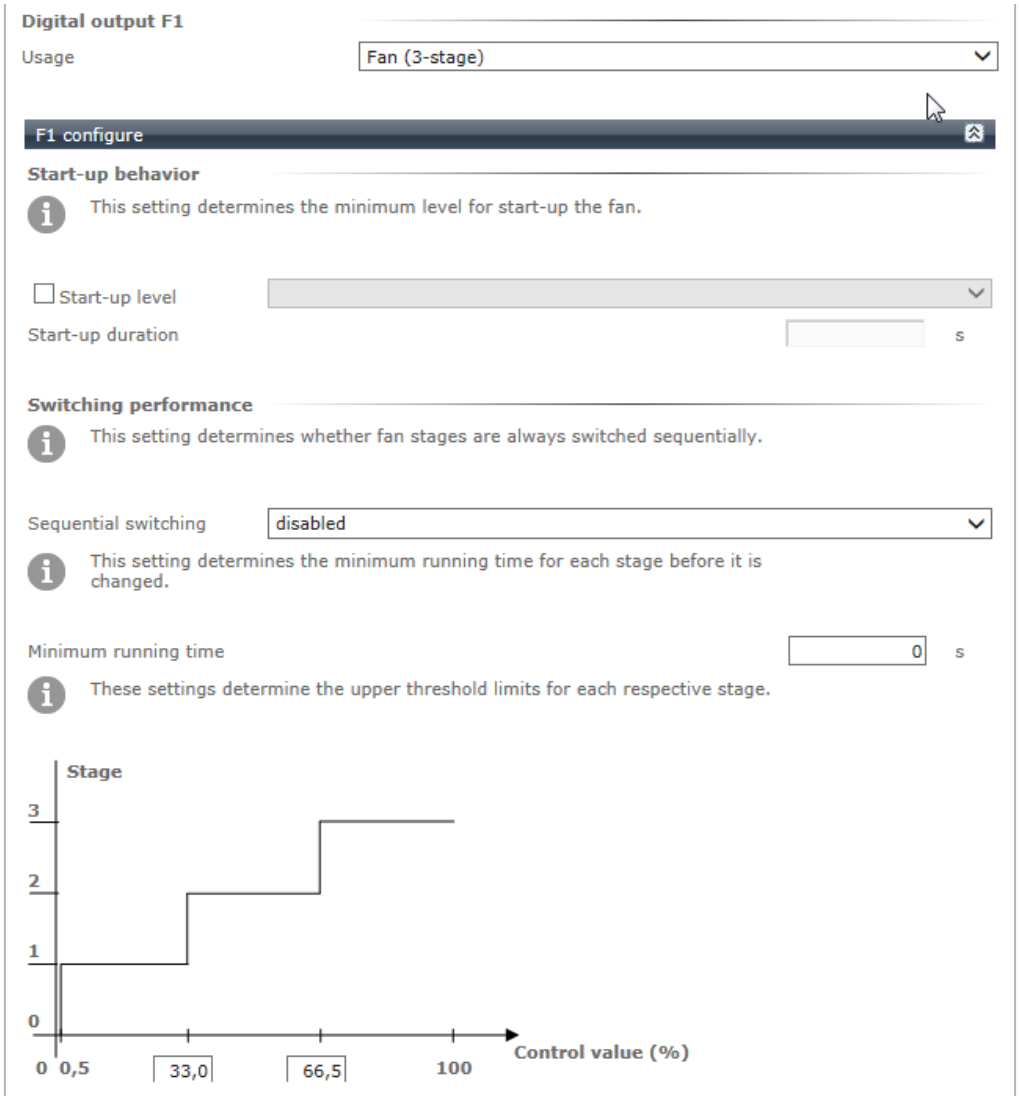

*Control output value:*

By specifying the control output value you can determine the input value from which the next fan stage is activated.



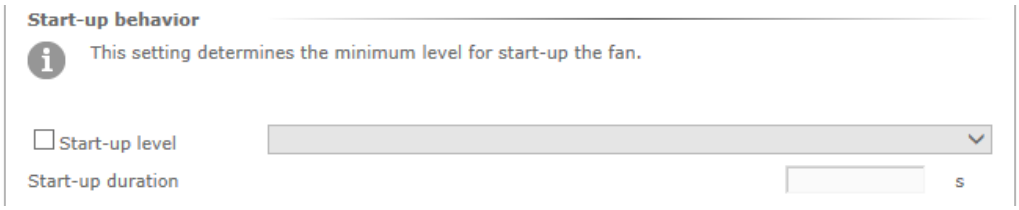
## Fan (3-stage)

The following settings can be made:



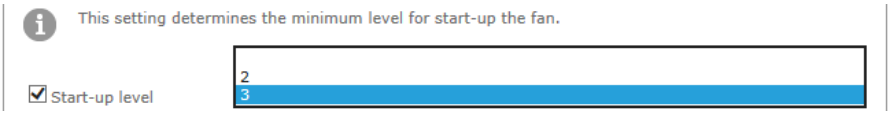

## Start-up behavior

The start-up behavior determines how the fan responds when it is switched on. It is only executed if the required activation setting is lower than the parameterised start-up setting.




*Start-up level:*

By parameterising the start-up setting you can stipulate which minimum setting is activated when the fan is switched on. With a lower fan setting, therefore, the fan is activated at the start-up setting for the parameterised start-up time.

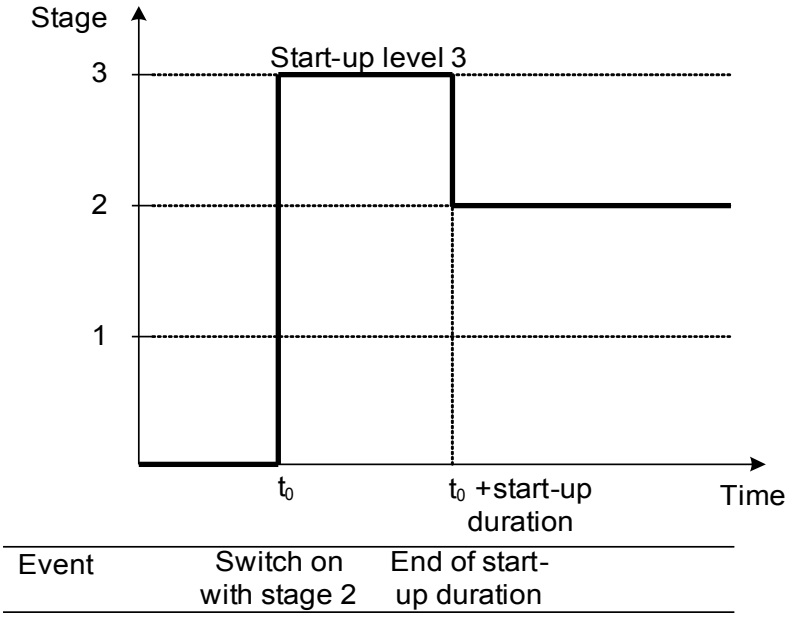



*Start-up duration:*

Once the start-up duration has elapsed the fan is activated at the lower activation setting requested. The parameterised minimum running time does not affect the validity of the start-up duration.

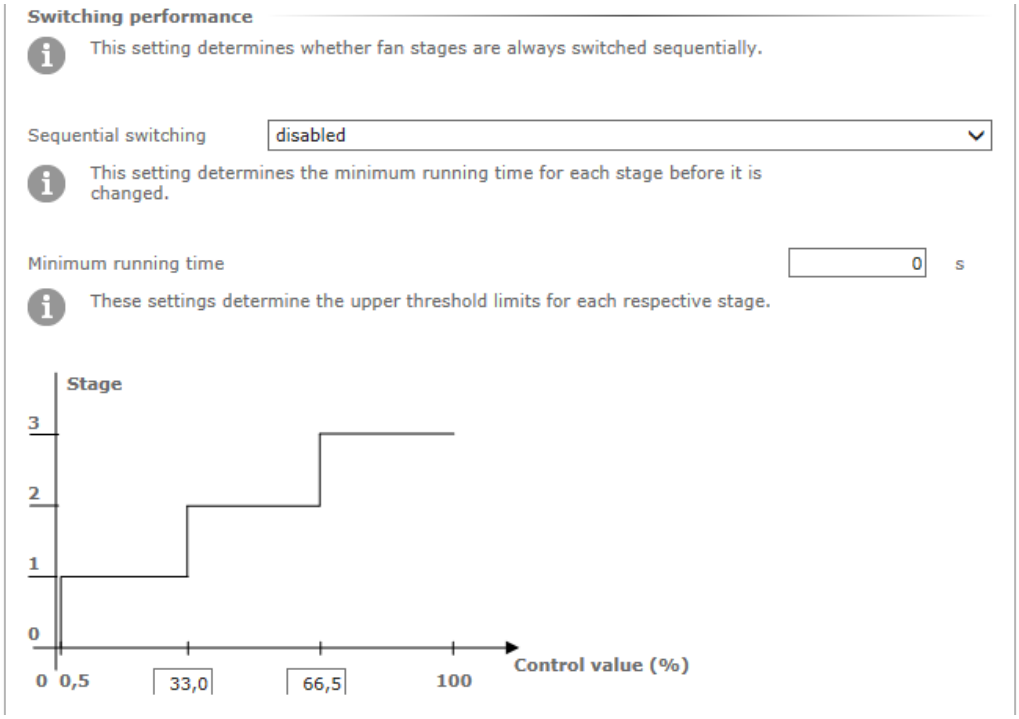

**Example:**

In the following figure stage 2 has been selected as the activation setting. By specifying a start-up setting of 3 the fan is activated for the start-up time period for stage 3. Once the start-up time has elapsed the fan is automatically activated at the activation setting requested. If stage 3 is specified as the activation setting, the start-up behaviour is not taken into consideration, as the minimum setting for start-up has already been reached.



## Switching performance

The switching performance function is used for specifying whether the fan is to be used for sequential operation, as well as for the minimum time period in which a setting remains activated. The switching threshold between the setting stages can also be parameterised.

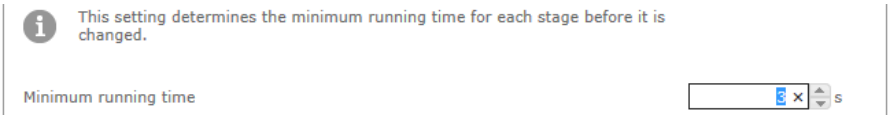



*Sequential switching:*

If sequential switching is selected, a stage change across several stages is always executed in such a way that each intermediate stage is actuated.

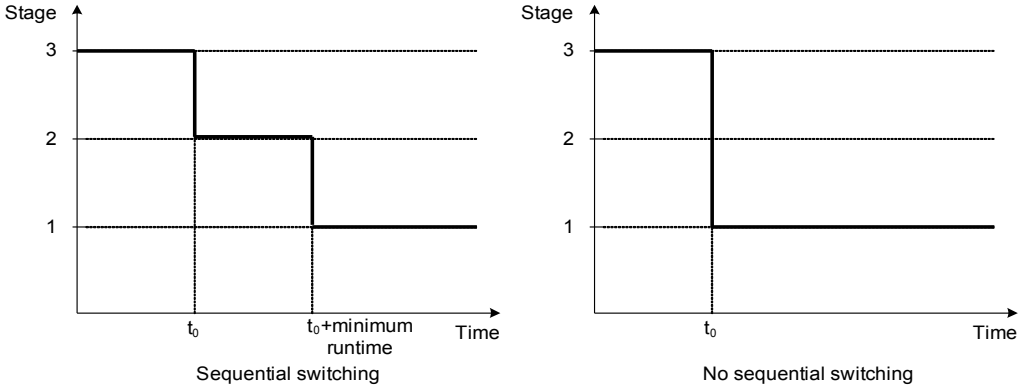

*Minimum running time:*

The minimum running time is used to specify the minimum time period in which a stage remains activated. It is only possible to switch to the next higher or lower stage once the minimum running time has expired. The validity of the start-up time triggered on activation is not affected by the parameterised minimum running time.



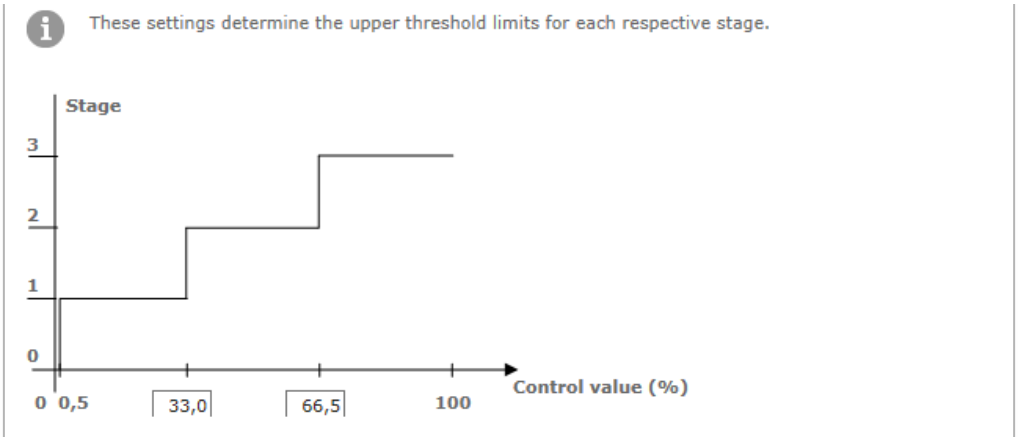
**Example:**

In the figure below the fan is switched from stage 3 to stage 1. With sequential switching, fan stage 2 is run for the minimum running time specified. If no sequential switching is selected the fan is switched directly to stage 1.



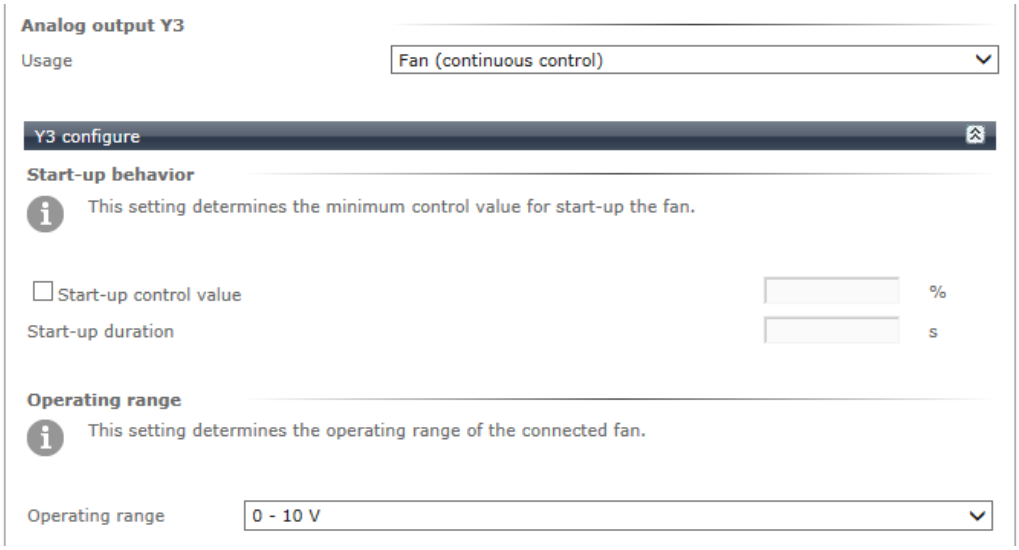

*Control value:*

By specifying the control value you can determine the input value from which the next fan stage is activated.



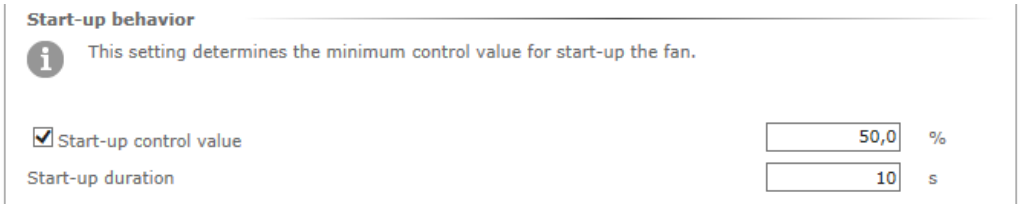
## Fan (continuous control)

The following settings can be made:




## Start-up behavior

The start-up behavior determines the minimum setting with which the fan is activated and for how long this output remains active. The start-up behavior is only executed if the required activation value is lower than the parameterised start-up setting.




*Start-up control value:*

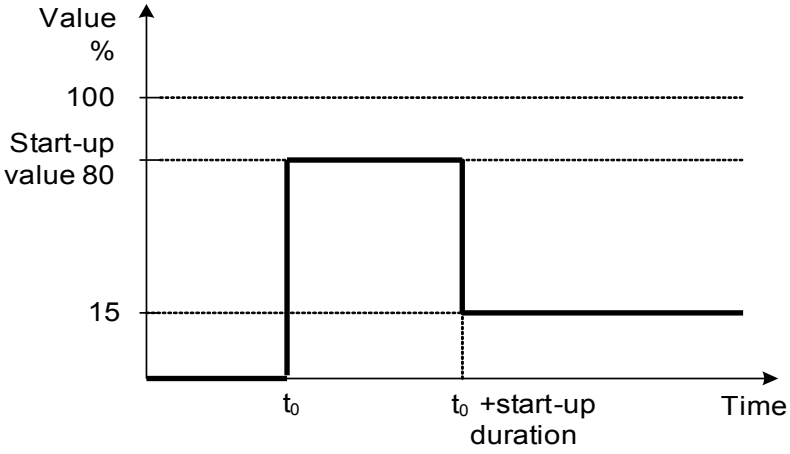
By parameterising the start-up control value you can specify the minimum percentage value at which the fan is activated. Requests for lower settings are temporarily overridden.


*Start-up duration:*

Once the start-up duration has elapsed the fan is activated at the lower setting requested.

**Example:**

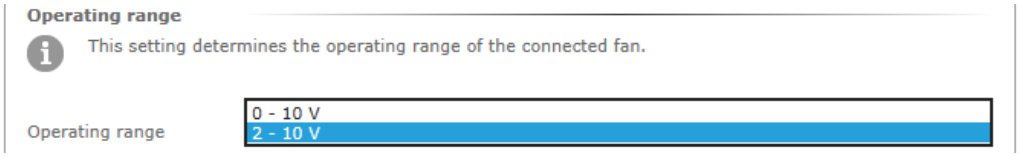
In the figure shown below a requested setting of 15% was given. However, the fan is activated for the set start-up time at a parameterised start-up setting of 80%. Once the start-up time has elapsed the start-up setting override is cancelled and the fan is activated at the requested setting of 15%.




| Event | Switch on with 15% | End of start-up duration |
|---|---|---|

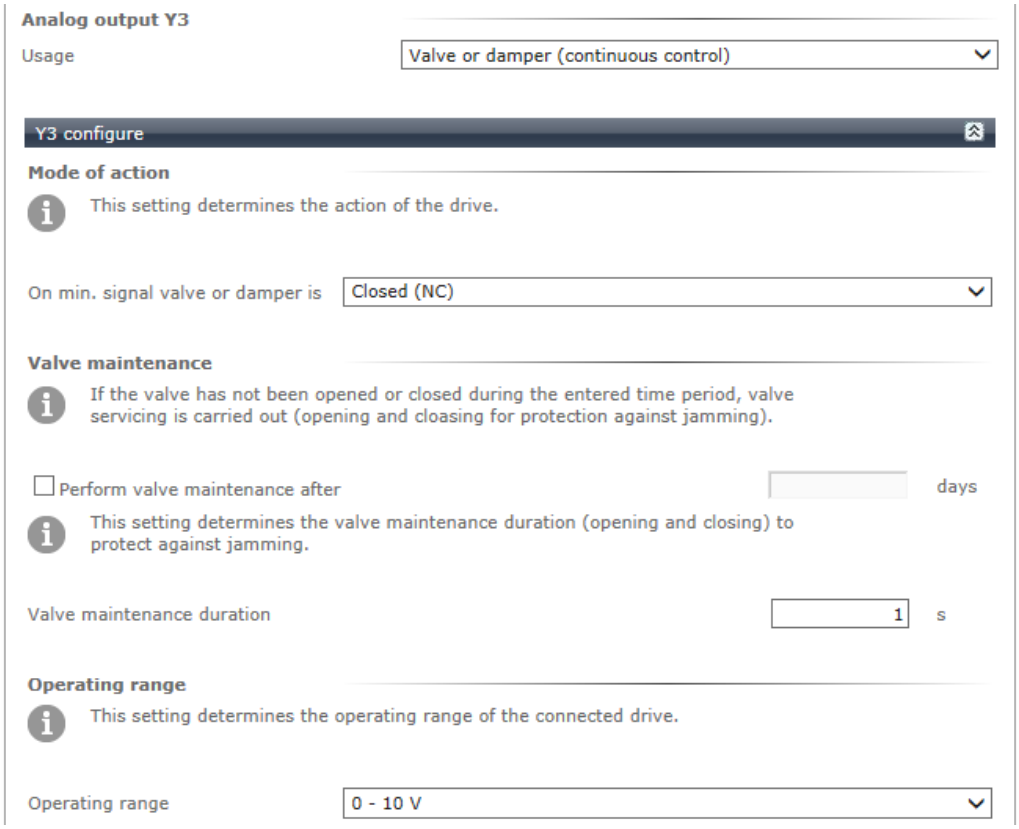
## Operating range:

By setting the operating range you can specify which voltages are used to activate the valve.



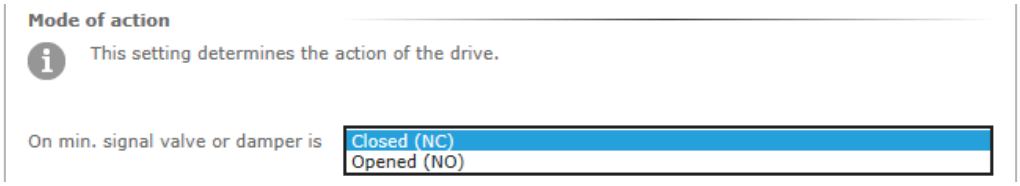
## Valve or damper (continuous control)

The following settings can be made:



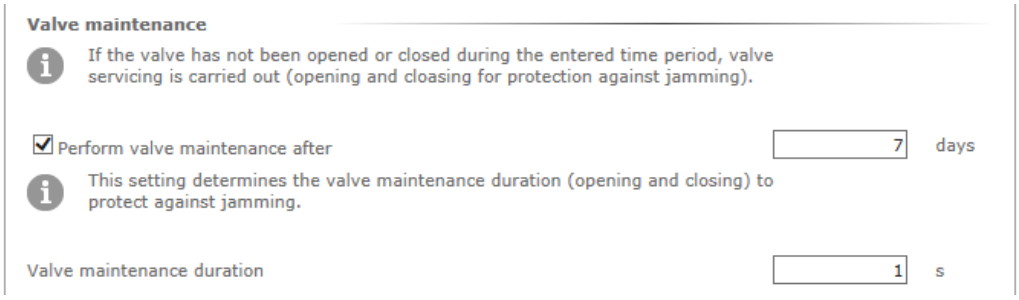

## Mode of action

By defining the mode of action, you can stipulate the behavior of a valve or flap on reaching the minimum level of the defined operating range on the output.




## Valve maintenance

A maintenance function can be activated for valves at this point.




*Perform valve maintenance after:*

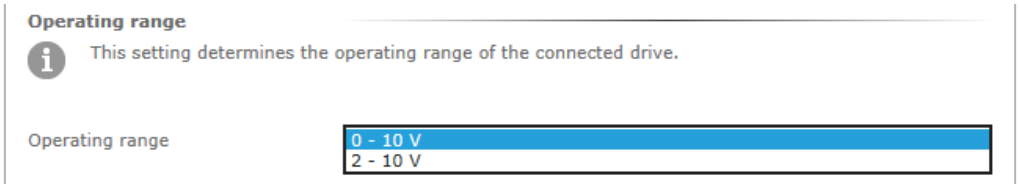
The maintenance operation is initiated if at least one of the end positions of the valve has not been reached within a specified time period.

*Valve maintenance duration:*

By stipulating a valve maintenance period you can specify the time period in which valve maintenance is carried out. It should be noted that it must be possible to open and close the valve fully within this period.

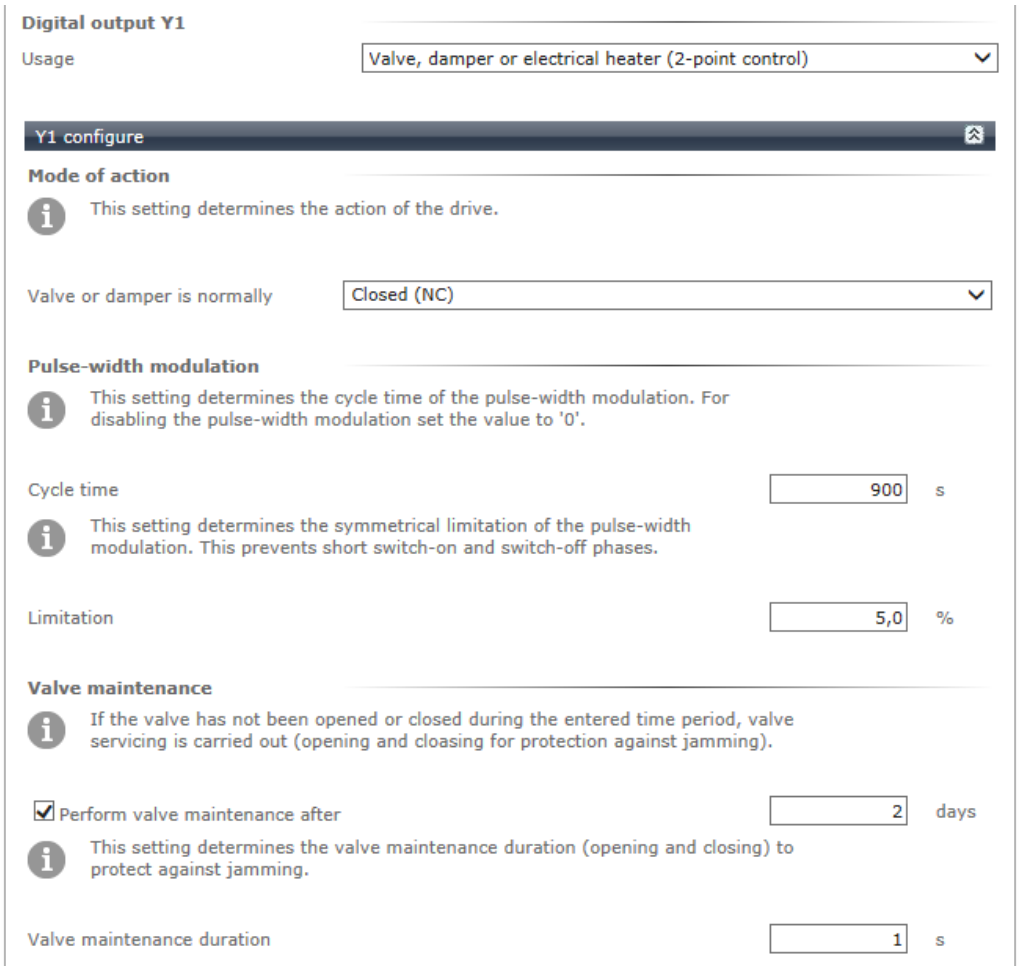
## Operating range

Setting the operating range determines which voltages are used to activate the valve or flap.



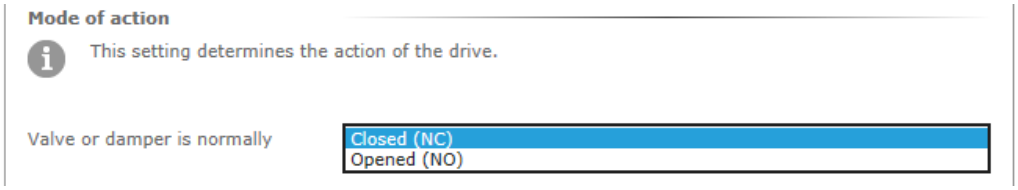
## Valve, damper or electric heater (2-point control)

The following settings can be made:



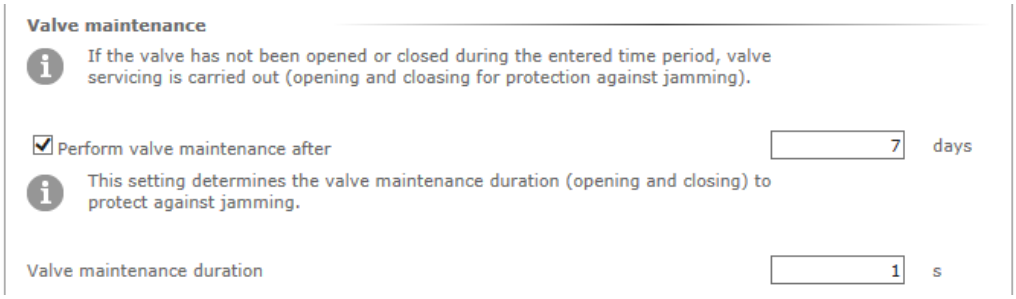

## Mode of action

The "Mode of action" function allows you to choose whether the connected actuator is open or closed when de-energised.



## Valve maintenance

A maintenance function can be activated for valves at this point.




*Perform valve maintenance after:*

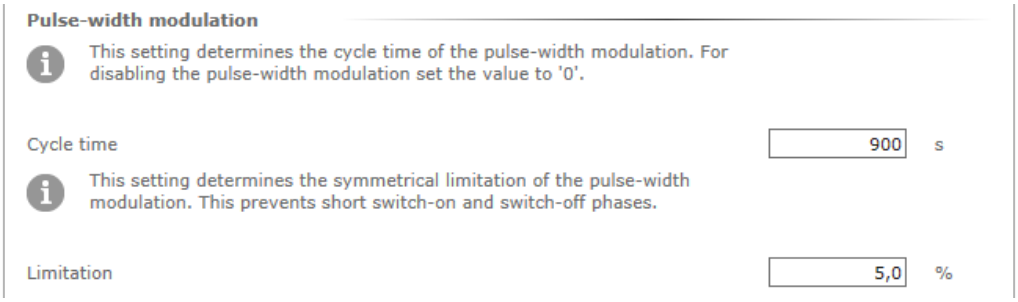
The maintenance operation is initiated if at least one of the end positions of the valve has not been not reached within a specified length of time.

*Valve maintenance duration:*

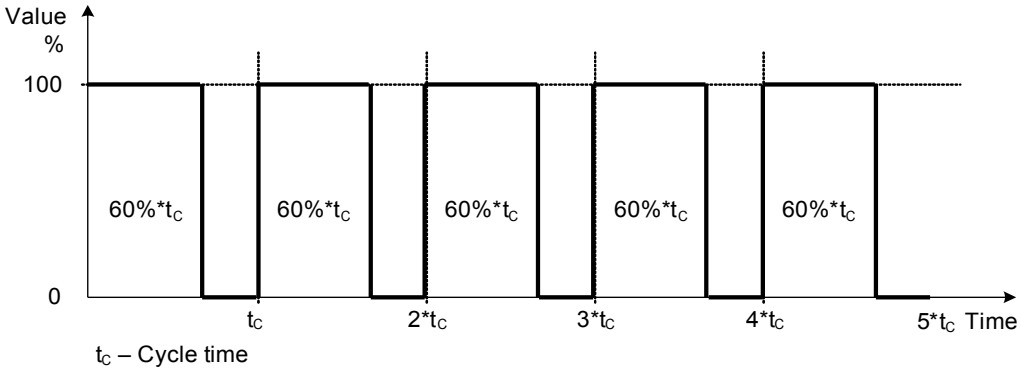
By stipulating a valve maintenance period you can specify the time period in which valve maintenance is carried out. It should be noted that it must be possible to open and close the valve fully within this period.

## Pulse width modulation

Pulse width modulation can be set for 2-point control.

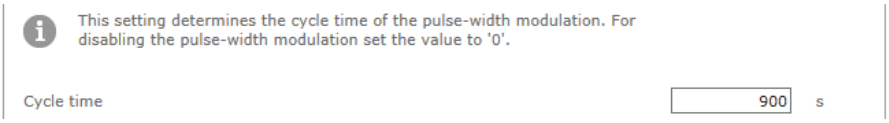


With this a constant control output value can be used to influence a thermoelectric actuator, for example, in such a way that the averaged flow rate is proportional to the control output value. The figure shows an example of pulse width modulation for a control output value of 60%



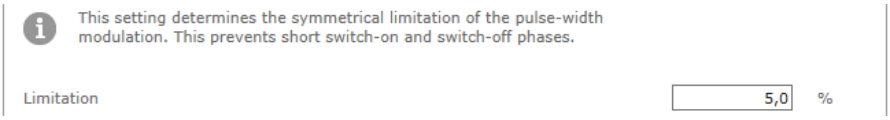

*Cycle time:*

This is where the duration of a pulse width modulation cycle is set. Pulse width modulation is deactivated if the time is set to 0 seconds.




*Limitation*:

In the case of low and high control output values, switching cycles which follow in very quick succession may occur. To prevent this a symmetrical limit can be set.

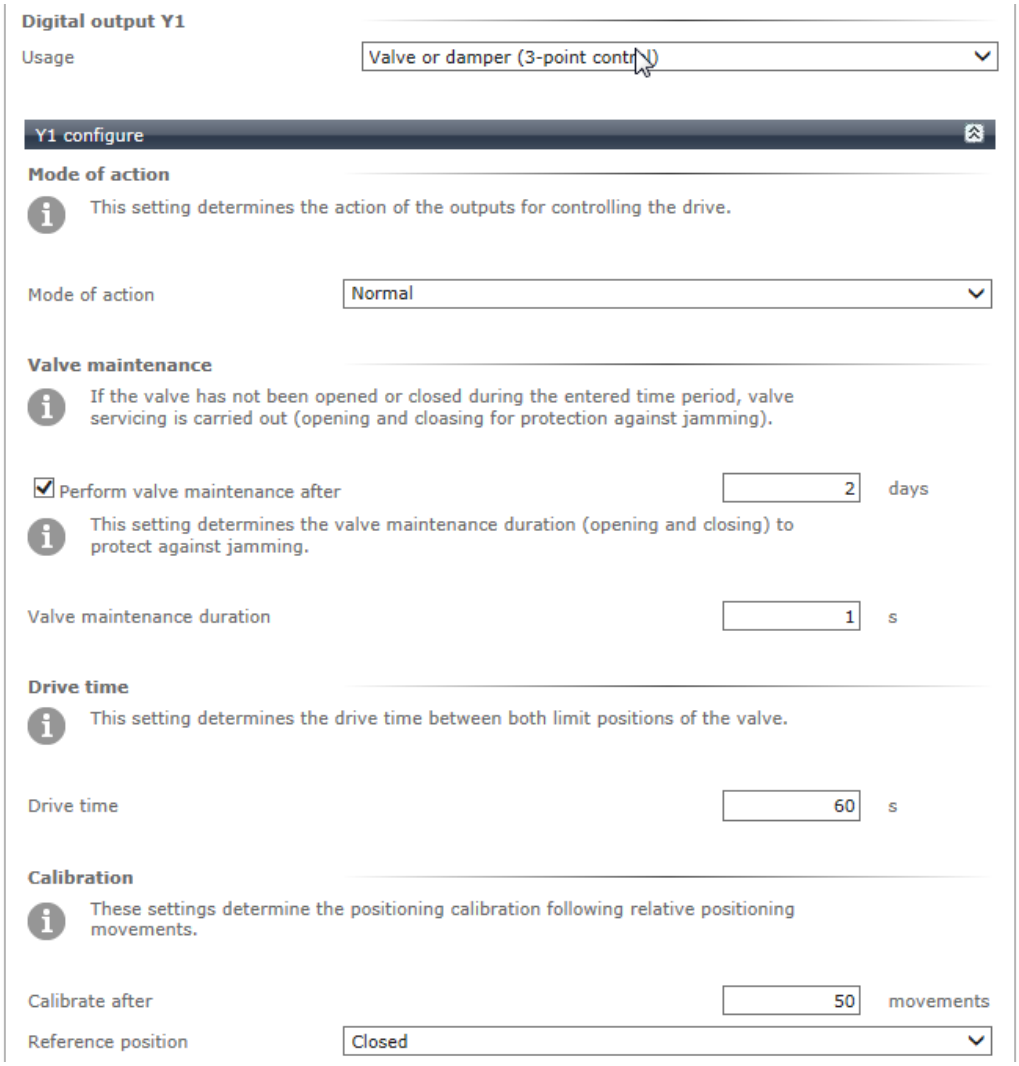



In the case of the above setting the following applies:

For control output values below 5% the output remains switched off. With control output values of 95% and above (100% - limit value), on the other hand, the output remains permanently switched on. In both cases pulse width modulation is not active.

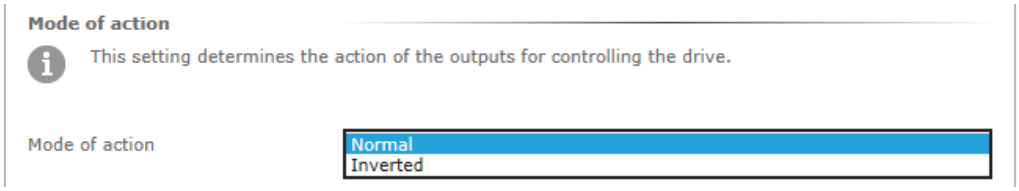
## Valve or damper (3-point control)

With 3-point control two outputs are used to activate a drive. One output is used to open and the other to close the actuator. The following settings can be made for 3-point control:



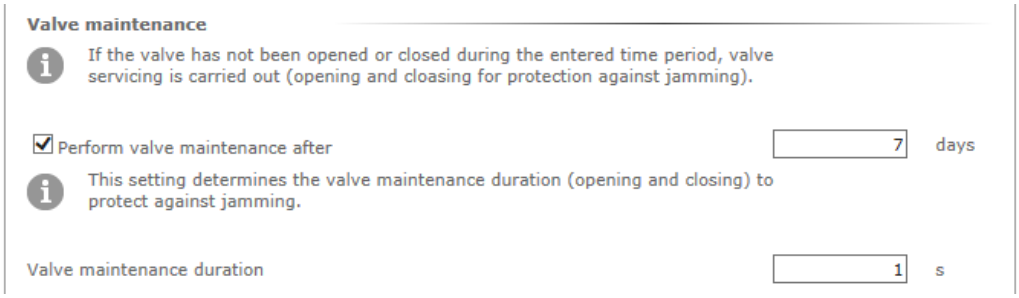

## Mode of action

Using the "Mode of action" function you can choose which output is activated to open the actuator and which to close it. If the "Normal" setting is chosen the first output is used for opening, and with the "Inverted" setting the second output is used for opening.




## Valve maintenance

A maintenance function can be activated for valves at this point.




*Perform valve maintenance after:*

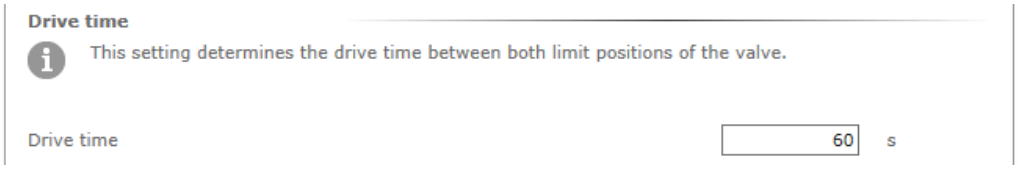
The maintenance operation is initiated if at least one of the end positions of the valve has not been reached within a specified length of time.

*Valve maintenance duration:*

By stipulating a valve maintenance period you can specify the time period in which valve maintenance is carried out. It should be noted that it must be possible to open and close the valve fully within this period. For this reason the valve maintenance period must be longer than twice the travel time.

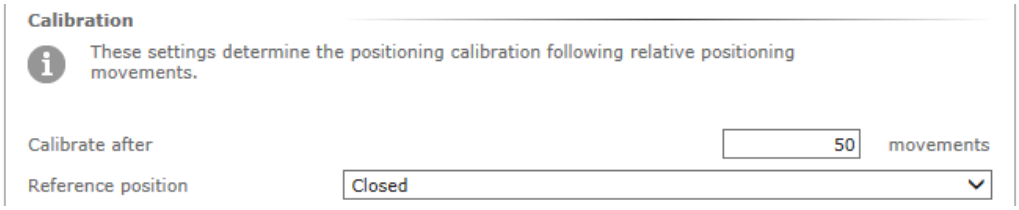
## Drive time

The drive time between both end positions should be set in this section.




## Calibration

If the drive is controlled using only relative travel movements over a prolonged period of time, with no direct triggering of one of the end positions, this may result in positioning inaccuracies. To prevent this, calibration may be performed after a certain number of relative movements.




*Calibrate after:*

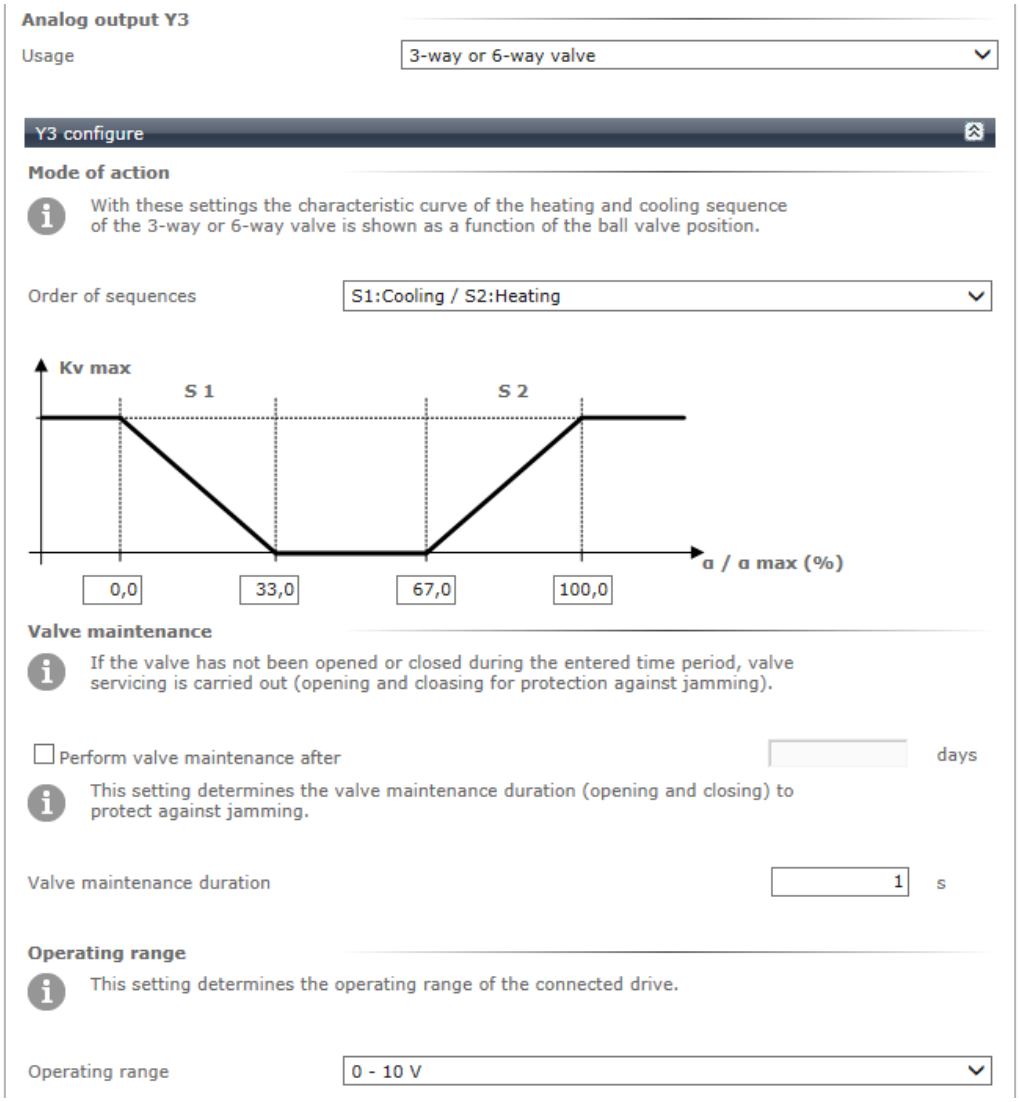
The number of relative movements after which calibration is required can be preset at this point.


*Reference position:*

During calibration the drive is moved into one of the two end positions and then moves back into its initial position. You can select whether the valve is opened or closed for calibration.

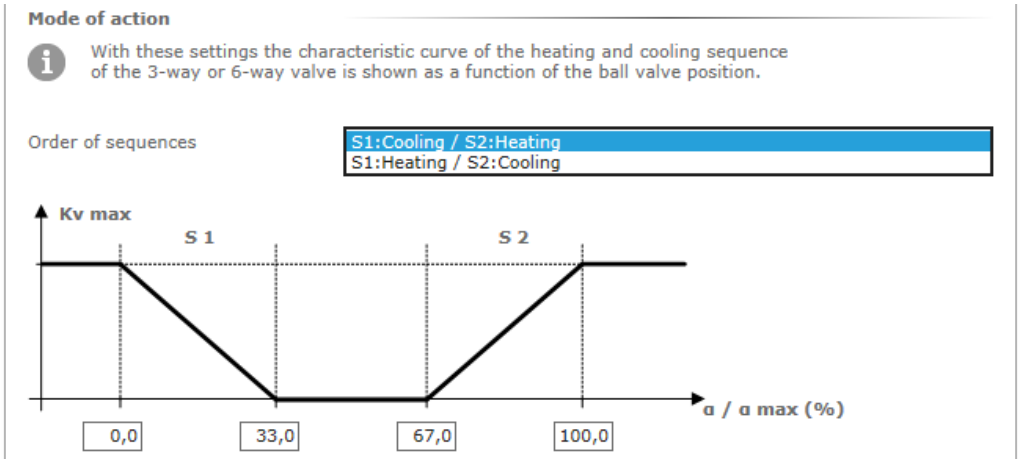
## 3-way or 6-way valve

The following settings can be made:



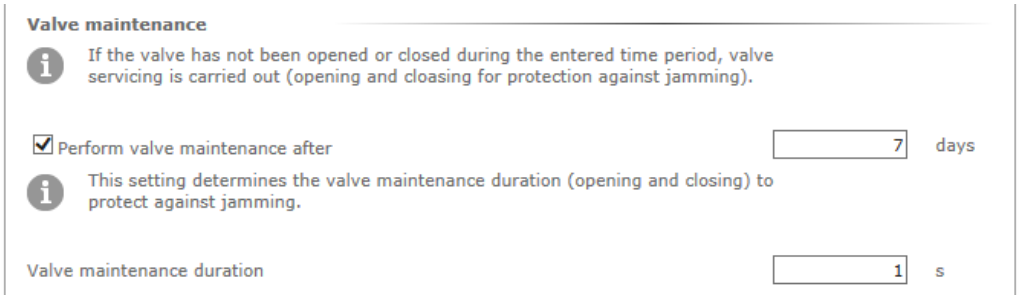

## Mode of action

By defining the “Mode of action” you can stipulate which valve sequence is used for heating and cooling. The valve adjustment angles can be specified using the start and end points for the individual sequences.




