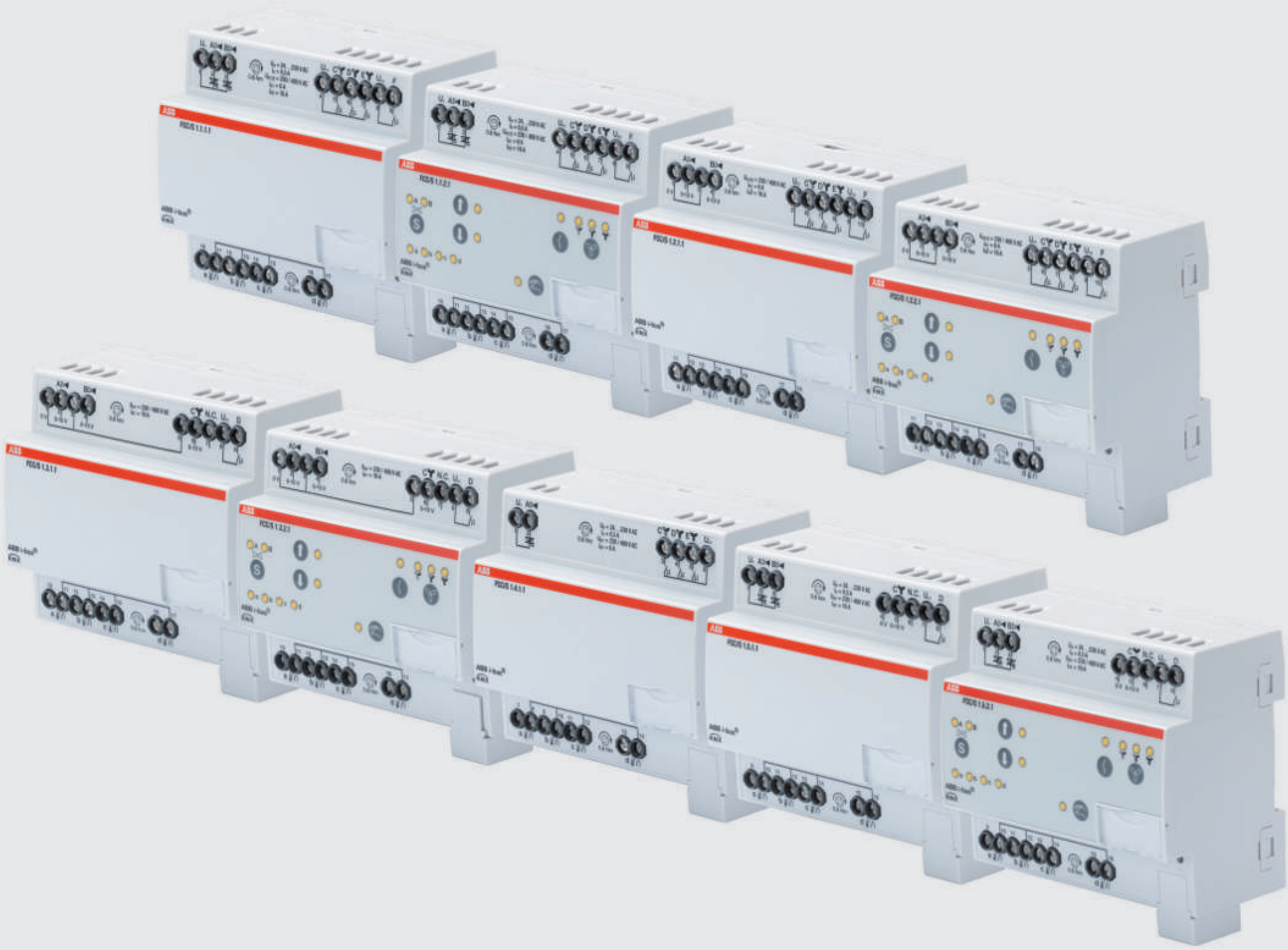
PRODUCT MANUAL

ABB i-bus® KNX

FCC/S 1.X.X.1

Fan Coil Controller



1 General

1.1 Using the product manual

This manual provides detailed technical information on the function, installation and programming of the ABB i-bus® KNX

1.2 Legal disclaimer

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1.3 Explanation of symbols

1. 2.	Instructions in specified sequence
▶	Individual action
a)	Priorities
1)	Processes run by the device in a specific sequence
•	1st-level list
–	2nd-level list

Table 1: Explanation of symbols

Notes and warnings are represented as follows in this manual:

DANGER -

DANGER This symbol is a warning about electrical voltage and indicates high-risk hazards that will definitely result in death or serious injury unless avoided.

DANGER -

DANGER Indicates high-risk hazards that will definitely result in death or serious injury unless avoided.

WARNING -

WARNING Indicates medium-risk hazards that could result in death or serious injury unless avoided.

CAUTION -

CAUTION Indicates low-risk hazards that could result in slight or moderate injury unless avoided.

NOTICE

ATTENTION Indicates a risk of malfunctions or damage to property and equipment, but with no risk to life and limb.

Example:

For use in application, installation and programming examples

Note

For use in tips on usage and operation

2 Safety

2.1 General safety instructions

- ► Protect the device from moisture, dirt and damage during transport, storage and operation.
- ► Operate the device only within the specified technical data.
- ► Operate the device only in a closed housing (distribution board).
- ► Mounting and installation must be carried out by qualified electricians
- ► Switch off the device supply voltage before mounting.

2.2 Proper use

The Fan Coil Controller can be installed either centrally in an electrical distribution board or distributed in a fan coil unit.

The device is a Modular Installation Device for quick installation in distribution boards on 35 mm mounting rails to EN 60715.

3 Product Overview

3.1 Product Overview

The devices are Modular Installation Device (MDRC) in pro *M* design. The module width of the devices is six space units. They are designed for installation in distribution boards on 35 mm mounting rails.

The devices are powered by the bus and require no additional auxiliary voltage supply. They connect to the ABB i-bus® KNX via a bus connection terminal at the front.

Physical address assignment and parametrization are carried out with the Engineering Tool Software (ETS).

The device is ready for operation after connecting the supply voltage.

Abbreviation	**Description**		
F	Fan		
C	Coil		
C	Controller		
/S	MDRC		
x.	1	=	1-fold
x.	1	=	Electrothermal Valve Drive (PWM); 3-speed fan (relay)
	2	=	Analog valve drive (0…10 V); 3-speed fan (relay)
	3	=	Analog valve drive (0…10 V); continuous fan (0...10 V)
	4	=	Electrothermal Valve Drive (PWM); 3-speed fan (relay)
	5	=	Electrothermal Valve Drive (PWM); continuous fan (0…10 V)
x.	1	=	Without manual operation
	2	=	With manual operation
x	x	=	Version number (x = 1, 2, etc.)

Table 2: Product name description

	FCC/S 1.1.1.1	**FCC/S 1.1.2.1**	**FCC/S 1.2.1.1**	**FCC/S 1.2.2.1**	**FCC/S 1.3.1.1**	**FCC/S 1.3.2.1**	**FCC/S 1.4.1.1**	**FCC/S 1.5.1.1**	**FCC/S 1.5.2.1**
Operation									
Manual operation	–	x	–	x	–	x	–	–	x
Inputs									
Contact scanning or temperature sensor	x	x	x	x	x	x	x	x	x
Analog room control unit	x	x	x	x	x	x	x	x	x
Outputs									
3-speed fan (relay)	x	x	x	x	–	–	x	–	–
Continuous fan (0… 10 V)	–	–	–	–	x	x	–	x	x
Electronic valves (PWM/3-point)	x	x	–	–	–	–	x	x	x
Analog valves (0…10 V)	–	–	x	x	x	x	–	–	–
Switching contacts 16 A (additional heater)	x	x	x	x	x	x	–	x	x

Table 3: Product Overview

Each fan output on Fan Coil Controllers FCC/S 1.1.x.1, FCC/S 1.2.x.1 and FCC/S 1.4.1.1 features a relay that is mechanically independent of the other outputs. All Fan Coil Controllers except the FCC/S 1.4.1.1 also have an auxiliary relay for switching an additional heater. Switching noises cannot be avoided due to the mechanical nature of the design.

3.2 Ordering details

Description	MB	Type	Order No.	Packaging unit [pcs.]	Weight 1 pc. [g]
Fan Coil Controller	6	FCC/S 1.1.1.1	2CDG 110 210 R0011	1	230
Fan Coil Controller	6	FCC/S 1.1.2.1	2CDG 110 211 R0011	1	235
Fan Coil Controller	6	FCC/S 1.2.1.1	2CDG 110 212 R0011	1	230
Fan Coil Controller	6	FCC/S 1.2.2.1	2CDG 110 213 R0011	1	235
Fan Coil Controller	6	FCC/S 1.3.1.1	2CDG 110 214 R0011	1	210
Fan Coil Controller	6	FCC/S 1.3.2.1	2CDG 110 215 R0011	1	215
Fan Coil Controller	6	FCC/S 1.4.1.1	2CDG 110 209 R0011	1	215
Fan Coil Controller	6	FCC/S 1.5.1.1	2CDG 110 234 R0011	1	210
Fan Coil Controller	6	FCC/S 1.5.2.1	2CDG 110 235 R0011	1	215

Table 4: Ordering details

3.3 Fan Coil Controller FCC/S 1.1.1.1, PWM, MDRC

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Fig. 1: Device illustration FCC/S 1.1.1.1

The device is a modular installation device (MDRC) in pro *M* design. It is intended for installation in distribution boards on 35 mm mounting rails. Physical address assignment and parametrization are carried out with ETS.
The device is powered by the ABB i-bus® KNX bus and requires no additional auxiliary voltage supply. The device is ready for operation after connecting the bus voltage.

3.3.1 Dimension drawing

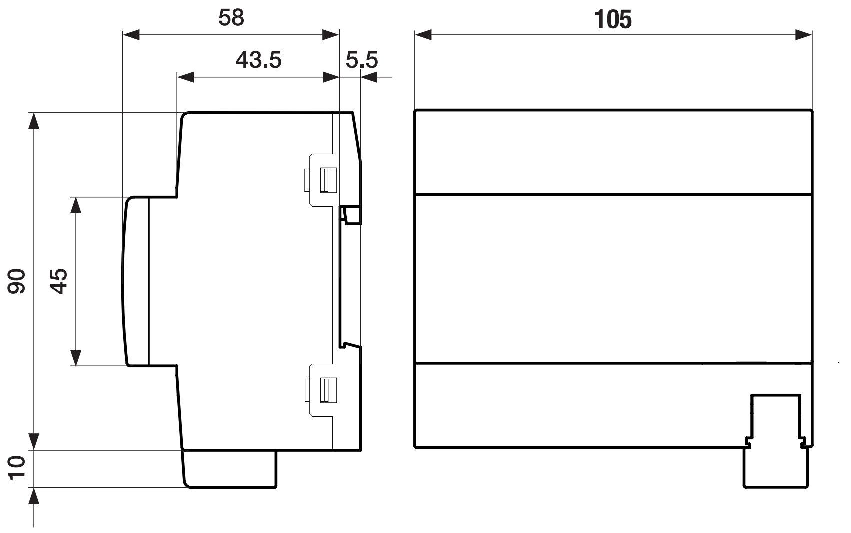

Fig. 2: Dimension drawing

3.3.2 Connection diagram

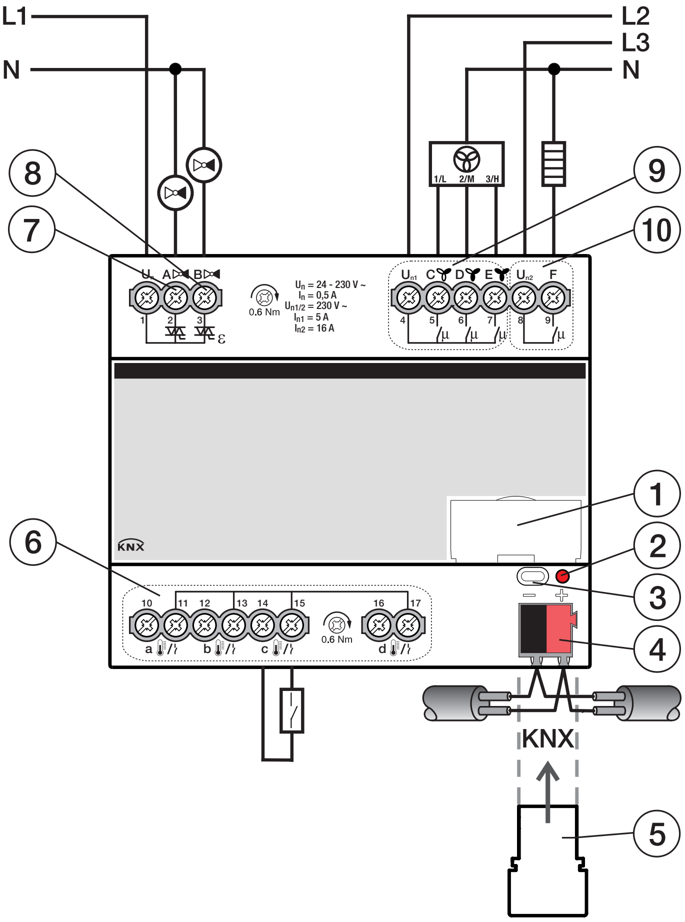

Fig. 3: FCC/S 1.1.1.1

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LEGEND

1	Label carrier
2	Programming LED
3	Programming button
4	Bus connection terminal
5	Cover cap
6	Inputs (a, b, c, d)
7	Valve output A
8	Valve output B
9	Fan output
10	Auxiliary relay

3.3.3 Operating and display elements

Button/LED	Description/Function	LED indicator
⬭ 🔴	Assignment of the physical address	On: Device is in programming mode.

Table 5: Operating and display elements – general

3.3.4 Technical data

3.3.4.1 General technical data

Supply	Bus voltage	21…32 V DC
	Current consumption, bus	< 12 mA
	Leakage loss, bus	Maximum 250 mW
	Leakage loss, device	Maximum 3 W
	KNX connection	0.25 W
	Relay 16 A	1.0 W
	Relay 5 A	0.6 W
	Electronic outputs	1.2 W
Terminals	KNX	Via bus connection terminal
	Inputs/Outputs	Via screw terminals
Connection terminals	Screw terminal	Screw terminal with universal head (PZ 1)
		0.2…4 mm² stranded, 2 x (0.2…2.5 mm²)
		0.2…6 mm² single core, 2 x (0.2…4 mm²)
	Wire end ferrule without plastic sleeve	0.25...2.5 mm²
	Wire end ferrule with plastic sleeve	0.25...4 mm²
	TWIN ferrules	0.5...2.5 mm²
	Wire end ferrule contact pin length	Min. 10 mm
	Tightening torque	Max. 0.6 Nm
	Grid	6.35
Protection degree and class	Degree of protection	IP 20 to EN 60529
	Protection class	II to EN 61140
Isolation category	Overvoltage category	III to EN 60664-1
	Pollution degree	II to EN 60664-1
SELV	KNX safety extra low voltage	SELV 24 V DC
Temperature range	Operation	-5...+45°C
	Transport	-25...+70°C
	Storage	-25...+55°C
Ambient conditions	Maximum air humidity	93%, no condensation allowed
	Atmospheric pressure	Atmosphere up to 2,000 m
Design	Modular installation device (MDRC)	Modular installation device
	Design	ProM
	Housing/color	Plastic housing, gray
Dimensions	Dimensions	90 x 105 x 63.5 mm (H x W x D)
	Mounting width in space units	6x 18 mm modules
	Mounting depth	63.5 mm
Mounting	35 mm mounting rail	To EN 60715
	Mounting position	Any
	Weight	0.23 kg
	Fire classification	Flammability V-0 as per UL94
Approvals	KNX certification	To EN 50491
	Certification	To EN 60669
	CE marking	In accordance with the EMC directive and low voltage directive

3.3.4.2 Device type

Device type	Fan Coil Controller	FCC/S 1.1.1.1
	Application	Fan Coil Unit Controller, PWM/…*
	Maximum number of group objects	114
	Maximum number of group addresses	255
	Maximum number of assignments	255

* … = Current version number of the application. Please refer the software information on our homepage for this purpose.

3.3.4.3 Valve outputs (electrothermal, PWM)

Rated values	Number	2
	non-floating	Yes
	U_n rated voltage	24…230 V AC (50/60 Hz)
	I_n rated current (per output pair)	0.5 A
	Continuous current at T_u up to 20°C	0.25 A resistive load per channel
	Continuous current at T_u up to 45°C	0.15 A resistive load per channel
	Starting current	Maximum 1.6 A, 10 s at T_u up to 45°C
		T_u = ambient temperature
	Minimum load	1.2 VA per PWM output

3.3.4.4 Valve outputs (motor-driven, 3-point)

Rated values	Number	1
	non-floating	Yes
	U_n rated voltage	24…230 V AC (50/60 Hz)
	I_n rated current (per output pair)	0.5 A
	Continuous current at T_u up to 20°C	0.25 A resistive load per channel
	Continuous current at T_u up to 45°C	0.15 A resistive load per channel
	Starting current	Maximum 1.6 A, 10 s at T_u up to 45°C
		T_u = ambient temperature
	Minimum load	1.2 VA per output

3.3.4.5 Rated current output 16 A

Rated values	Number	1
	U_{n2} rated voltage	250 V AC (50/60 Hz)
	I_{n2} rated current (per output pair)	16 A (resistive load for additional heater)
Switching currents	AC3* operation (cos ϕ = 0.45) to EN 60947-4-1	16 A / 230 V AC
	AC1* operation (cos ϕ = 0.8) to EN 60947-4-1	16 A / 230 V AC
	Minimum switching capacity at 100 mA	24 V AC
	DC current switching capacity, resistive load, at 16 A	24 V DC
Service life	Mechanical service life	> 3 x 10^6 cycles
	Electrical endurance of switching contacts to IEC 60947-4-1	> 10^6 cycles
	AC1* (240 V/cos ϕ=0.8)	> 10^5 cycles
Switching times	Maximum relay position change per output and minute if only one relay is switched.	> 500

3.4 Fan Coil Controller FCC/S 1.1.2.1, PWM, MDRC


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Fig. 4: Device illustration FCC/S 1.1.2.1

The device is a modular installation device (MDRC) in pro *M* design. It is intended for installation in distribution boards on 35 mm mounting rails. Physical address assignment and parametrization are carried out with ETS.
The device is powered by the ABB i-bus® KNX bus and requires no additional auxiliary voltage supply. The device is ready for operation after connecting the bus voltage.

3.4.1 Dimension drawing

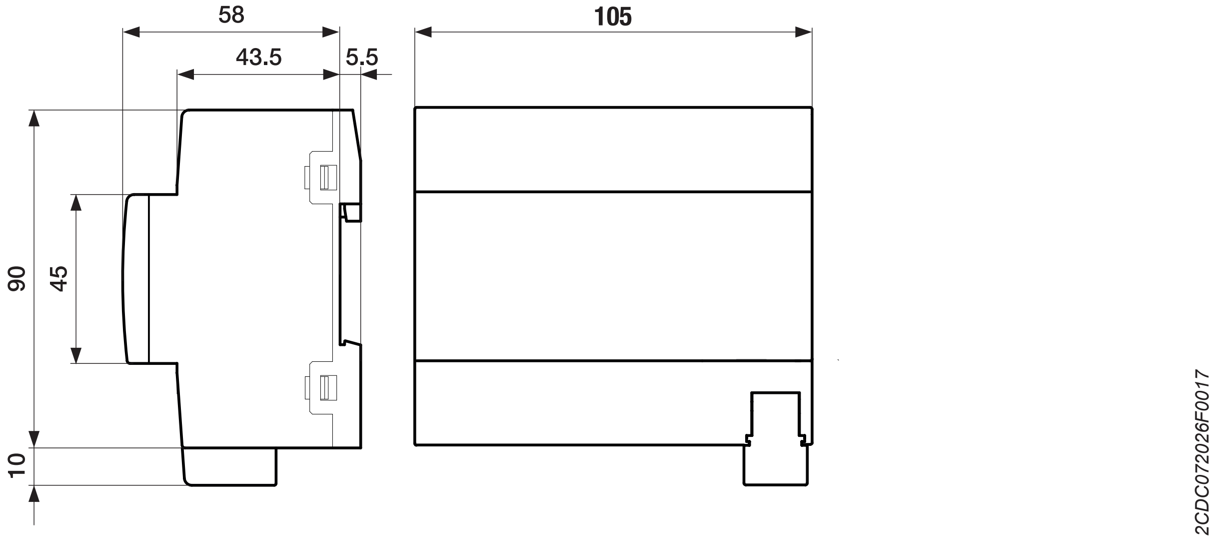

Fig. 5: Dimension drawing

3.4.2 Connection diagram

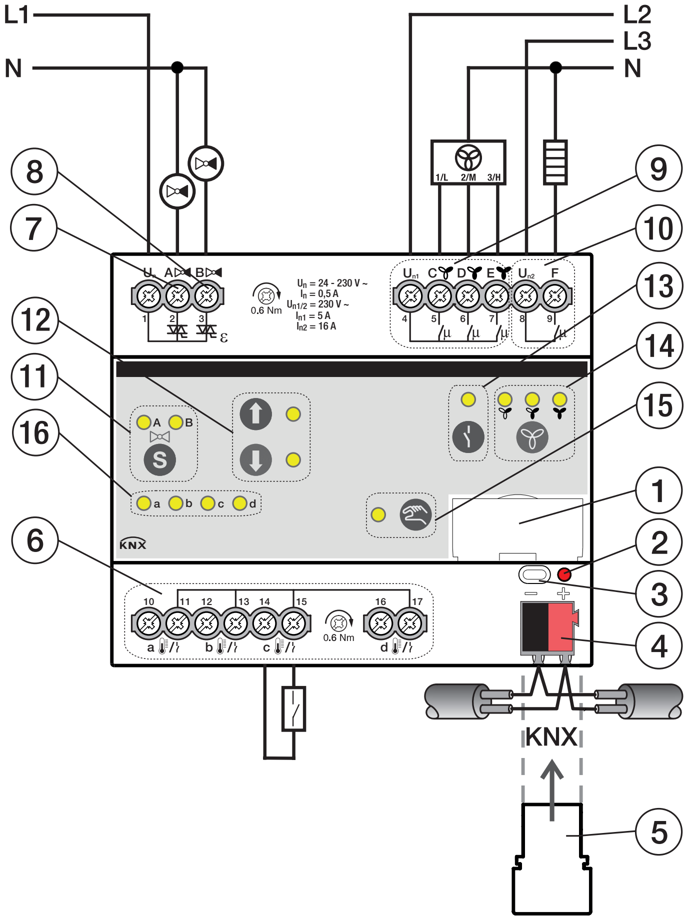

Fig. 6: FCC/S 1.1.2.1

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LEGEND

1	Label carrier	9	Fan output
2	Programming LED	10	Auxiliary relay
3	Programming button	11	Valve output changeover button/LED
4	Bus connection terminal	12	Valve output open/close button/LED
5	Cover cap	13	Relay output open/close button/LED
6	Inputs (a, b, c, d)	14	Switch fan speed button/LED
7	Valve output A	15	Manual operation button/LED
8	Valve output B	16	Inputs (a, b, c, d) status indicator LEDs

3.4.3 Operating and display elements

Button/LED	Description/Function	LED indicator
▭ ●	Assignment of the physical address	On: Device is in programming mode.

Table 6: Operating and display elements – general

Manual operation

Button/LED	Description/Function	LED indicator
● A ● B ⋈ S Valve output changeover	Switches between valve A and valve B If a valve output has been disabled in the parameters, it is not possible to select the valve.	On: Indicates the selected valve Flashing: Error (overload/short circuit) on the output concerned
⬆ ● Open valve output	Maximum valve control value (100 %) set. Reset both outputs: Button must be pressed for at least 5 seconds.	On: Valve control value at 100% Flashing: Indicates a fault, e.g. overload/short circuit
⬇ ● Close valve output	Minimum valve control value (0 %) is set.	On: Valve control value at 0 % Flashing: Indicates a fault, e.g. overload/short circuit
⬆ ● ⬇ ●		Both LEDs on: Valve control value is between 1% and 99% Both LEDs off: Fault
● ⌿ Open/close relay output	Relay is switched.	On: Contact closed Off: Contact open

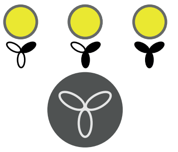
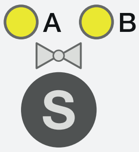
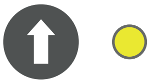
Button/LED	Description/Function	LED indicator
 Fan speed	Switches the fan speed in the following sequence: • 0 > 1 > 2 > 3 > 0 > 1… (Long push of the button always switches to 0.)	Indication of the current fan speed with speed switching: • Speed 0: all LEDs off • Speed 1: LED 1 on • Speed 2: LEDs 1 &2 on • Speed 3: all LEDs on Indication of the current fan speed with changeover switching: • Speed 0: all LEDs off • Speed 1: LED 1 on • Speed 2: LED 2 on • Speed 3: LED 3 on
 Manual operation	Activate KNX mode with a short press of the button.	On: On: The device is in Manual Off: Device is in KNX mode
 Inputs a...x	LED indication depending on how the inputs are used.	Binary sensor: • LED on: Contact closed • LED off: Contact open Temperature sensor: • LED on: Temperature sensor connected • LED flashing: Error (cable break/short circuit) Analog room control unit • LED on: Analog room control unit connected • LED flashing: Error (cable break/short circuit)

Table 7: Operating and display elements – manual operation

KNX operation

Button/LED	Description/Function	LED indicator
 Valve output changeover	Switches between valve A and valve B If a valve output has been disabled in the parameters, it is not possible to select the valve.	On: Indicates the selected valve Flashing: Error (overload/short circuit) on the output concerned
 Open valve output/increase control value	Button without function	On: Valve control value at 100% Flashing: Indicates a fault, e.g. overload/short circuit
 Close valve output/decrease control value	Button without function	On: Valve control value at 0 % Flashing: Indicates a fault, e.g. overload/short circuit

Button/LED	Description/Function	LED indicator
⬆ ● ⬇ ●	Button without function	Both LEDs on: Valve control value between 1 % and 99 % Both LEDs off: Fault
● Open/close relay output	Button without function	On: Contact closed Off: Contact open
● ● ● Fan speed	Button without function	Indication of the current fan speed with speed switching: • Speed 0: all LEDs off • Speed 1: LED 1 on • Speed 2: LEDs 1 &2 on • Speed 3: all LEDs on Indication of the current fan speed with changeover switching: • Speed 0: all LEDs off • Speed 1: LED 1 on • Speed 2: LED 2 on • Speed 3: LED 3 on
● Manual operation	Activate manual operation by pressing and holding the button (for at least 5 seconds).	On: On: The device is in Manual Off: Device is in KNX mode Flashing when button is pressed: Manual operation has been deactivated via ETS parameters
● a ● b ● c ● d Inputs a...x	LED indication depending on how the inputs are used.	Binary sensor: • LED on: Contact closed • LED off: Contact open Temperature sensor: • LED on: Temperature sensor connected • LED flashing: Error (cable break/short circuit) Analog room control unit • LED on: Analog room control unit connected • LED flashing: Error (cable break/short circuit)

Table 8: Operating and display elements – KNX operation

3.4.4 Technical data

3.4.4.1 General technical data

Supply	Bus voltage	21…32 V DC
	Current consumption, bus	< 12 mA
	Leakage loss, bus	Maximum 250 mW
	Leakage loss, device	Maximum 3 W
	KNX connection	0.25 W
	Relay 16 A	1.0 W
	Relay 5 A	0.6 W
	Electronic outputs	1.2 W
Terminals	KNX	Via bus connection terminal
	Inputs/Outputs	Via screw terminals
Connection terminals	Screw terminal	Screw terminal with universal head (PZ 1)
		0.2…4 mm² stranded, 2 x (0.2…2.5 mm²)
		0.2…6 mm² single core, 2 x (0.2…4 mm²)
	Wire end ferrule without plastic sleeve	0.25...2.5 mm²
	Wire end ferrule with plastic sleeve	0.25...4 mm²
	TWIN ferrules	0.5...2.5 mm²
	Wire end ferrule contact pin length	Min. 10 mm
	Tightening torque	Max. 0.6 Nm
	Grid	6.35
Protection degree and class	Degree of protection	IP 20 to EN 60529
	Protection class	II to EN 61140
Isolation category	Overvoltage category	III to EN 60664-1
	Pollution degree	II to EN 60664-1
SELV	KNX safety extra low voltage	SELV 24 V DC
Temperature range	Operation	-5...+45°C
	Transport	-25...+70°C
	Storage	-25...+55°C
Ambient conditions	Maximum air humidity	93%, no condensation allowed
	Atmospheric pressure	Atmosphere up to 2,000 m
Design	Modular installation device (MDRC)	Modular installation device
	Design	ProM
	Housing/color	Plastic housing, gray
Dimensions	Dimensions	90 x 105 x 63.5 mm (H x W x D)
	Mounting width in space units	6x 17,5 mm modules
	Mounting depth	63.5 mm
Mounting	35 mm mounting rail	To EN 60715
	Mounting position	Any
	Weight	0.24 kg
	Fire classification	Flammability V-0 as per UL94
Approvals	KNX certification	To EN 50491
	Certification	To EN 60669
	CE marking	In accordance with the EMC directive and low voltage directive

3.4.4.2 Device type

Device type	Fan Coil Controller	FCC/S 1.1.2.1
	Application	Fan Coil Unit Controller, PWM, manual operation/…*
	Maximum number of group objects	116
	Maximum number of group addresses	255
	Maximum number of assignments	255

* … = Current version number of the application. Please refer the software information on our homepage for this purpose.

