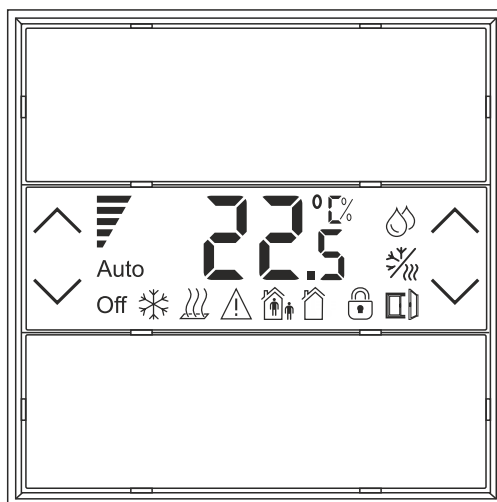


# EPHEBUS KNX ROOM CONTROLLER

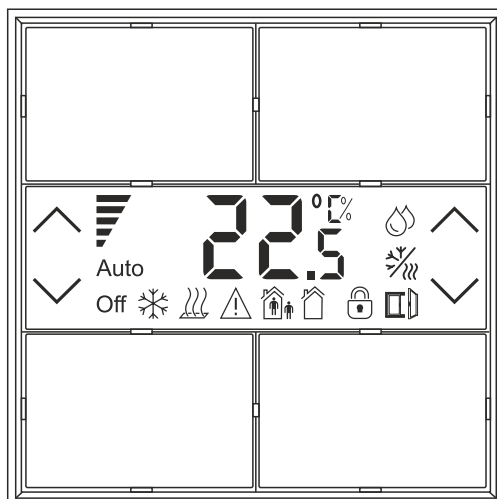
## User Manual

## ▶ EPHESUS ROOM CONTROLLER - 2 GANG



LXT-202-ZXX

## ▶ EPHESUS ROOM CONTROLLER - 4 GANG



LXT-204-ZXX

## TECHNICAL DATA

|                         |  |                                   |
|-------------------------|--|-----------------------------------|
| Type of protection      | IP 20                                      | EN 60529                          |
| Safety class            | II   | EN 60664                          |
| Models                  | 2 Gang                                     | LXT-202-XXX                       |
|                         | 4 Gang                                     | LXT-204-XXX                       |
| Product Detail          | Thermostat with 4 push button              | 2 Gang                            |
|                         | Thermostat with 8 push button              | 4 Gang                            |
| Power Supply            | Voltage                                    | KNX Bus system                    |
|                         | Current consumption                        | < 20 mA                           |
| External Supply         | -  |                                   |
| Connections             | KNX Bus connection terminal                | 0,8 mm <sup>2</sup> Ø, solid core |
| Modes                   | Outside, Inside, Comfort, Standby, Economy |                                   |
| Temperature Measurement | Range                                      | -5 C° / + 45 C°                   |
|                         | Tolerance                                  | - + 0,2 C°                        |
| Humidity Measurement    | Range                                      | %0 - %99                          |
|                         | Tolerance                                  | - + %2                            |
| Luminosity Measurement  | Range                                      | 0,01 Lux - 64K Lux                |
|                         | Tolerance                                  | - + 0,2 Lux                       |
| Installation            | 60mm x 60mm standart switch junction       |                                   |
| Operating Element       | Programming led and button                 |                                   |
| Temperature range       | Operation                                  | -5°C / +45°C                      |
|                         | Storage                                    | -20°C / +70°C                     |
| Humidity                | Maximum air humidity                       | 85% no moisture condensation      |
| Flammability            | Non-flammable product                      |                                   |
| Dimensions              | 92 x 92 x 33,4mm                           |                                   |
| Weight                  | 152 gr                                     |                                   |
| Warranty                | 2 Years                                    |                                   |
| Standarts               | EN 50491                                   |                                   |
|                         | EN 61000                                   |                                   |
| Certification           | KNX Certified                              |                                   |

|     |  |   |
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## 1. PRESENTATION

### 1.1 DESCRIPTION OF THE DEVICE

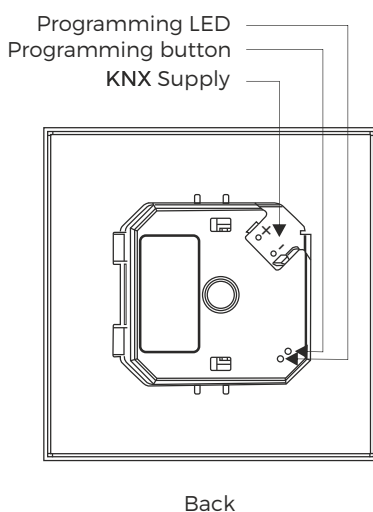
Ephesus Room Controller is a wall-mounted room controller for on/off switching loads, dimming of lighting devices, control of shutter and blind motor drives, doing scene controls or other programmable switching and control functions. This stylish device works as an electronic digital temperature controller for a room or a zone (consisting in a group of room or a whole) of a building and is part of the secondary regulation for heating and cooling. The room temperature controller was developed according to the KNX standard for use in systems of control of homes and buildings.

Via the integrated temperature/humidity and ambient sensors, the device can measure directly the room temperature value and luminosity value that can be used for control and regulation tasks of lighting, heating, cooling and ventilation. Furthermore, through the KNX bus line, the room controller receive temperature values from other bus devices. The integrated display visualizes a series of information concerning the room controller function. The device is provided with two side rockers which of one is on the right of the display and the other one is on the left that can be used for controlling the thermostat functions.

Ephesus Room Controller has 2 types: 2-Gang and 4-Gang. 2-Gang Ephesus Room Controller has 4 buttons and 4 status LEDs. On the other hand, 4-Gang Ephesus Room Controller has 8 buttons and 8 status LEDs.

### 1.2 PROGRAMMING

Programming button and LED are behind the device. The user can easily press the programming button when downloading. In this way, ETS5 downloading is completed.



**LXT- 20X - ZXX**

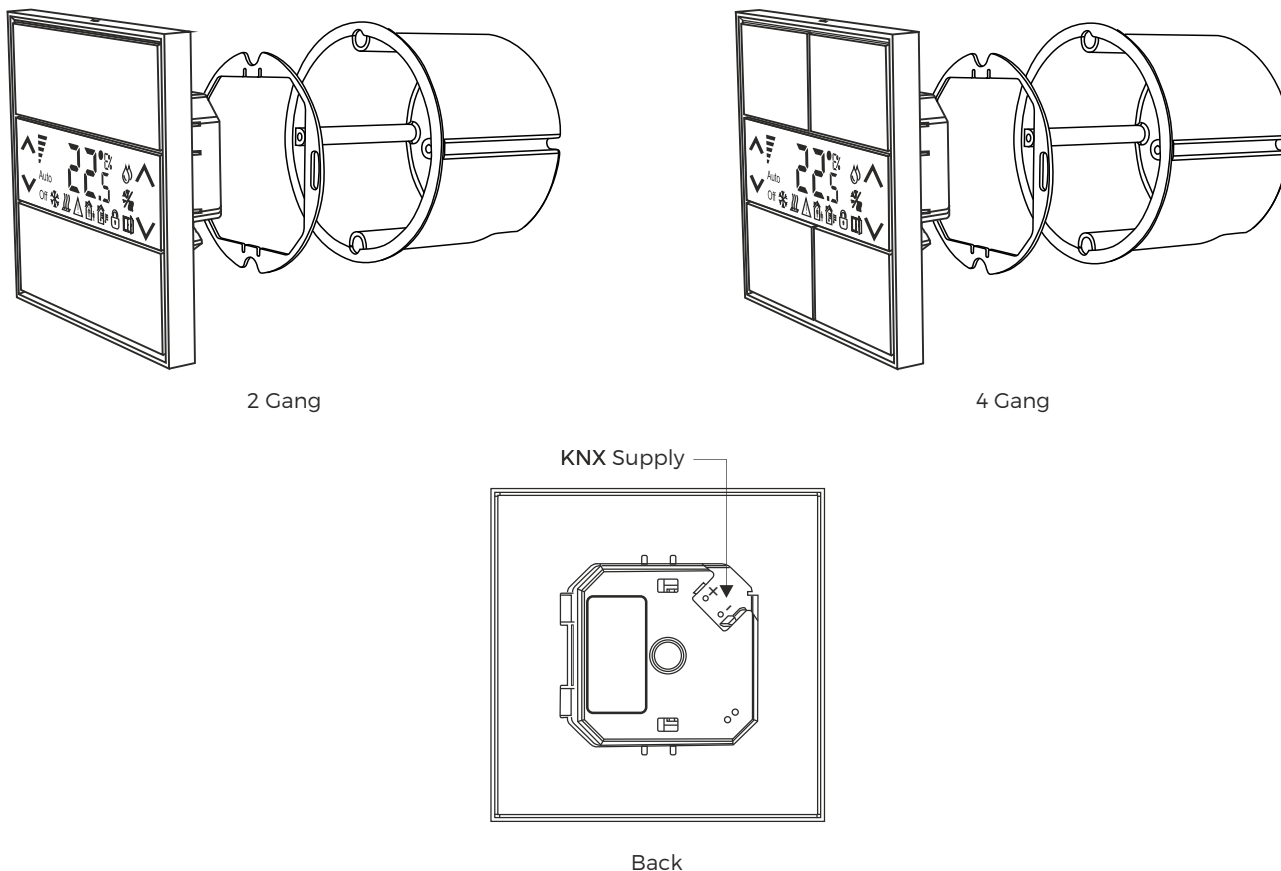
- Color Code
- Material Code
- Number of Gangs