## Valve maintenance

A maintenance function can be activated for valves at this point.




*Perform valve maintenance after:*

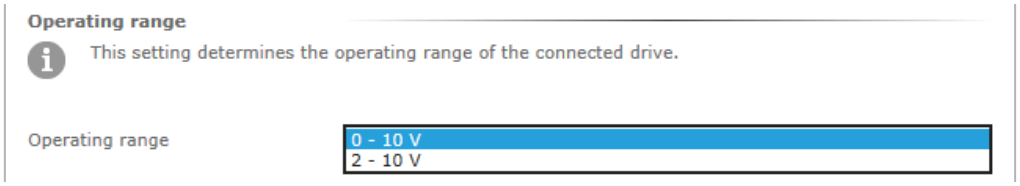
The maintenance operation is initiated if at least one of the end positions of the valve is not reached within a specified length of time.

*Valve maintenance duration:*

By stipulating a valve maintenance period you can specify the time period in which valve maintenance is carried out. When fixing the time period it should be noted that the valve must run both sequences fully in succession for maintenance purposes.

## Operating range

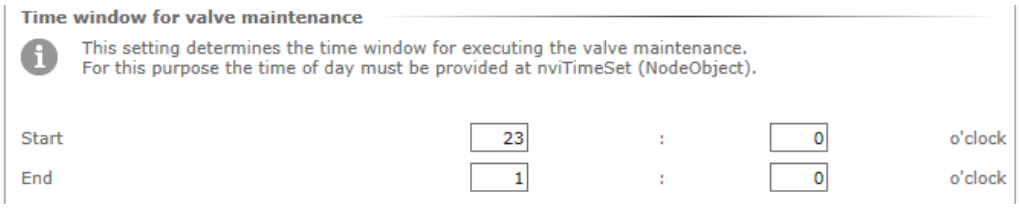
Setting the operating range determines which voltage is used to activate the valve.



# Parameterization of the maintenance function

## Maintenance

The maintenance function can be used to protect the connected valves against seizing. A time window can be parameterised on the "Maintenance" tab that applies to all outputs.




*Time window for valve maintenance:*

To activate the time window test, the current time stamp must be transmitted via the *nviTimeSet* of the node object. The time stamp must be updated at regular intervals for synchronisation purposes.

Movements into the maintenance positions are only performed during the specified time period. If no time test is to be carried out, the time window should be extended over the whole day. This is done by entering the same time for the start and end. With this setting maintenance can be carried out at any time of day. The valves are maintained successively.

*NOTE: You should specify in the configuration of the relevant output whether a valve is to be maintained.*

# 5.4. Configuration of objects

## 5.4.1 Light Sensor

The LightSensor object enables information on the brightness to be captured via a brightness sensor and the measurement data to be output into the network.

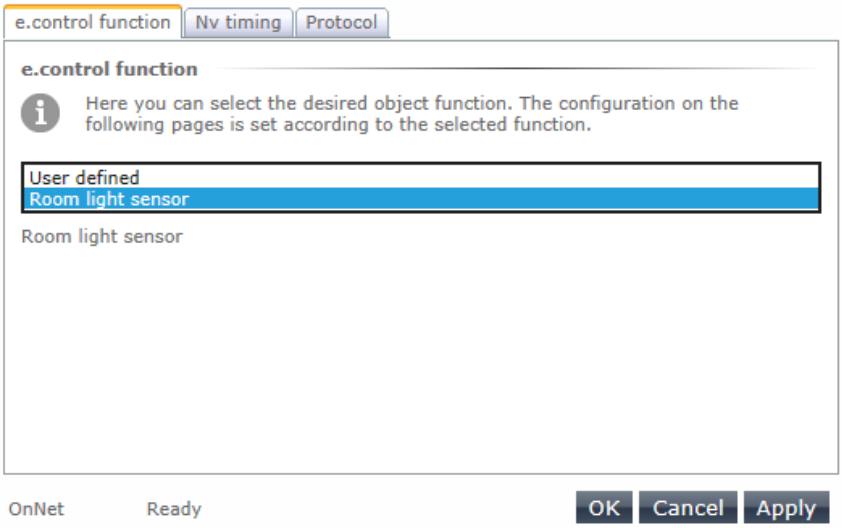
### Overview of object functions

Other functions are supported in addition to the VDI 3813-compliant room automation functions:

- General brightness measurement
- Brightness measurement (as per VDI 3813)

### Parameterisation of object functions

The individual functions are parameterised using the convenient web plug-in. For typical object applications there are pre-configured settings available which can be selected on the e.control function page:




All settings for the desired function are adopted when choosing a pre-configured setting. The settings required for the selected function can no longer be altered on the following pages. Settings used for adjusting the function may still be altered.

The "User defined" e.control function allows all settings to be adjusted.

### Description of object functions

#### General brightness measurement

The brightness measurement data from a connected sensor can be captured via the LightSensor object. The brightness level value is output via nvoLsLuxLevel (SNVT_lux).

The output value is sent as standard if there is any change in the brightness. By specifying a minimum change in the brightness it is possible to reduce the network load.

A transmission interval can also be specified. For this, the time after which the output value is resent - even if there are no value changes - is specified. Transmission intervals are required, for example, if the receiver is set to detect a transmitter failure. Note here that cyclic transmission increases the bus load.

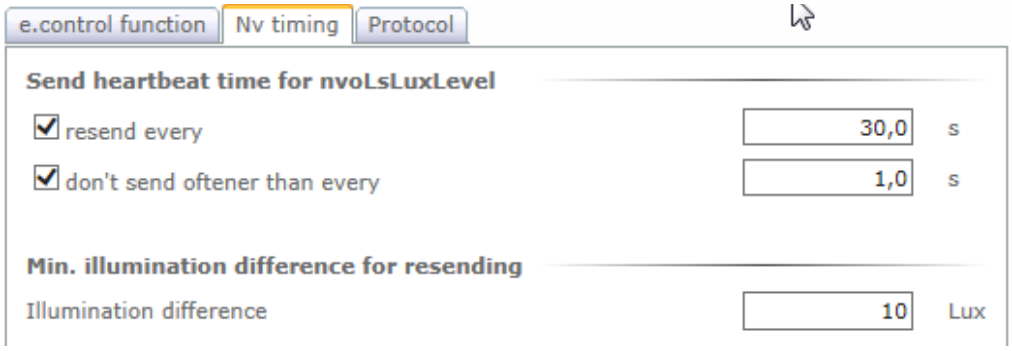
A minimum time interval may be defined for successive output data packets, to ensure the receiver has enough time to process the packets.

In order to enable the described parameters to be freely configured, the "User defined" setting on the "e.control function" tab may be selected. Several parameters are already preset via the plug-in once an e.control function has been selected.

The parameter settings are selected on the "Transmission behaviour" tab.

**Nv timing:**

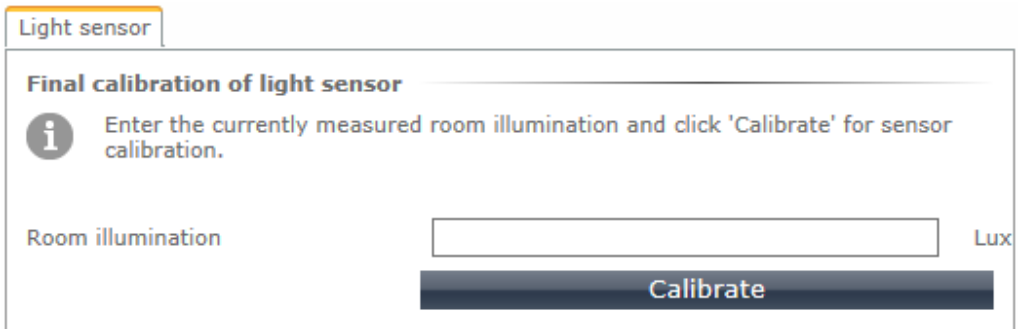
You can choose the parameters for the settings mentioned as well as for re-sending, a minimum time interval and the change in brightness on the "Nv timing" tab:




**Calibration:**

Calibration should always be used for starting up a brightness sensor, to ensure reliable data evaluation. This ensures the brightness sensor is adjusted to suit its installation conditions.

The brightness sensor is calibrated using the "Light sensor" tab.




The brightness sensor is calibrated by entering the brightness value measured by the reference value measuring device. Calibration should be performed in daylight.

## Brightness measurement (as per VDI 3813)

The "Brightness measurement" function captures the brightness level of lighting in rooms. The level of brightness is transmitted via the output network variable. It can be re-used for constant light control or daylight-dependent lighting, for example.

It is set to "Brightness measurement" by selecting it as a room brightness sensor on the "e.control function" tab.

## 5.4.2 Occupancy sensor

Occupancy detection using the *OccupancySensor* object allows an occupancy sensor to be picked up and information on its status to be sent into the network.

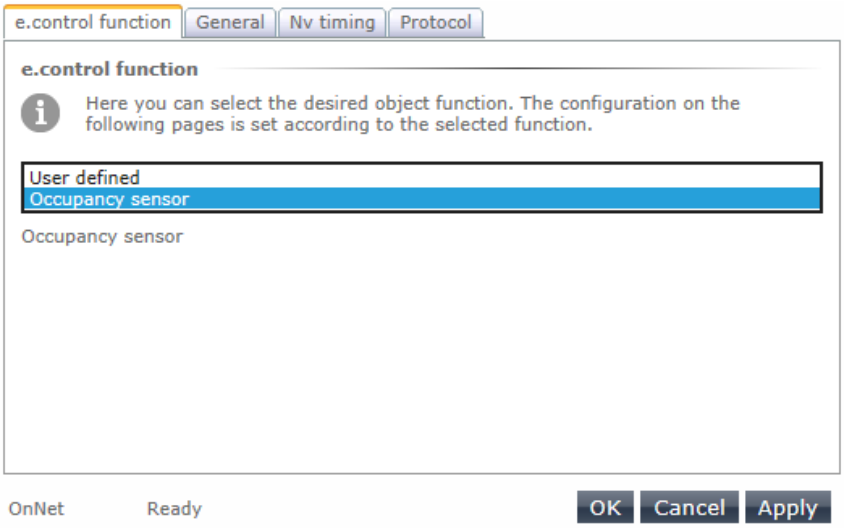
### Overview of object functions

Other functions are supported in addition to the VDI 3813-compliant room automation functions:

- General occupancy detection
- Occupancy detection (as per VDI 3813)

### Parameterisation of object functions

The individual functions are parameterised using the convenient web plug-in. For typical object applications there are preconfigured settings available which can be selected on the e.control function page:




All settings for the desired function are adopted when choosing a preconfigured setting. The settings required for the selected function can no longer be altered on the following pages. Settings used for adjusting the function may still be altered.

The "User-defined" e.control function allows all settings to be adjusted.

# Description of object functions

## General occupancy detection

An occupancy sensor can be picked up via the OccupancySensor object. The occupancy signal is output via *nvoOsOccSensor* (SNVT_occupancy).

The output values for room occupancy can be adjusted. The values which can be selected are shown in the table below:

| *Network variable type* | *Output value for:* | |
|---|---|---|
| | *Room occupied* | *Room unoccupied* |
| SNVT_occupancy | Occupied (OC_OCCUPIED) | |
| | Unoccupied (OC_UNOCCUPIED) | |
| | Comfort extension (bypass) (OC_BYBASS) | |
| | Standby (OC_STANDBY) | |

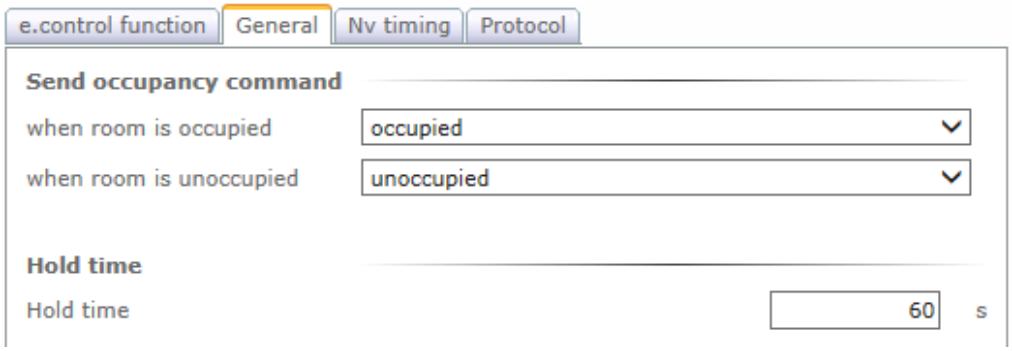
A holding time can be set for the "Room occupied" output value. This allows the presence signal to be maintained for the specified time period.

The output value is transmitted as standard if there is a change in the sensor state. A transmission interval can also be specified. For this, the time after which the output value is resent - even if there is no change in state - is specified. Transmission intervals are required, for example, if several sensors or control points on the receiver are to be evaluated, or if the receiver is set to detect a transmitter failure. Note here that cyclic transmission increases the network load.

By selecting "User-defined" as an e.control function, all parameter settings can be individually adjusted to suit the required ambient conditions. The settings are made using the "General" and "Nv timing" tabs.

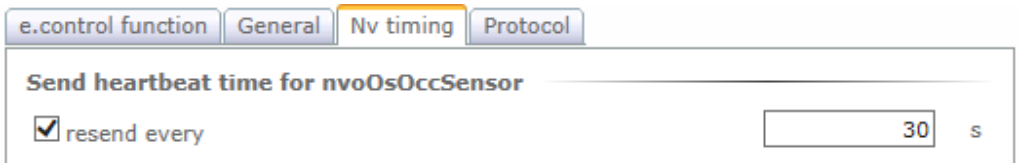
**General:**

The afore-mentioned settings for the occupancy command output value and the holding time for the occupancy signal can be parameterised on the "General" tab, if the "User-defined" e.control function has been selected.




**Nv timing:**

You can set the parameters for re-sending on the "Nv timing" tab, if the "User-defined" e.control function has been selected:




## Occupancy detection (as per VDI 3813)

The "Occupancy detection" function detects the presence of persons in the room using an occupancy sensor. The "Occupied" and "Unoccupied" output values are transmitted via the output network variable. The "Occupancy detection" function is set on the "e.control function" tab by selecting "Occupancy sensor".

The holding time for the "Occupied" signal can be adjusted on the "General" tab.

## 5.4.3 Temperature sensor

The *TempSensor* object is used to pick up a temperature sensor and output its measurement data into the network.

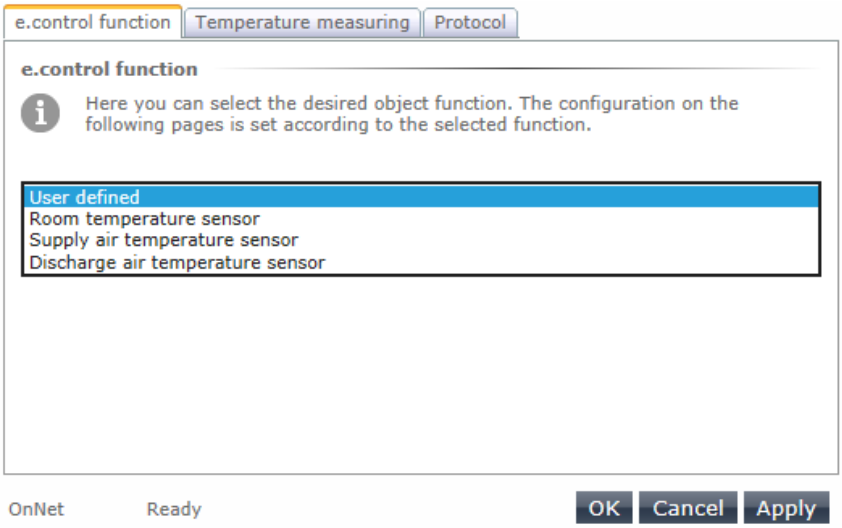
### Overview of object functions

Other functions are supported in addition to the VDI 3813-compliant room automation functions.

- General temperature measurement
- Air temperature measurement (as per VDI 3813)

### Parameterisation of object functions

The individual functions are parameterised using the convenient web plug-in. For typical object applications there are preconfigured settings available which can be selected on the e.control function page:




All settings for the desired function are adopted when choosing a pre-configured setting. The settings required for the selected function can no longer be altered on the following pages. Settings used for adjusting the function may still be altered.

The "User defined" e.control function allows all settings to be adjusted.

# Description of object functions

## General temperature measurement

The temperature values from a connected sensor can be captured via the TempSensor object. The temperature value is output via *nvoTsTemp* (SNVT_temp_p).

The temperature sensor can be used for individual measurements, e.g. for an office with a temperature sensor, or for generating an average temperature, e.g. for an open plan office with several temperature sensors, which are each connected to a TempSensor object.

The output value is sent as standard if there is any change in temperature. By specifying a minimum change in the temperature it is possible to reduce the network load.

A transmission interval can also be specified. For this, the time after which the output value is resent - even if there are no value changes - is specified. Transmission intervals are required if several sensors or control points on the receiver are to be evaluated, or if the receiver is set to detect a transmitter failure. Note here that cyclic transmission increases the bus load.

A minimum time interval may be defined for successive output data packets, to ensure the receiver has enough time to process the packets.

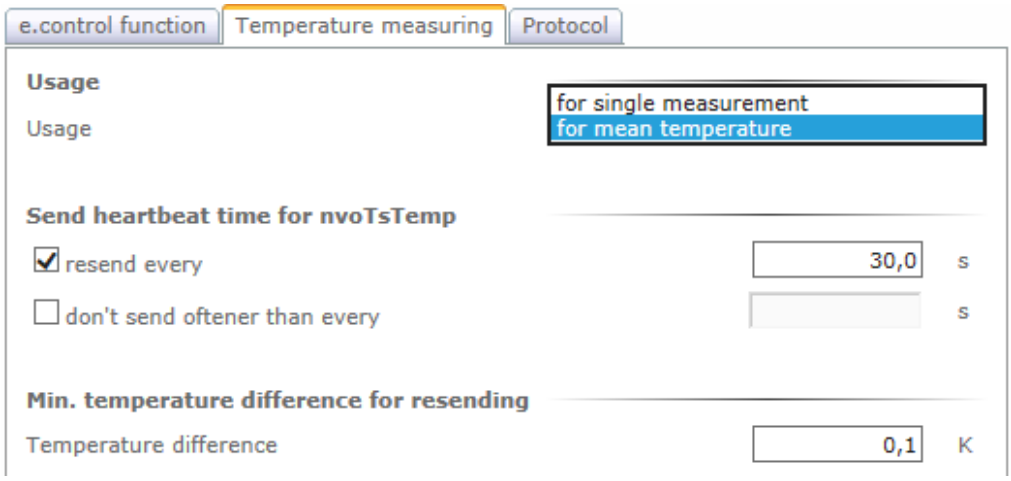
However, if the measured value is to be used for generating an average temperature, then it must be sent just once only within the message transmission interval of the room climate controller. For this purpose new measurements are only transmitted within the parametrisable transmission interval. This then prevents multiple weighting of the sensor during mean-value generation.

In order to enable the described parameters to be freely configured, the "User defined" setting on the "e.control function" tab may be selected. Several parameters are already preset via the plug-in once an e.control function has been selected.

The parameter settings are selected on the "Temperature measurement" tab.

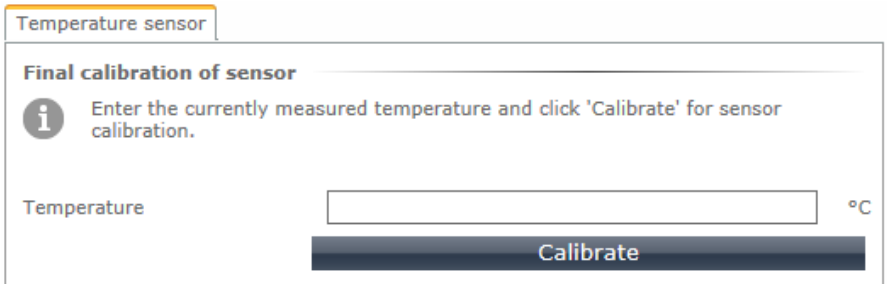
**Temperature measuring:**

You can choose the parameters for the application as well as for re-sending, a minimum time interval and the change in brightness on the "Temperature measurement" tab:




**Calibration:**

Irrespective of how the temperature sensor is used, it should always be calibrated. This ensures the temperature sensor is adjusted to suit widely varying installation conditions. The temperature sensor is calibrated using the "Temperature sensor" tab.




The temperature sensor is calibrated by entering the temperature value measured by the reference value measuring device.

## Air temperature measurement (as per VDI 3813)

The "Air temperature measurement" function captures the room temperature or the intake and exhaust air temperature in heating and cooling systems. The temperature value is transmitted via the output network variable. The The "Air temperature measurement" function is set on the "e.control function" tab by selecting it as a room temperature sensor, intake air temperature sensor or exhaust temperature sensor.

• Room temperature sensor: For single offices the temperature can be taken as an individual measurement, and for open plan offices with several measuring points the individual TempSensor objects on a room climate controller can be grouped to calculate an average temperature. The settings required for the transmission interval are already pre-configured via the plug-in. The temperature difference for re-sending can be adjusted.

• Intake air temperature sensor: In air assist systems the intake air can be used for heating and cooling support. You can specify whether the intake air temperature is used for this purpose. Its use and the transmission interval are preset via the plug-in. The

temperature difference for re-sending can be adjusted to suit the prevailing ambient conditions.

• Exhaust air temperature sensor: To protect a fan coil from overheating its exhaust temperature can be measured. The room climate controller is able to reduce the fan coil's capacity or its heating register if the exhaust temperature is too high. Its use and the transmission interval are preset via the plug-in. The temperature difference for re-sending can be adjusted to suit the prevailing ambient conditions.

## 5.4.4 Air quality sensor

The *AirQualitySensor* object is used to pick up a temperature sensor and output its measurement data into the network.

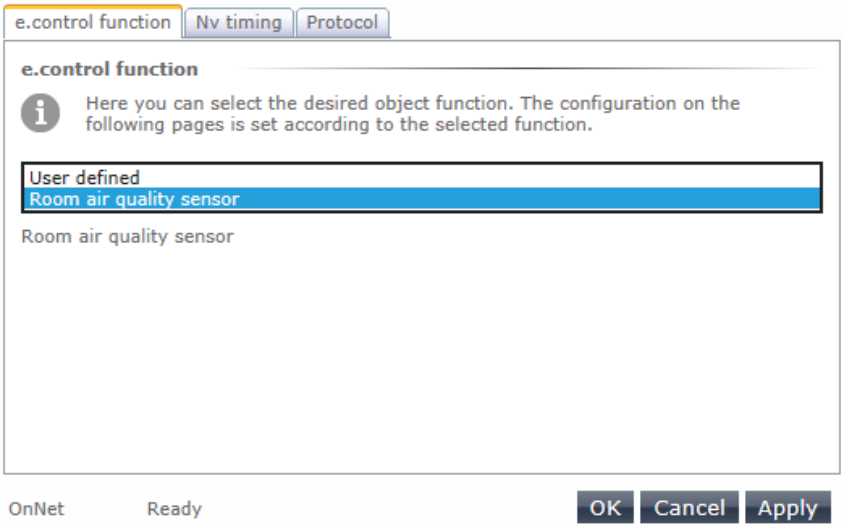
### Overview of object functions

Other functions are supported in addition to the VDI 3813-compliant room automation functions.

- General air quality measurement
- Air quality measurement (as per VDI 3813)

### Parameterisation of object functions

The individual functions are parameterised using the convenient web plug-in. For typical object applications there are preconfigured settings available which can be selected on the e.control function page:




All settings for the desired function are adopted when choosing a preconfigured setting. The settings required for the selected function can no longer be altered on the following pages. Settings used for adjusting the function may still be altered.

The "User-defined" e.control function allows all settings to be adjusted.

### Description of object functions

#### General air quality measurement

The air quality measurement values from a connected sensor can be captured via the AirQualitySensor object. The measured value is output via *nvoAqAirQuality* (SNVT_ppm).

The output value is transmitted as standard if there is any change in the value. By specifying a minimum change in the air quality it is possible to reduce the network load.

A transmission interval can also be specified. For this, the time after which the output value is resent - even if there are no value changes - is specified. Transmission intervals

are required, for example, if the receiver is set to detect a transmitter failure. Note here that cyclic transmission increases the network load.

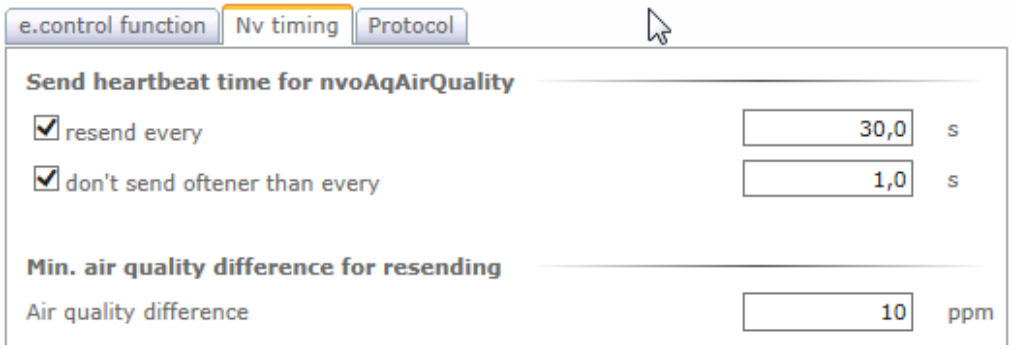
A minimum time interval may be defined for successive output data packets, to ensure the receiver has enough time to process the packets.

In order to enable the described parameters to be freely configured, the "User-defined" setting on the "e.control function" tab may be selected. Selecting an e.control function means several parameters are already preset via the plug-in.

The parameter settings are selected on the "Nv timing" tab.

**Nv timing:**

You can choose the parameters for the settings mentioned as well as for re-sending, a minimum time interval and the change in air quality on the "Nv timing" tab:




## Air quality measurement (as per VDI 3813)

The "Air quality measurement" function detects the air quality in rooms. The air quality measured is transmitted via the output network variable. It can be used for air quality control, for example.

It is set to "Air quality measurement" by selecting it as an air quality sensor on the "e.control function" tab.

## 5.4.5 Relative humidity sensor

The *RelHumSensor* object is used to pick up an air humidity sensor and output its measurement data into the network.

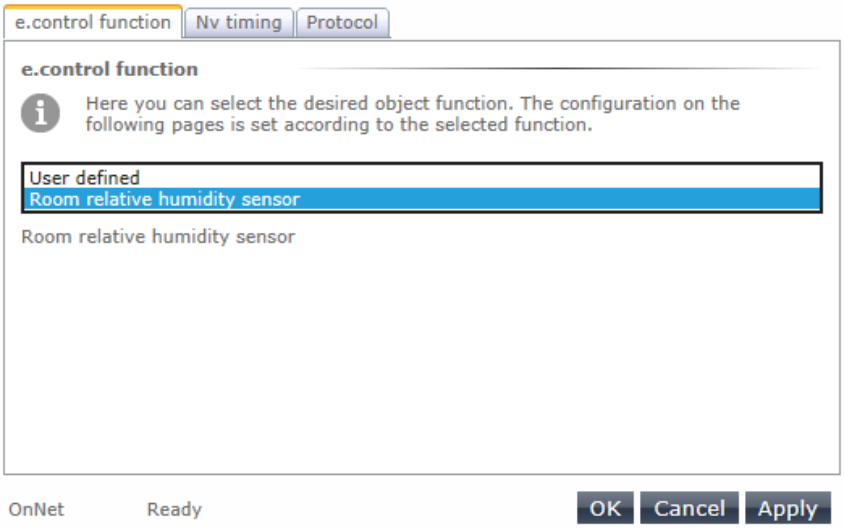
### Overview of object functions

The object supports the following functions:

- General measurement of relative air humidity
- Room air humidity measurement

### Parameterisation of object functions

The individual functions are parameterised using the convenient web plug-in. For typical object applications there are preconfigured settings available which can be selected on the e.control function page:




All settings for the desired function are adopted when choosing a preconfigured setting. The settings required for the selected function can no longer be altered on the following pages. Settings used for adjusting the function may still be altered.

The "User-defined" e.control function allows all settings to be adjusted.

### Description of object functions

#### General measurement of relative air humidity

The RelHumSensor object can be used to collect the measured values from a connected analogue sensor to measure the relative air humidity. The air humidity value is output via *nvoRhRelHumidity* (SNVT_lev_percent).

The output value is transmitted as standard if there is any change in the measured values. By specifying a minimum change in air humidity it is possible to reduce the network load.

A transmission interval can also be specified. For this, the time after which the output value is re-sent - even if there are no value changes - is specified. Transmission

intervals are required, for example, if the receiver is set to detect a transmitter failure. Note here that cyclic transmission increases the network load.

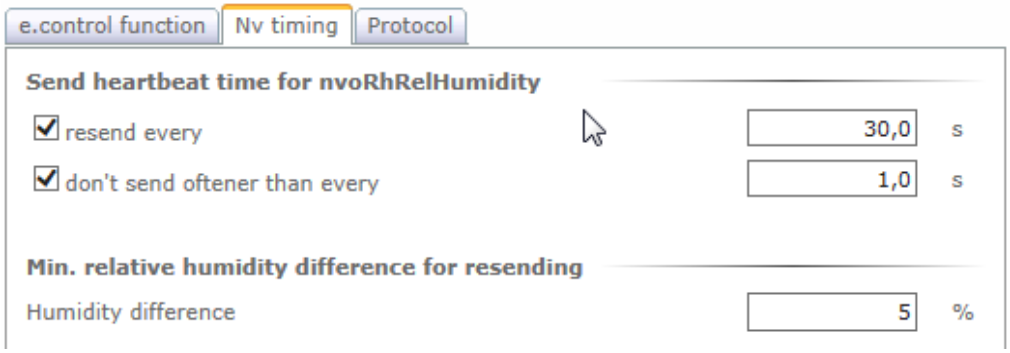
A minimum time interval may be defined for successive output data packets, to ensure the receiver has enough time to process the packets.

In order to enable the described parameters to be freely configured, the "User-defined" setting on the "e.control function" tab may be selected. Selecting an e.control function means several parameters are already preset via the plug-in.

The parameter settings are selected on the "Nv timing" tab.

### Nv timing

You can choose the parameters for the settings mentioned as well as for re-sending, a minimum time interval and the change in air humidity on the "Nv timing" tab:




## Room air humidity measurement

The "Room air humidity measurement" function captures the air humidity level in rooms. The data evaluation is transmitted via the output network variable. It can be used to calculate the dew point of a chilled ceiling.

It is set to "Relative air humidity measurement" by selecting it as a room air humidity sensor on the "e.control function" tab.

## 5.4.6 Command module

The *CommandModule* captures operational data relating to setpoints, fan levels and occupancy switches, as well as temperature measurements from a room operating unit.

### Overview of object functions

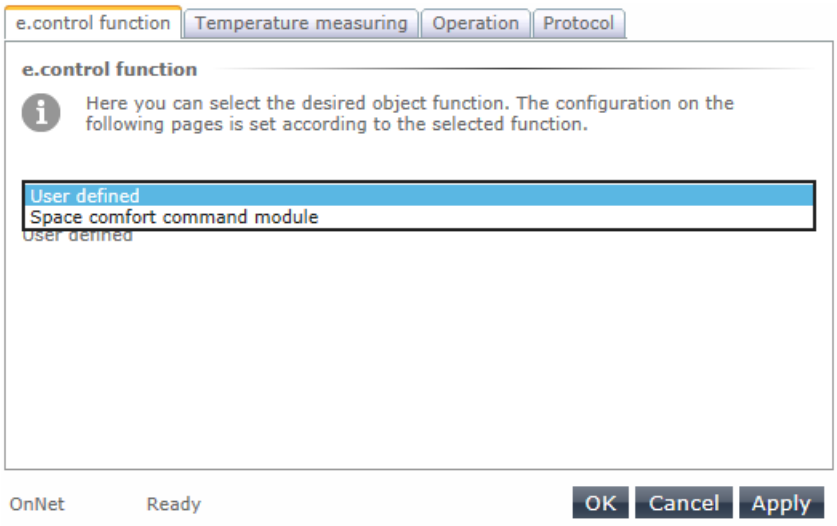
Other functions are supported in addition to the VDI 3813-compliant room automation functions.

- Air temperature measurement (as per VDI 3813)
- Adjust temperature setpoint (as per VDI 3813)
- Signal presence (as per VDI 3813)
- Status displays

## Parameterisation of object functions

The individual functions are parameterised using the convenient web plug-in. There is a choice of either "Pace comfort command module" or "User-defined" pre-settings.

Use the "e.control function" tab to make the relevant selection.




### Room climate control

The temperature value recorded is configured as an individual measurement for subsequent use and features a 30-second transmission interval. The occupancy control device sends an "OC_OCCUPIED" signal to log on. The setpoint offsets can be set manually.

### User-defined

All settings available on the tabs can be adapted to the desired response behaviour.

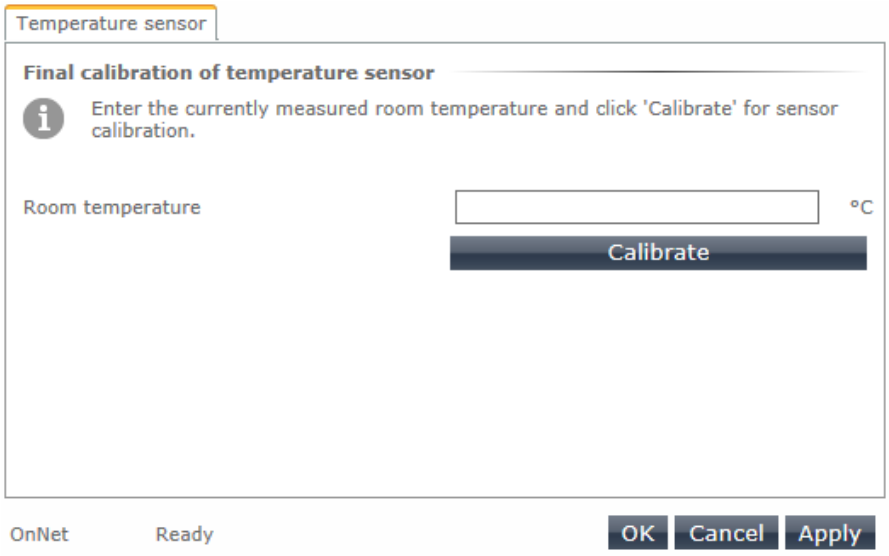
## Description of object functions

### Air temperature measurement (as per VDI 3813)

The measured value (at device level) from the assigned sensor is recorded and can be calibrated to suit the relevant installation conditions.

## Calibration

Calibration is used to adapt the temperature sensor to the device installation conditions. You will find the calibration function under "Commissioning" in the "View" menu item. The device must be online in order to select calibration.




## Usage

You can choose whether the temperature measurement value (*nvoCmSpaceTemp*) is to be used subsequently as an individual measurement or for calculating a mean value. If used as an individual measurement, all changes are forwarded. However, if the measured value is to be used to produce an average temperature, then it must be sent just once within the message transmission interval of the room climate controller. For this purpose new measurements are only transmitted within the parametrisable transmission interval. This then prevents multiple weighting of the sensor during mean-value calculation.

This setting is chosen in the plug-in on the "Temperature measuring" tab.


## Transmission interval

A transmission interval can be parameterised for the *nvoCmSpaceTemp* value. If the measured value is to be used subsequently to generate an average temperature, a value which is adjusted to the reception interval for mean-value generation in the room climate controller must be entered here.

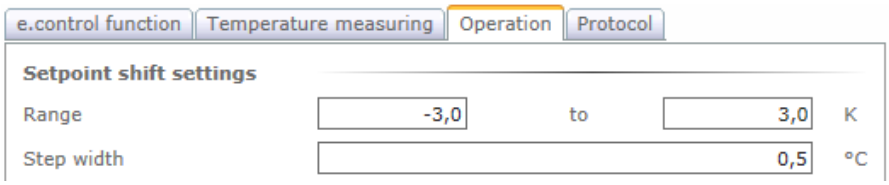
This setting is also chosen in the plug-in on the "Temperature measuring" tab:


*The nvoCmSpaceTemp value is sent after the set time period*

## Adjust temperature setpoint (as per VDI 3813)

A local adjustment of the temperature setpoint *(nvoCmSetptOffset)* allows the room climate to be adapted to the user's comfort requirements. It is possible to configure the upper and lower limits of the permitted adjustment range. The sequence of steps in which the setting is made should also be specified. When operating using the buttons, the setpoint is adjusted by one sequence step each time the button is pressed. With a continuous control component, such as a rotary wheel, the step width is used for grading and rounding the transmitted values.

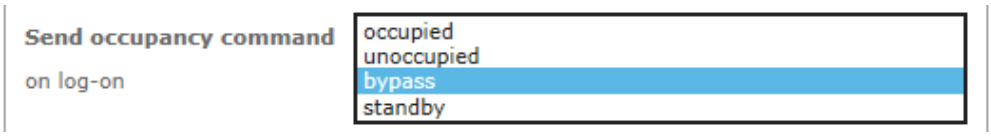
The step size and range setting can be adjusted in the plug-in on the "Operation" tab under "Setpoint shift settings":




The effective setpoint offset fedback by the room climate controller can be recorded *(nviCmSetptOffset)* and displayed (depending on the device's display options). The display is enabled in the device plug-in. In addition, synchronisation with other control stations in the room can be performed via the feedback message.

## Signal presence (as per VDI 3813)

Depending on the device, it is possible to signal the presence of a room manually using 1 or 2 buttons. The occupancy status detected is output on *nvoCmManOcc*. "OC_UNOCCUPIED" is always sent for leaving the room. You can choose which occupancy command should be sent when entering the room on the "Operation" tab in the plug-in.




The effective room occupancy status fedback by the occupancy controller can be recorded *(nviCmOccupancy)* and displayed (depending on the device's display options). The display is enabled in the device plug-in. When using a toggle button the feedback message is required for toggling the actual state. In addition, synchronisation with other control stations in the room can be performed via the feedback.

## Status displays

Other statuses are captured via the Command Module and these can be displayed depending on the device's display options. The display is enabled in the device plug-in.

### Room temperature

The temperature value to be displayed is received via *nviCmSpaceTemp*. This also allows an average temperature value from the room climate controller to be displayed, for example. The temperature can only be indicated on devices which have a display.

### Heating/cooling activity

The heating/cooling activity of the room climate controller can be received via *nviCmUnitStatus*. This is usually displayed by means of LEDs or symbols on a display.

### Window status

The window status can be received via *nviCmUnitStatus*. This also allows the status of several windows recorded by the room climate controller to be displayed, for example. This is usually displayed by means of an LED or symbols on a display.

### Dew point status data

The dew point status data can be received via *nviCmUnitStatus*. This also allows the status of several dew point sensors recorded by the room climate controller to be displayed, for example. This is usually displayed by means of an LED or symbols on a display.

### Frost alarm

The room climate controller's frost alarm can be received via *nviCmUnitStatus*. This is usually displayed by means of an LED or symbols on a display.

## 5.4.7 Binary input

With the *BinaryInput* object floating contacts can be installed and their wide range of functions utilised.

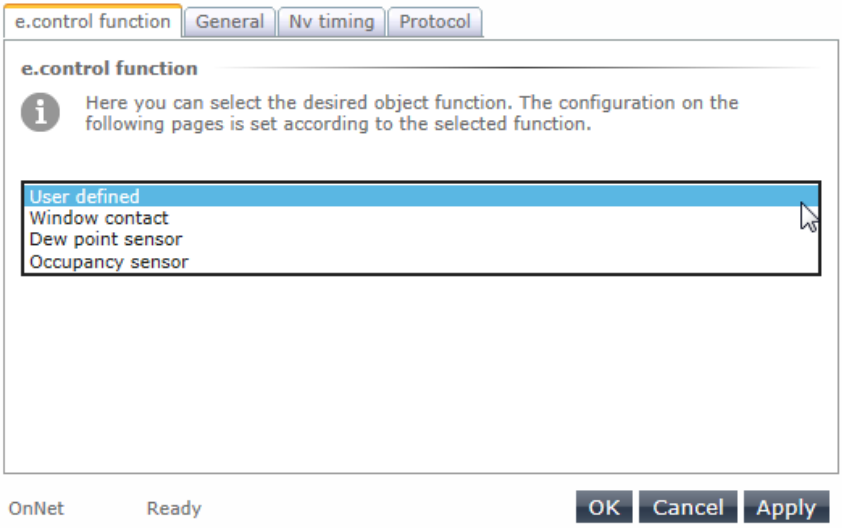
### Overview of object functions

Other functions are supported in addition to the VDI 3813-compliant room automation functions.

- General control and sensor function
- Occupancy detection (as per VDI 3813)
- Window monitoring (as per VDI 3813)
- Dew point monitoring (as per VDI 3813)
- Occupancy setting (as per VDI 3813)

### Parameterisation of object functions

The individual functions are parameterised using the convenient web plug-in. For typical object applications there are pre-configured settings available which can be selected on the e.control function page:




All settings for the desired function are adopted when choosing a pre-configured setting. The settings required for the selected function can no longer be altered on the following pages. Settings used for adjusting the function may still be altered.

The "User defined" e.control function allows all settings to be adjusted.

# Description of object functions

## General control and sensor function

Various types of controls and sensors which deliver a binary signal can be captured via the Binary Input object. The contact states are output via *nvoBiValue*. The following types of network variable for the output variable are available for the various control and sensor functions:

- SNVT_switch: e.g. for window contacts, dew point sensors or light controls
- SNVT_occupancy: e.g. for hotel key card switches or occupancy sensors
- SNVT_hvac_mode: e.g. for switching between heating and cooling (change-over signal)

The output values for the steady position and working position of the sensor are determined on the basis of the type of network variable selected.

The table below shows the values that can be preset/selected:

| *Network variable type* | *Function* | *Output value for:* | |
|---|---|---|---|
| | | *Steady position* | *Working position* |
| SNVT_switch | Standard | Switch off | Switch on |
| | User-defined | Switch on (100.0 1) | |
| | | Switch off (0.0 0) | |
| | | Invalid (0.0 -1) | |
| SNVT_occupancy | Occupancy sensor | Unoccupied | Occupied |
| | User-defined | Occupied (OC_OCCUPIED) | |
| | | Unoccupied (OC_UNOCCUPIED) | |
| | | Comfort extension (bypass) (OC_BYBASS) | |
| | | Standby (OC_STANDBY) | |
| | | Invalid (OC_NUL) | |
| SNVT_hvac_mode | User-defined | Automatic (HVAC_AUTO) | |
| | | Heating (HVAC_HEAT) | |
| | | Cooling (HVAC_COOL) | |
| | | Building protection (HVAC_NUL) | |

A holding time can be set for the output value in the working position. In the case of occupancy detection, for example, this allows the presence signal to be maintained for the specified time period.

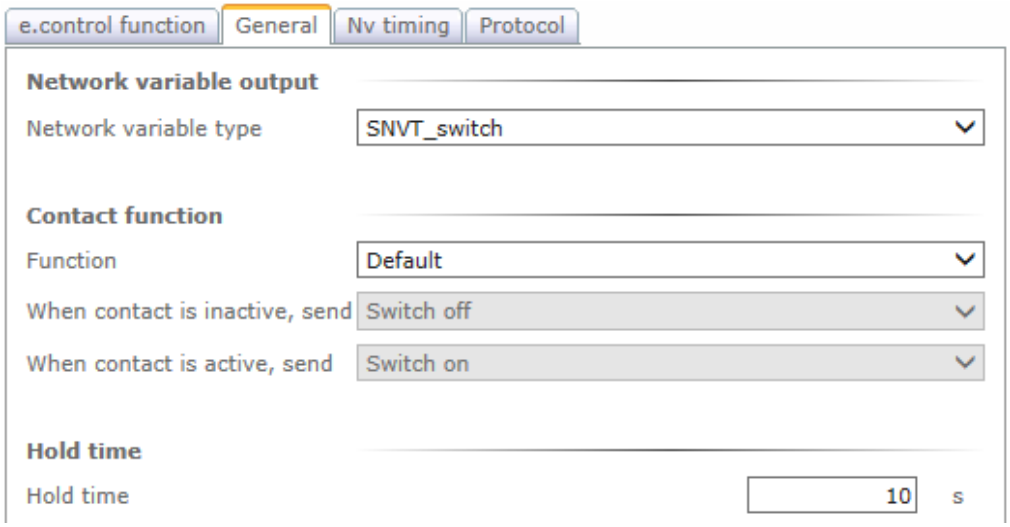
The output value is transmitted as standard if there is a change in the sensor state. A transmission interval can also be specified. Here the time period for re-sending is adjusted accordingly. Transmission intervals are required if several sensors or control points on the receiver are to be evaluated, or if the receiver is set to detect a transmitter failure. Note here that cyclic transmission increases the bus load.

A minimum time interval may be defined for successive output data packets, to ensure the receiver has enough time to process the packets. To do this check the box and set the time accordingly.

By selecting the "User defined" e.control function you can adjust all the parameter settings individually to the prevailing ambient conditions. The settings are made using the "General" and "Nv timing" tabs.