3.4.4.3 Valve outputs (electrothermal, PWM)

Rated values	Number	2
	non-floating	Yes
	U_n rated voltage	24…230 V AC (50/60 Hz)
	I_n rated current (per output pair)	0.5 A
	Continuous current at T_u up to 20°C	0.25 A resistive load per channel
	Continuous current at T_u up to 45°C	0.15 A resistive load per channel
	Starting current	Maximum 1.6 A, 10 s at T_u up to 45°C
	Minimum load	1.2 VA per PWM output

3.4.4.4 Valve outputs (motor-driven, 3-point)

Rated values	Number	1
	non-floating	Yes
	U_n rated voltage	24…230 V AC (50/60 Hz)
	I_n rated current (per output pair)	0.5 A
	Continuous current at T_u up to 20°C	0.25 A resistive load per channel
	Continuous current at T_u up to 45°C	0.15 A resistive load per channel
	Starting current	Maximum 1.6 A, 10 s at T_u up to 45°C
	Minimum load	1.2 VA per PWM output

3.4.4.5 Rated current output 16 A

Rated values	Number	1
	U_{n2} rated voltage	250 V AC (50/60 Hz)
	I_{n2} rated current (per output pair)	16 A (resistive load for additional heater)
Switching currents	AC3* operation (cos ϕ = 0.45) to EN 60947-4-1	16 A / 230 V AC
	AC1* operation (cos ϕ = 0.8) to EN 60947-4-1	16 A / 230 V AC
	Minimum switching capacity at 100 mA	24 V AC
	DC current switching capacity, resistive load, at 16 A	24 V DC
Service life	Mechanical service life	> 3 x 10^6 cycles
	Electrical endurance of switching contacts to IEC 60947-4-1	> 10^6 cycles
	AC1* (240 V/cos ϕ=0.8)	> 10^5 cycles
Switching times	Maximum relay position change per output and minute if only one relay is switched.	> 500

3.5 Fan Coil Controller FCC/S 1.2.1.1, 0-10V, MDRC

Fig. 7: Device illustration FCC/S 1.2.1.1

The device is a modular installation device (MDRC) in pro *M* design. It is intended for installation in distribution boards on 35 mm mounting rails. Physical address assignment and parametrization are carried out with ETS.
The device is powered by the ABB i-bus® KNX bus and requires no additional auxiliary voltage supply. The device is ready for operation after connecting the bus voltage.

3.5.1 Dimension drawing

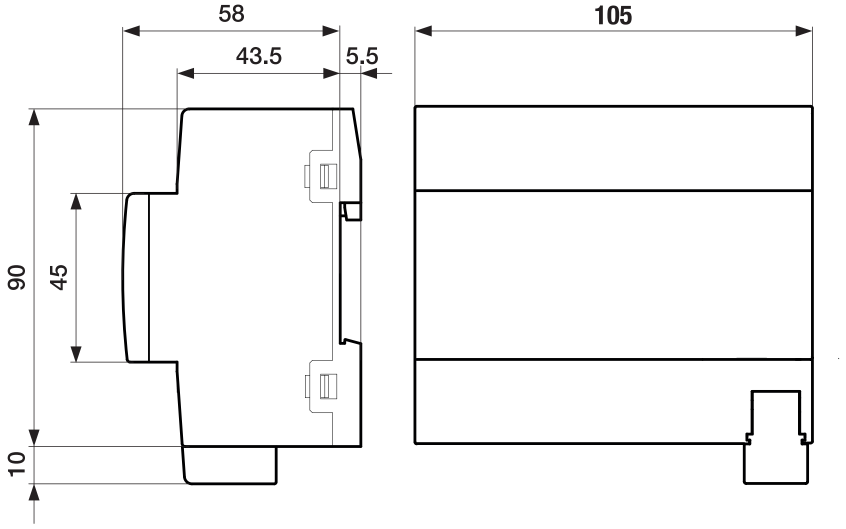


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Fig. 8: Dimension drawing

3.5.2 Connection diagram

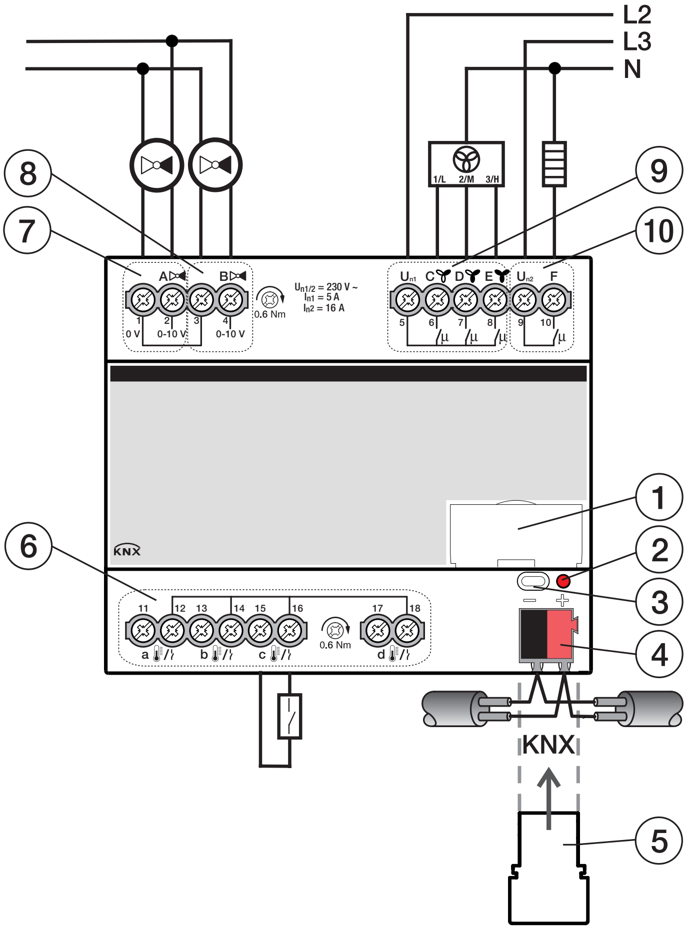

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Fig. 9: FCC/S 1.2.1.1

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LEGEND

1	Label carrier
2	Programming LED
3	Programming button
4	Bus connection terminal
5	Cover cap
6	Inputs (a, b, c, d)
7	Valve output A
8	Valve output B
9	Fan output
10	Auxiliary relay

3.5.3 Operating and display elements

Button/LED	Description/Function	LED indicator
⬭ ●	Assignment of the physical address	On: Device is in programming mode.

Table 9: Operating and display elements – general

3.5.4 Technical data

3.5.4.1 General technical data

Supply	Bus voltage	21…32 V DC
	Current consumption, bus	< 12 mA
	Leakage loss, bus	Maximum 250 mW
	Leakage loss, device	Maximum 3 W
	KNX connection	0.25 W
	Relay 16 A	1.0 W
	Relay 5 A	0.6 W
Terminals	KNX	Via bus connection terminal
	Inputs/Outputs	Via screw terminals
Connection terminals	Screw terminal	Screw terminal with universal head (PZ 1)
		0.2…4 mm² stranded, 2 x (0.2…2.5 mm²)
		0.2…6 mm² single core, 2 x (0.2…4 mm²)
	Wire end ferrule without plastic sleeve	0.25...2.5 mm²
	Wire end ferrule with plastic sleeve	0.25...4 mm²
	TWIN ferrules	0.5...2.5 mm²
	Wire end ferrule contact pin length	Min. 10 mm
	Tightening torque	Max. 0.6 Nm
	Grid	6.35
Protection degree and class	Degree of protection	IP 20 to EN 60529
	Protection class	II to EN 61140
Isolation category	Overvoltage category	III to EN 60664-1
	Pollution degree	II to EN 60664-1
SELV	KNX safety extra low voltage	SELV 24 V DC
Temperature range	Operation	-5...+45°C
	Transport	-25...+70°C
	Storage	-25...+55°C
Ambient conditions	Maximum air humidity	93%, no condensation allowed
	Atmospheric pressure	Atmosphere up to 2,000 m
Design	Modular installation device (MDRC)	Modular installation device
	Design	ProM
	Housing/color	Plastic housing, gray
Dimensions	Dimensions	90 x 105 x 63.5 mm (H x W x D)
	Mounting width in space units	6x 17,5 mm modules
	Mounting depth	63.5 mm
Mounting	35 mm mounting rail	To EN 60715
	Mounting position	Any
	Weight	0.23 kg
	Fire classification	Flammability V-0 as per UL94
Approvals	KNX certification	To EN 50491
	Certification	To EN 60669
	CE marking	In accordance with the EMC directive and low voltage directive

3.5.4.2 Device type

Device type	Fan Coil Controller	FCC/S 1.2.1.1
	Application	Fan Coil Unit Controller, 0-10 V/…*
	Maximum number of group objects	116
	Maximum number of group addresses	255
	Maximum number of assignments	255

* … = Current version number of the application. Please refer the software information on our homepage for this purpose.

3.5.4.3 Inputs

For Analog Room Controller	Number	1
Contact scanning	Scanning current	1 mA
	Scanning voltage	12 V
Resistance	Select	User-defined
	PT 1.000	2-conductor technology
	PT 100	2-conductor technology
	KT	1k
	KTY	2k
	NI	1k
	NTC	20k
Line length	between sensor and device input	Max. 100 m, one-way

3.5.4.4 Rated current output 16 A

Rated values	Number	1
	U_{n2} rated voltage	250 V AC (50/60 Hz)
	I_{n2} rated current (per output pair)	16 A (resistive load for additional heater)
Switching currents	AC3* operation (cos ϕ = 0.45) to EN 60947-4-1	16 A / 230 V AC
	AC1* operation (cos ϕ = 0.8) to EN 60947-4-1	16 A / 230 V AC
	Minimum switching capacity at 100 mA	24 V AC
	DC current switching capacity, resistive load, at 16 A	24 V DC
Service life	Mechanical service life	> 3 x 10^6 cycles
	Electrical endurance of switching contacts to IEC 60947-4-1	> 10^6 cycles
	AC1* (240 V/cos ϕ=0.8)	> 10^5 cycles
Switching times	Maximum relay position change per output and minute if only one relay is switched.	> 500

3.6 Fan Coil Controller FCC/S 1.2.2.1, 0-10V, MDRC

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Fig. 10: Device illustration FCC/S 1.2.2.1

The device is a modular installation device (MDRC) in pro *M* design. It is intended for installation in distribution boards on 35 mm mounting rails. Physical address assignment and parametrization are carried out with ETS.
The device is powered by the ABB i-bus® KNX bus and requires no additional auxiliary voltage supply. The device is ready for operation after connecting the bus voltage.

3.6.1 Dimension drawing

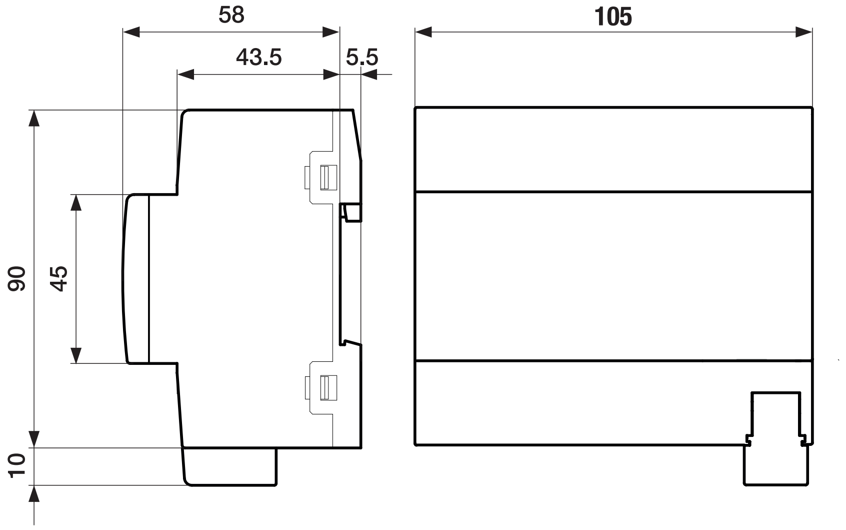

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Fig. 11: Dimension drawing

3.6.2 Connection diagram

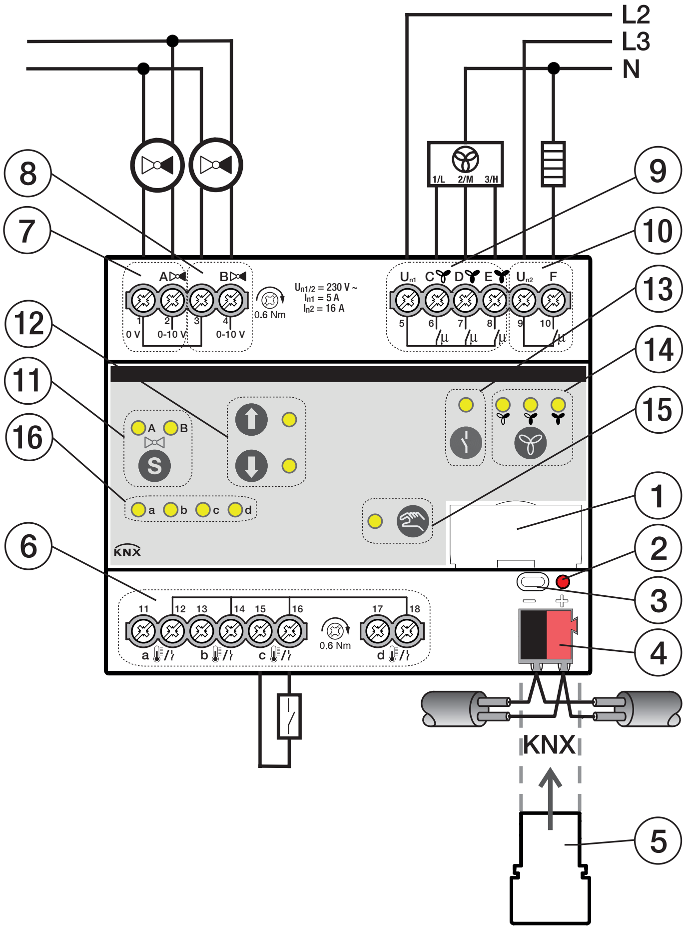

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Fig. 12: FCC/S 1.2.2.1

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LEGEND

1	Label carrier	9	Fan output
2	Programming LED	10	Auxiliary relay
3	Programming button	11	Valve output changeover button/LED
4	Bus connection terminal	12	Valve output open/close button/LED
5	Cover cap	13	Relay output open/close button/LED
6	Inputs (a, b, c, d)	14	Switch fan speed button/LED
7	Valve output A	15	Manual operation button/LED
8	Valve output B	16	Inputs (a, b, c, d) status indicator LEDs

3.6.3 Operating and display elements

Button/LED	Description/Function	LED indicator
⬭ 🔴	Assignment of the physical address	On: Device is in programming mode.

Table 10: Operating and display elements – general

Manual operation

Button/LED	Description/Function	LED indicator
🟡 A 🟡 B ⋈ Ⓢ Valve output changeover	Switches between valve A and valve B If a valve output has been disabled in the parameters, it is not possible to select the valve.	On: Indicates the selected valve Flashing: Error (overload/short circuit) on the output concerned
⬆ 🟡 Open valve output	Maximum valve control value (100 %) set. Reset both outputs: Button must be pressed for at least 5 seconds.	On: Valve control value at 100% Flashing: Indicates a fault, e.g. overload/short circuit
⬇ 🟡 Close valve output	Minimum valve control value (0 %) is set.	On: Valve control value at 0 % Flashing: Indicates a fault, e.g. overload/short circuit
⬆ 🟡 ⬇ 🟡		Both LEDs on: Valve control value is between 1% and 99% Both LEDs off: Fault
🟡 ⏻ Open/close relay output	Relay is switched.	On: Contact closed Off: Contact open

Button/LED	Description/Function	LED indicator
● ● ● Fan speed	Switches the fan speed in the following sequence: • 0 > 1 > 2 > 3 > 0 > 1… (Long push of the button always switches to 0.)	Indication of the current fan speed with speed switching: • Speed 0: all LEDs off • Speed 1: LED 1 on • Speed 2: LEDs 1 &2 on • Speed 3: all LEDs on Indication of the current fan speed with changeover switching: • Speed 0: all LEDs off • Speed 1: LED 1 on • Speed 2: LED 2 on • Speed 3: LED 3 on
● Manual operation	Activate KNX mode with a short press of the button.	On: On: The device is in Manual Off: Device is in KNX mode
● a ● b ● c ● d Inputs a...x	LED indication depending on how the inputs are used.	Binary sensor: • LED on: Contact closed • LED off: Contact open Temperature sensor: • LED on: Temperature sensor connected • LED flashing: Error (cable break/short circuit) Analog room control unit • LED on: Analog room control unit connected • LED flashing: Error (cable break/short circuit)

Table 11: Operating and display elements – manual operation

KNX operation

Button/LED	Description/Function	LED indicator
● A ● B S Valve output changeover	Switches between valve A and valve B If a valve output has been disabled in the parameters, it is not possible to select the valve.	On: Indicates the selected valve Flashing: Error (overload/short circuit) on the output concerned
⬆ ● Open valve output/increase control value	Button without function	On: Valve control value at 100% Flashing: Indicates a fault, e.g. overload/short circuit
⬇ ● Close valve output/decrease control value	Button without function	On: Valve control value at 0 % Flashing: Indicates a fault, e.g. overload/short circuit

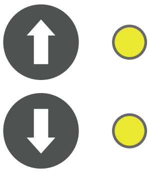
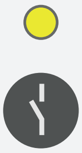
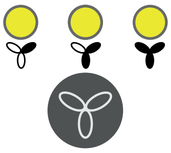
Button/LED	Description/Function	LED indicator
	Button without function	Both LEDs on: Valve control value between 1 % and 99 % Both LEDs off: Fault
 Open/close relay output	Button without function	On: Contact closed Off: Contact open
 Fan speed	Button without function	Indication of the current fan speed with speed switching: • Speed 0: all LEDs off • Speed 1: LED 1 on • Speed 2: LEDs 1 &2 on • Speed 3: all LEDs on Indication of the current fan speed with changeover switching: • Speed 0: all LEDs off • Speed 1: LED 1 on • Speed 2: LED 2 on • Speed 3: LED 3 on
 Manual operation	Activate manual operation by pressing and holding the button (for at least 5 seconds).	On: On: The device is in Manual Off: Device is in KNX mode Flashing when button is pressed: Manual operation has been deactivated via ETS parameters
 Inputs a...x	LED indication depending on how the inputs are used.	Binary sensor: • LED on: Contact closed • LED off: Contact open Temperature sensor: • LED on: Temperature sensor connected • LED flashing: Error (cable break/short circuit) Analog room control unit • LED on: Analog room control unit connected • LED flashing: Error (cable break/short circuit)

Table 12: Operating and display elements – KNX operation

3.6.4 Technical data

3.6.4.1 General technical data

Supply	Bus voltage	21…32 V DC
	Current consumption, bus	< 12 mA
	Leakage loss, bus	Maximum 250 mW
	Leakage loss, device	Maximum 3 W
	KNX connection	0.25 W
	Relay 16 A	1.0 W
	Relay 5 A	0.6 W
Terminals	KNX	Via bus connection terminal
	Inputs/Outputs	Via screw terminals
Connection terminals	Screw terminal	Screw terminal with universal head (PZ 1)
		0.2…4 mm² stranded, 2 x (0.2…2.5 mm²)
		0.2…6 mm² single core, 2 x (0.2…4 mm²)
	Wire end ferrule without plastic sleeve	0.25...2.5 mm²
	Wire end ferrule with plastic sleeve	0.25...4 mm²
	TWIN ferrules	0.5...2.5 mm²
	Wire end ferrule contact pin length	Min. 10 mm
	Tightening torque	Max. 0.6 Nm
	Grid	6.35
Protection degree and class	Degree of protection	IP 20 to EN 60529
	Protection class	II to EN 61140
Isolation category	Overvoltage category	III to EN 60664-1
	Pollution degree	II to EN 60664-1
SELV	KNX safety extra low voltage	SELV 24 V DC
Temperature range	Operation	-5...+45°C
	Transport	-25...+70°C
	Storage	-25...+55°C
Ambient conditions	Maximum air humidity	93%, no condensation allowed
	Atmospheric pressure	Atmosphere up to 2,000 m
Design	Modular installation device (MDRC)	Modular installation device
	Design	ProM
	Housing/color	Plastic housing, gray
Dimensions	Dimensions	90 x 105 x 63.5 mm (H x W x D)
	Mounting width in space units	6x 17,5 mm modules
	Mounting depth	63.5 mm
Mounting	35 mm mounting rail	To EN 60715
	Mounting position	Any
	Weight	0.24 kg
	Fire classification	Flammability V-0 as per UL94
Approvals	KNX certification	To EN 50491
	Certification	To EN 60669
	CE marking	In accordance with the EMC directive and low voltage directive

3.6.4.2 Device type

Device type	Fan Coil Controller	FCC/S 1.2.2.1
	Application	Fan Coil Unit Controller, 0-10 V, manual operation/…*
	Maximum number of group objects	118
	Maximum number of group addresses	255
	Maximum number of assignments	255

* … = Current version number of the application. Please refer the software information on our homepage for this purpose.

3.6.4.3 Inputs

For Analog Room Controller	Number	1
Contact scanning	Scanning current	1 mA
	Scanning voltage	12 V
Resistance	Select	User-defined
	PT 1.000	2-conductor technology
	PT 100	2-conductor technology
	KT	1k
	KTY	2k
	NI	1k
	NTC	20k
Line length	between sensor and device input	Max. 100 m, one-way

3.6.4.4 Rated current output 16 A

Rated values	Number	1
	U_{n2} rated voltage	250 V AC (50/60 Hz)
	I_{n2} rated current (per output pair)	16 A (resistive load for additional heater)
Switching currents	AC3* operation (cos ϕ = 0.45) to EN 60947-4-1	16 A / 230 V AC
	AC1* operation (cos ϕ = 0.8) to EN 60947-4-1	16 A / 230 V AC
	Minimum switching capacity at 100 mA	24 V AC
	DC current switching capacity, resistive load, at 16 A	24 V DC
Service life	Mechanical service life	> 3 x 10^6 cycles
	Electrical endurance of switching contacts to IEC 60947-4-1	> 10^6 cycles
	AC1* (240 V/cos ϕ=0.8)	> 10^5 cycles
Switching times	Maximum relay position change per output and minute if only one relay is switched.	> 500

3.7 Fan Coil Controller FCC/S 1.3.1.1, 0-10V, MDRC

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Fig. 13: Device illustration FCC/S 1.3.1.1

The device is a modular installation device (MDRC) in pro *M* design. It is intended for installation in distribution boards on 35 mm mounting rails. Physical address assignment and parametrization are carried out with ETS.
The device is powered by the ABB i-bus® KNX bus and requires no additional auxiliary voltage supply. The device is ready for operation after connecting the bus voltage.

3.7.1 Dimension drawing

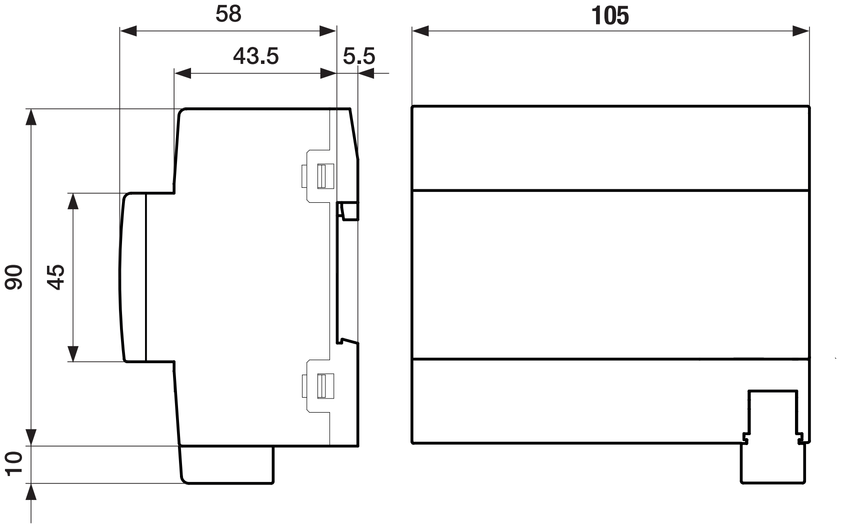

Fig. 14: Dimension drawing

3.7.2 Connection diagram

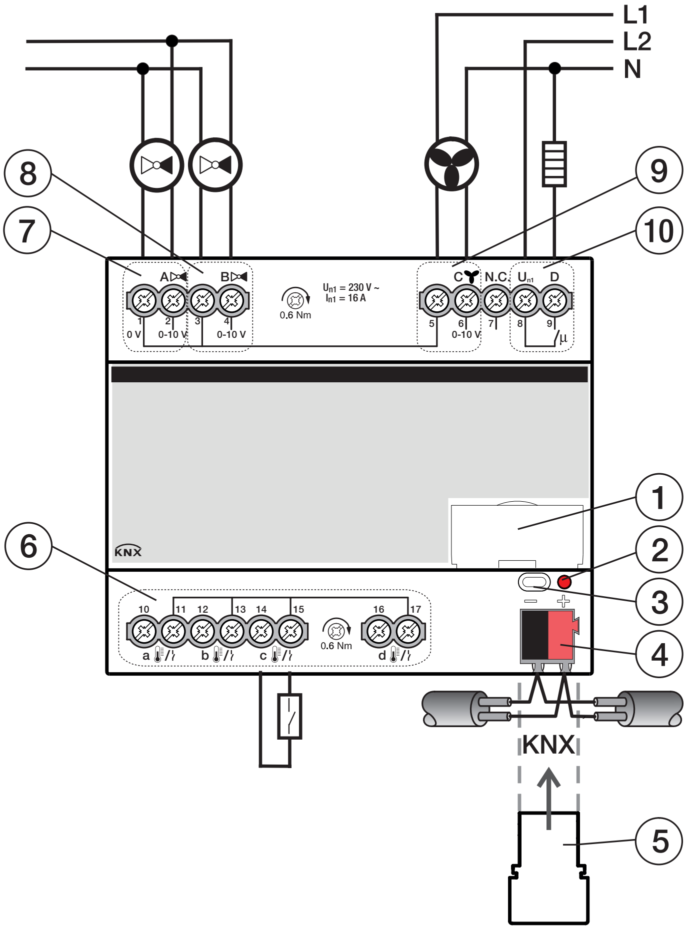

Fig. 15: FCC/S 1.3.1.1

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LEGEND

1	Label carrier		7	Valve output A
2	Programming LED		8	Valve output B
3	Programming button		9	Fan output
4	Bus connection terminal		10	Auxiliary relay
5	Cover cap			
6	Inputs (a, b, c, d)			

3.7.3 Operating and display elements

Button/LED	Description/Function	LED indicator
⬭ 🔴	Assignment of the physical address	On: Device is in programming mode.

Table 13: Operating and display elements – general

3.7.4 Technical data

3.7.4.1 General technical data

Supply	Bus voltage	21…32 V DC
	Current consumption, bus	< 12 mA
	Leakage loss, bus	Maximum 250 mW
	Leakage loss, device	Maximum 3 W
	KNX connection	0.25 W
	Relay 16 A	1.0 W
Terminals	KNX	Via bus connection terminal
	Inputs/Outputs	Via screw terminals
Connection terminals	Screw terminal	Screw terminal with universal head (PZ 1)
		0.2…4 mm² stranded, 2 x (0.2…2.5 mm²)
		0.2…6 mm² single core, 2 x (0.2…4 mm²)
	Wire end ferrule without plastic sleeve	0.25...2.5 mm²
	Wire end ferrule with plastic sleeve	0.25...4 mm²
	TWIN ferrules	0.5...2.5 mm²
	Wire end ferrule contact pin length	Min. 10 mm
	Tightening torque	Max. 0.6 Nm
	Grid	6.35
Protection degree and class	Degree of protection	IP 20 to EN 60529
	Protection class	II to EN 61140
Isolation category	Overvoltage category	III to EN 60664-1
	Pollution degree	II to EN 60664-1
SELV	KNX safety extra low voltage	SELV 24 V DC
Temperature range	Operation	-5...+45°C
	Transport	-25...+70°C
	Storage	-25...+55°C
Ambient conditions	Maximum air humidity	93%, no condensation allowed
	Atmospheric pressure	Atmosphere up to 2,000 m
Design	Modular installation device (MDRC)	Modular installation device
	Design	ProM
	Housing/color	Plastic housing, gray
Dimensions	Dimensions	90 x 105 x 63.5 mm (H x W x D)
	Mounting width in space units	6x 17,5 mm modules
	Mounting depth	63.5 mm
Mounting	35 mm mounting rail	To EN 60715
	Mounting position	Any
	Weight	0.21 kg
	Fire classification	Flammability V-0 as per UL94
Approvals	KNX certification	To EN 50491
	Certification	To EN 60669
	CE marking	In accordance with the EMC directive and low voltage directive

3.7.4.2 Device type

Device type	Fan Coil Controller	FCC/S 1.3.1.1
	Application	Fan Coil Unit Controller, 0-10 V, continuous /…*
	Maximum number of group objects	116
	Maximum number of group addresses	255
	Maximum number of assignments	255

* … = Current version number of the application. Please refer the software information on our homepage for this purpose.

3.7.4.3 Inputs

For Analog Room Controller	Number	1
Contact scanning	Scanning current	1 mA
	Scanning voltage	12 V
Resistance	Select	User-defined
	PT 1.000	2-conductor technology
	PT 100	2-conductor technology
	KT	1k
	KTY	2k
	NI	1k
	NTC	20k
Line length	between sensor and device input	Max. 100 m, one-way

3.7.4.4 Rated current output 16 A

Rated values	Number	1
	U_{n2} rated voltage	250 V AC (50/60 Hz)
	I_{n2} rated current (per output pair)	16 A (resistive load for additional heater)
Switching currents	AC3* operation (cos ϕ = 0.45) to EN 60947-4-1	16 A / 230 V AC
	AC1* operation (cos ϕ = 0.8) to EN 60947-4-1	16 A / 230 V AC
	Minimum switching capacity at 100 mA	24 V AC
	DC current switching capacity, resistive load, at 16 A	24 V DC
Service life	Mechanical service life	> 3 x 10^6 cycles
	Electrical endurance of switching contacts to IEC 60947-4-1	> 10^6 cycles
	AC1* (240 V/cos ϕ=0.8)	> 10^5 cycles
Switching times	Maximum relay position change per output and minute if only one relay is switched.	> 500

3.7.4.5 Valve output (analog)

Rated values	Number	2, non-isolated, short-circuit proofed
	Control signal	0…10 V DC
	Signal type	Analog
	Output load	> 10 kohms
	Output tolerance	± 10%
	Current limitation	max. 1.5 mA

3.7.4.6 Fan output (analog)

Rated values	Number	1, non-isolated, short-circuit proofed
	Control signal	0…10 V DC
	Signal type	Analog
	Output load	> 10 kohms
	Output tolerance	± 10%
	Current limitation	max. 1.5 mA

3.8 Fan Coil Controller FCC/S 1.3.2.1, 0-10V, MDRC

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Fig. 16: Device illustration FCC/S 1.3.2.1

The device is a modular installation device (MDRC) in pro *M* design. It is intended for installation in distribution boards on 35 mm mounting rails. Physical address assignment and parametrization are carried out with ETS.
The device is powered by the ABB i-bus® KNX bus and requires no additional auxiliary voltage supply. The device is ready for operation after connecting the bus voltage.

