ATTACHMENT
PANEL THERMOSTAT
KNX-113-35-IN

CONTENTS

1. SUMMARY

Thermostat is a device to control indoor temperature. It adjusts the room temperature and relative humidity according to the measured temperature and relative humidity, generally implemented by controlling indoor temperature controller and fan coil actuator on the bus. Thermostat closely bound up with our living environment. For example, in an air-conditioned room, people would feel comfortable only the room temperature and relative humidity is under in a certain range. Then we can monitor the current actual indoor temperature, relative humidity through the panel, if it is beyond control, the Thermostat will send a signal to adjust the indoor temperature and humidity by air condition. It is also widely applied in other industries, such as food industry, temperature and humidity are essential, greenhouse and other humidity-related industries.
User can adjust the indoor temperature according to their needs by capacitive touch buttons. LCD screen displays the status of the current temperature control.
This user manual provides specific technical information including installation and programming details, and explains how to use the binary input by the application examples.

2. PROJECT DESIGN AND APPLICATION

2.1. SUMMARY

Application program	Max. number of communication objects	Max. number of group addresses	Max. number of association addresses
Thermostat	108	180	180

Thermostat mainly send output control value to fan coil actuator through collecting temperature and setting temperature , so as to realize the effect of indoor constant temperature. Thermostat can also carry out fan speed adjustment, room mode switching and timing Settings by KNX manual operation, and so on. Thermostat also provide 3 binary inputs which can be used to switch, dimming, curtains and scene control.

2.2. THE EXTERNAL AND INTERNAL TEMPERATURE SENSOR

Thermostat can provide three temperature collecting ways, **1** from temperature sensor in Thermostat, **2** from bus to receive external temperature, **3** from external NTC thermistors.

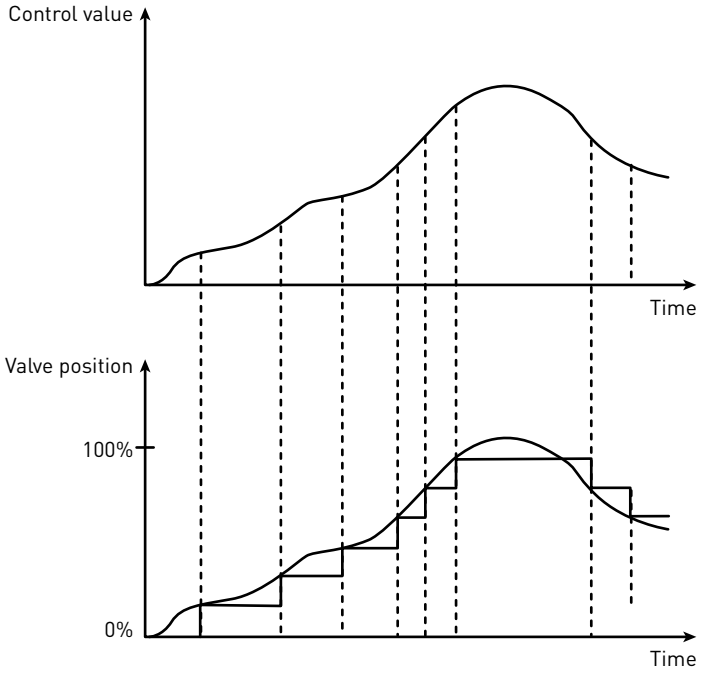
2.3. BASIC HEATING COOLING AND ADDITIONAL HEATING COOLING CONTROL FUNCTIONS

Thermostat has the basic heating refrigeration output control function according to the temperature set by the user , in addition to basic heating refrigeration control function, there is additional heating refrigeration control function as a supplement to the temperature control. When the actual temperature and set temperature have a large deviation, additional heating refrigeration control function can let a room faster heating or cooling.

2.4. THE TEMPERATURE CONTROL

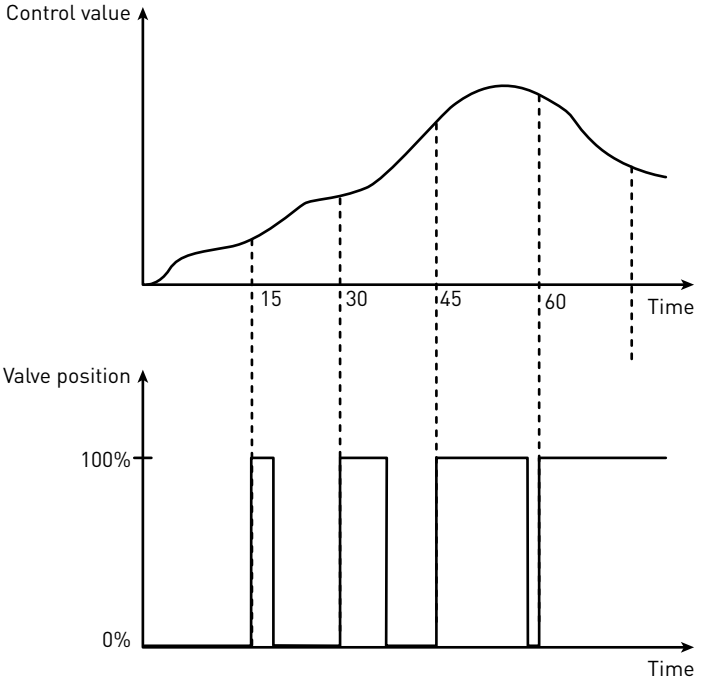
Thermostat use relative adjustment in all kinds of temperature setting values of work mode .At the same time ,it also provide a variety of types of controls, such as continuous PI control, switch mode PI control, 2 - point control and fan coil control, different types of control is suitable for different types of temperature controller.

Continuous control
Continuous control's control values is calculated by the actual temperature and set temperature, and then control the opening of continuous valve, attain the comfortable room temperature state. For example, when the current control values is 50% of the largest , the valve position will open to 50% according to the control values ;If the output control values is the maximum , the valve is fully open. Continuous control can realize the "on", "off" and "stop" three-step operations, specific action is shown in the figure below:



Continuous control can realize the most precise temperature adjustment without quite big overshoot. At the same time, the frequency of the positioning valve actuator can maintain at a low level. Continuous control can also control the rise and fall valve of the fan coil or KNX valve actuator.

PWM control
PWM (pulse width modulation) control's values is calculated according to the actual temperature and set temperature, and then calculate the on and off time of the switch valve to control it, to achieve a comfortable room temperature state. Switch valve only has "open" and "full close" two control operations. PWM control needs to set a fixed cycle time at first, such as setting the PWM cycle for 15 minutes, when the control values is 20% of the maximum , the valve will open 15*20% = 3 minutes; Close 15*80% = 12 minutes; When the control values is 50% of the maximum , the valve will open 15*50% = 7.5 minutes; Close 15*50% = 7.5 minutes. Schematic diagram is shown below:



PWM control is a relatively accurate adjustment, if you choose the appropriate cycle, the temperature overshoot will not be very big, a simple low cost common switch valve actuator can be used .It can be used to control ordinary switch valve of the fan coil , electric valve or KNX valve driver.

2.5. THRESHOLD FUNCTION

Temperature and humidity each provides two threshold functions, the Thermostat ,based on threshold range of the current temperature and humidity, triggers two different types (1bit/1byte) of data to sent to the bus, which can control other equipment switches or adjust related output of valves.

2.6. LOGICAL FUNCTION

Thermostat provides two logic functions, each has three inputs, each input can be arbitrarily set, it can be the message (1bit) sent by the temperature threshold, or the message (1bit) sent by the humidity threshold, or the message received from the bus, also it can be obtained by getting the opposite message to participate in the logic operation, the message (1bit/1byte) will be output according to the result , triggering the switch of other equipment, or to adjust output of valves.

2.7. DISABLE/ENABLE TEMPERATURE AND HUMIDITY CONTROL FUNCTION, THE THRESHOLD VALUE AND THE LOGICAL FUNCTION

The temperature and humidity control functions can be prohibited or enabled by bus, when the temperature/humidity function is banned, the Thermostat will not be able to send the control values. The threshold value and the logical function can also be banned or enabled by bus, when the threshold function is banned, the Thermostat will not determine the current threshold values range of temperature and humidity and will not control it; When logic functions are banned, the logic operation from Thermostat will be disrupted as well as the control of this function.

2.8. TIMING FUNCTION

Thermostat offers 16 timing time, so users can set the timing time regularly according to their using habits, which automatically adjust the working mode and send the appropriate value. When arrived at timing time, it can automatically switch to the corresponding working mode and the corresponding numerical values.

2.9. BINARY INPUT AND TEMPERATURE SENSOR INPUT

Thermostat offers binary input and three roads, which is used to switch, dimming, curtains and scene controls. One way is externally connected to temperature sensor input, which can be a NTC thermistor as an external temperature sensor, or as a floor heating temperature limiter, stops heating when floor heating is higher than the limited temperature heating.

3. PARAMETER SETTING DESCRIPTION IN THE ETS

3.1. OVERVIEW

Thermostat can be set at different control modes according to users' needs; here we introduce the database settings of Thermostat below.

3.2. PARAMETER SETTINGS WINDOW "GENERAL"

"General" parameter Setting interface as shown in figure 3.2, the interface are mainly some of the general Thermostat parameter Settings, such as the choice of heating and refrigeration control functions by temperature control, LCD backlight brightness parameter setting, and so on.

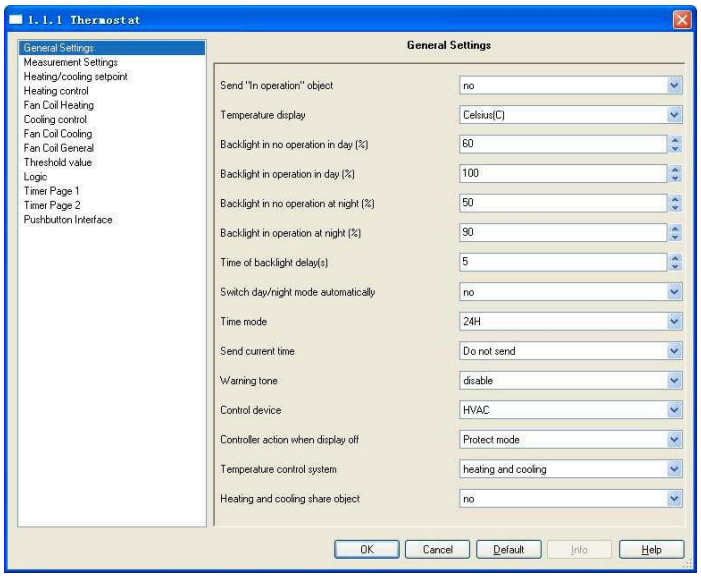


Figure 3.2"General settings "Parameter Settings interface

Parameter "Send 'In operation' object"

Options: No
Send value "0" cyclically
Send value "1" cyclically

These parameter set the Thermostat cycle and send a message "1" or "0" to the bus,which shows that the panel is working well. If fail, it will stop sending the message "1" or "0".Options for "No", do not send; Options for the value '0' cyclically "send" or "send the value '1' cyclically", Thermostat will send a message "0" or "1"according to the set period of time, so the object "in operation" and "Transmission period of" in operation "object" parameter will be visible.

Parameter "Transmission period of "In operation" object"

Options: 5s
10s
...
2h

This parameter is the communication object sending period for testing whether Thermostat is normal or not, and mainly being sent to the bus circularly to tell whether Thermostat is normal or not through object "in operation".

Parameter "Temperature display"

Options: Celsius (C)
Fahrenheit (F)

Here setting the LCD panel temperature display unit. Choose "Celsius (C)"the temperature will be displayed in Celsius; Choose "Fahrenheit (F)" the temperature will be displayed in Fahrenheit.

Parameter "Backlight in no operation in day (%)"
Parameter "Backlight in operation in day (%)"
Parameter "Backlight in no operation in night (%)"
Parameter "Backlight in operation in night (%)"

Options: 0...100%

This parameter is mainly used to set up the LCD panel backlight brightness in the daytime or at night under the condition of operation and non-operation. The user can set the day or night through the bus, also can identify the day or night by time points.

Parameter "Time of backlight delay(s)"

Options: 5...50 s

This parameter is mainly used for setting the backlight value from operating status to non-operation status. Namely when nobody operates screen, delaying the parameter time, entering the screen backlight without operation.

Parameter "Switch day/night mode automatically"

Options: no
yes

Set the mode automatically switches about whether to activate the day/night backlight brightness.
If you choose "no", conduct day or night light switch through the communication objects-"Day/night mode"; If you choose "yes", setting up automatic switching by setting the time moment.

Parameter "Time for switching to night at: hour (0 ... 23) / minute (0 ... 59)"
Set the time that LCD backlight brightness switches to night backlight. For example, once setting to 18:00 that means the backlight brightness of the LCD screen automatically switches to night mode when the time is 18:00 pm.

Parameter "Time for switching to day at: hour (0 ... 23) / minute (0 ... 59)"
Set the time that LCD backlight brightness of the backlight switch to daylight. For example, once setting to 6:00, that means LCD backlight brightness automatically switched to day mode when the time is 6:00.

Parameter "Time mode"

Options: 24H
AM / PM

This parameter set show the mode of time display. "24H" indicates the time on the Thermostat display system for 24 hours; "AM/PM", means the time display system in Thermostat for 12-hour.

Parameters "Send current time"

Options: Do not send
1s
30s
1min
30min
1h

This parameter set sends the current time on the bus, "Do not send" means don't send time to the bus; "1s" means sending the time to the bus per second; "30s" means sending time to the bus on 30s, such as 9:10:30, 9:11:30, 9:12:30; "1min" means sending the time to the bus per on minute point, such as 9:11:00, 9:12:00, 9:13:00; "30min" means sending the time to the bus on 30 minutes, such as 9:30:00, 10:30:00, 11:30:00; "1h" means sending the time to the bus per on hour point, such as 9:00:00, 10:00:00, 11:00:00.

Parameters "Warning tone"

Options: disable
enable

The parameters mainly are set in the Thermostat keys about whether to open the tone. "Disable" is not enabled tone, "enable" to enable beep.

Parameter "Control device"

Options: HVAC
air condition

This parameter is used to select the type of heating and cooling systems. "HVAC" means the fan coil system, controlling the temperature by controlling fan coil actuator; "air condition" means home air conditioning system, adjusting household air temperature by controlling the infrared device.

Parameter "Temperature control system"

Options: Cooling
Heating
Heating and Cooling
Basic and additional cooling
Basic and additional heating
Basic and additional Heating and Cooling

This parameter is used to set the temperature control feature, you can select the basic heating and cooling can also choose the basic heating and cooling plus auxiliary heating and cooling. Select "cooling/heating", enabling cooling/heating function, or both enabled, when selecting its options, the corresponding settings interface "heating/cooling setpoint" and "heating/cooling control" visible in the interface can be set with the corresponding parameters.

Parameter "Control action when display off"

Options: All off
Protect mode

This parameter is a command need to be send when the display off. "All off" means the command of sending off the fan and coil instructions when the screen being turned off; "Protect mode" means the command of the room mode transfer to protected mode when the screen being turned off.

Parameters "Heating and cooling share object"

Options: yes
no

This parameter is visible when choosing "Heating and Cooling" or "Basic and additional Heating and Cooling" in temperature control function, this parameter is used to select whether the heating and cooling control value share a communication object to accommodate two or four control system controls.

3.3. PARAMETER SETTING INTERFACE "MEASUREMENT SETTINGS"

"Measurement Settings" parameter setting interface as shown in Figure 3.3, where the main set some general parameters to measure temperature and humidity.