| Material Code |       |
|---------------|-------|
| Z             | Zamac |

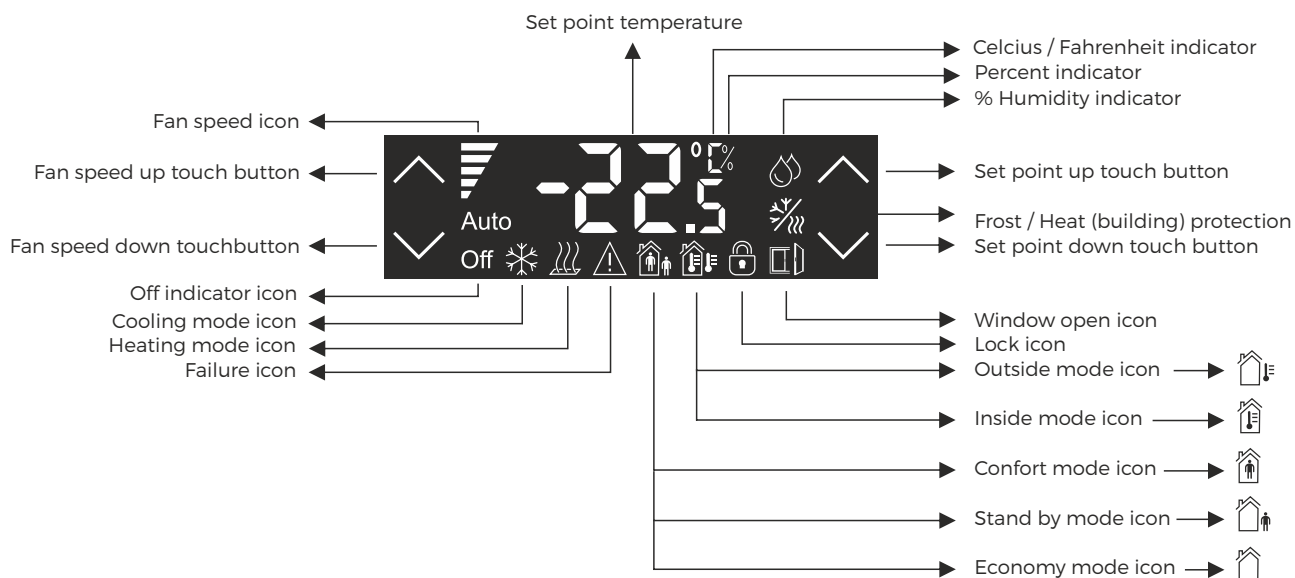
  

| Color Code |               |
|------------|---------------|
| AN         | Anthracite    |
| WH         | White         |
| MG         | Mat Gold      |
| BR         | Bronze        |
| BS         | Brushed Steel |
| CP         | Copper        |
| OC         | Old Copper    |
| RN         | Ruthenium     |
| RD         | Red           |
| BL         | Blue          |
| GR         | Green         |
| OR         | Orange        |

## 1.4 MOUNTING AND CABLE CONNECTION



## 1.5 DISPLAY SPECIFICATION



## 1.6 SAFETY INSTRUCTIONS

- Electrical equipment must be installed and suited only by qualified electricians.
- Observe the current accident prevention regulations.
- Failure to observe any of the installation instructions may cause damage to the device and result in fire and other hazards.
- Before working on the device or before replacing any connected loads, disconnect the supply voltage (by cutting out the circuit breaker) to avoid the risk of an electric shock.
- The switching actuator is not suited for safe disconnection of the mains.
- Do not connect mains voltage and SELV/PELV circuits to the same switching actuator.
- Do not connect three-phase AC motors to the actuator.
- Make sure during the installation that there is always sufficient insulation between the mains voltage and the bus.
- Do not open the device and do not use it outside the scope of the technical specifications.

## 1.7 INSTALLATION

I-Luxus Ephesus Room Controller has degree of protection IP20, and is suitable for use in dry interior rooms. The installation of the device requires the following step below:

- This device is only mounted on a standard round wall flush mounting box with 60mm.
- Fix the metallic plate with the screws supplied on a wall box with suitable fixing holes.
- The recommended to install the device at a height is 150 cm.
- Connect to the bus cable.
- At the moment, the device is ready for commissioning. Download physical address.
- Install the device on the metallic plate.

## 1.7 INSTALLATION

Ephesus Room Controller is a multidirectional device that includes diverse functions. Through integrated buttons, 7 main functions below can be carried out:

- Switching
- Dimming
- Blind / Shutter
- Scene
- Setpoint temperature
- Operating mode setting
- Fan control

Ephesus Room Controller has 2 integrated sensors:

- Temperature&Humidity Sensor
- Ambient Lighting Sensor

Ephesus Room Controller is used for HVAC operations:

- Heating
- Cooling
- Heating&Cooling

Actually, so many functions like below can be carried out by Ephesus Room Controller:

- Displaying environment humidity and temperature on the screen
- 4 or 8 integrated push buttons (for 2 or 4 gang models)
- 4 or 8 status LEDs on the push buttons for feedback of the operations (for 2 or 4 Gang models)
- Switching, dimming, blind/shutter, scene, setpoint temperature, operating mode setting and fan

control functions are available with push buttons

- Temperature measuring with possibly of sending the values of the bus
- 2-points (On/Off) or proportional (PWM or continuous) room temperature regulation
- Setting the fan speed with up and down touch button
- Seasonal modes: Heating and cooling with local or via bus switch-over
- Setting the setpoint value with up and down touch button
- Operating modes: Comfort, standby, night and frost/heat protection with setpoint value
- Manual or automatic control of a fan-coil unit with 2-pipes or 4-pipes connection
- Automatic switching of the operating mode when window opening is detected

### 3. ETS PARAMETERS AND OBJECTS

#### 3.1 Push Button

Ephesus Room Controller has 4 or 8 integrated push buttons (for 2-Gang and 4-Gang models).

These push buttons are usable for 7 main functions:

- Switching
- Dimming
- Blind / Shutter
- Scene
- Setpoint temperature
- Operating mode setting
- Fan control

Depending on the settings configured in the push button section, the 7 main functions are generated. After each operation a telegram is sent to KNX bus line. The telegrams are generated based on the configured settings.

##### 3.1.1 Switching

|                   |             |
|-------------------|-------------|
| Button function   | Switching ▼ |
| Switching type    | 1Bit ▼      |
| Switching value   | OFF ▼       |
|                   |             |
| Led configuration | Always on ▼ |

This function is used to perform the switching operation. Depending on the settings configured in the switching process, when the button is pressed, the ON, OFF or Toggle values are generated. After each operation a telegram is sent to KNX bus line. Telegram is generated based on the configured settings. Furthermore, user can configure switching type "1Bit, 2Bit Priority, 1Byte Value or 1Byte Percent". When the related push button pressed, the value configured on the section 'Switching type' is sent to the bus line.



As the 'Switching value' is configured 'Toggle', each time the button is pressed, the value "1" or "0" value is sent to the bus line via the object of the push button. If first time the push button is pressed and the "1" value is sent, when the button pressed next time the value "0" is sent. Each press to the push button the output value is always changed to "1" or "0" and they will be sent to bus line. The current values of the object can be updated by the devices at the same KNX bus line.

Ephesus Room Controller has 4 and 8 status LEDs for 2-Gang and 4-Gang types. The status LEDs act depend on the choice of the 'Led configuration' and according to the related push button.

### 3.1.1.1 Parameters

| PARAMETER         | DESCRIPTION  | VALUES  |
|-------------------|--|---|
| Button function   | 'Switching' parameter enables to send '1Bit, 2Bit Priority, 1Byte Value or 1Byte Percent' values to the bus line. '1Bit' especially is used for lighting ON, OFF or Toggle operations. '2Bit Priority' especially used 'Forced Operation'                        | Switching<br>Dimming<br>Blind / Shutter<br>Scene<br>Setpoint temperature<br>Operating mode setting<br>Fan control |
| Switching type    | 1Bit: 1Bit value (0,1) is sent to the bus line<br>2Bit Priority: 2Bit value(0,1,2,3) is sent to the bus line<br>1Byte Value: 1Byte value(0..255) is sent to the bus line<br>1Byte Percent: Percentage value (0..100%) is sent to the bus line                    | 1Bit2<br>Bit Priority<br>1Byte Value<br>1Byte Percent   |
| Switching value   | OFF: '0' value is sent to the bus line<br>ON: '1' value is sent to the bus line<br>Toggle: '1' and '0' values are sent consecutively for each press  | OFF<br>ON<br>Toggle   |
| Led configuration | Always On: The related status LED is always On<br>Always Off: The related status LED is always Off<br>On press / On release: When button pressed, LED is On. When released, LED is Off<br>Led status object: Depending on the button switching Led become active | Always On<br>Always Off<br>On press / On release<br>Led status object   |

### 3.1.1.2 Objects

| OBJECT NAME        | FUNCTION   | TYPE  | FLAG  |
|--------------------|------------|-------|-------|
| Button X Switching | 1:ON 0:OFF | 1-bit | CRWTU |

Via this object, switching telegram is sent when is connected to a related group adress

|                    |            |       |       |
|--------------------|------------|-------|-------|
| Button X Switching | 0, 1, 2, 3 | 2-bit | CRWTU |
|--------------------|------------|-------|-------|

This object is only visible when 'Switching type' is '2Bit Priority'. Via this object, 2Bit value is sent to the bus line

|                    |        |        |       |
|--------------------|--------|--------|-------|
| Button X Switching | 0..255 | 1 byte | CRWTU |
|--------------------|--------|--------|-------|

This object is only visible when 'Switching type' is '1Byte Value'. Via this object, 1Byte value 0 to 255 is sent to the bus line

|                    |         |       |       |
|--------------------|---------|-------|-------|
| Button X Switching | 0..100% | 1-bit | CRWTU |
|--------------------|---------|-------|-------|

This object is only visible when 'Switching type' is '1Byte Percent'. Via this object, 1Byte percentage value 0 to 100 (%) is sent to the bus line

| OBJECT NAME         | FUNCTION   | TYPE  | FLAG  |
|---------------------|------------|-------|-------|
| Button X Led status | 1:ON 0:OFF | 1-bit | CRWTU |

This object is only visible when the LED configuration parameter is selected as LED status object. It is possible to control the push button LED by configuration is done before

### 3.1.2 Dimming

Button function Dimming ▾

Dimming for long press  Brighter  Darker

Dimming for short press OFF ▾

---

Led configuration Always on ▾

Dimming function enables increasing or decreasing of lighting level. There are 2 different objects for each functions and the objects are controlled by push button pressing times. Pressing short time (less than 500ms) to the push button, ON or OFF value (1 bit) is sent via "switch" object. If the push button is pressed 500ms or longer, this action interpreted as a dimming function and value (4 bit) is sent via "dimming control" object. When the button is released after a long press, the "stop" telegram is sent to bus line and dimming control is over. Dimming control can be done by 2 buttons brighter/darker or 1 button toggle ON/OFF. Both brighter and darker cannot be realised by only one push button.

