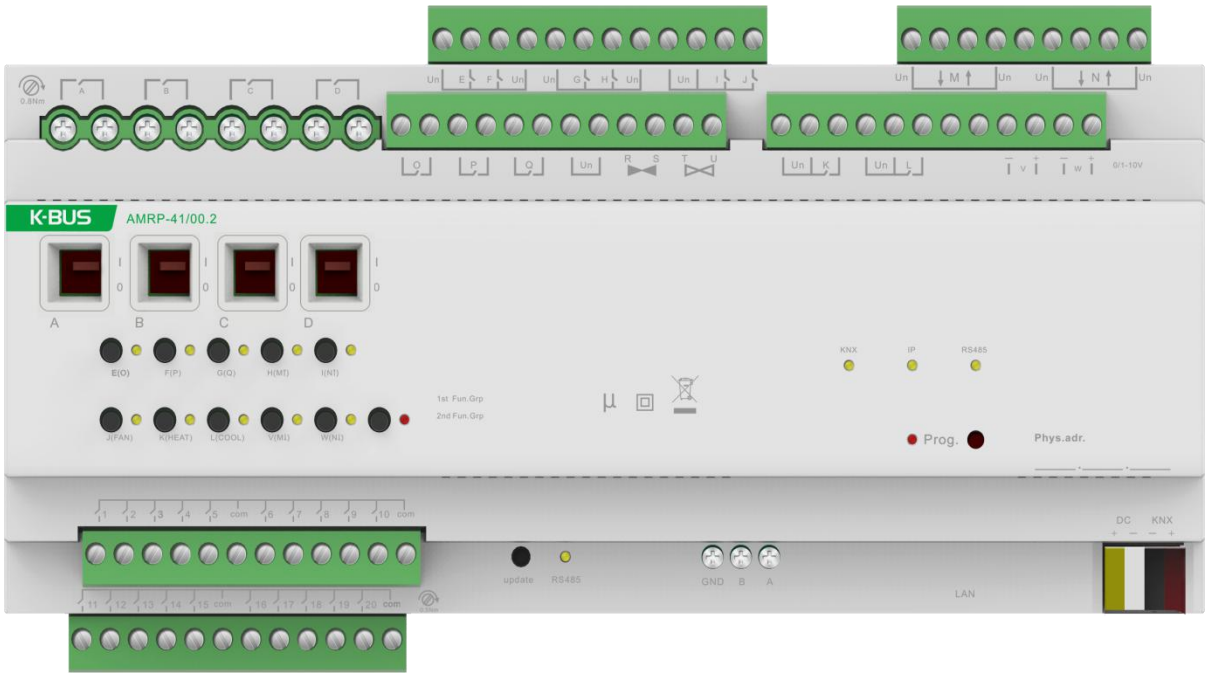
User Manual

K-BUS® Room Controller Premium_V1.2

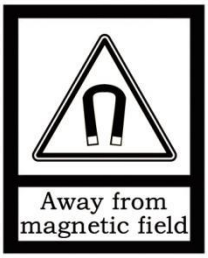
AMRP-41/00.2



KNX/EIB Home and Building Control System

Attentions

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



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

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

4. **Do not disassemble the devices.**

Contents

Chapter 1 Summary

The Room Controller Premium is a simple, low-cost solution for the hotel rooms, which can be used to achieve a single room control, such as heating, cooling, ventilation, lighting, water/fire alarm, emergency buttons and the blinds etc. But also can be used in apartments, hospitals, office buildings, assisted living facilities etc.

The Room Controller Premium's compact design covers most requirements of the electrical installation of the residential and building control systems and integrating most inputs and output interfaces for a single room's automatic control as well as covers all standard functions for a single room control. Besides, it's also able to connect with external protocols, for example RS485 protocol and KNXnet/IP protocol. Generally the functions are as follows:

- **Lighting Control**
- **Heating/cooling Control**
- **Fan coil Control**
- **Blinds or shutter Control**
- **Switching of electrical sockets and loads**
- **KNX/RS485 Converter**
- **KNXnet/IP convert**

In addition to these basic functions, further automation functions can be implemented by a combination with various detectors, such as a presence detector, motion detector. The integration into a hotel management system enables the efficient management and provision of rooms, for example, when a guest checks out, the room is automatically set to standby mode. Meanwhile the hotel manager will know the status of the room at any time and the service needs etc.

This manual provides detailed technical information about the Room Controller Premium for users as well as assembly and programming details, and explains how to use the Room Controller Premium by the application examples.

1.1 Product and functional overview

The Room Controller Premium is a modular installation device for fast installation in the distribution board on 35 mm mounting rails to DIN EN 60 715. The electrical connection is implemented by using screw terminals (most of them are plug-gable). The connection to the KNX bus is implemented using the supplied bus connection terminal, with the system power input of 20-30V DC.

The Room Controller Premium provides a number of input/output interfaces for a variety of function applications. The input interfaces can be used to connect switches, button, smoke detectors, door contact and other passive switch module. The output interfaces can be used to connect fan coil unit, lighting, curtains and other load equipment. The Room Controller Premium has 9 major functional modules, and each functional module is summarized as follows:

——**Dry contact input**, which can connect with a variety of passive switch module, such as general switch panel, doorbell push button, door contact, etc., which can be used to switch lighting, open/close curtain, activate Do Not Disturb and room service as well as emergency signal transmission, etc. There are 20 passive inputs, and each input offers the following functions:

- **Switching function, for switching the lighting by control dimmer and switch actuator.**
- **Dimming function, for dimming the lighting by control dimmer.**
- **Control of blinds and shutter, for up/down travel of a blinds or a shutter, and lamella adjustment/stop travel. There are a variety of operation types, according to actual use to select them.**
- **Sending of values e.g. temperature value, time etc.**
- **Control and storing of light scenes, the function can be set in the value/force output.**
- **Time Delay Function, mainly used for delay sending of switch value**

——**Switch output**, which can connect some electrical loads, such as lighting, sockets. There are 10 outputs, but the size of the load is different for some outputs, including 4×230V AC 16A output with manual control, 6×230V AC 10A output with manual button control in front of the device. The module offers the following functions:

- **Time function: on/off delay**
- **Time function: flashing switch, for lamps of aging test**
- **Time function: staircase lighting, for switch on the staircase lighting and after the duration time the lighting can be turned off automatically. It is better if the function is used together with motion detector.**
- **Provide 8 scenes, recall and storing via a 1byte object**
- **Logic operation: AND, OR, XOR, GATE function, up to three logic inputs**
- **Status response, for know the current output state in the visualization**
- **Forced operation, two data types: 1bit/2bit, for force action on or off, with the highest priority**
- **Set the relay contact position after power voltage recovery**
- **Manual switch outputs**

—— **Dimming output**, which can connect with dimmable ballast. There are two outputs for 1-10V dimming in its default mode, if 0-10V dimming is needed, then you have to open the shell and switch the driver manually. When the dimming outputs are no used or the dimming outputs do not need to cut off power supply via relays, here, we can simply use these two channels (with it's relay inside) as two independent channels for Switching output. The dimming output offers the following functions:

- **Switch lighting**
- **Relative dimming, regulation lighting brightness via increase or decrease brightness values.**
- **Absolute dimming, regulation lighting brightness via a brightness value.**
- **Status response, query and reply the current switch or brightness status to the bus, thereby indicating the status in the visualization device.**
- **Setting 15 scenes, the scenes can be stored or recalled via a 1byte object.**
- **Power recovery function, a brightness value can be defined after power voltage recovery.**
- **Staircase lighting function, for switch on the staircase lighting and after the duration time the lighting can be turned off automatically. It is better if the function is used together with motion detector. If necessary (such as cleaning stairs), you can switch on the staircase lighting for a long time via permanent on.**

——**Shutter control output**, which can connect with motor blinds, awnings, roller blinds, vertical blind, etc. There are two outputs with 230V AC 10A motor or dry contact controlling motor. The output contacts for the directions UP and DOWN. The pause on change in direction can be set via the parameters. The outputs can be also used as 4 channels switch when they are not used as shutter/blind output . The shutter/blind output offers the following functions:

- **Movement UP/DOWN**
- **Stop/Louvre adjustment**
- **Position Setting (revise preset position during operating)**
- **Move to position 0……100%**
- **Adjustment louver to position 0……100%(only "Shutter" working mode)**
- **Set 8 scenes, store or recall via a 1byte object**
- **Automatic sun protection**
- **Safety function**
- **Status response, query and reply the current shutter/blind position and operation mode to the bus, thereby indicating the status in the visualization device**
- **Two working mode: Blind and Shutter**

——**Fan control**, controls a single-phase fan with up to three fan speeds. The output contact is the same with the switch output230 V AC 10A, so the outputs can be also used as 3 channels switch when they are not used as fan control. The fan functions as follows:

- **Support the fan with 1-2-3 level fan speed**
- **Support two control modes: step or changeover control.**
- **Forced operation: the fan speed is only allowed to run in set fan speed range, and the force operation has the highest priority.**
- **Auto. Operation: the desired speed is run automatically according the control value that is received from the sensor device, and the auto. Operation can be set four limits and the minimum dwell period of fan speed**
- **Direct operation: control the fan speeds via a manual operation, as via operating a panel**
- **The fan with multilevel speeds can set its starting characteristic**
- **The fan with single-level speed can set on/off delay or on/off minimum time**
- **Status response, as the current operation, fan on/off status, speed status**

If as switch (relay) control, the function overview please refer to the chapters 5.5.4 and 6.4.2.

——**Coil control**, the output can connect with 2, 3 or 4-pipe system. The heating valve and cooling valve use two relay outputs separately, with 2A 230V AC per channel. There are two control types: continuous control (3 point, open and close) and PWM (continuous control, PWM). With continuous control, the valve is brought to a position, which complies with the calculated control value, i.e. the valve can be fully opened, fully closed and even positioned in certain position. The method can be implemented with the room controller for electric motor 3-point valve drives. With PWM, the valve is operated as with 2-point control exclusively in the positions fully opened and fully closed. The valve opening is calculated according to the control value and a cycle time. The valve type is distinguished normally closed and normally opened. The method can be used with the room controller in conjunction with electron-thermal valve drives. The functions as follows:

- **5 H VAC-Systems can be selected**
- **Fault monitoring, e.g. thermostat, and send report**
- **Correct valve characteristic curve**
- **Disable or enable valve heating / valve cooling**
- **Forced operation**
- **Response or query valve position status**
- **Purge valve via Manually or automatically, and send the valve purge status**
- **Automatically adjust valve position (only apply to the 3 point, open and close)**
- **5 scene function (1 byte object) to enable centralized control of fan and coil**

——**RS485 Protocol Conversion**, it connects and interacts with other RS485 system, for example thermostat, background music and intelligent lock etc. Details of supported protocol and function please refer to the manufacturer of products with relevant protocol.

——**KNX net/IP Protocol Conversion**, this can be used to control or to be controlled by the portable devices based on KNX net/IP, so far it supports up to 5 end-point communication.

Programmers are able to use the Engineering Tool Software ETS (ETS3 version or above) with a VD4 file to allocate the physical address and set the parameters.

To make sure that all the programmable functions are used correctly, you must check the connection of the loads before use and note technical characteristic of loading equipment, particularly shutter driver and fan coil, they refer more technical characteristics, some characteristics are inherent, if not properly set them, it is likely to cause the load device damage or not operating correctly.

Chapter 2 Technical Data

Power Supply	Operating voltage	21-30V DC, via the KNX bus
	Current consumption, bus	<12mA
	Power consumption, bus	<360mW
Auxiliary power	Voltage	20-30V DC
	Current	<250mA
	Power consumption	<6W
Output	Power consumption, Output 16A	<1.5W
	Power consumption, Output 10/6A	<1W
Connection	KNX	Via bus connection terminals(red/black)
	Output, 16A	Screw terminals
		Wire Range 0.5-4mm^2
		Torque 0.8N-m
	Middle, lower Input/ Output	Plug-gable screw terminals
	（Output 16A excluded）	Wire Range 0.5-1.5mm^2
		Torque 0.5N-m
Operation and Display	Programming LED and button	For assignment of the physical address
	Green LED flashing	Indicate the application layer running normally
Protection	IP 20, EN 60 529	
Temperature	Operation	-5℃……+45℃
	Storage	-25℃……+55℃
	Transport	-25℃……+70℃
Ambient	Max. air humidity	<93%，except dewing
Design	Modular installation device (MDRC)	
Housing/color	Plastic housing, Beige	
Installation	On 35mm DIN-Rail, To EN 60 715	
Dimension/Weight	216mm ×90 mm ×64mm / 0.7KG	
Input	20 channels	Can be individually set (all COM are internally connected)
	Input scanning voltage	30V DC
	Input scanning current	0.4mA
	Cable length	≤10m

Dimming Output	2 channels	
	Output Voltage	0/1~10V
	Max. Output Current	100mA
	Switchover Current	10A
Coil Output	Heating Valve/ Cooling Valve	
	Rated Voltage	250V AC
	Max. Loading Current	2A
	Electrical life	>1×10^5
Output, 16A	4 channels	Can be individually set
	U_n rated voltage	250/440 V AC（50/60Hz）
	I_n rated current capacity	16A/140uF
	Max. switching current	20A/250V AC
	Electrical life	>1×10^5
	Max. DC switching current (resistive load)	16A/24V DC
Output, 10A	15 channels	Can be individually set (including switch, shutter fan and dimmer)
	U_n rated voltage	240/400V AC（50/60Hz）
	I_n rated current capacity	10A/70uF
	Max. switching current	16A/240V AC
	Mechanical endurance	> 2 x 10^6
	Electrical endurance	>5 x10^4
	Max. DC switching current (resistive load)	16A/30V DC

Output, lamp load 16A prediction	
Incandescent lamp	2500 W
Fluorescent lamp, not compensated	2500W
Fluorescent lamp, Parallel compensated	1500W
Fluorescent lamp, DUO-combination	1500W
Halogen lamp (230 VAC)	2500W
Low-voltage halogen lamp with inductive transformer	1200W
Low-voltage halogen lamp with electronic transformer	1500W
Mercury arc/sodium discharge lamp not compensated	2000W
Mercury arc/sodium discharge lamp parallel compensated	2000W
Dulux lamp, not compensated	1100W
Dulux lamp, parallel compensated	1100 W

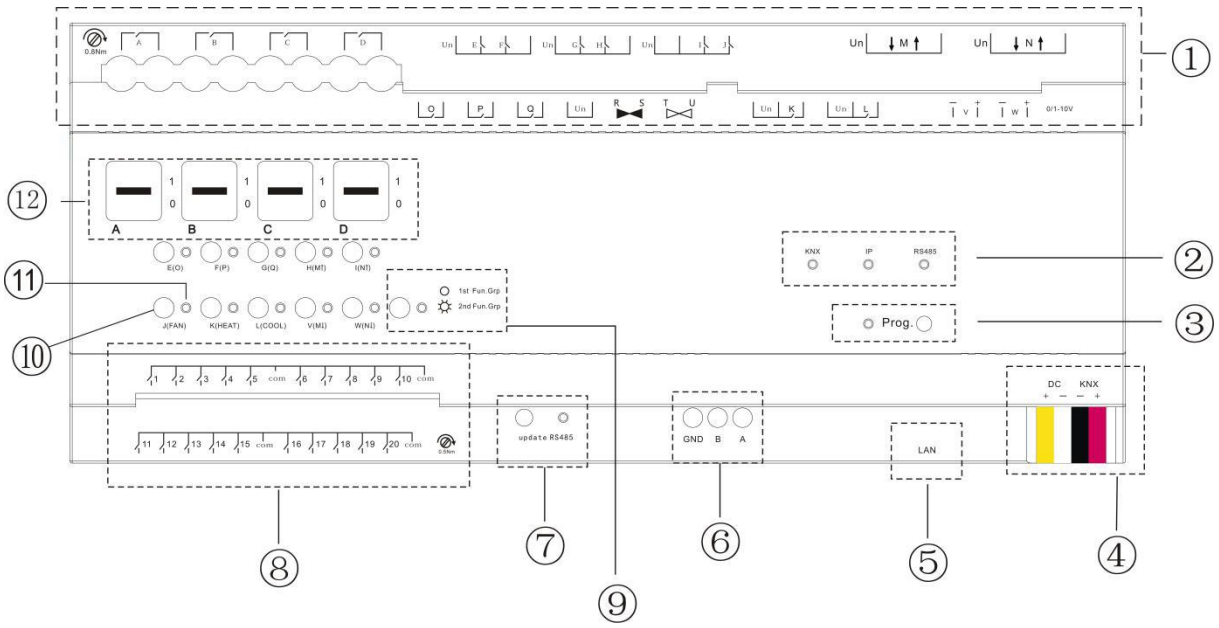
Note: The above load is only for single lamps. In the case of several lamps in parallel, the load will be reduced, although the power is unchanged, but the instantaneous impact of current will increase, and easy to make the relay contacts melted. So, in normal use, subject to the measured current, the measured maximum inrush current must be within the allowable range.

Application program：

Model	Max. number of communication objects	Max. number of group addresses	Max. number of associations
AMRP-41/00.2	254	254	254

Chapter 3 Functional, Dimension and Connection Diagram

3.1 Functional diagram



① Output terminals: A~L are switching outputs; V and W are dimming outputs； OPQ are fan speed outputs; R and S are for heating valve; T and U are for cooling valve; M and N are shutter outputs

② Communication port LED indication

③ Programming button and LED: Red LED indicates physical address programming; Green LED indicates the normal working of application layer

④ KNX bus and auxiliary power terminal

⑤ KNX IP communication port

⑥ RS485 communication port

⑦ RS485 application update button and indication light: slowly flashing indicates normal working, while fast flashing indicates firmware update

⑧ Dry contact input (1…20)

⑨ Electronic manual function shifting button and group set status indicating light

⑩ Manual operation buttons of various functions:

E、F、G、H、I、J、K、L for switching output

V and W for dimming output, with short press as ON/OFF and long press as dimming

O、P、Q for switching output（when O, P and Q are set as switching mode）

FAN for switching on/off fan and adjusting wind speed, with long press as ON/OFF fan and short press as speed adjustment, for example…-1-2-3-1-2-3-…

HEAT for control of heating valve, with short press as activating Manual Mode and HEAT, long press exits Manual Mode

COOL for control of cooling valve, with short press as activating Manual Mode and COOL, long press exits Manual Mode

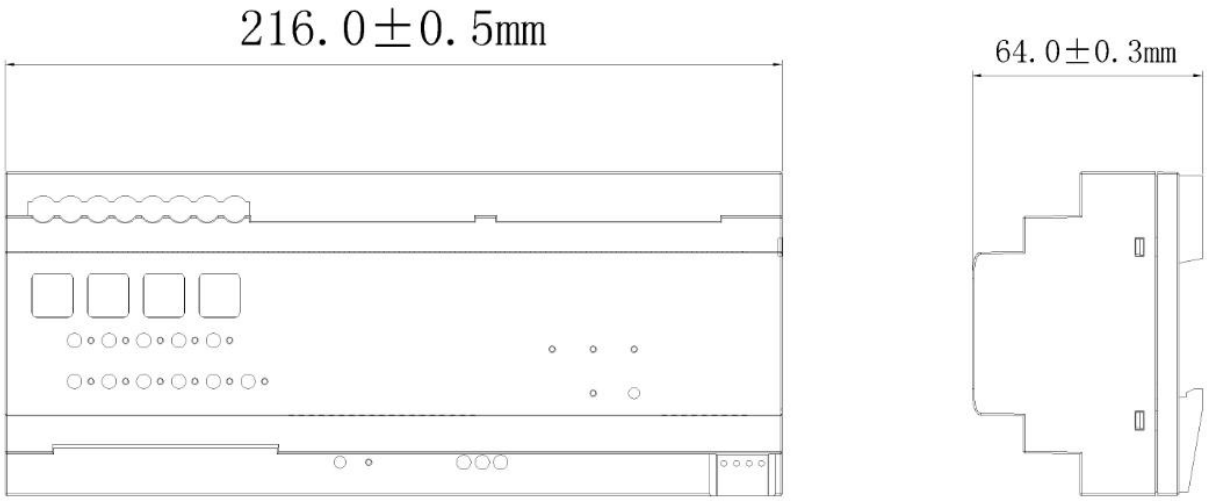
M↑↓ and N ↑↓ for blinds/shutter control, with long press as moving up/down and short press as stop/ louver (if it's used as independent switch output, M↑ is correspondent to M1, and M↓ to M2, N↑ to N1 and N↓ to N2)

For mechanic switching outputs A、B、C、D, 1- means contract closes and 0- contact disconnect.

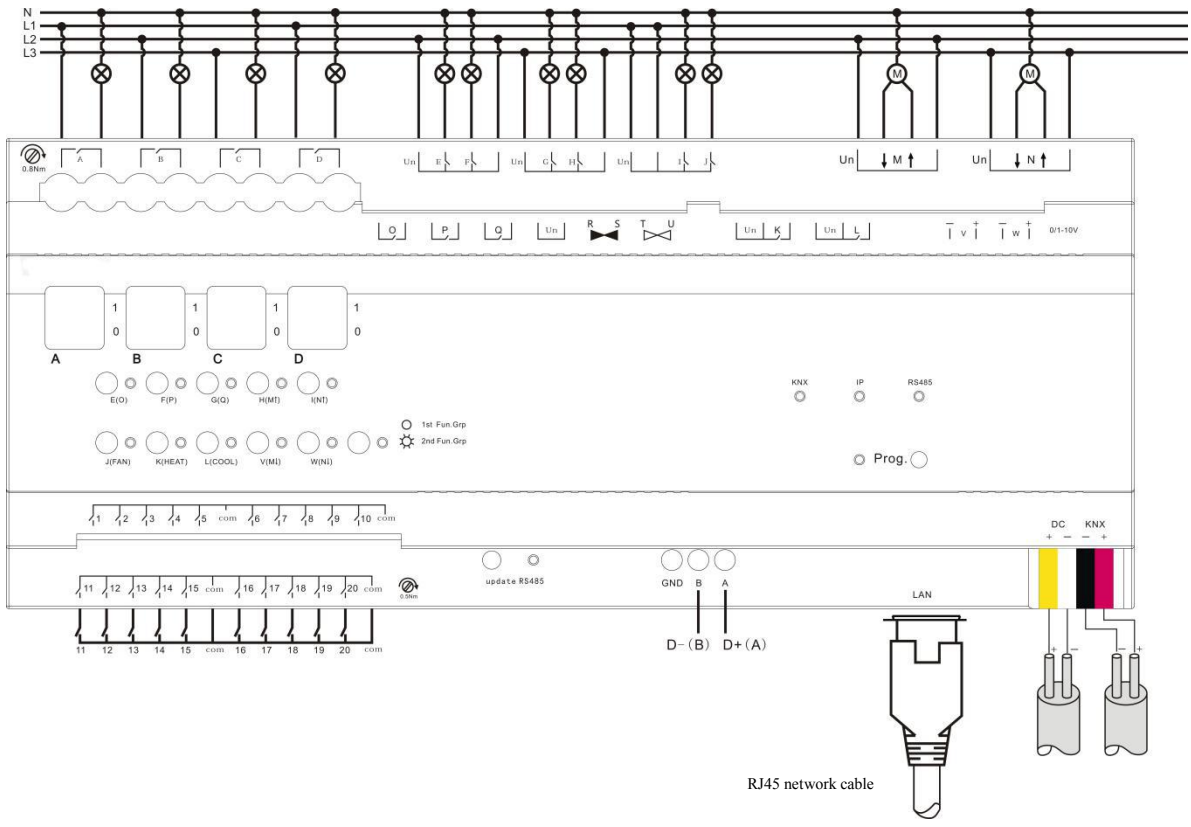
⑪ Output status indicating light

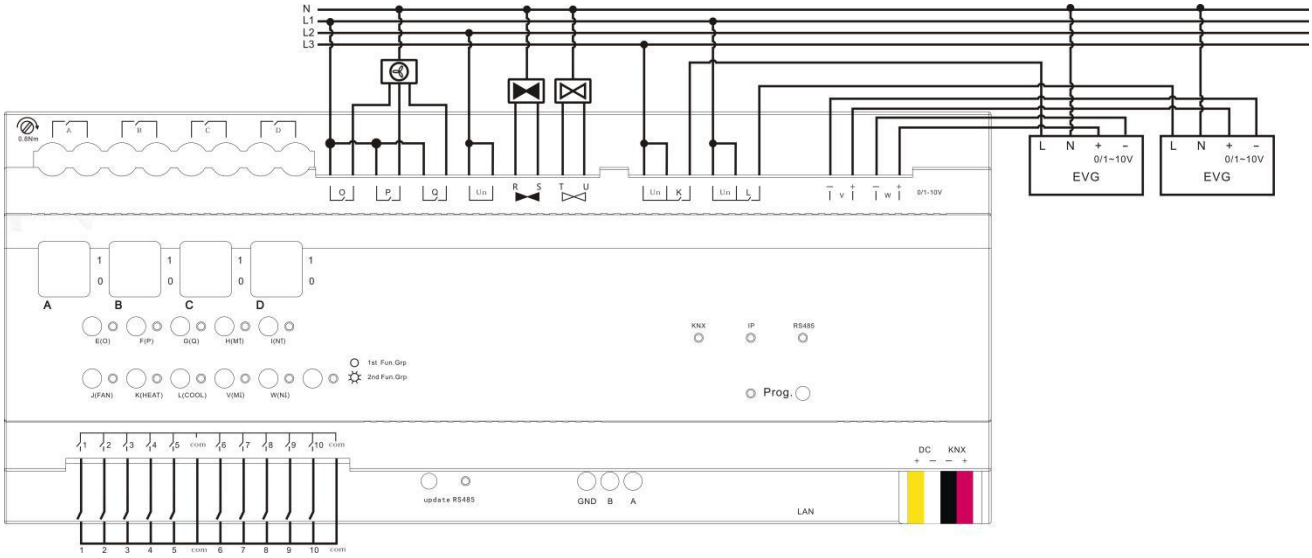
⑫ Mechanic switches of channel A、B、C、D and it's contact position

3.2 Dimension diagram



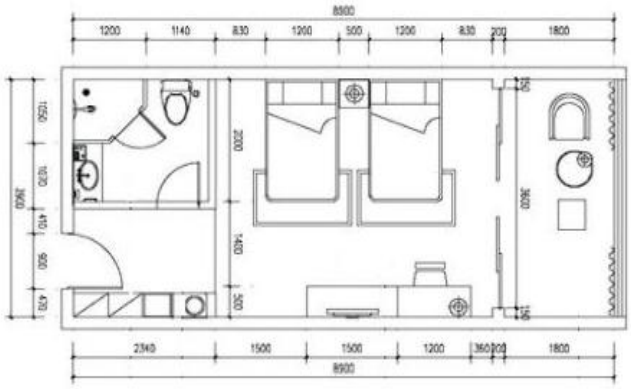
3.3 Connection diagram




N
L1
L2
L3
L N + - 0/1~10V
EVG
L N + - 0/1~10V
EVG
A
B
C
D
E(O)
F(P)
G(Q)
H(MT)
I(NT)
J(FAN)
K(HEAT)
L(COOL)
V(MI)
W(NI)
1st Fun.Grp
2nd Fun.Grp
KNX
IP
RS485
Prog.
update RS485
GND B A
LAN
DC
KNX

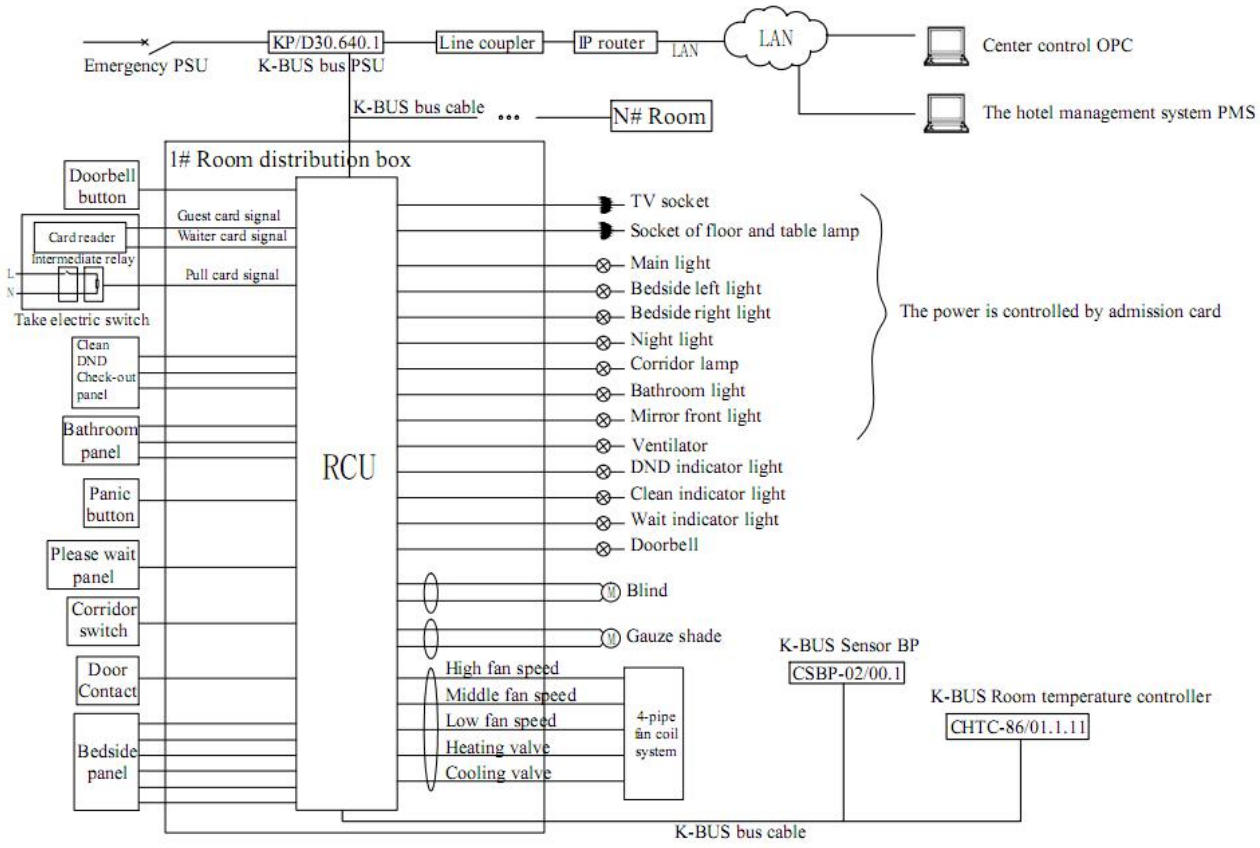
Chapter 4 Project design and application

The application of the Room Controller for the hotel rooms is summarized as follows:



The standard room plan

4.1 Distribution system diagram



RCU: Room Controller Premium Unit (AMRP-41/00.2)

4.2 Functional overview

1. Common functions: lighting control, air-conditioning local control, air-conditioning networking control, shutter and blind control, socket control, room status monitoring.
2. Do not disturb, please clean, doorbell interlock etc.
3. To realize the linkage control of various functions with access card, and realize control of different scenes based on the interacting with administrator card and guest card.
4. The fan coil unit can be controlled locally via the K-BUS Room thermostat, and controlled remotely via the center control system of hotel. The general switch panel can be connected to the dry contact input, which is used to switch lighting, open/close curtain, activate Do Not Disturb and room service as well as scene control, etc. In addition, you had better select the panel with indicator to control night-light, to distinguish it from other panels, and features simple, easy to use.
5. Linking control with the hotel management system and admission card: when a guest checks in, the air-conditioning of the corresponding room turns into comfortable mode. When the guest enters the room and takes electricity with admission card, the lights is adjusted automatically to the welcome mode. If the administrator enters the room, the lights will be adjusted to the clean mode. When the guest checks out, the room temperature controller is initialized via the center control system, and the air-conditioning is turned off.
6. Room control system: the computer in the housekeeping department can display in real time every room status, e.g. emergency situation, clean request etc., to improve the response time and accuracy of room service. Reception of the computer can display the operating status of controlled devices in each room, e.g. the air conditioning, lighting etc. The data exchange of intelligent control system and hotel management system can be achieved via the OPC interface, and the above linkage functions can be also achieved.

Chapter 5 Parameter setting description in ETS

The parameters will be described in the form of the function interfaces rather than the order of the parameters in the database, to prevent repetition.

5.1 Parameter window “General”

Here we can set the operation delay of the device and the limit number of sent telegram as well as the safety operation of the shutter actuator.

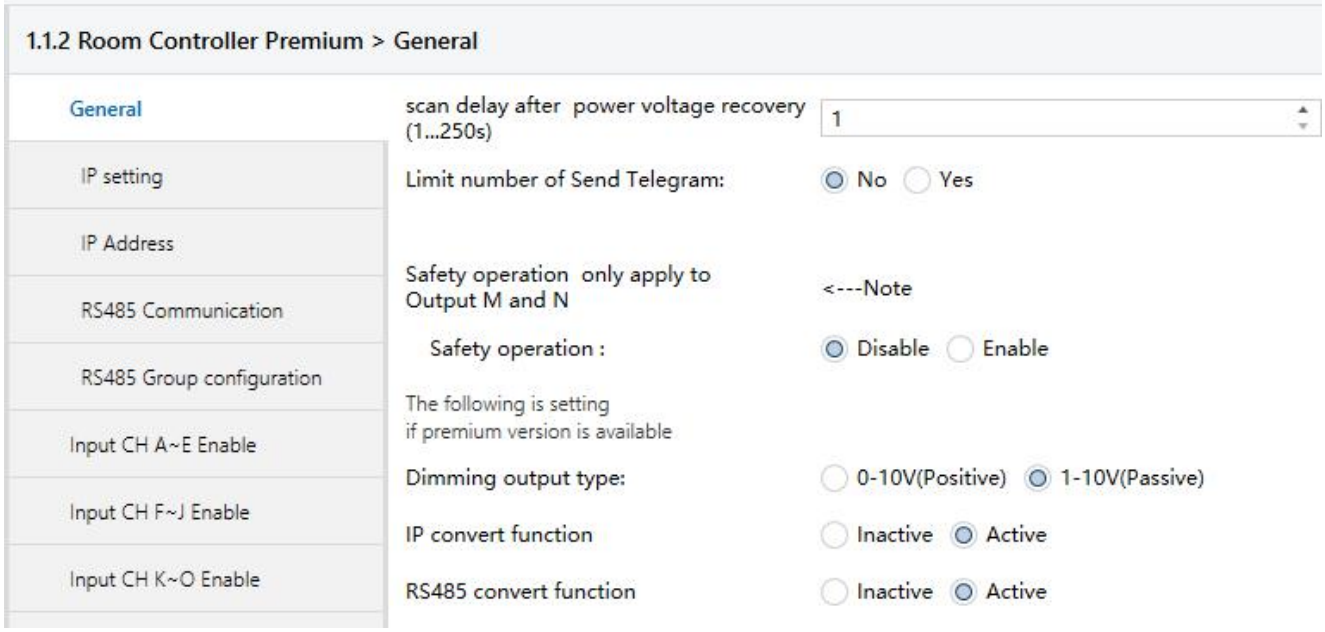


Fig. 5.1 Parameter Window “General”

Parameter “Scan delay after power voltage recovery [1...250s]”

The parameter defined the delay time that scan and relay operation after bus voltage recovery. No telegrams will be sent to the bus before the scan and relay operation delay finished, any telegram sent during this process will be ignored. Meanwhile, telegrams sent during the scan delay will be recorded and executed after the delay.

The relay time here does not include the initiation time of the device, normally it will take 3 seconds to re-initiate the device after power voltage recovery. However, this relay will not work on dimming output.

Parameter “Limit number of send telegram”

This parameter is used to set the number limit of sending telegrams sent to the bus in order to decrease the load of bus, options：

Yes

No

When select “Yes”, the parameter “Period” and “Max. Number of send telegram within a period[1…255]” will be visible.

Parameter “Period”

This is to set the limit time of sending telegrams. Options:：

100ms

500ms

……

10min

After bus voltage recovery, when the initialization time and the scan and relay operation delay have been completed, the set period begins and counting the telegrams also begins. Once the max. number of telegrams has reached during the set period, the device will not send telegram to the bus until the next set period start, and the telegrams that have not been sent will be stored in buffer and send in the next set period. The buffer can store up to 20 telegrams, if there are repetitive telegrams, the telegrams will be only sent once in the next set period.

Parameter “Max. Number of send telegram within a period[1…255]”

This is to set the Max. number of telegrams being sent within the setting monitored period. Option: **1…255**

Note: the above two parameters only affect the telegrams sent to the bus, they don’t affect the internal connection action.

Parameter “Safety operation is only used in output M and N”< --- Note

This parameter explains that function “Safety operation” only applies for outputs of channel M and N, thus, affects only the outputs which link to blinds shutter control.

Parameter “Safety operation ”

The parameter defines whether enable the safety operation of shutter/blinds, operations are:

Enable

Disable

When select “Disable”, the safety operation will be disabled;

When select “Enable”, the follow parameter “Safety operation x (x=1, 2)” will become visible, you are able to set conditions to trigger safety operation and relevant communication object “Safety operation” will be enabled.

Parameter "Safety operation object trigger value"

This parameter is used to set the "safety operation object trigger value", options are:

0 [OFF]

1 [ON]

When it's set "0 [OFF]", the communication object "Safety operation x" will receive telegraph with logic value "0" and the monitoring circle time of safety operation will be reset.

When it's set "1 [ON]", he communication object "Safety operation x" will receive telegraph with logic value "1" and the monitoring circle time of safety operation will be reset.

This means, if the object "Safety operation x" doesn't receive a corresponding telegram after the monitoring time, the Safety operation will be activated, and the shutter/blinds will be moved to a safety position that is defined in the parameter window "Shutter/Blind M/N:Safety operation".

Parameter "Cyclic monitoring time in s[0...65535,0=no monitoring]"

The parameter defines the monitoring time, at which the safety operation is monitored. The monitoring time in the Shutter actuator should be at least twice as long as the cyclical sending time of the sensor so that the Shutter/Blind is not immediately moved to the protected position due to the negligible omission of a signal, e.g. due to a high bus load. If the value of this parameter is set to "0", the monitoring of the safety operation will be deactivated, and their communications are also invalid.

Parameter "Description for safety operation X (X=1, 2)"(40 characters)

With the parameter, it is possible to enter a text of up to 40 characters in length for description the safety operation in the ETS, such as monitor rain sensor.

The priority of the safety operations is higher than other operation, if the safety operation is activated, other operation will be ignored.

Example:

Safety operation: Receive the signal from the rain sensor.

The rain sensor are monitored cyclically by the Shutter actuator i.e. the rain sensor send the protect status cyclically and the Shutter actuator expects this signal. If there is no signal, the Shutter actuator assumes that the rain sensor are faulty or that the bus line has been interrupted and moves all the Shutters/Blinds which are influenced to the set position of safety operation and other operations are blocked. When the device receives a signal from the rain sensor again, the monitoring time of safety operation will be reset. The position of shutter/blind will remain be

unchanged and other operations can be also carried out.

The monitoring time of the Shutter actuator should be twice as long as the cyclical sending time of the rain sensor so that the Shutters/Blinds do not move immediately to the safety operation when a signal is omitted (e.g. due to a high bus load).

Parameter "IP convert function "

This parameter is used to activate "IP convert function". When activated, you can set parameters to the IP , for example IP address, IP address distribution type etc. By using "IP convert function" we can transfer UDP telegram from LAN devices into EIB/KNX telegram and send it to KNX bus, hence, realizing control on KNX devices.Options:

Inactive

Active

Parameter "RS485 convert function "

This parameter is used to activate "RS485 convert function", When activated, you can set parameters to the RS485, for example, device ID, transfer speed etc. The "RS485convert function" here supports bidirectional communication, which means RS485 device can control EIB/KNX device and vice verse. Details for RS485 please refer to the manufacturer of the RS485 devices.Options:

Inactive

Active

The following parameters will be described in 8 functional parts which including IP convert, RS485 convert, dry contact inputs, switch outputs, shutter outputs, dimming outputs, fan coil outputs and scene control.

5.2 IP Conversion

Activate IP convert function in “General” and the following two interfaces will become visible, they are used for setting parameters for IP convert function.

5.2.1 Parameter window “IP setting”

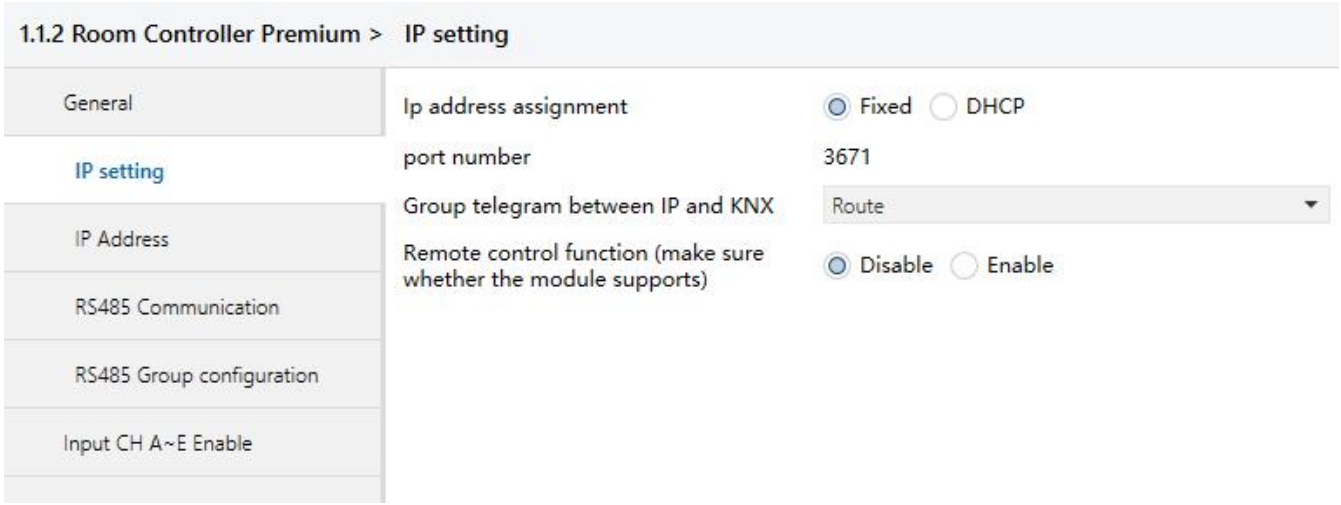


Fig. 5.2 Parameter window “IP setting”

Parameter “IP address assignment ”

Options：

Fixed

DHCP

When select Fixed, the distribution of IP address is fixed, the address can be set in the following parameter window “IP Address”.

Select DHCP, the IP address will be obtained automatically.

Parameter “port number”

Port number is defined as 3671.

Parameter “Group telegram between IP and KNX”

Options：

Route

Block

Filter

Select filter and the following two parameters will be visible.

——Parameter "IP <-> KNX filter group address begin (format is xx/x/xxx)"

——Parameter "IP <-> KNX filter group address end(format is xx/x/xxx)"

These two parameters are used to set the starting and ending group addresses in Filter, only the addresses sit within this range can be routed. MAKE SURE that the value of the ending group address is larger than the starting, or problem may occur.

Parameter "Remote control function (make sure whether the module supports)"

Options:

Disable

Enable

Note: Now is the backup parameters.

5.2.2 Parameter window "IP address"

Parameter "IP address" is shown as Fig. 5.3, it is used for setting Internet connection details, for example IP address, subnet mask, default gateway.

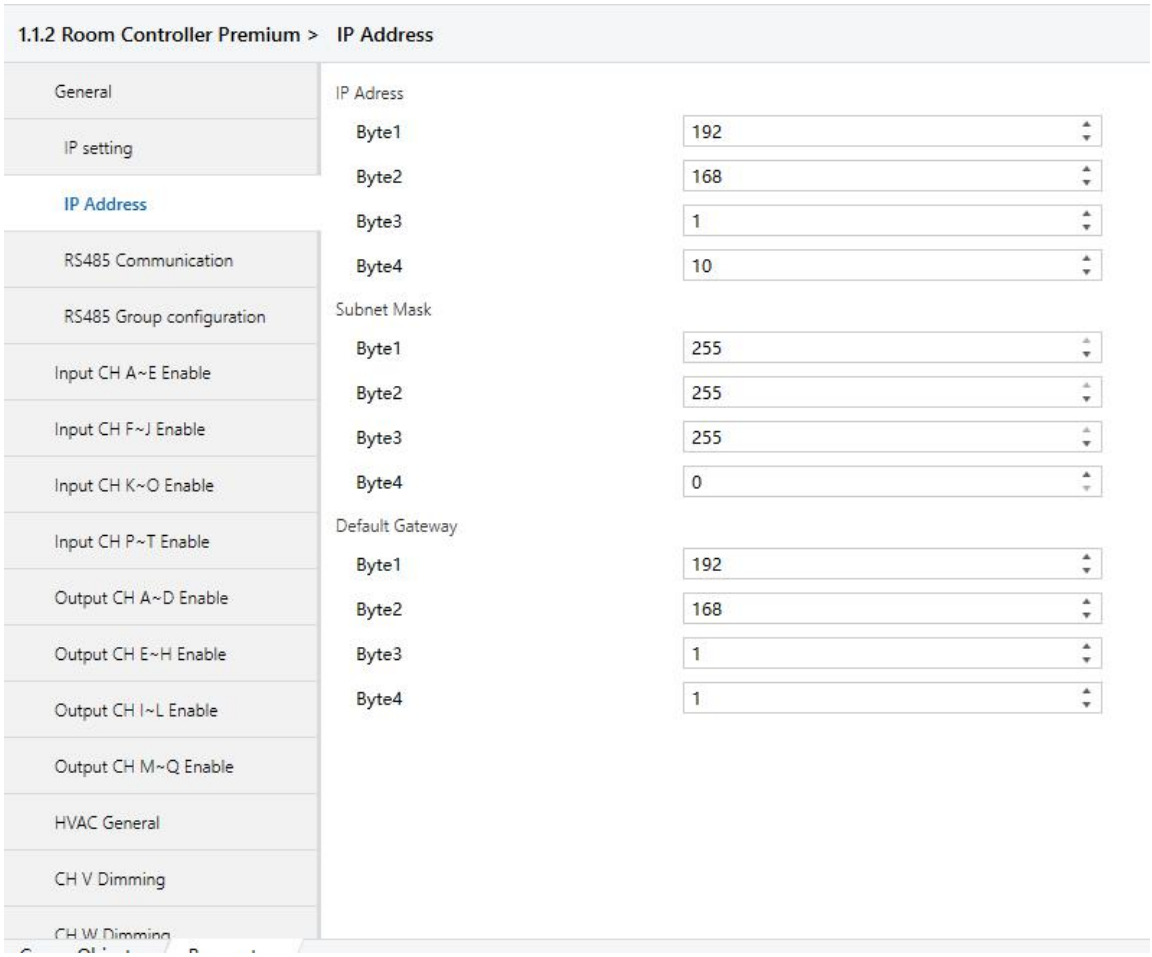


Fig. 5.3 Parameter window "IP address"

Parameter "IP address"

This parameter defines the device IP address, which must be unique in the LAN, or else conflict between IP may occur, options are: **Byte x：0…255**

IP address format as below: (e.g.: 192.168.77.10)

Byte1： 192

Byte2： 168

Byte3： 77

Byte4： 10

Parameter "Subnet mask"

This parameter defines device subnet mask, the setting of which must be able to show the structure and numbers of subnet, options are: **Byte x：0…255**

Subnet mask format as below: (take a example of the simplest small subnet mask 255.255.255.0 as example)

Byte1： 255

Byte2： 255

Byte3： 255

Byte4： 0

Parameter "default gateway"

This parameter defines the default gateway, which must be in the same network segment, options are: **Byte x：0…255**

Default gateway format as below: (e.g.: 192.168.77.1)

Byte1： 192

Byte2： 168

Byte3： 77

Byte4： 1

5.3 RS485 Conversion

Activate RS485 convert function in “General”, the following two interfaces will be visible, they are used for setting relevant RS485 convert parameter.

5.3.1 Parameter window “RS485 Communication”

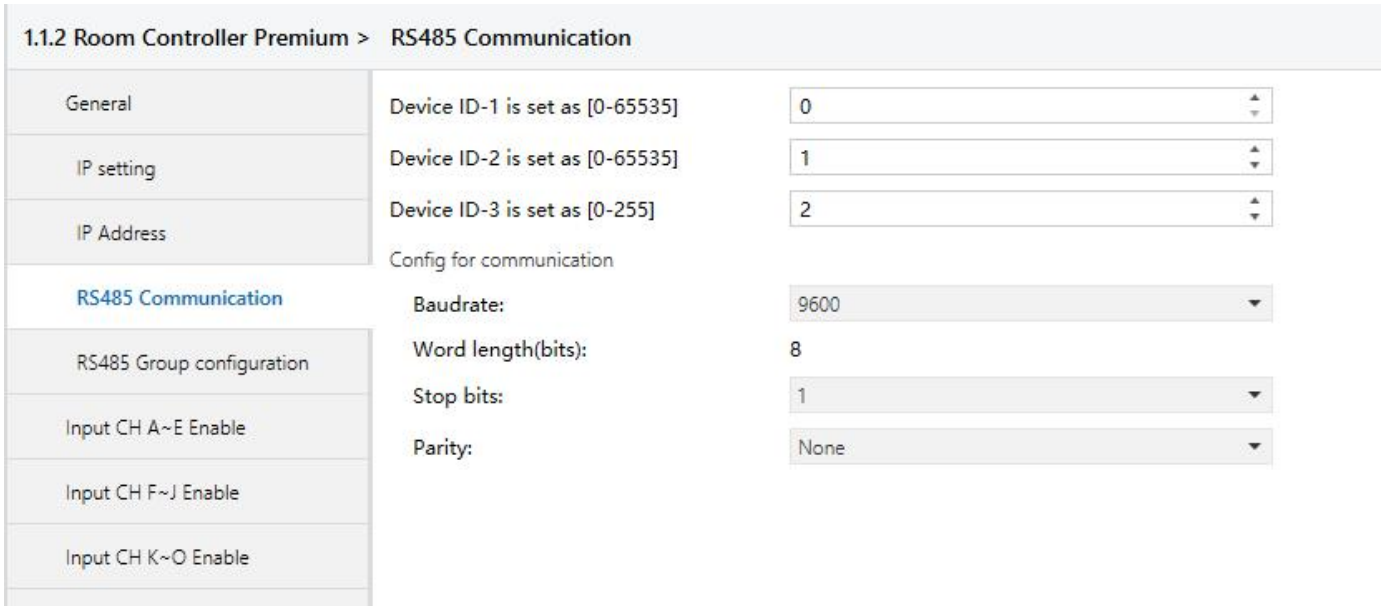


Fig. 5.4 Parameter window “RS485 Communication”

Parameter “Device ID-1/-2/-3 is set as [0…65535]/[]0…255]”

Defining device’s ID number. The devices on RS485 bus is identified through ID number, which is unique in the same system. The several parameters can be set 5 byte ID, in some RS485 device ID occupy 2byte, some occupy 4byte or above, set them according to the requirement.

