

SIEMENS



5WG1568-1AB81

24-fold Room actuator

Application program description

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1 Features

Switches on/off – 24 switch outputs

Connects switching outputs to electrical consumers, e.g. lighting, electrical sockets, and control valves. Max. 24 channels, each output is relay controlled and electronically switched.

- One switching output corresponds to one output channel
- direct to operation of switching operations
- Each switching channel is assigned to a central control function
- Contact position after bus recovery
- Contact position after bus failure
- Contact position after download
- Setting object value “Switching after bus recovery” (Logic)
- Switching status (state) feedback
- Inverts switching state
- Time function per channel: Switch-on delay / switch-off delay, flashing, staircase function
- Logic function per channel: 2 logic gates per output (AND, OR, XOR, GATE)
- Scene control per channel: Channel assignment in up to 8 scenes with a max. of 64 scene numbers, value settings for closing or opening output
- Forced control per channel: 1 or 2 bit via control
- Operating hours counter per channel: To acquire the relay switch-on time
- Thermal actuator control (without controller) via 1-bit or 1-byte setpoints, with setpoint monitoring and forced control

Solar protection control for AC 230 V actuators – 12 solar protection channels

- One solar protection channel requires 2 outputs
- Direct solar protection operation for each channel
- Operating modes: Blinds or shutter control
- Motor type setting: AC 230 V motor
- Assignment of individual solar protection channels for central control
- Manual mode, 1 bit as drive command or 1 byte as positioning command
- Position after bus recovery
- Position after bus failure
- Position after reference movement
- Slat position after reaching the low end position
- Manual blinds/shutter height control below the end position
- Status feedback of blinds or shutter position, 1 byte
- Setting drive or shutter setting times, blinds settings
- Automatic, automatic solar protection
- Scene control per solar protection channel in up to 8 scenes with a max. 64 scene numbers, shutter or slat settings
- 2 overrides, alarms (e.g. wind, rain, frost) at different priorities

Solar protection control for DC drives – 6 curtain channels

- One solar protection channel requires 4 outputs, inverse polarity
- Direct solar protection operation for each channel
- Operating modes: Blinds or shutter control
- Assignment of individual solar protection channels for central control
- Manual mode, 1 bit as drive command or 1 byte as positioning command
- Position after bus recovery
- Position after bus failure

- Position after reference movement
- Slat position after reaching the low end position
- Manual blinds/shutter height control below the end position
- Status feedback of blinds or shutter position, 1 byte
- Setting drive or shutter setting times, blinds settings
- Automatic, automatic solar protection
- Scene control per solar protection channel in up to 8 scenes with a max. 64 scene numbers, shutter or slat settings
- 2 overrides, alarms (e.g. wind, rain, frost) at different priorities

Heating/cooling function in 2-pipe system – 12 valve outputs

- Two relay outputs are required for valve control (3-port valve)
- Control via setpoint for heating/cooling (2-pipe system), external controller
- Can be set to pure heating, pure cooling, or heating and cooling mode
- Direct valve control
- Setpoint monitoring with error message and emergency reaction in the even of an erroneous setpoint
- Switching command on/off control (2-position control), modulating control commands (modulating control → PWM → 2-port valves) or 3-position control (open/close → 3-port valves)
- Sets valve operating direction (NC/NO)
- Valve control after bus recovery
- Valve control after bus failure
- Sets valve changeover for 3-port valves
- Sets valve opening time for 3-port valves
- Automatic valve position setting for 3-port valves
- Adapting valve characteristic curve for 3-position control
- Valve state feedback
- Automatic or manual valve purge
- Disable heating or cooling operation over the bus

Heating/cooling function in 4-pipe system – 6 valve outputs for heating, 6 valve outputs for cooling

- Requires two relay outputs for heating valve control (3-port valve)
- Requires two relay outputs for cooling control valves (3-port valve)
- External controller required to control via two separate setpoints for heating and cooling (4-pipe system)
- direct to operation of valve actuator
- Setpoint monitoring with error message and emergency reaction in the even of an erroneous setpoint
- Switching command on/off control (2-position control), modulating control commands (modulating control → PWM → 2-port valves) or 3-position control (open/close → 3-port valves)
- Sets operating direction (NC contact/NO contact)
- Valve control after bus recovery
- Valve control after bus failure
- Sets valve changeover for 3-port valves
- Sets valve opening time for 3-port valves
- Automatic valve position setting for 3-port valves
- Adapting valve characteristic curve for 3-position control
- Valve state feedback
- Automatic or manual valve purge
- Disable heating or cooling operation over the bus

Fan controller – 6 multi-stage ventilation systems

- The fan controller can be connected to a 1-speed (single phase) fan
- Selects 1-speed, 2-speed, or 3-speed fans
- A relay output required for each fan speed
- Sets up to 3 fan stages and speed
- Direct fan speed operation
- Operating modes: Changeover between fan speeds with delay (changeover mode) or stage switching
- Fan speed at bus recovery
- Fan speed after bus failure
- Manual mode via 1-bit or 1-byte objects
- Forced control via 1-bit control type, fan only operates at a speed within a valid range, at the highest priority
- Automatic with threshold setting and control via up to 2 setpoints
- Setpoint monitoring with error message and emergency reaction in the event of an erroneous setpoint
- Fan state feedback
- Feedback in auto mode
- Fan speed feedback

2 Commissioning

Device commissioning

1. Switch on KNX bus voltage and connect the actuator via the black/red KNX bus terminal to the KNX bus.
2. Wait ca. 2...3 s. while the device is initializing and all relays are open.
3. Close the load circuits.
4. Test the installation
 - direct to operation in delivery: Only one relay can be closed per pair (1/2, 3/4, 5/6, 7/8 ...)! The configured relay states cannot be saved after restart.
5. Load physical address and application program
 - Configure the outputs as switching on switched loads.
 - Configure the outputs for solar protection AC/ DC.
 - Configure the outputs for fan op as fan control.
 - Configure the outputs to control thermal or motorized actuators as heating/cooling/2-pipe outputs or valve control (4-pipe).
 - Press the programming button. The programming LED is red.
 - Load the physical address and application program via ETS.
 - The programming LED is green in KNX bus operation after download.
 - direct to operation after commissioning with ETS (downloading the ETS database): All outputs operate per the configuration with ETS. The configured relay states are saved after restart.

3 Parameter and communication objects

This section explains how ETS configures the device with parameters. The associated communication objects are also described below.

Communication objects communicate with other devices over the bus:

- Max. number of communication objects: 532
- Max. number of group address: 1000
- Max. number of links: 1000

The number and type of visible objects vary. All objects are never, however, available at the same time.

Note:

The column "Flag" of communication objects:

- C: Enables communications on the object.
- W: Writes the object value from the bus.
- R: Other devices can read the object value.
- T: Object can be transmitted.
- U: Updates the object value.

Note:

For direct to operation:

- direct to operation can test the installation if the database is not loaded. The configured relay states cannot be saved after restart. Only one of the channels can be set to "on" for each channel pair (1 and 2...23 and 24). For example, if channel 1 is set to "on", channel 2 must be set to "off".
- The relay operates as per the configuration in the database if loaded. The configured relay states are saved after restart.

3.1 Parameter "General"

Parameter "General" sets various general parameters on the individual function blocks.

Name	Description	Range
Operation delay after power voltage recovery (5...250 s)	<p>Defines the operation delay after KNX bus recovery. The operation is performed (the device can send telegrams to the bus) after the delay. During the delay, all operations are logged as part of the manual mode with the last triggered mode running after the delay. During the delay, telegrams from the bus are logged and run after the delay.</p> <p>The delay does not include device initialization. After the bus recovery, the initialization time is ca. 3 seconds. The operating delay is calculated after device initialization.</p> <p>Note: During the delay (period without operating output), the programming LED is green; the LED flashes once operational.</p>	5...250 s

Name	Description	Range
Sending cycle of "In operation" telegram [1...240, 0=inactive] s	Sets the interval for sending telegrams that indicates that the module is correctly operating. The object "In operation" does not send telegrams if "0" is selected. For a value not equal to zero (1...240 s), object "In operation" sends a telegram and the sets interval with a value of "1" to the bus. Shortening the interval increase bus load. Note: The interval is calculated after bus recovery and the delay does not refer to the the delay after bus power returns.	0...240 s 0 = inactive (no cyclical send)
Limit number of send telegram	Sets the number of telegrams sent by the device to the bus, in particular, to reduce bus load. No	
The following parameters are only displayed when "Yes" is selected.		
Period	Limits the monitoring time of the sent telegrams. The monitoring time, and counting of sent telegrams, starts after bus recovery and the device initializes, and the operation delay expires. Once the max. number of telegrams is reached, no additional telegrams are sent to the bus until the end of the set monitoring period. A new monitoring period and telegram counter start after the monitoring period ends. Telegrams not sent during the previous monitoring period (max. 40 telegrams can be copied to cache) are sent during the following period. With only one of the duplicated telegrams being sent. Note: The parameter only affects telegrams sent to the bus and not the operations performed.	100 ms 500 ms ... 10 min
Max. number tele. within a period [1...255]	Sets the max. number of telegrams sent during the monitoring period. Note: The parameter only affects messages sent to the bus and not the operations performed.	1...255
Central control for switch function	Sets whether to enable or disable central control for the switch function. If enabled, object "Central control for all switches" displays. The object controls all channels with enabled central control. The switches can be controlled as a group.	Disable Enable
Central control for curtain function	Sets whether to enable or disable central solar protection. Objects "Central control of up/down" and "Central control of Slat/Stop" displays. The object controls all channels with central control. Curtain position, slat angle, and stop can be jointly controlled.	Disable Enable
Direct operation	Enables or disables operations as part of direct to operations.	Disable Enable
The following parameters are displayed if option "Enable" is selected.		
Direct to Bus operation by	Sets how direct to bus operation is switched. <ul style="list-style-type: none"> Only long press: Long press (1 s) the button for direct/bus operation to switch to direct or return bus operation. Both long press as well as automatic delay: Long press the button for direct/bus operation to switch to direct to operation or return to bus operation. Or after a delay it switches automatically to direct to operation in bus operation, i.e. any time there is no direct to operation over a specific period. 	Only long press Both long press as well as automatic delay
The following parameters display if "Both long press as well as automatic delay" is selected.		
Delay time [10...6000] s	Sets the delay between direct to and bus operation.	10...6000

3.2 Parameter "Channel function"

Parameter "Channel functions sets the channel function.

Channel function: Switch on/off, solar protection (AC or DC actuators), fans, or valve. The assigned channels may vary by function. If channel 15 and channel 16 is set to "Disable", option "Curtain DC" is visible for channel 17...24.

Functions are always assigned relay outputs: Outputs 1...4, outputs 5...8, outputs 9...12, outputs 13...16, outputs 17...20, and outputs 21...24. The various selectable functions require a different number of outputs. The switch function always uses a relay output. Solar protection on AC drives always requires two relay outputs: One for "Up" and the other for "Down". The number of outputs for valve control is based on valve type (2-port or 3-port valves) and the heating/cooling system (2-pipe or 4-pipe system). A 2-pipe system requires one output (ON/OFF) for a 2-port valve, and 3-port valves require two outputs (OPEN/CLOSE/STOP). A 4-pipe system requires two outputs for both 2-port valves or four outputs for both 3-port valves. The number of outputs (1...3) for ventilation control is based on the number of fan speeds. Solar protection on DC drives requires four relay outputs due to polarity inversion. 230 V connections are not permitted in the vicinity of low voltage connections. As a consequence, only terminals 17...20 or 21...24 are used for DC drives. Terminals 15 and 16 cannot be used in this case.

Option "Solar protection DC" displays outputs 17...24 if outputs 15 and 16 are set to "Disable".

NOTICE



For electrical safety, note the following safety distances when connected 230 V load together with SELV-/FELV voltage (DC actuators):
Use only terminals 17 to 20 and 21 to 24 for DC actuators. Terminals 15 and 16 cannot be used in this case. See Connection diagram and ETS database entry!

General	Product select	24-Fold
Channel function	Output 1--4 config as	Switch/Solar protection AC/Heating/Cooling/2-pipe
Curtain 2	Output 1 & 2 function	Switch
C2: Drive	Output 1	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
C2: Automatic	Output 2	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
C2: Scene	Output 3 & 4 function	Curtain AC
C2: Safety	Curtain 2 output is fixed for	Output 3(Up/Open) & Output 4(Down/Close)
	Output 5--8 config as	Disable
	Output 9--12 config as	Disable
	Output 13--16 config as	Disable
	Output 17--20 config as	Disable
	Output 21--24 config as	Disable

Name	Description	Range
Product select	Describes the product	24 fold
Output 1~4 config as Output 5~8 config as Output 9~12 config as Output 13~16 config as	Sets the channel function	Disable (unused) Switch/solar protection AC/heating/cooling/2-pipe Fan control Valve control (4-pipe)
Output 17~20 config as Output 21~24 config as	Sets the channel function	Disable (unused) Switch/solar protection AC/heating/cooling/2-pipe Solar protection DC Fan control Valve control (4-pipe)

The following table describes output (1... 4).

Output 1...4	Switch/solar protection AC/heating/cooling/2-pipe			Fan control	Valve control (4-pipe)
	Switches	Solar protection AC	Heating/cooling/2-pipe		
Output 1	Output 1	Curtain 1	Valve 1 (output 1 and 2, if 3-position, open and close)	Fan 1: Fan speed 1	Valve 1: Heating (output 1 and 2, if 3-position, open and close)
Output 2	Output 2			Fan 1: Fan speed 2	
Output 3	Output 3	Curtain 2	Valve 2 (output 3 and 4, if 3-position, open and close)	Fan 1: Fan speed 3	Valve 1: Cooling (output 3 and 4, if 3-position, open and close)
Output 4	Output 4				

In the table above: A switching output uses only one channel. Solar protection output (AC) used two channels, and DC uses four channels. The channel used by the fan is based on fan speed. The channel used by the valve is based on HVAC operating mode and valve type. Example: 1 or 2 channels for heating/cooling/2-pipe, but 2 or 4 channels for 4-pipe systems.

You can use outputs as switching based on parameter settings if some of the outputs are unused for fan control. Details as follow:

Name	Description	Range
Curtain 1 output is fixed for	Defines the channel for curtain 1(AC) that is set as output 1 and output 2. Output 1 for curtain Up/Open and 2 for Down/Close.	Output 1 (Up/Open) and output 2 (Down/close)
External DC+ input External DC- input Output driver	Defines cabling for solar protection DC. The positive connection is outputs 17 and 19; the negative 18 and 20; the actuator is connected to UN.	Output 17 and output 19 Output 18 and output 20 UN
Fan 1 output is fixed for	Defines output 1 for 1-speed fans, outputs 1 and 2 for 2-speed fans; outputs 1, 2, and 3 for 3-speed fans.	1-speed: 1 2-speed: 1 and 2 3-speed: 1, 2, and 3
If Fan 1 set to 1 or 2 level, output 3&4 as switch output	Note: Output 3 and 4 can be used as a switch output if fan type is 1-speed or 2-speed.	
The following two parameters display if 4-pipe is selected. Define the channels for 4-pipe systems:		
Heat output for 4-pipe valve 1 is Output 1	Designates heating channel for valve 1, output 1, i.e. on 2-wire systems, one end of the valve is output 1 and the other is connected with power with UN. For 3-wire, output channels Output 1 and 2, i.e. two ends of the valve are connected to Output 1 and 2; the other to power with UN.	Output 1 and 2, for 3-position, open, and close
Cool output for 4-pipe valve 1 is Output 3	Designates cooling channel for valve 1 is output 3, i.e. on 2-wire systems, one end of the valve is output 3 and the other is connected with power with UN. For 3-wire, output channels Output 3 and 4, i.e. two ends of the valve are connected to Output 3 and 4; the other to power with UN.	Output 3 and 4, for 3-position, open, and close
Valve 1 output is fixed for Output 1	Displays only when heating only, cooling only, or 2-pipe is selected. Defines the valve output channel. For 2-wire, the output channel is Output 1, i.e. one end of the valve is connected to Output 1; the other to power with UN. For 3-wire, output channels Output 1 and 2, i.e. two ends of the valve are connected to Output 1 and 2; the other to power with UN.	Output 1 and 2, for 3-position, open, and close

3.3 Switching output – Switching actuator

Priority of switching actuator control:

Initialization (after downloading the parameters) → Direct to operation (long press of Direct to operation button to switching to direct to operation, and the button is operating and working) → Forced operation → manual bus operation

The following applies:

1. Direct to operation has the highest priority. The state after completing direct to operation returns to forced operation if enabled.
2. The unfinished time function is interrupted and not continued if the time function is operating and the channel operations are performed in direct to operation.
3. All telegrams are invalid in direct to operation and are not logged.

3.3.1 Parameter "Switch actuator: Output X"

The parameters "Switch actuator: Output X" are set to relay for the entire channel. The parameter can also be set, for example, for special functions and state messages in addition to the switch function.

General	Work mode of the channel is	<input checked="" type="radio"/> Switch actuator <input type="radio"/> Heating actuator(without controller)
Channel function	Central function of channel	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
Output 1	If bus recovery, contact is	Unchange
O1: Function	If bus failure, contact is	Unchange
O1: Time	After downloading,contact is	<input checked="" type="radio"/> Open <input type="radio"/> As bus recovery
O1: Logic	Object value of "switch" after bus recovery	<input checked="" type="radio"/> 0 <input type="radio"/> 1
O1: Scene	Set the reply mode of switch status	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
	Object value of switch status	<input type="radio"/> 0=contact close;1=contact open <input checked="" type="radio"/> 1=contact close;0=contact open
	Contact position if tele.value is "1" ("0" is opposite of "1" if changed)	<input type="radio"/> Open <input checked="" type="radio"/> Close
	Special function of channel	<input type="radio"/> Disable <input checked="" type="radio"/> Enable

Name	Description	Range
Work mode of the channel is	Sets the work mode on the channel. <ul style="list-style-type: none"> Switch actuator mode is designed for common switching controls, e.g. Light switches. Heating actuator (without controller) primarily control the heating valve. For parameters and applications, see Switch output – Parameter "Heating actuator (without controller)" [→ 21]. 	Switching actuator Heating actuator (without controller)
Central function of channel	Sets whether to enable or disable the central control for the channel. If enabled, the channel is controlled via object "Central control for all switches".	Disabled Selected
If bus recovery, contact is	Sets the position of the relay contacts if the device is bus powered. <ul style="list-style-type: none"> The relays do not change if "No change" is selected. If "Open" is selected, the relay contacts are opened. If "Closed" is selected, the relay contacts are closed. The relay contacts are switched to the same position as prior to the bus failure if "As before as bus fail" is selected. 	No change Open Closed As before as bus fail
If bus failure, contact is	Sets the position of the relay contacts in the event of bus fail. <ul style="list-style-type: none"> The relays do not change if "No change" is selected. If "Open" is selected, the relay contacts are opened. If "Closed" is selected, the relay contacts are closed. 	No change Open Closed
After downloading, contact is	Sets the position of the relay contacts after programming the application. <ul style="list-style-type: none"> If "Open" is selected, the relay contacts are opened. In "As bus recovery", the relay contacts move to the position in parameter "If bus recovery, contact is". 	Open As bus recovery

Name	Description	Range
Object value of "switch" after bus recovery	The parameter is used if logic "Input 0" is enabled. Sets the object's start value (0 or 1) for the channel upon bus recovery.	0 1
Set the reply mode of switch status	Sets the conditions for sending a telegram to report the present switching state. Two options are available: <ul style="list-style-type: none"> "Responds after read only", the object "Switch status" for the present switch state only sends the present state to the bus, if the device receives a request from another bus device or reads a switch state request from the bus. "Respond after change", the object "Switch status" immediately sends a telegram to the bus to report the state any time the channel switch state changes. 	Respond after read only Respond after change
Object value of switch status	Displays the state of the relay contact: <ul style="list-style-type: none"> "Switch status" to "0 = Contact close" means the relay contact is closed; "1 = Contact open" means it is open. Setting "1 = Contact close; 0 = Contact open" is the reverser. Note: The object "Switch status" sends the state telegram to the bus if the switch state is determined after programming or a system reset; otherwise no telegram is sent.	0 = Contact close; 1 = Contact open 1 = Contact close; 0 = Contact open
Contact position if tele. value is "1" ("0" is opposite of "1" if changed)	Defines the position of the channel contact when switching on the switch. Object "Switch" triggers the switching operation. If "Input 0" in logic is enabled, the object "Switch" does not trigger a switch operation, but rather changes the logical value from "Input 0". <ul style="list-style-type: none"> "Open" opens the position of the channel relay. Telegram "1" is open; "0" is closed. "Closed" closes the channel position. Telegram "1" is closed; "0" is opened. Note: Object "Switch" is used as the input for "Input 0" if the logic function "Input 0" is enabled and the normal switch operation is invalid.	Open Closed
Special function of channel	Main switch to enable the channel's special functions. "Enable" displays the parameter settings for "Ox: Function" so that all the channel's special functions can be individually enabled or disabled. <div> <div>General</div> <div>Channel function</div> <div>Output 1</div> <div>O1: Function</div> <div></div> </div> <div> <div>Function of "Time"</div> <div>Function of "Logic"</div> <div>Function of "Scene"</div> <div>Function of "Forced"</div> <div>Function of "Operation hours counter"</div> </div> <div> <div><input checked="" type="radio"/> Disable <input type="radio"/> Enable</div> <div><input checked="" type="radio"/> Disable <input type="radio"/> Enable</div> <div><input checked="" type="radio"/> Disable <input type="radio"/> Enable</div> <div><input checked="" type="radio"/> Disable <input type="radio"/> Enable</div> <div><input checked="" type="radio"/> Disable <input type="radio"/> Enable</div> </div>	Disabled Selected

3.3.2 Parameter "Ox: Time"

"Ox: Function of time" displays if set to "Enabled" in "Ox: Function".