3.8.1 Dimension drawing

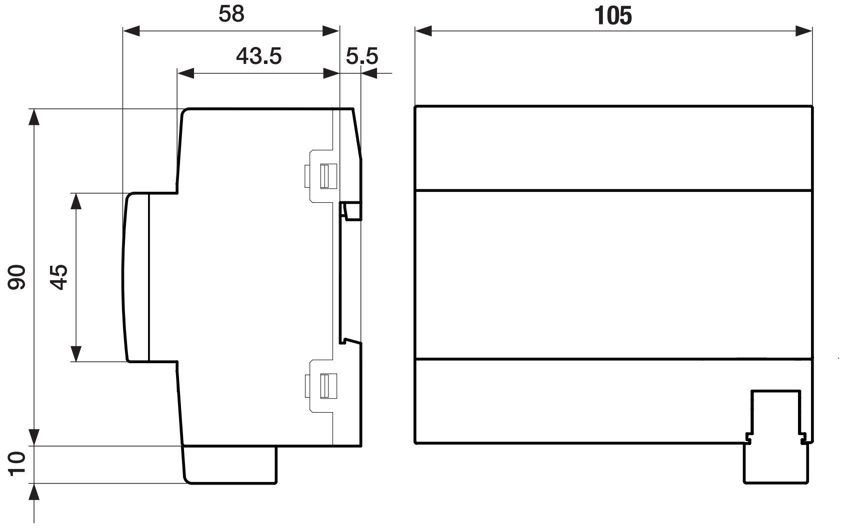

Fig. 17: Dimension drawing

3.8.2 Connection diagram

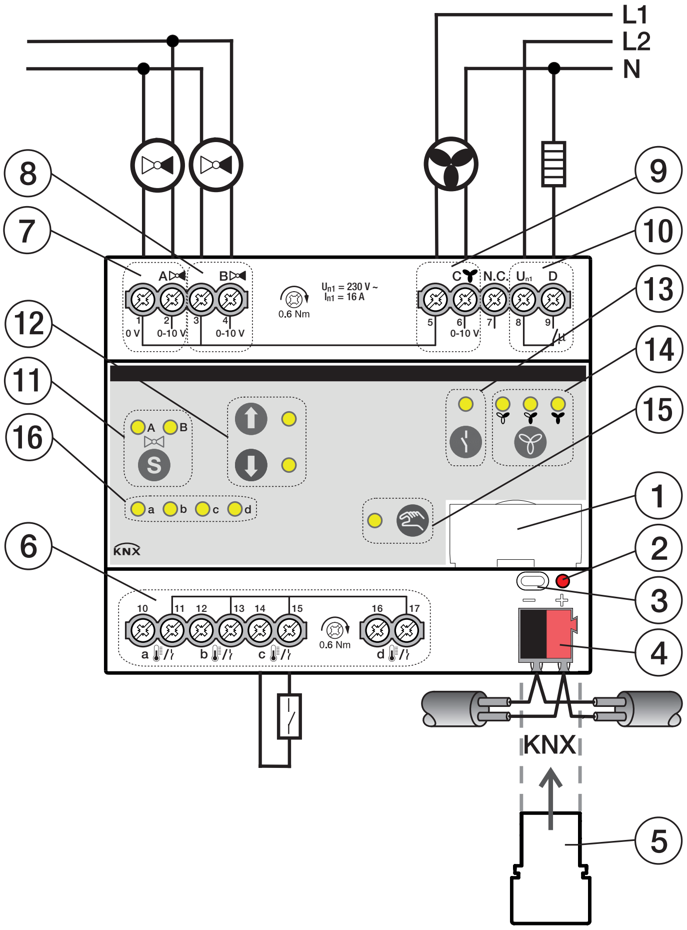

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Fig. 18: FCC/S 1.3.2.1

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Legend

1	Label carrier	9	Fan output
2	Programming LED	10	Auxiliary relay
3	Programming button	11	Valve output changeover button/LED
4	Bus connection terminal	12	Valve output open/close button/LED
5	Cover cap	13	Relay output open/close button/LED
6	Inputs (a, b, c, d)	14	Switch fan speed button/LED
7	Valve output A	15	Manual operation button/LED
8	Valve output B	16	Inputs (a, b, c, d) status indicator LEDs

3.8.3 Operating and display elements

Button/LED	Description/Function	LED indicator
⬭ ●	Assignment of the physical address.	On: Device is in programming mode.

Table 14: Operating and display elements – general

Manual operation

Button/LED	Description/Function	LED indicator
● A ● B ⋈ S Valve output changeover	Switches between valve A and valve B If a valve output has been disabled in the parameters, it is not possible to select the valve.	On: Indicates the selected valve Flashing: Error (overload/short circuit) on the output concerned
⬆ ● Open valve output	Maximum valve control value (100 %) set. Reset both outputs: Button must be pressed for at least 5 seconds.	On: Valve control value at 100% Flashing: Indicates a fault, e.g. overload/short circuit
⬇ ● Close valve output	Minimum valve control value (0 %) is set.	On: Valve control value at 0 % Flashing: Indicates a fault, e.g. overload/short circuit
⬆ ● ⬇ ●		Both LEDs on: Valve control value between 1 % and 99 % Both LEDs off: Fault
● Open/close relay output	Relay is switched.	On: Contact closed Off: Contact open

Button/LED	Description/Function	LED indicator
○ ○ ○ Fan speed	Switches the fan speed in the following sequence: • 0 % > 33 % > 66 % > 100 % > 0 % > 33 %… (Long push of the button always switches to 0 %.)	Display of current fan speed: • Speed 0 %: all LEDs off • Speed 1…33 %: LED 1 on • Speed 34…66 %: LEDs 1 &2 on • Speed 67…100 %: all LEDs on All LEDs flash: Fault on 0…10 V output
○ Manual operation	Activate KNX mode with a short press of the button.	On: On: The device is in Manual Off: Device is in KNX mode
○ a ○ b ○ c ○ d Inputs a...x	LED indication depending on how the inputs are used.	Binary sensor: • LED on: Contact closed • LED off: Contact open Temperature sensor: • LED on: Temperature sensor connected • LED flashing: Error (cable break/short circuit) Analog room control unit • LED on: Analog room control unit connected • LED flashing: Error (cable break/short circuit)

Table 15: Operating and display elements – manual operation

KNX operation

Button/LED	Description/Function	LED indicator
○ A ○ B S Valve output changeover	Switches between valve A and valve B If a valve output has been disabled in the parameters, it is not possible to select the valve.	On: Indicates the selected valve Flashing: Error (overload/short circuit) on the output concerned
⬆ ○ Open valve output/increase control value	Button without function	On: Valve control value at 100% Flashing: Indicates a fault, e.g. overload/short circuit
⬇ ○ Close valve output/decrease control value	Button without function	On: Valve control value at 0 % Flashing: Indicates a fault, e.g. overload/short circuit
⬆ ○ ⬇ ○	Button without function	Both LEDs on: Valve control value is between 1% and 99% Both LEDs off: Fault

Button/LED	**Description/Function**	**LED indicator**
● Open/close relay output	Button without function	On: Contact closed Off: Contact open
● ● ● Fan speed	Button without function	Indication of the current fan speed with speed switching: • Speed 0: all LEDs off • Speed 1: LED 1 on • Speed 2: LEDs 1 &2 on • Speed 3: all LEDs on Indication of the current fan speed with changeover switching: • Speed 0: all LEDs off • Speed 1: LED 1 on • Speed 2: LED 2 on • Speed 3: LED 3 on
● Manual operation	Activate manual operation by pressing and holding the button (for at least 5 seconds).	On: On: The device is in Manual Off: Device is in KNX mode Flashing when button is pressed: Manual operation has been deactivated via ETS parameters
● a ● b ● c ● d Inputs a...x	LED indication depending on how the inputs are used.	Binary sensor: • LED on: Contact closed • LED off: Contact open Temperature sensor: • LED on: Temperature sensor connected • LED flashing: Error (cable break/short circuit) Analog room control unit • LED on: Analog room control unit connected • LED flashing: Error (cable break/short circuit)

Table 16: Operating and display elements – KNX operation

3.8.4 Technical data

3.8.4.1 General technical data

Supply	Bus voltage	21…32 V DC
	Current consumption, bus	< 12 mA
	Leakage loss, bus	Maximum 250 mW
	Leakage loss, device	Maximum 3 W
	KNX connection	0.25 W
	Relay 16 A	1.0 W
Terminals	KNX	Via bus connection terminal
	Inputs/Outputs	Via screw terminals
Connection terminals	Screw terminal	Screw terminal with universal head (PZ 1)
		0.2…4 mm² stranded, 2 x (0.2…2.5 mm²)
		0.2…6 mm² single core, 2 x (0.2…4 mm²)
	Wire end ferrule without plastic sleeve	0.25...2.5 mm²
	Wire end ferrule with plastic sleeve	0.25...4 mm²
	TWIN ferrules	0.5...2.5 mm²
	Wire end ferrule contact pin length	Min. 10 mm
	Tightening torque	Max. 0.6 Nm
	Grid	6.35
Protection degree and class	Degree of protection	IP 20 to EN 60529
	Protection class	II to EN 61140
Isolation category	Overvoltage category	III to EN 60664-1
	Pollution degree	II to EN 60664-1
SELV	KNX safety extra low voltage	SELV 24 V DC
Temperature range	Operation	-5...+45°C
	Transport	-25...+70°C
	Storage	-25...+55°C
Ambient conditions	Maximum air humidity	93%, no condensation allowed
	Atmospheric pressure	Atmosphere up to 2,000 m
Design	Modular installation device (MDRC)	Modular installation device
	Design	ProM
	Housing/color	Plastic housing, gray
Dimensions	Dimensions	90 x 105 x 63.5 mm (H x W x D)
	Mounting width in space units	6x 17,5 mm modules
	Mounting depth	63.5 mm
Mounting	35 mm mounting rail	To EN 60715
	Mounting position	Any
	Weight	0.21 kg
	Fire classification	Flammability V-0 as per UL94
Approvals	KNX certification	To EN 50491
	Certification	To EN 60669
	CE marking	In accordance with the EMC directive and low voltage directive

3.8.4.2 Device type

Device type	Fan Coil Controller	FCC/S 1.3.2.1
	Application	Fan Coil Unit Controller, 0-10 V, continuous, manual operation /…*
	Maximum number of group objects	118
	Maximum number of group addresses	255
	Maximum number of assignments	255

* … = Current version number of the application. Please refer the software information on our homepage for this purpose.

3.8.4.3 Inputs

For Analog Room Controller	Number	1
Contact scanning	Scanning current	1 mA
	Scanning voltage	12 V
Resistance	Select	User-defined
	PT 1.000	2-conductor technology
	PT 100	2-conductor technology
	KT	1k
	KTY	2k
	NI	1k
	NTC	20k
Line length	between sensor and device input	Max. 100 m, one-way

3.8.4.4 Rated current output 16 A

Rated values	Number	1
	U_{n2} rated voltage	250 V AC (50/60 Hz)
	I_{n2} rated current (per output pair)	16 A (resistive load for additional heater)
Switching currents	AC3* operation (cos ϕ = 0.45) to EN 60947-4-1	16 A / 230 V AC
	AC1* operation (cos ϕ = 0.8) to EN 60947-4-1	16 A / 230 V AC
	Minimum switching capacity at 100 mA	24 V AC
	DC current switching capacity, resistive load, at 16 A	24 V DC
Service life	Mechanical service life	> 3 x 10^6 cycles
	Electrical endurance of switching contacts to IEC 60947-4-1	> 10^6 cycles
	AC1* (240 V/cos ϕ=0.8)	> 10^5 cycles
Switching times	Maximum relay position change per output and minute if only one relay is switched.	> 500

3.8.4.5 Valve output (analog)

Rated values	Number	2, non-isolated, short-circuit proofed
	Control signal	0…10 V DC
	Signal type	Analog
	Output load	> 10 kohms
	Output tolerance	± 10%
	Current limitation	max. 1.5 mA

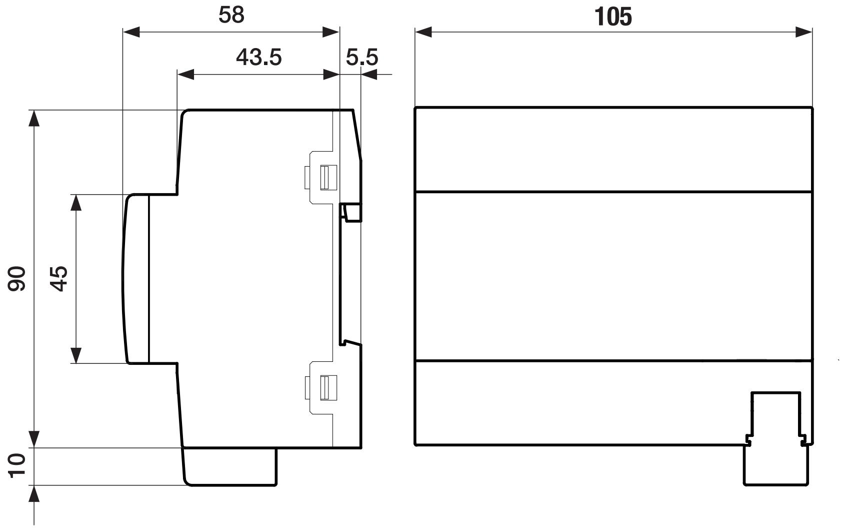
3.9 Fan Coil Controller FCC/S 1.4.1.1, PWM, MDRC

2CDC071018F0017

Fig. 19: Device illustration FCC/S 1.4.1.1

The device is a modular installation device (MDRC) in pro *M* design. It is intended for installation in distribution boards on 35 mm mounting rails. Physical address assignment and parametrization are carried out with ETS.
The device is powered by the ABB i-bus® KNX bus and requires no additional auxiliary voltage supply. The device is ready for operation after connecting the bus voltage.

3.9.1 Dimension drawing



2CDC072026F0017

Fig. 20: Dimension drawing

3.9.2 Connection diagram

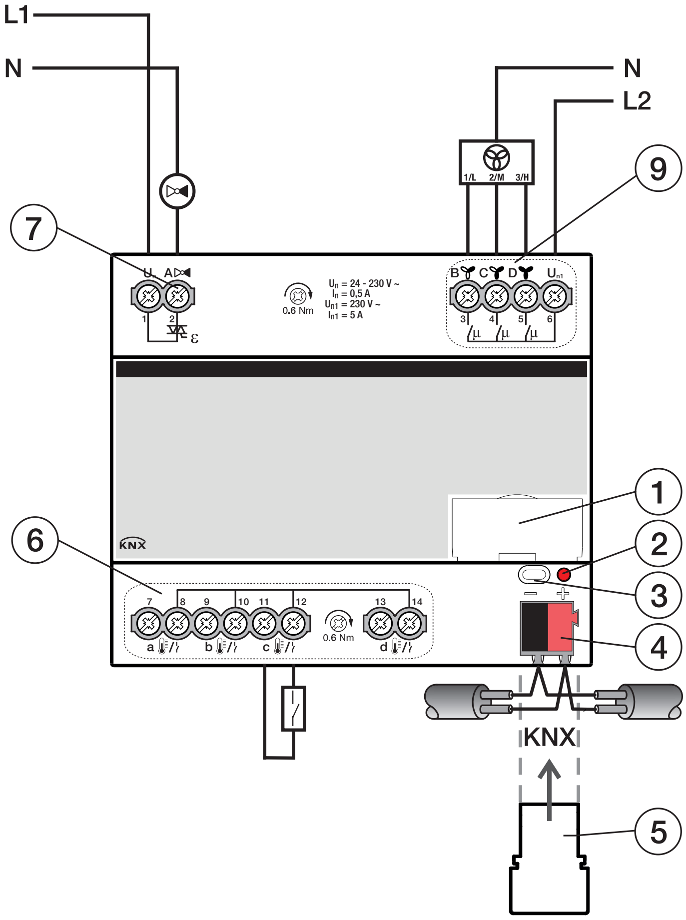


Fig. 21: FCC/S 1.4.1.1

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LEGEND

1	Label carrier	5	Cover cap
2	Programming LED	6	Inputs (a, b, c, d)
3	Programming button	7	Valve output A
4	Bus connection terminal	9	Fan output

3.9.3 Operating and display elements

Button/LED	Description/Function	LED indicator
⬭ ●	Assignment of the physical address	On: Device is in programming mode.

Table 17: Operating and display elements – general

3.9.4 Technical data

3.9.4.1 General technical data

Supply	Bus voltage	21…32 V DC
	Current consumption, bus	< 12 mA
	Leakage loss, bus	Maximum 250 mW
	Leakage loss, device	Maximum 3 W
	KNX connection	0.25 W
	Relay 5 A	0.6 W
	Electronic outputs	1.2 W
Terminals	KNX	Via bus connection terminal
	Inputs/Outputs	Via screw terminals
Connection terminals	Screw terminal	Screw terminal with universal head (PZ 1)
		0.2…4 mm² stranded, 2 x (0.2…2.5 mm²)
		0.2…6 mm² single core, 2 x (0.2…4 mm²)
	Wire end ferrule without plastic sleeve	0.25...2.5 mm²
	Wire end ferrule with plastic sleeve	0.25...4 mm²
	TWIN ferrules	0.5...2.5 mm²
	Wire end ferrule contact pin length	Min. 10 mm
	Tightening torque	Max. 0.6 Nm
	Grid	6.35
Protection degree and class	Degree of protection	IP 20 to EN 60529
	Protection class	II to EN 61140
Isolation category	Overvoltage category	III to EN 60664-1
	Pollution degree	II to EN 60664-1
SELV	KNX safety extra low voltage	SELV 24 V DC
Temperature range	Operation	-5...+45°C
	Transport	-25...+70°C
	Storage	-25...+55°C
Ambient conditions	Maximum air humidity	93%, no condensation allowed
	Atmospheric pressure	Atmosphere up to 2,000 m
Design	Modular installation device (MDRC)	Modular installation device
	Design	ProM
	Housing/color	Plastic housing, gray
Dimensions	Dimensions	90 x 105 x 63.5 mm (H x W x D)
	Mounting width in space units	6x 17,5 mm modules
	Mounting depth	63.5 mm
Mounting	35 mm mounting rail	To EN 60715
	Mounting position	Any
	Weight	0.22 kg
	Fire classification	Flammability V-0 as per UL94
Approvals	KNX certification	To EN 50491
	Certification	To EN 60669
	CE marking	In accordance with the EMC directive and low voltage directive

3.9.4.2 Device type

Device type	Fan Coil Controller	FCC/S 1.4.1.1
	Application	Fan Coil Unit Controller, PWM/…*
	Maximum number of group objects	104
	Maximum number of group addresses	255
	Maximum number of assignments	255

* … = Current version number of the application. Please refer the software information on our homepage for this purpose.

3.9.4.3 Valve outputs (electrothermal, PWM)

Rated values	Number	1
	non-floating	Yes
	U_n rated voltage	24…230 V AC (50/60 Hz)
	I_n rated current (per output pair)	0.5 A
	Continuous current at T_u up to 20°C	0.25 A resistive load per channel
	Continuous current at T_u up to 45°C	0.15 A resistive load per channel
	Starting current	Maximum 1.6 A, 10 s at T_u up to 45°C
	Standard title	T_u = ambient temperature
	Minimum load	1.2 VA per PWM output

3.9.4.4 Inputs

For Analog Room Controller	Number	1
Contact scanning	Scanning current	1 mA
	Scanning voltage	12 V
Resistance	Select	User-defined
	PT 1.000	2-conductor technology
	PT 100	2-conductor technology
	KT	1k
	KTY	2k
	NI	1k
	NTC	20k
Line length	between sensor and device input	Max. 100 m, one-way

3.10 Fan Coil Controller FCC/S 1.5.1.1, PWM, MDRC

2CDC071025F0017

Fig. 22: Device illustration FCC/S 1.5.1.1

The device is a modular installation device (MDRC) in pro *M* design. It is intended for installation in distribution boards on 35 mm mounting rails. Physical address assignment and parametrization are carried out with ETS.
The device is powered by the ABB i-bus® KNX bus and requires no additional auxiliary voltage supply. The device is ready for operation after connecting the bus voltage.

3.10.1 Dimension drawing

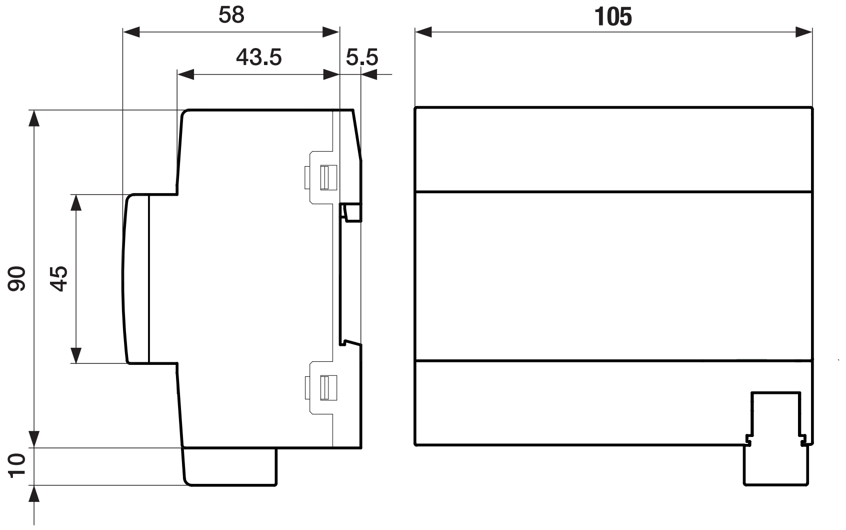

Fig. 23: Dimension drawing

3.10.2 Connection diagram

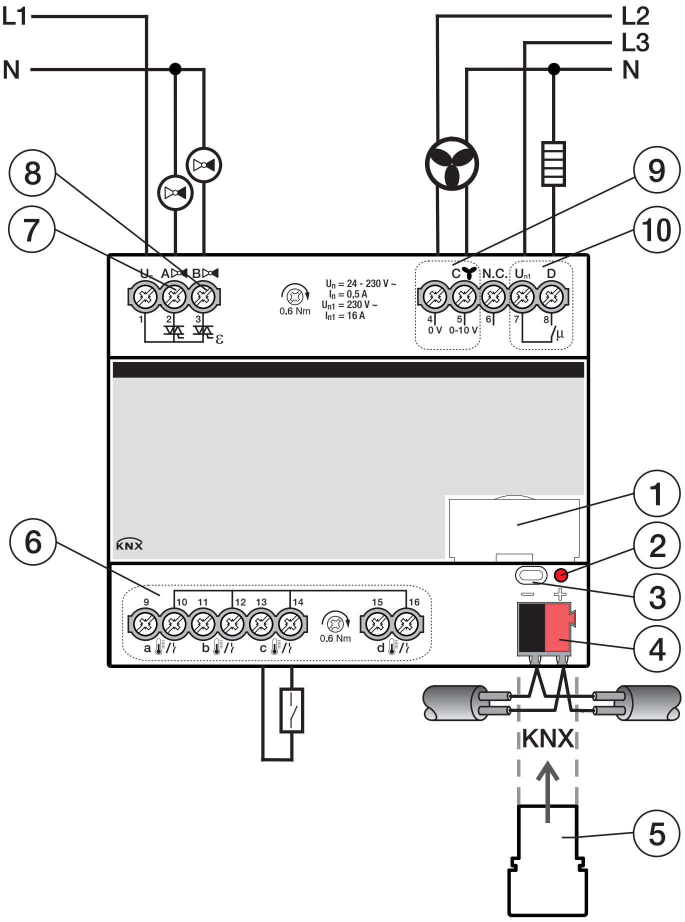

Fig. 24: FCC/S 1.5.1.1

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LEGEND

1	Label carrier	7	Valve output A
2	Programming LED	8	Valve output B
3	Programming button	9	Fan output
4	Bus connection terminal	10	Auxiliary relay
5	Cover cap		
6	Inputs (a, b, c, d)		

3.10.3 Operating and display elements

Button/LED	Description/Function	LED indicator
⬭ 🔴	Assignment of the physical address	On: Device is in programming mode.

Table 18: Operating and display elements – general

3.10.4 Technical data

3.10.4.1 General technical data

Supply	Bus voltage	21…32 V DC
	Current consumption, bus	< 12 mA
	Leakage loss, bus	Maximum 250 mW
	Leakage loss, device	Maximum 3 W
	KNX connection	0.25 W
	Relay 16 A	1.0 W
	Electronic outputs	1.2 W
Terminals	KNX	Via bus connection terminal
	Inputs/Outputs	Via screw terminals
Connection terminals	Screw terminal	Screw terminal with universal head (PZ 1)
		0.2…4 mm² stranded, 2 x (0.2…2.5 mm²)
		0.2…6 mm² single core, 2 x (0.2…4 mm²)
	Wire end ferrule without plastic sleeve	0.25...2.5 mm²
	Wire end ferrule with plastic sleeve	0.25...4 mm²
	TWIN ferrules	0.5...2.5 mm²
	Wire end ferrule contact pin length	Min. 10 mm
	Tightening torque	Max. 0.6 Nm
	Grid	6.35
Protection degree and class	Degree of protection	IP 20 to EN 60529
	Protection class	II to EN 61140
Isolation category	Overvoltage category	III to EN 60664-1
	Pollution degree	II to EN 60664-1
SELV	KNX safety extra low voltage	SELV 24 V DC
Temperature range	Operation	-5...+45°C
	Transport	-25...+70°C
	Storage	-25...+55°C
Ambient conditions	Maximum air humidity	93%, no condensation allowed
	Atmospheric pressure	Atmosphere up to 2,000 m
Design	Modular installation device (MDRC)	Modular installation device
	Design	ProM
	Housing/color	Plastic housing, gray
Dimensions	Dimensions	90 x 105 x 63.5 mm (H x W x D)
	Mounting width in space units	6x 17,5 mm modules
	Mounting depth	63.5 mm
Mounting	35 mm mounting rail	To EN 60715
	Mounting position	Any
	Weight	0.21 kg
	Fire classification	Flammability V-0 as per UL94
Approvals	KNX certification	To EN 50491
	Certification	To EN 60669
	CE marking	In accordance with the EMC directive and low voltage directive

3.10.4.2 Device type

Device type	Fan Coil Controller	FCC/S 1.5.1.1
	Application	Fan Coil Unit Controller, PWM, continuous/…*
	Maximum number of group objects	116
	Maximum number of group addresses	255
	Maximum number of assignments	255

* … = Current version number of the application. Please refer the software information on our homepage for this purpose.

3.10.4.3 Valve outputs (electrothermal, PWM)

Rated values	Number	2
	non-floating	Yes
	U_n rated voltage	24…230 V AC (50/60 Hz)
	I_n rated current (per output pair)	0.5 A
	Continuous current at T_u up to 20°C	0.25 A resistive load per channel
	Continuous current at T_u up to 45°C	0.15 A resistive load per channel
	Starting current	Maximum 1.6 A, 10 s at T_u up to 45°C
	Standard title	T_u = ambient temperature
	Minimum load	1.2 VA per PWM output

3.10.4.4 Valve outputs (motor-driven, 3-point)

Rated values	Number	1
	non-floating	Yes
	U_n rated voltage	24…230 V AC (50/60 Hz)
	I_n rated current (per output pair)	0.5 A
	Continuous current at T_u up to 20°C	0.25 A resistive load per channel
	Continuous current at T_u up to 45°C	0.15 A resistive load per channel
	Starting current	Maximum 1.6 A, 10 s at T_u up to 45°C
	Standard title	T_u = ambient temperature
	Minimum load	1.2 VA per output

3.10.4.5 Inputs

For Analog Room Controller	Number	1
Contact scanning	Scanning current	1 mA
	Scanning voltage	12 V
Resistance	Select	User-defined
	PT 1.000	2-conductor technology
	PT 100	2-conductor technology
	KT	1k
	KTY	2k
	NI	1k
	NTC	20k
Line length	between sensor and device input	Max. 100 m, one-way

3.10.4.6 Rated current output 16 A

Rated values	Number	1
	U_{n2} rated voltage	250 V AC (50/60 Hz)
	I_{n2} rated current (per output pair)	16 A (resistive load for additional heater)
Switching currents	AC3* operation (cos ϕ = 0.45) to EN 60947-4-1	16 A / 230 V AC
	AC1* operation (cos ϕ = 0.8) to EN 60947-4-1	16 A / 230 V AC
	Minimum switching capacity at 100 mA	24 V AC
	DC current switching capacity, resistive load, at 16 A	24 V DC
Service life	Mechanical service life	> 3 x 10^6 cycles
	Electrical endurance of switching contacts to IEC 60947-4-1	> 10^6 cycles
	AC1* (240 V/cos ϕ=0.8)	> 10^5 cycles
Switching times	Maximum relay position change per output and minute if only one relay is switched.	> 500

3.10.4.7 Fan output (analog)

Rated values	Number	1, non-isolated, short-circuit proofed
	Control signal	0…10 V DC
	Signal type	Analog
	Output load	> 10 kohms
	Output tolerance	± 10%
	Current limitation	max. 1.5 mA

3.11 Fan Coil Controller FCC/S 1.5.2.1, PWM, MDRC

2CDC071026F0017

Fig. 25: Device illustration FCC/S 1.5.2.1

The device is a modular installation device (MDRC) in pro *M* design. It is intended for installation in distribution boards on 35 mm mounting rails. Physical address assignment and parametrization are carried out with ETS.
The device is powered by the ABB i-bus® KNX bus and requires no additional auxiliary voltage supply. The device is ready for operation after connecting the bus voltage.