Parameter “Baud rate”

Defining communication rate of RS485 conversion. The communication rate set here have to be the same as the rate on RS485 bus. Options:

2400/4800/9600/14400/19200/38400/56000/57600/115200

Parameter “ Word length(bits)”

Defining the data bit length of RS485 Interface, which is fixed as 8bits.

Parameter “Stop bits”

Defining stop bits of data transmission. Options: **0.5/1/1.5/2**

Parameter “Parity”

Defining parity check digit of data transmission. Options: **None/Odd/Even**

5.3.2 Parameter window “RS485 Group configuration”

The interface of RS485 Group Configuration shown below, 64 groups can be configured altogether. The group function setting requires a combination with RS485 protocol, which can be learned from the manufacturer or relative user manual.

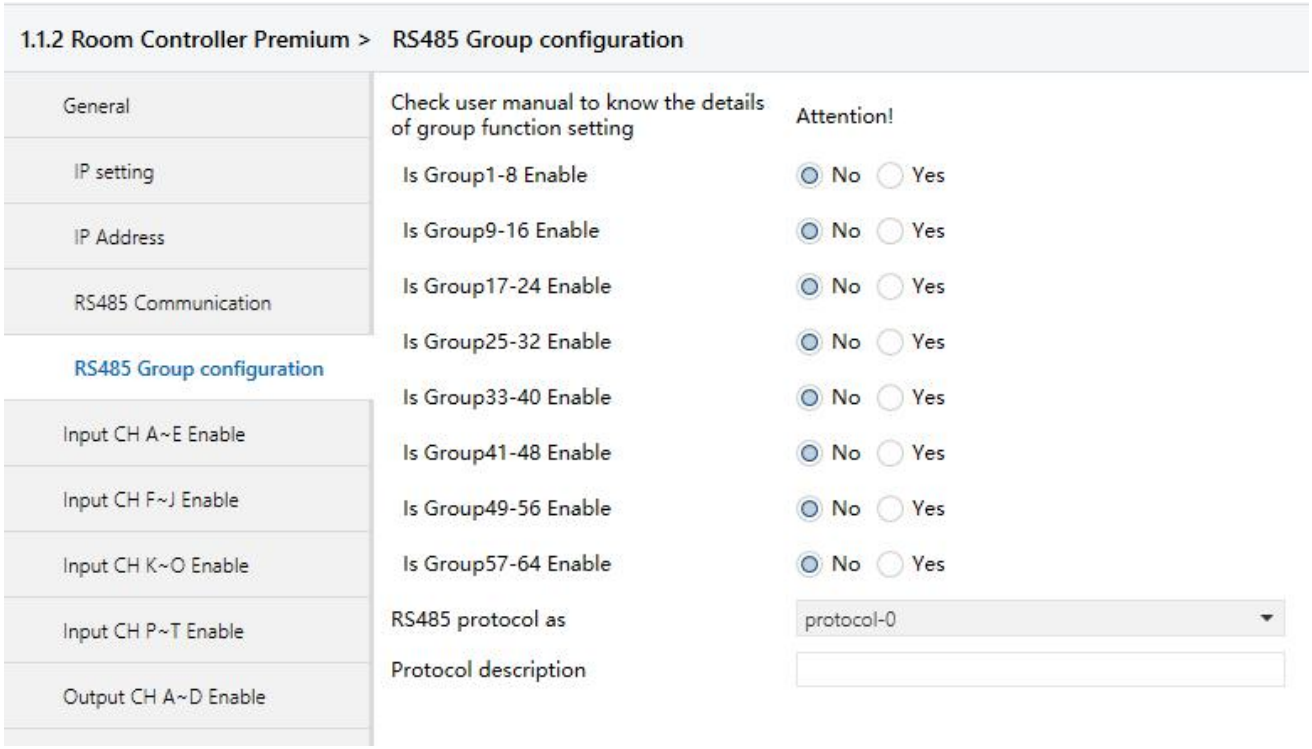


Fig. 5.5 Parameter window “RS485 Group configuration”

Parameter “Is Group 1-64 enable”

Using group function, each parameter to enable 8 groups, and 64 groups in total. After choosing “enable”, the following parameter setting interface will show up.

Parameter “RS485 protocol as”

Choosing RS485 Protocol, it can support up to 15 types of protocol.

Parameter “Protocol description”

Adding protocol description.

5.3.3 Parameter window “Group 1-64 configuration”

The interface is as follow, where you can set the parameter for each group. Each interface allows 8 groups setting, and a total of 64 groups can be set.

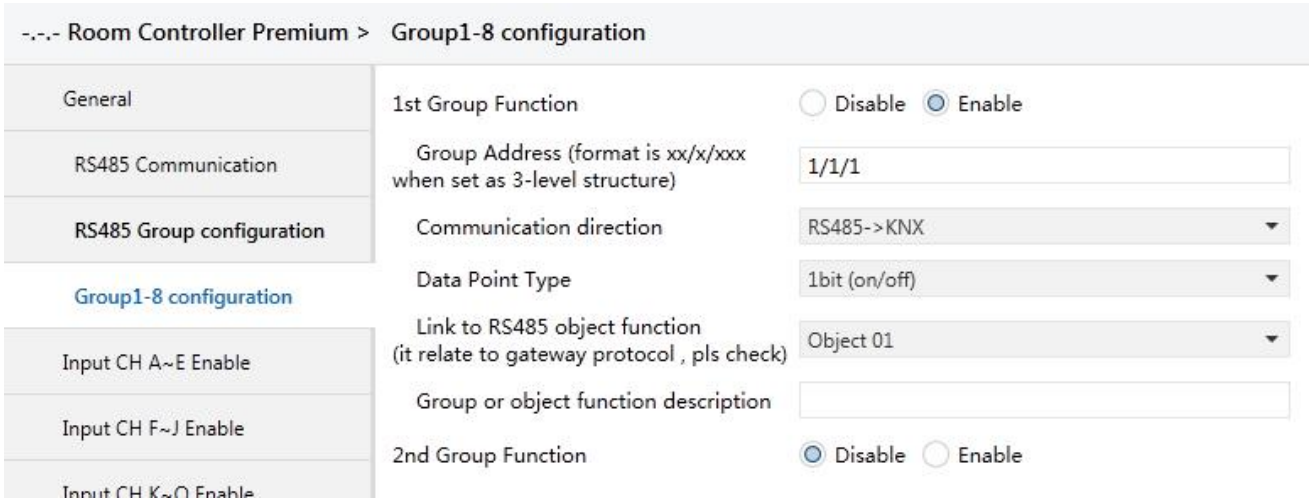


Fig. 5.6 Parameter window “Group 1-64 configuration”

Parameter “1st Group function”

Options:

Enable

Disable

When choosing “Enable”, the following parameters will show up.

---Parameter“Group address (format is xx/x/xxx) when set as 3-level structure”

Setting group address, if it is 3-level structure, the format is xx/x/xxx, if it is 2-level structure, the format is xx/xxxx, it can be free structure as well.

---Parameter“Communication direction”

Setting the communication direction of the set group address. Options:

RS485->KNX

KNX->RS485

RS485<->KNX

Selecting RS485->KNX, one-way control, the RS485 device can control KNX device.

Selecting KNX->RS485, one-way control, KNX device can control RS485 device.

Selecting RS485<->KNX, bi-directional control, The KNX device and RS485 device can be controlled by each other.

---Parameter "Data Point Type"

Setting data types of group object. Options:

1bit (on/off)

4bit (dimming)

1byte

2bytes

3bytes

4bytes

---Parameter"Link to RS485 object function (it relate to gateway protocol , pls check)"

Setting group objects. Options:

Object 01

...

Object 40

---Parameter"Group or object function description"

Function description of group object.

Notes:

1. When different group (64 groups in total) selects the same group object, the data type should be set the same, or it may cause abnormal communication control.

2. When different groups have the same group address, the data type should be set the same as well, or it may cause abnormal communication control.

5.4 Dry Contact Inputs （A~T）

There are 20 inputs. Each input can be set separately, and parameters and objects which are assigned to each input are the same. Using input A as an example described.

Usually, after the bus reset or programming, the device will detect the input state of the contacts. If the contact is closed, it is judged to input, and the corresponding object value is sent; if the contact is opened, it is no action except the parameter "send object value after bus voltage recovery" is enabled. But it is different for the function "shutter control", if the internal connection is enabled between the function and the shutter actuator. It is very trouble for scanning the state of contact and dealing with the internal connection simultaneously after the bus reset and programming. So there is no scanning the input status of contact for shutter control.

5.4.1 Parameter window “Input CH X enable”

Parameter window “Input CH X enable” can be shown in fig.5.2. Here set whether enable the input X (X=A~T) of dry contact inputs.

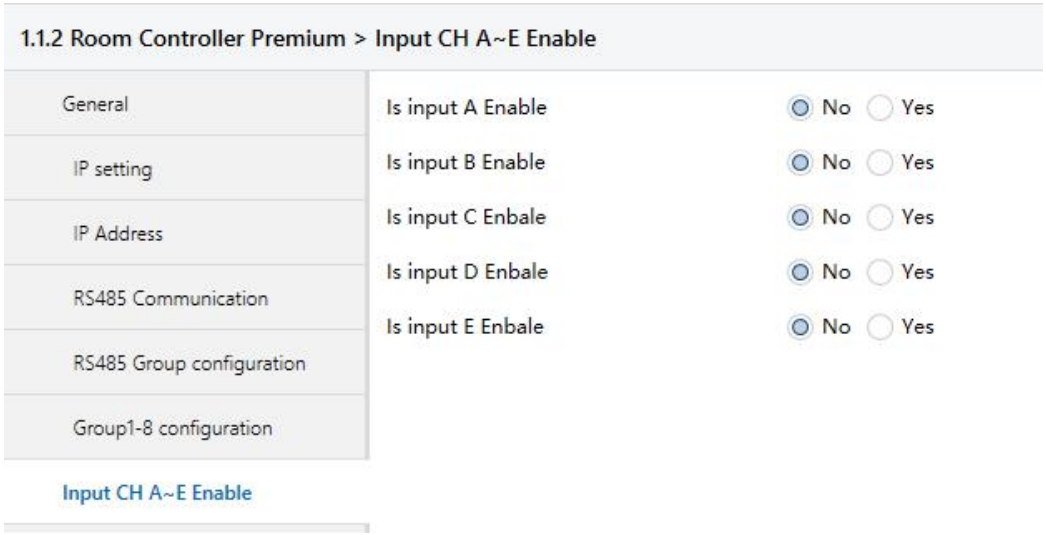


Fig. 5.7 Parameter window “Input CH A~T enable”

5.4.2 Parameter window “Input CH X- Switch sensor”

Parameter window “Switch sensor” can be shown in fig. 5.8 and fig. 5.9. No distinguish between long and short operation in fig. 5.8. It is opposite in fig. 5.9.

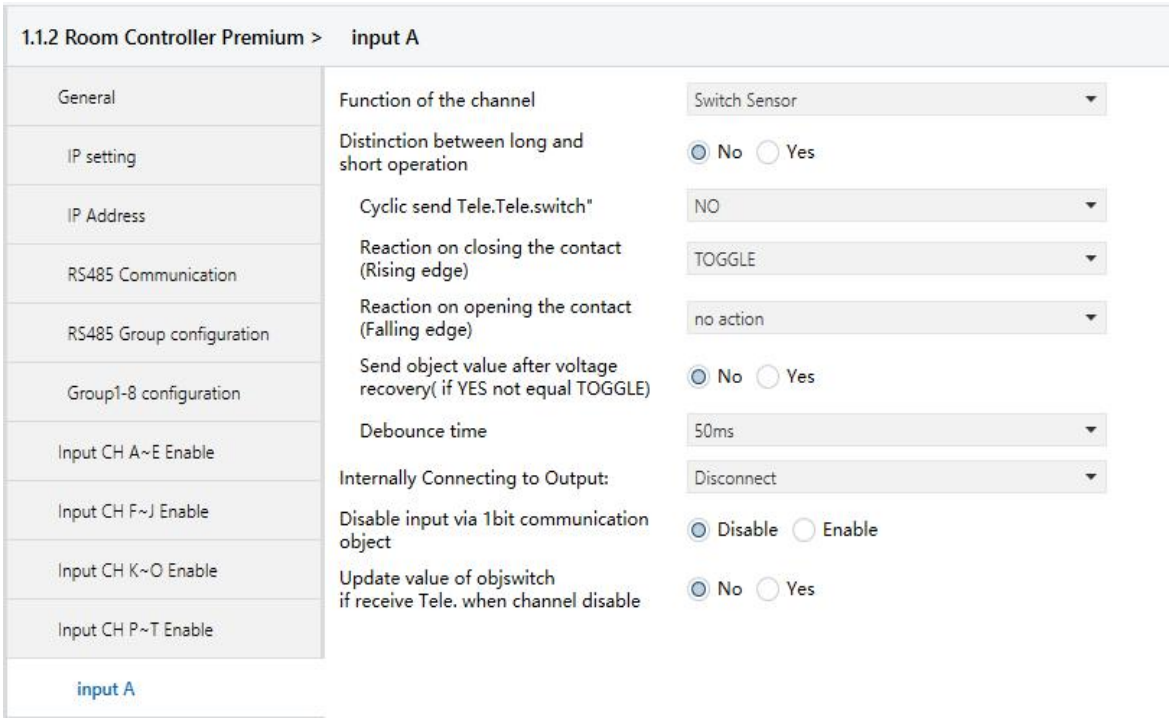


Fig. 5.8 Parameter window “Switch sensor” (No distinction long/short operation)

Parameter "Function of the channel"

The parameter determines the function option in the channel; the current option is "switch". If "No function" is selected, it means the channel is disabled. Options:

No Function

Switch sensor

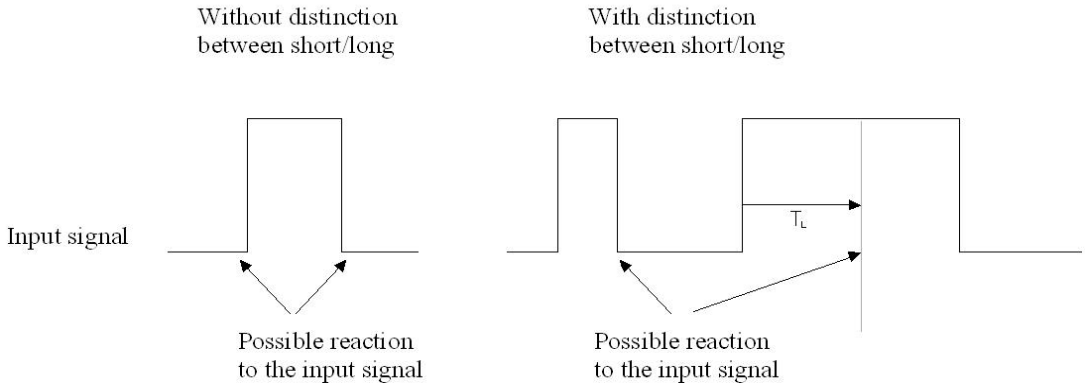
Switch/Dimming

Value/Forced output

Shutter Control

Parameter"Distinction between long and short operation"

This parameter sets whether the input distinguishes between a short and long operation. If "yes" is selected, there is a waiting period after the opening/closing of the contact to determine whether the operation is long or short. Only then is a possible reaction triggered. The following drawing clarifies the function:



Options:

Yes

No

Note: The long operation in the below chapters are the same with here. TL is the time duration from where a long operation is detected.

Parameter "Cyclic send Tele. "Tele. switch"

This parameter is visible if there is no distinction between a short and long operation. It is able to set whether to send the current value of object "switch operation" cyclically on the bus.Options:

No

Always

If switch off

If switch on

If the parameter value “Always” is selected, the object sends its value cyclically on the bus, regardless of its value is 0 or 1.

If the parameter value “If switch off” or “If switch on” is set, only the corresponding object value is sent cyclically.

Parameter “Reaction on closing the contact（rising edge）”/“Reaction on opening the contact (fall edge)”

This parameter is visible if there is no distinction between a short and long operation. It can be set the operation to open and close the contact.Options:

No action

Off

On

Toggle

Stop cyclic send

Delay mode

If the parameter “Toggle” is selected, negate the operation, that means negate the current value. For example, if “On” is carried out, when negate it will carry out “Off” operation next.

If the parameter “Stop cyclic send” is selected, it will stop the cyclical sending telegram till there is a new object value to be sent.

If the parameter “No action” is selected, it will not implement any operation.

If the parameter “Delay mode” is selected, while executing operation, it will trigger to send the first message , and the second message will be triggered to send after delay for certain time. The function can be used in the control of stair lighting. When you choose this option, there are 2 parameters visible and they are used to set the message and delay time triggered.

.

---Parameter “Value send mode”

Setting value send mode, which will be sent first, and which will be sent later. Options:

1/0

0/1

---Parameter “Delay time [1...65535]*0.1s”

Setting delay time. Options: **1..65535**

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

This parameter is used to set the interval time between two telegrams that are sent cyclically, it is visible if cyclical sending has been set. Transmission cycle time =Base× Factor.

Base options:

1s

10s

…

1h

Factor options: **1…255**

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

It can be set whether to send the value of the object "switch operation" on the bus after voltage recovery, this parameter is visible if there is no distinction between a short and long operation. Options:

Yes

No

If the parameter "Yes" is selected, it will send the current value of the object "switch operation" on the bus. Only when the value "Toggle" has not been set in either of the two parameters "Reaction on opening/closing the contact", the value of the object "switch operation" can be send on the bus. If one of the two parameters has the value "TOGGLE", no values are sent in general on the bus after bus voltage recovery. If "No action" or "Stop cyclic send" is selected, there is no values are sent on the bus either.

Parameter "Debounce time"

It can set the debounce time to prevent unwanted multiple operation by bouncing of contacts in debounce time, which means the effective time of the contact operation.

Options:

10ms

20ms

……

150ms

Parameter "Internally Connecting to Output"

With this parameter a direct connection of the dry contact input with a switch output can be

established. With this connection no assignment of the group address is possible.Options:

Disconnect

OUTPUT A:Switch

OUTPUT B:Switch

……

OUTPUT P: Switch

OUTPUT Q: Switch

The internal connection omits the link with a group address between objects, for example, you just need to set parameters of input A and enable OUTPUT A to realize the input A to control the OUTPUT A, and then if the switch object value of input A is updated, the switch object value of OUTPUT A is also updated together. Meanwhile, the switch object value of OUTPUT A can be also updated via other bus devices, but the OUTPUT A will carry out action with the last received value.

If the OUTPUT O, P, Q as a fan speed control, the internal connection is invalid, if as relay control, it is available.

Note: In the part of dry contact, if there are several inputs connected to the same input, then the output is decided by the last input operation.

Parameter "Disable input via 1bit communication object"

The parameter is used to disable the input of X channel, if enable is selected, the object "Enable communication" is visible. Options:

Disable

Enable

---Parameter"Trigger value of disable object"

The parameter is visible when"enable"is selected in last parameter, it is used to set the triggering value of prohibition function. Options:

Disable=1/enable=0

Disable=0/enable=1

When the option is "Disable=1/enable=0", the input of X channel will be prohibited when the message"1" is received and enabled when the message is "0". And vise versa.

The input of this channel is enabled by default after the power recovery.

Note: The prohibition function of other functions of Channel X is as same as described here, it will not be repeated in the following content.

Parameter 'Update value of obj. 'switch' if receive Tele. When channel disable"

The parameter set whether the object "switch" value can be updated when the input is disabled. Options:

Yes

No

Yes: after disabled, the object "switch" value can be modified via the bus.

No: after disabled, the object "switch" value can not be updated.

Note: The parameter has no effect on internal connection. Therefore, during exhibition, the updating of object "switch" will not cause the internal connected actuating end action.

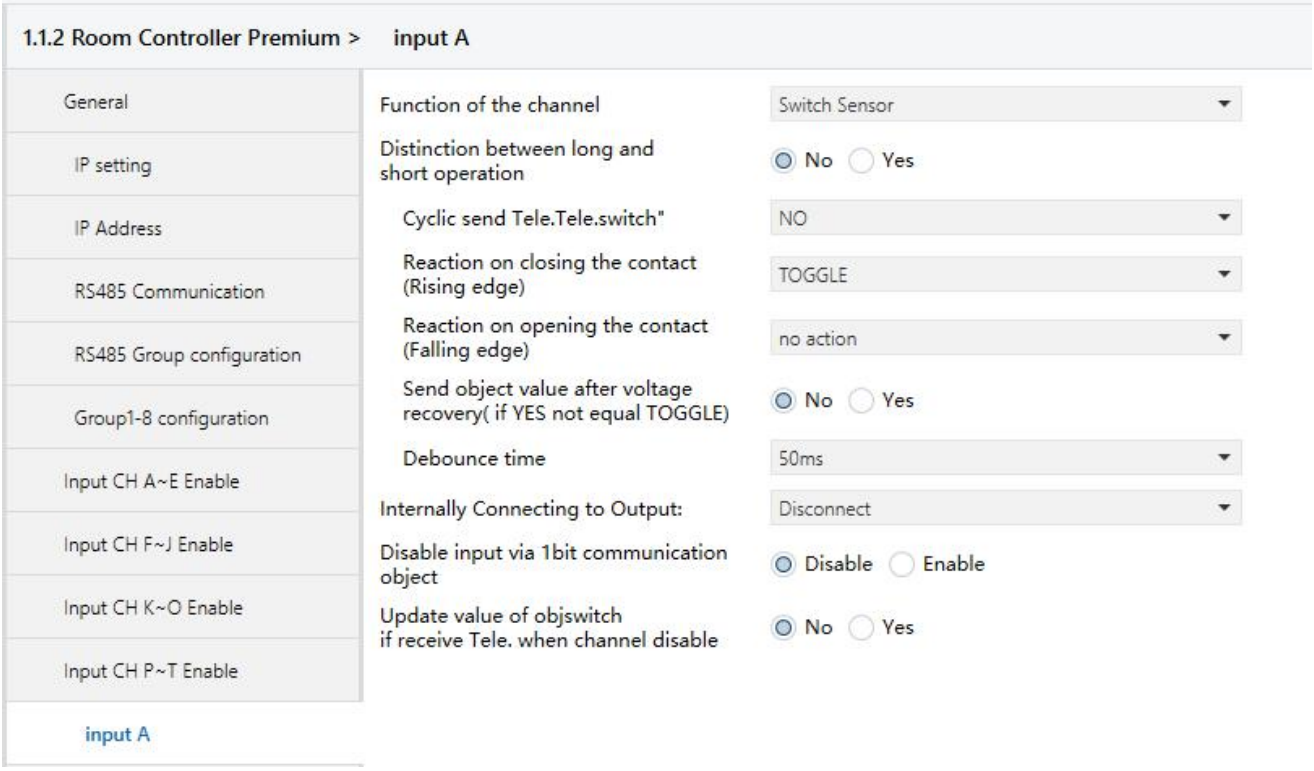


Fig.5.9 Parameter window "Switch X" (Distinction long/short operation)

Parameter "Connect contact type"

This parameter is visible if there is distinction between a short and long operation. It is used to set whether the input contact is a normally closed or normally open contact. Options:

Normally open

Normally close

The parameters that are described in this chapter are based on normally open connect type as example, the normally close connect type is just opposite.

Parameter "Reaction on short operation" or "Reaction on long operation"

The parameter is visible when there is distinction between long/short operation. Here you can set the reaction when there is execution of long/short operation. When the input is determined as long operation or short operation, the object value will be updated at once. Options:

No action

Off

On

Toggle

Parameter "Long operation after：Base× Factor"

The parameter is visible when there is distinction between long/short operation. Here defines the period T_L after which an operation is interpreted as "long". T_L=Base × Factor.

Base options:

100s

1s

……

1h

Factor options: **2~255**

Parameter "Number of objects for short/long object operation"

The parameter is visible when there is distinction between long/short operation. It is able to set one or two communication objects for short/long operation. When one communication object is set, long and short operations share a communication object. When two communication objects are set, long and short operations use a communication object separately.Options:

1object

2objects

If selecting "2objects", the internal connection is determined by a short operation. It is not affected by a long operation.

5.4.3 Parameter window “Input CH X- Switch/Dimming”

Parameter window “Switch/Dimming” can be shown in Fig.5.10. It is visible when Function of the channel “Switch/Dimming” is selected. When this function is selected, it is possible to switch and dim the lighting via one input.

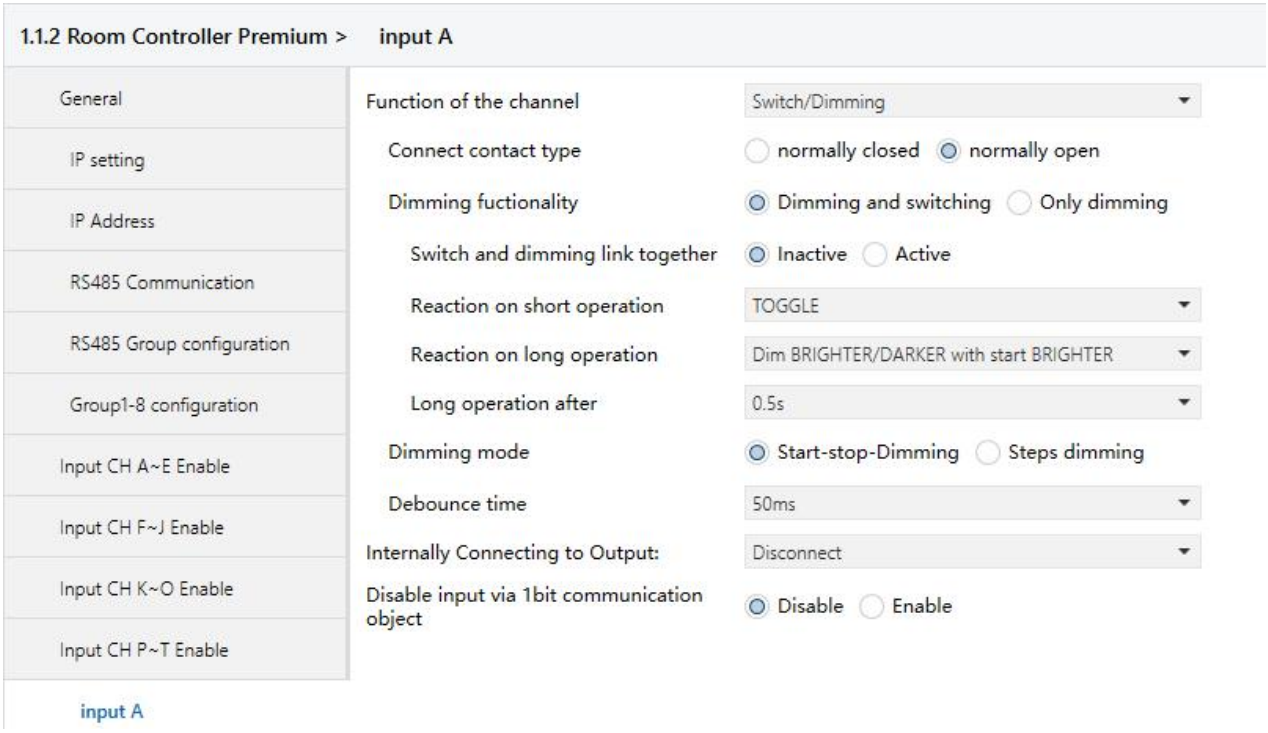


Fig. 5.10 Parameter window “Switch / Dimming”

Parameter “Connect contact type”

This parameter defines whether the input contact is a normally closed or normally open contact. Options:

Normally open

Normally closed

The parameters that are described in this chapter are based on normally open connect type as example, the normally close connect type is just opposite.

Parameter “Dimming functionality”

This parameter is used to define whether the lighting can only be dimmed or whether it also should be permitted switching. Options:

Dimming and switching

Only dimming

If “Only dimming” is selected, there is no distinction between a short and long operation. Therefore the dimming is carried out immediately after an operation action; there is not required to

determine whether the operation is long or short.

If “Dimming and switching” is selected, it will distinguish the operation is a short or long operation. In this case, the lighting is dimmed via a long operation and switched via a short operation.

Parameter"Switch and dimming link together"

The parameter is visible if the option “dimming and switching” has been selected with the parameter “dimming functionality”. Options：

Inactive

Active

If select“inactive”，the object“switch”and the object“dimming”are independent of each other；

If select“active”，they influence each other, such as .....--switch on -- dimming off -- switch on-- dimming off -- dimming on-- ....., or .....--dimming on --switch off -- dimming on --switch off --switch on --dimming off--..... .

Parameter “Reaction on short operation”

The parameter is visible if the option “dimming and switching” has been selected with the parameter “dimming functionality”. It is used to set if the value of object “Switch dimming” is ON, OFF, TOGGLE, or if no action should be occur with short operation.Options:

No action

Off

On

Toggle

Parameter “Reaction on long operation”

The parameter is visible if the option “dimming and switching” has been selected with the parameter “dimming functionality”. It is used to set if the object “dimming” sends a brighter or darker telegram with long operation. When the operation is over, the object will send a stop dimming telegram.Options:

Dimming BRIGHTER

Dimming DARKER

Dim BRIGHTER / DARKER with start BRIGHTER

Dim BRIGHTER / DARKER with start DARKER

If the option “Dim BRIGHTER / DARKER with start DARKER” is selected, the dim command which is the opposite to the last dim command is set, and the first action is dimming darker with long operation. Other options are similar with the option.

Parameter "Long operation after"

The parameter is visible if the option "dimming and switching" has been selected with the parameter "dimming functionality".Here defines the period TL after which an operation is interpreted as "long".Options:

0.3s

0.5s

……

10s

Parameter "Reaction on operation"

The parameter is visible if the option "only dimming" has been selected with the parameter "dimming functionality". There is no distinction between short and long operation. Therefore the object "dimming" will send a brighter or darker telegram after an operation trigger. When the operation is over, the object will send a stop dimming telegram. Options:

Dimming BRIGHTER

Dimming DARKER

Dim BRIGHTER / DARKER with start BRIGHTER

Dim BRIGHTER / DARKER with start DARKER

Parameter "Dimming mode"

The parameter sets whether the dimming mode is start-stop dimming or steps dimming.Options:

Start-stop dimming

Steps dimming

If the option start-stop dimming is selected, it will start the dimming mode with a bright or darker telegram and end the dimming mode with a stop dimming telegram at the end of operation. The dimming telegram need not be cyclically sent in start-stop dimming mode.

If the option step dimming is selected, the dimming telegram is sent cyclically during a long operation. The stop telegram ends the dimming process at the end of operation.

Parameter "Brightness change on every sent"

The parameter is visible if the option step dimming has been selected with the parameter dimming mode. It is used to set the change brightness (in percent) which is cyclically sent with every dim telegram. Options:

100%

50%

……

1.56%

Parameter "Interval of Tele. Cyclic send"

The parameter is visible if the option step dimming has been selected with the parameter dimming mode. It is used to set the interval time between two telegrams that are sent cyclically during a long operation.Options:

0.3s

0.5s

……

10s

Parameter "Debounce time"

This parameter is used to set the debounce time. Debouncing prevents unwanted multiple operation of the input, e.g. due to bouncing of the contact. Options:

10ms

20ms

……

150ms

Parameter "Internally Connecting to Output"

With this parameter a direct connection of the dry contact input with a dimming output can be established. With this connection no assignment of the group address is possible. Options:

Disconnect

OUTPUT V: Dimmer

OUTPUT W: Dimmer

The internal connection omits the link with a group address between objects, for example, you just need to set parameters of input A and enable OUTPUT V to realize the input A to control the OUTPUT V, and then if the switch dimming object value of input A is updated, the switch object value of OUTPUT V is also updated together. Meanwhile, the switch object value of OUTPUT V can be also updated via other bus devices, but the OUTPUT V will carry out action with the last received value. So it is with the relative dimming.

Note: In the part of dry contact, if there are several inputs connected to the same input, then the output is decided by the last input operation.

5.4.4 Parameter window “Input CH X- Value/Forced output”

Parameter window “Value/Forced output” can be shown in Fig. 5.11. It is visible when Function of the channel “Value/Forced output” is selected.

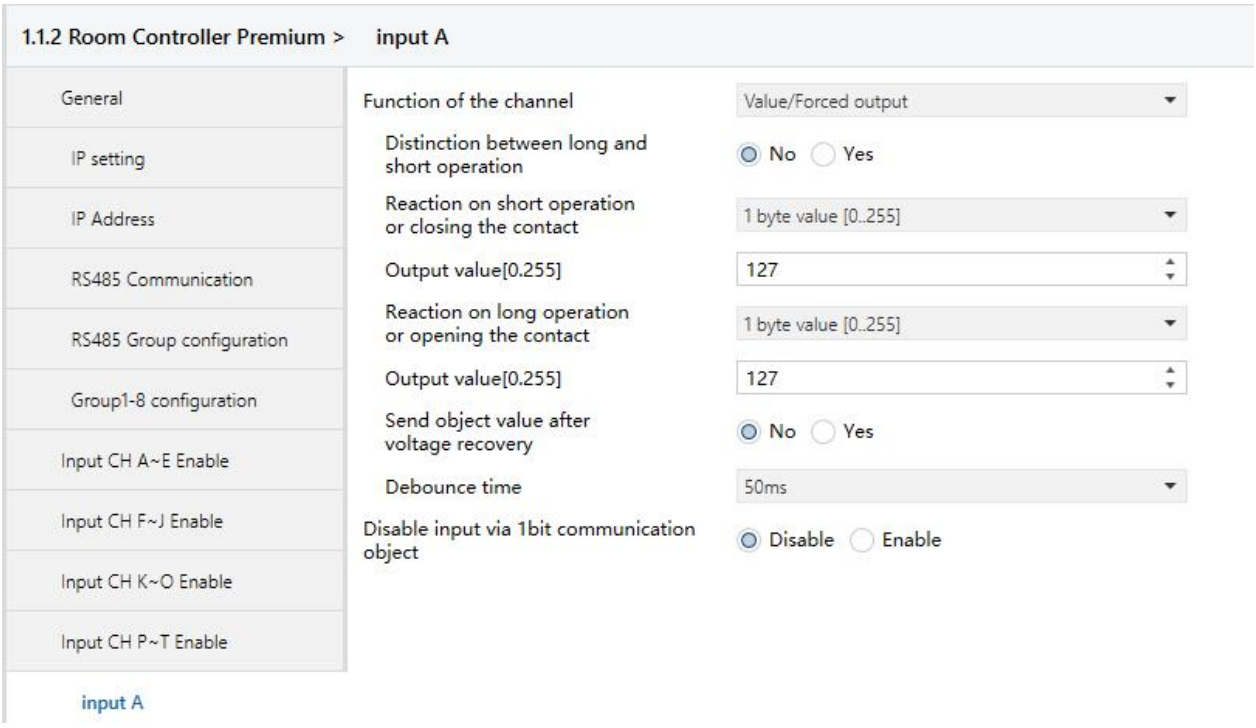


Fig. 5.11(1) Parameter window “Value / Force output” (No distinction long/short operation)

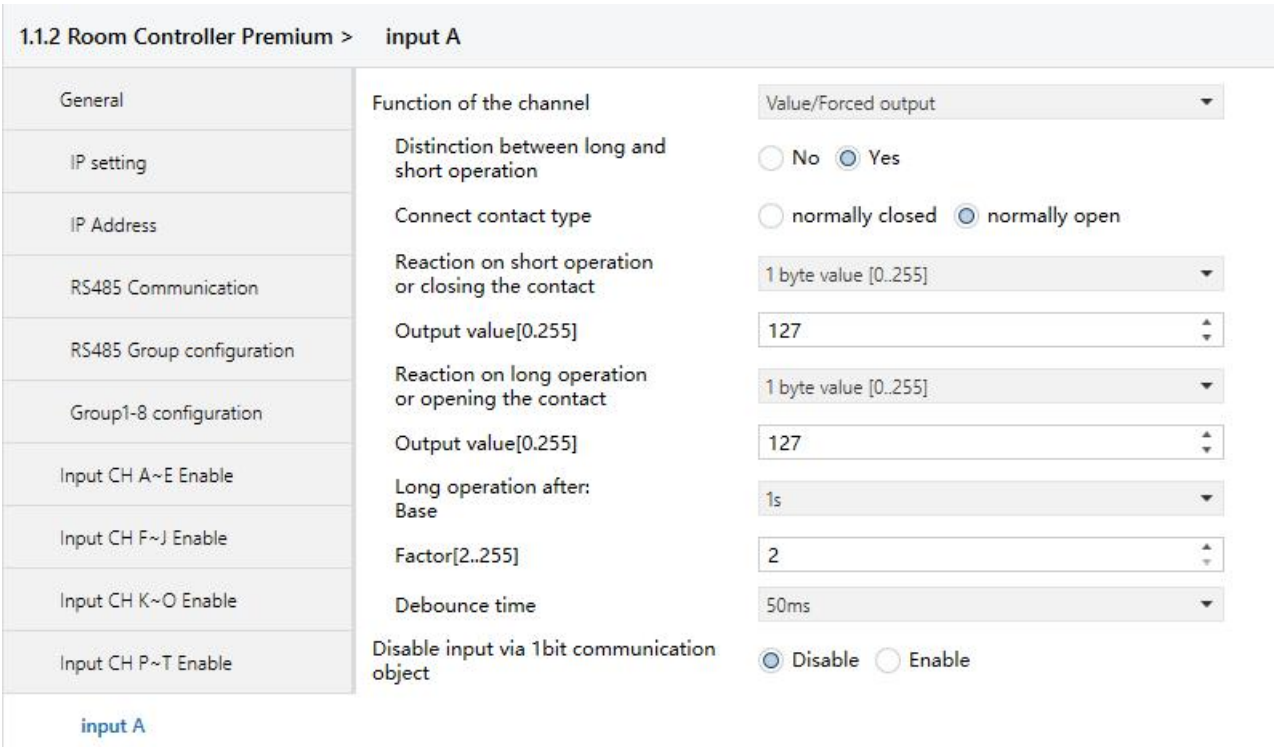


Fig. 5.11(2) Parameter window “Value / Force output” (Distinction long/short operation)

Parameter "Distinction between long and short operation"

This parameter defines whether the input distinguishes between a short and long operation. If "yes" is selected, there is a delay after opening/closing the contact to determine whether there is a short or long operation. Only then is a possible reaction triggered.Options:

Yes

No

Parameter"Connect contact type"

This parameter is visible if there is distinction between a short and long operation. It is used to set whether the input contact is a normally closed or normally open contact.Options:

Normally open

Normally closed

The parameters that are described in this chapter are based on normally open connect type as example, the normally close connect type is just opposite.

Parameter "Reaction on short operation or closing the contact"and"Reaction on longoperation or opening the contact"

If there is distinction between short and long operation, the parameter is used to define the data type that is sent when the contact is actuated with short or long operation. If no distinction, it defines the data type that is sent when the contact is actuated with closing or opening. Options:

No reaction

1bit value [0/1]

……

4 byte value [0…4294967295]

Parameter"Internally Connecting to Output"

The parameter is visible if the option"1byte value (Recall scene)/ (Store scene)" has been set with the above parameter. When the setting scene is recalled or stored, all the outputs of the device will be affected by this scene if the outputs activate the scene. Options：

Inactive

Active

Parameter "Output value[…]"

Here defines the value which is sent with the operation. The value range depends on the data type set for the parameter "Reaction on short operation or closing the contact" or "Reaction on long operation or opening the contact".

Parameter "Send object value after voltage recovery"

This parameter is visible if there is no distinction between a short and long operation as shown in fig. 5.11(1). It can be set whether to send the value of the object "…-long/open (short/close)" on the bus after bus voltage recovery. If "Yes" is selected, the object value will be sent on the bus after bus voltage recovery. Options:

Yes

No

Parameter "Long operation after: Base× Factor[2…255]"

The parameter is visible if the option "yes" has been selected with the parameter distinction between long and short operation. Here defines the period T_L after which an operation is interpreted as "long". T_L=Base × Factor.

Base options: **100ms/1s/……/1h**

Factor options: **2~255**

Parameter "Debounce time"

This parameter is used to set the debounce time. Debouncing prevents unwanted multiple operation of the input, e.g. due to bouncing of the contact. Options:

10ms/20ms/……/150ms

5.4.5 Parameter window "Input CH X- Shutter Control"

Parameter window "Shutter control, X" can be shown in fig. 5.12. It is visible when the input is operated with the function "shutter control". The function enables the operation of blinds and shutters with buttons or switches.

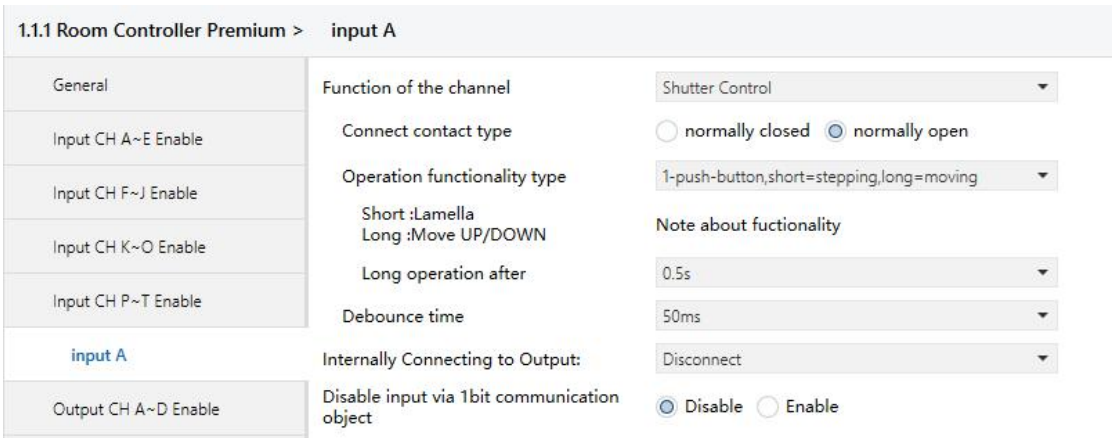


Fig. 5.12 Parameter window "Shutter control"

Parameter "Connect contact type"

This parameter is used to set whether the input contact is a normally closed or normally open contact. Options:

Normally open

Normally closed

The parameters that are described in this chapter are based on normally open connect type as example, the normally closed connect type is just opposite.

Parameter "Operation functionality type"

This parameter sets the shutter operating functionality type, which overview is provided in the following tables. According to the actual use, select an appropriate operation type.

1-push-button,short=stepping, long=moving	
Short operation	Alternate implement "Stop/Adjust upward" or "Stop/Adjust downward" operation. (alternate send the value of the object "0"and"1")
Long operation	Alternate implement "Move up" or "Move down" operation. (alternate send the value of the object "0"and"1")
1-push-button, short=moving, long=stepping	
Short operation	Alternate implement "Move up" or "Move down" operation (alternate send the value of the object "0"and"1")
Long operation	Alternate implement "Stop/Adjust upward" or "Stop/Adjust downward" operation (keep pressing the button can send cyclic) (alternate send the value of the object "0"and"1")
1-push-button-operation, moving	
On operation	When operation, send the command in sequence: …… - >Move up - >Stop/Adjust upward - >Move down->Stop/Adjust downward->……
1-switch-operation, moving	
Start of operation (contact closed)	Alternate implement "Move up" or "Move down" operation (alternate send the value of the object "0"and"1")
End of operation (contact open)	Stop/Adjust
2-push-button, standard	
Short operation	"Stop/Adjust upward" or "Stop/Adjust downward" (set by parameter)
Long operation	"Move up" or "Move down"(set by parameter)

2-push-button, moving[shutter]	
On operation	When operation, send the command in sequence: ……->Move up->Stop/Adjust upward->…… or ……->Move down->Stop/Adjust downward->…… (Move up/down set by parameter)
2-push-button, stepping	
On operation	"Stop/ Adjust upward" or "Stop/ Adjust downward" (set by parameter) (keep pressing the button can send cyclic)
2-switch-operation, moving[shutter]	
Start of operation (contact closed)	"Move up" or "Move down"(set by parameter)
End of operation (contact open)	"Stop / Adjust upward" or "Stop / Adjust downward" (the sending value is identical to the value that the operation starting)

Parameter "Long operation after"

This parameter is visible if long operation activate, it is defines the period T_L here, after which an operation is interpreted as "long".Options: **0.3s/0.5s/…/10s**

Parameter "Tele. STOP/lamella adj."Cyclical send"

It is visible if the shutter control type is "1-push-button, short=moving, long=stepping" and "2-push-button, stepping". It is able to set the interval time of sending the object "stop/adjust adj." cyclical.Options: **0.3s/0.5s/…/10s**

Parameter "Reaction on short operation"

It is visible if the shutter control type is "2-push-button, standard". This parameter defines the operation with short operation.Options:

Stop/lamella up

Stop/lamella down

Parameter "Reaction on long operation"

It is visible if the shutter control type is "2-push-button, standard". This parameter defines the operation with long operation.Options:

Move up

Move down

Parameter "Reaction on operation"

It is visible if the shutter operation functionally type is"2-push-button, moving [shutter]"、

“2-switch-operation, moving [shutter]”and“2-push-button, stepping”. It is defines the action when operation. Different operation functionally type makes different operate action. The former two operations functionally type is move up and down; the last operation functionally type is stop/lamella reaction.

Options:

Move up

Move down

Options:

Stop/lamella up

Stop/lamella down

Parameter “Denounce time”

This parameter is used to set the debounce time. Debouncing prevents unwanted multiple operation of the input, e.g. due to bouncing of the contact. Options: **10ms/20ms/…/150ms**

Parameter “Internally Connecting to Output”

With this parameter a direct connection of the dry contact input with a shutter output can be established. With this connection no assignment of the group address is possible. Options:

Disconnect

OUTPUT M: Shutter

OUTPUT N: Shutter

The internal connection omits the link with a group address between objects, for example, you just need to set parameters of input A and enable OUTPUT M to realize the input A to control the OUTPUT M, and then if the shutter UP/DOWN object value of input A is updated, the shutter UP/DOWN object value of OUTPUT M is also updated together. Meanwhile, the shutter UP/DOWN object value of OUTPUT M can be also updated via other bus devices, but the OUTPUT M will carry out action with the last received value. So it is with the Louvre adj. /Stop.

5.5 Switch outputs (A~L)

There are 12 outputs. Each output can be set separately, and parameters and objects which are assigned to each output are the same. Using output A as an example described.

Output K, L can be used as dimmer switch, along with dimmer output V, W, to control devices of 1-10V or 0-10V interface.

5.5.1 Parameter window “Output CH X enable”

Parameter window “Output CH X enable” can be shown in fig.5.13. Here set whether enable the output X (X=A~L)of switch outputs.

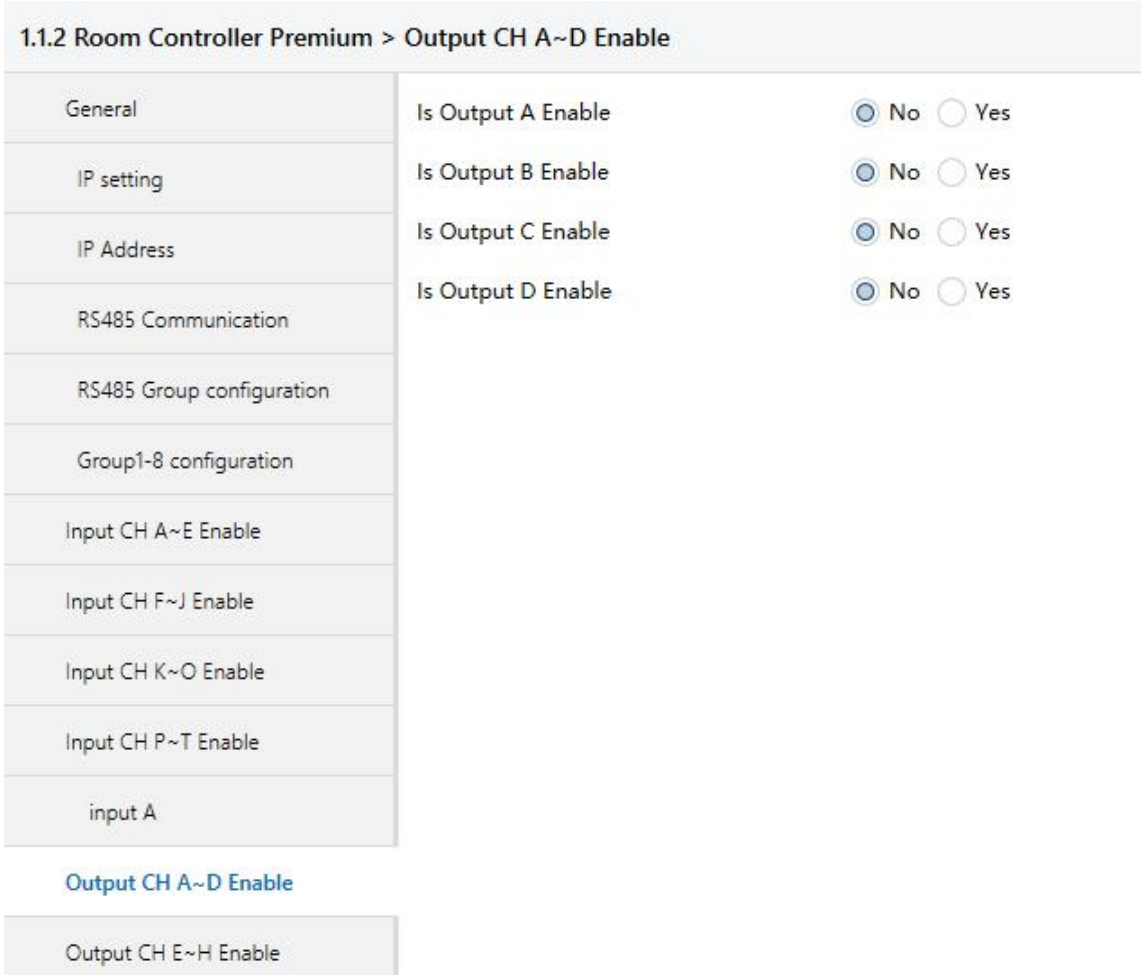


Fig. 5.13 parameter window “Output CH A~L enable”

5.5.2 Parameter window “Output X- Switch”

Parameter window “Switch” can be shown in fig. 5.14, which applies to a whole output. In addition to setting general switching function, but also set position of switch on the bus power on and power down , reports of switch status, etc..