The object "Enable time" displays at the same time to to disable the time function. Operation is continued once disabled for the period prior to disable up to the conclusion. For example, operation is disabled during the delay if delay is enabled. Open operation is still performed after the delay expires.

Delay

General	Type of time function	Delay
Channel function	Delay for switch on: --(0...240min)	0
Output 1	--(0...59s)	0
O1: Function	Delay for switch off: --(0...240min)	0
	--(0...59s)	0
O1: Time		
O1: Logic		
O1: Scene		

Flashing

General	Type of time function	Flashing
Channel function	Delay for switch on: --(0...240min)	0
Output 1	--(0...59s)	0
O1: Function	Delay for switch off: --(0...240min)	0
	--(0...59s)	0
O1: Time	Number of ON-impulses (1...255,0=no limited)	0
O1: Logic	Contact position after flashing	Unchange
O1: Scene	Control mode of flashing	Start with "1", Stop with "0"

Staircase

General	Type of time function	Staircase
Channel function	Duration of staircase lighting: --(0...1000min)	1
Output 1	--(0...59s)	0
O1: Function	Control mode of staircase lighting	Start with "1", Stop with "0"
O1: Time	During the lighting time, if receive the "start" telegram	Restart duration of staircase lighting

Name	Description	Range
Type of time function	<p>Sets the time function mode. Three options are available:</p> <ul style="list-style-type: none"> “Delay” enables the delay function in object “Delay function”. “Flashing”, the function displays lamp aging. “Flashing function” enables option “Flashing”. The flash interval can be set in parameters “Delay for switch on” and “Delay for switch off”. Flashing restarts if the object receives a telegram to switch on the flashing output while flashing. The contact position can be set via the parameter after completing the flashing output. “Staircase” enables the staircase function via the object of the same name. The parameter sets the value for switching on staircase lighting and the duration. 	Delay Flashing Staircase
The following parameters only display when “Delay” is selected.		
Delay for switch on: --(0...240min) / --(0...59 s)	<p>Sets the delay for switching on the switch.</p> <p>The switch switches on after the set delay if the object receives a control command.</p>	0...240 min 0...59 s
Delay for switch off: (0...240 min) / --(0...59 s)	<p>Sets the delay for switching off the switch.</p> <p>The switch switches off after the set delay if the object receives a control command.</p> <p>The clock restarts if a new command to trigger is received during the delay.</p>	0...240 min 0...59 s
The following parameters are displayed if option “Flashing” is selected.		

Name		Description	Range
	Delay for switch on: -- (0...240min) / --(0...59 s)	Defines the switch-on duration for a flashing output. Important: Only the switching frequencies below the relay limit are performed. Frequent switching may deprive the relay of sufficient energy to operate. And result in a delay in operation. This may also occur following a bus recovery.	0...240 min 0...59 s
	Delay for switch off: (0...240 min) / --(0...59 s)	Defines the switch-off duration for a flashing output. Important: Only the switching frequencies below the relay limit are performed. Frequent switching may deprive the relay of sufficient energy to operate. And result in a delay in operation. This may also occur following a bus recovery.	0...240 min 0...59 s
	Number of ON-impulses (1...255, 0=no limited)	Sets the times to switch on/off flashing operation: 1... 255, 0 is unlimited. On/off is counted as a flashing output.	0...255
	Contact position after flashing	Sets the position of the relay contacts after completing the flashing output.	No change Open Closed
	Control mode of flashing	Sets the method for switching on the flashing output. <ul style="list-style-type: none"> “Start at ‘1’, stop with ‘0’”; enables the output for value 1 and stops it with value 0. The stop position is determined by the prior parameter. “Start at ‘0’, stop with ‘1’”; enables the output for value 0 and stops it with value 1. The stop position is determined by the prior parameter. “Start with ‘0/1’, can not be stopped, enables the output with value 0 or 1. The flashing cannot be ended in this case by a telegram value unless otherwise interrupted by another operation or conclusion. 	Start with ‘1’, stop with ‘0’ Start with ‘0’, stop with ‘1’ Start with ‘0/1’ can not be stopped
The following parameters are displayed if option “Staircase” is selected.			
	Duration of staircase lighting: -- (0...1000min) / --(0...59 s)	Sets the duration of the staircase lighting if switched on.	0...1000 min 0...59 s
	Control mode of staircase lighting	Sets the method for switching on/off staircase lighting; the corresponding control type can be selected as needed. <ul style="list-style-type: none"> “Start at ‘1’, stop with ‘0’”; switches on staircase lighting for value 1 and stops for value 0. The contact position remains in the present state until changed by another operation. “Start with ‘1’, no reaction with ‘0’”, value 1 switches on the lighting while 0 does not trigger a reaction. “Start with ‘0/1’, can not be stopped”, switches on staircase lighting regardless of value “0” or “1”. The communications can, however, not be ended unless the duration of the staircase lighting has ended or is interrupted by other operations. “Start with ‘1’, OFF with ‘0’”, the value 1 switches on and value 0 switches off lighting. 	Start with ‘1’, stop with ‘0’ Start with ‘1’, no reaction with ‘0’ Start with ‘0/1’ can not be stopped Start with ‘1’, OFF with ‘0’

Name	Description	Range
During the lighting time, if receive the "start" telegram	<p>Sets the different time control methods during staircase lighting.</p> <ul style="list-style-type: none"> Lighting restarts and the duration resets when "Restart duration of staircase lighting" is selected and object "Staircase function" receives a new telegram from staircase lighting while lighting. The duration is extended based on the present time and added if option "Extend duration time" is selected and object "Staircase function" receives a new switch-on telegram for staircase lighting during lighting. For example, the duration if set to 60 seconds and the present time switch is 20 seconds. Upon receipt of the start telegram, the lighting time is $40 + 60 = 100$ seconds. Staircase lighting is automatically switched off after 100 seconds. Multiple start telegrams received one after the other are added up until the total time reaches the max. time limit. "Ignore the 'start' telegram" ignores the telegram value received from object "Staircase function" during staircase lighting. 	<p>Restart staircase lighting</p> <p>Extend duration</p> <p>Ignore "Start" telegram</p>

3.3.3 Parameter "Ox: Function of logic"

Interface to set the logic function parameter "Ox: Function of logic" in "Ox: Function" displays if option "Enable" is selected for parameter "Function of logic".

The function for a logical link supplies two communication objects for determining individual channel outputs. Both objects are linked to communication object "Switch".

The function re-performs the logical link after receiving the value of a logical communication object. The result of the logical link corresponds to the switching state (for "1", the channel contact is closed; for "0" the contact is open). Object value "Logic 1" is calculated logically using the value for object "Switch" and then using the value for object "Logic 2". The object and the corresponding logical link are ignored if the object for the logical link is disabled and the enabled portion is used directly for the next link.

General	Enable input 0	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
Channel function	Input 0 reverse	<input checked="" type="radio"/> NO <input type="radio"/> YES
Output 1	The input 1 of logic	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
O1: Function	Logic function type	AND
O1: Time	Input 1 reverse	<input checked="" type="radio"/> NO <input type="radio"/> YES
	Result reverse	<input checked="" type="radio"/> NO <input type="radio"/> YES
O1: Logic	Value of input1 after bus recovery	0
O1: Scene	The input 2 of logic	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
	Logic function type	AND
	Input 2 reverse	<input checked="" type="radio"/> NO <input type="radio"/> YES
	Result reverse	<input checked="" type="radio"/> NO <input type="radio"/> YES
	Value of input2 after bus recovery	<input checked="" type="radio"/> 0 <input type="radio"/> 1

Name	Description	Range
Enable input 0	<p>Sets whether "Input 0" participate in the logical link. The logical value for "Input 0" is entered via object "Switch".</p> <p>Parameters from "Input 0" different slightly between "Enabled" and "Disabled". All logical parameters are described as follows. There are fewer parameters in a disabled state.</p>	<p>Disabled</p> <p>Selected</p>

Name	Description	Range
Input 0 reverse Input 1 reverse Input 2 reverse	Sets whether the value from input 0/1/2 is inverted. For "Yes", the values are inverted and the logical linked is performed; for "No" there are not inverted.	No Yes
The input 1 of logic The input 2 of logic	Enabled logical inputs 1 or 2; the associated communication object "Logic 1" or "Logic 2".	Disabled Selected
Logic function type *)	Sets the logical relationship of the logical link. Three standard links (AND, OR, XOR) and a "GATE" function is available. The "GATE" function's application function is the condition for the next logic, i.e. the activation flag of the previous logic. An activation flag of "1" for the next logic can use the previous logical condition of the link. A value of Input 1 equals 1 can use the value for input 0 as the result of the link. A value of input 2 equal 1 can use the value for input 1 or input 0/input 1 as the the result of the link.	AND OR XOR GATE
Result reverse	Sets whether to invert the result of the of logical link. For yes, the result of the logical link is inverted; for "No" is it not.	No Yes
Value of input 1 after bus recovery	Determines the default logic value for object "Logic 1" after bus recovery. "1", "0" or "Value before power off".	0 1 Value before power off
Value of input 2 after bus recovery	Determines the default logic value for object "Logic 2" after bus recovery. "1" or "0" is available.	0 1

Note:

*) Following results possible:

Features	Object values					Description
	Input 0 (switch)	Input 1	Result of input 0/1	Input 2	Output	
AND	0 0 1 1	0 1 0 1	0 0 0 1	0 1 0 1	0 0 0 1	The result is only 1 if both input values are 1.
OR	0 0 1 1	0 1 0 1	0 1 1 1	0 1 0 1	0 1 1 1	The result is 1 if both input values are 1.
XOR	0 0 1 1	0 1 0 1	0 1 1 0	0 1 0 1	0 0 1 1	The result is 1 if both input values differ.
GATE	0 0 1 1	Closed Opened Closed Opened	0 1	Closed Opened Closed Opened	0 1	On an opened GATE (opened "1"), the value of the logical value or logical link is permitted, but otherwise ignored and not saved.

Note:

1. The value of object "Input 1" calculates the logical method with the value of object "Switch". The result is then calculated to the logical method with the value of object "Input 2". The calculated result is used as the end output.
2. A disabled input is ignored.
3. A inverted, logical result must be first inverted and then the next link is performed.
4. With the GATE function, the signal can be forwarded when the GATE is opened, it is otherwise ignored. For example, when the GATE to input 1 is closed, the logical value for input 0 is ignored and input 2 directly determines the output of input 2.

3.3.4 Parameter "Ox: Function scene"

The parameter "Ox: Function scene" displays if the option "Enable" is selected for parameter "Function scene". A total of 8 scenes can be set.

General	Overwrite scene stored values during download	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
Channel function	1> channel is assigned to (1...64,0=no assignment)	0
Output 1	Standard output value is	<input checked="" type="radio"/> Open <input type="radio"/> Close
O1: Function	2> channel is assigned to (1...64,0=no assignment)	0
O1: Time	Standard output value is	<input checked="" type="radio"/> Open <input type="radio"/> Close
O1: Logic	3> channel is assigned to (1...64,0=no assignment)	0
O1: Scene	Standard output value is	<input checked="" type="radio"/> Open <input type="radio"/> Close
	4> channel is assigned to (1...64,0=no assignment)	0
	Standard output value is	<input checked="" type="radio"/> Open <input type="radio"/> Close
	5> channel is assigned to (1...64,0=no assignment)	0
	Standard output value is	<input checked="" type="radio"/> Open <input type="radio"/> Close
	6> channel is assigned to (1...64,0=no assignment)	0
	Standard output value is	<input checked="" type="radio"/> Open <input type="radio"/> Close
	7> channel is assigned to (1...64,0=no assignment)	0
	Standard output value is	<input checked="" type="radio"/> Open <input type="radio"/> Close
	8> channel is assigned to (1...64,0=no assignment)	0
	Standard output value is	<input checked="" type="radio"/> Open <input type="radio"/> Close

Name	Description	Range
Overwrite scene stored values during download	<p>Determines whether the saved scene value is overwritten when downloading applications.</p> <ul style="list-style-type: none"> Disabled: During application download, the configured scene does not overwrite the scene values. The previously saved scene is enabled when the scene is triggered until replaced by a new saved scene. Enabled: During application download, the configured scene overwrites the saved scene values. The configured scene continues to apply when the scene is triggered until replaced by a new saved scene. 	<p>Disabled</p> <p>Selected</p>
Channel is assigned to (1...64, 0= no assignment)	<p>64 different scene numbers can be assigned to each output. Up to 8 scenes can b simultaneously set for each output.</p> <p>Note: Scene No. 1...64 corresponds to telegram values 0...63. The saved, new scene values are not reset upon bus recovery.</p>	<p>Scene 1... scene 64</p> <p>0 = No assignment</p>
Standard output value is	Sets the channel's output state if the scene is triggered.	<p>Open</p> <p>Closed</p>

3.3.5 Parameter “Ox: Forced operation”

Parameter "Ox: Forced operation" displays if the option "Enabled" is selected for parameter "Function from 'Forced operation'" in "Ox: Function".

Object "Forced output" enables "Function from 'Forced operation'". Forced operation is used in special exceptions. For example, forced operation has the highest priority during an emergency, i.e. other actions are ignored during a forced operation.

General	Function of "Time"	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
Channel function	Function of "Logic"	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
Output 1	Function of "Scene"	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
O1: Function		
O1: Time	Function of "Forced"	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
O1: Logic	Force operation type	<input type="radio"/> 1Bit <input checked="" type="radio"/> 2Bit
	Function of "Operation hours counter"	<input checked="" type="radio"/> Disable <input type="radio"/> Enable

Name	Description	Range
Force operation type	Sets the object data type to enable forced operation. <ul style="list-style-type: none"> For "1 bit", object "Forced output" receives telegram "1" to enable and telegram "0" to cancel forced operation. For "2 bit", object "Forced output" receives telegrams to performed the operations listed in the following table: 	1 bit 2 bit
	Value from object "Forced output, X" 00b (0), 01b (1) 10b (2) 11b (3)	Performed operations Cancel forced function; other operations available. OFF ON
The position of the relay contact does not change if forced operation is canceled. However, if the time function (delay/flashing/staircase) is run prior to the start of forced operation, the scheduler is continued during the period in forced operation. The time function is continued to the end if not completed at the time forced operation is was canceled.		
Contact position if forced operation	The parameter displays if the object data type is "1 bit". Moreover, it sets the contact position of the channel output for enabled forced operation. <ul style="list-style-type: none"> No change: The position of the delay contact does not change. Open: The relay contact position is open. Closed: The relay contact position is closed. Forced operations have the highest priority and all other actions are ignored during forced operations. Telegrams received during forced operation are also ignored.	No change Open Closed

3.3.6 Parameter "Ox: Operation hours counter"

Parameter "Ox: Operation hours counter" displays if the option "Enable" is selected in the "Ox: Function" for parameter "Function for 'Operation hours counter'". Logs the duration a relay is switched on.

General	Function of "Time"	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
Channel function	Function of "Logic"	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
Output 1	Function of "Scene"	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
O1: Function		
O1: Time	Function of "Forced"	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
O1: Logic	Function of "Operation hours counter"	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
O1: Scene	Object datatype of "Operation hours counter"	<input type="radio"/> 2 byte Value in h(DPT7.007) <input checked="" type="radio"/> 4 byte Value in s(DPT13.100)
	Cyclically send counter value in h[0...100] (0 = not send, only for reading)	0

Name	Description	Range
Object datatype of "Operation hours counter"	Sets the data type for time used to log the operation hours. <ul style="list-style-type: none"> "2-byte value in h (DPT 7.007)" indicates that the counter value is 2 bytes. "4-byte value in h (DPT 13.100)" indicates that the counter value is 4 bytes. 	2-byte value in h (DPT 7.007) 4-byte value in s (DPT 13.100)
Cyclically send counter value in h [0...100] (0 = not send, only for reading)	Sets the interval at which the switch-on time is periodically sent. "0" means that the switch-on time is not sent periodically, and "...100" indicates that the switch-on time is sent once between 1 and 100 hours. The operating time is measured in hours when parameter "Object data type from operating hours counter" is set to 2 bytes. It is measured in seconds if the parameter is set to 4 bytes.	0...100

3.3.7 Switch output – Communication objects for switch actuator

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
1	General	Central control for all switch			1 bit	C	-	W	-	-	switch	Low
2	Output 1	Switch			1 bit	C	-	W	-	-	switch	Low
3	Output 1	Switch status			1 bit	C	R	-	T	-	switch	Low
4	Output 1	Enable time function			1 bit	C	-	W	-	-	enable	Low
5	Output 1	Delay function			1 bit	C	-	W	-	-	switch	Low
6	Output 1	Operation hours counter			4 bytes	C	R	W	T	U	time lag (s)	Low
7	Output 1	Scene			1 byte	C	-	W	-	-	scene control	Low
8	Output 1	Forced output			1 bit	C	-	W	-	-	enable	Low
9	Output 1	Logic 1			1 bit	C	-	W	-	-	boolean	Low
10	Output 1	Logic 2			1 bit	C	-	W	-	-	boolean	Low
218	General	In operation			1 bit	C	-	-	T	-	switch	Low
5	Output 1	Flashing function	1 bit	C	-	W	-	-	-	-	switch	Low
5	Output 1	Staircase function	1 bit	C	-	W	-	-	-	-	switch	Low
8	Output 1	Forced output	2 bit	C	-	W	-	-	-	-	switch control	Low

Number	Name	Object function	Length	Flag	Data type
218	General	In operation	1 bit	KÜ	1.001 DPT_Switch
Periodically sends telegram "1" to the bus to show that the device is properly operating and this object is always enabled.					
1	General	Central control for all switch	1 bit	KS	1.001 DPT_Switch
Central control of switch outputs The switch output channel for central control must be enabled to centrally control the output. 0 – Off 1 – On					
2	Output X	Switch	1 bit	KS	1.001 DPT_Switch

Num ber	Name	Object function	Length	Flag	Data type
<p>Triggers switch operation.</p> <p>Object "Switch X" cannot directly trigger a switch operation if "Input 0" is enabled in the logic function. The logic function influences switch operation. Details are available in the following flow diagram:</p> <pre> graph TD SwitchX[Object "Switch, X"] --> LF1[Logic function] LF1 --> D1{Logic function "Input 0" enabled} D1 -- No --> SV[Object "switch" value] D1 -- Yes --> LF2 subgraph LF2 [Logic function] direction LR C1[AND, OR, XOR, GATE Logical connection] C2[AND, OR, XOR, GATE Logical connection] C1 --> LR[Logical results] C2 --> LR end I1[Object "Input 1 of logic, X"] --> C1 I2[Object "Input 2 of logic, X"] --> C2 LR --> OA[Output (Relay action)] SV --> OA </pre>					
3	Output X	Switch status	1 bit	KLÜ	1.001 DPT_Switch
<p>The state of the relay contact can be displayed directly, based on the object value (as defined by parameter "Object value of switch status").</p> <ul style="list-style-type: none"> For "Respond after read only", the object only sends the present switch state to the bus if the device receives a request from the bus to read the switch state for the channel. For "Respond after change", the object immediately sends the present switch state to the bus if the channel switch state changes. 					
4	Output X	Enable time function	1 bit	KS	1.003 DPT_Enable
<p>The object enables if the time function is enabled. The time function can also be disabled by this object. The time function is enabled upon receipt of telegram value "1". It is disabled upon receipt of telegram value "0". The operation prior to disable is nevertheless performed in sequence time control commands received during disable are ignored.</p> <p>The time function is switched on by default upon bus recover if enabled.</p>					
5	Output X	Delay function	1 bit	KS	1.001 DPT_Switch
Switches on the time delay switch. Displays if option "delay" is selected for parameter "Type of time function".					
5	Output X	Flashing function	1 bit	KS	1.001 DPT_Switch
Switches on flashing switch. Displays if option "Flashing" is select for parameter "Type of time function".					
5	Output X	Staircase function	1 bit	KS	1.001 DPT_Switch
Switches on the staircase light function. Displays if option "Staircase" is selected for parameter "Type of time function".					
6	Output X	Operation hours counter	2 byte 4 byte	KLSÜA	7.007 DPT_TimePeriodHrs 13,100 DPT_LongDeltaTimeSe
Reports the switch-on time of the load on this electrical circuit. Displays if option "Enable" is selected for parameter "Operation hours function". "Object data type for operation hours" can select the data type. The 2-byte unit is measured in hours; the 4-byte in seconds.					
7	Output X	Scene	1 byte	KS	18.001 DPT_SceneControl

Num ber	Name	Object function	Length	Flag	Data type
<p>Sends an 8-bit command to open or save the scene. It only displays if the scene function is enabled.. The meaning of the 8-bit command is described in detail below.</p> <p>8-Bit command (binary coded) set: FXNNNNNN</p> <ul style="list-style-type: none"> F: “0” triggers the scene; “1” saves the scene. X: Reserved (0); NNNNNN: Scene number (0... 63). <p>The parameter setting 1...64; the object “Scene” as received in the scene telegram corresponds to 0...63. The object “scene” receives scene telegram 0 for scene 1 in the parameter. As follows:</p>					
	Object telegram value	Description			
	0	Open scene 1			
	1	Open scene 2			
	2	Open scene 3			
			
	63	Open scene 64			
	128	Save scene 1			
	129	: Save scene 2			
	130	: Save scene 3			
			
	191	Save scene 64			
8	Output X	Forced output	1 bit 2 bit	KS	1.003 DPT_Enable 2.001 DPT_Switch control
<p>Enabled if forced control is enabled.</p> <ul style="list-style-type: none"> For 1 bit, telegram value “1” is used to enable the forced operation and actions, other than forced operation are ignored; telegram value “0” ends forced operation. The parameter determines the contact position in forced operation. For 2 bit, telegram value “3” is used to forcibly close the contact and telegram value “2” is used to forcibly open the contact. Telegram “1” or “0” cancels forced operation. 					
9	Output X	Logic 1	1 bit	KS	1.002 DPT_Bool
Is used for the logical input of input 1. Is displayed if option “Enable” is selected for parameter “The input of logic 1”.					
10	Output X	Logic 2	1 bit	KS	1.002 DPT_Bool
Is used for the logical input of input 2. Is displayed if option “Enable” is selected for parameter “The input of logic 2”.					