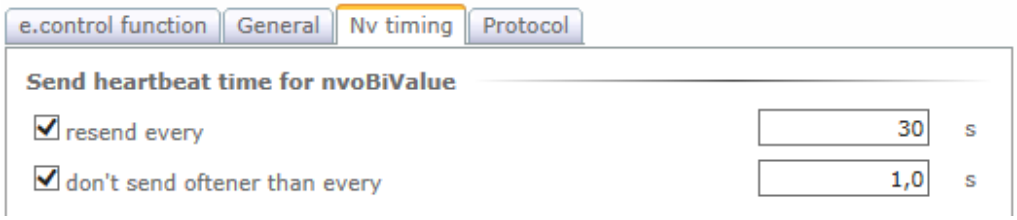
**General:**

The afore-mentioned settings for the output network variable, the corresponding contact function and the desired holding time can be parameterised on the "General" tab if the "User-defined" e.control function has been selected:




**Nv timing:**

The settings for re-sending as well as for the minimum time interval can be parameterised on the "Nv timing" tab if the "User-defined" e.control function has been selected:




## Occupancy detection (as per VDI 3813)

The "Occupancy detection" function picks up the presence of persons in the room via an occupancy sensor. An "unoccupied" or "occupied" signal is sent accordingly via the output network variable. The "Occupancy detection" function is set on the "e.control function" tab by selecting "Occupancy sensor".

The holding time for the "occupied" signal can be specifically adapted to the requirements of the project using the "General" tab.

## Window monitoring (as per VDI 3813)

The "Window monitoring" function captures the state of a window or skylight via a window contact. The "Switch-on" or "Switch-off" signal is sent accordingly via the output network variable.

The "Window monitoring" function is set on the "e.control function" tab by selecting "Window contact". The holding time for the "Switch-on" signal can be specifically adjusted to the requirements of the project using the "General" tab.

## Dew point monitoring (as per VDI 3813)

The "Dew point monitoring" function picks up the presence of condensation at the measuring point via a dew point sensor. A "Switch-on" or "Switch-off" signal is sent accordingly via the output network variable.

The "Dew point monitoring" function is set on the "e.control function" tab by selecting "Dew point sensor". The holding time for the "Switch-on" signal can be specifically adjusted to the requirements of the project using the "General" tab.

## Occupancy setting (as per VDI 3813)

The "Occupancy setting" function picks up the presence of persons in the room, e.g. via a hotel key card switch. An "unoccupied" or "occupied" signal is sent accordingly via the output network variable.

The "Occupancy setting" function is set on the "e.control function" tab by selecting "Occupancy sensor". The holding time for the "occupied" signal can be specifically adapted to the requirements of the project using the "General" tab.

## 5.4.8 Occupancy controller

The *OccupancyController* object determines the current room occupancy status using occupancy sensor and occupancy detector values. It provides the occupancy status for lighting, room climate and window blind control.

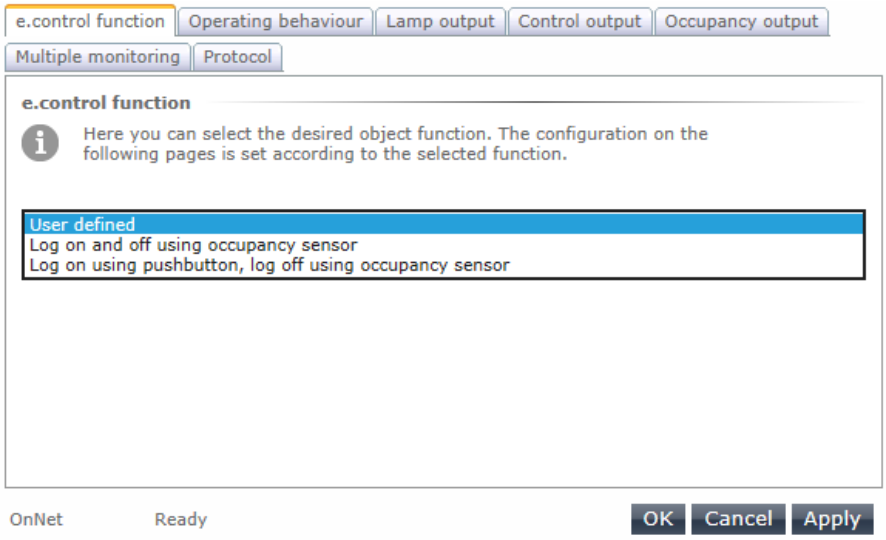
### Overview of object functions

Other functions are supported in addition to the VDI 3813-compliant room automation functions.

- Occupancy evaluation (as per VDI 3813)
- Automatic light/Occupancy-dependent control (as per VDI 3813)
- Occupancy-dependent control system
- Multiple monitoring for occupancy sensors

### Parameterisation of object functions

The individual functions are parameterised using the convenient web plug-in. For typical object applications there are preconfigured settings available which can be selected on the e.control function page:




All settings for the desired function are adopted when choosing a preconfigured setting. The settings required for the selected function can no longer be altered on the following pages. Settings used for adjusting the function may still be altered.

The "User-defined" e.control function allows all settings to be adjusted.

# Description of object functions

## Occupancy evaluation (as per VDI 3813)

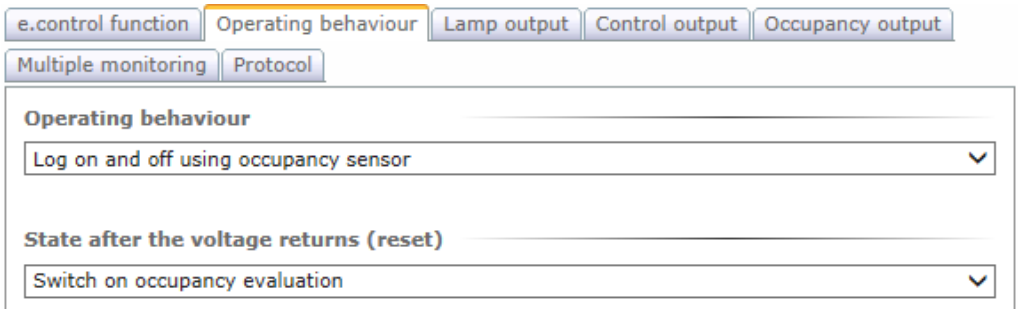
A room's occupancy status is determined by automatic and manual occupancy detection for the "Occupancy evaluation" function.

Occupancy status is output via *nvoOcOccupancy* (SNVT_occupancy). The "Occupancy evaluation" function can be switched on or off via *nviOcCtrlSetting* (SNVT_setting).

You can specify whether log-in occurs via a switch only or via occupancy sensors and switch. Log-out is always done using the occupancy switch or occupancy sensor.

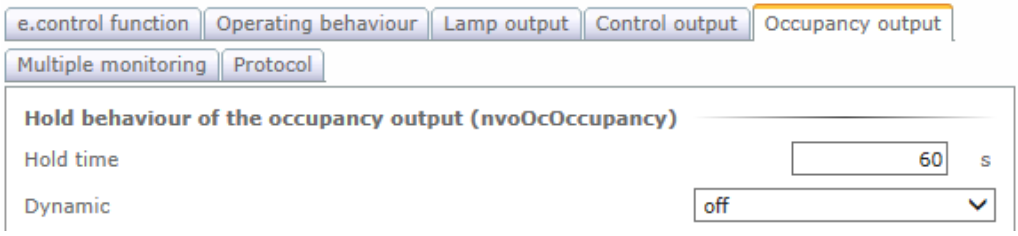
You can specify which occupancy status should be adopted after power has been restored or after a reset.

The settings for operational and reset behaviour are input on the "Operating behaviour" tab.




A hold time and dynamic response can be parameterised for the *nvoOcOccupancy* (SNVT_occupancy) output network variable. Logging off via *nviManOcc* is effective irrespective of hold times. A pre-set hold time begins when the occupancy sensor (*nviOcOccSensor*) is no longer sending an occupancy signal. It should be noted that the hold time must be longer than the time given for multiple monitoring. The dynamic response shortens the hold time if lighting evaluation is activated for just a moment, for example in passageways.

The settings for hold times and dynamic response are input on the "Occupancy output" tab.



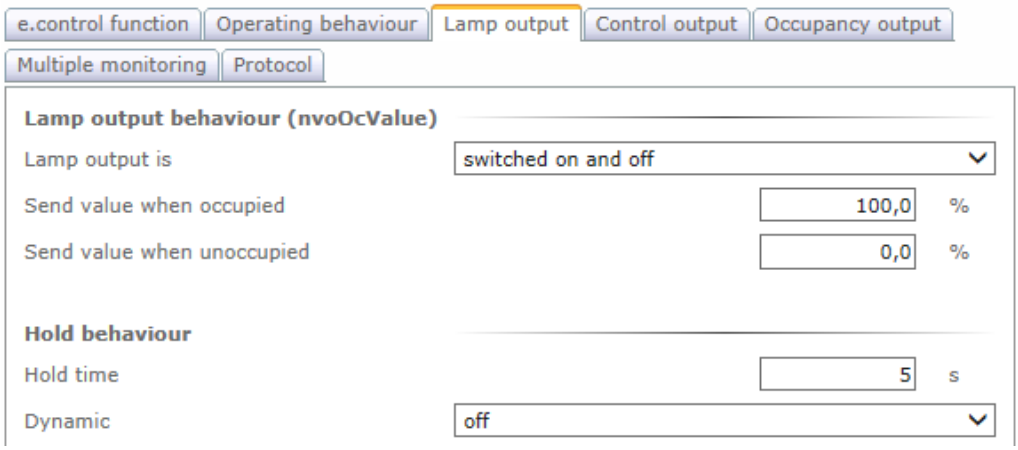

## Automatic light/Occupancy-dependent control (as per VDI 3813)

The "Automatic light" function uses the occupancy evaluation to provide a switching signal (*nvoOcValue*) for the lighting. You can specify whether the light output is used for switching on and off or for switching off only. In addition, a fixed value can be preset for the respective switching status.

A hold time and dynamic response can be parameterised for the *nvoOcValue* (SNVT_switch) output network variable. A pre-set hold time begins when occupancy is no longer being detected via occupancy evaluation. It should be noted that the hold time

must be longer than the time given for multiple monitoring. The dynamic response shortens the pre-set hold time if lighting evaluation is activated for just a moment, for example in passageways.

The settings for hold times and dynamic response are input on the "Light output" tab.

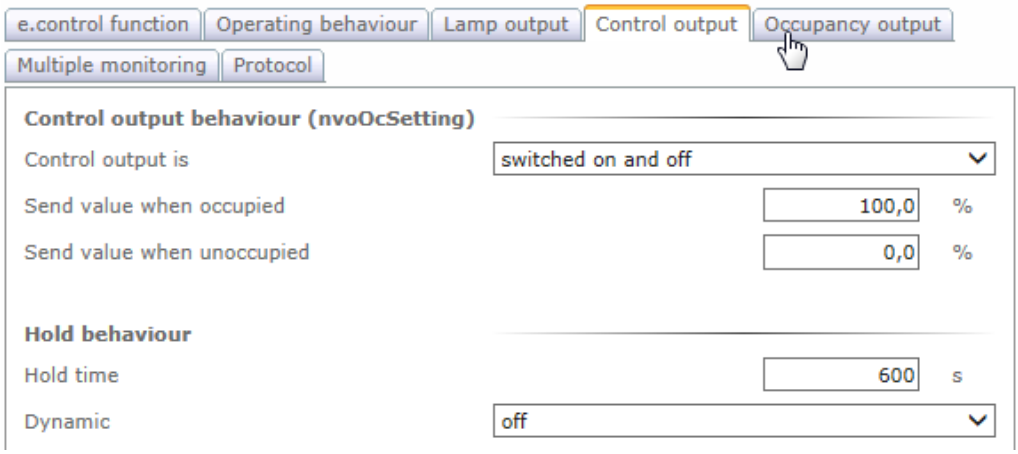



## Occupancy-dependent control system

The "Occupancy-dependent control system" uses the occupancy evaluation to provide control of lighting and window blinds. You can specify whether the control output is used for switching on and off or for switching off only. In addition, a fixed value for the switching moment can be preset for the respective switching status.

A hold time and dynamic response can be parameterised for the *nvoOcSetting* (SNVT_setting) output network variable. A pre-set hold time begins when occupancy is no longer being detected via occupancy evaluation. It should be noted that the hold time must be longer than the time given for multiple monitoring. The dynamic response shortens the pre-set hold time if lighting evaluation is activated for just a moment, for example in passageways.

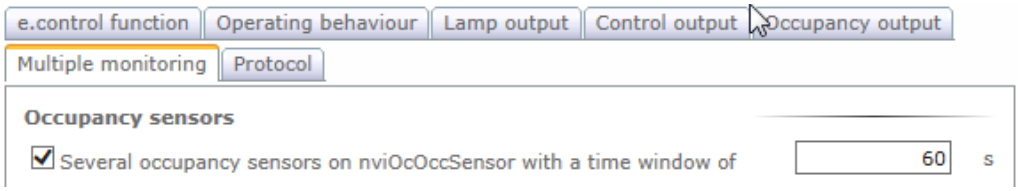
The settings for hold times and dynamic response are input on the "Control output" tab.




## Multiple monitoring for occupancy sensors

The "Multiple monitoring" function makes it possible to take multiple occupancy sensors into account, for example in open-plan offices. For multiple monitoring the transmission behavior of the individual sensors must be adapted for "Re-send after" (see the "OccupancySensor" description).

The settings for multiple monitoring are input on the "Multiple monitoring" tab:



## 5.4.9 Space comfort controller

The *SpaceComfortCtrl* object is a room climate controller which can be used for various control systems. It supports temperature control with radiators, heated/chilled ceilings, fan coils and supply air or outdoor air damper. The air quality can also be controlled as well as the temperature. The room climate controller provides outputs for all the relevant actuators as well as status information for monitoring and synchronising room control devices.

### Overview of object functions

Other functions are supported in addition to the VDI 3813-compliant room automation functions.

### Functions

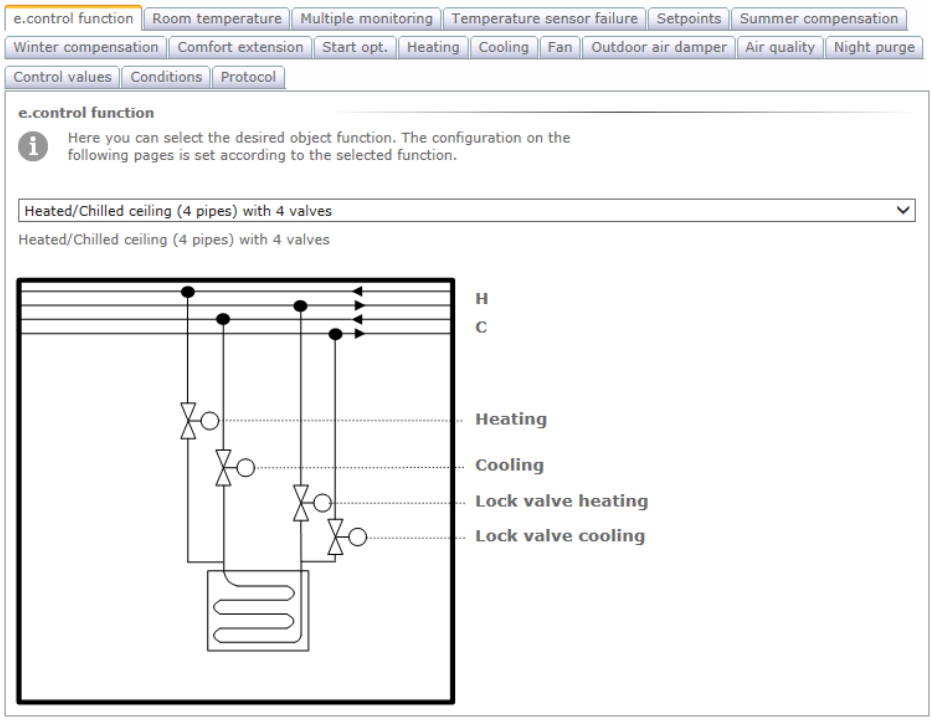
- Room temperature averaging
- Multiple monitoring for sensors and contacts
- Failure response for temperature sensors
- Setpoint calculation (as per VDI 3813)
- Energy mode selection (as per VDI 3813)
- Energy mode selection with start optimisation (as per VDI 3813)
- Function selection (as per VDI 3813)
- Setpoint determination for temperature and fan control
- Supply air sequence
- Temperature control (heating/cooling) (as per VDI 3813)
- Fan control (as per VDI 3813)
- Outdoor air damper control
- Air quality control (as per VDI 3813)
- Night-time cooling (as per VDI 3813)
- Free assignment of control output functions

## Parameterisation of object functions

The individual functions are parameterised using the convenient web plug-in.

As the room climate controller is designed for use with various control systems, some information on the control system needs to be entered. You can choose from a range of commonly-used control systems, for which a basic configuration has been stored. However it is also possible to configure the controller freely.

Use the "e.control function" tab to select one of the control systems available.




## Description of control systems:

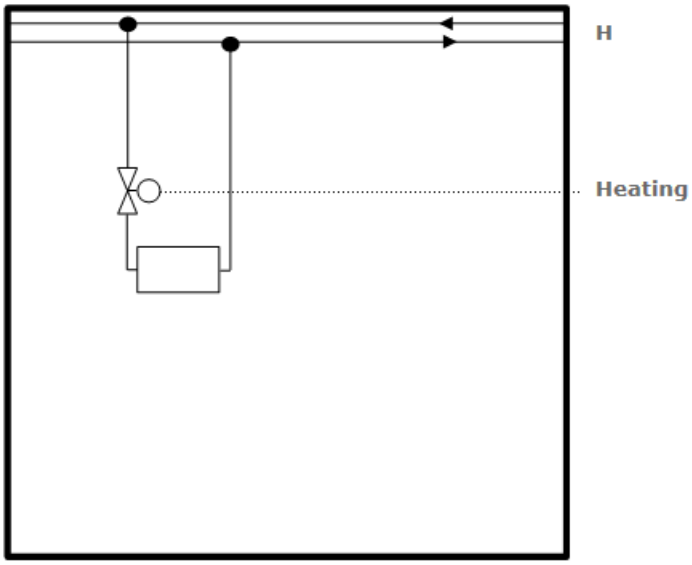
Specific settings must be input in order to operate a control system efficiently. Important settings are preconfigured when the control system is selected.

It is specified, for example, whether the system is working with a heating and cooling sequence or only with a heating sequence or only with a cooling sequence, and whether switching between sequences is automatic or is effected by an external changeover signal. If, for example, fan control or vent shut-off periods are required in the control system selected, these are made available accordingly.

The control systems available for selection are described in the following pages. The relevant input and output variables for individual systems are given in the tables.

## Radiator

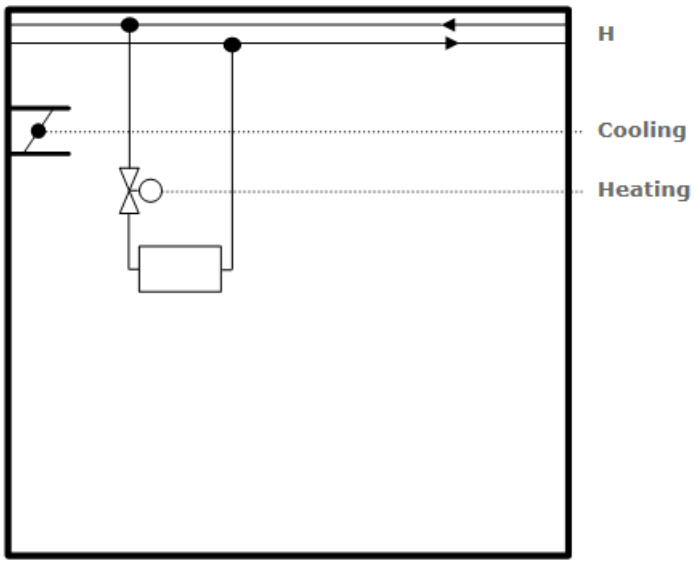
If the control system consists solely of one radiator, the room climate controller has only one heating sequence.




| Control output function | Network variable |
|---|---|
| Heating | nvoScHeatOutput |

## Radiator/cooling with VAV

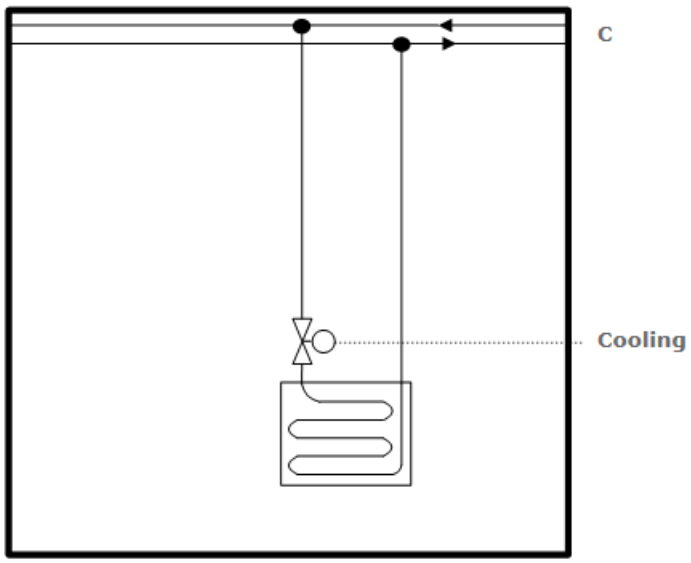
If the control system consists of a radiator and a variable volume flow system for cooling, the room climate controller has one heating sequence and one cooling sequence. Change over between the sequences takes place automatically.




| Control output function | Network variable |
|---|---|
| Heating | nvoScHeatOutput |
| Cooling | nvoScDamper |

## Chilled ceiling

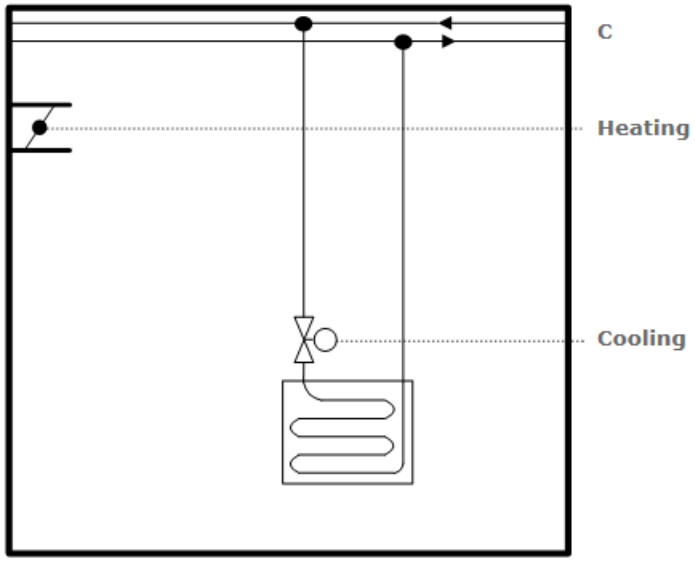
If the control system consists solely of a chilled ceiling, the room climate controller has only one cooling sequence.




| Control output function | Network variable |
|---|---|
| Cooling | nvoScCoolOutput |

## Heating with VAV/chilled ceiling

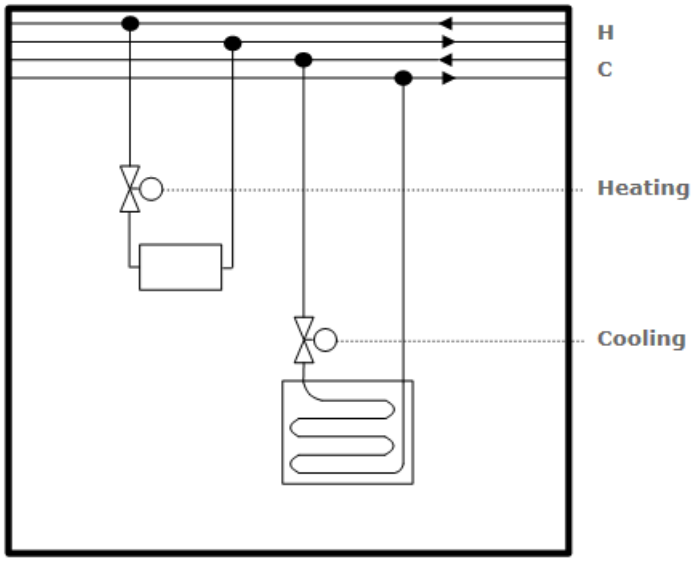
If the control system consists of a chilled ceiling and a variable volume flow system for heating, the room climate controller has one heating and one cooling sequence. Change over between the sequences takes place automatically.




| Control output function | Network variable |
|---|---|
| Heating | nvoScDamper |
| Cooling | nvoScCoolOutput |

## Radiator/chilled ceiling (4-pipe system)

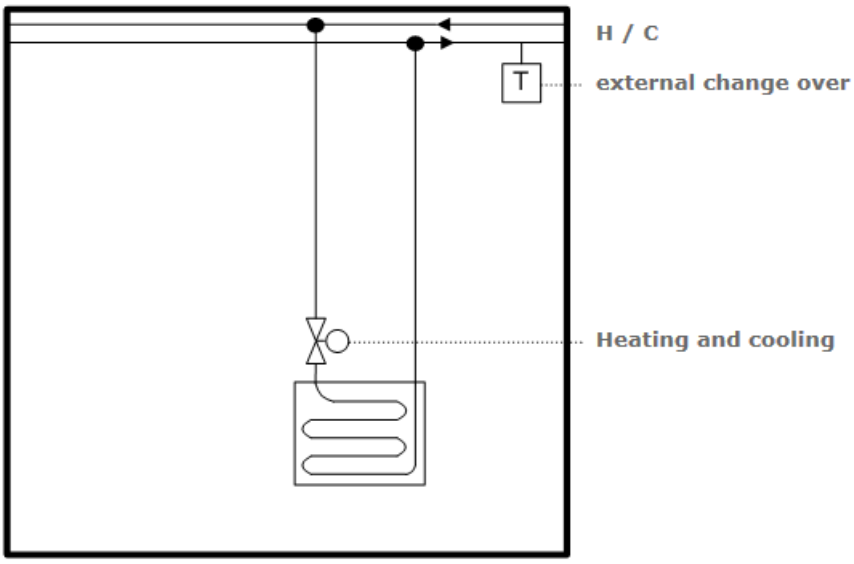
If the control system consists of a radiator and a chilled ceiling, the room climate controller has one heating and one cooling sequence. Change over between the sequences takes place automatically.




| Control output function | Network variable |
|---|---|
| Heating | nvoScHeatOutput |
| Cooling | nvoScCoolOutput |

## Heated/chilled ceiling (2-pipe system)

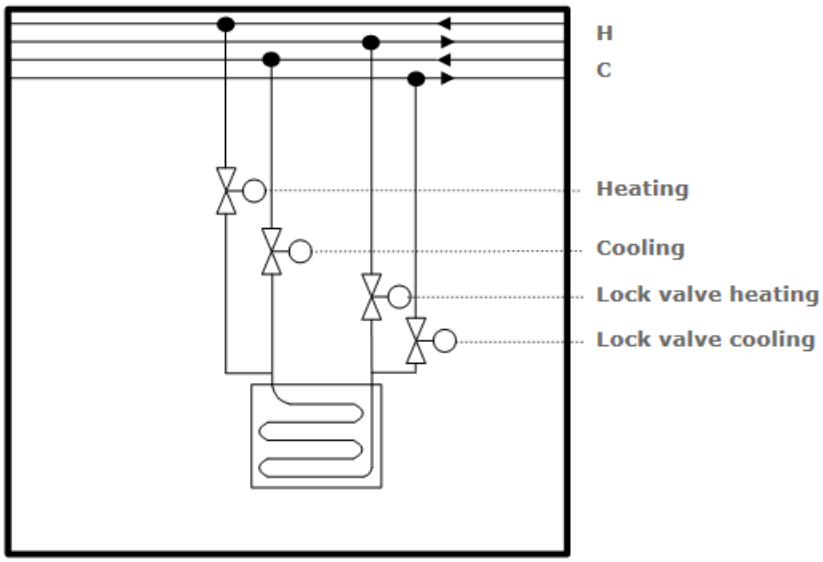
If the control system consists of a combined heated/chilled ceiling, the room climate controller has one heating and one cooling sequence. Change over between the sequences must be executed by means of an external changeover signal. Opening of the valves is regulated by a valve lock time.




| Control output function | Network variable |
|---|---|
| External change over | nviScHeatCool |
| Heating and cooling | nvoScHeatOutput **or** nvoScCoolOutput |

## Heated/chilled ceiling (4-pipe system) with 4 valves

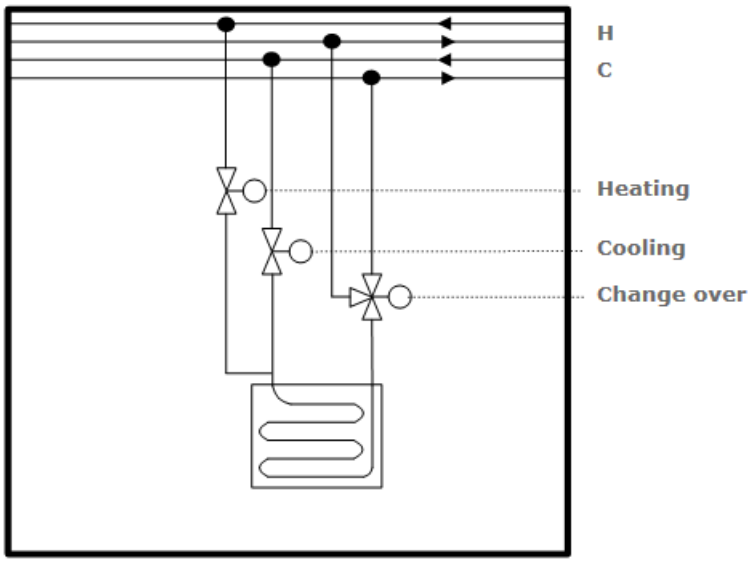
If the control system consists of a combined heated/chilled ceiling with 2 intake and 2 lock valves, the room climate controller has one heating and one cooling sequence. Change over between the sequences takes place automatically. Opening of the valves is regulated by a valve lock time.




| Control output function | Network variable |
|---|---|
| Heating | nvoScHeatOutput |
| Cooling | nvoScCoolOutput |
| Lock valve heating | nvoScSecHeatOutput |
| Lock valve cooling | nvoScSecCoolOutput |

## Heated/chilled ceiling (4-pipe system) with 3 valves

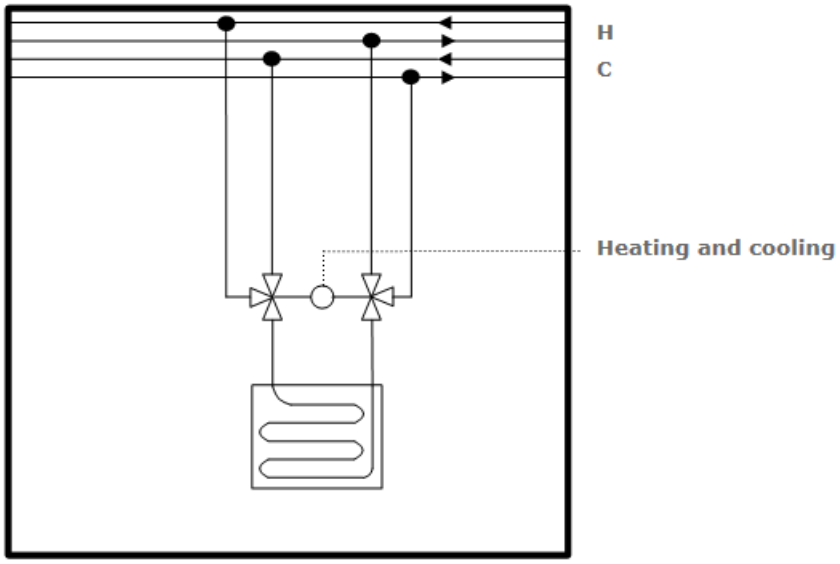
If the control system consists of a combined heated/chilled ceiling with 2 intake valves and 1 switch valve for return flow, the room climate controller has one heating and one cooling sequence. Change over between the sequences takes place automatically. Opening of the valves is regulated by a valve lock time.




| Control output function | Network variable |
|---|---|
| Heating | nvoScHeatOutput |
| Cooling | nvoScCoolOutput |
| Change over | nvoScSecHeatOutput **or** nvoScSecCoolOutput |

## Heated/chilled ceiling (4-pipe system) with 6-way valve

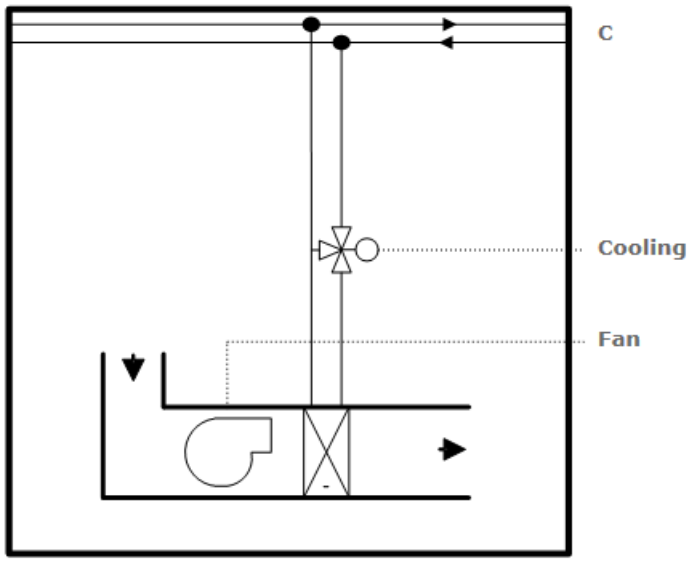
If the control system consists of a combined heated/chilled ceiling with a 6-way valve, the room climate controller has one heating and one cooling sequence. Change over between the sequences takes place automatically. Opening of the valves is regulated by a valve lock time.




| Control output function | Network variable |
|---|---|
| Heating and cooling | nvoScHeatOutput **or** nvoScCoolOutput |

## Cooling with fan coil

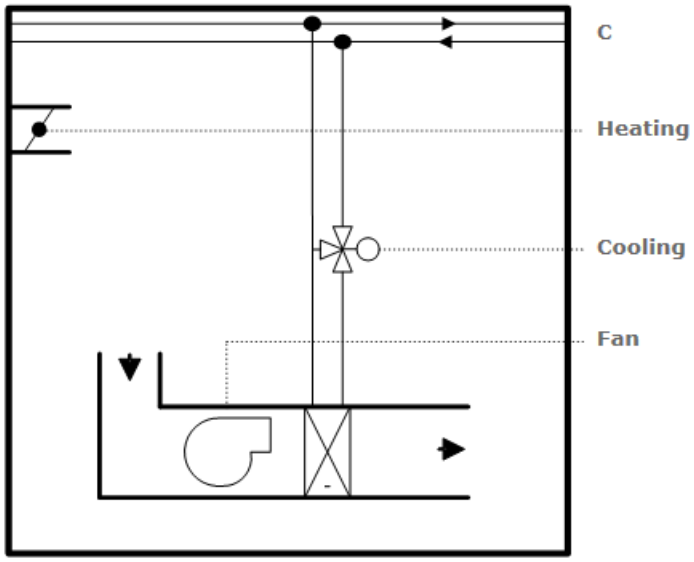
If the control system consists of a fan coil with integrated cooling register, the room climate controller has a cooling sequence with fan control.




| Control output function | Network variable |
|---|---|
| Cooling | nvoScCoolOutput |
| Fan | nvoScFanSpeed |

## Heating with VAV/cooling with fan coil

If the control system consists of a fan coil with integrated cooling register and a variable volume flow system for heating, the room climate controller has one cooling sequence with fan control and one heating sequence. Change over between the sequences takes place automatically.

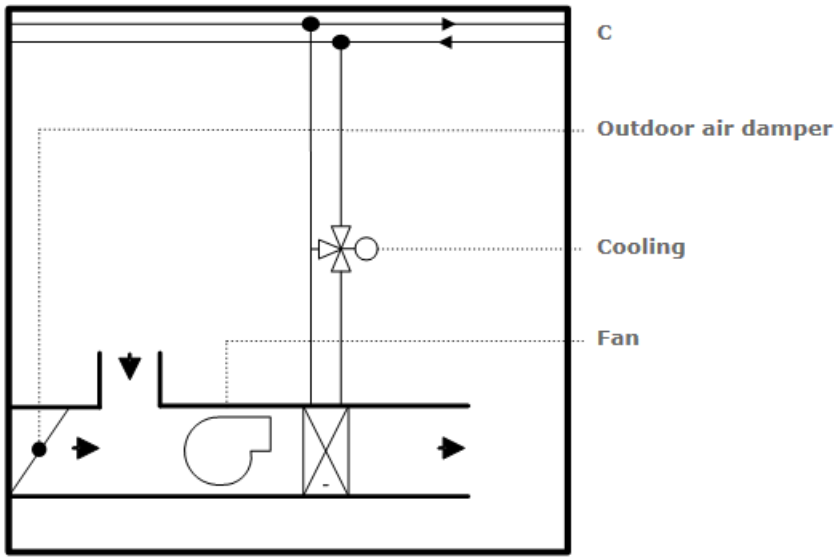



| Control output function | Network variable |
|---|---|
| Heating | nvoScDamper |
| Cooling | nvoScCoolOutput |
| Fan | nvoScFanSpeed |

## Cooling with fan coil and outdoor air damper

If the control system consists of a fan coil with integrated cooling register and an outdoor air damper, the room climate controller has one cooling sequence with fan control.

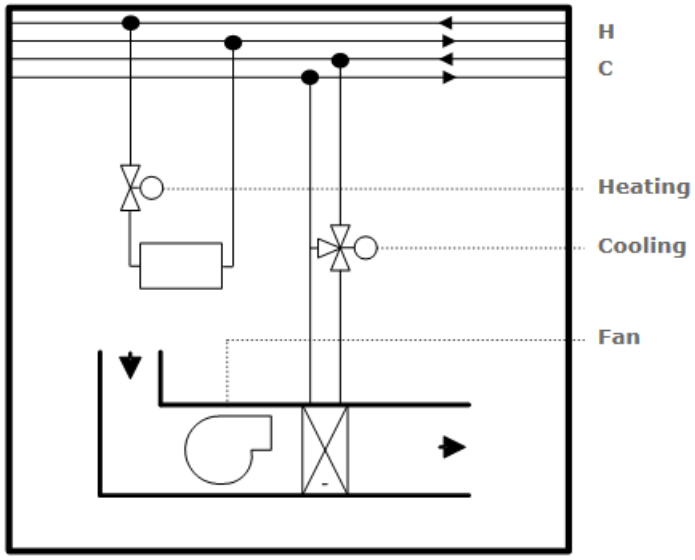
The outdoor air damper can be used for cooling support, air quality control and night-time cooling.




| Control output function | Network variable |
|---|---|
| Cooling | nvoScCoolOutput |
| Fan | nvoScFanSpeed |
| Outdoor air damper | nvoScDamper |

## Radiator/cooling with fan coil

If the control system consists of a fan coil with integrated cooling register and a radiator for heating, the room climate controller has one cooling sequence with fan control and one heating sequence. Change over between the sequences takes place automatically.

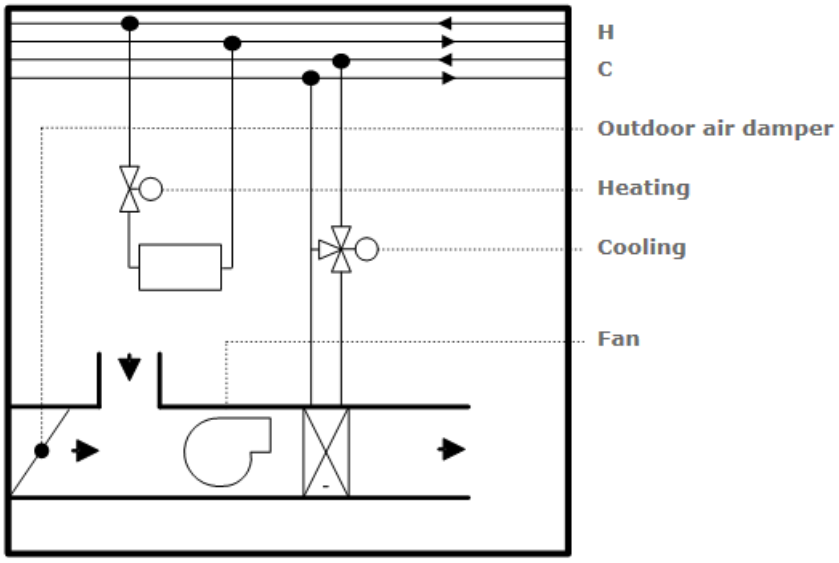



| Control output function | Network variable |
|---|---|
| Heating | nvoScHeatOutput |
| Cooling | nvoScCoolOutput |
| Fan | nvoScFanSpeed |

## Radiator/cooling with fan coil and outdoor air damper

If the control system consists of a fan coil with integrated cooling register and a radiator for heating, the room climate controller has one cooling sequence with fan control and one heating sequence. Change over between the sequences takes place automatically.

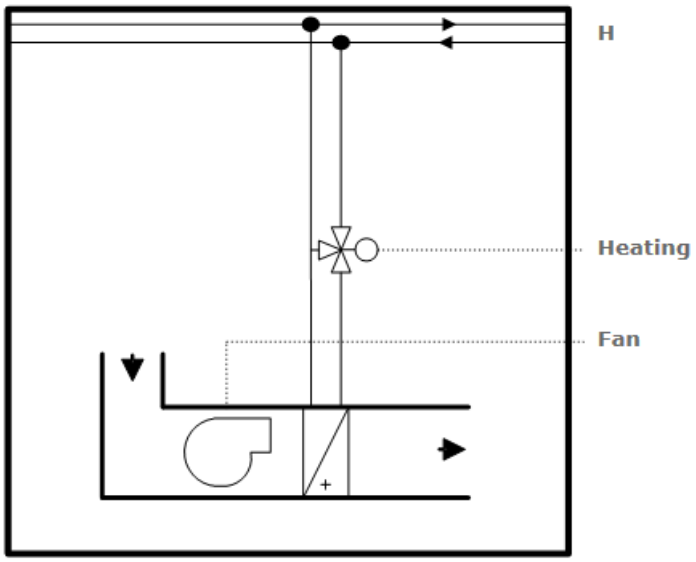
The outdoor air damper can be used for cooling support, air quality control and night-time cooling.




| Control output function | Network variable |
|---|---|
| Heating | nvoScHeatOutput |
| Cooling | nvoScCoolOutput |
| Fan | nvoScFanSpeed |
| Outdoor air damper | nvoScDamper |

## Heating with fan coil

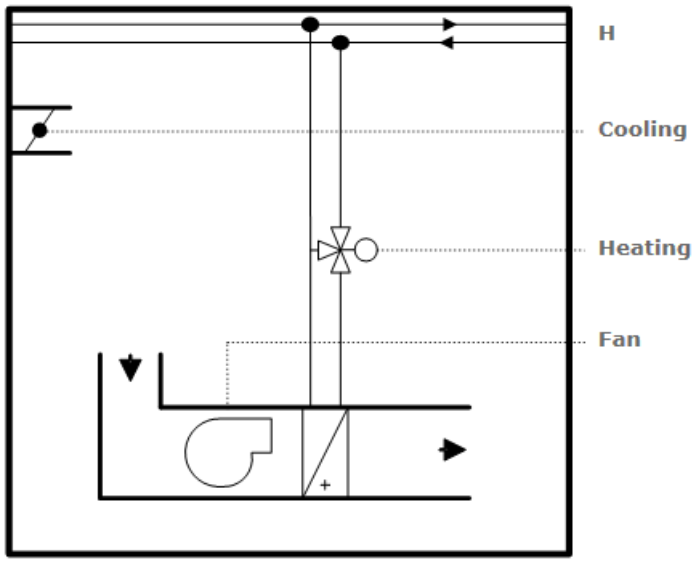
If the control system consists of a fan coil with integrated heating register, the room climate controller has a heating sequence with fan control.




| Control output function | Network variable |
|---|---|
| Heating | nvoScHeatOutput |
| Fan | nvoScFanSpeed |

## Heating with fan coil/cooling with VAV

If the control system consists of a fan coil with integrated heating register and a variable volume flow system for cooling, the room climate controller has one heating sequence with fan control and one cooling sequence. Change over between the sequences takes place automatically.

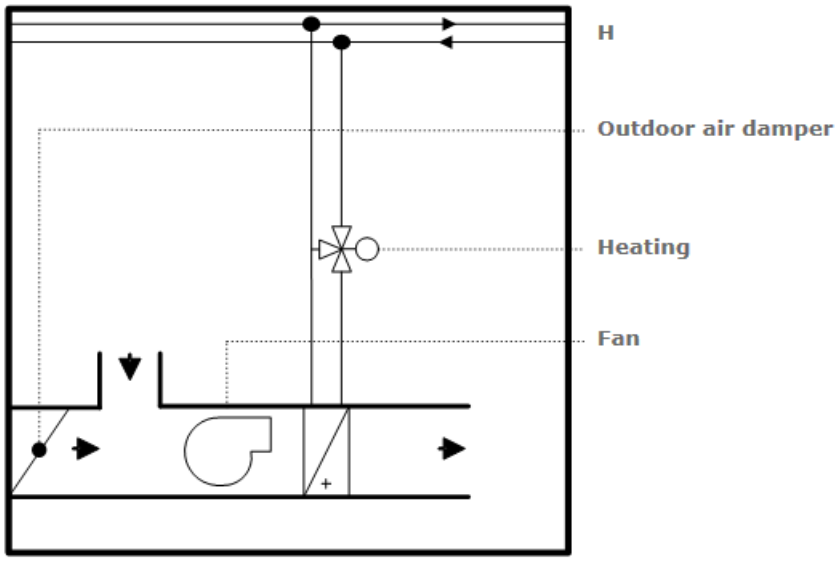



| Control output function | Network variable |
|---|---|
| Heating | nvoScHeatOutput |
| Cooling | nvoScCoolOutput |
| Fan | nvoScFanSpeed |

## Heating with fan coil and outdoor air damper

If the control system consists of a fan coil with integrated heating register, the room climate controller has a heating sequence with fan control.