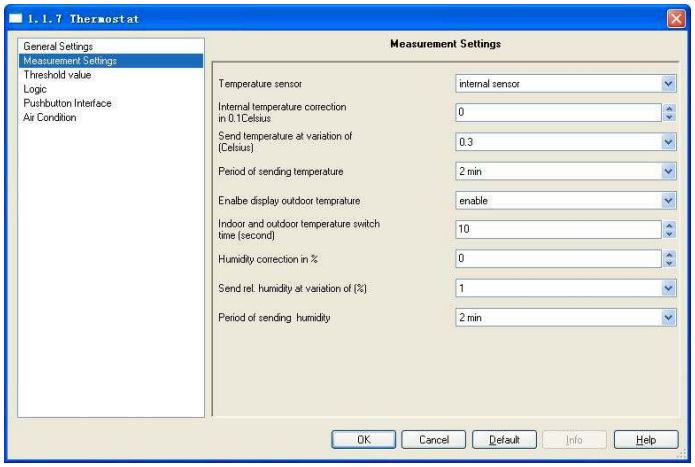


Figure 3.3 "Measurement Settings" parameter setting interface

Parameter "Temperature sensor"

Options: internal sensor
external sensor
internal sensor and external sensor

This parameter defines the type of temperature sensor.
If selecting "internal sensor", the temperature measured by the temperature sensor panel, will be read or send to the bus by the "Actual temperature", so that controller will control according to the temperature; If selecting "external sensor", the temperature will be measured by an external temperature sensor, Thermostat receives the temperature send from the bus temperature sensor by "Input external temperature", Thermostat will control according to this temperature. When you select this option, after power-up, the panel began to control the temperature. only when the Thermostat received the temperature from an external sensor.
Once selecting "internal sensor and external sensor", the local sensor and external temperature sensor will be used simultaneously, this sets suit for a large area to temperature control, such as a lobby, where using many sensors at the same time, temperature sensors B get the temperature from sensor A, then get the proportion of the sum itself, and then it will control the temperature based on the results of summation, or transmits the result to the summing sensor C, or give the sum to sensor C which will control temperature after receives the temperature and got the proportion of the sum itself too. The proportion of the sum results of multiple temperature sensors is set through the "Actual temperature", the temperature send from the external temperature sensor is received by "Input external temperature".

Parameters "Internal/External temperature correction

Options: -128 ... 127 (value*0.1)

It sets the temperature correction, which can correct the temperature detected by internal/external sensors to prevent too much error between the actual temperature and the measured one. For example, if the amendment data is 50, the temperature detected by sensor is 20 °C, so the temperature corrected is 20 + 50*0.1 = 25 °C.

Parameters "Weighting interior / exterior"

Options: 0% / 100%
10% / 90%
...
100% / 0%

This parameter is visible when selecting "Internal and External sensor" in the sensor type, it can set the proportion between the measured temperature of Thermostat sensor and an external sensor. For example, the option is "40%/ 60%", so, the panel temperature sensor (A) occupies 40%, an external sensor (B) occupies 60%, temperature control = (the temperature × 40% A) + (the temperature of B × 60%), Thermostat will control temperature according to the calculated temperature control which send by the "Actual temperature". This is the proportion summing process.

Parameters "Send temperature at variation of (°C)"

Options: Do not send
0.1
0.2
...
3

This parameter define "Actual temperature" can send the current temperature to the bus when a certain amount of temperature change.
If the option is "Do not send", the temperature only be sent to the bus through the "Actual temperature", because the temperature measurement value is not automatically transmitted to the bus.
If an option is "3", the "Actual temperature" can send the current temperature to the bus when the temperature reached changes at least 3 °C,

Parameter "Monitoring time of external sensor in min (0 = inactive)"

Options: 0 ... 255 min

This parameter will be visible when choosing "external sensor" or "internal and external sensor" about sensor type, to set monitoring time of the thermostat panel to external temperature sensor. If setting the monitoring time to 0, will not be monitoring the external temperature sensor .
Once setting the "external sensor", if the thermostat panel does not receive the temperature send from external temperature sensor within the set monitoring time, Thermostat will consider the external sensor is faulty, will stop controlling and control sending packets of controlling stop.
Once setting the "internal and external sensor", if the thermostat panel does not receive the temperature send by external temperature sensor within the set monitoring time, Thermostat will consider the external sensor is faulty , so that only use the measurement by Thermostat to control .
The monitoring time will be re-timed, when the thermostat panel receives each packet send from the external temperature sensor,

Note: The monitoring time from Thermostat for external temperature sensor should be at least 2 times for the time that the external temperature sensor sending messages for preventing packets missing.

Parameters "Period of sending temperature"

Options: Do not send
5s
10s
...
2h

This parameter sets the time interval of sensor for sending temperature to the bus loop through "Actual temperature".

Parameters "Indoor and outdoor temperature"

Options: disable
enable

The parameter is visible when the "Temperature sensor" selecting "internal sensor and external sensor", which can be used to set whether to alternately display the indoor temperature and outdoor temperature on the display. Outdoor temperature taken from the object 84.

Parameters "Indoor and outdoor temperature switch time (second)"

Options: 0 ... 255 s

The parameter will be visible when the parameter "Indoor and outdoor temperature" selecting "enable" ,which is used to set the time interval for the internal temperature and external temperature alternately.

Parameters "Humidity correction in %"

Optional: -15 ..15

This parameter defines the correction settings of humidity that sensor measured to prevent much error between the moisture measurement with the actual humidity. For example, setting correction value to 1%, if the humidity measured by the sensor is 40%, then the corrected humidity is 40% + 1% = 41%.

Parameters "Send rel. Humidity at variation of (%)"

Options: Do not send
1
2
...
20

This parameter defines to change when humidity change a certain amount, the communication object "rel. Humidity" can send current humidity to the bus.
If choosing "do not send", humidity measurements are not automatically sent to the bus, can sent automatically after be read through communication objects "rel. Humidity".
If choosing "3", the communication object "rel humidity" will send to the current temperature on the bus when the humidity changed to 3%.

Parameters "Period of sending humidity"

Options: Do not send
5s
10s
...
2h

This parameter setting defines the transmission time interval of the thermostat panel cycle send to other devices in the bus through its communication objects "rel. humidity.

3.4. PARAMETER SETTING INTERFACE"HEATING/ COOLING SETPOINT"

In the setting of "Temperature control system", parameter's setting content will be different in this page according to your choice from "Cooling", "Heating" or "Heating and Cooling". Temperature can be set here under any work patterns, including relative mode and absolute mode.

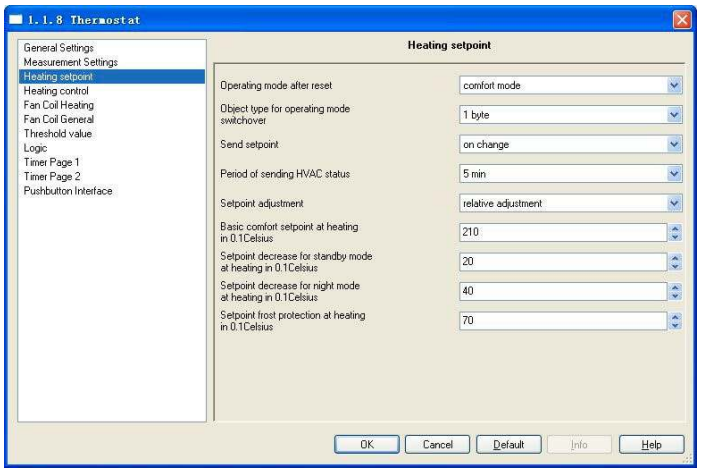


Figure 3.4.1 Parameter setting interface of "Heating setpoint"

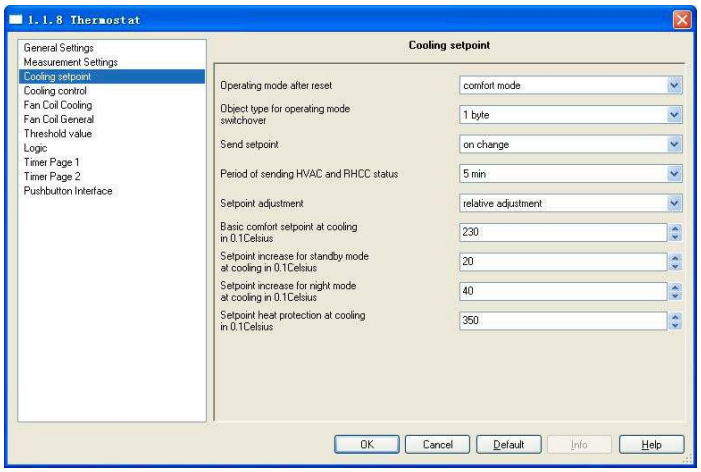


Figure 3.4.2 Parameter setting interface of "Cooling setpoint"

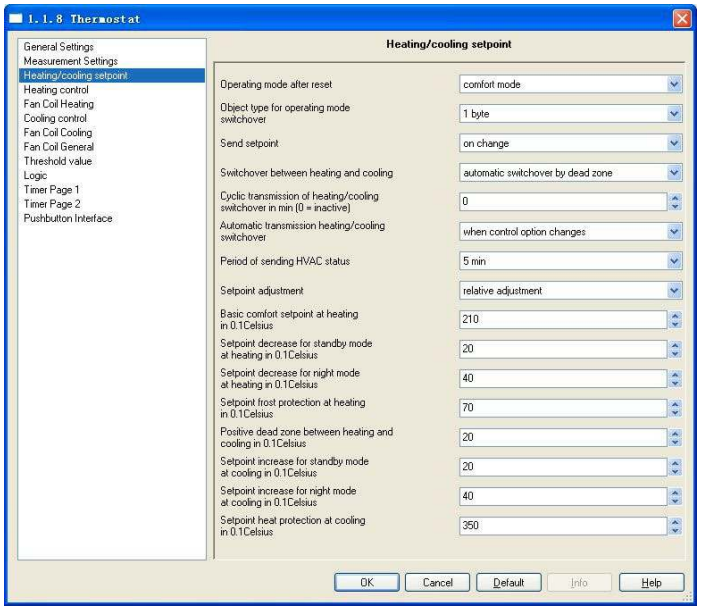


Figure 3.4.3 Parameter setting interface of "Heating/cooling setpoint"

Parameter "operation mode after reset"

Options: comfort
standby
night
Frost/heat protection

Here we can set the work patterns which is after BUS DEVICE RESET or after programming.
There are 4 work patterns in temperature controller including comfort mode, standby mode, night mode and Frost/Heating protecting mode. Every mode has its corresponding temperature setting. Comfort mode is applied to the daytime when someone at home. Standby mode is applied to the daytime when no one at home for saving the energy. Night mode is applied for the night time when someone at home. Frost/Heating protecting mode is applied for the long time going out in order to prevent the devices from damaging by the highest or lowest temperature.

Parameter "Object type for operating mode switchover"

Options: 1bit
1byte

This Parameter is use for giving a definition of object type when switching mode room's temperature work patterns.
When choosing "1bit", you can find the type of "Active frost/heating protection mode", "Active night mode" and "Active comfort mode". These types can switch the room temperature controller into different work patterns. The work pattern will switch to standby mode when the value of all these three type is "0".
Choosing "1bit", the priority of every work patterns are as follows. (Frost/heating protection→ Comfort→ night→ standby):

forcing switchover	Window status	Presence object	1bit switching				Work pattern to be activated
			Comfort	Standby	Night	Frost/heating protection	
01	X	X	X	X	X	X	Comfort
02	X	X	X	X	X	X	Standby
03	X	X	X	X	X	X	Night
04	X	X	X	X	X	X	Frost/heating protection
00	1	X	X	X	X	X	Frost/heating protection
00	0	1	X	X	X	X	Comfort
00	0	0	1	0	0	0	Comfort
00	0	0	0	1	0	0	Standby
00	0	0	0	0	1	0	Night
00	0	0	0	0	0	1	Frost/heating protection

When choosing "1byte", you can find the type of "Temperature operating mode switchover". Under this circumstances, different Room temperature controller can be switched into different work patterns by setting every value of type. Values to the work pattern is as follows. 0 - Automation (comfort mode). 1 - Comfort mode. 2 - Standby mode. 3 - Night mode. 4 - Frost/Heating protecting mode. 5 - Reserved.

forcing switchover	Window status	Presence object	Operating mode switchover	Work pattern to be activated
01	X	X	X	Comfort
02	X	X	X	Standby
03	X	X	X	Night
04	X	X	X	Frost/heating protection
00	1	X	X	Frost/heating protection
00	0	1	X	Comfort
00	0	0	01	Comfort
00	0	0	02	Standby
00	0	0	03	Night
00	0	0	04	Frost/heating protection

Parameter "Send setpoint"

Options: do not send
on change
cyclically
on change and cyclically

In the Parameter of "Send setpoint", the ways of sending the temperature setpoint can be set.
When choosing "do not send", the temperature setpoint won't be sent. It only can be sent to the busafter reading by "setpoint temperature".
When choosing "on change", the temperature setpoint will be sent to the bus after the changing of temperature setpoint.
When choosing "cyclically", the temperature setpoint will be sent to the bus recurrently. Once the temperature setpoint are changed, it will be sent one week later.
When choosing "on change and cyclically", the temperature setpoint will be sent to the bus recurrently. Once the temperature setpoint are changed, it will be sent immediately. Cycling time starts over.

Parameter "Period of sending setpoint"

Options: 5s
10s
...
2h

Parameter of "Send setpoint" is use for setting the interval of sending a temperature setpoint recurrently from its sensor to bus. The interval setting can be found in choosing "cyclically" or "on change and cyclically" in the Parameter of "Send setpoint".

Parameter "switchover between heating and cooling"

Options: automate switchover by dead zone
manual switchover by object

This parameter is use for setting the switching ways of Heating/cooling function.
When choosing "automate switchover by dead zone", it will switch to heating/cooling automatically according to the dead zone. It will switch to the cooling system if the current temperature is warmer than the temperature setpoint under cooling comfort mode. It will switch to the cooling system if the current temperature is lower than the temperature setpoint under heating comfort mode. When Choosing switching heating/cooling automatically in the parameter of "Switchover between heating and cooling", the object of "Heating/cooling switchover" will send the current status of heating/cooling to the fan coil controller or any other corresponding controllers to warm/cool.
Under the condition of relative adjustment, we can know the temperature setpoint under the cooling comfort mode by setting the parameter in different dead zone. Details are as follows.
Temperature setpoint of the cooling comfort mode = Temperature setpoint of the heating comfort mode + dead zone.
If the values of dead zone is 3 °C, temperature setpoint under the heating comfort mode is 22 °C, that means the temperature setpoint of the cooling comfort mode is 25 °C.
When choosing "manual switchover by object", it means that we can switch the heating or cooling manually by long press the mode key. The object "Heating/cooling switchover" will send the status to the bus. "1", means heating; "0", means cooling.

Parameter "Automatic transmission heating/cooling switchover"

Options: when control option changes
when control value changes

The parameter of "Automatic transmission heating/cooling switchover" can be found if you choose the "automate switchover by dead zone" from the "Switchover between heating and cooling", you'll see two options as follows. "when control option changes" means sending the heating/cooling status if the control function changes. "when control value changes" means sending the heating/cooling status if the control value changes.

Parameter "Cyclic transmission of heating/cooling switchover in min"

Options: 0-255 min

The parameter of "Cyclic transmission of heating/cooling switchover in min" can be found if you choose the "automate switchover by dead zone" from the "Switchover between heating and cooling". This parameter is use for setting the sending time period of heating/cooling status.

Parameter "control option after reset"

Options: cooling
heating
control option before reset

The parameter "control option after reset" can be found if you choose the "manual switchover by object" from the "switchover between heating and cooling". This parameter is use for setting the control function after the bus resetting or programming.
When choosing the "control option before reset", After bus power reset, the current control function is referring to the function before the bus off electricity, otherwise, it is referring to the default heating function after programming.

Parameter "Period of sending HVAC status"

Options: do not send
5s
10s
...
2h

Parameter of "Period of sending HVAC status" is use for setting the interval of sending HVAV to the bus recurrently through type of "Output HVAC status". The HVAC status is updated once every 30 seconds.

Status of type "Output HVAC status"							
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Frost warning -**1**	Dead zone status	Heating/ Cooling	Temperature control Disable /Enable	Frost/ Heat protection mode	Night mode	Standby mode	Comfort mode

Note-**1**: Current temperature ⩽ 5°C Value of frost warning is "1".

