Application software

12 & 16 Outputs module ON/OFF Multi-applications

Electrical / Mechanical characteristics : see user manual

	Order number	**Product designation**	**Application software ref.**	**TP device** **RF devices**
	TYF612	12 ON/OFF Outputs 10A Multi-applications	STTYF612 Version 1.x	
	TYF616	16 ON/OFF Outputs 10A Multi-applications	STTYF616 Version 1.x	

Summary

1 Presentation

1.1 General points

The purpose of this manual is to describe the operation and configuration of the KNX-devices using the ETS program. It will describe the available function with a description of the different parameters and objects.

1.2 About the ETS program

1.2.1 ETS Compatibility

The application programs are compatible with ETS3, ETS4 and ETS5. They can be downloaded from our website under the order number.

ETS Version	File extension of compatible files
ETS3	*.vd4
ETS4	*.vd4
ETS5	*.vd4

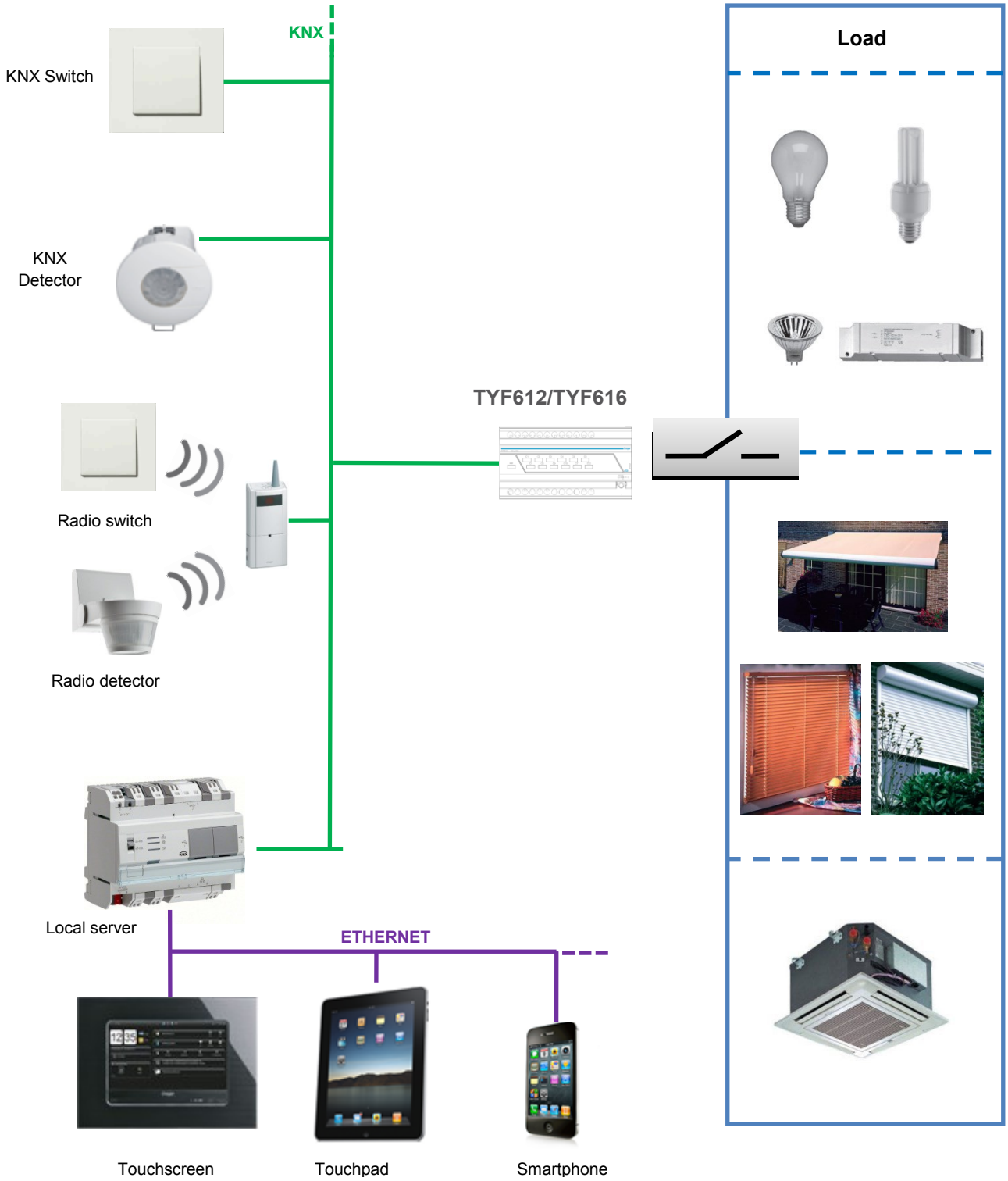
1.2.2 Application descriptions

Application	Product reference
STYF612	TYF612
STYF616	TYF616

2 General description

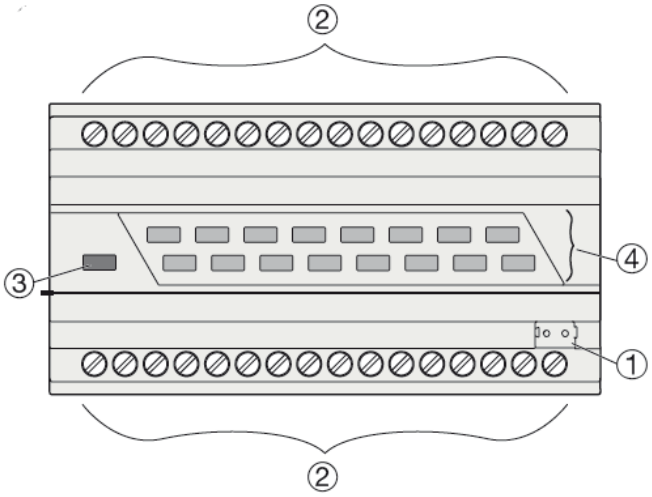
2.1 Installation of the device

2.1.1 Global schematic



2.1.2 Description of the device

- TYF612/TYF616



1) KNX bus connection terminal.

2) Connections of loads.

3) Illuminated programming button.

4) Operation button for manual operation for one output with status LED.

2.1.3 Physical addressing

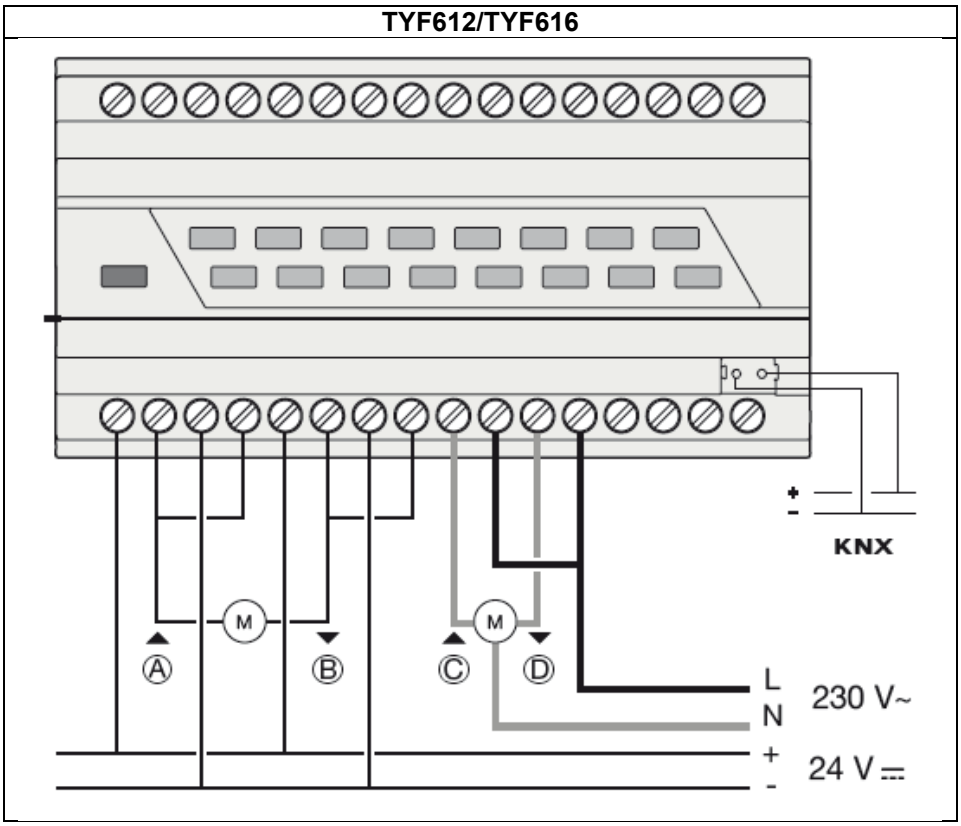
In order to perform the physical addressing or to check whether or not the bus is connected, press the lighted push button 3) on the left-hand side of the device.

Light on = bus connected and ready for physical addressing.

Programming mode is activated, until the physical address is transferred from ETS. Pressing the button again, exits programming mode.

2.1.4 Shutter motors connection

TYF612/TYF616



2.2 Function modules of the application

The switch actuators of the devices can be used in 2 different modes.

Lighting – Heating
- Each switching contact is used separately to switch a load.

Shutter/Blind
- Each pair of outputs constitutes a shutter and blind channel 230VAC.

Shutter/Blind 24VDC
- Two pairs of outputs constitutes a shutter and blind channel 24VDC.

Fan coil 2 pipes
- 4 outputs constitute a fan coil 2 pipes channel.

Fan coil 4 pipes
- 5 outputs constitute a fan coil 4 pipes channel.

A mix of the different operating modes is possible.

3 FUNCTIONAL DESCRIPTION

The KNX output module multi-application is a versatile device which allows a variety of configurations. The application program can be loaded with ETS3 or higher and supports the applications which will be described in this manual:

- Lighting.
- Heating.
- Shutter and Blind.
- Shutter and Blind 24V.
- Fan Coil 2 pipes.
- Fan Coil 4 pipes.

The functionalities for each output include among other things timing functions, logic gates, scenes, disabling function, forced, working hours counter, periodical monitoring and different configurations for feedback telegrams.

The manual control of the outputs is possible through the push buttons on the device. It allows the control of the outputs when bus communication failures between devices occur.

The product is supplied with power from the KNX bus and accordingly does not need any external power supply.

Note:

The bold values in the tables are the factory settings (default values).

Type and number of the available objects depend on the settings with ETS. Visible objects might vary according to settings you have already made. In this documentation, all objects are always shown.

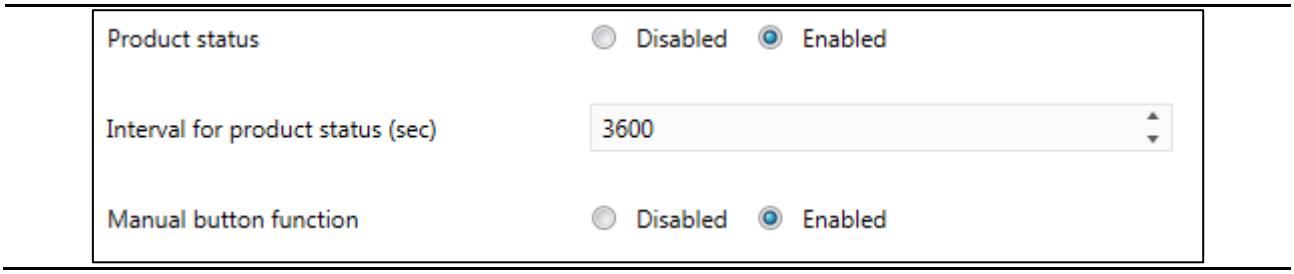
4 GENERAL FUNCTIONS

There are two general parameters such as “Module Alive Beacon” and “Manual Button Function”. These two functions play an important role in the system control safety.

Enabling the alive beacon parameter it is possible to know whether the device is working correctly. Via the object “General” the value true is sent with a preconfigured period. The receipt of this telegram periodically means that the device is working properly.

The manual control can be also enabled in this section. The outputs can be controlled through the push buttons on the device when this option is enabled. (See the Appendix A: Manual Control)

4.1 PARAMETERS



PARAMETER	DESCRIPTION	VALUES
Product status	This parameter allows sending the value “true” periodically while the module is running.	**Disabled** Enabled
Interval for product status (sec)[1]	This parameter determines the Module Alive Beacon sending period.	**3600** (1…65535)
Manual button function	This parameter determines if the use of the device buttons is allowed.	**Enabled** Disabled

[1]This parameter is only visible when the parameter “Module Alive Beacon” is set to “Enabled”

4.2 OBJECTS

The following object can be used through the general function:

OBJ NAME	FUNCTION	TYPE	FLAG
General	Product status	1 bit	CRT
This object is only visible when the “Product status” function is enabled. Via the group address linked, the value “true” is sent while the module is running.			

5 LOGIC GATE

Up to 4 logic gates can be used with the device. In addition, each logic gate allows the use of up to 4 inputs.

The standard logic operations AND, OR and XOR are available. (See the Appendix B: Logic Gates)

FEEBACK OPTIONS

The status of the output can be shown normally or inverted. This configuration can be done via the parameter “Output behaviour” and when it is parameterized as inverted, the status of the output is shown inversely.

Through the parameter “Send status On”, the type of feedback can be defined. The device allows sending the result of logic gates when the logic output is changed or conversely when one of the logic inputs is modified. Additionally, it is possible to define a cyclic sending of the feedback which permits getting information about the output status periodically.

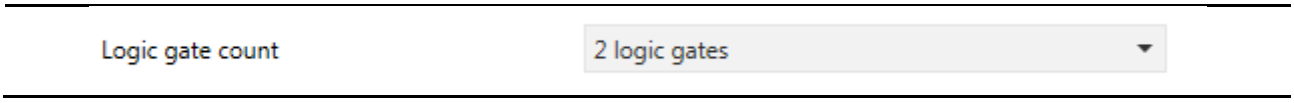
SWITCH DELAYS

The logic output can operate with delays previously configured.

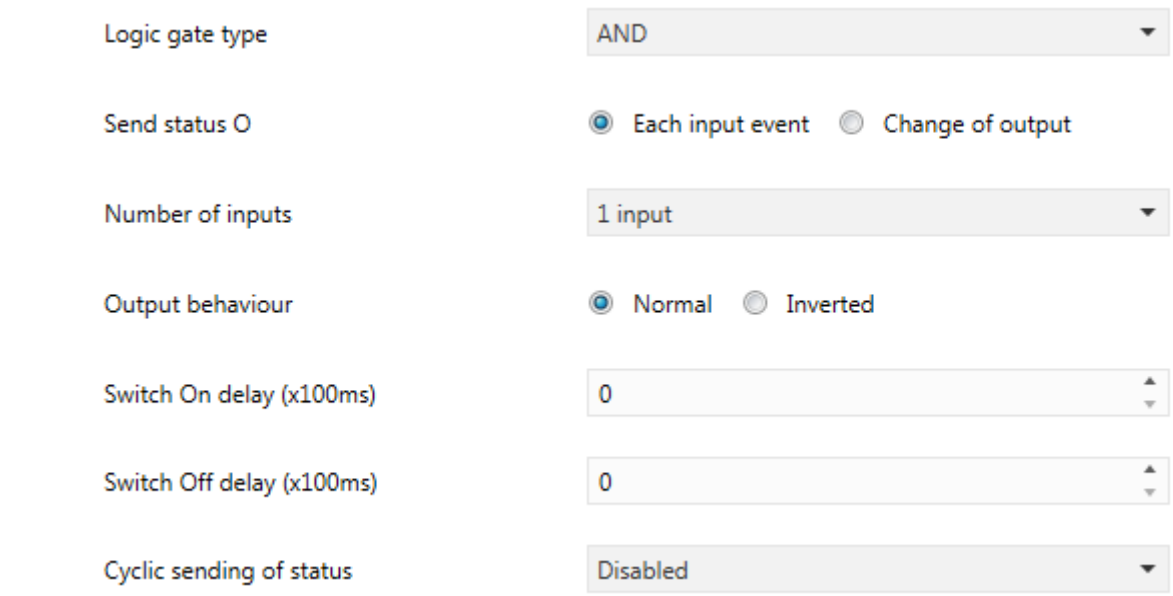
The logic output takes the values ON and OFF with delays. Depending of the switch delay parameters configuration, it is possible to set an ON delay (T_{ON}), an OFF delay (T_{OFF}) or both at the same time.

Fig1. Logic Gate with delay

5.1 PARAMETERS



PARAMETER	DESCRIPTION	VALUES
Logic gate count	This parameter determines the number of logic gates to use.	**No logic gate** 1 logic gate 2 logic gates 3 logic gates 4 logic gates



PARAMETER	DESCRIPTION	VALUES
Logic gate type	This parameter determines the logic gate type. The output will be true or false depending on the result of this logic. Disabled: This option is disabled. The logic operations AND, OR and XOR are possible for this function.	**AND** OR XOR
Send status On	This parameter determines when the status of the output is sent. Each Input Event: Every time an input value is modified. Change of Output: Every time the output is modified.	**Each input event** Change of output
Number of Inputs	This parameter determines the number of inputs for the logic.	**1 input** 2 inputs 3 inputs 4 inputs
Output behaviour	This parameter defines the behaviour of the logic output. Normal: The real status of the output is shown via the corresponding object. Inverted: The inverted status of the output is shown via the corresponding object.	**Normal** Inverted
Switch On delay (x100ms)	The output takes the value on after a delay configured in this parameter.	**0** (0...255)
Switch Off delay (x100ms)	The output takes the value off after a delay configured in this parameter.	**0** (0...255)
Cyclic sending of status	This parameter determines the sending period of the logic output value. “Disabled” option means that the feedback telegram is sent only after output or input changes, depending on the previous configuration.	**Disabled** 5 s, 10 s, 30 s, 1 min, 5 min, 10 min, 20 min, 30 min, 40 min, 50 min, 1 h, 2 h, 3 h, 4 h, 5 h, 6 h, 12 h, 24 h

5.2 OBJECTS

The following object can be used through the logic gate function:

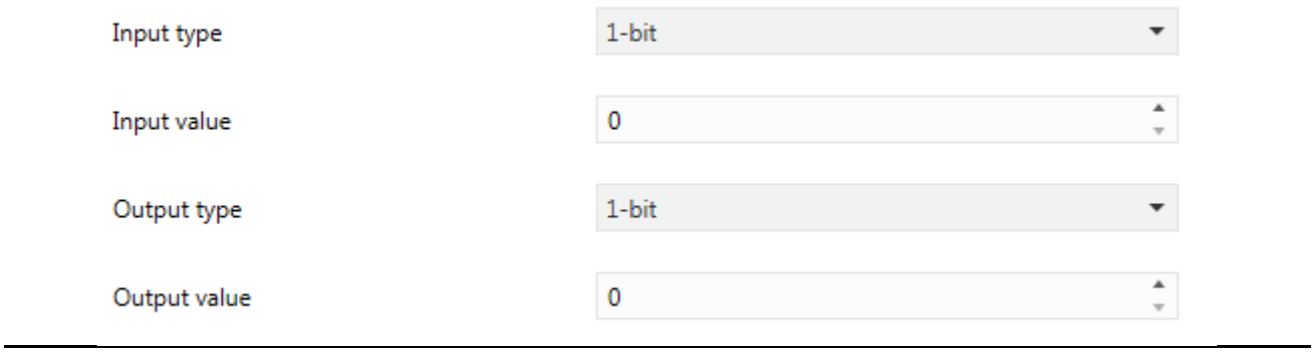
OBJ NAME	FUNCTION	TYPE	FLAG
LogicX (1,2,3 or 4)	Input X (1,2,3 or 4)	1 bit	CRWU
Via this object it is possible to set the value of the logic inputs.			
LogicX (1,2,3 or 4)	Output	1 bit	CRT
Via this object the current value of the logic output is shown.			