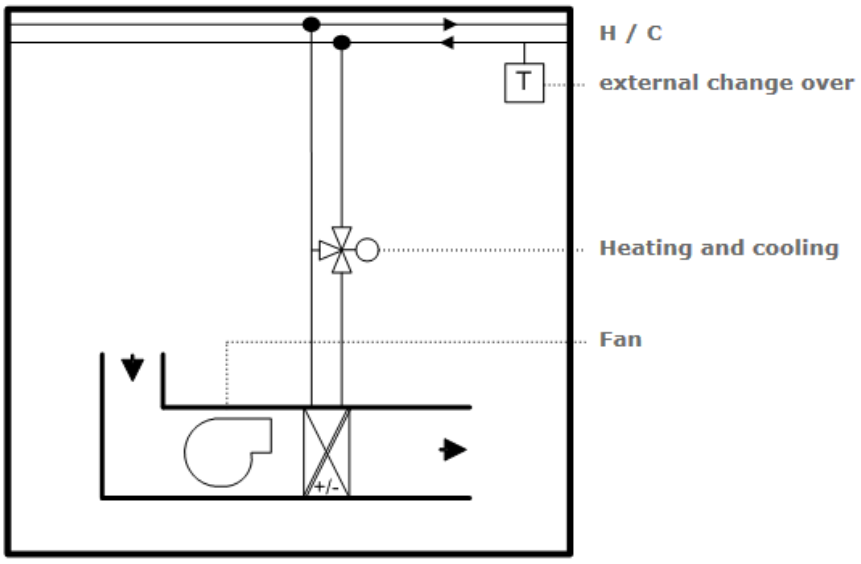
The outdoor air damper can be used for heating support and for air quality control.




| Control output function | Network variable |
|---|---|
| Heating | nvoScHeatOutput |
| Fan | nvoScFanSpeed |
| Outdoor air damper | nvoScDamper |

## Heating/cooling with fan coil (2-pipe system)

If the control system consists of a fan coil with integrated heating/cooling register, the room climate controller has one heating and one cooling sequence with fan control. Change over between the sequences must be executed by means of an external changeover signal. Opening of the valve is regulated by a valve lock time.

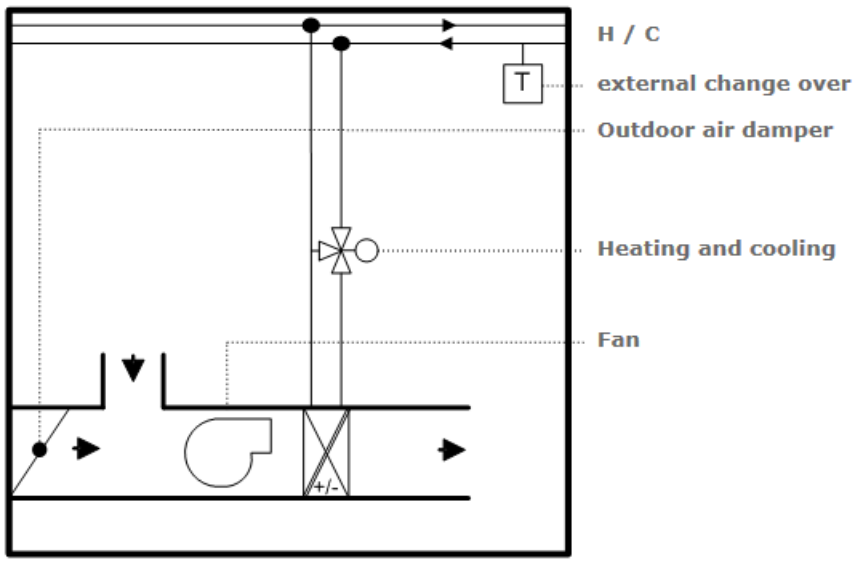



| Control output function | Network variable |
|---|---|
| Heating and cooling | nvoScHeatOutput **or** nvoScCoolOutput |
| Fan | nvoScFanSpeed |

## Heating/cooling with fan coil and outdoor air damper (2-pipe system)

If the control system consists of a fan coil with integrated heating/cooling register, the room climate controller has one heating and one cooling sequence with fan control. Change over between the sequences must be executed by means of an external changeover signal. Opening of the valve is regulated by a valve lock time.

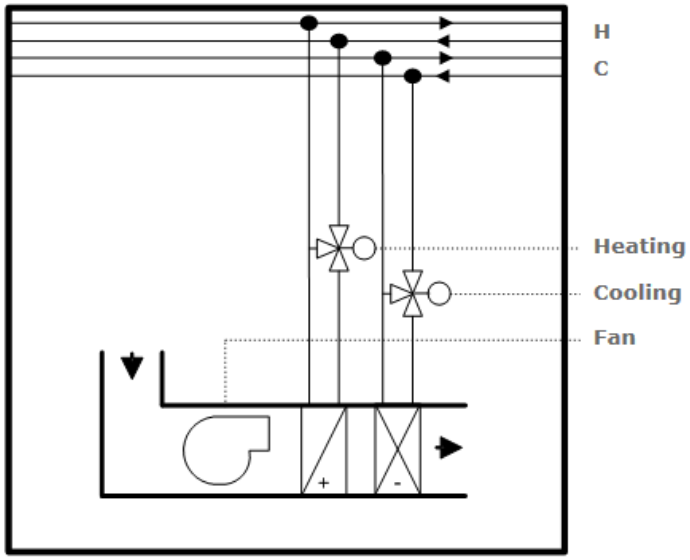
The outdoor air damper can be used for heating/cooling support, air quality control and night-time cooling.




| Control output function | Network variable |
|---|---|
| Heating and cooling | nvoScHeatOutput **or** nvoScCoolOutput |
| Fan | nvoScFanSpeed |
| Outdoor air damper | nvoScDamper |

## Heating/cooling with fan coil (4-pipe system)

If the control system consists of a fan coil with a heating and cooling register, the room climate controller has one heating and one cooling sequence with fan control. Change over between the sequences takes place automatically.

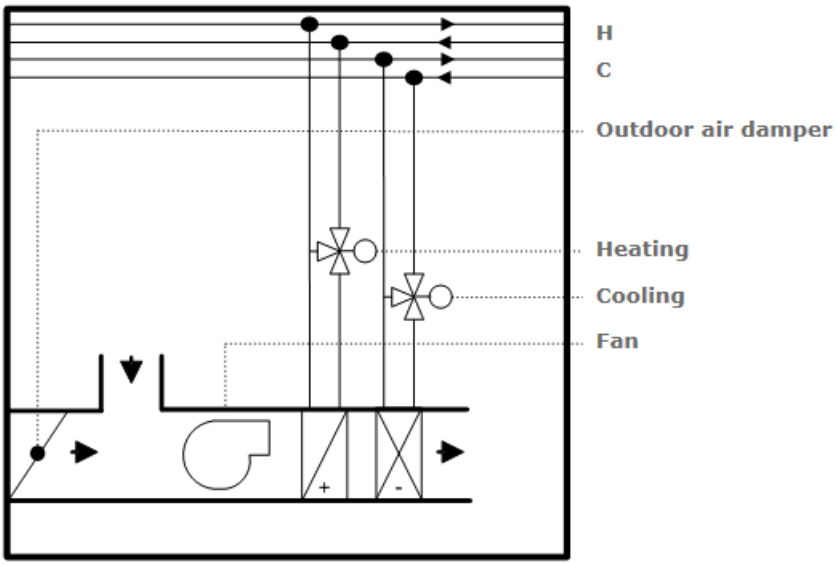



| Control output function | Network variable |
|---|---|
| Heating | nvoScHeatOutput |
| Cooling | nvoScCoolOutput |
| Fan | nvoScFanSpeed |

## Heating/cooling with fan coil and outdoor air damper (4-pipe system)

If the control system consists of a fan coil with a heating and cooling register, the room climate controller has one heating and one cooling sequence with fan control. Change over between the sequences takes place automatically.

The outdoor air damper can be used for heating/cooling support, air quality control and night-time cooling.

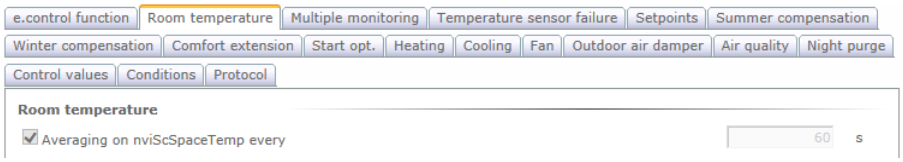



| Control output function | Network variable |
|---|---|
| Heating | nvoScHeatOutput |
| Cooling | nvoScCoolOutput |
| Fan | nvoScFanSpeed |
| Outdoor air damper | nvoScDamper |

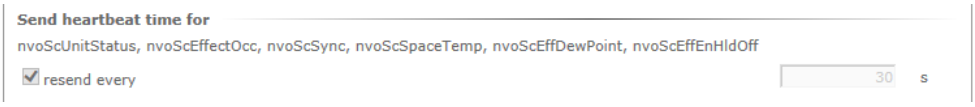
# Description of object functions

## Room temperature averaging

The room climate controller receives the current room temperature from the network. If an actual temperature sensor is available as a transmitter, no further settings are needed to detect the room temperature. If the temperature value should be an average taken from several temperature sensors, this is possible if a reception interval is specified. The reception interval is parameterised on the "Room temperature" tab.

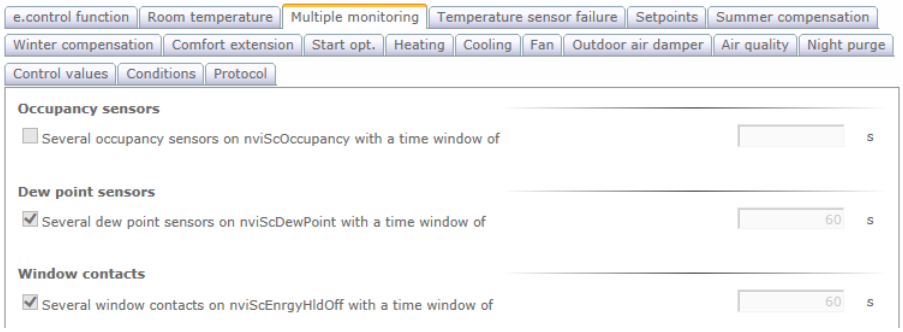



It is also necessary to ensure that the temperature sensors' transmission intervals are such that each one transmits exactly the same number of data packets within the reception interval. This enables the controller to average all the temperatures transmitted per interval. The averaged temperature value is output on *nvoScSpaceTemp*, for which a transmission cycle can be parameterised. The transmission cycle can be configured on the "Conditions" tab and applies to all the state variables listed in the plug-in.



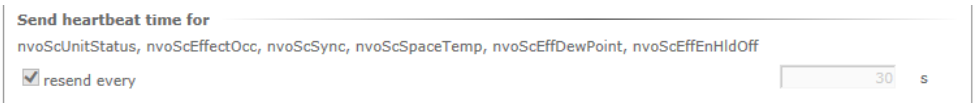

## Multiple monitoring for sensors and contacts

As with room temperature averaging, the room climate controller can also monitor the state of several, relevant sensors and contacts. To do this, the reception intervals are set under the respective headings on the "Multiple monitoring" tab.




All data packets received within the duration of the reception period are linked via an "OR" function. It must be ensured that the sensors and contacts are configured with an appropriate transmission interval.

The effective dew point status data is output on *nvoScEffDewPoint*, the effective window status on *nvoScEffEnHldOff*. A transmission cycle for both outputs can be set on the "Conditions" tab. This applies to all the state variables listed in the plug-in.



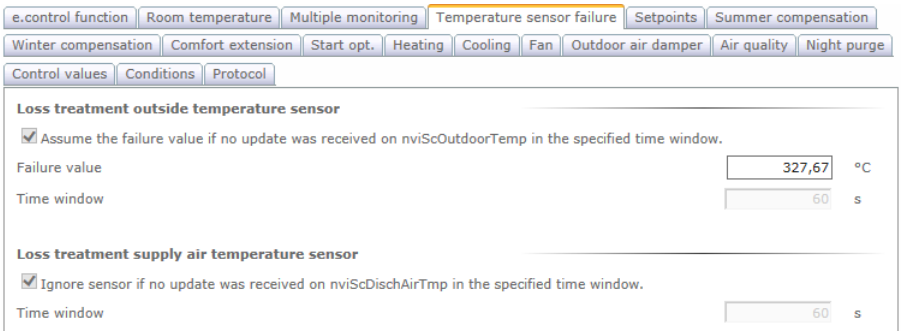
## Failure response for temperature sensors

A sensor failure may be detected with regard to the outdoor temperature and the supply air temperature.

The room climate controller is given a time window within which the relevant temperature value must be updated. To be able to do this, the sensors must be transmitting their readings cyclically.

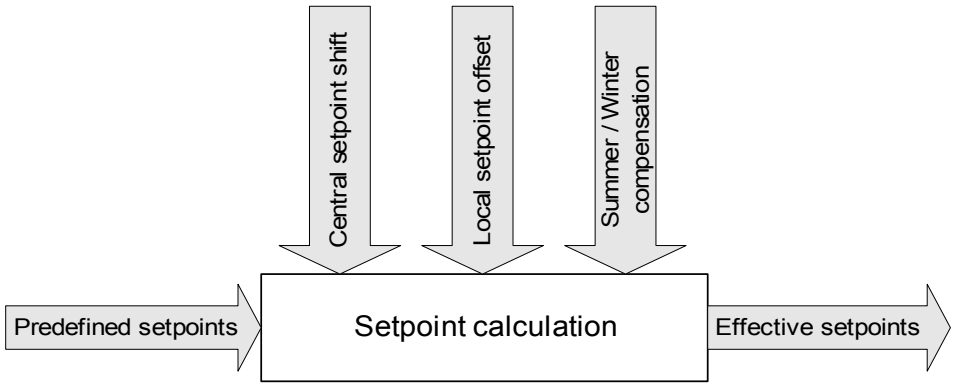
A default can also be set to specify which outdoor temperature value should be used until the new values are received.

The settings for both temperature values in the object plug-in are entered on the "Temperature sensor failure" tab.



## Setpoint calculation (as per VDI 3813)

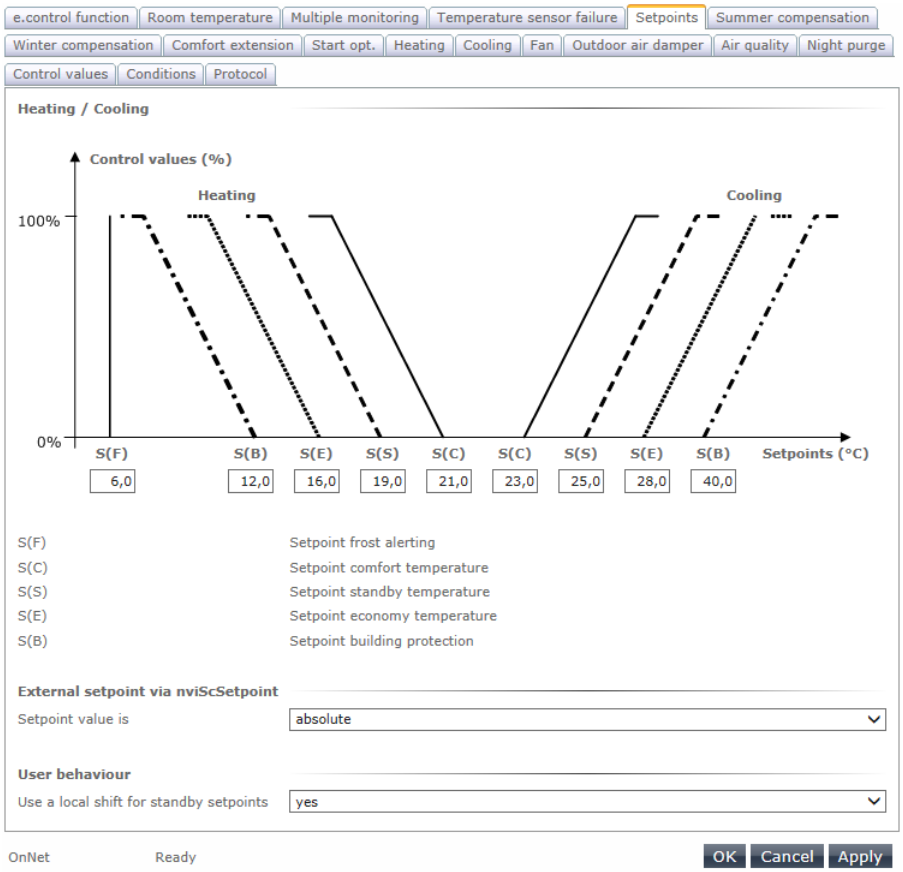
Setpoints are calculated on the basis of the current, predefined setpoints of the different energy modes (*nciScSetpoints*), a central setpoint shift (*nviScSetpoint*) and a local setpoint offset by the user (*nviSetpointOffset*). The outdoor temperature can also be used to activate summer and winter compensation.




*The effective setpoints are made available to the network on nvoScEffSetPnts.*

### Predefined setpoints

Setpoints for the various energy modes are specified in the object plug-in on the "Setpoints" tab.



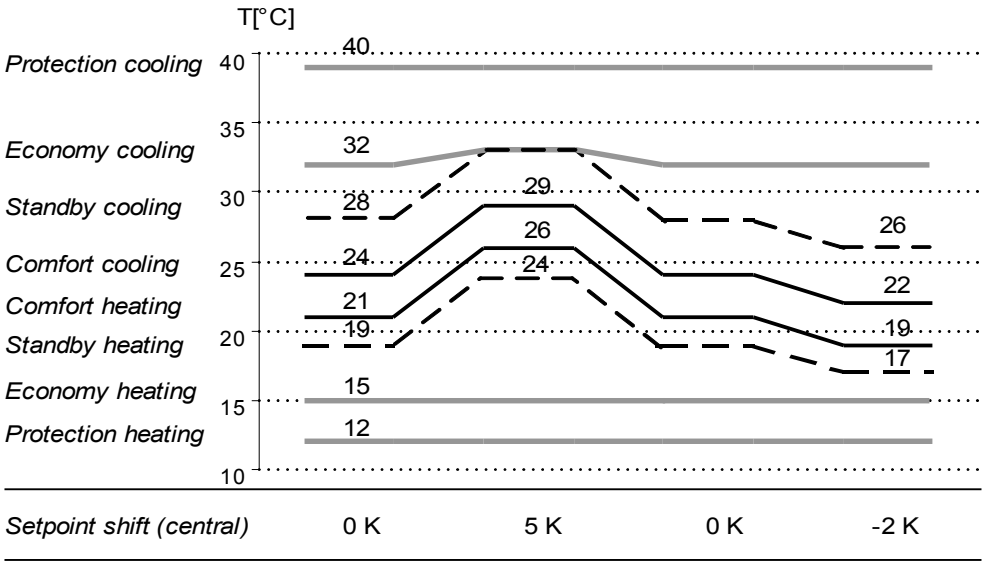

For heating and cooling setpoints (with the exception of building protection) there is a network variable (*nciScSetpoints*) available, which allows values to be adjusted across the network during operation.

## Central setpoint shift

The central setpoint shift *(nviScSetpoint)* can be entered by specifying an absolute value or an offset relative to the predefined setpoints. This applies to both control sequences of comfort and standby setpoints.

If an absolute value is specified, the offset value is calculated as the difference from the middle of the parameterised zero energy band.

If a relative value is specified, the parameter default after a reset is 0. If an absolute value is specified, the middle of the dead band is used after reset. If the control sequence comprises a heating sequence or a cooling sequence only, and an absolute value is specified, the comfort setpoint of the relevant sequence is used. Where necessary, the economy setpoints are adjusted to the standby setpoints.

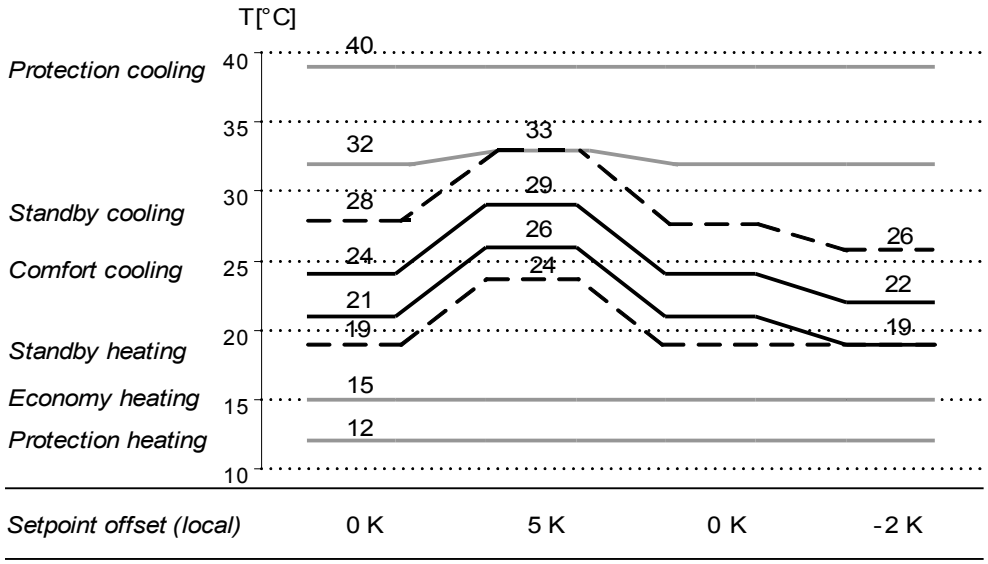



*As the example shows, the economy setpoints are adjusted to the setpoint of the higher standby energy mode.*

It should be entered on the "Setpoints" tab under "External setpoint via nviScSetpoint" whether the offset involves absolute or relative values.

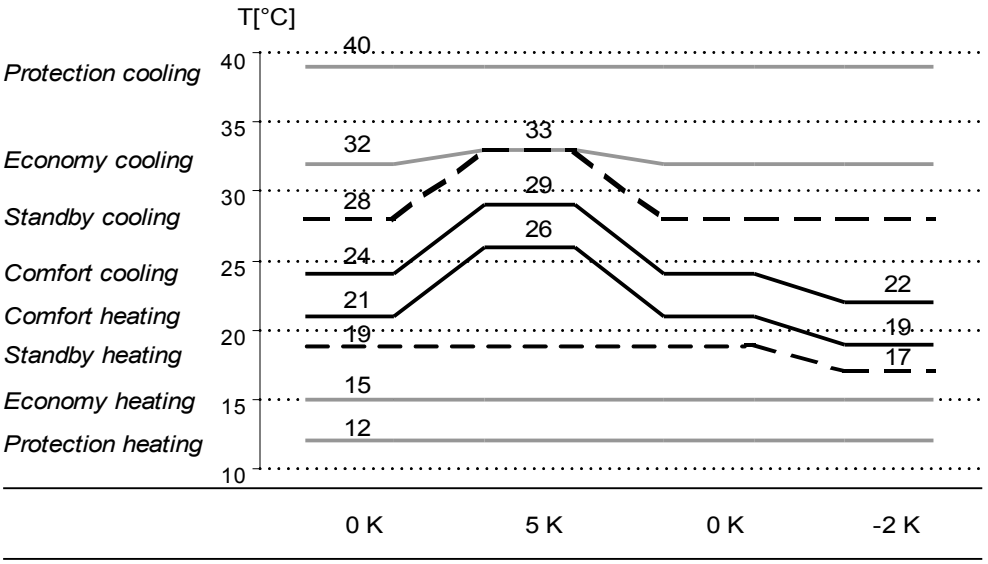

## Local setpoint offset

A local setpoint offset *(nviScSetptOffset)* is entered as a relative offset. It gives the user the opportunity to adapt the temperature to his/her liking. The controller guarantees a minimal difference between the comfort temperature and standby temperature through its asymmetrical adjustment whilst simultaneously ensuring energy savings.




** Shift of standby setpoints without considering energetic criterias*

The offset thereby applies to the comfort and standby setpoints of both control sequences. Alternatively, the standby setpoint offset can be restricted to the most appropriate energy mode.




** Shift of standby setpoints consider energetic criterias*

As the examples show, the economy setpoints are adjusted where necessary to the setpoint of the higher standby energy mode.

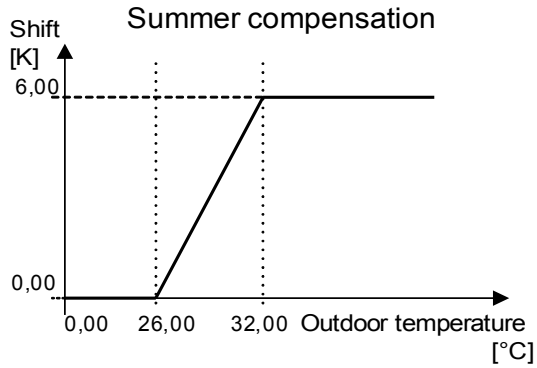
The settings for the local setpoint offset can be chosen in the object plug-in on the "Setpoints" tab.


## Summer compensation

Summer compensation helps to save energy when temperatures are rising and to avoid heat shocks caused by excessive differences in temperature between interiors and outdoor areas. (Standard for recommended values: DIN EN 13779). It achieves this by raising the cooling setpoints when outdoor temperatures are high.

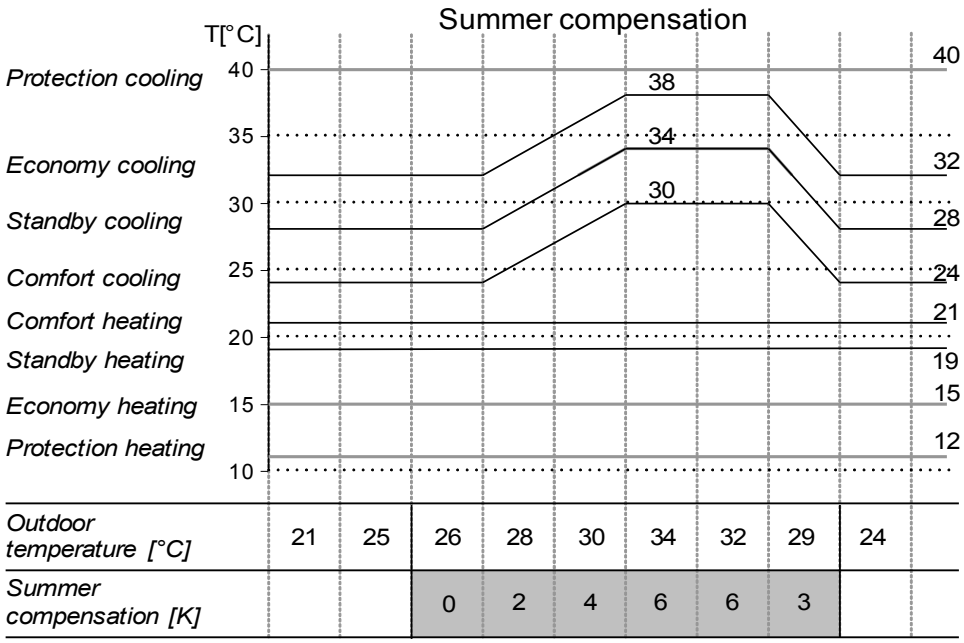
This setpoint adjustment is dependent on the outdoor temperature and is configured with temperature thresholds for the start of adjustment and the extent of maximum adjustment, as well as a value for the maximum increase.

| Parameter | Example |
|---|---|
| Starting temperature for summer compensation | 26.00°C |
| Temperature for maximum setpoint shift (summer compensation) | 32.00°C |
| Maximum setpoint shift with summer compensation | 6.00 K |

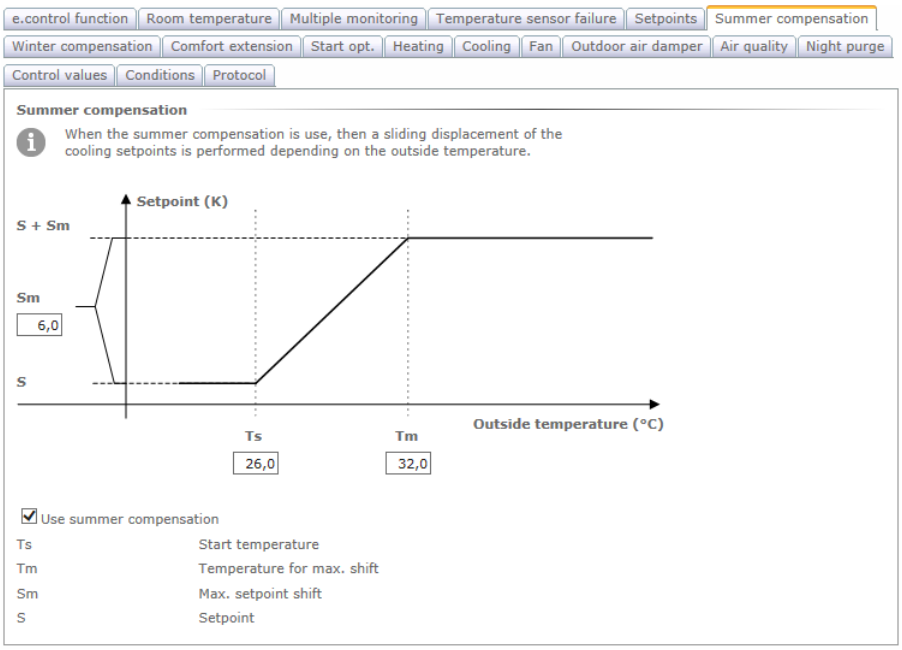



In the example shown, summer compensation begins when the outdoor temperature reaches 26°C. As the outdoor temperature rises, the setpoint is raised. When the outdoor temperature is 32°C, the maximum setpoint offset of 6K is reached. There are no further offsets in the event of higher temperatures.

The figures show the setpoint offset resulting from the example values given and the corresponding outdoor temperatures.



The summer compensation function can be activated on the "Summer compensation" tab and the appropriate setpoints can be entered.

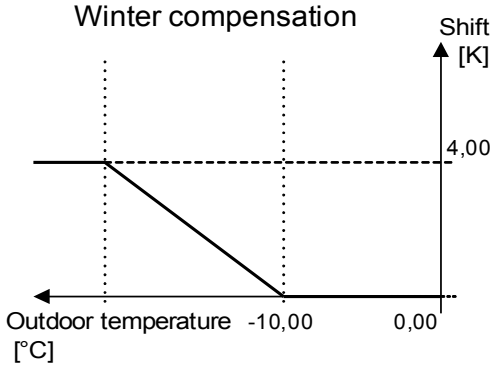



## Winter compensation

When winter compensation is activated, it raises the heating setpoints to offset the cold radiating from walls and windows when temperatures are low. Winter compensation does not affect the economy heating setpoints however.

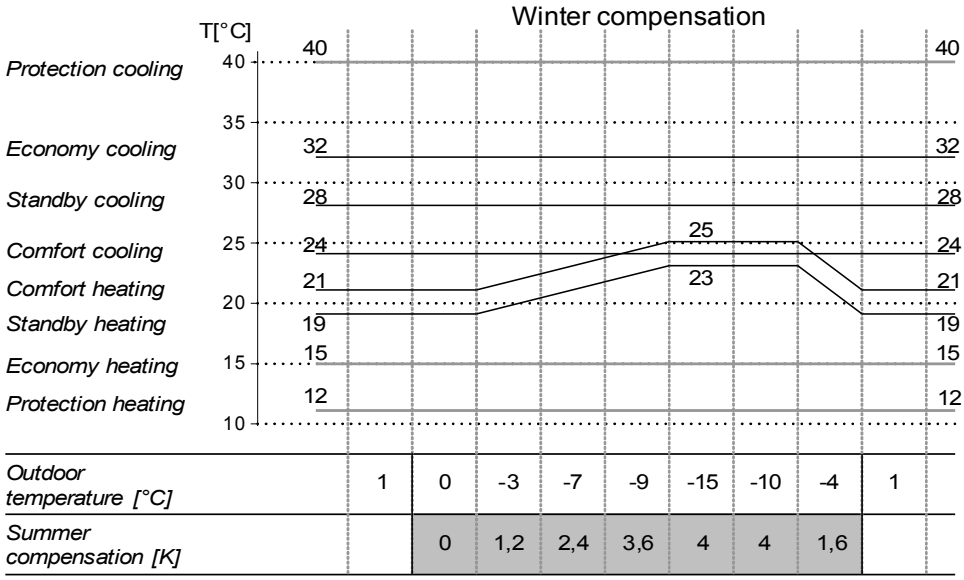
This setpoint adjustment is dependent on the outdoor temperature and is configured with temperature thresholds for the start of adjustment and the extent of maximum adjustment, as well as a value for the maximum increase.

| Parameter | Example |
|---|---|
| Starting temperature for winter compensation | 0.00°C |
| Temperature for maximum setpoint shift (winter compensation) | -10.00°C |
| Maximum setpoint shift with winter compensation | 4.00 K |



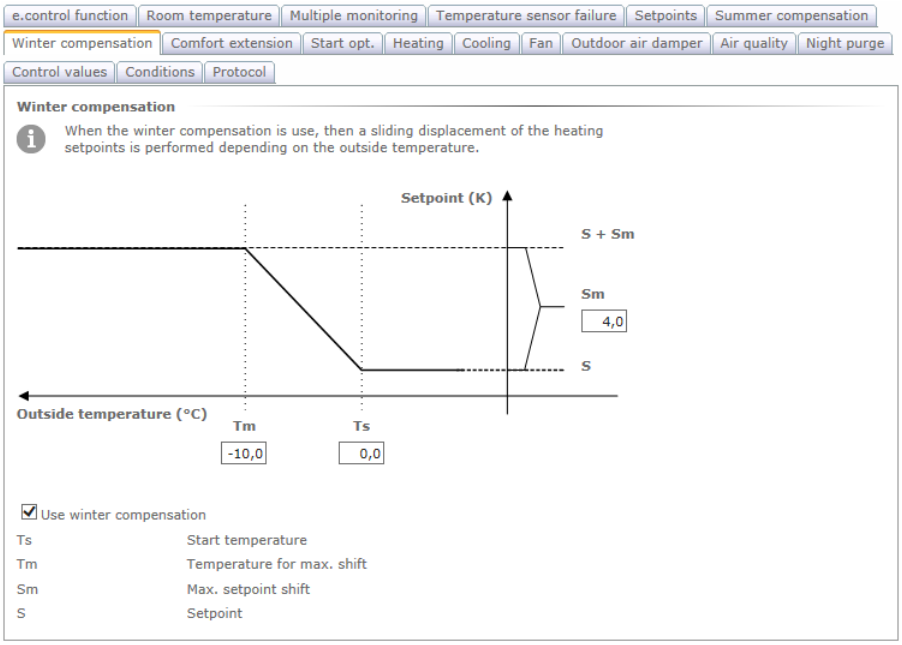
In the example shown, winter compensation begins when the outdoor temperature reaches 0°C. As the outdoor temperature drops, the setpoint is raised. When the outdoor temperature is -10°C, the maximum setpoint offset of 4K is reached. There are no further offsets in the event of lower temperatures.

The figures show the setpoint offset resulting from the example values given and the corresponding outdoor temperatures.



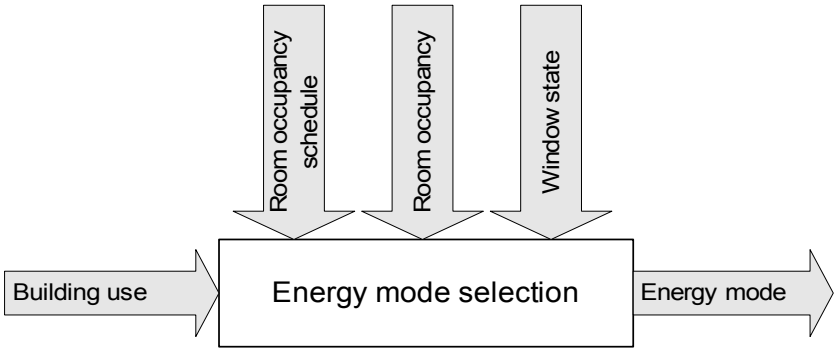

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Outdoor temperature [°C]* | 1 | 0 | -3 | -7 | -9 | -15 | -10 | -4 | 1 |
| *Summer compensation [K]* | | 0 | 1,2 | 2,4 | 3,6 | 4 | 4 | 1,6 | |

The winter compensation function can be activated on the "Winter compensation" tab and the appropriate setpoints can be entered.



## Energy mode selection (as per VDI 3813)

The energy mode being used by the controller at any given time is determined by the central specified setting for building use (*nviScBuildingUse*), a room occupancy schedule (*nviScOccSchedule*) and the current room occupancy (*nviScOccupancy*). Any interruptions (*nviScEnergyHdOff*), such as open windows, are taken into account here.




The room climate controller is able to adopt the following energy modes.

| Energy mode | Description |
|---|---|
| Comfort | Indicates the state of an occupied room. The temperature is at a comfortable level. Depending on the function, the controller operates with the relevant comfort setpoints in the heating or cooling sequence. |
| Standby | Indicates the state of a temporarily unoccupied room. Depending on the function, the controller operates in the heating or cooling sequence with standby setpoints, which are generally slightly below the comfort values in heating mode and slightly above the comfort values in cooling mode. This reduces the room's energy usage without making it any less comfortable. |
| Economy | Indicates the state of a room left unoccupied for a longer period of time, e.g. overnight. Energy use can be reduced significantly. The economy setpoints are generally below the standby values in heating mode and above them in cooling mode. |
| Building protection | The 'Protection' state uses a minimum amount of energy to protect the building, its fixtures and fittings. It is therefore suitable for periods when the building is unoccupied for a long time, e.g. holidays. |

If the room temperature drops below freezing point, an alarm is triggered and this is communicated to the building management system. The setpoints calculated continue to apply.

## Building use

General usage of the building can be preset centrally using a controller. This defines the highest energy level that can be reached. The following settings are included:

| **Building use - *nviScBuildungUse*** | **Meaning** | **Highest attainable energy mode** |
|---|---|---|
| OC_OCCUPIED | Building occupied | Comfort |
| OC_STANDBY | Building temporarily unoccupied | Economy |
| OC_UNOCCUPIED | Building unoccupied | Protection |

### Room occupancy schedule

Room occupancy is transmitted via a time program or a central control device. For example, each tenant can have their own time profile. In addition, night-time reductions or holidays for the whole building can be managed. The following settings are included:

| **Room utilisation - *nviScOccSchedule*** | **Meaning** |
|---|---|
| OC_OCCUPIED | Room occupied* |
| OC_STANDBY | Room on standby* |
| OC_UNOCCUPIED | Room unoccupied* |
| OC_NUL | Building protection |

** manual override is possible (see energy mode selection)*

The central specified setting can be transmitted either in the *SNVT_occupancy* or *SNVT_tod_event* formats.

The energy mode is parameterised as standard to "Room unoccupied" after a reset.

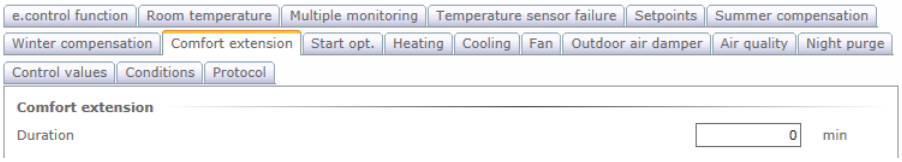
### Room occupancy

The value generally received from an occupancy controller provides information on the current occupancy of a room. Movement sensors or manual occupancy sensors can also be used directly however. The occupancy sensors allow an energy mode to be selected manually while the building is occupied. If an occupancy controller is used, both control options can be effectively combined. The room occupancy time program is overridden by a local mode selection. The room climate controller evaluates the following states:

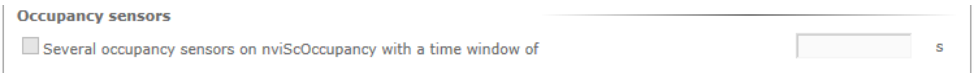
| **Room occupancy - *nviScOccupancy*** | **Meaning** |
|---|---|
| OC_OCCUPIED | Room occupied* |
| OC_BYPASS | Comfort extension* |
| OC_UNOCCUPIED | Room unoccupied* |

** For evaluation see energy mode selection*

The comfort extension is characterised by its parametrisable duration. During this time the 'Room occupied' state continues to apply. After this time the state reverts to 'Room unoccupied'. The comfort extension can be selected on the "Comfort extension" tab.




The room climate controller offers a function to evaluate the occupancy of several rooms using different sources. To do this, a time slot must be parameterised on the "Multiple monitoring" tab under "Occupancy sensors", during which all the room occupancies received on the input are linked via an 'OR' function. The transmitters/sources must transmit their occupancy states cyclically for this.



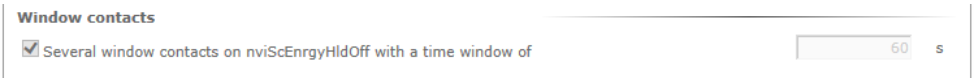

*After a reset the 'Room unoccupied' state is adopted.*

## Window status

In the event of interruptions, such as when a window is opened, the heating or cooling output is reduced to a minimum. During this time the controller switches to the protection energy mode. After the interruption ends, it reverts to the applicable state.

| **Interruption – *nviScEnergyHdOff.state*** | **Meaning** | **Example** |
|---|---|---|
| 1 | Control is interrupted | Window opened |
| 0 | Control is not interrupted | Window closed |

The room climate controller offers a function to evaluate several local interruptions using different sources. To do this, a time window must be parameterised on the "Multiple monitoring" tab under "Window contacts", during which all the states received on the input are linked via an 'OR' function. The transmitters/sources must transmit their states cyclically for this.



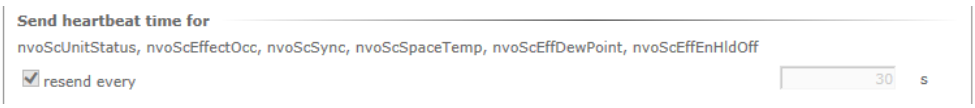
### Energy mode selection

The effective energy mode used by the controller is determined from the specified settings and sent to the network as feedback (*nvoScEffectOcc*):

| Building use nviScBuildingUse | Room utilisation nviScOccSchedule | Room occupancy nviScOccupancy | Window status nviScEnergyHdOff | Energy mode | Acknowledgement nvoScEffectOcc |
|---|---|---|---|---|---|
| OCCUPIED | OCCUPIED | not applicable | 0 | Comfort | OCCUPIED |
| | | not applicable | 1 | Protection | ZERO |
| | STANDBY | OCCUPIED | 0 | Comfort | OCCUPIED |
| | | BYPASS | | Comfort | BYPASS |
| | | UNOCCUPIED | | Standby | STANDBY |
| | | not applicable | 1 | Protection | ZERO |
| | UNOCCUPIED | OCCUPIED | 0 | Comfort | OCCUPIED |
| | | BYPASS | | Comfort* | BYPASS* |
| | | UNOCCUPIED | | Economy | UNOCCUPIED |
| | | not applicable | 1 | Protection | ZERO |
| | ZERO | OCCUPIED | 0 | Comfort | OCCUPIED |
| | | BYPASS | | Comfort* | BYPASS* |
| | | UNOCCUPIED | | Protection | ZERO |
| | | not applicable | 1 | Protection | ZERO |
| STANDBY | not applicable | not applicable | 0 | Economy | UNOCCUPIED |
| | | | 1 | Protection | ZERO |
| UNOCCUPIED | not applicable | not applicable | not applicable | Protection | ZERO |

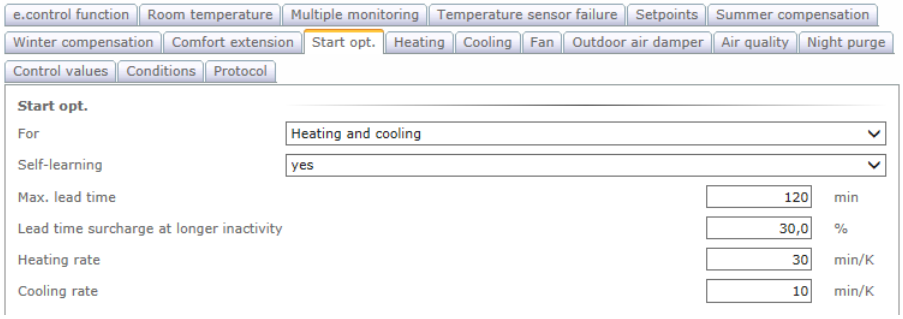
** the 'Room occupied' state can be retained for a time period that may be parameterised*

A transmission cycle can be set for *nvoScEffectOcc* on the "Conditions" tab. This applies to all the state variables listed in the plug-in.



## Energy mode selection with start optimisation (as per VDI 3813)

The energy mode selection outlined in the previous section can also come with start optimisation. In this case, the air temperatures inside and outside, as well as the time until the next change over between energy modes, are taken into account. The time until the next change over is determined by the specified setting in *nviScOccSchedule* (in the SNVT_tod_event format). As a result the system reacts promptly to the pending switchover without any loss of comfort.




An explicit choice can be made as to whether start optimisation should be used for heating, cooling or for both sequences. This setting is made on the "Start opt." tab shown above:


It is possible to specify a maximum lead time which start optimisation prevents from being exceeded. At weekends or during long periods of inoccupancy, interiors can cool down or warm up considerably. For this reason, when there has been a long period of inactivity, the maximum lead time can be extended by percentages, meaning longer lead times are also possible. The maximum lead time as well as the surcharge at longer inactivity can also be set on the "Start opt." tab.


It is also possible to specify a heating and cooling rate, which helps determine the lead time needed.

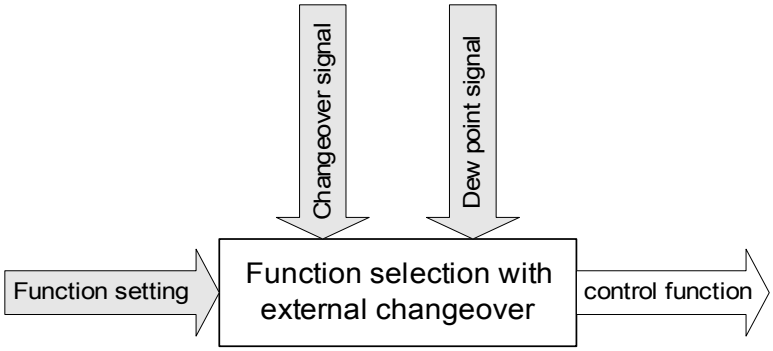

A self-learning algorithm to optimise the rate of maximum heating-up and cooling-down can be activated. Based on the specified setting, the algorithm learns which maximum heating and cooling rates are needed for various outdoor temperatures.

After an adequate learning phase the self-learning function can be deactivated.

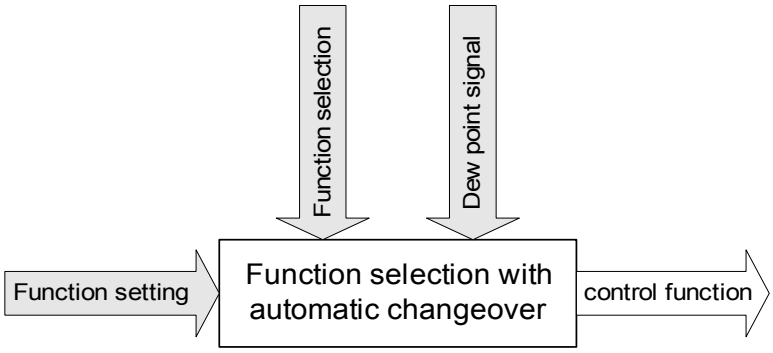

The values generated by the self-learning function can be imported from the device again. After import the plug-in displays the maximum heating rate when outdoor temperatures are low and the maximum cooling rate when outdoor temperatures are high.