Parameter "Setpoint adjustment"

Options: relative adjustment
absolute adjustment

Parameter of "Setpoint adjustment" is use for setting the adjusting way of the temperature setpoint.
For the option of "relative adjustment", the temperature setpoint is referred to definite comfortable temperature setpoint in every mode except the comfort mode.
For the option of "absolute adjustment", the temperature setpoint of comfort mode, stand by mode, night mode, protecting mode has its independent temperature setpoint which is not affected by the temperature setpoint of comfort mode.
The parameter as below is use for setting relative adjusting way on temperature setpoint. It can be found if you choose the "relative adjustment" from the "Setpoint adjustment".

Parameter "Basic comfort setpoint at heating in 0.1 Celsius"

Options: 0...500

The comfort temperature setpoint can be set here under the heating function. All the temperature setpoint is referred to the basic comfortable temperature setpoint of heating function. Temperature setpoint for all modes changes with the basic comfortable temperature setpoint of heating function. The setpoint can be set by bus and it will keep saving the new value after changing.

Parameter "Setpoint decrease for standby mode at heating in 0.1 Celsius"

Option: 0...100

The parameter is use for setting the reduction that decides the stand by mode's temperature setpoint which is changed with the comfort temperature setpoint under the circumstance of heating function. For example: if setting the deduction of 3 °C, when the comfort temperature setpoint is 23 °C, the stand by mode's temperature setpoint will be 20 °C.

Parameter of "Setpoint decrease for night mode at heating in 0.1Celsius"

Option: 0...100

The parameter is use for setting the reduction that decides the night mode's temperature setpoint which is changed with the comfort temperature setpoint under the circumstance of heating function. For example: if setting the deduction of 2 °C, when the comfort temperature setpoint is 23 °C, the stand by mode's temperature setpoint will be 21 °C.

Parameter of "Setpoint frost protection at heating in 0.1 Celsius"

Option: 0...255

The parameter is use for setting the temperature setpoint of Frost/Heat protection mode. The current temperature is not allow to be below the temperature setpoint of heating function in Frost/Heat protection mode. Otherwise, the Thermostat will send an order to the relative heating control of heating the room for avoiding too low temperature.

Parameter of "Positive dead zone between heating and cooling in 0.1 Celsius"

Option: 0...100

The parameter is to definite dead zone between heating function and cooling function. The cooling comfort temperature setpoint can be set here. Temperature setpoint of cooling comfort mode = Temperature setpoint of heating comfort mode + dead zone If the values of dead zone is 3 °C, temperature setpoint of heating comfort mode is 22 °C, that means the temperature setpoint of the cooling comfort mode is 25 °C.

Parameter of "setpoint increase for standby mode at cooling in 0.1 Celsius"

Option: 0...100

The parameter is use for setting the increment that decides the stand by mode's temperature setpoint which is changed with the comfort temperature setpoint under the circumstance of cooling function. For example: if setting the increment of 3 °C, when the comfort temperature setpoint is 23 °C, the stand by mode's temperature setpoint will be 26 °C.

Parameter of "setpoint increase for night mode at cooling in 0.1 Celsius"

Option: 0...100

The parameter is use for setting the increment that decides the night mode's temperature setpoint which is changed with the comfort temperature setpoint under the circumstance of cooling function. For example: if setting the deduction of 2 °C, when the comfort temperature setpoint is 23 °C, the night mode's temperature setpoint will be 25 °C.

Parameter "setpoint heat protection at cooling in 0.1 Celsius"

Options: 0 ... 500

This parameter is used to set the temperature setpoint for overheat protection. In the overheating protection mode of cooling function, the temperature is not allowed to be higher than the set-temperature, otherwise the Thermostat will trigger a control telegram to so that the corresponding Cooling actuator start cooling the room to avoid temperature to be over high.

When the parameter "Setpoint adjustment" select "absolute adjustment", the following parameters are visible, to set the temperature setpoint of absolute adjustment.

Parameters "Heating comfort setpoint in 0.1 Celsius"

Options: 0-500

Here it sets the temperature setpoint of heating function under Comfort Mode. Unlike that of relative adjustment, the setpoint of absolute adjustment does not affect the setpoint under other modes.

Parameters "Heating standby setpoint in 0.1 Celsius"

Options: 0-500

Here it sets the temperature setpoint of heating function under standby mode. This temperature setpoint is set independently and is not affected by the comfort mode.

Parameters "Heating night setpoint in 0.1 Celsius"

Options :0-500

Here it sets the temperature setpoint of heating function under night mode. This temperature setpoint is set independently and is not affected by the comfort mode.

Parameter "Setpoint frost protection at heating 0.1 Celsius"

Options :0-255

Here it sets the temperature setpoint of heating function under frost protection mode. This temperature setpoint is set independently and is not affected by the comfort mode.

Parameters "Cooling comfort setpoint in 0.1 Celsius"

Options :0-500

Here it sets the comfort temperature setpoint of cooling function. Unlike that of relative adjustment, this setpoint does not affect the setpoint of temperature under other modes.

Parameters "Cooling standby setpoint in 0.1 Celsius"

Options: 0-500

Here it sets the temperature setpoint of cooling function under standby mode.This temperature setpoint is set independently and is not affected by the comfort mode.

Parameters "Cooling night setpoint in 0.1 Celsius"

Options :0-500

Here it sets the temperature setpoint of cooling function under night mode. This temperature setpoint is set independently and is not affected by the comfort mode.

Parameter "Setpoint heat protection at cooling 0.1 Celsius"

Options: 0-500

Here it sets the temperature setpoint of cooling function under heat protection mode. This temperature setpoint is set independently and is not affected by the comfort mode.

Parameter "Minimum distance between heating setpoint and cooling setpoint 0.1 Celsius"

Options: 0-100

The minimum distance is always between "heating setpoint comfort mode" and "cooling setpoint comfort mode". It acts as a buffer zone to prevent the two setpoints from overlapping.

Example: Individual setpoints are selected. Heating comfort setpoint is set to 21 °C and cooling comfort setpoint is set to 25 °C. The dead zone between heating and cooling is 3 °C. If the heating setpoint is moved up, the dead zone is also moved up. If heating comfort setpoint is adjusted up to 23 °C, cooling comfort setpoint will be also adjusted up to 26 °C to ensure that there is always a minimum distance of 3 °C between heating and cooling. If the cooling setpoint is moved down, the dead zone is also moved down. If cooling comfort setpoint is adjusted down to 23 °C, heating comfort setpoint is also adjusted down to 20°C to ensure that the minimum distance is also retained in this case.

3.5. PARAMETER SETTING INTERFACE "HEATING/ COOLING CONTROL"

"Heating / Cooling Control" parameter setting interface is as shown in Figure 3.5, where related parameters of temperature control is set. The thermostat provides a variety of controlling types, such as continuous PI control, switching PI control, 2 position control and Fan coil control, used for controlling different types of temperature controllers. Under normal circumstances, we can control the fan coil actuator by Thermostat to switch on/off the electric valve and adjust the speed of fan to adjust the room temperature, making the temperature vary within the predetermined range.

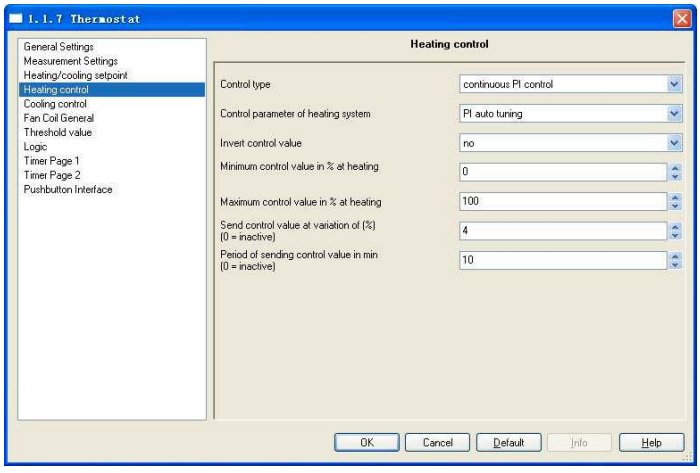


Figure 3.5 "Heating/cooling control" parameter setting interface

Parameter "Control type"

Options: continuous PI control
switching PI control
two position control
fan coil control

If you choose "Continuous PI Control", the controlled object transmits of 0 ... 255 (corresponds to 0% ... 100%), 0% to close the valve, 100% to open the valve, if it is between 0% and 100% , the actuator will adjust the controlling output according to the duty cycle of control target value. For example, assuming the cycle is 10mins (set in the switch actuator), the controlling value is 60%, then the valve will be opened for 6mins, closed for 4mins, all cycles in this way . Thermostat, according to temperature conditions, ratio range and integration time, calculate the control value every 30 seconds , and output the control value based on the output conditions. (Note: If no cycle parameter is set in the switch actuator, the actuator will not cyclically transmit the controlling value according to its duty cycle. In this case, this application of the panel may not be suitable for controlling switch actuator and applies only to actuators which could receive 1byte type controlling value.)

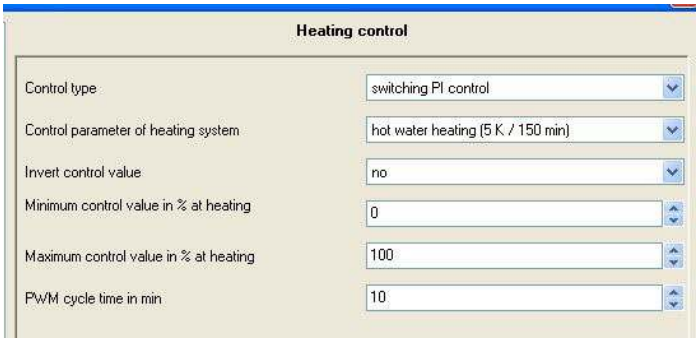
If you select "Switching PI Control", the controlled object sends switch value and directly controls the output of actuator by the switch command, which means the controlled object directly switches solenoid valve. The period of cyclical transmitting of switch value can be set through parameter, and the Thermostat will send switch value according to the duty cycle of control target value. For example, assuming the cycle is 10mins (set in the Thermostat), the controlling value is 80%, then the valve will be opened for 8mins, closed for 2 mins, all cycles in this way . Thermostat will calculate the control value every 30 seconds according to temperature conditions, ratio range and integration time.

If you select "Two Position Control", you can set a delay interval through parameter to prevent that the small decline or rise of temperature causes the frequent switching on/off of actuator, and results in the frequent switching on/ off of the valve. The delay interval is symmetrically disposed above and below the set temperature, e.g., in the cooling mode, if the set temperature is 21 °C, the delay interval is 2 °C, then the controlled object will send an "on" or "100%" telegram at 22 °C, and open the valve for cooling.

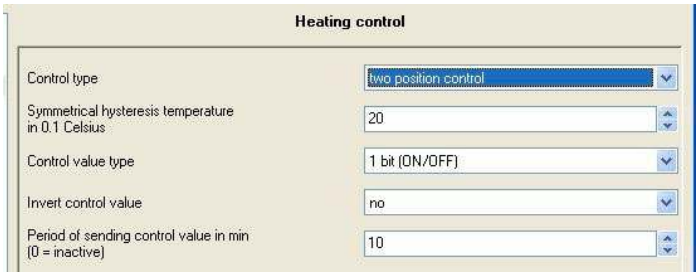
When the temperature drops to 20 °C, the controlled object will send an "off" or "0%" telegram-, and close the valve to stop cooling. Temperature setpoint is the temperature set under current working mode.

If you choose "fan coil Control", the type of communication object of control value will be the same with that of "Continuous PI Control". In addition, the page "Fan Coil Heating / Cooling" is visible.

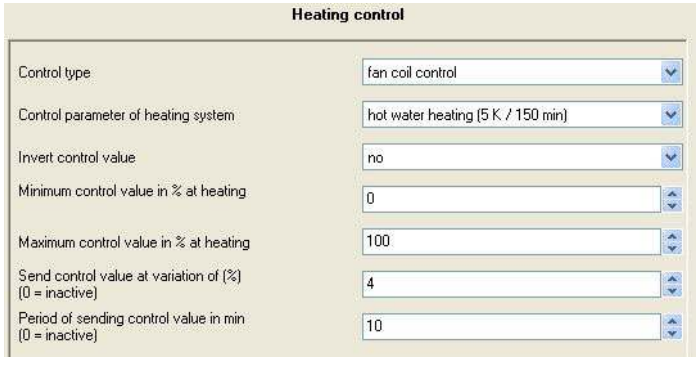
Different control types have different parameters and object, but most of them are similar. In order not to repeat the description of these similar parameters, we do not make distinguish description of parameters of different controlling types. If one type of control does not have some parameter, then it does not have the function of the parameter.



Switching PI control



Two position control



fan coil control

Parameter "Control parameter of heating system"

Options: Hot water heating (5K/150min)
Floor heating (5K/240 min)
Electric heating (4K/100min)
Split unit (4K/90min)
PI auto tuning
User-defined parameter

Parameter "Control parameter of cooling system"

Options: Cooling ceiling (5K/240min)
Split unit (4K/90min)
PI auto tuning
User-defined parameter

If the option is "PI auto tuning", you can obtain the PI parameters through auto tuning. After programming the Thermostat starts auto-tuning, makes room temperature oscillate upper and lower around temperature setpoint through fully open and fully close operations. After two oscillation cycles, PI parameters will be calculated according to the amplitude and period of oscillation waveform. Finally, the the self-tuning state ends and turns to PI control state, which controls according to the parameters got from auto tuning. When the bus turns off and then turns on PI continues to control according to those parameters. The period of Self-tuning ranges from tens of minutes to several hours depending on the controlled object. Parameters got from PI auto tuning may not be optimal.During the process of PI auto tuning, please do not adjust temperature setpoint, or convert heating and refrigeration to prevent interference of PI auto tuning.
In the option of "user-defined parameter", PI parameter values can be set through the following two parameters and application of Thermostat will calculate the control value basing on the given parameter values.
PI parameter values of other options are specified.

Parameter "proportional range (×0.1 °C)"

Options: 10 ... 100

In the parameter "control parameter of heating / cooling system",when the option is "user-defined parameter", this parameter is visible and is used to set parameter values of P (proportional band) with the unit is °C. Proportional factor equals to 255 divided by ratio range. The proper ratio range must be appropriately set. If it is too small it will cause very fast adjustment and overshoot.If it is too large it will cause very slow adjustment,but not overshoot. For example: the ratio range is 5 °C, when temperature deviation is 2 °C,proportional control value will be(255/5)*2 = 102. PI control value equals proportional control value plus integral term control value.

Parameters "reset time (min)"

Options: 0 ... 255

In the parameter "control parameter of heating / cooling system",when the option is "user-defined parameter", this parameter is visible and is used to set parameter values of I (integral time).The integral time must be appropriately set. If it is too large it will make adjustment very slow and oscillation unobvious. If it is too small it will cause adjustment very fast and oscillation.0 means not using integral term.

Parameters "invert control value"

Options: no
yes

Here it sets the method of control object sending control value, normal transmit or negative transmit, to suit control value to the type of valve.
If you select "no", the control object "Heating / Cooling control value ¨will send normal control values.
If you select "yes", control object "Heating / Cooling control value" will send negative control value. If control value is "off or 0%," negative control value will be "on or 100%"; If control value is "on, or 100%," negative control is "off or 0%"; If control value is "60%", then negative control value is 40%.

Parameters "minimum control value in %"

Options: 0 ... 30

This parameter is used to set the minimum allowable value of the PI control value. When control value calculated from PI is less than the set minimum value, Thermostat will send the minimum value. If you use a Thermostat to control an actuator using PWM (Pulse Width Modulation) mode, this parameter is very necessary. In PWM mode, if the PI control value is very small, it will cause the valve open for a very short time and close for very long, it may be not long enough to open the valve, thus will not make a good regulation of room temperature and the valve will be easily damaged.

Parameter "maximum control value in %"

Options: 70 ... 100

This parameter is used to set the maximum allowable value of the PI control value. When control value calculated from PI is larger than the set maximum value, Thermostat will send the maximum value. If you use a Thermostat to control an actuator using PWM (Pulse Width Modulation) mode, this parameter is very necessary. In PWM mode, if the PI control value is very large, it will cause the valve open for a very long time and close for very short, it may be not long enough to close the valve, thus will not make a good regulation of room temperature and the valve will be easily damaged.

