使用手册

K-BUS KNX Thermostat Lite,55mm_V1.3

CHTL-02/00.2.00 (White matt finish)



KNX/EIB Home and Building Control System

Attentions

1.Please keep devices away from strong magnetic field, high temperature, wet environment;



2.Do not fall the device to the ground or make them get hard impact;



3.Do not use wet cloth or volatile reagent to wipe the device;



4.Do not disassemble the devices.

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Chapter 1 Summary

KNX Thermostat Lite,55mm is mainly applied in building control system, connected to the bus via KNX connection terminals and installed together with other devices on the bus to become a system. It's functionally simple and intuitive to operate. Users can plan according to their own needs to performs these functions in the system.

KNX Thermostat Lite,55mm is designed based on the European standard 55mm system as any other European KNX manufacturers, which means it can be used as a thermostat that limits operation in common areas.

The manual provides detailed technical information about the Thermostat Lite,55mm, including installation and programming details, and explains how to use the panel in conjunction with examples in actual use.

KNX Thermostat Lite,55mm is power via KNX bus, mounted in a standard 80 or 86-box wall mount. The physical address assignment and parameter settings can be used with the engineering tool software ETS (version ETS5.7 or above) with the .knxprod file.

The functions are summarized as followed:

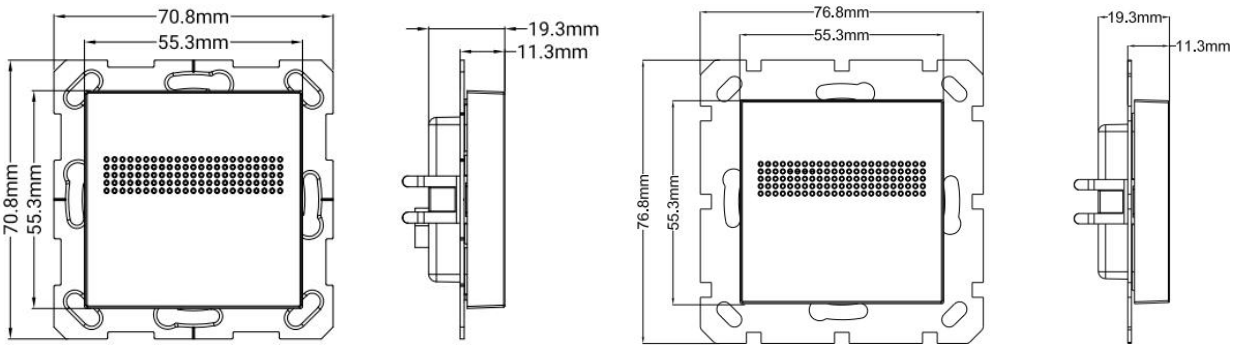
- ●Internal temperature / humidity sensor
- ●Control modes: heating, cooling, heating and cooling, with 2-pipes or 4pipes system
- ●HVAC operation modes: comfort, standby, economy, protection
- ●Temperature logic algorithm supports 2-point and PI control
- ●Fan auto.control
- ●2 external input interfaces, used as dry contact detection (Switch, Scene, String send) or NTC temperature detection
- ●Compatible with European 55mm-system push button standard design
- ●Support KNX secure

Chapter 2 Technical Data

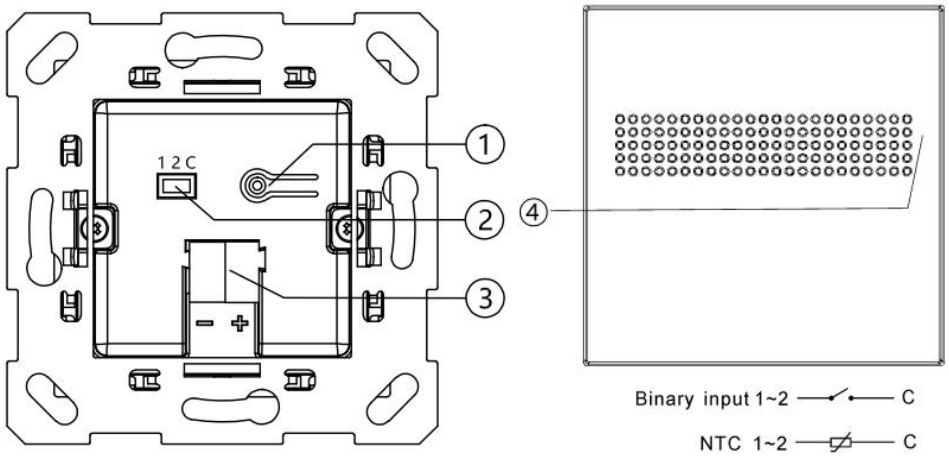
Power Supply	Bus voltage	21-30V DC, via the KNX bus
	Bus current	<6mA, 24V; <5.5mA, 30V
	Bus consumption	<165mW
Input	2 external inputs, as dry contact input or 10K NTC input	
Connection	KNX	Bus connection terminal
	Input	A three-wires connection terminal, cable length <5m
Operation and display	Programming button and red LED	For assigning the physical address, LED off after download
Temperature	Operation	– 5 °C ... 45 °C
	Storage	– 25 °C ... 55 °C
	Transport	– 25 °C ... 70 °C
Environment	Humidity	<93%, except dewing
Dimension	70.8 x 70.8 x 19.3 mm (80 mm wring box) 76.8 x 76.8 x 19.3 mm (86 mm wring box)	
Mounting	In a conventional 80 or 86 mm wring box	
Mounting	0.05kg	

Chapter 3 Dimension and Structural Diagram

3.1.Dimension Diagram



3.2.Structural Diagram



①Programming button and LED ②Input terminals

③KNX bus connection terminal ④Internal temperature / humidity sensor

Chapter 4 Project Design and Programming

Application	Maximum of communication objects	Maximum number of group addresses	Maximum number of associations	Secure group addresses
KNX Thermostat Lite,55mm/1.0	**49**	**100**	**100**	**100**

General function

General function includes device In operation setting and request device status after voltage recovery.

Internal temperature and humidity measurement

Internal temperature and humidity measurement value is sent to the bus: respond after read only and respond after change.

Set temperature and humidity calibration, and send alarm telegram when the preset range of threshold value for temperature alarm is exceeded.

External input interface function

Up to support 2 channels, enable/disable each channel functions. Optional dry contact detection or NTC temperature detection.

When selecting dry contact detection, only supports the basic functions, including switch, scene send strings (press/release, short/long, send after voltage recovery, disable function).

When selecting NTC temperature detection, the external temperature probe can be connected to detect the external temperature and the B value data of temperature sensing probe needs to be set.

Room temperature controller

Support to functions, including control mode input, heating/cooling system, operation mode and setpoint temperature, fan speed, window contact, presence detector, temperature threshold, 2 points and PI control algorithm and etc; At relative adjustment, extra optional whether to enable setpoint temperature offset value, with threshold option (-10~10°C), send the offset value to bus when enable.

Chapter 5 Parameter setting description in the ETS

5.1.KNX Secure

Thermostat Lite,55mm is a KNX device that complies with the KNX secure standard. That is, you can run the device in safe way.



Fig.5.1 (1) "KNX Secure" parameter window

The device with KNX secure will be displayed notes on ETS, as shown as Fig.5.1(1).

If secure commissioning is actived in ETS project, the following information must be considered during device debugging:



❖It is essential to assign a project password as soon as a KNX Secure device is imported into a project. This will protect the project against unauthorized access.

The password must be kept in a safe place – access to the project is not possible without it (not even the KNX Association or device manufacturer will be able to access it)!

Without the project password, the commissioning key will not be able to be imported.

❖A commissioning key is required when commissioning a KNX Secure device (first download). This key (FDSK = Factory Default Setup Key) is included on a sticker on the side of the device, and it must be imported into the ETS prior to the first download:

✧On the first download of the device, a window pops up in the ETS to prompt the user to enter the key, as shown in Fig.5.1 (2) below.

✧

The certificate can also be read from the device using a QR scanner (recommended).

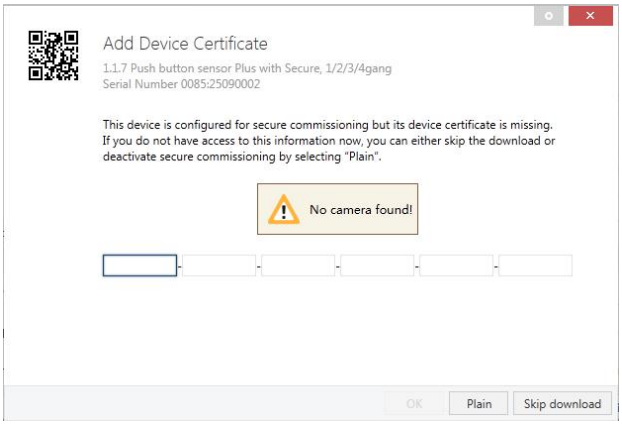


Fig.5.1(2) Add Device Certificate window

✧Alternatively, the certificates of all Secure devices can be entered in the ETS beforehand.

This is done on the “Security” tab on the project overview page, as shown in Fig.5.1(3) below.

The certificates can be also added to the selected device in the project, as shown in Fig.5.1(4).

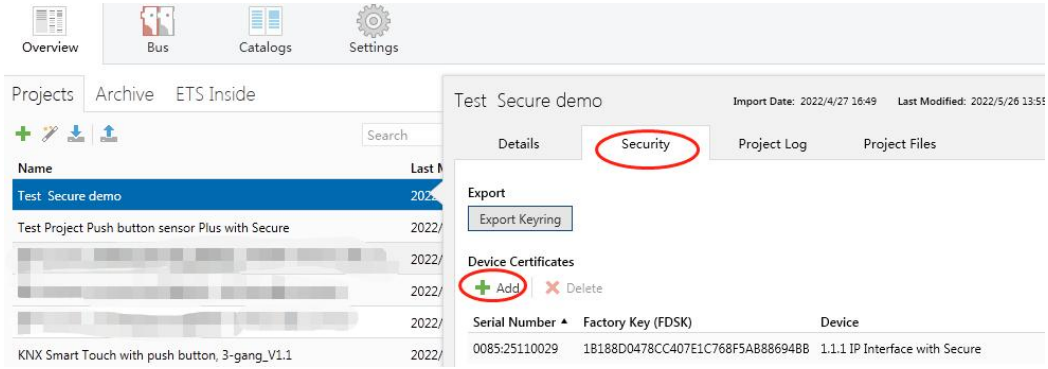


Fig.5.1(3) Add Device Certificate

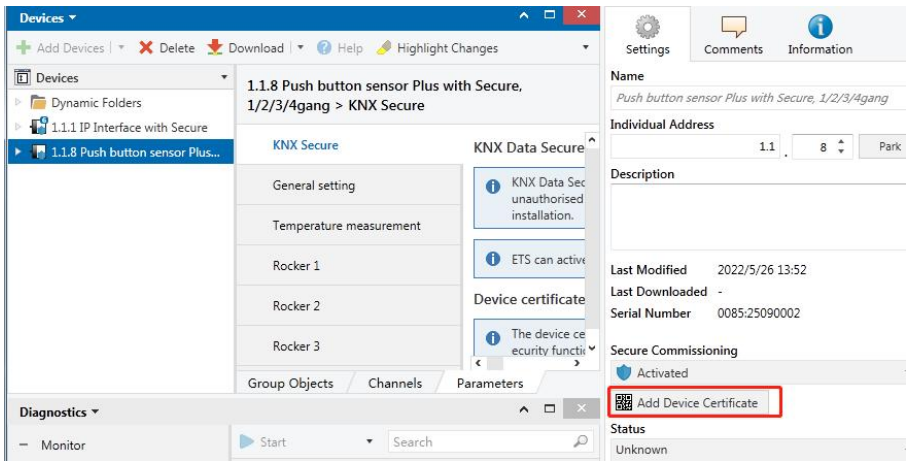


Fig.5.1(4) Add Device Certificate

✧There is a FDSK sticker on the device, which is used for viewing FDSK number.

Without the FDSK, it will no longer be possible to operate the device in KNX Secure mode after a reset.

The FDSK is required only for initial commissioning. After entering the initial FDSK, the ETS will assign a new key, as shown in Fig.5.1(5) below.

The FDSK will be required again only if the device was reset to its factory settings (e.g. If the device is to be used in a different ETS project).

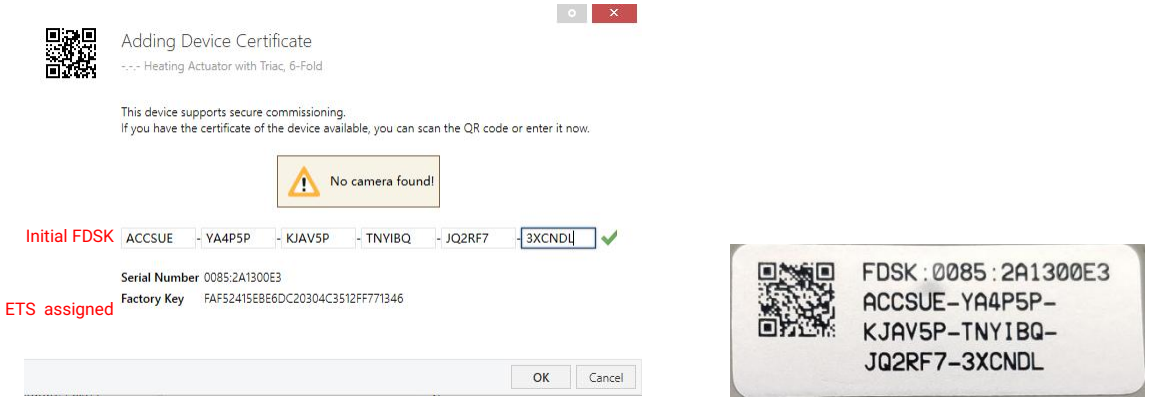


Fig.5.1(5)

Example:

If this application in the project needs to be tried with another device, it is no longer the original device. When the application is downloaded to a new device, the following prompt will appear on the left of Fig.5.1(6), click yes, the Add Device Certificate window will appear, then enter the initial FDSK of the new device, and you need to reset the device to the factory settings (it is not required if the device is still factory default; If it has been used, it will be required to reset, otherwise the following error message will appear on the right of Fig.5.1(6)), and then the device can be successfully downloaded again.