3.4 Switch output – Parameter “Heating actuator (without controller)”

The following parameters display if option “Heating actuator (without controller)” is selected for parameter “Work mode of the channel is”. The operating mode controls the device, typically the electric heating valve. A thermostat or temperature sensor assumes control to ensure a constant room temperature.

Each output has 2 types of control commands – 1 bit and 1 byte. For 1 bit, the control telegram is received via the object “Setpoint On/Off” and for 1 byte via object “Setpoint (modulating control)”.

Control command “0 %/OFF” means that the value is closed; “100 %/ON”, the valve is open. The average value of 0...100 % indicates that the valve is open for % of time during a cycle and closed for the remainder.

Operating priority by heating actuator control:

Initialization (after downloading the parameter) → direct to operation (long press of the direct to operation button to switch to direct to operation and the direct to operation button is operational and effective) → manual bus operation or error mode

The following is available:

1. The setpoint received in direct to operation and the command for forced operation are invalid, error monitoring is continued, and the setpoint can also reset the error monitoring cycle. The device behaves as per the present error state after direct to operation ends. The present state is maintained if there is no error until a new control command arrives. The device resets to forced operation state if forced operation was previously performed. It proceeds at the end of forced operation as per the present setpoint or error state.
2. Once forced operation ends, the state of the valve output returns to the present setpoint or error state. Telegrams received during forced operation are logged as manual bus operation.

1 bit (on/off control) or PWM)

General	Work mode of the channel is	<input type="radio"/> Switch actuator <input checked="" type="radio"/> Heating actuator(without controller)
Channel function	Valve type	<input type="radio"/> Normal (de-energised closed) <input checked="" type="radio"/> Inverted (de-energised open)
Output 1	If bus failure, contact is	Unchange
Output 2	If bus recovery, valve position	0%[Closed]
Output 3	PWM cycle time for continuous [60..65535]s	120
Output 4	Control telegram is received as	<input checked="" type="radio"/> 1bit (on-off control or PWM) <input type="radio"/> 1byte (Continuous)
	Reply the status for contact	Yes, 0=contact close; 1=contact open
	Function for monitoring is	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
	Cyclic monitoring of thermostat [0..65535]s	120
	Valve position during fault	0%[Closed]
	Send object "Report fault" is	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
	Function of forced operation is	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
	Valve position during forced operation	20%[51]

1 byte (modulating control)

General	Work mode of the channel is	<input type="radio"/> Switch actuator <input checked="" type="radio"/> Heating actuator(without controller)
Channel function	Valve type	<input type="radio"/> Normal (de-energised closed) <input checked="" type="radio"/> Inverted (de-energised open)
Output 1	If bus failure, contact is	Unchange
	If bus recovery, valve position	0%[Closed]
	PWM cycle time for continuous [60..65535]s	120
	Control telegram is received as	<input type="radio"/> 1bit (on-off control or PWM) <input checked="" type="radio"/> 1byte (Continuous)
	Reply the status for continuous control	Yes, continuous control value (1byte)
	Reply the status for contact	Yes, 1=contact close; 0=contact open
	Function for monitoring is	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
	Cyclic monitoring of thermostat [0..65535]s	120
	Valve position during fault	0%[Closed]
	Send object "Report fault" is	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
	Function of forced operation is	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
	Valve position during forced operation	20%[51]

Name	Description	Range
Valve type	Sets the valve switch type. For 2-position valves: Normal (NC) for deenergized Open/close valves and inverted (NO) for deenergized Open/close valves.	Normal (normally closed NC) Inverted (normally open NO)

Name	Description	Range
If bus failure, contact is	<p>Sets the position of the relay contacts in the event of bus fail.</p> <ul style="list-style-type: none"> The relays do not change if “No change” is selected. If “Open” is selected, the relay contacts are opened. If “Closed” is selected, the relay contacts are closed. <p>In the event of a bus failure, the aforementioned settings are only possible when the relays have sufficient energy.</p>	<p>No change</p> <p>Open</p> <p>Closed</p>
If bus recovery, valve position	<p>Sets the on/off valve state upon bus recovery. This state is retained until a control command arrives or error mode is enabled.</p> <p>For example, 20 % is set and the PWM cycle 100 s (1 Minute 40 s), the on/off cycle for the valve is 20 s on and 80 s off.</p>	<p>0 % [Closed]</p> <p>10 % [26]</p> <p>20 % [51]</p> <p>...</p> <p>90 % [203]</p> <p>100 % [Opened]</p>
PWM cycle time for continuous [60...65535]s	<p>Sets the period for pulse width modulation (PWM).</p> <p>Note: Sets the pulse cycle to the longest reasonable time to extend the life of the relay and controlled devices.</p> <p>For 1-bit control, PWM only controls actuator operation in the event of a fault, forced operation, and bus recovery.</p>	60...65535
Control telegram is received as	<p>Sets the telegram type for valve control.</p> <ul style="list-style-type: none"> For “1-bit” control, valve control corresponds to normal on/off control: The room thermostat controls the valve output with a switch command. If a thermostat fails, the output does not receive a control signal, the valve automatically performs a PWM operation as per the valve setting for a fault. The PWM cycle time is used from the channel. For control “1 Byte”, the room thermostat sends a setpoint in the range of 0...255 (corresponding to 0...100 %). The process is referred to as “modulating control”. The valve is closed at 0 % and fully opened at 100 %. The change adapts the output via a duty cycle for a value in a range of 0...100 %. <p>Note: In modulating control the channel calculates, every time a continuous adapted telegram is received, the duty cycle as per the new setpoint. Once the time expires, it is performed as per the new setpoint.</p>	<p>1 bit (on/off control or PWM)</p> <p>1 byte (modulating control)</p>
The following parameters display only if “1 byte (modulating control)” is selected.		
Reply the status for continuous control	<p>Sets whether the controlled valve reports the state. Two types are available (depending on the type of controlled device): 1 bit and 1 byte.</p>	<p>No reply</p> <p>Yes, 0 % = 0, otherwise “1” (1 bit)</p> <p>Yes, 0 % = 1, otherwise “0” (1 bit)</p> <p>Yes, manipulated variable modulating control (1 byte)</p>
Reply the status for contact	<p>Sets whether the device returns to the on/off state of the contacts.</p> <ul style="list-style-type: none"> The setting “No reply” does not return the object to the contact state. The setting “0 = Contact closed; 1 = Contact open”: Value “0” for object “Status of contact” indicates that the relay contact is closed and, value “1” that it is open. The reverse is true for setting “1 = Contact closed; 0 = Contact open”. <p>Note: The object “Status of contact” sends the state telegram to the bus, otherwise no telegram is sent if the switch state is determined following programming or system reset.</p>	<p>No reply</p> <p>Yes, 0 = Contact closed; 1 = Contact open</p> <p>Yes, 1 = Contact closed; 0 = Contact open</p>

Name	Description	Range
Function for monitoring is	Sets whether to enable the setpoint monitoring function.	Disabled Selected
The following parameters only display if option “Enabled” is selected.		
Cyclic monitoring of thermostat [0...65535]s	Sets the period that the device monitors control telegrams from the thermostat. As a rule, the device receives the thermostat's control telegram at specific intervals. The function can display a communications error or thermostat fault if one or more control telegrams (in sequence) are not received. The device automatically starts the error mode if no control telegrams are received from the device within the set period (by the parameter). The error mode ends once the device receives a new control telegram. The calculation of the monitoring period restarts each time if a control telegram is received. Note: If enabled, the room thermostat must send control telegrams at regular intervals. The value for the monitoring period must be greater than the interval that the controller sends the control telegrams.	0...65535
Valve position during fault	Sets the valve position in fault and open/close valve as per the PWM cycle. A PWM cycle, for example, of 100 s (1 min. 40 s) has an on/off cycles for the valve of 20 s “On” and 80 s “Off”. The valve position does not change if “Unchanged” is selected.	0 % [Closed] 10 % [26] ... 100 % [Opened] No change
Send object "Report fault" is	Sets whether a telegram is sent to report a fault. If enabled, a fault message is sent if the device does not receive a setpoint within the monitoring period. The channel performs dynamic actions in fault mode until it is canceled by other operations. The monitoring restarts the calculation if a setpoint is received. Object “Report fault” is enabled when “Enabled” is selected. Object value “1” notes that the channel is in fault and “0” indicates that the channel is not in fault.	Disabled Enable
Function of forced operation is	Sets whether to enable forced operation.	Disable Selected
The following parameters only displays if “Enabled” is selected.		
Valve position during forced operation	Sets the valve position during forced operation. The valve opens/closed per the PWM cycle. The valve position does not change if “Unchanged” is selected. The valve output returns to the previous operating mode once forced operation ends. A valve position, for example, in forced operation of 40% and that was 60% in the previous operating mode returns to a state of the valve output 60% at the end of forced operation. The monitoring time continues during forced operation and a error message is sent once the monitoring period expires. The action cannot be performed, however, as part of the fault and can only be performed at the end of forced operation. The control telegram for manual operation and received during forced operation is logged.	0 % [Closed] 10 % [26] ... 100 % [Opened] No change

3.4.1 Switch output – Communication objects for heating actuator (without controller)

1 bit (on/off control)
or PWM)

	Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
■	2	Output 1	On-off control value			1 bit	C	-	W	-	-	switch	Low
■	3	Output 1	Status of contact			1 bit	C	R	-	T	-	switch	Low
■	7	Output 1	Report fault			1 bit	C	R	-	T	-	alarm	Low
■	8	Output 1	Forced output			1 bit	C	-	W	-	-	enable	Low

1 byte (modulating control)

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
3	Output 1	Status of contact			1 bit	C	R	-	T	-	switch	Low
5	Output 1	Control value(Continuous)			1 byte	C	-	W	-	-	percentage (0..100%)	Low
6	Output 1	Status of continuous, 1byte			1 byte	C	R	-	T	-	percentage (0..100%)	Low
7	Output 1	Report fault			1 bit	C	R	-	T	-	alarm	Low
8	Output 1	Forced output			1 bit	C	-	W	-	-	enable	Low
4	Output 1	Status of continuous, 1bit			1 bit	C	R	-	T	-	switch	Low

Num ber	Name	Object function	Length	Flag	Data type
2	Output X	On-off control value	1 bit	KS	1.001 DPT_Switch
<p>Receives a 1-bit control command.</p> <p>If parameter "Valve type" is set to:</p> <ul style="list-style-type: none"> "Normal (normally closed NC)", object value "0" to close and "1" to open "Inverted (normally open NO)", object value "1" to close and "0" to open <p>The communication object displays if parameter "Control value is received as" is set to "1 bit (on/off control or PWM).</p>					
3	Output X	Status of contact	1 bit	KLÜ	1.001 DPT_Switch
<p>The communication object is enabled if parameter "Reply the status for contact" is set to "Yes, 1 = Close contact; 0 = Open contact" or "Yes, 0 = Close contact; 1 = Contact open". Displays the present room temperature.</p>					
5	Output X	Control value (Continuous)	1 byte	KS	5.001 DPT_Scaling
<p>Receive 1-byte control command. The communication object displays if parameter "Control value is received as" is set to "1 byte (modulating control). The object value range is 0... 100 %. The value is closed if value "0 %" is received; and fully open if value "100 %" is received.</p>					
4	Output X	Status of continuous, 1bit	1 bit	KLÜ	1.001 DPT_Switch
<p>The communication object is enabled, if parameter "Reply the status for continuous control" is set to "Yes, 0% = 0, otherwise "1" (1 bit)" or "Yes, 0 % = 1, otherwise "0" (1 Bit)". The object displays the present value for the operating state.</p> <ul style="list-style-type: none"> If "Yes, 0 % = 0, otherwise "1" (1 bit)" is selected, the telegram value "0" indicates that the valve is closed; otherwise the value is "1". If "Yes, 0 % = 1, otherwise "0" (1 bit)" is selected, telegram value "1" indicates that the valve is closed, otherwise the value is "0". 					
6	Output X	Status of continuous, 1byte	1 byte	KLÜ	5.001 DPT_Scaling
<p>The communication object is enabled if parameter "Reply the status for continuous control" is set to "Yes, continuous control value (1byte)". The object displays the operating state of the present valve to determine the PWM control setpoint.</p>					
7	Output X	Report fault	1 bit	KLÜ	1.005 DPT_Alarm
<p>The communication object is enabled if the monitoring function is enabled and parameter "Send object 'Report fault' is" is selected. Indicates whether a fault on the room thermostat is pending; value "1" displays a fault, and "0" means that the fault is ended.</p>					
8	Output X	Forced output	1 bit	KS	1.003 DPT_Enable
<p>Enable if forced operation is enabled. The device ignores other actions with the exception and forced operation if logical value 1 is received, after a logical value of 0 is received. The parameter defines the valve position in forced operation. The valve returns to the previous control state at the end of forced operation.</p>					

3.5 Solar protection AC

Operating priority for solar protection control:

Initialization (after downloading the parameter) → direct to operation (long press of the direct to operation button to switch to direct to operation and the direct to operation button is operational and effective) → Safety 2 → Safety 1 → direct to operation → manual bus operation or auto mode

The following is available:

- Any common operating commands, including curtain movements, can exit automatic bus operation.
- The received trigger or reset value is logged during direct to operation by the automatic bus operation or safety operation. The action is performed at exit from direct to operation as per the priority. It returns to manual bus or automatic bus operations once all the actions are completed.

3. The output state remains unchanged until a new control command is received if there is no priority operation pending when existing direct to operation.
4. Automatic bus operation cannot be automatically enabled when enabling direct or safety operation and the duration of automatic bus operation is only set after direct and safety operation end. (Time control is interrupted during direct or safety operation and only continued once they are ended.)

Output solar protection AC has up to 12 output channels. One channel is used as a reference since each output is assigned the same parameters and same communication objects.

3.5.1 Parameter “Curtain X: Blinds”

“Curtain X: Blinds” sets the general parameter for the curtain output.

General	Config channel function as	<input checked="" type="radio"/> Venetian Blind <input type="radio"/> Shutter
Channel function	Motor type	AC-motor
Curtain 1	If bus recovery, position is	Unchange
C1: Drive	If bus failure, position is	Unchange
C1: Automatic	After reference movement, position is	Disable
C1: Scene	Position of slat after arriving on lower end position	1
C1: Safety	When blind is under end position, up/down object function is	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
Curtain 2	Set response mode for position	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
	Central function of channel	<input checked="" type="radio"/> Disable <input type="radio"/> Enable

Name	Description	Range
Config channel function as	<p>Sets the channel operating mode; two modes are available. The different operating modes correspond to the different parameters and communication objects.</p> <ul style="list-style-type: none"> Option “Blinds” operates the function mode for blinds, i.e. blinds with slats. Option “Shutters” operates similar to operating mode “Blinds” but cannot adjust the slats. 	Blinds Shutters
Motor type	<p>Represents the type of motor for the blinds actuators.</p> <ul style="list-style-type: none"> “AC motor” is suitable for V230 AC actuators. 	AC motor
If bus recovery, position is	<p>Sets the action for the channel curtains after the device is reset over the bus.</p> <ul style="list-style-type: none"> “No change” keeps the blinds on the channel in the present state if the bus is switched on. “Up” drives the channel curtains to the highest position if the bus is switched on. “Down” drives the channel curtains to the lowest position if the bus is switched on. “Stop” stops the channel blinds if the blinds move when the bus is switched on. <p>All output contacts are separated after programming.</p> <p>Note: The value of objects “Status Position” and “Slat position” are 50% and not sent to the bus if the blinds actuator is unable to determine the position state of the present output after programming or a reset. Moreover, the status telegram is sent to the bus only after the position is determined.</p> <p>In the event the blinds drive to a clear position after programming, they initially go up or down (to the farthest position in the direction of the target position) to determine the present position and then complete one cycle before moving to the target position. In other words, the curtain must complete a full cycle before it can clearly position itself.</p>	No change Up Down Stop

Name	Description	Range
If bus failure, position is	<p>Sets the action for the curtain channel in the event of a power outage on the bus.</p> <ul style="list-style-type: none"> • “No change” keeps the blinds on the channel in the present state in the event of a power outage on the bus. • “Up” drives the channel curtains to the highest position in the event of a power outage on the bus. • “Down” drives the channel curtains to the lowest position in the event of a power outage on the bus. • “Stop” stops the blinds on the channel if they operate (i.e. Move) in the event of a bus power failure. <p>Note: A change in direction is not performed when the curtain is operating during a power outage and the user wants to change the direction after the outage; the curtain remains in an operational state. The blinds must first stop to change direction, but there is no time to perform all the operations after the outage. An action is performed if it is stopped after a power outage.</p>	<p>No change</p> <p>Up</p> <p>Down</p> <p>Stop</p>
After reference movement, position is	<p>Indicates how the blinds actuator acts when performing a reference movement.</p> <ul style="list-style-type: none"> • “Disable” means the reference movement is not enabled. • “No reaction” means the curtain goes up when the object “Reference movement” receives telegram “0” and goes down for telegram “1”. • “Moved to saved position” means when the object receives telegram “1”, the curtain goes down and returns to the original position and, for telegram “0”, goes up before returning to the original position. <p>The actuator continuously monitors the blinds position and slat angles while moving. When in use for longer periods, the scanned position may become imprecise due to changes in temperature or aging. As a result it is important to clearly define the top and low end positions of the blinds actuator. The top and low end blinds position is updated each time within the blinds actuator.</p> <p>A reference movement can be triggered via a bus telegram if the end position is not reached in manual operation to move the curtain up or down. The curtain can remain in the reference position or moved to the output position depending on the parameter settings.</p>	<p>Disabled</p> <p>No reaction</p> <p>Move to saved position</p>
Position of slat after arriving on lower end position	<p>The slat position can be set using the parameter after moving the curtain to the lower end position.</p> <p>For example, if “40 %” is selected, the slat angle is set to 40 % if object “Move UP/DOWN” receives telegram “1”.</p> <p>Note: This parameter currently acts on the down action only (for function parameters set to “DOWN”). This parameter does not affect safety commands and percentage move commands.</p>	<p>0 %/10 %/.../90 %/1</p>
When blind is under end position, up/down object function is	<p>Sets whether the curtain can also be moved by object “Move UP/DOWN” if the curtain reaches the top/low end.</p> <ul style="list-style-type: none"> • The curtain cannot be moved if “Disable” is selected. • The curtain can be moved over the entire moving time if “Enabled”. 	<p>Disabled</p> <p>Selected</p>

Name	Description	Range
Set response mode for position	<p>Defines the feedback method for the positioning state.</p> <ul style="list-style-type: none"> “Respond after read only” object “Status Position 0...100%/Slat adj. 0...100 %” sends the present curtain position to the bus only if the device can receive read requests from other devices or from the bus. “Respond after change” immediately sends object “Status Position 0...100%/Slat adj. 0...100 %” a telegram to the bus to report the present state of the curtain position if changed. 	<p>Respond after read only</p> <p>Respond after change</p>
Central function of channel	<p>Sets whether to enable or disable the central control for the channel.</p> <p>If enabled, the channel is controlled by the central control objects “Central control for Up/Down” and “Central control for Slat/Stop”.</p>	<p>Disabled</p> <p>Selected</p>

3.5.1.1 Parameter "Cx: Drive"

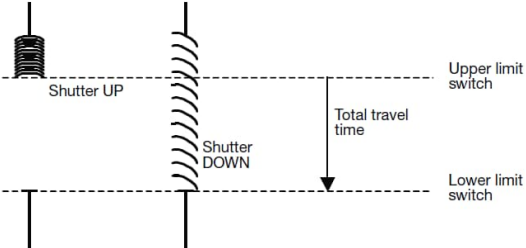
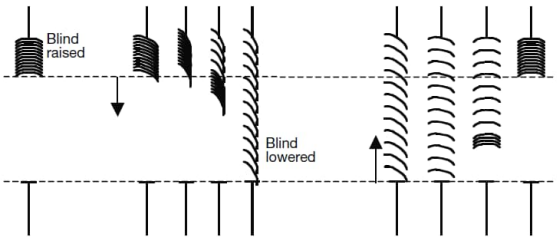
"Cx: Drive" sets the parameters linked to the actuator for blinds and shutters. The present shutter position can be estimated based on runtime and total moving time. The present slat angle can be estimated based on the angle position and total moving time of the slats. In addition, the start delays and pauses are required to set a change in direction. The technical parameters and the runtimes differ for the various blinds actuators. As a consequence, it is import to carefully read and correctly set the technical parameters prior to using the curtain.