Parameters "send control value at variation of %"

Options: 0 ... 15

This parameter is visible only when the control type is "continuous PI control" visible. Only when setting the certain amount of change of control value, the object "heating/cooling control value" sends current control value to the bus. 0 means not using this parameter.

Parameter "period of sending control value (1 ... 255 min)"

Options: 0 ... 255

This parameter sets time interval of control value cyclically send control value to the bus. 0 means not using this parameter.
Each time it sends a control value to the bus, cyclical sending time will be re-timing.
Note: the cycle time here should corresponds to the monitoring time of temperature control actuator , therefore the time of cyclical sending telegram should be half or less of the monitoring time of temperature control actuator to prevent that, temperature control actuators fail to monitor because of omission of cyclical telegram, and mistakenly judge Thermostat breaks down.

Parameter "PWM cycle time (1 ... 255 min)"

Options: 1 ... 255

This parameter is visible only when the control type is "switching PI control", and is used to set the period of control object cyclical sending switch value. Thermostat sends switch value according to the duty cycle of control value. For example, if the period is set to be 10mins,control value is 80%,Thermostat will send an open packet every 8 min, and send an closed packet every 2 min, and continue to cycle this way. If the control value changes, the duty cycle of Thermostat sending open/close telegram will change, while the period is still the time set by parameters.
If the control object sends a fully open or fully closed packet, the Thermostat will still cyclically send telegrams.
The two control type "continuous PI control" and "switching PI control" have same PI control value, but different control object. The control object of "continuous PI" sends out PI control (1byte) directly,but control object of "switching PI" outputs an "on/off" control telegram according to the duty cycle of control object.

Parameters "Symmetrical hysteresis temperature (× 0.1 °C)"

Options: 5 ... 50

This parameter is visible only when the control type "Two position control", and is used to set a delay interval to prevent that the small decline or rise of temperature causes the frequent switching on/off of actuator,and results in the frequent switching on/off of the valve. If the delay interval is set to be too large,it will reduce the number of actuator's action and extend actuator's life,but it will reduce control accuracy. For example, in the mode of heating, if temperature setpoint is 20 °C, the delay interval is 2 °C, then the control object will send an "on" telegram at 19 °C ,open the valve, and start heating. When temperature rises to 21 °C, the control object will send an "off" telegram, close the valve and stop heating.

Parameter "Control value type"

Options: 1bit (ON/OFF)
1byte (0% / 100%)

This parameter is visible only when the control type is "Two position control", and is used to set the type of control object.
If the option is "1bit", the object "Heating/Cooling control value" sends "on" and "off";
If the option is "1byte", the object "Heating/Cooling control value" sends only "0%" and "100%."

3.6. PARAMETER SETTING INTERFACE"ADDITIONAL HEATING/COOLING"

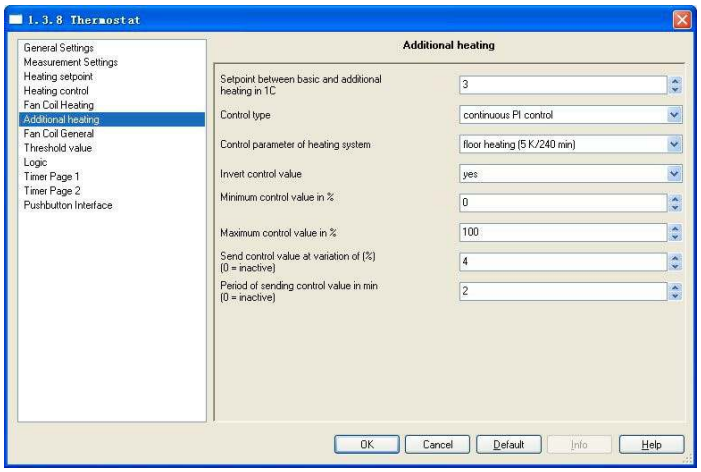


Figure 3.6 "Additional Heating/cooling" parameter setting interface

In the fig. 3.6 these parameter settings are the same as above except the first parameter. The parameter "Setpoint between basic and additional heating/cooling in 1C" is used to set the setpoint temperature of the additional heating/cooling, if select additional heating, the setpoint of additional heating= basis comfort temperature (at heating)-value of the parameter setting; if select additional cooling, the setpoint of additional cooling= basis comfort temperature (at cooling)+value of the parameter setting.

3.7. PARAMETER SETTING INTERFACE "FAN COIL GENERAL"

"Fan Coil General" parameter setting interface is as shown in Figure 3.7. Here it sets the general parameters of fan coil.

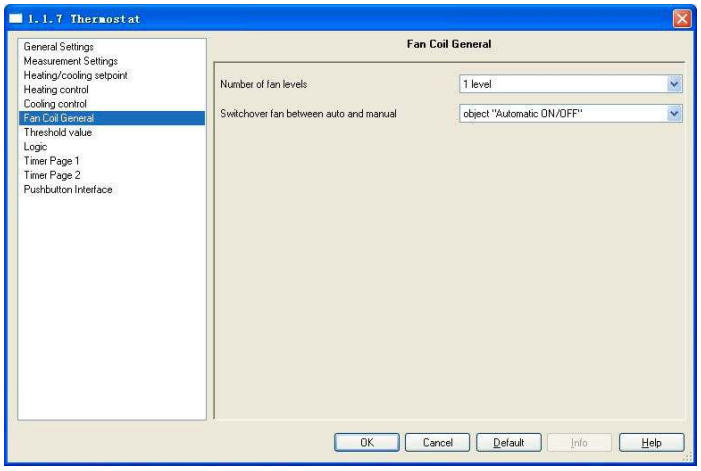


Figure 3.7 "Fan Coil General Parameter Setting Interface

Parameters "Number of fan level"

Options: 1 level
2 levels
3 levels

This parameter is used to set the levels of wind speed. The maximum wind speed does not exceed the levels.

Parameter "Switchover fan between auto and manual"

Options: object "Automatic ON / OFF"
object "Manual ON / OFF"

This parameter is used to set the automatic and manual switchover of wind speed.
When you select "object" Automatic ON/OFF" and switch to automatic wind speed mode, communication object 21 sends 1. When you switch to manual wind speed mode, communication object 21 sends 0, and communication object 22 sends the control value of corresponding wind. When choosing "object Manual ON/OFF" and switch to manual wind speed mode, communication object 21 sends 1, and communication object 22 sends the control value of corresponding wind. When you switch to automatic wind speed mode, communication object 21 sends 0.

3.8. PARAMETER WINDOW "FAN COIL HEATING/COOLING"

Parameter window "Fan Coil Heating/Cooling", shown in Figure 3.8

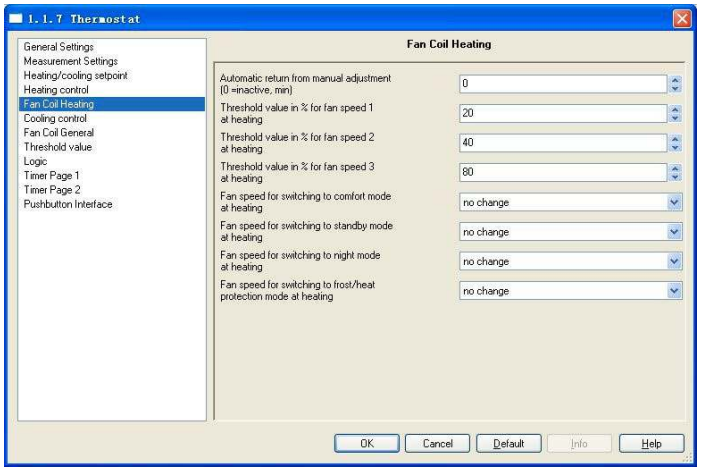


Figure 3.8 Parameter window "Fan Coil Heating/Cooling"

Parameter "Automatic return from manual adjustment"

Options: 1- 255

This parameter sets time of "Automatic return from manual adjustment". After user manually switching the wind speed, the wind speed reaches the time to return to the automatic mode, the communication object 21 sends packets to return to automatic speed mode.

Parameter "Threshold value in % for fan speed 1 at heating"

Parameter "Threshold value in % for fan speed 2 at heating"

Parameter "Threshold value in % for fan speed 3 at heating"

Options: 0- 100

"Threshold value in% for fan speed 1 at heating": to set packet value that "communication object 22-Fan manual stage" outputs when the Thermostat is switched to high speed 1.
"Threshold value in% for fan speed 2 at heating": to set packet value that "communication object 22-Fan manual stage" outputs when the Thermostat is switched to high speed 2.
"Threshold value in% for fan speed 3 at heating": to set packet value that "communication object 22-Fan manual stage" outputs when the Thermostat is switched to high speed 3.

Parameter "Fan speed for switching to comfort mode"

Parameter "Fan speed for switching to standby mode"

Parameter "Fan speed for switching to night mode"

Parameter "Fan speed for switching to frost/heat protection mode"

Options: auto
1
2
3
no change

This parameter is to set wind-sharing speed of fain coil in different operating modes. Each mode can be set its corresponding wind speed. When switching to a working mode, the communication object sends the control value, the corresponding wind speed.is entered. Each switching to an operation mode, timing mark start timing in "speed return mode", time will return to automatic speed mode.

3.9. PARAMETER WINDOW "THRESHOLD VALUE"

Parameter window "Threshold value" is shown in Figure 3.9: here is to set the threshold values of of temperature and humidity, which can be enabled in the interface. When the temperature threshold value is enabled, the parameter window is shown in Figure 3.9.1; when the humidity threshold value when enabled, the parameter window is shown in Figure 3.9.2. Thermostat, according to the current temperature and humidity within the threshold value range, triggers to send two different types of (1bit/1byte) data to the BUS, to control other devices.

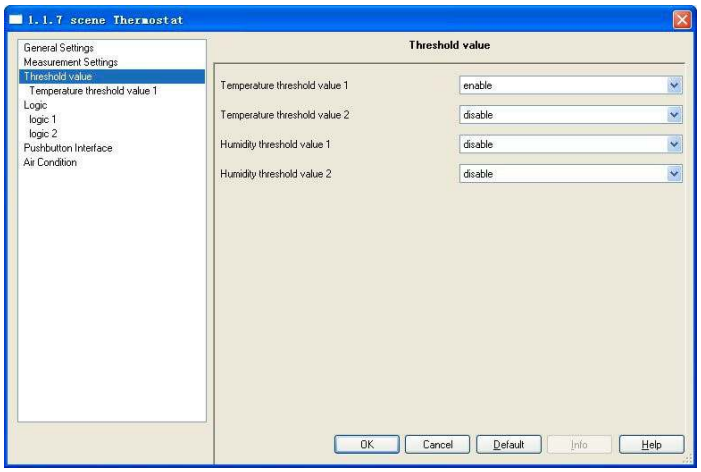
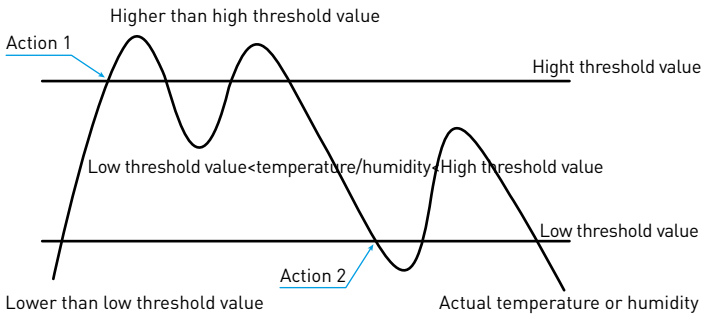


Figure 3.9 Parameter window "Threshold value"

Setpoints of "threshold values":



3.9.1. TEMPERATURE THRESHOLD VALUE

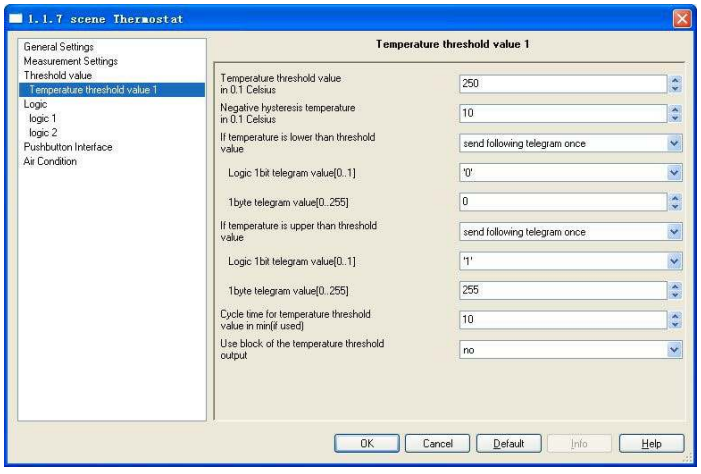


Figure 3.9.1 Parameter window "Temperature threshold value 1/2"

Parameter "Temperature threshold value (×0.1 °C)"

Options: 0- 500

This parameter sets a high threshold value of temperature, this threshold value can be changed as "change temperature threshold value 1/2", and once changing, in the bus will save the new value when the power of the BUS is off.

Parameter "Negative hysteresis temperature (×0.1 °C)"

Options: 5- 50

This parameter is used to set the hysteresis value of the low threshold value to high threshold value. Assuming the hysteresis value is 3 °C, then the lower threshold = high threshold value -3 °C. When the high threshold changes, the low threshold changes accordingly.

Parameter "If temperature is lower than threshold value"

Parameter "If temperature is upper than threshold value"

Options: do not send telegram
send following telegram once
send following telegram cyclically

These two parameters are used to respectively set ways of sending telegram to the object "1bit/1byte output, temperature", when the detected temperature is below the low threshold or above the high threshold.
If select "do not send telegram", no telegram is sent; if select "send following telegram once", the telegram is sent once; if select "send cyclically", the telegram is sent cyclically; send cyclically time can be set in the below "cycle time for temperature threshold value [min]", and at most two values can be set, in the below logic1bit/ 1byte telegram value.

Parameter "logic 1 bit /1byte telegram value"

Options: Logic 1bit (0~1)
1byte (0~255)

This parameter is used to specify, the telegram value that object "1bit/1byte output, temperature" sends, when the current temperature is below the low threshold and above the high threshold. After a bus reset or programming, if the current temperature is between the low threshold and the high threshold, the object does not send telegram to the bus.

Parameter "Cycle time for temperature threshold value [min] (if used)"

Options: 1- 255

This parameter is used to set the object "1bit/1byte output, temperature" cycle time on the bus to send the value of the interval, only when the parameter "If temperature is lower/upper than threshold value" set loop send it to use.

Parameter "use block of the temperature threshold output"

Options: yes
no

This parameter sets whether to enable the threshold value, if enabled, the object "temperature threshold value1/2 block" is visible, when the object receives telegram "1", threshold value is disabled, when the object receives telegram "0", the threshold value is enabled.

Parameter "Behaviour when setting the lock"

Options: Do not send telegram
Send the same telegram as lower threshold
Send the same telegram as upper threshold

This parameter sets the action when the threshold value is banned.
Select "do not send", no action;
Select "Send the same telegram as lower threshold", when the object "temperature threshold value 1/2 block" receives telegram "1", the object "1bit/1byte output, temperature" sends the same telegram as lower threshold.
Select "Send the same telegram as upper threshold", when the object "temperature threshold value 1/2 block" receives telegram "1", the object"1bit/1byte output, temperature"sends the same telegram as upper threshold.
This parameter can be seen in "use block of the temperature threshold output" if User selects "yes".

Parameter "Behaviour when releasing the lock"

Options: Do not send
Update

This parameter sets the action when the threshold value is started again.
Select "do not send", when the object "temperature threshold value 1/2 block" receives the telegram "0", if the threshold value changes, "1bit/1byte output, temperature" value will be sent immediately, but not vice versa. If the current temperature is between high and low thresholds, no telegram will be sent; if loop sending is enabled, the previous telegram will be loop sent.
Select "update", when the object "temperature threshold value 1/2 block" receives telegram "0", the object "1bit/1byte output, temperature" updates according to the threshold range of the current temperature, no matter whether the object value changes, the telegram is sent. If the current temperature is between the high and low thresholds, the object value cannot be determined, the telegram is not sent, even though in case of sending cyclically.
This parameter can be seen in "use block of the temperature threshold output" if User selects "yes".