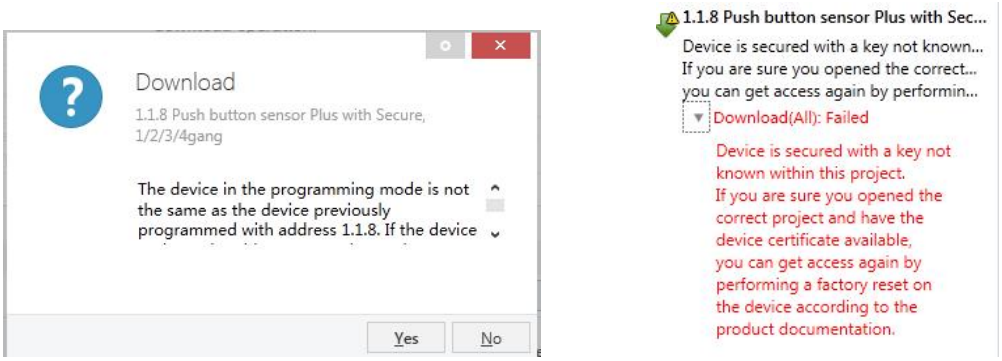


Fig.5.1(6) Example

Whether the device is replaced in the same project, or the device is replaced in a different project, the processing is similar: **Reset the device to the factory settings, then reassign the FDSK.**

After the device is downloaded successfully, the label Add Device Certificate turns gray, indicating that the key for this device has been assigned successfully, as shown in Fig.5.1(7) below.



Fig.5.1(7)

ETS generates and manages keys:

Keys and passwords can be exported as needed to the use of security keys outside of the associated ETS projects. As shown in Fig.5.1(8) below, the file extension is .knxkeys.

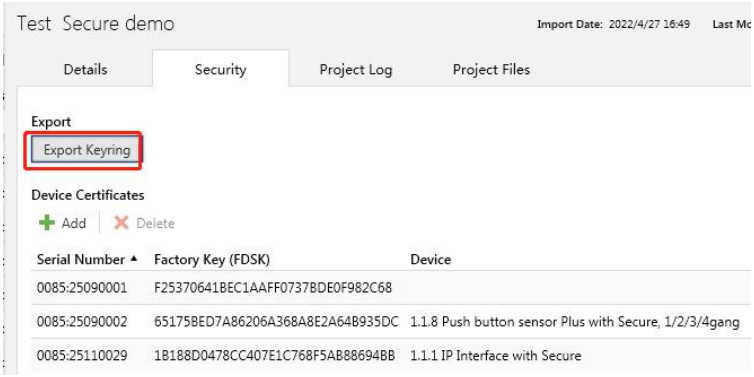


Fig.5.1(8)

Note: Any USB interface used for programming a KNX Secure device must support “long frames”. Otherwise ETS will report a download failure information, as shown below.

5.2.Parameter window “General setting”

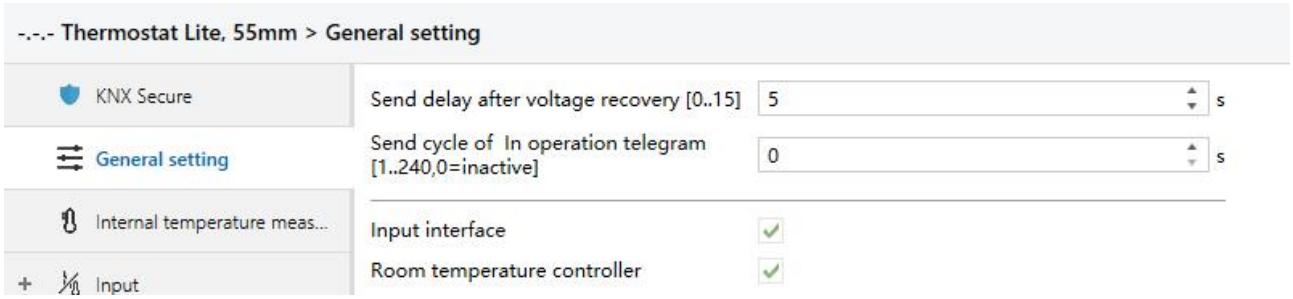


Fig.5.2 “General setting” parameter window

Parameter "Send delay after voltage recovery [0..15]s"

This parameter is for setting the delay time to send to bus after the device voltage recovery. Options: **0..15**

The setting dose not contain the device initialization time, and bus telegrams received during delay time will be recorded.

Parameter "Send cycle of "In operation" telegram [1..240,0=inactive]s"

This parameter is for setting the time interval when cyclically send telegrams through the bus to indicate this device in normal operation. When set to “0”, the object “In operation” will not send a telegram. If the setting is not “0”, the object “In operation” will send a telegram according to the setting period time with logic “1” to the bus. Options: **0...240s,0= inactive**

As to reduce the bus load as much as possible, the maximum time interval should be selected according to actual application requirement.

Parameter "Status object read request after restart"

This parameter is for setting whether to send status read request telegram when the device starts up. The sending time interval is fixed to 100ms.

Parameter "Input interface"

Setting page of input interface is visible after this parameter enabled.

Parameter "Room temperature controller"

Setting page of room temperature controller interface is visible after this parameter enabled.

5.3.Parameter window “Internal sensor measurement”

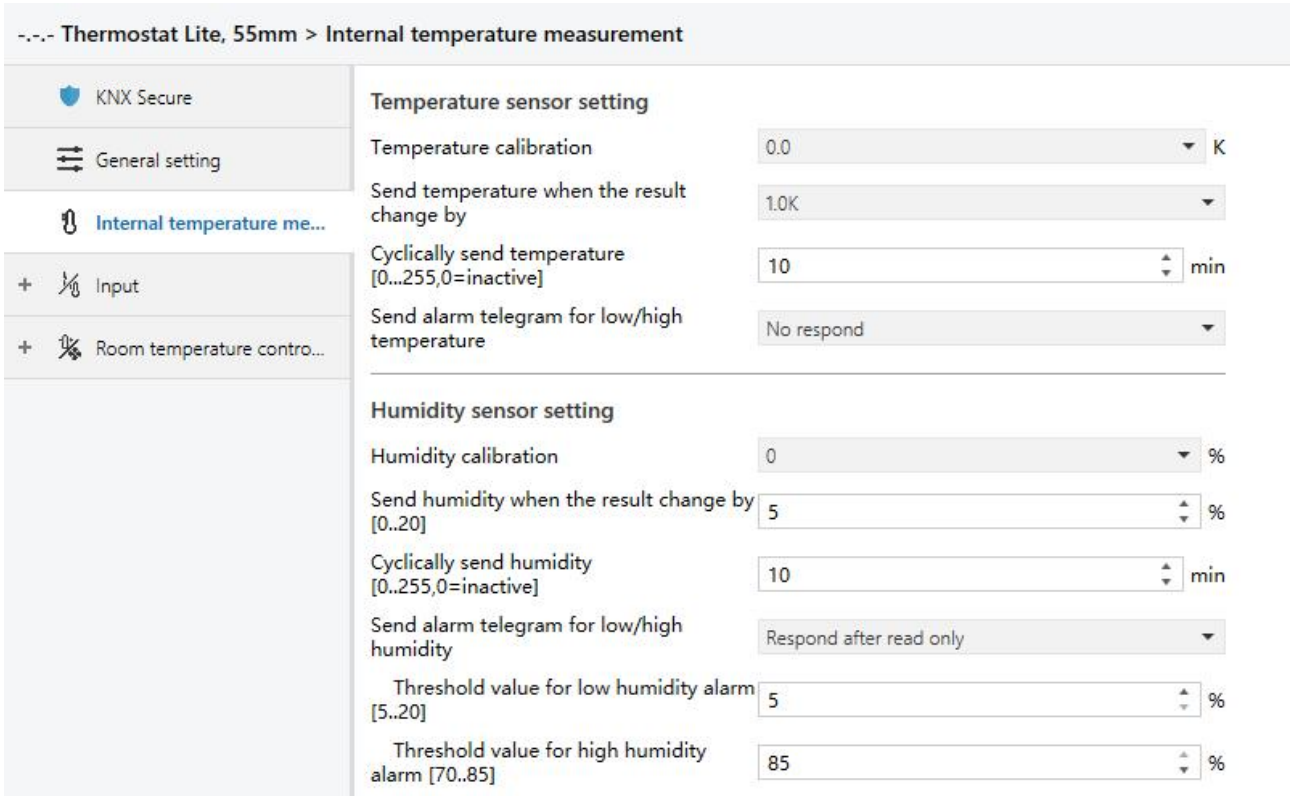


Fig.5.3 “Internal sensor measurement” parameter window

These parameters as follow are used for setting the calibration value, sending condition and error report of internal sensor, if room temperature controller select to use internal sensor, refer to the settings here.

Temperature sensor setting

Parameter “Temperature calibration”

This parameter is for setting the temperature calibration value of the internal sensor, that is, to calibrate the measured value of internal sensor to make it closer to the current ambient temperature.

Options:

-5.0K

...

0.0K

...

5.0K

Note: after the device is powered on, the stability time of internal sensor detection will take 30 minutes, therefore, the detected temperature value in the early stage of device work may be inaccurate.

Parameter "Send temperature when the result change by"

This parameter is for setting when temperature turns to a certain value, whether to enable to send the current temperature value to the bus. No telegram is sent when Disable is selected. Options:

Disable

0.5K

1.0K

...

10.0K

Parameter "Cyclically send temperature [0...255,0=inactive]min"

Setting the time for cyclically sending the temperature detection value to the bus. Options: **0..255**

This period is independent and starts time counting after programming completion or reset. Transmission change has no affect on this period.

Parameter "Send alarm telegram for low/high temperature"

This parameter is for setting condition of sending telegram when low/high temperature alarm. Options:

No respond

Respond after read only

Respond after change

Respond after read only: only when the device receives a read alarm from other bus device or bus will the object "Low temperature alarm"/" High temperature alarm" send the alarm status to the bus;

Respond after change: the object "Low temperature alarm"/"High temperature alarm" will immediately send the telegram to the bus to report the alarm value when the alarm status has changed.

These two parameters as follow are visible when "Respond after read only" or "Respond after change" are selected.

——Parameter "Threshold value for low temperature alarm [0..15]°C"

This parameter is for setting the threshold value for low temperature alarm. When the temperature lower than low threshold, low temperature alarm object will send telegram. Options:

0°C

1°C

...

15°C

——Parameter "Threshold value for high temperature alarm [30..45]°C"

This parameter is for setting the threshold value for high temperature alarm. When the temperature higher than high threshold, high temperature alarm object will send telegram. Options:

30°C

31°C

...

45°C

Humidity sensor setting

Parameter "Humidity calibration"

This parameter is for setting the humidity calibration value of the internal sensor, that is, to calibrate the measured value of internal sensor to make it closer to the current ambient humidity.

Options: **-20% / -15% / -10% / -5% / -3% / -1% / 0% / 1% / 3% / 5% / 10% / 15% / 20%**

Parameter "Send humidity when the result change by [0..20]%"

This parameter is for setting when humidity turns to a certain value, whether to enable to send the current humidity value to the bus. Not send when value is 0. Options: **0..20**

Parameter "Cyclically send humidity [0..255,0=inactive]min"

Setting the time for cyclically sending the humidity detection value to the bus. Options: **0..255**

This period is independent and starts time counting after programming completion or reset. Transmission change has no affect on this period.

Parameter "Send alarm telegram for low/high humidity"

This parameter is for setting condition of sending telegram when low/high humidity alarm. Options:

No respond

Respond after read only

Respond after change

Respond after read only: only when the device receives a read alarm from other bus device or bus will the object " Low humidity alarm"/" High humidity alarm" send the alarm status to the bus;

Respond after change: the object "Low humidity alarm"/"High humidity alarm" will immediately send the telegram to the bus to report the alarm value when the alarm status has changed.

These two parameters as follow are visible when "Respond after read only" or "Respond after change" are selected.

——Parameter "Threshold value for low humidity alarm [5..20]%"

This parameter is for setting the threshold value for low humidity alarm. When the humidity lower than low threshold, low humidity alarm object will send telegram. Options: **5..20**

——Parameter "Threshold value for high humidity alarm [70..85]%"

This parameter is for setting the threshold value for high humidity alarm. When the humidity higher than high threshold, high humidity alarm object will send telegram. Options: **70..85**

5.4.Parameter window "Input"

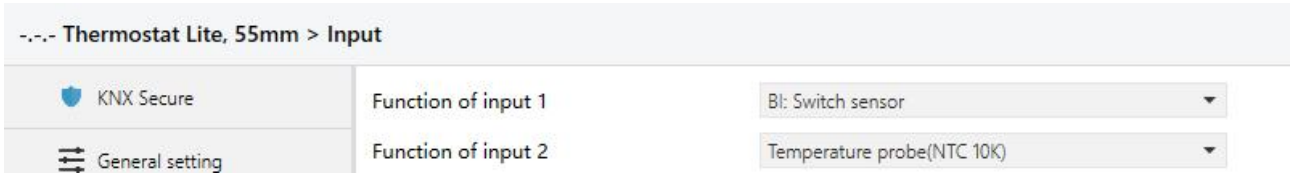


Fig.5.4 "Input" parameter window

Parameter "Function of input x"(x=1, 2)

This parameter is for setting the function of external input interface. Support temperature detection and dry contact input (BI), setting page will be visible when select corresponding chosen. Also can be disable this channel function. Options:

Disable

Temperature probe(NTC 10K)

BI: Switch sensor

BI: Scene control

BI: Send String(14bytes)

When select Temperature probe(NTC 10K), can detect external temperature, which needs set B value of temperature probe.

When select dry contact input (BI), only supports the basic functions, including switch, scene control, send strings (press/release operation, short/long operation, send after voltage recovery, disable function).

Chapters as follow explain the functions of external input interface separately.