#### 3.1.2.1 Parameters

| PARAMETER                | DESCRIPTION   | VALUES  |
|--------------------------|---|---|
| Button function          | 'This parameter enables 'Dimming' function which increases or decreases of lighting level   | Switching<br>Dimming<br>Blind / Shutter<br>Scene<br>Setpoint temperature<br>Operating mode setting<br>Fan control |
| Dimming for long press   | Brighter: When the push button is pressed 500 ms or longer, this parameter increases the lighting level.<br>Darker: When the push button is pressed 500 ms or longer, this parameter decreases the lighting level.  | Brighter<br>Darker  |
| Dimming short long press | OFF: When the push button is pressed less than 500ms, '0' value is sent to the bus line according to 1 bit 'switch' group object<br>ON: When the push button is pressed less than 500ms, '1' value is sent to the bus line according to 1 bit 'switch' group object<br>Toggle: When the push button is pressed less than 500ms, '1' and '0' values are sent consecutively for each press. | OFF<br>ON<br>Toggle   |

| PARAMETER         | DESCRIPTION   | VALUES  |
|-------------------|---|---|
| Led configuration | Always On: The related status LED is always On.<br>Always Off: The related status LED is always Off.<br>On press / On release: When button pressed, LED is On. When released, LED is Off.<br>Led status object: Depending on the button switching LED become active | Always On<br>Always Off<br>On press / On release<br><br>Led status object |

### 3.1.2.2 Objects

| OBJECT NAME      | FUNCTION   | TYPE  | FLAG  |
|------------------|------------|-------|-------|
| Button X Dimming | 1:ON 0:OFF | 1-bit | CRWTU |

Via this object, switching telegram for short press (less than 500ms) is sent when is connected to a related group adress

|                  |                         |       |       |
|------------------|-------------------------|-------|-------|
| Button X Dimming | 1-Step Up / 2-Step Down | 4-bit | CRWTU |
|------------------|-------------------------|-------|-------|

Via this object, dimming telegram for long press (500ms or longer) is sent when is connected to a related group adress

|                     |            |       |       |
|---------------------|------------|-------|-------|
| Button X Led status | 1:ON 0:OFF | 1 bit | CRWTU |
|---------------------|------------|-------|-------|

This object is only visible when the LED configuration parameter is selected as LED status object. It is possible to control the push button LED by configuration is done before

### 3.1.3 Blind / Shutter

Button function Blind / Shutter ▼

Blind operation for long&short press  UP  DOWN

Blind stop operation  Releasing  Short stroke

---

Led configuration Always on ▼

A shutter/blind circuit has 2 main functions; 'up / down' and 'step'.

Via 'up/down' function, up or down commands which configured as "Blind operation for long&short press" (long press: 500ms or longer; short press: less than 500ms) sends to the bus line.

Via 'step' function, for short press (less than 500ms) step or stop command sends to the bus line. When blind or shutter is stopping, by step function, it starts to move up or down which is configured. On the other hand, when blind or shutter is moving, by step function, it stops movement.

If user wants to control a shutter/blind motor drives, 2 buttons must be used for this option. If both buttons are configured, with long press action the shutter can be moved up or down and with short press action the movement stops or slat angle step movement can be configured. The minimum time to detect the long press action is 500ms. Every command controls the buttons defined as "Up" or "Down" via the "Blind operation for long&short press" parameter.

### 3.1.3.1 Parameters

| PARAMETER                            | DESCRIPTION   | VALUES  |
|--------------------------------------|---|---|
| Button function                      | This parameter enables 'Blind / Shutter' operations   | Switching<br>Dimming<br>Blind / Shutter<br>Scene<br>Setpoint temperature<br>Operating mode setting<br>Fan control |
| Blind operation for long&short press | This parameter determines the movement direction. UP: Shutter or Blind moves to UP. DOWN: Shutter or Blind moves to DOWN  | UP<br>DOWN  |
| Blind stop operation                 | This parameter determines how to stop movement.<br>Releasing: Shutter/Blind stops when pulled off the button.<br>Short stroke: Shutter/Blind stops when pressed the button.   | Releasing<br><br>Short stroke   |
| Led configuration                    | Always On: The related status LED is always On.<br>Always Off: The related status LED is always Off.<br>On press / On release: When button pressed, LED is On. When released, LED is Off.<br><br>Led status object: Depending on the button switching Led become active | Always On<br>Always Off<br><br>On press / On release<br><br>Led status object                                     |

### 3.1.3.2 Objects

| OBJECT NAME            | FUNCTION       | TYPE  | FLAG  |
|------------------------|----------------|-------|-------|
| Button X Blind/Shutter | 0: Up, 1: Down | 1 bit | CRWTU |

Via this object, up and down telegrams will be sent connected to related 1 bit group address

|                        |             |       |       |
|------------------------|-------------|-------|-------|
| Button X Blind/Shutter | 1:On, 2:Off | 1 bit | CRWTU |
|------------------------|-------------|-------|-------|

Via this object, stop telegram will be sent connected to related group address

|                     |            |       |       |
|---------------------|------------|-------|-------|
| Button X Led status | 1:ON 0:OFF | 1 bit | CRWTU |
|---------------------|------------|-------|-------|

This object is only visible when the LED configuration parameter is selected as LED status object. It is possible to control the push button LED by configuration is done before

### 3.1.4 Scene

|                                  |             |
|----------------------------------|-------------|
| Button function                  | Scenes ▼    |
| Scene Number ("0" for Deactive ) | 8 ▲▼        |
| <hr/>                            |             |
| Led configuration                | Always on ▼ |

The scene function is used to control many devices at the same time. Therefore, the scene function is used making pre-registration of their status with the push button which sends command via related group address. This feature allows to register a setting as scene and after a while, when the same settings or conditions are requested each devices can be activated only with 1 command instead of configure them separately.

This feature in the button, sends telegrams that contains "scene control" functions, via the "scene" object. Scene number between 1 and 64 can be selected via the related group address. The scene number that configured in the button must match the scene number configured on the parameters in other devices. Scene number (1 - 64) is used to run the scene using related object.

#### 3.1.4.1 Parameters

| PARAMETER                         | DESCRIPTION   | VALUES  |
|-----------------------------------|---|---|
| Button function                   | This parameter enables 'Scene' functions  | Switching<br>Dimming<br>Blind / Shutter<br>Scene<br>Setpoint temperature<br>Operating mode setting<br>Fan control |
| Scene number ("0" for Deactivate) | This parameter is used to give the scene number to the generated scene before   | 8 (0...64)  |
| Led configuration                 | Always On: The related status LED is always On.<br>Always Off: The related status LED is always Off.<br>On press / On release: When button pressed, LED is On. When released, LED is Off.<br>Led status object: Depending on the button switching Led become active | Always On<br>Always Off<br><br>On press / On release<br><br>Led status object                                     |

#### 3.1.4.2 Objects

| OBJECT NAME    | FUNCTION  | TYPE   | FLAG  |
|----------------|-----------|--------|-------|
| Button X Scene | 1-64: Run | 1 byte | CRWTU |

Via this object, scene telegram will be sent connected to related 1 byte group address

|                     |            |       |       |
|---------------------|------------|-------|-------|
| Button X Led status | 1:ON 0:OFF | 1-bit | CRWTU |
|---------------------|------------|-------|-------|

This object is only visible when the LED configuration parameter is selected as LED status object. It is possible to control the push button LED by configuration is done before

### 3.1.5 Setpoint Temperature

|                           |  |
|---------------------------|--|
| Button function           | Setpoint temperature   |
| Modification by pressing  | <input type="radio"/> Increase one step <input checked="" type="radio"/> Decrease one step |
| Step for setpoint control | 0.5K   |
| Led configuration         | Always on  |

Ephesus Room Controller has LCD Display which shows ambient temperature and setpoint temperature. Setpoint temperature is set by user on the touch buttons on the right side of the LCD display. This parameter is used, when user want to change or set the setpoint temperature value by a push button on the Ephesus Room Controller. This parameter assigns the push button for setpoint temperature setting.

#### 3.1.5.1 Parameters

| PARAMETER                 | DESCRIPTION  | VALUES  |
|---------------------------|--|---|
| Button function           | This parameter enables 'Setpoint temperature' function   | Switching<br>Dimming<br>Blind / Shutter<br>Scene<br>Setpoint temperature<br>Operating mode setting<br>Fan control |
| Modification by pressing  | Increase one step: This parameter increases one step -which is configured on 'Step for setpoint control'- the setpoint temperature value<br>Decrease one step: This parameter decreases one step -which is configured on 'Step for setpoint control'- the setpoint temperature value | Increase one step<br><br>Decrease one step  |
| Step for setpoint control | This parameter determines the 'one step' value to change the setpoint temperature  | 0.1K<br>0.2K<br>0.5K<br>1.0K  |
| Led configuration         | Always On: The related status LED is always On.<br>Always Off: The related status LED is always Off.<br>On press / On release: When button pressed, LED is On. When released, LED is Off.<br>Led status object: Depending on the button switching Led become active                  | Always On<br>Always Off<br><br>On press / On release<br><br>Led status object                                     |

#### 3.1.5.1 Parameters

There is no any object. Because, this object is valid for only the Ephesus Room Controller. It is just a setting for the device. Any other device doesn't effect from it. So, no telegram is needed to send to the bus line.

### 3.1.6 Operating Mode Setting

|                                   |  |
|-----------------------------------|--|
| Button function                   | Operating mode setting   |
| Change operating mode by pressing | <input checked="" type="radio"/> Operating mode individual selection<br><input type="radio"/> Change between all operating modes |
| Set operating mode                | Comfort  |
| Led configuration                 | Always on  |

Ephesus Room Controller has 3 main operating modes for HVAC operations: Comfort, Standby and Economy. Also, Frost/Heat Protection option is selectable. All setpoint values for Comfort Mode, Standby Mode, Night Mode and Frost/Heat Protection operations can be configured on "Setpoint" section. This parameter is used to manage the thermostat with an external push button. To select the operating mode or to change the operating mode are enable with this parameter.

#### 3.1.6.1 Parameters

| PARAMETER                         | DESCRIPTION   | VALUES  |
|-----------------------------------|---|---|
| Button function                   | This parameter enables 'Operating mode setting' function  | Switching<br>Dimming<br>Blind / Shutter<br>Scene<br>Setpoint temperature<br>Operating mode setting<br>Fan control |
| Change operating mode by pressing | Operating mode individual selection: Via this parameter, the configured operating mode on the 'set operating mode' section become active<br>Change between all operating modes: Via this parameter, each time the push button is pressed, the device changes the operating mode | Operating mode individual selection<br><br>Change between all operating modes                                     |
| Set operating mode                | This parameter enables the individual mode selection  | Comfort<br>Standby<br>Night<br>Frost/Heat Protection  |
| Led configuration                 | Always On: The related status LED is always On<br>Always Off: The related status LED is always Off<br>On press / On release: When button pressed, LED is On. When released, LED is Off.<br>Led status object: Depending on the button switching Led become active               | Always On<br>Always Off<br>On press / On release<br>Led status object   |

#### 3.1.6.2 Objets

There is no any object. Because, this object is valid for only the Ephesus Room Controller. It is just a setting for the device. Any other device doesn't effect from it. So, no telegram is needed to send to the bus line.

temperature chosen from the following ones: value measured by the integrated sensor, value measured by a temperature sensor connected to one of the inputs of the device, value received via bus from another KNX device.