6 CONVERTER

Up to 8 converters are available with the device. They allow the output converter to take a configured value depending on the input value. There are 8 different types of data input which can be converted to 4 different data values.

6.1 PARAMETERS

PARAMETER	DESCRIPTION	VALUES
Number of converter gate	This parameter determines the number of converter gates to use.	**No converter gate** 1 Converter gate 2 Converter gates 3 Converter gates 4 Converter gates



PARAMETER	DESCRIPTION	VALUES
Input type	This parameter determines the type of data for the logic input.	**1-bit** 2-bit 1-byte 2-byte 1-byte logic 2-byte logic 1-byte threshold 2-byte threshold
Input value	This parameter set the value of the converter input. Depending on the input type selected the input	

PARAMETER	DESCRIPTION	VALUES
	possible values are different: Input type: 1-bit → **0** (0-1) Input type: 2-bit → **0** (0-3) Input type: 1-byte → **0** (0-255) Input type: 2-byte → **0** (0-65535)	
Lower limit (0...255)[1]	This parameter set the low threshold value for the input when it is configured as 1-byte threshold.	**0** (0...255)
Upper limit (0...255)[1]	This parameter set the up threshold value for the input when it is configured as 1-byte threshold.	**0** (0...255)
Lower limit (0...65535)[2]	This parameter set the low threshold value for the input when it is configured as 2-byte threshold.	**0** (0...65535)
Upper limit (0...65535)[2]	This parameter set the up threshold value for the input when it is configured as 2-byte threshold.	**0** (0...65535)
Output type	This parameter determines the type of data for the logic output.	**1-bit** 2-bits 1-byte 2-byte
Output value	This parameter set the value of the converter output. Output type: 1-bit → **0** (0-1) Output type: 2-bits → **0** (0-3) Output type: 1-byte → **0** (0-255) Output type: 2-byte → **0** (0-65535)	

[1]These parameters are only visible when the parameter “Input type” is set to “1-byte threshold”.
[2]These parameters are only visible when the parameter “Input type” is set to “2-byte threshold”.

When the Input type is configured as 1 or 2 byte logic, the output data is 1 bit and it will take the value 1 provided that the entry is not 0

6.2 OBJECTS

The following object can be used through the converter function:

OBJ NAME	FUNCTION	TYPE	FLAG
Converter X (1,2,3…8)	Input	1 bit	CRWU
Via this object it is possible to send values for the converter input.			
Converter X (1,2,3…8)	Output	1 bit	CRT
Via this object the current output of the converter is shown.			

7 LIGHTING

7.1 DESCRIPTION

The total number of device channels can be used for direct connection of lighting circuits.

The lighting configuration allows a large number of configurations which are described below.

TIME DELAYS

The function “Time delay” allows the output to operate with a delay previously configured. Different actions can be executed using this function:

- **Staircase function:**

After switching on the light, it will remain ON for a configurable time (T_{SF}). After this time, the output switches off automatically. Each time an ON telegram is received while the lights are ON, the delay time is restarts as long as the “Off delay retriggerable” parameter is enabled.

Fig2. Staircase function

Fig3. Staircase function retriggerable

- **On/Off delays**

The output is switched ON and OFF with delays. Depending of the “Time Delay” parameter configuration, it is possible to set an ON delay (T_{ON}), an OFF delay (T_{OFF}) or both at the same time. As well as the staircase function, the delays can be retriggerabled.

Fig4. On/Off delays

Fig5. On/Off delay retriggerable

WORKING HOURS COUNTER

This function allows counting the hours that the lighting channel remains On or Off. This selection can be done through the parameter “Working hours counter”.

The current value of the counter can be transmitted periodically via the object "hours counter". Depending on the “Count Direction” configuration the value of this object increases or decreases. With an incremental counter, the counter starts from the value 0 and it is incremented. On the other hand, with a decremental counter, it is necessary to send an initial value via the object "Hours Counter" to be decremented. If this value is not sent, the counter will remain 0 and it will be useless.

Additionally a “set point for alert” can be configured. The object “Counter set point reached” takes the value 1 when the counter reaches the value configured in this parameter.

With a decremental counter, the value “Set point for alert” should be 1 or a low value.

Knowing the life of the lamps connected to the outputs, the parameters can be configured to have a preventive maintenance.

The following figure shows an example of incremental hours counter when the output is ON:

Fig6. Hours Counter

This function permits resetting the value of the counter via the object “Reset counter”.

BLINKING

Via the “Blinking” communication object, the output starts to blink as soon as the value ON is received. The period (T_{FI}) is previously configured in the “Blinking Interval” parameter.

When the flashing function is switched off, the output retrieves the value prior to flashing activation.

The contact life of the contacts should be considered and can be found in the technical data.

Fig7. Blinking

LOCKING

This function allows the lights to be locked to a value. During a locking, the output is blocked and it can no longer be controlled via any telegram.

It is possible to define the light status during the locking and the value that the lights take after the locking. When the parameter “Output Status at End of Locking” is set to “No Reaction/Last mode”, it must take into account that the output after the locking will take the last value received through the bus even though this value has been received during the locking time. Via the object “Locking” the locking function can be enabled or disabled.

The locking function remains active even after bus voltage failure.
The manual control via the push buttons of the device is possible during the locking.

SCENES

Up to 16 scenes can be configured for each lighting output. The configuration of each scene permits:

- Assign a number of scenes (1-64).
- Set a value for the output.
- Enable storing of the scene.
- Define an ON Delay for the scene.

Via the object “scene”, telegrams which contents the call or store functions of a scene are sent.
Up to 64 different scenes are managed via a single group address and the scene number telegram must match with the scene number previously configured in the parameters. The scene number (1-64), is used to recall the scene via the corresponding object. For storage the scene, the value sent via the object “scene” must be 128+scene number.

When a scene is configured with a number, the value to send for calling that scene must be that number -1. For example, if a scene is configured with the number 24, the number to be sent via the object “scene” must be 23. On the other hand, the value 152 (128+23) must be sent for storage the scene number 24.

The recall of each scene can be delayed whether a time delay has been defined previously in the parameter window. This option allows creating dynamical scene sequences when several outputs are combined with different delays.

After ETS programming, the scene values parameterized for the output concerned will be overwritten into the actuator. It means that any change made by the user will be deleted. Therefore it is important, before any maintenance, to know the previous scene configuration and whether the user wants to keep operating with that configuration.

LOGIC FUNCTION

With the logic function a new communication object is added (Logic input) which is logically linked with the object “On/Off”. The value of these two objects is evaluated and then the output will be switched on or off depending on the result of the logic.

The parameters allow defining the status of the logic input after a bus failure and the ETS programming.

The logic object will take the values defined in these parameters but the reaction of the output after bus failure will be as it is defined in the parameter “Behaviour after bus voltage return”. After the first action, the logic value is taken into consideration.

The standard logic operations are available:

Function	On/Off	Logic Input	Output
AND	0	0	0
	0	1	0
	1	0	0
	1	1	1

Fig8. AND Logic Function

Function	On/Off	Logic Input	Output
OR	0	0	0
	0	1	1
	1	0	1
	1	1	1

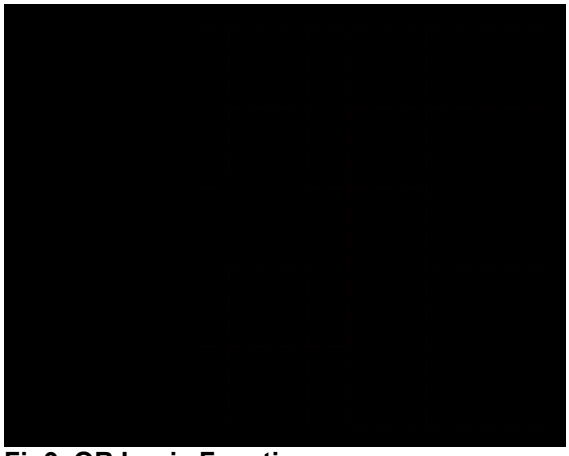


Fig9. OR Logic Function

Function	On/Off	Logic Input	Output
XOR	0	0	0
	0	1	1
	1	0	1
	1	1	0

Fig10. XOR Logic Function

FEEDBACK FEATURE

The status of the output can be shown via the object “Status”. Additionally the value of the feedback telegram can be inverted.

When the feedback telegram is enabled, the status information is transmitted every time that a change occurs on the output. However, it is also possible to define a periodical sending of the status through the parameter “Status periodical sending”. Thereby, the current value of the output is transmitted with the period configured.

Additionally, to reduce the bus traffic after any failure, a delay for the status feedback transmission at startup can be parameterized. When this option is used, the status of the output after a bus voltage failure is sent once the time delay configured has elapsed.

The delay configured only affects the sending of the feedback. The behaviour of the outputs has no effect and they can even be switched during the course of the delay.

BUS VOLTAGE CUT

The behaviour of the output during and after bus voltage failure can be parameterized. The device is equipped with bistable relays. That is why the reaction of the output during bus voltage failure can be configured too.

The product allows three different behaviors for bus voltage failure:

No reaction/Last mode: The relay of the output has no reaction and remains the last state received.

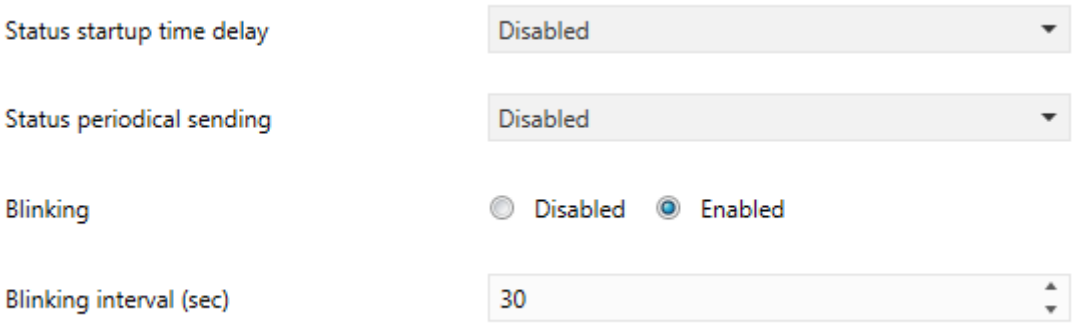
On: The relay is closed.

Off: The relay is opened.

7.2 PARAMETERS

CONFIGURATION

Contact type	(•) Normally open ( ) Normally close
Time delay	On/Off delay
On delay: hours (0...23)	0
On delay: minutes (0...59)	0
On delay: seconds (0...59)	30
On delay retriggable	(•) No ( ) Yes
Off delay: hours (0...23)	0
Off delay: minutes (0...59)	0
Off delay: seconds (0...59)	30
Off delay retriggerable	(•) No ( ) Yes
Working hours counter	Count on duration
Count direction	( ) Decrement (•) Increment
Set point for alert (hour)	1000
Periodic sending of working duration	5 s
Locking	Lock on value 0
Output state at beginning of locking	No reaction/Last mode
Output state at end of locking	No reaction/Last mode
Status telegram	Inverted



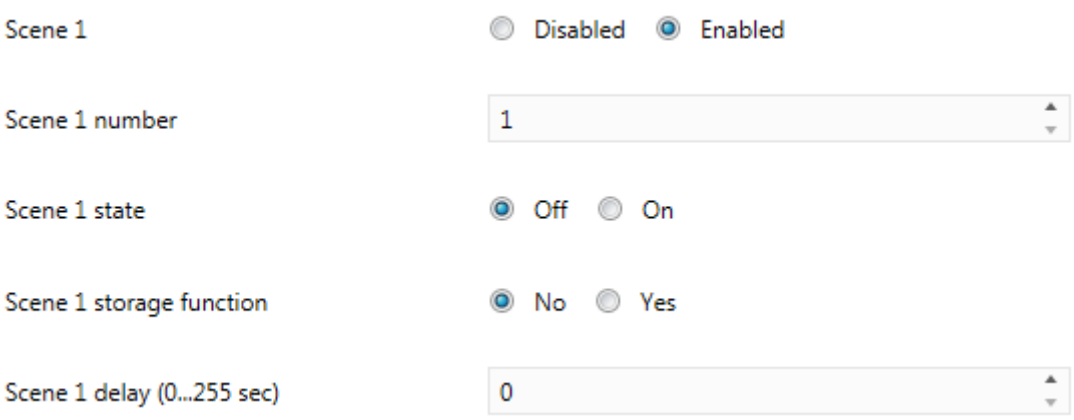
PARAMETER	DESCRIPTION	VALUES
Contact Type	This parameter determines the type of contact output. Normally Open: The relay works as normally open contact. Normally Close: The relay works as normally close contact.	**Normally open** Normally close
Time Delay	This parameter set a delay in the output. Staircase Function: The output works as a timer. After switching on the light, it will remain on for a configurable time. On delay: The output is switched on with a configurable delay. Of delay: The output is switched off with a configurable delay. On/Off delay: The delay is set at both On and Off.	**Staircase Function** On delay Off delay On/Off delay
Off delay hours (0…23)[1]	Timer hours for staircase function.	**0** (0…23)
Off delay minutes (0…59)[1]	Timer minutes for staircase function.	**0** (0…59)
Off delay seconds (0…59)[1]	Timer seconds for staircase function.	**30** (0…59)
Off delay hours (0…23)[2]	Hours of Off delay.	**0** (0…23)
Off delay minutes (0…59)[2]	Minutes of Off delay	**0** (0…59)
Off delay seconds (0…59)[2]	Seconds of Off delay	**30** (0…59)
On delay hours (0…23)[3]	Hours of On delay.	**0** (0…23)
On delay minutes (0…59)[3]	Minutes of On delay	**0** (0…59)
On delay seconds (0…59)[3]	Seconds of On delay	**30** (0…59)
Off delay retriggerable[1]	This parameter allows the staircase time to be extended if a further On telegram is received during the staircase lighting time. No: A new On telegram has no effect. The staircase time is not modified. Yes: A new On telegram reset the staircase time and it starts to count again each time that a new telegram is received.	**Yes** No
Off delay retriggerable[2]	This parameter allows the Off delay time to be extended if a further Off telegram is received during the Off delay time. No: A new Off telegram has no effect. The delay Off time is not modified. Yes: A new Off telegram reset the delay Off time and it starts to count again each time that a new telegram is received.	**Yes** No
On delay retriggerable[3]	This parameter allows the On delay time to be extended if a further On telegram is received during the On Delay time. No: A new On telegram has no effect. The On	**Yes** No

PARAMETER	DESCRIPTION	VALUES
	delay time is not modified. Yes: A new On telegram reset the On delay time and it starts to count again each time that a new telegram is received.	
Working hours counter	This parameter allows counting the hours that the output is operating as On or Off. Disabled: This option is disabled. Count off duration: The counter shows the time during which the output is off. Count on duration: The counter shows the time during which the output is on.	**Disabled** Count off duration Count on duration
Count direction[4]	This parameter determines the direction of the hours counter. Increment: The counter starts from 0 and increases incrementally. Decrement: The counter starts from a value which will be decreased.	**Increment** Decrement
Set point for alert (hour)[4]	This parameter set an alert value for hours counter.	**1000** (1...65535)
Periodic sending of working duration[4]	This parameter determines the sending period of the hours counter current value. “Disabled” option means that the value of the hours counter is not sent to the bus and it is necessary to read the value to know it.	**Disabled** 5s, 10s, 30s, 1min, 5min, 10min, 20min, 30min, 40min, 50min, 1h. 2h, 3h, 4h, 5h, 6h, 12h, 24h.
Locking	This parameter determines if the output can be locked via an additional locking object or not. Disabled: This option is disabled. Lock on Value 0: When the locking communication object takes the value 0, status changes at the output are not transmitted. Lock on Value 1: When the locking communication object takes the value 1, status changes at the output are not transmitted.	**Disabled** Lock on value 0 Lock on value 1
Output state at beginning of locking[5]	This parameter determines the behaviour of the lighting at the beginning of locking. No reaction/Last mode: There is no reaction; the lights remain the last value received. Off: The lights are switched off. On: The lights are switched on.	**No reaction/Last mode** Off On
Output state at end of locking[5]	This parameter determines the behaviour of the lighting at the end of locking. No Reaction/Last State: The lights remain the last value received even thought this value has been received during the locking. OFF: The lights are switched off. ON: The lights are switched on.	**No reaction/Last mode** Off On
Status telegram	This parameter is used to set weather the status output is shown. Disabled: There is no information about the status output. Normal: The real status of the output is shown via the “status” communication object. Inverted: The inverted status of the output is shown via the “status” communication object.	Disabled **Normal** Inverted
Status startup time delay[6]	This parameter set a delay between the startup and the sending of the status telegram to the bus. ‘Disabled” option means there is no	**Disabled** 5s, 10s, 30s, 1min, 5min, 10min,