5.4.1.Temperature probe

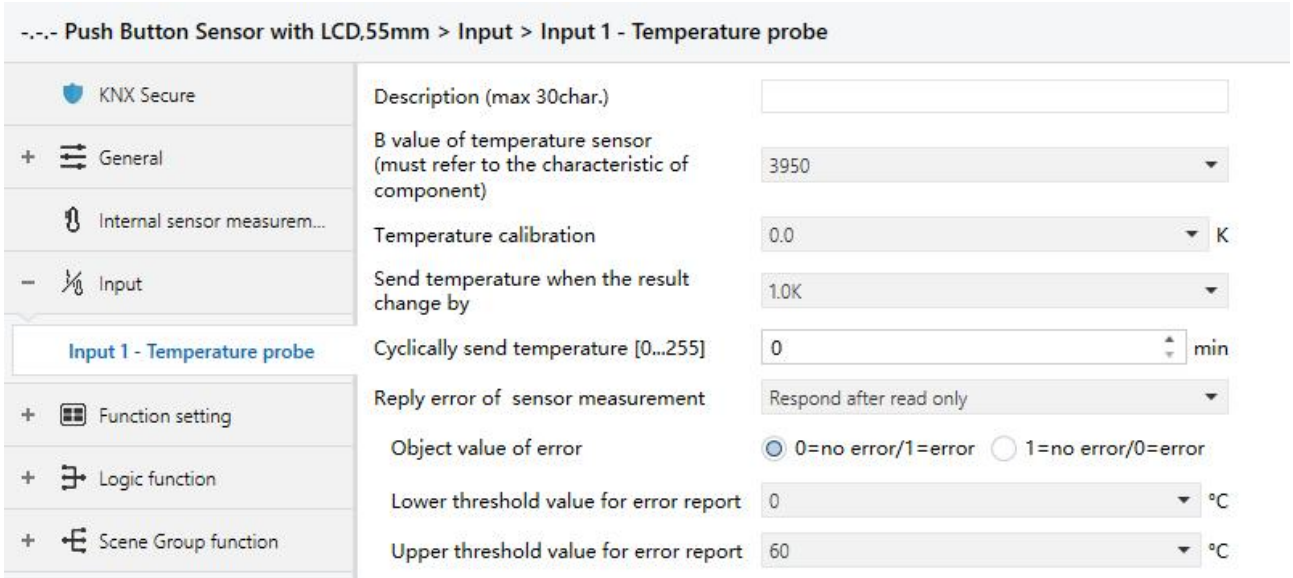


Fig.5.4.1 Parameter setting of temperature probe

Parameter "Description (max 30char.)"

This parameter is for setting the name description of temperature probe.

Parameter "B value of temperature sensor(must refer to the characteristic of component)"

This parameter is for setting the B value of temperature sensor. Options:

3275

3380

...

4200

Note: This value must refer to the characteristic of component, available from the instruction manual. If selected B value is different from used sensor, it will effect detection result directly.

Parameter "Temperature calibration"

This parameter is for setting the temperature calibration value of the temperature sensor, that is, to calibrate the measured value of sensor to make it closer to the current ambient temperature. Options:

-5.0K

...

0.0K

...

5.0K

Parameter "Send temperature when the result change by"

This parameter is for setting when temperature turns to a certain value, whether to enable to send the current temperature value to the bus. No telegram is sent when Disable is selected. Options:

Disable

0.5K

1.0K

...

10.0K

Parameter "Cyclically send temperature [0...255,0=inactive]min"

Setting the time for cyclically sending the temperature detection value to the bus. No telegram is sent when value is 0.

Options: **0..255**

Parameter "Reply error of sensor measurement"

This parameter for setting the condition of sending error status report when temperature exceeds the valid detection. options:

No respond

Respond after read only

Respond after change

Respond after read only: only when the device receives a read error from other bus device or bus will the object " Temperature error report, Sensor" send the error status to the bus;

Respond after change: the object " Temperature error report, Sensor" will immediately send the telegram to the bus to report the error value when the error status has changed.

These three parameters as follow are visible when "Respond after read only" or "Respond after change" are selected.

——Parameter "Object value of error"

This parameter for defining object value of error. Options:

0=no error/1=error

1=no error/0=error

0=no error/1=error: the object value for which sensor no error occurs is 0, and the object value for which sensor error occurs is 1;

1=no error/0=error: it has the opposite meaning.

——Parameter "Upper threshold value for error report"

This parameter is for setting the upper threshold value for temperature error. When the temperature higher than the threshold, temperature error object will send telegram.

Options: **40°C / 45°C / 50°C / 55°C / 60°C / 70°C**

——Parameter "Lower threshold value for error report"

This parameter is for setting the lower threshold value for temperature error. When the temperature lower than the threshold, temperature error object will send telegram.

Options: **10°C / 5°C / 0°C / -5°C / -10°C / -20°C**

5.4.2.Binary input

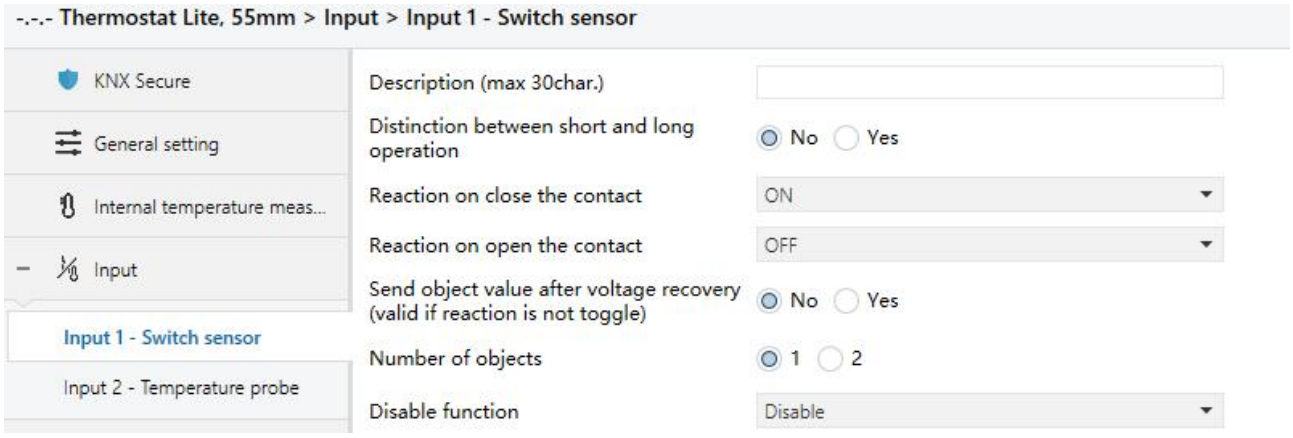


Fig.5.4.2(1) Parameter setting of switch sensor

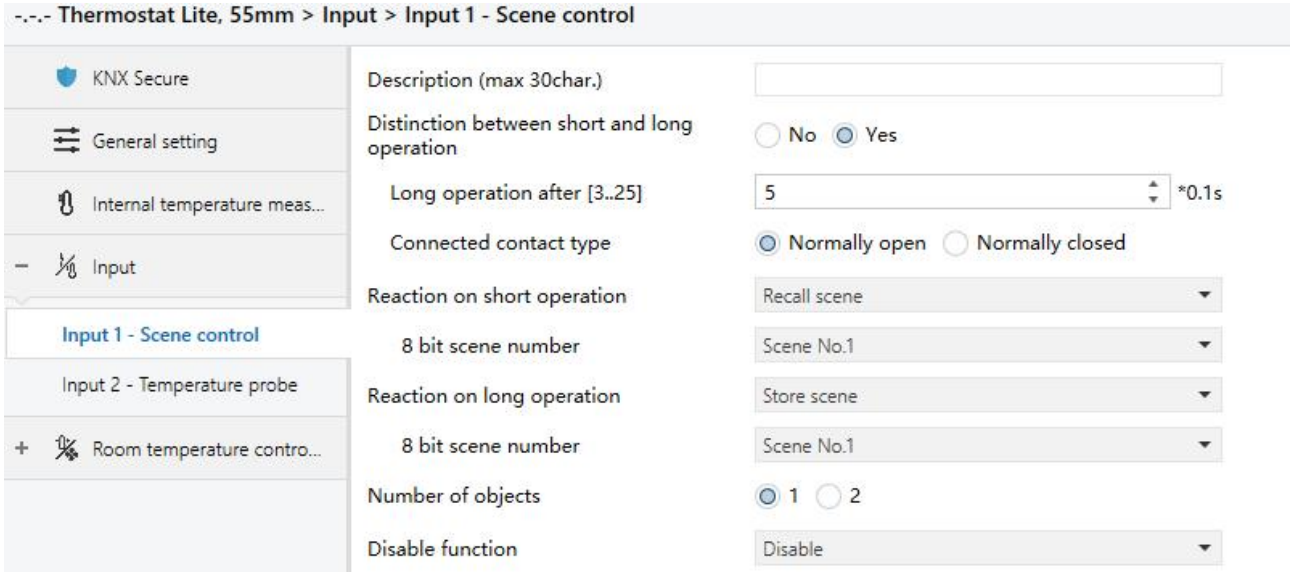


Fig.5.4.2(2) Parameter setting of scene control

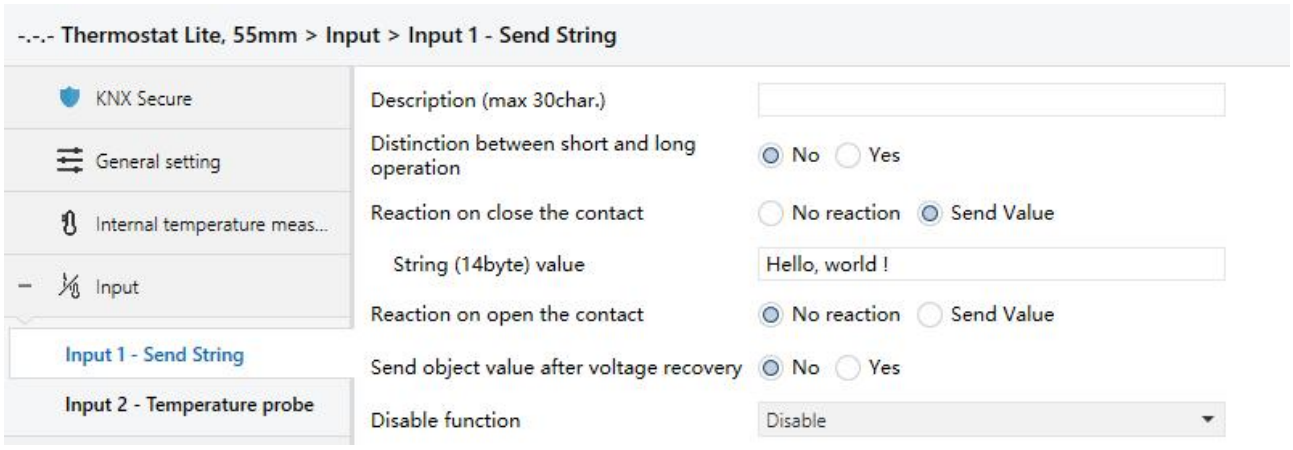


Fig.5.4.2(3) Parameter setting of sending sting

Parameter "Description (max 30char.)"

This parameter is for setting the name description for binary input function.

Parameter "Distinction between short and long operation"

This parameter is for setting whether to distinction between short and long operation. Options:

No

Yes

——Parameter "Long operation after [3..25]*0.1s"

This parameter is visible when distinction between short and long operation. Set the effective time of long operation. When button operation out of the setting time, it is a long operation, otherwise it is a short operation.

Options: **3..25**

——Parameter "Connected contact type"

This parameter is visible when distinction between short and long operation. Set the connected contact type.

Options:

Normally open

Normally closed

When function is selected "BI: Switch sensor", the following parameters are visible, for setting switch sensor.

——Parameter "Reaction on short/long operation"

This parameter is visible when distinction between short and long operation, performing the action according to the settings of the short and long operations. Set the switch value to send when button operation. Options:

No reaction

OFF

ON

TOGGLE

No action: No telegrams have been sent.

ON: Send the on telegram.

OFF: Send the off telegram.

TOGGLE: Each operation will switch between on and off.

——Parameter "Reaction on close/open the contact"

This parameter is visible when no distinction between short and long operation. Judge the close and open operations, and perform the actions according to the settings. Set the switch value to send when button operation. Options:

No reaction

OFF

ON

TOGGLE

——Parameter "Send object value after voltage recovery (valid if reaction is not toggle)"

This parameter is visible when no distinction between short and long operation. This parameter is valid if not select "TOGGLE" or "No reaction", set whether to send object value after voltage recovery. Options:

No

Yes

When function is selected "BI: Scene control", the following parameters are visible, for setting scene control.

——Parameter "Reaction on short/long operation"

This parameter is visible when distinction between short and long operation, performing the action according to the settings of the short and long operations. Set the scene command to send when button operation. Options:

No reaction

Recall scene

Store scene

——Parameter "Reaction on close/open the contact"

This parameter is visible when no distinction between short and long operation. Judge the close and open operations, and send or storage scenes according to the settings. Set the scene command to send when button operation. Options:

No reaction

Recall scene

Store scene

——Parameter "8 bit scene number"

This parameter is visible when "Recall scene" or "Store scene" is selected. Set the scene number, range: **Scene NO.1~64, corresponding telegram is 0~63**

When function is selected "BI: Send String(14bytes)", the following parameters are visible, for setting string sending.

——Parameter "Reaction on short/long operation"

This parameter is visible when distinction between short and long operation, performing the action according to the settings of the short and long operations.Options:

No reaction

Send Value

——Parameter "Reaction on close/open the contact"

This parameter is visible when no distinction between short and long operation. Judge the close and open operations, and send strings according to the settings. Options:

No reaction

Send Value

——Parameter "String (14byte) value"

This parameter is visible when “Send Value” is selected. Input the strings to send.