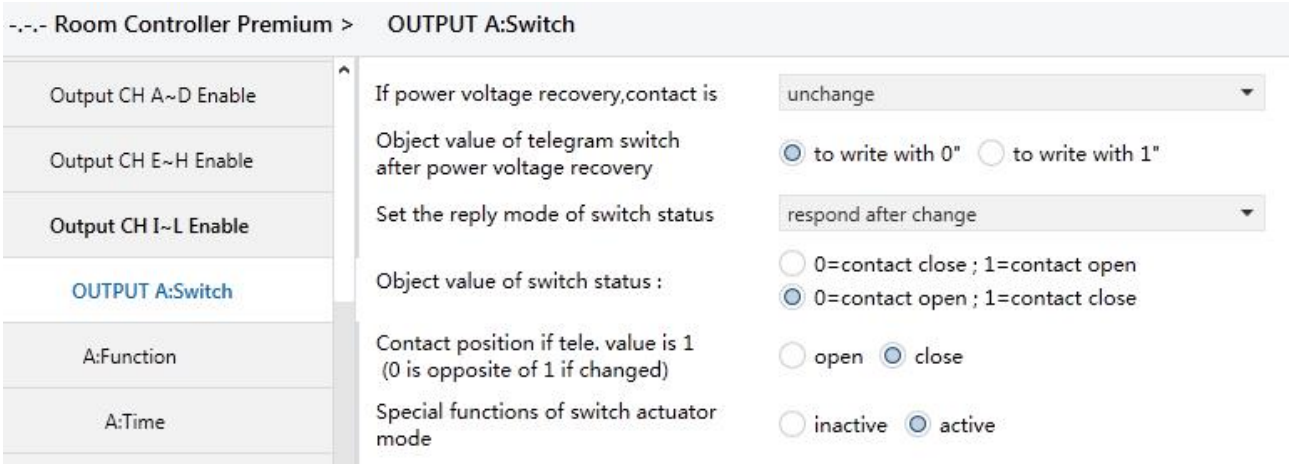


Fig. 5.14 parameter window “Switch”

Parameter “If power voltage recovery, contact is”

The output can adopt a defined status on power voltage recovery via this parameter. Options:

Unchange

Open

Close

When selecting “Unchange”, the contact of the relay will remain the same as the last status on the power on. When selecting “open”, the contact will be open; while it is closed when selecting “close”.

Note: When the dry contact input is associated to the output, the action of the output need to be considered the switch object value associated with input after power voltage recovery, if the value is certain, the output will execute the action according the object value (the next fig.5.15), if uncertain, it will execute the action via the parameter setting on power voltage recovery.

Parameter ”Object Value of ”Telegram Switch” after power voltage recovery”

This parameter will be used when enabling the logic function “input 0” to define the default value of the communication object “Switch, X” after power voltage recovery, which can be “0” or “1”. If selecting “not write”, the value “0” is written into the object “Telegram Switch” and remains until this value is changed via the bus. Options:

To write with 0

To write with 1

Parameter "Set the reply mode of switch status"

This parameter defines how to respond the current switch status to the bus. There are four options to select.Options:

no respond

respond， after read only

respond after change

respond always

If selecting "no respond", there is no telegram to send out for report the current switch status.

If selecting "respond, after read only", the status telegram will not be sent out until receiving a read request telegrams via the object "reply switch status" from the bus.

If selecting "respond after change", it will send the status immediately via the object "reply switch status" when there are any changes on the output.

If selecting "respond always", no matter it's reading or there is change for the status, as long as the controlling telegram can be received, the object will send the current status to the BUS.

Parameter "Object value of switch status :"

This parameter will be visible when "Set the reply mode of switch status" does not select"no respond". Options:

0=contact close; 1=contact open

0=contact open; 1=contact close

It means the contact of the relay will be closed when the value of the communication object "reply switch status" is 0 when setting "0=contact close; 1=contact open", while it is open when the value is "1".

It means the opposite with setting "0=contact open; 1=contact close".

Note: after programming or bus reset, all communication object values default to 0. In the case the last parameter is set to "respond after change", if the object "reply switch status, X"value is changed after bus reset or programming, it will send the status, if not change, no send.

Parameter "Contact position if tele. Value is '1'('0' is opposite of '1' if changed) "

This parameter defines the contact position when switch on the switch, which will be triggered by the communication object "switch, X". When enabling "input 0" in the logic function, it will use the communication object "switch, X" to modify the value of "input 0", rather than triggering the switch operation. In this case, this parameter is no significance to the switch. Similarly, it is still no significance when the time function is enabled. Options:

Open

Close

It will be off with “Open”, and on with “Close”.

When ending the operation, position will be reversed if it is changed after starting (for instant, selecting “open” or “close”), otherwise, it will remain the same.

Note: The parameter only works after the object “Switch x” receiving value, and defines the direction of the contact after receiving it. More details can be found in the below form:

Parameter options	“Switch, X” object value =1	“Switch, X” object value =0
Open	Contact open(OFF)	Contact close (ON)
close	Contact close (ON)	Contact open (OFF)

Since the switch, time and logic functions share the same object “switch, X”, thus need to understand the relationship between them, the control sequence shown below (the time and logic functions, please refer to the following chapter describe):

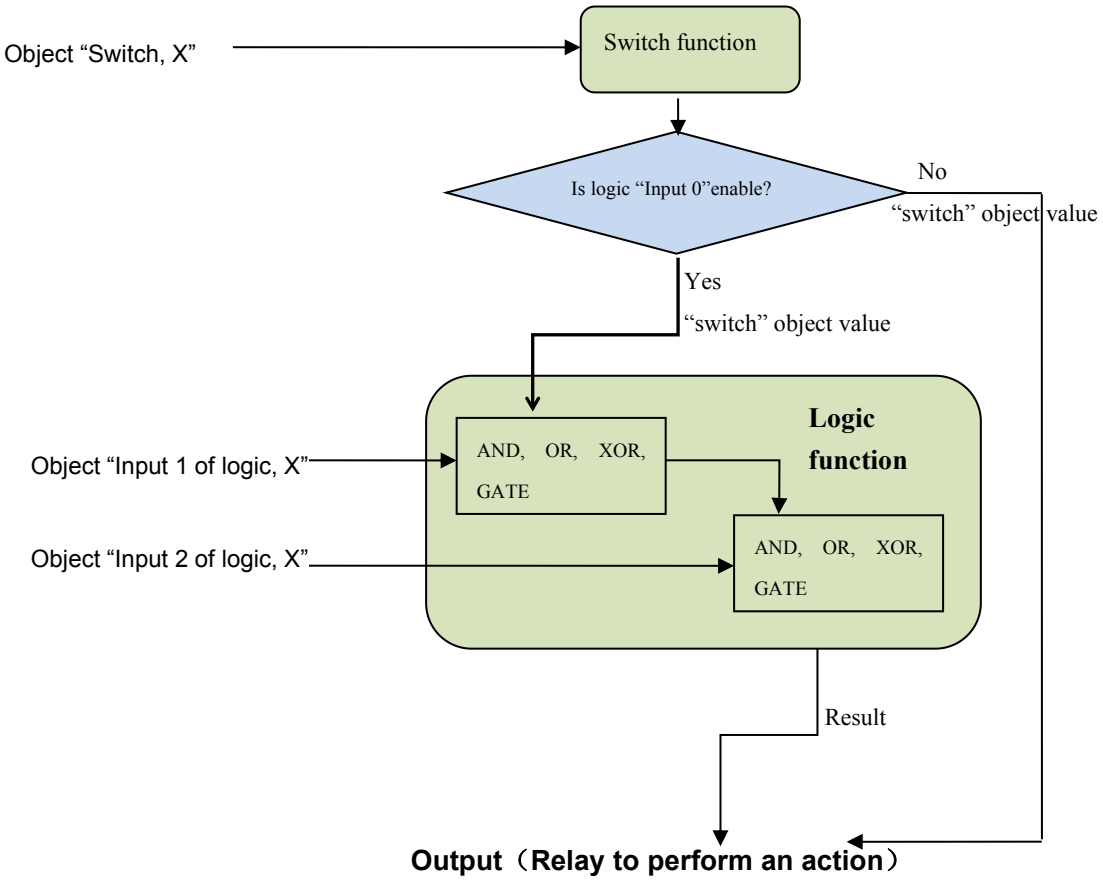


Fig. 5.15 switch and logical function diagram

When the logic function “input 0” enables, the object “switch, X” used as input of “input 0”, the operation of general switch will become invalid.

Parameter "Special functions of switch actuator mode"

This parameter defines whether enable the special functions of the switch actuator. The parameter window "X: Function" will be seen with "active", and able to set the special functions individually in Fig. 5.16. Enable or disable the special function in "X: Function".Options:

Active

Inactive

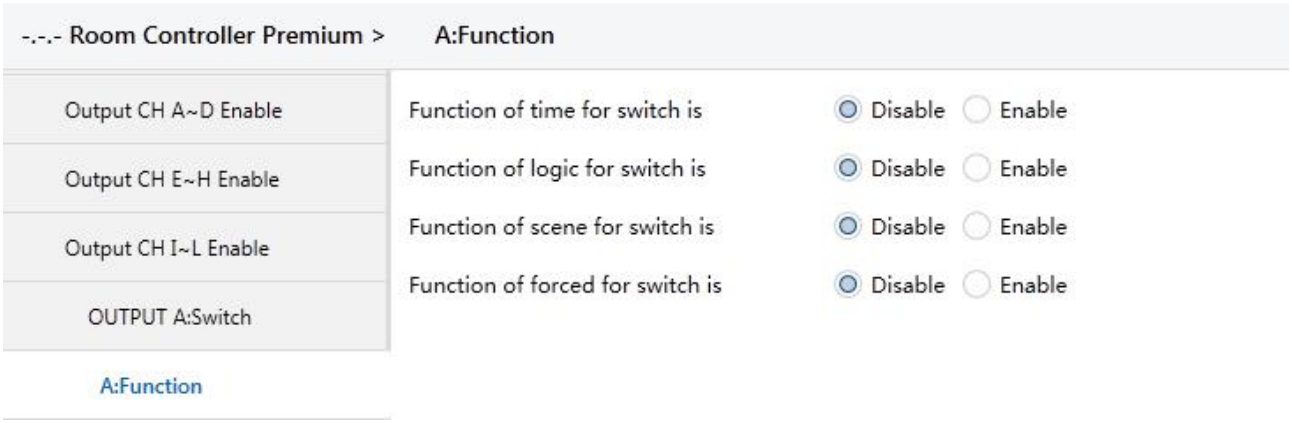


Fig. 5.16 the special function enable window "X:Function"

5.5.3 Parameter window "X: Time"

This parameter window(will become visible when selecting "enable" in the parameter "Function of "time" for switch is" for switch is" in the window "X:Function" shown in Fig. 5.16. See Fig. 5.17. And the object "enable time function" will be also visible, which is used to disable the time function. After disabled, previous operation is still carried out completely. Such as delay switch on, the function is disabled during delay, and then the switch is still switched on once the delay has been finished.

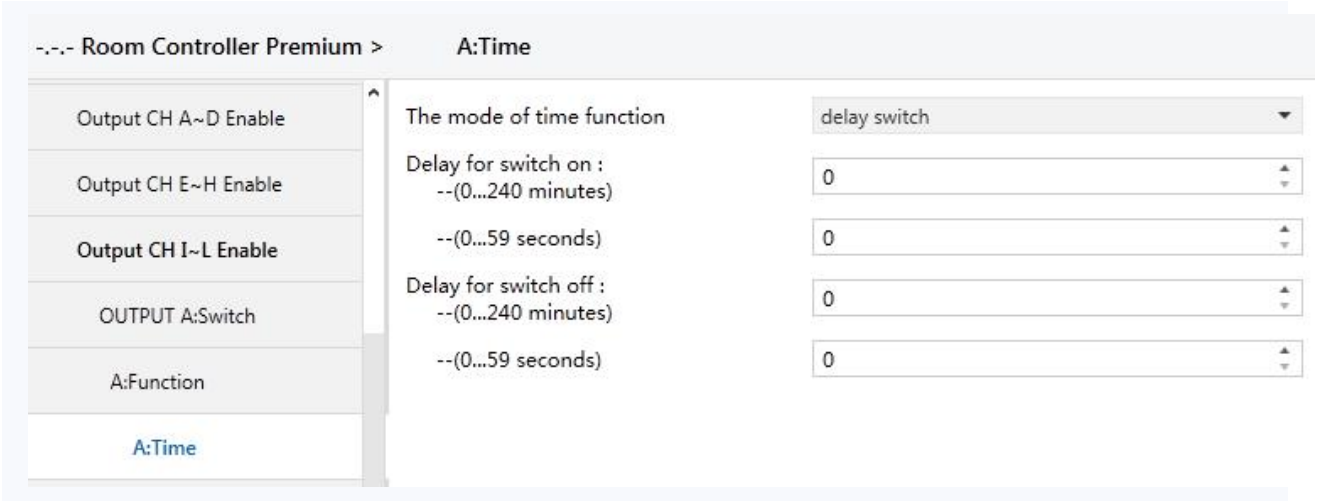


Fig. 5.17 parameter window "X: Time-Delay switch"

Parameter 'The mode of time function"

The parameter defines the mode of the time function, there are three options for the mode of work. Options：

Delay switch

Flashing switch

Staircase lighting

5.5.3.1 Selection "Delay switch"

The parameter window of the delay switch in Fig. 5.17 will be shown when selecting "Delay switch". The delay switch can be started via the object "switch, X", as shown in fig. 5.15.

Parameter "Delay for switching on: (0...240 minutes)/ (0...59 seconds)"

This parameter defines the delay time of switching on.Options:

0…240 min

0…59s

After receiving the relevant telegram, the switch is on once the delay over.

Parameter "Delay for switching off: (0...240 minutes) / (0...59 seconds)"

This parameter defines the delay time of switching off. Options:

0…240 minutes

0…59 seconds

After receiving the relevant telegram, the switch is off once the delay over.

If receiving the relevant telegram again during delay, the delay will be reset.

5.5.3.2 Selection "Flashing switch"

The parameter window in Fig. 5.18 "X: Time-flashing switch" will be shown up when selecting "flashing switch" in the parameter "The mode of time function". The flashing switch function is mainly used for lamp aging test.

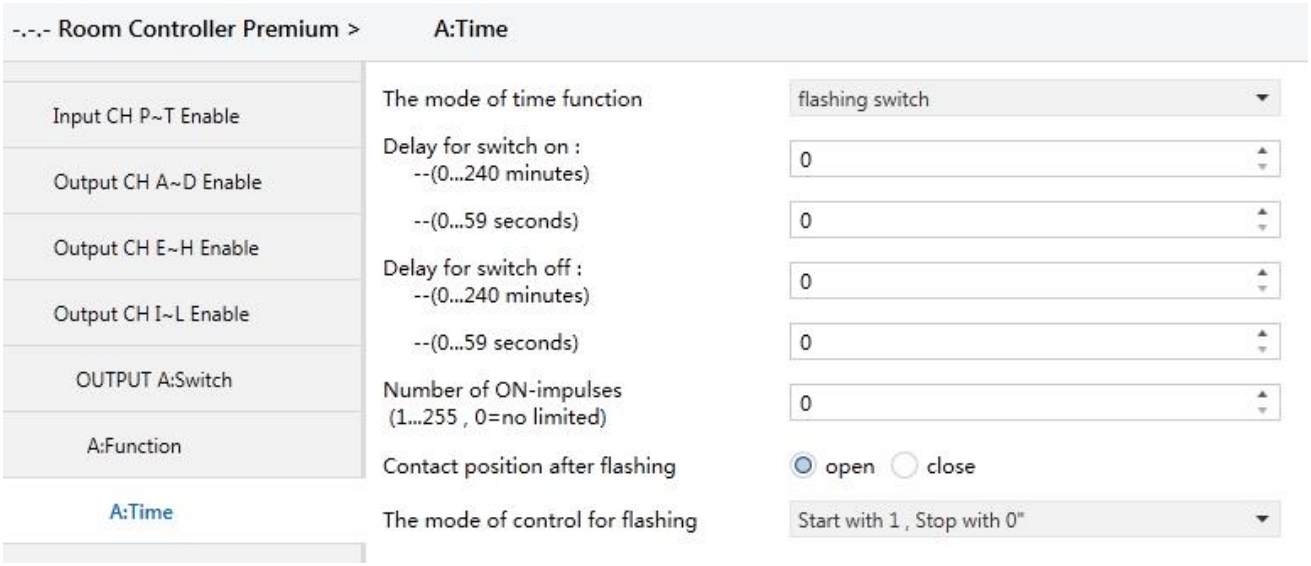


Fig. 5.18 parameter window “X: Time-flashing switch”

The flashing switch can be started via the object “switch, X”, as shown in fig. 5.10. It is able to set the flashing time in “Delay for switch on” or “Delay for switch off”, which will restart the flashing when receiving the relevant telegram, and define the contact position after flashing.

Parameter “Delay for switch ON: Min. (0...240), Sec. (0...59)”

The parameter defines the duration time of switch on the output when flashing.Options:

0...240 minutes

0...59 seconds

Note: it will not be executed unless the time is lower than the relay threshold switch frequency. Since there will be not sufficient energy to do it because of the frequent relay switching, and it may cause the time delay. The same situation will happen after the power voltage recovery.

Parameter “Delay for switch off: Min. (0...240), Sec. (0...59)”

The parameter defines the duration time of switch off the output when flashing. Options:

0...240 minutes

0...59 seconds

Note: it will not be executed unless the time is lower than the relay threshold switch frequency. Since there will be not sufficient energy to do it because of the frequent relay switching, and it may cause the time delay. The same situation will happen after the bus voltage recovery.

Parameter “Number of ON-impulses (1...255, 0=no limited)”

This parameter sets the flashing times.0 means no limited. A flashing includes an on and an off actions.Options:**0...255**

Parameter "Contact position after flashing"

This parameter defines the relay contact position after flashing. Options:

Open

Close

Parameter"The mode of control for flashing"

The parameter is used to select the control mode of the flashing output. Options:

Start with"1", stop with "0"

Start with "0", stop with "1"

Startwith "1/0", can not be stopped

It will start flashing with value "1" when selecting "star with "1", stop with "0" "; it will stop flashing with "0". The stop position is defined via last parameter.

It will start flashing with value "0" when selecting "star with "0", stop with "1" "; it will stop flashing with "1". The stop position is defined via last parameter.

It will start flashing with either "1" or "0" when selecting "star with "1/0", can not be stopped"; Under this circumstance it cannot terminate the flashing by value until operation over or it is blocked by other operation.

5.5.3.3 Selection "Staircase lighting"

The parameter window of the staircase lighting function in Fig. 5.19 will be visible when selecting "Staircase lighting" in the parameter "The mode of time function".

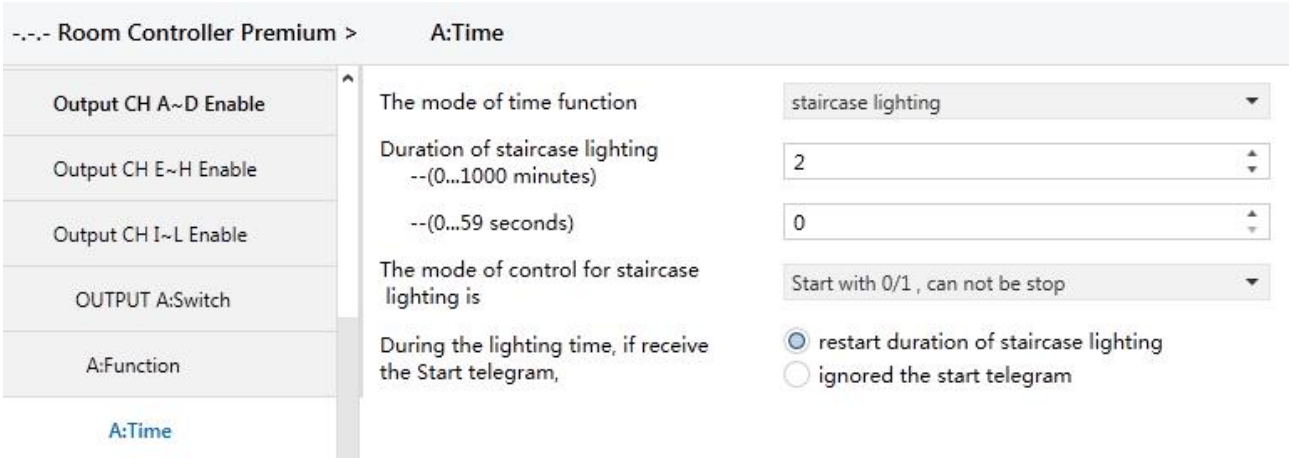


Fig. 5.19 parameter window "X: Time-staircase lighting"

The staircase lighting can be started via the object "switch, X". The value that switches on the staircase lighting can be set via a parameter. The duration time of the lighting on is also set via a parameter.

Parameter "Duration of staircase lighting--(0...1000 minutes) --(0...59 second)"

This parameter describes the duration time when switching on the staircase lighting. Options:

0…1000minutes

0…59seconds

Parameter "The mode of control for Staircase lighting is"

This parameter defines the control mode on/off of the staircase lighting.Choose suitable control mode according to the needs. Options:

Start with "1"，stop with "0"

Start with "1"，no action with "0"

Start with "0/1", cannot be stopped

Start with "1", Off with "0"

When selecting "Start with "1", stop with "0"", it will switch on the staircase lights with the value "1"; it will stop the time counting operation with "0" and don't change the contact position until changed by other operations.

When selecting "Start with "1", no action with "0"", it will switch on the staircase lights with the value "1" and no reaction with "0".

When selecting "Start with "0/1", cannot be stopped", it will switch on the staircase lights either with "0" or "1" but cannot stop it until the duration time finished or changed by other operation.

When selecting "Start with '1', off with '0'", it will switch on the staircase lights with the value "1", and off with "0".

Parameter "During the lighting time ,if receive the 'start' telegram"

Options：

Restart duration of staircase lighting

Ignored the "switch on" telegram

If selecting "Restart duration of staircase lighting", if the object "Staircase function, X" again receive the telegram of starting staircase lighting during the duration time, then the staircase lighting will restart and the duration time will be restart.

While it will ignore the control value during the duration time with "Ignored the "switch on" telegram".

If selecting "Ignored the 'switch on' telegram", then it will ignore the receiving telegram of the object "Staircase function, X" during the duration time.

5.5.4 Parameter window “X: Logic”

Parameter window of logic function will shown up in Fig. 5.16 “X: Function” when selecting “enable” in “Function of “logic” for switch is” in Fig. 5.20.

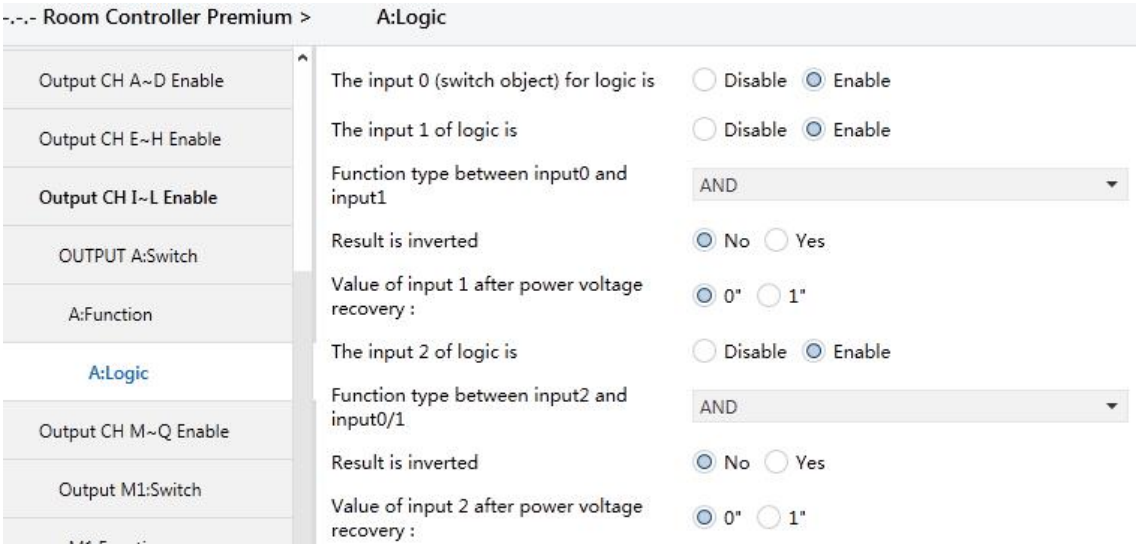


Fig. 5.20 parameter window “X: Logic”

There are 2 logic communication objects to decide the status of each output, which are related to the “Switch, X”, as shown in fig. 5.15

It will re-operate when receiving a new object value as the final output status (close the contact with “1”, open it with “0”). The values of the communication object “Input 1 of logic” makes logic operation with “Switch, X” firstly, and then the result after that will makes operations with the value of “Input 2 of logic”. This operation will ignore the objects which are unable, and continue to the next step with the ones who are enabled.

Parameter “The input 0 (switch object) for logic is”

This parameter is used to enable the function of logic operation of “input 0”, whose values are wrote by the object “Switch, X”. Options:

Disable

Enable

In the both cases of input 0 enabled and not enabled, there are not different parameters. All parameters of logic function have described in the following. If input0 is disabled, the parameters will be less. If there are not certain parameters in the case, then it is also not available with the function of these parameters.

Parameter “The input x of Logical” (x = 1, 2)”

This parameter is used to enable input1 and input 2. If enable, their communication objects “Input 1 of logic” and “Input 2 of logic” will be also visible. Options:

Disable

Enable

Parameter "Function type between input 0 and input 1/（input 2 and input 0/1）"

Explanation of gate function: it will use the next logic value as the enable mark of the previous logic. If the enable mark of the next logic is "1", that means it is able to use the previous logic value as the operation result. E.g. the value of input 1 is 1, that means the value of input 0 can be used as the operation result; if the value of input 2 is 1, that means the operation value of input 0/1 can be used as the result. Options:

AND

OR

XOR

Gate function

Below result of logic operation is possible:

Logic function	Object values					Description
	Input0 (Switch)	Input1	Result of Input0/1	Input2	Output	
AND	0 0 1 1	0 1 0 1	0 0 0 1	0 1 0 1	0 0 0 1	The result is 1 if both input values are 1.
OR	0 0 1 1	0 1 0 1	0 1 1 1	0 1 0 1	0 1 1 1	The result is 1 if one of both input values is 1.
XOR	0 0 1 1	0 1 0 1	0 1 1 0	0 1 0 1	0 0 1 1	The result is 1 if both input values have a different value.
GATE	0 0 1 1	Closed Open Closed Open	0 1	Closed Open Closed Open	0 1	The input0 of value is only allowed through if the GATE (input 1 and input 2) is open. Otherwise the input0 of value is ignored.

Note:

1. The values of the communication object "Input 1" makes logic operation with "Switch, X" firstly, and then the result will makes operations with the value of "Input 2", and the final operation result as the final output (close the contact with "1", open it with "0").

2. If an input is not enabled, this input is ignored.

3. If logic result needs to be negated, the first negated, then the next step.

4、GATE function is available only if input0 is enabled. The signal can be passed if the GATE is open, otherwise it is ignored. For example, the input 0 of value is ignored when the GATE of input1 is closed, and the output is directly determined by the input2 (input2 is not GATE).

Parameter "Result is inverted"

This parameter defines whether negate the logical operation results. Negate it with "yes", don't with "no". Options:

No

Yes

Parameter "Value of input 1 after power voltage recovery"

This parameter is visible if input 0 is disabled, which defines the default value of the object "Input X of logic1" after power voltage recovery. Options:

0

1

Parameter "Value of input 2 after power voltage recovery"

This parameter defines the default value of the communication object "Input x of logic 2" after bus voltage recovery, "1" or "0" is optional. Options:

0

1

5.5.5 Parameter window "X: Scene"

The parameter window shown in Fig. 5.16 will be visible when selecting "enable" in "Function of "scene" for switch is" in Fig. 5.21. Here can set 8 scenes.

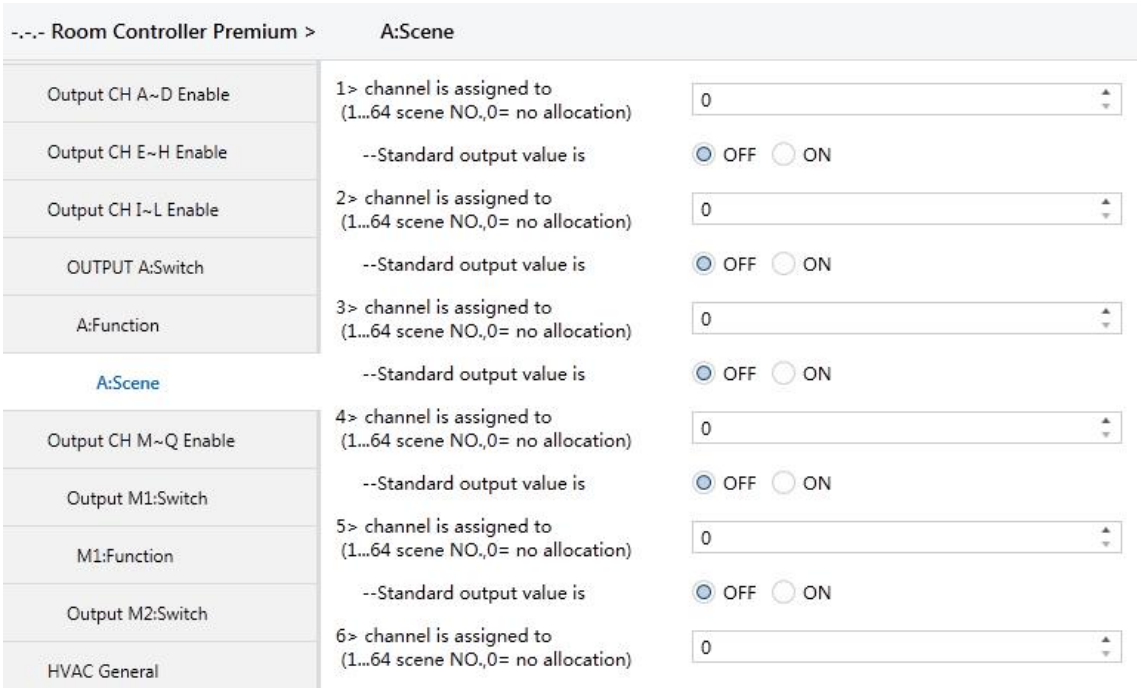


Fig. 5.21 parameter window "X:Scene"

Parameter "channel is assigned to (1...64 scene NO.,0= no allocation)"

It is able to allocate 64 different scene numbers to every output. There are 8 various scenes can be set per output. Options：**Scene 1... Scene 64, 0=no allocation**

Note: 1-64 in the parameter setup corresponds to the scene number 0-63 received by the communication object "Scene". If a scene is modified, the new scene will be stored when power off.

Parameter "--Standard output value is"

This parameter defines the switch output status when recall the scene. Options:

ON

OFF

5.5.6 Parameter window "X：Forced"

The window of the function "forced" in Fig. 5.16 "X: Function" will be visible with "enable" in the parameter "Function of "forced" for switch is" in Fig. 5.22.

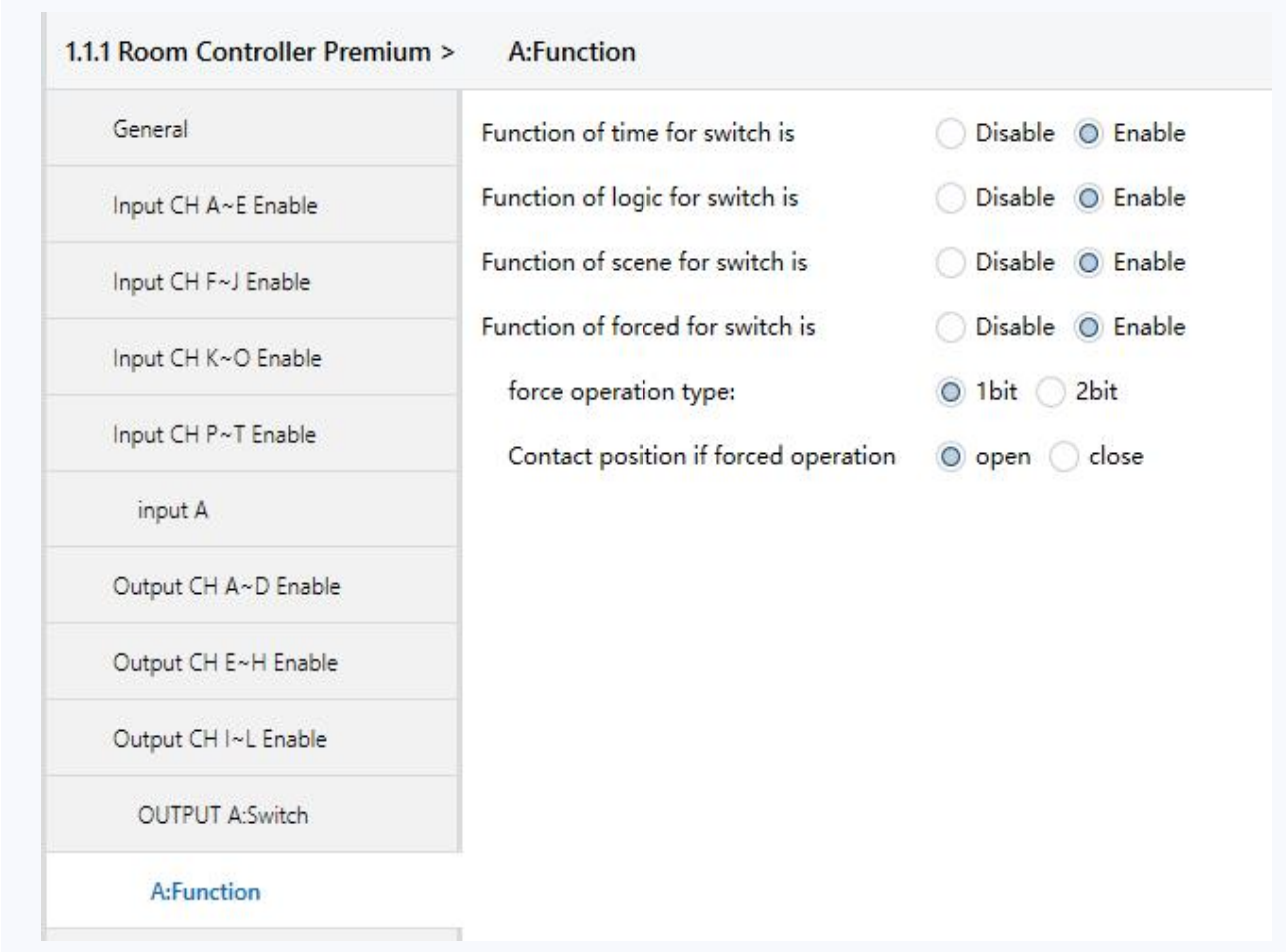


Fig. 5.22 parameter window "X: Forced"

This function will be used in some special situation such as emergency, and are activated by the object “Forced output, X” with the highest priority in the system, which means only “forced operation” are valid in this case.

Parameter “Force operation type”

The parameter defines the control type of force operation. Options:

1bit

2bit

If selecting“1bit”, object “Forced output, X” receives telegram “1” to activate force operation, telegram “0” to cancel the force operation.

If selecting“2bit”, when the object “Forced output, X” receives a telegram value, the action as follow:

Value of object “Foreced output，X”	**Action**
00b（0），01b（1）	Cancel force operation, other operation can be performed.
10b（2）	Force switch off
11b（3）	Force switch on

When cancel the forced operation, the position of relay contact is unchanged.

Parameter “Contact position if forced operation”

The parameter is visible if the option “1bit” is selected via last parameter, which defines the contact position of force operation. Option:

Open

Close

The forced operation has the highest priority, and all the other operations are ignored during the forced operation. If telegram of the time function is received during the forced operation, the time function will be performed after cancel the forced operation.

5.6 Shutter outputs（M~N）

There are 2 outputs. Each output can be set separately, and parameters and objects which are assigned to each output are the same. Using one of outputs as an example described.

5.6.1 Parameter window “Output CH X enable”

Parameter window “Output CH X enable” can be shown in fig.5.23. Here set whether enable the output X (X=M,N)of Shutter actuator.

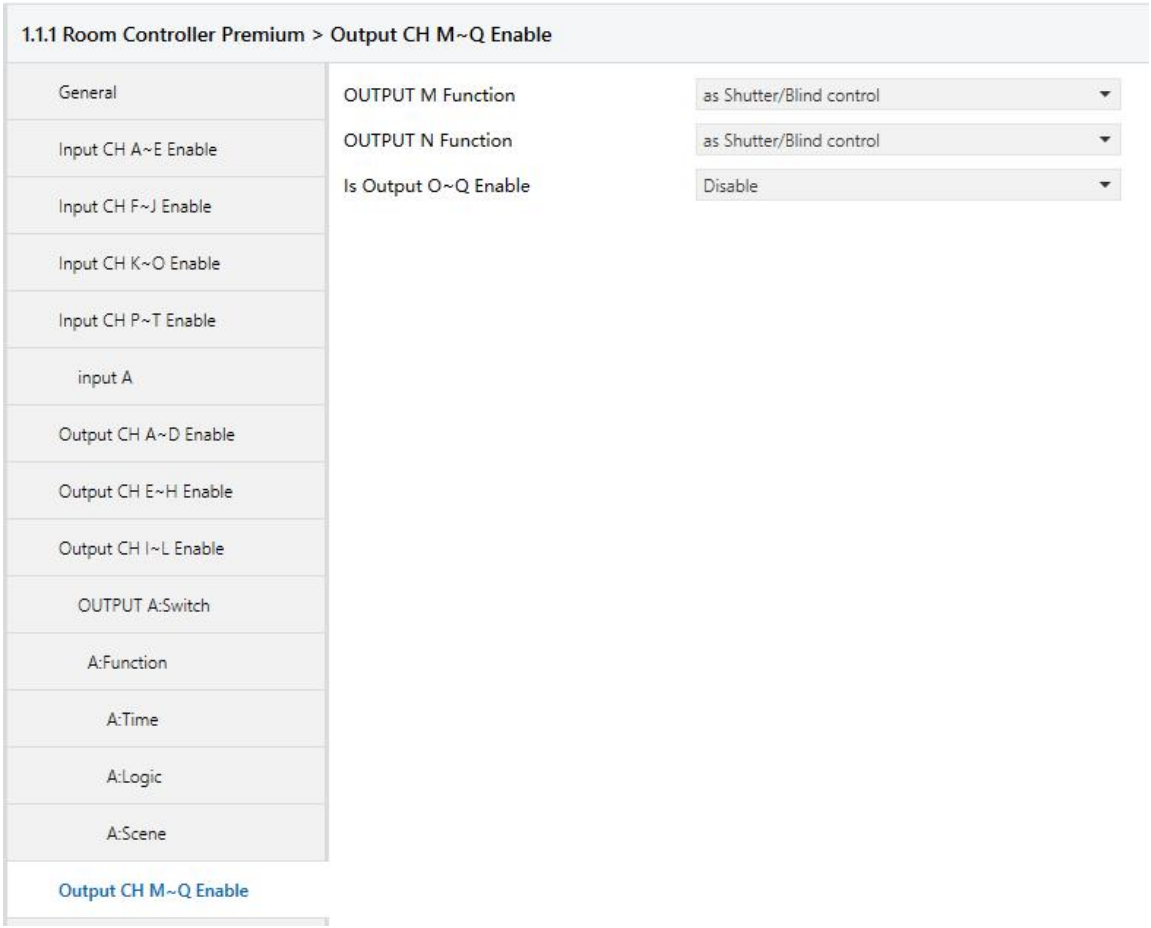


Fig.5.23 parameter window “Output CH M~N enable”

5.6.2 Parameter window “Output CH X- Shutter”

Parameter window “Shutter” can be shown in fig.5.24.

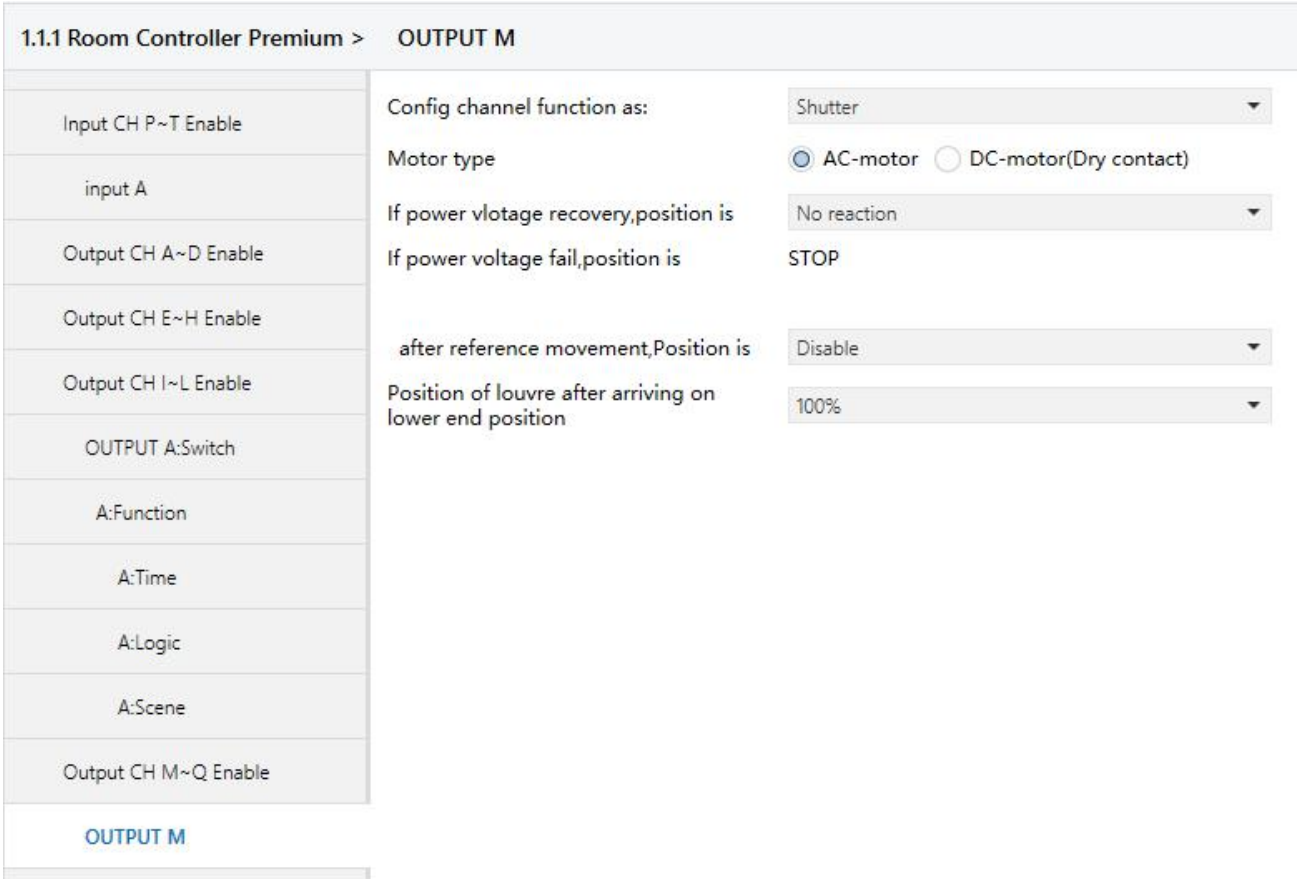


Fig. 5.24 parameter window “Shutter”

Parameter “Config channel function as:”

This parameter is used to define the output mode. Different output modes have different parameters and communications. Options:

No function

Shutter

Blinds

If selecting “No function”, the output is disabled.

If selecting “Shutter”, the output is for the Shutter operation mode, which can operate the curtain with louvres.

If selecting “Blind”, the output is similar with the Shutter operation mode, except that it cannot adjust louvres.

The section details the parameters and communication objects for the “Shutter” mode.

Parameter "Motor type"

This parameter is used to set the mode of shutter drive. Options:

AC-motor

DC-motor (Dry contact)

The option "AC-motor", is applied to driver of power.

The option "DC-motor (Dry contact)", is applied to driver of dry contact control.

Parameter "If power voltage recovery, position is"

The parameter is used to set the position where shutter moves, after the output on power voltage recovery or programming. Options:

No reaction

Up

Down

If the option "no reaction" is set, the output contacts remain in their current position. If the option "up" is set, the Shutter is moved to the top after power voltage recovery. If the option "down" is set, the Shutter is moved to the bottom after power voltage recovery.

All the communication objects adopt the value "0" after programming or power voltage recovery.

Note: If the option "no reaction" has been set the position after programming or power voltage recovery, the Shutter actuator does not detect the current position of the Shutter. The communication objects "Shutter position [0…100%]" and "Louvre position [0…100%]" have the default value "130" and are not sent on the bus.

If after programming or power voltage recovery a defined position of the Shutter is required for the first time, it is first of all raised to the top or dropped to the bottom (toward near the target location moving) to determine the current position and then into the target position. Only the Shutter finish a full running can confirm position.

Parameter "If power voltage fail, position is"

The parameter note that the shutter is stop running and the position status is not saved when the power voltage fail.

Parameter "After reference movement, Position is"

This parameter specifies how the Shutter actuator behaves after a reference movement. Options:

Disable

No reaction

Move to save position

If the option “Disable” is selected, the reference movement is deactivated, other option is selected, and the communication object “reference movement” appears. If the option “No reaction” is selected, the object receives a telegram “0”, the Shutter is moved to the top; the object receives a telegram “1”, the Shutter is moved to the bottom. If the option “move to save position” is selected, the object receives a telegram “0”, the Shutter is moved to the top, then back to its original position; the object receives a telegram “1”, the Shutter is moved to the bottom, then back to its original position.

The Shutter actuator continually determines the current position of the Shutter as well as the angle position of the louver using the duration of individual movements. Over longer periods, slight inaccuracies may occur when determining the position due to temperature variations and aging processes. Therefore the Shutter actuator uses the upper and lower limit positions to clearly define the current position of the Shutter. Each time that the Shutter is in the upper or lower limit position, the position is updated in the memory of the Shutter actuator.

If the limit positions have not been reached during normal operation, a reference movement can be triggered via a bus telegram to move the Shutter right to the top or right to the bottom. Depending on the parameter settings, the Shutter either remains in the reference position after the reference movement or moves back into the saved position.

Parameter “Position of louver after arriving on lower end position”

The parameter can set the slat positions of louver after the lower end position is reached. Options:

0%/10%/…/90%/100%

For example, if select “40%”, when the object “Shutter UP/DOWN” receives a telegram “1”, the shutter will move to the lower end position, then the slat positions are adjusted to 40%.

Note: the parameter relates to the reaction of the shutter, if the motion has been triggered via the communication object “Shutter UP/DOWN” or by the Automatic function, and the reaction after bus voltage recovery. Other trigger ways is not affected for the parameter.

5.6.2.1 Parameter window “Shutter: Drive”

Parameter window “Shutter: Drive” is shown in fig. 5.25. Here set the relevant parameters with the Shutter drive. The current position of the Shutter can be usually calculated based on the total move time. The duration of louver adjustment and total move time of louver can calculate the current position of louver. The technical data and running time are different for different Shutter. It is therefore important to know its technical data and running time before using the Shutter. It is the only way that the relevant parameters can be set precisely for the Shutter actuator.

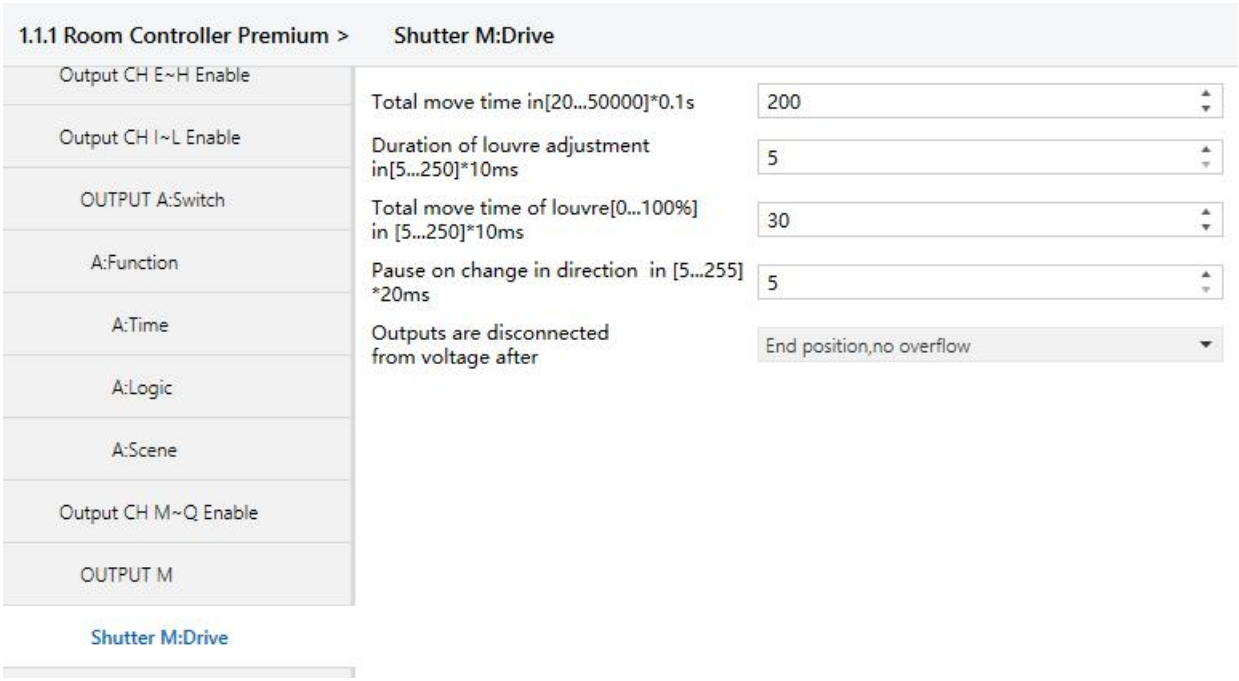
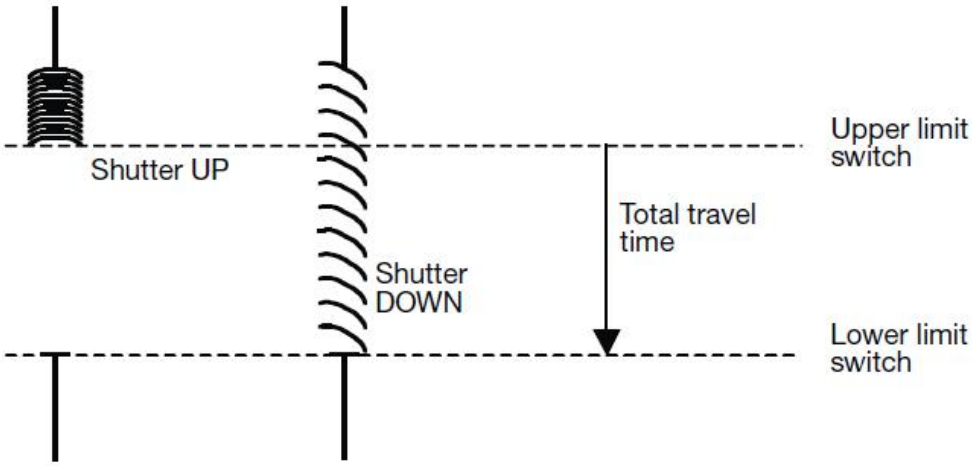


Fig. 5.25 parameter window “Shutter: Drive”

Parameter “Total move time in [20...50000]*0.1s”

The parameter is used for setting the total move time in seconds.