PARAMETER	DESCRIPTION	VALUES
	emission of the telegram after the startup.	20min, 30min, 40min, 50min, 1h. 2h, 3h, 4h, 5h, 6h, 12h, 24h.
Status periodical sending[6]	This parameter determines the sending period of the output current value. “Disabled” option means that the status telegram is sent only after output changes, not periodically.	**Disabled** 5s, 10s, 30s, 1min, 5min, 10min, 20min, 30min, 40min, 50min, 1h. 2h, 3h, 4h, 5h, 6h, 12h, 24h.
Blinking	This parameter allows the relay to be opened and closed automatically with an interval. It causes the blinking of the lights.	**Disabled** Enabled
Blinking interval (sec)[7]	This parameter set the blinking interval in seconds.	**30** (1...255)

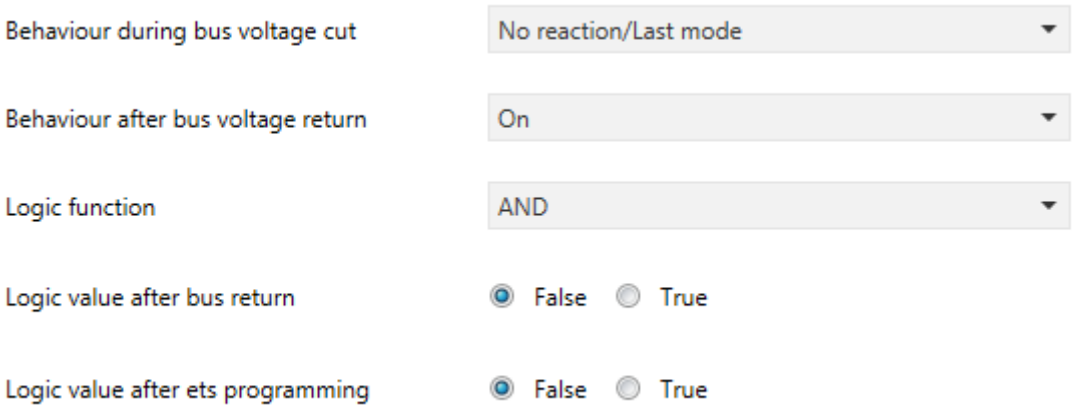
[1]These parameters are only visible when the parameter “Time Delay” is set to “Staircase Function”.
[2]These parameters are only visible when the parameter “Time Delay” is set to “Off Delay” or “On/Off Delay”.
[3]These parameters are only visible when the parameter “Time Delay” is set to “On delay” or “On/Off delay”.
[4]These parameters are only visible when the parameter “Working hours counter” is enabled.
[5]These parameters are only visible when the parameter “Locking” is enabled.
[6]These parameters are only visible when the parameter “Status telegram” is enabled.
[7]This parameter is only visible when the parameter “Blinking” is enabled.

SCENES



PARAMETER	DESCRIPTION	VALUES
Scene (1...16)	This parameter allows the use of 16 different scenes.	**Disabled** Enabled
Scene (1...16) number	This parameter is used to assign the number of the scene.	**1** (1...64)
Scene (1...16) state	This parameter determines the status of the output for the current scene.	**Off** On
Scene (1...16) storage function	This parameter is used to set whether the scene can be stored.	**Off** On
Scene (1...16) delay	This parameter set a delay between the call of the scene and the real action of the output. Value “0” means the immediate emission of the scene.	**0** (0...255)

SPECIAL



PARAMETER	DESCRIPTION	VALUES
Behaviour during bus voltage cut	This parameter determines the value of the output during a bus voltage cut. No reaction/Last mode: The output remains the last value received. Off: The output is forced to 0. On: The output is forced to 1.	**No reaction/Last mode** Off On
Behaviour after bus voltage return	This parameter determines the value of the output after a bus voltage cut. No reaction/Last mode: The output remains the last value received. Off: The output is forced to 0. On: The output is forced to 1.	**No reaction/Last mode** Off On
Logic function	This parameter provides a logic object which is logically linked with the On/Off object when this option is enabled. The output will be switched On or Off depending on the result of this logic. Disabled: This option is disabled. The logic operations AND, OR and XOR are possible for this function.	**Disabled** AND OR XOR
Logic value after bus return[1]	This parameter set the value of the logic input after a bus cut.	**False** True
Logic value after ETS rrogramming[1]	This parameter set the value of the logic input after the ETS programming.	**False** True

[1]These parameters are only visible when the parameter “Logic function” is enabled.

7.3 Objects

The following object can be used through the lighting function:

OBJ NAME	FUNCTION	TYPE	FLAG
OutputX	Status	1 bit	CRWT
This object is only visible when the “Status telegram” function is enabled (Normal or Inverted). Via the group address linked, it indicates the current status of a related output.			
OutputX	Scene	1 byte	CRWU
This object is used to recall or store the different scenes previously configured.			
OutputX	On/Off	1 bit	CRWU
Via the group address linked, it is possible to switch on and off the lighting channels. Using this object, the delays configured do not take any effect.			
OutputX	Timer	1 bit	CRWTU
This object is used to control the lighting with the delays previously configured.			
OutputX	Hours counter	4 byte	CRWTU
This object is only visible when the “Working hours counter” function is enabled. The number of hours that the lighting channel remains On or Off is shown via this object. Otherwise, when the “Count direction” parameter is configured as “Decrement”, the starting value for the countdown is sent via this object too.			
OutputX	Reset counter	1 bit	CRWTU
This object is only visible when the “Working hours counter” function is enabled. Via this object it is possible to reset the number of hours in the counter.			
OutputX	Counter set point reached	1 bit	CRWTU
This object is only visible when the “Working hours counter” function is enabled. It takes the value 1 when the hours counter takes the value configured in “Set Point for Alert” parameter.			
OutputX	Logic input	1 bit	CRWTU
This object is only visible when the “Logic function” is enabled. Vis this object the value for the logic input is set.			
OutputX	Blinking	1 bit	CRWU
This object is only visible when the “Blinking” function is enabled. When this object takes the value 1, the output is switched on and off periodically. The blinking interval is previously configured.			
OutputX	Locking	1 bit	CRWU
This object is only visible when the locking function is enabled. Via the group address linked, it is possible to activate the locking function and to lock the current output through the value configured previously.			

8 HEATING

8.1 DESCRIPTION

The outputs of the device can be configured to control a heating system. It basically consists of one valve which controls the flow of the warm water.

The configuration options for heating will be described as following.

TYPE OF MANIPULATED VARIABLE

There are 2 possibilities to control the heating valve:

- **Switching (1-bit)**

The valve control is performed via On/Off telegrams. When the value On is received via “Manipulated value” object, the valve is opened. Otherwise, the value Off closes the valve.

Fig11. Manipulated value (1-bit)

- **Continuous (1-byte)**

The valve control is performed by percentages. When this option is enabled, it is necessary to configure 2 parameters that define the hysteresis value.

Upper limit (%): This value set the opening of the valve. It must be a value greater than 0.

Lower limit (%): This parameter set the value for the output to go back to off. It must be a value smaller than the upper limit.

The hysteresis value is the result of the subtraction between Upper limit and Lower limit.

In the next example the Upper limit=25% and the Lower limit=15%. It means that the hysteresis is 10%.

Fig12. Manipulated value (1-byte)

MODE SWITCH OVER

Enabling this function a new object is provided which can be used for switching over between winter and summer mode. While the winter mode is activated, the valve is controlled taking the manipulating values into account. However, during summer mode, the valve remains closed and no value is taken into consideration.

When the switch over mode is used, it is possible to define the operation mode at startup. It can be configured as summer, winter or simply keep on working as the last operating mode before the voltage failure.

FORCED POSITION

The heating valve can be forced to a position at a given time. During the forced, any value received takes effect.

It is possible to define the value during the forcing and the value that the valve takes after the forcing. When the parameter “After forced position” is set to “No reaction/Last mode”, it must take into account that the valve after the forcing will take the last value received through the bus even though this value has been received during the forcing time. Via the “Forced position” object the forcing can be enabled or disabled.

The forced position function remains active even after bus voltage failure.
The manual control via the push buttons of the device is possible during the forcing.

VALVE PROTECTION

This function allows the valve to open automatically for 5 minutes every 24 hours. This is a protection measure which allows the recirculation of water when the valve is close.

FEEDBACK FEATURE

The status of the valve can be shown via the object “Status”. Additionally the value of the status telegram can be inverted.

When the status telegram is enabled, the status information is transmitted every time that a change occurs on the output. However, it is also possible to define a periodical sending of the status through the parameter “Status periodical sending”. Thereby, the current value of the output is transmitted with the period configured.

Additionally, to reduce the bus traffic after any bus cut, a delay for the status transmission at startup can be parameterized. When this option is used, the status of the output after a bus voltage cut is sent once the time delay configured has elapsed.

The delay configured only affects the sending of the status. The behaviour of the outputs has no effect and they can even be switched during the course of the delay.

BUS VOLTAGE CUT

The behaviour of the output during and after bus voltage cut can be parameterized. The device is equipped with bistable relays. That is why the reaction of the output during bus voltage cut can be configured too.

The product allows three different behaviors for bus voltage cut:

No reaction/Last mode: The relay of the output has no reaction and remains the last mode received.

On: The relay is closed.

Off: The relay is opened.

The operation mode configured at startup has priority over the behaviour of the output after bus voltage cut.
Example:
If the parameter “Operation mode at startup” is set as summer and the “Behaviour after bus voltage return” is set as On, the output will be Off at startup because the summer mode has priority.

8.2 PARAMETERS

CONFIGURATION

Valve protection	○ No ◉ Periodically open valve 5-min every 24-h
Summer/Winter mode switch over?	○ No ◉ Yes
Summer/Winter pol. (normal:sum=0, win=1)	◉ Normal ○ Inverted
Operation mode at startup	No reaction/Last mode
Operation mode of valve contact	◉ Normally open ○ Normally close
Type of manipulated variable	◉ Switching (1-bit) ○ Continuous (1-byte)
Forced position	Forced position on value 0
During forced position	No reaction/Last mode
After forced position	No reaction/Last mode
Status telegram	Normal
Status startup time delay	Disabled
Status periodical sending	Disabled
Behaviour during bus voltage cut	Off
Behaviour after bus voltage return	No reaction/Last mode

PARAMETER	DESCRIPTION	VALUES
Valve protection	This parameter allows the valve to open automatically for 5 min every 24h when the valve is closed.	**No** Periodically open valve 5-min every 24h
Summer/Winter mode switch over ?	This parameter provides an object which can be used as Summer/Winter switch.	**No** Yes
Summer/Winter Pol. (Normal: Sum=0, Win=1)[1]	This parameter determines the set value for each mode. Normal: Summer=0 / Winter=1.	**Normal** Inverted

PARAMETER	DESCRIPTION	VALUES
	Inverted: Summer=1 / Winter=0.	
Operation mode at startup[1]	This parameter defines the operating mode at startup. No reaction/Last mode: The system remains the last operating mode received. Summer mode: The operation mode is summer at startup. Winter mode: The operation mode is winter at startup.	**No reaction/Last mode** Summer mode Winter mode
Operation mode of valve contact	This parameter determines the type of contact output. Normally open: The relay works as normally open contact. Normally close: The relay works as normally close contact.	**Normally open** Normally close
Type of manipulated variable	This parameter determines the type of data used for the control of the valve. Switching (1-bit): The valve is controlled via On and Off telegrams. Continuous (1-byte): The valve is controlled by percentages values.	Switching (1-bit) **Continuous (1-byte)**
Lower limit (%)[2]	This parameter set the value for the output to go back to off. It must be a value smaller than the upper limit.	**10** (0-100)
Upper limit (%)[2]	This value set the value of the valve opening. It must be a value greater than 0.	**10** (0-100)
Forced position	This parameter determines if the output can be forced via an additional “Forced position” object or not. Disabled: This option is disabled. Forced position on value 0: When the “forced position” communication object takes the value 0, status changes at the output are not transmitted. Forced position on value 1: When the “Forced position” communication object takes the value 1, status changes at the output are not transmitted.	**Disabled** Forced position on value 0 Forced position on value 1
During forced position[3]	This parameter set the value of the output while it is forced. No reaction/Last mode: The output remains the last value received. Off: The output is forced to 0. On: The output is forced to 1.	**No reaction/Last mode** Off On
After forced position[3]	This parameter set the value of the output after a forced. No Reaction/Last State: The output remains the last value received even thought this value has been received during the forced. OFF: The output takes the value 0. ON: The output takes the value 1.	**No reaction/Last mode** Off On
Status telegram	This parameter is used to set weather the status output is shown. Disabled: There is no information about the status output. Normal: The real status of the output is shown via the “status” communication object. Inverted: The inverted status of the output is shown via the “status” communication object.	Disabled **Normal** Inverted

PARAMETER	DESCRIPTION	VALUES
Status startup time delay[4]	This parameter set a delay between the startup and the sending of the status telegram to the bus. “Disabled” option means that there is not emission of the telegram after the startup.	**Disabled** 5s, 10s, 30s, 1min, 5min, 10min, 20min, 30min, 40min, 50min, 1h. 2h, 3h, 4h, 5h, 6h, 12h, 24h.
Status periodical sending[4]	This parameter determines the sending period of the output current value. “Disabled” option means that the status telegram is sent only after output changes, not periodically.	**Disabled** 5s, 10s, 30s, 1min, 5min, 10min, 20min, 30min, 40min, 50min, 1h. 2h, 3h, 4h, 5h, 6h, 12h, 24h.
Behaviour during bus voltage cut	This parameter determines the behaviour of the output during a bus voltage failure No Reaction/Last mode: There is no reaction; the output remains the last state. Off: The output is switched off. On: The output is switched on.	**No reaction/Last mode** Off On
Behaviour after bus voltage Return	This parameter determines the behaviour of the output after a bus voltage cut. No Reaction/Last mode: There is no reaction; the output remains the last state. Off: The output is switched off. On: The output is switched on.	**No reaction/Last mode** Off On

[1]These parameters are only visible when the parameter “Summer/Winter mode switch over” is set to “Yes”.
[2]These parameters are only visible when the parameter “Type of manipulated variable” is set to “Continuous (1-byte)”.
[3]These parameters are only visible when the parameter “Forced position” is enabled.
[4]These parameters are only visible when the parameter “Status telegram” is enabled.

8.3 Objects

The following object can be used through the heating function:

OBJ NAME	FUNCTION	TYPE	FLAG
OutputX	Status	1 bit	CRWT
This object is only visible when the “Status Telegram” function is enabled (Normal or Inverted). Via the group address linked, it indicates the current status of a related output.			
OutputX	Manipulated value	1 bit	CRWU
This object is only visible when the “Type of manipulated variable” is set to “Switching (1-bit)”. Via this object, the valve is controlled with switching telegrams (On or Off).			
OutputX	Manipulated value	1 byte	CRWU
This object is only visible when the “Type of manipulated variable” is set to “Continuous (1-byte)”. Via this object, the valve is controlled with percentages taking the limits, previously configure, into consideration.			
OutputX	Forced position	1 bit	CRWU
This object is only visible when the “Forced position” function is enabled. Via this object, it is possible to activate or deactivate the forcing. When the forcing is activated, the output takes the value configured previously and remains it until the forcing is disabled.			
OutputX	Summer / Winter mode switch over	1 bit	CRWTU
This object is only visible when the “Summer/Winter mode switch over ?” is set to the value “Yes”. Via the group address linked, the operating mode can be defined.			

9 SHUTTER/BLIND

9.1 Description

Every channel is available to connect 230 V AC drive motors of shutters, blinds or awnings.

The operating mode is parameterized for the control of shutters or blinds with slats. Depending on this configuration the features are different.

The characteristics of this function will be described here.

TYPE OF FUNCTION

The device allows controlling shutters and blinds. Depending on the function chosen, different parameters and objects are shown.

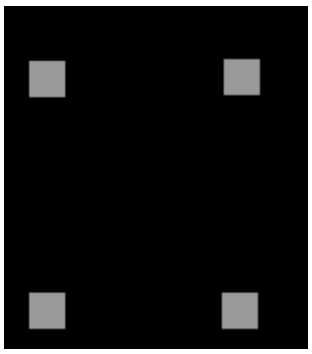


Fig13. Shutter/Blind

Shutter

The drive moves Up/Down. There is no possibility of moving slats with this option. Via the object “Up/Down” the motion telegrams are sent. If a telegram with the value 0 is received, the shutter moves Up while the value 1 moves the shutter Down. Otherwise, through the object “Slat angle/Stop”, it is possible to stop the movement of the shutter when it is moving or execute short movements when it is stopped.

“Slat angle/Stop”. If the shutter is moving, the movement stops regardless if a 1 or a 0 is received via this object.

Shutter/Blind

The behaviour is the same as for shutter but with this option the movement of slats is available. In contrast to the shutter function, when the blind is at rest, the telegrams received via the object “Slat angle/Stop” allow the positioning of the slats.

“Slat angle/Stop”. When the positioning of the slats reaches its maximum or minimum (0° or 360°), the following telegrams received via this object will execute short movements of the shutter. For example, if the value 0° is reached and a new telegram with the value 0 is received, it will be interpreted as a short Up movement. Similarly when the value 360° is reached, a new telegram with the value 1 will be interpreted as a short Down movement.

TIME DELAY FOR DIRECTION INVERSION

The correct configuration of this parameter is important for protecting the shutter motor from any damage. This parameter defines a pause time in the inversion of the motion direction. During this time, the shutter is stopped and represents the transition from one direction to another.

This time value can normally be found in the technical documents of the shutter motor used.

POSITION INDICATION %

The device actuator can calculate the current position of the shutter or blind. This is calculated according to the Up and Down movements duration parameters. For the correct operation of this option, it is imperative that the measured time of up and down movements is done correctly in order to achieve the best possible positioning results. (See the Appendix D: Measurings).