3.11.1 Dimension drawing

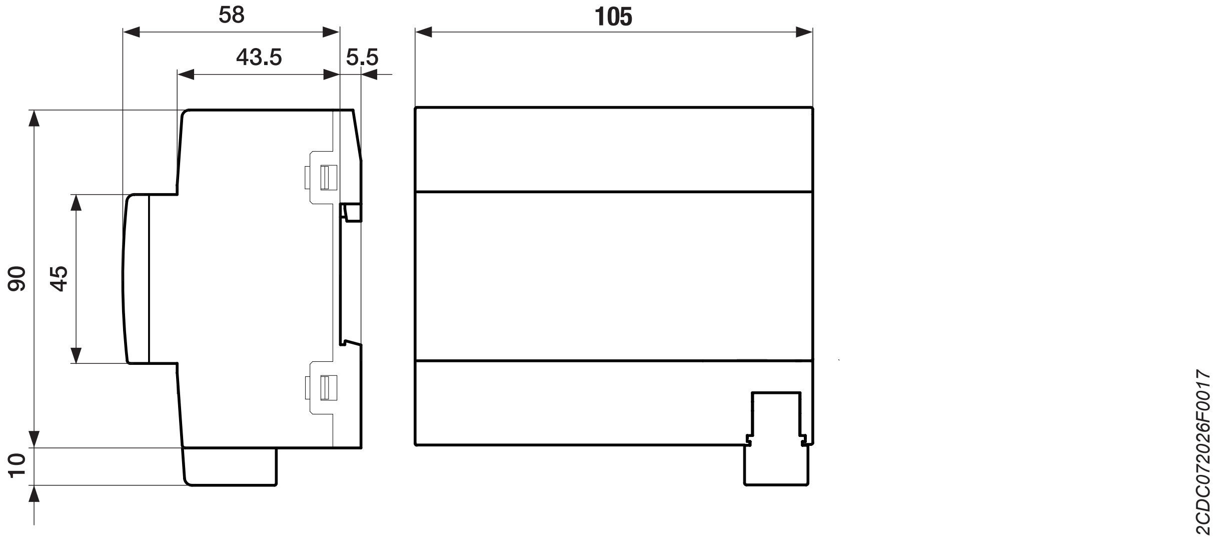

Fig. 26: Dimension drawing

3.11.2 Connection diagram

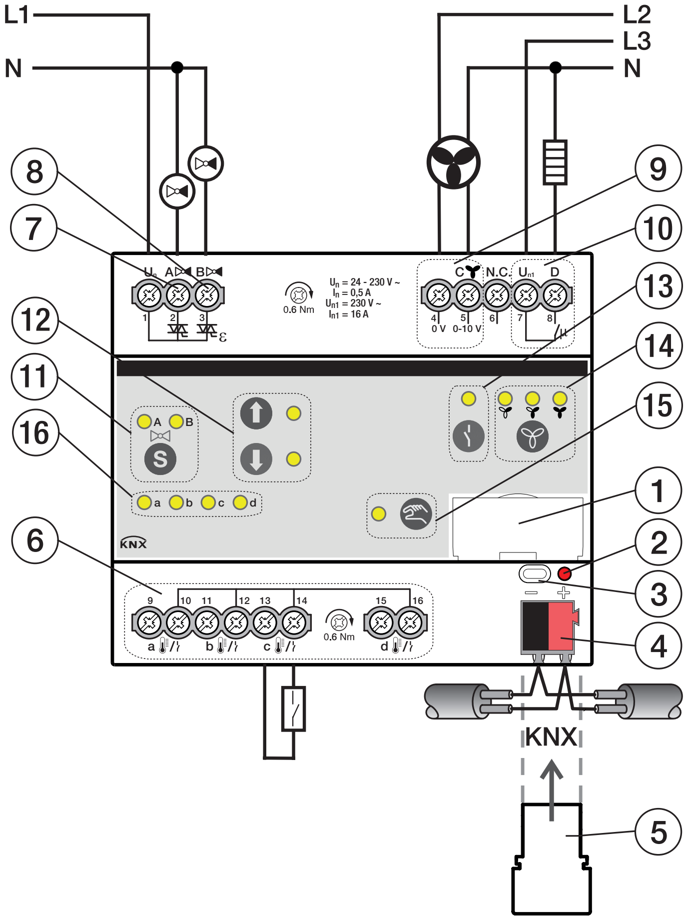

Fig. 27: FCC/S 1.5.2.1

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LEGEND

1	Label carrier		9	Fan output
2	Programming LED		10	Auxiliary relay
3	Programming button		11	Valve output changeover button/LED
4	Bus connection terminal		12	Valve output open/close button/LED
5	Cover cap		13	Relay output open/close button/LED
6	Inputs (a, b, c, d)		14	Switch fan speed button/LED
7	Valve output A		15	Manual operation button/LED
8	Valve output B		16	Inputs (a, b, c, d) status indicator LEDs

3.11.3 Operating and display elements

Button/LED	Description/Function	LED indicator
⬭ 🔴	Assignment of the physical address.	On: Device is in programming mode.

Table 19: Operating and display elements – general

Manual operation

Button/LED	Description/Function	LED indicator
🟡 A 🟡 B ⋈ S Valve output changeover	Switches between valve A and valve B If a valve output has been disabled in the parameters, it is not possible to select the valve.	On: Indicates the selected valve Flashing: Error (overload/short circuit) on the output concerned
⬆ 🟡 Open valve output	Maximum valve control value (100 %) set. Reset both outputs: Button must be pressed for at least 5 seconds.	On: Valve control value at 100% Flashing: Indicates a fault, e.g. overload/short circuit
⬇ 🟡 Close valve output	Minimum valve control value (0 %) is set.	On: Valve control value at 0 % Flashing: Indicates a fault, e.g. overload/short circuit
⬆ 🟡 ⬇ 🟡		Both LEDs on: Valve control value between 1 % and 99 % Both LEDs off: Fault
🟡 ⏻ Open/close relay output	Relay is switched.	On: Contact closed Off: Contact open

Button/LED	Description/Function	LED indicator
○ ○ ○ Fan speed	Switches the fan speed in the following sequence: - 0 % > 33 % > 66 % > 100 % > 0 % > 33 %… (Long push of the button always switches to 0 %.)	Display of current fan speed: - Speed 0 %: all LEDs off - Speed 1…33 %: LED 1 on - Speed 34…66 %: LEDs 1 &2 on - Speed 67…100 %: all LEDs on All LEDs flash: Fault on 0…10 V output
○ Manual operation	Activate KNX mode with a short press of the button.	On: On: The device is in Manual Off: Device is in KNX mode
○ a ○ b ○ c ○ d Inputs a...x	LED indication depending on how the inputs are used.	Binary sensor: - LED on: Contact closed - LED off: Contact open Temperature sensor: - LED on: Temperature sensor connected - LED flashing: Error (cable break/short circuit) Analog room control unit - LED on: Analog room control unit connected - LED flashing: Error (cable break/short circuit)

Table 20: Operating and display elements – manual operation

KNX operation

Button/LED	Description/Function	LED indicator
○ A ○ B S Valve output changeover	Switches between valve A and valve B If a valve output has been disabled in the parameters, it is not possible to select the valve.	On: Indicates the selected valve Flashing: Error (overload/short circuit) on the output concerned
⬆ ○ Open valve output/increase control value	Button without function	On: Valve control value at 100% Flashing: Indicates a fault, e.g. overload/short circuit
⬇ ○ Close valve output/decrease control value	Button without function	On: Valve control value at 0 % Flashing: Indicates a fault, e.g. overload/short circuit
⬆ ○ ⬇ ○	Button without function	Both LEDs on: Valve control value is between 1% and 99% Both LEDs off: Fault

Button/LED	Description/Function	LED indicator
● Open/close relay output	Button without function	On: Contact closed Off: Contact open
● ● ● Fan speed	Button without function	Indication of the current fan speed with speed switching: • Speed 0: all LEDs off • Speed 1: LED 1 on • Speed 2: LEDs 1 &2 on • Speed 3: all LEDs on Indication of the current fan speed with changeover switching: • Speed 0: all LEDs off • Speed 1: LED 1 on • Speed 2: LED 2 on • Speed 3: LED 3 on
● Manual operation	Activate manual operation by pressing and holding the button (for at least 5 seconds).	On: On: The device is in Manual Off: Device is in KNX mode Flashing when button is pressed: Manual operation has been deactivated via ETS parameters
● a ● b ● c ● d Inputs a...x	LED indication depending on how the inputs are used.	Binary sensor: • LED on: Contact closed • LED off: Contact open Temperature sensor: • LED on: Temperature sensor connected • LED flashing: Error (cable break/short circuit) Analog room control unit • LED on: Analog room control unit connected • LED flashing: Error (cable break/short circuit)

Table 21: Operating and display elements – KNX operation

3.11.4 Technical data

3.11.4.1 General technical data

Supply	Bus voltage	21…32 V DC
	Current consumption, bus	< 12 mA
	Leakage loss, bus	Maximum 250 mW
	Leakage loss, device	Maximum 3 W
	KNX connection	0.25 W
	Relay 16 A	1.0 W
	Electronic outputs	1.2 W
Terminals	KNX	Via bus connection terminal
	Inputs/Outputs	Via screw terminals
Connection terminals	Screw terminal	Screw terminal with universal head (PZ 1)
		0.2…4 mm² stranded, 2 x (0.2…2.5 mm²)
		0.2…6 mm² single core, 2 x (0.2…4 mm²)
	Wire end ferrule without plastic sleeve	0.25...2.5 mm²
	Wire end ferrule with plastic sleeve	0.25...4 mm²
	TWIN ferrules	0.5...2.5 mm²
	Wire end ferrule contact pin length	Min. 10 mm
	Tightening torque	Max. 0.6 Nm
	Grid	6.35
Protection degree and class	Degree of protection	IP 20 to EN 60529
	Protection class	II to EN 61140
Isolation category	Overvoltage category	III to EN 60664-1
	Pollution degree	II to EN 60664-1
SELV	KNX safety extra low voltage	SELV 24 V DC
Temperature range	Operation	-5...+45°C
	Transport	-25...+70°C
	Storage	-25...+55°C
Ambient conditions	Maximum air humidity	93%, no condensation allowed
	Atmospheric pressure	Atmosphere up to 2,000 m
Design	Modular installation device (MDRC)	Modular installation device
	Design	ProM
	Housing/color	Plastic housing, gray
Dimensions	Dimensions	90 x 105 x 63.5 mm (H x W x D)
	Mounting width in space units	6x 17,5 mm modules
	Mounting depth	63.5 mm
Mounting	35 mm mounting rail	To EN 60715
	Mounting position	Any
	Weight	0.22 kg
	Fire classification	Flammability V-0 as per UL94
Approvals	KNX certification	To EN 50491
	Certification	To EN 60669
	CE marking	In accordance with the EMC directive and low voltage directive

3.11.4.2 Device type

Device type	Fan Coil Controller	FCC/S 1.5.2.1
	Application	Fan Coil Unit Controller, PWM, continuous, manual operation/…*
	Maximum number of group objects	118
	Maximum number of group addresses	255
	Maximum number of assignments	255

* … = Current version number of the application. Please refer the software information on our homepage for this purpose.

3.11.4.3 Valve outputs (electrothermal, PWM)

Rated values	Number	2
	non-floating	Yes
	U_n rated voltage	24…230 V AC (50/60 Hz)
	I_n rated current (per output pair)	0.5 A
	Continuous current at T_u up to 20°C	0.25 A resistive load per channel
	Continuous current at T_u up to 45°C	0.15 A resistive load per channel
	Starting current	Maximum 1.6 A, 10 s at T_u up to 45°C
	Standard title	
	Minimum load	1.2 VA per PWM output

3.11.4.4 Valve outputs (motor-driven, 3-point)

Rated values	Number	1
	non-floating	Yes
	U_n rated voltage	24…230 V AC (50/60 Hz)
	I_n rated current (per output pair)	0.5 A
	Continuous current at T_u up to 20°C	0.25 A resistive load per channel
	Continuous current at T_u up to 45°C	0.15 A resistive load per channel
	Starting current	Maximum 1.6 A, 10 s at T_u up to 45°C
	Standard title	
	Minimum load	1.2 VA per output

3.11.4.5 Inputs

For Analog Room Controller	Number	1
Contact scanning	Scanning current	1 mA
	Scanning voltage	12 V
Resistance	Select	User-defined
	PT 1.000	2-conductor technology
	PT 100	2-conductor technology
	KT	1k
	KTY	2k
	NI	1k
	NTC	20k
Line length	between sensor and device input	Max. 100 m, one-way

3.11.4.6 Rated current output 16 A

Rated values	Number	1
	U_{n2} rated voltage	250 V AC (50/60 Hz)
	I_{n2} rated current (per output pair)	16 A (resistive load for additional heater)
Switching currents	AC3* operation (cos ϕ = 0.45) to EN 60947-4-1	16 A / 230 V AC
	AC1* operation (cos ϕ = 0.8) to EN 60947-4-1	16 A / 230 V AC
	Minimum switching capacity at 100 mA	24 V AC
	DC current switching capacity, resistive load, at 16 A	24 V DC
Service life	Mechanical service life	> 3 x 10^6 cycles
	Electrical endurance of switching contacts to IEC 60947-4-1	> 10^6 cycles
	AC1* (240 V/cos ϕ=0.8)	> 10^5 cycles
Switching times	Maximum relay position change per output and minute if only one relay is switched.	> 500

3.11.4.7 Fan output (analog)

Rated values	Number	1, non-isolated, short-circuit proofed
	Control signal	0…10 V DC
	Signal type	Analog
	Output load	> 10 kohms
	Output tolerance	± 10%
	Current limitation	max. 1.5 mA

4 Function

4.1 Fan coil unit overview

Configuration design types
A fan coil unit can be configured as a compact device or a modular installation device:

- Compact devices: These are supplied with enclosures and are available as self-contained units or for wall or ceiling mounting.
- Built-in devices: These have no enclosures and are mounted in the wall, in the ceiling or in the floor. The air is blown into the room through a grille.

Air supply

Fan coil units are available as recirculation or as mixed air devices.

- Recirculation devices: The room air is directed past heat exchangers by the fans.
- Mixed air devices: The room air is mixed with fresh air. The mixing ratio between recirculated and fresh air can usually be adjusted.

4.2 Functional overview

Fans, also called blower convectors and fan coil units, are used for distributed heating and cooling applications. They are installed rooms and powered via central heating and cooling systems. Using fans, room temperature can be quickly adjusted to suit individual preferences.

The Fan Coil Controllers FCC/S control fans either as a single-phase fan with up to three fan speeds via step or changeover actuation, or a continuous fan via 0 … 10 V actuation. For speed-controlled fans in Changeover operation mode, it is ensured that no two fan speeds can be switched on simultaneously. An additional programmable switch-over delay is provided for this purpose. Three-phase drives are not supported.

Four inputs are available for connecting temperature sensors and for monitoring a window contact, condensate formation or a collection pan. Additionally, one of the inputs can be used to connect a local analog room control unit (SAF/A or SAR/A). Such a device can be used for local adjustment of the setpoint temperature for the room and the fan speed. When another input is used, the room temperature additionally can be measured directly via the analog room control unit. The scanning voltage for the inputs is provided by the Fan Coil Controller.

An electric heater can be actuated via an additional floating relay contact.

In addition to the distinction in the type of fan actuation (3-speed or continuous), the Fan Coil Controllers differ in the type of valve actuation.

Fan Coil Controllers FCC/S 1.1.x.1 and FCC/S 1.5.x.1 have two outputs to actuate electrothermal heating or cooling valves or to actuate a motorized (3-point) drive. The FCC/S 1.4.1.1 features only one output to actuate electrothermal heating or cooling valves

Fan Coil Controllers FCC/S 1.2.x.1 and FCC/S 1.3.x.1 have two outputs to actuate analog heating and cooling valves.

Manual operation of the device is possible in the versions FCC/S 1.1.2.1, FCC/S 1.2.2.1, FCC/S 1.3.2.1 and FCC/S 1.5.2.1.

	FCC/S 1.1.1.1	**FCC/S 1.1.2.1**	**FCC/S 1.2.1.1**	**FCC/S 1.2.2.1**	**FCC/S 1.3.1.1**	**FCC/S 1.3.2.1**	**FCC/S 1.4.1.1**	**FCC/S 1.5.1.1**	**FCC/S 1.5.2.1**
Inputs	4	4	4	4	4	4	4	4	4
Analog room control unit	1	1	1	1	1	1	1	1	1
Binary sensor (e.g.: window contact, dew point, fill level)	4	4	4	4	4	4	4	4	4

	FCC/S 1.1.1.1	FCC/S 1.1.2.1	FCC/S 1.2.1.1	FCC/S 1.2.2.1	FCC/S 1.3.1.1	FCC/S 1.3.2.1	FCC/S 1.4.1.1	FCC/S 1.5.1.1	FCC/S 1.5.2.1
Temperature sensor (e.g. room temperature)	4	4	4	4	4	4	4	4	4
Fan output	1	1	1	1	1	1	1	1	1
3-speed fan	1	1	1	1	–	–	1	–	–
2-speed fan	1	1	1	1	–	–	1	–	–
1-speed fan	1	1	1	1	–	–	1	–	–
Continuous fan (0 … 10 V)	–	–	–	–	1	1	–	1	1
16 A outputs (resistive load)	1	1	1	1	1	1	1	1	1
Electrical auxiliary heater	1	1	1	1	1	1	1	1	1
Electronic valve outputs	2	2	–	–	–	–	1	2	2
Electrothermal Valve Drives (PWM)	2	2	–	–	–	–	1	2	2
Motor-Driven Valve Drives (3-point)	1	1	–	–	–	–	–	1	1
Analog outputs (0 … 10 V)	–	–	2	2	2	2	–	–	–
Analog Valve Drives	–	–	2	2	2	2	–	–	–

Table 22: Functional overview

For more information see: .

4.3 Input functions

The following table provides an overview of the functions possible with the inputs of the FCC/S and the application:

Function		a	b	c	d
Connection of analog room control unit		X			
Binary signal input (floating)		X	X	X	X
Temperature sensor					
	PT100	X	X	X	X
	PT1000	X	X	X	X
	KT/KTY	X	X	X	X
	KT/KTY user defined	X	X	X	X
	NTC10k	X	X	X	X
	NTC20k	X	X	X	X
	NI-1000	X	X	X	X
Dew point sensor (floating)		X	X	X	X
Filling level sensor (floating)		X	X	X	X
Window contact (floating)		X	X	X	X

Table 23: Input functions

4.4 Output functions

4.4.1 Valve outputs

The following tables provide an overview of the functions possible with the valve outputs of the FCC/S and the application:

FCC/S 1.1.X.1 and FCC/S 1.5.X.1

Function		A	B
Electrothermal Valve Drive (PWM)		X	X
Solenoid valve (open/close)		X	X
Motorized valve drive (3-point)		Open	Close
Error detection			
	Overload/short circuit	X	X

Table 24: Valve output function

FCC/S 1.4.1.1

Function		A
Electrothermal Valve Drive (PWM)		X
Solenoid valve (open/close)		X
Error detection		
	Overload/short circuit	X

Table 25: Valve output function

FCC/S 1.2.X.1 and FCC/S 1.3.X.1

Function		A	B
Analog valve drive			
	0…10 V	X	X
	1…10 V	X	X
	2…10 V	X	X
	10…0 V	X	X
6-way valve drive		X	
VAV damper drive - control signal		X	X
Error detection			
	Overload/short circuit	X	X

Table 26: Valve output function

4.4.2 Fan output

The following tables provide an overview of the functions possible with the fan output of the FCC/S and the application:

FCC/S 1.1.X.1 and FCC/S 1.2.X.1 and FCC/S 1.4.1.1

Function		Fan output
Number of fan speeds (5 A)		
	1-speed	X
	2-speed	X
	3-speed	X
Switching function		X
Step switching		X

Table 27: Functions of the fan output

FCC/S 1.3.X.1 and FCC/S 1.5.X.1

Function		Fan output
Continuous fan 0-10 V, freely selectable voltage range		X
Error detection		
	Overload/short circuit	X

Table 28: Functions of the fan output

4.4.3 Relay output

This chapter does not apply to the FCC/S 1.4.X.1.

Function	Relay output
Use by internal controller for electric heater	X
Use as independent switching output	X
Internal connection to the device input	X

Table 29: Function of the relay output

4.5 Integration into the i-bus® Tool

The device possesses and interface to the i-bus® Tool.

The i-bus® Tool can be used to read out data and test functions on the connected device.

In addition, values can be simulated for test purposes. If there is no communication, output values are no longer sent to the bus, even if they are simulated using the i-bus® Tool.

The i-bus® Tool can be used to specify controller parameters to test the correct adjustment of the room thermostat. It is also possible to switch between the various room states (Comfort, Standby, Economy, Building Protection) to test the device reaction. The device's physical inputs and outputs can be tested via the i-bus® Tool.

The i-bus® Tool can be downloaded for free from our website (www.abb.com/knx).

A description of the functions is provided in the i-bus® Tool online help.

4.6 Special operating states

4.6.1 Reaction on bus voltage failure, recovery, download and ETS reset

The device reaction on bus voltage failure, recovery, download and ETS reset can be set in the device parameters.

NOTICE

If the allocation of the outputs is changed (e.g. *Actuate basic-stage heating via* from *Internal output A (valve)* to *Group object*) when the device is parametrized, a reset must be performed to ensure proper functioning of the outputs.

4.6.1.1 Bus voltage failure

Bus voltage failure describes the sudden drop in/failure of the bus voltage, e.g. due to a power failure.

4.6.1.2 Bus voltage recovery

Bus voltage recovery is the state after bus voltage is restored after failing previously due to a bus voltage failure.

4.6.1.3 ETS reset

Generally an ETS reset is defined as a reset of the device via ETS. The ETS reset is triggered in the ETS under the menu item Commissioning with the function *Reset device*. This stops and restarts the application.

4.6.1.4 Download

Downloading describes loading a modified or updated application into the application with the ETS.

ⓘ **Note**

After the application is removed or after an interrupted download, the device no longer functions.

5 Mounting and installation

5.1 Information about mounting

The installation position can be selected as required.

The electrical connection is implemented using screw terminals. The connection to the bus is implemented using the supplied bus connection terminal. The terminal assignment is located on the housing.

The device is ready for operation after connection to the bus voltage.

ⓘ **Note**

The maximum permissible current of a KNX line must not be exceeded.
During planning and installation ensure that the KNX line is correctly dimensioned.
The device has a maximum current consumption of 12 mA.

DANGER - Severe injuries due to touch voltage

Feedback from differing phase conductors can produce touch voltages and lead to severe injuries.

Operate the device only in a closed housing (distribution board).

Disconnect all phases before working on the electrical connection.

5.2 Mounting on DIN rail

The device is held and removed exclusively without auxiliary tools.

Make sure the device is accessible for operation, testing, visual inspection, maintenance and repair.

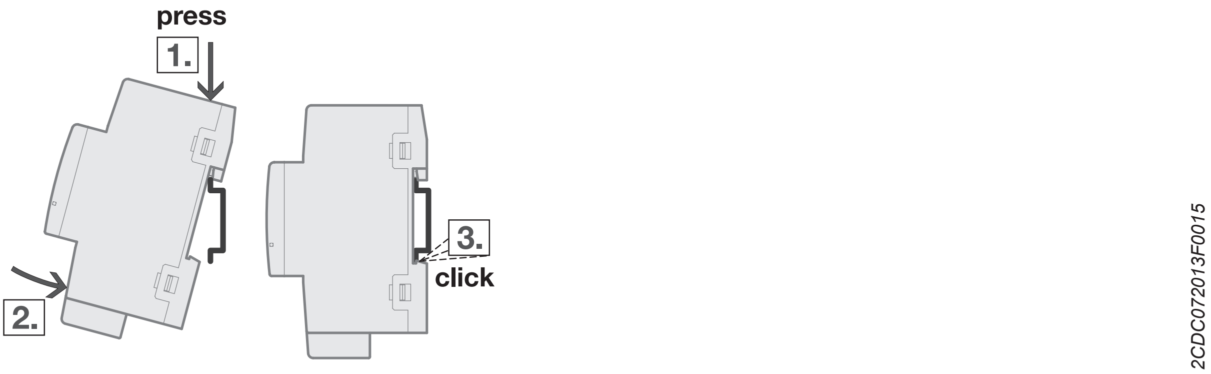


Fig. 28: Mounting on DIN rail

1. Place the DIN rail holder on the upper edge of the DIN rail and push down.
2. Push the lower part of the device toward the DIN rail until the DIN rail holder engages.
   ⇨ The device has now been mounted on the DIN rail.
3. Relieve the pressure on the top of the housing.

5.3 Supplied state

The device is supplied with the physical address 15.15.255. The application is preloaded.

The complete application can be downloaded again if required. Downloads may take longer after a change of application or unloading.

6 Commissioning

6.1 Commissioning requirement

In order to commission the device, a PC with ETS is required along with a connection to the ABB i-bus®, e.g. via a KNX interface.

The device is ready for operation after the bus voltage is applied. No auxiliary voltage is required.

6.2 Commissioning overview

The *Fan Coil Controller, PWM, 3-speed* application is available for the Fan Coil Controller FCC/S 1.1.1.1.

The *Fan Coil Controller, PWM, 3-speed, manual operation* application is available for the Fan Coil Controller FCC/S 1.1.2.1.

The *Fan Coil Controller, 0–10V, 3-speed* application is available for the Fan Coil Controller FCC/S 1.2.1.1.

The *Fan Coil Controller, 0–10V, 3-speed, manual operation* application is available for the Fan Coil Controller FCC/S 1.2.2.1.

The *Fan Coil Controller, 0–10V, 0–10V* application is available for the Fan Coil Controller FCC/S 1.3.1.1.

The *Fan Coil Controller, 0–10V, 0–10V, manual operation* application is available for the Fan Coil Controller FCC/S 1.3.2.1.

The *Fan Coil Controller, PWM, 3-speed* application is available for the Fan Coil Controller FCC/S 1.4.1.1.

The *Fan Coil Controller, PWM, 0–10V* application is available for the Fan Coil Controller FCC/S 1.5.1.1.

The *Fan Coil Controller, PWM, 0–10V, manual operation* application is available for the Fan Coil Controller FCC/S 1.5.2.1.

ETS is required in order to parametrize the device.
For information on how to use the i-bus® Tool, see: Integration into the i-bus® Tool, Page 81
The available functions are as follows:

Additional output	For control of auxiliary electrical heating, e.g. in the winter <-> summer transition phase.
Relay fan	A three-speed fan is controlled either with a two-way connection or with step switching.
Continuous fan	A continuous fan is controlled by a 0…10 V analog control signal.
Thermoelectric valve	The valve drives are actuated via PWM or 3-point control. The outputs are protected against short circuit and overload.
Analog valve	The valve drives are actuated via a 0...10 V analog control signal. The outputs are protected against short circuit and overload.
Inputs	There are four inputs available. These are used to monitor and/or connect, e.g., window contacts, a condensation pan, dew point sensors or temperature sensors. As an option, an analog room control unit can be connected to input a.

Table 30: Fan coil controller functions

5 A outputs are provided for fan coil applications.

NOTICE

Improper switching will destroy the fan motors.

Follow the technical data for the fan, e.g. step or two-way switching.

For more information:

6.3 Physical address assignment

The physical address, group address and parameters are assigned and programmed in ETS.

The device features a *Programming* button for physical address assignment. The red *Programming* LED lights up after the button has been pressed. It goes off as soon as ETS has assigned the physical address or the *Programming* button is pressed again.

The device performs an ETS reset during physical address programming. This resets all states.

6.4 Software/application

6.4.1 Download response

Due to the complexity of the device, the progress bar for the download may take up to one and a half minutes before it appears depending on the PC used.

6.4.2 Copying, exchanging and converting

The *ABB Update Copy Convert* application can be used to copy or exchange parameter settings and to convert the application version. The application is available free of charge from the KNX online shop.
It also provides the following functions:

- *Update*: Changes the application program to a later or earlier version while retaining current configurations
- *Convert*: Transfers/adopts a configuration from an identical or compatible source device
- *Channel Copy*: Copies a channel configuration to other channels on a multichannel device
- *Channel Exchange*: Exchanges configurations between two channels on a multichannel device
- *Import/Export*: Saves and reads device configurations as external files

7 Parameters

7.1 General

The ETS Engineering Tool Software is used to parameterize the device.

In ETS, the applications are in the *Catalogs* window under Manufacturers/ABB/Heating, ventilation, air conditioning/ Fan Coil Controller.

The following chapters describe the device parameters based on the parameter windows. Parameter windows are structured dynamically so that further parameters may be enabled depending on the parameterization and function of the outputs.

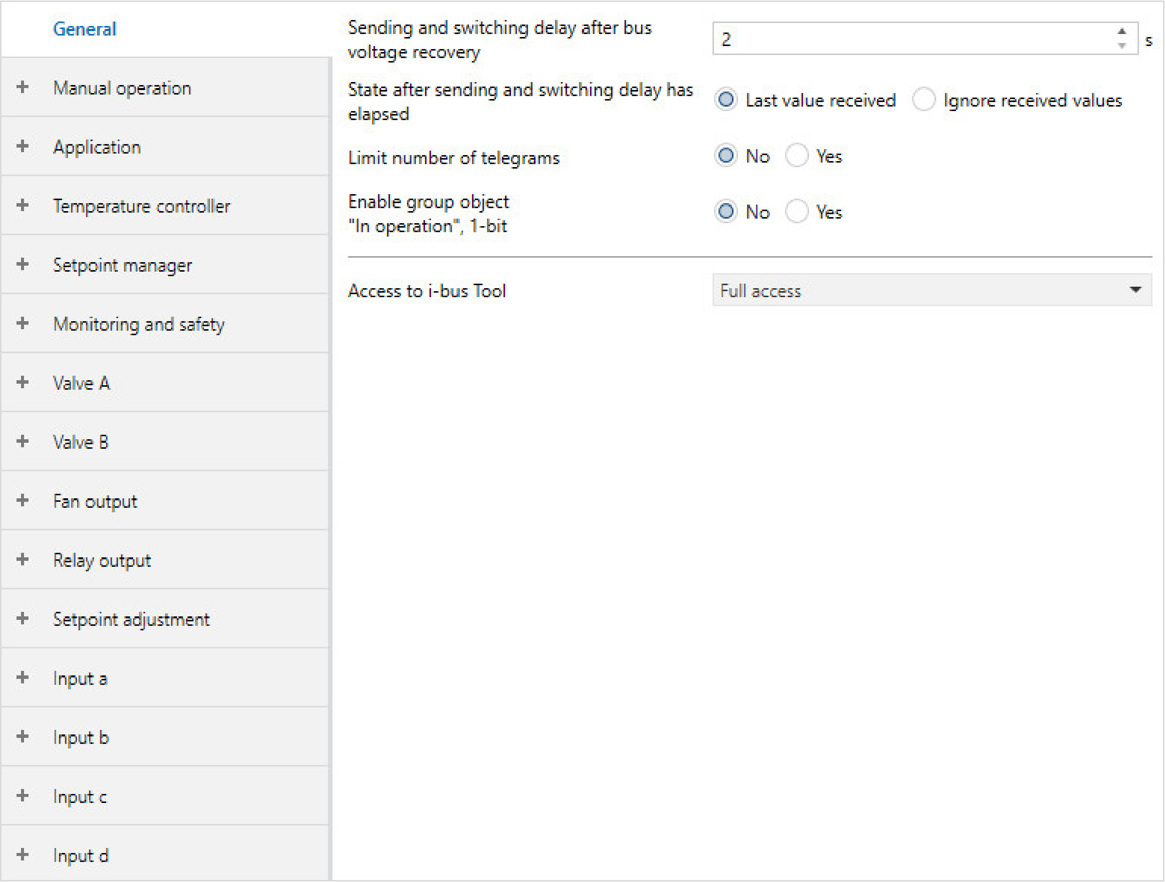
The default values of the parameters are underlined, e.g.:

Options: *yes*
no

ⓘ **Note**

The applications for devices with manual operation were used as examples for the screen shots.