——Parameter “Send object value after voltage recovery”

This parameter is visible when no distinction between short and long operation. Set whether to send object value after voltage recovery. Options:

No

Yes

Parameter "Number of objects"

This parameter is visible when the parameter “Reaction on long/open operation” is not selected “No reaction”. Set whether to use a common object or two separate objects when open/close and long/short operations. Options:

1

2

Parameter "Disable function"

This parameter is visible when binary input functions are selected. Set trigger value to disable/enable contacts. Options:

Disable

Disable=1/Enable=0

Disable=0/Enable=1

5.5.Parameter window “Room temperature controller”

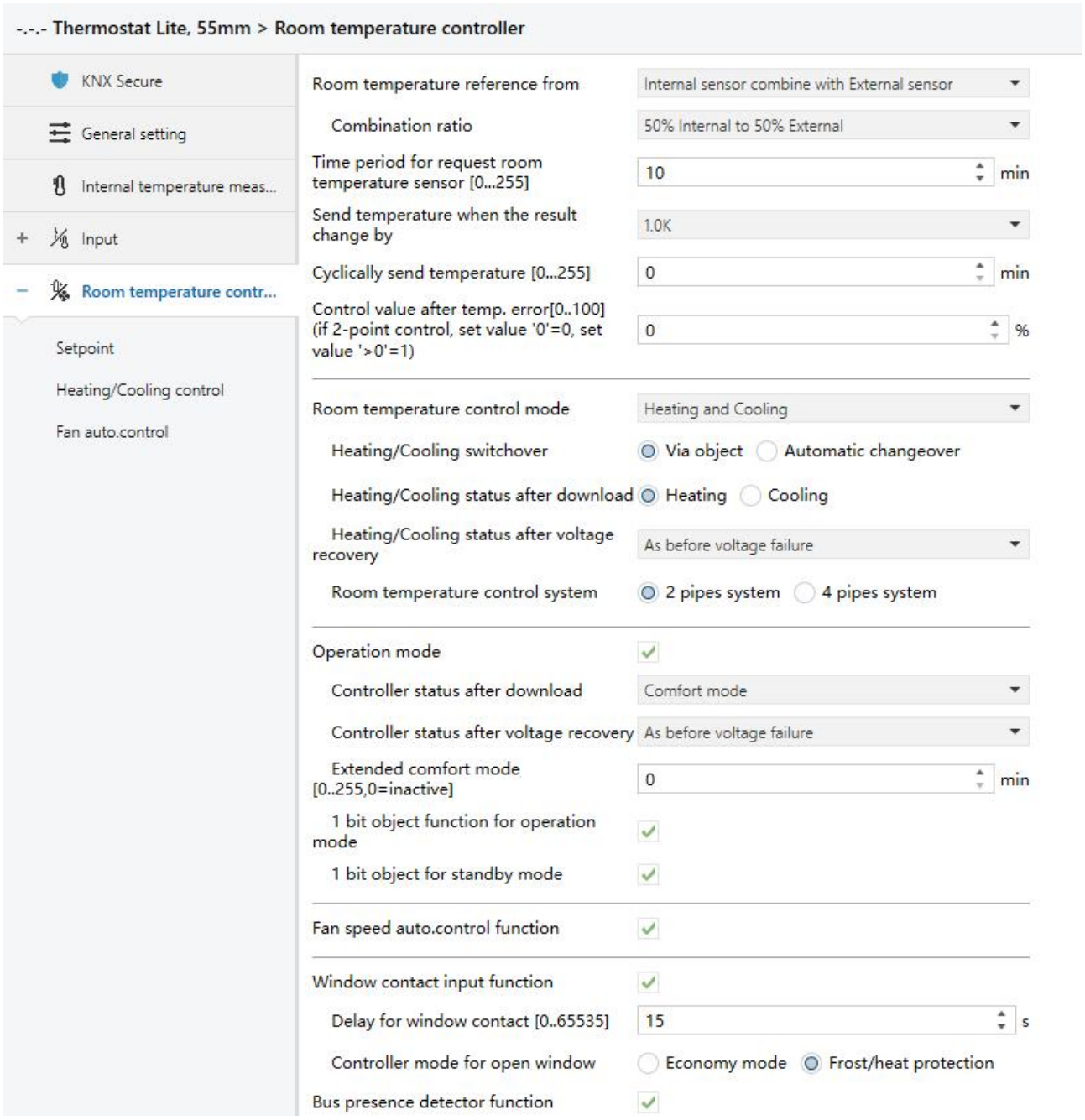


Fig.5.5.5 “Room temperature controller” parameter window

Parameter "Room temperature reference from"

This parameter is for setting the resource of the RTC function temperature reference. Options:

Internal sensor

External sensor

Internal sensor combine with External sensor

When selecting the reference internal sensor, the temperature is determined by the setting of the “Internal sensor measurement” in the parameter interface, more details refer to chapter 5.3.

——Parameter “Time period for request room temperature sensor [0...255]min”

This parameter is visible when “...External sensor” is selected. Set the time period for read request external temperature sensor. Options: **0..255**

Parameters as follow are visible when “Internal sensor combine with External sensor” is selected.

——Parameter “Combination ratio”

This parameter is for setting the internal sensor and the external sensor to measure the specific gravity of the temperature. Options:

10% Internal to 90% External

20% Internal to 80% External

...

90% Internal to 10% External

For example, if the option is “40% internal to 60% external”, then the internal sensor accounts for 40%, the external sensor accounts for 60%, and the control temperature = (internal sensor's temperature × 40%) + (external sensor's temperature × 60%), the RTC function of the device will control and display the temperature according to the calculated temperature.

When two sensors are combined for detection, when one sensor is in error, the temperature value detected by the other sensor is used.

——Parameter “Send temperature when the result change by”

This parameter is for setting when temperature turns to a certain value, whether to enable to send the current temperature value to the bus. Not send when disable. Options:

Disable

0.5K

1.0K

...

10K

——Parameter "Cyclically send temperature [0...255]min"

Setting the time for cyclically sending the temperature detection value to the bus. Not send when value is 0.

Options: **0..255**

Note: cyclically sending and change sending are independent of each other.

Parameter "Control value after temp. error[0..100]% (if 2-point control, set value '0'=0, set value >0'=1)"

This parameter is for setting the control value when temperature error occur. Options: **0..100**

If 2-Point control, then the parameter value is 0, as well as the control value; if the parameter value is more than 0, then the control value will be 1.

Parameter "Room temperature control mode"

This parameter is for setting room temperature control mode. Options:

Heating

Cooling

Heating and Cooling

Parameters as follow are visible when "Heating and Cooling" is selected.

——Parameter "Heating/Cooling switchover"

This parameter is for setting the switchover way of Heating/Cooling. Options:

Via object

Automatic changeover

——Parameter "Heating/Cooling status after download"

This parameter is for setting the heating/cooling control mode of device after download.

Options:

Heating

Cooling

——Parameter "Heating/Cooling status after voltage recovery"

This parameter is for setting the heating/cooling control mode of device after voltage recovery. Options:

Heating

Cooling

As before voltage failure

As before voltage failure: When the device is reset after power on, the control mode will recover as before voltage failure. If it is the first time the device is used or a newly enabled function page, the control mode after the device is started is in an uncertain state, and it needs to be manually selected at this time.

——Parameter "Room temperature control system"

This parameter is for setting the type of RTC control system, that is, pipe types of fan coil water inlet/outlet. Options:

2 pipes system

4 pipes system

2 pipes system: Shares an inlet and outlet pipe for heating and cooling, that is, both hot and cold water are controlled by a valve.

4 pipes system: Has its own inlet and outlet pipes for heating and cooling, and two valves are needed to control the entry and exit of hot water and cold water respectively.

Parameter "Operation mode"

This parameter is for setting whether to enable RTC operation mode.

When enable, support 4 modes with comfort, standby, economy and frost/heat protection. Support datatype of 1bit and 1byte, and preset a operation mode when download and voltage recovery.

Parameters as follow are visible when operation mode enabled.

——Parameter "Controller status after download"

This parameter is for setting the operation mode after download. Options:

Comfort mode

Standby mode

Economy mode

——Parameter "Controller status after voltage recovery"

This parameter is for setting the operation mode after voltage recovery. Options:

Comfort mode

Standby mode

Economy mode

Frost/heat protection

As before voltage failure

——Parameter "Extended comfort mode [0..255,0=inactive]min"

When the work mode is "Slave", this parameter is not visible.

Set the extended time of comfort mode. When value >0, activate the extended, and 1 bit object "Extended comfort mode" is visible. Options: **0..255**

When object receives telegram 1, comfort mode is activated. If receive telegram 1 again during the delay time, the time is retiming. And comfort mode will return to previous operation mode once finish the timing. Exit the comfort mode when a new operation mode in delay time.

Change the operation mode will quit the timing, and heating/cooling switchover will not.

——Parameter "1 bit object function for operation mode"

This parameter is for setting whether to enable 1 bit objects of operation mode are visible. Corresponding mode activation when objects send telegram 1; Perform standby mode when object values of comfort, economy, protection received from the bus are 0.

——Parameter "1 bit object for standby mode"

This parameter is visible when previous parameter enabled. Set whether to enable 1 bit object of standby mode is visible.

Parameters as follow are visible when operation mode disabled.

——Parameter "Initial setpoint temperature (°C)"

This parameter is for setting the initial value of setpoint temperature. Options:

10.0

10.5

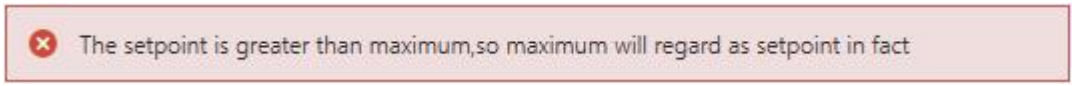
...

35.0

When initial setpoint temperature is less than the min. setpoint temperature, display following warning:



When initial setpoint temperature is greater than the max. setpoint temperature, display following warning:



Automatic H/C mode changeover dead zone

——Parameter " Upper/Lower dead zone"

These two parameters are visible when control mode is selected "Heating and Cooling", and "Automatic changeover" is selected. Setting the dead zone range of auto switchover heating/cooling. Options:

0.5K

1.0K

...

10K

Under heating control, when the actual temperature(T) greater than or equal to the setpoint temperature + the upper dead zone, then mode heating switch to cooling;

Under cooling control, when the actual temperature(T) less than or equal to the setpoint temperature + the upper dead zone, then mode cooling switch to heating.

Parameter "Fan speed auto control function"

This parameter is for setting whether to enable fan auto control interface is visible.

Parameter "Window contact input function"

This parameter is visible when operation mode enabled. Set whether to link to window contact status.

——Parameter "Delay for window contact [0..65535]s"

This parameter is visible when operation mode and window contact input function are enabled. Set the delay time to window contact detection. That is, when receive a telegram "Open window", the controller will regard that as a valid signal and execute the behaviour after this delay time. Options: **0..65535**

——Parameter "Controller mode for open window"

If window status is open, perform corresponding operation according to configuration. (Other control telegram receiving will be record during window is open and performed after receiving the telegram "Close window". If there is no telegram receiving when window is open, return to the mode before opening the window). Options:

Economy mode

Frost/heat protection

Parameter "Bus presence detector function"

This parameter is visible when operation mode is enabled. Set whether to link to bus presence detector status.

If presence is detected, enter the comfort mode and it will be restored to original mode after leaving. If there is a telegram/manual operation to adjust the mode during the period, the telegram is logged in the background, and it will be exited comfort mode and restored to this mode after leaving. If there is no telegram receiving during timing, return to original mode. (If receive the presence status cyclically, comfort mode can not be re-triggered, and only can be after leaving.)

Parameter "Min./Max. setpoint temperature [5..37]°C"

These parameters are visible when operation mode disabled. Set to limit the adjustable range of the setpoint temperature. If the setpoint temperature beyond the limited range, the will output the limited temperature.

Options:

5°C

6°C

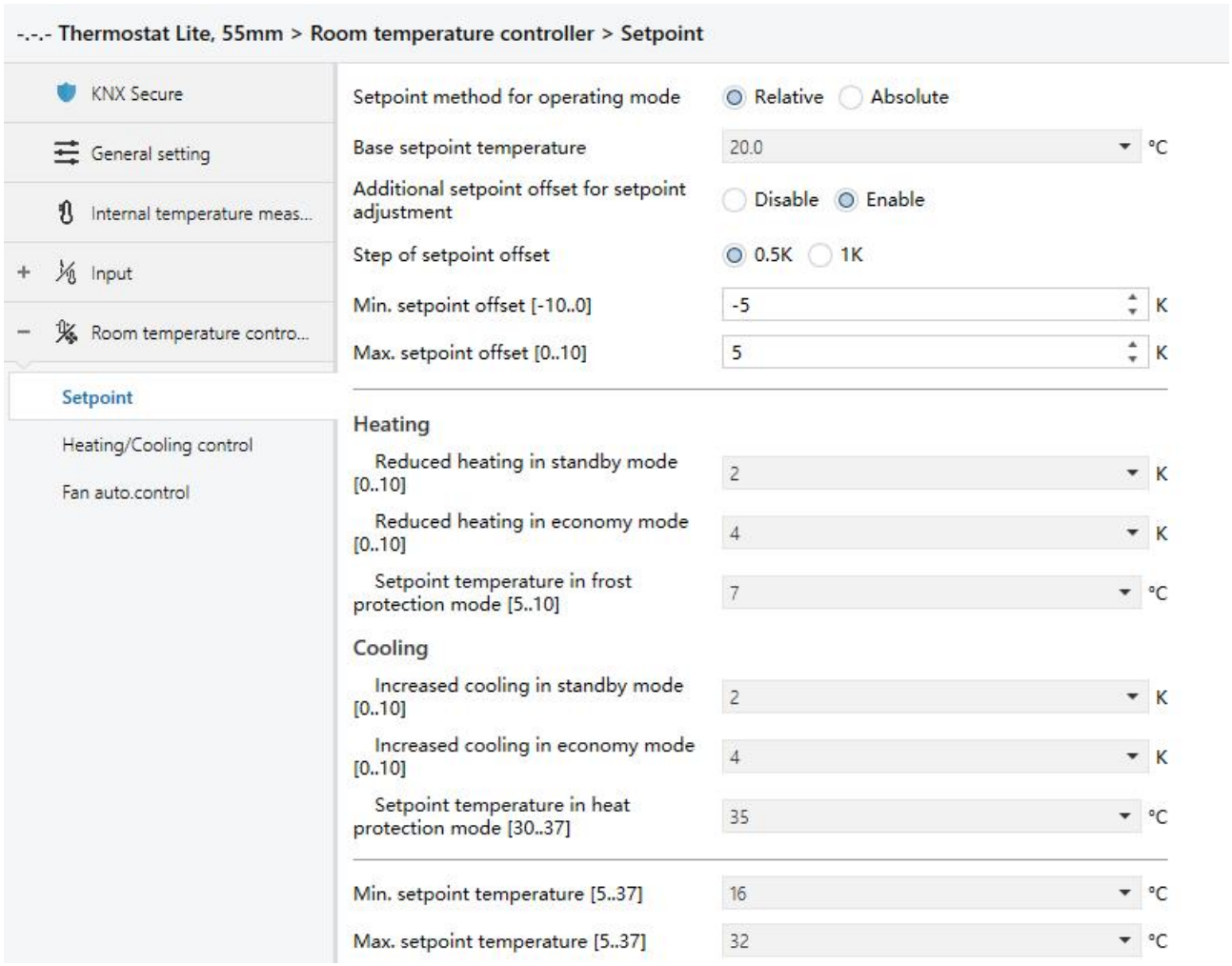
...