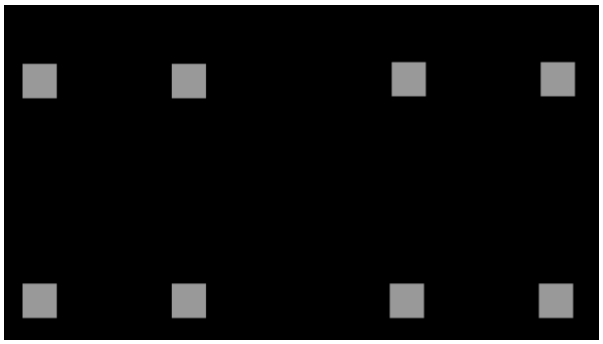


Fig14. Position Indication %

Example:

The measurement time results the following values:

Up Movement Duration (sec): 110

Down Movement Duration (sec): 105

The shutter is at 0% and a new telegram command is received to be positioned at 40%. The device calculates the time necessary to achieve the desired position taking the duration configuration into account: 105 sec x 0.40 = 42 sec. Then the output responsible of lowering the shutter will be activated for 42 seconds and the current position will be 40%. If at that moment a new telegram of positioning is received with the value 20%, the product will make the following calculations: 40-20= 20%. This is the difference between the two positions and therefore the motion time will be: 110 sec x 0.20 = 22 sec. This time the output responsible of raising the shutter will be activated for 22 seconds and the current position will be 20%.

SLAT ANGLE INDICATION °

The device can also calculate the current position of the slats when the function selected is shutter/blind. This is calculated according to the parameterization of “Number of slat angle steps for 0...180°”. This parameter determines the number of steps required to move the slats from the 0° position to the 180° position. The time of these steps is configured through the parameter “Duration of short movement”. For the correct operation of this option, it is imperative that the calculation of these steps is done correctly in order to achieve the best possible positioning results. (See the Appendix D: Measurings)

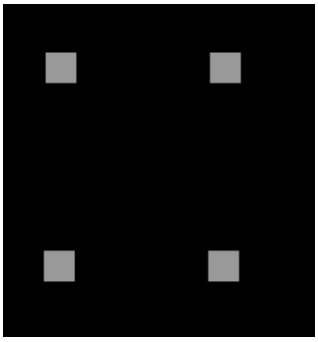


Fig15. Slat Angle Indication°

The real angle position of the slat is from 0° to 180° but the indication of this position via the object “Slat angle indication in °” is shown as 0-360°. The value 360° corresponds to the position 180°. Likewise, when a new value for a position of the slat is sent, the possible values are between 0° and 360°.

LOCKING

This function allows the shutter to be locked to a position. During a locking, the outputs are blocked and they can no longer be controlled via any telegram.

It is possible to define the value during the locking and the value that the shutter takes after the locking. When the parameter “Output state at end of locking” is set to “No reaction”, the shutter will not move at the end of locking and therefore it will remain the last position.

The locking function remains active even after a bus voltage failure.
The manual control via the push buttons of the device is possible during the locking.

SAFETY FUNCTIONS

The device has three different types of alarms available; wind, rain and frost.

The wind alarm can be used to protect shutters and buildings from strong wind while the rain alarm to protect the windows. On the other hand, the frost alarm can be used as a protection against mechanical damage with low temperatures.

There are three different communication objects, one for each type of alarm, which shows the status of the alarms. The value 0 indicates no alarm while the value 1 means that an alarm has occurred.

The reaction of the shutter when one alarm occurs and at the end of it can be configured via the window parameters. The shutter can remain the last state, can be lowered, raised or positioned at a predetermined value. Normally these functions are used together with a weather station which allows knowing the wind speed, the temperature and the existence of rain.

SCENES

Up to 16 scenes can be configured for each shutter/blind output. The configuration of each scene permits:

- Assign a number of scenes (1-64).
- Set a position indication for the shutter.
- Set a slat angle value for the blind.
- Enable storing of the scene.
- Define an On delay for the scene.

Via the object “scene”, telegrams which contents the call or store functions of a scene are sent.
Up to 64 different scenes are managed via a single group address and the scene number telegram must match with the scene number previously configured in the device parameters. The scene number (1-64), is used to recall the scene via the corresponding object. For storage the scene, the value sent via the object “scene” must be 128+scene number.

When a scene is configured with a number, the value to send for calling that scene must be that number -1. For example, if a scene is configured with the number 24, the number to be sent via the object “scene” must be 23. On the other hand, the value 152 (128+23) must be sent for storage the scene number 24.

The recall of each scene can be delayed whether a time delay has been defined previously in the parameter window. This option allows creating dynamical scene sequences when several outputs are combined with different delays.

After ETS programming, the scene values parameterized for the output concerned will be overwritten into the actuator. It means that any change made by the user will be deleted. Therefore it is important, before any maintenance, to know the previous scene configuration and whether the user wants to keep operating with that configuration.

FEEDBACK FEATURE

The current status of the shutter can be shown via different objects. For the shutter position the object used is “Position indication in %” while for the slat position it is “Slat angle indication in °”. Additionally, there is another object, “Moving status”, which indicates whether the shutter is moving or no. When the shutter is moving, this object takes the value 1 whereas when it is stopped the value is 0.

When the status telegram is enabled, the status information is transmitted every time that a change occurs on the outputs. However, it is also possible to define a periodical sending of the status through the parameter “Status periodical sending”. Thereby, the current value of the above objects are transmitted with the period configured.

Additionally, to reduce the bus traffic after any failure, a delay for the status transmission at startup can be parameterized. When this option is used, the status of the shutter after a bus voltage failure is sent once the time delay configured has elapsed.

The delay configured only affects the sending of the status. The behaviour of the shutter has no effect and it can even be modified during the course of the delay.

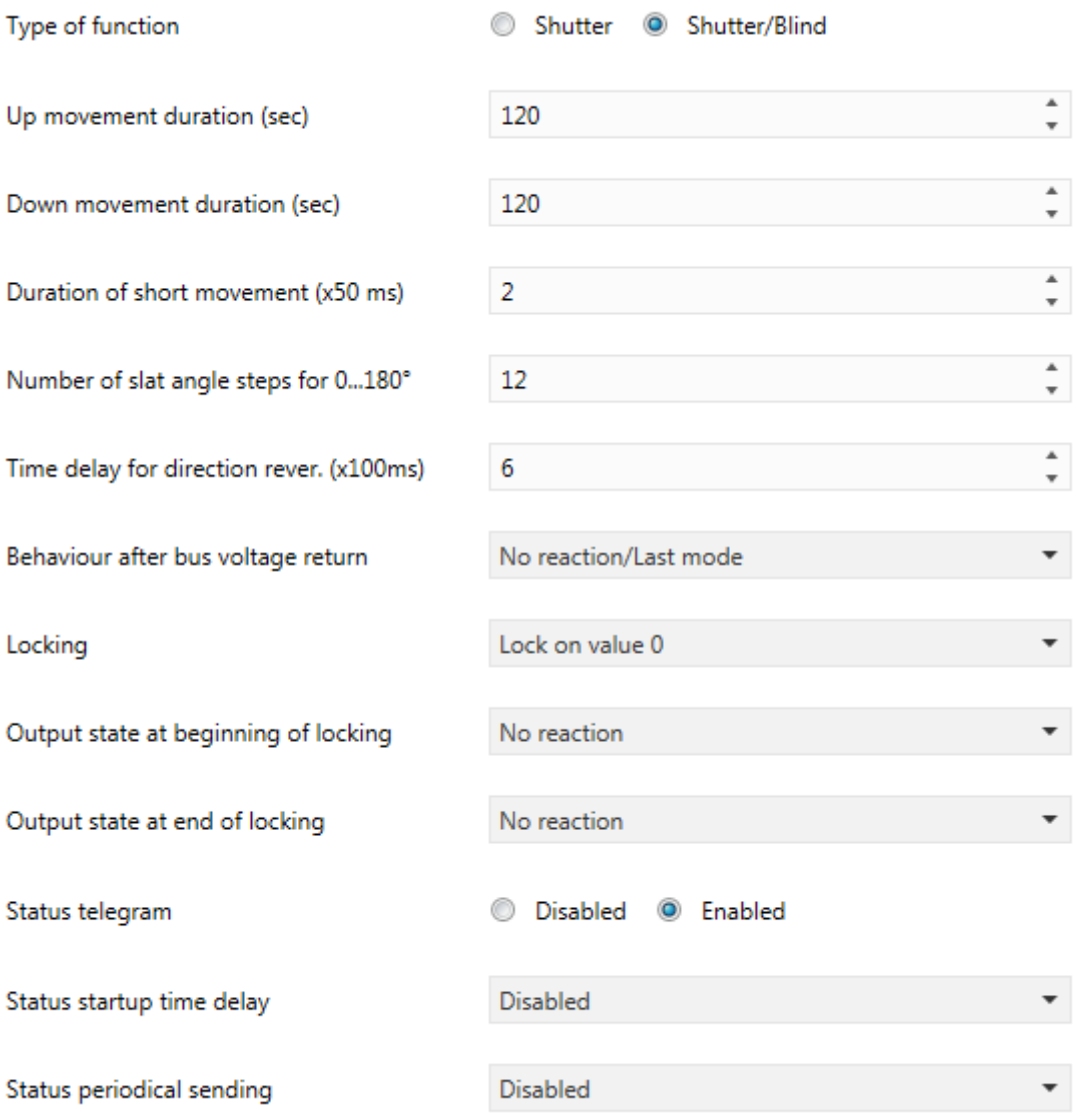
BUS VOLTAGE CUT

Only the behaviour of the shutter after bus voltage cut can be parameterized. The device allows three different behaviors for bus voltage cut:

No reaction/Last mode: There is no action on the outputs.
Up: The shutter goes up.
Down: The shutter goes down.

9.2 Parameters

CONFIGURATION

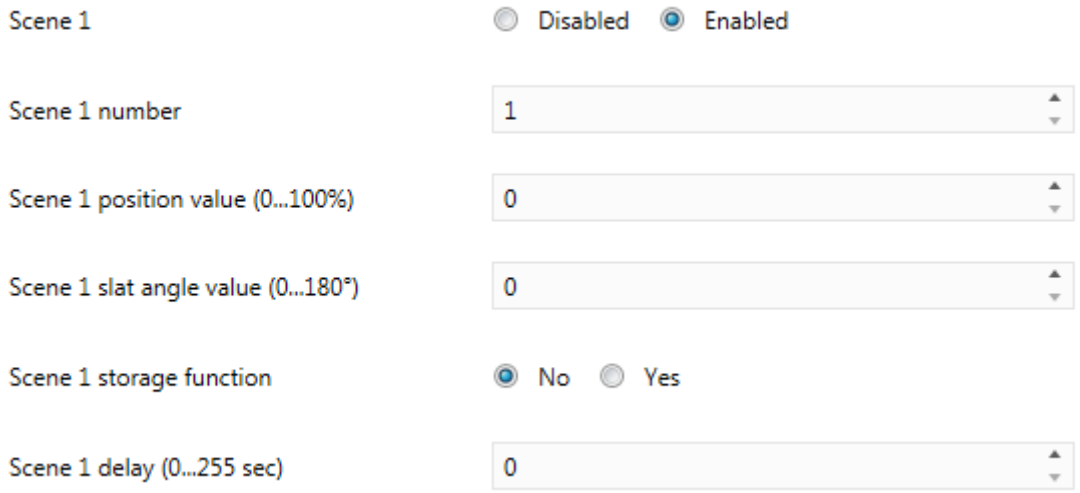


PARAMETER	DESCRIPTION	VALUES
Type of function	This parameter determines the type of shutter which will be controlled.	**Shutter** Shutter/Blind
Up movement duration (sec)	This parameter set the time of the up shutter movement duration.	**120** (0…255)
Down movement duration (sec)	This parameter set the time of the down shutter movement duration.	**120** (0…255)
Duration of short movement	This parameter set the time for the short	**2** (0…255)

PARAMETER	DESCRIPTION	VALUES
(x50ms)	movements when the shutter is stopped and the duration of the slat steps.	
Number of slat angle steps for 0...180° [1]	This parameter determines the number of steps required to move the slats from the 0° position to the 180° position.	**12** (2…60)
Time delay for direction rever. (x100ms)	This parameter defines the inversion time between the two directions of movement.	**6** (0…255)
Behaviour after bus voltage return	This parameter determines the behaviour of the shutter after a bus voltage cut. No reaction/Last mode: There is no action on the outputs. Up: The shutter goes up. Down: The shutter goes down.	**No reaction/Last mode** Up Down
Locking	This parameter determines if the output can be locked via an additional locking object or not. Disabled: This option is disabled. Lock on value 0: The locking communication object takes the value 0 and then status changes at these outputs are not transmitted. Lock on value 1: The locking communication object takes the value 1 and then status changes at these outputs are not transmitted.	**Disabled** Lock on value 0 Lock on value 1
Output state at beginning of locking[2]	This parameter determines the behaviour of the shutter at the beginning of locking. No reaction: There is no reaction; the shutter remains the last state. Up: The shutter goes up. Down: The shutter goes down.	**No reaction** Up Down
Output state at end of locking[2]	This parameter determines the behaviour of the shutter at the end of locking. No reaction: The shutter remains stopped and therefore in the previous position. Up: The shutter goes up. Down: The shutter goes down.	**No reaction** Up Down
Status Telegram	This parameter is used to set weather the status output is shown. Disabled: There is no information about the status outputs. Enabled: The status of the outputs is shown via the corresponding communication object.	Disabled **Normal** Inverted
Status startup time delay[3]	This parameter set a delay between the startup and the sending of the feedback telegrams to the bus. ‘Disabled” option means that there is not emission of the telegram after the startup.	**Disabled** 5s, 10s, 30s, 1min, 5min, 10min, 20min, 30min, 40min, 50min, 1h. 2h, 3h, 4h, 5h, 6h, 12h, 24h.
Status periodical sending[3]	This parameter determines the sending period of the output current value. “Disabled” option means that the status telegram is sent only after output changes, not periodically.	**Disabled** 5s, 10s, 30s, 1min, 5min, 10min, 20min, 30min, 40min, 50min, 1h. 2h, 3h, 4h, 5h, 6h, 12h, 24h.

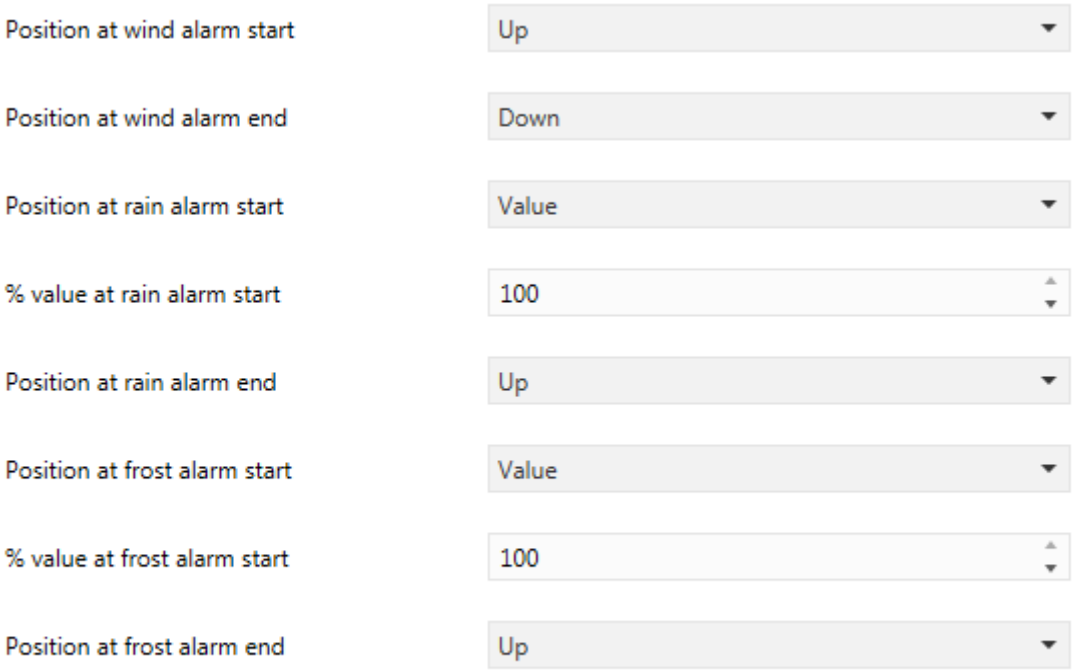
[1]This parameter is only visible when the parameter “Type of function” is set to “Shutter/Blind”.
[2]These parameters are only visible when the parameter “Locking” is enabled.
[3]These parameters are only visible when the parameter “Status Telegram” is enabled.