7.2 General parameter window



Sending and switching delay after bus voltage recovery: 2 s

State after sending and switching delay has elapsed: ● Last value received ○ Ignore received values

Limit number of telegrams: ● No ○ Yes

Enable group object "In operation", 1-bit: ● No ○ Yes

Access to i-bus Tool: Full access

Fig. 29: General parameter window

7.2.1 Sending and switching delay after bus voltage recovery

Options: *2…255*

During the sending and switching delay, telegrams are only received. However, the telegrams are not processed and the outputs remain unchanged. No telegrams are sent on the bus.

After the sending and switching delay, telegrams are sent and the state of the outputs is set to correspond with the parameterization or the group object values.

If group objects are read out via the bus during the sending and switching delay, e.g. by a visual display system, these requests are stored and a response is sent once the delay time has expired.

An initialization time of about two seconds is included in the delay time. The initialization time is the time that the processor requires before it is ready to function.

Note

After bus voltage recovery, the device always waits for the sending delay time to elapse before sending telegrams via the bus.

Note

In controller mode, the switching delay set does not apply to the parameterized behavior of the outputs.

7.2.2 State after sending and switching delay has elapsed

Options: *Last value received*
Ignore received values

- *Last value received*: During the sending and switching delay, the inputs and outputs continue reading. They send the current value after the delay has elapsed.
- *Ignore received values*: No new values are accepted during the sending and switching delay. The first value received after the sending and switching delay has elapsed applies.

7.2.3 Limit number of telegrams

Options: *No*
Yes

This parameter limits the device-generated bus load. This limit relates to all telegrams sent by the device.

—

7.2.3.1 DEPENDENT PARAMETER

Maximum number of telegrams

Options: *1…20…50*

This parameter defines the number of telegrams sent by the device within a certain period of time. The telegrams are sent as quickly as possible at the start of a period.

ⓘ **Note**

The device counts the number of telegrams sent within the parametrized period. As soon as the maximum number of sent telegrams is reached, no further telegrams are sent on the KNX bus until the end of the period. A new period commences at the end of the previous period. The telegram counter is reset to zero, and sending of telegrams is allowed again. The current group object value at the time of sending is always sent.

The first period (break time) is not precisely predefined. It can be anywhere between zero seconds and the parametrized time. The subsequent sending times correspond with the parametrized time.

Example:

Maximum number of sent telegrams = 5, period = 5 s. 20 telegrams are ready to send. The device immediately sends 5 telegrams. The next 5 telegrams are sent after a maximum of 5 seconds. From this point, a further 5 telegrams are sent on the KNX every 5 seconds. The telegrams are sent in the order in which they arise (first in - first out).

7.2.3.2 DEPENDENT PARAMETER

In period

Options: *1 second*
2 seconds
5 seconds
10 seconds
30 seconds
1 minute

This parameter defines the number of telegrams sent by the device within a certain period of time. The telegrams are sent as quickly as possible at the start of a period.

ⓘ **Note**

The device counts the number of telegrams sent within the parametrized period. As soon as the maximum number of sent telegrams is reached, no further telegrams are sent on the KNX bus until the end of the period. A new period commences at the end of the previous period. The telegram counter is reset to zero, and sending of telegrams is allowed again. The current group object value at the time of sending is always sent.

The first period (break time) is not precisely predefined. It can be anywhere between zero seconds and the parametrized time. The subsequent sending times correspond with the parametrized time.

Example:

Maximum number of sent telegrams = 5, period = 5 s. 20 telegrams are ready to send. The device immediately sends 5 telegrams. The next 5 telegrams are sent after a maximum of 5 seconds. From this point, a further 5 telegrams are sent on the KNX every 5 seconds. The telegrams are sent in the order in which they arise (first in - first out).

7.2.4 Enable group object "In operation" 1 bit

Options: *No*
Yes

- *Yes*: The group object is enabled.
- No: The group object is not enabled.

—

7.2.4.1 DEPENDENT PARAMETER

Send

Options: *Value 0*
Value 1

—

7.2.4.2 DEPENDENT PARAMETER

Sending cycle time

Options: *00:00:01…00:01:00…18:12:15*

The time interval at which the *In operation* group object cyclically sends a telegram is set here.

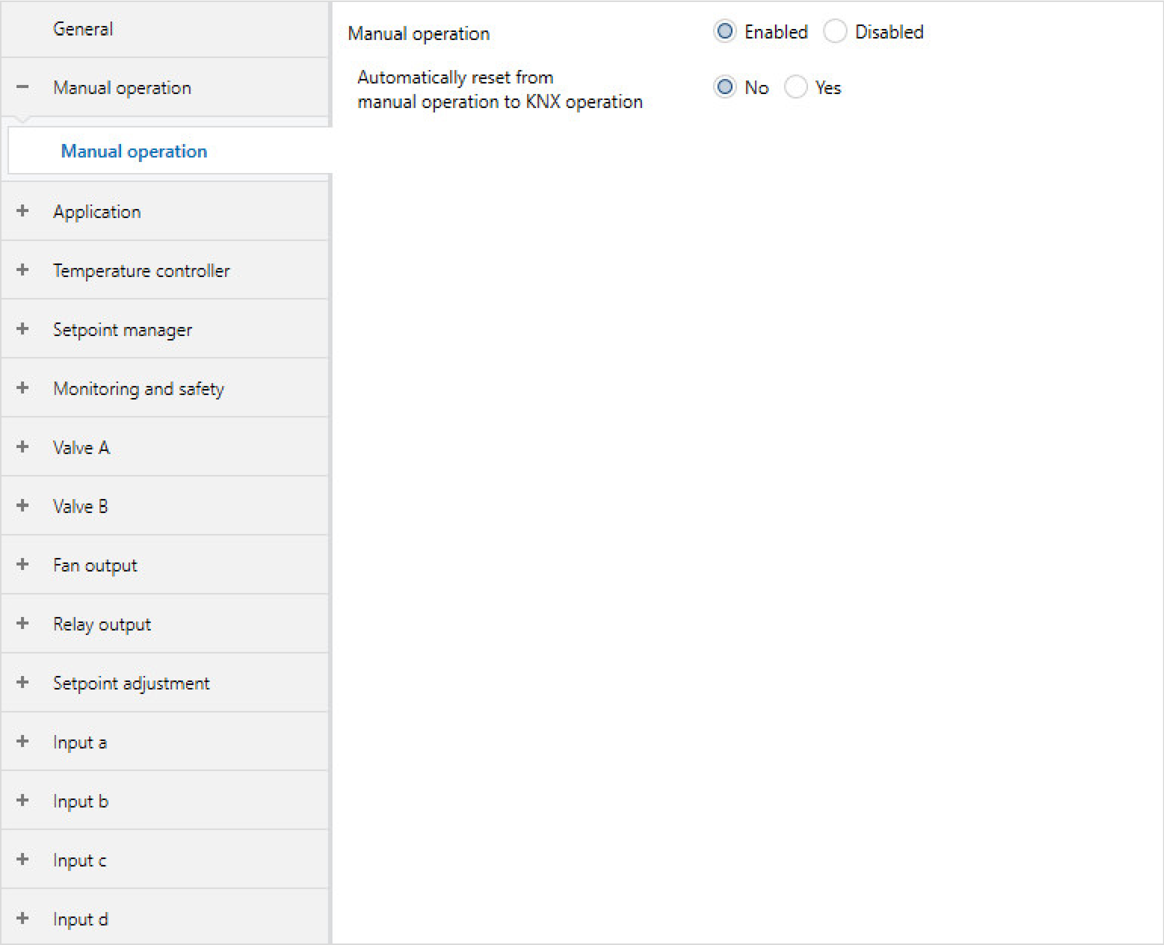
> ⓘ **Note**
> After bus voltage recovery, the group object sends its value after the sending and switching delay set.

7.2.5 Access to i-bus Tool

Options: *Deactivated*
Value display only
Full access

This parameter is used to restrict or forbid completely access by the ABB i-bus® Tool. If *Deactivated* is selected, access by the i-bus Tool is completely disabled. If *Value display only* is selected, no values can be changed by the i-bus® Tool; only the status is displayed. If *Full access* is selected, the i-bus® Tool functions without restriction; values can be displayed and changed (see Integration into the i-bus® Tool, Page 81).

7.3 Manual operation parameter window



Manual operation ● Enabled ○ Disabled

Automatically reset from manual operation to KNX operation ● No ○ Yes

Fig. 30: Manual operation parameter window

7.3.1 Manual operation

Options: <u>*Enabled*</u>
Disabled

This parameter defines if the changeover between the operating states *Manual operation* and *KNX operation* is possible via the *Manual operation* button on the device.

- *Enabled*: The operating states *Manual operation* and *KNX operation* can be switched over via the *Manual operation* button. The *Enable/disable manual operation* and *Status Manual operation* group objects are enabled.
  The *Enable/disable manual operation* group object makes it possible to enable or disable manual operation via the bus.
  The *Status Manual operation* group object indicates whether manual operation is active or inactive. The group object is sent automatically after a change.
- *Disabled*: Manual operation is generally disabled.

7.3.2 Automatically reset from manual operation to KNX operation

Options: <u>*No*</u>
Yes

This parameter determines whether, after pressing the *Manual operation* button, the device will remain in *Manual operation* or will be reset back to *KNX operation*.

- *Yes*: The device is reset to KNX operation depending on the parameterized time.

7.3.2.1 DEPENDENT PARAMETER

Time for automatic reset to KNX operation

Options: *00:00:30…<u>00:05:00</u>…18:12:15*

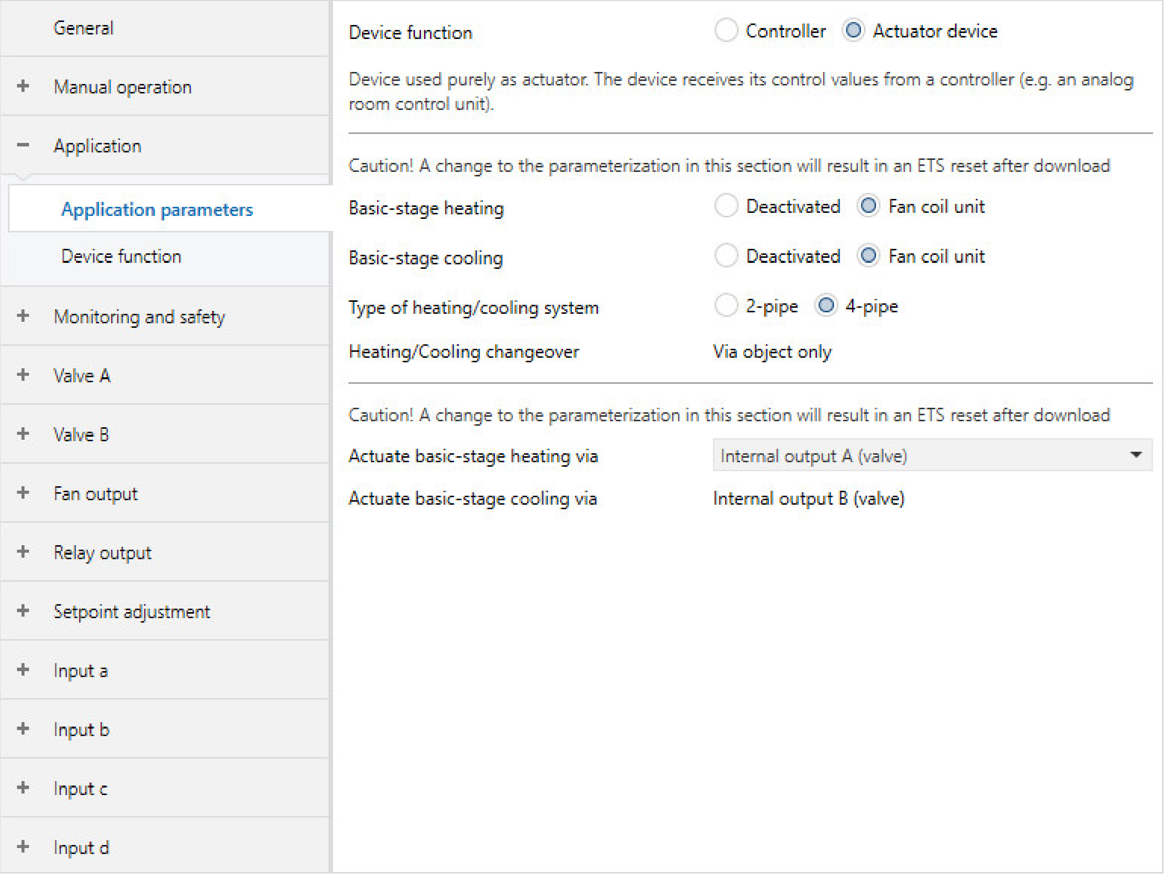
This parameter determines how long, after pressing the *Manual operation* button, the device will remain in *Manual operation*.

The device remains in *Manual operation* after the last button press until either the *Manual operation* button is pressed again or the parameterized time has elapsed.

7.4 Application

7.4.1 Application parameters parameter window

The basic settings necessary for the application are made in the *Application parameters* parameter window.



Device function ○ Controller ● Actuator device

Device used purely as actuator. The device receives its control values from a controller (e.g. an analog room control unit).

Caution! A change to the parameterization in this section will result in an ETS reset after download

Basic-stage heating ○ Deactivated ● Fan coil unit

Basic-stage cooling ○ Deactivated ● Fan coil unit

Type of heating/cooling system ○ 2-pipe ● 4-pipe

Heating/Cooling changeover Via object only

Caution! A change to the parameterization in this section will result in an ETS reset after download

Actuate basic-stage heating via Internal output A (valve)

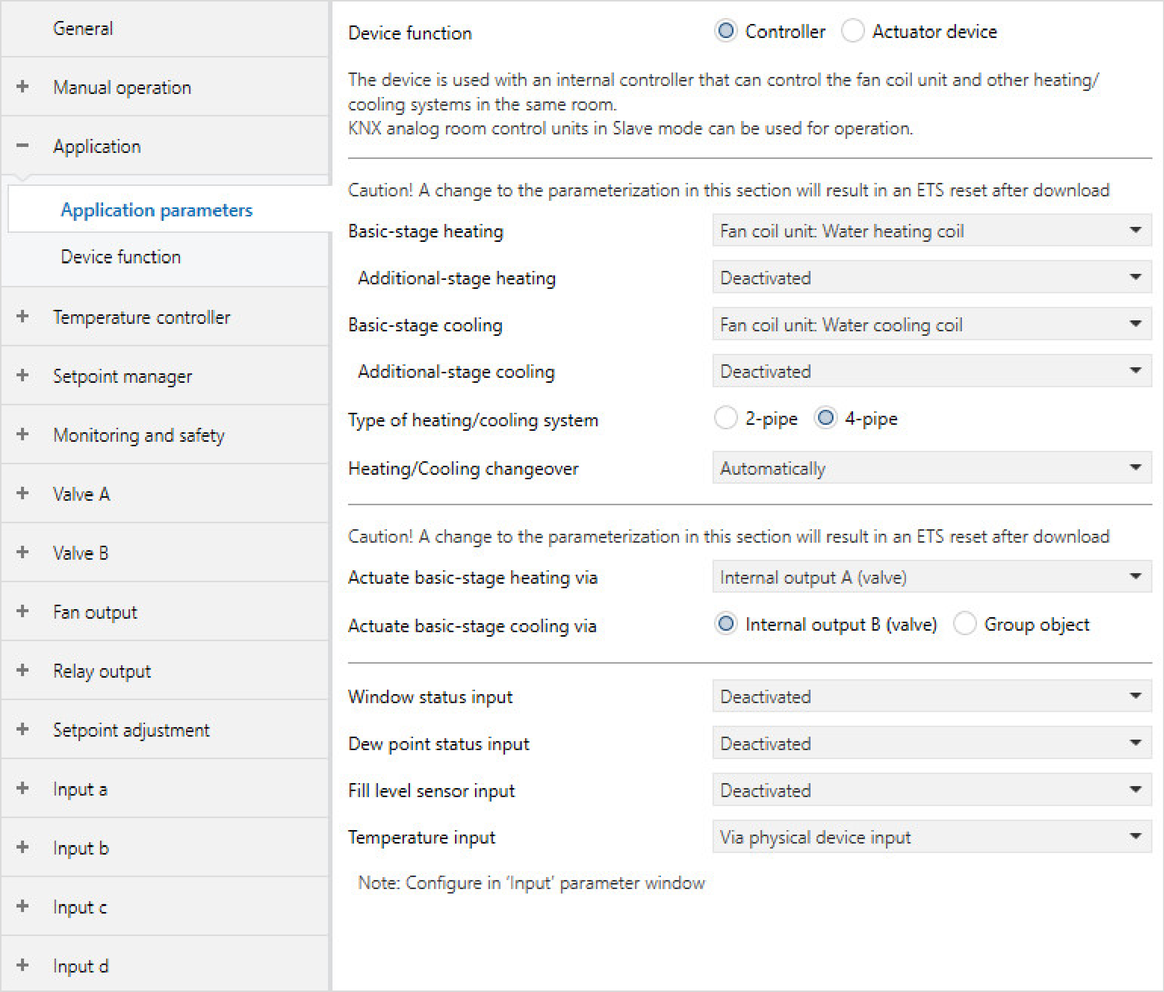
Actuate basic-stage cooling via Internal output B (valve)

Fig. 31: Application parameters parameter window

7.4.1.1 FCC/S 1.1.x.1 / 1.5.x.1

The following explanations only apply to:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.5.1.1
- FCC/S 1.5.2.1



Device function ● Controller ○ Actuator device

The device is used with an internal controller that can control the fan coil unit and other heating/cooling systems in the same room.
KNX analog room control units in Slave mode can be used for operation.

Caution! A change to the parameterization in this section will result in an ETS reset after download

Basic-stage heating	Fan coil unit: Water heating coil
Additional-stage heating	Deactivated
Basic-stage cooling	Fan coil unit: Water cooling coil
Additional-stage cooling	Deactivated
Type of heating/cooling system	○ 2-pipe ● 4-pipe
Heating/Cooling changeover	Automatically

Caution! A change to the parameterization in this section will result in an ETS reset after download

Actuate basic-stage heating via	Internal output A (valve)
Actuate basic-stage cooling via	● Internal output B (valve) ○ Group object

Window status input	Deactivated
Dew point status input	Deactivated
Fill level sensor input	Deactivated
Temperature input	Via physical device input

Note: Configure in 'Input' parameter window

Fig. 32: Application parameters parameter window

7.4.1.1.1 Device function

Options: *Controller*
Actuator device

The function of the device is set using this parameter. It can be used with activated controller and optional communication with an analog room control unit or as a pure actuator device for controlling a fan coil unit. In the latter case, the control values for actuating the outputs must be sent by an external controller to the device.

- *Controller*: In this mode the device operates independently – based only on the states (e.g. temperature) measured on the inputs (or received via KNX) and the setpoints/operating mode changeovers received via KNX. The necessary control values for the outputs are calculated independently from this information.
  The *Temperature controller* and *Setpoint manager* parameter windows, as well as group objects for the master/slave communication are activated. Here the device acts as a master.
- *Actuator device*: In this mode the device acts as a pure actuator. The controller function must be undertaken by an external device and the control values sent to the actuator via KNX.
  The *Temperature controller* and *Setpoint manager* parameter windows are correspondingly deactivated.

7.4.1.1.1.1 Selection of Controller

The following parameters are visible if the *Controller* option has been selected in the *Device function* parameter.

—

7.4.1.1.1.1.1 DEPENDENT PARAMETER

Basic-stage heating

The following description applies in the case that the *Controller* option has been selected in the *Device function* parameter.

Options: *Deactivated*
Convector (e.g. radiator)
Area heating (e.g. floor)
Electric heater (in room)
Free configuration
Fan coil unit: electric heater (in fan coil unit)
Fan coil unit: Water heating coil

The type of application for the heating stage is selected with this parameter. The controller is pre-configured based on this selection and can be used for the selected application.

- *Deactivated*: The heating stage is deactivated by selecting this option. All dependent parameters and parameter windows are also deactivated.
- *Convector (e.g. radiator)*: This option should be selected if a convector, e.g. a radiator, is used as the heating stage.
  The *Basic heating stage control value type* parameter is pre-parameterized to *PI continuous (0…100 %)* with the corresponding P and I proportions.
- *Area heating (e.g. floor)*: This option should be selected if an area, e.g. floor heating, is used as the heating stage.
  The *Basic heating stage control value type* parameter is pre-parameterized to *PI continuous (0…100 %)* with the corresponding P and I proportions.
- *Electric heater (in room)*: This option should be selected if an electric heater in the room is used as the heating stage and for this heater the fan does not need to run as well in operation.
  The *Basic heating stage control value type* parameter is pre-parameterized to *2-point 1 bit (On/Off)*.
- *Free configuration*: With this option it is possible to select freely the type of heating stage and also the type of control. This option can be selected if the type of application is not entirely clear or if specific adjustments are necessary.
  The *Basic heating stage control value type* parameter is pre-configured to *PI continuous (0…100 %)*, however it is possible to select freely between all control types.
- *Fan coil unit: electric heater (in fan coil unit)*: This option should be selected if an electric heater in the fan coil unit is used as the heating stage and the fan must therefore also run in operation.
  The *Basic heating stage control value type* parameter is pre-parameterized to *2-point 1 bit (On/Off)*.
- *Fan coil unit: Water heating coil*: This option should be selected if the water heating coil in the fan coil unit is used as the heating stage.
  The *Basic-stage heating control value type* parameter is pre-parameterized to *PI continuous (0…100 %) for Fan Coil* with the corresponding P and I proportions.

Dependent parameters:

- *Additional-stage heating*
- *Type of heating/cooling system*
- *Heating/Cooling changeover*
- *Use 6-way valve* (only FCC/S 1.2.x.1 / 1.3.x.1)
- *Actuate basic-stage heating via*

ⓘ **Note**

On the selection of the *Fan coil unit: electric heater or Fan coil unit: Water heating coil* options, the fan follows the valve control value for this stage if the automatic mode is active.
On the selection of the *Free configuration* option, this can also be set via a parameter.

7.4.1.1.1.1.1.1 DEPENDENT PARAMETER

Additional-stage heating

This parameter is visible if, in the *Device function* parameter, the *Controller* option is selected and the *Basic-stage heating* parameter is not deactivated.

Options: *Deactivated*
Convector (e.g. radiator)
Area heating (e.g. floor)
Electric heater (in room)
Free configuration
Fan coil unit: electric heater (in fan coil unit)
Fan coil unit: Water heating coil

The type of application for the additional-stage heating is selected with this parameter. The controller is pre-configured based on this selection and can be used for the selected application.

- *Deactivated*: The additional-stage heating is deactivated by selecting this option. All dependent parameters and parameter windows are also deactivated.
- *Convector (e.g. radiator)*: This option should be selected if a convector, e.g. a radiator, is used as the additional-stage heating.
  The *Additional-stage heating control value type* parameter is pre-parameterized to *PI continuous (0…100%)* with the corresponding P and I proportions.
- *Area heating (e.g. floor)*: This option should be selected if an area, e.g. floor heating, is used as the additional-stage heating.
  The *Additional-stage heating control value type* parameter is pre-parameterized to *PI continuous (0…100%)* with the corresponding P and I proportions.
- *Electric heater (in room)*: This option should be selected if an electric heater in the room is used as the additional-stage heating and for this heater the fan does not need to run as well in operation.
  The *Additional-stage heating control value type* parameter is pre-parameterized to *2-point 1 bit (On/Off)*.
- *Free configuration*: With this option it is possible to select freely the type of additional-stage heating and also the type of control. This option can be selected if the type of application is not entirely clear or if specific adjustments are necessary.
  The *Basic-stage/Additional-stage heating control value type* parameter is pre-configured to *PI continuous (0…100%)*, however it is possible to select freely between all control types.
- *Fan coil unit: electric heater (in fan coil unit)*: This option should be selected if an electric heater in the fan coil unit is used as the additional-stage heating and the fan must therefore also run in operation.
  The *Additional-stage heating control value type* parameter is pre-parameterized to *2-point 1 bit (On/Off)*.
- *Fan coil unit: Water heating coil*: This option should be selected if the water heating coil in the fan coil unit is used as the additional-stage heating.
  The *Additional-stage heating control value type* parameter is pre-parameterized to *PI continuous (0…100%) for Fan Coil* with the corresponding P and I proportions.

Dependent parameters:

- *Actuate additional-stage heating via*

ⓘ **Note**

On the selection of the *Fan coil unit: electric heater or Fan coil unit: Water heating coil* options, the fan follows the valve control value for this stage if the automatic mode is active.
On the selection of the *Free configuration* option, this can also be set via a parameter.

7.4.1.1.1.1.2 DEPENDENT PARAMETER

Basic-stage cooling

The following description applies in the case that the *Controller* option in the *Device function* parameter.

Options: *Deactivated*
Area cooling (e.g. cooling ceiling)
Free configuration
Fan coil unit: Water cooling coil

The type of application for the basic-stage cooling is selected with this parameter. The controller is pre-configured based on this selection and can be used for the selected application.

- *Deactivated*: The basic-stage cooling is deactivated by selecting this option. All dependent parameters and parameter windows are also deactivated.
- *Area cooling (e.g. cooling ceiling)*: This option should be selected if an area, e.g. cooling ceiling, is used as the basic-stage cooling.
  The *Basic-stage cooling control value type* parameter is pre-parameterized to *PI continuous (0…100%)* with the corresponding P and I proportions.
- *Free configuration*: With this option it is possible to select freely the type of basic-stage cooling and also the type of control. This option can be selected if the type of application is not entirely clear or if specific adjustments are necessary.
  The *Basic-stage cooling control value type* parameter is pre-configured to *PI continuous (0…100%)*, however it is possible to select freely between all control types.
- *Fan coil unit: Water cooling coil*: This option should be selected if the water heating coil in the fan coil unit is used as the basic-stage cooling.
  The *Basic-stage cooling control value type* parameter is pre-parameterized to *PI continuous (0…100%) for Fan Coil* with the corresponding P and I proportions.

Dependent parameters:

- *Additional-stage cooling*
- *Type of heating/cooling system*
- *Heating/Cooling changeover*
- *Use 6-way valve (only FCC/S 1.2.x.1 / 1.3.x.1)*
- *Actuate basic-stage cooling via*

ⓘ **Note**

On the selection of the *Fan coil unit: Water cooling coil* options, the fan follows the valve control value for this stage if the automatic mode is active.
On the selection of the *Free configuration* option, this can also be set via a parameter.

—

7.4.1.1.1.1.2.1 DEPENDENT PARAMETER

Additional-stage cooling

This parameter is visible if, in the *Device function* parameter, the *Controller* option is selected and the *Basic-stage cooling* parameter is not deactivated.

Options:	*<u>Deactivated</u>* *Area cooling (e.g. cooling ceiling)* *Free configuration* *Fan coil unit: Water cooling coil*

The type of application for the additional-stage cooling is selected with this parameter. The controller is pre-configured based on this selection and can be used for the selected application.

- *Deactivated*: The additional-stage cooling is deactivated by selecting this option. All dependent parameters and parameter windows are also deactivated.
- *Area cooling (e.g. cooling ceiling)*: This option should be selected if an area, e.g. cooling ceiling, is used as the additional-stage cooling.
  The *Additional-stage cooling control value type* parameter is pre-parameterized to *PI continuous (0…100%)* with the corresponding P and I proportions.
- *Free configuration*: With this option it is possible to select freely the type of additional-stage cooling and also the type of control. This option can be selected if the type of application is not entirely clear or if specific adjustments are necessary.
  The *Additional-stage cooling control value type* parameter is pre-configured to *PI continuous (0…100%)*, however it is possible to select freely between all control types.
- *Fan coil unit: Water cooling coil*: This option should be selected if the water heating coil in the fan coil unit is used as the additional-stage cooling.
  The *Additional-stage cooling control value type*parameter is pre-parameterized to *PI continuous (0…100%) for Fan Coil* with the corresponding P and I proportions.

Dependent parameters:

- *Actuate additional-stage cooling via*

ⓘ **Note**

On the selection of the *Fan coil unit: Water cooling coil* options, the fan follows the valve control value for this stage if the automatic mode is active.
On the selection of the *Free configuration* option, this can also be set via a parameter.

7.4.1.1.1.1.3 DEPENDENT PARAMETER

Type of heating/cooling system

This parameter is not visible if the *Basic-stage heating* or *Basic-stage cooling* parameters are deactivated.

Options: *2-pipe*
4-pipe

This parameter must be selected to suit the heating/cooling system in which the device is to be used. It affects the changeover behavior of the device between heating and cooling.

- *2-pipe*: This option is to be selected if the heating and cooling devices actuated are in a 2-pipe system. In this system, only one pipe is used to supply the device with hot and cold water. It is therefore only ever possible to heat or cool; a changeover is necessary to change. It follows that the device is not allowed to decide on a change between heating and cooling and the changeover must always be made via the bus. The *Heating/Cooling changeover* parameter is correspondingly parameterized to *Via object only* and cannot be changed.
- *4-pipe*: This option is to be selected if the devices actuated are in a 4-pipe system. In a 4-pipe system, separate pipes are used for the hot and cold water supply. It is therefore possible to change between heating and cooling at any time. In this situation the decision can be made centrally, and also by the device. The *Heating/Cooling changeover* parameter is correspondingly parameterized to *Automatically*.

7.4.1.1.1.1.4 DEPENDENT PARAMETER

Heating/Cooling changeover

This parameter is not visible if the *Basic-stage heating* or *Basic-stage cooling* parameters are deactivated.

Options: *Automatically*
Via object only
Via slave and via object

The standard value for this parameter depends on the selection in the *Type of heating/cooling system* parameter.

- Selection of *4-pipe*:
  - *Automatically*: If the *Automatically* option is selected, the changeover is only made by the controller for the device depending on the setpoint temperature selected. Here the *Heating/Cooling changeover* group object is hidden.
  - *Via object only*: If the changeover is only allowed to be made centrally by a visualization or a building management system, e.g. if the cooling equipment and heating equipment are not to operate at the same time for energy-saving reasons, this parameter can also be changed to *Via object only*. The *Heating/Cooling changeover* group object is visible.
  - *Via slave and via object*: The *Heating/Cooling changeover* and *Request heating/cooling (master)* group objects are visible. It is possible to trigger a change between heating and cooling via the bus using these group objects. The *Request heating/cooling (master)* group object is used for connecting to a slave analog room control unit in the context of master/slave communication.
- Selection of *2-pipe*:
  If *2-pipe* has been selected, the standard value is set to *Via object only* and cannot be changed; the related *Heating/Cooling changeover* group object is visible.
  In a 2-pipe system, the same pipe is used for the supply of hot and cold water. Because the device cannot detect which situation is present, the changeover must always be made centrally and sent to the device using a group object.