3.9.2. HUMIDITY THRESHOLD VALUE

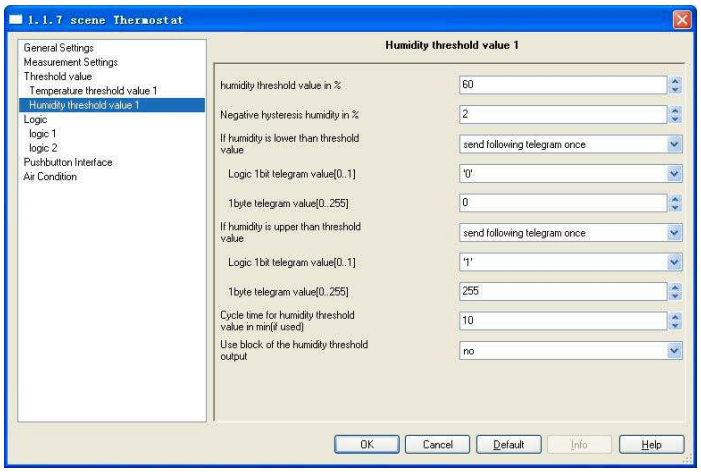


Figure 3.9.2 Parameter window "Humidity threshold value 1/2"

Parameter "Humidity threshold value (%)"
Options: 0- 100
This parameter sets a high threshold value humidity, this threshold value can be changed as
"change humidity threshold value1/2", and once changing, in the bus will save the new value when the power of the BUS is off.

Parameter "Negative hysteresis humidity (%)"

Options: 1-10

This parameter is used to set the hysteresis value of the low threshold value to high threshold value.
Assuming the hysteresis value is 5%, then the lower threshold = high threshold value -5%. When the high threshold changes, the low threshold changes accordingly.

Parameter "If humidity is lower than threshold value"

Parameter "If humidity is upper than threshold value"

Options: Do not send telegram
Send following telegram once
Send following telegram cyclically

These two parameters are used to respectively set ways of sending telegram to the object "1bit/1byte output, humidity", when the detected humidity is below the low threshold or above the high threshold.
If select "do not send telegram", the object does not sends telegram;
If select "send following telegram once", the object sends telegram once;
If select "send cyclically", the object sends telegram cyclically, sending time can be set in the following parameter "cycle time for humidity threshold value [min]" in the settings, you can send two object types, the value of the object is set in the following parameters "logic1bit / 1byte telegram value ".

Parameter "logic 1 bit/1 byte telegram value"

Options: Logic 1bit (0~1)
1 byte (0~255)

This parameter is used to specify, the telegram value that object "1bit/1byte output, humidity" sends, when the current humidity is below the low threshold and above the high threshold. After a bus reset or programming, if the current humidity is between the low threshold and the high threshold, the object does not send telegram to the bus.

Parameter "Cycle time for humidity threshold value [min] (if used)"

Options: 1- 255

This parameter is used to set the object "1bit/1byte output, humidity" cycle time on the bus to send the value of the interval, only when the parameter "If humidity is lower / upper than threshold value" set loop send it to use.

Parameter "use block of the humidity threshold output"

Options: yes
no

This parameter sets whether to enable the threshold value, if enabled, the object "humidity threshold value 1/2 block" is visible, when the object receives telegram "1", threshold value is disabled, when the object receives telegram "0", the threshold value is enabled.
When select "yes", the following parameters can be seen.

Parameter "Behaviour when setting the lock"

Options: Do not send telegram
Send the same telegram as lower threshold
Send the same telegram as upper threshold

This parameter sets the action when the threshold value is banned.
Select "do not send", no action;
Select "Send the same telegram as lower threshold", when the object "humidity threshold value 1/2 block" receives telegram "1", the object "1bit/1byte output, humidity" sends the same telegram as lower threshold.
Select "Send the same telegram as upper threshold", when the object "humidity threshold value 1/2 block" receives telegram "1", the object "1bit/1byte output, humidity" sends the same telegram as higher threshold.
This parameter can be seen in "use block of the humidity threshold output" if User selects "yes".

Parameter "Behaviour when releasing the lock"

Options: Do not send
Update

This parameter sets the action when the threshold value is started again.
Select "do not send", when the object "humidity threshold value 1/2 block" receives the telegram "0", if the threshold value changes, "1bit/1byte output, humidity" value will be sent immediately, but not vice versa. If the current humidity is between high and low thresholds, no telegram will be sent; if loop sending is enabled, the previous telegram will be loop sent.
Select "update", when the object "humidity threshold value 1/2 block" receives telegram "0", the object "1bit/1byte output, temperature" updates according to the threshold range of the current humidity, no matter whether the object value changes, the telegram is sent. If the current humidity is between the high and low thresholds, the object value cannot be determined, the telegram is not sent, even though in case of sending cyclically.
This parameter can be seen in "use block of the humidity threshold output" if User selects "yes".

3.10. PARAMETER WINDOW "LOGIC"

Parameter window "Logic" shows in Figure 3.10.1 Temperature controller provides two logic functions, each function has three logic inputs, each input can be freely set, telegrams may be sent by the temperature threshold (1bit), or humidity threshold (1bit), or from the bus, these telegrams can also be inverted, then participate in logic operations.

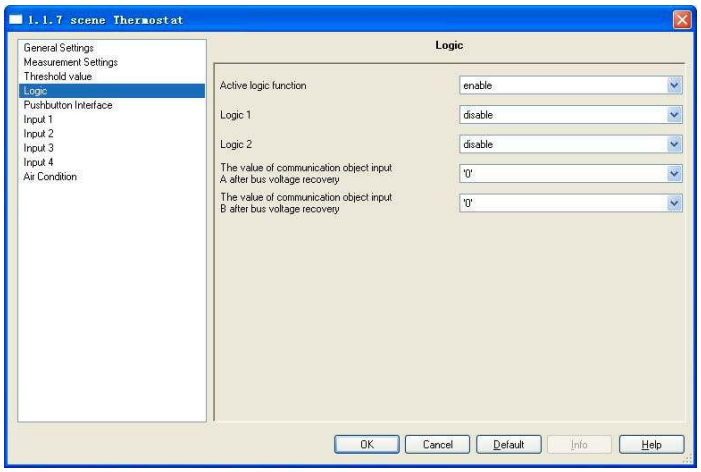


Figure 3.10.1 Parameter window "Logic"

Parameter "Active logic function"

Options: enable
disable

Here is to set whether to enable logic functions.

Parameter "logic1"

Parameter "logic 2"

Options: enable
disable

This parameter sets whether to enable logic 1 and logic 2.
If select "enable", it means logic 1 and logic 2 are enabled, and their parameter window can be seen in Figure 3.10.2.

Parameter "The value of communication object input A after bus voltage recovery"

Parameter "The value of communication object input B after bus voltage recovery"

Options: 0
1

This parameter sets logic values of "Input A" and "Input B", when the bus on a power-on reset. "Input A" and "Input B" logic values can be changed via the communication object "communication object logic Input A" and "communication object logic Input B".
In Figure 3.10.2, in the parameter window of logic1 and the logic 2, "Input 1" and "Input 2" for the first run logic operation, and the operation result is then runs logical operation with"Input3", at last the final logical result is obtained, according to the final results two different types of data transmission can be achieved. When the final logic result is "1", user can specify the values of two different types of transmission on the bus; when the final result is "0"; user may further specify two different types of transmission on the bus. Each time the Thermostat detects the input of new logical values, it will re-do a logic operation, while updating the final result of logic operation. Logic functions can also set ways of sending the value of logical objects; user can disable / enable logic functions.

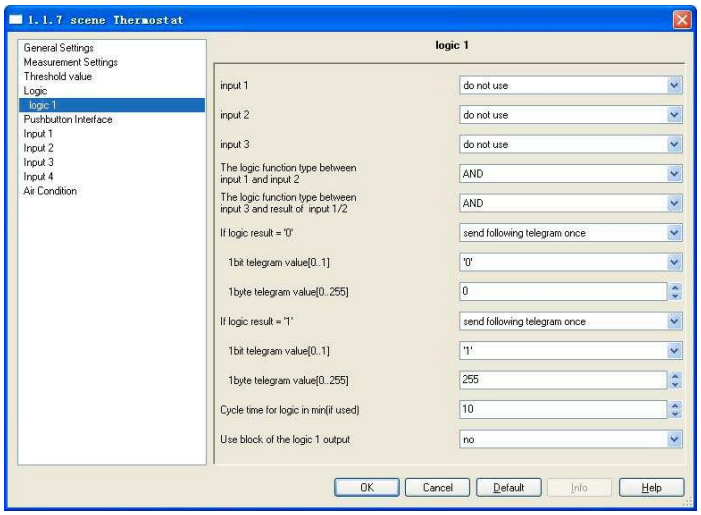


Figure 3.10.2 Parameter window "Logic 1/2"

Parameter "input X(X=1...6)"

Options: do not use
temperature threshold value 1
temperature threshold value 1 inverted
temperature threshold value 2
temperature threshold value 2 inverted
humidity threshold value1
humidity threshold value1 inverted
humidity threshold value 2
humidity threshold value 2 inverted
communication object input A
communication object input A inverted
communication object input B
communication object input B

Here is to set the input value of logic operations, logic input value of logic 1 is input 1 ~ input 3, logic input value of logic 2 is input 4 ~ input 5.
If one of the logic input isn't used, the logic input and its logic operations should be ignored.
If in a certain threshold state no telegrams are sent, then in this case logic input is not involved in the logic operation, equivalent do not use, and if the threshold function is disabled, and in this case logic input is also equivalent to do not use.
If the object value of the threshold value is in an indeterminate state, logic input doesn't participate in logic operations. If temperature and humidity testing fail, the relevant logic inputs are not involved in logical operations.

Parameter: The logic function type between input 1 (4) and input 2 (5)"

Options: AND
OR
XOR

This parameter sets the logic operations of "Input 1 (4)" and "Input 2 (5) ". Three kinds of logic operations relations:"AND", "OR", "XOR".

Parameter "The logic function type between input 3 (6) and result of input 1/2 (4/5)"

Options: AND
OR
XOR

This parameter sets the logic operations results or relations of "Input 3 (6)" and "Input 1 (4)" / "Input 2 (5)", providing three kinds of logic operations relations: "AND", "OR", "XOR".

Parameter "if logic result='0/1'"

Options: do not send telegram
send following telegram once
send following telegram cyclically

Here is to set the way of the logic object sends value when the logic results are "1" and "0".
If select "do not send telegram", the object does not sends telegram;
If select "send following telegram once", the object sends telegram once;
If select "send cyclically", the object sends telegram cyclically, sending time can be set in the following parameter "cycle time for humidity threshold value [min]" in the settings, you can send two object types, the value of the object is set. in the following parameters "logic1bit / 1byte telegram value ".

Parameter "logic 1 bit /1byte telegram value"

Options: 1bit (0~1)
1byte (0~255)

Here is to set the value of the logic object sends when the logic results are "1" and "0".

Parameter "cycle time for logic [min]"
This parameter is used to set the interval of the object "logic 1/2, 1bit/1byte output" cyclically sends on the bus, only when the parameter "if logic result=0/1" set cyclically sending, is it enabled.

Parameter "use block of the logic 1/2 output"

Options: yes
no

This parameter sets whether to disable the threshold value, if enabled, the object "logic 1/2 block" is visible, when the object receives telegram "1", threshold value is disabled, when the object receives telegram "0", the threshold value is enabled.
When select "yes", the following parameters can be seen.

Parameter "Behaviour when setting the lock"

Options: do not send
the same as logic result ='0'
the same as logic result='1'

This parameter sets the action when the threshold value is disabled.
Select " do not send", no action;
Select "the same as logic result='0'", when the object "logic 1/2 block" receives telegram "1", the object "logic 1/2, 1bit/1byte output" sends the same telegram as with telegram "0".
Select "the same as logic result='1'", when the object "logic 1/2 block" receives telegram "1", the object "logic 1/2, 1bit/1byte output" sends the same telegram as with telegram "1".

Parameter "Behaviour when releasing the lock"

Options: Do not send
Update

This parameter sets the action when the logic is started again.
Select "do not send", when the object "humidity threshold value 1/2 block" receives the telegram "0", if the threshold value changes, "1bit/1byte output, humidity" value will be sent immediately, but not vice versa.
If selecting "update", when "logic 1/2 bock" receives telegram "0", no matter whether the logic results change, the value of "logic 1/2, 1bit/1byte output" will be sent immediately.

3.11. PARAMETER WINDOW "TIMER PAGE 1" AND "TIMER PAGE 2"

Parameter window of Timer Page 1" and "Timer Page 2" is shown in Figure 3.11, here is to set the relevant parameters of timer. Thermostat panel can set schedule to automatically adjust the work mode. A thermostat panel has 16 timing times, and each timing time has its own work mode. If the current time is equal to a timing time, it will automatically switch to the corresponding work mode and send the corresponding data.

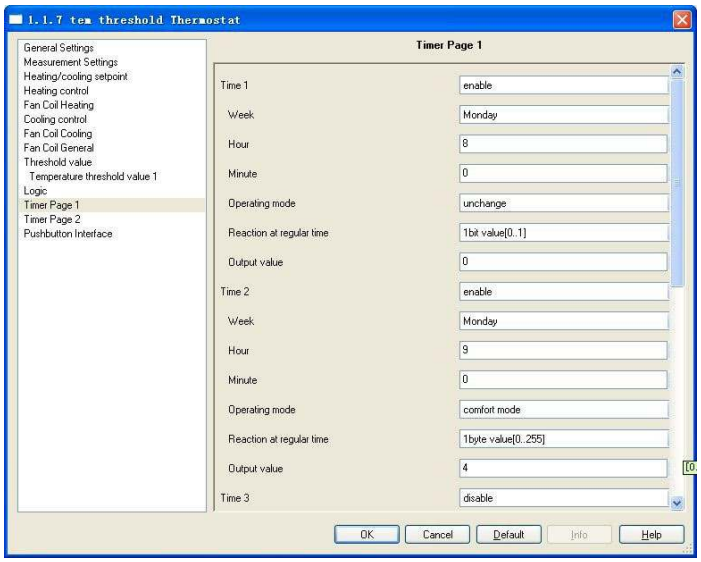


Figure 3.11 parameter window "Timer Page x" and "Timer Page 2"

Parameter "Time x"

Options: enable
disable

This parameter is used to activate a timing time. After the timing is enabled, timing mode switching and manually adjust the timing time can be achieved. If the 16 timers has overlap time, thermostat will send the front timer mode and data to the bus. When regular time enabled, users can long press the timer button to modify the regular time.

Parameter "Week"

Options: Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday
Monday- Wednesday
Thursday- Friday
Monday- Friday
Saturday- Sunday
Monday- Sunday

This parameter sets the date. Users can set according to their needs.

Parameter "Hour"

Options: 0- 23

This parameter is used to set time in hours.

Parameter "Minute"

Options: 0-59

This parameter is used to set time in minutes.

Parameter "operating mode"

Options: comfort mode
standby mode
night mode
frost/heat protection
unchanged

This parameter sets the room control mode when the set timing time reaches.

Parameter "Reaction at regular time"

Options: No reaction
1 bit value [0..1]
2 bit value [0..3]
4 bit value [0..15]
1 byte value [0..255]
2 byte value [-32768...32767]
2 byte value [0..65535]
4 byte value [0..4294967295]

This parameter sets the data type thermostat panel sent to the bus when the set timing time reaches.

Options "Output value"

Options: 0..1/0..3/0..15/0..255/-32768...32767/0..65535/0..4294967295

This parameter sets the data value that is sent to the bus.

3.12. PARAMETER WINDOW "PUSHBUTTON INTERFACE"

Pushbutton Interface has three binary inputs and a temperature sensor input; three binary inputs can be set to switch, dimming, curtains and other functions. Temperature sensor inputs can be connected an external NTC thermistor, as an external temperature sensor of thermostat panel, or as a temperature limiter of underfloor heating, to stop heating when the heating temperature is higher than the limit.