The total move time is the period that the Shutter requires to travel from the upper limit position to the lower limit position (see following Diagram). If the Shutter actuator receives an UP or DOWN movement command, the corresponding output is switched and the Shutter is moved in this direction until the Shutter actuator receives a STOP command, or until the upper or lower limit position has been reached and then the motor is switched off via the limit switch. If the Shutter is switch off via the limit switch, the corresponding output contact of the Shutter actuator remains closed until the set total move time has elapsed plus the parameterized overflow time (see parameter “outputs are disconnected from voltage after” description), only then the output contact reverts to neutral position.

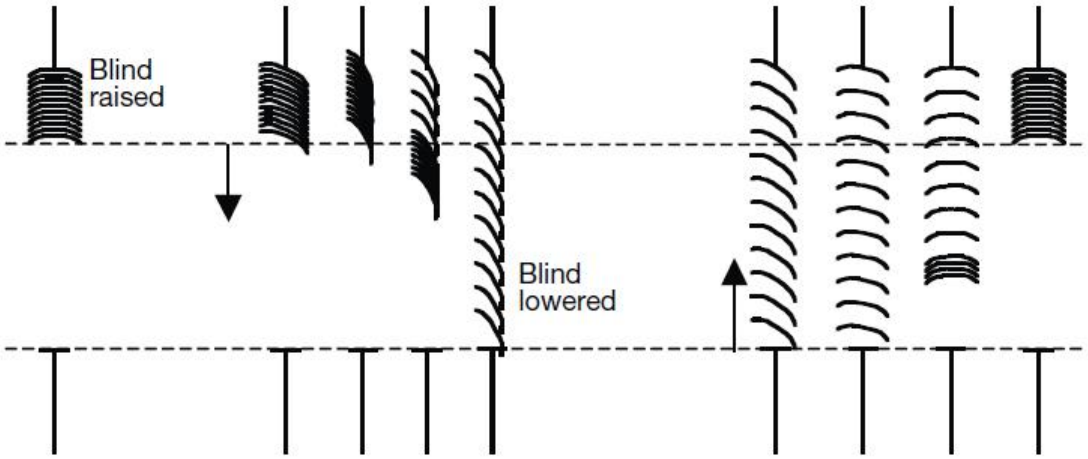


Note: The current position of the Shutter during operation can also be determined with the help of the total move time. It is therefore important to measure and set the total move time as accurately as possible, particularly if the functions "Move to position via a 1byte value" and "Status response" are used. Only then is it possible to calculate the current position of the Shutter precisely.

Parameter "duration of louver adjustments [10…250]*10ms"

The parameter is used for setting the duration of louver adjustment in milliseconds. The shorter the time, the more precise angle adjustment of slats.

After an upward movement of the Shutter, the louvers normally are open (horizontal louver position). If the Shutter is now lowered, the louvers are closed first of all (vertical louver position) and the Shutter moves downwards. If the Shutter is now raised again, the louvers are opened again first (horizontal louver position) and then raised. (See following Diagram)



Parameter "Total move time of louver [0…100%] in [5…250]*10ms"

The parameter is used for setting the total move time of louver adjustments from fully closed to fully open. It determines the current position of the louvers during operation. It is therefore important

to measure and set the total move time of louver as accurately as possible, particularly if the functions “adjust to position via a 1byte value” and “Status response” are used. Only then is it possible to calculate the current position of the louver precisely.

The parameter is used together with above parameter. The max. number of louver adjustment that the louvers is adjusted from fully closed to fully open is divide the total move time of louver by the duration of louver adjustment.

Parameter “pause on change in direction in [0…255]*20ms”

The parameter is used for setting the pause on change in direction in milliseconds. The technical data supplied by the drive manufacturer must be taken into account, to enter a suitable value in the parameter. The function can prevent the motor to damage on change suddenly in direction, and extend the service life of the motor.

Parameter “outputs are disconnected from voltage after”

This parameter is used to set the output off delay time. Options:

End position, no overflow

End position + 2% overflow

End position + 5% overflow

End position + 10% overflow

End position + 20% overflow

Total travel time + 10% overflow

If selecting “End position, no overflow”, the output is disconnected from voltage without delay, i.e. when the total move time has elapsed, the output is disconnected immediately.

If selecting “End position +2%/…/20% overflow”, when the Shutter reach the end position (completely up or completely down), the output is disconnected after a delay time (the delay time=2%/…/20%×the total move time). If the end position does not reach completely up or completely down, the output will be disconnected without delay. Other case is, after reached the end position the output also has a delay time, and then turned to move to the target location.

Note: The end position here refers to the position of shutter and blinds are in 0% or 100%, just go to this end position, there will be delay.

If selecting “Total travel time + 10% overflow”, the time that the Shutter is moved from the top to the bottom is for the total move time plus the overflow time (the overflow time=10%×the total move time). When the time has elapsed, the output is disconnected immediately. Regardless of whether the Shutter reaches the top or the bottom, the time will affect the entire movement.

5.6.2.2 Parameter window “Shutter: Status response”

Parameter window “Shutter: Status response” is shown in fig. 5.26. Here set status response, to know and query the current position of shutter and the current operation status etc.

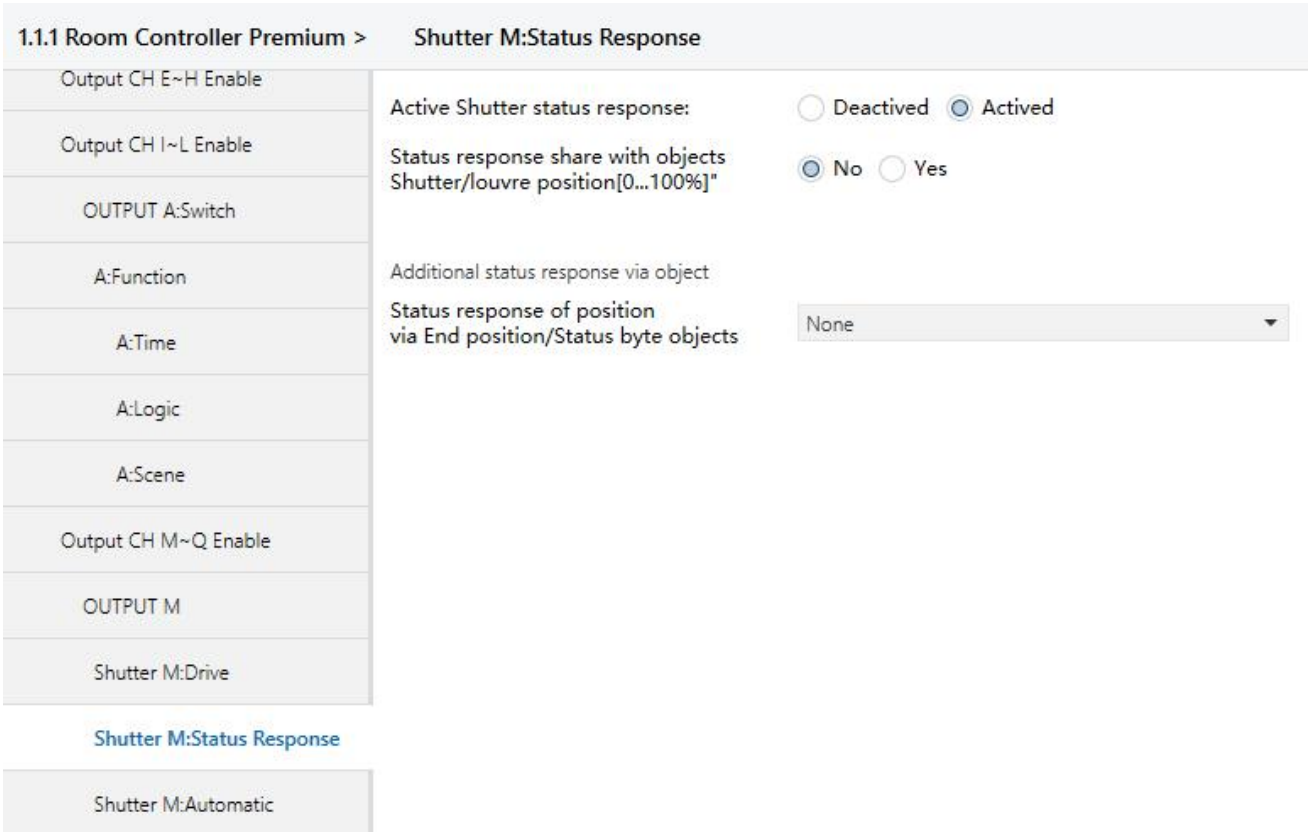


Fig.5.26 Parameter window“Shutter：Status response”

Parameter“Active Shutter status response”

The parameter defines whether enable status response of shutter. Options:

Actived

Inactive

If select "Actived", the following parameters will be visible.

Parameter “Status response share with objects Shutter/louvre position [0…255]’”

The parameter defines whether the communication object “Shutter position [0…100%]/Louvre position [0…100%]”sends a status response. Options:

Yes

No

If select“No”, the shutter actuator will not send the current shutter position to the bus;

If select“Yes”, the following parameter“Set response mode for position”appears;

Parameter"Set response mode for position"

The parameter defines the response mode for shutter position. Options:

no respond

Respond, after read only

Respond after change

Respond always

If selecting "no respond", there is no telegram to send out for report the current shutter position.

IF select"Respond, after read only",only when the device receive the current shutter position from other bus devices or the bus read the current shutter position,object "Shutter position[0…100%]/Louvre position[0…100%]"send the information of shutter position to the bus.

IF select"Respond after change", when the shutter position changes, object "Shutter position[0…100%]/Louver position[0…100%]"send the telegram to the bus,so as to report the shutter position.

If selecting "Respond always", when the shutter position changes or the device receive the request of reading the current shutter position,object "Shutter position[0…100%]/Louvre position[0…100%]"send the telegram to the bus,so as to report the shutter position.

Note: under the mode of status feedback, object "Shutter position[0…100%]" and "Louver position [0…100%]" can be used as status feedback and adjust the position of shutter.If the status feedback not selected,so both objects is only used for adjust the position of shutter.

Parameter "Status response of position via End position/Status byte objects"

The parameter defines whether the communication object "End position (Upper/Lower)/Status byte"sends a status response. Options:

None

End position

Status byte

If select"none", there is no feedback.

If select"End position", the communication objects"End position (Upper)"and"End position (Lower)"are enabled. These indicate that the shutter is in the upper or lower position (measured based on total movement time).

If select"Status byte", the communication objects"Status byte"is enabled. The information is provided in coded format in a 1byte value, see table below:

Object “Status byte”								
Data bits	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Functions	Not used	Not used	Not used	Safety	Automatic	Sun	Upper end position	Lower end position
Values	0	0	0	0:inactive 1:active	0:inactive 1:active	0:inactive 1:active	0:inactive 1:active	0:inactive 1:active

Note:

Special coding for Bit1 and Bit0:

00——Shutter between upper and lower end position

01——lower end position

10——upper end position

11——Shutter position undefined

Parameter“Response mode for position”

The parameter is visible if the above parameter “Status response of position via ‘End position/Status byte’ objects” is not “none”, which defines the response mode for end position or operation status. Options:

no respond

respond, after read only

respond after change

respond always

If select “no respond”, the status is no feedback;

If select “respond, after read only”, the status is sent after a request;

If select “respond after change”, the status is sent after a change.

If select “respond always”, the status is sent after a change or a request.

5.6.2.3 Parameter window “Shutter: Automatic”

The Parameter window “Shutter: Automatic” is shown in fig.5.23. Here can set the automatic sun protection operation. Depending on the strength of induction light for the brightness sensor, the Shutter actuator moves the shutter/blind into a set position. For example, the shutter/blind can be raised if the sun is very weak or is not shining on the window at all. As much light as possible is thereby let into the room. If there is blazing sun on the window, the shutter/blind can be lowered and the louvers can be adjusted to the extent that direct sunlight cannot penetrate the room. Meanwhile, the residual opening in the shutter lets in a sufficient level of diffuse light into the room.

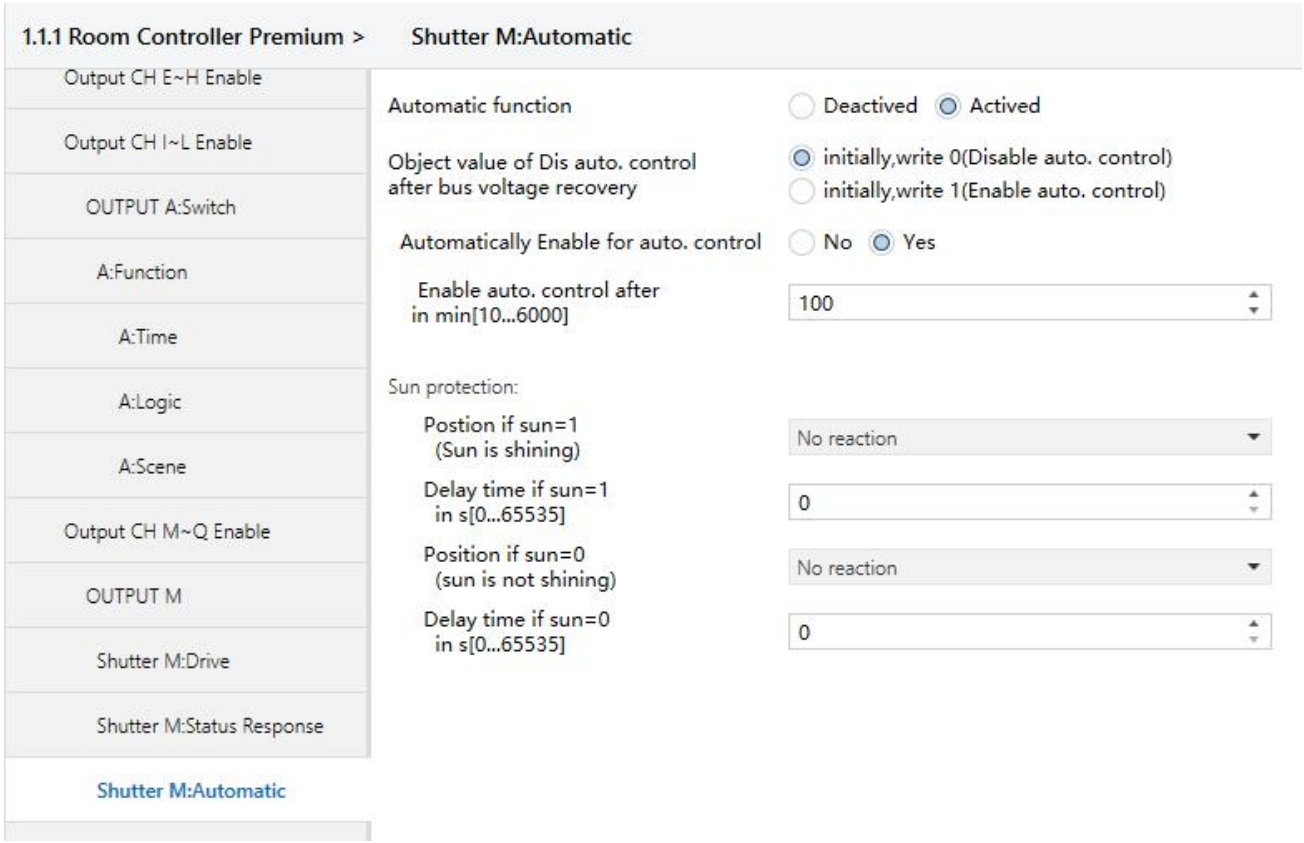


Fig.5.27Parameter window“Shutter：Automatic”

Parameter “Automatic function”

The parameter is used to set whether the Auto. Control operation is activated, i.e. the Automatic sun protection function. Options:

Actived

Deactived

If the option “Activated” is selected, the following three parameters will be visible.The communication objects “Dis. Auto. Control”, “Sun operation”, “Sun: Shutter position [0…100%]” and “Sun: Louver adj. [0…100%]” also will be visible.

When the object “Dis. Auto. Control” receives a telegram “1”, the Auto. Operation is activated. When the object “Dis. Auto. Control” receives a telegram “0” or the user sends a direct movement command (e.g. UP/DOWN, move to position etc.), the Auto. Operation is deactivated. If the command is not belong to the direct movement command (e.g. store scene etc.), the Auto. Operation is still activated.

The priority of direct operation and automatic operation is the same, but they cannot occur at the same time.

Note: After the automatic operation is deactivated, only when the object "Dis. Auto. Control" receives a telegram "1"or the set time for the direct operation to automatic has elapsed (see parameter "Enable auto. Control after in min [10…6000]"), it can be activated again.

Parameter"Object value of'Dis. auto. Control after bus voltage recovery"

The parameter defines the initial value of the communication object "Dis. Auto. Control" after bus voltage recovery. Options:

Initially, write "0" (disable auto. control)

Initially, write "1" (enable auto. control)

If select "Initially, write '0'", the initial value is 0, indicate that the auto. Operation is deactivated after bus voltage recovery.

If select "Initially, write '1'", the initial value is 1, indicate that the auto. Operation is activated after bus voltage recovery.

Parameter"Automatically Enable for auto. control"

The parameter defines whether the auto. Operation can be automatically reactivated after it has been deactivated for the direct operation or the object "Dis. Auto. Control". Options:

No

Yes

Select "Yes",the following parameter appears:

Parameter 'Enable auto. Control after in min [10…6000]"

Using the parameter, the duration for the automatic reactivation of the automatic Operation is defined. I.e. after the automatic operation has been deactivated for the direct operation or the object "Dis. Auto. Control", it can be automatically reactivated when the set time has elapsed.

If the automatic operation is interrupted during the set time by a direct operation or object "En. / Dis. Auto. Control", the time will re-timing.

Note: the safety operations have the higher priority. It is therefore the automatic operation can be not activated automatically if the safety operation is active. The duration time will be begun to time until the safety operation is cancelled.

Parameter"Sun protection:"

-- Parameter"Position if sun= '1' (Sun is shining) "

This parameter is used to set the position that the shutter is moved into when there is blazing sun, i.e. when the object "Sun operation" receives a telegram "1", the shutter is moved into the position. Options:

No reaction

Up

Down

Stop

Receive 1 byte value

If the option "no reaction" is set, the output contacts remain in their current position when the object "Sun operation" receives a telegram "1".

If the option "receive 1 byte value" is set, when the object "Sun operation" receives a telegram "1", the position depending on the values that the objects "Sun: Louvre adj.[0…100%]" and "Sun: Shutter position [0…100%]" received. After programming or bus voltage recovery, the two objects values are uncertain, and then their values are "130" by default. Only when the two objects receive the values, the position is confirmed. In any operating status, the values that the two objects receive can be stored, including the safety operation of the higher priority.

-- Parameter"Delay time if sun= '1' in s [0…65535]"

This parameter defines the delay time, i.e. the time that the Shutter actuator delays executing action when the object "Sun operation" received a telegram "1". Mainly to prevent component damage or affect the motor life due to light frequent fluctuations lead to the Shutter actuator frequent action. Option: **0…65535 s**

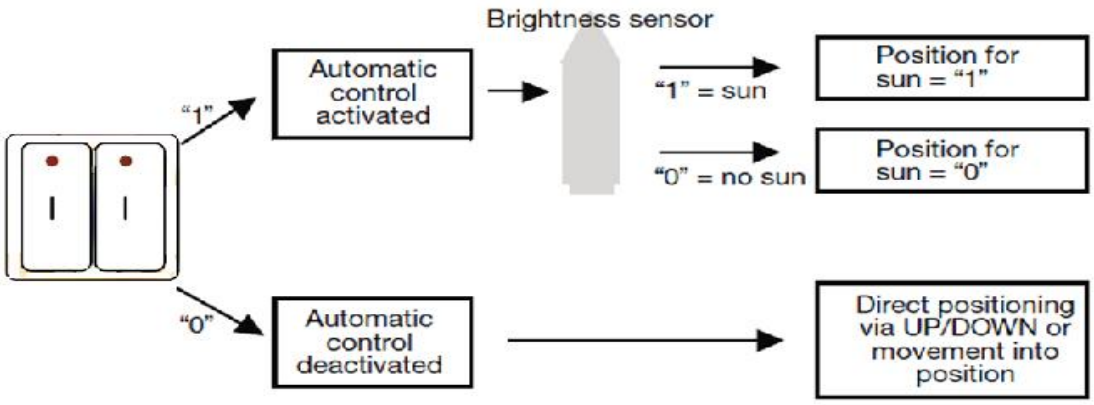
-- Parameter"Position if sun= '0' (Sun is not shining) "

This parameter is similar with last parameter. The difference is that here defined the position that the shutter is moved into when the object "Sun operation" receives a telegram "0".

-- Parameter "Delay time if sun= '0' in s [0…65535]"

This parameter defines the delay time, i.e. the time that the Shutter actuator delays executing action when the object "Sun operation" received a telegram "0". Mainly to prevent component damage or affect the motor life due to light frequent fluctuations lead to the Shutter actuator frequent action. Option: **0…65535 s**

The follow is a simple automatic sun protection system:



The brightness sensor is used to sense the light intensity. The push button can be connected with the universal interface or substitute for other switch sensor on the bus.

With the help of the second switch sensor, the user can specify whether to enable the automatic sun protection or to control the shutters/blinds manually. If the automatic sun protection is activated via a switch sensor, the shutter/blind moves automatically until either the automatic sun protection is deactivated via the same switch sensor or the user sends a direct movement command and the automatic function is thus also deactivated.

The Shutter actuator receives the information via the brightness sensor as to whether there is direct sunlight on the window. Once the delay period has elapsed, the Shutter actuator positions the shutter/blind according to the set Position for sun= “1” (sun) or Position for sun= “0” (no sun).

5.6.2.4 Parameter window “Shutter: Scene”

The Parameter window“Shutter: Scene” is shown in fig.5.28. Here can set 8 scenes for per output.

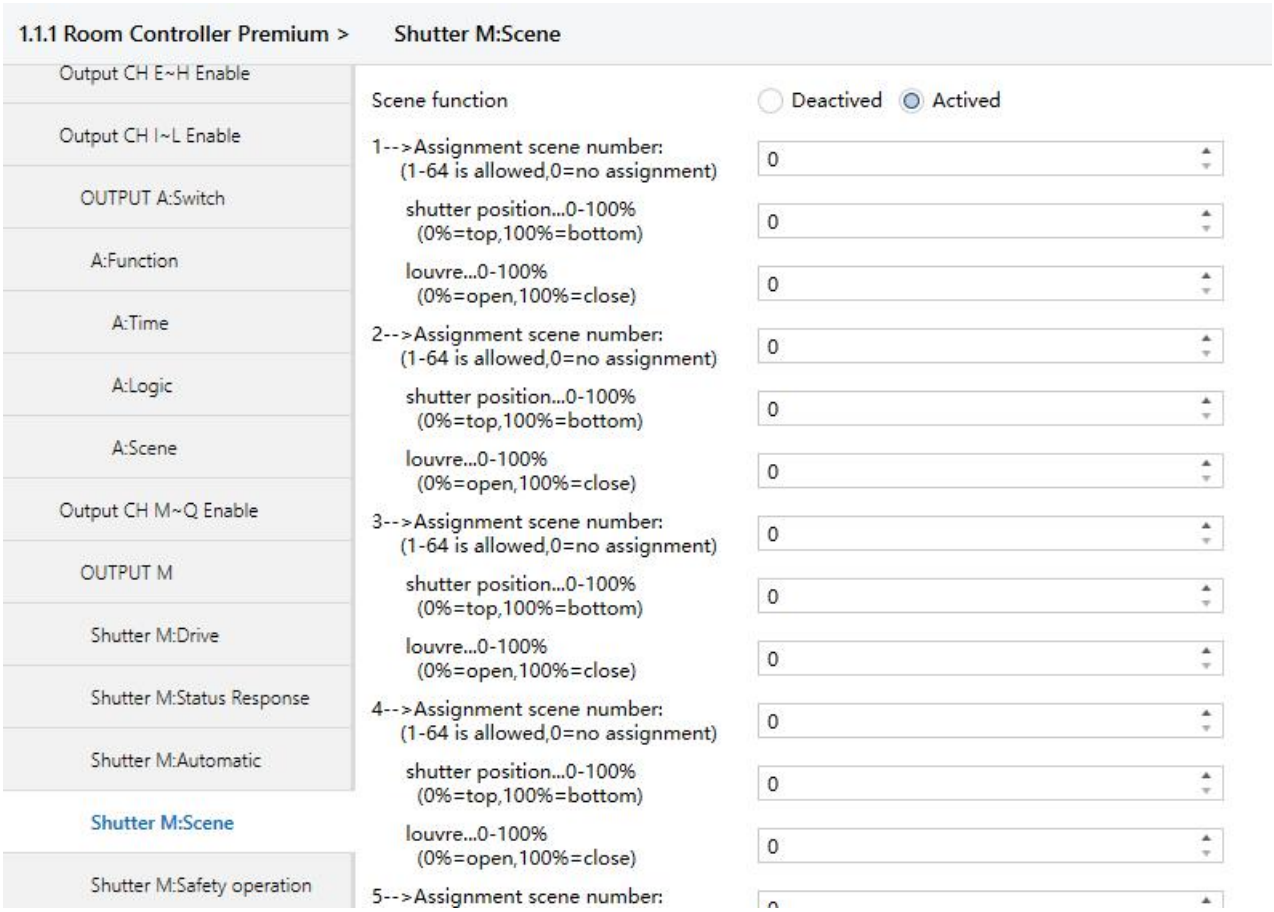


Fig. 5.28Parameter window “Shutter：Scene”

Parameter “Assignment Scene NO. (1...64 , 0= no allocation)”

There are 8 various scenes can be set for per output. It is able to allocate 64 different scene numbers for per scene. Options: **Scene 1... Scene 64 , 0=no allocation**

Note: 1-64 in the parameter setting corresponds to the telegram 0-63 received. On power voltage failure, the modified scene value is not stored.

Parameter “Shutter position 0...100%(0%=top,100%=bottom)”

This parameter is used to set the preset position of Shutter for a scene:**0…100%,0%=top, 100%=bottom**

Parameter “Louvers 0...100%(0%=opened,100%=closed)”

This parameter is used to set the preset position of louvers for a scene:**0…100%,0%=opened, 100%=closed**

5.6.2.5 Parameter window “Shutter: Safety operation”

The Parameter window “Shutter: Safety operation” is shown in fig.5.29. Here can set safety operation of shutter actuator.

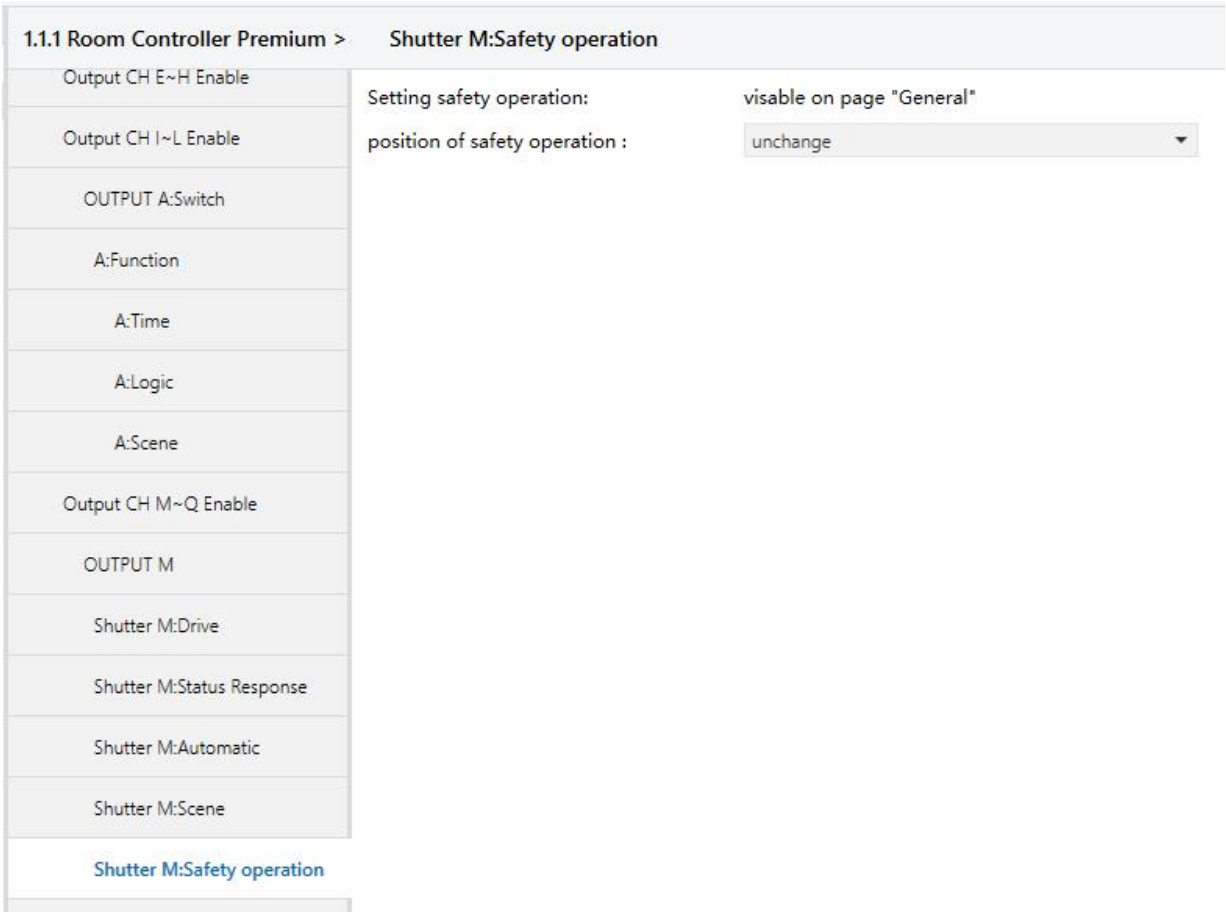


Fig.5.29 Parameter window “Shutter：Safety operation”

Enable “Safety operation” in the Parameter window “General”, which define the action that the shutter should be carried out when the safety operation is triggered of every channel. Every channel is independent and non-influential from each other.

Parameter “Position of safety operation ”

It defines the shutter action after triggering “Safety operation x” (x=1, 2). Options:

Unchanged

Up

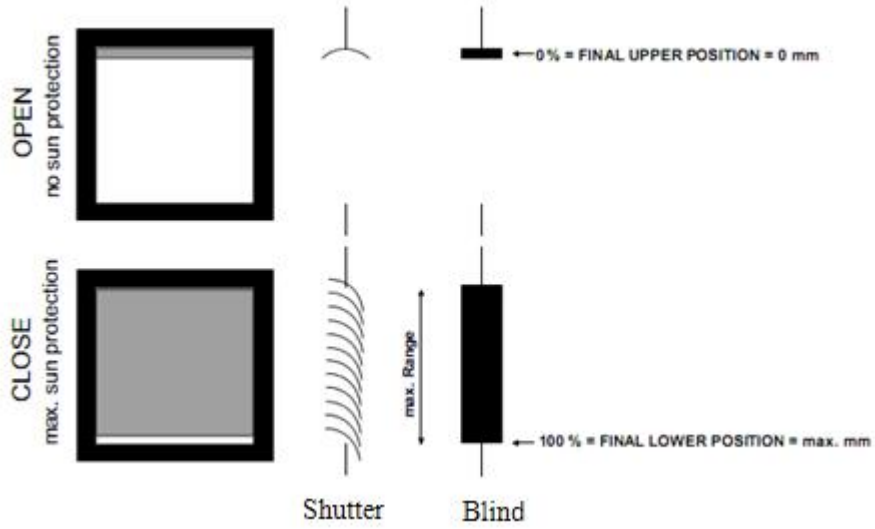
Down

Stop

5.6.3 Parameter window “Output CH X- Blind”

The “Blind” operation mode is similar with the “Shutter” operation mode in the parameters and the objects, and their function is also almost the same. The only difference is that there is no louver adjustment function in the “Blind” operating mode.

“Shutter” and “Blind” difference as shown:



The functions described for the “Shutter” operating mode also apply to the “Blind” operating mode (with the exception of the louver adjustment function).

5.6.4 Parameter window “Switch”

When the output M.N is used as switch output, it can be set as 4-fold switch output. Parameter window is as follows, The parameter and the functions of the output M1 and M2 is the same with the switch output in Chapter5.5; The only difference in the channel parameter between the output of M1,M2 and the switch is that the former don not have the logic function.

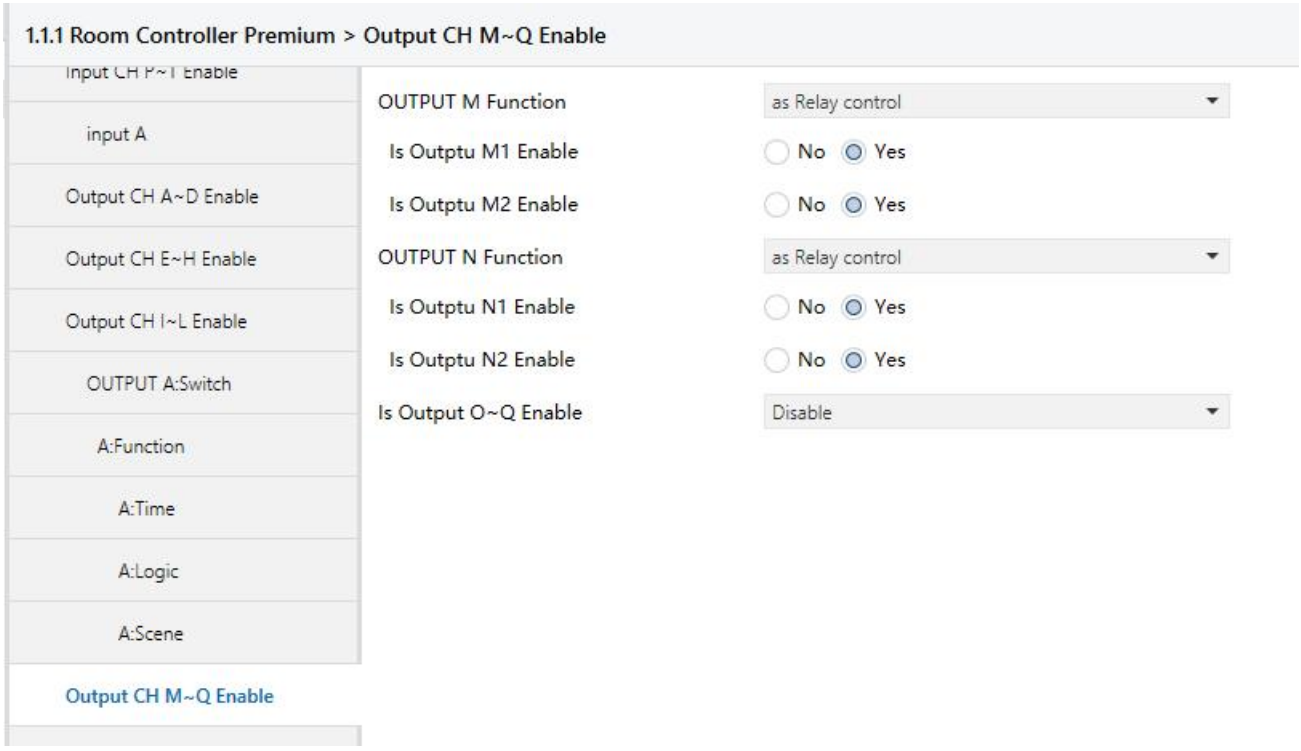


Fig.5.30Parameter window “Switch- outputs M1,M2,N1,N2”

5.7 Fan speed control (O~Q)

Fan coil controller includes fan speed control and HVAC system control, the fan speeds can be controlled by three outputs (O, P, and Q), the output O – lower fan speed, the output P – middle fan speed, the output Q – high fan speed. If these outputs are not as fan speeds control, they can be served as switch output and the functions of switch output are similar to the chapter 5.5 except for some functions deletion.

The chapter introduces the fan speed control and instruction of switch output functions deletion. The HVAC system control will be described in the follow chapter.

5.7.1 Parameter window “Output CH X enable”

The Parameter window “Output CH X enable” is shown in fig.5.26. Here can set whether enable the fan speed control or switch output.

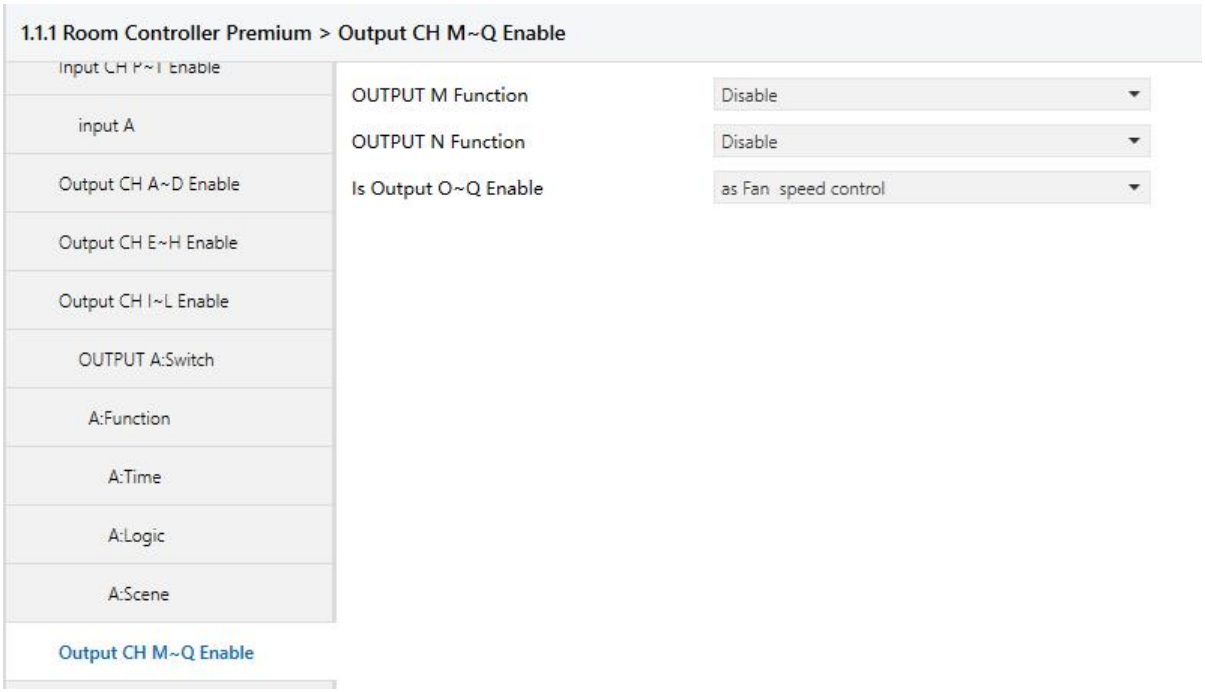


Fig.5.31Parameter windows “Output CH O~Q enable”

5.7.2 Parameter window “Fan-one level”

The Parameter window of fan speed control is shown in fig.5.27. The fan speed of 1, 2 and 3, where 1 level is the output O, 2 levels are the output O and P, 3 levels are the output O, P, Q. The section will describe the parameter settings of one level fan speed, as follow:

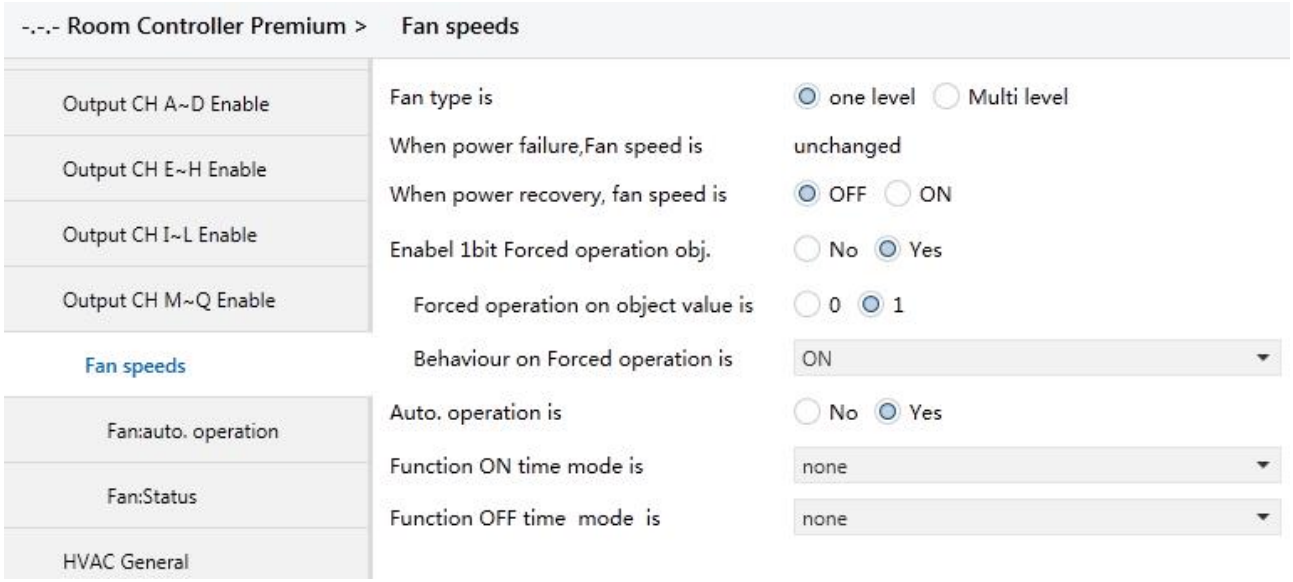


Fig.5.32 Parameter window “Fan-one level”

Parameter "Fan type is"

The fan type to be controlled is set with this parameter. Options:

One level

Multilevel

If a fan with one speed is to be controlled, the option “One level” must be selected, and the output P and Q is no functions.

If a fan with up to three speeds is to be controlled, the option “Multilevel” must be selected.

Parameter "When power failure, Fan speed is"

The parameter defines that the behavior of the fan on power voltage failure is unchanged.

Parameter "When power recovery, Fan speed is"

The behavior of the fan on power voltage recovery is defined here. Options:

OFF

ON

With the “OFF”, the fan is switched off. If the switch off minimum time is set in follow parameter, the OFF will be remained for at least this time.

With the “ON”, the fan is switched on. If the switch on delay is set in follow parameter, the ON will be executed when the delay has been elapsed.

Note: it is advisable to apply a power voltage before connecting the fan in order to achieve a defined switch state of the fan. This eliminates the possibility of the destruction of the fan due to an incorrect contact setting.

Parameter "Enable 1bit 'Force operation' obj."

Options:

No

Yes

With the “Yes”, a 1bit communication object “Fan Forced Operation” is enabled. The follow two parameters appear at the same time:

-- Parameter "Forced operation on object value is"

Options:

0

1

1:the Forced operation is activated by a telegram value 1 of the object “Fan Forced Operation” and is cancelled by value 0.

0:the Forced operation is activated by a telegram value 0 of the object “Fan Forced Operation” and is cancelled by value 1.

-- Parameter"Behaviour on Force operation is"

This parameter defines how the fan should respond with the Forced operation. Options:

Unchanged

ON

OFF

With the “Unchanged”, the current speed is remained.

With the “ON”, the fan is switched on.

With the “OFF”, the fan is switched off.

The Forced operation has the highest priority, so its action is not influenced by the minimum time and switching delay of the follow parameter setting, rather than the forced action is performed immediately and other operations are ignored during Forced operation until the forced operation is canceled.

Parameter "Auto. Operation is"

Options:

No

Yes

With the “Yes”, Automatic mode is enabled, an additional – Automatic operation Parameter window (fig.5.28) appears. And the Auto. operation will be influenced by the follow two parameters “switching delay” and “minimum time”.

Parameter "Function ON time mode is"

The function time at fan ON is defined with this parameter. Options:

None

Switching delay

Minimum time

With the “None”, the time function is executed.

With the “Switching delay”, the fan is switched on using this delay.

With the “Minimum time”, the fan remains ON for at least this time.

With option switching delay the following parameter appears:

-- Parameter “ON time is [1…65535]*0.1s”

The fan is switched on using this delay. Option: **1…65535**

With option minimum time the following parameter appears:

-- Parameter “ON time is [1…65535]* 1s”

The fan remains ON for at least this time. Option: **1…65535**

Parameter “Function OFF time mode is”

The function time at fan OFF is defined with this parameter. Options:

None

Switching delay

Minimum time

With the “None”, the time function is executed.

With the “Switching delay”, the fan is switched off using this delay.

With the “minimum time”, the fan remains OFF for at least this time.

With option switching delay the following parameter appears:

-- Parameter “OFF time is [1…65535]*0.1s”

The fan is switched off using this delay. Option: **1…65535**

With option minimum time the following parameter appears:

-- Parameter “OFF time is [1…65535]* 1s”

The fan remains OFF for at least this time. Option: **1…65535**

5.7.2.1 Parameter window “Fan: Auto. Operation”

This Parameter window (fig.5.33) is visible if in fig. 5.32 the option yes has been selected in the parameter “Auto. Operation is”. Here set the auto. Operation of one level fan, the threshold values for switchover of the fan ON/OFF is defined. If the control value is greater than or equal to the threshold value, the fan is ON; if the control value is lower than the threshold value, the fan is OFF. You can also set a hysteresis value. The control value is received via the object “HVAC-General HEAT/COOL” or “HVAC-General COOL”. Furthermore, the 4 limitations can also be enabled.

The priority of direct operation and automatic operation is the same, but they cannot occur at the same time. That is, in the case that Auto. Operation has been activated, if there is direct operation, the Auto. Operation will be exited automatically, and it can be activated again by the object “Fan Automatic ON/OFF”. The forced operation can also make the Auto. Operation exit, but it has higher priority.

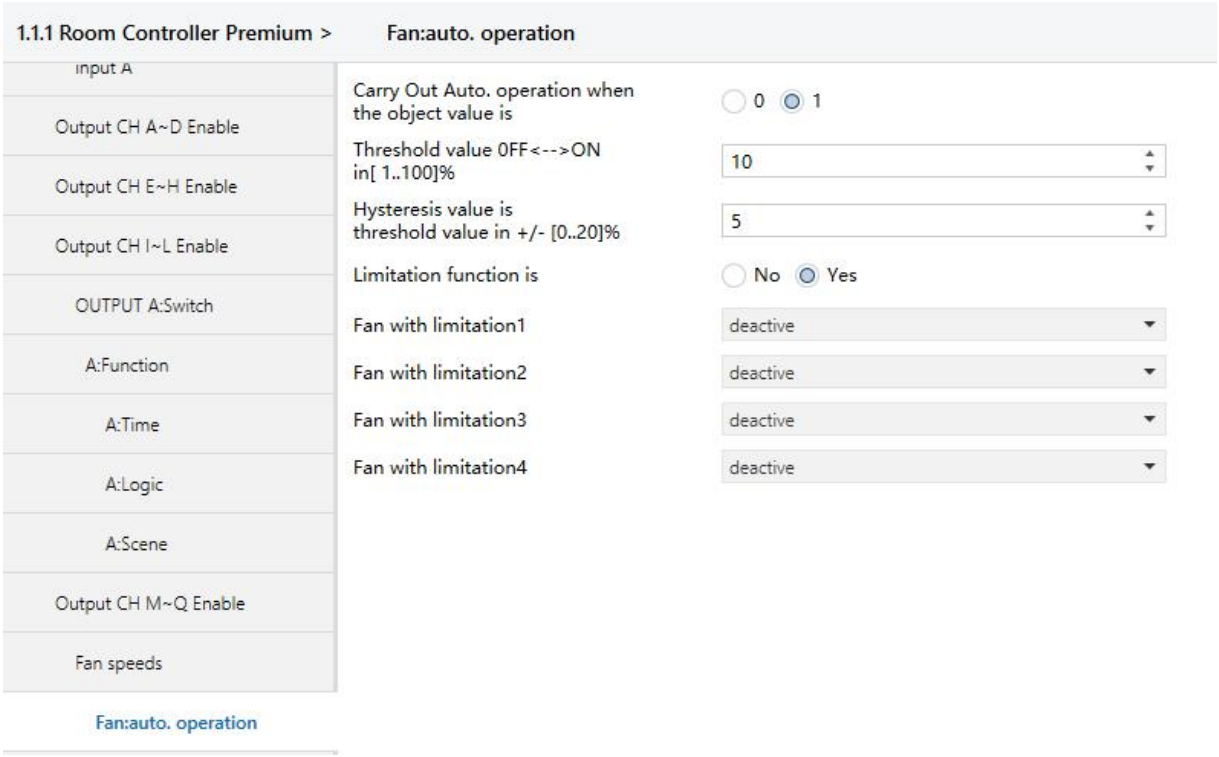


Fig.5.33 Parameter windows “Fan-one level：Auto. operation”

Parameter “Carry out Auto. Operation when the object value is”

This parameter defines how to react to a telegram value of the communication object “Fan Automatic ON/OFF”. Options:

0

1

1: Automatic is activated by a telegram with value 1 and inactive by value 0.

0: Automatic is activated by a telegram with value 0 and inactive by value 1.

Parameter “Threshold value OFF<-->ON in [1…100]%”

Here the threshold value, at which switch on occurs, is defined. Options: **1…100%**

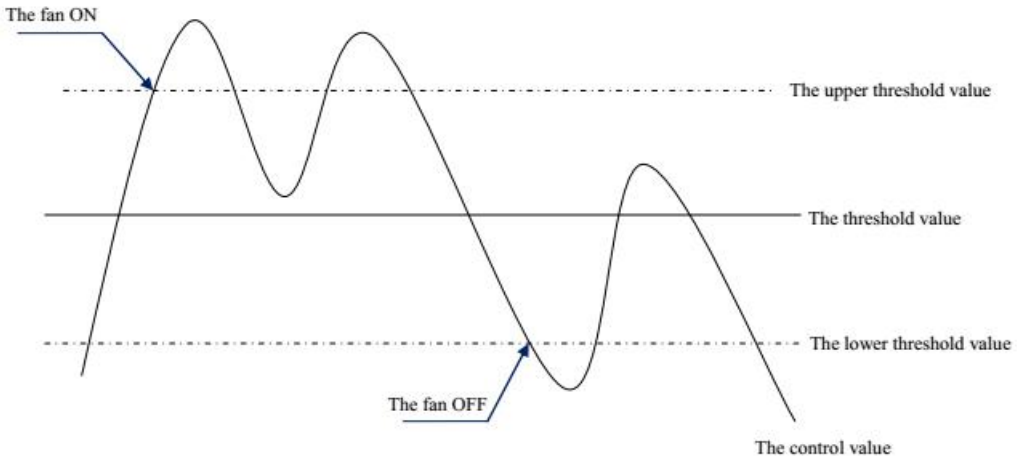
If the control value of the communication object “HVAC-General HEAT/COOL”, “HVAC-General HEAT”or “HVAC-General COOL” is greater than or equal to the parameterized threshold value, it is switched on. If the value is less, it is switched off.