Blinds (with slats)

General	Total moving time [20...50000]* 0.1s	600
Channel function	Delay time from switch-on to moving [0..200] *10ms	0
Curtain 1	Duration of Slat adjustment [10...250]*10ms	20
C1: Drive	Total moving time of Slat 0-100 % in [10...250]*10ms	100
C1: Automatic	Pause on change in direction [5...255]*20ms	50
C1: Scene	Additional moving time in upward direction [0...255]*0.1s	0
C1: Safety		

Shutters (without slats)

General	Total moving time [20...50000]* 0.1s	600
Channel function	Delay time from switch-on to moving [0..200] *10ms	0
Curtain 1	Pause on change in direction [5...255]*20ms	50
C1: Drive	Additional moving time in upward direction [0...255]*0.1s	0
C1: Automatic		
C1: Scene		
C1: Safety		

Name	Description	Range
Total moving time [20...50000]* 0.1s	<p>Sets the total moving time for moving blinds.</p> <p>The total moving time is the period required by the curtain to move from the highest to the lowest position (is indicated in the figure below). The curtain moves according to the command as received by the blinds actuator, up or down, until receiving a stop command or the end switch switches off the motor, or until it reaches the highest or lowest position. The output of the connected actuator remains closed if the motor stops the curtain and the output connection is disconnected only after the set moving time expires.</p>  <p>Note: The total moving time is used to determine the present curtain position. It is particularly important to log and sets the total moving time as accurately as possible when using "Move to position 0...100%" and "Status Position 0...100%". This permits highly accurate calculation of the present curtain position.</p>	20...50000
Delay time from switch-on to moving [0...200]*10ms	<p>Sets the delay for curtain/blinds start, i.e. the buffer time for motor start.</p> <p>The parameter setting is generally used together with the technical characteristics of the curtain.</p>	0...200
Duration of Slat adjustment [10...250]*10ms	<p>Sets the time to setting the slat angle, i.e. the time required to set the slat angle after a command is received to set the angle up or down. The shorter the time, the more accurate the angle setting.</p> <p>The slat angle is general open when the curtain goes up. When it goes down, the slat angle first closes. Then moves down. When the curtain goes up again, the slat angle opens first, before the curtain goes up (see below).</p> 	10...250
Total moving time of Slat 0-100 % in [10...250]*10ms	<p>Sets the time required to set the slat angle from fully closed to fully open. The parameter determines the present slat angle during slat angle setting. It is particularly important to log and set the total moving time for the slat setting as accurately as possible when using "Slat adjustment" and "Status feedback".</p> <p>The maximum number of adjusts to the slat angle from fully closed to fully open = Total moving time/setting time if object "Slat adjustment/stop" sets the slat angle. The parameter "Duration of Slat adjustment [10...250] × 10 ms" sets the setting time. The smaller the value, the larger the number of adjustments and, therefore, the more precise the angle.</p>	10...250

Name	Description	Range
Pause on change in direction [5...255]*20ms	Sets the pause time when the direction of movement or angle setting changes. The pause due to a change in direction must match the technical information from the actuator manufacturer to receive suitable values. The pause can prevent damage to the blinds actuator due to unplanned changes in direction and extends the life of the actuator.	5...255
Additional moving time in upward direction [0...255]*0.1s	Sets the additional moving time if the curtain moves to the end position. The moving time need not be extended if the target position is not the highest point. Additional moving time is required if the blinds do not reach the end switch after reason the top position 0 %, for example, during a reference drive.	0...255

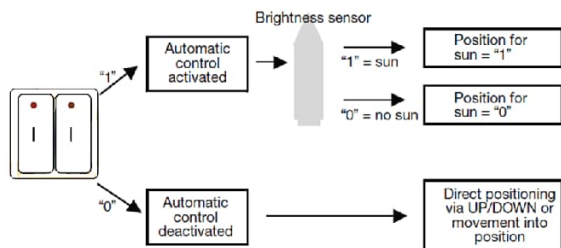
3.5.1.2 Parameter "Cx: Automatic function"

"Cx: Automatic function" sets the automatic functions and operations relating to solar protection. The blinds actuator determines the blinds position as per the luminance recorded by the the luminance sensor. For example, blinds/curtains can be raised, when solar radiation is very weak or light does not penetrate the windows to let in as much light as possible. Blinds/curtains can be lowered and the slat angle set to prevent direct light into the room when solar radiation is strong on the outside of the window. Partially opened blinds permit diffused light into the room.

General	Function automatic	<input type="radio"/> Inactive <input checked="" type="radio"/> Active
Channel function	Object value of 'Enable auto. control' after bus voltage recovery	<input checked="" type="radio"/> 0'(Disable auto. control) <input type="radio"/> 1'(Enable auto.control)
Curtain 1	Automatically enable for auto.control	<input type="radio"/> NO <input checked="" type="radio"/> Yes
C1: Drive	Enable auto. control after [10...6000min]	10
C1: Automatic	Sun protection	
C1: Scene	Position if sun = 1 (sun is shining)	Down
C1: Safety	Delay time on sun = 1 [0...65,535s]	10
	Position if sun = 0 (sun not shining)	Down
	Delay time on sun = 0 [0...65,535s]	10

Name	Description	Range
Function automatic	<p>Sets whether to enable automatic control mode, i.e. automatic solar protection.</p> <p>The following parameters and objects display if enabled: Enable auto.control, Sun operation, Sun: Blinds/Shutter position 0...100% and Sun: Slat position 0... 100 %.</p> <p>The blinds switch to automatic operation if object "Enable auto.control receives value "1". Automatic operation ends when object "Enable auto.control" receives a value "0" or the user sends a direct move command (e.g. Up/Down to a specific position)>. Saving a scene does not end automation operation.</p> <p>Manual and automatic operations have the same priority but cannot be performed at the same time.</p> <p>Note: Object "Enable auto.control must receive another value "1" to enable automation control once it ends or after the period for automatic enable expires (see parameter "Enable auto.control after [10... 6000 min]").</p>	Inactive Active
The following parameters only display if enabled.		

Name		Description	Range
	Object value of 'Enable auto. control' after bus voltage recovery	<p>Defines the receive value of objects "Enable auto.control" after a bus reset.</p> <ul style="list-style-type: none"> A start value "0" for object "Enable auto.control" means that automatic control is disabled upon bus recovery. A start value "1" for object "Enable auto.control" Means that automatic control is enabled upon bus recovery. 	<p>"0" (Enable auto.control) "1" (Enable auto.control)</p>
	Automatically enable for auto. control	Determines whether auto.control can be automatically enabled after ending manual control or object "Enable auto.control".	No Yes
		The following parameters only display when "Yes" is selected.	
	Enable auto. control after [10...6000min]	<p>Sets the duration before auto.control can be re-enabled after completion via manual operation or an object.</p> <p>The duration of the automatic enable is restarted if auto.control is interrupted during this period by object "Enable auto.control" or a manual operation.</p> <p>Note: Operations as part of direct to operation have the highest priority and are accompanied with safety measures. Automatic operations can only be enabled when enabling direct and safety operations by canceling operations as part of direct and safety operations. The time clock for the duration of auto enable begins.</p>	10...6000 m
Solar protection			
	Position if sun = 1 (sun is shining)	<p>Sets the curtain position for solar radiation, i.e. the position the curtain goes to if object "Sun operation" receives telegram "1" while solar protection is enabled.</p> <ul style="list-style-type: none"> The present operating state is maintained if "No response" is selected and object "Sun operation" receives telegram "1". "Receive 1byte value" determines upon receipt of telegram "1" via object "Sun operation" the curtain position from the values received from "Sun: Blinds/shutter position 0...100%" and "Sun: Slat position 0...100 %". The default value, when two object values are unclear, is "130" (51%) upon bus recovery. A new value must be received to determine the curtain position. The received value is saved in each operating state, even in a high priority protection state. 	<p>No reaction Up Down Stop Receive 1byte value</p>
	Delay time on sun = 1 [0...65535s]	Sets the delay, i.e. if object "Sun operation" receives telegram "1", the delay on the part of the blinds actuator before performing the movement. This primarily prevents the blinds actuator from moving too often due to changes in light. This could damage the device and impact the life of the shutter motor.	0...65535 s
	Position if sun= 0 (sun not shining)	Defines the curtain position and stops solar protection if object "Sun operation" receives a telegram "0".	<p>No reaction Up Down Stop Receive 1byte value</p>

Name	Description	Range
Delay time on sun= 0 [0...65535s]	<p>Sets the delay, i.e. if object "Sun operation" receives telegram "0", the delay on the part of the blinds actuator before performing the movement. This primarily prevents the blinds actuator from moving too often due to changes in light. This could damage the device and impact the life of the shutter motor.</p> <p>Simple automated solar protection system:</p>  <p>Illuminance sensor records external light intensity and buttons can be connected to a universal interface or other control switch on the bus.</p> <p>The user can set a second switch for the button to enable solar protection or manually control blinds. When enabling by switch auto solar protection, the blinds move automatically until auto solar protection is disabled using the same switch or until the user sends a direct move command (Up/Down or move to a specific position) and the auto function is disabled.</p> <p>The blinds actuator receives a telegram from the illuminance sensor to notify the user when direct light is available outside the window. The actuator moves to the set point after the delay.</p>	0...65535 s

3.5.1.3 Parameter "Cx: Function scene"

"Cx: Function scene" sets the main scene. Max. 8 scenes can be set at the same time for each output and various scenes can receive different curtain positions and slat angles.

General	Function scene	<input type="radio"/> Inactive <input checked="" type="radio"/> Active
Channel function	Overwrite scene stored values during download	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
Curtain 1	1> channel is assigned to (1...64, 0=no assignment)	0
C1: Drive	Shutter position: 0-100% (0%=top,100%=bottom)	0
C1: Automatic	2> channel is assigned to (1...64, 0=no assignment)	0
C1: Scene	Shutter position: 0-100% (0%=top,100%=bottom)	0
C1: Safety	3> channel is assigned to (1...64, 0=no assignment)	0
	Shutter position: 0-100% (0%=top,100%=bottom)	0
	4> channel is assigned to (1...64, 0=no assignment)	0

Name	Description	Range
Overwrite scene stored values during download	Determines whether the saved scene value is overwritten when downloading applications. <ul style="list-style-type: none"> Disabled: Configured scenes do not overwrite saved scene values when downloading the application. The previously saved scene is enabled when the scene is triggered until replaced by a new saved scene. Enabled: The configured scene overwrites the saved scene value when downloading the application. The configured scene applies when triggered until it is replaced by a new, saved scene. 	Disabled Selected
Channel is assigned to (1...64, 0= no assignment)	Up to 8 scenes can be simultaneously set for each output, the scene number can be selected in a range of 1...64. Note: The valid scene number in parameter option 1...64, corresponding to telegram 0...63. The new scene is saved in the event of a bus fail. The new scene is opened upon bus recovery.	Scene 1...Scene 64 0 = No assignment
Shutter position: 0...100% (0%=top,100%=bottom) Blind position: 0...100% (0%=top,100%=bottom)	Sets the blinds position for the scene.	0... 100 % 0 % = Top 100 % = Bottom
Slat position: 0...100% (0%=open,100%=close)	Sets the slat angle for the scene.	0... 100 % 0 % = Opened 100 % = Closed

3.5.1.4 Parameter "Cx: Safety"

"Cx: Safety" sets the function for blinds safety operation.

The curtain is set in the interface to perform the action if safety operation is triggered for each output. The settings for the individual channels are independent and do not affect the others.

General	Safety function <input type="radio"/> Inactive <input checked="" type="radio"/> Active
Channel function	Safety operation 1 <input type="radio"/> Inactive <input checked="" type="radio"/> Active
Curtain 1	Safety operation trigger value (Cancel safety is opposite of selection) <input checked="" type="radio"/> 0 <input type="radio"/> 1
C1: Drive	Position on safety operation 1 Down
C1: Automatic	Cyclic monitoring time in s [0...65,535, 0 = no monitoring] 120
C1: Scene	Safety operation 2 <input type="radio"/> Inactive <input checked="" type="radio"/> Active
C1: Safety	Safety operation trigger value (Cancel safety is opposite of selection) <input checked="" type="radio"/> 0 <input type="radio"/> 1
	Position on safety operation 2 Up
	Cyclic monitoring time in s [0...65,535, 0 = no monitoring] 120
	Position with canceling of the safety operation Down
	Note: the priority of safety operation 2 is higher than that of 1

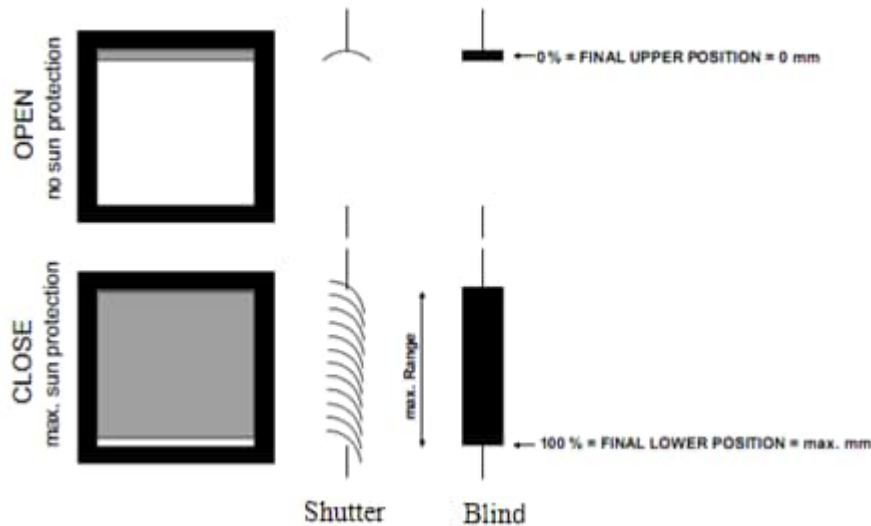
Name	Description	Range
Safety operation 1 Safety operation 2	Sets whether to enable the blinds safety function. <ul style="list-style-type: none"> "Inactive" does not enable the safety operation. "Active" enables the safety operation. 	Inactive Active
The following parameters only display if enabled. The conditions to triggering the safety operation can be set and the corresponding communication object "Safety operation 1/2" is enabled.		

Name		Description	Range
	Safety operation trigger value (Cancel safety is opposite of selection)	<p>Sets the trigger value for blinds safety operation.</p> <ul style="list-style-type: none"> Parameter set to "0": Safety operation is triggered if object "Safety operation 1/2" receives a telegram with the logical value "0". The operation is canceled and the monitoring period for safety operations is reset if telegram "1" is received. Parameter set to "1": Safety operation is triggered if object "Safety operation 1/2" receives a telegram with the logical value "1". The operation is canceled and the monitoring period for safety operations is reset if telegram "0" is received. 	0 1
	Position on safety operation 1 Position on safety operation 2	Sets the action for the curtain after triggering a safety action.	No change Up Down Stop
	Cyclic monitoring time in s [0...65,535, 0 = no monitoring]	<p>Sets the monitoring period for safety operation. At a minimum, select double the cyclical telegram cycle for the sensor to prevent omitting the sensor signal when the bus is full. The blinds/curtains could otherwise unexpectedly move to the safety position. Parameter "0" means monitoring of safety operations is disabled and can be directly controlled with object "Safety operation".</p> <p>Safety operation for blinds/curtains is triggered if object "Safety operation 1/2" does not receive a telegram to rescind safety operation with the monitoring period. In addition, blinds/curtain performs the operation once safety operation is triggered.</p>	0...65535
	Position with canceling of the safety operation	<p>Sets the action performed by the curtain once the safety operation is canceled.</p> <p>The action only performs if safety operation is enabled, the command to cancel is performed and all operations relating to safety are canceled on the channel.</p> <p>The safety operation of blinds/shading has a higher priority than other functions. Other operations are disabled on the output if safety operation is enabled for the output and the priority for Safety 2 is higher than the priority for Safety 1.</p>	No change Up Down Stop

3.5.2 Parameter "Curtain X: Shutters"

Operation mode "Shutters" for the blinds actuator is similar to the parameter and communication objects for operation mode "blinds" and functions are similar. The only difference is that "Shutters" cannot set the slat angle. Operation mode "Shutters" covers only curtain movement without slats.

"Shutters" and "Blinds" differ as follows:



Operation mode "Shutters" is not described here. For functions, see operation mode (with the exception of slat settings), described in Parameter "Curtain X: Blinds" [→ 26].

3.5.3 Communication objects for Solar protection (AC)

The output communication objects for Solar protection AC and Solar protection DC are essentially the same so that only the Solar protection AC is listed as an example here.