## Function selection (as per VDI 3813)

For control systems with external change over between sequences, the room climate controller determines its current control function from a combination of the function setting *(nviScApplicMode)* and the changeover signal *(nviScHeatCool)*. The changeover signal can be transmitted either by the higher-level building management system or by a local sensor. The dew point signal is also taken into consideration for function selection.




For control systems with automatic change over between sequences, the room climate controller determines its current control function from a combination of the function setting *(nviScApplicMode)* and the local function selection *(nviScHeatCool)*. The dew point signal is also taken into consideration for function selection.




The control functions supported are described in the following table:

| Function | Value | Description |
|---|---|---|
| Switch off | HVAC_OFF | turns off the control sequences for heating and cooling operation. The controller triggers an alarm only when the temperature drops below the frost protection value. |
| Automatic | HVAC_AUTO | is the controller's standard function. The controller switches between heating and cooling sequences independently. The setpoints are generated from the setpoint calculation incl. adjustment for the applicable operational state. |
| Heating | HVAC_HEAT | only activates the heating sequence in the controller. The setpoints for this are generated from the setpoint calculation incl. adjustment for the applicable operational state. |

| Function | Value | Description |
|---|---|---|
| Warm-up | HVAC_MRNG _WRMUP | activates the heating sequence in the controller for speedy warming in *Economy* mode to the *Comfort* setpoint, e.g. after night-time cooling. If the controller is in other states, the relevant setpoints apply, i.e. the controller then works as in the *Heating* function. |
| Maximum heating | HVAC_MAX _HEAT | except when there are interruptions, the heating sequence is active at full power (control outputs at maximum), independent of the current energy mode and its corresponding setpoints. |
| Emergency heating | HVAC_EMERG _HEAT | indicates the emergency operation which can be activated by a building management system, if the temperature falls below the frost threshold. The *Comfort* setpoint is used for all energy modes and the heating sequence is activated in the controller. |
| Cooling | HVAC_COOL | only activates the cooling sequence in the controller. The setpoints for this are generated from the setpoint calculation incl. adjustment for the applicable operating state. |
| Precooling | HVAC_PRE _COOL | activates the cooling sequence to cool the temperature down to the *Comfort* setpoint in *Economy* or *Standby* mode. If the controller is in other states, the applicable setpoints apply, i.e. the controller then works as in the *Cooling* function. With this function the room can be cooled significantly before use. |
| Maximum cooling | HVAC_MAX _COOL | except when there are interruptions, the cooling sequence is active at full power (control outputs at maximum), independent of the current energy mode and its corresponding setpoints. |
| Emergency cooling | HVAC_EMERG _COOL | indicates the emergency operation which can be activated by a building management system, if the upper thermal protection limit is exceeded. The *Comfort* setpoint is used for all energy modes and the cooling sequence is activated in the controller. |
| Night-time cooling | HVAC_NIGHT _PURGE | allows a room to be cooled down during the night using just cool air from outside. When the function is activated, the controller opens the air dampers or windows as soon as the outdoor temperature is below the indoor temperature and the room has not yet cooled down to the *Comfort* heating setpoint. This function is only active in the *Economy* and *Standby* operating states. If another state is adopted, the windows and/or dampers are closed. |

### Function setting

By qualifying *nviScApplicMode* with one of the above-mentioned control functions from a central control device or a time program, a function setting can be made.

### Changeover signal

To use control systems with external change over, a signal *(nviScHeatCool)* must inform the room climate controller which function is supported by the pending medium.

The following values are supported for the changeover signal:

- HVAC_OFF (switch off)
- HVAC_HEAT (heating)
- HVAC_COOL (cooling)

### Local function selection

If a control system with automatic change over is being used, a function can be selected locally *(nviScHeatCool)*. This can be done with a room control device, for example.

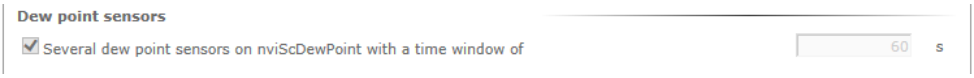
You can choose from the following control functions:

- HVAC_OFF (switch off)
- HVAC_AUTO (automatic)
- HVAC_HEAT (heating)
- HVAC_COOL (cooling)

### Dew point signal

Alongside the function defaults the controller also registers dew point signals *(nviScDewPoint)* as required, for consideration when a function is being selected. Several sensors can be connected logically for this, whilst a reception interval is specified for the input. Feedback received during this time frame is thus sufficient to interrupt the cooling operation. Condensation on chilled ceilings is thereby avoided.

The reception interval can be entered on the "Multiple monitoring" tab:




### Current control function selection

Where control systems with external change over are concerned, the control function is determined by the function selection, changeover signal and dew point signal in line with the following table.

*With external changeover signal:*

| **Function setting** ***nviScApplicMode*** | **Changeover signal** ***nviScHeatCool*** | **Dew point signal** ***nviScDewPoint*** | **Control function** ***nvoScUnitStatus.mode*** |
|---|---|---|---|
| AUTO | HEAT | *not applicable* | HEAT |
| | COOL | Normal operation | COOL |
| | | Dew point reached | OFF |
| | OFF | *not applicable* | OFF |
| Heating function (HEAT, MRNG_WRMUP, MAX_HEAT, EMERG_HEAT) | HEAT | *not applicable* | Preset heating function |
| | COOL, OFF | *not applicable* | OFF |
| OFF | *not applicable* | *not applicable* | OFF |
| Cooling function (COOL, PRE_COOL, MAX_COOL, EMERG_COOL) | COOL | Normal operation | Preset cooling function |
| | | Dew point reached | OFF |
| | HEAT, OFF | *not applicable* | OFF |
| NIGHT_PURGE | *not applicable* | *not applicable* | NIGHT_PURGE |

*The current control function is provided on the network in the controller's status feedback (nvoScUnitStatus).*

Where control systems with automatic change over are concerned, the control function is determined by the function setting, local function selection and dew point signal in line with the following table. Function setting has priority over local selection here.

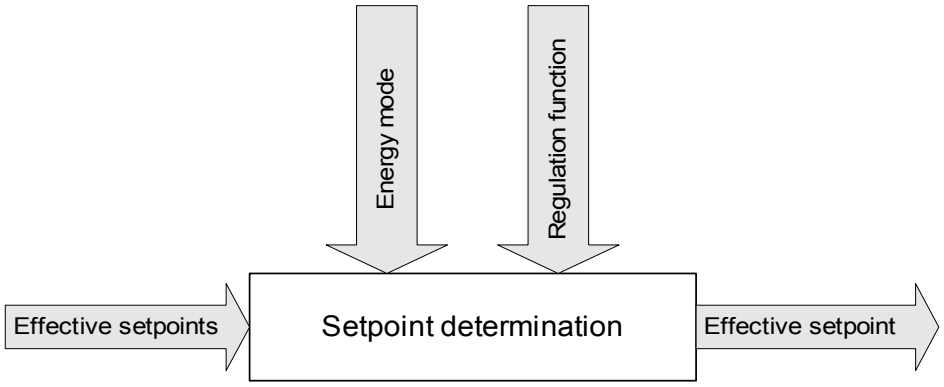
*With local switching (e.g. via a room control device):*

| **Function setting** ***nviScApplicMode*** | **Local function selection** ***nviScHeatCool*** | **Dew point signal** ***nviScDewPoint*** | **Control function** ***nvoScUnitStatus.mode*** |
|---|---|---|---|
| AUTO | HEAT | *not applicable* | HEAT |
| | COOL | Normal operation | COOL |
| | | Dew point reached | OFF |
| | OFF | *not applicable* | OFF |
| | AUTO | Normal operation | AUTO |
| | | Heating operation and dew point reached | AUTO |
| | | Cooling operation and dew point reached | OFF |
| Heating function (HEAT, MRNG_WRMUP, MAX_HEAT, EMERG_HEAT) | *not applicable* | *not applicable* | Preset heating function |
| OFF | *not applicable* | *not applicable* | OFF |
| Cooling function (COOL, PRE_COOL, MAX_COOL, EMERG_COOL) | *not applicable* | Normal operation | Preset cooling function |
| | | Dew point reached | OFF |
| NIGHT_PURGE | *not applicable* | *not applicable* | NIGHT_PURGE |

*The current control function is provided on the network in the controller's status feedback (nvoScUnitStatus).*

## Setpoint determination for temperature and fan control

The setpoint generated by combining the results from setpoint calculation, energy mode selection and function selection determines the effective setpoint *(nvoScEffSetpoint)* used by the temperature and fan control systems.




*Effective setpoint shown on nvoScEffSetpoint*

The correlations for effective setpoint determination are described in the following table:

| **Control function from "Function selection"** | **Energy mode from "Energy mode selection"** | **Active setpoint** *nvoScEffectSetpt* |
|---|---|---|
| HEAT, AUTO, MAX_HEAT* | Comfort | Comfort heating setpoint |
| | Standby | Standby heating setpoint |
| | Economy | Economy heating setpoint |
| | Protection | Building protection heating setpoint |
| MRNG_WRMUP | Comfort | Comfort heating setpoint |
| | Standby, Economy | Standby heating setpoint |
| | Protection | Building protection heating setpoint |
| EMERG_HEAT | not applicable | Building protection heating setpoint |
| COOL, AUTO, MAX_COOL* | Comfort | Comfort cooling setpoint |
| | Standby | Standby cooling setpoint |
| | Economy | Economy cooling setpoint |
| | Protection | Building protection cooling setpoint |
| PRE_COOL | Comfort | Comfort cooling setpoint |
| | Standby, Economy | Standby cooling setpoint |
| | Protection | Building protection cooling setpoint |
| EMERG_COOL | not applicable | Building protection cooling setpoint |

## Supply air sequence

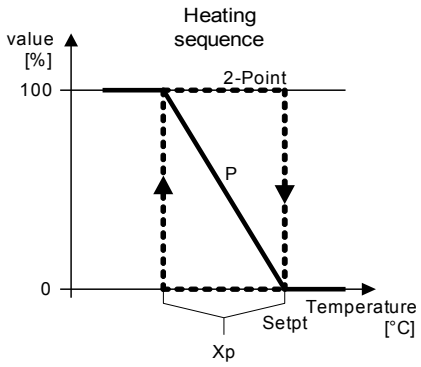
To support the room climate in an energy-efficient way, the current supply air temperature of a variable volume flow system may also be taken into account. To do this, the difference in temperature between the room and the supply air is used at regular intervals to determine whether the supply air can be used to support heating or cooling. The information is made available to the "Temperature control" function.

## Temperature control (heating/cooling) (as per VDI 3813)

Temperature control determines the control outputs for the heating and cooling sequences. Separate control algorithms are available for both sequences.

### Heating sequence

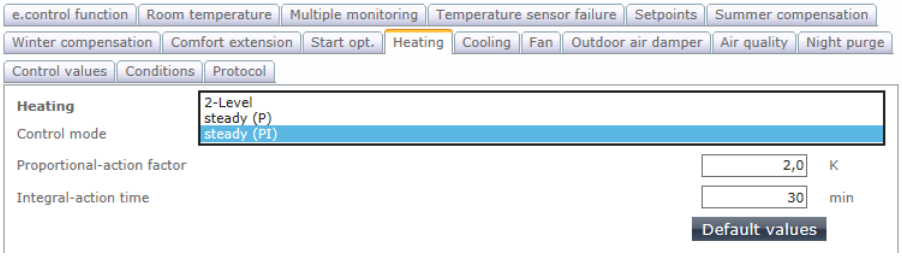
To control the heating sequence you can choose between a 2-point algorithm, a P algorithm or a PI algorithm. The relevant control output is calculated using the control temperature deviation from the effective setpoint, as shown in the figure.



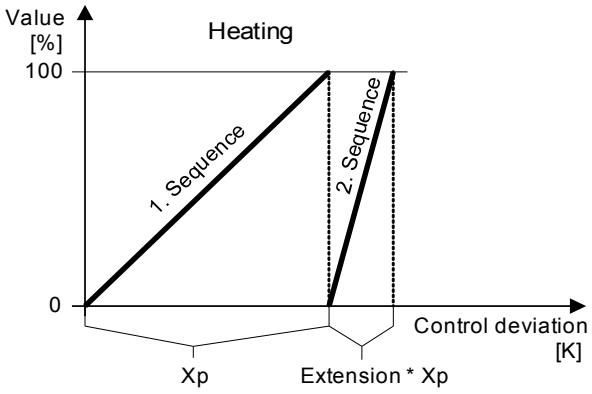

| Legend: | |
|---|---|
| Parameter | Value |
| Setpt | Setpoint |
| Xp | Proportional band (P/PI) |
| | Hysteresis (2-point) |
| P | P algorithm |
| 2-point | 2-point algorithm |

The hysteresis is entered if the 2-point algorithm is used; the proportional band is entered for the P or PI algorithm. The PI algorithm also requires a action time for the integral part (not shown in the figure).

The control algorithm is selected and the control parameters are entered on the "Heating" tab.




Temperature control additionally supports a 2nd heating sequence. A heating actuator can be connected here to give support when there are substantial temperature deviations. The 2nd heating sequence is controlled with the 1st heating sequence's control algorithm. The control range is extended for this purpose as shown in the figure:

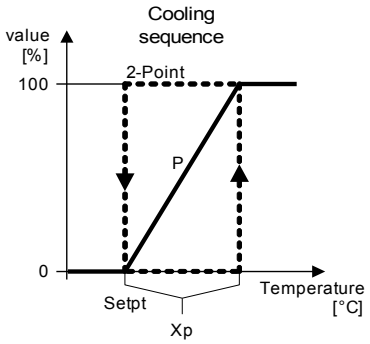



The 2nd heating sequence can also be provided with a switch on delay. Heating sequences with fan control are deactivated when the fan is switched off manually.

The setting for the 2nd heating sequence is selected on the "Heating" tab:


## Cooling sequence

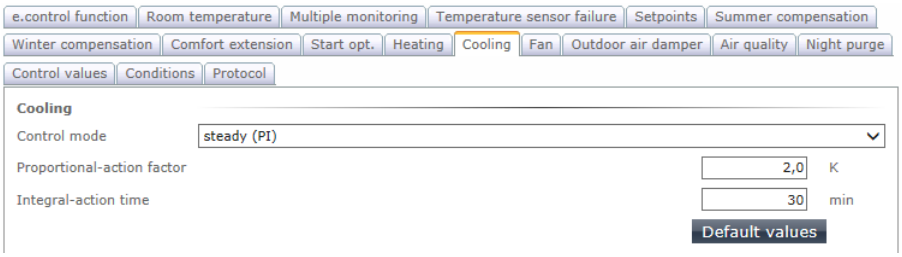
To control the cooling sequence you can choose between a 2-point algorithm, a P algorithm or a PI algorithm. The relevant control output is calculated using the control temperature deviation from the effective setpoint, as shown in the figure.



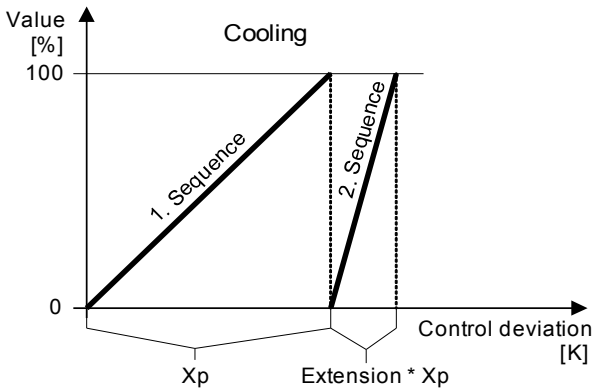

| Legend: | |
|---|---|
| Parameter | Value |
| Setpt | Setpoint |
| Xp | Proportional band (P/PI) |
| | Hysteresis (2-point) |
| P | P algorithm |
| 2-point | 2-point algorithm |

The hysteresis is entered if the 2-point algorithm is used; the proportional band is entered for the P or PI algorithm. The PI algorithm also requires a action time for the integral part (not shown in the figure).

The control algorithm is selected and the control parameters are entered on the "Cooling" tab.




Temperature control additionally supports a 2nd cooling sequence. A cooling actuator can be connected here to give support when there are substantial temperature deviations. The 2nd cooling sequence is controlled with the 1st cooling sequence's control algorithm. The control range is extended for this purpose as shown in the figure:



The 2nd cooling sequence can also be provided with a switch on delay. Cooling sequences with fan control are deactivated when the fan is switched off manually.

The setting for the 2nd cooling sequence is selected on the "Cooling" tab:

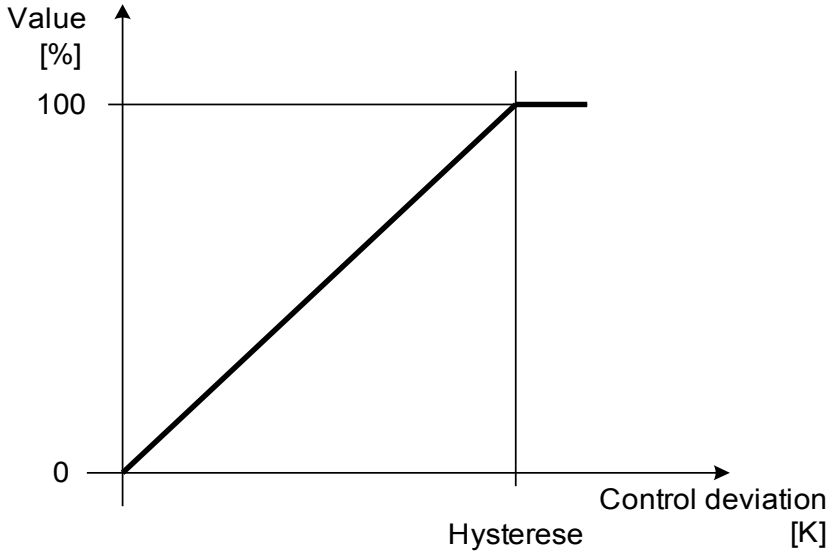
## Fan control (as per VDI 3813)

In principle fan control is only possible in conjunction with temperature control (heating/cooling). You can set which control sequences have active fan control. A manual override *(nviScFanSpeed)* can be activated in the "Comfort" energy mode.

Two different fan control strategies are available. You can specify whether control should be dependent on room temperature or should accord to the valve control outputs. The control strategy setting is entered on the "Fan" tab.

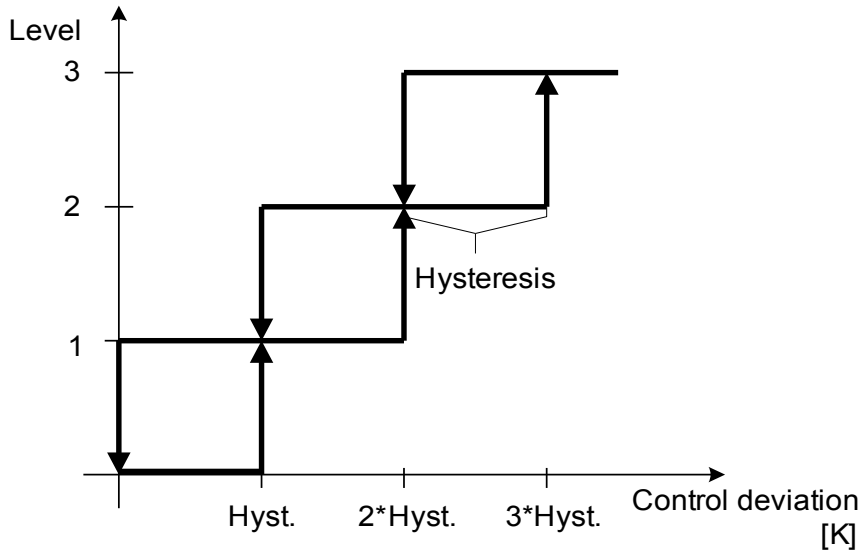

### Control based on room temperature

With room temperature-based control, the deviation from the temperature control system (heating/cooling) is used to determine the fan control outputs. If there are significant control deviations, the fan is also activated with higher control outputs.



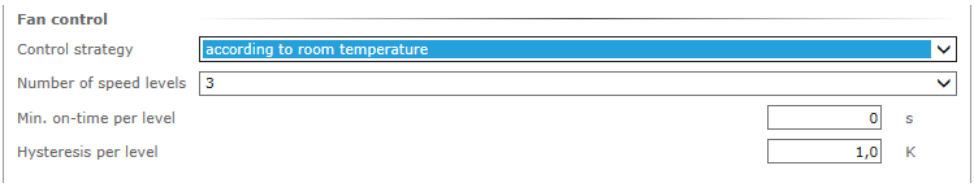

*Fan control based on room temperature - continuous*

In the case of staged fans, it is essential to know how many level there are in order to determine the control outputs. There is also an option to enter a minimum running time for each fan level. The fan levels are controlled by taking into account the switching hysteresis which can be parameterised.



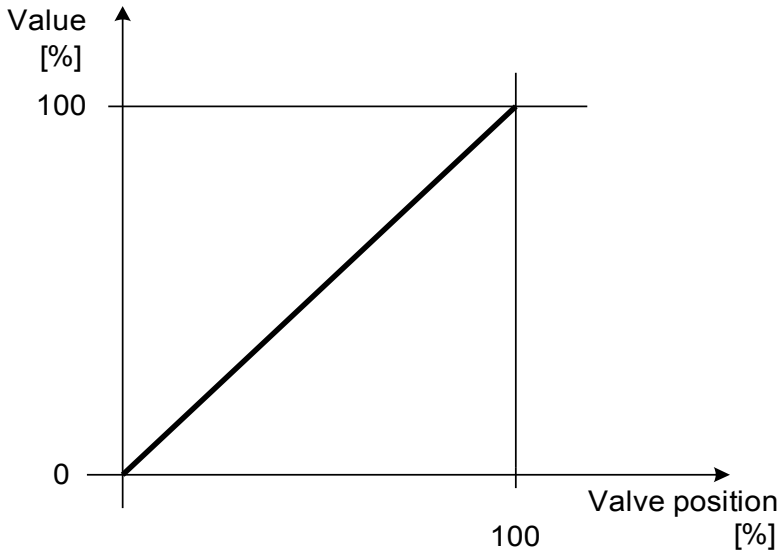

*Fan control based on room temperature - 3 levels*

The fan control setting is entered on the "Fan" tab.



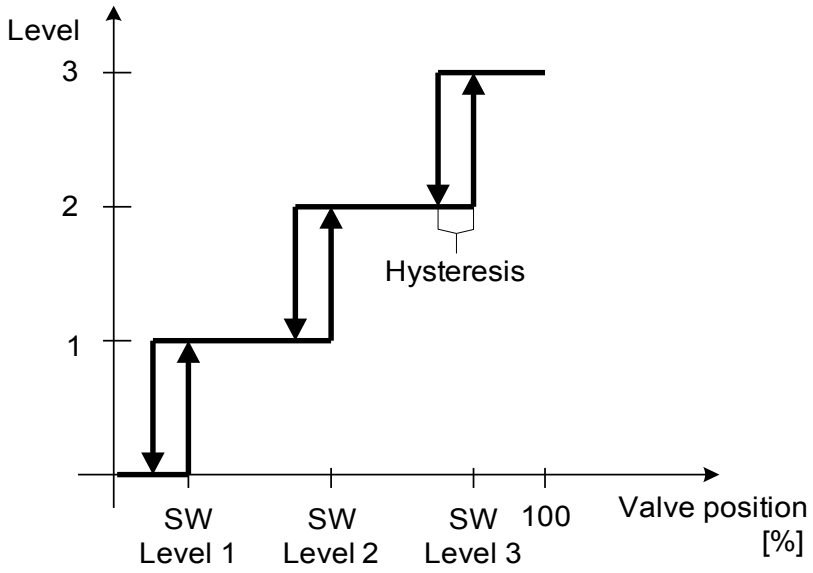

## Control based on valve position

For control based on the valve position, the fan control output is determined by the position of the heating/cooling valve. In the case of continuous fans, the fan is activated with the same control output as the associated control valve.



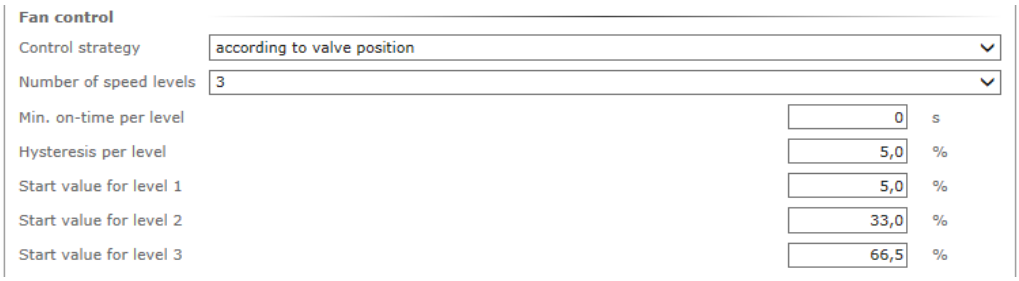

*Fan control based on valve position - continuous*

For staged fans, you must specify the valve position at which each level should start. The fan levels are controlled by taking into account the switching hysteresis which can be parameterised. A minimum running time per level can also be entered.



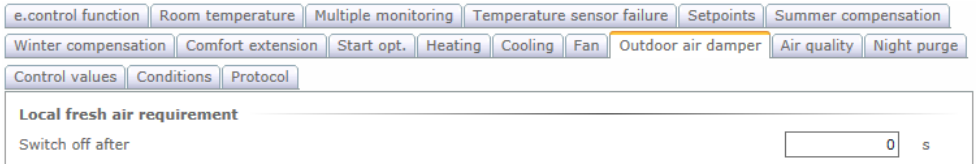

*Fan control based on valve position - in 3 levels*

The fan control setting is entered on the "Fan" tab.




## Outdoor air damper control

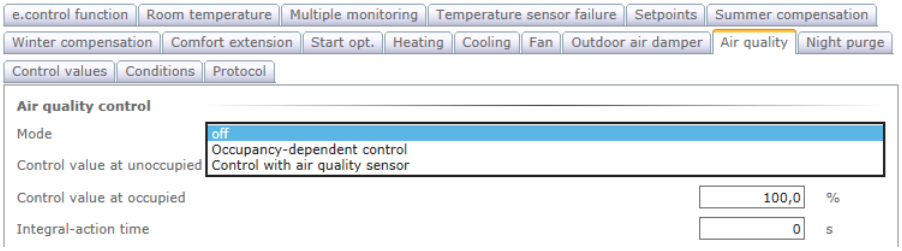
In the Comfort energy mode the outdoor air damper can be controlled with a manual override *(nviScManOADamper)*. The control override ends when the parameterised switch-off time has elapsed.




*If the switch-off time is set at "0", cancellation must be done manually.*

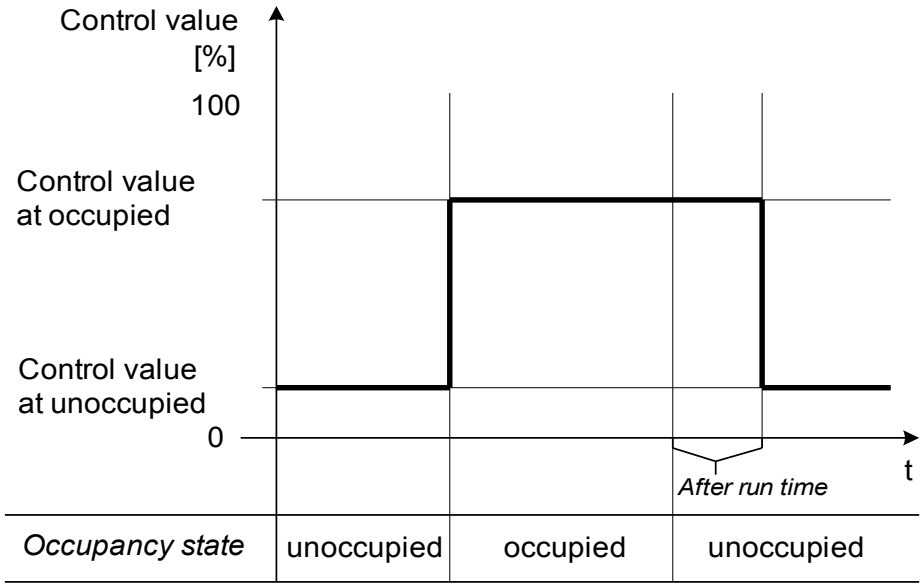
## Air quality control (as per VDI 3813)

Air quality control ensures satisfactory room air quality by supplying fresh air. The fresh air required for air quality control is fed in via an outdoor air damper or the supply air damper in a variable volume flow system. You can choose between simple occupancy-dependent control and control using an air quality sensor.




### Occupancy-dependent control

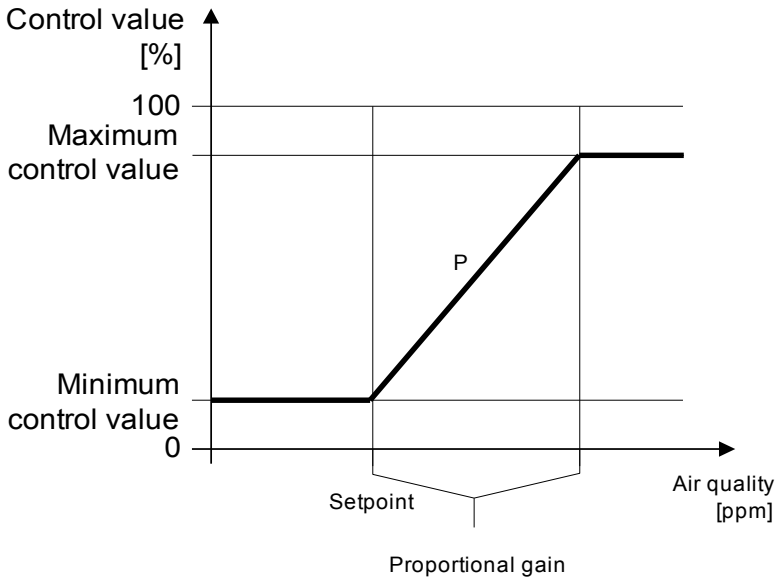
When control is occupancy-dependent, the air damper is set to a specified position when the room is either occupied or unoccupied. An after run time can be specified to switch room occupancy from "occupied" to "unoccupied".



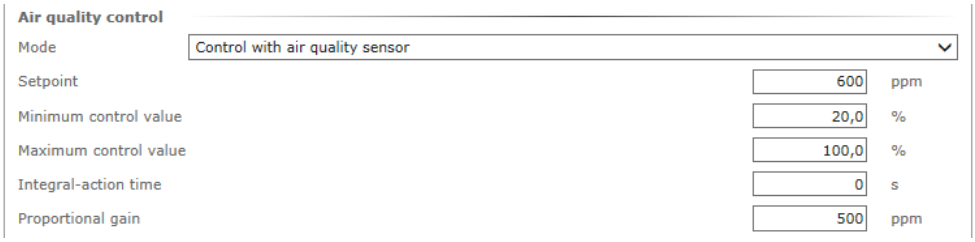

Settings for the control output and after run time are entered on the "Air quality" tab.

### Control with air quality sensor

If an air quality sensor is available, air quality can be controlled to a predefined setpoint *(nciSclAQSetpt)*. Control is carried out by means of a P-algorithm, for which the proportional band can be freely configured. If the room is unoccupied, the minimum damper control output is used. If the room is occupied the damper is positioned between the minimum and maximum control output depending on the control deviation. An after run time can be specified to switch room occupancy from "occupied" to "unoccupied".




Settings for the control output and after run time are entered on the "Air quality" tab.




## Night-time cooling (as per VDI 3813)

Night-time cooling allows a room to cool down overnight without an active cooling sequence. Parameters can be freely set so that it is either supported by means of an outdoor air damper or by a variable volume flow system. This setting is chosen as a *Mode* on the "Night-purge" tab:

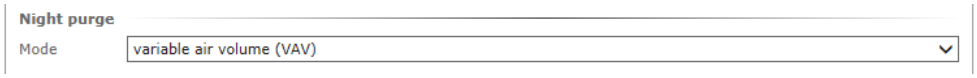

### Outdoor air damper

If the control system has an outdoor air damper available, cold night air can be used for cooling down. If the difference between the lower outside temperature and the higher room temperature falls within a parametrisable range, is it used to cool the room down to the comfort heating setpoint.

The settings for the temperature differential are also selected on the "Night purge" tab:


### Variable volume flow system

Control systems with a variable volume flow system can use an intake of cold air to cool down a room. If the supply air temperature is at least 1K lower than the room temperature, is it used to cool the room down to the comfort heating setpoint.




## Free assignment of control output functions

The control output functions are automatically assigned to the output variables when the e.control function is selected. The assignment made can be found in the description of the control system used.

### Transmission interval

It is possible to alter the transmission behaviour of the relevant network variables by entering a transmission interval.

This setting is selected on the "Control values" tab:


*All network variables listed are re-sent after the time specified*

### Minimum change

It is possible to alter the transmission behaviour of the relevant network variables by entering a transmission interval.

This setting is selected on the "Control values" tab:


*A network variable will only be re-sent once its value has changed by the amount specified.*

## 5.4.10 Hvac Actuator

The "HvacActuator" object is used to operate various types of drives in HVAC technology and can be adapted as required by parameterising the object functions. In addition, each object sends back the current position of the actuator on its output network variable.

### Overview of object functions

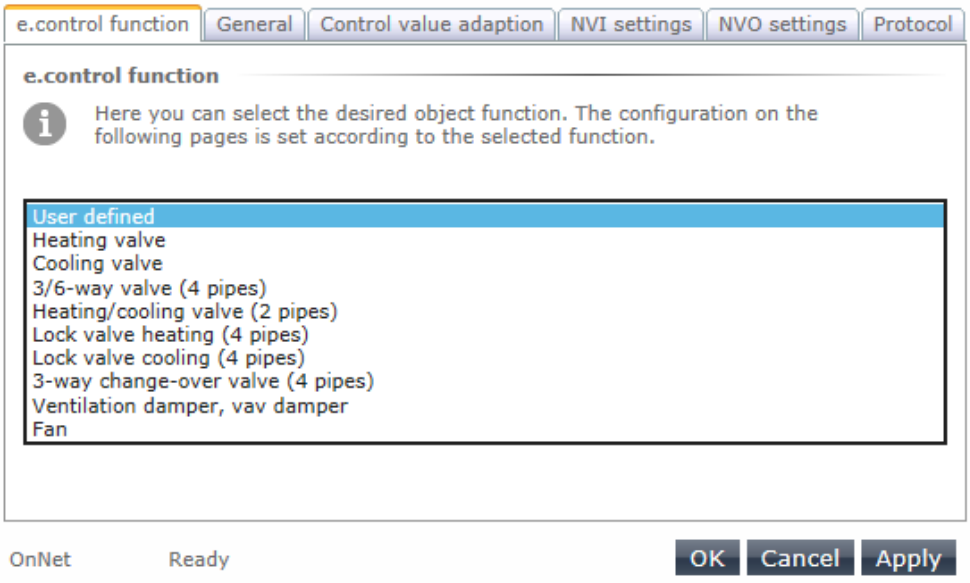
Other functions are supported in addition to the VDI 3813-compliant room automation functions.

### Functions

- Failure response for control outputs
- Control drive actuator (as per VDI 3813)
- Sequence control (as per VDI 3813)

### Parameterisation of object functions

The individual functions are parameterised using the convenient web plug-in. Several types of actuator with basic configuration are available. They can be selected on the "e.control function" tab.




### Description of pre-configurations:

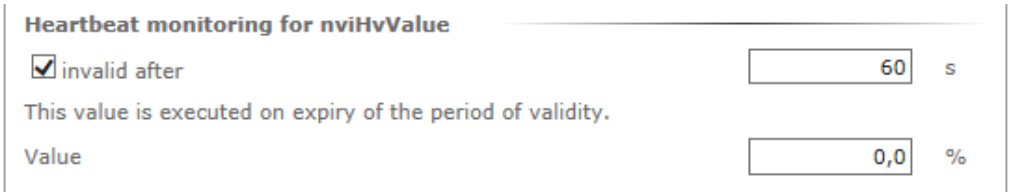
Various specifications must be set in order to use the HVAC actuators correctly. Important settings are already preset when a pre-configured type of actuator is chosen.

# Description of object functions

## Failure response for control outputs

A failure response can be set for the *nviHvValue* input, which is usually used for receiving the outputs from the higher-level room climate control system. If no data packet is received on the input within the configurable reception interval, the configurable failure value is used until a new packet is received.

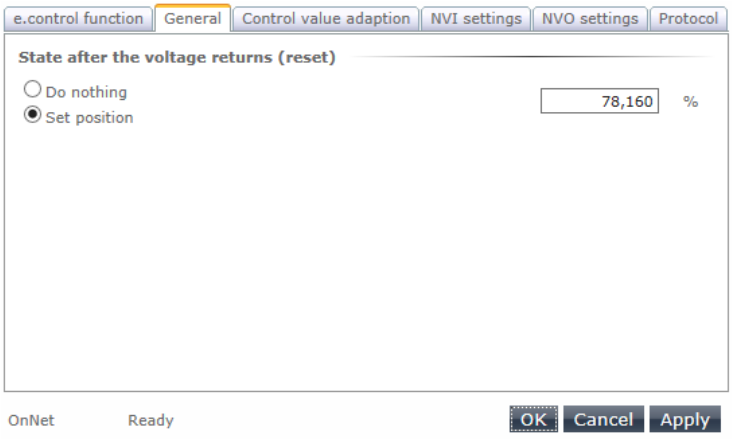
The "NVI settings" tab is used for the settings for heartbeat monitoring:




## Control drive actuator (as per VDI 3813)

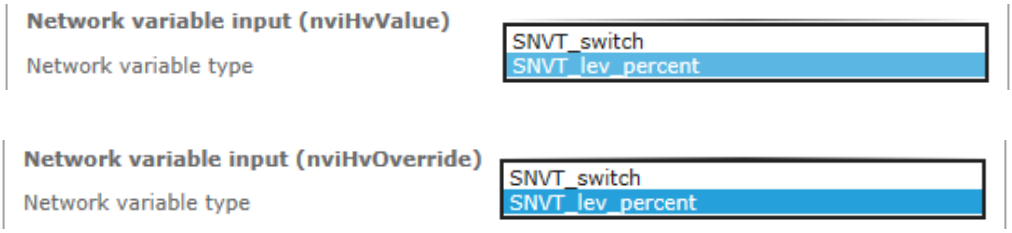
The actuator object can pick up outputs from higher-level control units via two inputs. The *nviHvOverride* input takes priority here over the *nviHvValue* input. An active override must be reset by means of a cancel message on *nviHvOverride*, to ensure the outputs received on the *nviHvValue* input continue to be processed. An output value can be parameterised for the response following resumption of the power supply.

The "General" tab is used for the response following resumption of the power supply:




The control output values are forwarded to the output ports assigned in the device plug-in following sequence control evaluation.

You can choose between the SNVT_lev_percent and SNVT_switch network variables for both inputs. The "NVI settings" tab is used for setting the types of network variable:




With regard to the feedback signal for valves and other actuators, the current position reported back is output via the *nvoHvValue* output network variable. With staged fans the threshold value for the current level is output. A transmission cycle, a minimum

time interval for successive data packets and a minimum change required for transmission can be parameterised for the position feedback signal.

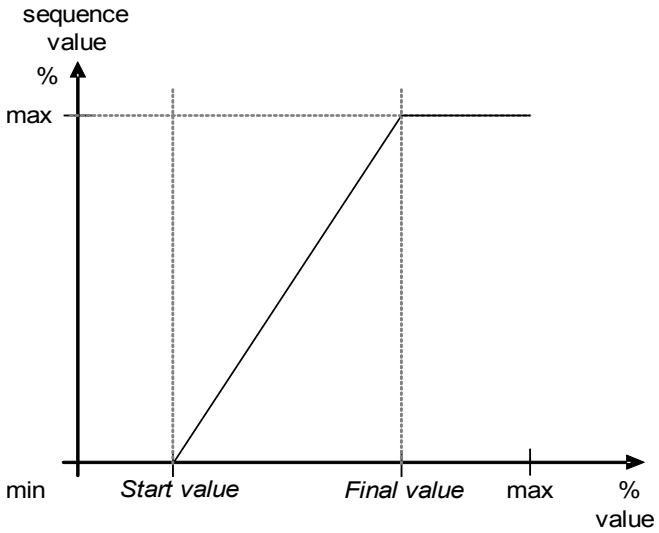
The transmission interval settings can be entered on the "NVO settings" tab.


In addition, a required minimum for sending change are parameterized.

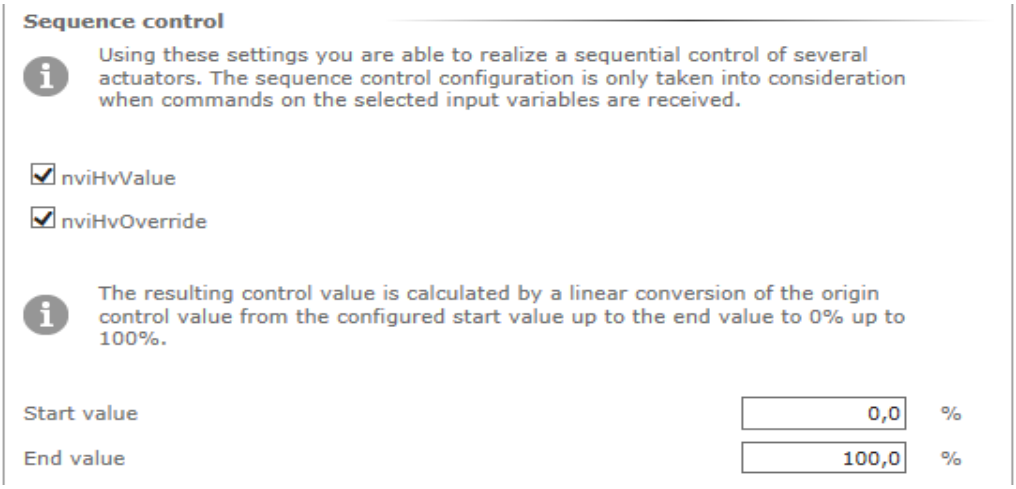
The value change settings can be entered on the "NVO settings" tab.


## Sequence control (as per VDI 3813)

Sequence control can be used to operate several actuators sequentially as a function of the output. Separate specifications as to whether sequence control is to be used for the outputs received can be made. The resulting output in the sequence is calculated using the original output and the parameterised start and end values, as shown in the figure.



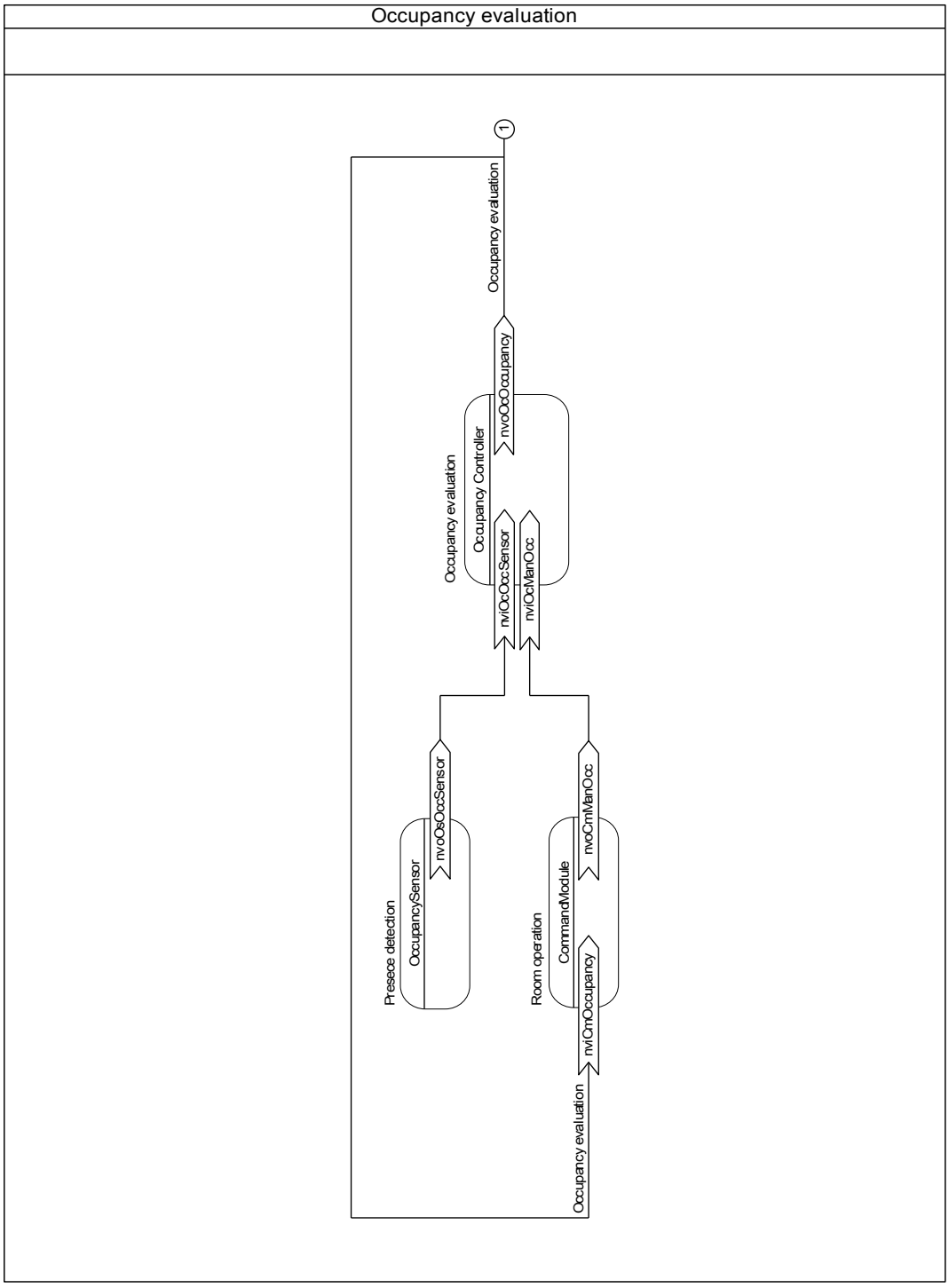

The sequence control settings can be entered on the "Control value adaption" tab.