Parameter "Hysteresis value is threshold value in +/- [0...20]%"

Here a hysteresis value is set, at which switchover to the fan switch occurs. Using hysteresis, a continuous switching of the fan around the threshold value with the control value deviating can be avoided. Options: **0…20%**

The setting 0 causes immediate switching without hysteresis.

Assuming the hysteresis value of 5% and the threshold value is 50%, then the upper threshold value will be 55% (the threshold value + the hysteresis value), the lower threshold value will be 45%(the threshold value - the hysteresis value), then when the control value is between 45% and 55%, it will not cause the operation of the fan, only less than 45% is off the fan, and greater than 55% is on the fan. As shown below:



Parameter "Limitation function is"

The parameter set the limitation function of the Auto. Operation. Options:

Yes

No

With the "Yes", the following parameters appear, and 4 communication objects for limitation of the fan switching are enabled.

The four limitations can be used for example for the control of various operation modes such as:

Limitation 1: e.g. for frost/heat protection

Limitation 2: e.g. for comfort operation

Limitation 3: e.g. for night shutdown

Limitation 4: e.g. for standby operation

In normal cases, the thermostat takes these operating modes into account in its control variable for the room controller.

The sequence of the displayed parameters corresponds with their priorities, i.e. the parameter with the highest priority has limitation 1 followed by limitation 2, 3 and 4. So the highest priority is assigned to limitation 1, e.g. Frost/Heat protection; the lowest priority is assigned to limitation 4, e.g. standby operation.

The limitation is activated if a telegram with the value 1 is received on the limitation object. The limitation is deactivated if a telegram with the value 0 is received on the limitation object.

The direct operation and the forced operation can end the Auto. Operation, but the limitations status can be maintained, it will affect the Auto. Operation again when the Auto. Operation is activated again. And even if the limitations can be also activated during the forced operation, but they only affect the Auto. Operation.

If a limitation is activated during the Auto. Operation, the switching of the fan is switchover to the parameterized status regardless of the control value. For example, a limit is set to “ON”, the fan is only switched on when the limit is activated. If there are several limitations, their priorities need to be considered.

After the limitations are cancelled or the Auto. Operation is re-activated, the fan switching and the control value are recalculated and executed. This means that the fan switching will be executed according to the latest control value.

After programming or bus voltage recovery, if the control value has been not received before the Auto. Operation active and the limitations are not activated, now the output is no action.

Parameter "Fan with limitation x (x=1,2,3,4)"

With this parameter, the fan switching can be set in active limitation. There are the same parameters for each of the individual four limitations. Options:

Inactive

Unchanged

ON

OFF

Inactive: The limitation is not effect to the Auto. Operation, but the status can be activated.

Unchanged: The fan status is remained the current status when the limitation is activated.

ON: The fan is only switched on when the limitation is activated.

OFF: The fan is only switched off when the limitation is activated.

5.7.2.2 Parameter window “Fan: Status”

The Parameter window “Fan: Status” is shown in fig.5.34.,Here the status messages are defined for the Fan-one level.

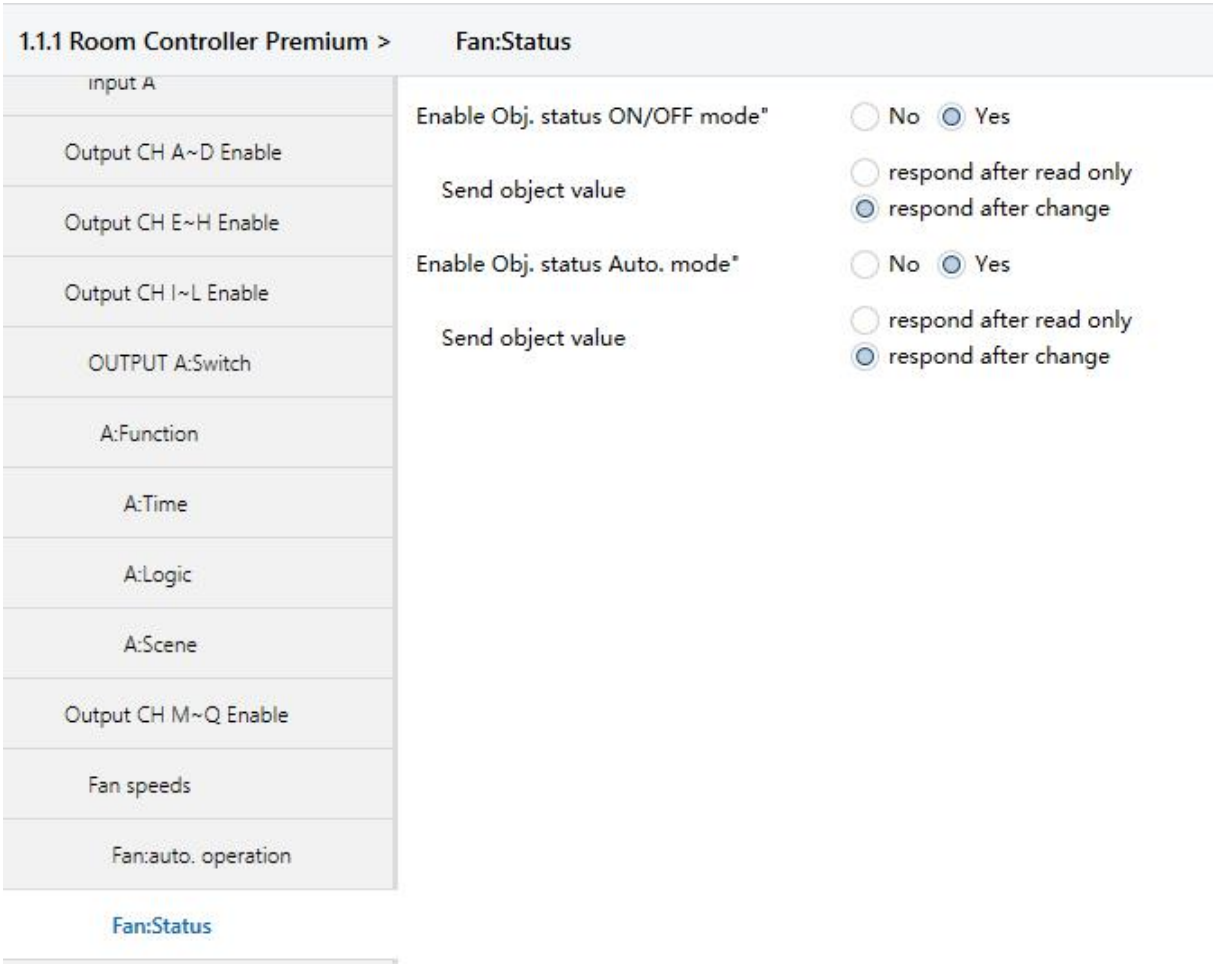


Fig.5.34 Parameter window “Fan-one level：Status”

Parameter "Enable Obj. "status ON/OFF mode""

Options:

Yes

No

With the “Yes”, the object “Fan status ON/OFF" is enabled, which is used to feedback of the working status of the fan.

With option yes the following parameter appears:

-- Parameter "Send object value"

Options:

Respond, after read only

Respond after change

With the “Respond, after read only”, the status is sent after a request.

With the “Respond after change”, the status is send after a change or a request.

Parameter "Enable Obj. “status Auto. mode”"

Options:

Yes

No

With the “Yes”, the communication object “Fan status ON/OFF” is enabled. The fan status ON/OFF is indicated directly via the object. Telegram value: **1— the Fan ON, 0 — the Fan OFF**.

With option yes the following parameter appears:

-- Parameter "Send object value"

Options:

Respond, after read only

Respond after change

With the “Respond, after read only”, the status is sent after a request.

With the “Respond after change”, the status is send after a change or a request.

5.7.3 Parameter window "Fan-multi level”

The Parameter window of multilevel fan speeds is shown in fig.5.35. Here can set 2 level or 3 level fan speeds. 2 levels are the output O and P, 3 levels are the output O, P and Q.

The parameter settings as follow:

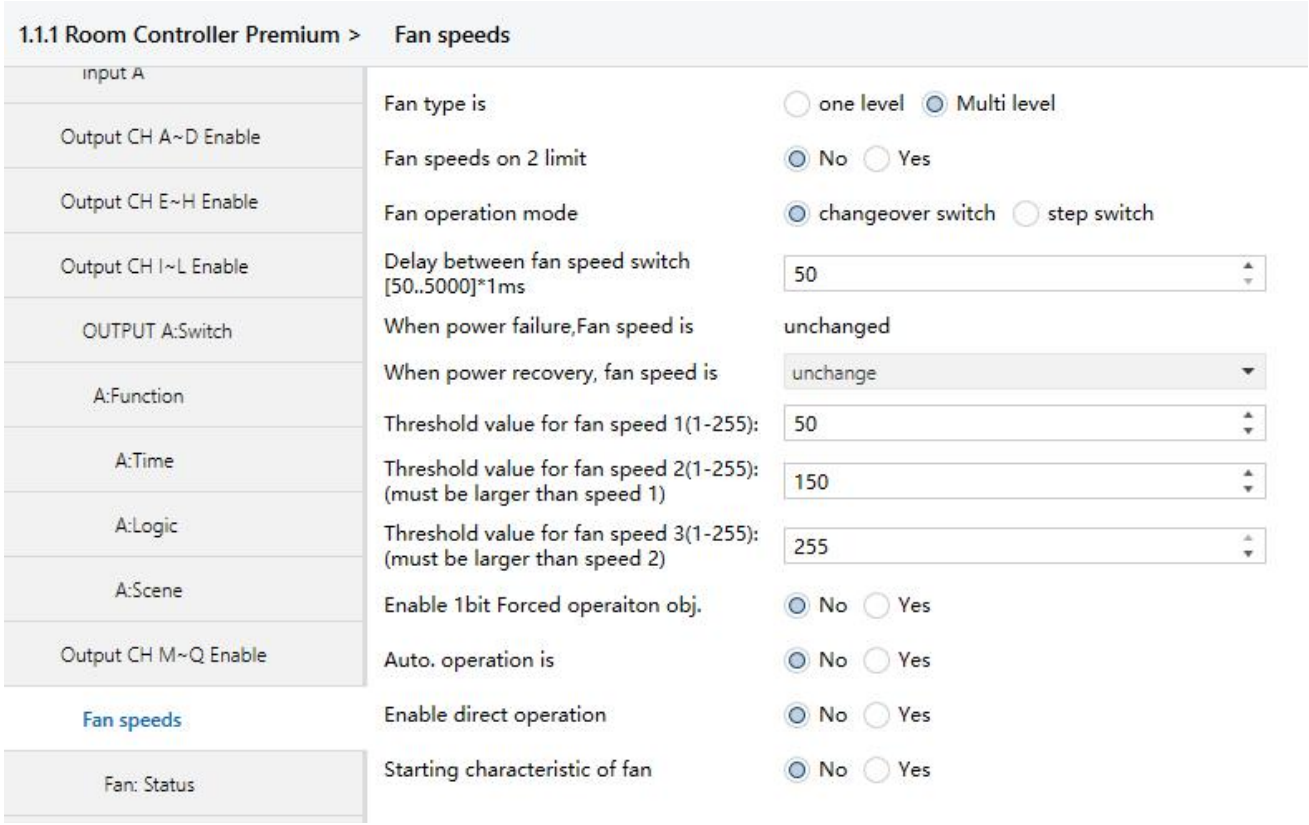


Fig.5.35 Parameter window “Fan-two level”

The two level fan speeds and the three level fan speeds have the same parameter settings. Just the fan speeds are limited to two, the fan speed 3 is non-functional.

Some technical characteristics need to be considered with a multilevel speed fan, such as fan operation mode, starting characteristic etc. Only know these characteristics, you can set the following parameters reasonably.

Parameter "Fan speeds on 2 limit"

With the parameter, the fan speeds can be limited to two. Options:

No

Yes

With the “Yes”, a two speed fan is controlled via fan speeds 1 and 2, fan speed 3 is non-functional. The following settings are the same as those for a three speed fan, but are only limited to two speeds.

Parameter "Fan operation mode"

The control of the fan is set with this parameter. The mode of fan control should be taken from the technical data of the fan. Options:

Changeover switch

Step switch

Changeover switch: Only the corresponding output of the assigned fan speed is switched on with the parameterization. The delay time between the speed switchover and a minimum dwell time in a valve speed are programmable. The minimum dwell time in a fan speed is only active in automatic mode. With the changeover switch, the fan speed is directly switched on, as follows:

Output / Fan speed	Output O	Output P	Output Q
Off	0	0	0
Fan speed 1	1	0	0
Fan speed 2	0	1	0
Fan speed 3	0	0	1

Step switch: The individual fan speeds are activated consecutively (outputs switched on) until the required fan speed is achieved. The minimum dwell time in a fan speed is also only active in automatic mode. A step switch normally means that the previous fan speeds are usually switched on consecutively, as follows.

Output / Fan speed	Output O	Output P	Output Q
Off	0	0	0
Fan speed 1	1	0	0
Fan speed 2	1	1	0
Fan speed 3	1	1	1

-- Parameter "Delay between fan speed switch [50…5000]*1ms"

The parameter is visible if the fan operation mode selects “changeover switch”, which is used to set a switchover delay. This time is a fan specific factor and it is always taken into consideration. Options: **50…5000**

After a target fan speed telegram is received, the target fan speed is carried out as soon as the delay has passed. However, switch the fan on do not need delay, switch the fan off need delay.

If a new fan speed is received during the delay, the delay is not restarted and the new fan speed is carried out in the last.

-- Parameter "When power failure, Fan speed is"

The parameter defines that the behavior of the fan on power voltage failure is unchanged.

-- Parameter "When power recovery, fan speed is"

The behavior of the fan on power voltage recovery is defined here. Options:

Unchange

OFF

1

2

3

With the "OFF", the fan is switched off.

With the "1, 2 or 3", the fan switches to fan speed 1, 2 or 3.

Note: it is advisable to apply a power voltage before connecting the fan in order to achieve a defined switch state of the fan. This eliminates the possibility of the destruction of the fan due to an incorrect contact setting. If the fan speed is limited to 2 levels, but the parameter is with 3, then the fan speed will use 2 after bus voltage recovery.

Parameter"Threshold value for fan speed 1(1-255):"

The parameter is used to set a threshold value for switching to fan speed 1.if value of fan speed is no less than the value, then fan will run at speed 1,otherwise fan will be cut off.Option:**1-255**

Parameter"Threshold value for fan speed 2(1-255):"

The parameter is used to set a threshold value for switching to fan speed 2.if value of fan speed is no less than the value, then fan will run at speed 2.Option:**1-255**

Parameter"Threshold value for fan speed 3(1-255):"

The parameter is used to set a threshold value for switching to fan speed 3.if value of fan speed is no less than the value, then fan will run at speed 3.Option:**1-255**

-- Parameter "Enable 1bit 'Force operation' obj."

Options:

No

Yes

With the “Yes”, a 1bit communication object “Fan Forced Operation” is enabled. The follow two parameters appear at the same time:

-- Parameter “Forced operation on object value is”

Options:

0

1

1: the Forced operation is activated by a telegram value 1 of the object “Fan Forced Operation” and is canceled by value 0.

0: the Forced operation is activated by a telegram value 0 of the object “Fan Forced Operation” and is canceled by value 1.

Note : During the force operation, it is ignored of the automatic operation of the limit setting. After cancel compulsory operation, it will be updated of the automatic operation . Mandatory is activating, but the wind speed under automatic operation still need to consider the minimum operation time, except the start-up wind speed, because it has its own minimum running time. After a bus reset or programming, forced the default operation is inactive.

-- Parameter “Limitation on Force operation ”

This parameter defines forced under operation, the speed of the fan can run. Options:

Unchanged

3, 2, 1, off

1

1, off

2

2, 1

2, 1, off

3

3, 2

3, 2, 1

Off

If choose “Unchanged”， Fan wind speed remains the same, to maintain the current running status;

Options for "3, 2, 1, off", can run per level wind speed, can also off the fan;

Option for "1", can only run wind speed 1 ;

Options for "1, off", can only run wind speed 1 and turn off the fan;

Options for "2", can only run wind speed 2;

Options for "2, 1", can only run wind speed 1 and 2;

Options for "2, 1, off", can only run wind speed 1, 2, and turn off the fan;

Options for "3", can only run wind speed 3;

Options for "3, 2", can only run wind speed 3 and 2;

Options for "3, 2, 1", can only run 1, 2, and 3 wind speed;

Option to "Off", only turn off the fan.

Note: in the case of compulsory activation operation, if the current wind speed is not in the allowed range, the wind speed will switch to close to the current wind speed of wind speed, running in the allowed range, such as the current wind speed is 1, allows the wind speed is 2, 3, so when activation force operation, winds will automatically switch to 2, if it is manually to the wind speed is set to 1, run the wind speed will be 2.

Another case, if the current wind speed is zero, allowing the wind speed is 1, 2, 3, start wind speed is 3, when the activation force operation, fan 3 to start with the speed of the wind, then automatically switch to the wind speed 1; If the current wind speed is 2, allowing the wind speed is 1, 2, when the activation force operation, receive a message a wind speed 0, then the wind speed will switch to 1, this kind of circumstance is the wind speed will switch to the near target wind speed .

-- Parameter "Auto. Operation is"

This parameter is used to enable automatic operation of the fan. Options:

No

Yes

Select "Yes", parameter interface 5.31 will be visible.

-- Parameter "Enable direct operation"

This parameter can make the fan control operation directly. Direct operating mainly in a different way to manually adjust the wind speed. Different types of fans, such as switch type of blower fan and stepping switch mode, suitable for different control mode, according to actual needs. Options:

No

Yes

Choosing "Yes", the following three parameters can be seen, each parameter corresponding to a kind of control mode, three levels of wind speed can be a separate object control, also can through an object step by step raised or lowered, or through an object directly open the specified wind speed.

Note: during the period of direct operation, it is ignored of the setting of the minimum residence time in the automatic mode. Therefore, timely detection of direct manipulation response. In order to protect the fan, wind speed switch delay time are still valid. Mandatory operation is activated at the same time, need to take into account the force can run under wind speed.

-- Parameter 'Enable 'Switch speed x' obj.'

Options:

No

Yes

Choosing "Yes", three 1 bit of object "Fan speed 1", "Fan speed 2" and "Fan speed 3". When object received "1", open speed, three objects of any object received "0" the fan off. If three objects in a short time continuous received ON/OFF, so the message is received by the final object value to control fan speed.

-- Parameter 'Enable 'Fan speed Up/Down' obj.'

Options:

No

Yes

Select "Yes", 1 bit of object "Fan speed UP/DOWN" visible, object received "1" raised wind speed , received "0" cut wind speed . When wind speed reaches maximum (speed 3) or minimum (off), continue to rise or fall, the wind speed will remain, the continue to increase or reduce the message will be ignored and does not perform, and the wind speed is to increase or decrease step by step.

If multiple upward or downward adjustment wind speed in a short time, the target speed will increase a continuous multistage or reduce stage, such as the current wind speed is 1, received two consecutive increase message, then 3 will execute the wind speed.

-- Parameter "Enable 'Fan speed switch' obj."

Options:

No

Yes

Choosing "Yes", 1 byte of the object "Fan speed switch" visible, can directly open the specified wind speed. Object values: 0 - turn off the fan, 1-the fan rotation speed fan speed 1, 2- fan speed 2, 3 - fan speed 3, more than 3 message are ignored.

-- Parameter "Starting characteristic of fan"

This parameter to define the fan characteristics of start , this is also a technical characteristics of the fan. Fan used in our life, such as floor fan, when open the fan, usually started from the second wind speed, and then switch to the minimum wind speed, some fans start also like this kind of situation, in order to start the fan in a higher wind speed, because the fan to start with a higher torque, mainly in order to guarantee the safety of the fan motor startup. Optional: in order to guarantee the safety of the fan motor start, when the fan open, to open a higher wind speed fan motor will be better, so that the fan motor in startup phase to obtain a higher torque. Options:

Yes

No

Select "Yes", the following two parameters visible .

Note: due to it is a technical characteristics of startup feature of the fan, so start behavior has a higher priority than activate the automatic operation under the restriction or forced operation . If the fan itself has No start features, we don't have to consider the characteristics of relevant parameters, it can be as long as you select "No". For example, Start wind speed is 3, limit allowed by the operation of the wind speed is 2, the current in the OFF state, when receiving a control message in the wind speed is 1, the fan will open with wind speed 3 , and then turn to wind speed 2, then the actual need of wind speed 1 will not run due to the limit. (to be automatic operation under the restrictions described in the next chapters 5.7.3.1)

For stepping switch type of fan, the feature of start is not the same, stepping switch type of fan is usually continuous open wind speed, and switch to switch type of fan is directly open the wind speed. So in defining characteristic parameters of start , also need to consider the fan switch type.

Switching wind speed in the Automatic mode , the minimum residence time will be considered after startup phase, in the startup phase it is not activated. Start-up wind speed on the minimum residence time can be set up in addition, refer to the following parameters.

-- Parameter "Switch on over fan speed"

This parameter is set the needed speed to start the fan from the OFF state . Options: **1/2/3**

When in the wind speed 2, if start wind speed set 3, then start up automatically with speed 2 to start. But in order to ensure the normal operation of the fan, it can set the parameters associated with fan performance, it's best to know the characteristics of the fan, reasonable according to the characteristics of the fan to set these parameters, so that no damage to the fan.

-- Parameter "Minimum dwell period in switch"

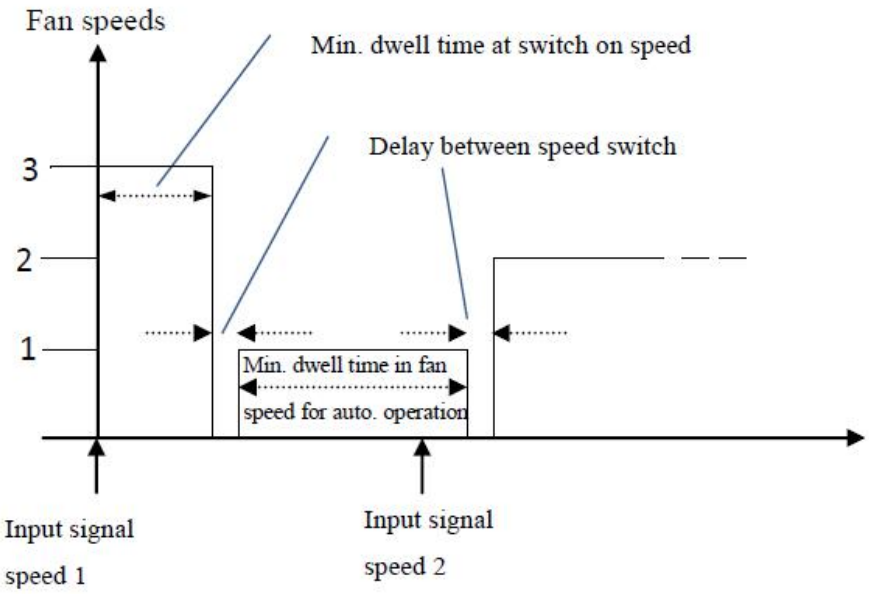
This parameter defined in the start stage to open a certain wind speed, the minimum residence time. Options: **1... 65535**

When the fan star up, will start up with the star up wind speed , switch to the target wind speed after the minimum residence time , the target speed can be the wind speed of the reset fan, or triggered by other operating speed.

Startup phase, delay time of switch between two wind speed is also need to be taken into account.

For example: a startup behavior with 3 levels wind speed of the fan.

Assuming that the fan current state is closed, the wind speed is level 3, target speed is level 1, eventually wind speed is level 2, as shown in the figure below:



Shown above, if the fan is in a off state, when it received a "wind speed 1" message, it will start up with "wind 3" , after the minimum residence time of start-up wind speed, and then switch wind speed, switch of wind speed needs a delay time (this is a technical parameters of the fan, good to protect the fan), after the delay, and switch to the target speed "wind speed 1", in the process of the operation of the "wind speed 1", if the fan receives a message of "wind speed 2" , at this time need to consider whether the automatic mode is activated, if the automatic mode is active, you will need to consider the minimum residence time of wind speed run , if it is a direct operation, do not need to consider the minimum residence time of wind speed run , after the switching delay, and running to "wind speed 2".

5.7.3.1 Parameter window “Fan: Auto. Operation”

This parameter window (fig.5.36) is visible if in fig. 5.35 the option yes has been selected in the parameter “Auto. Operation is”. Here set the auto. Operation of one level fan, the threshold values for switchover of the fan ON/OFF is defined. If the control value is greater than or equal to the threshold value, the fan is ON; if the control value is lower than the threshold value, the fan is OFF. You can also set a hysteresis value. The control value is received via the object “HVAC-General HEAT/COOL” or “HVAC-General COOL”. Furthermore, the 4 limitations can also be enabled.

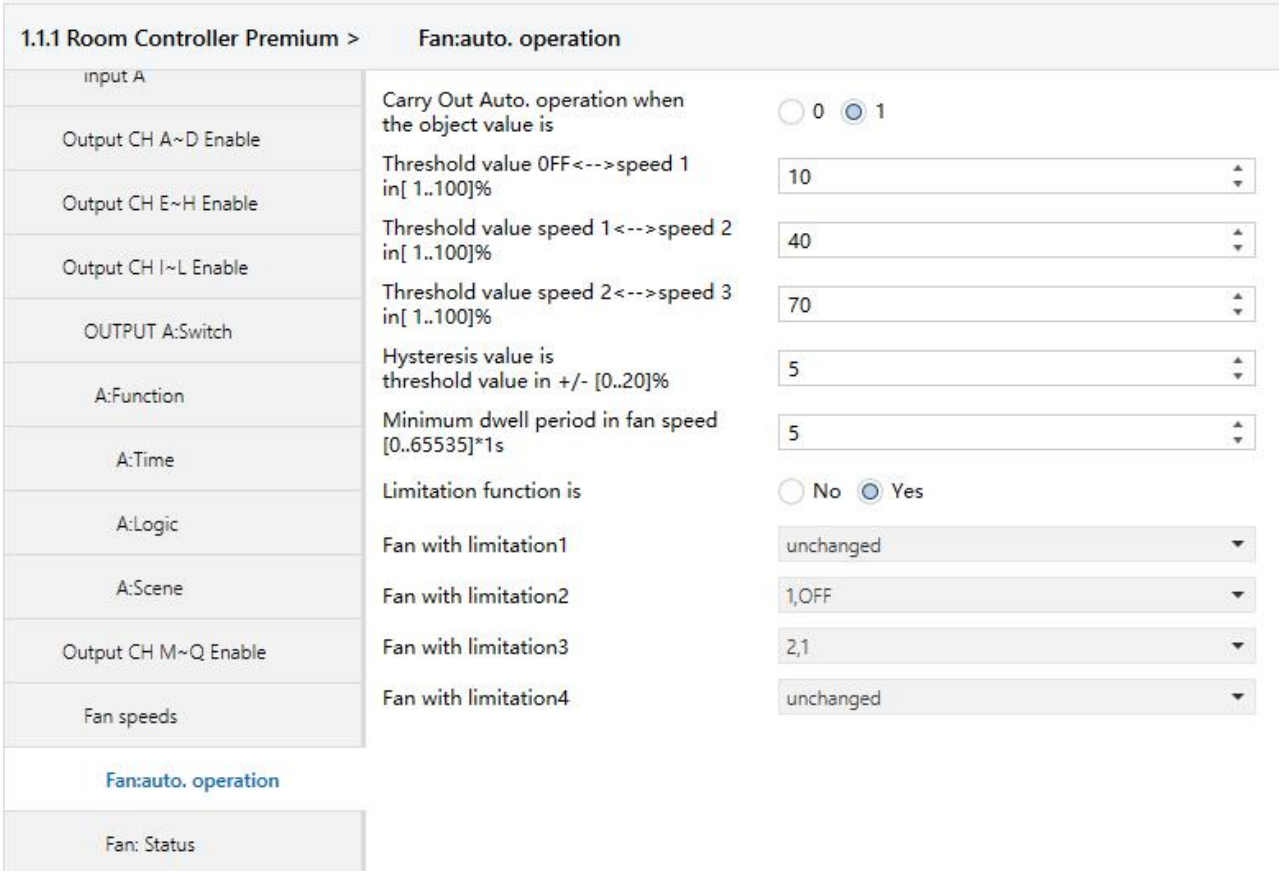


Fig. 5.36 parameter window “Fan-multievel：Auto. operation”

-- Parameter "Carry out Auto. Operation when the object value is"

This parameter defines how to react to a telegram value of the communication object "Fan Automatic ON/OFF". Options:

0

1

1: Automatic is activated by a telegram with value 1 and inactive by value 0.

0: Automatic is activated by a telegram with value 0 and inactive by value 1.

After reset, automatic operation is not activated by default.

--Parameter "Threshold value OFF<-->speed 1 in [1...100] %"

Here to defined the threshold value that switch between fan off and fan speed 1, if the control values greater than or equal to the threshold of the parameter Settings, run speed 1, else off the fan ; control values determined by object - "HVAC General HEAT/COOL", "HVAC - General HEAT" or "HVAC - General COOL" . Options: **1... 100%**

-- Parameter "Threshold value 1<-->2 in [1...100]%"

-- Parameter "Threshold value speed 1<-->speed 2 in [1...100]%"

Here to defined the threshold value when switch to speed 2, if the control values greater than or equal to the threshold of the parameter Settings, run speed 2; control values determined by object - "HVAC General HEAT/COOL", "HVAC - General HEAT" or "HVAC - General COOL" .

Options: **1... 100%**

-- Parameter "Threshold value speed 2<-->speed 3 in [1...100]%"

Here to defined the threshold value when switch to speed 3, if the control values greater than or equal to the threshold of the parameter Settings, run speed 3; control values determined by object - "HVAC General HEAT/COOL", "HVAC - General HEAT" or "HVAC - General COOL" .

Options: 1... 100%

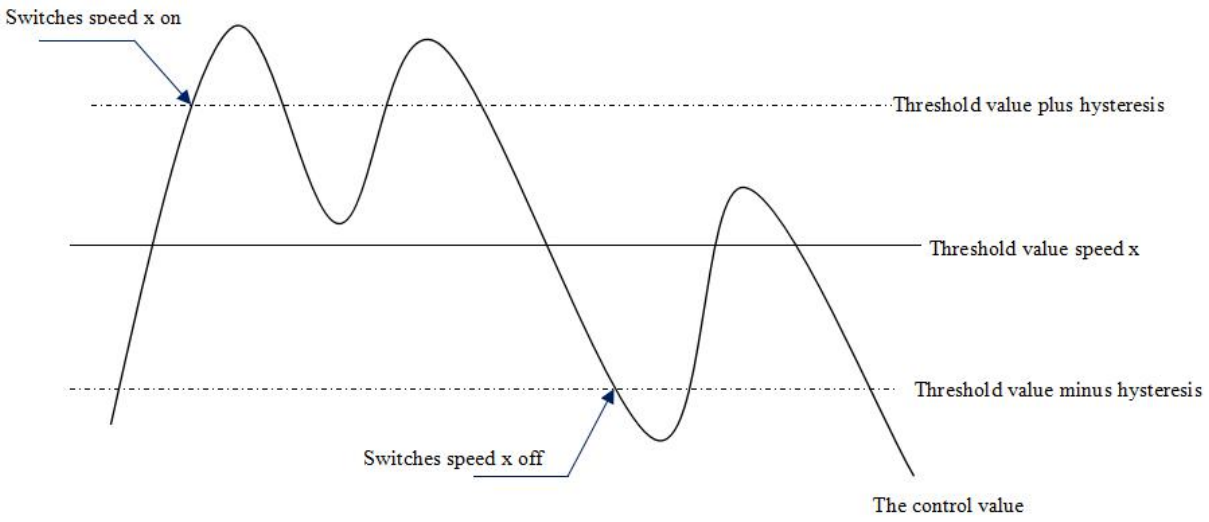
Note: room controller in the form of an ascending to evaluate these thresholds, that is, first of all check OFF < - > threshold of wind speed 1 , and then the wind speed 1 < - > wind speed 2, wind speed 2 < - > wind speed 3. The correctness of the functions performed in such a case only guaranteed: the threshold of OFF < - > wind speed 1 is less than the threshold of wind speed 1 < - > wind speed 2's threshold, the threshold of wind speed 1 < - > wind speed 2 is less than the threshold wind velocity 2 < - > wind speed of 3's threshold.

-- Parameter "Hysteresis value is threshold value in +/- [0...20]%"

Here a hysteresis value is set, at which switchover to the fan switch occurs. Using hysteresis, a continuous switching of the fan around the threshold value with the control value deviating can be avoided. Options: **0…20%**

The setting 0 causes immediate switching without hysteresis.

Assuming the hysteresis value of 5% and the threshold value is 50%, then the upper threshold value will be 55% (the threshold value + the hysteresis value), the lower threshold value will be 45%(the threshold value - the hysteresis value), then when the control value is between 45% and 55%, it will not cause the operation of the fan, only less than 45% is off the fan, and greater than 55% is on the fan. As shown below:



Note:

In enabling the lagging situation, if there is a threshold overlap, fan action rules are as follows:

1) lag determine the wind speed conversion of control points;

2) if the wind speed transformation, the new wind speed is determined by the control values and threshold, without considering lag.

For example, (1) :

OFF < - > wind speed 1 threshold of 10%

Wind speed 1 < - > wind speed 2 threshold of 20%

3 wind speed 2 < - > wind speed threshold of 30%

Hysteresis is 15%

The wind speed behavior of fan raise from OFF :

OFF state of the fan will be in the control values of 25%（≥10%+15%）this point to shift , the new wind speed will be 2 (because of 25% between 20% to 30% , no need to consider lag at this time), so the wind speed 1 is ignored;

The behavior of the fan's wind speed decreased from 3:

Fan speed 3 will be in control values 14% (< 30% 15%) this point to shift, a new wind speed will be 1 (because of 14% between 10% to 20% , no need to consider lag), so the wind speed 2 is ignored.

For example, (2) :

OFF < - > wind speed 1 threshold of 10%

Wind speed 1 < - > wind speed 2 threshold of 40%

Wind speed 2 < - > wind speed 3 threshold of 70%

Hysteresis is 5%

The wind speed behavior of fan raise from OFF :

OFF state of the fan will be in the control values of 15%（≥10%+5%）this point to shift , if received the control value is 41%, the new wind speed will be 2 (because of 41% between 40% to 70% , no need to consider lag at this time), so the wind speed 1 is ignored; if received the control value is 39%, the new wind speed is 1 (because of 39% between 10% to 40% , no need to consider lag at this time)

The behavior of the fan's wind speed decreased from 3:

Fan speed 3 will be in control values 64%（<70%-5%) this point to shift, if received the control value is 39%, the new wind speed will be 1 (because of 39% between 10% to 40% , no need to consider lag), so the wind speed 2 is ignored.

3) no matter what happens, control values is 0, the fan will turn off.

-- Parameter 'Minimum dwell period in fan speed [0...65535]*1s'

This parameter to define the residence time before the current wind speed switch to a higher or lower wind speed , which is a minimum wind speed running time, if you want to switch to another wind speed, can only be to switch after waiting for this period of time, if the current wind speed has been running long enough, the wind speed change can quickly switch. Options: **0... 65535**

0: means not delay switch;

Note: The setting of the residence time in this parameter is only using in automatic mode . Automatic mode of each wind speed (including off) need to consider the minimum operation time, and automatic operation of the wind speed is changed step by step , such as the current wind speed is 1, the target speed is 3, then the wind speed transform from 1 to 2, and 3, and each operation of the wind speed over the minimum operation time to transform. Start wind speed without considering the minimum run time, because the starting wind speed has its own minimum running time.

-- Parameter "Limitation function is"

The parameter set the limitation function of the Auto. Operation. Options:

Yes

No

With the"Yes", the following parameters appear, and 4 communication objects"Fan Limitation x (x=1,2,3,4)" for limitation of the fan switching . The four limitations can be used for example for the control of various operation modes such as:

Limit 1: e.g. for frost/heat protection

Limit2: e.g. for comfort operation

Limit 3: e.g. for night shutdown

Limit 4: e.g. for standby operation

In normal cases, the thermostat takes these operating modes into account in its control variable for the room controller.

The sequence of the displayed parameters corresponds with their priorities, i.e. the parameter with the highest priority has limitation 1 followed by limitation 2, 3 and 4. So the highest priority is assigned to limitation 1, e.g. Frost/Heat protection; the lowest priority is assigned to limitation 4, e.g. standby operation.

The limitation is activated if a telegram with the value 1 is received on the limitation object. The limitation is deactivated if a telegram with the value 0 is received on the limitation object.

The direct operation and the forced operation can end the Auto. Operation, but the limitations status can be maintained, it will affect the Auto. Operation again when the Auto. Operation is activated again. And even if the limitations can be also activated during the forced operation, but they only affect the Auto. Operation.

If a limitation is activated during the Auto. Operation, the switching of the fan is switchover to the parameterized status regardless of the control value. For example, a limit is set to “ON”, the fan is only switched on when the limit is activated. If there are several limitations, their priorities need to be considered.

After the limitations are cancelled or the Auto. Operation is re-activated, the fan switching and the control value are recalculated and executed. This means that the fan switching will be executed according to the latest control value.

After programming or bus voltage recovery, if the control value has been not received before the Auto. Operation active and the limitations are not activated, now the output is no action.

-- Parameter “Fan with limitation x (x=1,2,3,4)”

With this parameter, the fan switching can be set in active limitation. There are the same parameters for each of the individual four limitations. Options:

Unchanged

3, 2, 1, off

1

1, off

2

2, 1

2, 1, off

3

3, 2

3, 2, 1

Off

“Unchanged”: The fan status is remained the current status when the limitation is activated.

“3, 2, 1, off”: Wind speed per level can run, also can turn off the fan;

“1”: Can only run wind speed 1;

“1, off”: Only run wind speed 1 and turn off the fan;

“2”: Can only run wind speed 2;

“2, 1”: Can only run wind speed 1 and 2;

“2, 1, off”: Can only run wind speed 1 and 2 and turn off the fan;

“3”: Can only run wind speed 3;

"3, 2": Can only run wind speed 2 and 3;

"3, 2, 1": Can only run wind speed 1, 2 and 3;

"Off": Can only turn off the fan.

5.7.3.2 Parameter window "Fan: Status"

The parameter window "Fan: Status" is shown in fig.5.37. This interface is used to set multilevel wind speed of the fan's running status information

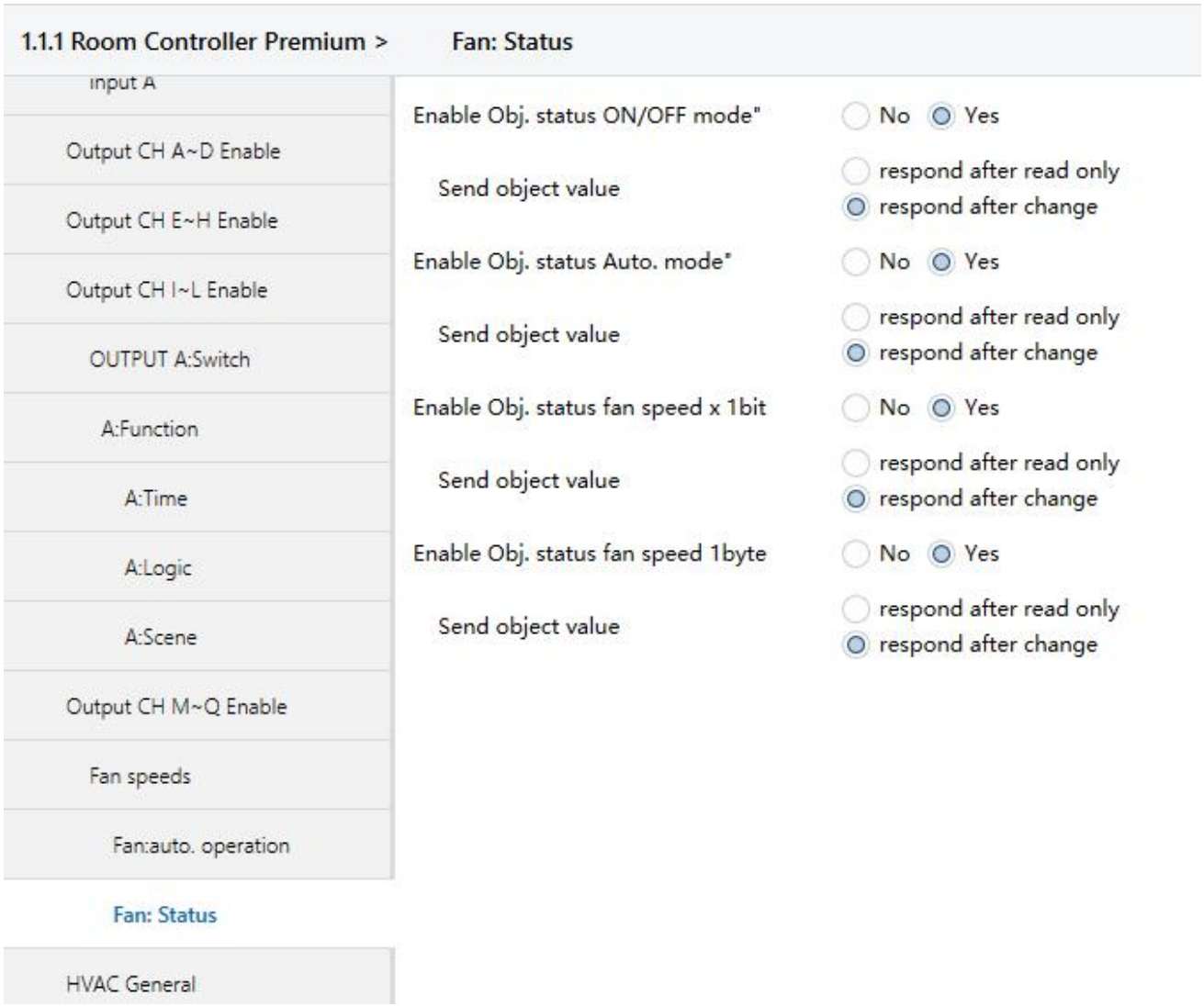


fig.5.37 Parameter Settings interface "Fan-multi level：Status"

Parameter "Enable Obj. "status ON/OFF mode""

Options:

Yes

No

With the “Yes”, the communication object “Fan status ON/OFF” is enabled. The different states are indicated directly via a bit coding, as follows:

-- Parameter “Send object value”

This parameter in the parameter choosing "Yes", defined the fan switch state feedback method. Options:

Respond, after read only

Respond after change

Choose "Respond, after read only", only when the device receives from the request of reading the Fan switch state from other devices or the bus , object "Fan status ON/OFF" to send out the current switch state of the Fan to the bus;

Choose "Respond after change", when the Fan running status change or device receives the “read the state” of the request, object "Fan status ON/OFF" immediately send the message to report the current state of the bus.

Parameter “Enable Obj. “status Auto. mode””

Options:

Yes

No

With the “Yes”, the communication object “Fan status ON/OFF” is enabled. Used for state feedback for automatic operation. When activated, automatic operation object to send a message "1" to the bus; When after the automatic operation, send the message "0" to the bus.

-- Parameter “Send object value”

This parameter is enable if last parameter choosing "Yes", defined automatically operating state feedback method. Options:

Respond, after read only

Respond after change

Choose "Respond, after read only", only when the device receives the request of reading the Fan switch state from other devices or the bus , object “Fan status automatic” will send out the current switch state of the Fan to the bus;

Choose "Respond after change", When the automatic operation condition change or equipment receive the request of reading the status , object "Fan status automatic" immediately send the message to report the current state of the bus.

Parameter "Enable Obj. "status fan speed x" 1bit"

Options:

Yes

No

Choosing "Yes", three 1 bit of objects "Fan status speed 1", "Fan status speed 2" and "Fan status speed 3" are enable , used for feedback per level state of wind speed, can indicate the current operation of the wind speed.

-- Parameter "Send object value"

This parameter is enable if last parameter choosing "Yes", to define the state of the wind speed feedback method. Options:

Respond, after read only

Respond after change

Choose "Respond, after read only", only when the device receives the request of reads the state from the other devices or the bus , object will sent the state to bus;

Choose "Respond after change", when the state changes or device receives the the request of reading the state, object immediately sent a message to report the status on the bus

Parameter "Enable Obj. "status fan speed " 1byte"

Options:

Yes

No

Choosing "Yes", the object (1 byte)"Fan status speed" is enable, used to feedback the current running speed. Different object values corresponding to different wind speed: 0-off ,1 - wind speed 1,2- wind speed 2, 3 - wind speed 3, > 3 is not used.

-- Parameter "Send object value"

This parameter is enable if last parameter choosing "Yes",, to define the state of the wind speed feedback method. Options:

Respond, after read only

Respond after change

Choose "Respond, after read only", only when the device receives the request of reads the state from the other devices or the bus , object will sent the state to bus;

Choose "Respond after change", when the state changes or device receives the the request of reading the state, object immediately sent a message to report the status on the bus.

5.7.4 Parameter window “Switch”

When the O,P,Q as three channels switching output, parameter setting interface as shown in fig. 5.38. Here parameters and functions are similar to the switch actuator of the chapter 5.5. The different is that there is not logic function, other functions are same with the chapter 5.5. O, P, Q as a switch output with N1, N2 as the function of the switch output is the same.

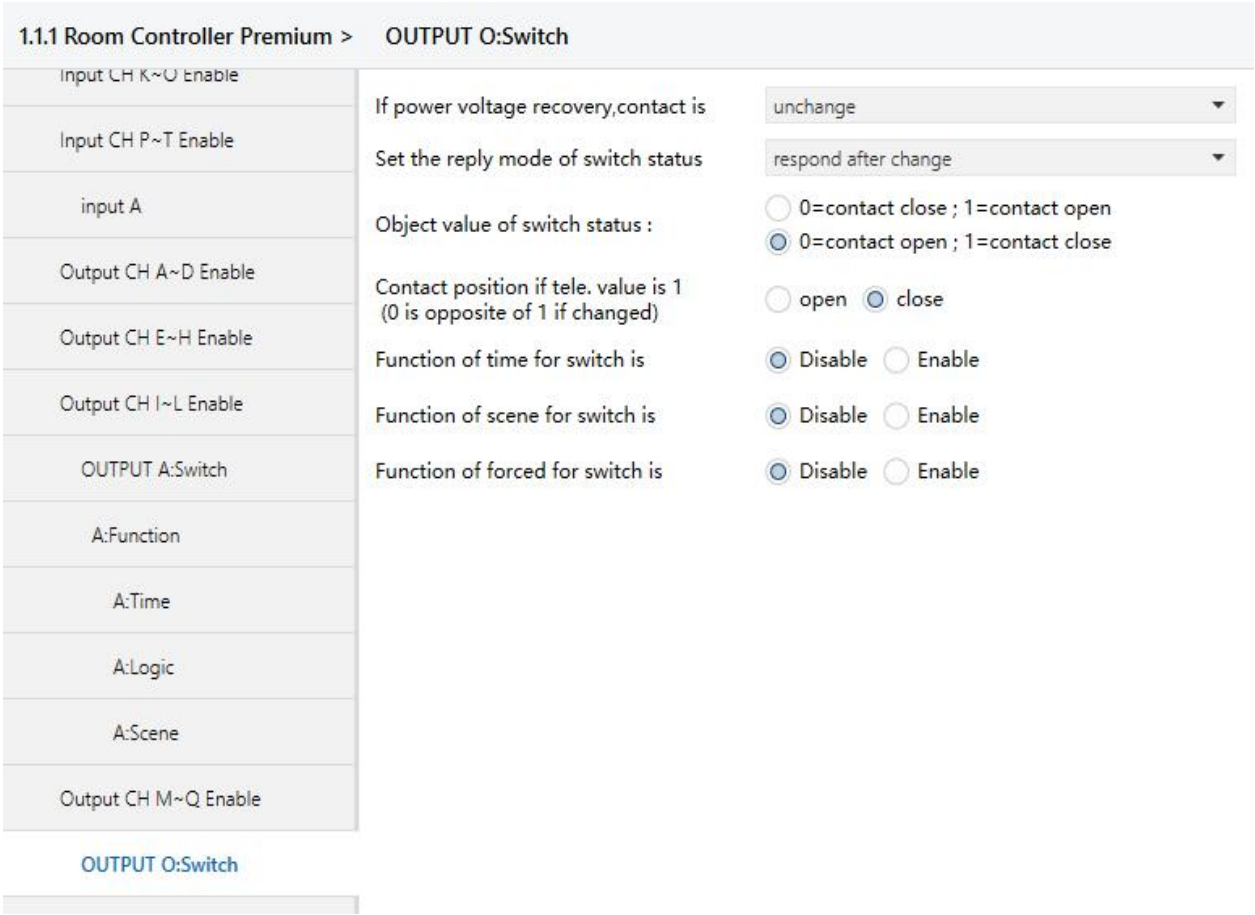


Fig. 5.38 Parameter setting interface of “Switch- outputs O,P,Q”

5.8 HVAC system (R~U)

This chapter introduces HVAC system of the valve control unit, following the fan control of the previous section. The room controller can be used to control 2-pipe, 3-pipe or 4-pipe system. The fan and the HVAC system can be parameterized independently. Therefore, when we use the room controller to control the valve, we need to consider both the fan and HVAC system parameter settings and reasonably set them in order to the two parts to better work together.

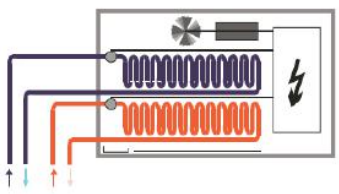
The valve is the end product of central air-conditioning, thus the function of the room controller is mainly used in places with central air-conditioning, to give a room heating, cooling and ventilation.

Pipe systems description:

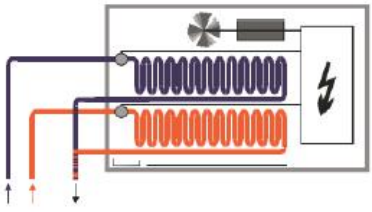
In daily life, a fan coil unit can be configured as a 4-, 3- or 2-pipe system.

The 2 pipe system consists of just a single water circuit, which is heated or cooled alternately to suit the season. In a 2 pipe fan coil unit, there is only one heat exchange with a valve for heating or cooling, the control value for heating or cooling is provided by a thermostat, only warm or only cold water is supplied centrally to the pipe system. Connections of 2 pipe system: the fan and the valve HEATING (output R, S), the valve COOLING (output T, U) is not usable or independently usable. In many HVAC systems, cooling is undertaken exclusively with a 2 pipe fan coil unit. The heating function is undertaken by a conventional heater or an electrical heater in the fan coil unit.