7.4.1.1.1.1.5 DEPENDENT PARAMETER

Actuate basic-stage heating via

This parameter is not visible if the *Basic-stage heating* parameter is deactivated.

Options: *Internal output A (valve)*
Internal output B (valve) (Not for FCC/S 1.4.1.1)
Internal relay output (Not for FCC/S 1.4.1.1)
Group object

The way the control value for the basic-stage heating is to be output is set using this parameter.

ⓘ **Note**

Depending on the selection in the *Basic-stage heating* parameter, it may not be possible to select all options.

Example:

If, in the *Basic-stage heating* parameter, the *Fan coil unit: electric heater (in fan coil unit)* option is selected, it is not possible to select one of the valve outputs A or B as the output, because an electric heater cannot be controlled via a valve output. Conversely, the relay output cannot be selected if a water heating type is selected.

- *Internal output A (valve)*; *Internal output B (valve)*; *Internal relay output*: If one of the internal outputs is selected, the control value is output directly on this physical output where it is converted into the corresponding output signal.
  The outputs A and B are used to actuate valve drives, while the relay output is used to actuate an electric heater.
  In parallel to the actuation via the corresponding internal output, the control value is also output via the related *Status Control value Basic-stage heating* group object.
- *Group object*: If *Group object* has been selected as the option, there is no actuation via any of the internal outputs, instead the control value is only output on the bus.
  The control value is output via the related *Status Control value Basic-stage heating* group object.

ⓘ **Note**

Depending on the option selected in the *Basic-stage heating* parameter, this parameter may have a different standard value.

The settings for the exact control parameters are made in the *Temperature controller – Basic-stage heating* parameter window.

The settings for the actuation of the control values via the valve outputs are made in the related valve parameter window.

Only FCC/S 1.2.x.1 & 1.3.x.1: If the *Use 6-way valve* parameter has been parameterized with *Yes*, then this parameter is pre-set to *Internal output A (valve)* and cannot be changed.

7.4.1.1.1.1.6 DEPENDENT PARAMETER

Actuate basic-stage cooling via

This parameter is not visible if the *Basic-stage cooling* parameter is deactivated.

Options: *Internal output A (valve)*
Internal output B (valve) *(Not for FCC/S 1.4.1.1)*
Group object

The way the control value for the basic-stage cooling is to be output is set using this parameter.

- *Internal output A (valve)*; *Internal output B (valve)*: If one of the internal outputs is selected, the control value is output directly on this physical output where it is converted into the corresponding output signal.
  The outputs A and B are used to actuate valve drives.
  In parallel to the actuation via the corresponding internal output, the control value is also output via the related *Status Control value Basic-stage cooling* group object.

ⓘ **Note**

(Selection in the *Type of heating/cooling system* parameter: *4-pipe*)

Depending on the selection in the *Actuate basic-stage heating via* parameter, it may not be possible to select all options. If one of the outputs has already been selected here, it cannot also be used as an output for the basic-stage cooling.

Example:
If the *Internal output A (valve)* option has been selected as the output for the basic-stage heating, this cannot be selected as the output for the basic-stage cooling. Conversely, this statement also applies on the selection of *Internal output B (valve)*.

Only FCC/S 1.2.x.1 & 1.3.x.1:
If the *Use 6-way valve* parameter has been parameterized with *Yes*, this parameter is pre-set to *Internal output A (valve)* and cannot be changed.

(Selection in the *Type of heating/cooling system* parameter: *2-pipe*)

In a 2-pipe system, heating and cooling are undertaken using the same device (e.g. fan coil unit). Here it is possible that either the same valve is used for heating and cooling or that two valves are used because the heat/cooling is output into the room via a dedicated heating/cooling coil. For this reason it is therefore possible here to output the control values for heating and cooling on the same output.

- *Group object*: If *Group object* has been selected as the option, there is no actuation via any of the internal outputs, instead the control value is only output on the bus.
  The control value is output via the related *Status Control value Basic-stage cooling* group object.

ⓘ **Note**

Depending on the option selected in the *Actuate basic-stage heating via* parameter, this parameter may have a different standard value.

The settings for the exact control parameters are made in the *Temperature controller – Basic-stage cooling* parameter window.

The settings for the actuation of the control values via the valve outputs are made in the related valve parameter window.

Only FCC/S 1.2.x.1 & 1.3.x.1: If the *Use 6-way valve* parameter has been parameterized with *Yes*, then this parameter is pre-set to *Internal output A (valve)* and cannot be changed.

7.4.1.1.1.1.7 DEPENDENT PARAMETER

Actuate additional-stage heating via

This parameter is not visible if the *Additional-stage heating* parameter is deactivated.

This parameter is not visible if the *Actuator device* option has been selected in the *Device function* parameter.

Options: *Internal output A (valve)*
Internal output B (valve) (Not for FCC/S 1.4.1.1)
Internal relay output (Not for FCC/S 1.4.1.1)
Group object

The way the control value for the additional-stage heating is to be output is set using this parameter.

The parameter options are dependent on the values selected in the *Additional-stage heating*, *Actuate basic-stage heating via* and *Actuate basic-stage cooling via* parameters.

- *Internal output A (valve)*; *Internal output B (valve)*:
  If one of the internal outputs is selected, the control value is output directly on this physical output where it is converted into the corresponding output signal.
  The outputs A and B are used to actuate valve drives.
  In parallel to the actuation via the corresponding internal output, the control value is also output via the related *Status Control value Additional-stage heating* group object.

ⓘ **Note**

4-pipe system (selection in the *Type of heating/cooling system* parameter: *4-pipe*):
Depending on the selection in the*Actuate basic-stage heating via* and *Basic-stage cooling* parameters, it may not be possible to select all options. If one of the outputs has already been selected here, then it cannot also be used as an output for the additional-stage heating.

Example:
If the *Internal output A (valve)* option has been selected as the output for the basic-stage heating, this cannot be selected as the output for the additional-stage heating.

2-pipe system (selection in the *Type of heating/cooling system* parameter: *2-pipe*):
In a 2-pipe system, heating and cooling are undertaken using the same device (e.g. fan coil unit). Here it is possible that either the same valve is used for heating and cooling or that two valves are used because the heat/cooling is output into the room via a dedicated heating/cooling coil. For this reason it is therefore possible here to output the control values for heating and cooling on the same output.

- *Group object*: If *Group object* has been selected as the option, there is no actuation via any of the internal outputs, instead the control value is only output on the bus.
  The control value is output via the related *Status Control value Additional-stage heating* group object.

ⓘ **Note**

The settings for the exact control parameters are made in the *Temperature controller – Additional-stage heating* parameter window.

The settings for the actuation of the control values via the valve outputs are made in the related valve parameter window.

Only FCC/S 1.2.x.1 & 1.3.x.1: If the *Use 6-way valve* parameter has been parameterized with *Yes*, this parameter is pre-set to *Internal output A (valve)* and cannot be changed.

7.4.1.1.1.1.8 DEPENDENT PARAMETER

Actuate additional-stage cooling via

This parameter is not visible if the *Additional-stage cooling* parameter is deactivated.

This parameter is not visible if the *Actuator device* option has been selected in the *Device function* parameter.

Options: *Internal output A (valve)*
Internal output B (valve) (Not for FCC/S 1.4.1.1)
Group object

The way the control value for the additional-stage cooling is to be output is set using this parameter.

The parameter options are dependent on the values selected in the*Additional-stage heating*, *Actuate basic-stage heating via*, *Actuate basic-stage cooling via* and *Actuate additional-stage heating via* parameters.

- *Internal output A (valve)*; *Internal output B (valve)*:
  If one of the internal outputs is selected, the control value is output directly on this physical output where it is converted into the corresponding output signal.
  The outputs A and B are used to actuate valve drives.
  In parallel to the actuation via the corresponding internal output, the control value is also output via the related *Status Control value Additional-stage cooling* KNX group object.

ⓘ **Note**

4-pipe system (selection in the *Type of heating/cooling system* parameter: *4-pipe*):
Depending on the selection in the *Actuate basic-stage heating via*, *Basic-stage cooling* and *Additional-stage heating* parameters, it may not be possible to select all options. If one of the outputs has already been selected here, then it cannot also be used as an output for the basic-stage cooling.

Example:
If the *Internal output A (valve)* option has been selected as the output for the basic-stage heating, this cannot be selected as the output for the additional-stage cooling. Conversely, this statement also applies on the selection of *Internal output B (valve)*.

2-pipe system (selection in the *Type of heating/cooling system* parameter: *2-pipe*):
In a 2-pipe system, heating and cooling are undertaken using the same device (e.g. fan coil unit). Here it is possible that either the same valve is used for heating and cooling or that two valves are used because the heat/cooling is output into the room via a dedicated heating/cooling coil. For this reason it is therefore possible here to output the control values for heating and cooling on the same output.

In parallel to the actuation via the corresponding internal output, the control value is also output via the related *Status Control value basic heating stage* group object.

- *Group object*: If *Group object* has been selected as the option, there is no actuation via any of the internal outputs, instead the control value is only output on the bus.
  The control value is output via the related *Status Control value Additional-stage cooling* group object.

ⓘ **Note**

The settings for the exact control parameters are made in the *Temperature controller – Additional-stage cooling* parameter window.

The settings for the actuation of the control values via the valve outputs are made in the related valve parameter window.

7.4.1.1.1.1.9 DEPENDENT PARAMETER

Switch relay output independently of fan speed (including when fan = 0)

This parameter is only visible if the *Internal relay output* option has been selected for either *Actuate basic-stage heating via* or *Actuate additional-stage heating via*.

Options: *No*
Yes

This parameter is used to set whether switching of the relay output is to be allowed, independently of whether the fan is running or not. The switching is undertaken via the dependent object *Switch relay* group object.

NOTICE

Device damage due to large amount of heat

An electric heater can produce a large amount of heat. On the usage of the *Switch relay* group object it is possible to switch on the electric heater without the fan running. Normally the fan is used to blow heated air into the room. Without the fan running, there is a risk of overheating, which may lead to damage to the building or the risk of a fire.
To prevent this situation from arising, suitable measures must be taken, e.g. temperature monitoring with mechanical shutdown.

7.4.1.1.1.1.9.1 DEPENDENT PARAMETER

Automatic reset of manual relay overdrive to controller operation after

This parameter is only visible if the *Yes* option has been selected in the *Switch relay output independently of fan speed (including when fan = 0)* parameter.

Options: *00:00:30…00:05:00…18:12:15*

This parameter defines when switching of the relay outside the control is to be reset and controller operation activated again.

For the time stated here the relay output can be overridden via the group object. Only after this time has elapsed is the control value specified by the controller applied again for the relay.

A change in the operating mode from heating to cooling will always reset the relay manual override to controller operation.

—

7.4.1.1.1.1.10 Dependent Parameter

Window status input

This parameter is not visible if the *Device function* parameter has been parameterized with the *Actuator device* option.

Options: *Deactivated*
Via physical device input
Via group object

This parameter is used to inform the integrated controller whether it is to include the status of a window (open/closed) in the control.

- *Deactivated*: If *Deactivated* has been selected, the window status is not taken into account by the controller.
- *Via physical device input*: If this option is selected, the controller checks which of the physical device inputs has been parameterized for a window contact. The status of the window contact connected to this input is included in the control.
  The message: Configure in 'Inputs' parameter window appears.

ⓘ **Note**

Only device inputs that have been parameterized as a window contact are detected as such.

If no input has been parameterized as a window contact, the function is considered deactivated.

If several inputs have been parameterized as a window contact, there is a logical OR link between these inputs. As soon as one of the contacts signals the status "Window open", the controller evaluates the status as "Window open". Conversely, if all inputs signal the status "Window closed", the controller evaluates the status as "Window closed".

- *Via group object*: The window status is received via a group object. The dependent *Window contact* group object appears. In addition, the dependent *Window open when* parameter is enabled.

—

7.4.1.1.1.1.10.1 Dependent Parameter

Window open when

Options: *Object value = 0*
Object value = 1

This parameter is used to select which object value is to be considered the window open status on reception.

- *Object value = 0*: On the reception of the object value 0, it is evaluated as the "Window open" status. Reception of the object value 1 signifies "Window closed".
- *Object value = 1*: On the reception of the object value 1, it is evaluated as the "Window open" status. Reception of the object value 0 signifies "Window closed".

The controller reacts to the reception of the "Window open" status by changing to Building Protection mode (building protection heating = frost protection, building protection cooling = protection against heat).

—

7.4.1.1.1.1.11 DEPENDENT PARAMETER

Dew point status input

This parameter is not visible if the *Device function* parameter has been parameterized with the *Actuator device* option.

This parameter is not visible if the *Basic-stage cooling* parameter is deactivated.

Options: <u>*Deactivated*</u>
Via physical device input
Via group object

This parameter is used to inform the integrated controller whether it is to include the dew point alarm (Alarm/No alarm) in the control.

- *Deactivated*: If *Deactivated* has been selected, the dew point alarm is not taken into account by the controller.
- *Via physical device input*: If this option is selected, the controller checks which of the physical device inputs has been parameterized for a dew point sensor. The status of the dew point sensor connected to this input is included in the control.
  The message: Configure in 'Inputs' parameter window appears.

> ⓘ **Note**
>
> Only device inputs that have been parameterized as a dew point sensor are detected as such.
>
> If no input has been parameterized as a dew point sensor, the function is considered deactivated.
>
> If several inputs have been parameterized as a dew point sensor, there is a logical OR link between these inputs. As soon as one of the contacts signals the status "Dew point reached", the controller evaluates the status as "Dew point alarm". Conversely, if none of the inputs signals the status "Dew point reached", the controller evaluates the status as "No dew point alarm".

- *Via group object*: The dew point alarm is received via a group object. The dependent *Dew point alarm* group object appears. In addition, the dependent *Dew point reached when* parameter is enabled.

7.4.1.1.1.1.1.11.1 DEPENDENT PARAMETER

Dew point reached when

Options: *Object value = 0*
Object value = 1

This parameter is used to select which object value is to be considered dew point reached on reception.

- *Object value = 0*: On the reception of the object value 0, it is evaluated as the "Dew point alarm" status. Reception of the object value 1 signifies "No dew point alarm".
- *Object value = 1*: On the reception of the object value 1, it is evaluated as the "Dew point alarm" status. Reception of the object value 0 signifies "No dew point alarm".

The controller reacts to the reception of the "Dew point alarm" status with the shutdown of the cooling and a changeover to Building Protection mode. This mode applies until the dew point alarm is cleared. However, a change to the heating mode (if possible) is allowed at any time. Here the device continues to operate normally because the dew point only relates to the cooling and heating counteracts the dropping below the dew point temperature.

ⓘ **Note**

The dew point (or dew point temperature) is the temperature below which condensation is formed. At this temperature the relative humidity is 100 %. The air can therefore not absorb any moisture. Due to the formation of condensation, the building may be damaged (damp/formation of mold).

The dew point can be calculated based on the temperature and moisture values or measured by a sensor.

To prevent dropping below the dew point, the cooling must be reduced or stopped.

—

7.4.1.1.1.1.12 DEPENDENT PARAMETER

Fill level sensor input

This parameter is not visible if the *Device function* parameter has been parameterized with the *Actuator device* option.

This parameter is not visible if the *Basic-stage cooling* parameter is deactivated.

Options: *Deactivated*
Via physical device input
Via group object

This parameter is used to inform the integrated controller whether it is to include the level in a condensation tray (Alarm/No alarm) in the control.

- *Deactivated*: If *Deactivated* has been selected, the level alarm is not taken into account by the controller.
- *Via physical device input*: If this option is selected, the controller checks which of the physical device inputs has been parameterized for a fill level sensor. The status of the fill level sensor connected to this input is included in the control.
  The message: Configure in 'Inputs' parameter window appears.

ⓘ **Note**

Only device inputs that have been parameterized as a fill level sensor are detected as such.

If no input has been parameterized as a fill level sensor, the function is considered deactivated.

If several inputs have been parameterized as a fill level sensor, there is a logical OR link between these inputs. As soon as one of the contacts signals the status "Fill level reached", the controller evaluates the status as "Fill level alarm". Conversely, if none of the inputs signals the status "Fill level reached", the controller evaluates the status as "No fill level alarm".

- *Via group object*: The fill level alarm is received via a group object. The dependent *Fill level alarm* group object appears. The fill level alarm must be connected to the group object using this object. In addition, the dependent *Fill level reached when* parameter is enabled:

7.4.1.1.1.1.12.1 DEPENDENT PARAMETER

Fill level reached when

Options: *Object value = 0*
Object value = 1

This parameter is used to select which object value is to be considered fill level reached on reception.

- *Object value = 0*: On the reception of the object value 0, it is evaluated as the "Fill level alarm" status. Reception of the object value 1 signifies "No fill level alarm".
- *Object value = 1*: On the reception of the object value 1, it is evaluated as the "Fill level alarm" status. Reception of the object value 0 signifies "No fill level alarm".

The controller reacts to the reception of the "Fill level alarm" status with the shutdown of the cooling and a changeover to Building Protection mode. This mode applies until the fill level alarm is cleared. However, a change to the heating mode (if possible) is allowed at any time. Here the device continues to operate normally because the fill level only relates to the cooling.

ⓘ **Note**

A fill level sensor is used, e.g., to monitor a condensation tray fitted under a fan coil unit. Because moisture often arises directly on the fins during cooling, a tray is installed underneath to collect the moisture.

These trays normally have an outlet to drain off the condensation. To monitor whether the outlet is functioning, fill level sensors are installed. These sensors signal if a specific level is exceeded. To prevent further filling and the overflow of the condensation tray, cooling is deactivated in this situation.

7.4.1.1.1.1.13 DEPENDENT PARAMETER

Temperature input

This parameter is not visible if the *Device function* parameter has been parameterized with the *Actuator device* option.

Options: <u>*Via physical device input*</u>
Via group object
Via phys. device input and group object

This parameter specifies how the integrated controller receives the actual temperature. Because the controller cannot operate without information on the actual temperature, this parameter cannot be deactivated.

- *Via physical device input*: If this option is selected, the controller checks which of the physical device inputs has been parameterized for a temperature sensor. The value measured using this sensor is taken into account in the control.
  The message: Configure in 'Inputs' parameter window appears.
- *Via group object*: If this option is selected, the actual temperature is received via group object(s). The temperature can then be measured in a different device and transmitted to the device via the bus.
  The dependent parameter *Number of temperature input objects* is enabled.
- *Via physical device input and group object*: If this option is selected, the controller checks which of the physical device inputs have been parameterized as a temperature sensor. Temperature values can also be received via the bus. The values measured on the inputs and received via the bus are weighted.
  The message: Configure in 'Inputs' parameter window appears.
  The dependent parameters *Number of temperature input objects*, *Internal measurement weighting* and *Weighting of external measurement 1* appear.

> ⓘ **Note**
>
> Only device inputs that have been parameterized as a temperature sensor are detected as such.
>
> If several inputs are parameterized as a temperature sensor, a mean value is formed from the values measured and this mean value is used as the actual temperature value.
>
> If an option with the physical device inputs has been selected as the temperature input, it is to be ensured that a temperature sensor is also connected to one of the inputs. Otherwise, the controller changes to a fault mode.

With the aid of the parameters on the type of temperature input and the weighting of the different inputs, it is possible to represent even more complex room situations. The temperature values can flow into the calculation with different weightings.

7.4.1.1.1.1.13.1 DEPENDENT PARAMETER

Number of temperature input objects

This parameter is visible if, in the *Temperature input* parameter, the *Via group object* or *Via physical device input and group object* option has been selected.

Options: *1* (default)
2

This parameter is used to specify the number of group objects that can receive temperature values via the bus.

- *1*: If this option is selected, the *External temperature 1* group object is enabled.
- *2*: If this option is selected, the *External temperature 1* and *External temperature 2* group objects are enabled.

Using these two objects, temperature values measured using other devices can be received; these values are then used to determine the actual temperature.

If the *1* option has been selected and in the *Temperature input* the *Via physical device input and group object* option is not selected, the temperature received in the *External temperature 1* group object is the actual temperature. If the *2* option has been selected, the dependent parameters *Weighting of external measurement 1* and *Weighting of external measurement 2* are enabled.

7.4.1.1.1.1.13.2 DEPENDENT PARAMETER

Internal measurement weighting

This parameter is only visible if, in the *Temperature input* parameter, the *Via physical device input and group object* option has been selected.

Options: *0…100*

This value specifies the weighting with which the internal measurement is to flow into the calculation of the actual temperature.

7.4.1.1.1.1.13.3 DEPENDENT PARAMETER

Weighting of external measurement 1

This parameter is only visible if both the following cases apply:

- In the *Temperature input* parameter, the *Via physical device input and group object* option has been selected.
- In the *Temperature input* parameter, the *Via group object* option has been selected and in the *Number of temperature input objects* parameter, the *2* option has been selected.

Options: *0…100*

This value specifies the weighting with which the external measurement 1 is to flow into the calculation of the actual temperature.

—

7.4.1.1.1.1.13.4 DEPENDENT PARAMETER

Weighting of external measurement 2

This parameter is only visible if in the *Number of temperature input objects* parameter, the *2* option has been selected.

Options: *0…100*

This value specifies the weighting with which the external measurement 2 is to flow into the calculation of the actual temperature.

If the sum of the total weighting values is greater than 100 %, the ratio of the values is formed and the result then scaled back to 100 %.

Example 1:
Value 1 = 20 %
Value 2 = 80 %

Value 2 is taken into account with four times the weighting of value 1.

Expressed in figures:
Value 1: 20 °C; weighting 20 %
Value 2: 25 °C; weighting 80 %

((20 °C × 0.2) + (25 °C × 0.8)) / (0.8 + 0.2) = 24 °C

Example 2:
3 values: If 50 % is entered as the weighting for all three values, all values have the same weighting and a mean value is simply formed from the three values.

Example 3:
2 values: The weighting 80 % applies to value 1 and the weighting 40 % to value 2, value 1 is therefore taken into account in the calculation with twice the weighting of value 2.

Expressed in figures:
Value 1: 21 °C; weighting 80 %
Value 2: 24 °C; weighting 40 %

((21 °C × 0.8) + (24 °C × 0.4)) / (0.8 + 0.4) = 22 °C

ⓘ **Note**

If only the external measurement is used and the value 0 % selected as the weighting for both measurements, the value received as external temperature 1 is always used as the valid temperature value.

7.4.1.1.1.2 Selection of actuator device

The following parameters are visible if the *Actuator device* option has been selected in the *Device function* parameter.

7.4.1.1.1.2.1 DEPENDENT PARAMETER

Basic-stage heating

The following description applies in the case that the *Actuator device* option has been selected in the *Device function* parameter.

Options: *Deactivated*
Fan coil unit: Water heating coil

This parameter is used to select whether the device is to be used for a heating application.

- *Deactivated*: If this option is selected, the *Heating* function is deactivated and the *Heating control value* group object hidden. All dependent parameters and parameter windows are also deactivated.
- *Fan coil unit: Water heating coil*: This option should be selected if the device is used to actuate a heating stage. The dependent parameters and the dependent *Heating control value* group object are enabled.

Dependent parameters:

- *Type of heating/cooling system*
- *Heating/Cooling changeover*
- *Use 6-way valve (only FCC/S 1.2.x.1 / 1.3.x.1)*
- *Actuate basic-stage heating via*

ⓘ **Note**

On the selection of the *Fan coil unit: electric heater or Fan coil unit: Water heating coil* options, the fan follows the valve control value for this stage if the automatic mode is active.
On the selection of the *Free configuration* option, this can also be set via a parameter.

7.4.1.1.1.2.2 DEPENDENT PARAMETER

Basic-stage cooling

The following description applies in the case that the *Actuator device* option has been selected in the *Device function* parameter.

Options: *Deactivated*
Fan coil unit: Water cooling coil

This parameter is used to select whether the device is to be used for a cooling application.

- *Deactivated*: If this option is selected, the *Cooling* function is deactivated and the *Cooling control value* group object hidden. All dependent parameters and parameter windows are also deactivated.
- *Fan coil unit: Water cooling coil*: This option should be selected if the device is used to actuate a heating stage. The dependent parameters and the dependent *Cooling control value* group object are enabled.

Dependent parameters:

- *Type of heating/cooling system*
- *Heating/Cooling changeover*
- *Use 6-way valve*
- *Actuate basic-stage cooling via*

ⓘ **Note**

On the selection of the *Fan coil unit: Water cooling coil* options, the fan follows the valve control value for this stage if the automatic mode is active.
On the selection of the *Free configuration* option, this can also be set via a parameter.

7.4.1.1.1.2.3 DEPENDENT PARAMETER

Type of heating/cooling system

This parameter is not visible if the *Basic-stage heating* or *Basic-stage cooling* parameters are deactivated.

Options: *2-pipe*
4-pipe

This parameter must be selected to suit the heating/cooling system in which the device is to be used. It affects the changeover behavior of the device between heating and cooling.

- *2-pipe*: This option is to be selected if the heating and cooling devices actuated are in a 2-pipe system. In this system, only one pipe is used to supply the device with hot and cold water. It is therefore only ever possible to heat or cool; a changeover is necessary to change. It follows that the device is not allowed to decide on a change between heating and cooling and the changeover must always be made via the bus. The *Heating/Cooling changeover* parameter is correspondingly parameterized to *Via object only* and cannot be changed.
- *4-pipe*: This option is to be selected if the devices actuated are in a 4-pipe system. In a 4-pipe system, separate pipes are used for the hot and cold water supply. It is therefore possible to change between heating and cooling at any time. In this situation the decision can be made centrally, and also by the device. The *Heating/Cooling changeover* parameter is correspondingly parameterized to *Automatically*.

7.4.1.1.1.2.4 DEPENDENT PARAMETER

Heating/Cooling changeover

This parameter is set to *Via object only* and cannot be changed because a pure actuator device cannot decide whether heating or cooling is required. This changeover must always be made via the controller.

This parameter is only visible if the *Basic-stage heating* and *Basic-stage cooling* parameters are activated.

7.4.1.1.1.2.5 Dependent Parameter

Actuate basic-stage heating via

Options: <u>*Internal output A (valve)*</u>
Internal output B (valve) (Not for FCC/S 1.4.1.1)
Internal relay output (Not for FCC/S 1.4.1.1)
Group object

The control value is received via the bus and output directly on the selected output.

On the selection of the *Group object* option, the control value received is output directly again via the bus without any processing in the device.

7.4.1.1.1.2.6 Dependent Parameter

Actuate basic-stage cooling via

Options: *Internal output A (valve)*
<u>*Internal output B (valve)*</u> *(Not for FCC/S 1.4.1.1)*
Group object

The control value is received via the bus and output directly on the selected output.

On the selection of the *Group object* option, the control value received is output directly again via the bus without any processing in the device.

7.4.1.1.1.2.7 Dependent Parameter

Switch relay output independently of fan speed (including when fan = 0)

This parameter is only visible if the *Internal relay output* has been selected for *Actuate basic-stage heating via*.

Options: <u>*No*</u>
Yes

This parameter is used to set whether switching of the relay output is to be allowed, independently of whether the fan is running or not. The switching is undertaken via the dependent object *Switch relay* group object.

NOTICE

Device damage due to large amount of heat

An electric heater can produce a large amount of heat. On the usage of the *Switch relay* group object it is possible to switch on the electric heater without the fan running. Normally the fan is used to blow heated air into the room. Without the fan running, there is a risk of overheating, which may lead to damage to the building or the risk of a fire.
To prevent this situation from arising, suitable measures must be taken, e.g. temperature monitoring with mechanical shutdown.

ⓘ **Note**

If the device is in the cooling operating mode, even on the activation of this parameter it is not possible to switch on the relay. This feature prevents simultaneous heating and cooling.

7.4.1.1.1.2.7.1 DEPENDENT PARAMETER

Automatic reset of manual relay overdrive to controller operation after

This parameter is only visible if the *Yes* option has been selected in the *Switch relay output independently of fan speed (including when fan = 0)* parameter.

Options: *00:00:30…00:05:00…18:12:15*

This parameter defines when switching of the relay outside the control is to be reset and controller operation activated again.

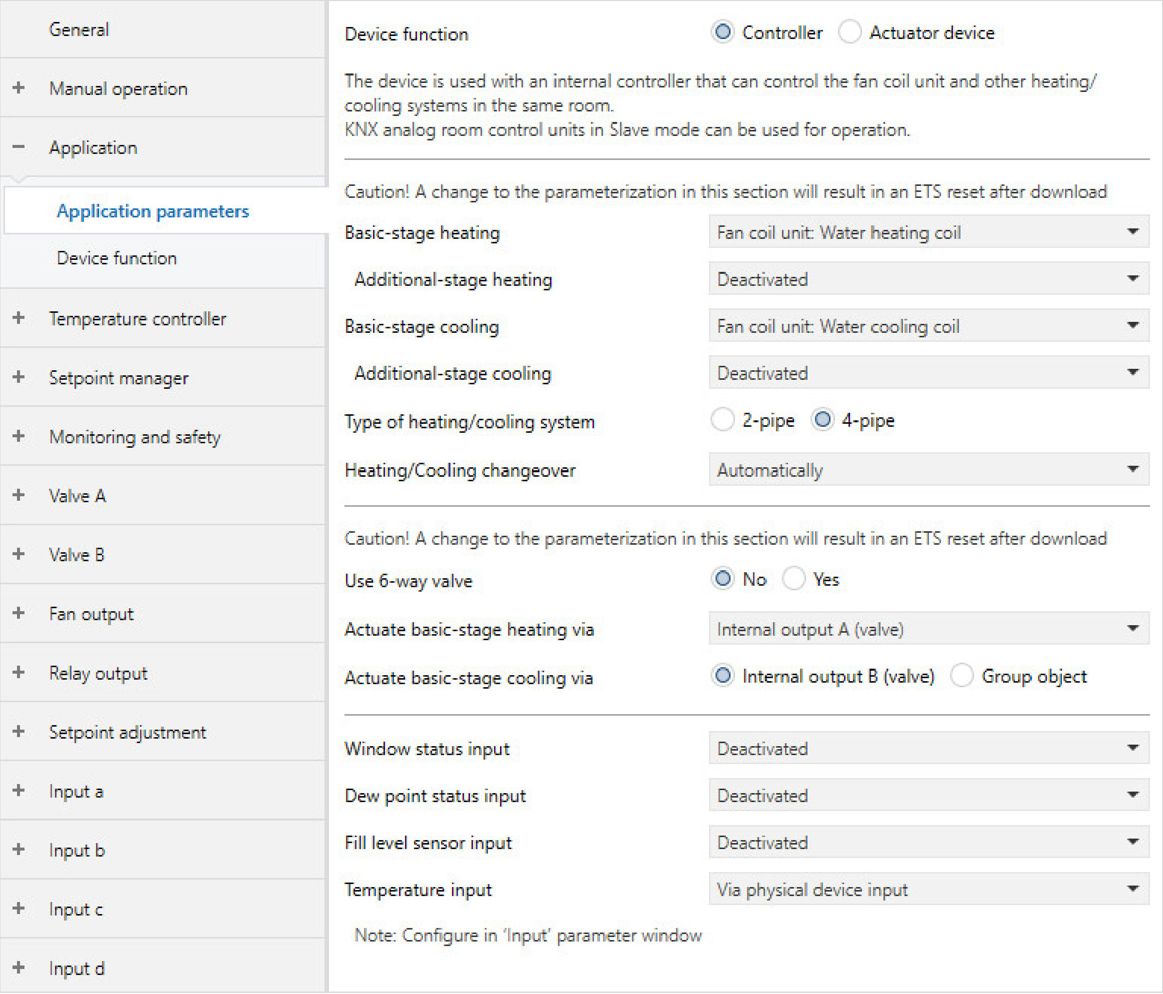
For the time stated here the relay output can be overridden via the group object. Only after this time has elapsed is the control value specified by the controller applied again for the relay.