SCENES



PARAMETER	DESCRIPTION	VALUES
Scene (1...16)	This parameter allows the use of 16 different scenes.	**Disabled** Enabled
Scene (1...16) number	This parameter is used to assign the number of the scene.	**1** (1...64)
Scene (1...16) position value (0...100%)	This parameter set the position of the shutter for a particular scene.	**0** (0...100)
Scene (1...16) slat angle value (0...180°)	This parameter set the slat angle value for a particular scene.	**0** (0...100)
Scene (1...16) storage function	This parameter is used to set whether the scene can be stored.	**OFF** ON
Scene (1...16) delay (0...255 sec)	This parameter set a delay between the call of the scene and the real action of the output. Value “0” means the immediate emission of the scene.	**0** (0...255)

SAFETY FUNCTIONS



PARAMETER	DESCRIPTION	VALUES
Position at wind alarm start	This parameter determines the behaviour of the shutter when a wind alarm occurs. No reaction: The shutter remains the last state. Up: The shutter is upped. Down: The shutter is lowered. Value: It is possible to define a position value in %.	**No reaction** Up Down Value
Position at wind alarm end	This parameter determines the behaviour of the shutter when a wind alarm is ended. No reaction: The shutter remains the last state. Up: The shutter is upped. Down: The shutter is lowered. Value: It is possible to define a position value in %.	**No reaction** Up Down Value
Position at rain alarm start	This parameter determines the behaviour of the shutter when a rain alarm occurs. No reaction: The shutter remains the last state. Up: The shutter is upped. Down: The shutter is lowered. Value: It is possible to define a position value in %.	**No reaction** Up Down Value
Position at rain alarm end	This parameter determines the behaviour of the shutter when a rain alarm is ended. No reaction: The shutter remains the last state. Up: The shutter is upped. Down: The shutter is lowered. Value: It is possible to define a position value in %.	**No reaction** Up Down Value
Position at frost alarm start	This parameter determines the behaviour of the shutter when a frost alarm occurs. No reaction: The shutter remains the last state. Up: The shutter is upped.	**No reaction** Up Down Value

PARAMETER	DESCRIPTION	VALUES
	Down: The shutter is lowered. Value: It is possible to define a position value in %.	
Position at frost alarm end	This parameter determines the behaviour of the shutter when a frost alarm is ended. No reaction: The shutter remains the last state. Up: The shutter is upped. Down: The shutter is lowered. Value: It is possible to define a position value in %.	**No reaction** Up Down Value

9.3 Objects

The following object can be used through the shutter/blind function:

OBJ NAME	FUNCTION	TYPE	FLAG
OutputX	Up / Down	1 bit	CRWT
Via this object up and down telegrams are sent.			
OutputX	Scene	1 byte	CRWU
This object is used to recall or store the different scenes previously configured.			
OutputX	Slat angle / Stop	1 byte	CRWU
Via this object stop and slat angle telegrams are sent.			
OutputX	Wind alarm	1 bit	CRWTU
This object indicates the current status of the wind alarm.			
OutputX	Rain alarm	1 bit	CRWTU
This object indicates the current status of the rain alarm.			
OutputX	Frost alarm	1 bit	CRWTU
This object indicates the current status of the frost alarm.			
OutputX	Moving status	1 bit	CRWTU
This object takes the value 1 while the shutter is moving up or down. Otherwise the value of the object is 0.			
OutputX	Slat position	1 byte	CRWU
This object is only visible when the “Type of function” is set to “Shutter/Blind”. Via this object it is possible to set a position of the slat in °.			
OutputX	Blind position	1 byte	CRWU
Via this object it is possible to set a position of the blind in %.			
OutputX	Position indication in %	1 bit	CRWTU
Via this object the current position of the shutter in % is indicated.			
OutputX	Slat angle indication in °	1 byte	CRT
This object is only visible when the “Type of function” is set to “Shutter/Blind”. Via this object the current position of the slat in ° is indicated.			
OutputX	Locking	1 bit	CRWU
This object is only visible when the locking function is enabled. Via the group address linked, it is possible to lock the current output through the value configured previously.			

10 SHUTTER/BLIND 24V

The application description for Shutter/Blind 24v is the same as Shutter/Blind. The unique difference between these two options is the number of outputs needed, 2 for Shutter/Blind while 4 for Shutter/Blind 24V.

11 FAN COILS

11.1 Description

A fan coil is a device basically consisting of one or two heat exchangers, one or two control valves and a fan. It is part of an HVAC system connected to a central heating and cooling water supply. The main aim is to heat, cool or ventilate a room in residential, commercial, and industrial buildings.

There are two different types of fan coils:

- **Fan Coil 2 pipes:** only one heat exchanger and one control valve are available. This system consists of a single water circuit which is heated or cooled depending on the season.

- **Fan Coil 4 pipes:** two separate heat exchangers with their respective control valves (for heating and cooling) are available. Warm and cold water is provided to two separate water circuits.

The device allows the following functions for both fan coil systems, 2 and 4 pipes.

FAN OPERATION

The fans are controlled via a multistage where the fan speed is increased in steps. Depending on the command value (1 byte), whose value comes from the thermostat or room master, the device determines the corresponding fan speeds via configurable threshold values.

Here an example of the threshold values configuration:

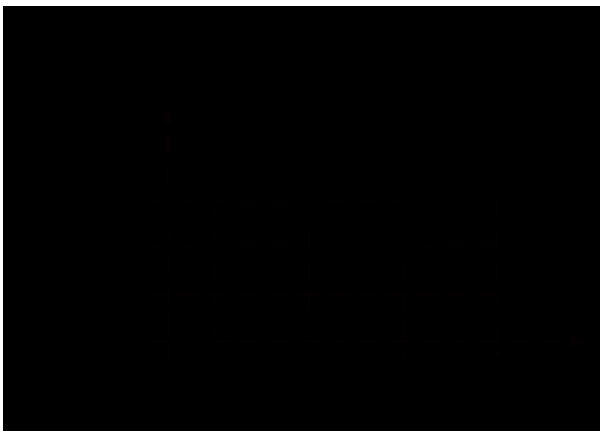


Fig16. Fan Operation

The “Fan 1 Lower Limit” and the “Heating valve lower limit” parameters should be configured with the same value with the aim of the valve opening and the fan activation occur simultaneously.

The device allows the control of three speed single phase fans with step or changeover control:

- **Only one fan output at the same time**

Each fan speed is controlled individually with a unique output. Two contacts are not switched on simultaneously with this control and it is possible to set a delay between these switchings.

The following table shows the outputs result for a three-stage fan:

	OUT 1	OUT 2	OUT 3
OFF	0	0	0
Speed 1	1	0	0
Speed 2	0	1	0
Speed 3	0	0	1

- **Hierarchically**

The individual fan speeds are activated consecutively (outputs switched on) until the required fan speed is achieved.

The following table shows the outputs result for a hierarchically control:

	OUT 1	OUT 2	OUT 3
OFF	0	0	0
Speed 1	1	0	0
Speed 2	1	1	0
Speed 3	1	1	1

FAN DELAYS

It is possible to configure a fan delay for heating and cooling operating mode.
When the fan coil is operating as heating, a delay between the opening of the valve and the fan switching on can be defined. It allows the fan to be switched on once the valve has been opened.

The “Switching wait” time is added to the fan delay heating

On the other hand, when the operating mode is cooling, a delay can be configured between the fan switching off and the closing of the heating valve.

AUTOMATIC AND FORCED FAN CONTROL

Via some communication objects, it is possible to force the fan coil to a determinate value.

- **“Manual fan level value”**

Via this object the fan coil can be forced to a new value such as 1, 2 or 3. If another fan speed is switched on when this object takes a new value, it will be switched off and the fan will be activated with the new value. At this point any value received via “Command value” object has no effect.

For this option to be available, the parameter “Manual fan control” has to be enabled.
If the operating mode is changed during the fan manual control, the fan coil will be switched off and the manual control finished (only when the changeover object is used).

- **“Constant fan speed”**

A constant speed for the fan can be defined. When a value is sent via these objects, the fan remains that speed regardless of the real operating percentage.

If the operating mode is changed during the use of constant fan speed, the fan coil will be switched off but the constant fan speed will remain for the new operating mode.

When one of the preceding functions is used and return to the automatic mode is required, it is necessary to use the “Return to automatic mode” object. When this object takes the value 1, every forcing are disabled and the system keep on operating as automatic mode. It means that the values received via “Command value” again have effect.

DISABLING FUNCTION

This function allows the fancoil to be forced to a position. While the disabling function is activated no further data is taken into account.

The fancoil status during the disabling function and at the end of it can be configured.

This function can be activated via the “Disabling” object and the action to the outputs is configured through the windows parameter.

STATUS FEATURE

The current status of the fan and the valve of a fan coil can be shown via different objects. For the valve status the object used is “Status active fan coil valve” and additionally the value of this status telegram can also be shown inverted.

The fan status can be shown in two different ways depending on the configuration defined in the parameter “Status type”. If this parameter is set to “Fan speeds individually”, three communication objects are added, one for each fan speed (“Status for fan speed 1”, “Status for fan speed 2” and “Status for fan speed 3”). On the other hand, if the parameter is configured as “Fan speed via value”, only one object (2-byte) shows the status of the fan speed such as 1, 2 or 3.

When the status telegram is configured as inverted the status of the fan speed is shown normally even though this option is used.

When the status telegram is enabled, the status information is transmitted every time that a change occurs on the outputs. However, it is also possible to define a periodical sending of the status through the parameter “Status periodical sending”. Thereby, the current value of the fan coil is transmitted with the period configured.

Additionally, to reduce the bus traffic after any cut, a delay for the status transmission at startup can be parameterized. When this option is used, the status of the outputs after a bus voltage cut is sent once the time delay configured has elapsed.

The delay configured only affects the sending of the status. The behaviour of the outputs has no effect and they can even be modified during the course of the delay.

BUS VOLTAGE CUT

The behaviour of the output during and after bus voltage cut can be parameterized. The device is equipped with bistable relays. That is why the reaction of the output during bus voltage cut can be configured too.

The device allows two different behaviors for bus voltage cut:

No reaction: There is no reaction; the outputs remain the last state.

Switch Off all outputs: Both the fan and the valve are switched off.

AIRING

The device permits activating the fan when the fan coil is not working. This feature allows the ventilation of room when there is no demand of heat or cold. This option is always available and via the object “Airing speed” it is possible to define a new value for the fan speed. When a new value is defined for airing, the fan will be switched on whenever the fan coil is off (without demand).

When a value for airing is defined, this value is saved and restored after bus voltage cut. It is important to set the airing object to 0 if the ventilation option will not be used.

12 FAN COIL – 2 PIPES

It is possible to configure the device to control 2 pipe system fan coils.

FAN COIL FUNCTION

The fan coil can be configured as heating, cooling or heating/cooling.

- **Heating:**

Only warm water is supplied centrally to the pipe system. There is a heat exchanger and the valve controls the flow of the warm water.

- **Cooling:**

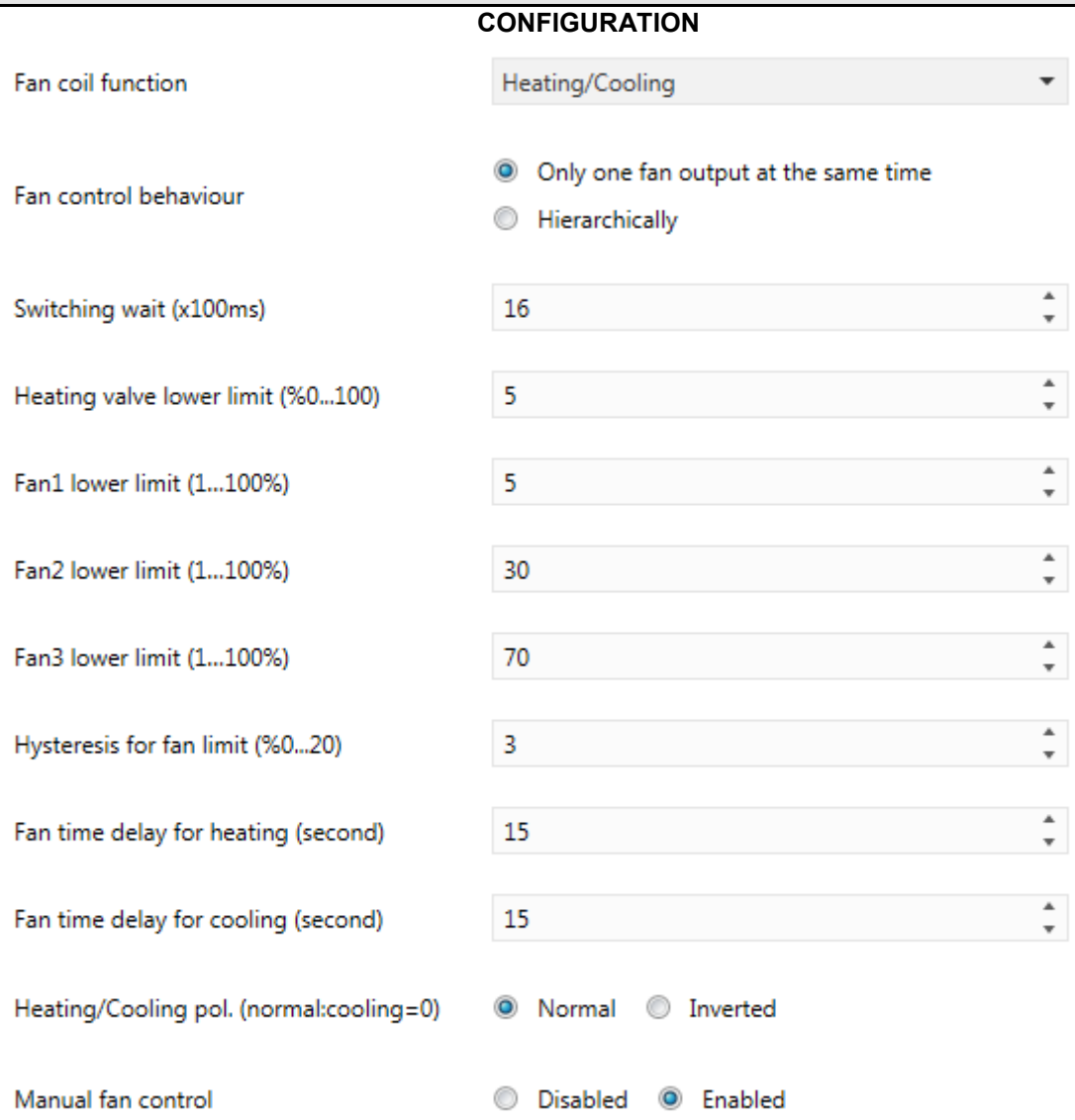
In this case, the valve controls the flow of the cold water which is supplied centrally.

- **Heating/Cooling:**

In this system only one water circuit is available for heating and cooling. Depending on the central system, warm or cold water is supplied to the pipe system but the valve which controls the flow of this water is unique.

When the Fan coil function is parameterized as heating/cooling, a new communication object is added (Heating/Cooling change over) which defines the operating mode of the fan coil. With the normal configuration, when this object takes the value 0 the fan coil operates as cooling and when the value is 1 as heating. However it is possible to change this configuration via “Heating/Cooling pol.” parameter.

12.1 Parameters



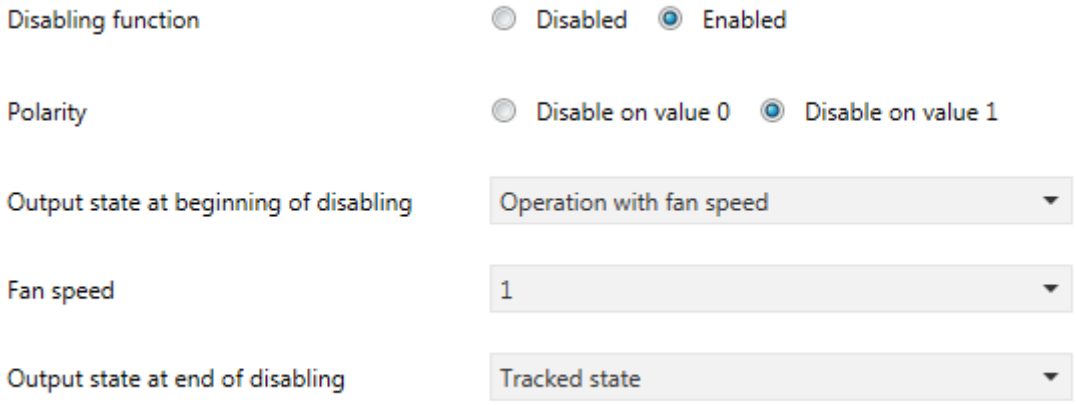
PARAMETER	DESCRIPTION	VALUES
Fan coil function	This parameter determines the function of the fan coil. Only heating: The system has a unique valve used for heating. Only cooling: The system has a unique valve used for cooling. Heating/Cooling: The system has a unique valve but used for cooling and heating.	**Only heating** Only cooling Heating/ Cooling
Fan control behaviour	This parameter is used to set how the fan coil fan speed is controlled. Only one fan output at the same time: Each fan speed is controlled individually with a unique output. Only the corresponding output of the assigned fan speed is switched on with this parameterization. The outputs are not activated at the same time. Hierarchically: The fan speed 1 is controlled with	**Only one fan output at the same time** Hierarchically

PARAMETER	DESCRIPTION	VALUES
	the corresponding output but the fan speed 2 and 3 are the result of the sum of a new output and the previous outputs. The individual fan speeds are activated consecutively (outputs switched on) until the required fan speed is achieved.	
Switching wait (x100ms)[1]	This parameter set a delay between the switching of the fan speeds. When the value 0 is configured the relay of the current speed is opened at the same time that the next output speed is closed.	**15** (0…255)
Heating valve lower limit (%1…100) [2]	This parameter set the low threshold value for the heating valve.	**5** (0…100)
Fan 1 lower limit (%1…100)	This parameter set the low threshold value for the fan 1.	**5** (1…100)
Fan 2 lower limit (%1…100)	This parameter set the low threshold value for the fan 2.	**30** (1…100)
Fan 3 lower limit (%1…100)	This parameter set the low threshold value for the fan 3.	**70** (1…100)
Hysteresis for fan limit (%0…20)	This parameter determines the hysteresis for fan limits. This value is proportional to the limits configured previously.	**3** (0…20)
Fan time delay for heating (second)	This parameter set a delay between the opening of the heating valve and the fan switching on.	**15** (0…255)
Fan time delay for cooling (second)	This parameter set a delay between the fan switching off and the closing of the heating valve.	**15** (0…255)
Heating/Cooling pol. (Normal: Cooling=0)	This parameter allows toggling heating and cooling.	**Normal** Inverted
Manual fan control	This parameter allows enabling the manual control of the fan speed.	**Enabled** Disabled

[1]This parameter is only visible when the parameter “Fan control behaviour” is set to “Only one fan output at the same time”.

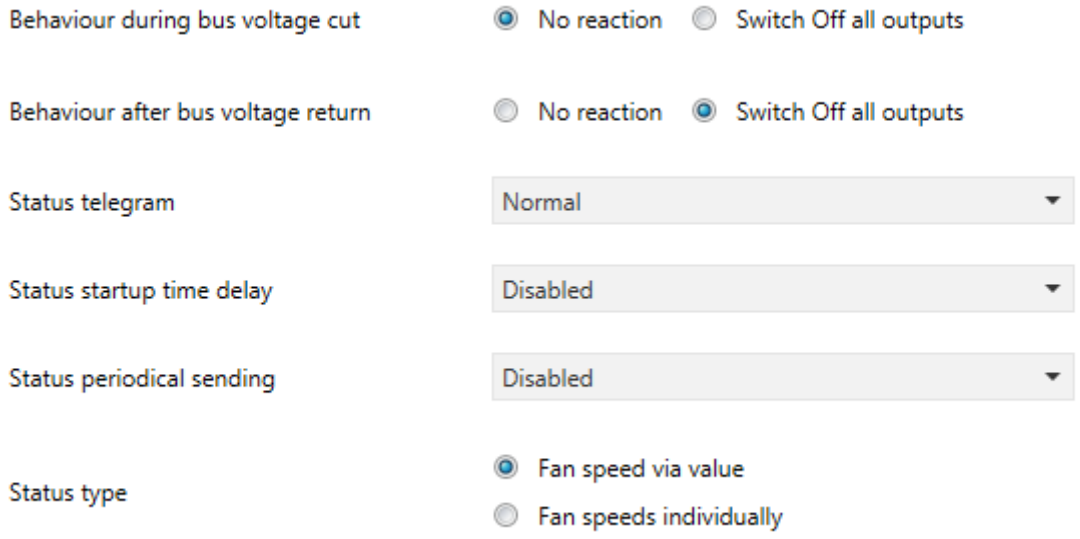
[2]This parameter is only visible when the parameter “Fan coil function” is set to “Only heating” or “Heating/Cooling.