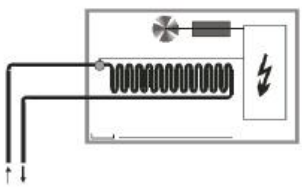
The 3 pipe system has a similar design to the 4 pipe system. It has a separate inlet for heating and cooling water as well as two separate heat exchangers with one valve each. In contrast to a 4 pipe system the 3 pipe system has a common return flow for heating or cooling water. In a 4 pipe system, separate water circulation loops are used for heating and cooling water. Thus there are also two separate heat exchangers for heating and cooling which are each triggered via a valve. Warm and cold water is provided centrally to two separate pipe system. The thermostat onsite decides if heating or cooling is applied. Connections of 3-, 4-pipe system: the fan, the valve HEATING (output R, S) and the valve COOLING (output T, U).



4 pipe system



3 pipe system



2 pipe system

All settings for the control input are undertaken in the follow parameter window.

5.8.1 Parameter window “HVAC General”

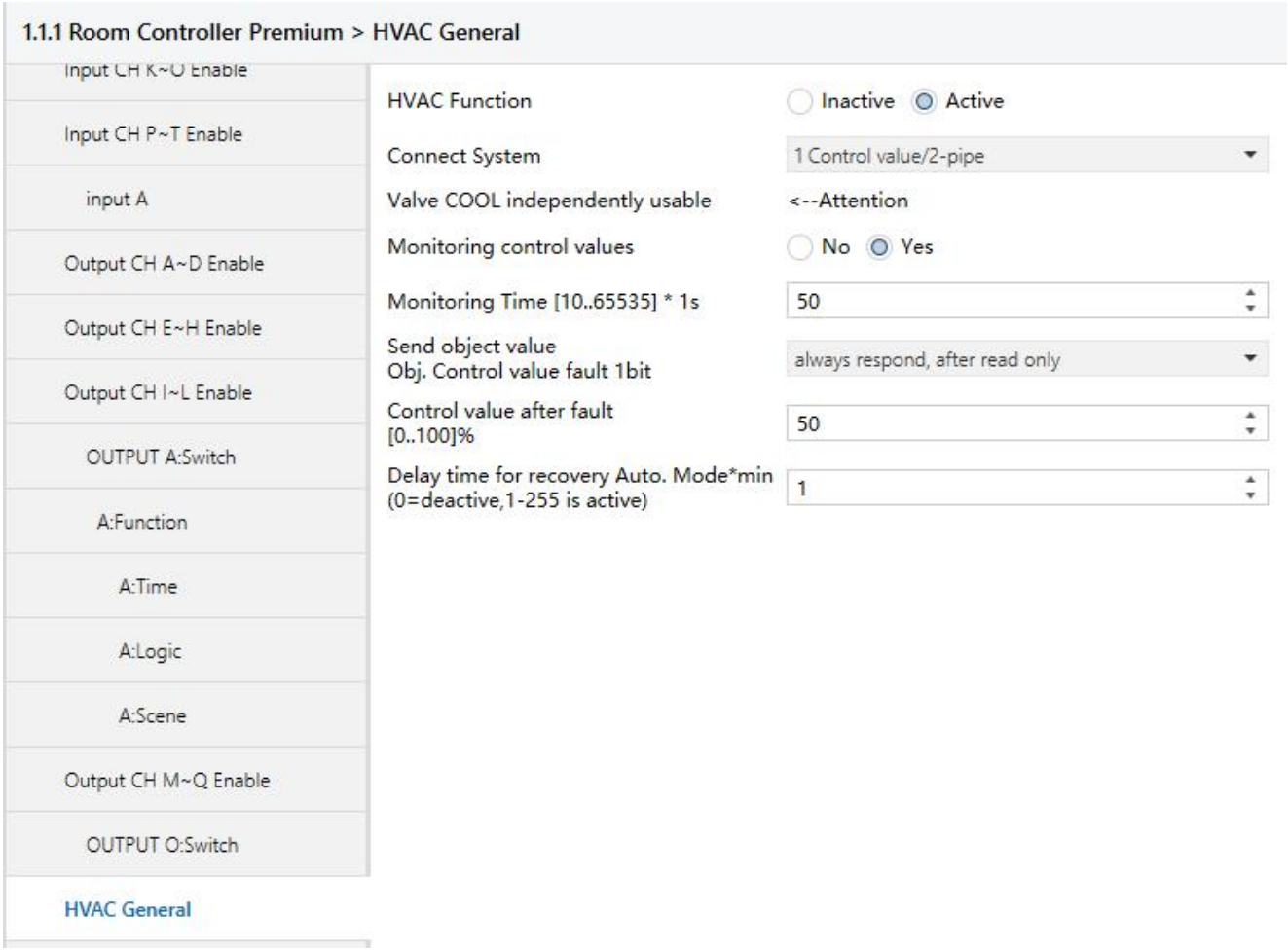


Fig. 5.39 parameter setting of “HVAC General”

-- Parameter "Connect System"

This parameter defines the pipe system that is used with the room controller. Options:

1 Control value/2-pipe

1 Control value/4-pipe with switch obj.

2 Control value/2-pipe

2 Control value/2-pipe with switch obj.

2 Control value/4-pipe

The individual functions are described in the following chapters.

If a valve is deactivated due to a conversion of the HVAC system, the valve will be fully closed.

-- Parameter "Monitoring control values"

Options:

Yes

No

Yes: the fault monitoring is enabled, and the communication object “Fault control value” appears. Hereby a thermostat can be cyclically monitored, if the control signal from the thermostat is not received in monitoring time, the room controller will send a fault report via the object “Fault control value”, and perform a valve adjustment according to parameter setting.

With option yes, the following parameters appear:

-- Parameter “Monitoring Time [10…65535]”1s”

With this parameter, the monitoring time can be set, which used to monitor all telegrams on the input/setting values of the room controller is set : communication objects “HVAC-General HEAT/COOL”,“HVAC-General COOL” or “HVAC-General HEAT”. If a setting variable is not received within the parameterized time, a communication malfunction has occurred and a faulty valve adjustment is activated. Options: **10…65535 s**

Note: It must be assured that the monitoring time is set to at least factor 3 larger than the set sending time of the thermostat so that the valve is not immediately adjusted to the position of occurred fault due to the negligible omission of a signal, e.g. due to a high bus load.

-- Parameter “Send object value Obj. “Control value fault” 1bit”

The parameter defines how to respond a fault report. Options:

No reply

Transmit after change

Always respond, after read only

With the “no reply”, the status is not sent, and the object “control value fault” value is always 0.

With the “transmit after change”, the status is send after a change or a request.

With the “always respond, after read only”, the status is only sent after a request.

-- Parameter “Control value after fault [0…100%]”

With the parameter, the reaction of the room controller to a setting value not received can be defined. Options: **0…100%**

-- Parameter “Delay time for recovery from Auto. Mode”min”

The Parameter defines delay time from manual mode to automatic mode for valve control, that is said valve control function will run at automatic mode after the delay time from the last manually

control.Options:**0…255**

Note: If the value is set as "0",this function will be deactivated. In this case, if manual function is not cancelled after manually control(long operation the button K(HEAT) or L(COOL) can cancel manual function),the valve can't be controlled by other devices.

If a control signal from the thermostat is not received in monitoring time, the room controller will perform a valve adjustment according to the control value of the parameter setting.

5.8.1.1 1 Control value/2-pipe

The 2-pipe system is only with a control object that is used to control the heating valve. The cooling valve can be used additionally and independently via an extra communication object. The advantage of this way can achieve some rooms heating, while other some rooms cooling.

-- Parameter "Valve COOL independently usable"

The parameter serves as a remark that the cooling valve can be used independently.

Valve COOLING

The cooling valve can be controlled additionally and independently via the communication object "HVAC-General COOL", and it is not monitored in the process.

In the case of the valve control mode "Continuous, PWM", output U is effective.

In the case of the valve control mode "3 point, open and close", output T is used to close the valve (100%→0%), output U is used to open the valve (0%→100%).

Valve HEATING

Via the communication object "HVAC-General HEAT/COOL" the heating valve and the fan can be controlled.

In the case of the valve control mode "Continuous, PWM", output S is effective.

In the case of the valve control mode "3 point, open and close", output R is used to close the valve (100%→0%), output S is used to open the valve (0%→100%).

5.8.1.2 1 Control value/4-pipe with switch obj.

The 4-pipe system is only with a control object that is used to control the heating valve and the cooling valve. And toggle between the heating valve and the cooling valve is implemented via a separate communication object.

-- Parameter "Toggle by separately object"

The parameter serves as a remark that between the heating valve and the cooling valve can be toggled via a separate object.

Valve HEATING/ Valve COOLING

Via the communication object "HVAC-General HEAT/COOL" the heating/cooling valve and the fan can be controlled.

And toggle between the heating valve and the cooling valve is implemented via the separate communication object "HVAC-General Toggle HEAT/COOL". The corresponding inactive valve is thus automatically closed when toggled. The control value is updated after the valve enabled, for example, the object "HVAC-General HEAT/COOL" receives a control value of 40% during heating, and the cooling still maintains its last control value until it is enabled. I.e. the cooling control value is updated to 40% after it is enabled.

When the object "HVAC-General HEAT/COOL" receives a control value or the object "HVAC-General Toggle HEAT/COOL" receives a toggle value, the monitoring time is re-started. After bus voltage recovery if the heating and the cooling is toggled, the fault is also reset instead of maintain.

During the heating, the communication object that is used for disable the cooling is unusable, so the value that it receives is invalid, and vice versa.

In the case of the valve control mode "Continuous, PWM", output S is effective in the heating operation; output U is effective in the cooling operation.

In the case of the valve control mode "3 point, open and close", if the heating operation, output R is used to close the valve (100%→0%), output S is used to open the valve (0%→100%). If the cooling operation, output T is used to close the valve (100%→0%), output U is used to open the valve (0%→100%).

-- Parameter "Operation HEAT/COOL after power recovery"

With the parameter, the reaction after power voltage recovery is set. Options:

Unchanged

HEAT

COOL

Unchanged: After bus voltage recovery, the state that existed before bus voltage failure is

re-established.

HEAT: After bus voltage recovery, the heating state is set.

COOL: After bus voltage recovery, the cooling state is set.

Note: After download parameters, the heating state is set by default.

-- Parameter "Object value for 'Toggle HEAT/COOL obj.'"

With the parameter you set the object value used to toggle between heating and cooling. Options:

0

1

0: As soon as a telegram value 0 is received, heating is activated and cooling is deactivated.

1: As soon as a telegram value 1 is received, heating is activated and cooling is deactivated.

5.8.1.3 2 Control value/2-pipe

The 2-pipe system has two control objects act on the heating valve; the cooling valve is not used.

Parameter "Toggle automatically, Valve COOL not usable"

The parameter serves as a remark that between the heating and the cooling can be toggled via automatically, finally, it depends on receiving the control value. and the valve COOLING is not usable. The communication objects in conjunction with the cooling valve, e.g. status, forced operation or valve purge are not effective.

Valve HEATING/ COOLING

Via the communication object "HVAC-General HEAT" or "HVAC-General COOL" the heating valve and the fan can be controlled.

Toggling between heating and cooling is implemented by updating the control values. The control values is updated via the object "HVAC-General HEAT" or "HVAC-General COOL". If its via the object "HVAC-General COOL" to receive the control value, then it indicates the valve in a cooling state at this time. Otherwise, valve is in the heating or cooling status. It dependent on the last active received control value.

When the object "HVAC-General HEAT" or "HVAC-General COOL" receives a control value,

the monitoring time is re-started. When reset for cooling / heating switch, it can reset the fault monitoring as well. After bus voltage recovery if the heating and the cooling is toggled, the fault is also reset instead of maintain.

In the case of the valve control mode “Continuous, PWM”, output S is effective.

In the case of the valve control mode “3 point, open and close”, output R is used to close the valve (100%→0%), output S is used to open the valve (0%→100%).

Parameter “Operation HEAT/COOL after bus recovery”

With the parameter, the reaction after bus voltage recovery is set. Options:

Unchanged

HEAT

COOL

Unchanged: After bus voltage recovery, the state that existed before bus voltage failure is re-established.

HEAT: After bus voltage recovery, the heating state is set. If the reset valve is unchanged, the valve will be adjusted according to the received control value before powered off., regardless of the control value is received by the object "HVAC-General HEAT" or "HVAC-General COOL".

COOL: After bus voltage recovery, the cooling state is set. If the reset valve is unchanged. Then the valve will remain the default state on the current power, regardless of the control value is received by the object "HVAC-General HEAT" or "HVAC-General COOL".

5.8.1.4 2 Control value/2-pipe with switch obj.

The 2-pipe system has two control objects act on the heating valve and the cooling valve is not used. At the same time add the object for switching heating / cooling.

Parameter “Toggle by separately object, Valve COOL not usable”

The parameter serves as a remark that between the heating and the cooling can be toggled via a separate object, and the valve COOLING is not usable. The communication objects in conjunction with the cooling valve, e.g. status, forced operation or valve purge are not effective as well.

Valve HEATING/ COOLING

Via the communication object “HVAC-General HEAT” or “HVAC-General COOL” the heating valve and the fan can be controlled.

Cooling control value updated via the objects "HVAC-General COOL". Heating control value

updated via the objects "HVAC-General HEAT". To realize switching the object of cooling / heating via "HVAC-General Toggle HEAT / COOL". If the current status is heating and the control value of 50%,when the status is toggled to cooling, the valve is still adjusted according to 50% until the object “HVAC-General COOL” received a new control value, then the valve adjusted according to the latest control value. During heating mode, the control value that is received via the object “HVAC-General COOL” is invalid, and vice-versa.

When the object “HVAC-General HEAT” or “HVAC-General COOL” receives a control value, the monitoring time is re-started. When switching the cooling/heating via an object "HVAC-General Toggle HEAT / COOL". It can reset the fault monitoring as well.

Note: If the received control value is invalid, the fault is not reset.

In the case of the valve control mode “Continuous, PWM”, output S is effective.

In the case of the valve control mode “3 point, open and close”, output R is used to close the valve (100%→0%), output S is used to open the valve (0%→100%).

Parameter "Operation HEAT/COOL after power recovery"

With the parameter, the reaction after power voltage recovery is set. Options:

Unchanged

HEAT

COOL

Unchanged: After power voltage recovery, the state that existed before power voltage failure is re-established.

HEAT: After power voltage recovery, the heating state is set.

COOL: After power voltage recovery, the cooling state is set.

Parameter "Object value for 'Toggle HEAT/COOL obj.'"

With the parameter you set the object value used to toggle between heating and cooling. Options:

0

1

0: As soon as a telegram value 0 is received, heating is activated and cooling is deactivated.

1: As soon as a telegram value 1 is received, heating is activated and cooling is deactivated.

5.8.1.5 2 Control value/4-pipe

The 4-pipe system has two control objects, one act on the heating valve, and other one act on the cooling valve.

Parameter "Toggle automatically"

The parameter serves as a remark that between the heating and the cooling can be toggled via automatically. It is determined by the last control value received.

Valve HEATING/ Valve COOLING

Via the communication object "HVAC-General HEAT" or "HVAC-General COOL" the heating /cooling valve and the fan can be controlled.

Toggling between heating and cooling is implemented by updating the control values.The control values is updated via the object "HVAC-General HEAT" or "HVAC-General COOL". If its via the object "HVAC-General COOL" to receive the control value, then it indicates the valve in a cooling state at this time. Otherwise, valve is in the heating or cooling status. It dependent on the last active received control value.

When the object "HVAC-General HEAT" or "HVAC-General COOL" receives a control value, the monitoring time is re-started. After power voltage recovery if the heating and the cooling is toggled, the fault is also reset instead of maintain.

During the heating, the communication object that is used for disable the cooling is unusable, so the value that it receives is invalid, and vice versa.

In the case of the valve control mode "Continuous, PWM", output S is effective in the heating operation; output U is effective in the cooling operation.

In the case of the valve control mode "3 point, open and close", if the heating operation, output R is used to close the valve (100%→0%), output S is used to open the valve (0%→100%). If the cooling operation, output T is used to close the valve (100%→0%), output U is used to open the valve (0%→100%).

Parameter "Operation HEAT/COOL after power recovery"

With the parameter, the reaction after power voltage recovery is set. Options:

Unchanged

HEAT

COOL

Unchanged: After power voltage recovery, the state that existed before power voltage failure is re-established.

HEAT: After power voltage recovery, the heating state is set.

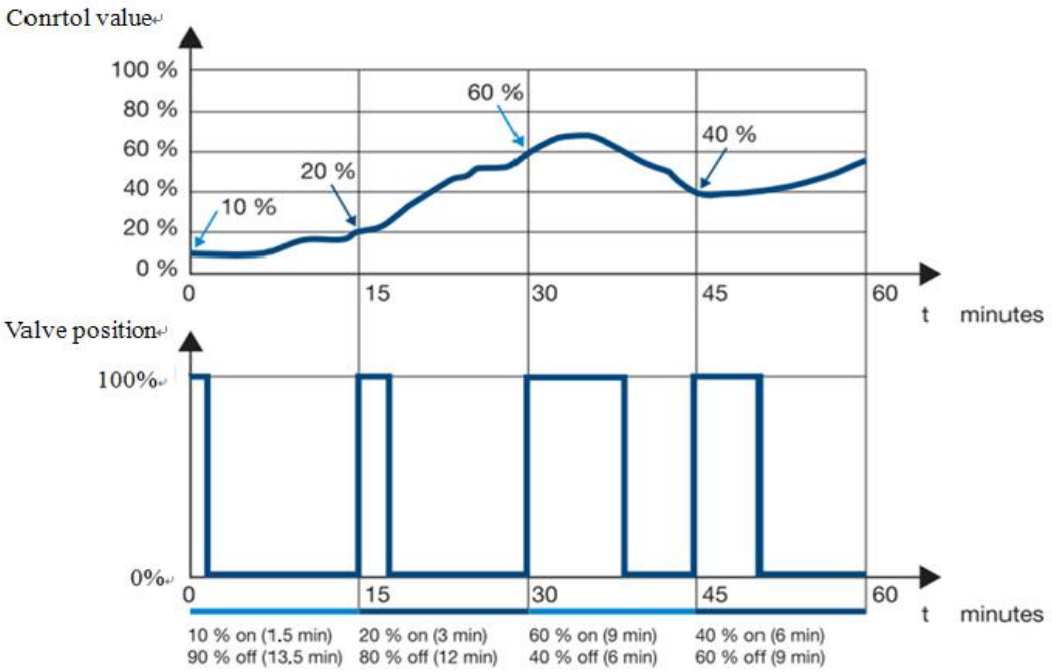
COOL: After power voltage recovery, the cooling state is set.

Note: After download parameters, the heating state is set by default.

5.8.2 Parameter window "OUTPUT R,S---HEATING: Continuous, PWM"

The follow parameters appear if the valve control mode "Continuous, PWM" has been selected. This control type is suitable for driving two-wire valve that one end is connected to the output S (U if cooling valve) and the other end is connected to the N_2 of the power supply.

With PWM, the valve is operated as with 2-point control exclusively in the positions fully opened and fully closed. The valve opening is calculated according to the control value and a cycle time. For example, the room controller receives a control value 20% at a cycle time of 15min, the valve will be opened for 3 minutes and closed for 12 minutes. The control value 60% results in a valve opening time of 9 minutes and closing time of 6 minutes. The control value for heating or cooling is provided by a thermostat. Then send the value to the room controller. PWM control type as follows:



With PWM, a relatively accurate control of the temperature can be achieved without any resulting overshoots. Simple and attractively-priced control valves can be used. The positioning frequency of the control valve is relatively high. PWM can be used with the room controller in conjunction with electron-thermal valve drives. All settings parameters for the PWM as follows:

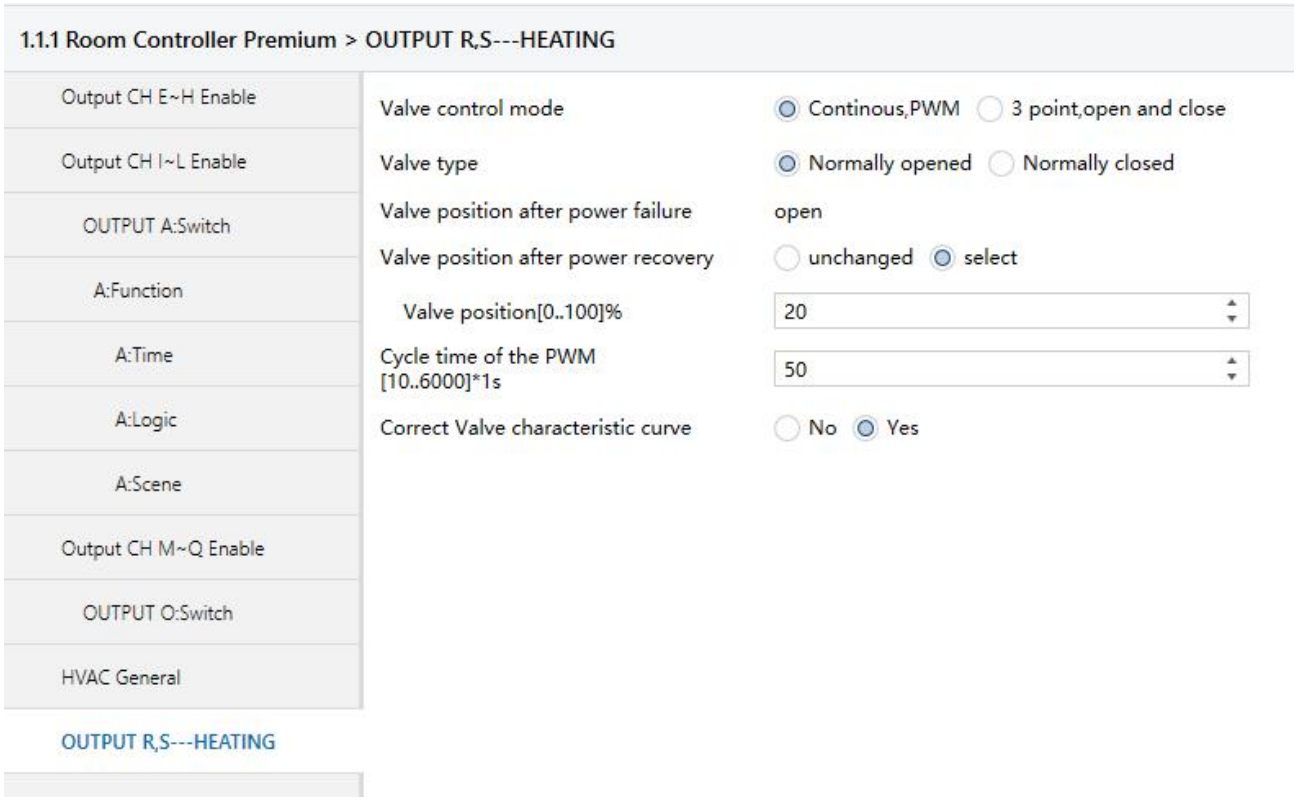


Fig. 5.40 parameter window “HEATING: Continues, PWM”

Parameter “Valve type”

With this parameter, the valve type for the connected valve is set. Options:

Normally opened

Normally closed

Normally opened: If no current flows in the control, circuit the valve is opened. The valve is closed as soon as current flows in the control circuit.

Normally closed: If no current flows in the control, circuit the valve is closed. The valve is opened as soon as current flows in the control circuit.

Parameter “Valve position after power failure”

This parameter serves as a remark that the valve position after power voltage failure.

If the valve type is Normally opened, the valve remains opened at power voltage failure.

If the valve type is Normally closed, the valve remains closed at power voltage failure.

Parameter "Valve position after power recovery"

With this parameter, the position of the valves after power voltage recovery can be set. Options:

Unchanged

Select

Unchanged: After power voltage recovery, the valve position before power voltage failure is remained.

Select: the follow parameter appears.

If the valve characteristic curve correction is enabled, the valve position after power voltage recovery is as a control value to correct.

If there is a higher priority operation before power voltage failure, then after power voltage recovery the operation will be retained. For example, the operation is valve purge before power off, then after power reset the operation is continued and the purge duration time is re-started. The valve position via the parameter setting is executed after the priority operation has been completed. The cycle time of the PWM is also re-time after power voltage recovery.

Note: the download is not as a power reset processing, and the valve position is adjusted to 0%.

The priority of various operations refer to the end of the section 5.8.3.

-- Parameter "Valve position [0…100%]"

With this parameter, the position of the valves after bus voltage recovery can be set as a percentage. Options: **0…100%**

Parameter "Cycle time of the PWM [10…6000]*1s"

This parameter is used to set the cycle time of the PWM control. If the longer the time, the positioning frequency is lower, the shorter the time, the positioning frequency is higher. Options: **10…6000s**

Parameter "Correct Valve characteristic curve"

The parameter sets whether to enable the valve characteristic curve correction. Options:

Yes

No

Yes: the parameter window "Curve" appears, fig.5.42.

5.8.2.1 Parameter window “HEATING: Function”

Some additional functions can be enabled in the parameter window -- Function.

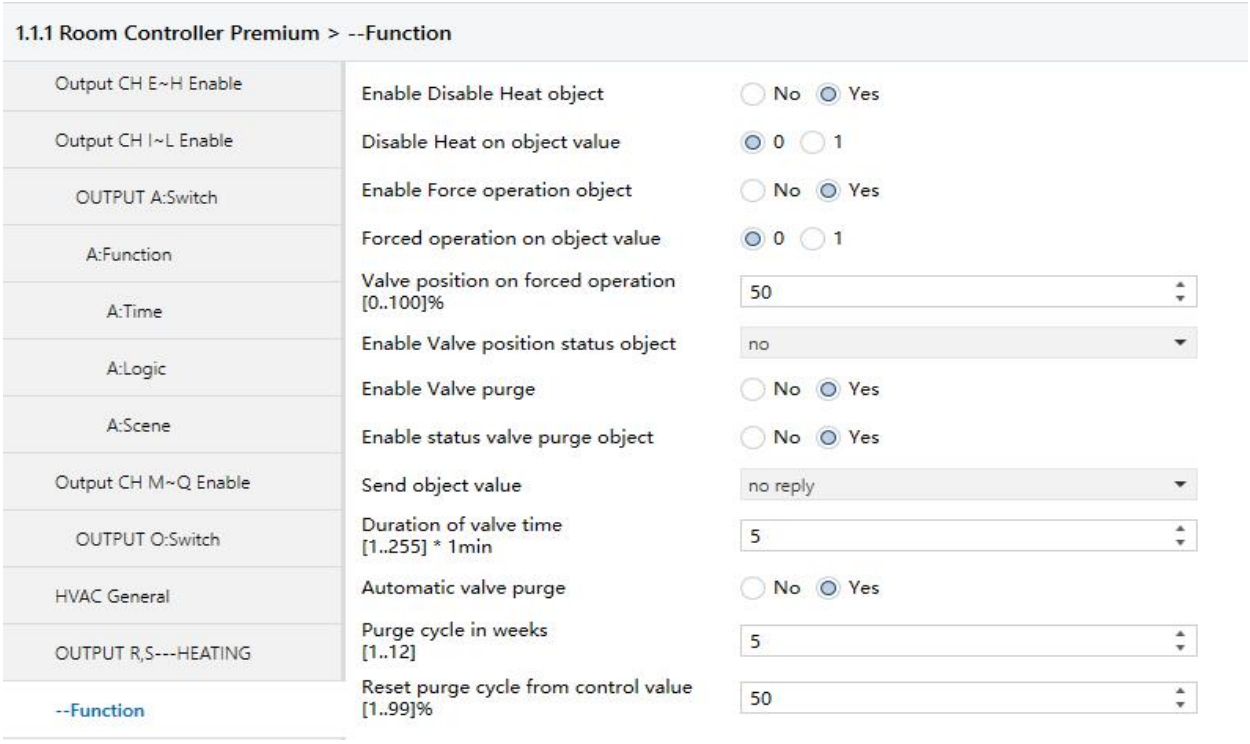


Fig. 5.41 parameter window “HEATING: Function”

Parameter “Enable ‘Disable Heat’ object”

Options:

Yes

No

Yes: The 1 bit communication object “HEAT Disabled” is enabled and is used for blocking the heating valve. And the following parameter appears:

-- Parameter “Disable Heat on object value”

This parameter sets the object value used to block the heating valve. Options:

0

1

1: the heating is disabled by a telegram value 1 of the object “HEAT Disabled” and is enabled by value 0.

0: the heating is disabled by a telegram value 0 of the object “HEAT Disabled” and is enabled by value 1.

Note: when the heating is disabled, the valve position is adjusted to 0%, when it is

enabled again, the operation before disable is restored immediately. During disable, the cycle time of PWM is interrupted, but once again enabled, the time will continue.

In addition, during disable the received telegram is valid, and is executed after enable again, if there is special case, please refer to the chapter 5.6.1 description of piping systems.

-- Parameter "Enable 'Forced operation' object"

Options:

No

Yes

Yes: The 1 bit communication object "HEAT Forced operation" is enabled and can thus be forced operated. And the following two parameters appear:

-- Parameter "Forced operation on object value"

This parameter sets the object value used to forcibly operate the valve. Options:

0

1

1: the Forced operation is activated by a telegram value 1 of the object "HEAT Forced operation" and is canceled by value 0.

0: the Forced operation is activated by a telegram value 0 of the object "HEAT Forced operation" and is canceled by value 1.

-- Parameter "Valve position on force operation [0…100%]"

With this parameter, the forced operation of the valve position is set. Options: 0…100%

If the valve characteristic curve correction is enabled, the valve position on force operation is as a control value to correct.

-- Parameter "Enable 'Valve position status' object"

Options:

No

1bit

1byte

1bit: the follow two parameters appear, a 1 bit communication object "HEAT Valve position status " also appears, which is used to indicate the valve status.

-- Parameter "Send object value when"

The parameter defines how to respond the valve status. Options:

No reply

Transmit after change

Always respond, after read only

With the "no reply", the status is not sent, and the object "HEAT Valve position status" value is always 0.

With the "transmit after change", the status is send after a change or a request. The object "HEAT Valve position status" send a telegram to the bus to indicate the current status.

With the "always respond, after read only", the status is only sent after a request.

-- Parameter "Object value with valve position >0"

Options:

0

1

In "Continues control, PWM", the status information as follows:

The valve types	options	Description
Normally opened	0	If no current flows in the control circuit (valve opened), the object "HEAT Valve position status" sends a telegram "0"; if current flows (valve closed) with telegram "1".
	1	If no current flows in the control circuit (valve opened), the object "HEAT Valve position status" sends a telegram "1"; if current flows (valve closed) with telegram "0".
Normally closed	0	If current flows in the control circuit (valve opened), the object "HEAT Valve position status" sends a telegram "0"; if no current flows (valve closed) with telegram "1".
	1	If current flows in the control circuit (valve opened), the object "HEAT Valve position status" sends a telegram "1"; if no current flows (valve closed) with telegram "0".

In "3 point, open and close", if the valve position>0, the object "HEAT Valve position status" sends a telegram "1"; if the valve position is fully closed(=0) with telegram "0".

1byte: the follow parameter appears, a 1 byte communication object "HEAT Valve position status " also appears, which is used to indicate the valve position status.

-- Parameter "Send object value when"

The parameter defines how to respond the valve position status. Options:

No reply

Transmit after change

Always respond, after read only

With the "no reply", the status is not sent, and the object "HEAT Valve position status" value is always 0.

With the "transmit after change", the status is send after a change or a request.

With the "always respond, after read only", the status is only sent after a request.

Note: In "3 point, open and close", the valve position status is updated when the valve position is changed.

In "Continues control, PWM", the valve position status is also updated when the valve position is changed. So when the device receives a new control value, the valve position is not changed immediately until last PWM valve adjustment has completed. Because only when last PWM valve adjustment has completed, the valve position adjustment is carried out according to the new control value, even if there is different priority operation (except the disable heating/cooling operation and the valve purge are carried out immediately. But when the heating/cooling is re-enabled or the valve purge has completed, the last PWM valve adjustment is still continue, and then enter a new adjustment when it has completed).

Parameter "Enable Valve purge"

Options:

Yes

No

Yes: a 1bit communication object "HEAT Trigger valve purge" is enabled, which is used to trigger the valve purge operation. If there is not a higher priority operation, it will be executed immediately after trigger. The follow parameters appear.

-- Parameter "Enable 'status valve purge' object"

Options:

Yes

No

Yes: a 1 bit communication object “HEAT Status valve purge” is enabled, which is used to indicate the valve purge status. And the follow parameter appears:

-- Parameter “Send object value”

Options:

No reply

Transmit after change

Always respond, after read only

With the “no reply”, the status is not sent, and the object “HEAT Status valve purge” value is always 0.

With the “transmit after change”, the status is send after a change or a request.

With the “always respond, after read only”, the status is only sent after a request.

-- Parameter “Duration of valve time[1…255]*1min”

The time duration for the valve purge is set with this parameter. In this time the valve is fully opened, i.e. the valve position for purging is always 100%. When the time has elapsed, the state before the purge is re-established. Options: **1…255min**.

If the heating/cooling is disabled during valve purge, the purge is interrupted, and the time is also interrupted, but the heating/cooling is restored, the purge will be continued and the time is extended.

-- Parameter “Automatic valve purge”

Options:

Yes

No

Yes: the following parameters appear.

-- Parameter “Purge cycle in weeks [1…12]”

The parameter defines the cycle in weeks for automatic purging. The counter starts to run when the parameter is downloaded (except “3 point, open and close”, it is started from the valve position is determined). When the time has passed, the purging is triggered. The time is reset as soon as purging is completed. This can occur either via automatic purging or via the communication object “HEAT Trigger valve purge” (If during purging, the purging process is interrupted, e.g. via the object, the purging duration time is not reset, but the process has been recorded, and when the cycle for automatic purging is arrived, the process continue to be completed.). The power voltage failure time

is not considered. After power voltage recovery, the cycle continues. But the timer is 2 min as a unit, that is, if the timing is not 2min before power voltage failure, it will not be accumulated to the cycle. For example, the timed 3min before power power off, then after power reset, the recorded time is only 2min. Options:**1…12**

-- Parameter "reset purge cycle from control value [1…99] %"

Hereby the purge cycle from the set control value is reset. If the current valve position is greater than the parameterized value, the purge cycle is reset.

5.8.2.2 Parameter window “HEATING: Curve”

The parameter window “Curve” is visible if in parameter window 5.40 the parameter “Correct Valve characteristic curve” has been selected with the option yes, which is used to correct the valve characteristic curve. Parameter description as follows:

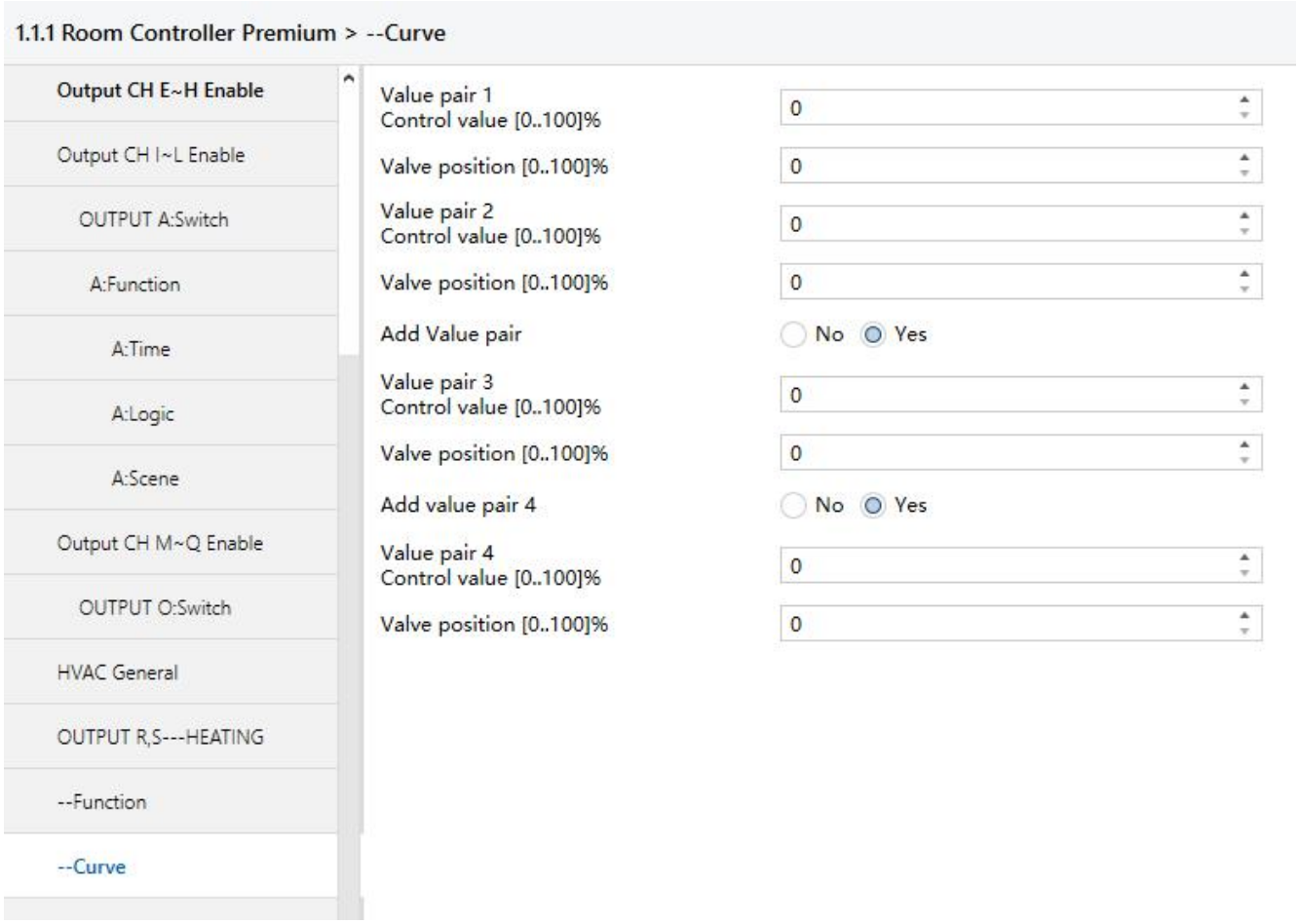


Fig. 5.42 parameter window “HEATING: Curve”

Value pair 1

-- Parameter "Control value [0…100] %"

The parameter sets the lower limit control value of the curve. Options: **0…100%**

-- Parameter "Valve position [0…100] %"

The parameter sets the lower limit valve position of the curve. Options: **0…100%**

Value pair 2

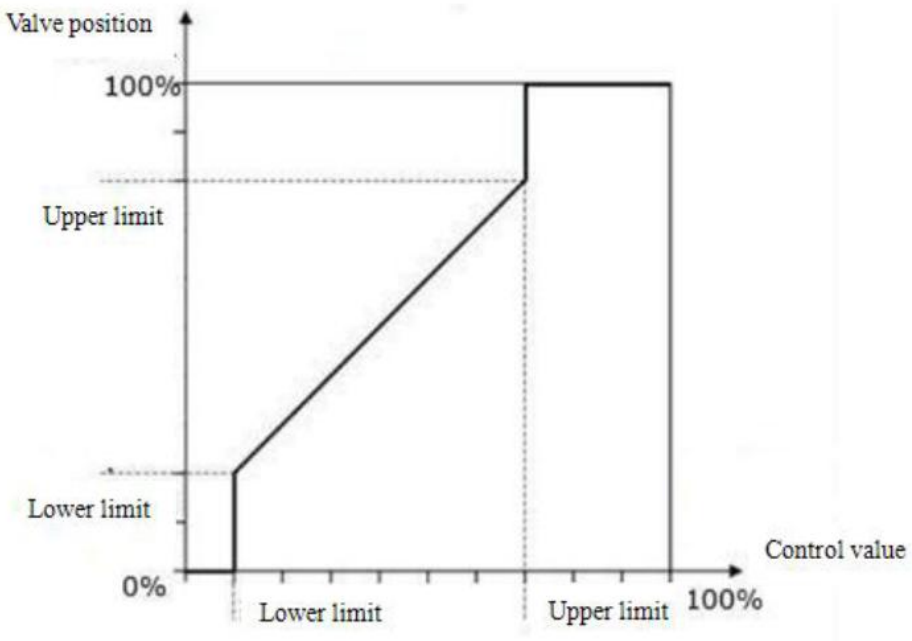
-- Parameter "Control value [0…100] %"

The parameter sets the upper limit control value of the curve. Options: **0…100%**

-- Parameter "Valve position [0…100] %"

The parameter sets the upper limit valve position of the curve. Options: **0…100%**

Assume that the lower limit control value is 10%, the lower limit valve position is 20%, the upper limit control value is 70% and the upper limit valve position is 80%, there is shown below the valve characteristic curve:



When the control value is less than 10%, the valve is fully closed; the control value is greater than 70%, the valve is fully opened; the control value is between 10% to 70%, the valve opening range is 20% to 80% and the valve control is a linear curves. The positioning frequency of the valve drive may be reduced by limitation of the active valve opening range and the control value, for example, a valve movement with a minimal heating or cooling requirement can be avoided. And the

service life of the valve can be increased by the function, and the valve noise at low flows can be reduced, because many valves emit an annoying whistling sound at low flows. However, a reduced positioning frequency will also impair the accuracy of the temperature control.

In addition, the valve characteristic curve through the following parameters can be further corrected.

Parameter "Add Value pair"

Options:

Yes

No

Yes: a further value pair can be set. The value pair 1 can be further corrected by the Value pair 3.

——Value pair 3

Parameter "Control value [0…100] %"

Options: **0…100%**

Parameter "Valve position [0…100] %"

Options: **0…100%**

Parameter "Add Value pair"

Options:

Yes

No

Yes: a further value pair can be set.

The value pair 2 can be further corrected by the Value pair 4.

——Value pair4

Parameter "Control value [0…100] %"

Option: **0…100%**

Parameter "Valve position [0…100] %"

Option: **0…100%**

Note: the control value and valve position of Value pair 1 must be less than Value pair 2 settings, and the value pair 3 settings must be less than the value pair 4 settings. The value

pairs 1 and 2 are used to correct the valve characteristic curve. While the value 3 and 4 are used to correct further the corrected curve.

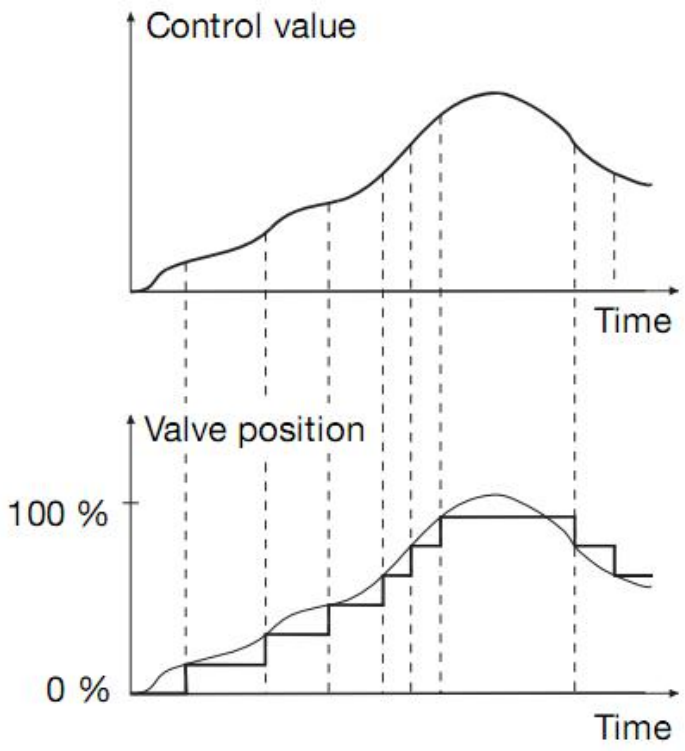
If the control value is entered as a percentage, the corrected valve characteristic curve will be a little deviation, typically deviation within 2%.

5.8.3 Parameter window "OUTPUT R,S---HEATING: 3 point, open and close"

The follow parameters appear if the valve control mode "3 point, open and close" has been selected. This control type is suitable for driving 3-point valve that one end is connected to the output R, S (T, U if cooling valve) and the other end is connected to the N2 of the power supply.

With "3 point, open and close", a control value is calculated, based on the target temperature and the actual temperature, and is the most precise form of temperature control. The valve is brought to a position, which complies with the calculated control value, for example, the control value of 20%, and then the valve position will be opened to 20% and stopped. With this method, the valve can be fully opened, fully closed and even positioned in every intermediate position, and the position frequency of the valve drive can be kept low.

The control value for heating or cooling is provided by a thermostat. "3 point, open and close" control type as follows:



All settings parameters for the “3 point, open and close” as follows:

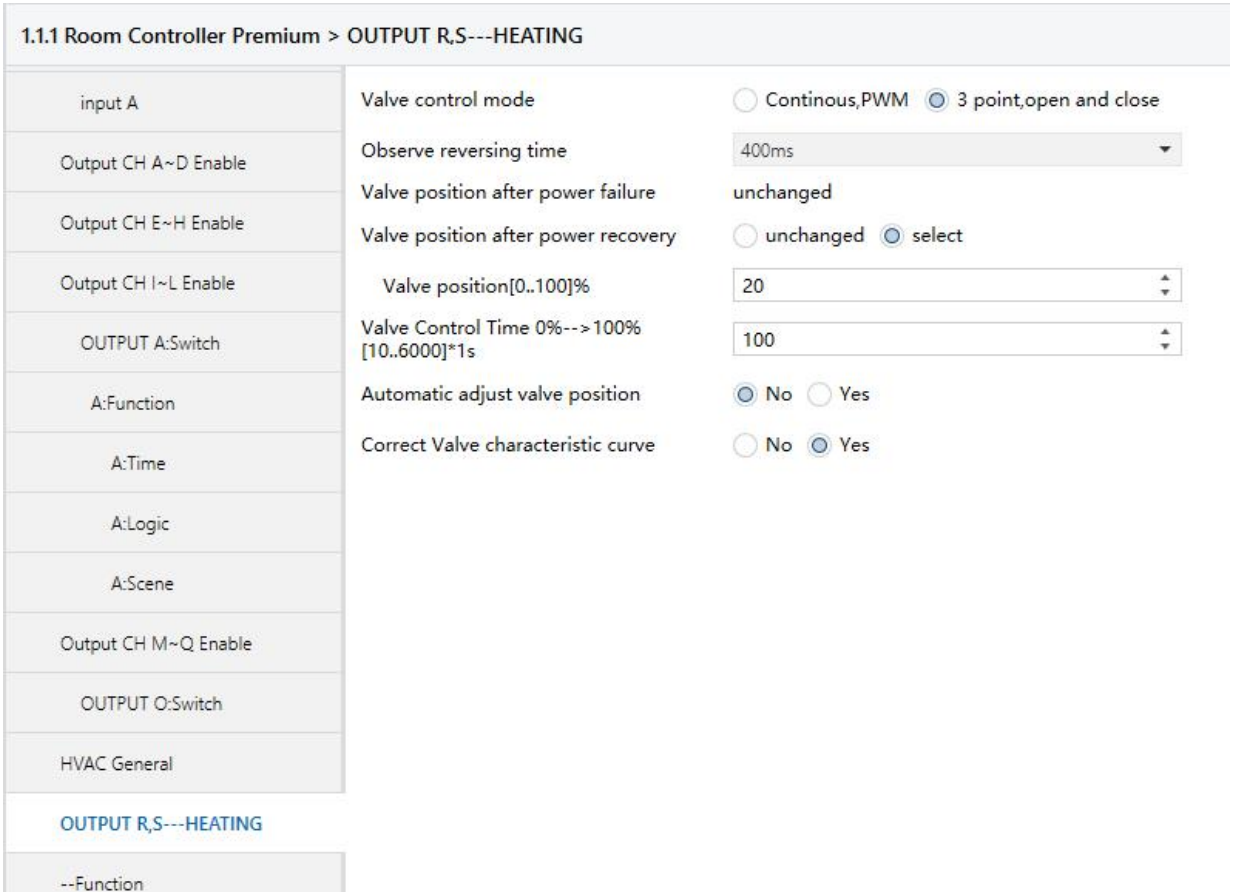


Fig. 5.43 parameter window “HEATING:3 point, open and close”

Parameter “Observe reversing time”

A reversing pause time is set via this parameter. It is helpful to protect the valve. Options:

0/100ms/200ms/…/1s/1.2s/1.5s

This time is a technical data of the valve and it is always taken into consideration.

Parameter “Valve position after power failure”

The parameter serves as a remark that the valve remains unchanged at its position with a power voltage failure.

Parameter “Valve position after power recovery”

With this parameter, the position of the valves after power voltage recovery can be set. Options:

Unchanged

Select

Unchanged: After power voltage recovery, the valve position before power voltage failure is

remained. If the valve action has not completed before power voltage failure, it will be executed continually after power voltage recovery until completed.

Select: the follow parameter appears.

Note: the download is not as a power reset processing, and the valve position is adjusted to 0%. Only when the valve position to 0%, the valve position is determined, then the further operation can be carried out. For example, the parameter valve position is 50% after power reset, but if the valve position is not determined before power power off, then after power reset the valve is firstly adjusted to 0%, then to 50%. If the position is determined, the valve is directly adjusted to 50%.

In 3 point, open and close, the cycle for automatic purging is started from the valve position is determined.

-- Parameter "Valve position [0…100%]"

With this parameter, the position of the valves after power voltage recovery can be set as a percentage. Options: **0…100%**

-- Parameter "Valve control time 0%→100% [10…6000]*1s"

With the parameter, a time that the connected valve requires to move from position 0% (valve fully closed) to position 100% (valve fully opened) can be set, that is the total travel time. Options: **10…6000s.**

For example, the time is 180s, the current valve position is at 20%, the target position is 60%, then the travel time of the valve will need 72s from 20% to 60%.

The time should be taken from the technical data of the valve.

-- Parameter "Automatic adjust valve position"

With this parameter enable automatically adjust valve position. Options:

Yes

No

Yes: The following parameter appears.

This function is mainly used to correct the valve position, for example, the valve is not fully opened or closed after long working hours due to various reasons lead to the valve position slight inaccuracies, such temperature, aging of the device etc. So it needs to be re-positioned via the function.

-- Parameter "Number of valve controls up to adjustment [1...65535]"

With this parameter, the number of operations (valve controls), after which automatic adjustment is undertaken, can be set. Options: **1…65535**

When the automatic adjustment is executed, the valve is fully closed, and the closing position is exceeded by 5% of the total time, max. One minute.

Assuming that the parameter value is 100, when the number of valve controls arrived to 100, if the valve is adjusted to the opening direction on the 101st adjustment, then the automatic adjustment is not executed, if to the closing direction, the automatic adjustment will be executed, and the valve is adjusted to the position 0%, and then adjusted to the target position. For example, on the 100st the valve position is 50%, if the 101st the valve position is 60%, the valve position is adjusted directly to 60% and do not execute an automatic adjustment until a reversal control value is received. If the 101st the valve position is 40%, an automatic adjustment is undertaken and the valve is adjusted to the position 0%, and then adjusted to the target position 40%.