# 6. Bindings

For the realization of room automation functions the individual objects must be logically connected (Binding). Attached are some Binding templates are listed.

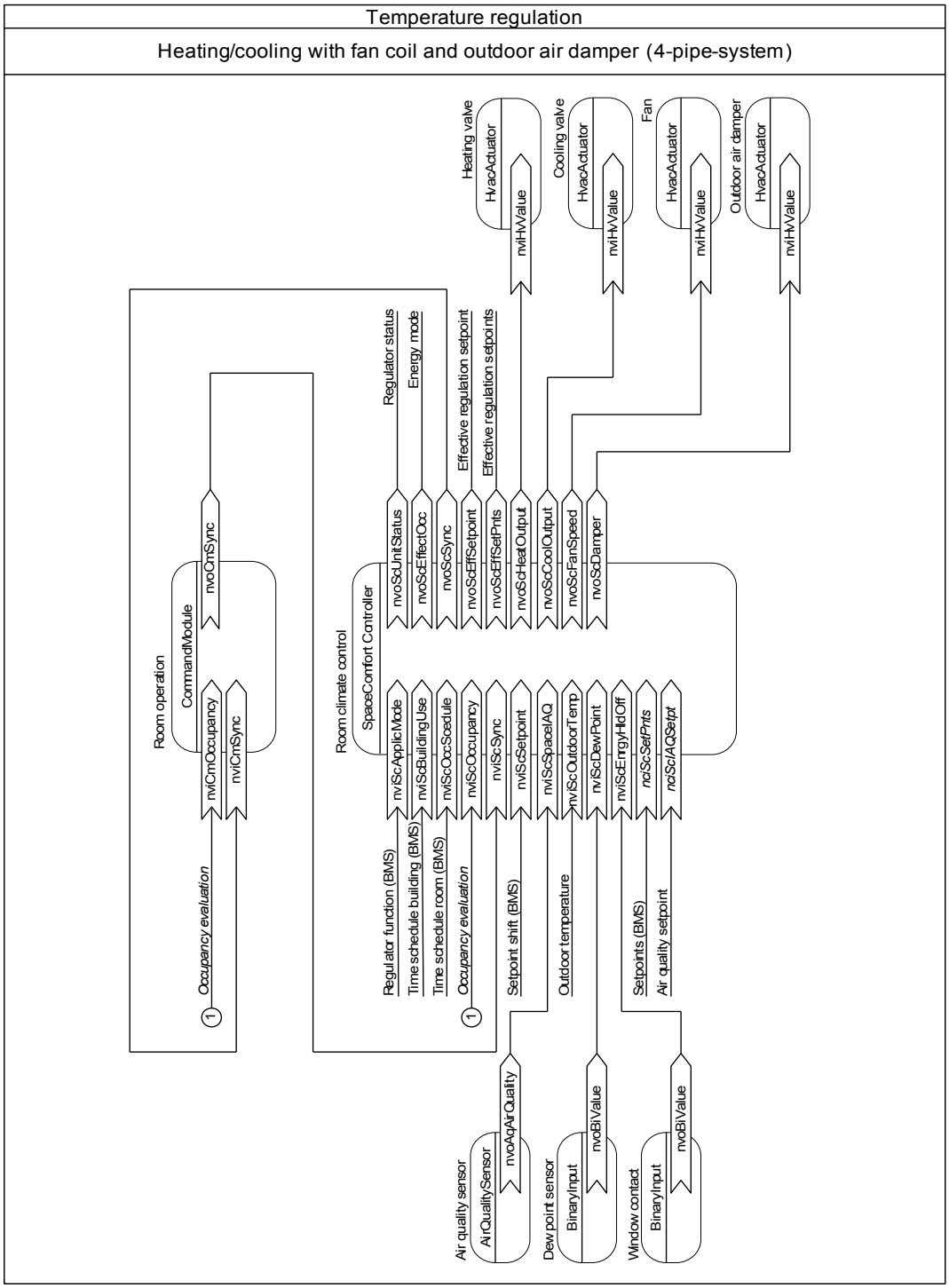
## 6.1. Occupancy evaluation



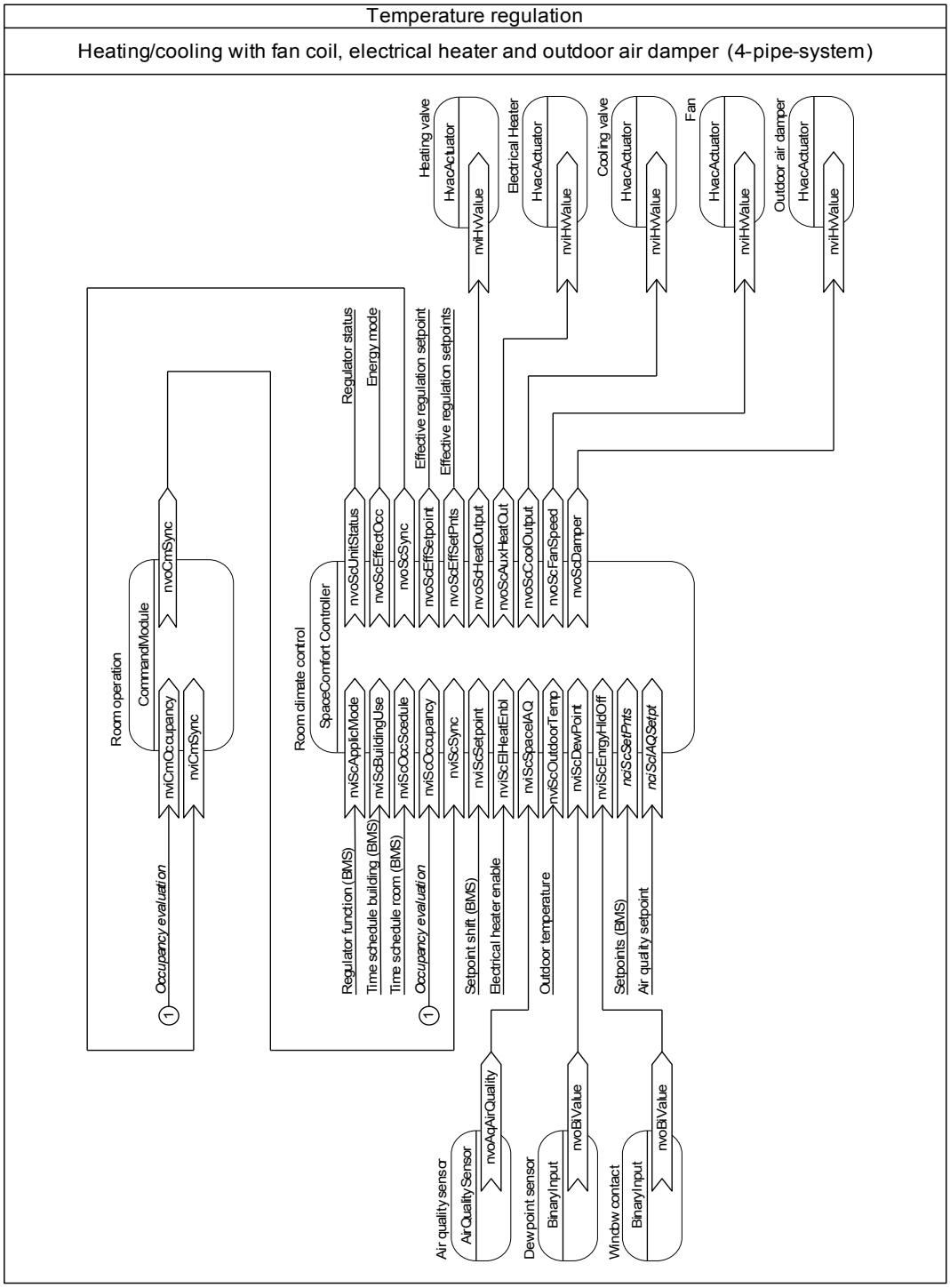
For evaluating the room occupancy status all occupancy sensors and occupancy buttons must be bound to the occupancy evaluation ("OccupancyController"). This object evaluates the actual occupancy state of the room and provides this information as output network variable. For displaying the occupancy state and synchronizing occupancy buttons the evaluated room occupancy state must be bound to the room operation ("CommandModule"). The  The occupancy evaluation can be used in other functions (e.g. Temperature regulation).

## 6.2. Temperature regulation

Several sensor data are necessary for the temperature control function. Outdoor air temperature, dew point sensor and window contact must be bound. The acutal room occupancy state must be bound, too. The time schedule for room and building must be bound for affecting the energy level.



The temperature regulation calculates the control values for the actuators. Depending on the heating/cooling system the necessary control value output network variables must be bound to the actuator objects.



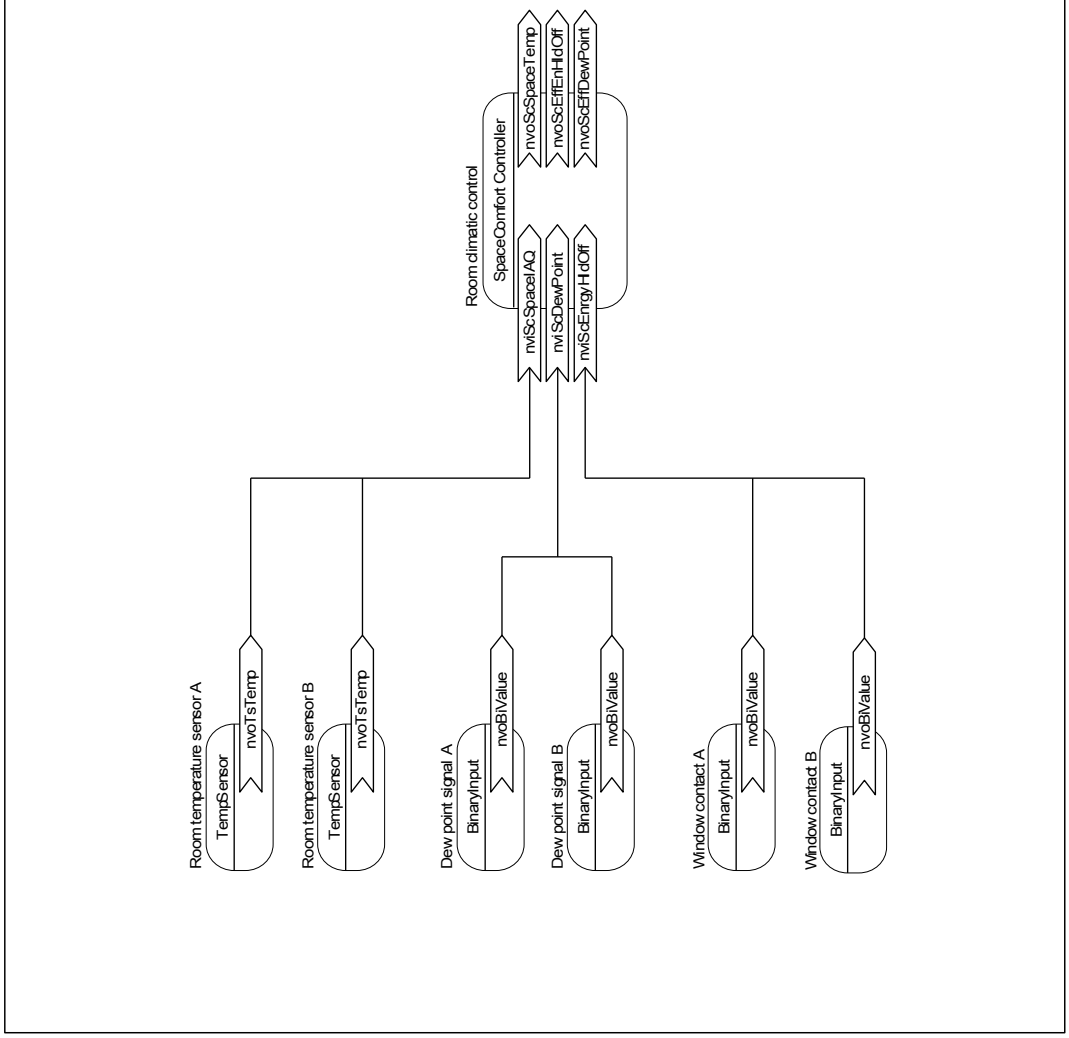
## 6.3. Multiple evaluation

To make it possible to evaluate several sensors of the same type, these simply need to be linked to the Space Comfort Controller object in parallel.

This generates an average temperature for the temperature sensors and an "OR" link for contacts. There is no limit to the number of sensors of the same type.

Multiple evaluation

for room temperature sensors , dew point signals and window contacts



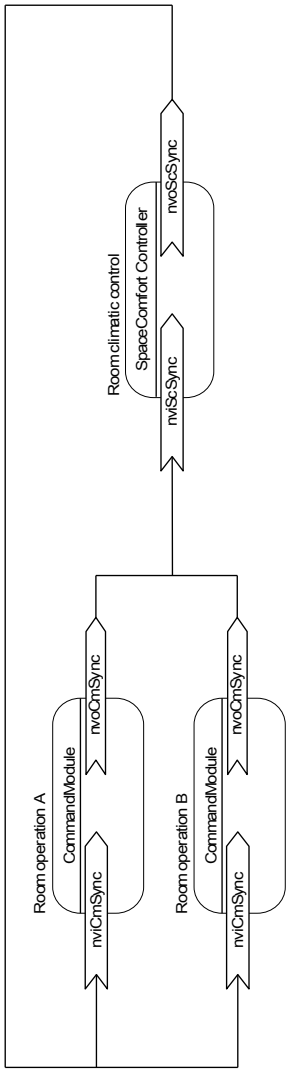
It should be noted here that sensor transmission settings and the Space Comfort Controller object's reception check must be set accordingly. Using a preconfigured setting in the configuration plug-ins guarantees the multiple evaluation functionality.

## 6.4. Synchronisation of operating units

To enable several control units to be evaluated and their displays to be synchronised, they must be linked to the Space Comfort Controller object as shown below.

An average temperature is generated according to the respective configuration. There is no limit to the number of control units.

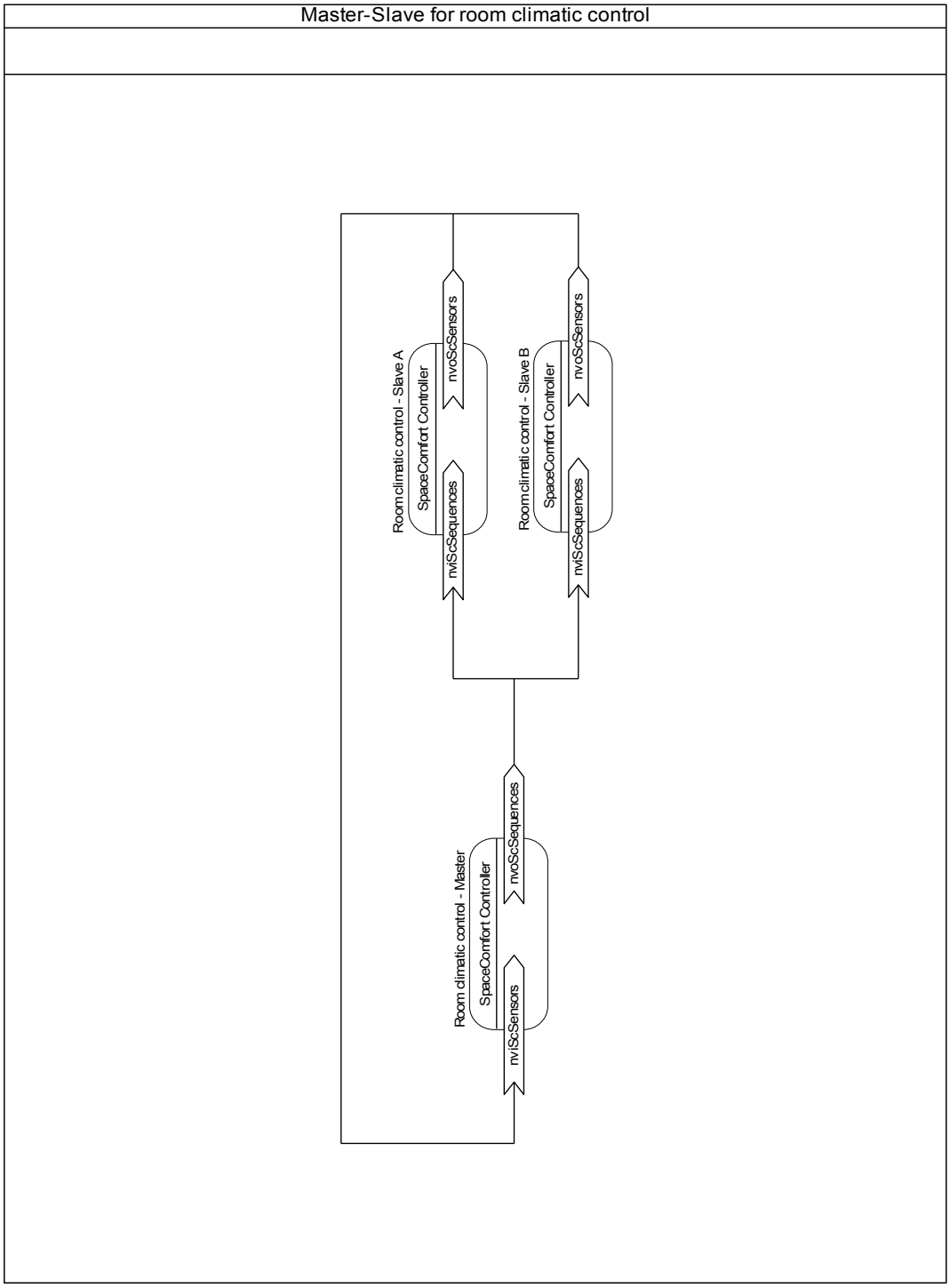
Synchronisation of operating units



It should be noted here that the Command Module object transmission settings and the Space Comfort Controller object's reception check must be set accordingly. Using a preconfigured setting in the configuration plug-ins guarantees the multiple evaluation functionality.

## 6.5. Master-Slave for room climatic control

For master-slave control, it must be possible for information to be shared between slaves and master. This is guaranteed by the bindings shown. The Space Comfort Controller object is in "Master" mode as standard. It changes to "Slave" mode if there is a binding available to the "nviScSequences" network variable.

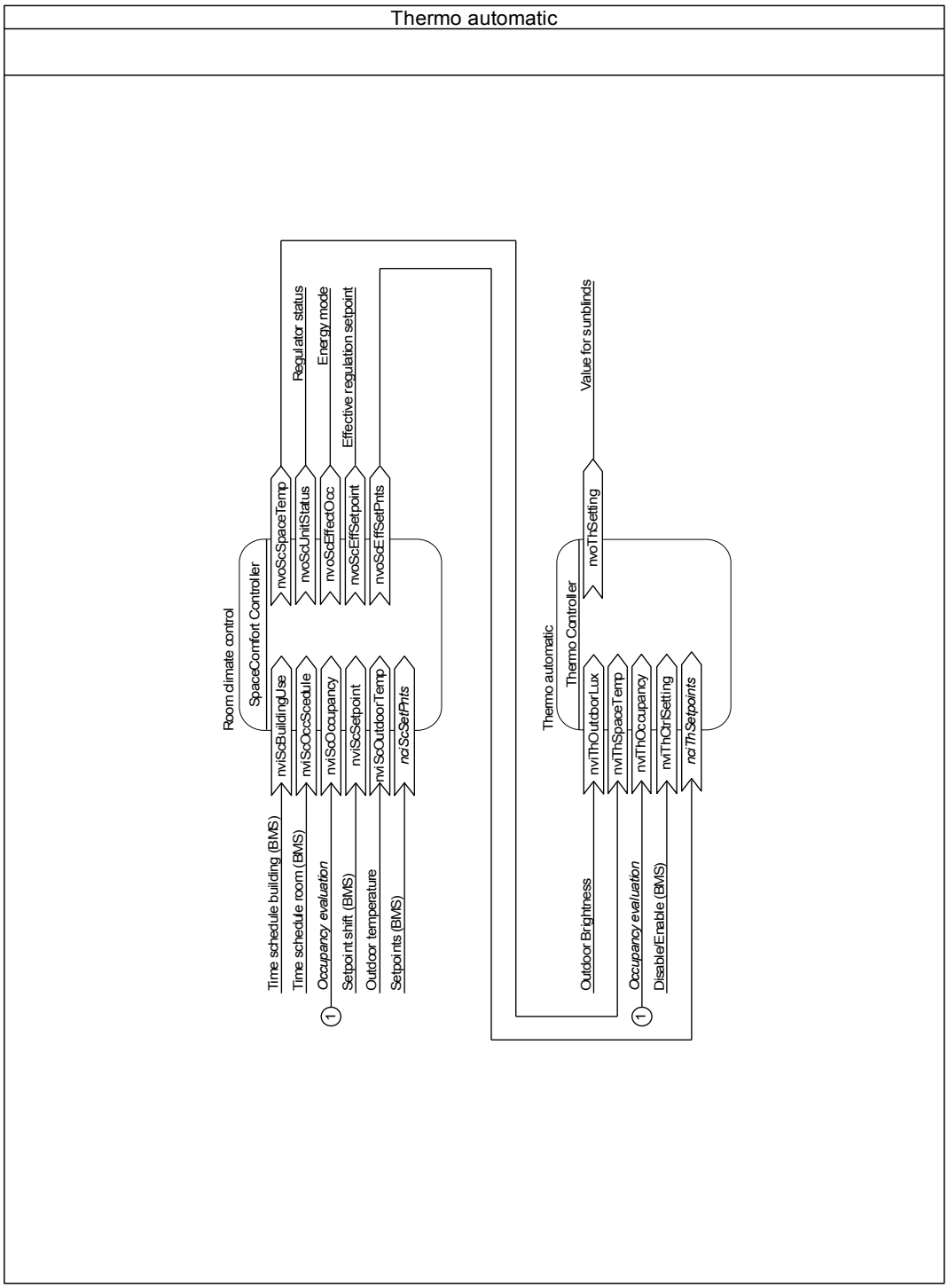



Room temperature control is deactivated in "Slave" mode. Only data from the connected sensors continue to be sent to the master, whilst the control output values received from the

master are made available on the relevant network variable outputs for the control of valves, fans and flaps.

## 6.6. Thermo automatic

For this function the actual room temparature and the temperature regulation setpoints must be bound from the temperature regulation ("SpaceComfortController") to the thermo automatic ("ThermoController").



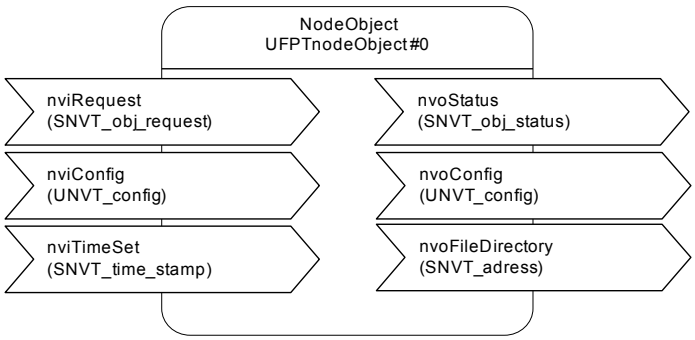
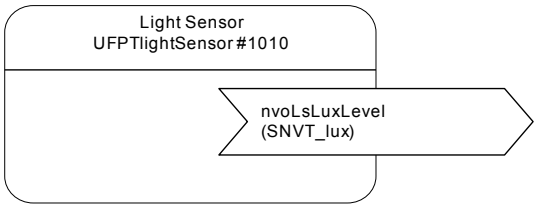
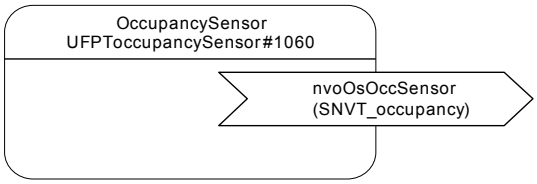
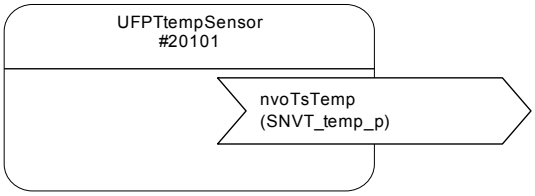

Furthermore the outdoor brightness and the actual room occupancy state (occupancy evaluation) must be bound.

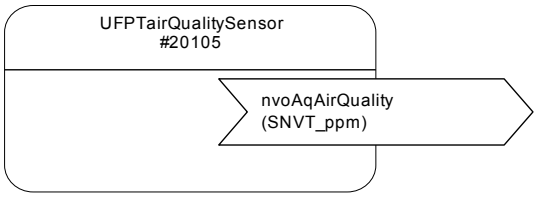
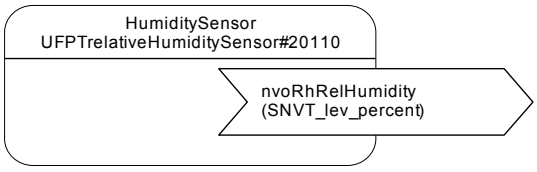
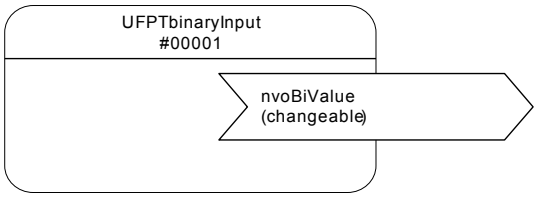
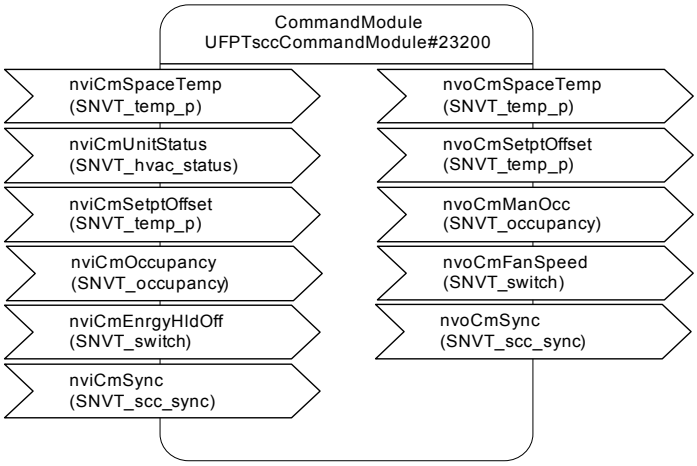
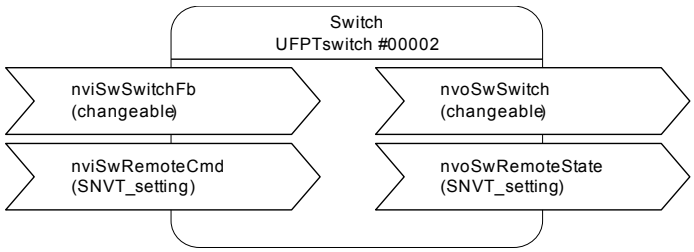
# 7. Interface description

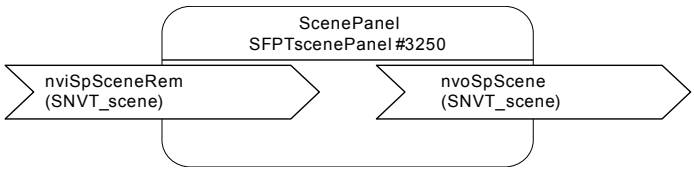
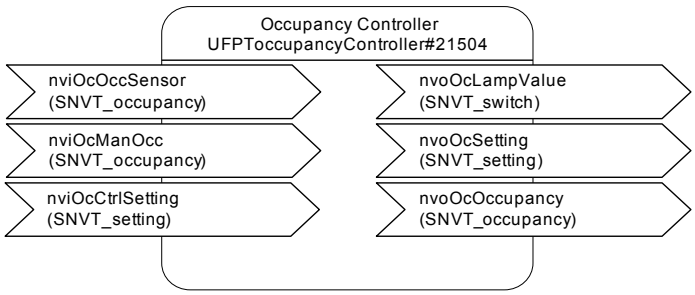
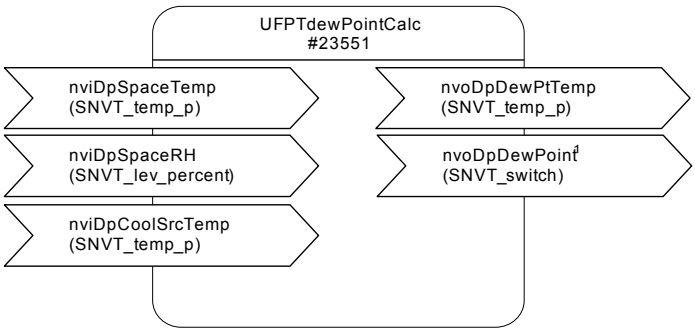
This section contains a brief description of the device templates for the available applications.

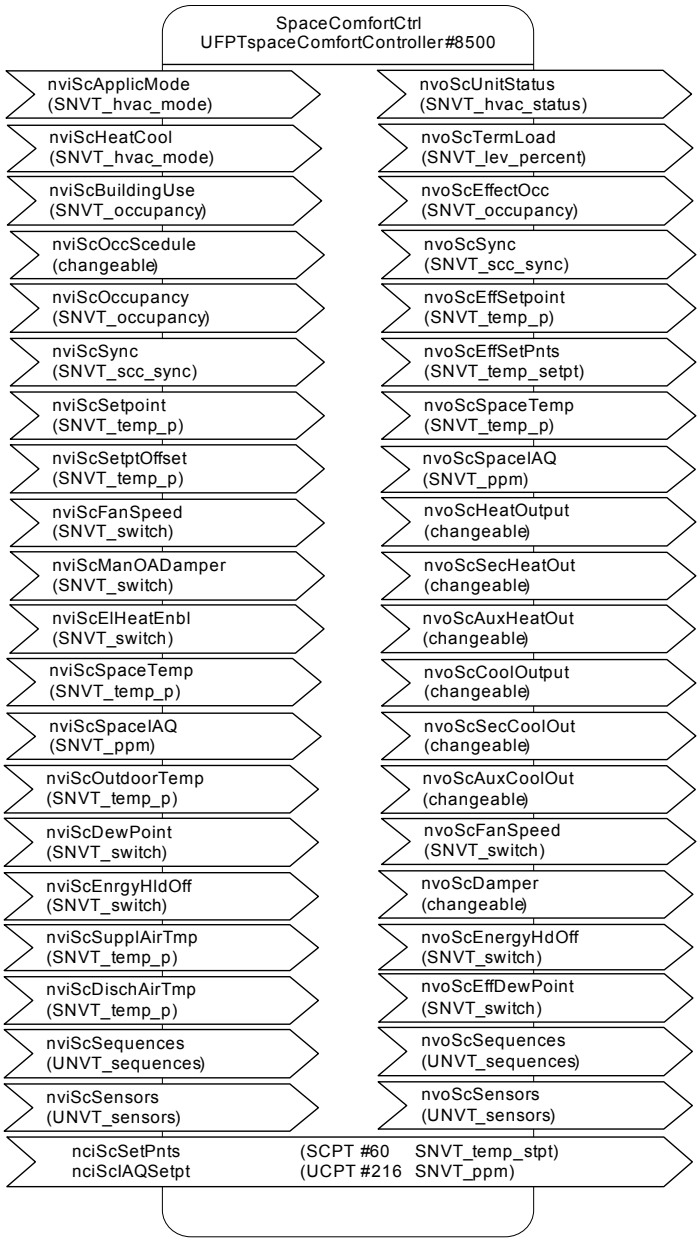
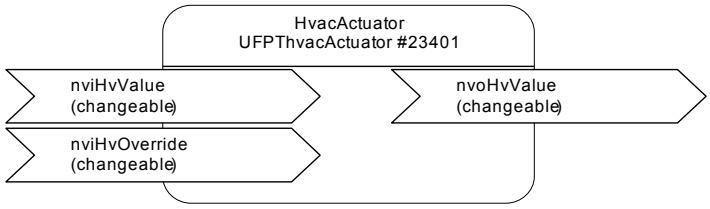
## 7.1. Application

### SC331110EC_02

| Count | Object | Interface |
|---|---|---|
| 1 | NodeObject |  |
| 1 | LightSensor |  |
| 1 | Occupancy Sensor |  |
| 2 | Temperature Sensor |  |

| Count | Object | Interface |
|---|---|---|
| 1 | AirQualitySensor |  |
| 1 | RelativHumidity Sensor |  |
| 4 | BinaryInput |  |
| 1 | Command Module |  |
| 8 | Switch |  |

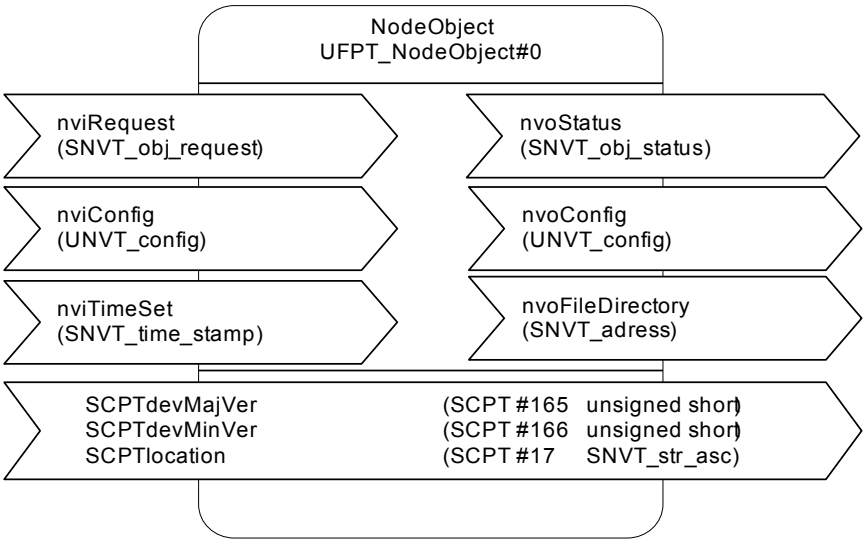
| Count | Object | Interface |
|---|---|---|
| 1 | ScenePanel |  |
| 1 | Occupancy Controller |  |
| 1 | DewPoint Calculator |  |

| Count | Object | Interface |
|---|---|---|
| 1 | SpaceComfort Controller |  |
| 8 | HvacActuator |  |

# 7.2. Objects

## 7.2.1 Node Object

### Network interface




### Network variables

#### Input variables

`nviRequest` Default network input for receiving management commands

Type: SNVT_obj_request
Presetting: {0, RQ_NORMAL}

`nviTimeSet` Default network input for receiving actual date / time (synchronisation)

Type: SNVT_time_stamp

`nviConfig` Communication interface for plug-ins

Type: UNVT_config

#### Output variables

`nvoStatus` Output of status data for received request management commands via *nviRequest*

Type: SNVT_obj_status
Transmission: On request via *nviRequest*

`nvoFile Directory` Provides the start address of the config file directory of the device

Type: SNVT_address
Transmission: During file transfer or polling

`nvoConfig` Communication interface for plug-ins

Type: UNVT_config
Transmission: on request via *nviConfig*

## Configuration properties

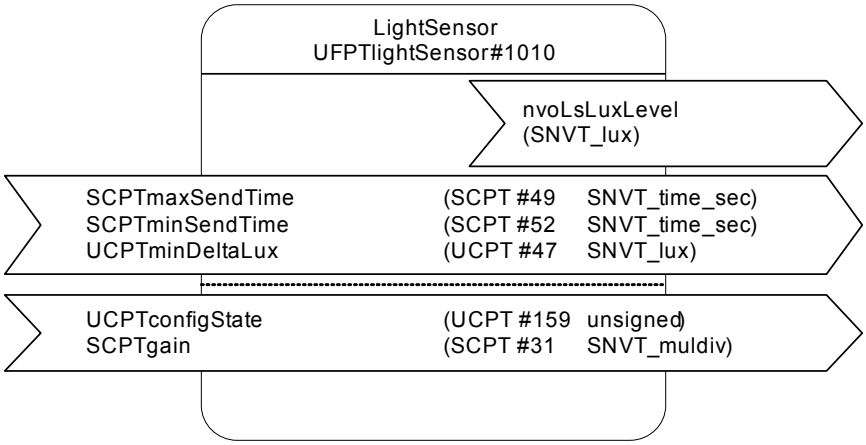
`SCPTdevMajVer`
Major version of the application, read only
Type: unsigned short (SCPT #165)
Value: Application specific

`SCPTdevMinVer`
Minor version of the application, read only
Type: unsigned short (SCPT #166)
Value: Application specific

`SCPTlocation`
Extended description of the device location
Type: SNVT_str_asc (SCPT #17)
Presetting: { 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 }

## 7.2.2 Brightness measurement

### Network interface




### Network variables

`nvoLsLuxLevel` Measurement value

| | |
|---|---|
| Type: | SNVT_lux |
| Range of values: | 0 – 65335 lux |
| Presetting: | 0 lux {0} |
| Transmission: | adjustable via *SCPTmaxSendTime*, *SCPTminSendTime* and *UCPTminDeltaLux* |

### Configuration parameters

#### Parametrization of network variables

`SCPTmaxSendTime` Maximum period of time between sending two telegrams

| | |
|---|---|
| Type: | SNVT_time_sec (SCPT #49) |
| Range of values: | 0 ... 6553 Seconds |
| Presetting: | 0 Seconds {0} |

`SCPTminSendTime` Minimum transmission interval before re-sending a value

| | | |
|---|---|---|
| Type: | SNVT_time_sec (SCPT #52) | |
| Range of values: | 0 | No periodic resend |
| | 0,5 - 6553,0 | Seconds |
| Presetting: | No periodic resend {0} | |

`UCPTminDeltaLux` Minimum of absolute value change causing the value to be re-sent

| | |
|---|---|
| Type: | SNVT_lux (UCPT #47) |
| Range of values: | 0 – 65335 lux |
| Presetting: | 0 lux {0} |

## Parametrization of functional object

`UCPTconfig State` Only used by Plug-in

Type: unsigned short (UCPT #159)

Range of values: 0 - 255

Presetting: 255 {255}

`SCPTgain` Gain for input signal (to balance variances depending on installation conditions)

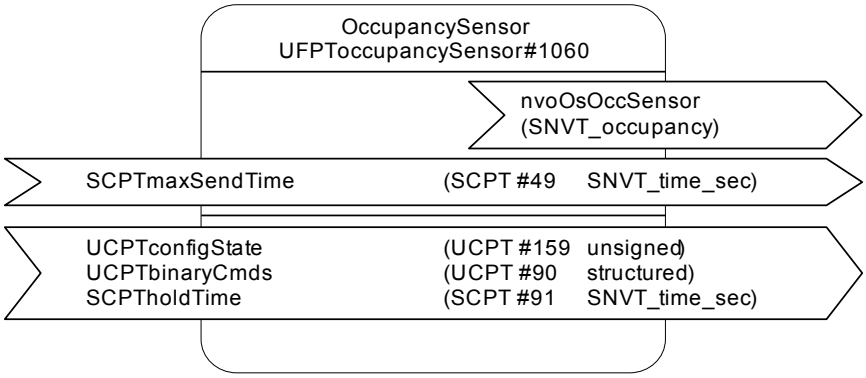
Type: SNVT_muldiv (SCPT #31)

Range of values: .multiplier: Reference value 1 ... 65535 lux
.divisor: Sensor value 1 ... 65535 lux

Presetting: 1/1 {1, 1}

## 7.2.3 Presence detection

### Network interface




### Network variables

`nvoOsOcc Sensor` occupation of the room

Type: SNVT_occupancy

Range of values:
0 OC_OCCUPIED
room occupied
1 OC_UNOCCUPIED
room unoccupied
2 OC_BYPASS
room temporary occupied
3 OC_STANDBY
room temporary unoccupied

Presetting: OC_UNOCCUPIED {0}

Transmission: on change and cyclic depending on *SCPTmaxSendTime*

### Configuration properties

### Parametrization of network variables

`SCPTmaxSend Time` Maximum period of time between sending two telegrams

Type: SNVT_time_sec (SCPT #49)

Range of values: 0 ... 6553,4 Seconds

Presetting: 0 Seconds {0}

## Parametrization of functional object

`UCPTconfig State` Only used by Plug-in

Type: unsigned short (UCPT #159)

Range of values: 0 - 255

Presetting: 255 {255}

`SCPTholdTime` Hold time for occupied state after there is no occupancy detected

Type: SNVT_time_sec (SCPT #91)

Range of values: 0 ... 6553,4 Seconds

Presetting: 60 seconds {600}

`UCPTbinary Cmds` used telegramm values

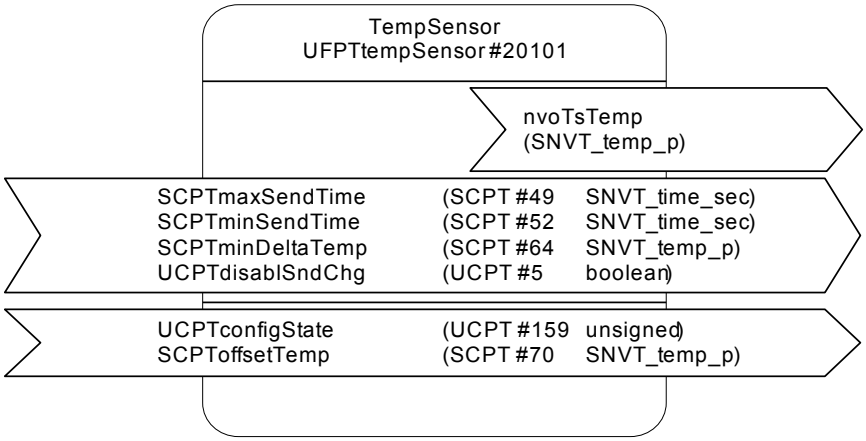
Type: structured (UCPT #90)

Range of values: .cmd_on / .cmd_off :
0 OC_OCCUPIED room occupied
1 OC_UNOCCUPIED room unoccupied
2 OC_BYPASS room temporary occupied
3 OC_STANDBY room temporary unoccupied

Presetting: occupied on switch on and unoccupied on switch off {0,1}

## 7.2.4 Temperature measurement

### Network interface




### Network variables

`nvoTsTemp` Temperature

Type: SNVT_temp_p

Range of values: SNVT_temp_p

Presetting: Invalid value {32767}

Transmission: adjustable via *SCPTmaxSendTime*, *SCPTminSendTime*, *UCPTdisableSndChg* and *SCPTminDeltaTemp*

### Configuration parameters

### Parametrization of network variables

`SCPTminSendTime` Minimum transmission interval before re-sending a value

Type: SNVT_time_sec (SCPT #52)

Range of values: 0 No periodic resend

0,5 - 6553,0 Seconds

Presetting: No periodic resend {0}

`SCPTmaxSendTime` Minimum transmission interval before re-sending a value

Type: SNVT_time_sec (SCPT #52)

Range of values: 0 No periodic resend

0,5 - 6553,0 Seconds

Presetting: No periodic resend {0}

`SCPTminDeltaTemp` Minimum of absolute value change causing the value to be re-sent

Type: SNVT_temp_p (SCPT #64)

Range of values: SNVT_temp_p

Presetting: 0,00 K {0}

`UCPTdisablSndChg` Suppress sending of value changes out of cycle

Type: boolean (UCPT #5)

Range of values: 0 send cyclic and sufficient value changes

1 send only cyclic

Presetting: send cyclic and changes {0}

## Parametrization of the object

`UCPTconfig State` Only used by Plug-in

Type: unsigned short (UCPT #159)

Range of values: -

Presetting: -

`SCPToffset Temp` Measurement offset to calibrate the sensor

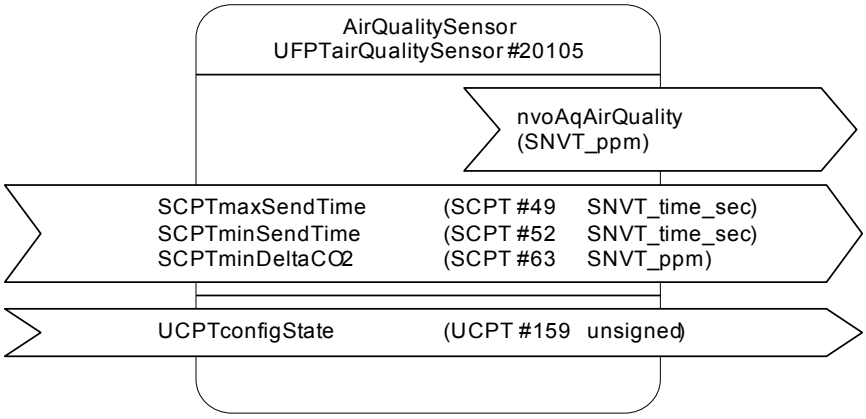
Type: SNVT_temp_p (SCPT #70)

Range of values: SNVT_temp_p

Presetting: 0,00 K {0}

## 7.2.5 Measurement of air quality

### Network interface




### Network variables

`nvoAqAir Quality` Air quality

Type: SNVT_ppm (SNVT #29)
Range of values: 0 – 65535 ppm
Presetting: Implausible value to illustrate that there is no processed value {65535}
Transmission: adjustable via *SCPTmaxSendTime*, *SCPTminSendTime* and *SCPTminDeltaC02*

### Configuration parameters

### Parametrization of network variables

`SCPTmaxSend Time` Maximum period of time between sending two telegrams

Type: SNVT_time_sec (SCPT #49)
Range of values: 0,0 ... 6553,4 Seconds
Presetting: 0,0 Seconds {0}

`SCPTmin DeltaCO2` Minimum of absolute value change causing the value to be re-sent

Type: SNVT_ppm (SCPT #63)
Range of values: 0 ... 65535 ppm
Presetting: 0 ppm {0}

`SCPTmax SendTime` Minimum transmission interval before re-sending a value

Type: SNVT_time_sec (SCPT #52)
Range of values: 0 No periodic resend
0,5 - 6553,0 Seconds
Presetting: No periodic resend {0}