A change in the operating mode from heating to cooling will always reset the relay manual override to controller operation.

7.4.1.2 FCC/S 1.2.x.1 / 1.3.x.1

The following explanations only apply to:

- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.3.1.1
- FCC/S 1.3.2.1



Device function ● Controller ○ Actuator device

The device is used with an internal controller that can control the fan coil unit and other heating/cooling systems in the same room.
KNX analog room control units in Slave mode can be used for operation.

Caution! A change to the parameterization in this section will result in an ETS reset after download

Basic-stage heating	Fan coil unit: Water heating coil
Additional-stage heating	Deactivated
Basic-stage cooling	Fan coil unit: Water cooling coil
Additional-stage cooling	Deactivated
Type of heating/cooling system	○ 2-pipe ● 4-pipe
Heating/Cooling changeover	Automatically

Caution! A change to the parameterization in this section will result in an ETS reset after download

Use 6-way valve	● No ○ Yes
Actuate basic-stage heating via	Internal output A (valve)
Actuate basic-stage cooling via	● Internal output B (valve) ○ Group object

Window status input	Deactivated
Dew point status input	Deactivated
Fill level sensor input	Deactivated
Temperature input	Via physical device input

Note: Configure in 'Input' parameter window

Fig. 33: Application parameters parameter window

7.4.1.2.1 Device function

Options: _Controller_
Actuator device

The function of the device is set using this parameter. It can be used with activated controller and optional communication with an analog room control unit or as a pure actuator device for controlling a fan coil unit. In the latter case, the control values for actuating the outputs must be sent by an external controller to the device.

- *Controller*: In this mode the device operates independently – based only on the states (e.g. temperature) measured on the inputs (or received via KNX) and the setpoints/operating mode changeovers received via KNX. The necessary control values for the outputs are calculated independently from this information.
  The *Temperature controller* and *Setpoint manager* parameter windows, as well as group objects for the master/slave communication are activated. Here the device acts as a master.
- *Actuator device*: In this mode the device acts as a pure actuator. The controller function must be undertaken by an external device and the control values sent to the actuator via KNX.
  The *Temperature controller* and *Setpoint manager* parameter windows are correspondingly deactivated.

7.4.1.2.1.1 Selection of Controller

The following parameters are visible if the *Controller* option has been selected in the *Device function* parameter.

—

7.4.1.2.1.1.1 DEPENDENT PARAMETER

Basic-stage heating

The following description applies in the case that the *Controller* option has been selected in the *Device function* parameter.

Options: *Deactivated*
Convector (e.g. radiator)
Area heating (e.g. floor)
Electric heater (in room)
Free configuration
Fan coil unit: electric heater (in fan coil unit)
<u>*Fan coil unit: Water heating coil*</u>

The type of application for the heating stage is selected with this parameter. The controller is pre-configured based on this selection and can be used for the selected application.

- *Deactivated*: The heating stage is deactivated by selecting this option. All dependent parameters and parameter windows are also deactivated.
- *Convector (e.g. radiator)*: This option should be selected if a convector, e.g. a radiator, is used as the heating stage.
  The *Basic heating stage control value type* parameter is pre-parameterized to *PI continuous (0…100 %)* with the corresponding P and I proportions.
- *Area heating (e.g. floor)*: This option should be selected if an area, e.g. floor heating, is used as the heating stage.
  The *Basic heating stage control value type* parameter is pre-parameterized to *PI continuous (0…100 %)* with the corresponding P and I proportions.
- *Electric heater (in room)*: This option should be selected if an electric heater in the room is used as the heating stage and for this heater the fan does not need to run as well in operation.
  The *Basic heating stage control value type* parameter is pre-parameterized to *2-point 1 bit (On/Off)*.
- *Free configuration*: With this option it is possible to select freely the type of heating stage and also the type of control. This option can be selected if the type of application is not entirely clear or if specific adjustments are necessary.
  The *Basic heating stage control value type* parameter is pre-configured to *PI continuous (0…100 %)*, however it is possible to select freely between all control types.
- *Fan coil unit: electric heater (in fan coil unit)*: This option should be selected if an electric heater in the fan coil unit is used as the heating stage and the fan must therefore also run in operation.
  The *Basic heating stage control value type* parameter is pre-parameterized to *2-point 1 bit (On/Off)*.
- *Fan coil unit: Water heating coil*: This option should be selected if the water heating coil in the fan coil unit is used as the heating stage.
  The *Basic-stage heating control value type* parameter is pre-parameterized to *PI continuous (0…100 %) for Fan Coil* with the corresponding P and I proportions.

Dependent parameters:

- *Additional-stage heating*
- *Type of heating/cooling system*
- *Heating/Cooling changeover*
- *Use 6-way valve* (only FCC/S 1.2.x.1 / 1.3.x.1)
- *Actuate basic-stage heating via*

ⓘ **Note**

On the selection of the *Fan coil unit: electric heater or Fan coil unit: Water heating coil* options, the fan follows the valve control value for this stage if the automatic mode is active.
On the selection of the *Free configuration* option, this can also be set via a parameter.

—

7.4.1.2.1.1.1.1 DEPENDENT PARAMETER

Additional-stage heating

This parameter is visible if, in the *Device function* parameter, the *Controller* option is selected and the *Basic-stage heating* parameter is not deactivated.

Options: *Deactivated*
Convector (e.g. radiator)
Area heating (e.g. floor)
Electric heater (in room)
Free configuration
Fan coil unit: electric heater (in fan coil unit)
Fan coil unit: Water heating coil

The type of application for the additional-stage heating is selected with this parameter. The controller is pre-configured based on this selection and can be used for the selected application.

- *Deactivated*: The additional-stage heating is deactivated by selecting this option. All dependent parameters and parameter windows are also deactivated.
- *Convector (e.g. radiator)*: This option should be selected if a convector, e.g. a radiator, is used as the additional-stage heating.
  The *Additional-stage heating control value type* parameter is pre-parameterized to *PI continuous (0…100%)* with the corresponding P and I proportions.
- *Area heating (e.g. floor)*: This option should be selected if an area, e.g. floor heating, is used as the additional-stage heating.
  The *Additional-stage heating control value type* parameter is pre-parameterized to *PI continuous (0…100%)* with the corresponding P and I proportions.
- *Electric heater (in room)*: This option should be selected if an electric heater in the room is used as the additional-stage heating and for this heater the fan does not need to run as well in operation.
  The *Additional-stage heating control value type* parameter is pre-parameterized to *2-point 1 bit (On/Off)*.
- *Free configuration*: With this option it is possible to select freely the type of additional-stage heating and also the type of control. This option can be selected if the type of application is not entirely clear or if specific adjustments are necessary.
  The *Basic-stage/Additional-stage heating control value type* parameter is pre-configured to *PI continuous (0…100%)*, however it is possible to select freely between all control types.
- *Fan coil unit: electric heater (in fan coil unit)*: This option should be selected if an electric heater in the fan coil unit is used as the additional-stage heating and the fan must therefore also run in operation.
  The *Additional-stage heating control value type* parameter is pre-parameterized to *2-point 1 bit (On/Off)*.
- *Fan coil unit: Water heating coil*: This option should be selected if the water heating coil in the fan coil unit is used as the additional-stage heating.
  The *Additional-stage heating control value type* parameter is pre-parameterized to *PI continuous (0…100%) for Fan Coil* with the corresponding P and I proportions.

Dependent parameters:

- *Actuate additional-stage heating via*

ⓘ **Note**

On the selection of the *Fan coil unit: electric heater or Fan coil unit: Water heating coil* options, the fan follows the valve control value for this stage if the automatic mode is active.
On the selection of the *Free configuration* option, this can also be set via a parameter.

7.4.1.2.1.1.2 DEPENDENT PARAMETER

Basic-stage cooling

The following description applies in the case that the *Controller* option in the *Device function* parameter.

Options: *Deactivated*
Area cooling (e.g. cooling ceiling)
Free configuration
Fan coil unit: Water cooling coil

The type of application for the basic-stage cooling is selected with this parameter. The controller is pre-configured based on this selection and can be used for the selected application.

- *Deactivated*: The basic-stage cooling is deactivated by selecting this option. All dependent parameters and parameter windows are also deactivated.
- *Area cooling (e.g. cooling ceiling)*: This option should be selected if an area, e.g. cooling ceiling, is used as the basic-stage cooling.
  The *Basic-stage cooling control value type* parameter is pre-parameterized to *PI continuous (0…100%)* with the corresponding P and I proportions.
- *Free configuration*: With this option it is possible to select freely the type of basic-stage cooling and also the type of control. This option can be selected if the type of application is not entirely clear or if specific adjustments are necessary.
  The *Basic-stage cooling control value type* parameter is pre-configured to *PI continuous (0…100%)*, however it is possible to select freely between all control types.
- *Fan coil unit: Water cooling coil*: This option should be selected if the water heating coil in the fan coil unit is used as the basic-stage cooling.
  The *Basic-stage cooling control value type* parameter is pre-parameterized to *PI continuous (0…100%) for Fan Coil* with the corresponding P and I proportions.

Dependent parameters:

- *Additional-stage cooling*
- *Type of heating/cooling system*
- *Heating/Cooling changeover*
- *Use 6-way valve (only FCC/S 1.2.x.1 / 1.3.x.1)*
- *Actuate basic-stage cooling via*

> ⓘ **Note**
> On the selection of the *Fan coil unit: Water cooling coil* options, the fan follows the valve control value for this stage if the automatic mode is active.
> On the selection of the *Free configuration* option, this can also be set via a parameter.

7.4.1.2.1.1.2.1 DEPENDENT PARAMETER

Additional-stage cooling

This parameter is visible if, in the *Device function* parameter, the *Controller* option is selected and the *Basic-stage cooling* parameter is not deactivated.

Options: *Deactivated*
Area cooling (e.g. cooling ceiling)
Free configuration
Fan coil unit: Water cooling coil

The type of application for the additional-stage cooling is selected with this parameter. The controller is pre-configured based on this selection and can be used for the selected application.

- *Deactivated*: The additional-stage cooling is deactivated by selecting this option. All dependent parameters and parameter windows are also deactivated.
- *Area cooling (e.g. cooling ceiling)*: This option should be selected if an area, e.g. cooling ceiling, is used as the additional-stage cooling.
  The *Additional-stage cooling control value type* parameter is pre-parameterized to *PI continuous (0…100%)* with the corresponding P and I proportions.
- *Free configuration*: With this option it is possible to select freely the type of additional-stage cooling and also the type of control. This option can be selected if the type of application is not entirely clear or if specific adjustments are necessary.
  The *Additional-stage cooling control value type* parameter is pre-configured to *PI continuous (0…100%)*, however it is possible to select freely between all control types.
- *Fan coil unit: Water cooling coil*: This option should be selected if the water heating coil in the fan coil unit is used as the additional-stage cooling.
  The *Additional-stage cooling control value type*parameter is pre-parameterized to *PI continuous (0…100%) for Fan Coil* with the corresponding P and I proportions.

Dependent parameters:

- *Actuate additional-stage cooling via*

ⓘ **Note**

On the selection of the *Fan coil unit: Water cooling coil* options, the fan follows the valve control value for this stage if the automatic mode is active.
On the selection of the *Free configuration* option, this can also be set via a parameter.

7.4.1.2.1.1.3 DEPENDENT PARAMETER

Type of heating/cooling system

This parameter is not visible if the *Basic-stage heating* or *Basic-stage cooling* parameters are deactivated.

Options: *2-pipe*
4-pipe

This parameter must be selected to suit the heating/cooling system in which the device is to be used. It affects the changeover behavior of the device between heating and cooling.

- *2-pipe*: This option is to be selected if the heating and cooling devices actuated are in a 2-pipe system. In this system, only one pipe is used to supply the device with hot and cold water. It is therefore only ever possible to heat or cool; a changeover is necessary to change. It follows that the device is not allowed to decide on a change between heating and cooling and the changeover must always be made via the bus. The *Heating/Cooling changeover* parameter is correspondingly parameterized to *Via object only* and cannot be changed.
- *4-pipe*: This option is to be selected if the devices actuated are in a 4-pipe system. In a 4-pipe system, separate pipes are used for the hot and cold water supply. It is therefore possible to change between heating and cooling at any time. In this situation the decision can be made centrally, and also by the device. The *Heating/Cooling changeover* parameter is correspondingly parameterized to *Automatically*.

7.4.1.2.1.1.4 DEPENDENT PARAMETER

Heating/Cooling changeover

This parameter is not visible if the *Basic-stage heating* or *Basic-stage cooling* parameters are deactivated.

Options: *Automatically*
Via object only
Via slave and via object

The standard value for this parameter depends on the selection in the *Type of heating/cooling system* parameter.

- Selection of *4-pipe*:
  - *Automatically*: If the *Automatically* option is selected, the changeover is only made by the controller for the device depending on the setpoint temperature selected. Here the *Heating/Cooling changeover* group object is hidden.
  - *Via object only*: If the changeover is only allowed to be made centrally by a visualization or a building management system, e.g. if the cooling equipment and heating equipment are not to operate at the same time for energy-saving reasons, this parameter can also be changed to *Via object only*. The *Heating/Cooling changeover* group object is visible.
  - *Via slave and via object*: The *Heating/Cooling changeover* and *Request heating/cooling (master)* group objects are visible. It is possible to trigger a change between heating and cooling via the bus using these group objects. The *Request heating/cooling (master)* group object is used for connecting to a slave analog room control unit in the context of master/slave communication.
- Selection of *2-pipe*:
  If *2-pipe* has been selected, the standard value is set to *Via object only* and cannot be changed; the related *Heating/Cooling changeover* group object is visible.
  In a 2-pipe system, the same pipe is used for the supply of hot and cold water. Because the device cannot detect which situation is present, the changeover must always be made centrally and sent to the device using a group object.

7.4.1.2.1.1.5 DEPENDENT PARAMETER

Use 6-way valve

This parameter is only visible for:

- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.3.1.1
- FCC/S 1.3.2.1

This parameter is not visible if the *Basic-stage heating* or *Basic-stage cooling* parameters are deactivated. This parameter is also only visible if the *4-pipe* option has been selected in the *Type of heating/cooling system* parameter.

Options:	No
	Yes

This parameter is used to parameterize the usage of a 6-way valve on the device. The 6-way valve is used to control both the heating and cooling stages at the same time. For this purpose the drive in the 6-way valve is connected to valve output A and the control values for heating and cooling are output on this output.

ⓘ **Note**

The usage of a 6-way valve is only possible for the two basic stages.

If one of the basic stages has been deactivated or the basic-stage heating is used for a non-water type of heating (e.g. electric heater), it is not possible to use a 6-way valve.

If *Yes* has been selected, the dependent parameter *Valve type* in the *Valve output A* parameter window is pre-configured to *6-way valve*. The *Actuate basic-stage heating via* and *Actuate basic-stage cooling via* parameters are set to *Output A*.

ⓘ **Note**

To prevent an erroneous configuration, none of the dependent parameters can be changed as long as the usage of a 6-way valve is parameterized.

7.4.1.2.1.1.6 DEPENDENT PARAMETER

Actuate basic-stage heating via

This parameter is not visible if the *Basic-stage heating* parameter is deactivated.

Options: *Internal output A (valve)*
Internal output B (valve) (Not for FCC/S 1.4.1.1)
Internal relay output (Not for FCC/S 1.4.1.1)
Group object

The way the control value for the basic-stage heating is to be output is set using this parameter.

ⓘ **Note**

Depending on the selection in the *Basic-stage heating* parameter, it may not be possible to select all options.

Example:

If, in the *Basic-stage heating* parameter, the *Fan coil unit: electric heater (in fan coil unit)* option is selected, it is not possible to select one of the valve outputs A or B as the output, because an electric heater cannot be controlled via a valve output. Conversely, the relay output cannot be selected if a water heating type is selected.

- *Internal output A (valve)*; *Internal output B (valve)*; *Internal relay output*: If one of the internal outputs is selected, the control value is output directly on this physical output where it is converted into the corresponding output signal.
  The outputs A and B are used to actuate valve drives, while the relay output is used to actuate an electric heater.
  In parallel to the actuation via the corresponding internal output, the control value is also output via the related *Status Control value Basic-stage heating* group object.
- *Group object*: If *Group object* has been selected as the option, there is no actuation via any of the internal outputs, instead the control value is only output on the bus.
  The control value is output via the related *Status Control value Basic-stage heating* group object.

ⓘ **Note**

Depending on the option selected in the *Basic-stage heating* parameter, this parameter may have a different standard value.

The settings for the exact control parameters are made in the *Temperature controller – Basic-stage heating* parameter window.

The settings for the actuation of the control values via the valve outputs are made in the related valve parameter window.

Only FCC/S 1.2.x.1 & 1.3.x.1: If the *Use 6-way valve* parameter has been parameterized with *Yes*, then this parameter is pre-set to *Internal output A (valve)* and cannot be changed.

7.4.1.2.1.1.7 DEPENDENT PARAMETER

Actuate basic-stage cooling via

This parameter is not visible if the *Basic-stage cooling* parameter is deactivated.

Options: *Internal output A (valve)*
Internal output B (valve) (Not for FCC/S 1.4.1.1)
Group object

The way the control value for the basic-stage cooling is to be output is set using this parameter.

- *Internal output A (valve)*; *Internal output B (valve)*: If one of the internal outputs is selected, the control value is output directly on this physical output where it is converted into the corresponding output signal.
  The outputs A and B are used to actuate valve drives.
  In parallel to the actuation via the corresponding internal output, the control value is also output via the related *Status Control value Basic-stage cooling* group object.

ⓘ **Note**

(Selection in the *Type of heating/cooling system* parameter: *4-pipe*)

Depending on the selection in the *Actuate basic-stage heating via* parameter, it may not be possible to select all options. If one of the outputs has already been selected here, it cannot also be used as an output for the basic-stage cooling.

Example:
If the *Internal output A (valve)* option has been selected as the output for the basic-stage heating, this cannot be selected as the output for the basic-stage cooling. Conversely, this statement also applies on the selection of *Internal output B (valve)*.

Only FCC/S 1.2.x.1 & 1.3.x.1:
If the *Use 6-way valve* parameter has been parameterized with *Yes*, this parameter is pre-set to *Internal output A (valve)* and cannot be changed.

(Selection in the *Type of heating/cooling system* parameter: *2-pipe*)

In a 2-pipe system, heating and cooling are undertaken using the same device (e.g. fan coil unit). Here it is possible that either the same valve is used for heating and cooling or that two valves are used because the heat/cooling is output into the room via a dedicated heating/cooling coil. For this reason it is therefore possible here to output the control values for heating and cooling on the same output.

- *Group object*: If *Group object* has been selected as the option, there is no actuation via any of the internal outputs, instead the control value is only output on the bus.
  The control value is output via the related *Status Control value Basic-stage cooling* group object.

ⓘ **Note**

Depending on the option selected in the *Actuate basic-stage heating via* parameter, this parameter may have a different standard value.

The settings for the exact control parameters are made in the *Temperature controller – Basic-stage cooling* parameter window.

The settings for the actuation of the control values via the valve outputs are made in the related valve parameter window.

Only FCC/S 1.2.x.1 & 1.3.x.1: If the *Use 6-way valve* parameter has been parameterized with *Yes*, then this parameter is pre-set to *Internal output A (valve)* and cannot be changed.

7.4.1.2.1.1.8 DEPENDENT PARAMETER

Actuate additional-stage heating via

This parameter is not visible if the *Additional-stage heating* parameter is deactivated.

This parameter is not visible if the *Actuator device* option has been selected in the *Device function* parameter.

Options: <u>*Internal output A (valve)*</u>
Internal output B (valve) (Not for FCC/S 1.4.1.1)
Internal relay output (Not for FCC/S 1.4.1.1)
Group object

The way the control value for the additional-stage heating is to be output is set using this parameter.

The parameter options are dependent on the values selected in the *Additional-stage heating*, *Actuate basic-stage heating via* and *Actuate basic-stage cooling via* parameters.

- *Internal output A (valve)*; *Internal output B (valve)*:
  If one of the internal outputs is selected, the control value is output directly on this physical output where it is converted into the corresponding output signal.
  The outputs A and B are used to actuate valve drives.
  In parallel to the actuation via the corresponding internal output, the control value is also output via the related *Status Control value Additional-stage heating* group object.

ⓘ **Note**

4-pipe system (selection in the *Type of heating/cooling system* parameter: *4-pipe*):
Depending on the selection in the*Actuate basic-stage heating via* and *Basic-stage cooling* parameters, it may not be possible to select all options. If one of the outputs has already been selected here, then it cannot also be used as an output for the additional-stage heating.

Example:
If the *Internal output A (valve)* option has been selected as the output for the basic-stage heating, this cannot be selected as the output for the additional-stage heating.

2-pipe system (selection in the *Type of heating/cooling system* parameter: *2-pipe*):
In a 2-pipe system, heating and cooling are undertaken using the same device (e.g. fan coil unit). Here it is possible that either the same valve is used for heating and cooling or that two valves are used because the heat/cooling is output into the room via a dedicated heating/cooling coil. For this reason it is therefore possible here to output the control values for heating and cooling on the same output.

- *Group object*: If *Group object* has been selected as the option, there is no actuation via any of the internal outputs, instead the control value is only output on the bus.
  The control value is output via the related *Status Control value Additional-stage heating* group object.

ⓘ **Note**

The settings for the exact control parameters are made in the *Temperature controller – Additional-stage heating* parameter window.

The settings for the actuation of the control values via the valve outputs are made in the related valve parameter window.

Only FCC/S 1.2.x.1 & 1.3.x.1: If the *Use 6-way valve* parameter has been parameterized with *Yes*, this parameter is pre-set to *Internal output A (valve)* and cannot be changed.

7.4.1.2.1.1.9 DEPENDENT PARAMETER

Actuate additional-stage cooling via

This parameter is not visible if the *Additional-stage cooling* parameter is deactivated.

This parameter is not visible if the *Actuator device* option has been selected in the *Device function* parameter.

Options: *Internal output A (valve)*
<u>Internal output B (valve)</u> (Not for FCC/S 1.4.1.1)
Group object

The way the control value for the additional-stage cooling is to be output is set using this parameter.

The parameter options are dependent on the values selected in the*Additional-stage heating*, *Actuate basic-stage heating via*, *Actuate basic-stage cooling via* and *Actuate additional-stage heating via* parameters.

- *Internal output A (valve)*; *Internal output B (valve)*:
  If one of the internal outputs is selected, the control value is output directly on this physical output where it is converted into the corresponding output signal.
  The outputs A and B are used to actuate valve drives.
  In parallel to the actuation via the corresponding internal output, the control value is also output via the related *Status Control value Additional-stage cooling* KNX group object.

> **Note**
> 4-pipe system (selection in the *Type of heating/cooling system* parameter: *4-pipe*):
> Depending on the selection in the *Actuate basic-stage heating via*, *Basic-stage cooling* and *Additional-stage heating* parameters, it may not be possible to select all options. If one of the outputs has already been selected here, then it cannot also be used as an output for the basic-stage cooling.
>
> Example:
> If the *Internal output A (valve)* option has been selected as the output for the basic-stage heating, this cannot be selected as the output for the additional-stage cooling. Conversely, this statement also applies on the selection of *Internal output B (valve)*.
>
> 2-pipe system (selection in the *Type of heating/cooling system* parameter: *2-pipe*):
> In a 2-pipe system, heating and cooling are undertaken using the same device (e.g. fan coil unit). Here it is possible that either the same valve is used for heating and cooling or that two valves are used because the heat/cooling is output into the room via a dedicated heating/cooling coil. For this reason it is therefore possible here to output the control values for heating and cooling on the same output.
>
> In parallel to the actuation via the corresponding internal output, the control value is also output via the related *Status Control value basic heating stage* group object.

- *Group object*: If *Group object* has been selected as the option, there is no actuation via any of the internal outputs, instead the control value is only output on the bus.
  The control value is output via the related *Status Control value Additional-stage cooling* group object.

> **Note**
> The settings for the exact control parameters are made in the *Temperature controller – Additional-stage cooling* parameter window.
>
> The settings for the actuation of the control values via the valve outputs are made in the related valve parameter window.

7.4.1.2.1.1.10 DEPENDENT PARAMETER

Switch relay output independently of fan speed (including when fan = 0)

This parameter is only visible if the *Internal relay output* option has been selected for either *Actuate basic-stage heating via* or *Actuate additional-stage heating via*.

Options: _No_
Yes

This parameter is used to set whether switching of the relay output is to be allowed, independently of whether the fan is running or not. The switching is undertaken via the dependent object *Switch relay* group object.

NOTICE

Device damage due to large amount of heat

An electric heater can produce a large amount of heat. On the usage of the *Switch relay* group object it is possible to switch on the electric heater without the fan running. Normally the fan is used to blow heated air into the room. Without the fan running, there is a risk of overheating, which may lead to damage to the building or the risk of a fire.
To prevent this situation from arising, suitable measures must be taken, e.g. temperature monitoring with mechanical shutdown.

7.4.1.2.1.1.10.1 DEPENDENT PARAMETER

Automatic reset of manual relay overdrive to controller operation after

This parameter is only visible if the *Yes* option has been selected in the *Switch relay output independently of fan speed (including when fan = 0)* parameter.

Options: *00:00:30…<u>00:05:00</u>…18:12:15*

This parameter defines when switching of the relay outside the control is to be reset and controller operation activated again.

For the time stated here the relay output can be overridden via the group object. Only after this time has elapsed is the control value specified by the controller applied again for the relay.

A change in the operating mode from heating to cooling will always reset the relay manual override to controller operation.

7.4.1.2.1.1.11 DEPENDENT PARAMETER

Window status input

This parameter is not visible if the *Device function* parameter has been parameterized with the *Actuator device* option.

Options: *<u>Deactivated</u>*
Via physical device input
Via group object

This parameter is used to inform the integrated controller whether it is to include the status of a window (open/closed) in the control.

- *Deactivated*: If *Deactivated* has been selected, the window status is not taken into account by the controller.
- *Via physical device input*: If this option is selected, the controller checks which of the physical device inputs has been parameterized for a window contact. The status of the window contact connected to this input is included in the control.
  The message: Configure in 'Inputs' parameter window appears.

ⓘ Note

Only device inputs that have been parameterized as a window contact are detected as such.

If no input has been parameterized as a window contact, the function is considered deactivated.

If several inputs have been parameterized as a window contact, there is a logical OR link between these inputs. As soon as one of the contacts signals the status "Window open", the controller evaluates the status as "Window open". Conversely, if all inputs signal the status "Window closed", the controller evaluates the status as "Window closed".

- *Via group object*: The window status is received via a group object. The dependent *Window contact* group object appears. In addition, the dependent *Window open when* parameter is enabled.

7.4.1.2.1.1.11.1 DEPENDENT PARAMETER

Window open when

Options: *Object value = 0*
<u>Object value = 1</u>

This parameter is used to select which object value is to be considered the window open status on reception.

- *Object value = 0*: On the reception of the object value 0, it is evaluated as the "Window open" status. Reception of the object value 1 signifies "Window closed".
- *Object value = 1*: On the reception of the object value 1, it is evaluated as the "Window open" status. Reception of the object value 0 signifies "Window closed".

The controller reacts to the reception of the "Window open" status by changing to Building Protection mode (building protection heating = frost protection, building protection cooling = protection against heat).

7.4.1.2.1.1.12 DEPENDENT PARAMETER

Dew point status input

This parameter is not visible if the *Device function* parameter has been parameterized with the *Actuator device* option.

This parameter is not visible if the *Basic-stage cooling* parameter is deactivated.

Options: *Deactivated*
Via physical device input
Via group object

This parameter is used to inform the integrated controller whether it is to include the dew point alarm (Alarm/No alarm) in the control.

- *Deactivated*: If *Deactivated* has been selected, the dew point alarm is not taken into account by the controller.
- *Via physical device input*: If this option is selected, the controller checks which of the physical device inputs has been parameterized for a dew point sensor. The status of the dew point sensor connected to this input is included in the control.
  The message: Configure in 'Inputs' parameter window appears.

ⓘ **Note**

Only device inputs that have been parameterized as a dew point sensor are detected as such.

If no input has been parameterized as a dew point sensor, the function is considered deactivated.

If several inputs have been parameterized as a dew point sensor, there is a logical OR link between these inputs. As soon as one of the contacts signals the status "Dew point reached", the controller evaluates the status as "Dew point alarm". Conversely, if none of the inputs signals the status "Dew point reached", the controller evaluates the status as "No dew point alarm".

- *Via group object*: The dew point alarm is received via a group object. The dependent *Dew point alarm* group object appears. In addition, the dependent *Dew point reached when* parameter is enabled.

7.4.1.2.1.1.12.1 DEPENDENT PARAMETER

Dew point reached when

Options: *Object value = 0*
Object value = 1

This parameter is used to select which object value is to be considered dew point reached on reception.

- *Object value = 0*: On the reception of the object value 0, it is evaluated as the "Dew point alarm" status. Reception of the object value 1 signifies "No dew point alarm".
- *Object value = 1*: On the reception of the object value 1, it is evaluated as the "Dew point alarm" status. Reception of the object value 0 signifies "No dew point alarm".

The controller reacts to the reception of the "Dew point alarm" status with the shutdown of the cooling and a changeover to Building Protection mode. This mode applies until the dew point alarm is cleared. However, a change to the heating mode (if possible) is allowed at any time. Here the device continues to operate normally because the dew point only relates to the cooling and heating counteracts the dropping below the dew point temperature.

ⓘ **Note**

The dew point (or dew point temperature) is the temperature below which condensation is formed. At this temperature the relative humidity is 100 %. The air can therefore not absorb any moisture. Due to the formation of condensation, the building may be damaged (damp/formation of mold).