After the automatic adjustment, the adjustment counter is set to 0. The adjustment counter is incremented by 1 every time the valve stops (the positioning adjustment after parameter download is not included). The automatic adjustment can not be interrupted, except there are higher priority operations and the adjustment will be performed later.

In the case of 2-pipe system, the adjustment counter does not differentiate between the heating and the cooling.

The number should be taken from the technical data of the valve manufacturer.

-- Parameter "Correct Valve characteristic curve"

The parameter sets whether to enable the valve characteristic curve correction. Options:

Yes

No

Yes: the parameter window “Curve” appears, fig.5.42.

The priority of various operations for HVAC system:

Initialization (after parameter download)→disable heating/cooling→forced operation→purging valve→valve automatic adjustment(only apply to 3point,open and close)→fault monitoring, bus reset or general operation(general operation is triggered via objects "HVAC-General HEAT/COOL", "HVAC-General HEAT" or "HVAC-General COOL")

The following applies with priority operations:

1、During fault, if heating/cooling is disabled, the fault status is still remained, except a control value is received via objects "HVAC-General heat/cool", "HVAC-General heat" or "HVAC-General cool" or switchover the heating/cooling. During disable heating/cooling, the valve position is 0% and can be adjusted. And the fault monitoring is only used to monitor telegrams from the objects "HVAC-General heat/cool", "HVAC-General heat" or "HVAC-General cool". The valve purging status is similar, during purging if there are higher priority operations to occur, the status is also remained, and the purging will be continued to perform after high priority operations end.

2、Forced operation, fault monitoring, bus reset and general operation need to consider curve correction, other operations regardless of the curve.

3、If more than one operation is active at the same time, the valve will be adjusted in accordance with their priority. For example, currently there are the forced operation, valve purging and general operation, when the forced operation is canceled, the valve purging will be performed, when the valve purging has been completed, the general operation will be performed.

5.8.4 Parameter window "OUTPUT T,U---COOLING"

The parameter settings of valve cooling are the same with the valve heating. Please refer to description of the parameters in the valve heating chapter.

5.9.2 General dimming

5.9.2.1 Parameter window “X: dimming general”

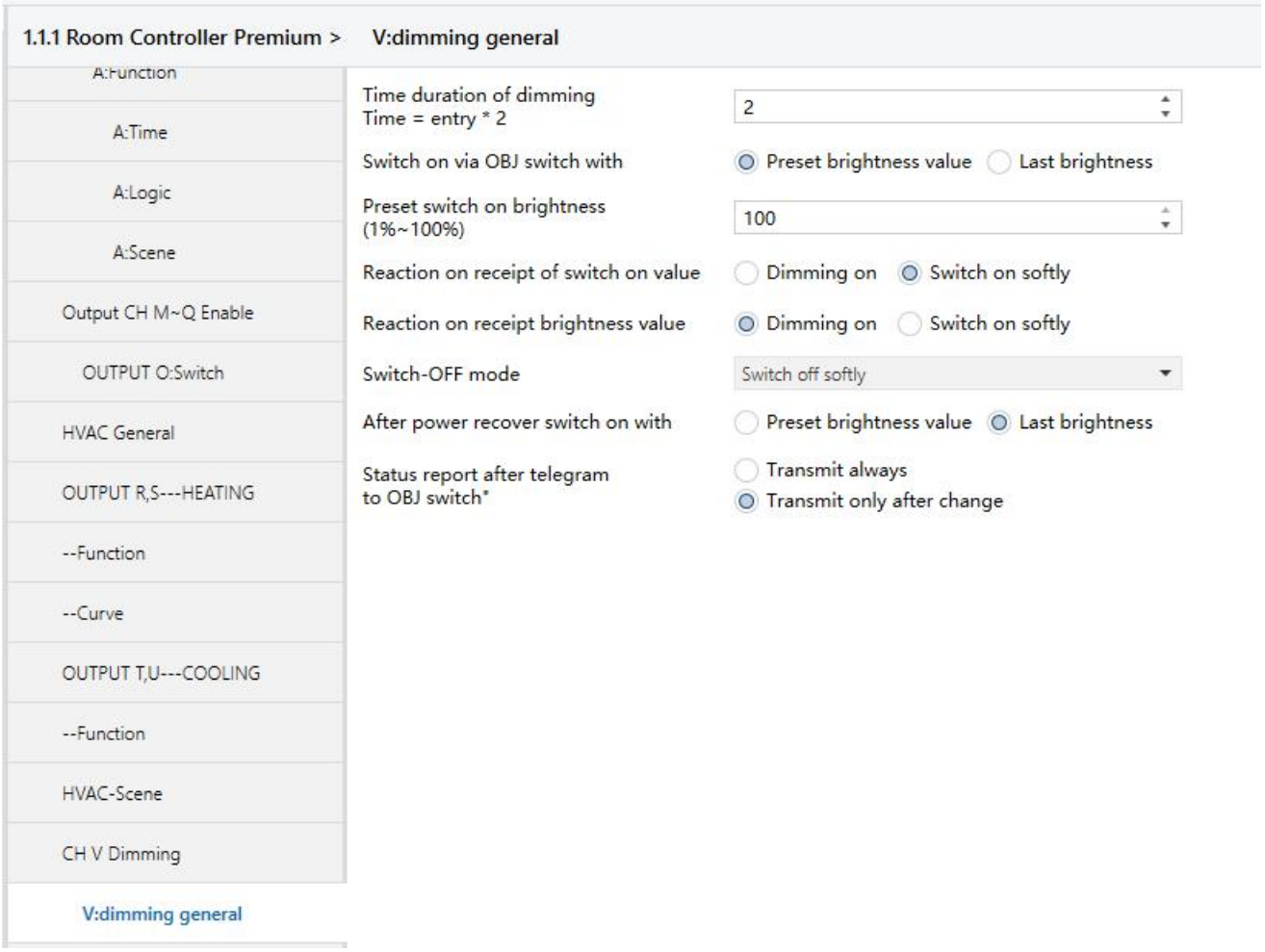


Fig.5.46 parameter window “X: dimming general”

Parameter “time duration of dimming time=entry*2”

It is used to set the duration time of dimming. No matter the lamp is switched on or off via brightness or switch, when choosing dimming on or dimming off in the follow parameters “reaction on receipt of brightness value” and “reaction on receipt of switch on value”, the time is equal to this input value multiply 2 seconds, and the maximum input time is 255s.

Parameter “Switch on via OBJ “switch” with”

It is used to select the brightness value is the last one or the preset one when using the switch mode to switch on the luminaries. Options:

Preset brightness value

Last brightness value

The option “Preset brightness value” means the brightness value is the preset value when switching on the luminaries by switch mode. When the brightness low threshold value is greater than the switch preset value, the brightness value of the luminaries is the low threshold value after switching on; when the switch preset value is greater than the high threshold, the brightness value is the high threshold one after switching on. The high and low threshold of the brightness is shown in the parameter window “X: dimming”, see Fig. 5.32.

The option “Last brightness value” means the brightness value is the last brightness value which is not equal to 0. If the first behavior of switching on the luminaries in switch mode after the BUS reset, and the luminaries after BUS reset are off, so the brightness value is the default brightness value 128; Other cases, the brightness value is the last brightness value which is not equal to 0 on switching mode.

Parameter “Preset switch on brightness(1%~100%)”

It is used to set the brightness value when switch on the luminaries in switch mode, with the setting range 1%~100%.

Parameter “reaction on receipt of switch on value”

It shows the duration time to switch on the luminaries from brightness 0 to 100% viathe switch mode. Options:

Dimming on

Switch on softly

The option “Dimming on” means the time of dimming is the input time multiplies 2 via switch. Then option “Switch softly” means the default dimming time is 4s.

The input time is defined in the parameter “time duration of dimming time=entry*2”.

Parameter “reaction on receipt brightness value”

It is used to set the duration time to switch on the luminaries from brightness 0% to 100% or off the luminaries via the brightness dimming mode. Options:

Dimming on

Switch on softly

The option “Dimming on” means the brightness dimming time is the input time multiplies 2. Then option “switch on softly” means the default dimming time is 4s.

The input time is defined in the parameter “time duration of dimming time=entry*2”.

Parameter "Switch-off mode"

It shows the duration time to switch off the luminaries from brightness 100% to 0% via the switch mode. Options:

Dimming off

Switch off softly

Switch off instantly

The option "Dimming off" means the duration time of switch off is the input time multiplies 2. The option "switch softly" means the default time is 4s. The option "switch off instantly" means the luminaries are switch off immediately.

The input time is defined in the parameter "time duration of dimming time=entry*2".

Parameter "After power recover switch on with"

The parameter defines the behavior after the power reset is the brightness value before power off or the preset value. Options:

Preset brightness value

Last brightness value

The option "Preset brightness value" means the brightness value after the power voltage recovery is the preset brightness value in the parameter "power recover preset brightness value (0%~100%)". If the input preset value is smaller than the low threshold, the value after the power voltage recovery is the low threshold; if the input preset value is greater than the high threshold, the value after the power voltage recovery is the high threshold. The high and low threshold values are shown in the parameter window "X: dimming", see Fig. 5.47.

The option "Last brightness value" means the brightness value is the last value before power off after power voltage recovery. It also carries out a power reset operation after downloading the parameters. Note that the program can not be treated as a power off, so there is no need to focus on the brightness value before programming, but the value before the bus power off. (Power off of the bus need more than 4s, otherwise the last brightness value may not be saved successfully.)

Parameter "Power recover preset brightness value(0%~100%)"

It is used to set the brightness value after the power voltage recovery, and the range is 0%~100%.

Parameter "status report after telegram to obj. "switch""

It is a backup parameter, do not care it.

5.9.2.2 Parameter window “X: dimming”

Parameter window “X:dimming” can be shown in fig. 5.47. Here can set the parameters of the brightness dimming and relative dimming.

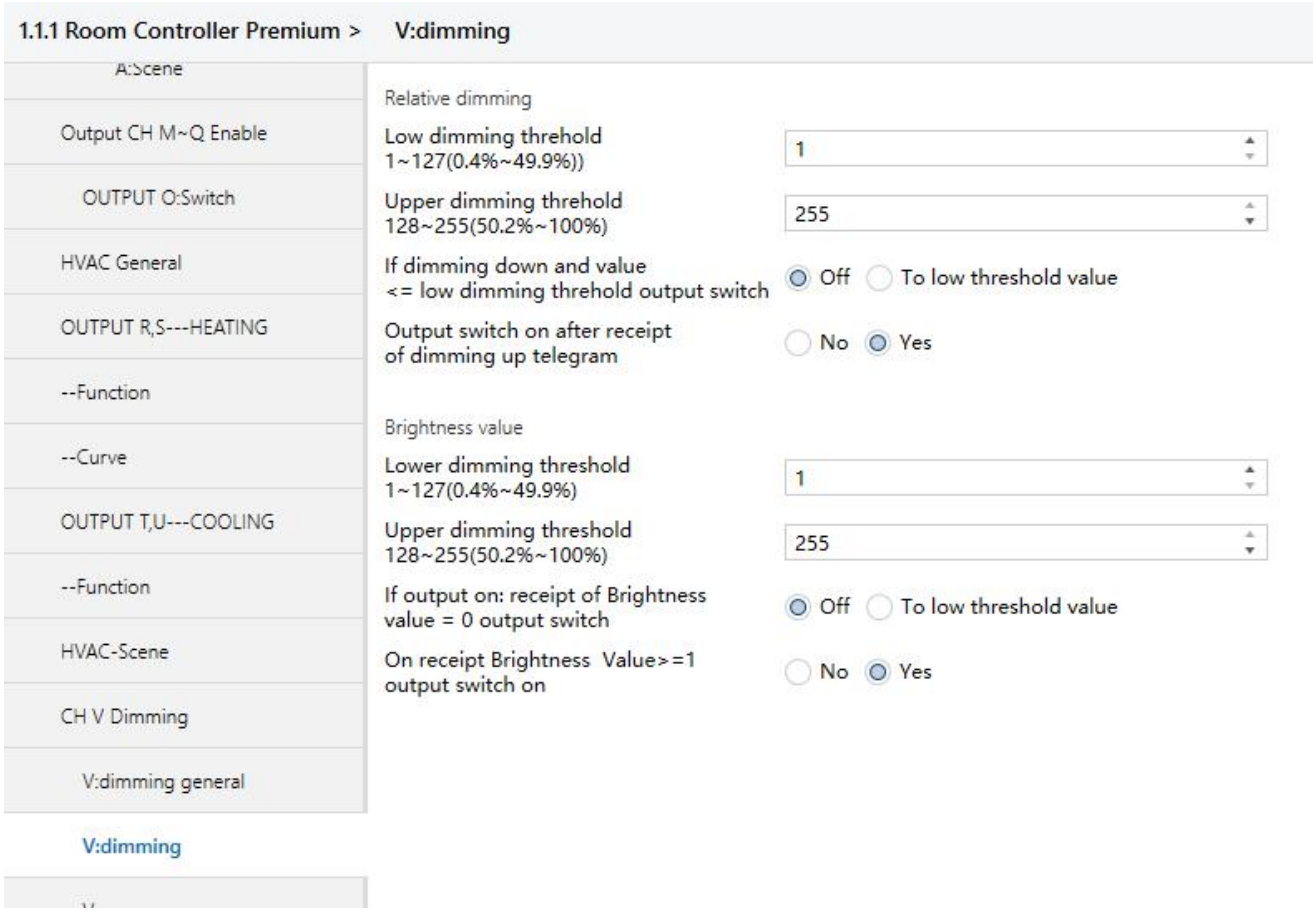


Fig.5.47 parameter window “X: dimming”

Relative dimming

Parameter “Low dimming threshold 1~127(0.4%~49.9%)”

This parameter defines the low threshold value of the relative dimming. When the brightness is smaller than the low threshold, it is not allowed to dim DOWN, only to dim UP, the range is 1~127 (0.4%~49.9%). Supposing the low threshold is 50, if the current brightness value is smaller than 50, so it is not allowable to dim DOWN until dimming UP to above 50.

Parameter “Upper dimming threshold 128~255(50.2%~100%)”

This parameter defines the high threshold value of the relative dimming. When the brightness is greater than the high threshold, it is not allowed to dim UP, only to dim DOWN, the range is 128~255 (50.2%~100%). Supposing the high threshold is 200, if the current brightness value is greater than 200, it is not allowable to dim UP until dim DOWN to below than 200.

Parameter "If dimming down and value <=low dimming threshold output switch"

This parameter defines the action that the brightness is dimmed down to less than or equal to the lower threshold value after relative dimming, whether it will be off or stay in the low threshold value. Options:

Off

To low threshold value

Supposing the low threshold is 50. If it is "Off", it will switch off the luminaries when dim DOWN to 50; if it is "To low threshold value", the value of the luminaries will remain the same even when dimming DOWN to 50. However, no matter whether it is "Off" or "To low threshold value", if the low threshold of the relative dimming is smaller than that of the brightness, it will switch off the luminaries automatically when dimming DOWN to the low threshold of the brightness value; if the high threshold of the brightness is less than relative high threshold, it is only possible to dim UP to the high threshold of the brightness. (The high and low threshold value of brightness will limit the total brightness value of the dimmer, see more details in the below description.)

Parameter "Output switch on after receipt of dimming up telegram"

It tells that whether it is possible to switch on the luminaries when receiving the "dimming up" message from relative dimming if the output is 0. Options:

No

Yes

Supposing the current output is 0. If it is "NO", the output still remain 0 even when the target receives the message "dimming UP"; if it is "YES", it will dim the luminaries to the target value when receiving the "dimming up" message. If the value after dimming up is smaller than the brightness low threshold, it will be dimmed to the low threshold directly. If the value after dimming up is greater than the brightness high threshold, it will be dimmed to the high threshold.

Brightness value

The high and low threshold value limits the high and low output value. It is not allowed to change the brightness value if it is beyond the high and low threshold which will be invalid. For example in Fig. 5.32 the value is set as 1~255 that is a whole range. If the low threshold value is set as 50 and the high threshold is 200, the brightness value "210" will be invalid. The luminaries will be dimmed from the low threshold directly when the brightness value goes up from 0; the luminaries will be dimmed from the high threshold directly when the brightness values goes down from 255.

Parameter "Low dimming threshold 1~127(0.4%~49.9%)"

This function defines the low threshold of the dimmer, and the range is 1~127. It is going to start dimming from the low threshold. Supposing the current brightness value is 0; the low threshold is 50 and the high threshold is 200. If receiving the message "30", the brightness value will go to 50 directly without gradual change; if receiving the message "60", so the brightness value will first go to 50 and then go up to 60 gradually; if the current value is 100 and the target value is 30, so the value will go from 100 to 50 and the brightness value is 50.

Parameter "Upper dimming threshold 128~255(50.2%~100%)"

This function defines the high threshold of the dimmer, and the range is 128~255. Supposing the low threshold is 50, and the high threshold is 200. If the target brightness value is greater than 200, it will go to 200 directly.

Parameter "If output on: receipt of "brightness value=0" output switch"

This function defines whether the brightness telegram "0" can switch off the output. Options:

Off

To low threshold value

The option "Off" means the output is 0 when the brightness value is 0.The option "To low threshold value" means the output is the low threshold when the value is 0.

Parameter "On receipt "brightness value">=1 output switch on"

This function defines whether object "brightness" can switch on the output when the output is 0. Options:

No

Yes

The option "No", if the current output is 0, the dimmer still output "0"after receiving the message of 100. The option "Yes" means the output is the input brightness value when the receiving value is greater or equals to 1; if the input brightness value is smaller than the brightness low threshold, the output is the brightness low threshold.

5.9.2.3 Parameter window “X: scene page”

This parameter shown in Fig.5.48 defines the scene function, totally 15 scenes from 1 to 15. It is able to set 15 scenes simultaneously and call any one of them by control panel when needed.

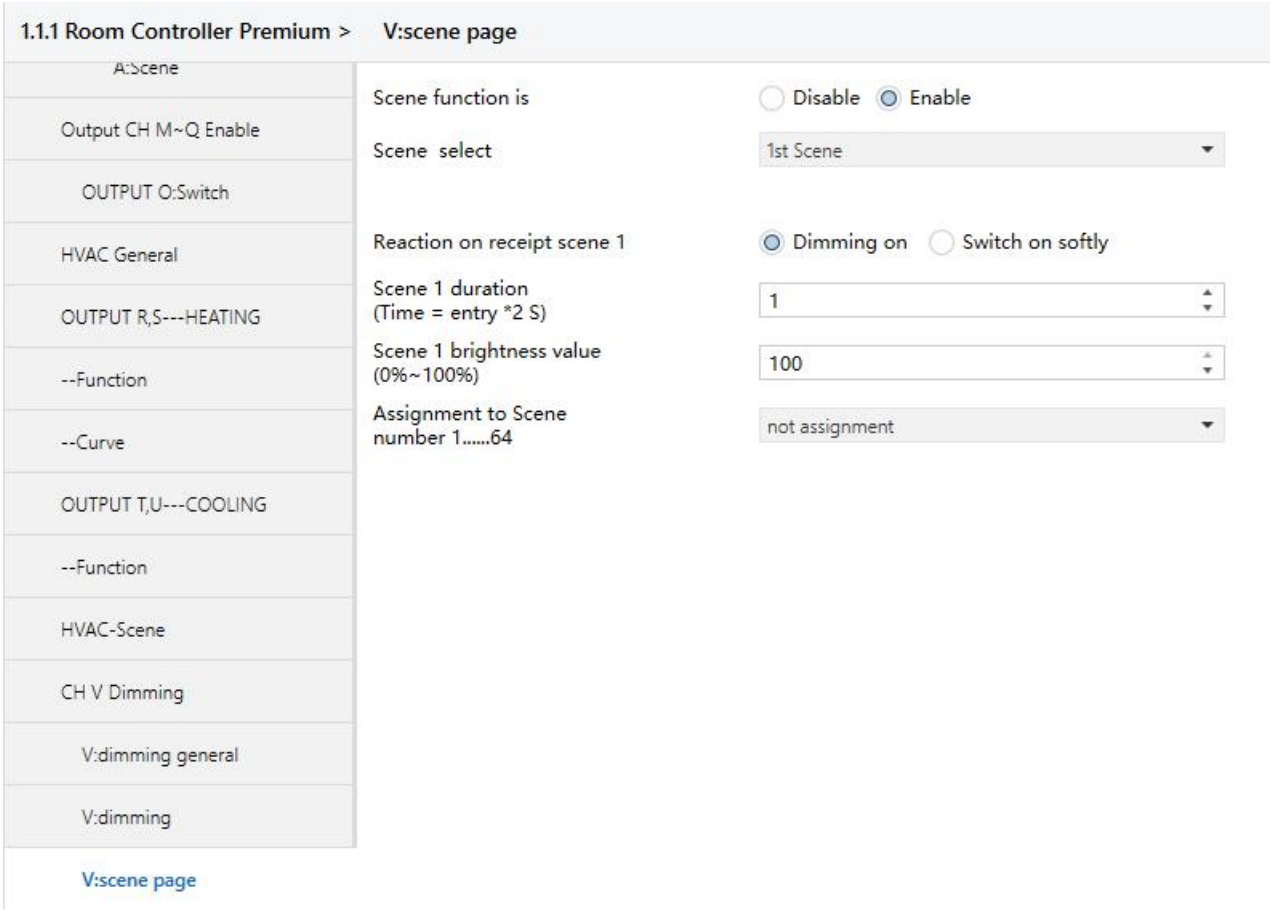


Fig.5.48 parameter window “X: scene page”

Parameter “Scene function is”

The function defines the enable or disable of the scene function. Options:

Enable

Disable

The option “Enable” means it is able to use the scene function of the dimmer X; the window shown in Fig. 5.48 will be displayed after selecting. If there is no need to use the function of scene, so select “Disable” option.

Parameter “Scene select”

This function is used to select a scene and set its brightness value, dimming mode and dimming time. Options:

Scene 1

Scene 2

……

Scene 15

The setting parameters for each scene are shown as below:

Parameter "Reaction on receipt scene Y"

The function defines the dimming mode of the set scene. Y means the scene that needs setting, 1~15. The Y shown as below has the same meaning. Options:

Dimming on

Switch on softly

The option "Dimming on" means dimming time of the set scene is the set time of the follow parameter "Scene Y duration (time=entry*2s)": the input time multiplies 2. The option "Switch on softly" means the scene dimming time is the default time "4S".

Parameter "Scene Y duration (time=entry*2 S)"

This function defines the dimming time of the set scene, which is the input value multiplies 2s; the maximum input time is 255s.

Parameter "Scene Y brightness value (0%~100%)"

This function defines the brightness value of the set scene, with range from 0% to 100%.

Parameter "Assignment to Scene number 1…64"

This function assigns the scene number of the set scene that means the communication object "Scene/save X" will call the scene by the allocated scene number. Options:

Not assignment

Assignment to scene 1

Assignment to scene 2

……

Assignment to scene 64

Note: 1-64 in the parameter setup corresponds to the scene number 0-63 received by the communication object "Scene/Save X". If a scene is modified, the new scene will be stored when power off. After bus voltage recovery, it can be recalled again.

5.8.5 Parameter window “HVAC-Scene”

Here mainly set the HVAC control scene, and can be set 5 scenes. “HVAC-Scene” Parameter window as follows:

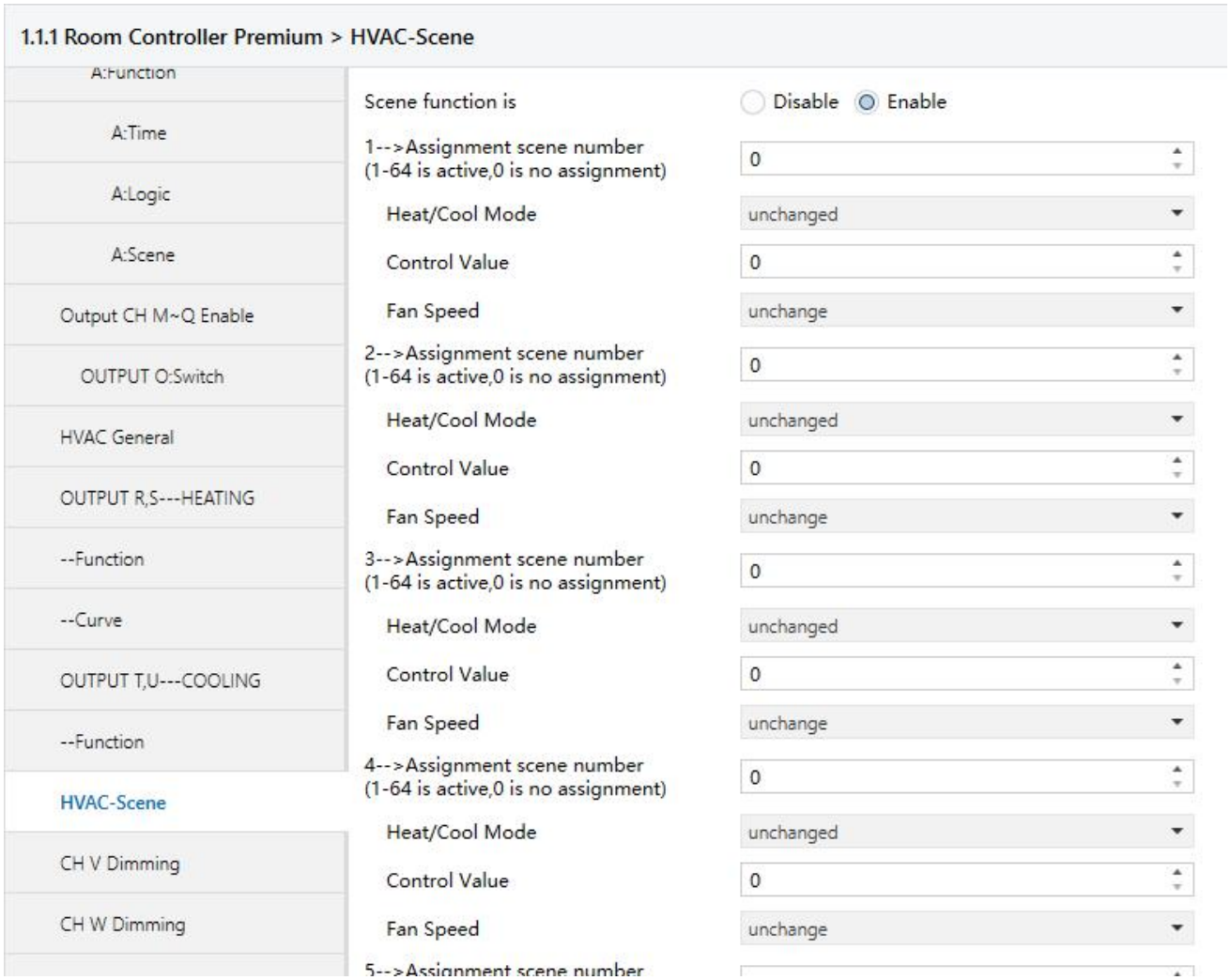


Fig. 5.44 parameter window “HVAC-Scene”

Parameter “Assignment Scene NO. (1...64 , 0= no assignment)”

Can be allocated 64 different scenarios, Options: **1-64 is active, 0 is no assignment**.

Note: The effective scenario number of parameter setting is 1-64, the corresponding telegram is 0-63. The scenes can be saved, but powered off the bus, the new scenes can't be saved.

Parameter "Heat/Cool Mode"

This parameter set the heat/cool Mode. Options:

Unchanged

Heat

Cool

Parameter "Control value"

This parameter sets the control values, Options: **0…255**

Parameter "Fan Speed"

This parameter set the wind speed, Options:

Unchange

Off

1

2

3

5.9 Dimming outputs (V~W)

There are 2 outputs. Each output can be set separately, and parameters and objects which are assigned to each output are the same. Using output V as an example described.

Note: Dimming output has a standard 0/1-10 v DC control interface, can control the dimming light which with fluorescent lamp electronic dimming ballast of 1-10V or 0-10V, or with the general device of 1-10V or 0-10V. Set the output type of dimming is via "Dimming output type" in "General". At the same time of output, need to change the output of K, L channel to "As dimming switch", it means that set to the switch of dimming. At that time, the output of K,L will be connected by the interface device of 1-10V or 0-10V. K as the output switch of V, L as the output switch of W. Equipment default is 1-10 v hardware design, If you need to use 0-10 v output, please contact with the product provider to get support.

5.9.1 Parameter window “Dimmer CHX Active”

The parameter window of “Dimmer CH X active” can be seen in Fig. 5.45, which activate or deactivate the dimming output X (X=V,W).

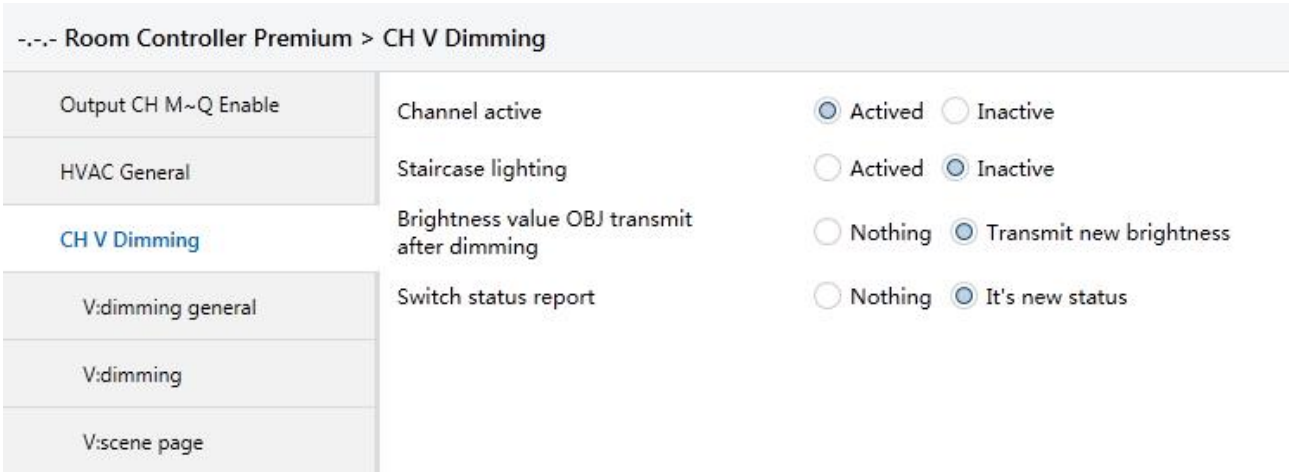


Fig. 5.45 parameter window "CH X Dimming"

Parameter “Channel Active”

Options:

Actived

Inactive

If selecting “Active”, the output will be enabled, and the follow parameters will be visible, which can set the working mode, the current brightness status and the switch status report. It will become null with “Inacitve” selection.

Parameter “Staircase lighting”

Options:

Actived

Inactive

It is in the status of staircase lighting control with “Actived” and in the general dimming control with “Inactive”.

2 operation modes (main function) per output:

——General dimming

This mode is mainly used to control general lighting system, which can set the output time and the brightness value of the dimmer, dim darker or brighter with the function of “relative dimming”,

and also call the preset brightness values from the scene function, until dim to the required brightness.

——Staircase lighting

The mode is mainly used to control the staircase lighting. Switch ON the staircase lighting and switch OFF automatically after a certain period, or switch OFF by manually. The staircase lighting can be also switched on for a long time via permanent on, but the case need to switch off by manually.

Parameter "brightness value OBJ. transmit after dimming"

This function is used to report the latest brightness value. When enable this function, it will send a brightness value to the BUS no matter what happen to make the brightness value changed. Options:

Nothing

Transmit new brightness

It will not send any report of the current brightness value with "Nothing". And with "Transmit new brightness" the object "brightness status" will send a brightness value to the BUS to report the current brightness value when the device receives a telegram to regulate the brightness, no matter what happens to make the brightness value changed or no changed.

Note: if selected "transmit new brightness", the object "Brightness status X" and object "Brightness X" cannot be linked together by a same group address, or lead to the device internal loop back, and enter into endless loop, to make the bus system crash.

Parameter "Status report"

This function defines whether report the switch status to the BUS when the value of object "switch status" is changed. Send "1" to the BUS when the current brightness value is greater than 0; send "0" when the value is equal to 0. Options:

Nothing

It's new status

It will not send any report of the current switch status with "Nothing". And send a status report of switch to the BUS if switch changed with "It's new status".

5.9.3 Staircase lighting

It is able to set the parameters of staircase lighting in Fig. 5.49 if the parameter “Staircase lighting” is set to “actived” in fig. 5.45

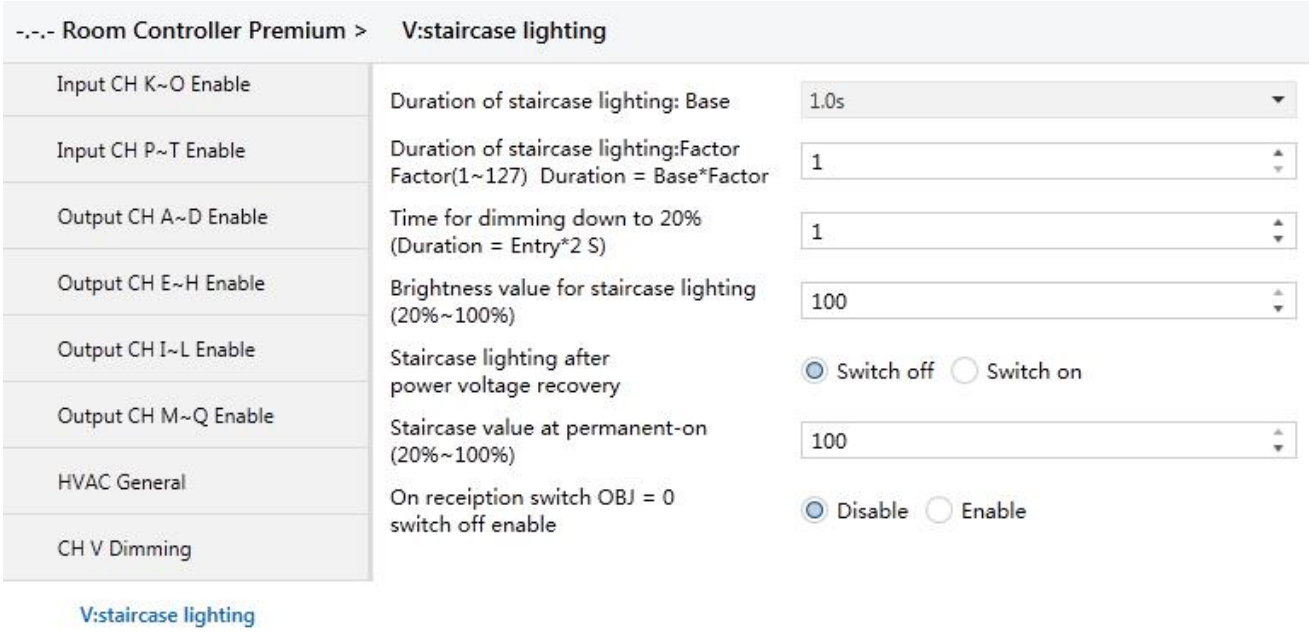


Fig.5.49 parameter window “X：staircase lighting”

Parameter “Duration of staircase lighting: Base”

Set the time of base:**1.0 s / 2.1 s / … / 1.1 min / … / 1.2 h**

Parameter “Duration of staircase lighting: Factor”

Set the time of factor: **1~127s**

When switch on the staircase lighting by “switch”, the ON duration time is: duration=base*factor.

It will switch off the lighting when the brightness goes down to 20% gradually after the ON duration time.

Parameter “Time for dimming down to 20% (Duration=Entry*2)”

This function defines the time that the brightness value of the staircase lighting goes down to 20%:

Duration=Entry*2. The maximum input value is 255s.

The luminaries will be switched off when the brightness value of the staircase goes down to 20%.

In fact the time of dimming off is calculated from 100% to 0%. Such as the brightness decreased from 80% to 20%, the dimming time is 60%× (the input time of the parameter*2).

Parameter "Brightness value for staircase lighting(20%~100%)"

The function defines the brightness value of the staircase when switching on the luminaries by "switch". Value: **20%~100%**。

Parameter "Staircase lighting after power voltage recovery"

The function defines the status of the staircase lighting after the power voltage recovery. Options:

Switch on

Switch off

The option "Switch on" means switch on the staircase lighting after the power voltage recovery; the duration time =base*factor. It is to use the parameter "Time for dimming down to 20% (Duration=Entry*2)" to set the DOWN time.

The option "Switch off" means the staircase lighting is off after the power voltage recovery.

Parameter "Staircase value at permanent-on(20%~100%)"

The function defines the output of the staircase lighting as a fixed brightness value. It will not switch off the staircase lighting without receiving the OFF message from "permanent on". "Permanent on" is another output mode of the staircase lighting. The DOWN time of turning off the lighting is set by the parameter "Time for dimming down to 20% (Duration=Entry*2)". It will switch off the lighting when going down to 20%. The range value is 20%~100%.

Parameter "On reception switch OBJ=0 switch off enable"

Options:

Enable

Disable

The output can be switched off by object "switch" no matter in switch or permanent on mode with "Enable"; but only off output "Permanent on" by using "permanent on" to send OFF command in the "permanent on" lighting mode with "Disable".

Note: In the switch output mode, it can start the "permanent on" output mode, but can't be performed the off operation of "permanent on" when you did not start the "permanent on" output mode.

5.10 Scenario group control function

In scenario group control function ,there are up to eight groups used for setting. This function mainly used to configure delay operation of different interaction channels in one scene recalling. Here only set delay parameters, objects do not increase the linkage. And only channel with switching function can set here for delay linkage. scenario group control function is not valid for other functions. Since the parameters are the same in each group, the following introduction is according to the parameters scenario group1.

5.10.1 Parameters window “Scene Group X”

Scenario Group 1 can be seen ,when set the parameters to enable , parameter interface shown in Figure 5.50.

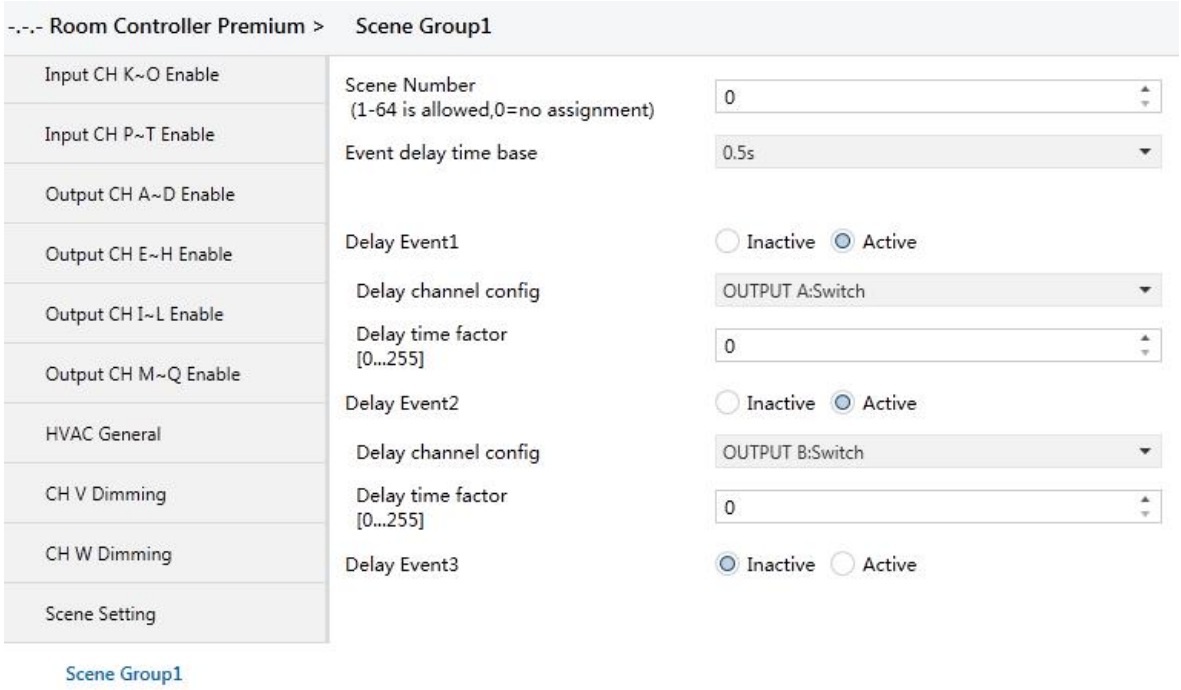


Fig.5.50 “Scene Group X”setting parameter interface

Parameter “Scene Number”

It is for setting Scene Number. Valid values are 1 to 64. If it is 0, then, that does not enable this scenario group.

Note: the scene number must be corresponding to the relevant switch channel number which performed to invoke delay operation.

Parameter "Event delay time base"

It is used for setting the time of delay operation, Options:

0.5s

1s

2s

5s

10s

20s

30s

1min

Parameter"Delay Event X"

In a scene setting ,there are maximum15 delay events can be activated, the parameters of each delay event are the same, so the following description is from the Parameter of delay event 1.

When the parameter for "Delay Event X" is activated, the delay time X configuration parameters will appear, as shown in Figure 5.50.

Parameter "Delay channel config"

It is used to setting switch for setting required linkage channel, options:

Disconnect

OUTPUT A:Switch

OUTPUT B:Switch

OUTPUT C:Switch

OUTPUT D:Switch

OUTPUT E:Switch

OUTPUT F:Switch

OUTPUT G:Switch

OUTPUT H:Switch

OUTPUT I:Switch

OUTPUT J:Switch

OUTPUT K:Switch

OUTPUT L:Switch

OUTPUT M1:Switch

OUTPUT M2:Switch

OUTPUT N1:Switch

OUTPUT N2:Switch

OUTPUT O:Switch

OUTPUT P:Switch

OUTPUT Q:Switch

Note: K ~ Q output channels have effect , only when the corresponding channel is set to switch function.

Parameter "delay time factor"

It is used to set the delay time factor, therefore the total delay time for the linked switch channels would be: delay event time base X Factor.The options： **0 ~ 255.**

Chapter 6 Communication Objects Description

Communication object is the media of devices on the bus communicate with other device, that is, just communication object can communicate with the bus. The role of each communication objects as following.

Note: "C" in "Flag" column in the below table means that the object has a normal link to the bus; "W" means the object value can be modified via the bus; "R" means the value of the object can be read via the bus; "T" means that a telegram is transmitted when the object value has been modified; "U" means that value response telegrams are interpreted as a write command, the value of the object is updated.

6.1 Communication objects of Dry contact Inputs (A~T)

6.1.1 Communication objects "Switch sensor"

Number	Name	Object Function	Des	Group Adc	Length	C	R	W	T	U	Data Type	Priority
2	Input A	Enable communication			1 bit	C	-	W	-	-	enable	Low
1	input A	long operation			1 bit	C	-	-	T	-	switch	Low
0	input A	Switch operation			1 bit	C	-	W	T	-	switch	Low

Fig. 6.1 Communication objects "Switch"

No.	Function	Object name	Data type	Flags	DPT
0	**Input X**	**Switch operation**	**1bit**	**C,W,T**	**1.001 DPT_Switch**
In accordance with the parameter setting, this communication object can be switched by actuation of the ON, OFF or TOGGLE input. With TOGGLE the previous value e.g. "1" is switched directly to the value "0". Telegram value 0----- OFF 1------ON					
1	**Input X**	**Long operation**	**1bit**	**C,T**	**1.001 DPT_Switch**
This communication object is only visible if the parameter "Distinction between long and short operation" is "yes", and the parameter "Number of objects for short/long object operation" is"2 objects".This additional communication object is assigned to the long operation. Telegram value 0-----OFF 1------ ON					
2	**Input X**	**Enable communication**	**1bit**	**C,W**	**1.003 DPT_Enable**
This communication object is visible if the parameter "disable input via 1bit communication object" is "yes", which is used to disable/enable the channel function. All objects of the function are ineffectiveness when the channel function is disabled. The channel function default to enable after power voltage recovery. (The object "disable" is the same for all operation modes of the channel.)					

Table 1 Communication objects table "Switch"

6.1.2 Communication objects “Switch /Dimming”

Number	Name	Object Function	Des	Group Adc	Length	C	R	W	T	U	Data Type	Priority
1	input A	Dimming			4 bit	C	-	W	T	-	dimming control	Low
2	Input A	Enable communication			1 bit	C	-	W	-	-	enable	Low
0	input A	Switch dimming			1 bit	C	-	W	T	-	switch	Low

Fig.6.2 Communication objects “Switch/Dimming”

No.	Function	Object name	Data type	Flags	DPT
0	**Input X**	**Switch dimming**	**1bit**	**C,W,T**	**1.001 DPT_Switch**
It is visible if parameter “Dimming functionality” selected “Dimming and switching”. Operate with a short operation to input the object value to carry out the relevant action, such as ON、OFF、TOGGLE. Telegram value 0------OFF 1 ------ON					
1	**Input X**	**Dimming**	**4bit**	**C,T**	**3.007 DPT_Control Dimming**
This communication object inputs by a long operation, and sends the command to dim up or dim down. It can make the dimming device on the bus to carry out relative dimming. It will send a stop command to stop dimming when the long operation is end. (The object inputs with a long operation if the option “dimming and switching” is selected with the parameter “dimming functionality”. There is no distinction between short/long operations if the option is “only dimming”.)					

Table 2 Communication objects table “Switch/Dimming”

6.1.3 Communication objects “Value/force output”

There are many data types and communication objects; it will not list in Fig.6.3. The communication objects of different data types have the same operation that are transmit the object value, which the range of transmit object value are different. It is possible to distinguish a long/short operation or not.

Number	Name	Object Function	Des	Group Adc	Length	C	R	W	T	U	Data Type	Priority
1	input A	1byte unsigned-long/open			1 byte	C	-	-	T	-	counter pulses (0..255)	Low
0	input A	1byte unsigned-short/close			1 byte	C	-	-	T	-	counter pulses (0..255)	Low
2	Input A	Enable communication			1 bit	C	-	W	-	-	enable	Low

Fig. 6.3 Communication objects “Value/Forced output”

No.	Function	Object name	Data type	Flags	DPT
0	Input X	1bit-short/close	1bit [0/1]	C,T	1.001 DPT_Switch
		2bit- short/close	2bit [0…3]		2.002 DPT_Bool_Control
		4bit- short/close	4bit [0…15]		3.007 DPT_Control_Dimming
		1byte signed- short/close	1byte [-128…127]		6.010 DPT_Value_1_Count
		1byte unsigned- short/close	1byte [0…255]		5.010 DPT_Value_1_UCount
		1byte recall scene-short/close	1byte [recall scene]		17.001 DPT_SceneControl
		1byte store scene-short/close	1byte [store scene]		18.001 DPT_SceneControl
		2byte signed- short/close	2byte [-32768…32767]		8.001 DPT_Value_2_Count
		2byte unsigned- short/close	2byte [0…65535]		7.001 DPT_Value_2_UCount
		2byte float-short/close	2byte[float]		9.001 DPT_Value_Temp
		3byte time- short/close	3byte[time of day]		10.001 DPT_TimeOfDay
		4byte signed- short/close	4byte [-2147483648…2147483647]		13.001 DPT_Value_4_Count
		4byte unsigned- short/close	4byte [0…4294967295]		12.001 DPT_Value_4_UCount
This communication object is used to transmit the input value. It is only transmit the object value in short operation if distinguish a long and short operation. It will transmit the object value when the contact is closed if no distinction between long and short operation. The object value range depend on the data type, The data type is set in the parameter “Reaction on short operation/closing the contact”.					
1	Input X	1bit-long/open	1bit [0/1]	C,T	1.001 DPT_Switch
		2bit- long/open	2bit [0…3]		2.002 DPT_Bool_Control
		4bit- long/open	4bit [0…15]		3.007 DPT_Control_Dimming
		1byte signed- long/open	1byte [-128…127]		6.010 DPT_Value_1_Count
		1byte unsigned- long/open	1byte [0…255]		5.010 DPT_Value_1_UCount
		1byte recall scene- long/open	1byte [recall scene]		17.001 DPT_SceneControl
		1byte store scene- long/open	1byte [store scene]		18.001 DPT_SceneControl
		2byte signed- long/open	2byte [-32768…32767]		8.001 DPT_Value_2_Count
		2byte unsigned- long/open	2byte [0…65535]		7.001 DPT_Value_2_UCount
		2byte float- long/open	2byte[float]		9.001 DPT_Value_Temp
		3byte time- long/open	3byte[time of day]		10.001 DPT_TimeOfDay
		4byte signed- long/open	4byte [-2147483648…2147483647]		13.001 DPT_Value_4_Count
		4byte unsigned- long/open	4byte [0…4294967295]		12.001 DPT_Value_4_UCount
This communication object is used to transmit the input value. It is only transmit the object value in long operation if distinguish a long and short operation. It will transmit the object value when the contact is opened if no distinction between long and short operation. The object value range depend on the data type, The data type is set in the parameter “Reaction on long operation/opening the contact”.					

Table 3 Communication objects table “Value/Forced output”

6.1.4 Communication objects “Shutter control”

The communication objects “Shutter Control” will be shown in Fig.6.4.