37°C

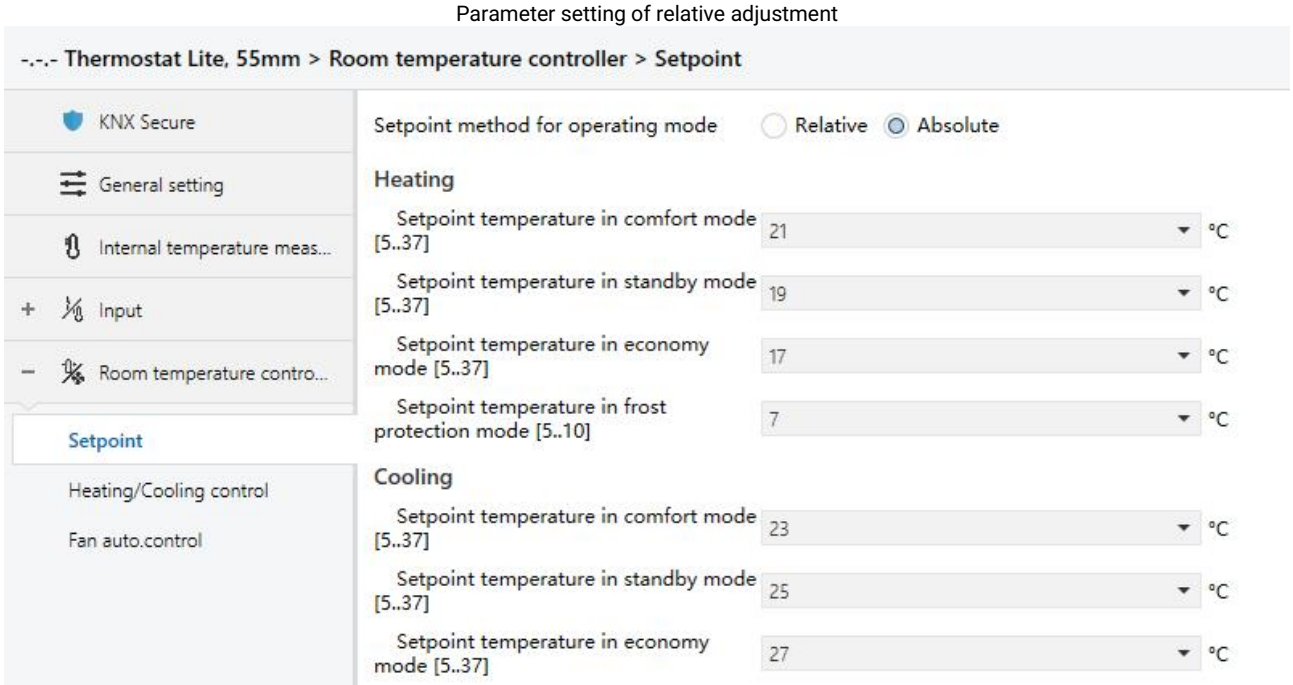
These parameters are display below the parameters settings interface “Setpoint” when enable operation mode.

For setpoint temperature, the Min. value must less than the Max., if not, it can not be modified on ETS.

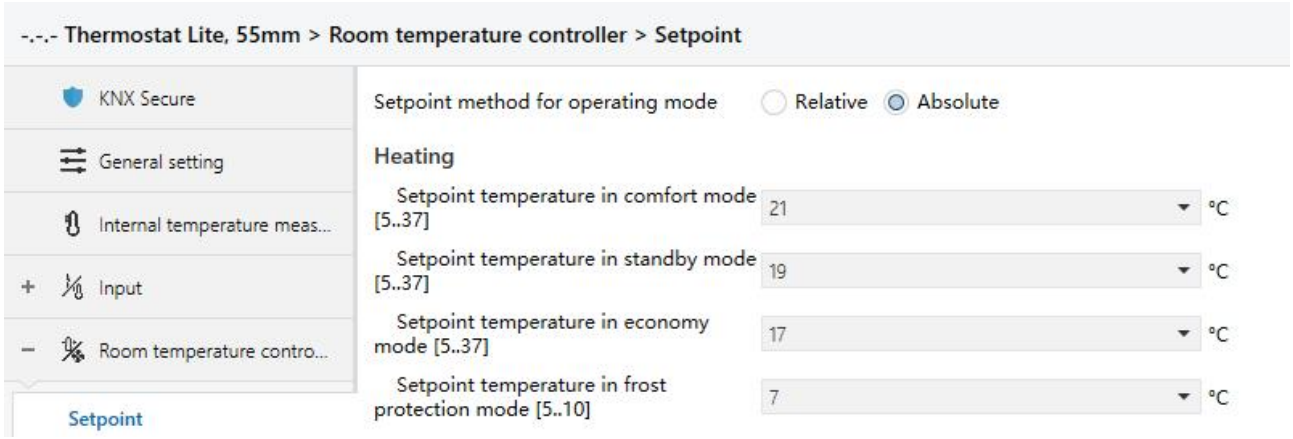
5.5.1.Parameter window “Setpoint”



Parameter setting of relative adjustment



Parameter setting of absolute adjustment (1)



Parameter setting of absolute adjustment (2)

Fig.5.5.2.1.1 "Setpoint" parameter window

This parameter window is visible when operation mode is enabled, and display according to control mode.

Parameter "Setpoint method for operating mode"

This parameter is for setting the setpoint method for operating mode. Options:

Relative

Absolute

Relative: relative adjustment, the setpoint temperature of economy mode and standby mode will refer to the defined temperature setpoint.

Absolute: absolute adjustment, each mode has its independent temperature setpoint.

Parameters as follow are visible when the setpoint temperature adopts the relative adjustment method.

Parameter "Base setpoint temperature (°C)"

This parameter is for setting the base setpoint temperature, from which the setpoint temperature of the room comfort mode is obtained. Options:

10.0

10.5

...

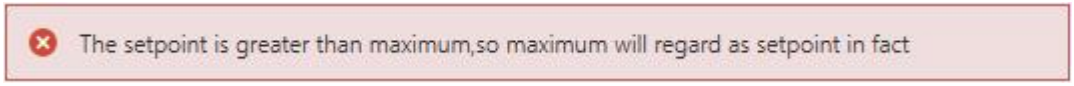
35.0

The setpoint value will be modified through object “Base temperature setpoint, status”, then the new value will be stored after the device power off.

When base setpoint temperature is less than the min. setpoint temperature, display following warning:



When base setpoint temperature is greater than the max. setpoint temperature, display following warning:



The setpoint value will be modified through object “Base setpoint adjustment”, then the new value will be stored after the device power off.

Current basic setpoint temperature = modified basic setpoint temperature +/- accumulated offset(if existence)

When adjusting the setpoint temperature of current operation mode, the setpoint value will be changed with it, but the relative temperature of each mode is unchanged. Relative temperature of standby, economy and comfort mode is set by the parameters as follows.

Parameter “Additional setpoint offset for setpoint adjustment”

This parameter is for setting whether to enable additional setpoint offset function for setpoint adjustment, mainly used to adjust setpoint temperature by 1 bit object. Options:

Disable

Enable

Increase/decrease offset by 1 bit object “Setpoint offset”, adjust the setpoint temperature indirectly, and send offset value to the bus by 2 byte object “Float offset value”. Also reset the offset value by 1 bit object “Setpoint offset reset”, modified the offset value by 2 byte object “Float offset value”. Save the offset value when control mode and operation mode changed.

Three parameters as follow are visible when offset function enabled.

——Parameter "Step of setpoint offset"

This parameter is for setting step value of setpoint offset increased/decreased when receiving telegrams. Telegram 1- increase, telegram 0- decrease. Accumulated offset can be saved when power off. Options:

0.5K

1K

Setpoint temperature of current mode = base temperature + fix offset of mode + accumulated additional offset

Note: Fix offset of mode is the offset of standby and economy modes compared to comfort mode, which is decided by the follow parameters of heating/cooling. Accumulated additional offset is adjusted by 1bit object "Setpoint offset", or directly modified the offset value by 2 byte object "Float offset value".

——Parameter "Min. setpoint offset [-10..0]K"

This parameter is for setting the maximum offset allowed when negative offset (setpoint temperature is decreased). Options: **-10..0**

——Parameter "Max. setpoint offset [0..10]K"

This parameter is for setting the maximum offset allowed when forward offset (setpoint temperature is increased). Options: **0..10**

For offset, the Min. value and the Max. can not equal to 0 at the same time, if not, it can not be modified on ETS.

Automatic H/C mode changeover dead zone (only for comfort mode)

Parameter "Upper/Lower dead zone"

These two parameters are visible when control mode "Heating and Cooling" is selected, and "Automatic changeover" is selected. Setting the dead zone range of auto switchover heating/cooling. Options:

0.5K

1.0K

...

10K

Under heating control, when the actual temperature(T) is greater than or equal to the setpoint temperature + the upper dead zone, then mode heating switch to cooling;

Under cooling control, when the actual temperature(T) is less than or equal to the setpoint temperature + the upper dead zone, then mode cooling switch to heating.

Parameter "Reduced heating in standby mode [0...10]K"

Parameter "Increased cooling in standby mode [0...10]K"

These two parameters are for setting the setpoint of economy mode. Options:

0K

1K

...

10K

Heating: The setpoint of economy mode is the temperature setpoint minus the reference value;

Cooling: The setpoint of economy mode is the temperature setpoint plus the reference value.

Parameter "Reduced heating in economy mode [0...10]K"

Parameter "Increased cooling in economy mode [0...10]K"

These two parameters are for setting the setpoint of economy mode. Options:

0K

1K

...

10K

Heating: The setpoint of economy mode is the temperature setpoint minus the reference value;

Cooling: The setpoint of economy mode is the temperature setpoint plus the reference value.

Parameter "Setpoint temperature in frost protection mode [5...10]°C"

This parameter is for setting the setpoint of frost protection mode. Options:

5°C

6°C

...

10°C

Under the frost protection mode, when room temperature reduce to the setpoint, the controller will trigger a control telegram so that related heating controller will output heating control to prevent the temperature from being too low.

Parameter "Setpoint temperature in heat protection mode [30...37]°C"

This parameter is for setting the setpoint of heat protection mode. Options:

30°C

31°C

...

37°C

Under the heat protection mode, when room temperature raise to the setpoint, the controller will trigger a control telegram so that related cooling controller will output cooling control to prevent the temperature from being too high.

Parameters as follow are visible when the setpoint temperature adopts the absolute adjustment method.

Parameter "Setpoint temperature in comfort mode [5...37]°C"

Parameter "Setpoint temperature in standby mode [5...37]°C"

Parameter "Setpoint temperature in economy mode [5...37]°C"

These parameters are for setting the setpoint temperature in comfort, standby and economy mode when heating or cooling. Options:

5°C
6°C
...
37°C

Parameter "Setpoint temperature in frost protection mode [5...10]°C"

This parameter is for setting the setpoint temperature in frost protection mode when heating. Options:

5°C

6°C

...

10°C

Parameter "Setpoint temperature in heat protection mode [30...37]°C"

This parameter is for setting the setpoint temperature in heat protection mode when cooling. Options:

30°C

31°C

...

37°C

Note: The heating setpoint must be always less than the cooling setpoint.

For absolute adjustment mode, when "Heating and Cooling" is selected, whether it is manual changeover, either bus changeover or automatic changeover, the heating setpoint value must be less than or equal to the cooling of the same operation mode. At the same time, these setpoint temperatures can not exceed the configured range of maximum and minimum values. If not, it can not be modified on ETS. Please consider the limitations of multiple conditions when configuring.

1.When the ambient temperature is higher than the setpoint temperature of current mode in cooling, it is changed to cooling mode; When the ambient temperature is lower than the setpoint temperature of current mode in heating, it is changed to heating mode.

2.In the same operation mode, the setpoint temperature difference between cooling and heating remains constant, whether it is written on the bus or adjusted on the panel. That is, when adjust the setpoint temperature, it need to update cooling and heating setpoint temperature of current operation mode at the same time.

3.When the bus is received setpoint temperature, it is still necessary to limit the value according to the high and low thresholds, that is heating and cooling temperature neither can not be lower than the min., or can not be higher than the max.

Note: for relative/absolute adjustment, in protection mode, the setpoint temperature is only configured via ETS, and not limited with the min./max. value. When the received setpoint value from bus is different from the ETS configuration, the value is not updated and returned to the current setpoint temperature, to update synchronously to other devices on the bus.