## Parametrization of the object

`UCPTconfig State` Only used by Plug-in

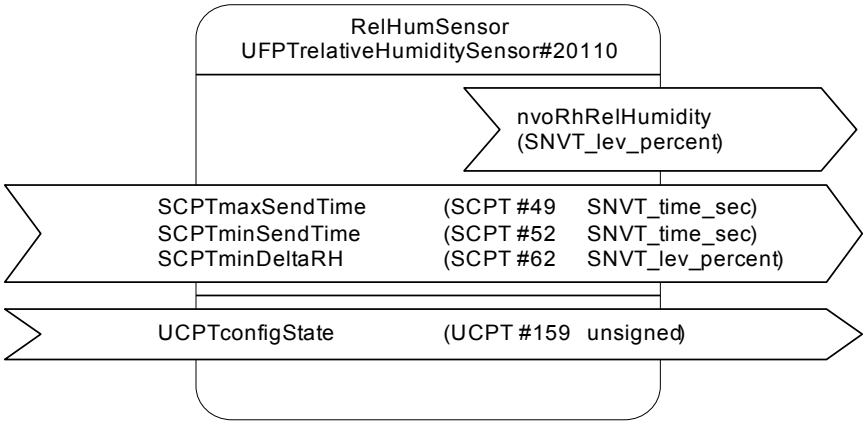
Type: unsigned short (UCPT #159)

Range of values: -

Presetting: -

## 7.2.6 Measurement of relative humidity

### Network interface




### Network variables

`nvoRhRel Humidity` Relative Humidity

Type: SNVT_lev_percent (SNVT #81)
Range of values: 0,00 – 100,00%
Presetting: Invalid value {163,835 %}
Transmission: Adjustable via *SCPTmaxSendTime, SCPTminSendTime* and *SCPTminDeltaRH*

### Configuration properties

### Parametrization of network variables

`SCPTmaxSend Time` Maximum period of time between sending two telegrams

Type: SNVT_time_sec (SCPT #49)
Range of values: 0,0 ... 6553,4 Seconds
Presetting: 0,0 Seconds {0}

`SCPTminSend Time` Minimum transmission interval before re-sending a value

Type: SNVT_time_sec (SCPT #52)
Range of values: 0 No periodic resend
0,5 - 6553,0 Seconds
Presetting: No periodic resend {0}

`SCPTminDeltaRH` Minimum of absolute value change causing the value to be re-sent

Type: SNVT_lev_percent (SCPT #62)
Range of values: 0,00 ... 10,00 %
Presetting: 0% {0}

## Parametrization of functional object

`UCPTconfig State` Only used by Plug-in

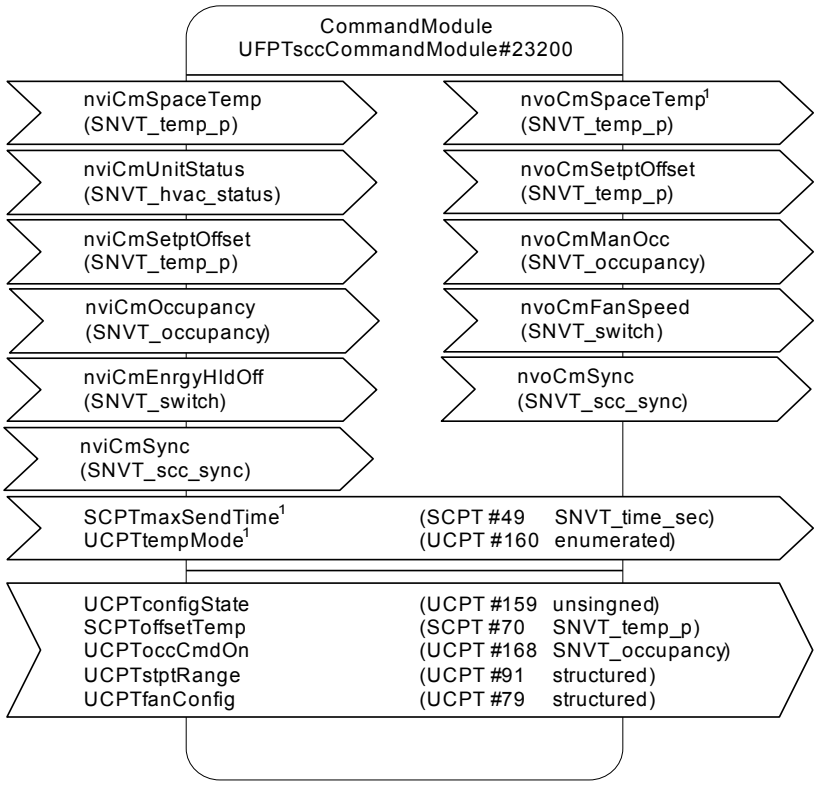
Type: unsigned short
(UCPT #159)

Range of values: -

Presetting: -

## 7.2.7 Operating module

### Network interface




## Network variables

### Network input variables

`nviCm Occupancy` Occupancy feedback for synchronization of toggle buttons and for display

Type: SNVT_occupancy
Range of values: SNVT_occupancy
Presetting: Invalid value {OC_NUL}

`nviCmUnit Status` Room temperature controller states for syncronization and display

Type: SNVT_hvac_status
Range of values: SNVT_hvac_status
Presetting: Invalid values {HVAC_NUL, 32767, 32767, 32767, 32767, 32767, 255}

`nviCmSpace Temp` Room temperature to show on display

Type: SNVT_temp_p
Range of values: SNVT_temp_p
Presetting: Invalid value {327,67}

`nviCmSync` Feedback from spega SpaceComfortController and synchronization between spega CommandModul objects

Type: UNVT_scc_sync
Range of values: UNVT_scc_sync
Presetting: Invalid values {32767, HVAC_NUL, HVAC_NUL, 32767, 32767, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255}

`nviCmEnrgyHldOff` Feedback of current regulation interrupts

Type: SNVT_switch
Range of values: {0, 0} no interrupt
{x, 1} interrupt
Presetting: no interrupt {0, 0}

`nviCmSetptOffset` Setpoint offset feedback for syncronization and display

Type: SNVT_temp_p
Range of values: SNVT_temp_p
Presetting: Invalid value {327,67}

## Network output variables

`nvoCmSpaceTemp` Temperature measurement value

Type: SNVT_temp_p
Range of values: SNVT_temp_p
Presetting: Invalid value {32767}
Transmission: via *SCPTmaxSendTime* and *UCPTtempMode*

`nvoCmSetptOffset` Manual setpoint offset

Type: SNVT_temp_p
Range of values: parametrized at *UCPTstptRange*
Presetting: Invalid value {32767}

`nvoCmManOcc` Manual occupancy

Type: SNVT_occupancy
Range of values: *UCPToccCmdOn*, OC_UNOCCUPIED
Presetting: Invalid value {OC_NUL}

`nvoCmFanSpeed` Manual fan stage

Type: SNVT_switch
Range of values: { *x*, 1} Stage values
*x* = *UCPTfanConfig.level_n* or % values for continuous fan control
{ 0.0, -1} Automatic
{127.5, -1} Invalid value
Presetting: Invalid value {0xFF, 0xFF}

`nvoCmSync` control for spega SpaceComfortController and synchronization between spega CommandModul objects

Type: UNVT_scc_sync
Range of values: UNVT_scc_sync
Presetting: Invalid value
{32767, HVAC_NUL, HVAC_NUL, 32767, 32767, 255, 255, 255, 255, 255, 255, 255, 255, 255}

## Configuration parameters

### Parametrization of the network variables

`SCPTmaxSendTime` Maximum period of time between sending two telegrams at *nvoCmSpaceTemp*, *nvoCmSync*

Type: SNVT_time_sec (SCPT #49)
Range of values: 0,0 ... 6553,4 Seconds
Presetting: 0,0 Seconds {0}

`UCPTtempMode` use of temperature value, influencing the sending behavior of temperature

Type: enumeration (UCPT #160)
Range of values: 1 TM_AVERAGE
for use on average only cyclic sending
2 TM_INTERNAL
as simply value send each change and cyclic if needed
255 TM_NUL
sensor not used
Presetting: simpel value {2}

## Parametrization of the object

`UCPTconfig State` only used by Plug-in

Type: unsigned (UCPT #159)

Range of values: -

Presetting: -

`SCPToffset Temp` Measurement offset for temperature to calibrate the sensor

Type: SNVT_temp_p (SCPT #70)

Range of values: -5,00°C - +5,00°C

Presetting: 0,00°C

`UCPToccCmdOn` Occupancy telegram on occupancy

Type: SNVT_occupancy (UCPT #168)

Range of values:
0 OC_OCCUPIED Room occupied
2 OC_BYPASS Room temporary occupied

Presetting: Room occupied {0}

`UCPTstptRange` Range and increment for setpoint adjustment

Type: structured (UCPT #91)

Range of values: .min_range
-5,00°C – 0,00°C
.max_range
0,00°C - +5,00°C
.step
0,5 K – 1,0 K

Presetting: range of -3,00 to +3,00°C with increments of 0,5 K {-300, +300, 50}

`UCPTfan Config` Selectable fan stages

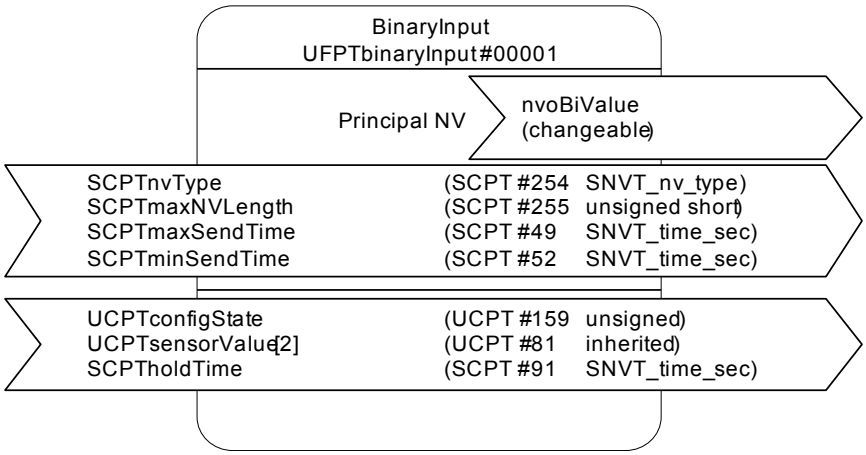
Type: structured (UCPT #79)

Range of values: .enable_auto
0 FALSE AUTO not used
1 TRUE AUTO selectable
.enable_off 0
FALSE OFF not used 1
TRUE OFF selectable
.level_1/.level_2/.level_3
all 0,0% continuous fan control
0,5 - 100,0% Used value for the stage
127,5 Stage not used

Presetting: AUTO an OFF selectable and 3 stages
{TRUE, TRUE, 33.0%, 66.5%, 100,0%}

## 7.2.8 Binary input

### Network interface




### Network variables

`nvoBiValue` Sensor output

Type: Changeable
Type presetting: SNVT_switch
Range of values: Depends on nv-type
Presetting: 0/OFF {0,0 0}

### Configuration parameters

#### Parametrization of network variables

`SCPTmax NVLength` Maximum length of the network variable (read only)

Type: Unsigned short (SCPT #255)
Presetting: 2 Byte {2}

`SCPTminSend Time` Minimum transmission interval before re-sending a value

Type: SNVT_time_sec (SCPT #52)
Range of values: 0 No periodic resend
0,5 - 6553,0 Seconds
Presetting: No periodic resend {0}

`SCPTnvType` Type definition of the network variable

Type: Structure (SCPT #254)
Range of values: Supported nv types
Presetting: SNVT_switch {0,0,0,0,0,0,0,0,0,95, NVT_CAT_STRUCT,2, 1,0,0}

`SCPTmaxSend Time` Maximum period of time between sending two telegrams

Type: SNVT_time_sec (SCPT #49)
Range of values: 0 ... 6553 Seconds
Presetting: 0 Seconds {0}

## Parametrization of the object

`UCPTconfig State` Only used by Plug-in

Type: unsigned short (UCPT #159)

Range of values: -

Presetting: -

`SCPTholdTime` Hold time for switch-on state after switch-off detected

Type: SNVT_time_sec (SCPT #91)

Range of values: 0 ... 6553,4 Seconds

Presetting: 60 seconds {600}

`UCPTsensor Value[2]` Telegram values for switch- on and switch-off

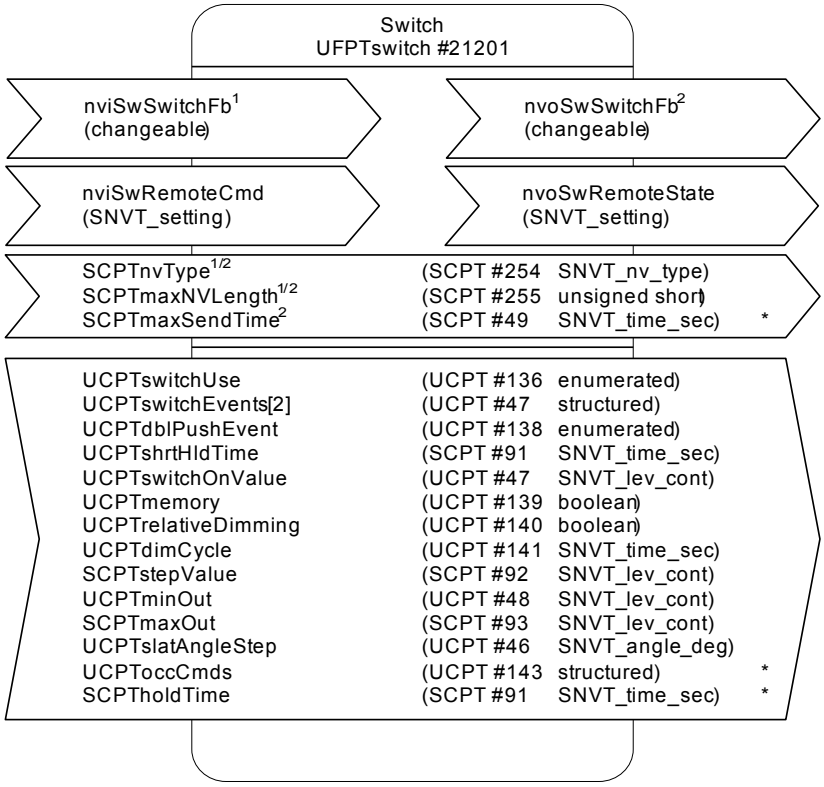
Type: inherited (values have nv-type of *nvoBiValue)*

Range of values: [0] switch-off value
[1] switch-on value

Presetting: ON on switch-on and OFF on switch-off {(0,0 0), (100,0 1)}

## 7.2.9 Switch

### Network interface




** These parameters are only available on devices with inputs for binary contacts and without BinaryInput objects*

### Network variables

`nviSwSwitchFb` Feedback input

| | | |
|---|---|---|
| Type: | Changeable | - |
| | SNVT_switch | - |
| | SNVT_setting | |
| Default type: | SNVT_setting | |
| Range of values : | Depends on nv type | |
| Presetting: | 0/OFF | |
| | {SET_OFF, 0.0, 0.00} | |

`nviSwRemoteCmd` Simulation input

| | |
|---|---|
| Type: | SNVT_setting |
| Range of values : | SNVT_setting |
| Presetting: | 0/OFF |
| | {SET_OFF, 0.0, 0.00} |

`nvoSwSwitch` Value output

| | |
|---|---|
| Type: | Changeable |
| | - SNVT_switch |

- SNVT_setting
- SNVT_occupancy*

Default type: SNVT_setting
Range of values : Depends on nv type
Presetting: 0/OFF
{SET_OFF, 0.0, 0.00}
Transmission: Adjustable via *SCPTmaxSendTime*

** This NV-typ is only selectable on devices with inputs for binary contacts and without BinaryInput objects*

`nvoSwRemote State` Feedback of actual input state

Type: SNVT_setting
Range of values : SNVT_setting
Presetting: 0/OFF
{SET_OFF, 0.0, 0.00}

## Configuration properties

### Parametrization of network variables

`SCPTmax NVLength` Maximum length of the network variable (read only)

Type: unsigned short
(SCPT #255)
Presetting: 4 Byte {4}

`SCPTnvType` Type of network variable

Type: Structure
(SCPT #254)
Range of values : supported NV-types
Presetting: SNVT_setting

`SCPTmaxSend Time` Maximum time between two telegrams

Validity: for *nvoSwSwitch*
Type: SNVT_time_sec
(SCPT #48)
Range of values : 0 – 6553,4 Seconds
Presetting: 0 Seconds {0}

** This NV-typ is only selectable on devices with inputs for binary contacts and without BinaryInput objects*

### Parametrization of functional object

`UCPTswitch Use` Only used by plug-in

Type: unsigned short
(UCPT #195)

`UCPTdblPush Event` Event for parallel pressing of both assigned buttons

Type: enumerated
Range of values : see *UCPTswitchEvents*
Presetting: no Event selected
{EV_NO_MSG}

`UCPTshrtHld Time` Time limit between short and long hold action

Type: SNVT_time_sec
(UCPT #91)
Range of values : 0,1 – 30,0 Seconds
Presetting: 0,5 Seconds

`UCPTswitchOn Value` Switch on value

Type: SNVT_lev_cont
(UCPT #47)
Range of values : 0,0 – 100,0 %
Presetting: ON with 100% {100.0}

`SCPTstepValue` value step for dimming /drive

Type: SNVT_lev_cont
(SCPT #92)
Range of values : 0,0 – 100,0 %
Presetting: 10% {20}

`UCPTslatAngle Step` angle step for slat turning

Type: SNVT_angle_deg
(UCPT #46)
Range of values : -90,00° - +90,00°
Presetting: 10,00° {500}

`UCPTswitch Events[2]` Events on press, hold and release of button(s)
Type: array of structured
Structure: for each button:
.push short pressing
.hold long pressing
.release release after short pressing
.release_late release after long pressing
Range of values : for each element/action:
-1 EV_NUL send invalid
0 EV_OFF switch off
1 EV_ON switch on
2 EV_DIM_DOWN dimm down
3 EV_DIM_UP dimm up
4 EV_STOP send stop
5 EV_SB_DOWN drive sunblind down
6 EV_SB_UP drive sunblind up
7 EV_SLAT_DOWN turn slat down
8 EV_SLAT_UP turn slat up
9 EV_TOGGLE toggle
10 EV_DIM dimm toggle
11 EV_SB_TOGGLE drive toggle
14 EV_NO_MSG send no message
Vorbelegung: send no messages

`UCPTrelative Dimming` decides the usage of relative dimming with NV-type SNVT_setting
Type: boolean (UCPT #140)
Range of values : 0 BOOL_FALSE no relative dimming
1 BOOL_TRUE use relative dimming
Presetting: use relative dimming {BOOL_TRUE}

`UCPTminOut` lower limit for dimming and switching
Type: SNVT_lev_cont (UCPT #48)
Range of values : 0,0 ... 100,0%
Presetting: 0% {0}

`SCPTmaxOut` upper limit for dimming and switching
Type: SNVT_lev_cont (SCPT #93)
Range of values : 0,0 ... 100,0%
Presetting: 100% {200}

`UCPTdimm Cycle` Dimming cycle (Update rate on dimming)
Type: SNVT_time_sec
Range of values : 0,0 No dimming
0,5-.6553,4s Cycle time
Presetting: 0,5 s {5}

`UCPTmemory` decides the usage of memory for last switch on value
Type: boolean (UCPT #139)
Range of values : 0 FALSE send *UCPTswitchOnValue*
1 TRUE send memorised switch on value
Presetting: no memory use {0}

`UCPToccCmds*` Switch On and switch of values for NV-type SNVT_occupancy
Type: structured (UCPT #143)
Range of values : *.cmd_on / .cmd_off* SNVT_occupancy
Presetting: 'room occupied' on switch on and 'room unoccupied' on switch of {OC_OCCUPIED, OC_UNOCCUPIED}

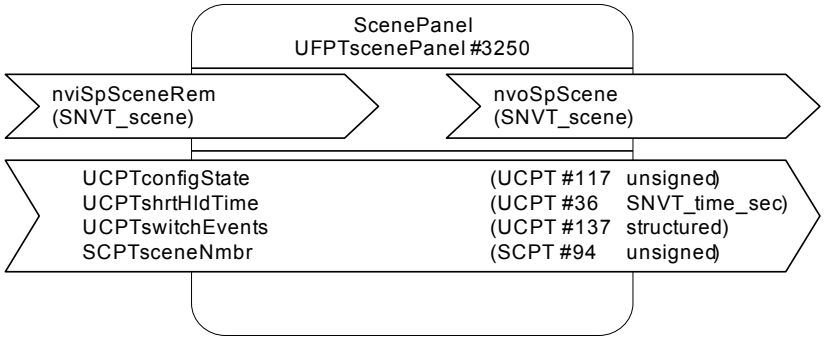
** This parameter is only available on devices with inputs for binary contacts and without BinaryInput objects*

`SCPTholdTime*` hold time for switch on state of binary input
Type: SNVT_time_sec
Range of values : 0,0 No hold time
0,5-.6553,4s Hold time
Presetting: 0,5 s {5}

*This parameter is only available on devices with inputs for binary contacts and without BinaryInput objects*

## 7.2.10 Scene Panel

### Network interface




### Network variables

`nviSpSceneRem` Scene input for remote scene buttons

Type: SNVT_scene

Range of values: SNVT_scene

Presetting: Invalid scene command {0, 0}

`nvoSpScene` Scene output

Type: SNVT_scene

Range of values: SNVT_scene

Presetting: Invalid scene command {0, 0}

### Configuration parameters

`UCPTconfig State` Only used by Plug-in

Type: unsigned short (UCPT #117)

Range of values: 0 - 255

Presetting: 255 {255}

`UCPTshrtHld Time` Time threshold between the short and long hold function of the buttons

Type: SNVT_time_sec (UCPT #36)

Range of values: 0,1 – 30,0 Seconds

Presetting: 0,5 Seconds

`SCPTsceneNmbr` Scene number of first scene button on remote control

Type: unsigned {SCPT #94}

Range of values: 0 No valid number
1 – 255 Scene number

Presetting: No valid number {0}

`UCPTswitch Events` Actions on push, reaching short hold time and releasing assigned buttons

Type: array of structured (UCPT #137)

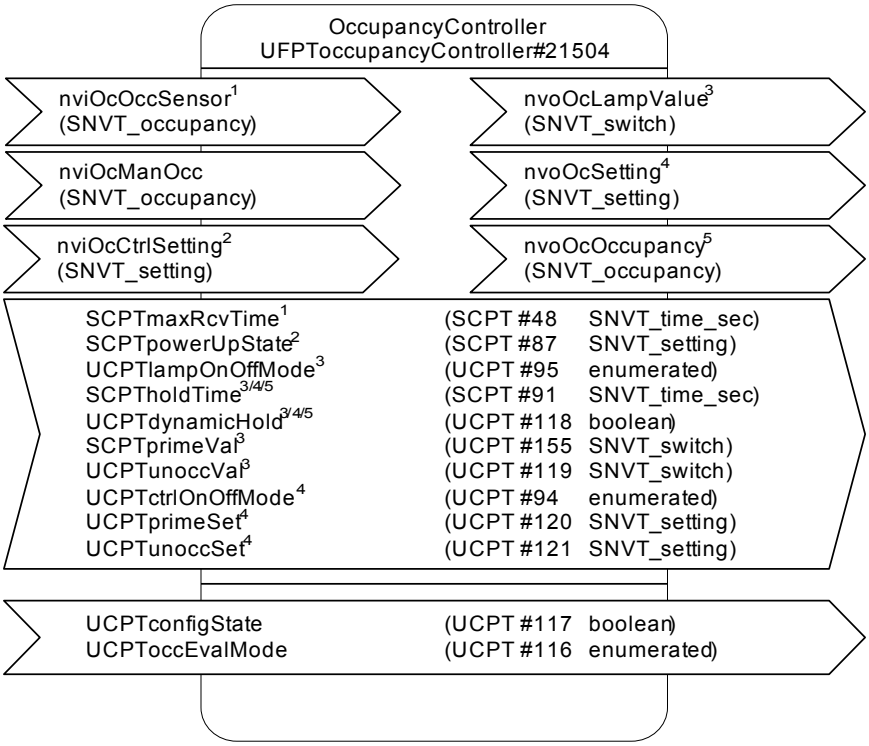
Structure:
- .push — Pushing
- .hold — reaching short hold time
- .release — Releasing be-for short hold time reached
- .release_late — Releasing after short hold time reached

Range of values: For each element
- 12 EV_SCENE_RCL Recall scene
- 13 EV_SCENE_LRN Learn scene
- 14 EV_NO_MSG No action

Presetting: No actions

## 7.2.11 Occupancy control

### Network interface




### Network variables

`nviOcOcc Sensor` Occupancy status of the room (sensor input)

Type: SNVT_occupancy

Range of values:
- 0 OC_OCCUPIED Room occupied
- 1 OC_UNOCCUPIED Room unoccupied

Presetting: Room unoccupied {1}

`nviOcCtrl Setting` Control input of controller

Type: SNVT_setting

Range of values: .setting

| | | |
|---|---|---|
| -1 | SET_NUL | Reset the controller |
| 0 | SET_OFF | Controller off |
| 1 | SET_ON | Controller on |

Presetting: *SCPTpowerupState*

`nviOcManOcc` Occupancy status of the room (manual input)

Type: SNVT_occupancy

Range of values:
- -1 OC_NUL Invalid value
- 0 OC_OCCUPIED Room occupied
- 1 OC_UNOCCUPIED Room unoccupied
- 2 OC_BYPASS Room temporary occupied
- 3 OC_STANDBY Room temporary unoccupied

Presetting: Room unoccupied {1}

`nvoOcSetting` output for controller control

Type: SNVT_setting

Range of values:

| | |
|---|---|
| *SCPTprimeVal* | If room is occupied |
| *UCPTunoccVal* | If room is unoccupied |

`nvoOc Occupancy` Evaluated occupancy

Type: SNVT_occupancy

Range of values:
0 OC_OCCUPIED Room occupied
1 OC_UNOCCUPIED Room unoccupied
2 OC_BYPASS Room temporary occupied
3 OC_STANDBY Room temporary unoccupied

Presetting: Room unoccupied {1}

`nvoOcLamp Value` Switching output for actuator control

Type: SNVT_switch

Range of values:
*UCPTprimeSet* If room is occupied
*UCPTunoccSet* If room is unoccupied

## Configuration parameters

### Parametrization of the network variables

`SCPTmax RcvTime` Duration of validity for 'occupied' telegrams on *nviOcOccSensor*, serves parallel connection of several sensors

Type: SNVT_time_sec (SCPT #48)

Range of values: 0 ... 6553,4 Seconds

Presetting: 0 Seconds {0}

`SCPTpowerup State` Controller status after power restoration

Type: SNVT_setting

Range of values: See *nviOcCtrlSetting*

Presetting: Controller active {SET_ON, 100.0%, 0.00°}

`UCPTlampOn OffMode` Switching behavior of switching output

Type: enumerated {UCPT #95}

Range of values:
0 ONOFF Switch on and off
1 OFFONLY Switch off only

Presetting: Switch on and off {0}

`SCPTholdTime` Delay time before an 'unoccupied' telegram causes switch-off of the network output variable

Type: SNVT_time_sec (SCPT #91)

Range of values: 0 ... 6553,4 Seconds

Presetting: 10 Minutes (6000)

`UCPTdynamic Hold` Dynamic increase of the hold time

Type: boolean {UCPT #118}

Range of values:
0 FALSE No increase
1 TRUE Dynamic increase

Presetting: No increase {0}

`SCPTprimeVal` Value of switching output if room is occupied

Type: SNVT_switch

Range of values: SNVT_switch

Presetting: Switch on {100.0%, 1}

`UCPTunoccVal` Value of switching output if room is unoccupied

Type: SNVT_switch

Range of values: SNVT_switch

Presetting: Switch off {0.0%, 0}

`UCPTctrlOnOff Mode` Switching behavior of control output

Type: enumerated {UCPT #94}

Range of values:
0 ONOFF Switch on and off
1 OFFONLY Switch off only

Presetting: Switch on and off {0}

`UCPTprimeSet` Value of control output if room is occupied

Type: SNVT_setting

Range of values: SNVT_setting

Presetting: Switch on {SET_ON, 100.0%, 0.00°}

`UCPTunoccSet` Value of control output if room is unoccupied

Type: SNVT_setting
Range of values: SNVT_setting
Presetting: Switch off
{SET_OFF, 0.0%, 0.00°}

## Parametrization of the object

`UCPTconfig State` only used by Plug-in

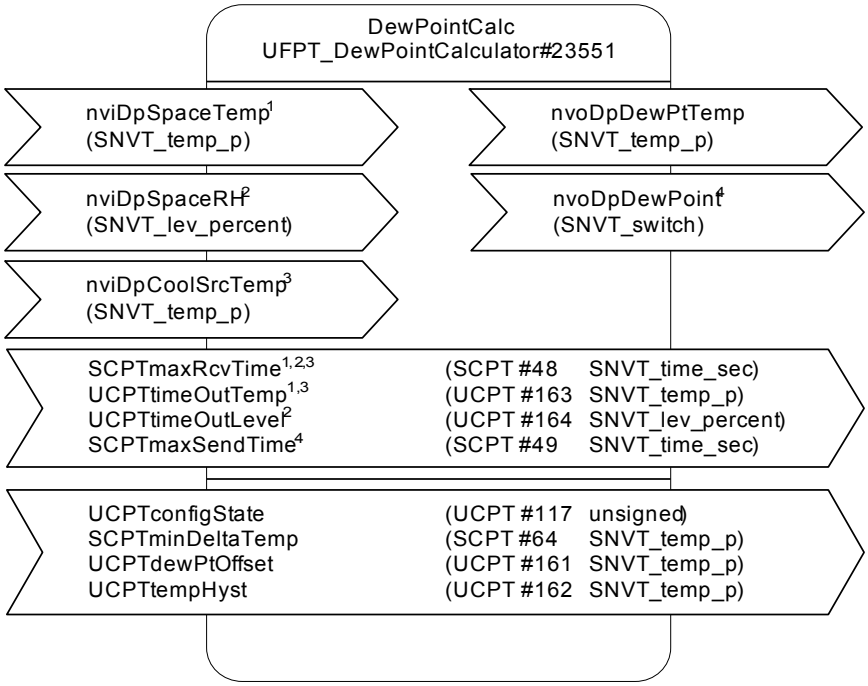
Type: unsigned short
(UCPT #195)
Range of values: -
Presetting: -

`UCPToccEval Mode` Reaction for changes on *nviOcOccSensor*

Type: enumerated
{UCPT #116}
Range of values: 0 AUTOONOFF
Switch on and off
1 MANON_AUTOOFF
Switch off only, switch on only via *nviOcManOcc*
Presetting: Switch on and off {0}

## 7.2.12 Dew point calculation

### Network interface




### Network variables

`nviDpSpaceTemp` Room temperature

Type: SNVT_temp_p
Range of values: SNVT_temp_p
Presetting: Invalid value {32767}

`nviDpSpaceRH` Relative humidity

Type: SNVT_lev_percent
Range of values: 0,00% - 100,00%
Presetting: Invalid value {32767}

`nviDpCoolSrcTemp` Temperature of cooling medium

Type: SNVT_temp_p
Range of values: SNVT_temp_p
Presetting: Invalid value {32767}

`nvoDpDewPtTemp` Calculated temperature of cooling medium on reaching dew point

Type: SNVT_temp_p
Range of values: SNVT_temp_p
Presetting: Invalid value {32767}

`nvoDpDewPoint` Dew point signal output

Type: SNVT_switch
Range of values: {100.0%, 1} Dew point reached
{0.0%, 0} No condensation
Presetting: No condensation {0,0 0}

# Configuration parameters

## Parametrization of the network variables

`SCPTmaxRcv Time` — Maximum time for receiving sensor values to detect sensor absence

| | |
|---|---|
| Type: | SNVT_time_sec {SCPT #48} |
| Range of values: | 0 No detection<br>1 - 6553 Seconds |
| Presetting: | No detection {0} |

`UCPTtimeOut Temp` — Value on sensor absence

| | |
|---|---|
| Type: | SNVT_temp_p {UCPT #163} |
| Range of values: | SNVT_temp_p |
| Presetting: | *nviDpSpaceTemp* 35,00°C {3500}<br>*nviDpCoolSrcTemp* 5,00°C {500} |

`UCPTtimeOut Level` — Value on sensor absence

| | |
|---|---|
| Type: | UNVT_lev_percent {UCPT #164} |
| Range of values: | See *nviDpSpaceRH* |
| Presetting: | 100,0% {20000} |

`SCPTmaxSend Time` — Maximum period of time between sending two dew point telegrams

| | |
|---|---|
| Type: | SNVT_time_sec {SCPT #49} |
| Range of values: | 0 No periodic re-sent<br>0,5 - 6553,0 Seconds |
| Presetting: | No periodic resend {0} |

## Parametrization of the object

`UCPTconfig State` — Only used by Plug-in

| | |
|---|---|
| Type: | unsigned short (UCPT #117) |
| Range of values: | 0 - 255 |
| Presetting: | - |

`SCPTminDelta Temp` — Rounding value for *nvoDpDewPtTemp*

| | |
|---|---|
| Type: | SNVT_temp_p {SCPT #64} |
| Range of values: | 0,00°C – 2,00°C |
| Presetting: | 0,10°C {10} |

`UCPTdewPt Offset` — Safety distance to calculated dew point temperature

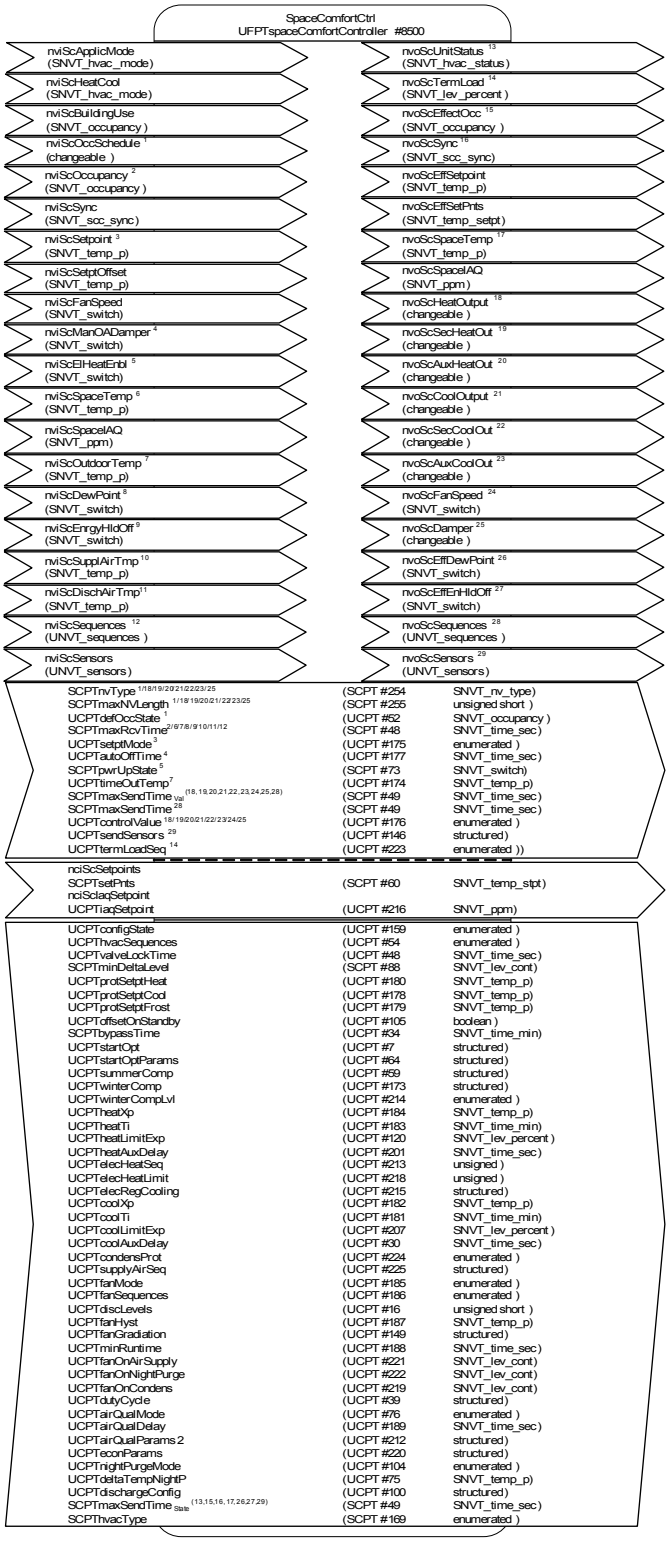
| | |
|---|---|
| Type: | SNVT_temp_p {UCPT #161} |
| Range of values: | -5,00 K – +5,00 K |
| Presetting: | 0 K |

`UCPTtempHyst` — Switchback hysteresis for dew point signal

| | |
|---|---|
| Type: | SNVT_temp_p {UCPT #162} |
| Range of values: | 0,20 K – 5,00 K |
| Presetting: | 1,00 K {100} |

## 7.2.13 Space comfort control

### Network interface



# Network variables

## Input network variables

`nviScApplicMode` Central selection of controller function

Type: SNVT_hvac_mode
Range of values:
0 AUTO
Automatic
1 HEAT
Heating
2 MRNG_WRMUP
Quick warm up (comfort)
3 COOL
Cooling
4 NIGHT_PURGE
Night purge
5 PRE_COOL
pre cooling (comfort)
6 OFF
switch off
8 EMERG_HEAT
Emergency heating (building protection)
12 MAX_HEAT
Maximum heating (all heating valves full open)
16 EMERG_COOL
Emergency cooling
17 MAX_COOL
Maximum Cooling (all cooling valves full open)
Presetting: Automatic {0},
Last value stored in non-volatile memory

`nviScHeatCool` Local selection of controller function or external change-over signal for 2-pipe-systems

Type: SNVT_hvac_mode
Range of values:
0 AUTO Automatic (not for change-over)
1 HEAT Heating
3 COOL Cooling
6 OFF Switch off
Presetting: Automatic {0}

`nviScBuildingUse` Central default for building use

Type: SNVT_occupancy
Range of values:
0 OCCUPIED
Building in use
1 UNOCCUPIED
Building protected
3 STANDBY
Building temporary not used
Presetting: Building in use {0}

`nviScOccSchedule` Central room utilization plan

Type: changeable (SNVT_tod_event, SNVT_occupancy)
Default type: SNVT_tod_event
Range of values: *.current_state/.next_state*
0 OCCUPIED
Room occupied
1 UNOCCUPIED
Room unoccupied
3 STANDBY
Room in standby
*.time_to_next_state*
0 Next change unknown
0 – 65535 Minutes
Presetting: actual utilization see *UCPTdefOccState* and next change unknown {*UCPTdefOccState*,0,0}

`nviScOccupancy` Local room occupancy

Type: SNVT_occupancy
Range of values:
0 OCCUPIED
Room occupied
1 UNOCCUPIED
Room unoccupied
2 BYPASS
Comfort extension
3 STANDBY
Room in standby
Presetting: Room unoccupied {1}

`nviScSetpoint` Central setpoint (absolute or relative)

Type: SNVT_temp_p
Range of values: *Absolute*
15,00°C – 35,00°C
*Relative* -10,00 K - +10,00 K
Presetting: *Absolute*
Depending on configured regulation sequenzes (see *UCPThvacSequences*)
HEAT: Comfort setpoint for heating {*SCPTsetPnts.occupied_heat*}
COOL: Comfort setpoint for cooling {*SCPTsetPnts.occupied_cool*}
else: Middle of deadband {*SCPTsetPnts.occupied_heat*+(*SCPTsetPnts.occupied_cool*-*SCPTsetPnts.occupied_heat*)/2}
*Relative*
0 K {0}

`nviScSync` Control of the Regulator via CommandModul objects
Type: UNVT_scc_sync, (see nvoScSccSync)
Range of values: UNVT_scc_sync
Presetting: {0,0,0,0,0,0,0,0,0,0,0,0,0,0}

`nviScSetpt Offset` Local setpoint adjustment (relative)
Type: SNVT_temp_p
Range of values: 5,00 K - +5,00 K
Presetting: 0,00 K {0}

`nviScFanSpeed` Local fan command
Type: SNVT_switch
Range of values: SNVT_switch
Presetting: Automatic {0.0%, -1}

`nviScManDamper` Local fresh air command
Type: SNVT_switch
Range of values: SNVT_switch
Presetting: Automatic {0.0%, -1}

`nviScDischAir Temp` Discharge air temperature
Type: SNVT_temp_p
Range of values: SNVT_temp_p
Presetting: invalid value {32767}

`nviScSupplAir Temp` Supply air temperature
Type: SNVT_temp_p
Range of values: SNVT_temp_p
Presetting: invalid value {32767}

`nviScOutdoor Temp` Outdoor temperature
Type: SNVT_temp_p
Range of values: SNVT_temp_p
Presetting: invalid value {32767}

`nviScDewPoint` Dew point signal for chilled ceiling
Type: SNVT_switch
Range of values: *.state*
0 Normal
1 Dew point reached
Presetting: Normal {0.0%, 0}

`nviScSpaceTemp` Room temperature
Type: SNVT_temp_p
Range of values: SNVT_temp_p
Presetting: 20°C {2000}

`nviScSpaceIAQ` Air quality
Type: SNVT_ppm
Range of values: SNVT_ppm
Presetting: 0 ppm {0}

`nviScEnergyHd Off` Regulation interrupt (e.g. on open windows)
Type: SNVT_switch
Range of values: *.state*
0 No interrupt
1 Regulation interrupt
Presetting: No interrupt {0.0%, 0}

`nviScElHeat Enbl` Limitation for electrical heater
Type: SNVT_switch
Range of values: 0,0 % - 100,0%
Presetting: *SCPTpwrUpState*

`nviSc Sequences` Master controlled sequences, input for slaves
Type: structure
Range of values: *.heat/.cool*
0 - 160% including heat/ cool extension
*.fan/.iaq/.econ/.oad_limit/ .night_purge*
0 - 100%
*.applic_mode*
1 HEAT Heating
3 COOL Cooling
6 OFF Switch off
*.active_seq/.out_air_seq/ .supply_air_seq*
1 HEAT Heating
3 COOL Cooling
-1 NUL Neither heating nor cooling
*.energy_mode*
0 OCCUPIED
1 UNOCCUPIED
2 BYPASS
3 STANDBY
*.out_air_frost/.dew_point/ .energy_hold_off/.fan_stop*
0 not active
1 active
Presetting: -

`nviScSensors` At slave measured sensor values, input for master
Type: structure
Range of values: *.energy_hold_off/ .dew_point*
0 FALSE not active
1 TRUE active
*.iaq_sensor*
see *nviScSpaceIAQ*
Presetting: -

## Output network variables

`nvoScSpace Temp` Feedback of averaged space temperature
Type: SNVT_temp_p
Range of values: SNVT_temp_p
Presetting: 0°C {0}

`nvoScSpaceIAQ` Feedback of maximum air quality
Type: SNVT_ppm
Range of values: SNVT_ppm
Presetting: 0 ppm {0}

`nvoScUnit Status` Output of all controller manipulated variables
Type: SNVT_hvac_status
Meaning of values: *.mode:*
actual regulator function
*.heat_output_primary:*
value 1. heating sequence
*.heat_output_secondary:*
value 2. heating sequence
*.cool_output:*
value 1. cooling sequence
*.econ_output:*
value output function of *nvoScDamper* & night purge & cool down of electrical heater
*.fan_output:*
value output function of *nvoScFanSpeed* & night purge via OAD
*Meaning of bits at .in_alarm*:

```
unsigned    reserved:3;
unsigned    discharge_limitation:1;
unsigned    fan_ovrd:1;
unsigned    dew_point:1;
unsigned    energy_hold_off:1;
unsigned    frost_alarm:1;
```

*.discharge_limitation*
set on active output reduction based on discharge air temperature
*.fan_ovrd*
set on manual fan control
*.dew_point*
set on active dew point
*.energy_hold_off*
set on open window
*.frost_alarm*
set on reached frost alert temperature
Presetting: {0,0,0,0,0,0,0}

`nvoScEnergyHd Off` Feedback of current regulation interrupts (OR-function over all sources)
Type: SNVT_switch
Range of values: see *nviScEnergyHdOff*
Presetting: 0 % {0, 0}

`nvoScEff Setpts` Feedback of current setpoints (for each energy level & regulation seq.)
Type: SNVT_temp_setpt
Range of values: each element SNVT_temp_p
Presetting: each 0°C {0,0,0,0,0,0}

`nvoScEffect Setpt` Feedback of current controller setpoint
Type: SNVT_temp_p
Range of values: SNVT_temp_p
Presetting: 0°C {0}

`nvoScTermLoad` Output of current heating and cooling requirements, sequences parametrizable at *UCPTtermLoadSeq*
Type: SNVT_lev_percent
Range of values: -100,00% - 0,00%
Heating requirement
0,00% - 100,00%
Cooling requirement
Presetting: Neither heating nor cooling requirement {0}

`nvoScEffect Occ` Output of current energy level
Type: SNVT_occupancy
Range of values:

| | | |
|---|---|---|
| -1 | NUL | Building protection |
| 0 | OCCUPIED | Comfort |
| 1 | UNOCCUPIED | Economy |
| 2 | BYPASS | Comfort extension |
| 3 | STANDBY | Standby |

Presetting: Building protection {-1}

`nvoSc Sequences` Sequences output of master
Type: structure
Range of values: see *nviScSequences*
Presetting: -

`nvoScSensors` Sensor output of slave, sensors selectable via *UCPTsendSensors*
Type: structure
Range of values: see *nviScSensors*
Presetting: -

`nvoScEffDew Point` Feedback of current dew point information (OR-function over all sources)
Type: SNVT_switch
Range of values: see *nviScDewPoint*
Presetting: 0 % {0, 0}

`nvoScHeat Output` Controller manipulated value, meaning depends on *UCPTcontrolValue*
Type: changeable
Default type: SNVT_lev_percent
Range of values: -100,00 % - +100,00%
Presetting: 0 % {0}

`nvoScSecHeat Out` Controller manipulated value, meaning depends on *UCPTcontrolValue*
Type: changeable
Default type: SNVT_lev_percent
Range of values: -100,00 % - +100,00%
Presetting: 0 % {0}

`nvoScAuxHeat Out` Controller manipulated value, meaning depends on *UCPTcontrolValue*
Type: changeable
Default type: SNVT_lev_percent
Range of values: -100,00 % - +100,00%
Presetting: 0 % {0}

`nvoScCool Output` Controller manipulated value, meaning depends on *UCPTcontrolValue*
Type: changeable
Default type: SNVT_lev_percent
Range of values: -100,00 % - +100,00%
Presetting: 0 % {0}