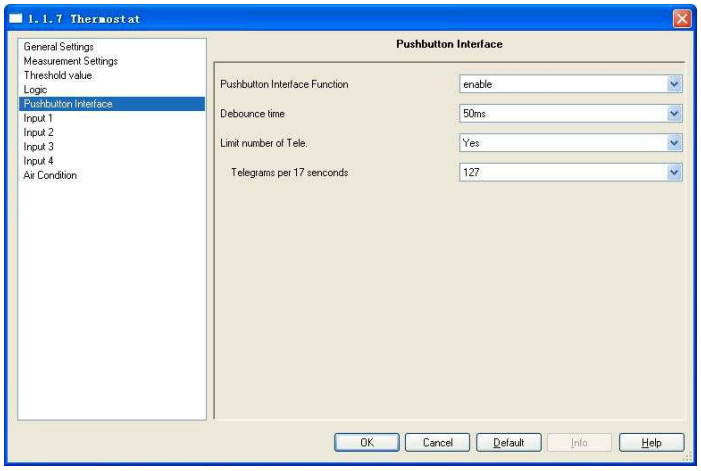


Figure 3.12.1 Parameter window "Push button Interface"

Parameter "Debounce Time"

Options: 10ms/20ms/.../150ms

Debounce time set here, to prevent unnecessary repeatedly operations caused by multiple triggering when the contact repeatedly jitter, which is the minimum effective time of contact input.

Parameter "Limit number of Tele."

Options: yes
No

This parameter sets limits on the number of binary input telegrams sent to the main bus, in order to reduce the burden of bus. If selecting "Yes", the parameter "Max. Number Tele. Within a period" is visible.

Parameter "Max. Number Tele. Within a period"

Options: 30/60/100/127

This parameter sets the number of telegrams can be sent in a maximum of 17 seconds.
Bus voltage is restored, the device initialization is complete, the timer starts and starts counting telegrams, once the maximum allowed number of telegrams sent once reached, then no telegrams will be sent to the bus until the end of 17 seconds. After the end of the 17 seconds, the timer re-starts, and the telegram restarts to count.

Parameter "Function of input 1"

Options: No function
Switch
Switch/Dimming
Shutter control
Scene

This parameter sets functions of binary inputs.

3.12.1. SWITCH

In parameter window "Input 1/2/3", select "Switch" in "Function of input 1/2/3", seen in Figure 3.12.2.

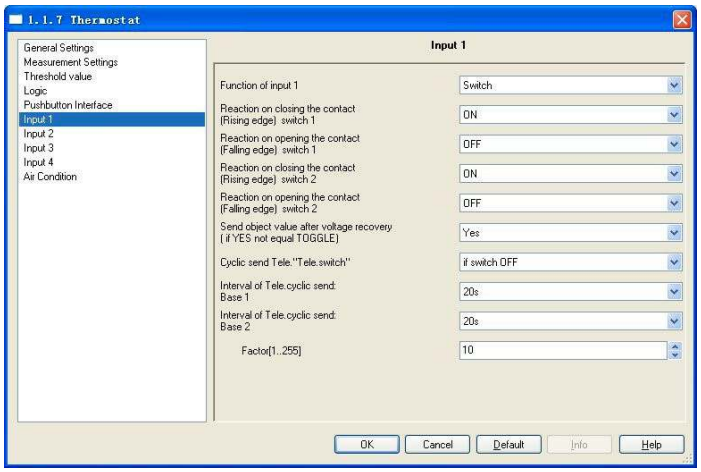


Figure 3.12.2 parameter window "switch"

Parameter "Reaction on closing the contact (rising edge) switch 1/2"

Parameter "Reaction on opening the contact (falling edge) switch 1/2"

Options: No function
off
on
toggle

Here is to set the switch value that the object "Switch, X" sent when performing the operation.
If selecting "no action", no actions will be performed. If selecting "toggle", it will perform the inverse operation, namely, inverse the last value and send again, such as before executing the "On" to operate, inverted, perform the "Off" operation.

Parameter "Send object value after voltage recovery (if yes not equal toggle)"

Options: yes
No

Here to set whether to send the current switch value of "Switch, X" to the bus when power is restored, this parameter is visible when it does not distinguish between long and short operation.
If selecting "yes", it will send the current switch value of "Switch, X" to the bus when power is restored, but only when the parameter "Reaction on closing the contact(rising edge)/ opening the contact (falling edge)", and all options don't select "Toggle", will it send the current switch value of "Switch, X" to the bus; if any of the options selects "Toggle", no value will be sent in the bus. If the current operation is "No reaction" or "Stop cyclic transmission", no value will be sent.

Parameter "Cyclical send Tele. Switch"

Options: no
always
if switch off
if switch on

Here is to set whether to cyclically send the current switch value of "Switch, X" to the bus.
Parameter option "Always" is selected, regardless of the object "Switch, X" in the current switch value is 0 or 1; the switch will send cyclically the current value to the bus. Parameter option is set as "If switch off" or "If switch on", Only when the current value is the same as the option, the value will be cyclically sent.

Parameter "Interval of Tele. Cyclic send: Base × Factor"

Base Options: 0.5s/1s/ .../1h
Factor Options: 1...255

Here set the interval of cyclically sending telegrams, the parameter is visible when setting cyclically sending, its cycle: Base × Factor.

3.12.2. SWITCH/DIMMING

In parameter window "Input 1/2/3", select "Switch/Dimming" in "Function of input 1/2/3", seen in Figure 3.12.3. After this function is enabled, user through one input operation can control switching and dimming devices simultaneously.

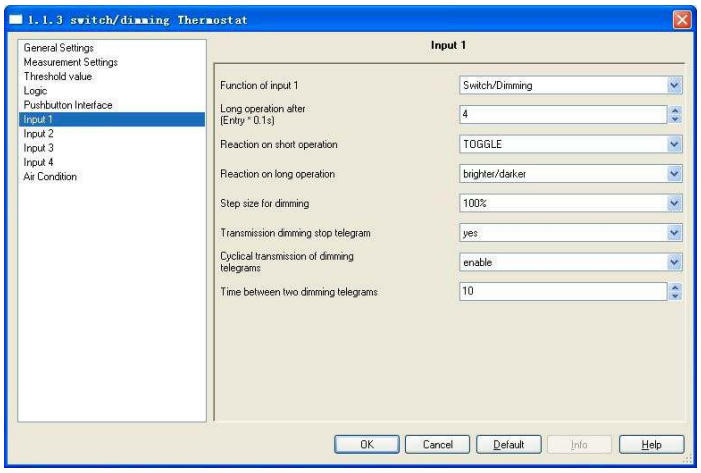


Figure 3.12.3 parameter window "Switch / Dimming"

Parameter "Long operation after(entry*0.1s)"

Options: 3-250

This parameter defines the contact input's effective time for a long operation. If the connecting time of input contacts is longer that the set time, the operation is considered as long operation.

Parameter "Reaction on short operation"

Options: no action
off
on
toggle

Through this parameter, user can set the operation after "Switch, X" is triggered, namely, the switching operations when the contact input is short operation.

Parameter "Reaction on long operation"

Options: brighter
darker
brighter/darker

Here is to set when the contact input is long operation, operations performed on dimmable devices, relative dimming, brighten or darken, the input is disconnected and stop dimming.
If select "brighter /darker", the contact input is long operation, both the brighter and darker can be performed, but at first is brighter, then the later operation is the inverse of the former operation.

Parameter "Step size for dimming"

Options: 100%
50%
.....
1.56%

This parameter sets the brightness range (percentage) of cyclically sending dimming telegrams.

Parameter "Transmission dimming stop telegram"

Options: yes
no

It sets whether to send stop dimming telegram when the dimming stops.

Parameter "Cyclical transmission of dimming telegrams"

Options: disable
enable

It sets whether to cyclically send dimming telegram.

Parameter "Time between two dimming telegrams in 0.1s"

Options: 3-250

If selecting "enable" in the parameter "Cyclical transmission of dimming telegrams", then the parameter is visible. Here is to set the interval of cyclical transmission of dimming telegrams.

3.12.3. SHUTTER CONTROL

In parameter window "Input 1/2/3", select "Shutter control" in "Function of input 1/2/3", seen in Figure 3.12.4. After enabling this function, user can control the shutter through one or two input operations.

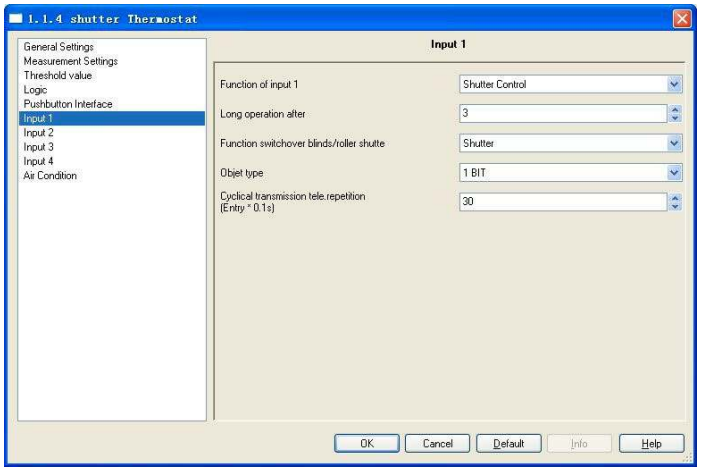


Figure 3.12.4 parameter window "Shutter control"

Parameter "Long operation after(Entry*0.1s)"

Options: 3-250

This parameter defines the contact input's effective time for a long operation. If the connecting time of input contacts is longer that the set time, the operation is considered as long operation.

Parameter "Function switchover blinds/roller shutter"

Options: Shutter
Roller shutter

Set action performed when contact input is operated.
Note that: if the parameter "reaction on operation" selects "toggle", its direction is negated after each time sending a moving telegram.

Parameter "Object type"

Options: 1BIT
1BYTE

If this parameter is visible when "function switchover blinds/roller shutter" selects "shutter", and is used to set the object types of "Output shutter UP/DOWN" and "Output Stop/lamella adj".

Parameter "Cyclical transmission tele. repetition (Entry*0.1s)"

Options: 3-250

The parameter is visible when selecting"1bit" in the parameter "object type", where setting the switch's long press operation, the interval of two telegrams is sent cyclically.

Parameter "value for position down (%)"/"value for position up (%)"
This parameter can only be set if "1 byte" has been set as object type, which can be used to set the position (percent values) that a connected blind shall be lowered or raised to. Options: 0~100, the value 0% means travel up completely, the value 100% means travel down completely.

Parameter "value for stats position down (%)"/"value for stats position up (%)"
This parameter can only be set if "1 byte" has been set as object type, which can be used to set the position (percent values) that a connected blind slat shall be opened or closed to. Options: 0~100, the value 0% means slat opened completely, the value 100% means closed completely.

3.12.4. SCENE

In "Input 1/2/3", when selecting "Scene" for "Function of input 1/2/3", the parameter window is seen as Figure 3.12.5: if this function is enabled, sending and saving the scene can be achieved.

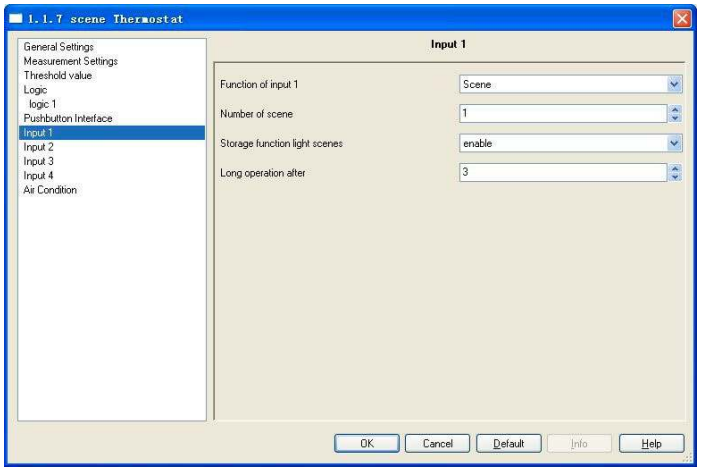


Figure 3.12.5 parameter window "Scene"

Parameter "Number of scene"

Options: 1-64

Here "Number of scene" can be set, and its range: 1~64; when the switch is operated, via 1 byte communication object "Input x, scene" send telegram value. The setting scene number 1-64 corresponding to the telegram value 0-63.

Parameter "storage function light scenes"

Options: enable
disable

Here is to set whether to enable scene saving. If select "enable", long press the switch will save the scene, short press the switch will recall scene, the calling and saving of the scene are controlled by the same 1byte communication object.

Parameter "Long operation after (Entry*0.1s)"

Options: 3-250

Scene save function is enabled, this parameter can be seen, here to set the time of the detection long press the switch.

3.12.5. EXTERNAL TEMPERATURE SENSOR FOR RTC

Parameter window "Input 4" is seen as Figure 3.12.6, Temperature sensor inputs can be connected an external NTC thermistor, as an external temperature sensor of thermostat panel, or as a temperature limiter of underfloor heating, to stop heating when the heating temperature is higher than the limit.

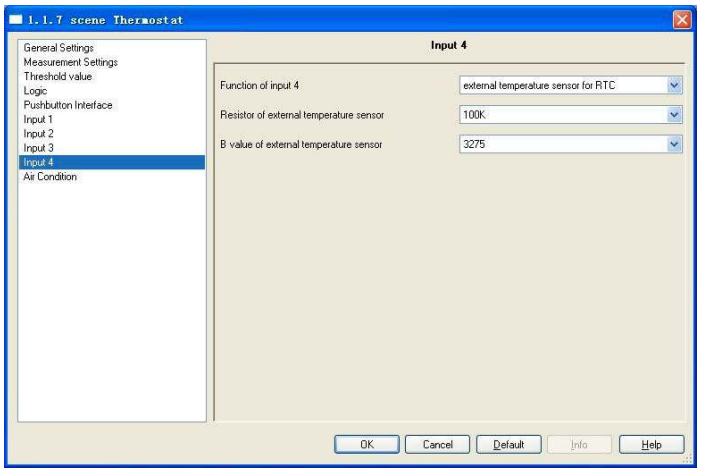


Figure 3.12.6 parameter window "Input 4"

Parameter "Function of input 4"

Options: No function
external temperature sensor for RTC
temperature limiter(underfloor heating)

If temperature sensor inputs is used as an external temperature sensor of thermostat panel, it should be connected an external NTC thermistor, but also selects "external sensor" or "internal sensor and external sensor" for "Temperature sensor "in "Measurement Settings".
Note: if temperature sensor input is used as an external temperature sensor, the communication object of external temperature on the bus into the external temperature is invalid.

Parameter "Resistor of external temperature sensor"

Options: 1K
5K
...
200K

This parameter sets the resistance value of the external temperature sensor thermistor.

Parameter "B value of external temperature sensor"

Options: 3275
3380
...
4200

This parameter sets the B value of the external temperature sensor thermistor. When a temperature sensor input is used as underfloor heating temperature limiter, you need to connect an NTC thermistor and put the thermistor into the floor inside. In "Measurement Settings", it doesn't matter whether to select "external sensor" or "internal sensor and external sensor" for "Temperature sensor". Communication objects---62-Floor temperature, is used to send the current floor temperature. Floor temperature sending variation refers to parameter "Send temperature at variation of (°C)", the floor temperature cyclically sending refers to parameter "period of sending temperature".

The following parameter is visible if selecting "temperature limiter (underfloor heating)" in the "Function of input 4".

Parameter "Limit temperature in 1Celsius"

Options: 1-50

This parameter sets the limit temperature of sensor inputs.

Parameter "Negative hysteresis temperature in 0.1 Celsius"

Options: 5-50

This parameter sets the hysteresis of temperature limit.