Ephesus Room Controller has two main values:

- The measured value by the integrated temperature sensor
- The measured value by an external temperature sensor

Temperature sensor for room controller

-> Internal sensor calibration

Send temperature value periodically  Disable  Enable

Internal threshold 1

Internal threshold 2

### 3.2.1 Parameters

| PARAMETER                              | DESCRIPTION  | VALUES  |
|--|--|---|
| Temperature sensor for room controller | By this parameter, connection type of the temperature sensor can be determined   | Internal<br>External<br>Internal&External   |
| Internal sensor calibration            | By this parameter, internal sensor calibration can be made   | 0 °C (-6 °C...+6°C)   |
| External sensor calibration            | By this parameter, external sensor calibration can be made   | 0 °C (-6 °C...+6°C)   |
| Weighting factor (Internal/External)   | By this parameter, which weighted average ratio will be chosen for the temperature values taken from internal and external sensors | 100% / 0%<br>90% / 10%<br>80% / 20%<br>70% / 30%<br>60% / 40%<br>50% / 50%<br>40% / 60%<br>30% / 70%<br>20% / 80%<br>10% / 90%<br>0% / 100% |
| Send temperature value periodically    | By this parameter, the measured internal temperature value is sent to the bus line   | Disable<br>Enable   |
| Sending interval for temperature (sec) | By this parameter, sending interval is chosen for the measured internal temperature value  | 10 (0...255)  |
| Internal threshold 1                   | By this parameter, first threshold value is determined   | 0 °C (-10 °C...+50°C)   |
| Internal threshold 2                   | By this parameter, second threshold value is determined  | 36 °C (-10 °C...+50°C)  |



### 3.2.2 Objects

| OBJECT NAME                 | FUNCTION         | TYPE   | FLAG  |
|-----------------------------|------------------|--------|-------|
| Actual internal temperature | Temperature (°C) | 2 byte | CRWTU |

This object provides to measure the actual internal temperature with internal sensor connected to related group address.

|                             |                  |        |       |
|-----------------------------|------------------|--------|-------|
| Actual external temperature | Temperature (°C) | 2 byte | CRWTU |
|-----------------------------|------------------|--------|-------|

This object provides to measure the actual internal temperature with external sensor connected to related group address.

|                                      |                  |        |       |
|--------------------------------------|------------------|--------|-------|
| Actual internal&external temperature | Temperature (°C) | 2 byte | CRWTU |
|--------------------------------------|------------------|--------|-------|

This object provides to measure at which ratio the actual internal temperature with external and internal sensors, via connected to related group address.

|                             |                  |        |       |
|-----------------------------|------------------|--------|-------|
| External temperature sensor | Temperature (°C) | 2 byte | CRWTU |
|-----------------------------|------------------|--------|-------|

This object provides to measure the actual internal temperature with external sensor, via connected to related group address.

|                                  |                 |       |       |
|----------------------------------|-----------------|-------|-------|
| Internal temperature threshold 1 | 1-True / 0False | 1 bit | CRWTU |
|----------------------------------|-----------------|-------|-------|

This object provides the use of the first internal threshold value, via connected to group address.

|                                  |                 |       |       |
|----------------------------------|-----------------|-------|-------|
| Internal temperature threshold 2 | 1-True / 0False | 1 bit | CRWTU |
|----------------------------------|-----------------|-------|-------|

This object provides the use of the second internal threshold value, via connected to related group address.

### 3.3 GENERAL PARAMETERS

|                        |   |
|------------------------|---|
| RS485 Slave ID Number  | <input type="text" value="1"/>  |
| Activate heart beat    | <input checked="" type="radio"/> Disable <input type="radio"/> Enable |
| Set leds intensity     | <input type="text" value="Via parameter"/>                            |
| -> Intensity (%)       | <input type="text" value="10"/>                                       |
| Room controller        | <input type="radio"/> Disable <input checked="" type="radio"/> Enable |
| Fan controller         | <input type="radio"/> Disable <input checked="" type="radio"/> Enable |
| Device control locking | <input checked="" type="radio"/> Disable <input type="radio"/> Enable |

This section includes general information about Ephesus Room Controller. The information like the device is alive or not, the percentage of LED intensity, room controller and fan controller is enable or disable and etc.

LEDs Intensity: Ephesus Room Controller has 4 or 8 push button for 2-Gang and 4-Gang models. Each push button has its own status LED to make the identification of each associated function easier. It is possible to select percentage of intensity levels for LEDs brightness.

### 3.3.1 Parameters

| PARAMETER                 | DESCRIPTION  | VALUES   |
|---------------------------|--|--|
| RS 485 Slave ID Number    | This parameter determines the RS 485 Slave ID Number   | <b>1</b> (1...254)   |
| Active heart beat         | The data sending to the bus line of the module is alive or not   | <b>Disable</b><br>Enable   |
| Heart beat interval (sec) | By this parameter, sending interval is chosen for the heart beat   | <b>1</b> (0...65535)   |
| Set LEDs intensity        | Via parameter: This parameter determines the LEDs intensity via 'Intensity(%)' parameter<br><br>Via communication object: This parameter determines the LEDs intensity via 'LEDs intensity' object<br><br>This parameter is not valid for Ephesus Room Controller. It has no any function. | <b>Via parameter</b><br><br>Via communication object<br><br>Via ambient sensor |
| Intensity (%)             | This parameter is only visible when 'Set LEDs intensity' section is configured 'Via parameter'. This section determines the intensity of the LEDs.   | <b>10</b> (0...100)  |
| Room controller           | This parameter determines room controller parameter and objects are alive or not   | Disable<br><b>Enable</b>   |
| Fan controller            | This parameter determines fan controller parameters and objects are alive or not   | Disable<br><b>Enable</b>   |
| Device control locking    | Via this parameter, to lock the Ephesus Room Controller is enable  | <b>Disable</b><br>Enable   |

### 3.3.2 Objects

| OBJECT NAME | FUNCTION         | TYPE  | FLAG  |
|-------------|------------------|-------|-------|
| Heart beat  | 1-True / 0-False | 1 bit | CRWTU |

This object activates the heart beat it is linked with a related 1 bit group object

|                |                |        |       |
|----------------|----------------|--------|-------|
| LEDs intensity | Percentage (%) | 1 byte | CRWTU |
|----------------|----------------|--------|-------|

This object is only visible when 'Set leds intensity' is configured 'Via communication object'. The LEDs intensity is determined via this object

|             |                  |       |       |
|-------------|------------------|-------|-------|
| Device lock | 1-True / 0-False | 1 bit | CRWTU |
|-------------|------------------|-------|-------|

This object is only visible when 'Device control locking' is configured 'Enable'. The device can be locked via this object it is related 1 bit group object

### 3.4 ROOM CONTROLLER

#### 3.4.1 Parameters

|                                |   |
|--------------------------------|---|
| Room controller mode           | Heating & Cooling ▾   |
| -> Command value object        | <input type="radio"/> 1 common object <input checked="" type="radio"/> 2 seperated object |
| -> Heating/Cooling change over | <input type="radio"/> Automatic <input checked="" type="radio"/> Via communication object |
| Controller mode after reset    | Previous value ▾  |
| Operating mode after reset     | Previous mode ▾   |

Room controller device can be used for only heating, only cooling or heating&cooling. If the room controller is on heating&cooling mode, transition from heating to cooling or vice versa can occur automatically. The integrated temperature sensor measures the actual temperature of the ambient air and continuously compares it to the set temperature, and the controller automatically calculates whether to send a control signal for heating or cooling.

The control algorithm based on the difference between the desired setpoint temperature values and the measured actual temperature values, processes a command value that can be either percentage or On / Off. The command, periodically or depending on the event, is transmitted to a KNX actuator device via bus line with communication objects.

#### Heating

The floor or ceiling heating system (warm water version) provides plastic pipes embedded in the concrete layer or placed directly under the final coating of the floor or ceiling filled by heated water. The water releases heat to the final coating that heats the room by radiation.

The integrated temperature sensor measures the ambient temperature. When the measured temperature lower than the difference between the setpoint and the hysteresis value ( $T_{setpoint} - T_{measured}$ ), the device activates the heating system by sending KNX command to the actuator that controls the heating system via connected to related group address. When the measured temperature reaches to the setpoint temperature, the device sends a related command and deactivates the heating system. In this way, there are 2 decision thresholds to activate and deactivate the heating system. First one is the temperature that the device activates the system ( $T_{setpoint} - T_{measured}$ ), second one is the temperature that the device deactivates the heating system ( $T_{setpoint}$ ).

#### Cooling:

The operating system of the cooling is similar to the heating. The floor or ceiling cooling system (cold water version) provides plastic pipes embedded in the concrete layer or placed directly under the final coating of the floor or ceiling filled by cooled water. The water releases cold to the final coating that colds the room by radiation.

The integrated temperature sensor measures the ambient temperature. When the measured temperature higher than the difference between the setpoint and the hysteresis value ( $T_{setpoint} - T_{measured}$ ), the device activates the heating system by sending KNX command to the actuator that controls the cooling system via connected to related group address. When the measured temperature reaches to the setpoint temperature, the device sends a related command and

deactivates the cooling system. In this way, there are 2 decision thresholds to activate and deactivate the cooling system. First one is the temperature that the device activates the system ( $T_{\text{setpoint}} + T_{\text{measured}}$ ), second one is the temperature that the device deactivates the heating system ( $T_{\text{setpoint}}$ ).

## Heating&Cooling:

Heating&Cooling mode is generally used when there are 2 different heating and cooling sources or only 1 source that have both heating and cooling ability together. If the heating/cooling sources are different, command value object parameter should be selected as "2 separated object". However, if heating and cooling is obtained from the same source, command value object parameter should be selected as "1 common object". Additionally, in this mode, distinction is made whether the switch-over between heating and cooling is to be effected automatically or in a controlled way through the communication object.

In automatic switch-over option: for the heating, the controller will turn on the heating when the room temperature has fallen below a preset deadband limit. As soon as the room temperature is exceeding the heating setpoint, the control will turn off the heating in the heating & cooling mode. For the cooling, the controller will turn on the cooling system when the room temperature has exceeded a preset deadband limit. As soon as the room temperature is reaching above the cooling setpoint, the control will turn off the cooling system in the heating & cooling mode.

## Heating/Cooling Change Over:

The change over between the two modes (heating / cooling) can be happened as below:

**Automatic:** The automatic changeover is suitable for a 4-pipe hydraulic configuration of the heating&cooling operation (used e.g. for fan-coil units or ceiling radianti panels). Also in this case the information can be sent on the bus with the output communication object the difference from the first mode is that switching is performed automatically on the basis of a comparison between the values of the actual temperature and the setpoint temperature.