DISABLING FUNCTIONS



PARAMETER	DESCRIPTION	VALUES
Disabling function	This parameter allows enabling the disabling function.	**Disabled** Enabled
Polarity	This parameter determines how the disabling function can be activated. Disable on value 1: The function is activated through the value 1. Disable on value 0: The function is activated through the value 0.	**Disable on value 1** Disable on value 0
Output state at beginning of disabling	This parameter determines the behaviour of the fan coil at the beginning of the disabling function. No reaction: There is no reaction; the outputs remain the last state until the deactivation of the function. Switch Off all outputs: The outputs are switched off. Operation with fan speed: The fan speed is set to a value configured in the next parameter.	**No reaction** Switch Off all outputs Operation with fan speed
Fan speed	This parameter defines the fan speed value when the “Operation with fan speed” option is used.	**1** 2 3
Output state at end of disabling	This parameter determines the behaviour of the fan coil at the end of the disabling function. No reaction: There is no reaction; the outputs recover the last state before the disabling activation. Switch Off all outputs: The outputs are switched off. Operation with fan speedl: The fan speed is set to a value configured in the “Fan speed” parameter. Tracked state: If some values are received during the disabling function is activated, the outputs take the values according to the last command received. Note: If during the disabling, the operating mode is changed, it is always taken into account.	**No reaction** Switch Off all outputs Operation with fan level Tracked state

SPECIAL FUNCTIONS



PARAMETER	DESCRIPTION	VALUES
Behaviour during bus voltage cut	This parameter determines the behaviour of the outputs during a bus voltage cut No reaction: There is no reaction; the outputs remain the last state. Switch Off all outputs: The outputs are switched off.	**No reaction** Switch Off all outputs
Behaviour after bus voltage cut	This parameter determines the behaviour of the outputs after a bus voltage cut. No reaction: There is no reaction; the outputs remain the last state. Switch Off all outputs: The outputs are switched off.	**No reaction** Switch Off all outputs
Status telegram	This parameter is used to set weather the status of the fan coil and the fan speed are shown. Disabled: There is no information about the status outputs. Normal: The real status of the outputs is shown via the corresponding communication objects. Inverted: The inverted status of the fan coil is shown via the “Status active fan coil valve” communication object. The status of the fan speed is shown normally even though this option is used.	Disabled **Normal** Inverted
Status startup time delay	This parameter set a delay between the startup and the sending of the status telegram to the bus. ‘Disabled” option means that there is not emission of the telegram after the startup.	**Disabled** 5s, 10s, 30s, 1min, 5min, 10min, 20min. 30min, 40min, 50min, 1h, 2h, 3h, 4h, 5h, 6h, 12h, 24h.
Status periodical sending	This parameter determines the sending period of the outputs current value. “Disabled” option means that the status telegram is sent only after output changes, not periodically.	**Disabled** 5s, 10s, 30s, 1min, 5min, 10min, 20min. 30min, 40min, 50min, 1h, 2h, 3h, 4h, 5h, 6h,

PARAMETER	DESCRIPTION	VALUES
		12h, 24h.
Status type	This parameter defines the type of feedback for the fan speed. Fan speed via value: The fan speed status is shown such as 1, 2 or 3 depending on the speed activated. Fan speeds individually: There are 3 different communication objects, one for each speed, which shows the status of them individually.	**Fan speed via value** Fan speeds individually

12.2 Objects

The following object can be used through the fan coil 2 pipes function:

OBJ NAME	FUNCTION	TYPE	FLAG
OutputX	Status active fan coil valve	1 bit	CRWT
This object is only visible when the “Feedback Telegram” function is enabled (Normal or Inverted). Via the group address linked, it indicates the current status of the fan coil (valve output status).			
OutputX	Manual fan level value	1 byte	CRWU
This object is only visible when the “Manual fan control” function is enabled. Via this object, it is possible to force the fan speed to a certain level such as 1, 2 or 3. When a value is sent via the group address linked, no further data is taken into account.			
OutputX	Heating/Cooling change over	1 bit	CRWTU
This object is only visible when the “Fan coil function” parameter is set to “Heating/Cooling”. Via this object it is possible to define the operating mode of the fan coil.			
OutputX	Status for fan speed 1	1 bit	CRWTU
This object is only visible when the “Status type” parameter is set to “Fan Levels Individually”. Via the group address linked, it indicates the current status of the fan speed 1.			
OutputX	Status for fan speed 2	1 bit	CRWTU
This object is only visible when the “Status type” parameter is set to “Fan Levels Individually”. Via the group address linked, it indicates the current status of the fan speed 2.			
OutputX	Status for fan speed 3	1 bit	CRWTU
This object is only visible when the “Status type” parameter is set to “Fan Levels Individually”. Via the group address linked, it indicates the current status of the fan speed 3.			
OutputX	Disabling	1 bit	CRWU
This object is only visible when the “Disabling function” is enabled. Via this object the “Disabling” function can be activated.			
OutputX	Return to automatic mode	1 bit	CRWTU
This object allows the system to return to operate in automatic mode. When this object takes the value 1, any fan forced is disabled and the system start to work according to the last command received.			
OutputX	Status for active fan speed	1 byte	CRWTU
This object is only visible when the “Status type” parameter is set to “Fan speed via value”. Via the group address linked, it indicates the current status of the fan speed such as 1, 2 or 3.			
OutputX	Command value for heating	1 byte	CRWU
This object is only visible when the “Fan coil function” parameter is set to “Only heating” or “Heating/Cooling”. Via this object, command value for heating operation is sent.			
OutputX	Command value for cooling	1 byte	CRWU
This object is only visible when the “Fan coil function” parameter is set to “Only cooling” or “Heating/Cooling”. Via this object, command value for heating operation is sent.			
OutputX	Airing speed	1 byte	CRWTU
Via this object the value for airing is set. It is possible to define a fan speed level such as 1, 2 or 3. When the fan coil is switched off, the fan can be activated with the value configured through this object			
OutputX	Constant fan speed (1-Byte)	1 byte	CRWTU
Via this object, a constant fan speed such as 1, 2 or 3 can be defined. When a value is sent via this object, the fan remains that speed regardless of the real operating percentage.			
OutputX	Constant fan speed (1-Bit)	1 bit	CRWTU

Via this object, a constant fan speed can be defined through the sending of consecutive values. When this object takes the value 1 consecutively, the fan speed is increased. Otherwise, taking the value 0, the fan speed is decreased.

Note: The first value sent make the fan remain the current fan speed and then the fan speed is increased or decreased depending of the new values sent.

OutputX	Man. constant speed fan status	1 bit	CRWTU

Via the group address linked, it indicates whether the system is operating automatically or, conversely, it has been forced. The value Off means that there is not forced.

13 FAN COIL – 4 PIPES

13.1 Description

The device can be configured to control 4 pipes system fan coil.

FAN COIL FUNCTION

The change of the operating mode (heating or cooling) can be executed in two different ways depending on the configuration.

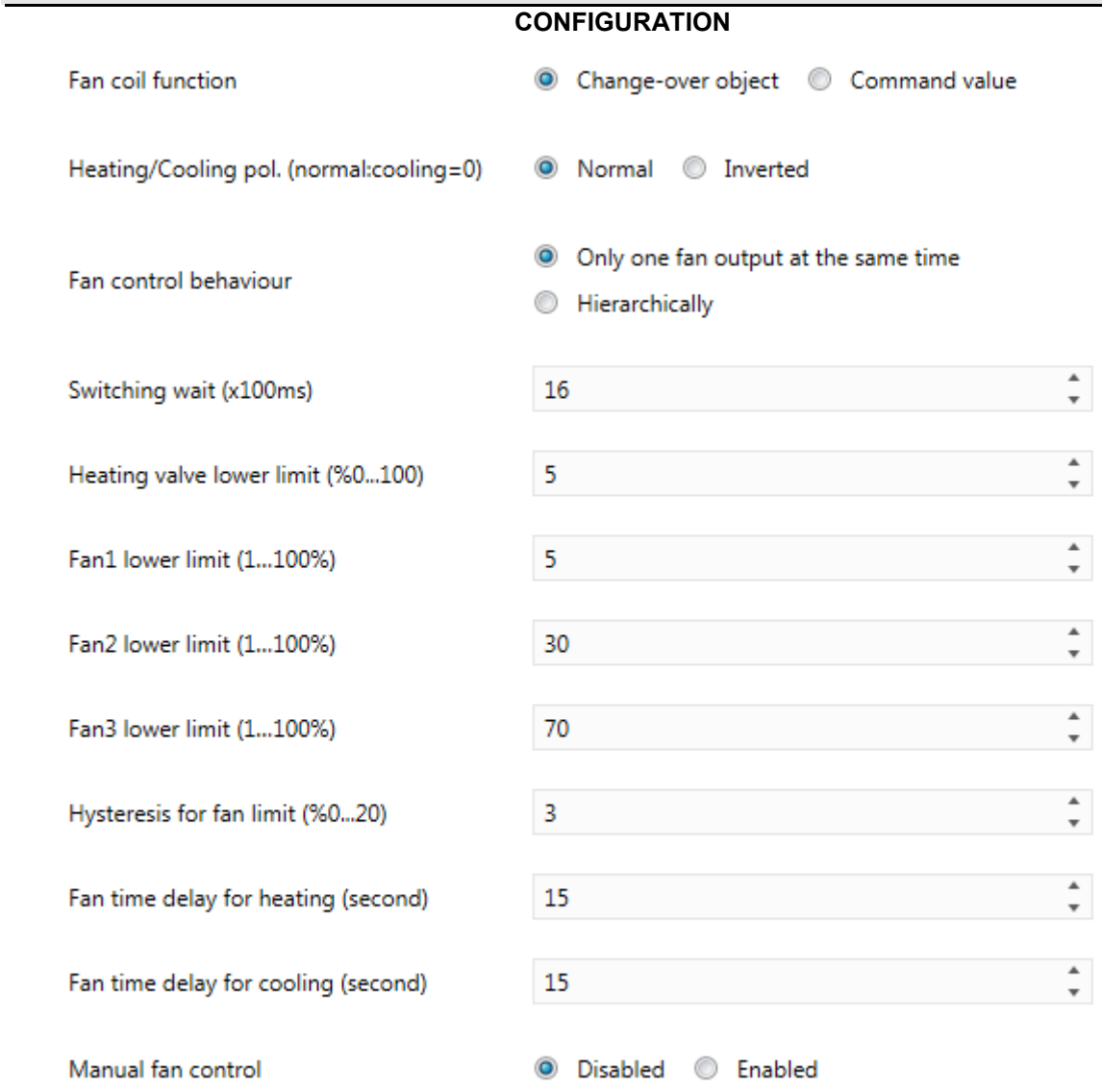
- **Change-over object:**

When the Fan coil function is parameterized as Change-over object, a new communication object is added (Heating/Cooling change over) which defines the operating mode of the fan coil. With the normal configuration, when this object takes the value 0 the fan coil operates as cooling and when the value is 1 as heating. However it is possible to change this configuration via “Heating/Cooling pol.” parameter.

- **Command value:**

The operating mode of the fancoil is determined by the command value. The fancoil works taking into account the last value received via “Command value for heating” or “Command value for cooling” objects.

13.2 Parameters

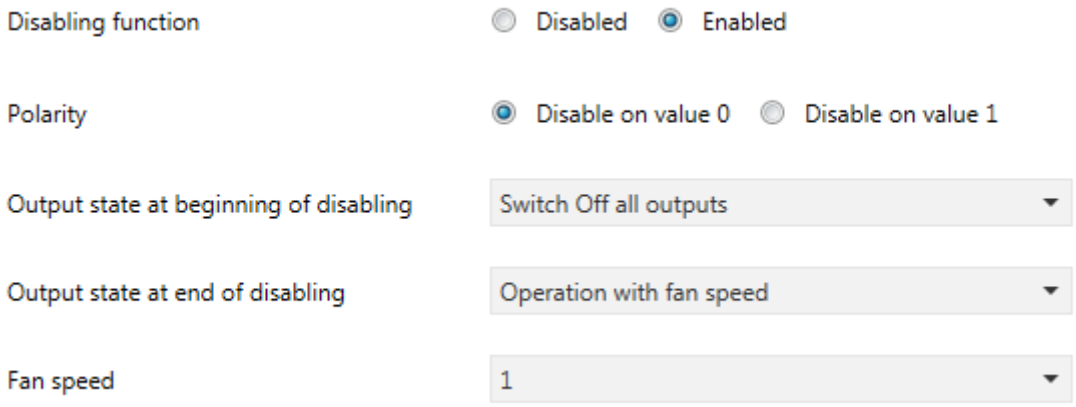


PARAMETER	DESCRIPTION	VALUES
Fan coil function	This parameter determines the function of the fan coil. Change-over object: Selecting this option a new object is added with which it is possible to change the operating mode of the fancoil (heating or cooling). Command Value: The operating mode of the fancoil is determined by the command value. The fancoil works taking into account the last value received via “Command value for heating” or “Command value for cooling” objects.	**Change-over object** Command value
Heating/Cooling pol. (Normal: Cooling=0)[1]	This parameter determines the value for activating the two operating mode. Normal: Cooling=0 / Heating=1. Inverted: Cooling=1 / Heating=0.	**Normal** Inverted
Fan control behaviour	This parameter is used to set how the fan coil fan speed is controlled.	**Only one fan output at the**

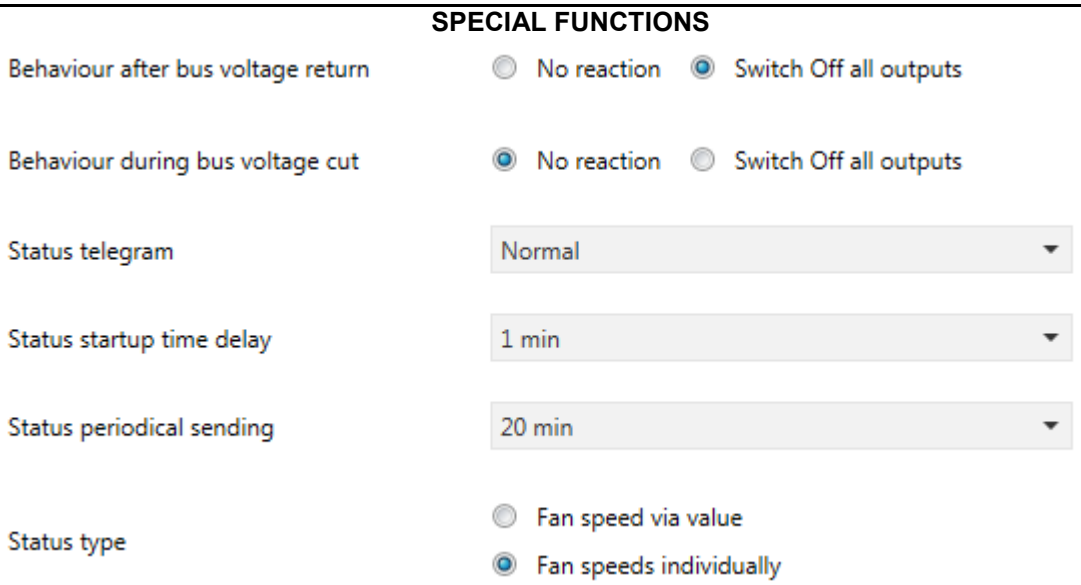
PARAMETER	DESCRIPTION	VALUES
	Only one fan output at the same time: Each fan speed is controlled individually with a unique output. Only the corresponding output of the assigned fan speed is switched on with this parameterization. The outputs are not activated at the same time. Hierarchically: The fan speed 1 is controlled with the corresponding output but the fan speed 2 and 3 are the result of the sum of a new output and the previous outputs. The individual fan speeds are activated consecutively (outputs switched on) until the required fan speed is achieved.	**same time** Hierarchically
Switching wait (x100ms)[2]	This parameter set a delay between the switching of the fan speeds. When the value 0 is configured the relay of the current speed is opened at the same time that the next output speed is closed.	**15** (0…255)
Heating valve lower limit (%1…100)	This parameter set the low threshold value for the fan heating valve.	**5** (0…100)
Fan 1 lower limit (%1…100)	This parameter set the low threshold value for the fan 1.	**5** (1…100)
Fan 2 lower limit (%1…100)	This parameter set the low threshold value for the fan 2.	**30** (1…100)
Fan 3 lower limit (%1…100)	This parameter set the low threshold value for the fan 3.	**70** (1…100)
Hysteresis for fan limit (%0…20)	This parameter determines the hysteresis for fan limits. This value is proportional to the limits configured previously.	**3** (0…20)
Fan time delay for heating (second)	This parameter set a delay between the opening of the heating valve and the fan switching on. Note that when this time is elapsed the switch wait time for fan speed has to be elapsed too before switching on the fan.	**15** (0…255)
Fan time delay for cooling (second)	This parameter set a delay between the fan switching off and the closing of the heating valve.	**15** (0…255)
Manual fan control	This parameter allows enabling the manual control of the fan speed.	**Disabled** Enabled

[1]This parameter is only visible when the parameter “Fan coil function” is set to “Change-over object”.
[2]This parameter is only visible when the parameter “Fan control behaviour” is set to “Only one fan output at the same time”.