Parameter "Acting on"

Options: basic heating
additional heating

This parameter defines the temperature control function of temperature limiter. For example, if selecting "basic heating", the thermistor temperature of temperature sensor is higher than the limit temperature, the basic heating stop heating, the control value is 0. If selecting "basic heating", the thermistor temperature of temperature sensor is lower than the limit temperature, the basic heating restarts. Additional heating has a similar situation. Note that the temperature limiter's influence on the set temperature, the heating temperature will not reach the set temperature higher than the limit.

3.13. PARAMETER WINDOW "AIR CONDITION"

These parameters is used to set the air conditioning control. There are two object types: 1bit or 1byte. If 1bit type is selected, control commands are sent by 1bit objects, and different objects corresponds to a different commands. If 1byte type is selected, control command sent by 1byte object, different 1 byte value corresponds to a different commands. These control commands similar to the air-conditioning on the remote control commands, Users can learn the air conditioner remote control commands to the infrared transmitter module, configure the Thermostat with corresponding parameters, and then users can send through these commands by operating the Thermostat to control the infrared transmitter module. Under this setting, the 4 room temperature modes invalid and can not be switched, only display comfort mode. The "Set Key" is only used to switch heating and cooling.

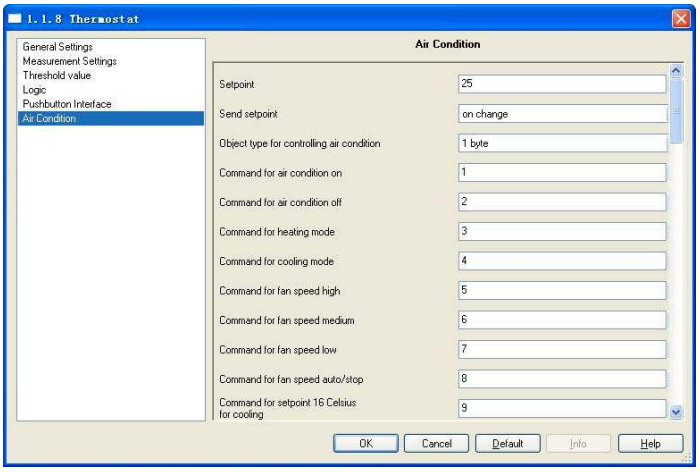


Figure 3.13 parameter window "Air Condition"

Parameter "Setpoint"

Options: 16- 32

This option is to set the setpoint temperature the air-conditioner. It is used to achieve thermostatic control.

Parameter "Send setpoint"

Options: Do not send
on change
cyclically
on change and cyclically

This option is set to send the way of the set temperature; "do not send" means do not send commands, "on change" means that there is a change on the sending, "cyclically" means cyclically Send, "on change and cyclically" means that, both change and sending, as well as cyclically sending.

Parameter "Period of sending setpoint"

Options: 5-64
10s
...
2h

This option sets the time period of cyclically send, the parameter "Send setpoint" is visible when selecting the "cyclically" or "on change and cyclically".

Parameter "Object type for controlling air condition"

Options: 1bit
1byte

This option is set to format of sending command; "1bit" means that using different 1bit communication objects to control different commands, the specific information can be seen in the description of 64-83 communication objects.
The following parameters setting value 1-64 corresponding to the telegram value 0-63.

Parameter "Command for air condition on"

Parameter "Command for air condition off"

Options: 1-64

These two parameters are to set the command value of air-conditioner ON/OFF. When parameter "Object type for controlling air condition" is selected "1byte", it is visible.

Parameter "Command for heating mode"

Parameter "Command for air cooling mode"

Options: 1- 64

These two parameters are to set the command value of switching between heating and cooling mode. When parameter "Object type for controlling air condition" is selected "1byte", it is visible.

Parameter "Command for fan speed high"

Parameter "Command for fan speed medium"

Parameter "Command for fan speed low"

Parameter "Command for fan speed auto/stop"

Options: 1-64

These parameters are used to set the command value of switching speed velocity. When parameter "Object type for controlling air condition" is selected "1byte", it is visible.

Parameter "Command for setpoint 16-31Celsius"

Options: 1-64

These parameters are to adjust the command value of set temperature. When parameter "Object type for controlling air condition" is selected "1byte", it is visible.

AUTO ON TIME
Parameter "Hour"

Options: 0-23

Parameter "Minute"

Options: 0-59

This parameter is to set the ON time of air conditioner. Long Press the timer button to modify the timing value, and its timing number is 1.
The function is valid only when the timing function is enabled by a short operation of timing icon.

AUTO OFF TIME
Parameter "Hour"

Options: 0-23

Parameter "Minute"

Options: 0-59

This parameter is to set the OFF time of air conditioner. Long Press the timer button to modify the timing value, and its timing number is 2.
The function is valid only when the timing function is enabled by a short operation of timing icon.

4. COMMUNICATION OBJECT DESCRIPTION

Communication objects are media for devices on the bus to communicate with other devices, and only through communication objects can carry out bus communication; the following is detailed description of each function of the thermostat panel's communication objects.

Note: "C" means enabling communication functions; "W" means the value of communication objects can be modified through the bus; "R" means the value of communication objects can be read through the bus; "T" means the communication object has a transmission function; "U" means the value of the communication objects can be updated.

4.1. "GENERAL SETTING" COMMUNICATION OBJECT

Figure 4.1 "General" Communication Object

No.	Object name	Functions	Data type	Flags	DPT
0	In operation	General	1Bit	C,T	1.001 DPT_Switch
This communication object cyclically sends telegram "1" or "0" on the bus, to show that the thermostat panel is in normal operation. It is enabled when the parameter "Send 'in operation ' object" selects "end value '0' cyclically" or "send value '1' cyclically"; but it is disabled if selecting "do not send". If selecting "send value '0 'cyclically", sending telegram '0'; if selecting "send value '1' cyclically" sending telegram '1 '.					
1	Day/night mode	General	1Bit	C,R, W,T	1.001 DPT_Switch
This communication object is used to receive telegram value from the bus to switch the backlight brightness of backlit screen. Received telegram values: 1——the backlight brightness of backlit screen in daytime 0——the backlight brightness of backlit screen at night.					

4.2. "HEATING/COOLING CONTROL "COMMUNICATION OBJECT

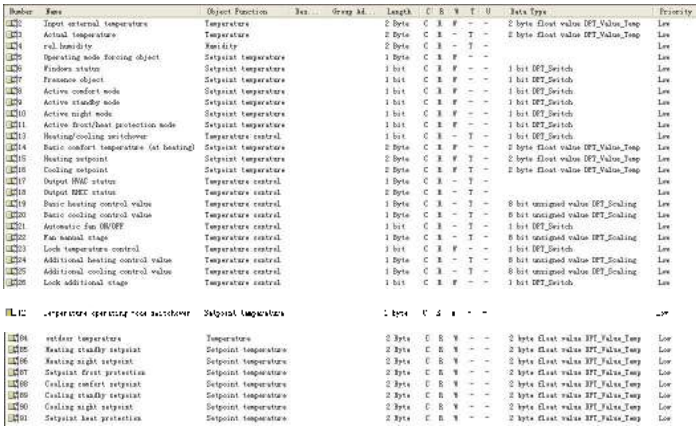


Figure 4.2 Temperature control communication object

No.	Object name	Functions	Data type	Flags	DPT
2	Input external temperature	Temperature	2 byte	C, R,W	9.001 DPT_Value_Temp
This communication object is for receiving temperature the external temperature sensor sends on the bus.					
3	Actual temperature	Temperature	2 byte	C,R,T	9.001 DPT_Value_Temp
The communication object is used to send the current temperature that is detected by the thermostat panel sensor, to the bus; the transmission time is set via parameter settings. When there is an external temperature sensor, the object is used to send the proportion and sum of temperatures sent by multiple sensors, or temperature by external sensor.					
4	rel. humidity	Humidity	2 byte	C,R,T	9.007 DPT_Value_Humidity
The communication object is used to send the current humidity that is detected by the thermostat panel sensor, to the bus; the transmission time is set via parameter settings.					
5	Operating mode forced object	Setpoint temperature	1 byte	C,R,W	20.102 DPT_HVACMode
This communication object is mandatory conversion of operating mode, and has the highest priority. Different telegrams mean different operating modes, as follows: 0: Auto (comfortable), 1: comfort mode, 2: Standby mode, 3: Night Mode, 4: Frozen protection /heat protection, 5~255: Reserved, do not use. For example, when an object receives a telegram "2", the thermostat panel will control the actuator according to the standby mode setting.					

No.	Object name	Functions	Data type	Flags	DPT
6	Window status	Setpoint temperature	1 bit	C, R,W	1.019 DPT_Window_Door

This communication object is used to connect a window contact

Receive telegram "1" - the windows open
Receive telegram "0" - the windows closed

7	Actual temperature	Temperature	1 bit	C, R, W	1.001 DPT_Switch

This communication object is used to connect presence sensor

Receive telegram "1" - somebody or something exists
Receive telegram "0" - somebody or something doesn't exist

8	rel. humidity	Humidity	1 bit	C, R, W	1.001 DPT_Switch

The communication object is visible when the object type of operating mode is "1bit", and is used to activate comfort mode. Receiving telegram "1"will activate comfort mode; receiving telegram "0" will not activate comfort mode.

Receive telegram "1"----activate comfort mode
Receive telegram "0"----not activate comfort mode

9	Operating mode forced object	Setpoint temperature	1 bit	C,R,W	1.001 DPT_Switch

The communication object is visible when the object type of operating mode is "1bit", and is used to activate standby mode. Receiving telegram "1"will activate standby mode; receiving telegram "0" will not activate standby mode.

Receive telegram "1"----activate standby mode
Receive telegram "0"----not activate standby mode

10	Active night mode	Setpoint temperature	1 bit	C,R,W	1.001 DPT_Switch

The communication object is visible when the object type of operating mode is "1bit", and is used to activate night mode. Receiving telegram "1"will activate night mode; receiving telegram "0" will not activate night mode.

Receive telegram "1"----activate night mode
Receive telegram "0"----not activate night mode

11	Active frost/heat protection mode	Setpoint temperature	1 bit	C,R,W	1.001 DPT_Switch

The communication object is visible when the object type of operating mode is "1bit", and is used to activate the frost/heat protection mode. Receiving telegram "1"will activate thefrost/heat protection mode; receiving telegram "0" will not activate the frost /heat protection mode.

Receive telegram "1"----activate the frost /heat protection mode
Receive telegram "0"----not activate the frost /heat protection mode

12	Temperature operating mode switchover	Setpoint temperature	1 byte	C,R,W	20.102 DPT_HVACMode

The communication object is visible when the object type of operating mode is "1bit", and is used to switch to RTC mode. Different telegrams mean different operating modes, as follows: 0: Auto (comfortable), 1: comfort mode, 2: Standby mode, 3: Night Mode, 4: Frozen protection /heat protection, 5-255: Reserved, do not use. For example, when an object receives a telegram "2", the thermostat panel will control the actuator according to the standby mode setting.
Communication object of operating mode switching has priority; thermostat panel activates the operating mode according to the priority of a communication object of operating mode. More information is seen in 4.4 "Object type for operating mode switchover".

13	Heating/cooling switchover	Temperature control	1bit	C,R,W	1.100 DPT_Heat/Cool

The communication object is for heating/cooling switchover. Receiving telegram "1"will activate heating; receiving telegram "0" will activate cooling.

Receiving telegram "1"----- heating
Receiving telegram "0" ----- cooling

14	Basic comfort temperature (at heating)	Setpoint temperature	2byte	C,R,W	9.001 DPT_Value_Temp

This object is mainly used to change the setpoint value of temperature in comfort mode, and after the change, a new value will be saved when the bus is powered off.

Telegram: 0...50 ℃

If the first page parameter "Temperature control system" selects "heating and cooling", this object is mainly used to change the comfort temperature value of heating; the comfort temperature value of cooling, is determined by the comfort temperature value of dead zone and heating. More information is seen in 4.4 "switchover between heating and cooling".

15	Heating setpoint	Setpoint temperature	2 byte	C,R, W,T	9.001 DPT_Value_Temp

The communication object is used to send the heating setpoint of the current operating mode on the bus, sending way depends on the parameter "send setpoint" in 4.4. The communication object is used to modify the heating setpoint of the current operating mode. Note that due to the relative adjustment of setpoint temperature, the setpoint temperature in standby mode, night mode and frost / heat protection mode can only be increased to the maximum setpoint temperature comfort mode.

16	Cooling setpoint	Setpoint temperature	2 byte	C,R, W,T	9.001 DPT_Value_Temp

The communication object is used to send the cooling setpoint of the current operating mode on the bus, sending way depends on the parameter "send setpoint" in 4.4. The communication object is used to modify the cooling setpoint of the current operating mode. Note that due to the relative adjustment of setpoint temperature, the setpoint temperature in standby mode, night mode and frost / heat protection mode can only be decreased to the minimum setpoint temperature comfort mode.

No.	Object name	Functions	Data type	Flags	DPT
17	Output HVAC status	Temperature control	1 byte	C, R,T	DPT_HVACStatus

This communication object is used to report the status of temperature control, updated every 30 seconds, the interval of cyclically sending depends on parameter "Period of sending HVAC status". Each 1byte means as follows:

Bit0: flag of enabling comfort mode 1---enable 0----disable
Bit1: flag of enabling standby mode 1---enable 0----disable
Bit2: flag of enabling night mode 1---enable 0----disable
Bit3: flag of enabling frost / heat protection mode 1---enable 0----disable
Bit4: flag of disable temperature control 1---disable 0----enabled
Bit5: flag of heating/cooling 0—cooling 1—heating.
Bit6: flag of dead zone Select both heating and cooling control functions, and when the current temperature is in the dead zone, set 1, otherwise set 0.
Bit7: flag of frost alarm When the actual temperature is below 5 °C, set 1, otherwise set 0. This bit is only as alert signs, has no effect on the temperature control.

18	Output RHCC status	Temperature control	2 byte	C, R, T	22.101 DPT_StatusRHCC

RHCC Status Report Bit no: 0: error, "1" alarm, "0" normal
8: heating or cooling, "0" cooling, "1" heating
12: Dewpoint alarm, "1" alarm, "0": normal
13: frost alarm, "1" alarm, "0": normal
14: over-heat/cold alarm "1" alarm, "0": normal

Over-heat: the current temperature exceed 35 °C, Over-cooling: the current temperature below 15 °C

19/ 20/ 24/ 25	Basic/ heating/ cooling control value Additional heating/cooling control value	Temperature control	1bit 1byte	C, R, T	1.001 DPT_Switch 5.001 DPT_Scaling

This communication object is used to send the control value of heating /cooling, to control actuator ON/OFF, and adjust the room temperature.

Send telegrams (two position control——1bit): on/off
Send telegrams (two position control ——1byte): 0%/100%
Send telegrams (continuous PI control): 0...100%
Send telegrams (switching PI control): on/off
Send telegrams (switching PI control): on/off
Send telegrams (fan coil control): 0...100%

21	fan automatic or fan manual	Fan	1 bit	C,R,T	1.001 DPT_Switch

This communication object is used to switch over fan between auto and manual.
When parameter "Switchover fan between auto and manual" selects "object 'Automatic ON/OFF'",
Send the telegram "1" - fan automatic
Send the telegram "0" - fan manual
When parameter "Switchover fan between auto and manual" selects "object 'Manual ON/OFF'",
Send the telegram "1" - fan manual
Send the telegram "0" - fan automatic

22	Fan manual stage	Fan	1 byte	C,R,T	5.001 DPT_Scaling

This communication object is used to send the control value of fan manual, to change the wind speed.

23	Lock temperature control	Temperature control	1 bit	C,R,W	1.001 DPT_Switch

This communication object is used to disable/enable temperature control, including disable/enable basic heating/cooling control and additional heating/cooling control. When receiving telegram "1", the object "Basic heating/cooling control value" and object "additional heating/cooling control value" stop sending control telegrams; when receiving telegram "0", they update control value immediately.

Receive telegram "1" - disable temperature control
Receive telegram "0" - enable temperature control

Note: Stop control telegrams is not restricted by the minimum and maximum control value, if the control values are negated, stop control telegrams are negated, too.