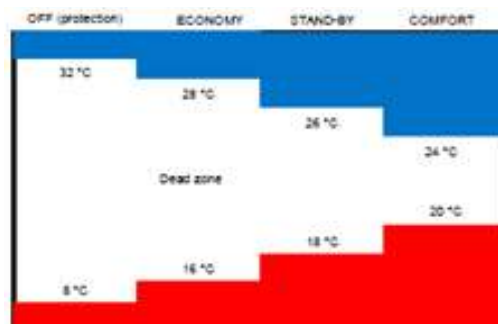


Figure: Neutral zone and example of setpoint values

Until the measured temperature is located below the setpoint value for the heating, the operation is heating; in the same way, if the actual value (measured) is greater than the setpoint value for the cooling, the mode is cooling. If the measured temperature value is within the dead zone, the previous mode of operation remains active. Also, the switching point of the operation mode for heating&cooling must take place in correspondence with the current setpoint for the active HVAC, in the same way the switching heating/cooling must take place at the setpoint for heating.

**Via Communication Object:** To change over from the bus requires that the command is received from 'Heating/Cooling change over' object is related to a 1-bit group object for this purpose. According to 1-bit group object, '1' is Heating and '0' is Cooling.

### 3.4.1.1 Parameters

| PARAMETER                   | DESCRIPTION   | VALUES  |
|-----------------------------|---|---|
| Room controller mode        | This parameter determines the mode of Room controller   | Heating<br>Cooling<br><b>Heating&amp;Cooling</b>      |
| Command value object        | This parameter determines the object types of temperature command values for heating and cooling mode | 1 command object<br><b>2 seperated object</b>         |
| Heating/Cooling change over | This parameter determines how the heating/cooling transition is made                                  | Automatic<br><b>Via communication object</b>          |
| Controller mode after reset | This parameter determines the controller mode after device restarts                                   | <b>Previous value</b><br>Heating mode<br>Cooling mode |
| Operating mode after reset  | This parameter determines the operating mode after device restarts                                    | <b>Previous value</b><br>Heating mode<br>Cooling mode |

### 3.4.1.2 Objects

| OBJECT NAME               | FUNCTION   | TYPE   | FLAG  |
|---------------------------|--|--------|-------|
| Operating mode switchover | 1-Comfort 2Standby<br>3-Night 4Frost/Heat Protection | 1 byte | CRWTU |

Via this object, the operating mode is determined it is linked related by 1 byte group object

|              |                      |       |       |
|--------------|----------------------|-------|-------|
| Comfort mode | 1-Set mode; 0Nothing | 1 bit | CRWTU |
|--------------|----------------------|-------|-------|

Via this object, the comfort mode becomes active.

|              |                      |       |       |
|--------------|----------------------|-------|-------|
| Comfort mode | 1-Set mode; 0Nothing | 1 bit | CRWTU |
|--------------|----------------------|-------|-------|

Via this object, the comfort mode becomes active when it is linked a related 1 bit group object

|              |                      |       |       |
|--------------|----------------------|-------|-------|
| Standby mode | 1-Set mode; 0Nothing | 1 bit | CRWTU |
|--------------|----------------------|-------|-------|

Via this object, the standby mode becomes active when it is linked a related 1 bit group object

|            |                      |       |       |
|------------|----------------------|-------|-------|
| Night mode | 1-Set mode; 0Nothing | 1 bit | CRWTU |
|------------|----------------------|-------|-------|

Via this object, the night mode becomes active when it is linked a related 1 bit group object

|                       |                      |       |       |
|-----------------------|----------------------|-------|-------|
| Frost/Heat protection | 1-Set mode; 0Nothing | 1 bit | CRWTU |
|-----------------------|----------------------|-------|-------|

Via this object, the Frost/Heat protection becomes active when it is linked a related 1 bit group object

|                             |                      |       |      |
|-----------------------------|----------------------|-------|------|
| Heating/Cooling change over | 1- Heating; 0Cooling | 1 bit | CRWU |
|-----------------------------|----------------------|-------|------|

Via this object, Heating mode or Cooling mode is determined when it is linked related 1 group address

## 3.4.2 Heating

If the measured temperature value is lower than the setpoint temperature value, Ephesus Room Controller sends heating group objects to the KNX bus line. The related heating actuator takes the heating commands and operates the heating channels. As the measured value reaches to the setpoint temperature value, Ephesus Room Controller deactivates the heating system.

Heating system has 3 type of control systems. These systems and configurations is shown below:

### 3.4.2.1 Heating 2-Points Control

The 2-point control is the simplest type of control. The controller switches on when the room temperature drops below a certain level (setpoint temperature value minus hysteresis) and switches off when a particular value (setpoint temperature value plus hysteresis) is exceeded. The switch-on and switch-off commands are transmitted as 1-bit commands.

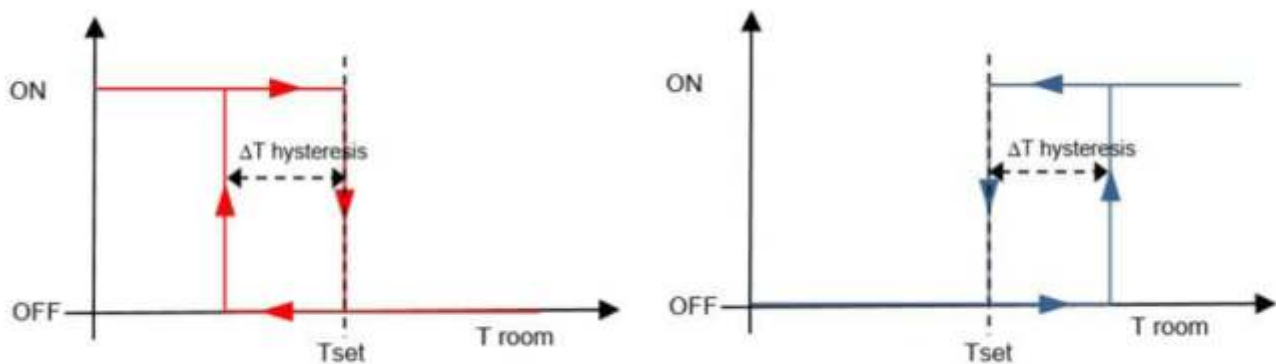


Figure: 2-Points control hysteresis cycle

### 3.4.2.2 Heating 2-Points Parameters

|   |   |
|---|---|
| Heating control type                        | 2-Points  |
| -> Hysteresis                               | 0.1K  |
| Sending of command value periodically (min) | 10  |
| <hr/>                                       |   |
| Additional heating system                   | <input checked="" type="radio"/> Disable <input type="radio"/> Enable |

| PARAMETER                                   | DESCRIPTION   | VALUES                               |
|---|---|--------------------------------------|
| Heating control type                        | This parameter determines the heating control type  | <b>2-Points</b><br>Pwm<br>Continuous |
| Hysteresis                                  | This parameter determines the hysteresis value.   | <b>0.1K</b> (0.1K...2K)              |
| Sending of command value periodically (min) | This parameter determines the time period of command value to be sent periodically              | <b>10</b> (0...255)                  |
| Additional heating system                   | Disable: There is no additional heating system<br>Enable: There is an additional heating system | <b>Disable</b><br>Enable             |

### 3.4.2.3 Heating 2-Points Objects

| OBJECT NAME           | FUNCTION    | TYPE  | FLAG  |
|-----------------------|-------------|-------|-------|
| Heating command value | 1-ON; 0-OFF | 1 bit | CRWTU |

Via this object, 1-bit heating command is sent to the bus line

### 3.4.2.4 Heating PWM Control

This also is a proportional-integral controller. Here, the output is a 1-bit command. For this to occur, the calculated control value is converted into a pulse-interval signal. Controller, runs periodically through a cycle and keeps its output ON for each period in proportion to the value of the control variable. As shown in the below figure, by varying the ratio between the "ON" time and the "OFF" time, the average activation time of the output changes, and as a result the average heating or cooling power supplied by the room changes.

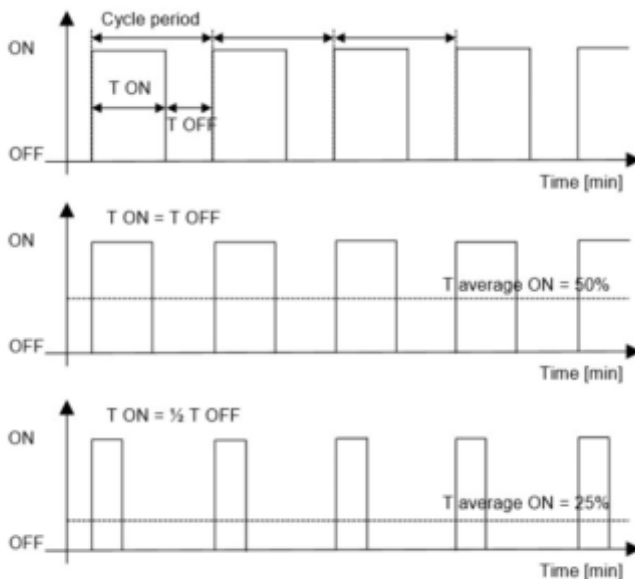


Figure: PWM Control Sampling

This type of control is well suited for use with ON/OFF actuators, such as electrothermal actuators and drives for zone valves. One of the important advantage of this type of control is that it eliminates the inertia of the system: it allows significant energy savings, because unnecessary interventions on the system introduced by the 2-point control with hysteresis are avoided and only the power required to compensate the losses.

Every time the changes the desired temperature setpoint, the cycle time is interrupted, the control output is reprocessed and the PWM restarts with a new cycle: this allows the system to reach its steady state more quickly.

### 3.4.2.5 Heating PWM Parameters

|   |                    |
|---|--------------------|
| Heating control type                        | Pwm                |
| -> Type of heating system                   | Warm water heating |
| -> Proportional band (K)                    | 5.0K               |
| -> Integral time (min)                      | 150                |
| -> Minimum control value (%)                | 10                 |
| -> Maximum control value (%)                | 100                |
| Sending of command value periodically (min) | 10                 |

Additional heating system  Disable  Enable

| PARAMETER                 | DESCRIPTION  | VALUES   |
|---------------------------|--|--|
| Heating control type      | This parameter determines the heating control type                       | 2-Points<br><b>Pwm</b><br>Continuous   |
| Type of heating system    | This parameter determines the heating system to be controlled            | <b>Warm water heating</b><br>Electric heating<br>Floor heating<br>Split unit<br>Fan coil<br>User customize |
| Proportional band         | This parameter determines the proportional band                          | <b>0.5K</b> (0.5K...10K)   |
| Integral time (min)       | This parameter determines the integral time                              | <b>100</b> (0...255)   |
| Minimum control value (%) | This parameter determines the minimum control value of the output object | <b>10</b> (0...100)  |



| PARAMETER                                   | DESCRIPTION   | VALUES            |
|---|---|-------------------|
| Sending of command value periodically (min) | This parameter determines the time period of command value to be sent periodically              | 10 (0...255)      |
| Additional heating system                   | Disable: There is no additional heating system<br>Enable: There is an additional heating system | Disable<br>Enable |

### 3.4.2.6 Heating PWM Objects

| OBJECT NAME           | FUNCTION    | TYPE  | FLAG  |
|-----------------------|-------------|-------|-------|
| Heating command value | 1-ON; 0-OFF | 1 bit | CRWTU |

Via this object, 1-bit heating command is sent to the bus line

### 3.4.2.7 Heating Continuous Control

The PI controller adjusts its output value between 0% and 100% to match the difference between the actual value and the setpoint value and enables a precise regulation of the room temperature to the setpoint value. It sends the control value to the bus as a 1-byte value (0% - 100%). To reduce the bus load, the control value is only transmitted if it has changed by a predefined percentage in relation to the previous sent value. The control value can also be transmitted cyclically.