Numb	Name	Object Function	Det	Group	Length	C	R	W	T	U	Data Type	Priority
2	Curtain 1	Move UP/DOWN			1 bit	C	-	W	-	-	up/down	Low
3	Curtain 1	Slat adj/stop			1 bit	C	-	W	-	-	step	Low
4	Curtain 1	Reference movement			1 bit	C	-	W	-	-	up/down	Low
5	Curtain 1	Move to position 0..100%			1 byte	C	-	W	-	-	percentage (0..100%)	Low
6	Curtain 1	Slat position 0..100%			1 byte	C	-	W	-	-	percentage (0..100%)	Low
7	Curtain 1	Scene			1 byte	C	-	W	-	-	scene control	Low
8	Curtain 1	Position status 0..100%			1 byte	C	R	-	T	-	percentage (0..100%)	Low
9	Curtain 1	Slat status 0..100%			1 byte	C	R	-	T	-	percentage (0..100%)	Low
10	Curtain 1	Sun operation			1 bit	C	-	W	-	-	switch	Low
11	Curtain 1	Enable auto.control			1 bit	C	-	W	-	-	enable	Low
12	Curtain 1	Sun:blind position 0..100%			1 byte	C	-	W	-	-	percentage (0..100%)	Low
13	Curtain 1	Sun:slat adj. 0..100%			1 byte	C	-	W	-	-	percentage (0..100%)	Low
14	Curtain 1	Safety operation 1			1 bit	C	-	W	-	-	alarm	Low
15	Curtain 1	Safety operation 2			1 bit	C	-	W	-	-	alarm	Low
16	Curtain 1	Status of operation			1 byte	C	R	-	T	-		Low
531	General	Central control for Up/Down			1 bit	C	-	W	-	-	up/down	Low
532	General	Central control for Slat/Stop			1 bit	C	-	W	-	-	step	Low

Num ber	Name	Object function	Length	Flag	Data type
531	General	Central control for Up/Down	1 bit	KS	1.008 DPT_UpDown
Is only used for central control of the curtain position if the solar protection output channel for central control is enabled. Telegram "0" – Blinds move up / Curtain opens Telegram "1" – Blinds move down / Curtain closes					
532	General	Central control for Slat/Stop	1 bit	KS	1.007 DPT_Step
Used for central control to stop curtain movement or to set the slat angle if the curtain output channel for central control is enabled. Telegram "0" – Stop/slats adjust up Telegram "1" – Stop/Slate adjust down					
2	Curtain X	Move UP/DOWN	1 bit	KS	1.008 DPT_UpDown
Telegram "0" moves the blinds/curtain up; telegram "1" moves the blinds/curtain down. Telegram "0" – Blinds move up / Curtain opens Telegram "1" – Blinds move down / Curtain closes					
3	Curtain X	Slat adj./stop Stop	1 bit	KS	1.007 DPT_Step

Num ber	Name	Object function	Length	Flag	Data type
<p>The operation is stopped if the curtain is moving and the object receives telegram "0" or "1". Operation mode blinds: If the shutters are not moving when the object receives telegram "0", the slat angle is set to up and for telegram "1", down.</p> <p>Operating mode shutters: If the curtain is not moving, the object does not perform an operation when receiving telegrams.</p> <p>Telegram "0" – Stop</p> <p>Telegram "1" – Stop</p> <p>The telegram for the setting is ignored if the slats are set in the end position and the settling request is still pending.</p>					
4	Curtain X	Reference movement	1 bit	KS	1.008 DPT_UpDown
<p>If parameter "After the reference movement the position is not set to "Disable", the object is enabled and used to perform a reference movement of the blinds/curtain to ensure a precise position of blinds/curtain. For additional information, see Parameter "Curtain X: Blinds" [→ 26].</p> <p>Telegram "0" – Blinds/curtain move up and then to the target position</p> <p>Telegram "1" – Blinds/curtain move down and then to the target position</p>					
5	Curtain X	Move to position 0...100 %	1 byte	KS	5.001 DPT_Scaling
<p>The blinds/curtain move to the corresponding position for the value if the object receives a telegram. In operation mode "blinds", the slat position does not change, i.e. after arriving at the target position, the slat position adapts to the previous position. The slat position drives to the telegram unless object "Slat position 0... 100%" receives a a telegram.</p> <p>Telegram "0 %" – Moves up</p> <p>... – Interim position</p> <p>"100%" – Move down</p>					
6	Curtain X	Slat position 0...100 %	1 byte	KS	5.001 DPT_Scaling
<p>The object only displays in operation mode "blinds", and the slats are positioned as per the telegram value when the object receives a telegram.</p> <p>Telegram "0 %" – Slats angle is fully open</p> <p>... – Middle position</p> <p>Telegram "100 %" – Slats are fully closed</p>					
7	Curtain X	Scene	1 byte	KS	18.001 DPT_SceneControl
<p>An 8-bit command can be sent via this communication object to query or save the scene of the blinds actuator. The meaning of the 8-bit command is described in detail below.</p> <p>8-Bit command (binary coded) set: FXNNNNNN</p> <ul style="list-style-type: none"> F: "0" triggers the scene; "1" saves the scene. X: 0; NNNNNN: Scene number (0... 63). <p>The parameter setting 1...64; the object "Scene" as received in the scene telegram corresponds to 0...63. The object "scene" receives scene telegram 0 for scene 1 in the parameter. As follows:</p>					
	Object telegram value	Description			
	0	Open scene 1			
	1	Open scene 2			
	2	Open scene 3			
			
	63	Open scene 64			
	128	Save scene 1			
	129	: Save scene 2			
	130	: Save scene 3			
			
	191	Save scene 64			
8	Curtain X	Position status 0...100 %	1 byte	KLÜ	5.001 DPT_Scaling
<p>Sends the blinds/curtain position. Immediately sends the position to the bus, if the blinds/curtain moves to the target position.</p> <p>Telegram "0 %" – Up</p> <p>Center</p> <p>Telegram "100 %" – Down</p>					
9	Curtain X	Slat status 0...100 %	1 byte	KLÜ	5.001 DPT_Scaling

Num ber	Name	Object function	Length	Flag	Data type
<p>The object displays only in operation mode "blinds". Sends the slat position. Immediately sends the position to the bus if the slats move to the target position.</p> <p>Telegram "0 %" – Slats fully open ... – Middle position Telegram "100 %" – Slats are fully closed</p>					
10	Curtain X	Sun operation	1 bit	KS	1.001 DPT_Switch
The curtain moves to a predefined position if the object receives telegram "0" or "1". Details see Parameter "Cx: Automatic function" [→ 30].					
11	Curtain X	Enable auto.control	1 bit	KS	1.003 DPT_Enable
<p>Automatic operations (i.e. auto.control) disable and enable. Auto.control ends if telegram "0" is received and enabled for telegram "1".</p> <p>Telegram "0" – End auto.control Telegram "1" – Enable auto.control</p>					
12	Curtain X	Sun: blind position 0...100 % Sun: shutter position 0...100 %	1 byte	KS	5.001 DPT_Scaling
<p>The blinds/curtain move to the corresponding position for the value if object auto.control receives a telegram. Operation mode "Blinds" does not change the slats position, unless the object "Sun: Slat adjustment 0... 100 %" receives a telegram. The slat position is positioned as per the value for object "Sun: Slat setting 0... 100 %".</p> <p>Telegram "0 %" – Moves up ... – Interim position Telegram "100%" – Move down</p>					
13	Curtain X	Sun: slat adj. 0...100%	1 byte	KS	5.001 DPT_Scaling
<p>In auto.control, the object only displays in operation mode "blinds". The slats are positioned to the telegram value if the object receives a telegram.</p> <p>Telegram "0 %" – Slats fully open ... – Middle position Telegram "100 %" – Slats are fully closed</p>					
14/15	Curtain X	Safety operation 1 Safety operation 2	1 bit	KS	1.005 DPT_Alarm
<p>Messages sent in cycles are received via this communication object (0 or 1, depending on the parameter setting). If the value to cancel the safety function is "1", the object is able to receive the message "1" from the sensor during the monitoring period. It indicates that no anomaly has occurred during this period, monitoring continues, and the monitoring period is reset. The actuator considers the sensor in fault if the object does not receive the message during the monitoring periods. Once the monitoring period ends, the configured safety operation is immediately performed and the blinds are moved to the safe position.</p> <p>Safety operation 2 has priority over Safety operation 1.</p>					
16	Curtain X	Status of operation	1 byte	KLÜ	No DPT
<p>Sends the present operating state of the blinds/curtains output and can only enabled one operation at a time. The object sends a telegram when the operation changes. The 8-bit command is defined as follows:</p> <p>Telegram "0" – Manual operation Telegram "1" – Direct to operation (button operation) Telegram "2" – auto.control (Solar protection) Telegram "3" – Safety operation 1 Telegram "4" – Safety operation 2 Other values are not used.</p>					

3.6 Output Solar protection DC

NOTICE	
!	<p>For electrical safety, note the following safety distances when connected 230 V load together with SELV-/FELV voltage (DC actuators):</p> <p>Use only terminals 17 to 20 and 21 to 24 for DC actuators. Terminals 15 and 16 cannot be used in this case. See Connection diagram and ETS database entry!</p>

Motor selection is also not available for AC actuators. Only "Motor type": AC-Motor is available for information rows.

The parameter function of the output for Solar protection (DC) is not described here; see Solar protection AC [→ 25].

General	Config channel function as	<input checked="" type="radio"/> Venetian Blind <input type="radio"/> Shutter
Channel function	If bus recovery, position is	Unchange
Curtain DC 5	If bus failure, position is	Up
DCS: Drive	After reference movement, position is	Move to saved position
DCS: Automatic	Position of slat after arriving on lower end position	1
DCS: Scene	When blind is under end position, up/down object function is	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
DCS: Safety	Set response mode for position	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
	Central function of channel	<input checked="" type="radio"/> Disable <input type="radio"/> Enable

Operating priority for solar protection control:

Initialization (after downloading the parameter) → Direct operation (long press of the direct operation button to switch to direct operation and the direct operation button is operational and effective) → Safety 2 → Safety 1 → manual bus operation or auto mode

The following is available:

1. Any common operating commands, including curtain movements, can exit automatic bus operation.
2. The received trigger or reset value is logged during direct to operation by the automatic bus operation and safety operation. The action is performed at exit from direct to operation as per the priority. Returns to normal or auto.control after processing all priorities stages.
3. The output state remains unchanged when exiting direction operation, if there is no priority operation until the control commanded is received to return to manual bus operation or auto.control.
4. Automatic bus operation cannot be automatically enabled when enabling direct and safety operation and the duration of automatic bus operation is only set after direct and safety operation end. (Time control is interrupted during direct or safety operation and only continued once they are ended.)

3.7 Fan control

Up to 6 fan stages are currently available. Only one channel for fan control is depicted here since the parameters and communication objects assigned to each output are the same.

Priority of different operations on fan control:

Initialization (after downloading the parameter) → direct to operation (long press of the direct to operation button to switch to direct to operation and the direct to operation button is operational and effective) → manual bus operation or auto.control

The following is available:

1. Direct to operation is primarily used for emergencies or on-site commissioning, so that technical ventilation features such as start-up speed, delay/minimum operating time, changeover, etc. are not considered; only the reaction is supplied directly.
2. Auto.control can automatically exit bus operation by one operation in direct to operation. Automatic bus operation can only be enabled again once direct to operation is ended. On single-speed fans, forced operation can also be ended by automatic bus operation; for multi-stage fans, only the fan speed can be limited within the permissible range.
3. Commands received in direct to operation are logged as well as positioning values for automatic bus operation.

3.7.1 Parameter "Fan type – single stage"

"Fan type – 1-level" sets the parameter for a 1-speed fan.

General	Fan type	<input checked="" type="radio"/> One level <input type="radio"/> Multi-level
Channel function	When bus failure, Fan speed is	Unchange
Fan 1	When bus recovery, fan speed is	Unchange
Fl: Status	After downloading, fan speed is	OFF
Output 3	Forced operation function	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
Output 4	Forced operation on object value	<input type="radio"/> 0=Force/1=Cancel <input checked="" type="radio"/> 1=Force/0=Cancel
	Behaviour on Forced operation	Unchange
	Auto. operation function	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
	Time mode for function ON	Switch Delay
	Delay time[1..65535]*0.1s	10
	Time mode for function OFF	Switch Delay
	Delay time[1..65535]*0.1s	10

Name	Description	Range
Fan type	Sets the type of the controlled fan. <ul style="list-style-type: none"> One speed: Controls the fan using a single speed. Multi-stage: Controls max. 3 speed stages, 2 or 3 can be selected. 	1-speed Multi-speed
When bus failure, Fan speed is	Defines the fan response in the event of a bus fail.	No change OFF ON
When bus recovery, fan speed is	Defines the fan response after a bus fail. <ul style="list-style-type: none"> No change: State does not change. OFF: Fan is switched off. ON: Fan is switched on. As before as bus fail: State prior to bus fail. <p>Note: To reach a defined fan switch-on state, we recommend to first connect the bus voltage prior to connecting the fan to prevent damage to the fan due to a faulty connection.</p>	No change OFF ON As before as bus fail
After downloading, fan speed is	Sets that the fan is switched off at the completion of application programming.	OFF
Forced operation function	Sets whether to enable function "Forced operation". Sets the enable value and action for forced operation. Object "Forced operation" displays if enabled.	Disabled Selected
The following parameters only display if option "Enabled" is selected.		
Forced operation on object value	Sets the telegram value to enable forced operation. <ul style="list-style-type: none"> 0 = Forced operation/1 = Cancel: If object "Forced operation" receives telegram "0", it enables forced operation, and for "1", forces a cancellation of forced operation. 1 = Forced/0 = Cancel: If object "Forced operation" receives telegram "1", it enables forced operation, and "0", forces a cancellation of forced operation. 	0 = Forced/1 = Cancel 1 = Forced/0 = Cancel
Behaviour on Forced operation	Defines fan operation for an active forced operation. <ul style="list-style-type: none"> No change: Fan speed is maintained. OFF: Fan is switched off. ON: Fan is switched on. <p>Forced operation has the highest priority but is influenced by minimum time and delay as set by the following parameter.</p>	No change OFF ON

Name	Description	Range
Auto. operation function	Enables fan auto.control. Enabled: For additional information on parameters, see Parameter "F: Automatic" [→ 40] At the same time, the following parameters act on auto.control, including delay and minimum time.	Disable Selected
Time mode for function ON	Defines fan runtime. <ul style="list-style-type: none"> None: Performs immediately after receipt of control command to switch on the fan. Delay: The ON-action following a reset is enabled with a delay if the fan is switched on. The delay is set in parameter "Delay time [1...65535] × 0.1 s". In the event object "Fan speed" continuously receives telegram "1", the delay is calculated based actual state and not as of the time of the last received telegram. Note: The ON-action after reset must also consider the delay. The fan is only switched on after the delay. Minimum time: Minimum fan runtime. The fan can only be switched off after the runtime expires. The minimum runtime is set in parameter "Minimum time [1...65535] s". The user must wait until the period for minimum runtime ends before switching off the fan if a telegram of type "Fan OFF" is received during the minimum runtime. 	None Switching delay Minimum time
The following parameters only display if option "Minimum time" is selected.		
Delay time 1...65535]*0.1s	Defines the delay time to switch on the fan.	1...65535
Minimum time [1...65535]s	Defines the minimum runtime to switch-on the fan.	1...65535
Time mode for function OFF	Defines the fan switch-off time. <ul style="list-style-type: none"> None: Performs immediately after receipt of control command to switch off the fan. Delay: The OFF-action after reset is also enabled with a delay if the fan is switched off. The delay is set in parameter "Delay time [1...65535] × 0.1 s". Minimum time: Minimum switch-off time for the fan. The fan can only be switched off after the delay. The minimum switch-off time is set in parameter "Minimum time [1...65535] s". The user must wait until the period for minimum switch-off time ends before switching on the fan if a telegram of type "Fan ON" is received during the minimum runtime. Note: The OFF-action after reset must also consider the minimum time. 	None Switching delay Minimum time
The following parameters only display if option "Minimum time" is selected.		
Delay time 1...65535]*0.1s	Defines the time switches off with delay.	1...65535
Minimum time [1...65535]s	Defines the minimum time the fan is switched off.	1...65535

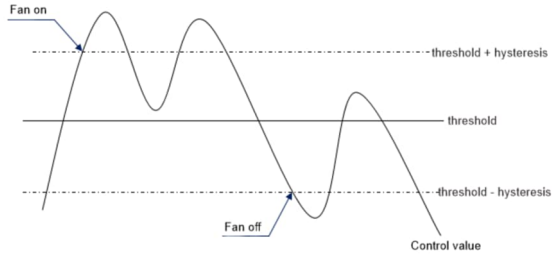
3.7.1.1 Parameter "F: Automatic"

"F: Automatic" sets auto.control for the single-stage fan speed and can define a threshold value. The parameter displays if "enable" is selected for "Function auto.control". The setpoint for fan speed comes from the bus for "Automatic". One or two setpoints can be set in the function parameters. For example, the Fan-coil unit control requires only one setpoint for fan control of heating or cooling. Two setpoints are probably required if the system has both heating and cooling.

Manual control and auto.control cannot be operated at the same time, i.e. after enabling an operation under auto.controls via object "Automatic function" automatically ended for other operations (e.g. Manual operation, Forced operation, direct to operation) for auto.control. auto.control must be enabled via object "Automatic function" and object "Status automatic" reports whether state "auto.control" is enabled.

General	Auto. operation on object value	<input type="radio"/> 0=Auto/1=Cancel <input checked="" type="radio"/> 1=auto / 0=cancel
Channel function	State of Auto.operation after startup	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
Fan 1	Automatically enable auto.operation	<input type="radio"/> NO <input checked="" type="radio"/> Yes
F1: Automatic	Enable auto.operation after in [10..6000]min	100
F1: Status	Threshold value OFF<->ON [1..100]%	30
Output 3	Hysteresis threshold value in +/- [0..50]%	10
Output 4	Number of control value	<input checked="" type="radio"/> 1 <input type="radio"/> 2
	Monitoring control value	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
	Monitoring period of control value [10..65535]s	120
	Reply mode of Obj.'Control value fault'	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
	Control value after fault occurs [0..100]%	0

Name	Description	Range
Auto. operation on object value	Sets the telegram value to enable auto.control. <ul style="list-style-type: none"> 0 = Auto/1 = Cancel: auto.control is enabled if object "Automatic function" receives telegram "0", and auto.control ends upon receipt of telegram "1". 1 = Auto/0 = Cancel: auto.control is enabled if object "Automatic function" receives telegram "1", and auto.control ends upon receipt of telegram "0". 	0 = Auto/1 = Cancel 1 = Auto/0 = Cancel
State of Auto. operation after startup	Sets whether to enable auto.control at device startup. <ul style="list-style-type: none"> Disabled: auto.control is disabled by default at device startup. Enabled: auto.control is enabled by default at device startup. 	Disabled Selected
Automatically enable auto. operation	Indicates whether to enable automatic enabled. If auto.control is returned from manual operation and no operations occur, auto.control is automatically enabled after the time set in parameter "auto.control enable after [10...6000] min" expires.	No Yes
The following parameters only display when "Yes" is selected.		
Enable auto.operation after [10...6000]min	Sets the time for automatic return form manual operation to auto.control.	10...6000
Threshold value OFF<--->ON [1...100]%	Defines the threshold value. The fan changes the operating state based on the set point's threshold range. Object "Control value" determines the setpoint. <ul style="list-style-type: none"> The fan is switched on if the setpoint is greater than the threshold value set in the parameter. The fan is switched off if the setpoint is below the threshold value. 	1...100

Name	Description	Range
Hysteresis threshold value in +/-[0...50]%	<p>Sets the hysteresis threshold to prevent unintended fan movement if the setpoint varies around the threshold value. No hysteresis for 0. The fan immediately switches on and off as soon as the setpoint is outside the threshold value. For a hysteresis of 10 and threshold value of 50, the high threshold value is 60 (threshold value + hysteresis) and the low threshold value is 40 (threshold value - hysteresis). A setpoint between 40...60 means that there is no fan operation pending and the previous fan state is retained. The fan is switched off below 40. And switched on if the value is greater than or equal to 60. See following figure:</p> 	0...50
The following parameters refer to the fan speed setpoints.		
Number of control value	<p>Sets the number of fan speed setpoints under "Auto".</p> <ul style="list-style-type: none"> 1 setpoint: The fan speed can only be controlled by a single setpoint. Generally suitable for heating/cooling or for 2-pipe fan-coil control systems. 2 setpoints: There are two setpoints to control fan speed. Generally suitable for fan-coil control systems as well as supporting heating and cooling. 	1: 1 setpoint 2: 2 setpoints
The following parameters display for "2".		
Select by	<p>Defines the changeover for use of control values.</p> <ul style="list-style-type: none"> Last value: The fan controls speed to the last setpoint received from the bus. Control value with switching object: This option displays object "Switching control value 1/2" to changeover the fan speed setpoint. Telegram 0 corresponds to setpoint 1, and telegram 1 to setpoint 2. <p>Note: After the option is selected following auto.control is enabled, setpoint 1 or 2 must be enabled to validate the received setpoint. There is not response to the received value as long as a setpoint is not enabled. The value received from object "Control switching value 1/2" is logged as long as auto.control is not enabled. The setpoint is only valid, however, when received in auto.control. Once auto.control is re-enabled, the fan speed operates per the last setpoint or fault control value. The effective setpoint is the present value. For setpoint 1, setpoint 2 is invalid.</p>	Latest value Control value with switching object
Monitoring control value	Sets whether to enable external setpoint monitoring.	No Yes
The following parameters display for "Yes".		
Monitoring period of control value [10...65535]s	Sets the period for external setpoint monitoring. The external controller is considered in fault if the setpoint is not received within this period and the fan output follows the setpoint set using the next parameter.	10...65535 s

Name	Description	Range
Reply mode of Obj. "Control value fault"	<p>Defines how feedback occurs if an external setpoint is incorrect.</p> <ul style="list-style-type: none"> Respond after read only: Object "Control value fault" sends the present state only after a read request to the bus. Respond after change: Object "Control value fault" immediately sends a telegram to the bus to report the state if the fault state changes or the device receives a request to read the state. 	<p>Respond after read only</p> <p>Respond after change</p>
Control value after fault occurs [0...100]%	Fan output is controlled to the setpoint set in this parameter in the event of a fault to external control.	0... 100 %

3.7.1.2 Parameter "F: Status"

"F: Status" sets the state info for fan operation.