26	Lock additional stage	Temperature control	1bit	C,R,W	1.001 DPT_Switch

This communication object is used to disable or enable additional heating/cooling control. When receiving telegram "1", the object "additional heating / cooling control value" stop sending control telegrams; when receiving telegram "0", it updates control value immediately.

Receive telegram "1" - disable additional heating / cooling control value
Receive telegram "0" - enable additional heating / cooling control value

Note: Stop control telegrams is not restricted by the minimum and maximum control value, if the control values are negated, stop control telegrams are negated, too.

84	Outdoor temperature	Setpoint temperature	2byte	C,R,W	9.001 DPT_Value_Temp

This communication object would display when parameter " Enable display outdoor temperature" Selects "enable", it is used to receive outdoor temperature from the bus.

85	Heating standby setpoint	Setpoint temperature	2byte	C,R,W	9.001 DPT_Value_Temp

This communication object would display when parameter "Setpoint adjustment" Selects "absolute adjustment", it is used to modify the standby mode temperature at heating

86	Heating night setpoint	Setpoint temperature	2 byte	C,R,W	9.001 DPT_Value_Temp

This communication object would display when parameter"Setpoint adjustment" Selects "absolute adjustment", it is used to modify the night mode temperature at heating.

No.	Object name	Functions	Data type	Flags	DPT
87	Setpoint frost protection	Setpoint temperature	2byte	C, R, W	9.001 DPT_Value_Temp
This communication object would display when parameter "Setpoint adjustment" Selects "absolute adjustment", it is used to modify the frost protection mode temperature at heating.					
88	Cooling comfort setpoint	Setpoint temperature	2 byte	C, R, W	9.001 DPT_Value_Temp
This communication object is used to modify the comfort mode temperature at cooling.					
89	Cooling standby setpoint	Setpoint temperature	2byte	C, R, W	9.001 DPT_Value_Temp
This communication object would display when parameter "Setpoint adjustment" Selects "absolute adjustment", it is used to modify the standby mode temperature at cooling.					
90	Cooling night setpoint	Setpoint temperature	2byte	C, R, W	9.001 DPT_Value_Temp
This communication object would display when parameter "Setpoint adjustment" Selects "absolute adjustment", it is used to modify the night mode temperature at cooling.					
91	Setpoint heat protection	Setpoint temperature	2byte	C, R, W	9.001 DPT_Value_Temp
This communication object would display when parameter "Setpoint adjustment" Selects "absolute adjustment", it is used to modify the heat protection mode temperature at cooling.					

4.3. "THRESHOLD VALUE" COMMUNICATION OBJECT

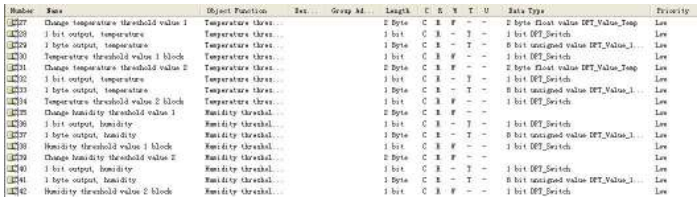


Figure 4.3 Threshold value communication object

No.	Object name	Functions	Data type	Flags	DPT
27/31	Chang temperature threshold value 1/2	Temperature threshold value 1/2	2byte	C, R, W	9.001 DPT_Value_Temp
This communication object is used to change the temperature's high threshold value. Telegram: 0...50 °C.					
28/32	1 bit output temperature	Temperature threshold value 1/2	2 byte	C, R, W	1.001 DPT_Switch
When the temperature is higher than the current high threshold or below the low threshold, 1bit telegram can be sent via this object to the bus, specific telegrams can be set by the parameter "logic 1bit telegram value [0 ... 1]".					
29/33	1 bit output temperature	Temperature threshold value 1/2	2byte	C, R, W	5.010 DPT_Value_1_Ucount
When the temperature is higher than the current high threshold or below the low threshold, 1bit telegram can be sent via this object to the bus, specific telegrams can be set by the parameter "1byte telegram value [0...255]".					
30/34	Temperature threshold value 1/2 block	Temperature threshold value 1/2	2byte	C, R, W	1.001 DPT_Switch
This communication object is used to disable or enable the function of the temperature threshold value. Disabled and enabled actions can be set by the parameter. Receive telegram "1" - disable the temperature threshold value Receive telegram "0" - enable the temperature threshold value					
35/39	Change humidity threshold value 1/2	Humidity threshold value 1/2	2byte	C, R, W	9.007 DPT_Value_Humidity
This communication object is used to change the humidity's high threshold value; telegram range: 0...100%.					
36/40	1 bit output humidity	Humidity threshold value 1/2	2byte	C, R, W	1.001 DPT_Switch
When the humidity is higher than the current high threshold or below the low threshold, 1bit telegram can be sent via this object to the bus, specific telegrams can be set by the parameter "logic 1bit telegram value [0 ... 1]".					
37/41	1 byte output humidity	Humidity threshold value 1/2	2byte	C, R, W	5.010 DPT_Value_1_Ucount
When the humidity is higher than the current high threshold or below the low threshold, 1bit telegram can be sent via this object to the bus, specific telegrams can be set by the parameter "1byte telegram value [0...255]".					
38/42	Humidity threshold value 1/2 block	Humidity threshold value 1/2	2byte	C, R, W	1.001 DPT_Switch
This communication object is used to disable or enable the function of the humidity threshold value. Disabled and enabled actions can be set by the parameter. Receive telegram "1" - disable the humidity threshold value Receive telegram "0" - enable the humidity threshold value					

4.4. "LOGIC" COMMUNICATION OBJECT

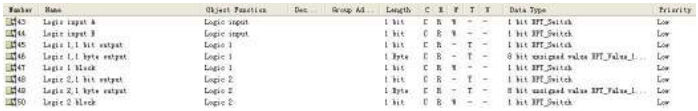


Figure 4.4 Logic communication object

No.	Object name	Functions	Data type	Flags	DPT
43	Logic input A	Logic input	1bit	C, R, W	1.001 DPT_Switch
This communication object is used to receive the value of logic Input A.					
44	Logic input B	Logic input	1bit	C, R, W	1.001 DPT_Switch
This communication object is used to receive the value of logic Input B.					
45/48	Logic 1/2, 1 bit output	Logic 1/2	1bit	C, R, T	1.001 DPT_Switch
When the logical result is 1 or 0, 1bit telegram is sent e through this object; the telegram is set by parameter "1bit telegram value".					
46/49	Logic 1/2, 1 byte output	Logic 1/2	1byte	C, R, T	5.010 DPT_Value_1_Ucount
When the logical result is 1 or 0, 1bit telegram is sent e through this object; the telegram is set by parameter "1byte telegram value" in 4.8.					
47/50	Logic 1/2 block	Logic 1/2	1bit	C, R, W	1.001 DPT_Switch
This communication object is used to disable or enable the logic function. Disabled and enabled actions can be set by the parameter. Receive telegram "1" - disable the logic function Receive telegram "0" - enable the logic function					

4.5. "TIMER PAGE 1/2" COMMUNICATION OBJECT

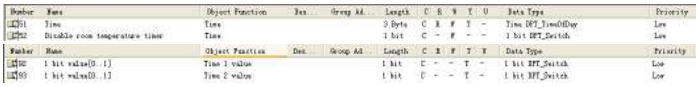


Figure 4.5 Timer communication object

No.	Object name	Functions	Data type	Flags	DPT
51	Time	Timer	3 byte	C, R, W, T	10.001 DPT_TimeOfDay
This communication object is used to modify the LCD screen displaying time by bus. The data format as follow:					

Day	Hour	0	Minuter	0	Seconds
NNN	UUUUU	rr	UUUUUU	rr	UUUUUU
0...7 1=Monday ... 7=Sunday 0=no day	0...23	0	0...59	0	0...59

52	Disable room temperature timer	Timer	1bit	C, W	1.001 DPT_Switch
This communication object is used to disable or enable the Timer function. Receive telegram "1" - disable the timer function Receive telegram "0" - enable the timer function					
92/ ..../ 107	1bit value/.../ 4byte value	Time X value (X=1..16)	1bit/.../ 4byte	C, T	1.001 DPT_Switch 2.002 DPT_Bool_Control 3.007 DPT_Control_Dimming 5.010 DPT_Value_1_UCount 8.001 DPT_Value_2_Count 7.001 DPT_Value_2_UCount 12.001 DPT_Value_4_UCount
When the timer time reaches, this communication object sends the appropriate data values to the bus, the user can select the appropriate data type and value in the parameter "Reaction at regular time" and the parameter "Output value" as required for transmission.					

4.6. "PUSHBUTTON INTERFACE" COMMUNICATION OBJECT

4.6.1. "SWITCH" COMMUNICATION OBJECT

Figure 4.6.1. "Switch" Communication Object

No.	Object name	Functions	Data type	Flags	DPT
53/ 56/59	Switch 1, input 1/2/3	CH A Switch	1bit	C, W, T	1.001 DPT_Switch
When CH A "Switch" is enabled, this communication object is visible, through short push, according to the parameters settings, performs the corresponding actions, e.g. ON, OFF, TOGGLE, etc. When the telegram is "1"--- ON; When the telegram is "0"--- OFF.					
54/ 57/60	Switch 2, input 1/2/3	CH A Switch-long	1bit	C, T	1.001 DPT_Switch
When CH A "Switch" is enabled, this communication object is visible, through long push, according to the parameters settings, performs the corresponding actions, e.g. ON, OFF, TOGGLE, etc. When the telegram is "1"--- ON; When the telegram is "0"--- OFF.					
55/ 58/61	Disable input 1/2/3	CH A Disable	1bit	C, W	1.001 DPT_Switch
When the channel function is enabled, the communication object is activated, which is used to disable / enable channel function. When this communication object receives a logic value of "0", the channel function is enabled; receives "1", disabled. When the channel function is disabled, control telegrams sent by all objects are invalid. When the bus power is restored, channel function is enabled by default. (If all communications objects with channel function are "Disable", the operations performed are the same).					

4.6.2. "DIMMING" COMMUNICATION OBJECT

Figure 4.6.2. "Dimming" Communication Object

No.	Object name	Functions	Data type	Flags	DPT
53/ 56/59	Switch	CH A Switch	1bit	C, W, T	1.001 DPT_Switch
When CH A "Switch" is enabled, this communication object is visible, through short push, according to the parameters settings, performs the corresponding actions, e.g. ON, OFF, TOGGLE, etc. When the telegram is "1"--- ON; When the telegram is "0"--- OFF.					
54/ 57/60	Switch 2, input 1/2/3	CH A Switch-long	4bit	C, T	3.007 DPT_Control_ Dimming
The communication object via contact input, send brighten or darken command, User can control the dimming device on the bus, conduct relative dimming. When the input is disconnected, it will send an end command to stop dimming.					
55/ 58/61	Disable input 1/2/3	CH A Disable	1bit	C, W	1.001 DPT_Switch
As above.					

4.6.3. "SHUTTER" COMMUNICATION OBJECT

Figure 4.6.3 "shutter" communication object

No.	Object name	Functions	Data type	Flags	DPT
53/ 56/59	Output shutter UP/DOWN	CH A/B/C Blind	1bit/ 1byte	C, T	1.008 DPT_UpDown 5.001 DPT_Scaling
The communication object, by sending commands to the bus, moves up / down curtains. The communication object can send 1bit or 1bytecommands, by "Function of switchover blinds / roller shutter" choose curtain type, by "Object type" select the telegram type. When the communication object is"1bit", send "1" to move downward; send "0" to move upward. When the telegram is "1 byte", telegrams are sent based on the value set by the user.					
54/ 57/60	Stop/lamella adj	CH A/B/C Blind	1bit/ 1byte	C, T	1.007 DPT_Step 5.001 DPT_Scaling
The communication objects, by sending commands to the bus, stop/adjust curtains. The communication object can send 1bit or 1bytecommands, by "Function of switchover blinds / roller shutter" choose curtain type, by "Object type" select the telegram type. When the communication object is"1bit", send "1" to stop or move downward; send "0" to stop or move upward. When the telegram is "1 byte", telegrams are sent based on the value set by the user.					
55/ 58/61	Disable input 1/2/3	CH A/B/C Disable	1bit	C, W	1.001 DPT_Switch
As above.					

4.6.4. "SCENE" COMMUNICATION OBJECT

Figure 4.6.4 "scene" communication object

No.	Object name	Functions	Data type	Flags	DPT
53/ 56/59	Input 1/2/3, Scene	Scene number	1byte	C, T	18.001 DPT_SceneControl
This object sends a scene number by operating the switch, short press to call the scene, and long press to save the current scene. The "scene number" is set in parameter "Number of scene".					
Set an 8bit instruction(binary coded): FXNNNNNN F: "0"-- call the scene; "1"--save the scene; X: Undecided, no application; NNNNNN: scene number (0...63).					
In parameter "Number of scene", scene number is 1~64, and the communication object "Number of light scene" sends scene number 0~63. E.g. in parameter "Number of scene", scene number is 1, and the communication object "Number of light scene" sends scene number 0.					
55/ 58/61	Disable input 1/2/3	CH A/B/C Disable	1bit	C, W	1.001 DPT_Switch
As above.					

4.6.5. "TEMPERATURE LIMITER (UNDERFLOOR HEATING)" COMMUNICATION OBJECT

Figure 4.6.5 NTC communication object

No.	Object name	Functions	Data type	Flags	DPT
54	Floor temperature	External temperature sensor	2byte	C, T	9.001 DPT_Value_Temp
This communication object is used to send the current floor temperature. Floor temperature sending variation refers to parameter "Send temperature at variation of (°C)", the floor temperature cyclically sending refers to parameter "period of sending temperature".					

4.7. "AIR CONDITION" COMMUNICATION OBJECT

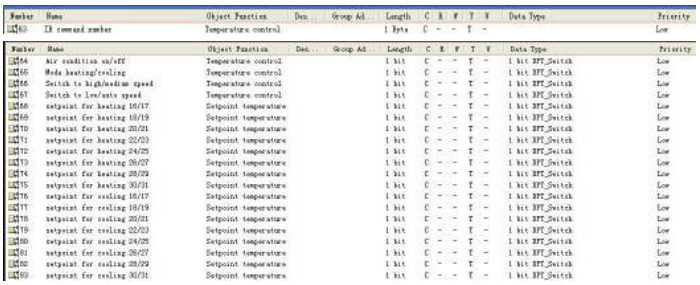


Figure 4.7 air condition communication object

No.	Object name	Functions	Data type	Flags	DPT
63	IR command number	Temperature control	1byte	C, T	17.001 DPT_ SceneNumber
In the first parameter "Control device" selects "air condition", and selecting "1byte" in "Object type for controlling air condition", this communication object can be seen. This communication object is scene number for sending the appropriate command value. If "command for air condition on" is set as "1", when the thermostat panel is ON, it will send "1" on the bus.					
64	Air condition on/off	Temperature control	1 bit	C, T	1.001 DPT_Switch
In "Air condition", the object is visible when selecting "1 bit" in "Object type for controlling air condition". When the thermostat panel is ON, sending "1", when OFF, sending "0".					
65	Mode heating/ cooling	Temperature control	1 bit	C, T	1.001 DPT_Switch
In "Air condition", the object is visible when selecting "1 bit" in "Object type for controlling air condition". When heating, sending "1"; when "cooling", sending "0".					
66	Switch to high/ medium speed	Temperature control	1 bit	C, T	1.001 DPT_Switch
In "Air condition", the object is visible when selecting "1 bit" in "Object type for controlling air condition". When the wind speed is high, sending "1"; when the speed is medium, it will send "0".					
67	Switch to low/auto speed	Temperature control	1 bit	C, T	1.001 DPT_Switch
In "Air condition", the object is visible when selecting "1 bit" in "Object type for controlling air condition". When the wind speed is low, sending "1"; when the speed is automatic, it will send "0".					
68... 83	setpoint for cooling A/B	Setpoint temperature	1 bit	C, T	1.001 DPT_Switch
In "Air condition", the object is visible when selecting "1 bit" in "Object type for controlling air condition". When the temperature is set as "A", "1" will be sent; when the set temperature is "B", "0" will be sent.					