DISABLING FUNCTIONS



PARAMETER	DESCRIPTION	VALUES
Disabling function	This parameter allows enabling the disabling function.	**Disabled** Enabled
Polarity	This parameter determines how the disabling function can be activated. Disable on value 1: The function is activated through the value 1. Disable on value 0: The function is activated through the value 0.	**Disable on value 1** Disable on value 0
Output state at beginning of disabling	This parameter determines the behaviour of the fan coil at the beginning of the disabling function. No reaction: There is no reaction; the outputs remain the last state until the deactivation of the function. Switch Off all outputs: The outputs are switched off. Operation with fan speed: The fan speed is set to a value configured in the next parameter.	**No reaction** Switch Off all outputs Operation with fan speed
Fan speed	This parameter defines the fan speed value when the “Operation with fan speed” option is used.	**1** 2 3
Output state at end of disabling	This parameter determines the behaviour of the fan coil at the end of the disabling function. No reaction: There is no reaction; the outputs recover the last state before the disabling activation. Switch Off all outputs: The outputs are switched Off. Operation with fan speed: The fan speed is set to a value configured in the “Fan speed” parameter. Tracked state: If some values are received during the disabling function is activated, the outputs take the values according to the last command received. Note: If during the disabling, the operating mode is changed, it is always taken into account.	**No reaction** Switch Off all outputs Operation with fan speed Tracked state



PARAMETER	DESCRIPTION	VALUES
Behaviour during bus voltage cut	This parameter determines the behaviour of the outputs during a bus voltage cut No reaction: There is no reaction; the outputs remain the last state. Switch Off all outputs: The outputs are switched off.	**No reaction** Switch Off all outputs
Behaviour after bus voltage Return	This parameter determines the behaviour of the outputs after a bus voltage failure. No reaction: There is no reaction; the outputs remain the last state. Switch Off all outputs: The outputs are switched off.	**No reaction** Switch Off all outputs
Status telegram	This parameter is used to set weather the status of the fan coil and the fan speed are shown. Disabled: There is no information about the status outputs. Normal: The real status of the outputs is shown via the corresponding communication objects. Inverted: The inverted status of the fan coil is shown via the “Status active fan coil valve” communication object. The status of the fan speed is shown normally even though this option is used.	Disabled **Normal** Inverted
Status startup time delay	This parameter set a delay between the startup and the sending of the status telegram to the bus. ‘Disabled” option means that there is not emission of the telegram after the startup.	**Disabled** 5s, 10s, 30s, 1min, 5min, 10min, 20min. 30min, 40min, 50min, 1h, 2h, 3h, 4h, 5h, 6h, 12h, 24h.
Status periodical sending	This parameter determines the sending period of the outputs current value. “Disabled” option means that the status telegram is sent only after output changes, not periodically.	**Disabled** 5s, 10s, 30s, 1min, 5min, 10min, 20min. 30min, 40min, 50min, 1h, 2h, 3h, 4h, 5h, 6h, 12h, 24h.

PARAMETER	DESCRIPTION	VALUES
Status type	This parameter defines the type of status for the fan speed. Fan speed via Value: The fan speed status is shown such as 1, 2 or 3 depending on the speed activated. Fan speeds individually: There are 3 different communication objects, one for each speed, which shows the status of them individually.	**Fan speed via value** Fan speeds individually

13.3 Objects

The following object can be used through the fan coil 4 pipes function:

OBJ NAME	FUNCTION	TYPE	FLAG
OutputX	Status active fan coil valve	1 bit	CRWT
This object is only visible when the “Status telegram” function is enabled (Normal or Inverted). Via the group address linked, it indicates the current status of the fan coil (valve output status).			
OutputX	Manual fan level value	1 byte	CRWU
This object is only visible when the “Manual fan control” function is enabled. Via this object, it is possible to force the fan speed. When a value is sent via the group address linked, no further data is taken into account.			
OutputX	Heating/Cooling change-over	1 bit	CRWTU
This object is only visible when the “Fan coil function” parameter is set to “Change-over object”. Via this object it is possible to define the operating mode of the fan coil.			
OutputX	Status for fan speed 1	1 bit	CRWTU
This object is only visible when the “Status type” parameter is set to “Fan speeds individually”. Via the group address linked, it indicates the current status of the fan speed 1.			
OutputX	Status for fan speed 2	1 bit	CRWTU
This object is only visible when the “Status type” parameter is set to “Fan speeds individually”. Via the group address linked, it indicates the current status of the fan speed 2.			
OutputX	Status for fan speed 3	1 bit	CRWTU
This object is only visible when the “Status type” parameter is set to “Fan speeds individually”. Via the group address linked, it indicates the current status of the fan speed 3.			
OutputX	Disabling	1 bit	CRWU
This object is only visible when the “Disabling function” is enabled. Via this object the “Disabling” function can be activated.			
OutputX	Return to automatic mode	1 bit	CRWTU
This object allows the system to return to operate in automatic mode. When this object takes the value 1, any fan forced is disabled and the system start to work according to the last command received.			
OutputX	Status active fan speed	1 byte	CRWTU
This object is only visible when the “Status type” parameter is set to “Fan speed via value”. Via the group address linked, it indicates the current status of the fan speed such as 1, 2 or 3.			
OutputX	Command value for heating	1 byte	CRWU
This object is only visible when the “Fan Coil Function” parameter is set to “Only Heating” or “Heating/Cooling”. Via this object, command value for heating operation is sent.			
OutputX	Command value for cooling	1 byte	CRWU
This object is only visible when the “Fan coil function” parameter is set to “Only cooling” or “Heating/Cooling”. Via this object, command value for heating operation is sent.			
OutputX	Airing speed	1 byte	CRWTU
Via this object the value for airing is set. It is possible to define a fan speed such as 1, 2 or 3. When the fan coil is switched off, the fan can be activated with the value configured through this object			
OutputX	Constant fan speed (1-Byte)	1 byte	CRWTU
Via this object, the fan speed can be forced to a certain level such as 1, 2 or 3.			
OutputX	Constant fan speed (1-Bit)	1 bit	CRWTU
Via this object, the fan speed can be forced to a certain level through the sending of consecutive values. When this object takes the value 1 consecutively, the fan speed is increased. Otherwise, taking the value 0,			

the fan speed is decreased. Note: The first value sent make the fan remain the current fan speed and then the fan speed is increased or decreased depending of the new values sent.			
OutputX	Man. constant fan status	1 bit	CRWTU
Via the group address linked, it indicates whether the system is operating automatically or, conversely, it has been forced. The value Off means that there is not forced.			

14 APPENDIX

14.1 APPENDIX A: MANUAL CONTROL

The device has one push button for each output of the device. It allows the manual control of the outputs even when a bus communication failure occurs.

When locking, forced or disabling functions are activated, the manual control via the push buttons on the device is even possible.

This appendix aims to explain the correct use of these push buttons depending on the configuration chosen for each output.

LIGHTING

Each press of the push button sends to the bus a telegram with the value “0” or “1” depending on the previous status. The light is switched on and off alternately in every press and its status is represented via the status led. Moreover, after any manual change the current status of the output is transmitted to the bus via the status object.

HEATING

The valve is opened or closed alternately in every press of the push button depending on the previous status. The current status of the valve is represented via the status led and is transmitted to the bus via the status object.

SHUTTER/BLIND

Shutter and blinds can be lowered or raised with a long push button action while a short push button action ends the movement when it is moving. Moreover, depending on the configuration (shutter or shutter/blind), a short push button action executes short movements or positions the slats when the shutter is at a rest.

Configuration as Shutter/Blind: When the positioning of the slats reaches its maximum or minimum (0° or 360°), the following short press of the button will execute short movements of the shutter. For example, if the value 0° is reached and a new short push button is executed, it will be interpreted as a short Up movement. Similarly when the value 360° is reached, it will be interpreted as a short Down movement.

FAN COILS

Using the push button which corresponds to the valve output it is possible to open the valve and modify the fan speed. Depending on the previous status, each pressing increases the fan speed. However, if the fan coil is deactivated, the first pressing opens the valve and switches on the speed 1. Conversely, if the fan coil is active and operating with the speed 3, a new pressing turns the fan coil Off.

14.2 APPENDIX B: LOGIC GATES

Function	Input 1	Input 2	Input 3	Input 4	Output
AND	0	0	0	0	0
	0	0	0	1	0
	0	0	1	0	0
	0	0	1	1	0
	0	1	0	0	0
	0	1	0	1	0
	0	1	1	0	0
	0	1	1	1	0
	1	0	0	0	0
	1	0	0	1	0
	1	0	1	0	0
	1	0	1	1	0
	1	1	0	0	0
	1	1	0	1	0
	1	1	1	0	0
	1	1	1	1	1

Function	Input 1	Input 2	Input 3	Input 4	Output
OR	0	0	0	0	0
	0	0	0	1	1
	0	0	1	0	1
	0	0	1	1	1
	0	1	0	0	1
	0	1	0	1	1
	0	1	1	0	1
	0	1	1	1	1
	1	0	0	0	1
	1	0	0	1	1
	1	0	1	0	1
	1	0	1	1	1
	1	1	0	0	1
	1	1	0	1	1
	1	1	1	0	1
	1	1	1	1	1

Function	Input 1	Input 2	Input 3	Input 4	Output
XOR	0	0	0	0	0
	0	0	0	1	1
	0	0	1	0	1
	0	0	1	1	0
	0	1	0	0	1
	0	1	0	1	0
	0	1	1	0	0
	0	1	1	1	1
	1	0	0	0	1
	1	0	0	1	0
	1	0	1	0	0
	1	0	1	1	1
	1	1	0	0	0
	1	1	0	1	1
	1	1	1	0	1
	1	1	1	1	0

14.3 APPENDIX C: SCENE EXAMPLE

The following example shows the creation of a scene in which both lights and shutter are involved.

The number of the scene will be 24 therefore the number of recall will be 23 and the number of storage will be 152 (128+23).

The activation of the scene involves the following actions:

- The shutter is positioned to 50% and 90°.
- 25 seconds after scene recall, the light 1 is switched off.
- 30 seconds after scene recall, the light 2 is switched on.
- 35 seconds after scene recall, the light 3 is switched on.

Fig17. Scene Example

A telegram is sent with the number of the scene which must correspond with the scene number in the parameters configuration. The parameters can be defined as follows for the example scene:

SHUTTER

Scene 1	Disabled / Enabled
Scene 1 number	24
Scene 1 position value (0...100%)	50
Scene 1 slat angle value (0...180°)	50
Scene 1 storage function	No / Yes
Scene 1 delay (0...255 sec)	0

LIGHT 1

Scene 6	Disabled / Enabled
Scene 6 number	24
Scene 6 state	Off / On
Scene 6 storage function	No / Yes
Scene 6 delay (0...255sec)	25

LIGHT 2

Scene 1	Disabled / Enabled
Scene 1 number	24
Scene 1 state	Off / On
Scene 1 storage function	No / Yes
Scene 1 delay (0...255 sec)	30

LIGHT 3

Scene 1	Disabled / Enabled
Scene 1 number	24
Scene 1 state	Off / On
Scene 1 storage function	No / Yes
Scene 1 delay (0...255 sec)	35

A scene may involve outputs of same or different devices. The important thing is that all to be configured with the same scene number and the objects “scene” are grouped in the same group address. With this function it is possible to connect multiple KNX devices in a scene.

The value of the scene can be modified through the storage option. In the above example, the light 2 is switched on recalling the scene 24. If it is required that the light 2 is switched off instead of, the output can be switched to the value desired via the object “On/Off” and then the new value can be saved. For storing the new value, a telegram with the value 152 must be sent via the object “scene”.

The delays configured for the recall scenes have no influence on the storage of scene values.

14.4 APPENDIX D: MEASURINGS

MEASURING OF MOVEMENT DURATION

For the correct operation of the positioning of shutters, it is imperative that the measured time of Up and Down movements is done correctly in order to achieve the best possible positioning results. The device needs to know the exact time of both movements Up and Down.

For measuring the up movement duration, the shutter should be positioned to the completely closed position (100%) and then start the measurement when the shutter starts to move from that position to the completely opened position. On the contrary, for measuring the down movement duration, the shutter should be positioned to the completely opened position (0%) and then start the measurement when the shutter starts to move from that position to the completely closed position. The time measurement must be stopped when the shutter is completely opened or closed.

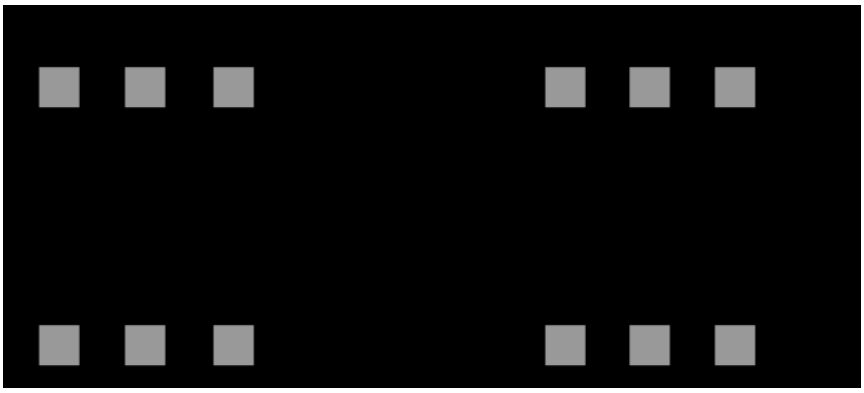


Fig18. Shutter movement duration

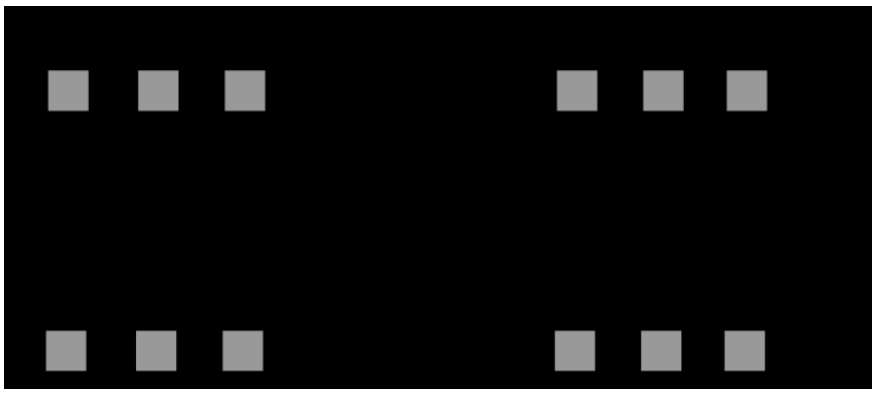


Fig19. Shutter/Blind movement duration

These times must be measured in situ and introduced into the ETS as parameters. For a higher precision, it is recommended to repeat the measurements several times and to take the average of these values as the last value for the ETS parameterization.

MEASUREMENT OF SLAT STEPS

For the correct operation of the positioning of the blind slats, it is imperative that the measurement of the steps to move the slats is done correctly in order to achieve the best possible positioning results. The device needs to know the exact number of steps required to move the slats from the 0° position to the 180° position.

For measuring this number of steps, the slats should be positioned to the completely closed position (0°) and then start to move the slats step by step (and counting them at the same time) to the completely opened position (180°).

In the following example the number of steps required is 4:

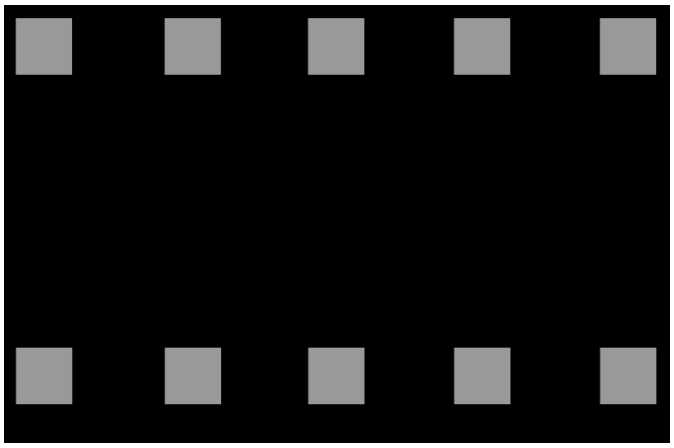


Fig20. Slat steps

This number of steps required must be measured in situ and introduced into the ETS as parameters. For a higher precision, it is recommended to repeat the measurements several times and to take the average of these values as the last value for the ETS parameterization.

14.5 APPENDIX C: POSSIBLE CONFIGURATIONS

The device allows multiple configurations. The aim of this appendix is to show every possible output configuration and to warn that posterior changes in the configuration can be fatal. Thus, it is highly recommended to be clear about the outputs destination before starting the parameters configuration.

The configuration of the outputs through the window parameter works as a tree, depending on the previous configuration, it allows different options. This configuration tree is divided in blocks of 6 outputs. The output 1 of the block permits choosing every option and depending on the option selected, the next outputs of the block can be configured differently.

Device	Number of Blocks	Outputs Distribution
TYF612	2	1-6 and 7-12
TYF616	3	1- 6, 7-12 and 13-16

- **Example:**

Out 1+2+3+4 configured as fan coil 2 pipes. This allows configuring the output 5 and 6 as Shutter/Blind or Lighting and Heating.

If the parameters for the outputs 5 and 6 are modified by the user and then the output configuration for the first outputs are modified (for example output 1 as lighting), the previous parameterization for output 5 and 6 is missed and it is necessary to do it again.