Name	Description	Range
Reply mode of Obj. "Status Fan ON/OFF" (1bit)	<p>Defines how feedback on fan operating state is provided.</p> <ul style="list-style-type: none"> Respond after read only: Object "Status Fan ON/OFF (1-Bit)" sends the present state of auto.control to the bus only after a read request. Respond after change: Object "Status Fan ON/OFF" immediately sends a telegram to the bus to report the state if the operating state of the fan changes or the device receives a request to read the state. 	<p>Respond after read only</p> <p>Respond after change</p>
Reply mode of Obj. "Status Automatic" (1bit)	<p>The parameter displays if auto.control is enabled, and defines how it responds to state "auto.control".</p> <p>Object "Status automatic" sends telegram "1" to indicate that auto.control is enabled and telegram "0" indicates the ending of auto.control.</p> <ul style="list-style-type: none"> Respond after read only: Object "Status automatic" sends the present state of auto.control to the bus only after a read request. Respond after change: Object "Status automatic" immediately sends a telegram to the bus to report the state if the auto.control state changes or the device receives a request to read the state. 	<p>Respond after read only</p> <p>Respond after change</p>

3.7.2 Parameter "Fan type – multi-speed"

"Fan type – multi-speed" sets the parameter for multi-speed fan.

The parameter settings for fan speed 2 and 3 are the same. If the fan speed is limited to 2, fan 3 corresponds to the parameter value for speed 2, the output fan speed corresponds to 2.

Multi-speed fans not only consider the ramp-up response, but also the operation mode, i.e. switching, step switch, etc. The parameters can only be correctly set if sufficient understanding exists with regard to the technical features of the fan.

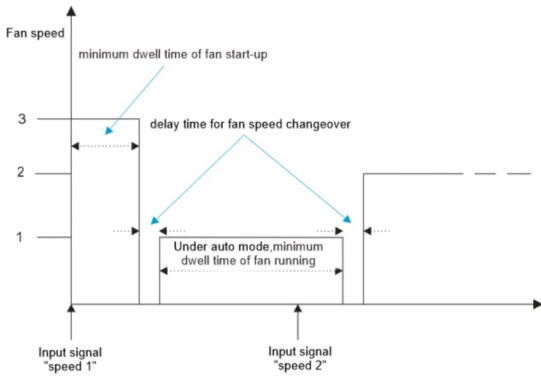
General	Fan type	<input type="radio"/> One level <input checked="" type="radio"/> Multi-level
Channel function	Fan speeds on 2 limit	<input type="radio"/> NO <input checked="" type="radio"/> YES
Fan 1	Fan operation mode	<input checked="" type="radio"/> Changover switch <input type="radio"/> Step switch
F1: Status	Delay between fan speed switch[50..5000] ms	500
Output 3	When bus failure, Fan speed is	Unchange
Output 4	When bus recovery, fan speed is	Unchange
	After downloading, fan speed is	OFF
	Object value for fan speed	
	Object value for Fan speed 1	33 %
	Object value for Fan speed 2	67 %
	Object value for Fan speed 3	100 %
	Forced operation function	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
	Forced operation on object value	<input type="radio"/> 0=Force/1=Cancel <input checked="" type="radio"/> 1=Force/0=Cancel
	Limitation on forced operation	Unchange
	Auto. operation function	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
	Obj. "Switch speed x" 1bit function	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
	Delay time for function OFF[0..65535]*0.1s	0
	Starting characteristic of fan	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
	Switch on over fan speed	1
	Minimum time in switch[1..65535]s	10

Name	Description	Range
Fan type	Sets the type of the controlled fan. <ul style="list-style-type: none"> One speed: Controls the fan using a single speed. Multi-stage: Controls max. 3 speed stages, 2 or 3 can be selected. 	1-speed Multi-speed
The following parameters display only if "multi-speed" is selected.		
Fan speeds on 2 limit	Sets whether a 2-speed fan or 3-speed fan is enabled. <ul style="list-style-type: none"> No: Controls the 3-speed fan. Yes: The maximum fan speed can only reach speed 2, even if the parameter is set to speed 3. Ignores object for 3-speed. Note: The fan remains in the present state if the fan speed is limited to speed 2 and the fan speed is set to 3 after a loss of power or a reset.	No Yes
Fan operation mode	Sets the fan operation mode to be considered together with the technical properties of the fan. <ul style="list-style-type: none"> Switch: The delay for the fan speed switch can be sent via the next parameter in this operation mode. The control mode can switch the fan speed to any speed, e.g. from the first to the third speed. But only one of the three outputs can be used. Step switch: In this operation mode, a 3-speed fan speed corresponds to a combination of three 1-speed fans. Fan speed 3, for example, uses all three channels at the same time (e.g. Output 1, 2, and 3); fan speed 2 uses 2 outputs at the same time (e.g. Output 1 and 2). Note: The parameters consider the fan's technical properties.	Changover Step switch
The following parameters display only if "Switch" is selected.		

Name		Description	Range
	Delay between fan speed switch [50...5000]*ms	Defines the delay that is a specific element of the fan and that must be considered in all cases. The set fan speed is only performed after the delay if a telegram is received to switch fan speed. A new fan speed received during the delay does not restart the delay, but rather uses the last received fan speed.	50...5000
When bus failure, Fan speed is		Defines fan operation in the event of a bus fail. <ul style="list-style-type: none"> OFF: Switch off fan 1, 2 or 3: The fan is switched on at speeds 1/2/3. Note: The fan remains at the fan speed before a power failure if it is limited to 2 speeds, but set to speed 3.	No change OFF 1 2 3
When bus recovery, fan speed is		Defines fan operation after bus recovery. <ul style="list-style-type: none"> OFF: Switch off fan 1, 2 or 3: The fan is switched on at speeds 1/2/3. As before a bus fail: Corresponds to the speed prior to the bus fail. Note: We recommend connecting the bus voltage before connected the fan to receive a defined fan speed. This prevents damage to the fan caused by a faulty connection. The fan speed does not change after a bus recovery if the fan is limited to 2 speeds, but set to 3.	No change OFF 1 2 3 As before as bus fail
After downloading, fan speed is		Indicates that the fan is switched off after application programming.	OFF
Object value for fan speed			
Object value for Fan speed 1/2/3		Defines the fan speed switching point and present fan speed of object "Fan speed – 1 byte". Object value "0" is "Fan speed off".	1...100 %
Forced operation function		Sets whether to enable function "Forced operation". "Enable" displays the 1-bit object "Forced operation" to set the enable value for forced operations and actions that are performed as part of forced operations.	Disable Enable
The following display only option "Enable" is selected.			
	Forced operation on object value	Sets the telegram value to enable forced operation. <ul style="list-style-type: none"> 0 = Forced operation/1 = Cancel: If object "Forced operation" receives telegram "0", it enables forced operation, and for "1", forces a cancellation of forced operation. 1 = Forced/0 = Cancel: If object "Forced operation" receives telegram "1", it enables forced operation, and "0", forces a cancellation of forced operation. Note: The minimum runtime of the fan speed in auto.control still applies unless the start-up fan stage has its own minimum runtime. Forced operation is not enabled by default after a bus reset or programming.	0 = Forced/1 = Cancel 1 = Forced/0 = Cancel

Name	Description	Range
Limitation on forced operation	<p>Defines the speed that can be used for fan in forced operation.</p> <ul style="list-style-type: none"> • No change: The fan speed remains unchanged, and the fan retains the present operating state. • 1: Only 1-speed fan. • 1, OFF: Only 1-speed fan and switch off fan. • 2: Only 2-speed fan. • 2, 1: Only 1 and 2-speed fans. • 2, 1, OFF: Only 1-speed and 2-speed fans and switch off fan. • 3: Only 3-speed fan. • 3, 2: Only 2-speed and 3-speed fans. • 3, 2, 1: Only 1-speed, 2-speed and 3-speed fan. • Off: Switch off fan only. <p>Note: The fan speed switches to the next closest present speed (within the permissible range) if the present fan speed is not within the permissible range when enabling forced operations. Example: Present fan speed is 1 and the permissible fan speed is 2 and 3. The fan speed automatically switches to 2 when enabling forced operation. The fan speed also operates at 2 if the fan speed is manually set to 1.</p> <p>In another case, the fan starts upon enable of forced operations at fan speed 3 and switches automatically to fan speed 1 if the present fan speed is 0 and the permissible fan speeds are 1, 2, 3, and the start-up fan speed is 3. The fan speed changes to 1 if the present fan speed is 2 in forced operation and the permissible fan speeds are 1 and 2 and a telegram with fan speed 0 is received. The fan switches in this case to the fan speed that is closest to the set fan speed.</p>	<p>No change 1 1, OFF 2 2, 1 2, 1, OFF 3 3, 2 3, 2, 1 OFF</p>
Auto. operation function	<p>Enables fan auto.control.</p> <p>Enabled: For additional information on parameters, see Parameter "F: Automatic" [→ 48]</p>	<p>Disabled Selected</p>
Obj. "Switch speed x " 1bit function	<p>Controls fan speed.</p> <p>Enabled: Three 1-bit objects "Fan speed 1", "Fan speed 2" and "Fan speed 3" display.</p> <p>The fan speed is enabled if the object receives telegram "1" and switches off if one of the three objects receives telegram "0".</p> <p>The fan speed is determined by the last telegram value if the three objects receive multiple ON/OFF telegrams.</p> <p>Note: A minimum runtime received in manual operation via parameter auto.control is ignored. In this way, the reaction to a direct measure can be recognized in time.</p> <p>The delay for fan speed switching remains active to protect the fan. At the same time, the permissible fan speeds in forced operation must also be considered when enabled.</p>	<p>Disabled Selected</p>
Delay time for function OFF [0...65535]*0.1s	<p>Defines the delay switch-off time. The fan retains the preset fan speed and the delay starts switching off after the timeframe as defined by this parameter, if, for example, the present fan speed is 1 and the control telegram "Fan OFF" is received.</p> <p>Note: The parameter is available if the fan is operating in auto.control, if parameter "Minimum time in fan speed [0..65535]s" is 0.</p>	<p>0...65535</p>

Name	Description	Range
Starting characteristic of fan	<p>Defines the the fan's start-up properties that also represent a technical property of the fan. It is generally better to switch on the fan motor at a higher speed to ensure safe ramp-up of the fan motor. This allows the fan motor to achieve a higher torque during the ramp-up phase.</p> <p>Note: Start-up behavior has a higher priority than forced operation since is represents a technical property of the fan. The user can select "disable" regardless of the associated parameters even if the fan does not have a start-up response.</p> <p>Example: Start-up fan speed is 3 but the permissible fan speed is 2 for forced operation and it is currently in an OFF state. The fan is initially switched on at speed 3 if a control telegram is received for the first fan speed and then switched to speed 2. The required 1-speed operation is not possible due to a limitation on the part of forced operations. Fan type with stage switches have a different start-up response. The fan continuously sets the fan speed as a rule whereas fans with a switch directly enables the fan speed. As a result, the fan switch type must also be considered when setting the configuration of the start-up response. The minimum linger time for fan speeding switching in auto.control is considered only after start-up while the start-up phase is disabled. The minimum switch-on time for the fan during start-up can be set separately.</p>	Disabled Selected
	The following parameters display when "Enabled".	
Switch on over fan speed	<p>Sets the fan speed for the fan as of the OFF state.</p> <p>The fan is automatically started at speed 2 when controlling the fan with 2 speeds, if the fan speed is set to 3.</p> <p>We recommend, however, learning the fan properties when setting this parameter to ensure property operation in manual operation. The parameters are set as per the fan properties to avoid damaging the fan.</p>	1/2/3

Name	Description	Range
Minimum time in switch [1...65535]s	<p>Defines the minimum linger for a specific speed to switch-on the fan during the start-up phase.</p> <p>Once switched on, the fan starts at the start-up speed and then switches to the setpoint speed after a linger period. The speed setpoint for the fan can be triggered after a reset or other operation.</p> <p>During the start-up phase, consider the delay between both fan speeds.</p> <p>Example: Start-up functions for a 3-speed fan</p> <p>Assuming the fan is switched off, the start-up speed is 3, the target fan speed is 1 and the final fan speed is 2 (see image below):</p>  <p>The image above illustrates that the fan, in a switched-off state, receives a telegram from "Fan speed 1", start in "Fan speed 3". The fan speed is switched after a minimum linger period for the fan start-up speed expires. A delay is required to switch the fan speed (this is a technical fan parameter to protect the fan). The fan switches to target fan speed "Fan speed 1" after the delay. If the fan receives an "Air speed 2" telegram in this state, it must check whether auto.control is enabled. The minimum linger must be considered for enabled auto.control. A minimum linger is not considered for a direct command. The fan operates at "Fan speed 2" after the delay.</p>	1...65535

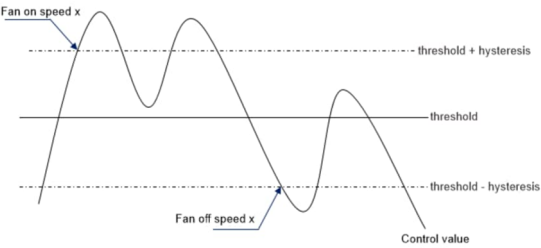
3.7.2.1 Parameter "F: Automatic"

Parameter "F: Automatic" displays if "Function auto.control" is "Enabled".

Set the multi-speed fan speed for auto.control and defines the threshold values. The fan speed setpoint comes from the bus in auto.control. The setpoint's threshold range determines the fan speed.

General	Auto. operation on object value	<input type="radio"/> 0=Auto/1=Cancel <input checked="" type="radio"/> 1=auto / 0=cancel
Channel function	State of Auto.operation after startup	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
Fan 1	Automatically enable auto.operation	<input type="radio"/> NO <input checked="" type="radio"/> Yes
F1: Automatic	Enable auto.operation after in [10..6000]min	100
F1: Status	Threshold value OFF<->speed 1 [1..100]%	30
Output 3	Threshold value speed 1<->speed 2 [1..100]%	60
Output 4	Threshold value speed 2<->speed 3 [1..100]%	80
	Hysteresis threshold value in +/- [0..50]%	10
	Minimum time in fan speed [0..65535]s	10
	Number of control value	<input checked="" type="radio"/> 1 <input type="radio"/> 2
	Monitoring control value	<input checked="" type="radio"/> Disable <input type="radio"/> Enable

Name	Description	Range
Auto. operation on object value	Sets the telegram value to enable auto.control. <ul style="list-style-type: none"> 0 = Auto/1 = Cancel: auto.control is enabled if object "Automatic function" receives telegram "0", and auto.control ends upon receipt of telegram "1". 1 = Auto/0 = Cancel: auto.control is enabled if object "Automatic function" receives telegram "1", and auto.control ends upon receipt of telegram "0". 	0 = Auto/1 = Cancel 1 = Auto/0 = Cancel
State of Auto. operation after startup	Sets whether to enable auto.control at device startup. <ul style="list-style-type: none"> Disabled: auto.control is disabled by default at device startup. Enabled: auto.control is enabled by default at device startup. 	Disabled Selected
Automatically enable auto. operation	Indicates whether to enable automatic enabled. If auto.control is returned from manual operation and no operations occur, auto.control is automatically enabled after the time set in parameter "auto.control enable after [10...6000] min" expires.	No Yes
The following parameters only display when "Yes" is selected.		
Enable auto.operation after [10...6000]min	Sets the time for automatic return form manual operation to auto.control.	10...6000
Threshold value OFF<-->speed 1 [1...100]%	Defines the threshold value to switch off the fan and speed 1. <ul style="list-style-type: none"> The operating speed is 1 if the setpoint is greater than or equal to the threshold value as set by this parameter. The fan is switched off if the setpoint is below the threshold value. Note: The fan determines the switch-on and switch-off or fan speed as per the threshold range of the setpoint. Parameter "Setpoint speed 1 <--> speed 2 [1...100] %" and "Threshold value speed 2 <--> Speed 3 [1...100] %" are similar.	1...100 %
Threshold value speed 1<-->speed 2 [1...100]%	Defines the threshold value to switch the fan to speed 2. Speed 2 applies if the setpoint is greater than or equal to the set threshold value.	1... 100 %
Threshold value speed 2<-->speed 3 [1...100]%	Defines the threshold value to switch the fan to speed 3. Speed 3 applies if the setpoint is greater than or equal to the set threshold value. Control evaluates the threshold value in ascending order, i.e. OFF <--> Threshold value fan speed 1 1, Fan speed 1 <--> Threshold speed 2, then speed 2 <--> Threshold value speed 3. Proper operation of the function is only ensured as follows: OFF <--> Threshold value speed 1 is less than speed 1 <--> Threshold value speed 2, speed 1 <--> Threshold value speed 2 is less than speed 2<--> Threshold value speed 3.	1... 100 %

Name	Description	Range
Hysteresis threshold value in +/-[0...50]%	<p>Sets the hysteresis threshold to prevent unintended fan movement if the setpoint varies around the threshold value. No hysteresis for 0. The fan is switched on and off immediately as soon as the setpoint is outside the threshold value. For a hysteresis of 10 and threshold value of 50, the high threshold value is 60 (threshold value + hysteresis) and the low threshold value is 40 (threshold value - hysteresis). A setpoint between 40...60 means that there is no fan operation pending and the previous fan state is retained. The fan operating state only changes once it is less than 40 or greater than 60. See following figure:</p>  <p>Note: The fan operations as follows if hysteresis is enabled and the threshold values overlap:</p> <ol style="list-style-type: none"> 1. Hysteresis determines the fan speed switching point. 2. If a fan speed changes, the new speed is determined independent of the hysteresis by the setpoint and threshold value. Example (1): OFF <-> Threshold value for speed 1 is 10 % Speed 1 <-> Threshold value for speed 2 is 20 % Speed 2 <-> Threshold value for speed 3 is 30 % Hysteresis is 15% Fan response upon drop-off from 3-speed: Speed 3 changes if the setpoint is 14 % (< 30–15 %) and the new speed is set to 1 (hysteresis need not be considered since the value is between 10 % and 20 %). Speed 2 is thus ignored. 3. The fan always switches off for setpoint 0. 	0...50

Name	Description	Range
Minimum time in fan speed [0...65535]s	<p>Defines the linger period before the present speed is switched to a higher or lower speed, i.e. minimum fan operating time.</p> <p>The user can only switch to another fan speed once the minimum time expires. The fan speed can be quickly switched, however, if the present speed is active long enough.</p> <p>0: Means no delay when switching.</p> <p>Note: The linger set via this parameters is only available in auto.control.</p> <p>Considers the minimum runtime for each fan speed in auto.control, including Off, and the fan speed changes in stage in auto.control.</p> <p>For example, the present speed is 1 and the setpoint speed is 3, the fan speed changes from 1 to 2 before switching to 3. Each fan speed changes if it is longer than the minimum time.</p> <p>The start-up speed does not need to consider the minimum runtime since it has its own minimum runtime.</p> <p>The fan switches directly to the fan speed setpoint if the minimum time is set to 0 and the fan speed no longer changes in stages.</p>	0...65535

For addition information on fan speed setpoints, see Parameter "F: Automatic" [→ 40]:

3.7.2.2 Parameter "F: Status"

"F: Status" sets the information on fan operating state with multi-speed fan speed.