5.5.2.Parameter window “Heating/Cooling control”

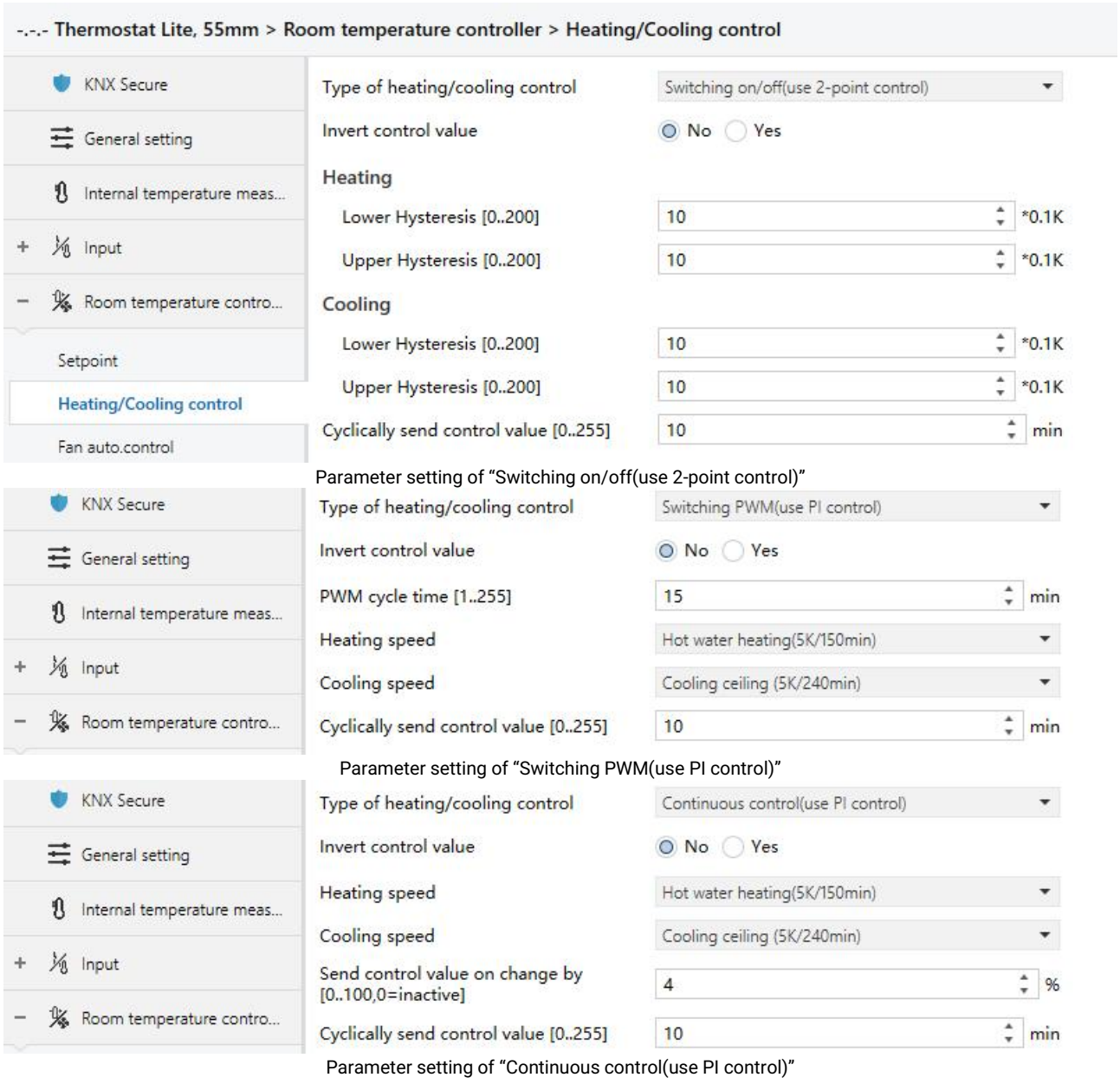


Fig.5.5.2.1.2(1) “Heating/Cooling control” parameter window

Parameters of this window display according to control mode and control system(2 pipe or 4pipe).

Parameter "Type of heating/cooling control"

This parameter is for setting the type of heating/cooling control. Different control types are suitable for controlling different temperature controllers. Options:

Switching on/off(use 2-point control)

Switching PWM(use PI control)

Continuous control(use PI control)

Parameter "Invert control value"

This parameter is for setting whether to invert control value or normal sending control value, so that the control value will be suitable for the valve type. Options:

No

Yes

Yes: Sending the control value to the bus through objects after inverting the control value.

Two parameters as follow are suitable for 2 point control:

——Parameter "Lower Hysteresis [0...200]*0.1K "

——Parameter "Upper Hysteresis [0...200]*0.1K "

These two parameters are for setting the lower/upper hysteresis temperature in FCU heating or cooling.

Options: **0..200**

Under heating control,

When the actual temperature(T) > the setpoint temperature + the upper hysteresis temperature, then will stop heating;

When the actual temperature(T) < the setpoint temperature - the lower hysteresis temperature, then will start heating.

For example, the lower hysteresis temperature is 1K, the upper hysteresis temperature is 2K, the setpoint temperature is 22℃, if T is higher than 24℃, then it will stop heating; if T is lower than 24℃,then it will start heating; if T is between 21~24℃, then it will maintain the previous status.

Under the cooling control,

When the actual temperature (T) < the setpoint temperature -the lower hysteresis temperature, then will stop cooling;

When the actual temperature (T) > the setpoint temperature +the upper hysteresis temperature, then will start cooling.

For example, the lower hysteresis temperature is 1K, the upper hysteresis temperature is 2K, the

setpoint temperature is 26℃, if T is lower than 25℃, then it will stop cooling; if T is lower than 28℃, then it will start cooling; if T is between 28~25℃, then it will maintain the previous status.

2-point control mode is a very simple control mode. When adopting this control mode, it is necessary to set the upper hysteresis temperature and the lower hysteresis temperature through parameters. When setting the hysteresis temperature, the following effects need to be considered

1. When hysteresis interval is small, the temperature range will be small, however, frequent sending of control value will bring large load to the bus;

2. When hysteresis interval is large, the switch switching frequency will be low, but it is easy to cause uncomfortable temperature change.

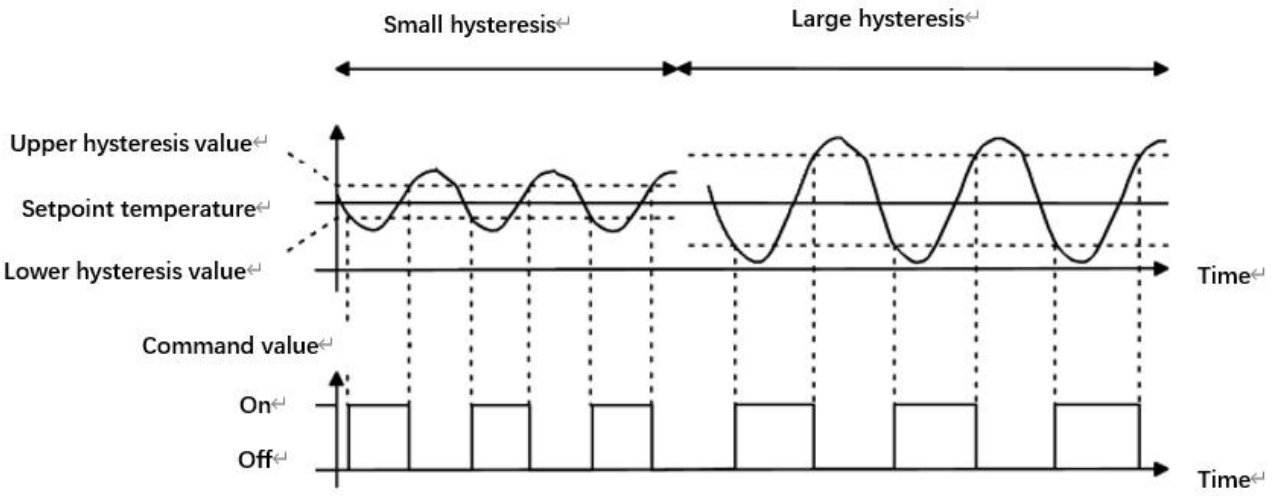


Fig.5.5.2 (2) Effects of hysteresis on control value switch action(heating) under2-point control mode

These two parameters as follow are suitable for PI control:

——Parameter "Heating speed"

——Parameter "Cooling speed"

These two parameters are for setting the responding speed of heating or cooling controller. Different responding speeds are suitable for different environments.

Options:

Hot water heating (5K/150min)

Underfloor heating (5K/240 min)

Electrical heating (4K/100min)

Split unit (4K/90min)

Fan coil unit (4K/90min)

User defined

Options

Cooling ceiling (5K/240min)

Split unit (4K/90min)

Fan coil unit(4K/90min)

User defined

——Parameter "Proportional range [10..100]*0.1K"(P value)

——Parameter "Reset time [0..255]min"(I value)

These two parameters are visible when "User defined" is selected. Set the PI value of PI controller.

Options: **10..100 (P value)**

Options: **0..255 (I value)**

——Parameter "PWM cycle time [1...255]min"

This parameter is only visible when the control type is "Switching PWM(use PI control)". Set the period of the control object cycle to send the switch value, the object sends the switch value according to the duty cycle of the control value. For example, if the set period is 10 min and the control value is 80%, then the object will send an open telegram for 8 min. If the control value is changed, the time duty ratio of the on/ off telegram of the object will also change, but the period is still the time of parameter setting.

Options: **1..255**

The PI values of "Switching PWM (use PI control)" and "Continuous control (use PI control)" are the same, only different in control objects, the control object of "Continuous control" output PI value(1byte) directly, while the control value of "Switching PWM" output a "on/off" telegram according to the duty cycle of the control value.

——Parameter "Send control value on change by [0...100,0=inactive]%"

This parameter is visible when control type is "Continuous control (use PI control)", for setting the changing value of the control value to be sent to the bus. Options: **0..100，0＝inactive**

Parameter "Cyclically send control value [0...255]min"

This parameter is for setting the period for cyclically sending the control value to the bus. Options: **0..255**

In PI control mode, the predefined control parameters of each PI controller in heating or cooling system are recommended as follows:

(1)Heating

Heating type	P value	I value(integration time)	Recommended PI control type	Recommended PWM period
Hot water Heating	5K	150min	Continuous/PWM	15min
Underfloor heating	5K	240min	PWM	15-20min
Electrical heating	4K	100min	PWM	10-15min
Split unit	4K	90min	PWM	10-15min
Fan coil unit	4K	90min	Continuous	--

(2)Cooling

Cooling type	P value	I value(integration time)	Recommended PI control type	Recommended PWM period
Cooling ceiling	5K	240min	PWM	15-20mIn
Split unit	4K	90min	PWM	10-15min
Fan coil unit	4K	90min	Continuous	--

(3)User defined

When the parameter"Heating/Cooling speed" is set to "User defined", the parameter value of P (scale factor) and I (integration time) can be set through the parameter. When adjusting the parameters, refer to the fixed PI value mentioned in the above table. Even if the control parameters are adjusted slightly, the control behavior will be significantly different.

In addition, the integration time should be set properly. If the integration time is too long, the adjustment will be slow, and the oscillation will not be obvious; if the integration time is too small, the adjustment will be fast, but the oscillation will occur. 0 means the integral term is not used.

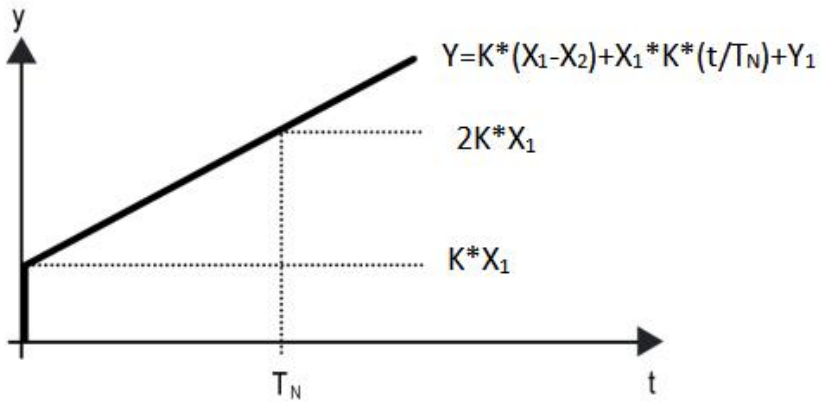


Fig.5.5.2 (3) control value of PI control mode

Y: control value

Y1: last control value

X1: temperature deviation = set temperature - actual temperature

X2: last temperature deviation = set temperature - actual temperature

T_N: integration time

K: scale factor (the scale factor is not zero)

PI control algorithm: $Y = K * (X1-X2) + X1 * K * t / T_N + Y1$

When the integration time is set to zero, the PI control algorithm is: Y = K (X1-X2) + Y2

Setting and influence of user-defined parameters:

Parameter setting	Effect
K: If the scale range is too small	Quick adjustment, and overshoot will occur
K: If the scale range is too small	Slow adjustment, but no overshoot
T_N: If the integration time is too short	Quick adjustment, but there will be oscillation
T_N: If the integration time is too long	Slow adjustment, no obvious oscillation

5.5.3.Parameter window “Fan auto.control”

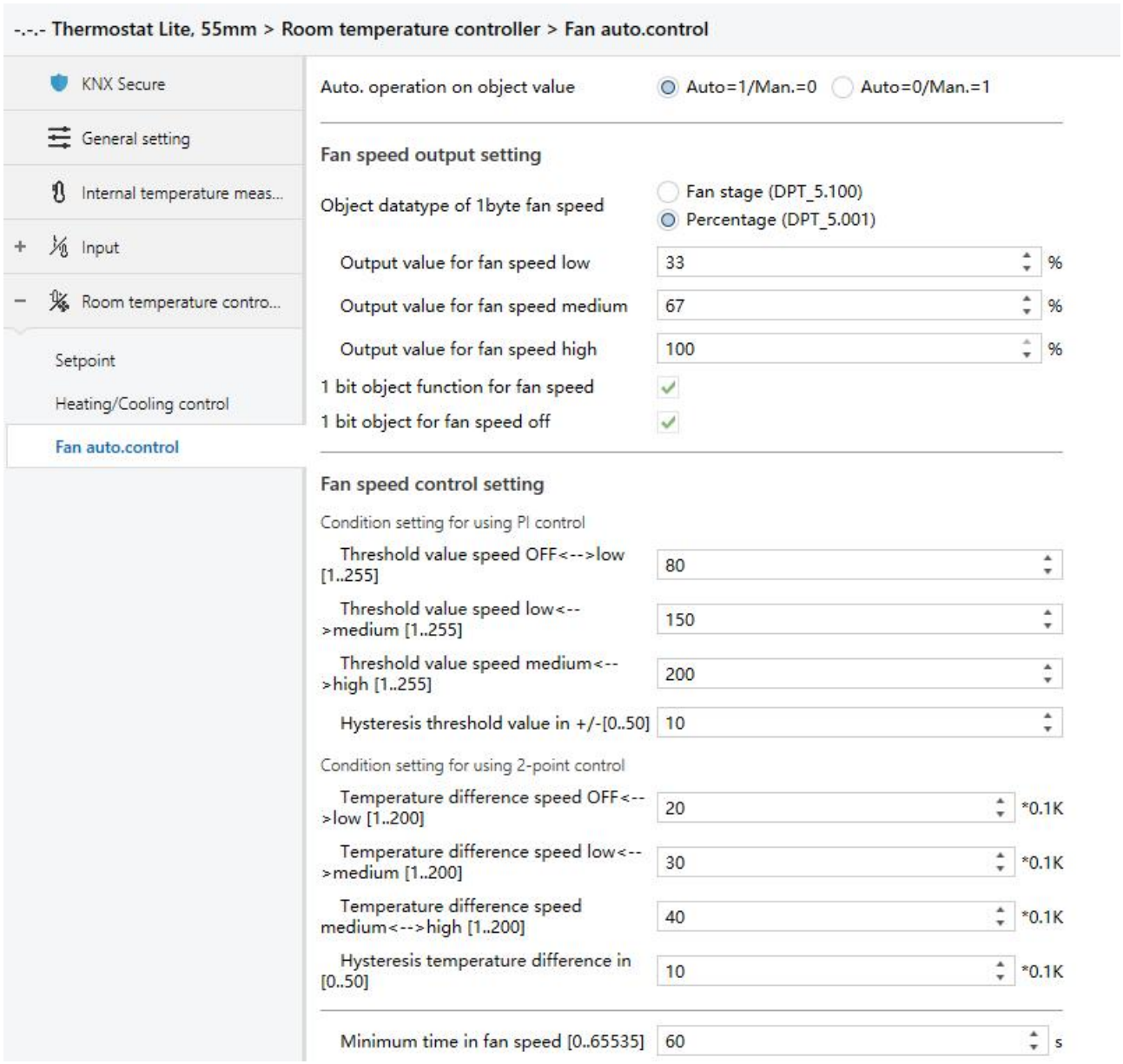


Fig.5.3.2.3 “Fan” parameter window

Parameters of this window are visible when fan auto control enabled.