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
0	input A	shutter UP/DOWN			1 bit	C	-	-	T	-	up/down	Low
1	input A	Stop/lamella adj			1 bit	C	-	-	T	-	step	Low
2	Input A	Enable communication			1 bit	C	-	W	-	-	enable	Low

Fig. 6.4 Communication objects “Shutter Control”

No.	Function	Object name	Data type	Flags	DPT
0	**Input X**	**shutter UP/DOWN**	**1Bit**	**C,T**	**1.008 DPT_UpDown**
This communication object sends a shutter move command (up or down) to the bus. Telegram value 0------move up 1------move down					
1	**Input X**	**Stop/lamella adj.**	**1Bit**	**C,T**	**1.007 DPT_Step**
This communication object sends a stop command or lamella adjustment. Telegram value 0------ stop/adjust up 1------ stop/adjust down					

Table 4 Communication objects table “Shutter Control”

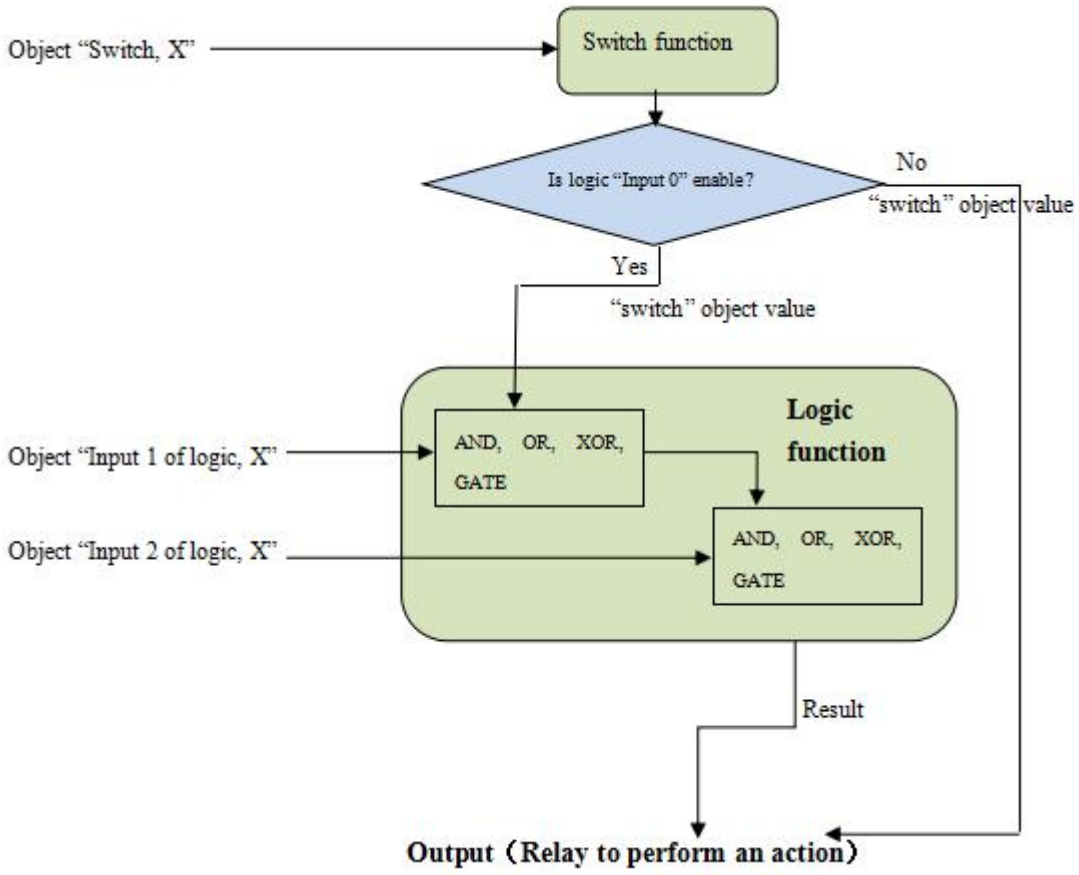
6.2 Communication objects of Switch outputs (A~L)

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
72	Output A	Switch, A			1 bit	C	-	W	-	-	switch	Low
73	Output A	Reply switch status, A			1 bit	C	R	-	T	-	switch	Low
74	Output A	Enable time function, A			1 bit	C	-	W	-	-	enable	Low
75	Output A	Delay function, A			1 bit	C	-	W	-	-	switch	Low
76	Output A	Scene , A			1 byte	C	-	W	-	-	scene control	Low
77	Output A	Forced output , A			1 bit	C	-	W	-	-	enable	Low
78	Output A	Input 1 of logic , A			1 bit	C	-	W	-	-	switch	Low
79	Output A	Input 2 of logic , A			1 bit	C	-	W	-	-	switch	Low
75	Output A	Flashing function, A			1 bit	C	-	W	-	-	switch	Low
75	Output A	Staircase function, A			1 bit	C	-	W	-	-	switch	Low

6.5 Communication objects of switch actuator

No.	Function	Object name	Data type	Flags	DPT
72	Output X	Switch, X	1bit	C,W	1.001 DPT_Switch

This object is used to trigger the switch operation. It will start the switch operation with “1”, and end with “0”. When enabling “input 0” in the logic function, the object “Switch, X” will be subject to logic functions, rather than trigger the switch operation directly. For details, please refer to the following flowchart:



73	Output X	Reply switch status, X	1bit	C,R,T	1.001 DPT_Switch

This object will be enabled when selecting “respond after change” , “respond, after read only” or“respond always”in the parameter “set the replay mode of switch status”, which will indicate the contact status (details will be defined by parameter “Object value of switch status:” in “Channel X: Switch”).

If selecting “respond, after read only”, the status telegram will not be sent out until receiving a read request telegrams from the bus via the object.

If selecting “respond after change”, it will send the status automatically via the object when there are any changes on the output.

If selecting“respond always”The object will not send current status to the bus, until the device received the request of reading the switch status from the other bus device operation or the bus.

74	Output X	Disable time function, X	1bit	C,W	1.003 DPT_Enable

This object will be enabled only when enabling the time function, it can be used to enable and disable the time function. It will enable the timing function when receiving the value “1”; will disable it when receiving “0”. The operation before disabled it is still carried out completely. Enable is a default setting after bus voltage recovery if the time function is set.

75	Output X	Delay function, X	1bit	C,W	1.001 DPT_Switch

When select “delay switch”, the “The mode of time function” will be activated, then the delay switch function will be activated

75	Output X	Flashing function, X	1bit	C,W	1.001 DPT_Switch

When select “flashing function”, the “The mode of time function” will be activated, then the Open flashing switch function will be activated

75	Output X	Staircase function, X	1bit	C,W	1.001 DPT_Switch

When select “staircase function”, the “The mode of time function” will be activated, then the stairs lighting function will be activated

76	Output X	Scene, X	1byte	C,W	18.001 DPT_SceneControl

It is able to recall or save the scene when sending an 8-bit command by this object, which will be enabled when enabling the scene function. The definition of the 8-bit command will be described below:

Assuming an 8-bit command (binary coding) as: FXNNNNNN

F: recall the scene with “0”; save the scene with “1”;

X: 0

NNNNNN: scene number (0-63).

1-64 in the parameter setup corresponds to the scene number 0-63 received by the communication object “Scene”. For example, scene 1 in the parameter setup has the same output result as scene 0 in the communication object “Scene”. As follow:

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

77	Output X	Forced output, X	1bit/2bit	C,W	1.003 DPT_Enable /2.001 DPT_Switch
This object will be enabled after enabling the forced function. If 1bit, Enable the forced operation with “1”, and the 77 device behaviors will be ignored except the forced function; cancel the forced operation with “0”. The contact position of force operation can be set via a parameter. If 2bit, the contact is forced closed when receiving telegram “3”; the contact is forced opened when receiving telegram “2”; cancel the force operation with telegram “1” or “0”.					
78	**Output X**	**Input 1 of logic, X**	**1bit**	**C,W**	**1.001 DPT_Switch**
This object will be enabled when selecting “enable” in the parameter “The input 1 of logic is”, which is used to modify logic value of input 1.					
79	**Output X**	**Input 2 of logic, X**	**1bit**	**C,W**	**1.001 DPT_Switch**
This object will be enabled when selecting “enable” in the parameter “The input 2 of logic is”, which is used to modify logic value of input 2.					

Table 5 Communication objects table “Switch output”

6.3 Communication objects of Shutter outputs (M~N)

6.3.1 Communication objects “M,N as Shutter/Blind control”

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
196	Output M	Shutter position[0...100%]			1 byte	C	R	W	T	-	percentage (0..100%)	Low
197	Output M	Louvre position[0...100%]			1 byte	C	R	W	T	-	percentage (0..100%)	Low
198	Output M	Shutter UP/DOWN			1 bit	C	-	W	-	-	up/down	Low
199	Output M	Louvre adj./Stop			1 bit	C	-	W	-	-	step	Low
200	Output M	Reference movement			1 bit	C	-	W	-	-	up/down	Low
201	Output M	End position(Upper)			1 bit	C	R	-	T	-	boolean	Low
202	Output M	End position(Lower)			1 bit	C	R	-	T	-	boolean	Low
203	Output M	Sun operation			1 bit	C	-	W	-	-	boolean	Low
204	Output M	Dis auto. control			1 bit	C	-	W	-	-	enable	Low
205	Output M	Sun:shutter position[0...100%]			1 byte	C	-	W	-	-	percentage (0..100%)	Low
206	Output M	Sun:louvre adj.[0...100%]			1 byte	C	-	W	-	-	percentage (0..100%)	Low
207	Output M	Scene			1 byte	C	-	W	-	-	scene control	Low
208	Shutter/Blinds	Safety operation			1 bit	C	-	W	-	-	reset	Low
201	Output M	Status byte			1 byte	C	R	-	T	-		Low

Fig. 6.6 Communication objects of shutter actuator

NO.	Function	Object name	Data type	Flags	DPT
196	**Output X**	**Shutter/Blinds position[0…100%]**	**1byte**	**C,R,W,T**	**5.001 DPT_Scaling**
If this communication object receives a telegram value, the Shutter/Blind moves to the corresponding position for the received value. In the “Shutter” operation mode, after the Shutter reaching the target position, the louvres are positioned as before. Only the object “Louvre position [0…100%]” receives a telegram value, the louvres will be positioned accordingly. Telegram value 0% —— top …… —— intermediate position 100% —— bottom					

197	Output X	Louvre position[0…100%]	1byte	C,R,W,T	5.001 DPT_Scaling

Only in the “Shutter” operation mode, the communication is visible. If the object receives a telegram value, the louvres are positioned according to the received value.

Telegram value 0% —— louvres opened to maximum

…… —— intermediate position

100% —— louvres closed to maximum

198	Output X	Shutter/Blinds UP/DOWN	1Bit	C,W	1.008 DPT_UpDown

If this communication object receives a telegram with the value “0”, the Shutter/Blind is raised. If the object receives a telegram with the value “1”, the Shutter/Blind is lowered. The output contact reverts to the neutral position once the total move time for UP/DOWN movement has elapsed.

Telegram value 0 —— UP

1 —— DOWN

After the louvers have been reached to limit position, the telegram will be ignored if continually adjust in the same direction.

199	Output X	Louvre adj. / Stop	1Bit	C,W	1.007 DPT_Step

If the Shutter/Blind is in motion, the movement is stopped on this communication object receiving a telegram value “0” or “1”.

“Shutter” operating mode: if the Blind is idle, it is raised for the louvres adjustment on the communication object receiving a telegram value “0”; it is lowered for the louvres adjustment on the communication object receiving a telegram value “1”.

“Blind” operating mode: if the Shutter is idle, no action is carried out on the communication object receiving any telegram value.

Telegram value 0 ——stop/louvre adj. UP

1 —— stop/louvre adj. DOWN

After the louvers have been reached to limit position, the telegram will be ignored if continually adjust in the same direction.

200	Output X	Reference movement	1Bit	C,W	1.008 DPT_UpDown

The communication object is enabled when the “disable” option is not selected in the parameter “position after reference movement”. If the object receives a telegram value, the Shutter/Blind is carried out a reference movement that makes sure its location exactly.

Telegram value 0——first the Shutter/Blind is fully raised, then move to the target position

1—— first the Shutter/Blind is fully lowered, then move to the target position

The detail process is described in relevant parameter chapter.

201	Output X	Status byte	1byte	C,R,T	No DPT

The communication object is enabled when the option “Status byte” is selected in the parameter “status response of position via ‘End position/Status byte’ objects” and the parameter “Response mode for position” is not “none”, which is used to send the current operation status after a change or a request. The information is provided in coded format in a 1byte value, see table below:

Data bits	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Functions	Not used	Not used	Not used	Safety	Automatic	Sun	Upper end position	Lower end position
Values	0	0	0	0:inactive 1:active	0:inactive 1:active	0:inactive 1:active	0:inactive 1:active	0:inactive 1:active

Note:

① Special coding for Bit1 and Bit0:

00——Shutter between upper and lower end position

01——lower end position

10——upper end position

11——Shutter position undefined

② The sun belongs to the auto. Operation, so it only can be activated when auto. Operation is enabled.

③ The upper end position only indicates the position of shutter/blind is 0%, rather than the louvre also is 0%. So does the lower end position.

④ The safety operations have the most priority.

201	Output X	End position (Upper)	1Bit	C,R,T	1.002 DPT_Bool

The communication object is enabled when the option “End position” is selected in the parameter “status response of position via ‘End position/Status byte’ objects” and the parameter “Response mode for position” is not “none”, which is used to send the Upper end position status after a change or a request. When the shutter/blind reach the upper end position, the object sends a telegram “1” immediately, leave the position, and send “0”.

The upper end position only indicates the position of shutter/blind is 0%, rather than the louvre also is 0%.

Telegram value 0——the shutter/blind is not in the upper end position

1——the shutter/blind is in the upper end position

202	Output X	End position (Lower)	1Bit	C,W	1.002 DPT_Bool

The communication object is enabled when the option “End position” is selected in the parameter “status response of position via ‘End position/Status byte’ objects” and the parameter “Response mode for position” is not “none”, which is used to send the lower end position status after a change or a request. When the shutter/blind reach the lower end position, the object sends a telegram “1” immediately, leave the position, and send “0”.

The lower end position only indicates the position of shutter/blind is 100%, rather than the louvre also is 100%.

Telegram value 0——the shutter/blind is not in the lower end position

1——the shutter/blind is in the lower end position

203	Output X	Sun operation	1bit	C,W	1.001 DPT_Switch
If the communication object receives a telegram “0” or “1”, the shutter/blind is moved into a predefined position, see the parameter chapter description.					
204	Output X	Dis. Auto. control	1bit	C,W	1.003 DPT_Enable
The communication object is used to disable and enable the Auto. Operation. If the object receives a telegram “0”, the Auto. Operation is deactivated; if the object receives a telegram “1”, the Auto. Operation is activated. Telegram value 0——deactivate the Auto. Operation 1—— activate the Auto. Operation					
205	Output X	Sun: shutter/blinds position[0…100%]	1byte	C,W	5.001 DPT_Scaling
In Auto. Operation status, if this communication object receives a telegram value, the Shutter/Blind moves to the corresponding position for the received value. In the “Shutter” operation mode, after the Shutter reaching the target position, the louvres are positioned as before. Only the object “Sun: louvre adj. [0…100%]” receives a telegram value, the louvres will be positioned accordingly. Telegram value 0 —— top …… —— intermediate position 100%—— bottom					
206	Output X	Sun: louvre adj.[0…100%]	1byte	C,W	5.001 DPT_Scaling
In Auto. Operation status, the communication is visible only in the “Shutter” operation mode. If the object receives a telegram value, the louvres are positioned according to the received value. Telegram value 0 —— louvres opened to maximum …… —— intermediate position 100%—— louvres closed to maximum					
207	Output X	Scene	1byte	C,W	18.001 DPT_SceneControl
It is able to recall or store the scene when sending an 8-bit command by this object. The definition of the 8-bit command will be described below: Assuming an 8-bit command (binary coding) as: FXNNNNNN F: recall scene with “0”; store scene with “1”; X: 0 NNNNNN: scene number (0-63). 1-64 in the parameter setting corresponds to the scene number 0-63 received by the communication object “Scene”. For example, scene 1 in the parameter setting has the same output result as scene 0 in the communication object “Scene”.					

As follow:

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

208	**Output X**	**Safety operation**	**1bit**	**C,W**	**1.015 DPT_Reset**

The communication object is visible if the safety operation is enabled in the parameter window “General”, which is used to receive a special 1bit telegram from some sensors sending cyclically. Such as the special telegram is “1” via parameter, if the object doesn’t receive the telegram “1” from the sensor during the monitor period, the actuator will think that the sensor malfunctions, and then triggered the safety operation and make the shutter move to a safety position. When the actuator receives a telegram “1” again, the monitor period will re-timing, and exit the safety operation, other operations can be carried out.

Table 6 Communication objects table of Shutter actuator

6.3.2 Communication objects “M,N as relay control”

The M, N as switching output, the communication objects are similar with the communication objects of the front switch output. Here the only difference is no logic function, so the communication objects refer to the chapter 6.2.

6.4 Communication objects of Fan control (O~Q)

6.4.1 Communication objects of “O, P, Q as fan speed control”

When output O,P,Q work as fan speed control, the communication objects as follows:

6.4.1.1 Communication objects of “Fan-one level”

When the fan type is one level, the communication objects as follows:

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
223	1Level-Fan	Fan Switch			1 bit	C	-	W	-	-	switch	Low
227	1Level-Fan	Fan status ON/OFF			1 bit	C	R	-	T	-	switch	Low
232	1Level-Fan	Fan Limitation 1			1 bit	C	-	W	-	-	enable	Low
233	1Level-Fan	Fan Limitation 2			1 bit	C	-	W	-	-	enable	Low
234	1Level-Fan	Fan Limitation 3			1 bit	C	-	W	-	-	enable	Low
235	1Level-Fan	Fan Limitation 4			1 bit	C	-	W	-	-	enable	Low
236	1Level-Fan	Fan Forced Operation			1 bit	C	-	W	-	-	enable	Low
237	1Level-Fan	Fan Automatic ON/OFF			1 bit	C	-	W	-	-	enable	Low
238	1Level-Fan	Fan status automatic			1 bit	C	R	-	T	-	enable	Low

Fig. 6.7 Communication objects “Fan-one level”

NO.	Object name	Data type	Flags	DPT	Object name
223	1Level-Fan	Fan switch	1bit	C,W	1.001 DPT_Switch
With this 1 bit communication object the fan can be switched on or off. If several ON/OFF telegrams are received, the value last received for the fan control is decisive. Telegram value 0 ——fan OFF 1 ——fan ON					
227	1Level-Fan	Fan status ON/OFF	1bit	C,R,T	1.001 DPT_Switch
This communication object is enabled if in parameter window “Fan: Status” the parameter “Enable Obj. ‘status ON/OFF mode’” have been selected with option “yes”. The value of the communication object is updated and sent when the switch status of the fan is changed, or sent on request. Telegram value 0 ——fan OFF 1 ——fan ON					
232	1Level-Fan	Fan Limitation 1	1bit	C,W	1.003 DPT_Enable
This communication object is enabled if in parameter window “Fan: auto. Operation” the parameter “Limitation function is” has been selected with the option “yes”. The limitation 1 is active if a telegram “1” is received on the object. The limitation 1 is deactivated if a telegram “0” is received on the object. When the limitation 1 is activated, the fan can only assume the set fan status in the parameter “Fan with limitation 1”. Telegram value 0 ——limitation 1 inactive 1 ——limitation 1 active **Note: limitation 1 is only active in automatic mode.**					

233	**1Level-Fan**	**Fan Limitation 2**	**1bit**	**C,W**	**1.003 DPT_Enable**
234	**1Level-Fan**	**Fan Limitation 3**	**1bit**	**C,W**	**1.003 DPT_Enable**
235	**1Level-Fan**	**Fan Limitation 4**	**1bit**	**C,W**	**1.003 DPT_Enable**
Refer to communication object 232					
236	**1Level-Fan**	**Fan Forced Operation**	**1bit**	**C,W**	**1.003 DPT_Enable**

The communication object is enabled if in parameter window “Fan speeds” the parameter “Enable 1bit ‘Forced operation’ Obj.” has been selected with the option “yes”.

The forced operation can be activated via the object receiving a telegram “0” or “1” set by the parameter “forced operation on object value is”. When the object receives an inverse telegram value, the forced operation is cancelled.

The switch status of the fan can be parameterized during forced operation.

If the parameter “forced operation on object value is” is set to “1”:

Telegram value 0 ——no forced operation

1 ——forced operation

If the parameter “forced operation on object value is” is set to “0”:

Telegram value 0 ——forced operation

1 ——no forced operation

237	**1Level-Fan**	**Fan Automatic ON/OFF**	**1bit**	**C,W**	**1.003 DPT_Enable**

The communication object is enabled if in parameter window “Fan speeds” the parameter “Auto. Operation is” has been selected with the option “yes”.

The Auto. Operation can be activated via the object receiving a telegram “0” or “1” set by the parameter “carry out auto. Operation when the object value is”. When the object receives an inverse telegram value, the Auto. Operation is disabled.

After bus voltage recovery or programming, the Auto. Operation is inactive by default.

During the Auto. Operation, if the direct operation or the forced operation is activated, the Auto. Operation will be disabled automatically. But these limit status is still retained, and is valid again if the Auto. Operation is activated again.

If the parameter “carry out auto. Operation when the object value is” is set to “1”:

Telegram value 0 ——the Auto. operation inactive

1 ——the Auto. operation active

If the parameter “carry out auto. Operation when the object value is” is set to “0”:

Telegram value 0 ——the Auto. operation active

1 ——the Auto. operation inactive

238	**1Level-Fan**	**Fan status automatic**	**1bit**	**C,R,T**	**1.003 DPT_Enable**

This communication object is enabled if in parameter window “Fan: Status” the parameter “Enable Obj. ‘status Auto. Mode’” has been selected with option “yes”. The value of the communication object is updated and sent when the status of the Auto. Operation is changed, or sent on request.

Telegram value 0 ——the Auto. operation inactive

1 ——the Auto. operation active

Table 7 Communication objects “Fan-one level”

6.4.1.2 Communication objects of “Fan-multi level”

When the fan type is multi level, the communication objects as follows:

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
222	Multi-Fan	Fan speed switch			1 byte	C	-	W	-	-	counter pulses (0..255)	Low
223	Multi-Fan	Fan speed 1			1 bit	C	-	W	-	-	switch	Low
224	Multi-Fan	Fan speed 2			1 bit	C	-	W	-	-	switch	Low
225	Multi-Fan	Fan speed 3			1 bit	C	-	W	-	-	switch	Low
226	Multi-Fan	Fan speed UP/DOWN			1 bit	C	-	W	-	-	step	Low
227	Multi-Fan	Fan status ON/OFF			1 bit	C	R	-	T	-	switch	Low
228	Multi-Fan	Fan status speed			1 byte	C	R	-	T	-	counter pulses (0..255)	Low
229	Multi-Fan	Fan status speed 1			1 bit	C	R	-	T	-	switch	Low
230	Multi-Fan	Fan status speed 2			1 bit	C	R	-	T	-	switch	Low
231	Multi-Fan	Fan status speed 3			1 bit	C	R	-	T	-	switch	Low
232	Multi-Fan	Fan Limitation 1			1 bit	C	-	W	-	-	enable	Low
233	Multi-Fan	Fan Limitation 2			1 bit	C	-	W	-	-	enable	Low
234	Multi-Fan	Fan Limitation 3			1 bit	C	-	W	-	-	enable	Low
235	Multi-Fan	Fan Limitation 4			1 bit	C	-	W	-	-	enable	Low
236	Multi-Fan	Fan Forced Operation			1 bit	C	-	W	-	-	enable	Low
237	Multi-Fan	Fan Automatic ON/OFF			1 bit	C	-	W	-	-	enable	Low
238	Multi-Fan	Fan status automatic			1 bit	C	R	-	T	-	enable	Low

Fig. 6.8 communication objects “Fan-Multi level”

No.	Function	Object name	Data type	Flags	DPT
222	**Multi-Fan**	**Fan speed witch**	**1byte**	**C,W**	**5.010 DPT_Value_1_UCount**

The communication object is enabled if in parameter window “Fan speeds” the parameters “enable direct operation” and “Enable ‘Fan speed switch’ obj.” have been selected with the option “yes”.

With this communication object the fan can be switched on via a 1byte communication object of a fan speed. If another fan speed is switched on, at this point it will be switched off. A new fan speed is switched on taking the start-up phase into consideration.

Telegram value:

<threshold value 1 ——the fan off

>=threshold value 1 —— fan speed 1

>=threshold value 2 —— fan speed 2

>=threshold value 3 —— fan speed 3

No.	Function	Object name	Data type	Flags	DPT
223	**Multi-Fan**	**Fan speed 1**	**1bit**	**C,W**	**1.001 DPT_Switch**

The communication object is enabled if in parameter window “Fan speeds” the parameters “enable direct operation” and “Enable ‘Fan speed switch’ obj.” have been selected with the option “yes”.

Via the communication object, the fan speed 1 can be switched on.

If several On telegrams are received consecutively in a short period of time at various fan speed 1-3 commnication objects, the value last received by the fan control is the decisive value.

An OFF telegram to one of the three communication objects, fan speed 1-3, switches off the fan completely.

Telegram value:

0 ——fan OFF

1 ——fan ON in speed 1

224	**Multi-Fan**	**Fan speed 2**	**1bit**	**C,W**	**1.001 DPT_Switch**
Refer to communication object 223					
225	**Multi-Fan**	**Fan speed 3**	**1bit**	**C,W**	**1.001 DPT_Switch**
Refer to communication object 223					
226	**Multi-Fan**	**Fan speed UP/DOWN**	**1bit**	**C,W**	**1.007 DPT_Step**

The communication object is enabled if in parameter window “Fan speeds” the parameters “enable direct operation” and “Enable ‘Fan speed Up/Down’ obj.” have been selected with the option “yes”.

With this communication object, the fan can be switched one fan speed further up or down. Switching (UP/DOWN) is determined by the telegram value. After the maximum or minimum speed is achieved, further UP/DOWN telegrams are ignored and not executed.

Telegram value:

0 ——switch fan speed DOWN

1 —— switch fan speed UP

227	**Multi-Fan**	**Fan status ON/OFF**	**1bit**	**C,R,T**	**1.001 DPT_Switch**

This communication object is enabled if in parameter window “Fan: Status” the parameter “Enable Obj. ‘status ON/OFF mode’” have been selected with option “yes”. The value of the communication object is updated and sent when the switch status of the fan is changed, or sent on request.

Telegram value 0 ——fan OFF

1 ——fan ON, at least one fan speed is not off.

Note: some fans require an ON telegram before you set a fan speed. Using the communication object Fan status ON/OFF, the fan can, for example, be switched on centrally with a switch actuator via the main switch.

228	**Multi-Fan**	**Fan status speed**	**1byte**	**C,R,T**	**5.010 DPT_Value_1_UCount**

This communication object is enabled if in parameter window “Fan: Status” the parameter “Enable Obj. ‘status fan speed’ ” have been selected with option “yes”. The value of the communication object is updated and sent when the status of the fan speed is changed, or sent on request.

Telegram value:

0 —— the fan off

1 —— fan speed 1

2 —— fan speed 2

3 —— fan speed 3

229	**Multi-Fan**	**Fan status speed 1**	**1bit**	**C,R,T**	**1.001 DPT_Switch**

This communication object is enabled if in parameter window “Fan: Status” the parameter “Enable Obj. ‘status fan speed x’ ” have been selected with option “yes”. The value of the communication object is updated and sent when the switch status of the fan speed is changed, or sent on request.

Telegram value 0 ——fan speed 1OFF

1 ——fan speed 1 ON

230	**Multi-Fan**	**Fan status speed 2**	**1bit**	**C,R,T**	**1.001 DPT_Switch**
Refer to communication object 229					
231	**Multi-Fan**	**Fan status speed 3**	**1bit**	**C,R,T**	**1.001 DPT_Switch**
Refer to communication object 229					
232	**Multi-Fan**	**Fan Limitation 1**	**1bit**	**C,W**	**1.003 DPT_Enable**

This communication object is enabled if in parameter window “Fan: auto. Operation” the parameter “Limitation function is” has been selected with the option “yes”.

The limitation 1 is active if a telegram “1” is received on the object. The limitation 1 is deactivated if a telegram “0” is received on the object.

When the limitation 1 is activated, the fan can only assume the fan speed or fan speed ranges as parameterized in fan speed with limitation 1.

Telegram value 0 ——limitation 1 inactive

1 ——limitation 1 active

Note: limitation 1 is only active in automatic mode.

233	**Multi-Fan**	**Fan Limitation 2**	**1bit**	**C,W**	**1.003 DPT_Enable**
Refer to communication object 223					
234	**Multi-Fan**	**Fan Limitation 3**	**1bit**	**C,W**	**1.003 DPT_Enable**
Refer to communication object 223					
235	**Multi-Fan**	**Fan Limitation 4**	**1bit**	**C,W**	**1.003 DPT_Enable**
Refer to communication object 223					
236	**Multi-Fan**	**Fan Forced Operation**	**1bit**	**C,W**	**1.003 DPT_Enable**

The communication object is enabled if in parameter window “Fan speeds” the parameter “Enable 1bit ‘Forced operation’ Obj.” has been selected with the option “yes”.

The forced operation can be activated via the object receiving a telegram “0” or “1” set by the parameter “forced operation on object value is”. When the object receives an inverse telegram value, the forced operation is cancelled.

When the force operation is activated, the fan can only assume the fan speed or fan speed ranges as parameterised in Limitation on forced operation.

During Forced operation, the limits setting in Automatic operation are ignored

If the parameter “forced operation on object value is” is set to “1”:

Telegram value 0 ——no forced operation

1 ——forced operation

If the parameter “forced operation on object value is” is set to “0”:

Telegram value 0 ——forced operation

1 ——no forced operation

237	Multi-Fan	Fan Automatic ON/OFF	1bit	C,W	1.003 DPT_Enable

The communication object is enabled if in parameter window “Fan speeds” the parameter “Auto. Operation is” has been selected with the option “yes”.

The Auto. Operation can be activated via the object receiving a telegram “0” or “1” set by the parameter “carry out auto. Operation when the object value is”. When the object receives an inverse telegram value, the Auto. Operation is disabled.

After bus voltage recovery or programming, the Auto. Operation is inactive by default.

During the Auto. Operation, if the direct operation is activated, the Auto. Operation will be disabled automatically. But these limit status is still retained, and is valid again if the Auto. Operation is activated again.

The direct operation:

Fan: Fan speed witch

Fan: Fan speed x (x=1,2,3,)

Fan: Fan speed UP/DOWN

During forced operation the automatic mode remains active; however, it is only operated within the allowed limits.

If the parameter “carry out auto. Operation when the object value is” is set to “1”:

Telegram value 0 ——the Auto. operation inactive

1 ——the Auto. operation active

If the parameter “carry out auto. Operation when the object value is” is set to “0”:

Telegram value 0 ——the Auto. operation active

1 ——the Auto. operation inactive

238	Multi-Fan	Fan status automatic	1bit	C,R,T	1.003 DPT_Enable

This communication object is enabled if in parameter window “Fan: Status” the parameter “Enable Obj. ‘status Auto. Mode’” has been selected with option “yes”. The value of the communication object is updated and sent when the status of the Auto. Operation is changed, or sent on request.

Telegram value 0 ——the Auto. operation inactive

1 ——the Auto. operation active

Table 8 Communication objects table “Fan-multi level”

6.4.2 Communication object of “O,P,Q as relay control”

The O, P , Q as switching output, the communication objects are similar with the communication objects of the front switch output. Here the only difference is no logic function, so the communication objects refer to the chapter 6.2.

6.5 Communication objects of HVAC system (R~U)

6.5.1 Communication object of “HVAC General”

6.5.1.1 Communication objects “1Control value/2-pipe”

The heating/cooling shares the heating valve. The cooling valve can be used independently.

Number	Name	Object Function	Des	Group Adc	Length	C	R	W	T	U	Data Type	Priority
240	HVAC-General	HVAC-General HEAT/COOL			1 byte	C	-	W	-	-	percentage (0..100%)	Low
241	HVAC-General	HVAC-General COOL			1 byte	C	-	W	-	-	percentage (0..100%)	Low

Fig. 6.9 communication objects “1 control value/2-pipe”

No.	Function	Object name	Data type	Flags	DPT
240	HVAC-General	HVAC-General HEAT/COOL	1byte	C,W	5.001 DPT_Scaling
The communication object is used to receive a control signal from a thermostat on the bus. The control value can adjust the valve position. Telegram value 0% ——OFF, no heating or cooling …… 100% ——ON, largest control value, maximum heating or cooling					
241	HVAC-General	HVAC-General COOL	1byte	C,W	5.001 DPT_Scaling
The communication object is used to receive a cooling control signal from a thermostat on the bus. It is independent of last object. The cooling valve can be additionally controlled without monitoring via the object. Telegram value 0% ——OFF, no cooling …… 100% ——ON, largest control value, maximum cooling					

Table 9 communication objects table “1 control value/2-pipe”

6.5.1.2 Communication objects “1Control value/4-pipe with switch obj.”

The heating is realized via the heating valve, the cooling is realized via the cooling valve. But Here only heating or cooling are active. And toggle between the heating valve and the cooling valve is implemented via a separate communication object.

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
240	HVAC-General	HVAC-General HEAT/COOL			1 byte	C	-	W	-	-	percentage (0..100%)	Low
242	HVAC-General	HVAC-General Toggle HEAT/COOL			1 bit	C	-	W	-	-	cooling/heating	Low

Fig. 6.10 communication objects “1 control value/4-pipe with switch obj.”

No.	Function	Object name	Data type	Flags	DPT
240	HVAC-General	HVAC-General HEAT/COOL	1byte	C,W	5.001 DPT_Scaling
The communication object is used to receive a control signal from a thermostat on the bus. The control value can adjust the valve position. Telegram value 0% ——OFF, no heating or cooling …… 100% ——ON, largest control value, maximum heating or cooling					
242	HVAC-General	HVAC-General Toggle HEAT/COOL	1bit	C,W	DPT_Bool
The communication object is used to toggle between the heating and the cooling. If the value 1 is set in the parameter “Object value for ‘Toggle HEAT/COOL obj.’” Telegram value 0 ——the cooling active 1 ——the heating active If the value 0 is set in the parameter “Object value for ‘Toggle HEAT/COOL obj.’” Telegram value 0 ——the heating active 1 ——the cooling active If the object receives a toggle value, the monitor time is re-started.					

Table 10 communication objects table “1 control value/4-pipe with switch obj.”

6.5.1.3 Communication objects “2 Control value/2-pipe”

The heating/cooling shares the heating valve. The cooling valve is unused. Here only heating or cooling are active, dependent on the last active received control value.

Number	Name	Object Function	Des	Group Add	Length	C	R	W	T	U	Data Type	Priority
240	HVAC-General	HVAC-General HEAT			1 byte	C	-	W	-	-	percentage (0..100%)	Low
241	HVAC-General	HVAC-General COOL			1 byte	C	-	W	-	-	percentage (0..100%)	Low

Fig.6.11 communication objects “2 control value/2-pipe”

No.	Function	Object name	Data type	Flags	DPT
240	HVAC-General	HVAC-General HEAT	1byte	C,W	5.001 DPT_Scaling
The communication object is used to receive a heating control signal from a thermostat on the bus. Telegram value 0% ——OFF, no heating …… 100% ——ON, largest control value, maximum heating					
241	HVAC-General	HVAC-General COOL	1byte	C,W	5.001 DPT_Scaling
The communication object is used to receive a cooling control signal from a thermostat on the bus. Telegram value 0% ——OFF, no cooling …… 100% ——ON, largest control value, maximum cooling					

Table 6.11 communication objects table “2 control value/2-pipe”

6.5.1.4 Communication objects “2 Control value/2-pipe with switch obj.”

The heating/cooling shares the heating valve. The cooling valve is unused. And toggle between the heating and the cooling is implemented via a separate communication object.

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
240	HVAC-General	HVAC-General HEAT			1 byte	C	-	W	-	-	percentage (0..100%)	Low
241	HVAC-General	HVAC-General COOL			1 byte	C	-	W	-	-	percentage (0..100%)	Low
242	HVAC-General	HVAC-General Toggle HEAT/COOL			1 bit	C	-	W	-	-	cooling/heating	Low

Fig. 6.12 communication objects “2 control value/2-pipe with switch obj.”

No.	Function	Object name	Data type	Flags	DPT
240	**HVAC-General**	**HVAC-General HEAT**	**1byte**	**C,W**	**5.001 DPT_Scaling**
The communication object is used to receive a heating control signal from a thermostat on the bus. Telegram value 0% ——OFF, no heating …… 100% ——ON, largest control value, maximum heating					
241	**HVAC-General**	**HVAC-General COOL**	**1byte**	**C,W**	**5.001 DPT_Scaling**
The communication object is used to receive a cooling control signal from a thermostat on the bus. Telegram value 0% ——OFF, no cooling …… 100% ——ON, largest control value, maximum cooling					
242	**HVAC-General**	**HVAC-General Toggle EAT/COOL**	**1bit**	**C,W**	**1.100 DPT_Cool/Heat**
The communication object is used to toggle between the heating and the cooling. If the value 1 is set in the parameter “Object value for ‘Toggle HEAT/COOL obj.’” Telegram value 0 ——the cooling active 1 ——the heating active If the value 0 is set in the parameter “Object value for ‘Toggle HEAT/COOL obj.’” Telegram value 0 ——the heating active 1 ——the cooling active If the object receives a toggle value, the monitor time is re-started.					

Table 6.12 communication objects table “2 control value/2-pipe with switch obj.”

6.5.1.5 Communication objects “2 Control value/4-pipe”

The heating is realized via the heating valve, the cooling is realized via the cooling valve. But Here only heating or cooling are active, dependent on the last active received control value.

Number	Name	Object Function	Des	Group Add	Length	C	R	W	T	U	Data Type	Priority
240	HVAC-General	HVAC-General HEAT			1 byte	C	-	W	-	-	percentage (0..100%)	Low
241	HVAC-General	HVAC-General COOL			1 byte	C	-	W	-	-	percentage (0..100%)	Low

Fig. 6.13 communication objects “2 control value/4-pipe”

No.	Function	Object name	Data type	Flags	DPT
240	**HVAC-General**	**HVAC-General HEAT**	**1byte**	**C,W**	**5.001 DPT_Scaling**
The communication object is used to receive a cooling control signal from a thermostat on the bus. Telegram value 0% ——OFF, no heating …… 100% ——ON, largest control value, maximum heating					
241	**HVAC-General**	**HVAC-General COOL**	**1byte**	**C,W**	**5.001 DPT_Scaling**
The communication object is used to receive a cooling control signal from a thermostat on the bus. Telegram value 0% ——OFF, no cooling …… 100% ——ON, largest control value, maximum cooling					

Table 13 communication objects table “2 control value/4-pipe”

6.5.1.6 Communication objects “Fault Control Value”

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
243	HVAC-General	Fault Control Value			1 bit	C	R	-	T	-	alarm	Low

Fig. 6.14 communication objects “Fault control value”

No.	Function	Object name	Data type	Flags	DPT
243	**HVAC-General**	**Fault Control Value**	**1bit**	**C,R,T**	**1.005 DPT_Alarm**
During the monitoring time, if the communication objects “HVAC-General HEAT/COOL”,“HVAC-General HEAT” or “HVAC-General COOL” do not receive the control signal from other bus device (e.g. thermostat), then the communication object will send a fault report to indicate a malfunction of the thermostat, and the valve is adjusted to a safety position. Telegram value 0 ——no fault 1 ——fault The fault monitoring time starts when the parameter download has been completed. In monitoring time, if a control value is received via the objects “HVAC-General HEAT/COOL”,“HVAC-General HEAT” or “HVAC-General COOL”, the time is reset, and the monitor time is also reset when toggle between the heating and cooling.					

Table 14 communication objects table “Fault control value”

6.5.2 Communication objects of “OUTPUT R,S---HEATING”

The following communication objects act on the heating valve.

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
244	Valve HEAT	HEAT Disabled			1 bit	C	-	W	-	-	enable	Low
245	Valve HEAT	HEAT Forced operation			1 bit	C	-	W	-	-	enable	Low
246	Valve HEAT	HEAT Trigger valve purge			1 bit	C	-	W	-	-	enable	Low
247	Valve HEAT	HEAT Status valve purge			1 bit	C	R	-	T	-	enable	Low
248	Valve HEAT	HEAT Valve position status			1 bit	C	R	-	T	-	switch	Low
248	Valve HEAT	HEAT Valve position status			1 byte	C	R	-	T	-	percentage (0..100%)	Low

Fig. 6.15 communication objects of “OUTPUT R,S--HEATING”

No.	Function	Object name	Data type	Flags	DPT
244	**Valve HEAT**	**HEAT Disabled**	**1bit**	**C,W**	**1.003 DPT_Enable**

Via the communication object, the heating valve can be disabled or enabled. The valve position is set to 0% when disabled; the valve reverts back to its previous position when enabled again. Please refer to the description in the end of the section 5.6.3.

If the parameter “Disable Heat on object value” is set to “1”:

Telegram value 0 ——the valve not disabled

1 ——the valve disabled

If the parameter “Disable Heat on object value” is set to “0”:

Telegram value 0 ——the valve disabled

1 ——the valve not disabled

No.	Function	Object name	Data type	Flags	DPT
245	**Valve HEAT**	**HEAT Forced operation**	**1bit**	**C,W**	**1.003 DPT_Enable**

The communication object is used to enable the forced operation.

If the parameter “Forced operation on object value” is set to “1”:

Telegram value 0 ——end forced operation

1 ——start forced operation

If the parameter “Forced operation on object value” is set to “0”:

Telegram value 0 ——start forced operation

1 ——end forced operation

No.	Function	Object name	Data type	Flags	DPT
246	**Valve HEAT**	**HEAT Trigger valve purge**	**1bit**	**C,W**	**1.017DPT_Trigger**

The communication is used to trigger the valve purge. When the valve purge is triggered, the valve will be fully opened.

Telegram value 0 ——end valve purge

1 ——start valve purge

No.	Function	Object name	Data type	Flags	DPT
247	**Valve HEAT**	**HEAT Status valve purge**	**1bit**	**C,R,T**	**1.003 DPT_Enable**

The status of the valve purge is indicated via this communication object as soon as a purge has been activated. The status remains active even when the purge has been interrupted, e.g. by a priority.

Telegram value 0 ——valve purge not active

1 ——valve purge active

The status will be displayed once the valve purge function be activated。

248	Valve HEAT	HEAT Valve position status	1byte	C,R,T	5.001 DPT_Scaling
The communication object is enabled if in parameter window “function” the parameter “Enable ‘Valve position status’ object”, the option “1byte” has been selected. The status of the valve position is indicated via this communication object. The target position, to where the valve should move, is always transferred. Telegram value 0 …100%：0...100%					
248	Valve HEAT	HEAT Valve position status	1bit	C,R,T	1.001 DPT_Switch
The communication object is enabled if in parameter window “function” the parameter “Enable ‘Valve position status’ object”, the option “1bit” has been selected. The status of the valve position is indicated via this communication object. The target position, to where the valve should move, is always transferred. Please refer to the description of the parameter “Object value with valve position >0” in the section 5.6.2.1.					

Table 15 communication objects table “OUTPUT R, S--HEATING”

6.5.3 Communication objects of “OUTPUT T,U---COOLING”

The communication objects that act on the cooling valve are the same with the heating valve. Please refer to description of the objects in the chapter 6.5.2.

6.6 Communication objects of Dimming outputs (V,W)

6.6.1 Communication objects “General dimming”

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
60	DIM V	Switch			1 bit	C	-	W	-	-	switch	Low
61	DIM V	Switch status			1 bit	C	R	-	T	-	switch	Low
62	DIM V	Relative dimming			4 bit	C	-	W	-	-	dimming control	Low
63	DIM V	Brightness			1 byte	C	-	W	-	-	percentage (0..100%)	Low
64	DIM V	Brightness status			1 byte	C	R	-	T	-	percentage (0..100%)	Low
65	DIM V	Scene / save V			1 byte	C	-	W	-	-	scene control	Low

Fig. 6.16 Communication objects “general dimming”

No.	Function	Object name	Data type	Flags	DPT
60	DIM X	Switch	1bit	C,W	1.001 DPT_Switch
This object is used to receive the switch command to switch the dimmer actuator. It will switch on the dimmer actuator with “1”, off with “0”.					
61	DIM X	Switch status	1bit	C,R,T	1.001 DPT_Switch
This object is used to report the status of the current switch to the bus. The object will send “1” to the bus when the value of the brightness is larger than 0, mean the switch is on; “0” to the bus if value of “0”, mean the switch is off. The object will be enabled when selecting “It is new status” in the parameter “Status report”.					

62	DIM X	Relative dimming	4bit	C,W	3.007 DPT_Control Dimming

This object is used to dim up or down the outputs. It will dim down when the telegram value is from 1 to 7. During this range, smaller amplitude of dimming down with larger value; that means it will dim down to the biggest amplitude with 1, while to the smallest amplitude with 7, and 0 means stop dimming. It will dim up when the telegram value is from 9-15. During this range, smaller amplitude of dimming up with larger value; that means it will dim up to the biggest amplitude with 9, while to the smallest amplitude with 15, and 8 means stop dimming. Defined as follow:

Object value	0	1	2	3	4	5	6	7
Dim down	Unchanged/ stop dimming	255	128	64	32	16	8	4
Object value	8	9	10	11	12	13	14	15
Dim up	Unchanged/ stop dimming	255	128	64	32	16	8	4

63	DIM X	Brightness	1byte	C,W	5.001 DPT_Scaling

It is used to receive a brightness value to switch the dimmer actuator, switching on the actuator when the received value is larger than 0, off or stay to the lower threshold value with “0”, which is defined by the parameter setup in the brightness value dimming.

64	DIM X	Brightness status	1byte	C,R,T	5.001 DPT_Scaling

This object is used to send the brightness status of the current output to the bus whatever causes the changes of the value. The object will be enabled when selecting “Transmit new brightness” in the parameter “Brightness value OBJ transmit after dimming”.

65	DIM X	Scene/save	1byte	C,W	18.001 DPT_SceneControl

It is able to recall or save the scene when sending an 8-bit command by this object, which will be enabled when enabling the scene function. The definition of the 8-bit command will be described below:

Assuming an 8-bit command (binary coding) as: FXNNNNNN

F: recall the scene with “0”; save the scene with “1”;

X: 0

NNNNNN: scene number (0-63).

1-64 in the parameter setup corresponds to the scene number 0-63 received by the communication object “Scene/save”. For example, scene 1 in the parameter setup has the same output result as scene 0 in the communication object “Scene/save”. As follow:

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

Table 16 Communication objects table “general dimming”

6.6.2 Communication objects “staircase lighting”

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
60	DIM V	Switch			1 bit	C	-	W	-	-	switch	Low
63	DIM V	Permanent on			1 bit	C	-	W	-	-	switch	Low

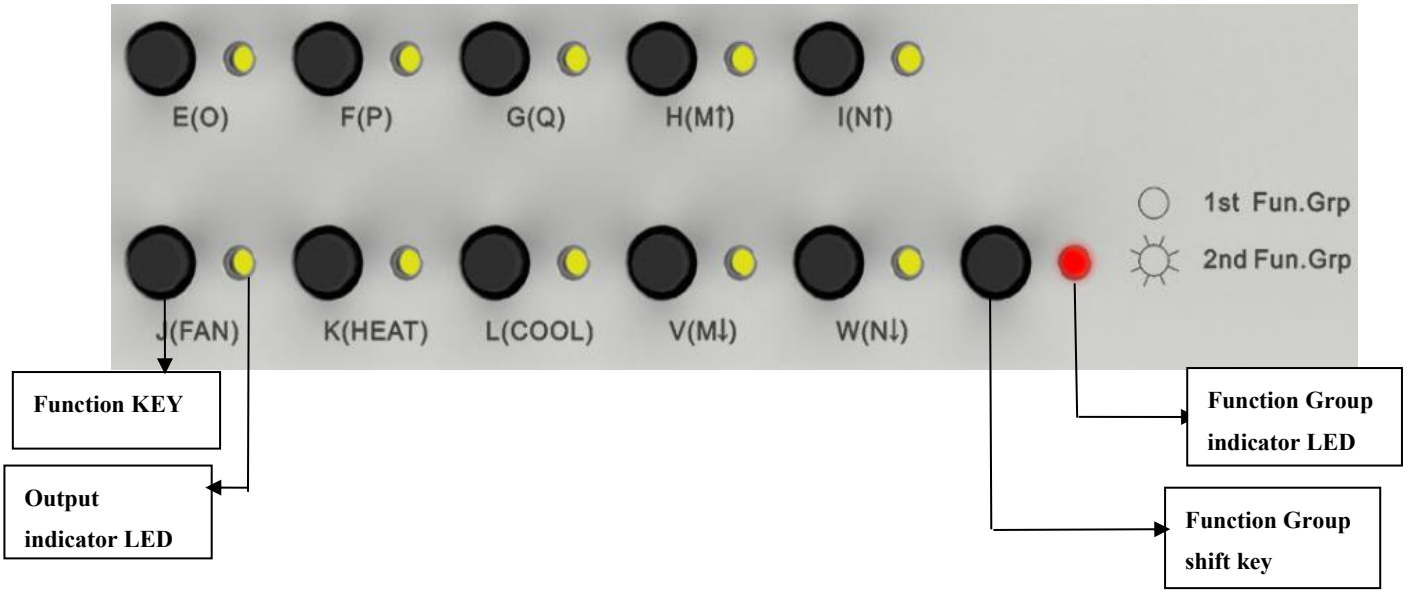
Fig. 6.17 Communication objects “staircase lighting”

No.	Function	Object name	Data type	Flags	DPT
60	**DIM X**	**Switch**	**1bit**	**C,W**	**1.001 DPT_Switch**
The communication object is used to switch on the staircase light function of dimmer with telegram “1”. It will switch off the staircase lighting after a certain on time, and the ON duration time are defined by “Duration of staircase lighting: Base” and “Duration of staircase lighting: Factor” and lights on duration is: duration=base*factor. It will be off automatically after the time. It can also switch off the lights with telegram “0”.					
63	**DIM X**	**Permanent on**	**1bit**	**C,W**	**1.001 DPT_Switch**
The object receives the value “1” to switch on staircase light for a long time, receives the value “0” to switch off the staircase light.					

Table 17 Communication objects table “staircase lighting”

Chapter 7 Manual function description

Room Controller provides manual function for All of outputs. If it is electronic manual operation, only bus power recovers can it be operated; If it is mechanic manual operation, it can be operated in any case. When bus power recovers, electronic manual function is defined in first function group. Electronic manual function is show as following:



As show in Fig 7.1,there are two kinds of manual function button according to their use:

1、 **Function key**: control the certain output

2、**Function group shift key**: shift function group, that is said that it can shift the function of manual key and LED

If the LED in the right of function group shift key is off, function key can control the outputs of channel E、F、G、H、I、J、K、L、V、W;

If the LED in the right of function group shift key is on, function key can control the outputs of channel FAN(or O、P、Q)、M、N、R、S、T、U;

The LED of function group can be cyclically indicated between on and off via operating function group shift key.

Therefore, make sure that operating function group key to make LED be on, then the outputs of shutter、fan speed and HVAC function can be controlled via function key.

Manual operation for every function are described as following:

Switch outputs: the processing of Fig 5.10 do not disturb manual function output, the correspond of switch output is executed immediately. However, the priority of manual function is lower than that of Force operation.

Shutter outputs: it can be achieved through operating key “H(M)”、“I(N)”、“V(M)”and“W(N)”,short operation is the same as the function of communication object “Louvre adj./Stop”,long operation is the same as the function of communication object “Shutter UP/DOWN”. when shutter is running, LED will flash; If both of blinds and louver arrive at minimum or maximum position, LED will be on.

Fan control: manual operation of fan is achieved by button“J(FAN)”.short operation can adjust fan speed, long operation can cut off fan; but the indicate LED of fan speed is O、P、Q.

O-lower speed,P-middle speed, Q-high speed

Valve control:short operation of button“K(HEAT)” can control HEATING(R,S),short operation of “L（COOL）” can control COOLING(T,U),while long operation of one of these two buttons can cancel manual function of valve.short operation is the function of all-on or all-off.

Dimming outputs:short operation is the same as the function of communication object“switch”,long operation is the same as the function of communication object“Relative dimming”,and the dimming mode is “start-stop dimming”.when dimming is running,LED will flash;when dimming is complete,the status of LED will be depended on the status of channel output.