General	Reply mode of Obj. 'Status Fan ON/OFF'(1bit)	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
Channel function	Reply mode of Obj. 'Status Automatic'(1bit)	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
Fan 1	Reply mode of Obj. 'Status fan speed x'(1bit)	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
F1: Automatic	Reply mode of Obj. 'Status fan speed'(1byte)	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
F1: Status	Status feedback for fan speed Status value for fan speed 1: <input type="text" value="33"/> % Status value for fan speed 2: <input type="text" value="67"/> % Status value for fan speed 3: <input type="text" value="100"/> %	
Output 3		
Output 4		

Name	Description	Range
Reply mode of Obj. "Status Fan ON/OFF" (1bit)	<p>Defines how feedback on fan operating state is provided.</p> <ul style="list-style-type: none"> Respond after read only: Object "Status Fan ON/OFF (1 bit)" sends the present state of auto.control to the bus only in response to read only. . Respond after change: Object "Status Fan ON/OFF" immediately sends a telegram to the bus to report the state if the fan state changes or a read state is received. 	Respond after read only Respond after change

Name	Description	Range
Reply mode of Obj. "Status Automatic" (1bit)	<p>The parameter displays if auto.control is enabled, and defines how it responds to state "auto.control".</p> <p>Object "Status Automatic" sends telegram "1" to indicate that auto.control is enabled, and telegram "0" indicates that auto.control is disabled.</p> <ul style="list-style-type: none"> Respond after read only: Object "Status automatic" sends the present state of auto.control to the bus only after a read request. Respond after change: Object "Status automatic" immediately sends a telegram to the bus to report the state if the auto.control state changes or the device receives a request to read the state. 	<p>Respond after read only</p> <p>Respond after change</p>
Reply mode of Obj. "Status Fan speed x" (1bit)	<p>Defines how feedback on fan operating state is supplied. Three 1-bit objects, "Status fan speed 1", "Status fan speed 2" and "Status fan speed 3", are used to report feedback on the individual fan speeds.</p> <ul style="list-style-type: none"> Respond after read only: The object sends the present state only after a read request to the bus. Respond after change: The object immediately sends a telegram to the bus to report the state if the device receives a request to read the state. 	<p>Respond after read only</p> <p>Respond after change</p>
Reply mode of Obj. "Status Fan speed " (1byte)	<p>Sets the reply mode for the present fan speed state. Object "Status fan speed" and data type "1 byte", the next parameter defines the output state for each fan speed.</p> <ul style="list-style-type: none"> Respond after read only: The object sends the present state only after a read request to the bus. Respond after change: The object immediately sends a telegram to the bus to report the state if the device receives a request to read the state. 	<p>Respond after read only</p> <p>Respond after change</p>
Status feedback for fan speed		
Status feedback for fan speed	Sets the status feedback for each fan speed. The value for state "Fan OFF" is 0.	1...100 %

3.7.3 Communication objects to control air

Fan control _One speed

Numb	Name	Object Function	Des	Group	Length	C	R	W	T	U	Data Type	Priority
219	Fan 1	Fan speed			1 bit	C	-	W	-	-	switch	Low
223	Fan 1	Status Fan ON/OFF			1 bit	C	R	-	T	-	switch	Low
228	Fan 1	Automatic function			1 bit	C	-	W	-	-	enable	Low
229	Fan 1	Status Automatic			1 bit	C	R	-	T	-	enable	Low
230	Fan 1	Forced operation			1 bit	C	-	W	-	-	enable	Low
231	Fan 1	Control value 1			1 byte	C	-	W	-	-	percentage (0..100%)	Low
232	Fan 1	Control value 2			1 byte	C	-	W	-	-	percentage (0..100%)	Low
233	Fan 1	Switching control value 1/2			1 bit	C	-	W	-	-	switch	Low
234	Fan 1	Control value fault			1 bit	C	R	-	T	-	alarm	Low

Fan control _Multi-speed

Numb	Name	Object Function	Des	Group	Length	C	R	W	T	U	Data Type	Priority
219	Fan 1	Fan speed			1 byte	C	-	W	-	-	percentage (0..100%)	Low
220	Fan 1	Fan speed 1			1 bit	C	-	W	-	-	switch	Low
221	Fan 1	Fan speed 2			1 bit	C	-	W	-	-	switch	Low
222	Fan 1	Fan speed 3			1 bit	C	-	W	-	-	switch	Low
223	Fan 1	Status Fan ON/OFF			1 bit	C	R	-	T	-	switch	Low
224	Fan 1	Status Fan speed			1 byte	C	R	-	T	-	counter pulses (0..255)	Low
225	Fan 1	Status Fan speed 1			1 bit	C	R	-	T	-	switch	Low
226	Fan 1	Status Fan speed 2			1 bit	C	R	-	T	-	switch	Low
227	Fan 1	Status Fan speed 3			1 bit	C	R	-	T	-	switch	Low
228	Fan 1	Automatic function			1 bit	C	-	W	-	-	enable	Low
229	Fan 1	Status Automatic			1 bit	C	R	-	T	-	enable	Low
230	Fan 1	Forced operation			1 bit	C	-	W	-	-	enable	Low
231	Fan 1	Control value 1			1 byte	C	-	W	-	-	percentage (0..100%)	Low
232	Fan 1	Control value 2			1 byte	C	-	W	-	-	percentage (0..100%)	Low
233	Fan 1	Switching control value 1/2			1 bit	C	-	W	-	-	switch	Low
234	Fan 1	Control value fault			1 bit	C	R	-	T	-	alarm	Low

Num ber	Name	Object function	Length	Flag	Data type
219	Fan X	Fan speed	1 bit 1 byte	KS	1.001 DPT_Switch 5.001 DPT_Scaling
<p>Used on 1-speed fans with object type "1 bit" to switch on and off the fan. Telegram "0" – Fan OFF Telegram "1" – Fan ON</p> <p>Used on multi-speed fans with object type "1 byte" to switch on and off individual fan speed. Only one fan speed is enabled at a time, the fan's start-up properties must be considered when switching on a new fan speed. The parameter defines the object value corresponding to the fan speed. The telegram value is 1...255 with 0 corresponding to "Fan OFF".</p>					
220	Fan X	Fan speed 1	1 bit	KS	1.001 DPT_Switch
221		Fan speed 2			
222		Fan speed 3			
<p>The object is available for multi-level fans. Switches on speed 1. The object for fan speed 1...3 applies the last telegram if it receives multiple ON telegrams within a short period. The fan switches off as soon as an object with speed 1...3 receives on OFF telegram.</p>					
223	Fan X	Status Fan ON/OFF	1 bit	KLÜ	1.001 DPT_Switch
<p>Sends the fan's switch state to the bus. The fan is switched on if there is a fan speed. Telegram "0" – Fan OFF Telegram "1" – Fan ON</p>					
224	Fan X	Status Fan speed	1 byte	KLÜ	5.001 DPT_Scaling
<p>The object is available for multi-level fans. Sends the present fan speed to the bus. Each fan speed corresponding to the telegram value is set in parameter "Speed 1/2/3". Telegram 0 is "Fan OFF".</p>					
225	Fan X	Status Fan speed 1	1 bit	KLÜ	1.001 DPT_Switch
226		Status Fan speed 2			
227		Status Fan speed 3			
<p>The object is available for multi-level fans. Sends the state "Fan in operation" to the bus. Telegram "0" – Speed OFF Telegram "1" – Speed ON</p>					
228	Fan X	Automatic function	1 bit	KS	1.003 DPT_Enable
<p>Enables auto.control. The parameter determines whether auto.control is enabled after bus reset or programming. Manual operation can reset auto.control. Auto.control remains enabled on multi-speed fan if forced operation is enabled. Forced control, however, determines the permissible fan operating state oriented on the fan speed in forced operation. Forced operation can reset auto.control on a 1-speed fan speed.</p> <ul style="list-style-type: none">Parameter option "0 = Auto/1 = Cancel":<ul style="list-style-type: none">Telegram "0" – Enable auto.controlTelegram "1" – End auto.controlParameter option "1 = Auto/0 = Cancel":<ul style="list-style-type: none">Telegram "0" – End auto.controlTelegram "1" – Enable auto.controlThe following can trigger manual operation:<ul style="list-style-type: none">Object 219: Fan X – SpeedObjects 220...222: Fan X – Speed x (x = 1,2,3)					
229	Fan X	Status Automatic	1 bit	KLÜ	1.003 DPT_Enable
<p>Sends the state of auto.control to the bus. Telegram "0" – auto.control disabled Telegram "1" – auto.control enabled</p>					
230	Fan X	Forced operation	1 bit	KS	1.003 DPT_Enable

Num ber	Name	Object function	Length	Flag	Data type
<p>Enables Forced operation. The permissible fan speed when enabled is set via the parameter "Limitation on forced operation".</p> <ul style="list-style-type: none"> Parameter option "0 = Forced operation/1 = Cancel": <ul style="list-style-type: none"> Telegram "0" – Enable forced operation telegram "1" – Cancel forced operation Parameter option "1 = Forced operation/0 = Cancel": <ul style="list-style-type: none"> Telegram "1" – Enable forced operation telegram "0" – Cancel forced operation 					
231	Fan X	Control value/Control value 1	1 byte	KS	5.001 DPT_Scaling
232		Control value 2			
<p>The setpoint displays in auto.control if the control variable is 1. "Setpoint 1/2" displays if the number for the control value is 2. The bus receives setpoints. The fan power is calculated based on the defined threshold value and setpoint.</p>					
233	Fan X	Switching control value 1/2	1 bit	KS	1.001 DPT_Switch
<p>The object displays and is used to select setpoints if the number for the setpoints is 2 and "Select by" is set to "Control value with switching object". Telegram "0" – Control value 1 Telegram "1" – Control value 2</p>					
234	Fan X	Control value fault	1 bit	KLÜ	1.005 DPT_Alarm
<p>The object reports a setpoint error if the device does not receive a setpoint from an external controller within the monitoring period. The fault is rescinded as soon as the setpoint is received. Telegram "0" – No fault Telegram "1" – Fault</p>					

3.8 Valve control

Valve control consists of heating, cooling, 2-pipe system, and 4-pipe system. The parameters are essentially the same with the exception of used output channels. Heating only, cooling, or 2-pipe systems use a max. 2 output channels while a 4-pipe system uses max. 4 output channels. As a result, a max. 12 output channels can be configured for heating, cooling, 2-pipe valve system and a max. 6 output channels for 4-pipe systems.

Channel function – System type

General	Product select	24-Fold
Channel function	Output 1--4 config as	Switch/Solar protection AC/Heating/Cooling/2-pipe
Valve 1 General	Output 1 & 2 function	Heating/Cooling/2-pipe
V1: Heating/Cooling	Valve 1 output is fixed for Output 1	Output 1 & 2, if 3point, open and close
Curtain 2	Output 3 & 4 function	Curtain AC
	Curtain 2 output is fixed for	Output 3(Up/Open) & Output 4(Down/Close)
C2: Drive	Output 5--8 config as	Disable
C2: Automatic	Output 9--12 config as	Disable
C2: Scene	Output 13--16 config as	Disable
C2: Safety	Output 17--20 config as	Disable
	Output 21--24 config as	Disable
General	Product select	24-Fold
Channel function	Output 1~4 config as	Valve control(4-pipe)
4-Pipe Valve 1 General	Heat output for 4-pipe valve 1 is Output 1	Output 1&2, if 3point, open and close
	Cool output for 4-pipe valve 1 is Output 3	Output 3&4, if 3point, open and close
4-pipe V1: Heating	Output 5~8 config as	Disable
	Output 9~12 config as	Disable
4-pipe V1: Cooling	Output 13~16 config as	Disable
	Output 17~20 config as	Disable
	Output 21~24 config as	Disable

Valve X general – Heating

General	HVAC control mode	Heating
Channel function	Monitoring control value	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
Valve 1 General	Monitoring period of control value [10..65535]s	60
V1: Heating	Reply mode of Obj."Control value fault"	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
	Control value after fault occurs[0..100]%	0

Valve X general – Cooling

General	HVAC control mode	Cooling
Channel function	Monitoring control value	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
Valve 1 General	Monitoring period of control value [10..65535]s	60
V1: Cooling	Reply mode of Obj."Control value fault"	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
	Control value after fault occurs[0..100]%	0

Valve X general – Heating and cooling (2-pipe)

General	HVAC control mode	Heating and Cooling
Channel function	HVAC System	2 pipes system
Valve 1 General	Monitoring control value	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
V1: Heating/Cooling	Monitoring period of control value [10..65535]s	60
	Reply mode of Obj."Control value fault"	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
	Control value after fault occurs[0..100]%	0

4-pipe valve X general – Heating and cooling (4-pipe)

General	HVAC control mode	Heating and Cooling
Channel function	HVAC System	4 pipes system
4-Pipe Valve 1 General	Number of control value	2 control value
4-pipe V1: Heating	Monitoring control value	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
4-pipe V1: Cooling	Monitoring period of control value [10..65535]s	60
	Reply mode of Obj."Control value fault"	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
	Control value after fault occurs[0..100]%	0

Name	Description	Range
HVAC control mode	Sets control mode HVAC. <ul style="list-style-type: none"> Heating: Only heating applies. Cooling: Only cooling applies. Heating and cooling: Heating and cooling apply. 	Heating Cooling Heating and cooling
HVAC System	The parameter displays if a 2-pipe valve system or 4-pipe valve system is selected and provides data on the HVAC plant, i.e. the type of piping for incoming and outgoing water in the the system. <ul style="list-style-type: none"> 2-pipe system: In a 2-pipe system heating and cooling are supply and return lines, i.e. the valve controls both heating and chilled water. 4-pipe system: In a 4-pipe system, heating and cooling have their own supply and return lines (requires two valves). 	
Number of control value	Displays if the 4-pipe system is selected. Indicates that two setpoints are available for 4-pipe (one for the heating valve, the other for the cooling valve).	2 control values

Name	Description	Range
Monitoring control value	Determines whether to enable setpoint monitoring.	Disabled Selected
The following parameters only display if option "Enabled" is selected.		
Monitoring period of control value [10...65535]s	Sets the period for external setpoint monitoring. The external controller is considered in fault if the setpoint is not received within this period and the valve output following the setpoint uses the next parameter.	10...65535 s
Reply mode of Obj."Control value fault"	Defines how feedback occurs if an external setpoint is incorrect. <ul style="list-style-type: none"> Respond after read only: Object "Control value fault" sends the present state only after a read request to the bus. Respond after change: Object "Control value fault" immediately sends a telegram to the bus to report the state if the fault state changes or the device receives a request to read the state. 	Respond after read only Respond after change
Control value after fault occurs [0...100]%	The valve output applies the setpoint set via this parameter in the event of a fault to the external control. On a 2-port valve, the valve is open, if the setpoint is set to > 0 % and closed if set to 0 %.	0... 100 %

The following a supplemental description of the pipe system (this product is suitable for both 2-pipe and 4-pipe systems):

In daily operations, heating/cooling systems can be divided into 2-pipe, 3-pipe, and 4-pipe systems and correspond to the supply and return lines for heat and chilled water.

In a 2-pipe system, chilled and hot water share a set for flow and return. Cooling, if the chilled water flows through the water pipe, and heating if hot water flows. Hot and chilled water cannot flow at the same time.

Wiring in a 2-pipe system: Only one valve is required to control the flow of hot or chilled water.

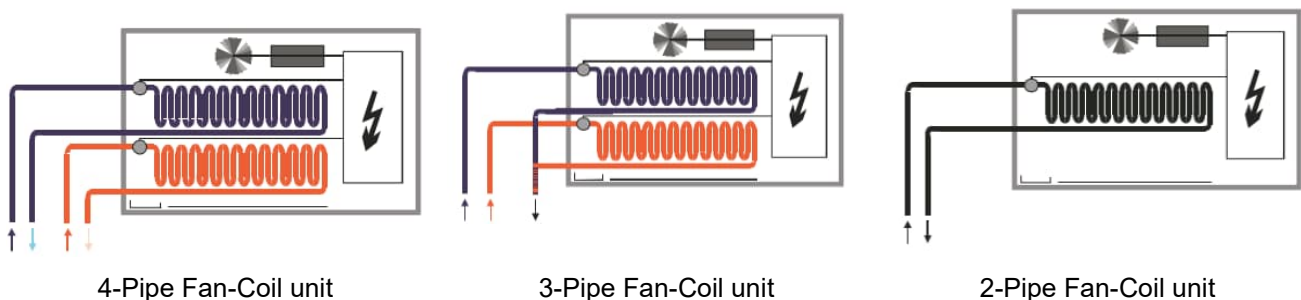
In a numerous applications, 2-pipe system are primarily used for cooling, with heating provided by other common devices.

The 4-pipe system is similar. The 3-pipe system has one inlet system for hot water as well as one for chilled water; the output pipe is shared by both. Heating and cooling is not possible at the same time.

A 4-pipe system has two sets of incoming and outgoing water and can flow at the same time.

There is only one SPST (Single Pole Single Throw) switch however, and only one can be used to simultaneously heat and cool.

Wiring in a 4-pipe system: The cooling/heating valve is generally connected to the output terminal on the device to control the flow of chilled and hot water.



Valve control priority

Initialization (after downloading the parameters) → direct to operation → Valve purge → automatic adjustment to valve position (only 3-position, open and close) → Disable valve operation → Fault monitoring or manual operation (manual operation triggered by object "Control value cooling/heating")

The following applies:

1. In operation mode Fault monitoring, fault monitoring is continued on the disabled valve and the results of the monitoring can be sent to the bus. The fault operation can only be performed however if there are no measures at a higher priority. The fault state is reset if the setpoint and the monitoring cycle are restarted.
2. Valve purge is ended if an operation at a higher priority (e.g. direct to operation) is interrupted. The purge operation is not continued after direct to operation is ended.
3. Adaptation to the valve characteristic curve acts on the setpoints in operation mode fault monitoring and normal operation and the valve position is adapted based on the corrected value (only for 3-position valve, open and close).
4. In direction operation, pressing the direct to operation buttons fully closes (0%) an open valve and fully opens (100%) a closed valve. If direct to operation is active or enabled, setpoint commands, valve purge, and disabling the valve are ignored, fault monitoring continues, and a valid control value can reset the cycle for fault monitoring. An operation per the fault status is performed after exiting direct to operation. The state is retained until a new setpoint is received if no fault is pending.
5. Heating/cooling can only be switched by a setpoint or direct to operation. The purge function is not limited by this since it has a higher priority, i.e. the purge function for the heating valve can be triggered in cooling and vice-versa. Cleaning heating can only occur after a cooling purge is performed. The operation mode does not change and remains in cooling mode. The state of the operating mode immediately changes if a setpoint for another operation mode is received during purge. The operation can only be performed per the present setpoint, once purge is completed.
6. In the event that multiple operations occur in the same operation mode within a period, they are processed as per the order of the priorities. The operation with the lowest priority is processed once the operation with the higher priority is canceled. For example, if "Valve purge", "Disable valve" and "direct to operation" are enabled at the same time, the valve returns to state "Disable valve" after the "Purge" is canceled, i.e. the valve is disabled. The valve behaves as per the preset setpoint or fault state as soon as it is re-enabled.

The following items apply to automatic valve adjustment (if enabled):

1. Automatic valve adjust repeats the operations after interrupted by direct to operation or purge operation.
2. Automatic valve adjustment disables valve operation and acts on fault monitoring and control values. The valve moving time is extended if the number of valve settings reaches the maximum number for setting. The valve must be repositioned before moving to the target position.
3. The automatic valve position adjustment (e.g. direct to operation, valve purge, disable valve control, etc.) increases the count by 1, when stopped, and resets after completion
4. The valve only moves to the new target position if automatic valve adjustment receives a new setpoint, after automatic adjustment (positioning) is completed.

3.8.1 Parameter "Vx: Heating/cooling"

Parameter "Vx: Heating" and "Vx: Cooling" set the control type and associated parameters for heating and cooling valves. Various valve types are suitable for the different control types. The valve type must be considered when setting the control type. (The control type and associated parameters for valves in 2-pipe and 4-pipe valve systems are similar.)

Vx: Heating

General	Valve control mode	2 state-ON/OFF
Channel function	Valve type	<input checked="" type="radio"/> Normal(de-energised closed) <input type="radio"/> Inverted(de-energised open)
Valve 1 General	If bus recovery, valve position	<input checked="" type="radio"/> Unchange <input type="radio"/> Close valve
V1: Heating	If bus failure, valve position	<input checked="" type="radio"/> Unchange <input type="radio"/> Close valve
	Reply mode for valve status	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
	Valve purge function	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
	"Disable heating" object function	<input checked="" type="radio"/> Disable <input type="radio"/> Enable

Vx: Cooling

General	Valve control mode	2 state-ON/OFF
Channel function	Valve type	<input checked="" type="radio"/> Normal(de-energised closed) <input type="radio"/> Inverted(de-energised open)
Valve 1 General	If bus recovery, valve position	<input checked="" type="radio"/> Unchange <input type="radio"/> Close valve
V1: Cooling	If bus failure, valve position	<input checked="" type="radio"/> Unchange <input type="radio"/> Close valve
	Reply mode for valve status	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
	Valve purge function	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
	"Disable cooling" object function	<input checked="" type="radio"/> Disable <input type="radio"/> Enable

Name	Description	Range
Valve control mode	Sets the control type for the valve type. <ul style="list-style-type: none"> 2 states ON/OFF: Control type "2 state-ON/OFF" is suitable for common valves with type "ON/OFF". The output switches per the received ON/OFF request. Modulating, PWM: For control type "Modulating, PWM" the valve switches periodically per the received setpoint. 3-position, open and close: Suitable for controlling 3-port valves. The valve opening is controlled as per the valve control value. 	2 states ON/OFF Modulating, PWM 3-port, open and close

The following sections describe the parameter settings for the three operating modes using the parameter interface for a heating valve as an example; the cooling valve is similar.