### 3.4.2.8 Heating Continuous Parameters

|   |                    |
|---|--------------------|
| Heating control type  | Continuous         |
| -> Type of heating system   | Warm water heating |
| -> Proportional band (K)  | 5.0K               |
| -> Integral time (min)  | 150                |
| -> Minimum control value (%)  | 10                 |
| -> Maximum control value (%)  | 100                |
| Sending of command value periodically (min)   | 10                 |
| Additional heating system <input checked="" type="radio"/> Disable <input type="radio"/> Enable |                    |

| PARAMETER                                   | DESCRIPTION   | VALUES   |
|---|---|--|
| Heating control type                        | This parameter determines the heating control type  | 2-Points<br>Pwm<br><b>Continuous</b>   |
| Type of heating system                      | This parameter determines the heating system to be controlled                                   | <b>Warm water heating</b><br>Electric heating<br>Floor heating<br>Split unit<br>Fan coil<br>User customize |
| Minimum control value (%)                   | This parameter determines the minimum control value of the output object                        | <b>10</b> (0...100)  |
| Maximum control value (%)                   | This parameter determines the maximum control value of the output object                        | <b>100</b> (0...100)   |
| Sending of command value periodically (min) | This parameter determines the time period of command value to be sent periodically              | <b>10</b> (0...255)  |
| Additional heating system                   | Disable: There is no additional heating system<br>Enable: There is an additional heating system | <b>Disable</b><br>Enable   |

### 3.4.2.9 Heating Continuous Objects

| OBJECT NAME           | FUNCTION   | TYPE   | FLAG  |
|-----------------------|------------|--------|-------|
| Heating command value | Percentage | 1 byte | CRWTU |

Via this object, the heating system is controlled with 1 byte data

### 3.4.2.10 Additional Heating System

Ephesus Room Controller has an option that all types of heating controls (2-points, PWM and Continuous control) have additional heating system. The additional heating system works in all control types with the same characteristics. It controls the heating system with hysteresis method. The system activates itself according to the offset and hysteresis configuration. Besides, there are 2 control type objects these are; switching(1bit) and continuous(1 byte). The continuous one is designed for compatibility with other heating systems. Additional heating system has same parameters and objects with the all control types. Therefore, the parameters and objects of additional heating system will not take part in this document again.

### 3.4.3 Cooling

If the measured temperature value is higher than the setpoint temperature value, Ephesus Room Controller sends cooling group objects to the KNX bus line. The related cooling actuator takes the cooling commands and operates the cooling channels. As the measured value reaches to the setpoint temperature value, Ephesus Room Controller deactivates the cooling system. Heating system has 3 type of control systems. These systems and configurations is shown below:

### 3.4.3.1 Cooling 2-Points Control

The 2-point control is the simplest type of control. The controller switches on when the room temperature drops below a certain level (setpoint temperature value minus hysteresis) and switches off when a particular value (setpoint temperature value plus hysteresis) is exceeded. The switch-on and switch-off commands are transmitted as 1-bit commands.

### 3.4.3.2 Cooling 2-Points Parameters

Cooling control type

-> Hysteresis

Sending of command value periodically (min)

---

Additional cooling system  Disable  Enable

| PARAMETER                                   | DESCRIPTION   | VALUES                               |
|---|---|--------------------------------------|
| Cooling control type                        | This parameter determines the cooling control type  | <b>2-Points</b><br>Pwm<br>Continuous |
| Hysteresis                                  | This parameter determines the hysteresis value.   | <b>0.1K</b> (0.1K...2K)              |
| Sending of command value periodically (min) | This parameter determines the time period of command value to be sent periodically              | <b>10</b> (0...255)                  |
| Additional cooling system                   | Disable: There is no additional cooling system<br>Enable: There is an additional cooling system | <b>Disable</b><br>Enable             |

### 3.4.3.3 Cooling 2-Points Object

| OBJECT NAME           | FUNCTION    | TYPE  | FLAG  |
|-----------------------|-------------|-------|-------|
| Cooling command value | 1-ON; 0-OFF | 1 bit | CRWTU |

Via this object, 1 -bit cooling command is sent to the bus line

### 3.4.3.4 Cooling PWM Control

This also is a proportional-integral controller. Here, the output is a 1-bit command. For this to occur, the calculated control value is converted into a pulse-interval signal. Controller, runs periodically through a cycle and keeps its output ON for each period in proportion to the value of the control variable. As shown in the below figure, by varying the ratio between the "ON" time and the "OFF" time, the average activation time of the output changes, and as a result the average heating or cooling power supplied by the room changes.

### 3.4.3.5 Cooling PWM Parameters

|   |              |
|---|--------------|
| Cooling control type                        | Pwm          |
| -> Type of system                           | Cool ceiling |
| -> Proportional band (K)                    | 5.0K         |
| -> Integral time (min)                      | 240          |
| -> Minimum control value (%)                | 10           |
| -> Maximum control value (%)                | 100          |
| Sending of command value periodically (min) | 10           |

Additional cooling system  Disable  Enable

| PARAMETER                                   | DESCRIPTION   | VALUES   |
|---|---|--|
| Cooling control type                        | This parameter determines the cooling control type  | 2-Points<br><b>Pwm</b><br>Continuous                               |
| Type of system                              | This parameter determines the cooling system to be controlled                                   | <b>Cooling ceiling</b><br>Split unit<br>Fan coil<br>User customize |
| Minimum control value ( %)                  | This parameter determines the minimum control value of the output object                        | <b>10</b> (0...100)  |
| Maximum control value (%)                   | This parameter determines the maximum control value of the output object                        | <b>100</b> (0...100)   |
| Sending of command value periodically (min) | This parameter determines the time period of command value to be sent periodically              | <b>10</b> (0...255)  |
| Additional heating system                   | Disable: There is no additional heating system<br>Enable: There is an additional heating system | <b>Disable</b><br>Enable   |

### 3.4.3.6 Cooling PWM Objects

| OBJECT NAME           | FUNCTION    | TYPE  | FLAG  |
|-----------------------|-------------|-------|-------|
| Cooling command value | 1-ON; 0-OFF | 1 bit | CRWTU |

Via this object, 1-bit cooling command is sent to the bus line

### 3.4.3.7 Cooling Continuous Control

The PI controller adjusts its output value between 0% and 100% to match the difference between the actual value and the setpoint value and enables a precise regulation of the room temperature to the setpoint value. It sends the control value to the bus as a 1-byte value (0% - 100%). To reduce the bus load, the control value is only transmitted if it has changed by a predefined percentage in relation to the previous sent value. The control value can also be transmitted cyclically.

### 3.4.3.8 Cooling Continuous Parameters

|   |   |
|---|---|
| Cooling control type                        | Continuous  |
| -> Type of system                           | Cool ceiling  |
| -> Proportional band (K)                    | 5.0K  |
| -> Integral time (min)                      | 240   |
| -> Minimum control value (%)                | 10  |
| -> Maximum control value (%)                | 100   |
| Sending of command value periodically (min) | 10  |
| Additional cooling system                   | <input checked="" type="radio"/> Disable <input type="radio"/> Enable |

| PARAMETER                                   | DESCRIPTION   | VALUES   |
|---|---|--|
| Cooling control type                        | This parameter determines the heating control type  | 2-Points<br>Pwm<br><b>Continuous</b>                               |
| Type of cooling system                      | This parameter determines the cooling system to be controlled                                   | <b>Cooling ceiling</b><br>Split unit<br>Fan coil<br>User customize |
| Minimum control value (%)                   | This parameter determines the minimum control value of the output object                        | <b>10</b> (0...100)  |
| Maximum control value (%)                   | This parameter determines the maximum control value of the output object                        | <b>100</b> (0...100)   |
| Sending of command value periodically (min) | This parameter determines the time period of command value to be sent periodically              | <b>10</b> (0...255)  |
| Additional cooling system                   | Disable: There is no additional cooling system<br>Enable: There is an additional cooling system | <b>Disable</b><br>Enable   |

### 3.4.3.9 Cooling Continuous Objects

| OBJECT NAME           | FUNCTION   | TYPE   | FLAG  |
|-----------------------|------------|--------|-------|
| Cooling command value | Percentage | 1 byte | CRWTU |

Via this object, the system is controlled with 1 byte data

### 3.4.3.10 Additional Cooling System

Ephesus Room Controller has an option that all types of cooling controls (2-points, PWM and Continuous control) have additional cooling system. The additional cooling system works in all control types with the same characteristics. It controls the cooling system with hysteresis method. The system activates itself according to the offset and hysteresis configuration. Besides, there are 2 control type objects these are; switching (1bit) and continuous (1 byte). The continuous one is designed for compatibility with other cooling systems.

Additional cooling system has same parameters and objects with the all control types. Therefore, the parameters and objects of additional cooling system will not take part in this document again.

## 3.4.4 Set Points

Ephesus Room Controller enables to configure the setpoint values. In this section, temperature setpoints for heating or cooling modes are configured in this section. The operation modes such as comfort, standby, night and frost/heat protection modes can be separately specified from this section.

In this parameter page, maximum band width settings are configured for that increasing or decreasing the temperature value manually can be determined.

Frost/Heat Protection: The setpoint temperature value for frost/heat protection is configured on this page. When the frost/heat protection become active, Ephesus Room Controller sends 'OFF' command to the bus line. If measured temperature value is lower than the 'Setpoint for frost protection', Ephesus sends 'OFF' command to the bus line for cooling system. On the other hand, If measured temperature value is higher than the 'Setpoint for heat protection', Ephesus sends 'OFF' command to the bus line for heating system.