`nvoScSecCool Out` Controller manipulated value, meaning depends on *UCPTcontrolValue*
Type: changeable
Default type: SNVT_lev_percent
Range of values: -100,00 % - +100,00%
Presetting: 0 % {0}

`nvoScAuxCool Out` Controller manipulated value, meaning depends on *UCPTcontrolValue*
Type: changeable
Default type: SNVT_lev_percent
Range of values: -100,00 % - +100,00%
Presetting: 0 % {0}

`nvoScFanSpeed` Controller manipulated value for fans
Type: SNVT_switch
Range of values: SNVT_switch
Presetting: 0 % {0}

`nvoScDamper` Controller manipulated value, meaning depends on *UCPTcontrolValue*
Type: changeable
Default type: SNVT_lev_percent
Range of values: -100,00 % - +100,00%
Presetting: 0 % {0}

`nvoScSync` Output of controller manipulated variables for visualization and synchronization of CommandModul objects
Type: UNVT_scc_sync
Structure:

```
typedef struct{
SNVT_temp_p   space_temp;
SNVT_hvac_mode      mode;
SNVT_occupancy      effect_occ;
SNVT_temp_p   setpoint;
SNVT_temp_p   setpoint_offset;
SNVT_switch   fan_output;
SNVT_switch   damper_output;
SNVT_switch   heat_output;
SNVT_switch   cool_output;
unsigned      reserved:3;
unsigned      discharge_limitation:1;
unsigned      fan_ovrd:1;
unsigned      dew_point:1;
unsigned      energy_hold_off:1;
unsigned      frost_alarm:1;
}
```

Meaning of values:
*.space_temp*
averaged room temp.
*.mode*
actual regulation function
*.effect_occ*
actual energy level
*.setpoint*
setpoint (see presetting *nviScSetpoint* for absolute values) with central setpoint shift
*.setpoint_offset*
*nviScSetpointOffset*
*.fan_output*
value output function of *nvoScFanSpeed* & night purge via OAD
*.damper_output*
Value ouput function of *nvoScDamper* & night purge & cooling down of electrical heater
*.heat_output*
value 1. heating sequence
*.cool_output*
value 1. cooling sequence
*.discharge_limitation*
set on active output reduction based on discharge air temperature
*.fan_ovrd*
set on manual fan control
*.dew_point*
set on active dew point
*.energy_hold_off*
set on open window
*.frost_alarm*
set on reached frost alert temperature
Range of values: UNVT_scc_sync
Presetting: {0,0,0,0,0,0,0,0,0,0,0,0,0,0}

# Configuration parameters

## Parametrization of the network variables

`UCPTtimeOut Temp` Value for the temperature on missing telegrams
Type: SNVT_temp_p (UCPT #163)
Range of values: SNVT_temp_p
Presetting: invalid value {32767}

`UCPTdefOcc State` Value for room utilization after Reset
Type: SNVT_occupancy
Range of values:
0 OCCUPIED Room occupied
1 UNOCCUPIED Room unoccupied
2 BYPASS Comfort extension
3 STANDBY Room in standby
Presetting: Room unoccupied {1}

`SCPTmax NVLength` Maximum length of the network variable (constant)
Type: unsigned short (SCPT #255)
Presetting: *nviScOccSchedule*: 4 Byte {4}
*Value output variables:* 2 Byte {2}

`SCPTnvType` Type of the network variable
Type: Structured (SCPT #254)
Range of values: Supported NV-types
Presetting: *nviScOccSchedule:* SNVT_tod_event {0,0,0,0,0,0,0,0,0,128, NVT_CAT_REFERENCE,4,0,0,0}
*Value output variables:* SNVT_lev_percent {0,0,0,0,0,0,0,0,0,81, NVT_CAT_REFERENCE,2, 5L, -3L, 0L}

`UCPTtermLoad Seq` selection of the meaning for the values at *nvoScTermLoad*
Type: structured
Range of values: for both elements:
0 NONE no sequence
1 FIRST 1. sequence
2 SECOND 2. sequence
3 BOTH 1. & 2. sequence
Presetting: First heating and first cooling sequence {SEQ_FIRST,SEQ_FIRST}

`SCPTmaxSend Time (States)` Maximum period of time between sending two telegrams on one of the status outputs
Type: SNVT_time_sec (SCPT #49)
Validity: One shared time for:
- *nvoScUnitStatus*
- *nvoScEffectOcc*
- *nvoScSync*
- *nvoScSpaceTemp*
- *nvoScEffDewPoint*
- *nvoScEnergyHdOff*
Range of values: 0 No periodic resend
1 - 6553 Seconds
Presetting: No periodic resend {0}

`SCPTmaxSend Time (Values)` Maximum period of time between sending two telegrams on one of the value outputs
Type: SNVT_time_sec (SCPT #49)
Validity: One shared time for:
- *nvoScHeatOutput*
- *nvoScSecHeatOut*
- *nvoScAuxHeatOut*
- *nvoScCoolOutput*
- *nvoScSecCoolOut*
- *nvoScAuxCoolOut*
- *nvoScFanSpeed* - *nvoScDamper*
Range of values: 0 No periodic resend
1 - 6553 Seconds
Presetting: no periodic resend {0}

`SCPTmaxSend Time` Maximum period of time between sending two telegrams
Type: SNVT_time_sec (SCPT #49)
Validity: *nvoScSequences* (Master)
Range of values: 0 No periodic resend
1 - 6553 Seconds
Presetting: no periodic resend {0}

`UCPTcontrol Value` value output function

Type: enumerated (UCPT #293)

Range of values:

| | | |
|---|---|---|
| 0 | OFF | Not used |
| 1 | HEAT | 1.heat. seq. |
| 2 | COOL | 1.cooling sequence |
| 3 | HEAT_COOL | 1.heat- & 1.cooling seq. |
| 4 | HEAT_COOL_SIG | 1.heat-/1.cooling sequence for 6-way-valves |
| 5 | HEAT_LOCK | shutoff valve 1.heat. seq. |
| 6 | COOL_LOCK | shutoff valve 1.cool. seq. |
| 7 | CHANGEOVER_HEAT_COOL | change over valve heating to cooling |
| 8 | CHANGEOVER_COOL_HEAT | change over valve cooling to heating |
| 9 | IAQ | Air quality |
| 10 | HEAT_IAQ | 1.heat. seq. & air quality |
| 11 | COOL_IAQ | 1.cool. seq. & air quality |
| 12 | HEAT_COOL_IAQ | 1.heat-/1.cooling sequence & air quality |
| 13 | FAN | Ventilator |
| 14 | OAD | Outdoor air damper |
| 15 | OAD_IAQ | Outdoor air damper & air quality |
| 16 | CHANGEOVER_SIG | 6-way valve for changeover between 1.cool- & 1.heating |
| 17 | AUXH | 2. (auxiliary) heating seq. |
| 18 | AUXC | 2. (auxiliary) cooling seq. |
| 19 | AUXHC | 2. heat-/2. cooling seq. |
| 20 | AUXH_IAQ | 2.heat. seq. & air quality |
| 21 | AUXC_IAQ | 2. cool. seq. & air quality |
| 22 | AUXHC_IAQ | 2.heat.-/2.cool. seq. & air qual. |
| 23 | FAN_OAD | Ventilator & economizer |
| 24 | FAN_OAD_IAQ | Ventilator, economizer & air quality |
| 25 | HEAT_AUXC | 1.heat--/2. cooling seq. |
| 26 | HEAT_AUXC_IAQ | 1.heat-/2.cooling sequence & air quality |
| 27 | COOL_AUXH | 2.heat-/1. cooling seq. |
| 28 | COOL_AUXH_IAQ | 2.heat-/1.cooling sequence & air quality |

Presetting: Not used {0}

`UCPTautoOff Time` Period of validity for local fresh air requests until return to automatic

Type: SNVT_time_sec (UCPT #107)

Range of values: 0 No automatic return
>0 Seconds until return

Presetting: No automatic return {0}

`SCPTpwrUp State` Limitation for electrical heater on power up

Type: SNVT_switch

Range of values: 0,0 % - 100,0%

Presetting: no limitation {0}

`UCPTsetptMode` meaning of values on *nviScSetpoint*

Type: enumerated (UCPT #141)

Range of values:

| | | |
|---|---|---|
| 0 | RELATIVE | relative values |
| 1 | ABSOLUTE | absolute values |

Presetting: absolute values {1}

`SCPTmax RcvTime` Validity duration of tele-grams received on the network variables:
for *nviScSpaceTemp*, *nviScOccupancy*, *nviScEnergyHdOff* and *nviScDewPoint* collect values from many sources;
for *nviScOutdoorTemp, nviScSequences* (Slave), *nviScSupplAirTemp* and *nviScDischAirTemp* detect missing telegrams

Type: SNVT_time_sec (SCPT #48)

Range of values: 0 ... 6553 seconds

Presetting: 0 seconds {0}

`UCPTsend Sensors` selection of slave measured sensors to be send to master

Type: structured

Structure:

```
typedef struct{:
  unsigned    send_enrgy_hld_off:1;
  unsigned    send_dew_point:1;
  unsigned    send_space_iaq:1;
  unsigned    reserved:5;
}
```

Presetting: send all sensors {1 1 1 0}

## Parametrization of the functional object

`SCPTsetPnts` Central setpoints for each energy level and regulation sequence, changeable via *nciSetpoints*

Type: SNVT_temp_setpt (SCPT #60)

Range of values: each element 10,00°C – 40,00°C

Presetting: Comfort cooling stpt 23°C
Standby cooling stpt 25°C
Economy cooling stpt 28°C
Comfort heating stpt 21°C
Standby heating stpt 19°C
Economy heating stpt 16°C
{2300, 2500, 2800, 2100, 1900, 1600}

`UCPTconfig State` only used by Plug-in

Type: unsigned short (UCPT #195)

Range of values: 0 - 255

Presetting: 255 {255}

`SCPTminDelta Level` Minimum of absolute value change causing the value to be re-sent

Type: SNVT_lev_cont (SCPT #88)

Range of values: 0,00% - 20,00 %

Presetting: 0,05% {10}

`UCPTprotSetpt Heat` Heating setpoint for building protection

Type: SNVT_temp_p (UCPT #121)

Range of values: 0,00°C – 50,00°C

Presetting: 12,00°C {1200}

`UCPTiaq Setpoint` Setpoint for internal air quality, changeable via *nciScIaqSetpoint*

Type: SNVT_ppm

Range of values: 300 – 1000 ppm

Presetting: 600 ppm {600}

`UCPTvalveLock Time` valve off-time on sequence change

Type: SNVT_time_sec (UCPT #294)

Range of values: 0 No off-time
0,5 – 900,0 Seconds off-time

Presetting: no off-time {0}

`UCPThvac Sequences` Selection of sequences to be regulated

Type: enumerated (UCPT #295)

Range of values:

| | | |
|---|---|---|
| -1 | NUL | No regulation |
| 0 | HEAT | Heating seq. |
| 1 | COOL | Cooling seq. |
| 2 | HC_AUTO | Heat. & cool. seq. with automatic change over |
| 3 | HC_EXT | Heat. & cool. seq. with external change over |

Presetting: No regulation {-1}

`UCPTprotSetpt Cool` Cooling setpoint for building protection

Type: SNVT_temp_p (UCPT #122)

Range of values: 0,00°C – 50,00°C

Presetting: 40,00°C {4000}

`UCPTprotSetpt Frost` Temperature limit for activation of frost alarm

Type: SNVT_temp_p (UCPT #123)

Range of values: 0,00°C – 50,00°C

Presetting: 6,00°C {600}

`UCPToffsetOn Standby` Determine the use of the local setpoint adjustment on standby

Type: boolean (UCPT #283)

Range of values:

| | | |
|---|---|---|
| 0 | FALSE | Use for both sequences |
| 1 | TRUE | Used only for the sequence, where it make sens in energetic aspect |

Presetting: Use for both sequences {0}

`SCPTbypass Time` Duration of comfort extension

Type: SNVT_time_min (SCPT #34)

Range of values: 0 no extension
1 - 600 Minutes

Presetting: No comfort extension {0}

`UCPTstartOpt` Configuration of the start optimization

Type: structured (UCPT #279)

Range of values:
*.mode*
0 AUTO For heating and cooling sequence
1 HEAT For heating sequence only
3 COOL For cooling sequence only
6 OFF No start optimization
*.max_time*
5 - 360 Minutes
*.heat_weekend_ext*
0,0% - 100,0%
*.learn_enable*
0 FALSE No self learning
1 TRUE Self learning

Presetting: No start optimization {6, 120, 60, 1}

`UCPTstartOpt Params` Current used parameters of start optimization (adapted by self learning if active)

Type: structured (UCPT #290)

Range of values: for each element
0 - 2000 Minutes

Presetting: {30, 10, 30, 10}

`UCPTsummer Comp` Parameters of summer compensation

Type: structured (UCPT #280)

Range of values: *.min_temp / .max_temp*
20,00°C – 50,00°C
*.max_offset*
0,00 K No summer compensation
>0,00 K Maximum setpoint increase

Presetting: No summer compensation {2600, 3200, 0}

`UCPTwinter Comp` Parameters of winter compensation

Type: structured (UCPT #281)

Range of values: *.min_temp / .max_temp*
-20,00°C – 10,00°C
*.max_offset*
0,00 K No winter compensation
>0,00 K Maximum setpoint increase

Presetting: No winter compensation {0, -1000, 0}

`UCPTwinter CompLvl` Effective range for winter compensation

Type: enumerated

Range of values:
0 ALL affects all energy levels
1 UNOCC affects only unoccupied level
2 OCC affects only occupied and standby level

Presetting: Affects all energy levels {0}

`UCPTheatXp` Proportional band for heating sequence (PI-regulation) or hysteresis width (2-point-regulation)

Type: SNVT_temp_p (UCPT #20)

Range of values: 0,50 K – 10,00 K

Presetting: 2,00 K {200}

`UCPTheatTi` Integral time for heating sequences (PI-regulation)

Type: SNVT_time_min (UCPT #21)

Range of values:
0 2-Point-regulation
1 – 360 Minutes

Presetting: 30 Minutes {30}

`UCPTheatLim Exp` expansion for auxiliary heating sequence

Type: SNVT_lev_percent

Range of values:
0,00% no auxiliary heating sequence
5,00 – 100,00% expansion

Presetting: no auxiliary heating sequence {0}

`UCPTheatAux Delay` switch on delay for auxiliary heating sequence

Type: SNVT_time_sec

Range of values: SNVT_time_sec

Presetting: 10 min {6000}

`UCPTelecHeatSeq` sequence of electrical heater

Type: unsigned
Range of values: 0 no electrical heater
1 heating sequence
2 auxiliary heating seq.
Presetting: no electrical heater {0}

`UCPTelecHeatLimit` electrical heater limitation for position depended fan regulation

Type: unsigned
Range of values: 0 – 250% percentage of fan level with 1% solution
Presetting: 200% {200}

`UCPTelecHeatRegCooling` Specifies if and how the fan should cool down electrical heater after switch-off

Type: structured
Range of values: *.cooling_time*
0 no reg. cooling
1 - 6553,5 Seconds
*.relative_to_output*
1 TRUE runtime is fixed
0 FALSE runtime relates to last heating value (% of *.cooling_time*)
*.run_level*
0,0 no reg.cooling
0.5 - 100,0%
Presetting: no reg. cooling {0, 1, 0}

`UCPTcoolXp` Proportional band for cooling sequence (PI-regulation) or hysteresis width (2-point-regulation)

Type: SNVT_temp_p
(UCPT #25)
Range of values: 0,50 K – 10,00 K
Presetting: 2,00 K {200}

`UCPTcoolTi` Integral time for cooling sequence (PI-regulation)

Type: SNVT_time_min
(UCPT #26)
Range of values: 0 2-Point-regulation
1 – 360 Minutes
Presetting: 30 Minutes {30}

`UCPTcoolLimExp` expansion for auxiliary (2.) cooling sequence

Type: SNVT_lev_percent
Range of values: 0,00% no 2. cool. seq.
5,00 – 100,00% expansion
Presetting: no auxiliary cooling sequence {0}

`UCPTcoolAuxDelay` switch on delay for auxiliary cooling sequence

Type: SNVT_time_sec
Range of values: SNVT_time_sec
Presetting: 10 min {6000}

`UCPTcondensProt` select which sequence will be cut-off if dew-point is reached

Type: enumerated
Range of values: 0 NONE no protection
1 FIRST protection for first sequence
2 SECOND protection for second sequence
3 BOTH protection for both sequences
Presetting: protection for first sequence {SEQ_FIRST}

`UCPTsupplyAirSeq` select heating and cooling sequences working with supply air

Type: structured
Range of values: .heating/.cooling
0 NONE no sequence
1 FIRST first sequence
2 SECOND second sequence
3 BOTH both sequences
Presetting: No supply air sequences {SEQ_NONE,SEQ_NONE}

`UCPTfanMode` Selection of fan control

Type: enumerated
(UCPT #315)
Range of values: 0 OFF
No fan regulation
1 SPACE_TEMP
Temperature depended regulation
2 VALVE_POS
Valve position depended regulation
Presetting: Temperature depending fan regulation {1}

**UCPTfanSequences** — Selection of regulation sequences for fan control

Type: enumerated (UCPT #317)

Range of values:

| | | |
|---|---|---|
| 0 | HEAT | 1. heating sequence |
| 1 | COOL | 1. cooling sequence |
| 2 | HEAT_COOL | 1.heat- & 2. cooling seq. |
| 3 | AUXH | 2.heating sequence |
| 4 | HEAT_AUXH | 1. & 2.heat. sequence |
| 5 | COOL_AUXH | 1. cool- & 2. heat.seq. |
| 6 | HEAT_COOL_AUXH | 1. & 2.heat. sequence & 1. cool.seq. |

Presetting: 1.heating & 1.cooling sequence {2}

**UCPTdiscLevels** — Fan stage count

Type: unsigned short (UCPT #112)

Range of values:

| | |
|---|---|
| 0 | continuous fan |
| 1 – 3 | stage count |

Presetting: Fan with 3 stages {3}

**UCPTfanHyst** — Hysteresis steps for temperature depended fan regulation

Type: SNVT_temp_p (UCPT #131)

Range of values: 0,50 K – 4,00 K

Presetting: 0,50 K {50}

**UCPTfanGradiation** — Lower valve position limits for fan stages and the hysteresis width for valve position depended fan regulation

Type: structured (UCPT #316)

Range of values: *.stage1 / .stage2 / .stage3*
0,0% – 100,0% lower valve position limit of stage
*.hyst*
0,5% - 20,0%

Presetting: Stage 1 starting with 5,0% valve pos., Stage 2 starting with 33,0% valve position, Stage 3 starting with 66,5% valve pos. and Hysteresis is 5,0% {10, 66, 133, 10}

**UCPTminRuntime** — Minimum runtime per stage before stage change

Type: SNVT_time_sec (UCPT #128)

Range of values:

| | |
|---|---|
| 0 | No minimum runtime |
| 1 - 3600 | Seconds |

Presetting: No minimum runtime {0}

**UCPTfanOnAirSupply** — Fan level on fresh air supply via outdoor air damper if no heating or cooling is active

Type: SNVT_lev_cont
Range of values: 0,0 – 100,0% fan level
Presetting: 33,0% {66}

**UCPTfanOnNightPurge** — Fan level for night purge via outdoor air damper

Type: SNVT_lev_cont
Range of values: 0,0 – 100,0% fan level
Presetting: 66,5% {133}

**UCPTfanOnCondens** — Fan level on condensation protection, for dry-out the cooling register

Type: SNVT_lev_cont
Range of values: 0,0 – 100,0% fan level
Presetting: 33,0% {66}

**UCPTdutyCycle** — Cyclic (switching between on and off time) ventilation if no temperature regulation sequence is active, e.g. as support for use of return air temperature sensors

Type: Structured
Range of values:

*.on_time*

| | |
|---|---|
| 0 | no duty cycle |
| 1-255 min | fan run time |

*.occ_off_time*

| | |
|---|---|
| 1-255 min | fan off time if the room is occupied or at standby |

*.unocc_off_time*

| | |
|---|---|
| 1-255 min | fan off time if the room is at frost protection or unoccupied |

*.run_level*

| | |
|---|---|
| 0,0% | no duty cycle |
| 0,5– 100,0% | fan level |

Presetting: no duty cycle {0,30,120,0}

**SCPThvacType** — Hvac control type (const and device specific)

Type: SNVT_hvac_type (SCPT #169)
Value: Generic regulator {HVT_GENERIC}

`UCPTairQual Mode` — Selection of air quality control

Type: enumerated (UCPT #284)

Range of values:
- 0 OFF — No air quality control
- 1 OCC — occupancy depended air quality control
- 2 IAQ — continuous air quality control

Presetting: occupancy depended air quality control {1}

`UCPTairQual Delay` — Follow-up time for air quality control after the room occupation changes to unoccupied

Type: SNVT_time_sec (UCPT #318)

Range of values:
- 0 — No follow-up time
- 1 – 6553 — Seconds

Presetting: No follow-up time {0}

`UCPTairQual Params2` — Air quality position range and regulation parameter

Type: Structured

Range of values:
*.v_min / .v_max*
0,0% - 100,0%
with: *.v_min* < *.v_max*
*.proportional_gain*
100 ppm – 2000 ppm
*.integration_time*
- 1 – 360 — Minutes (PI-reg.)
- 65535 — P-regulation

Presetting:
Minimum position 20%
Maximum position 100%
Proportional gain 500 ppm
P-regulation
{40, 200, 500, 65535}

`UCPTecon Params` — Parameters for outdoor air damper control

Type: structured

Range of values:
*.econ_setpt*
SNVT_temp_p
starting temperature of o. air damper control, max. position (100%) is reached at comfort heating setpoint
*.econ_min*
0,5-100,0%
minimum position of outd. air damper, used also at temperatures lower than .econ_setpt, at temperatures lower the frost alert temperature the damper is closed (0%)

Presetting: start at 16°C and minimum position is 0% {1600, 0}

`UCPTnight PurgeMode` — Selection of actuators used for night purge

Type: enumerated (UCPT #286)

Range of values:
- 0 OFF — No night purge
- 1 DAMPER — via central air condition
- 2 DAMPER_FAN — via fancoil with outdoor air damper

Presetting: No night purge {0}

`UCPTdelta TempNightP` — Minimum temperature difference of outdoor air temp for night purge via outdoor air

Type: SNVT_temp_p (UCPT #282)

Range of values: 0,50 K – 10,00 K

Presetting: 2,00 K {200}

`UCPTdischarge Config` — Regulation parameters for value reduction depending on discharge air temperature

Type: Structured

Range of values:
*.heat_limit / .cool_limit*
SNVT_temp_p
*.proportional_gain*
SNVT_temp_p

Presetting: Over 40 °C reduction of heating values and under 15°C reduction of cooling value with full reduction on 10 K over/under run
{4000, 1500, 1000}

`SCPTmaxSend Time (States)` — Maximum period of time between sending two telegrams on one of the status outputs

Type: SNVT_time_sec (SCPT #49)

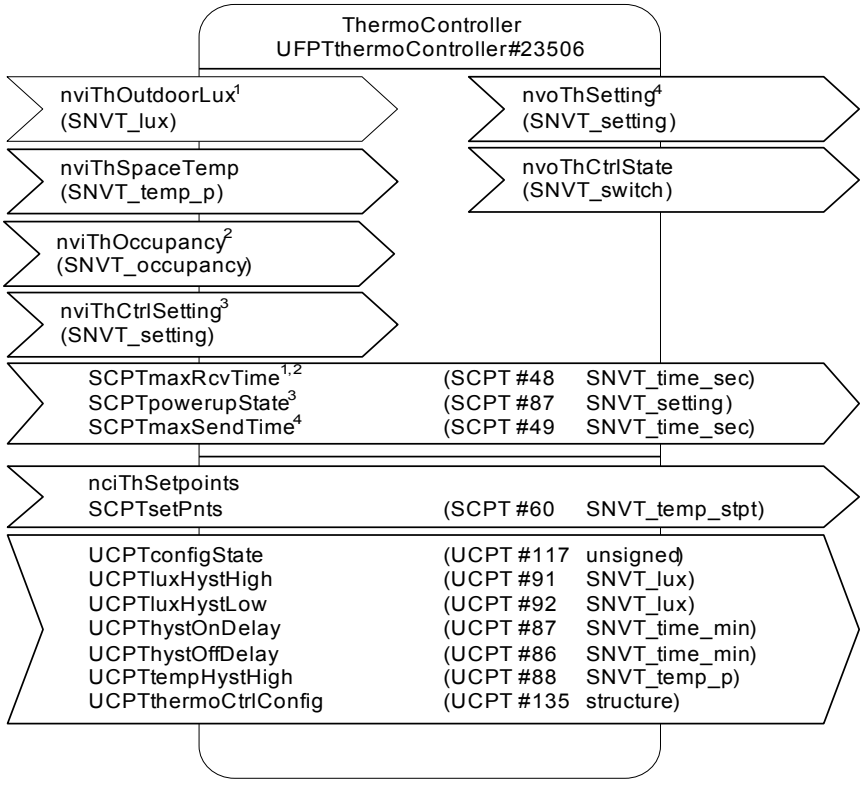
Validity: One shared time for:
- *nvoScUnitStatus*
- *nvoScEffectOcc*
- *nvoScSync*
- *nvoScSpaceTemp*
- *nvoScEffDewPoint*
- *nvoScEnergyHdOff*

Range of values:
- 0 — No periodic resend
- 1 - 6553 — Seconds

Presetting: no periodic resend {0}

## 7.2.14 Thermal control

### Network interface




### Network variables

`nviThOutdoorLux` Outdoor brightness

Type: SNVT_lux
Range of values: 0 – 65535 lux
Presetting: 0 lux

`nviThSpaceTemp` Room temperature

Type: SNVT_temp_p
Range of values: 0,00°C – 60,00°C
Presetting: 20,00°C {2000}

`nviThCtrlSetting` Control input for activation and deactivation of the controller

Type: SNVT_setting
Range of values: *.state*
-1 SET_NUL Automatic
0 SET_OFF Deactivation
1 SET_ON Activation
Presetting: *SCPTpowerupState*

`nviThOccupancy` Actual room occupancy

Type: SNVT_occupancy
Range of values: 0 OC_OCCUPIED
Room occupied
1 OC_UNOCCUPIED
Room unoccupied
2 OC_BYPASS
Comfort extension
3 OC_STANDBY
Room in standby
Presetting: Room unoccupied {1}

`nvoThCtrlState` Feedback of controller activity

Type: SNVT_switch
Range of values: { 0, 0} Thermal control inactive
{200, 1} Thermal control active
Presetting: Inactive {0, 0}

`nvoThSetting` Sunblind operating commands to support heating/cooling

Type: SNVT_setting

Range of values: {SET_NUL, 0.0, 0.00}
No valid command/ priority reset
And values from *UCPTthermoCtrlConfig*

Presetting: No valid command {SET_NUL, 0.0, 0.00}

## Configuration parameters

### Parametrization of the network variables

`SCPTmax RcvTime` Maximum time for receiving sensor values on *nviThOccupancy,* used to combine telegramms from different sources with an OR-function

Type: SNVT_time_sec (SCPT #48)

Range of values: 0 – 6553 Seconds

Presetting: 0 Seconds {0}

`SCPTmaxSend Time` Maximum period of time between sending two telegrams on *nvoThSetting*

Type: SNVT_time_sec (SCPT #49)

Range of values: 0 No periodic re-sent
1 - 6553 Seconds

Presetting: No periodic re-sent {0}

`SCPTpowerUp State` Status of the controller after power restoration

Type: SNVT_setting

Range of values: See *nviThCtrlSetting*

Presetting: Automatic {SET_NUL, 0.0, 0.00}

### Parametrization of the object

`UCPTconfig State` Only used by Plug-in

Type: unsigned short (UCPT #195)

Range of values: 0 - 255

Presetting: 255 {255}

`SCPTsetPnts` Setpoints for heat/cool support, can be changed via *nciThSetpoints*

Type: SNVT_temp_setpt

Range of values: Only .occupied_x relevant, each element: 0,00°C – 50,00°C

Presetting: Comfort cool setpoint 23°C
Comfort heat setpoint 21°C
{2300, 0, 0, 2100, 0, 0}

`UCPTluxHyst High` Activation treshold value of light intensity

Type: SNVT_lux

Range of values: 0 - 65535 lux

Presetting: 20000 lux {20000}

`UCPTluxHyst Low` Deactivation treshold value of light intensity

Type: SNVT_lux

Range of values: 0 - 65535 lux

Presetting: 5000 lux {5000}

`UCPThystOn Delay` Delay on activation

Type: SNVT_time_min

Range of values: 0 - 360 Minutes

Presetting: 10 Minutes {10}

`UCPThystOff Delay` Delay on deactivation

Type: SNVT_time_min
Range of values: 0 - 360 Minutes
Presetting: 20 Minutes {20}

`UCPTtempHyst` Temperature hysteresis

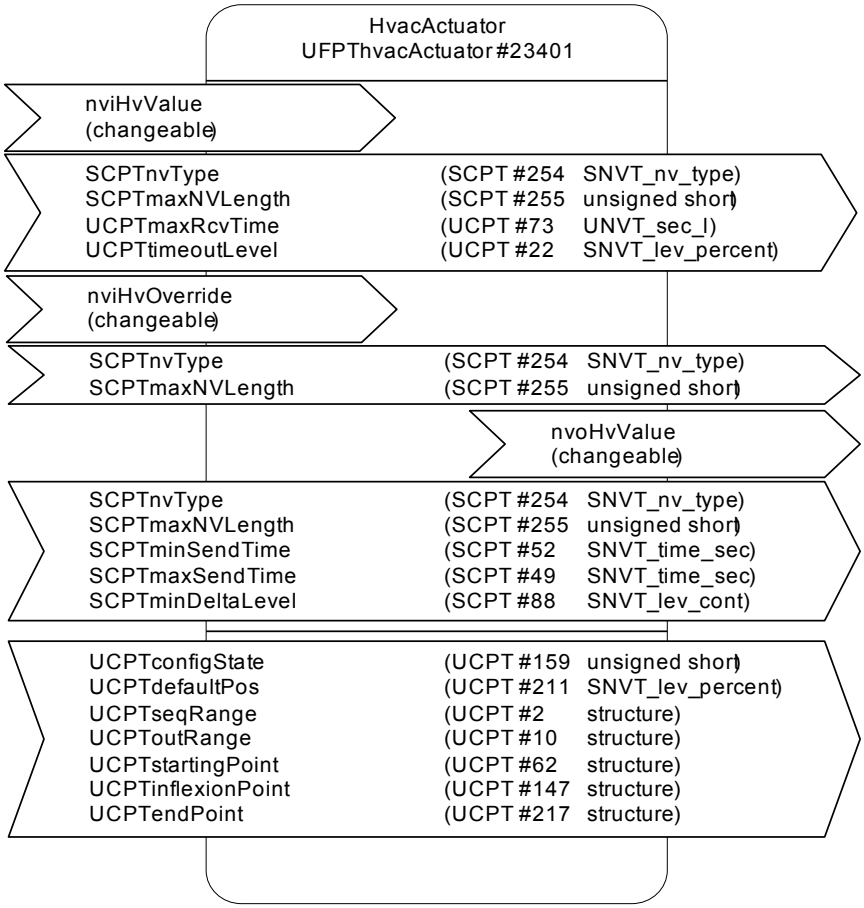
Type: SNVT_temp_p
Range of values: 0,5 K - 5,00 K
Presetting: 1 K {100}

`UCPTthermo CtrlConfig` Sunblind operating commands

Type: structured
Range of values: Each element: SNVT_setting
Presetting: Top end position for heat support, bottom end position with closed slat for cool support and priority reset on deactivation {{SET_STATE,0,0}, {SET_STATE,200,-2250}, {SET_NUL,0,0}}

## 7.2.15 HVAC actuator

### Network interface




### Network variables

`nviHvValue` Regulation value input

Type: Changeable
Type presetting: SNVT_lev_percent
Range of values: Depends on nv-type
Presetting: 0/OFF {0.00}
Heartbeat control: Adjustable via *SCPTmaxRcvTime*

`nviHvOverride` Override input

Type: Changeable
Type presetting: SNVT_lev_percent
Range of values: Depends on nv-type
Presetting: 0/OFF {0.00}

`nvoHvValue` Feedback output of the actuator

Type: Changeable
Type presetting: SNVT_lev_percent
Range of values: Depends on nv-type
Presetting: Depends on nv-type
Transmission: Adjustable via *SCPTminSendTime*, *SCPTmaxSendTime*, *SCPTminDeltaLevel*

# Configuration properties

## Parametrization of network variables

`SCPTnvType` Type definition of the network variable
Type: Structure (SCPT #254)
Range of values: Supported nv types
Presetting: SNVT_lev_percent {0,0,0,0,0,0,0,0,81, NVT_SIGNED_LONG,2, 5L,-3L,0L}

`SCPTmax NVLength` Maximum length of the network variable (read only)
Type: unsigned short (SCPT #255)
Presetting: 2 Byte {2}

## Parametrization of input variables

`UCPTmax RcvTime` Maximum receive time for messages
Type: UNVT_sec_l (UCPT #48)
Range of values: 0 no timeout
1 ... 65535 Seconds timeout
Presetting: No timeout {0}

`UCPTtimeout Level` Command for transmission failure
Type: SNVT_lev_percent
Range of values: -100 - 100% timeout value
Presetting: off (0)

## Parametrization of output variable

`SCPTmin SendTime` Minimum time between two telegrams
Type: SNVT_time_sec (SCPT #52)
Range of values: 0,0 ... 6553,5 Seconds
Presetting: 0,1 Seconds {1}

`SCPTminDelta Level` Absolute minimum change on value
Type: SNVT_lev_percent (SCPT #88)
Range of values: 0,0% ... 20,0%
Presetting: 0,0% {0}

`SCPTmax SendTime` Maximum time between two telegrams
Type: SNVT_time_sec (SCPT #49)
Range of values: 0,0 ... 6553,5 Seconds
Presetting: 0,0 Seconds {0}

## Parametrization of functional object

`UCPTconfig State` Only used by Plug-in
Type: unsigned short (UCPT #195)

`UCPTdefault Pos` Control value / movement command on voltage recovery
Type: SNVT_lev_percent
Range of values: -100 - 100% value
163,7% no default
Presetting: off 0,0% {0}

`UCPToutRange` Limit of the output range
Type: structure (UCPT #10)
Structure:
```
typedef struct{
  SNVT_lev_percent min_output;
  SNVT_lev_percent max_output;
}
```
Range of values: *.min_output / .max_output*
-100,00% ... 100,00 %
Presetting: 0,00% - 100%
{0 20000}

`UCPTseqRange` Valid input value range (sequence control)

Type: structure (UCPT #2)

Structure:
```
typedef struct{
  SNVT_lev_percent min_range;
  SNVT_lev_percent max_range;
  unsigned use_on_auto :1;
  unsigned  use_on_man :1;
  unsigned  use_on_ovrd1 :1;
  unsigned  use_on_weather :1;
  unsigned  use_on_ovrd2 :1;
  unsigned  use_on_safety :1;
}
```

Range of values: *.min_range / .max_range*
-100,00% ... 100,00%
*.use_on_auto* (nviHvValue)
*.use_on_man* (nviHvOver.)
0 No sequence control
1 Use min_range and max_range

Presetting: No sequence control {0 20000 0 0 0 0 0 0}

`UCPTstarting Point` Starting point for the line-arisation of output values

Type: structure

Structure:
```
typedef struct{
  SNVT_lev_percent      in_value;
  SNVT_lev_percent      out_value;
}
```

Range of values: *.in_value/.out_value*

| | |
|---|---|
| -100 - 100% | start values |
| both 0% | normal start |
| both -100% | normal start for 6/3-way valves |

Presetting: normal start {0, 0}

`UCPTinflexion Point` Inflexion point for the line-arisation of output values

Type: structure

Structure:
```
typedef struct{
  SNVT_lev_percent      in_value;
  SNVT_lev_percent      out_value;
}
```

Range of values: *.in_value/.out_value*
-100 - 100% inflexion value
if no inflexion needed set values to endpoint values

Presetting: no inflexion {200, 200}

`UCPTendPoint` Endpoint for the line-arisation of output values

Type: structure

Structure:
```
typedef struct{
  SNVT_lev_percent      in_value;
  SNVT_lev_percent      out_value;
}
```

Range of values: *.in_value/.out_value*

| | |
|---|---|
| -100 - 100% | end value |
| both 100% | normal end |

Presetting: normal end {200, 200}

# 8. spega e.control Plug-ins

To ease up the configuration and commissioning of our components spega offers comfortable LNS plug-ins.

## 8.1. Installation

The spega e.control plug-in suite setup is available for download from our homepage www.spega.de or our e.control CD.

Run the file "econtrol_PlugIns.exe" and follow the instructions on the screen. Leave all components selected to install all available plug-ins.

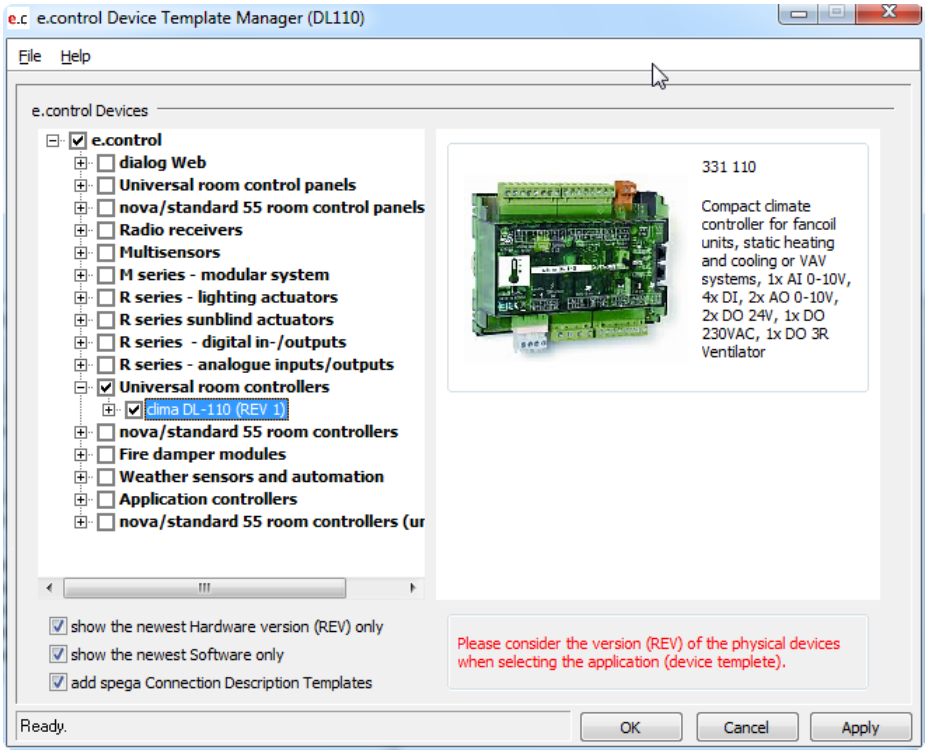
For the first time, web-based plug-ins are available for the clima DL-110 and these are displayed in an internet browser. The additional components required for this are installed when a plug-in is started for the first time.

The Microsoft components required are downloaded directly from the internet at the same time.

Internet Explorer 8 (or higher) or Mozilla Firefox 20 (or higher) are required for the plug-ins to be displayed correctly. We recommend that you always use the latest version.

## 8.2. Preparing to use the plug-ins

Once the installation has been successfully completed, the plug-in with the name "spega e.control device template manager" must be registered in the LNS tool used. This project plug-in will then be available under the item "Add spega e.control device templates".




All spega components and their applications are sorted by category within the tree structure of the e.control device template manager. A product photo with a brief description is shown

in the top right-hand section. There is also a brief description of the selected application with the option of displaying the relevant software description.

If older devices or applications are required, these will appear when the "Show only current device versions" and/or "Show only current software" filter(s) is/are removed. If the device or application you are looking for is still not listed, more information is available on our homepage.

In cases where "Create spega connection description templates" is selected, the current connection parameter templates and a brief description will be created in the LNS project.

By selecting the respective applications for the spega devices being used in the project, these can be transferred to the LNS database. The device templates selected are created and all available plug-ins registered. The device and object plug-ins are now available to support configuration and commissioning.

## 8.3. Device and object plug-ins

Both a device plug-in and an object plug-in are available for spega components.

All device-related settings, such as the reading of radio sensors or the configuration of connected consumers, are applied using the device plug-in.

The object plug-ins allow the functionality of the corresponding LonMark object to be easily configured.

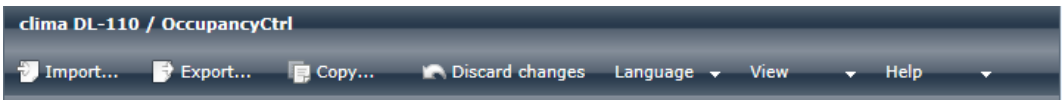
For the first time, web-based plug-ins are available for the clima DL-110 and these are displayed in an internet browser. An additional program for this – the e.control Config Server – must be run whilst the plug-ins are being used. It starts automatically when a plug-in is opened.

## 8.4. Service of the device plug-ins

Operation of the spega e.control plug-ins is simple and standardised. The menu items and buttons are described below. In addition, other control elements may be available and are explained in the relevant documentation.

### Menu bar

The following items may be available on the menu bar:




### Import

The "Import" function allows you to load a stored configuration.

The file can be loaded from any directory. The plug-in checks whether the chosen file has a valid configuration.

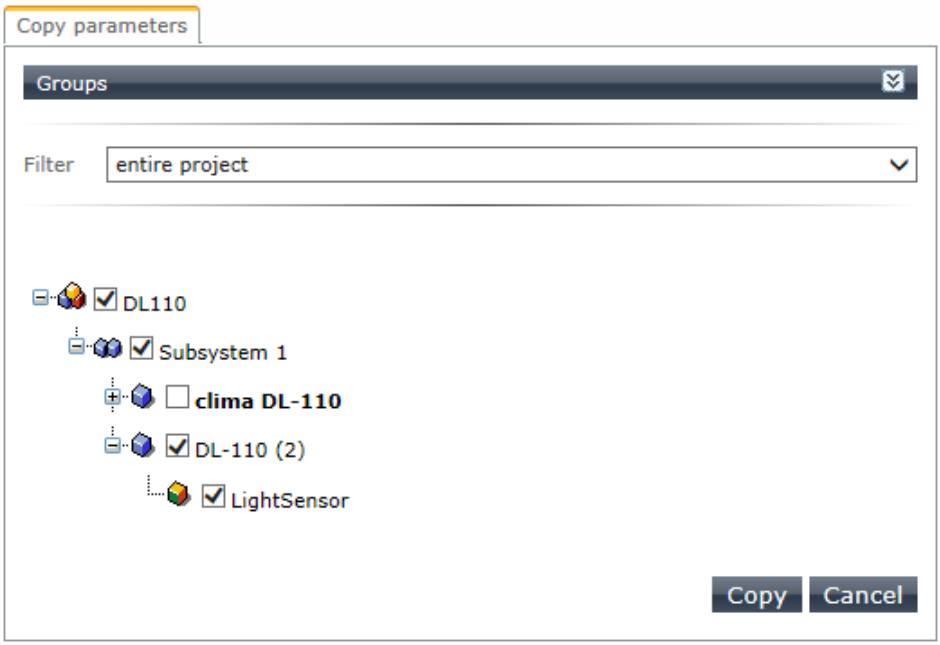
### Export

The "Export" function allows you to save the configuration in a file.

The file is saved either in the web browser's default directory ("Save") or in any other directory ("Save as").

## Copy

The "Copy" function allows you to transfer the configuration to other compatible devices or objects. This function only allows the configuration to be transferred within the project. If it is to be applied to another project, the "Import" and "Export" functions should be used.




If you select the "Cancel" function, the window is closed without the configuration being transferred to other devices.

## Discard changes

With the "Discard changes" function, changes which have been made but not yet saved to the database via the "Apply" function are discarded. The web plug-in reads the values from the database and displays these once again.

## Language

Here you can select the language of your choice.

## View

Here you can switch between configuration, commissioning and monitoring.

### Configuration

In this view you can select the desired configuration.

### Commissioning

In this view you can work on e.g. sensor calibration.

### Monitoring

The network variables available are displayed here with their current value.

### Help

You can access the manual and information on devices and plug-ins here.

#### Manual

The manual can be accessed here.

#### Device information

Useful device information is shown here.

Firmware, hardware and software versions are read from the device. This information is available only if the current device is responsive.

## Buttons

The buttons at the bottom of the window are used for writing any parameters which have been changed into the LNS database and/or closing the plug-in.


| | |
|---|---|
| *Status display* | The status display can be found on the left next to the buttons. Current operations are shown here in plain text. |
| *OK* | If settings in the plug-in have been changed, these are written into the LNS database. The plug-in is then closed. |
| *Cancel* | The plug-in is closed. Any settings which have been changed are not written into the LNS database. |
| *Apply* | Any settings which have been changed are written into the LNS database. |

# 9. Appendix

## 9.1. Support

The information given in this manual was carefully compiled. Should you have any further questions regarding this product, please contact:

spega - spelsberg gebäudeautomation gmbh
zechenstr. 70
47443 moers
Germany
fon: +49 (2841) 88049-70
fax: +49 (2841) 88049-49
e-mail: support@spega.de

## 9.2. Glossary

| | |
|---|---|
| AC | alternating current |
| ASK | amplitude shift keying |
| DC | direct current |
| DECT | digital enhanced cordless telecommunications |
| FTT | free topology transceiver |
| functional object | functional component of an device application |
| GSM | global system for mobile communications |
| hex | hexadecimal |
| ID | identification number |
| LAN | local area network |
| LED | light emitting diode |
| LNS | LonWorks network services |
| LON | local operating network |
| LonMark™ | International organization with the intention to advance and bring forward the LON technology |
| Neuron-ID | individual, definite 48-bit device number |
| NV | network variable |
| Plug-in | Tool to configure, commission and log components of applications |

| | |
|---|---|
| Resource Files | files including definitions of interface components which can be used from network management tools to display and interpret the data properly |
| SCPT | standard configuration property type |
| SNVT | standard network variable type |
| SMI | standard motor interface |
| SMI-LoVo | standard motor interface for low voltage motors (24VDC) |
| TP | twisted pair |
| UCPT | user configuration property type |
| UNVT | user network variable type |