3.8.1.1 Parameter "2-speed ON/OFF"

General	Valve control mode	2 state-ON/OFF
Channel function	Valve type	<input checked="" type="radio"/> Normal(de-energised closed) <input type="radio"/> Inverted(de-energised open)
Valve 1 General	If bus recovery, valve position	<input checked="" type="radio"/> Unchange <input type="radio"/> Close valve
V1: Heating	If bus failure, valve position	<input checked="" type="radio"/> Unchange <input type="radio"/> Close valve
	Reply mode for valve status	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
	Valve purge function	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
	Duration of valve purge time[1..255]min	10
	Automatic valve purge	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
	Purge Cycle in weeks[1..12]	1
	Reply mode for valve purge status(1bit)	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
	"Disable heating" object function	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
	Trigger object value	<input checked="" type="radio"/> 0=Disable/1=Enable <input type="radio"/> 1=Disable/0=Enable

Name	Description	Range
Valve type	Sets the direction of the valve switch. For 2-port valves "Normal (normally closed NC)" are closed when deenergized and "Inverted" (normally open NO) are open when deenergized.	Normal (normally closed NC) Inverted (normally open NO)

Name	Description	Range
If bus recovery, valve position	Sets the valve position after bus recovery. <ul style="list-style-type: none"> No change: The valve state remains unchanged after a bus failure. Close valve: The valve is closed. 	No change Close valve
If bus failure, valve position	Sets the valve position after a bus failure. <ul style="list-style-type: none"> No change: The valve state remains unchanged after a bus failure. Close valve: The valve is closed. Note: The valve state is "closed" by default after application programming.	No change Close valve
Reply mode for valve status	Defines the reaction to the valve state. <ul style="list-style-type: none"> Respond after read only: Object "Valve state, Heating/Cooling" sends the present state only after a read request to the bus. Respond after change: Object "Valve state, heating/cooling" immediately sends a telegram to the bus to report the state if the state changes or the device receives request to read the state. 	Respond after read only Respond after change
Valve purge function	Enabled: 1-bit object "Trigger valve purge, Heating/Cooling" displays and trigger the valve purge operation.	Disabled Selected
The following parameters only display if option "Enabled" is selected.		
Duration of valve purge time [1...255] min	Set the duration of the purge during which the valve is fully open. Once completed, returns to the state active prior to the purge. Note: The purge is continued if operations as part of heating/cooling are disabled during the purge. In other words, both the disable telegram as well as the valve control telegram are logged during the purge period and updated upon completion of the purge.	1...255 min
Automatic valve purge	The parameter displays if the valve purge function is enabled. Enabled: Enables automatic valve purge.	Disabled Selected
The following parameters only display if option "Enabled" is selected.		
Purge Cycle in weeks [1...12]	Defines the cycle for automatic valve purge (measured in weeks). The calculation begins at device startup and the purge operation is triggered after the timer expires. The time is reset, either automatically or by an object, as soon as the purge is completed. Note: Direct to operation has the highest priority and purge is second. If not expired and the purge operation is manually canceled, the purge is ended and not continued after the operation is canceled as per of direct to operation.	1...12
Reply mode for valve purge status (1bit)	The parameter displays if the valve purge function is enabled, and defines how it responds to state "Valve purge". <ul style="list-style-type: none"> Respond after read only: Object "Valve purge state, Heating/Cooling" sends the present state only after a read request to the bus. Respond after change: Object "Valve purge state, heating/cooling" immediately sends a telegram to the bus to report the state if the state changes or the device receives request to read the state. 	Response after read-only access Respond after change
"Disable heating/cooling" object function	Enable: 1-bit object "Disable, Heating/cooling" displays and can lock heating/cooling mode	Disabled Selected
The following parameters only display when "Enabled" is selected.		

Name	Description	Range
Trigger object value	<p>Sets the telegram value to disabled heating/cooling mode.</p> <ul style="list-style-type: none"> 0 = Disable/1 = enable if "Disable, Heating/cooling" receives telegram value "0", heating/cooling is disabled, and for "1" is enabled again. 1 = Disable/0 = Enable: If object "Disable, heating/cooling" receives telegram "1", heating/cooling is disabled and enabled again upon receipt of telegram "0". <p>Note: The valve goes immediately to the "Off" state if disabled. It goes to the present setpoint when re-enabled. The incoming control telegrams are logged during valve control lock and fault monitoring continues.</p>	<p>0 = Disable/1 = enable 1 = Disable/0 = enable:</p>

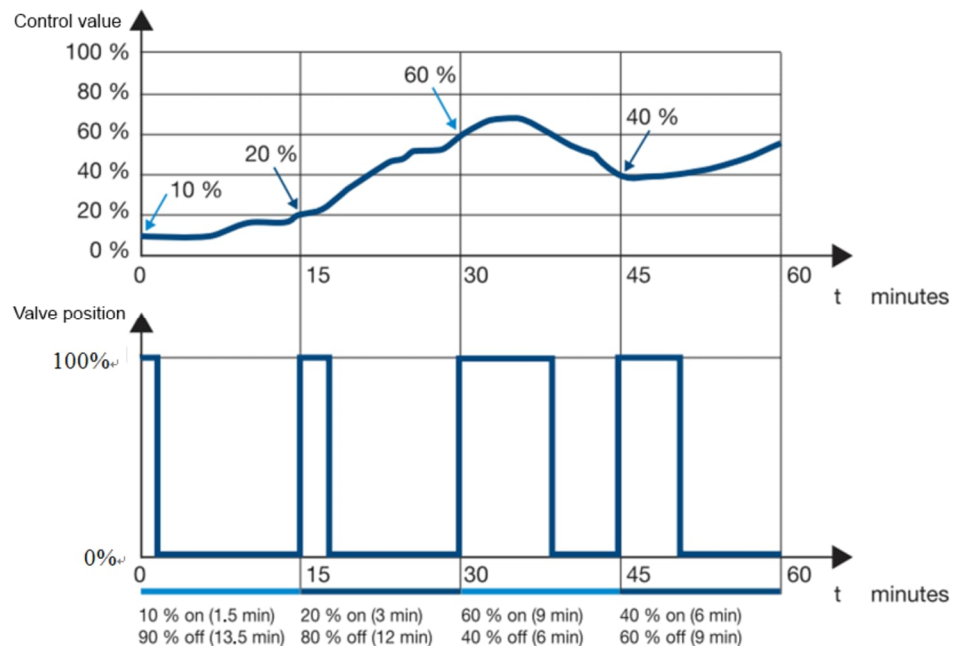
The purge function and valve control disable are similar for all control types, so that the following controls are not described multiple times.

3.8.1.2 Parameter "Modulating, PWM"

The control type is suitable for controlling 2-port valves.

There only two states: "Fully open" and "Fully closed". The valve is switched on and off in cycles as per the setpoint and PWM cycle. For example, at a setpoint of 20 % and a PWM cycle of 15 min., the valve is open for 3 minutes and closed for 12 minutes. At 60 %, the valve is open for 9 minutes and closed for 6. The setpoint for the present temperature from the thermostat or sensor and the setpoint temperature are evaluated and then sent to the device.

Schematic view of the valve setting:



The control type provides relatively precise temperature controller without temperature overshoot and supports the use of simple, inexpensive control valves, e.g. valves that can be paired with electric valve actuators at relative high switching frequencies.

The parameter interface for this control type is similar to "2 states ON/OFF", and the same parameters are not repeated here. The difference is that the PWM switching cycle can be set as follows:

Name	Description	Range
PWM cycle time [10...6000]s	Set the period for PWM control. The higher the value the less the valve is open and closed and vice-versa: The smaller the value, the more often the valve opens and closes.	10...6000 s

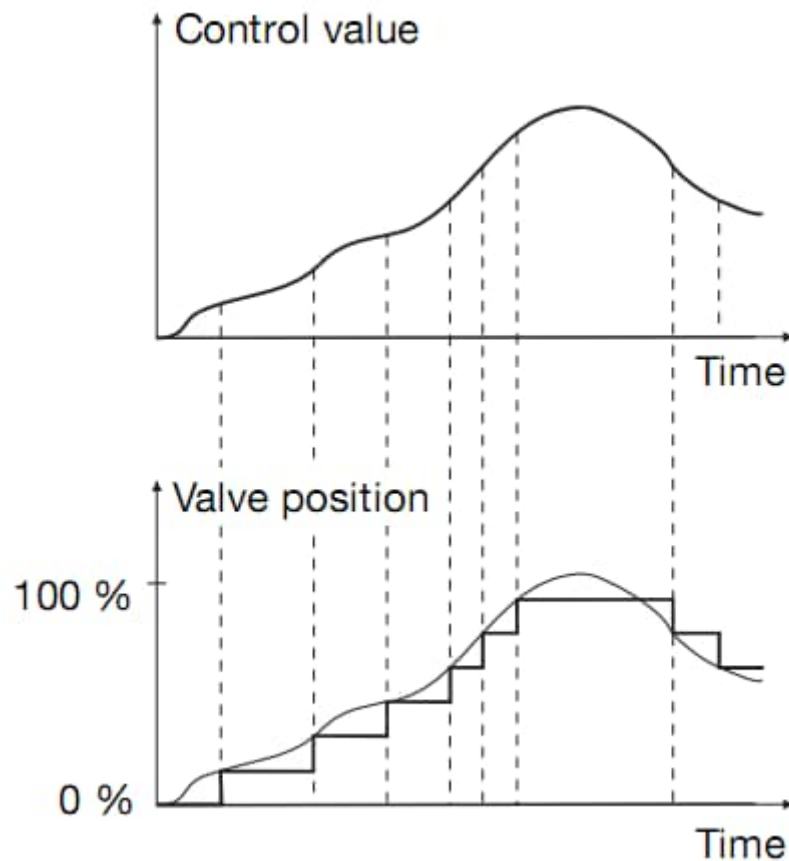
For modulating, PWM control, various switching states On/Off the feedback messages are as follows:

2-port valve	Description
Normal (normally closed NC)	Object "Valve state, heating/cooling" send telegram "0" if the valve relay is open. If closed, it sends telegram "1".
Inverted (normally open NO)	Object "Valve state, heating/cooling sends telegram "0" if the valve relay is closed and in a deenergized state (relay open), sends telegram "1".

3.8.1.3 Parameter "3-port, open and close"

General	Valve control mode	3 point, open and close
Channel function	Observe resevering time	400ms
Valve 1 General	If bus failure, valve position	Unchange
	If bus recovery, valve position	<input checked="" type="radio"/> Unchange <input type="radio"/> Close valve
V1: Heating/Cooling	Valve control time 0%->100%[50..6000]s	100
	Automatic adjust valve position	<input type="radio"/> NO <input checked="" type="radio"/> YES
	Number of valve control up to adjust [1..65535]	200
	Correct Valve characteristic curve	<input type="radio"/> NO <input checked="" type="radio"/> YES
	Min. controller value for closed valve [0..100]%	0
	Max. controller value for fully opened valve[0..100]%	100
	Lower valve position for opening [0..100]%	0
	Upper valve position for opening [0..100]%	100
	Reply mode for valve status	<input type="radio"/> Respond after read only <input checked="" type="radio"/> Respond after change
	Object type of valve status	<input type="radio"/> 1bit <input checked="" type="radio"/> 1byte
	Valve purge function	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
	"Disable heating/cooling" object function	<input checked="" type="radio"/> Disable <input type="radio"/> Enable

The control type is suitable for controlling a 3-port valve, with the valve controlled as per the setpoint received by the object and can move the valve to "Fully open", "Fully closed" or to a specific position. The control type is highly accurate and the opening and closing frequency is also very low. For example, the valve stops outflow when it reaches 20% if the setpoint is 20 %. Schematic view of the valve setting:



Name	Description	Range
Observe reseversing time	Sets the timeframe for stopping the valve in reverse operation to protect the valve. The reverse pause is a technical valve feature that must be considered for each operation and configuration.	100 ms 200 ms ... 1 s 1.2 s 1.5 s
If bus failure, valve position	Indicates that the valve position returns to the previous state after a system power failure.	No change
If bus recovery, valve position	Sets the valve position after return of system power. <ul style="list-style-type: none"> No change: Default state at start-up and is retained after system power is restored. Close valve: The valve is closed. Note: It is not treated as a system reset after a parameter download. Valve position is set to 0%. The next step can only be performed after determining the valve position. In this control type, the clock expires for automatic purge once the valve position is determined.	No change Close valve
Valve Control Time 0%-->100% [50...6000]s	Sets the time required for the valve to move from fully closed to a fully open state, i.e. total travel time. A travel time set for this parameter and present valve position of 20 % and target position of 60 % result in a valve travel time from 20 % → 60 % is 72 s. Consider the technical data for the valve to set this parameter.	50...6000 s

Name		Description	Range
Automatic adjust valve position		Sets whether to enable automatic valve position. Automatic valve setting mainly corrects the valve position since the valve can no longer be fully closed or opened after setting for various reasons, e.g. temperature, device aging, etc. and requires a repositioning.	Yes No
The following parameters only display when "Yes" is selected.			
	Number of valve control up to adjust [1...65535]	Sets how often the valve was set and and conducts an automatic setting, i.e. the valve position is set to 0 %, and the position is reset; requires a longer travel time. For example, if the setting is "100 times" and the valve is set 100 times, no automatic setting is undertaken for the 101st setting to the open position. If the valve is set in the closed direction, an automatic adjustment takes place, the valve is set to the 0% position and then to the target position. For example, if the valve position is 50% for the 100th position and 60% for the 101st position, the valve will not be set automatically until a command to reverse the setting is received. If the 101st value is 40 %, the valve is automatically set once to 0 % and then to the target position of 40 %. The time for automatic setting extends total travel time by 5 %, i.e. travel time + total travel time × 5 %, whereby total travel time × 5 % must be less than or equal to 1 min. It is set to 1 min if the value is greater than 1 min. The number of settings returns to zero if automatic setting is performed. The counter is increased one time if valve positioning stops (position setting after downloading the parameter is not counted as a setting). The setpoint is not performed until the end of automatic setting if received during automatic setting. If there is an operation with a higher priority, it is only performed after the end of the operation with the higher priority. Consider the technical data for the valve to set this parameter.	1...65535
Correct Valve characteristic curve		Sets whether to enable characteristic curve adjustment.	Yes No
The following parameters are only displayed when "Yes" is selected.			
	Min. controller value for closed valve [0...100]%	Sets the setpoint for the lower limit value of the valve characteristic curve.	0...100 %
	Max. controller value for fully opened valve [0...100]%	Sets the setpoint for the upper limit value of the valve characteristic curve.	0...100 %
	Lower valve position for opening [0...100]%	Sets the lower limit value for the valve position.	0...100 %
	Upper valve position for opening [0...100]%	Sets the upper limit value for the valve position.	0...100 %

Name	Description	Range
	<p>For example, a valve with valve interface relay sets the low limit value for the setpoint at 10%, the low limit value for the valve at 20 %, the high limit value for the setpoint at 70 % and the high limit value at 80 % has an output characteristic curve as per the following illustration:</p>	
Reply mode for valve status	<p>Defines the reaction to the valve state.</p> <ul style="list-style-type: none"> Respond after read only: Object "Valve state, Heating/Cooling" sends the present state only after a read request to the bus. Respond after change: Object "Valve state, heating/cooling" immediately sends a telegram to the bus to report the state if the state changes or the device receives request to read the state. 	<p>Respond after read only</p> <p>Respond after change</p>
Object type of valve status	<p>Sets the object type for valve position state feedback.</p> <ul style="list-style-type: none"> 1 bit: The next parameter displays, and a 1-bit object "Valve state, heating/cooling" indicates that the feedback on the opening and closing valve state applies. 1 byte: The 1-byte object "Valve state, heating/cooling" displays and provides feedback on valve position state. 	<p>1 bit</p> <p>1 byte</p>
The following parameters only display if "1 bit" is selected.		
Object value with valve position >0	<p>This parameter reports the opening and closing valve state.</p> <p>1: Object "Valve state, heating/cooling" sends at a valve position >0, value "1", and for valve position "0", value "0". 0: Object "Valve state, heating/cooling" sends at a valve position > 0, value "0", and for valve position "0", the value "1".</p>	<p>0</p> <p>1</p>

3.8.2 Communication objects for valve output

The description of the communication objects for the valve output are based on a 4-pipe valve system.

Numb	Name	Object Function	Des	Group	Length	C	R	W	T	U	Data Type	Priority
315	4-pipe Valve 1	Heat/Cool mode status			1 bit	C	R	-	T	-	cooling/heating	Low
316	4-pipe Valve 1	Control value fault			1 bit	C	R	-	T	-	alarm	Low
317	4-pipe Valve 1	Disable,Heat			1 bit	C	-	W	-	-	enable	Low
318	4-pipe Valve 1	Control value, Heat			1 byte	C	-	W	-	-	percentage (0..100%)	Low
319	4-pipe Valve 1	Valve status, Heat			1 bit	C	R	-	T	-	switch	Low
320	4-pipe Valve 1	Trigger valve purge, Heat			1 bit	C	-	W	-	-	enable	Low
321	4-pipe Valve 1	Valve purge status, Heat			1 bit	C	R	-	T	-	enable	Low
322	4-pipe Valve 1	Disable,Cool			1 bit	C	-	W	-	-	enable	Low
323	4-pipe Valve 1	Control value, Cool			1 bit	C	-	W	-	-	switch	Low
324	4-pipe Valve 1	Valve status, Cool			1 bit	C	R	-	T	-	switch	Low
325	4-pipe Valve 1	Trigger valve purge, Cool			1 bit	C	-	W	-	-	enable	Low
326	4-pipe Valve 1	Valve purge status, Cool			1 bit	C	R	-	T	-	enable	Low

Num ber	Name	Object function	Length	Flag	Data type
315	4-pipe Valve X	Heat/Cool mode status	1 bit	KLÜ	1.100 DPT_Heat/Cool
The object reports changes to the bus to state "Heating/cooling" for the present valve output. Telegram "0" – Cooling Telegram "1" – Heating					
316	4-pipe Valve X	Control value fault	1 bit	KLÜ	1.005 DPT_Alarm
The object reports a fault if the device cannot receive a setpoint from an external controller during the monitoring period. The fault is rescinded as soon as the setpoint is received. Telegram "0" – No fault Telegram "1" – Fault					
317 322	4-pipe Valve X	Disable, Heat/Cool	1 bit	KS	1.003 DPT_Enable
The object can disable or enable the heating/cooling valve. The valve goes immediately to 0% (closed) when disabled and is controlled to the present setpoint when enabled.					
318 323	4-pipe Valve X	Control value, Heat/Cool	1 byte 1 bit	KS	5.001 DPT_Scaling 1.001 DPT_Switch
Receives the valve setpoints from other controllers. In a 2-pipe system, heating and cooling valves share an object (318) to receive valve setpoints. The setpoint can be 1 bit or 1 byte (depending on the control type).					
319 324	4-pipe Valve X	Valve status, Heat/Cool	1 byte 1 bit	KLÜ	5.001 DPT_Scaling 1.001 DPT_Switch
Indicates the opening or closing state of the valve, and the parameter setting determines the object type.					
320 325	4-pipe Valve X	Trigger valve purge, Heat/Cool	1 bit	KS	1.003 DPT_Enable
Trigger a valve purge. The valve is fully open during the purge. Telegram "0" – Purge is completed. Telegram "1" – Purge is triggered.					
321 326	4-pipe Valve X	Valve purge status, Heat/Cool	1 bit	KLÜ	1.003 DPT_Enable
Indicates the purge state of the valve. The associated state displays as soon as the purge is enabled. Telegram "0" – Purge function is disabled. Telegram "1" – Purge function is enabled					

4 Appendix

4.1 Cyber security disclaimer

Siemens provides a portfolio of products, solutions, systems and services that includes security functions that support the secure operation of plants, systems, machines and networks. In the field of Building Technologies, this includes building automation and control, fire safety, security management as well as physical security systems.

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Issued by
Siemens Switzerland Ltd
Smart Infrastructure
Global Headquarters
Theilerstrasse 1a
CH-6300 Zug
+41 58 724 2424
www.siemens.com/buildingtechnologies