The following tables show every possible output configuration from input 1 to 6:

Out 1	LIGHTING
Out 2	LIGHTING/HEATING
Out 3	LIGHTING
Out 4	LIGHTING/HEATING
Out 5	LIGHTING
Out 6	LIGHTING/HEATING

Out 1	LIGHTING
Out 2	LIGHTING/HEATING
Out 3	LIGHTING
Out 4	LIGHTING/HEATING
Out 5	HEATING
Out 6	LIGHTING/HEATING

Out 1	LIGHTING
Out 2	LIGHTING/HEATING
Out 3	LIGHTING
Out 4	LIGHTING/HEATING
Out 5+6	SHUTTER-BLIND

Out 1	LIGHTING
Out 2	LIGHTING/HEATING
Out 3	HEATING
Out 4	LIGHTING/HEATING
Out 5	LIGHTING
Out 6	LIGHTING/HEATING

Out 1	LIGHTING
Out 2	LIGHTING/HEATING
Out 3	HEATING
Out 4	LIGHTING/HEATING
Out 5	HEATING
Out 6	LIGHTING/HEATING

Out 1	LIGHTING
Out 2	LIGHTING/HEATING
Out 3	HEATING
Out 4	LIGHTING/HEATING
Out 5+6	SHUTTER-BLIND

Out 1	LIGHTING
Out 2	LIGHTING/HEATING
Out 3+4	SHUTTER-BLIND
Out 5	LIGHTING
Out 6	LIGHTING/HEATING

Out 1	LIGHTING
Out 2	LIGHTING/HEATING
Out 3+4	SHUTTER-BLIND
Out 5	HEATING
Out 6	LIGHTING/HEATING

Out 1	LIGHTING
Out 2	LIGHTING/HEATING
Out 3+4	SHUTTER-BLIND
Out 5+6	SHUTTER-BLIND

Out 1	HEATING
Out 2	LIGHTING/HEATING
Out 3	LIGHTING
Out 4	LIGHTING/HEATING
Out 5	LIGHTING
Out 6	LIGHTING/HEATING

Out 1	HEATING
Out 2	LIGHTING/HEATING
Out 3	LIGHTING
Out 4	LIGHTING/HEATING
Out 5	HEATING
Out 6	LIGHTING/HEATING

Out 1	HEATING
Out 2	LIGHTING/HEATING
Out 3	LIGHTING
Out 4	LIGHTING/HEATING
Out 5+6	SHUTTER-BLIND

Out 1	HEATING
Out 2	LIGHTING/HEATING
Out 3	HEATING
Out 4	LIGHTING/HEATING
Out 5	LIGHTING
Out 6	LIGHTING/HEATING

Out 1	HEATING
Out 2	LIGHTING/HEATING
Out 3	HEATING
Out 4	LIGHTING/HEATING
Out 5	HEATING
Out 6	LIGHTING/HEATING

Out 1	HEATING
Out 2	LIGHTING/HEATING
Out 3	HEATING
Out 4	LIGHTING/HEATING
Out 5+6	SHUTTER-BLIND

Out 1	HEATING
Out 2	LIGHTING/HEATING
Out 3+4	SHUTTER-BLIND
Out 5	LIGHTING
Out 6	LIGHTING/HEATING

Out 1	HEATING
Out 2	LIGHTING/HEATING
Out 3+4	SHUTTER-BLIND
Out 5	HEATING
Out 6	LIGHTING/HEATING

Out 1	HEATING
Out 2	LIGHTING/HEATING
Out 3+4	SHUTTER-BLIND
Out 5+6	SHUTTER-BLIND

Out 1+2	SHUTTER-BLIND
Out 3	LIGHTING
Out 4	LIGHTING/HEATING
Out 5	LIGHTING
Out 6	LIGHTING/HEATING

Out 1+2	SHUTTER-BLIND
Out 3	LIGHTING
Out 4	LIGHTING/HEATING
Out 5	HEATING
Out 6	LIGHTING/HEATING

Out 1+2	SHUTTER-BLIND
Out 3	LIGHTING
Out 4	LIGHTING/HEATING
Out 5+6	SHUTTER-BLIND

Out 1+2	SHUTTER-BLIND
Out 3	HEATING
Out 4	LIGHTING/HEATING
Out 5	LIGHTING
Out 6	LIGHTING/HEATING

Out 1+2	SHUTTER-BLIND
Out 3	HEATING
Out 4	LIGHTING/HEATING
Out 5	HEATING
Out 6	LIGHTING/HEATING

Out 1+2	SHUTTER-BLIND
Out 3	HEATING
Out 4	LIGHTING/HEATING
Out 5+6	SHUTTER-BLIND

Out 1+2	SHUTTER-BLIND
Out 3+4	SHUTTER-BLIND
Out 5	LIGHTING
Out 6	LIGHTING/HEATING

Out 1+2	SHUTTER-BLIND
Out 3+4	SHUTTER-BLIND
Out 5	HEATING
Out 6	LIGHTING/HEATING

Out 1+2	SHUTTER-BLIND
Out 3+4	SHUTTER-BLIND
Out 5+6	SHUTTER-BLIND

Out 1+2+3+4	SHUTTER-BLIND (24V)
Out 5	LIGHTING
Out 6	LIGHTING/HEATING

Out 1+2+3+4	SHUTTER-BLIND (24V)
Out 5	HEATING
Out 6	LIGHTING/HEATING

Out 1+2+3+4	SHUTTER-BLIND (24V)
Out 5+6	SHUTTER-BLIND

Out 1+2+3+4	FAN COIL 2 PIPES
Out 5	LIGHTING
Out 6	LIGHTING/HEATING

Out 1+2+3+4	FAN COIL 2 PIPES
Out 5	HEATING
Out 6	LIGHTING/HEATING

Out 1+2+3+4	FAN COIL 2 PIPES
Out 5+6	SHUTTER-BLIND

Out 1+2+3+4+5	FAN COIL 4 PIPES
Out 6	LIGHTING/HEATING

The same configurations can be done for the different blocks of 6.

14.6 APPENDIX F: CONNECTION DIAGRAM

- EXAMPLE CONFIGURATION 1

Out 1	LIGHTING	Out 7	HEATING
Out 2	LIGHTING	Out 8	LIGHTING
Out 3	HEATING	Out 9	HEATING
Out 4	HEATING	Out 10	HEATING
Out 5	LIGHTING	Out 11	LIGHTING
Out 6	HEATING	Out 12	LIGHTING

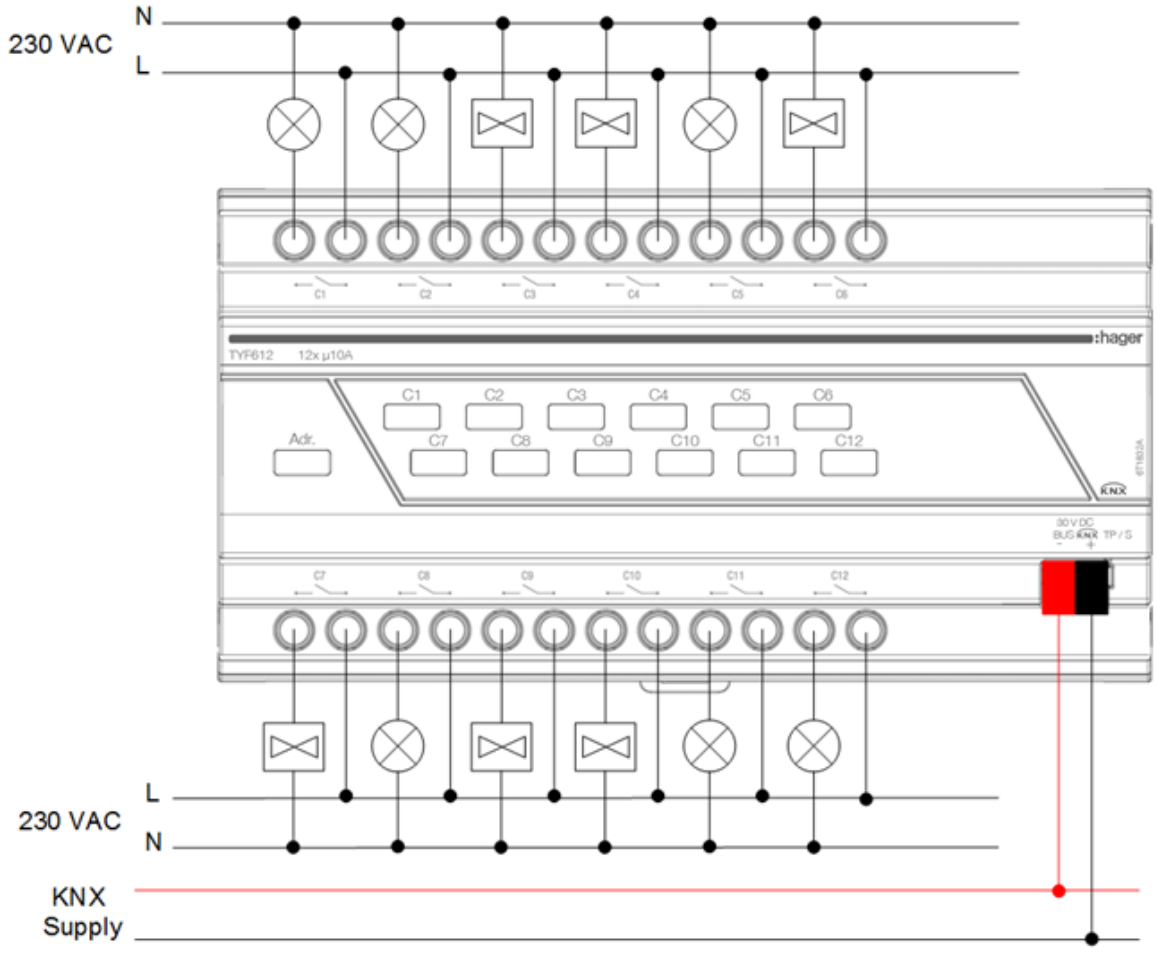


Fig21. Connection Diagram Example Configuration 1

Every output of the device module can be configured as Lighting or Heating. The example above is to show the connection of these loads.

- EXAMPLE CONFIGURATION 2

Out 1+2+3+4	FAN COIL 2 PIPES		Out 1+2+3+4+5	FAN COIL 2 PIPES
Out 5	LIGHTING		Out 6	LIGHTING
Out 6	HEATING			

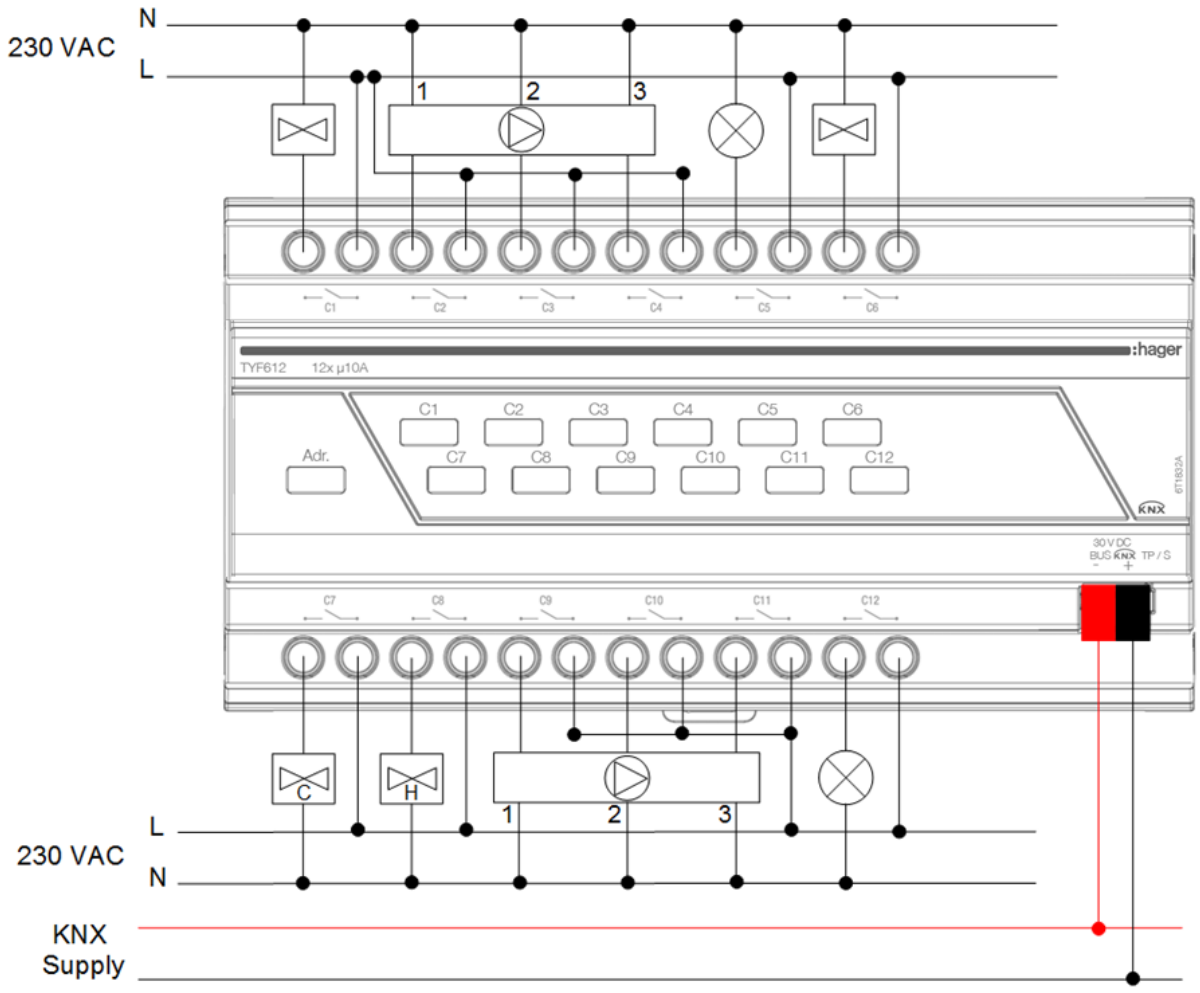


Fig22. Connection diagram example Configuration 2

The device module only allows configuring the first inputs as fancoil 2 or 4 pipes. In the example above the inputs C1-C4 are used for the connection of a 2 pipes fancoil and the inputs C7-C11 for a 4 pipes fancoil.

C1	VALVE (Heating or Cooling)	C7	VALVE COOLING
C2	FAN SPEED 1	C8	VALVE HEATING
C3	FAN SPEED 2	C9	FAN SPEED 1
C4	FAN SPEED 3	C10	FAN SPEED 2
		C11	FAN SPEED 3

- EXAMPLE CONFIGURATION 3

Out 1+2	SHUTTER/BLIND		Out 1+2+3+4	SHUTTER/BLIND 24VDC
Out 3	LIGHTING		Out 8	HEATING
Out 4	HEATING		Out 9	LIGHTING
Out 5+6	SHUTTER/BLIND			

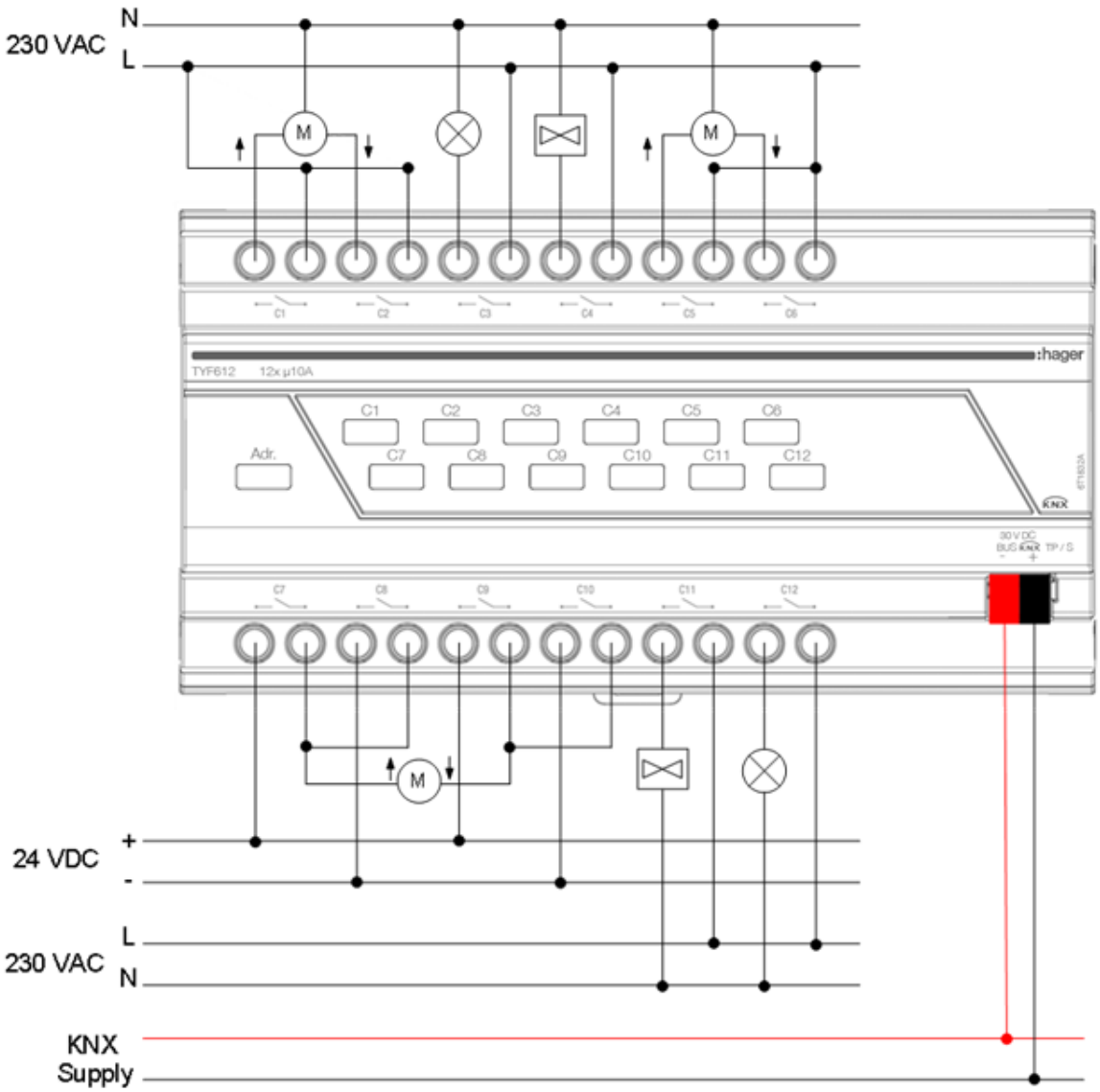


Fig23. Connection Diagram Example Configuration 3

Every output of the device module can be configured as shutter/blind provided that 2 consecutive outputs are available. However for the shutter/blind 24V configuration is necessary 4 outputs so that this configuration is only available in the first four outputs of the blocks. In the example above the inputs C7-C10 are used for the connection of Shutter/Blind 24VDC.