Parameter "Auto. operation on object value"

This parameter is for setting the telegram value to activate automatic operation. Options:

Auto=1/Man.=0

Auto=0/Man.=1

Auto=1/Man.=0: When the object “Fan automatic operation” receives the telegram value “0”, activate the automatic operation, when receive “1”, exit the automatic operation.

Auto=0/Man.=1: When the object “Fan automatic operation” receives the telegram value “1”, activate the automatic operation, when receive “0”, exit the automatic operation.

After power-on, automatic operation is not activated by default.

Fan speed output setting

Parameter "Object datatype of 1byte fan speed"

This parameter is for setting the object datatype of 1 byte fan speed. Options:

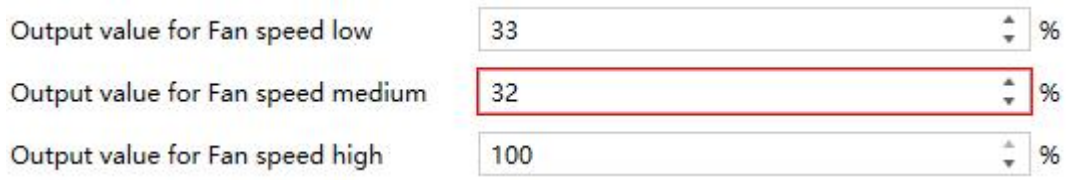
Fan stage (DPT 5.100)

Percentage (DPT 5.001)

——Parameter "Output value for fan speed low/medium/high"

These three parameters are for setting the value sent for each fan speed switchover. Fan speed off when value is 0. Options according to fan object datatype: **1..255 /1..100**

Note: the output value and status value must meet the condition low<medium<high, if not, they can not be modified on ETS, and display red box warning, as shown as follow:



Parameter "1 bit object function for fan speed"

This parameter is for setting whether to enable 1 bit object function for fan speed. 1 bit control objects of each fan speed are visible when enabled.

——Parameter "1 bit object for fan speed off "

This parameter is visible when previous parameter is enabled. Set whether to enable 1 bit object of fan speed off .

Fan speed control setting

Condition setting for using PI control

Under PI control, control value is PI operated within program, controller will power on/off fan or switch fan speed according to the threshold range of the control values.

Parameter "Threshold value speed OFF<-->low [1..255]"

Define threshold value for speed OFF<-->low, options: **1..255**

If the control value is greater than or equal to this setting threshold value, start to run low fan speed; if the control value is less than this setting threshold value, the fan will be turned off.

Parameter "Threshold value speed low<-->medium [1..255]"

Define the threshold for speed low<-->medium, if the control value is greater than or equal to this setting threshold, start to run medium fan speed. Options: **1..255**

Parameter "Threshold value speed medium<-->high [1..255]"

Define the threshold for speed medium<-->high, if the control value is greater than or equal to this setting threshold, start to run high fan speed. Options: **1..255**

Tip: The controller evaluates the threshold in ascending order.

First check →OFF <->low fan speed threshold →low fan speed <->medium fan speed →medium fan speed <->high fan speed.

If not meet the condition, they can not be modified on ETS, and display red box warning, as shown as follow:



The correctness of functional execution is guaranteed only in this case:

The threshold of OFF <-> low fan speed is lower than that of low fan speed <-> medium fan speed, and the threshold of low fan speed <-> medium fan speed is lower than that of medium fan speed <-> high fan speed.

Parameter "Hysteresis threshold value in +/-[0..50]"

This parameter is for setting the hysteresis value of the threshold value, which can avoid the unnecessary action of the fan when the control value fluctuates near the threshold. Options: **0..50**

If value is 0, no hysteresis. Fan switch to speed once control value greater than threshold value;

Suppose that hysteresis value is 10 and the threshold is 50, then the upper limit threshold 60 (Threshold value+Hysteresis value) and the lower limit threshold 40 (Threshold value-Hysteresis value). When the control value is between 40 ~60, fan action will not be caused, and the previous status will still be maintained. Only less than 40 or greater than or equal to 60 will change the running status of the fan.

Condition setting for using 2-point control

Under 2-point control, controller will decide the fan power on/off or fan speed according to the temperature difference between the actual temperature and setpoint temperature.

Cooling: Temperature difference = actual temperature - setpoint temperature;

Heating: Temperature difference = setpoint temperature - actual temperature.

Parameter "Temperature difference speed OFF<-->low [1..200] *0.1K"

This parameter is for setting the temperature difference for speed OFF<-->low.

Options: **1..200**

If the temperature difference is greater than or equal to this setting temperature difference, start to run low fan speed; if less than this setting temperature difference, the fan will be turned off.

Parameter "Temperature difference speed low<-->medium [1..200]*0.1K"

Define the temperature difference for speed low<-->medium, if the control value is greater than or equal to this setting temperature difference, start to run medium fan speed. Options: **1..200**

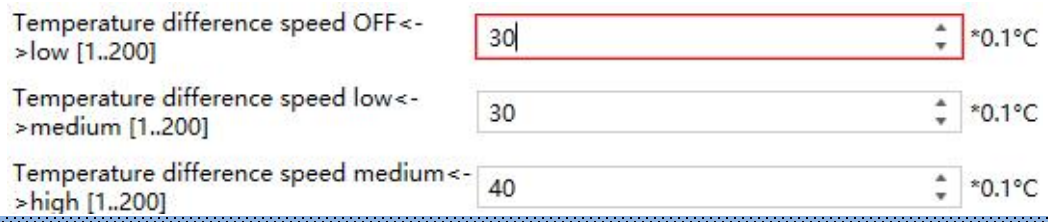
Parameter "Temperature difference speed medium<-->high [1..200]*0.1K"

Define the temperature difference for speed medium<-->high, if the control value is greater than or equal to this setting temperature difference, start to run high fan speed. Options: **1..200**

Tip: The controller evaluates the temperature difference in ascending order.

First check →OFF <->low fan speed temperature difference →low fan speed <->medium fan speed →medium fan speed <->high fan speed.

If not meet the condition, they can not be modified on ETS, and display red box warning, as shown as follow:



Parameter "Hysteresis temperature difference in [0..50] *0.1K"

This parameter is for setting the hysteresis value of the temperature difference, which can avoid the unnecessary action of the fan when the control value fluctuates near the temperature difference. Options: **0..50**

If value is 0, no hysteresis. Fan switch to speed once control value greater than temperature difference;

Suppose that hysteresis value is 0.5℃ and the temperature difference is 1℃, then the upper limit temperature difference 1.5℃ (Temperature difference+Hysteresis value) and the lower limit temperature difference 0.5℃ (Temperature difference-Hysteresis value). When the control value is between 0.5℃~1.5℃, fan action will not be caused, and the previous status will still be maintained. Only less than 0.5℃ or greater than or equal to 1.5℃ will change the running status of the fan.

Parameter "Minimum time in fan speed [0..65535]s"

Defines the residence time of the fan from the current fan speed to a higher fan speed or lower fan speed, that is, the minimum time for a fan speed operation.

If you need to switch to another fan speed, you need to wait for this period of time before switching.

If the current fan speed has been running long enough, the fan speed can be changed quickly.

Options: **0..65535**

0: there is no minimum running time, but the delay switching time of fan speed still needs to be considered.

Note: The residence time for this parameter setting is only enabled in Auto mode.

Chapter 6 Description of Communication Object

The communication object is the medium to communicate other device on the bus, namely only the communication object can communicate with the bus.

NOTE: "C" in "Flag" column in the below table means enable the communication function of the object; "W" means value of object can be written from the bus; "R" means the value of the object can be read by the other devices; "T" means the object has the transmission function; "U" means the value of the object can be updated.

6.1."General" Communication object

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
1	General	In operation			1 bit	C	R	-	T	-	switch	Low

Fig.6.1 "General" communication object

NO.	Object Function	Name	Data Type	Flag	DPT
1	**In operation**	**General**	**1bit**	**C,R,T**	**1.001 switch**
The communication object is used to periodically send a telegram "1" to the bus to indicate this device in normal operation. The period is set by the parameter.					

Table 6.1 "General" communication object table

6.2.“Internal sensor measurement” Communication object

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
5	Internal sensor	Temperature value			2 bytes	C	R	-	T	-	temperature (°C)	Low
6	Internal sensor	Low temperature alarm			1 bit	C	R	-	T	-	alarm	Low
7	Internal sensor	High temperature alarm			1 bit	C	R	-	T	-	alarm	Low
8	Internal sensor	Humidity value			2 bytes	C	R	-	T	-	humidity (%)	Low
9	Internal sensor	Low humidity alarm			1 bit	C	R	-	T	-	alarm	Low
10	Internal sensor	High humidity alarm			1 bit	C	R	-	T	-	alarm	Low

Fig.6.2 “Internal sensor measurement” communication object

NO.	Object Function	Name	Data Type	Flag	DPT
5	**Temperature value**	**Internal sensor**	**2byte**	**C,R,T**	**9.001 temperature**
The communication object is used for transmitting the temperature value detected by the built-in temperature sensor of the device to the bus. Range:-50~99.8℃					
6	**Low temperature alarm**	**Internal sensor**	**1bit**	**C,R,T**	**1.005 alarm**
The communication object is used to send the low temperature alarm signal to bus, when temperature lower than low threshold that defined by parameter.					
7	**High temperature alarm**	**Internal sensor**	**1bit**	**C,R,T**	**1.005 alarm**
The communication object is used to send the high temperature alarm signal to bus, when temperature higher than high threshold that defined by parameter.					
8	**Humidity value**	**Internal sensor**	**2byte**	**C,R,T**	**9.007 humidity**
The communication object is used to receive humidity measurements sent from the humidity sensor on the bus. Range:0~100%					
9	**Low humidity alarm**	**Internal sensor**	**1bit**	**C,R,T**	**1.005 alarm**
The communication object is used to send the low humidity alarm signal to bus, when humidity lower than low threshold that defined by parameter.					
10	**High humidity alarm**	**Internal sensor**	**1bit**	**C,R,T**	**1.005 alarm**
The communication object is used to send the high humidity alarm signal to bus, when humidity higher than high threshold that defined by parameter.					

Table 6.2 “Internal sensor measurement” communication object table

6.3. "Input" Communication object

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
11	Input 1 - Temperature probe	Actual temperature, Sensor			2 bytes	C	R	-	T	-	temperature (°C)	Low
12	Input 1 - Temperature probe	Temperature error report, Sensor			1 bit	C	R	-	T	-	alarm	Low

Temperature probe

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
11	Input 1 - Switch sensor	Switch			1 bit	C	R	W	T	U	switch	Low
11	Input 1 - Switch sensor	Close, Switch			1 bit	C	R	W	T	U	switch	Low
12	Input 1 - Switch sensor	Open, Switch			1 bit	C	R	W	T	U	switch	Low
11	Input 1 - Switch sensor	Short, Switch			1 bit	C	R	W	T	U	switch	Low
12	Input 1 - Switch sensor	Long, Switch			1 bit	C	R	W	T	U	switch	Low
13	Input 1 - Switch sensor	Disable			1 bit	C	-	W	-	-	enable	Low

BI: Switch sensor

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
11	Input 1 - Scene control	Scene			1 byte	C	-	-	T	-	scene control	Low
11	Input 1 - Scene control	Close, Scene			1 byte	C	-	-	T	-	scene control	Low
12	Input 1 - Scene control	Open, Scene			1 byte	C	-	-	T	-	scene control	Low
11	Input 1 - Scene control	Short, Scene			1 byte	C	-	-	T	-	scene control	Low
12	Input 1 - Scene control	Long, Scene			1 byte	C	-	-	T	-	scene control	Low
13	Input 1 - Scene control	Disable			1 bit	C	-	W	-	-	enable	Low

BI: Scene control

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
11	Input 1 - Send String	String			14 bytes	C	-	-	T	-	Character String (ISO 8859-1)	Low
11	Input 1 - Send String	Close, String			14 bytes	C	-	-	T	-	Character String (ISO 8859-1)	Low
12	Input 1 - Send String	Open, String			14 bytes	C	-	-	T	-	Character String (ISO 8859-1)	Low
11	Input 1 - Send String	Short, String			14 bytes	C	-	-	T	-	Character String (ISO 8859-1)	Low
12	Input 1 - Send String	Long, String			14 bytes	C	-	-	T	-	Character String (ISO 8859-1)	Low
13	Input 1 - Send String	Disable			1 bit	C	-	W	-	-	enable	Low

BI: Send string

Fig.6.3 "Input" communication object

NO.	Object Function	Name	Data Type	Flag	DPT
11	**Actual temperature, Sensor**	**Input 1 - {{Temperature probe}}**	**2byte**	**C,R,T**	**9.001 temperature**
The communication object is used for transmitting the temperature value detected by the external temperature sensor of the device to the bus. Range:-50~99.8℃ The name in parentheses changes with the parameter “Description (max 30 char.)”. If description is empty, display “Input x - ...” by default. The same below.					
12	**Temperature error report, Sensor**	**Input 1 - {{Temperature probe}}**	**1bit**	**C,R,T**	**1.005 alarm**
The communication object is used to send the error report of the external temperature sensor, and the object value is defined according to the parameters.					
11	**Switch**	**Input 1 - {{Switch sensor}}**	**1bit**	**C,R,W,T,U**	**1.001 switch**
11	**Close/Short, Switch**	**Input 1 - {{Switch sensor}}**	**1bit**	**C,R,W,T,U**	**1.001 switch**
12	**Open/Long, Switch**	**Input 1 - {{Switch sensor}}**	**1bit**	**C,R,W,T,U**	**1.001 switch**
These communication objects are used to trigger a switching operation. Use a common object or two separate objects is according to the parameter setting. Only the object “Switch” is visible when use a common object. If use two separate objects, “Close/Open” is visible when there is no distinction for short/long operation; “Short/Long” is visible when there is distinction for short/long operation. Telegrams: 0——Off 1——On					
11	**Scene**	**Input 1 - {{Scene control}}**	**1byte**	**C,T**	**18.001 scene control**
11	**Close/Short, Scene**	**Input 1 - {{Scene control}}**	**1byte**	**C,T**	**18.001 scene control**
12	**Open/Long, Scene**	**Input 1 - {{Scene control}}**	**1byte**	**C,T**	**18.001 scene control**

These communication objects are used to send a 8 bit command to recall or storage scene. Use a common object or two separate objects is according to the parameter setting.