### 3.4.4.1 Set Points Parameters

|                                     |   |
|-------------------------------------|---|
| Send setpoints                      | <input type="radio"/> Disable <input checked="" type="radio"/> Enable                   |
| Setpoint after bus voltage recovery | <input type="radio"/> Previous value <input checked="" type="radio"/> Parameter defined |
| Basic setpoint                      | <input type="text" value="17.0 °C"/>  |
| Heating setpoint comfort mode       | <input type="text" value="6.0 °C"/>   |
| Cooling setpoint comfort mode       | <input type="text" value="0.5 °C"/>   |
| Heating setpoint standby mode       | <input type="text" value="4.5 °C"/>   |
| Cooling setpoint standby mode       | <input type="text" value="2.0 °C"/>   |

Setpoint for frost protection

Setpoint for heat protection

| PARAMETER                           | DESCRIPTION  | VALUES                              |
|-------------------------------------|--|-------------------------------------|
| Send setpoints                      | This parameter enables to send the setpoint temperature values to the bus line       | Disable<br>Enable                   |
| Setpoint after bus voltage recovery | This parameter determines the setpoint values after bus voltage recovery             | Previous value<br>Parameter defined |
| Basic setpoint                      | This parameter determines the basic setpoint value which is shown on the LCD Display | 17°C (10°C...35°C)                  |
| Heating setpoint comfort mode       | This parameter determines the heating setpoint value for comfort mode                | 6°C (0.5°C...10°C)                  |
| Cooling setpoint comfort mode       | This parameter determines the cooling setpoint value for comfort mode                | 0.5°C (0.5°C...10°C)                |
| Heating setpoint standby mode       | This parameter determines the heating setpoint value standby mode                    | 4.5°C (0.5°C...10°C)                |
| Cooling setpoint standby mode       | This parameter determines the cooling setpoint value standby mode                    | 2°C (0.5°C...10°C)                  |
| Heating setpoint night mode         | This parameter determines the heating setpoint value for night mode                  | 1°C (0.5°C...10°C)                  |
| Cooling setpoint night mode         | This parameter determines the cooling setpoint value for night mode                  | 0.5°C (0.5°C...10°C)                |
| Setpoint for frost protection       | This parameter determines the setpoint value for frost protection                    | 7°C (0.5°C...15°C)                  |
| Setpoint for heat protection        | This parameter determines the setpoint value for heat protection                     | 35°C (25°C...35°C)                  |

### 3.4.4.2 Set Points Objects

| OBJECT NAME   | FUNCTION         | TYPE    | FLAG  |
|---|------------------|---------|-------|
| Comfort mode  | 1-ON / 0-Nothing | 1 bit   | CRWTU |
| This object activates the comfort mode as it is linked with a related bit group object          |                  |         |       |
| Standby mode  | 1-ON / 0-Nothing | 1 bit   | CRWTU |
| This object activates the standby mode as it is linked with a related bit group object          |                  |         |       |
| Night mode  | 1-ON / 0-Nothing | 1 bit   | CRWTU |
| This object activates the night mode as it is linked with a related bit group object            |                  |         |       |
| Frost/Heat protection   | 1-ON / 0-Nothing | 1 bit   | CRWTU |
| This object activates the frost/heat protection as it is linked with a related bit group object |                  |         |       |
| Current setpoint feedback   | Temperature (°C) | 2 bytes | CRTU  |

The actual setpoint value is send to the bus line via this object linked to a related group adr

| OBJECT NAME     | FUNCTION         | TYPE    | FLAG  |
|-----------------|------------------|---------|-------|
| Setpoint adjust | Temperature (°C) | 2 bytes | CRWTU |

The actual setpoint value can be configurable via this object

|                               |                  |         |       |
|-------------------------------|------------------|---------|-------|
| Setpoint for frost protection | Temperature (°C) | 2 bytes | CRTWU |
|-------------------------------|------------------|---------|-------|

The setpoint value for frost protection can be configurable via this object

|                             |                  |         |       |
|-----------------------------|------------------|---------|-------|
| Setpoint for heatprotection | Temperature (°C) | 2 bytes | CRTWU |
|-----------------------------|------------------|---------|-------|

The setpoint value for heat protection can be configurable via this object

### 3.4.5 Fan Controller

Ephesus Room Controller enables to operate fan control if in 'General Parameters' page, 'Fan controller' is configured 'Enable'. After it is configured, 'Fan controller' page is visible. At this page, number of fan level can be selected. Fan level lower limits can be edited. Also, fan level can be set after bus voltage recovery. In addition these options, some feedback parameters according to fan level can be configured at this page.

#### 3.4.5.1 Fan Controller Parameters

|   |  |
|---|--|
| Number of fan level                       | <input type="text" value="3"/>   |
| Fan 1 lower limit                         | <input type="text" value="10"/>  |
| Fan 2 lower limit                         | <input type="text" value="20"/>  |
| Fan 3 lower limit                         | <input type="text" value="40"/>  |
| Fan level after bus voltage recovery      | <input type="text" value="Level 1"/>   |
| Fan level individual objects              | <input type="radio"/> Disable <input checked="" type="radio"/> Enable                      |
| Fan level 1Byte object                    | <input type="radio"/> Disable <input checked="" type="radio"/> Enable                      |
| Auto/Manual control object                | <input checked="" type="radio"/> 1:Manual / 0:Auto <input type="radio"/> 0:Manual / 1:Auto |
| Feedback for fan level individual objects | <input type="radio"/> Disable <input checked="" type="radio"/> Enable                      |
| Feedback for fan level 1Byte object       | <input type="radio"/> Disable <input checked="" type="radio"/> Enable                      |
| Feedback for auto/manual control object   | <input type="radio"/> Disable <input checked="" type="radio"/> Enable                      |



| PARAMETER                                 | DESCRIPTION  | VALUES  |
|---|--|---|
| Number of fan level                       | This parameter determines the number of fan level  | <b>3</b> (1...5)                                    |
| Fan 1 lower limit                         | This parameter determines the lower limit value of the first speed                         | <b>10</b> (0...100)                                 |
| Fan 2 lower limit                         | This parameter determines the lower limit value of the second speed                        | <b>20</b> (0...100)                                 |
| Fan 3 lower limit                         | This parameter determines the lower limit value of the third speed                         | <b>40</b> (0...100)                                 |
| Fan 4 lower limit                         | This parameter determines the lower limit value of the fourth speed                        | <b>60</b> (0...100)                                 |
| Fan 5 lower limit                         | This parameter determines the lower limit value of the fifth speed                         | <b>80</b> (0...100)                                 |
| Fan level after bus voltage recovery      | This parameter determines the fan state after bus voltage recovery                         | Off<br>Auto<br><b>Level 1</b><br>Level 2<br>Level 3 |
| Fan level individual objects              | This parameter enables to send 1-bit ON or OFF command to the bus line for each fan level  | Disable<br><b>Enable</b>                            |
| Fan level 1Byte object                    | This parameter enables to send 1-byte ON or OFF command to the bus line for each fan level | Disable<br><b>Enable</b>                            |
| Auto/Manual control object                | This parameter enables to determine the value of the Auto/Manual control object            | <b>1:Manual / 0:Auto</b><br>0:Manual / 1:Auto       |
| Feedback for fan level individual objects | This parameter enables to create 1-bit feedback object for each fan level                  | Disable<br><b>Enable</b>                            |
| Feedback for fan level 1Byte objects      | This parameter enables to create 1-byte feedback object for fan levels                     | Disable<br><b>Enable</b>                            |
| Feedback for auto/manual control objects  | This parameter enables to create 1-bit feedback object for auto/manual control             | Disable<br><b>Enable</b>                            |

### 3.4.5.2 Fan Controller Objects

| OBJECT NAME     | FUNCTION  | TYPE   | FLAG  |
|-----------------|---|--------|-------|
| Fan level 1Byte | 0-OFF, <b>1</b> Level1, <b>2</b> Level2, <b>3</b> -Level3, <b>4</b> Level4, <b>5</b> Level5 | 1 byte | CRWTU |

This object allows the fan speed to be controlled with 1 byte data

| OBJECT NAME            | FUNCTION            | TYPE  | FLAG  |
|------------------------|---------------------|-------|-------|
| Fan Individual level 1 | 1-ON / <b>0</b> OFF | 1 bit | CRWTU |

This object is used to switch over to first fan level

| OBJECT NAME            | FUNCTION            | TYPE  | FLAG  |
|------------------------|---------------------|-------|-------|
| Fan Individual level 2 | 1-ON / <b>0</b> OFF | 1 bit | CRWTU |

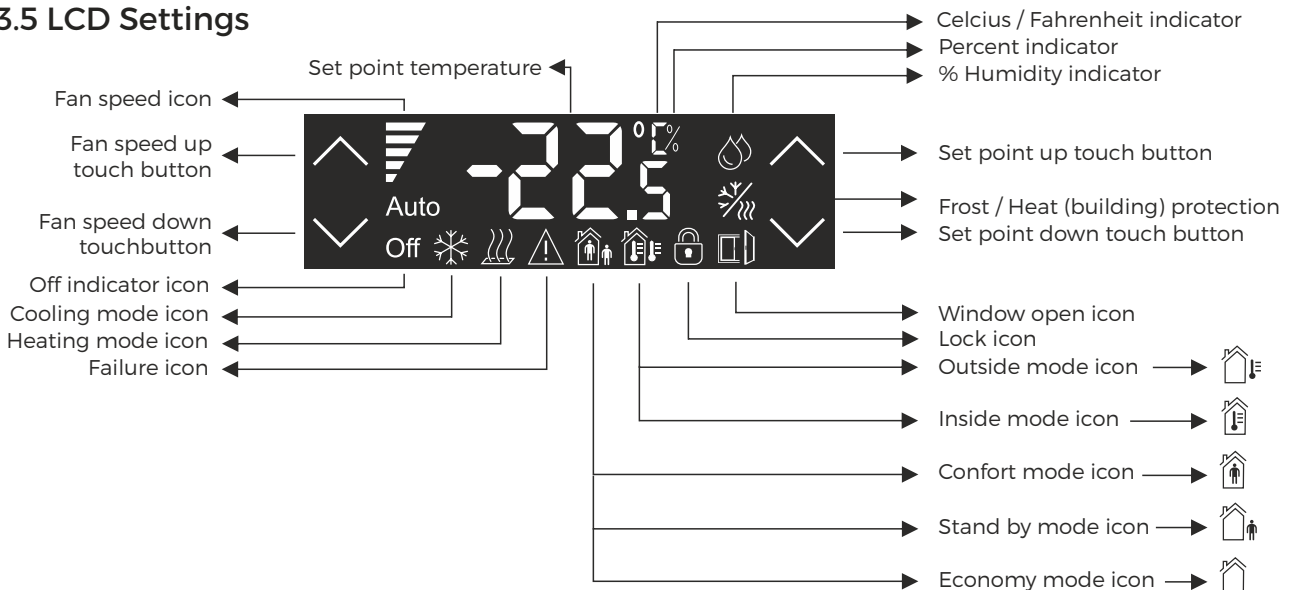
This object is used to switch over to second fan level

| OBJECT NAME            | FUNCTION            | TYPE  | FLAG  |
|------------------------|---------------------|-------|-------|
| Fan Individual level 3 | 1-ON / <b>0</b> OFF | 1 bit | CRWTU |

This object is used to switch over to third fan

| OBJECT NAME  | FUNCTION  | TYPE   | FLAG  |
|--|---|--------|-------|
| Fan Individual level 4   | 1-ON / 2-OFF  | 1 bit  | CRWTU |
| This object is used to switch over to fourth fan level                           |   |        |       |
| Fan Individual level 5   | 1-ON / 2-OFF  | 1 bit  | CRWTU |
| This object is used to switch over to fifth fan level                            |   |        |       |
| Fan level 1Byte feedback   | 0- OFF, 1-Level1, 2Level2, 3-Level3, 4Level4, 5Level5 | 1 byte | CRWTU |
| This object indicates the fan speed status with 1 byte value                     |   |        |       |
| Fan Individual Level 1 feedback  | 1-ON / 2-OFF  | 1 bit  | CRWTU |
| This object indicates the first fan speed status with 1 bit value                |   |        |       |
| Fan Individual Level 2 feedback  | 1-ON / 2-OFF  | 1 bit  | CRWTU |
| This object indicates the second fan speed status with 1 bit value               |   |        |       |
| Fan Individual Level 3 feedback  | 1-ON / 2-OFF  | 1 bit  | CRWTU |
| This object indicates the third fan speed status with 1 bit value                |   |        |       |
| Fan Individual Level 4 feedback  | 1-ON / 2-OFF  | 1 bit  | CRWTU |
| This object indicates the fourth fan speed status with 1 bit value               |   |        |       |
| Fan Individual Level 5 feedback  | 1-ON / 2-OFF  | 1 bit  | CRWTU |
| This object indicates the fifth fan speed status with 1 bit value                |   |        |       |
| Fan controller auto/manual   | 1-ON / 2-OFF  | 1 bit  | CRWU  |
| This object is used to switch over to automatic or manual fan speed control mode |   |        |       |
| Fan controller auto/manual feedback  | 1-ON / 2-OFF  | 1 bit  | CRWTU |
| This object indicates the manual/automatic fan operating mode with 1 bit value   |   |        |       |

### 3.5 LCD Settings



## 3.5.1 General

This parameter can be used to adjust the brightness level of the display to show the actual temperature. Also, the outside temperature to configure switching time between them to show whether the horizontal lines will be appeared on the display to control the display on/off status information.

### 3.5.1.1 Parameters

LCD enable  Disable  Enable

LCD illumination Always on ▼

LCD backlight intensity (%) 100 ▼

LCD backlight intensity when system is OFF (%) 25 % ▼

Temperature unit (C / F)  Celcius  Fahrenheit

Show temperature or setpoint value  Show temperature value  Show setpoint value

Return to temperature after setpoint adjust (sec) 7 ▼

Show outdoor temperature on LCD  Disable  Enable

| PARAMETER                                  | DESCRIPTION  | VALUES   |
|--|--|--|
| LCD enable                                 | This parameter determines the LCD is available or not  | Disable<br><b>Enable</b>                           |
| LCD illumination                           | This parameter determines the illumination of the display<br>Always off : LCD illumination is always off.<br>Always on: LCD illumination is always on.<br>Auto switch down : The display is turned off or switches to a new illumination level after the set time(0...255 sec) elapsed | Always off<br><b>Always on</b><br>Auto switch down |
| LCD backlight intensity (%)                | This parameter determines the backlight intensity of the LCD display   | <b>100</b> (0...100)                               |
| LCD backlight timer (sec)                  | This parameter determines the illumination time of the LCD display   | <b>10</b> (0...255)                                |
| LCD backlight intensity when system is OFF | This parameter determines the LCD backlight intensity when system is OFF   | <b>25 %</b> ( 0 %...100 %)                         |
| Temperature unit (C/F)                     | This parameter determines the temperature unit type to be displayed on the LCD screen  | <b>Celcius</b><br>Fahrenheit                       |

| PARAMETER   | DESCRIPTION  | VALUES  |
|---|--|---|
| Show temperature or setpoint value                | This parameter determines the which temperature value is displayed on the screen                     | Show temperature value<br>Show setpoint value |
| Return to temperature after setpoint adjust (sec) | This parameter determines the time to show temperature value on the LCD screen after setpoint adjust | 7 (0..255)                                    |
| Show outdoor temperature on LCD                   | This parameter determines outdoor temperature is available or not                                    | Disable<br>Enable                             |
| Interval outdoor temperature on LCD               | This parameter determines the interval time for outdoor temperature                                  | 2 (1..3)                                      |

### 3.5.1.2 Objects

| OBJECT NAME       | FUNCTION     | TYPE  | FLAG  |
|-------------------|--------------|-------|-------|
| Thermostat On/Off | 1-ON / 0-OFF | 1 bit | CRWTU |

This object enables the thermostat ON or OFF when it is linked a related **1 bit** group address

|               |              |       |       |
|---------------|--------------|-------|-------|
| Window status | 1-ON / 0-OFF | 1 bit | CRWTU |
|---------------|--------------|-------|-------|

This object enables to show the window status when it is linked a related **1 bit** group address

|                     |             |         |       |
|---------------------|-------------|---------|-------|
| Outdoor temperature | Temperature | 2 Bytes | CRWTU |
|---------------------|-------------|---------|-------|

This object enables to show outdoor temperature on LCD when it is linked a related **2 bytes** group address

### 3.5.2 Buttons

Ephesus Room Controller has 4 touch buttons on the LCD screen. 2 of them are the right side of the screen and the other ones are the left side of the LCD screen. This page configures the operations of the touch buttons. The general purpose of the buttons is designed to change the setpoint temperature. Fan level setting and operating mode setting are available with the buttons.

Left upper button function Fan control ▼

-> Fan level increase / decrease  Fan Increase  Fan Decrease

Left lower button function Fan control ▼

-> Fan level increase / decrease  Fan Increase  Fan Decrease

---

Right upper button function Setpoint temperature ▼

-> Modification by pressing  Increase one step  Decrease one step

-> Step for setpoint control 0.1K ▼

---

Right lower button function Setpoint temperature ▼

-> Modification by pressing  Increase one step  Decrease one step

-> Step for setpoint control 0.1K ▼

| PARAMETER                         | DESCRIPTION  | VALUES   |
|-----------------------------------|--|--|
| Left upper button function        | This parameter determines the function of the left upper button  | <b>Setpoint temperature</b><br>Operating mode setting<br>Fan control             |
| Modification by pressing          | Increase one step: This parameter increases the setpoint temperature for one step when button pressed<br>Decrease one step: This parameter decreases the setpoint temperature for one step when button pressed | <b>Increase one step</b><br><br>Decrease one step                                |
| Step for setpoint control         | This parameter determines the one step value for setpoint control  | <b>0.1K</b><br>0.2K<br>0.5K<br>1.0K  |
| Change operating mode by pressing | This parameter enables to change the operating mode  | <b>Operating mode individual selection</b><br>Change between all operating modes |
| Set operating mode                | This parameter enables to set the operating mode   | <b>Comfort</b><br>Standby<br>Night<br>Frost/Heat Protection                      |
| Fan level Increase/Decrease       | This parameter determines the touch button function  | <b>Fan Increase</b><br>Fan Decrease  |

### 3.5.2.2 Objects

There is no any object. Because, this object is valid for only the Ephesus Room Controller. It is just a setting for the device. Any other device doesn't effect from it. So, no telegram is needed to send to the bus line.

### 3.6 Humidity Sensor

The integrated humidity sensor on the device provides the measurement of the relative humidity value in the ambient. The measured value allows you to perform an upgraded room thermoregulation and to expand combinations for the safe operation of some type of terminal equipment used for cooling. The measured value can also be sent to the KNX bus line via 2-byte communication object. The psychrometric values obtained from the temperature and humidity combination measurement such as dew - point temperature on the KNX bus line and the perceived temperature index (in summer mode only) can also be sent, with the calculation made by the thermostat.

#### 3.6.1 Parameters

|                                    |  |
|------------------------------------|--|
| Humidity sensor                    | <input checked="" type="radio"/> Internal <input type="radio"/> External |
| Internal sensor calibration        | 0% <span style="float:right">▼</span>                                    |
| Send humidity periodically         | <input checked="" type="radio"/> Disable <input type="radio"/> Enable    |
| Show humidity on LCD               | <input type="radio"/> Disable <input checked="" type="radio"/> Enable    |
| Interval for humidity on LCD (sec) | 2 <span style="float:right">▲▼</span>                                    |
| Threshold 1 Limit (%)              | 10 <span style="float:right">▲▼</span>                                   |
| Threshold 2 Limit (%)              | 90 <span style="float:right">▲▼</span>                                   |

| PARAMETER                           | DESCRIPTION   | VALUES                      |
|-------------------------------------|---|-----------------------------|
| Humidity sensor                     | This parameter determines whether the humidity sensor is external or internal | <b>Internal</b><br>External |
| Internal sensor calibration         | This parameter determines the percentage of internal sensor calibration       | <b>0%</b> (-10%...10%)      |
| Send humidity periodically          | This parameter enables to send the humidity value to the bus line             | <b>Disable</b><br>Enable    |
| Sending interval for humidity (sec) | This parameter determines the sending interval time for humidity value        | <b>10</b> (0...255)         |
| Show humidity on LCD                | This parameter enables to show the humidity value on LCD screen               | Disable<br><b>Enable</b>    |
| Interval for humidity on LCD (sec)  | This parameter determines the interval time for humidity value                | <b>2</b> (1...3)            |
| Threshold 1 Limit (%)               | This parameter determines the first threshold value for humidity              | <b>10</b> (0...100)         |
| Threshold 2 Limit (%)               | This parameter determines the second threshold value for humidity             | <b>90</b> (0...100)         |

### 3.6.2 Objects

| OBJECT NAME       | FUNCTION   | TYPE    | FLAG  |
|-------------------|------------|---------|-------|
| Internal Humidity | Percentage | 2 bytes | CRWTU |

Internal humidity is received with this object via connected to related 2 bytes group address

|                   |            |         |       |
|-------------------|------------|---------|-------|
| External Humidity | Percentage | 2 bytes | CRWTU |
|-------------------|------------|---------|-------|

External humidity is received with this object via connected to related 2 bytes group address

|                      |                  |       |       |
|----------------------|------------------|-------|-------|
| Humidity threshold 1 | 1-True / 0-False | 1 bit | CRWTU |
|----------------------|------------------|-------|-------|

First threshold value property for relative humidity is configured by this object

|                      |                  |       |       |
|----------------------|------------------|-------|-------|
| Humidity threshold 2 | 1-True / 0-False | 1 bit | CRWTU |
|----------------------|------------------|-------|-------|

Second threshold value property for relative humidity is configured by this object



**iLUXUS**  
Intelligent Luxury Building Solutions

Theodor-Heuss-Ring 23, 50668 Köln / Germany

Tel.: +49 (0) 2234 9279153

[info@i-luxus.de](mailto:info@i-luxus.de)

[www.i-luxus.de](http://www.i-luxus.de)