Only the object “Scene” is visible when use a common object. If use two separate objects, “Close/Open” is visible when there is no distinction for short/long operation; “Short/Long” is visible when there is distinction for short/long operation.

Detailed 8bit the meaning of the directive.

Set up a 8bit Orders for the (Binary code): FXNNNNNN

F: '0' recall scene; '1' for storage scene;

X : 0 ;

NNNNNN: Scene number(0... 63).

As follows:

Object message value	Description
0	Recall scene 1
1	Recall scene 2
2	Recall scene 3
…	...
63	Recall scene 64
128	Store scene 1
129	Store scene 2
130	Store scene 3
…	...
191	Store scene 64

Parameter setting Options are 1~64, actually communication object “Scene” corresponds to the telegram received is 0~63 . Such as parameter settings is the scene 1, communication object “Scene” sends the telegram 0.

11	**String**	**Input 1 - {{Send String}}**	**14byte**	**C,T**	**16.001 character string (ISO 8859-1)**
11	**Close/Short, String**	**Input 1 - {{Send String}}**	**14byte**	**C,T**	**16.001 character string (ISO 8859-1)**
12	**Open/Long, String**	**Input 1 - {{Send String}}**	**14byte**	**C,T**	**16.001 character string (ISO 8859-1)**

These communication objects are used to send the sting to bus. Use a common object or two separate objects is according to the parameter setting.

Only the object “String” is visible when use a common object. If use two separate objects, “Close/Open” is visible when there is no distinction for short/long operation; “Short/Long” is visible when there is distinction for short/long operation.

13	**Disable**	**Input 1 - {{...}}**	**1bit**	**C,W**	**1.003 enable**
The communication object is used to disable/enable the function of contact input, apply to binary input function, including switch, scene and send string.					

Table 6.3 “Input” communication object table

6.4.“Room temperature controller” Communication object

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
17	Room temperature controller	Power on/off			1 bit	C	R	W	-	-	switch	Low
18	Room temperature controller	External temperature sensor			2 bytes	C	-	W	T	U	temperature (°C)	Low
19	Room temperature controller	Base setpoint adjustment			2 bytes	C	-	W	-	-	temperature (°C)	Low
20	Room temperature controller	Setpoint offset			1 bit	C	-	W	-	-	step	Low
21	Room temperature controller	Float offset value			2 bytes	C	-	W	-	-	temperature difference (K)	Low
22	Room temperature controller	Setpoint offset reset			1 bit	C	-	W	-	-	reset	Low
23	Room temperature controller	Heating/Cooling mode			1 bit	C	-	W	-	-	cooling/heating	Low
24	Room temperature controller	Operation mode			1 byte	C	-	W	-	-	HVAC mode	Low
25	Room temperature controller	Comfort mode			1 bit	C	-	W	-	-	enable	Low
26	Room temperature controller	Economy mode			1 bit	C	-	W	-	-	enable	Low
27	Room temperature controller	Frost/Heat protection mode			1 bit	C	-	W	-	-	enable	Low
28	Room temperature controller	Standby mode			1 bit	C	-	W	-	-	enable	Low
29	Room temperature controller	Extended comfort mode			1 bit	C	-	W	-	-	acknowledge	Low
30	Room temperature controller	Fan automatic operation			1 bit	C	-	W	-	-	enable	Low
31	Room temperature controller	Window contact			1 bit	C	-	W	-	U	window/door	Low
32	Room temperature controller	Presence detector			1 bit	C	-	W	-	U	occupancy	Low
33	Room temperature controller	Actual temperature, status			2 bytes	C	R	-	T	-	temperature (°C)	Low
34	Room temperature controller	Base temperature setpoint, status			2 bytes	C	R	-	T	-	temperature (°C)	Low
35	Room temperature controller	Setpoint offset, status			2 bytes	C	R	-	T	-	temperature difference (K)	Low
36	Room temperature controller	Current temperature setpoint, status			2 bytes	C	R	-	T	-	temperature (°C)	Low
37	Room temperature controller	Heating/Cooling mode, status			1 bit	C	R	-	T	-	cooling/heating	Low
38	Room temperature controller	Operation mode, status			1 byte	C	R	-	T	-	HVAC mode	Low
39	Room temperature controller	Comfort mode, status			1 bit	C	R	-	T	-	enable	Low
40	Room temperature controller	Economy mode, status			1 bit	C	R	-	T	-	enable	Low
41	Room temperature controller	Frost/Heat protection mode, status			1 bit	C	R	-	T	-	enable	Low
42	Room temperature controller	Standby mode, status			1 bit	C	R	-	T	-	enable	Low
43	Room temperature controller	Heating control value			1 bit	C	R	-	T	-	switch	Low
44	Room temperature controller	Cooling control value			1 bit	C	R	-	T	-	switch	Low
45	Room temperature controller	Fan speed			1 byte	C	-	-	T	-	percentage (0..100%)	Low
46	Room temperature controller	Fan speed low			1 bit	C	-	-	T	-	switch	Low
47	Room temperature controller	Fan speed medium			1 bit	C	-	-	T	-	switch	Low
48	Room temperature controller	Fan speed high			1 bit	C	-	-	T	-	switch	Low
49	Room temperature controller	Fan speed off			1 bit	C	-	-	T	-	switch	Low

Fig.6.4 “Room temperature controller” communication object

NO.	Object Function	Name	Data Type	Flag	DPT
17	**Power on/off**	**Room temperature controller**	**1bit**	**C,W,R**	**1.001 switch**
The communication object is used to receive the telegram from the bus to control RTC power on/off. Telegrams: 1——On 0——Off					
18	**External temperature sensor**	**Room temperature controller**	**2byte**	**C,W,T,U**	**9.001 temperature**
The communication object is used to receive the temperature value detected by the temperature sensor of the device form the bus. Range:-50~99.8℃					
19	**Current setpoint adjustment** **Base setpoint adjustment**	**Room temperature controller**	**2byte**	**C,W**	**9.001 temperature**
"Current setpoint adjustment" is visible when operation mode is not enabled, and under absolute adjustment. Used to modify the base value of the set temperature; and to modify set temperature value of current room operation mode when absolute adjustment.					
"Base setpoint adjustment" is visible only when relative adjustment, used to modify the base value of the set temperature, that is, the temperature setting value of the comfort mode, and the setting temperature of the standby mode and the economy mode changes according to the relative change. In the protection mode, only the temperature setting value of the protection mode is modified.					
20	**Setpoint offset**	**Room temperature controller**	**1bit**	**C,W**	**1.007 step**
The communication object is visible only when absolute adjustment, and offset function enabled. Used to adjust the offset to adjust setpoint temperature indirectly. The step value set according to the parameter. Telegrams: 1——Increase the offset 0——Decrease the offset					

21	**Float offset value**	**Room temperature controller**	**2byte**	**C,W**	**9.002 temperature difference**
The communication object is visible only when absolute adjustment, and offset function enabled. Used to modify the accumulated offset via 2 byte float value.					
22	**Setpoint offset reset**	**Room temperature controller**	**1bit**	**C,W**	**1.015 reset**
The communication object is visible only when absolute adjustment, and offset function enabled. Reset offset value when telegram is 1.					
23	**Heating/Cooling mode**	**Room temperature controller**	**1bit**	**C,W**	**1.100 cooling/heating**
The communication object is used for changing the heating and cooling via the bus. Telegrams: 1——Heating 0——Cooling					
24	**Operation mode**	**Room temperature controller**	**1byte**	**C,W**	**20.102 HVAC mode**
25	**Comfort mode**	**Room temperature controller**	**1bit**	**C,W**	**1.003 enable**
26	**Economy mode**	**Room temperature controller**	**1bit**	**C,W**	**1.003 enable**
27	**Frost/Heat protection mode**	**Room temperature controller**	**1bit**	**C,W**	**1.003 enable**
28	**Standby mode**	**Room temperature controller**	**1bit**	**C,W**	**1.003 enable**
These communication objects are used to control the RTC operation mode via the bus. When 1 byte: object 24 is visible, telegrams: 1-comfort, 2-standby, 3-economy, 4-protection, other reserved. When 1bit: Object 25—— Comfort mode					

Object 26—— Standby mode

Object 27—— Economy mode

Object 28—— Protection mode

When the object receives the telegram “1”, the corresponding mode is activated. When 1 bit standby object is not enable, and the telegrams of comfort, economy, protection mode are 0, is standby mode. When 1 bit standby object is enable, standby object receives “1” activates standby mode, 0 is ignored.

29	**Extended comfort mode**	**Room temperature controller**	**1bit**	**C,W**	**1.016 acknowledge**

The communication object is used for triggering time to extended comfort mode. Telegrams:

1——Activate comfort mode

0——No sense

Activate comfort mode when the object receives telegram 1. If receive again telegram 1 during delay time, time will be reset again. And return the previous operation mode from comfort mode once finish timing. If there is a new operation mode during delay time, exit the comfort mode.

If change the operation mode, exit the timing, but switch the heating/cooling will not.

30	**Fan automatic operation**	**Room temperature controller**	**1bit**	**C,W**	**1.003 enable**

The communication object is used to activate the fan automatic operation via the bus. Telegram:

1——Auto

0——Exit auto

31	**Window contact**	**Room temperature controller**	**1bit**	**C,W,U**	**1.019 Window/door**

The communication object is used to receive the switch status of window contact. Telegrams:

1——Open window

0——Close window

32	**Presence detector**	**Room temperature controller**	**1bit**	**C,W,U**	**1.018 occupancy**
The communication object is used to receive the room occupancy status from presence detector. Telegrams: 1——Occupied 0——No occupied					
33	**Actual temperature, status**	**Room temperature controller**	**2byte**	**C,R,T**	**9.001 temperature**
The communication object is visible when temperature reference of RTC function is combination of internal and external sensor. Used to send the actual temperature after the combination to the bus.					
34	**Base temperature setpoint, status**	**Room temperature controller**	**2byte**	**C,R,T**	**9.001 temperature**
The communication object is visible only when relative adjustment. Used to send the current base set temperature to the bus. Current base set temperature value = parameter set value (or object 19 base value)+accumulated offset value					
35	**Setpoint offset, status**	**Room temperature controller**	**2byte**	**C,R,T**	**9.002 temperature difference**
The communication object is visible only when relative adjustment. Used to send the accumulated offset value of base set temperature to the bus.					
36	**Current temperature setpoint, status**	**Room temperature controller**	**2byte**	**C,R,T**	**9.001 temperature**
The communication object is used to send current set temperature to the bus.					
37	**Heating/Cooling mode, status**	**Room temperature controller**	**1bit**	**C,R,T**	**1.100 cooling/heating**
The communication object is used to feedback the telegram of changing cooling and heating function to the bus.					
38	**Operation mode, status**	**Room temperature controller**	**1byte**	**C,R,T**	**20.102 HVAC mode**

39	**Comfort mode, status**	**Room temperature controller**	**1bit**	**C,R,T**	**1.003 enable**
40	**Economy mode, status**	**Room temperature controller**	**1bit**	**C,R,T**	**1.003 enable**
41	**Frost/Heat protection mode, status**	**Room temperature controller**	**1bit**	**C,R,T**	**1.003 enable**
42	**Standby mode, status**	**Room temperature controller**	**1bit**	**C,R,T**	**1.003 enable**

These communication objects are used to send RTC operation mode status to the bus.

When 1 byte: object 38 is visible, telegrams: 1-comfort, 2-standby, 3-economy, 4-protection, other reserved.

When 1bit:

Object39—— Comfort mode

Object 40—— Economy mode

Object 41—— Protection mode

Object 42—— Standby mode

When a mode is activated, the corresponding object only sends telegram “1”. When 1 bit standby object is not enable, activate standby mode when comfort, economy, protection objects send telegram 0 together. When 1 bit standby object is enable, activate standby mode only when standby object send 1.

Note: no requirement to send mode status to the bus when switchover via bus. The same is fan speed and other operation.

43	**Heating/Cooling control value** **Heating control value**	**Room temperature controller**	**1bit** **1byte**	**C,R,T**	**1.001 Switch** **5.001 percentage**
44	**Cooling control value**	**Room temperature controller**	**1bit** **1byte**	**C,R,T**	**1.001 Switch** **5.001 percentage**

The communication object is used to send control value of heating or cooling function to the bus. Object datatype is according to parameter setting.

45	**Fan speed**	**Room temperature controller**	**1byte**	**C,T**	**5.001 percentage** **5.100 fan stage**
46	**Fan speed low**	**Room temperature controller**	**1bit**	**C,T**	**1.001 switch**
47	**Fan speed medium**	**Room temperature controller**	**1bit**	**C,T**	**1.001 switch**

48	**Fan speed high**	**Room temperature controller**	**1bit**	**C,T**	**1.001 switch**
49	**Fan speed off**	**Room temperature controller**	**1bit**	**C,T**	**1.001 switch**

These communication objects are used to send control telegrams of the fan speed to the bus.

1bit object is visible according to the parameter setting :

Object 46——Low fan speed

Object 47——Medium fan speed

Object 48——High fan speed

Object 49——Fan speed off

Only the corresponding object sends telegram “1” when a certain fan speed is selected. When 1bit-off object is not enable, all objects send telegrams “0” when fan speed off is selected (The situation apply to connect with fan actuator of GVS);

When 1bit-off object is enable, only 1bit-off object send telegram “1” (The situation apply to connect with fan actuator of other manufacturers).

1byte: the corresponding telegram value of each fan speed is defined by the parameter. Activate the corresponding fan speed, and object 45 sends the corresponding telegram value of the fan speed to the bus.

Table 6.4 “Room temperature controller” communication object table