The dew point can be calculated based on the temperature and moisture values or measured by a sensor.

To prevent dropping below the dew point, the cooling must be reduced or stopped.

7.4.1.2.1.1.13 DEPENDENT PARAMETER

Fill level sensor input

This parameter is not visible if the *Device function* parameter has been parameterized with the *Actuator device* option.

This parameter is not visible if the *Basic-stage cooling* parameter is deactivated.

Options: *Deactivated*
Via physical device input
Via group object

This parameter is used to inform the integrated controller whether it is to include the level in a condensation tray (Alarm/No alarm) in the control.

- *Deactivated*: If *Deactivated* has been selected, the level alarm is not taken into account by the controller.
- *Via physical device input*: If this option is selected, the controller checks which of the physical device inputs has been parameterized for a fill level sensor. The status of the fill level sensor connected to this input is included in the control.
  The message: Configure in 'Inputs' parameter window appears.

ⓘ **Note**

Only device inputs that have been parameterized as a fill level sensor are detected as such.

If no input has been parameterized as a fill level sensor, the function is considered deactivated.

If several inputs have been parameterized as a fill level sensor, there is a logical OR link between these inputs. As soon as one of the contacts signals the status "Fill level reached", the controller evaluates the status as "Fill level alarm". Conversely, if none of the inputs signals the status "Fill level reached", the controller evaluates the status as "No fill level alarm".

- *Via group object*: The fill level alarm is received via a group object. The dependent *Fill level alarm* group object appears. The fill level alarm must be connected to the group object using this object. In addition, the dependent *Fill level reached when* parameter is enabled:

7.4.1.2.1.1.13.1 DEPENDENT PARAMETER

Fill level reached when

Options: *Object value = 0*
Object value = 1

This parameter is used to select which object value is to be considered fill level reached on reception.

- *Object value = 0*: On the reception of the object value 0, it is evaluated as the "Fill level alarm" status. Reception of the object value 1 signifies "No fill level alarm".
- *Object value = 1*: On the reception of the object value 1, it is evaluated as the "Fill level alarm" status. Reception of the object value 0 signifies "No fill level alarm".

The controller reacts to the reception of the "Fill level alarm" status with the shutdown of the cooling and a changeover to Building Protection mode. This mode applies until the fill level alarm is cleared. However, a change to the heating mode (if possible) is allowed at any time. Here the device continues to operate normally because the fill level only relates to the cooling.

Note

A fill level sensor is used, e.g., to monitor a condensation tray fitted under a fan coil unit. Because moisture often arises directly on the fins during cooling, a tray is installed underneath to collect the moisture.

These trays normally have an outlet to drain off the condensation. To monitor whether the outlet is functioning, fill level sensors are installed. These sensors signal if a specific level is exceeded. To prevent further filling and the overflow of the condensation tray, cooling is deactivated in this situation.

—

7.4.1.2.1.1.14 DEPENDENT PARAMETER

Temperature input

This parameter is not visible if the *Device function* parameter has been parameterized with the *Actuator device* option.

Options: *Via physical device input*
Via group object
Via phys. device input and group object

This parameter specifies how the integrated controller receives the actual temperature. Because the controller cannot operate without information on the actual temperature, this parameter cannot be deactivated.

- *Via physical device input*: If this option is selected, the controller checks which of the physical device inputs has been parameterized for a temperature sensor. The value measured using this sensor is taken into account in the control.
  The message: Configure in 'Inputs' parameter window appears.
- *Via group object*: If this option is selected, the actual temperature is received via group object(s). The temperature can then be measured in a different device and transmitted to the device via the bus.
  The dependent parameter *Number of temperature input objects* is enabled.
- *Via physical device input and group object*: If this option is selected, the controller checks which of the physical device inputs have been parameterized as a temperature sensor. Temperature values can also be received via the bus. The values measured on the inputs and received via the bus are weighted.
  The message: Configure in 'Inputs' parameter window appears.
  The dependent parameters *Number of temperature input objects*, *Internal measurement weighting* and *Weighting of external measurement 1* appear.

ⓘ **Note**

Only device inputs that have been parameterized as a temperature sensor are detected as such.

If several inputs are parameterized as a temperature sensor, a mean value is formed from the values measured and this mean value is used as the actual temperature value.

If an option with the physical device inputs has been selected as the temperature input, it is to be ensured that a temperature sensor is also connected to one of the inputs. Otherwise, the controller changes to a fault mode.

With the aid of the parameters on the type of temperature input and the weighting of the different inputs, it is possible to represent even more complex room situations. The temperature values can flow into the calculation with different weightings.

7.4.1.2.1.1.14.1 DEPENDENT PARAMETER

Number of temperature input objects

This parameter is visible if, in the *Temperature input* parameter, the *Via group object* or *Via physical device input and group object* option has been selected.

Options: *1*
2

This parameter is used to specify the number of group objects that can receive temperature values via the bus.

- *1*: If this option is selected, the *External temperature 1* group object is enabled.
- *2*: If this option is selected, the *External temperature 1* and *External temperature 2* group objects are enabled.

Using these two objects, temperature values measured using other devices can be received; these values are then used to determine the actual temperature.

If the *1* option has been selected and in the *Temperature input* the *Via physical device input and group object* option is not selected, the temperature received in the *External temperature 1* group object is the actual temperature. If the *2* option has been selected, the dependent parameters *Weighting of external measurement 1* and *Weighting of external measurement 2* are enabled.

7.4.1.2.1.1.14.2 DEPENDENT PARAMETER

Internal measurement weighting

This parameter is only visible if, in the *Temperature input* parameter, the *Via physical device input and group object* option has been selected.

Options: *0…100*

This value specifies the weighting with which the internal measurement is to flow into the calculation of the actual temperature.

7.4.1.2.1.1.14.3 DEPENDENT PARAMETER

Weighting of external measurement 1

This parameter is only visible if both the following cases apply:

- In the *Temperature input* parameter, the *Via physical device input and group object* option has been selected.
- In the *Temperature input* parameter, the *Via group object* option has been selected and in the *Number of temperature input objects* parameter, the *2* option has been selected.

Options: *0…100*

This value specifies the weighting with which the external measurement 1 is to flow into the calculation of the actual temperature.

—

7.4.1.2.1.1.14.4 DEPENDENT PARAMETER

Weighting of external measurement 2

This parameter is only visible if in the *Number of temperature input objects* parameter, the *2* option has been selected.

Options: *0…100*

This value specifies the weighting with which the external measurement 2 is to flow into the calculation of the actual temperature.

If the sum of the total weighting values is greater than 100 %, the ratio of the values is formed and the result then scaled back to 100 %.

Example 1:
Value 1 = 20 %
Value 2 = 80 %

Value 2 is taken into account with four times the weighting of value 1.

Expressed in figures:
Value 1: 20 °C; weighting 20 %
Value 2: 25 °C; weighting 80 %

((20 °C × 0.2) + (25 °C × 0.8)) / (0.8 + 0.2) = 24 °C

Example 2:
3 values: If 50 % is entered as the weighting for all three values, all values have the same weighting and a mean value is simply formed from the three values.

Example 3:
2 values: The weighting 80 % applies to value 1 and the weighting 40 % to value 2, value 1 is therefore taken into account in the calculation with twice the weighting of value 2.

Expressed in figures:
Value 1: 21 °C; weighting 80 %
Value 2: 24 °C; weighting 40 %

((21 °C × 0.8) + (24 °C × 0.4)) / (0.8 + 0.4) = 22 °C

ⓘ **Note**

If only the external measurement is used and the value 0 % selected as the weighting for both measurements, the value received as external temperature 1 is always used as the valid temperature value.

7.4.1.2.1.2 Selection of actuator device

The following parameters are visible if the *Actuator device* option has been selected in the *Device function* parameter.

7.4.1.2.1.2.1 DEPENDENT PARAMETER

Basic-stage heating

The following description applies in the case that the *Actuator device* option has been selected in the *Device function* parameter.

Options: *Deactivated*
Fan coil unit: Water heating coil

This parameter is used to select whether the device is to be used for a heating application.

- *Deactivated*: If this option is selected, the *Heating* function is deactivated and the *Heating control value* group object hidden. All dependent parameters and parameter windows are also deactivated.
- *Fan coil unit: Water heating coil*: This option should be selected if the device is used to actuate a heating stage. The dependent parameters and the dependent *Heating control value* group object are enabled.

Dependent parameters:

- *Type of heating/cooling system*
- *Heating/Cooling changeover*
- *Use 6-way valve (only FCC/S 1.2.x.1 / 1.3.x.1)*
- *Actuate basic-stage heating via*

ⓘ **Note**

On the selection of the *Fan coil unit: electric heater or Fan coil unit: Water heating coil* options, the fan follows the valve control value for this stage if the automatic mode is active.
On the selection of the *Free configuration* option, this can also be set via a parameter.

7.4.1.2.1.2.2 DEPENDENT PARAMETER

Basic-stage cooling

The following description applies in the case that the *Actuator device* option has been selected in the *Device function* parameter.

Options: *Deactivated*
Fan coil unit: Water cooling coil

This parameter is used to select whether the device is to be used for a cooling application.

- *Deactivated*: If this option is selected, the *Cooling* function is deactivated and the *Cooling control value* group object hidden. All dependent parameters and parameter windows are also deactivated.
- *Fan coil unit: Water cooling coil*: This option should be selected if the device is used to actuate a heating stage. The dependent parameters and the dependent *Cooling control value* group object are enabled.

Dependent parameters:

- *Type of heating/cooling system*
- *Heating/Cooling changeover*
- *Use 6-way valve*
- *Actuate basic-stage cooling via*

> ⓘ **Note**
> On the selection of the *Fan coil unit: Water cooling coil* options, the fan follows the valve control value for this stage if the automatic mode is active.
> On the selection of the *Free configuration* option, this can also be set via a parameter.

7.4.1.2.1.2.3 Dependent Parameter

Type of heating/cooling system

This parameter is not visible if the *Basic-stage heating* or *Basic-stage cooling* parameters are deactivated.

Options: *2-pipe*
4-pipe

This parameter must be selected to suit the heating/cooling system in which the device is to be used. It affects the changeover behavior of the device between heating and cooling.

- *2-pipe*: This option is to be selected if the heating and cooling devices actuated are in a 2-pipe system. In this system, only one pipe is used to supply the device with hot and cold water. It is therefore only ever possible to heat or cool; a changeover is necessary to change. It follows that the device is not allowed to decide on a change between heating and cooling and the changeover must always be made via the bus. The *Heating/Cooling changeover* parameter is correspondingly parameterized to *Via object only* and cannot be changed.
- *4-pipe*: This option is to be selected if the devices actuated are in a 4-pipe system. In a 4-pipe system, separate pipes are used for the hot and cold water supply. It is therefore possible to change between heating and cooling at any time. In this situation the decision can be made centrally, and also by the device. The *Heating/Cooling changeover* parameter is correspondingly parameterized to *Automatically*.

7.4.1.2.1.2.4 Dependent Parameter

Heating/Cooling changeover

This parameter is set to *Via object only* and cannot be changed because a pure actuator device cannot decide whether heating or cooling is required. This changeover must always be made via the controller.

This parameter is only visible if the *Basic-stage heating* and *Basic-stage cooling* parameters are activated.

7.4.1.2.1.2.5 DEPENDENT PARAMETER

Use 6-way valve

This parameter is only visible for:

- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.3.1.1
- FCC/S 1.3.2.1

This parameter is not visible if the *Basic-stage heating* or *Basic-stage cooling* parameters are deactivated. This parameter is also only visible if the *4-pipe* option has been selected in the *Type of heating/cooling system* parameter.

Options: *No*
Yes

This parameter is used to parameterize the usage of a 6-way valve on the device. The 6-way valve is used to control both the heating and cooling stages at the same time. For this purpose the drive in the 6-way valve is connected to valve output A and the control values for heating and cooling are output on this output.

ⓘ **Note**

The usage of a 6-way valve is only possible for the two basic stages.

If one of the basic stages has been deactivated or the basic-stage heating is used for a non-water type of heating (e.g. electric heater), it is not possible to use a 6-way valve.

If *Yes* has been selected, the dependent parameter *Valve type* in the *Valve output A* parameter window is pre-configured to *6-way valve*. The *Actuate basic-stage heating via* and *Actuate basic-stage cooling via* parameters are set to *Output A*.

ⓘ **Note**

To prevent an erroneous configuration, none of the dependent parameters can be changed as long as the usage of a 6-way valve is parameterized.

7.4.1.2.1.2.6 DEPENDENT PARAMETER

Actuate basic-stage heating via

Options: *Internal output A (valve)*
Internal output B (valve) (Not for FCC/S 1.4.1.1)
Internal relay output (Not for FCC/S 1.4.1.1)
Group object

The control value is received via the bus and output directly on the selected output.

On the selection of the *Group object* option, the control value received is output directly again via the bus without any processing in the device.

7.4.1.2.1.2.7 DEPENDENT PARAMETER

Actuate basic-stage cooling via

Options: *Internal output A (valve)*
Internal output B (valve) (Not for FCC/S 1.4.1.1)
Group object

The control value is received via the bus and output directly on the selected output.

On the selection of the *Group object* option, the control value received is output directly again via the bus without any processing in the device.

7.4.1.2.1.2.8 DEPENDENT PARAMETER

Switch relay output independently of fan speed (including when fan = 0)

This parameter is only visible if the *Internal relay output* has been selected for *Actuate basic-stage heating via*.

Options: *No*
Yes

This parameter is used to set whether switching of the relay output is to be allowed, independently of whether the fan is running or not. The switching is undertaken via the dependent object *Switch relay* group object.

NOTICE

Device damage due to large amount of heat

An electric heater can produce a large amount of heat. On the usage of the *Switch relay* group object it is possible to switch on the electric heater without the fan running. Normally the fan is used to blow heated air into the room. Without the fan running, there is a risk of overheating, which may lead to damage to the building or the risk of a fire.
To prevent this situation from arising, suitable measures must be taken, e.g. temperature monitoring with mechanical shutdown.

ⓘ **Note**

If the device is in the cooling operating mode, even on the activation of this parameter it is not possible to switch on the relay. This feature prevents simultaneous heating and cooling.

7.4.1.2.1.2.8.1 DEPENDENT PARAMETER

Automatic reset of manual relay overdrive to controller operation after

This parameter is only visible if the *Yes* option has been selected in the *Switch relay output independently of fan speed (including when fan = 0)* parameter.

Options: *00:00:30…00:05:00…18:12:15*

This parameter defines when switching of the relay outside the control is to be reset and controller operation activated again.

For the time stated here the relay output can be overridden via the group object. Only after this time has elapsed is the control value specified by the controller applied again for the relay.

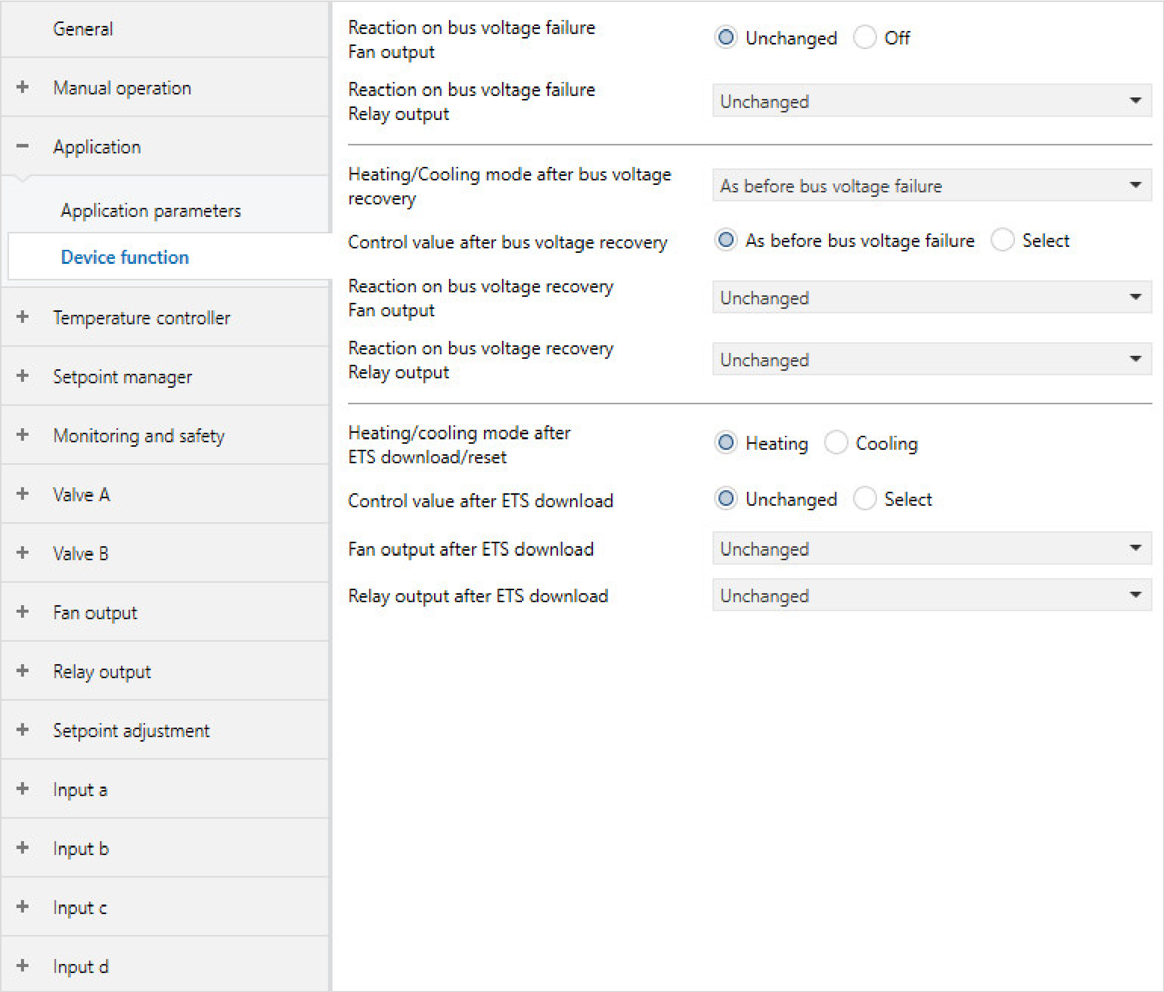
A change in the operating mode from heating to cooling will always reset the relay manual override to controller operation.

7.4.2 Device function parameter window

7.4.2.1 FCC/S 1.1.2.1 / 1.2.2.1

The following explanations only apply to

- FCC/S 1.1.2.1
- FCC/S 1.2.2.1



Reaction on bus voltage failure Fan output	● Unchanged ○ Off
Reaction on bus voltage failure Relay output	Unchanged
Heating/Cooling mode after bus voltage recovery	As before bus voltage failure
Control value after bus voltage recovery	● As before bus voltage failure ○ Select
Reaction on bus voltage recovery Fan output	Unchanged
Reaction on bus voltage recovery Relay output	Unchanged
Heating/cooling mode after ETS download/reset	● Heating ○ Cooling
Control value after ETS download	● Unchanged ○ Select
Fan output after ETS download	Unchanged
Relay output after ETS download	Unchanged

Fig. 34: Device function parameter window

7.4.2.1.1 Selection of Controller

The following parameters are visible if the *Controller* option has been selected in the *Device function* parameter.

7.4.2.1.1.1 Reaction on bus voltage failure Fan output

This parameter is only visible for:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.4.1.1

Options: _Unchanged_
OFF

The reaction of the fan output on bus voltage failure is specified using this parameter.

- *Unchanged*: The currently applicable fan speed is maintained on bus voltage failure.
- *OFF*: The fan is switched off if there is a bus voltage failure.

7.4.2.1.1.2 Reaction on bus voltage failure Relay output

This parameter is not available for the variant FCC/S 1.4.1.1.

Options: _Unchanged_
On
Off

The reaction of the relay output on bus voltage failure is specified using this parameter.

- *Unchanged*: The relay remains in its actual position on bus voltage failure.
- *On*: The relay is switched on if there is a bus voltage failure.
- *Off*: The relay is switched off if there is a bus voltage failure.

7.4.2.1.1.3 Heating/Cooling mode after bus voltage recovery

Options: _As before bus voltage failure_
Heating
Cooling

This parameter is used to specify the mode (heating or cooling) in which the device is to be after bus voltage recovery.

- *As before bus voltage failure*: The device is in the same mode as before bus voltage failure.
- *Heating*: The device is in the heating mode after bus voltage recovery.
- *Cooling*: The device is in the cooling mode after bus voltage recovery.

7.4.2.1.1.4 Control value after bus voltage recovery

Options: _As before bus voltage failure_
Select

This parameter specifies which control value is to apply after bus voltage recovery until the controller has calculated a new control value.

- *As before bus voltage failure*: The same control value as before the bus voltage failure applies.
- *Select*: A control value can be specified. This control value applies until a new control value is calculated/a new control value is received via the bus. The *Control value* dependent parameter is displayed.

> ⓘ **Note**
>
> The reaction parameterized here also applies during the sending and switching delay.
>
> After bus voltage recovery it can take up to 2 seconds until the device has started and the outputs can be switched/controlled again.

7.4.2.1.1.4.1 DEPENDENT PARAMETER

Control value

Options: _0_*…100*

This parameter is used to specify the control value that is to apply after bus voltage recovery until a new control value is received.

7.4.2.1.1.5 Reaction on bus voltage recovery Fan output

This parameter is only visible for:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.4.1.1

Options: _Unchanged_
Applies control value
1
2
3

This parameter is used to specify the fan speed that is to apply after bus voltage recovery.

- *Unchanged*: The same fan speed as before/during the bus voltage failure applies. The status of the automatic mode also remains unchanged. The fan follows the valve control value if the automatic mode is active.
- *Applies control value*: The speed is dependent on the valve control value. The automatic mode is active. If the automatic mode was deactivated before the download, it is activated.
- *1*: The fan runs with speed 1 in the manual mode.
- *2*: The fan runs with speed 2 in the manual mode.
- *3*: The fan runs with speed 3 in the manual mode.

7.4.2.1.1.6 Reaction on bus voltage recovery Relay output

This parameter does not apply to FCC/S 1.4.1.1.

Options: _Unchanged_
On
Off

The reaction of the relay output after bus voltage recovery is specified using this parameter.

- *Unchanged*: The relay remains in its actual position after bus voltage recovery.
- *On*: The relay is switched on after bus voltage recovery.
- *Off*: The relay is switched off after bus voltage recovery.

7.4.2.1.1.7 Heating/cooling mode after ETS download/reset

Options: *Heating*
Cooling

7.4.2.1.1.8 Control value after ETS download

Options: *Unchanged*
Select

This parameter specifies which control value is to apply after a download until the controller has calculated a new control value.

The value specified here applies until a new control value has been received via the bus.

- *Unchanged:* The same control value as before the download applies.
- *Select*: A control value can be specified. This control value then applies until a new control value is calculated/a new control value is received via the bus. The *Control value* dependent parameter is displayed.

—

7.4.2.1.1.8.1 DEPENDENT PARAMETER

Control value

Options: *0…100*

This parameter is used to specify the control value that is to apply after bus voltage recovery until a new control value is received.

7.4.2.1.1.9 Fan output after ETS download

This parameter is only visible for:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.4.1.1

Options: *Unchanged*
Applies control value
1
2
3

This parameter is used to specify the fan speed that is to apply after a download.

- *Unchanged*: The same fan speed as before the download. The status of the automatic mode also remains unchanged. The fan follows the valve control value if the automatic mode is active.
- *Applies control value*: The speed is dependent on the valve control value, the automatic mode is active. If the automatic mode was deactivated before the download, it is activated.
- *1*: The fan runs with speed 1 in the manual mode.
- *2*: The fan runs with speed 2 in the manual mode.
- *3*: The fan runs with speed 3 in the manual mode.

7.4.2.1.1.10 Fan output after ETS download

This parameter is only visible for:

- FCC/S 1.3.1.1
- FCC/S 1.3.2.1
- FCC/S 1.5.1.1
- FCC/S 1.5.2.1

Options: *Unchanged*
Applies control value
33 %
66 %
100 %

This parameter is used to specify the fan speed that is to apply after a download.

- *Unchanged*: The same fan speed as before the download. The status of the automatic mode also remains unchanged. The fan follows the valve control value if the automatic mode is active.
- *Applies control value*: The speed is dependent on the valve control value, the automatic mode is active. If the automatic mode was deactivated before the download, it is activated.
- *33 %*: The fan runs with speed 33 % in the manual mode.
- *66 %*: The fan runs with speed 66 % in the manual mode.
- *100 %*: The fan runs with speed 100 % in the manual mode.

7.4.2.1.1.11 Relay output after ETS download

This parameter does not apply to FCC/S 1.4.1.1.

Options: *Unchanged*
On
Off

The reaction of the relay output after the download is specified using this parameter.

- *Unchanged*: The relay remains in its actual position after the download.
- *On*: The relay is switched on after the download.
- *Off*: The relay is switched off after the download.

7.4.2.1.2 Selection of actuator device

The following parameters are visible if the *Actuator device* option has been selected in the *Device function* parameter.

7.4.2.1.2.1 Reaction on bus voltage failure Fan output

This parameter is only visible for:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.4.1.1

Options:	<u>*Unchanged*</u> *OFF*

The reaction of the fan output on bus voltage failure is specified using this parameter.

- *Unchanged*: The currently applicable fan speed is maintained on bus voltage failure.
- *OFF*: The fan is switched off if there is a bus voltage failure.

7.4.2.1.2.2 Reaction on bus voltage failure Relay output

This parameter is not available for the variant FCC/S 1.4.1.1.

Options:	<u>*Unchanged*</u> *On* *Off*

The reaction of the relay output on bus voltage failure is specified using this parameter.

- *Unchanged*: The relay remains in its actual position on bus voltage failure.
- *On*: The relay is switched on if there is a bus voltage failure.
- *Off*: The relay is switched off if there is a bus voltage failure.

7.4.2.1.2.3 Control value after bus voltage recovery

Options:	<u>*As before bus voltage failure*</u> *Select*

The value specified here applies until a new control value has been received via the bus.

- *As before bus voltage failure*: The same control value as before the bus voltage failure applies.
- *Select*: A control value can be specified. This control value applies until a new control value is calculated/a new control value is received via the bus. The *Control value* dependent parameter is displayed.

> ⓘ **Note**
>
> The reaction parameterized here also applies during the sending and switching delay.
>
> After bus voltage recovery it can take up to 2 seconds until the device has started and the outputs can be switched/controlled again.

7.4.2.1.2.3.1 DEPENDENT PARAMETER

Control value

Options: _0_*…100*

This parameter is used to specify the control value that is to apply after bus voltage recovery until a new control value is received.

7.4.2.1.2.4 Reaction on bus voltage recovery Fan output

This parameter is only visible for:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.4.1.1

Options: *Unchanged*
Applies control value
1
2
3

This parameter is used to specify the fan speed that is to apply after bus voltage recovery.

- *Unchanged*: The same fan speed as before/during the bus voltage failure applies. The status of the automatic mode also remains unchanged. The fan follows the valve control value if the automatic mode is active.
- *Applies control value*: The speed is dependent on the valve control value. The automatic mode is active. If the automatic mode was deactivated before the download, it is activated.
- *1*: The fan runs with speed 1 in the manual mode.
- *2*: The fan runs with speed 2 in the manual mode.
- *3*: The fan runs with speed 3 in the manual mode.

Note

The *Applies control value* option is only available if it has not been deactivated in the *Enable automatic mode based on control value* parameter in the *Fan output* window.

7.4.2.1.2.5 Reaction on bus voltage recovery Fan output

This parameter only applies to:

- FCC/S 1.3.1.1
- FCC/S 1.3.2.1
- FCC/S 1.5.1.1
- FCC/S 1.5.2.1

Options: _Unchanged_
Applies control value
33 %
66 %
100 %

This parameter is used to specify the fan speed that is to apply after bus voltage recovery.

- *Unchanged*: The same fan speed as before bus voltage failure applies. The status of the automatic mode also remains unchanged. The fan follows the valve control value if the automatic mode is active.
- *Applies control value*: The speed is dependent on the valve control value. The automatic mode is active. If the automatic mode was deactivated before the download, it is activated.
- *33 %*: The fan runs with speed 33 % in the manual mode.
- *66 %*: The fan runs with speed 66 % in the manual mode.
- *100 %*: The fan runs with speed 100 % in the manual mode.

> ⓘ **Note**
> The *Applies control value* option is only available if it has not been deactivated in the *Enable automatic mode based on control value* parameter in the *Fan output* window.

7.4.2.1.2.6 Control value after ETS download

Options: _Unchanged_
Select

This parameter specifies which control value is to apply after a download until the controller has calculated a new control value.

The value specified here applies until a new control value has been received via the bus.

- *Unchanged:* The same control value as before the download applies.
- *Select*: A control value can be specified. This control value then applies until a new control value is calculated/a new control value is received via the bus. The *Control value* dependent parameter is displayed.

—

7.4.2.1.2.6.1 DEPENDENT PARAMETER

Control value

Options: *_0_…100*

This parameter is used to specify the control value that is to apply after bus voltage recovery until a new control value is received.

7.4.2.1.2.7 Fan output after ETS download

This parameter only applies to:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.4.1.1

Options: *Unchanged*
Applies control value
1
2
3

This parameter is used to specify the fan speed that is to apply after a download.

- *Unchanged*: The same fan speed as before the download. The status of the automatic mode also remains unchanged. The fan follows the valve control value if the automatic mode is active.
- *Applies control value*: The speed is dependent on the valve control value, the automatic mode is active. If the automatic mode was deactivated before the download, it is activated.
- *1*: The fan runs with speed 1 in the manual mode.
- *2*: The fan runs with speed 2 in the manual mode.
- *3*: The fan runs with speed 3 in the manual mode.

ⓘ **Note**

The *Applies control value* option is only available if it has not been deactivated in the *Enable automatic mode based on control value* parameter in the *Fan output* window.

7.4.2.1.2.8 Fan output after ETS download

This parameter only applies to:

- FCC/S 1.3.1.1
- FCC/S 1.3.2.1
- FCC/S 1.5.1.1
- FCC/S 1.5.2.1

Options: *Unchanged*
Applies control value
33 %
66 %
100 %

This parameter is used to specify the fan speed that is to apply after a download.

- *Unchanged*: The same fan speed as before the download. The status of the automatic mode also remains unchanged. The fan follows the valve control value if the automatic mode is active.
- *Applies control value*: The speed is dependent on the valve control value, the automatic mode is active. If the automatic mode was deactivated before the download, it is activated.
- *33 %*: The fan runs with speed 33 % in the manual mode.
- *66 %*: The fan runs with speed 66 % in the manual mode.
- *100 %*: The fan runs with speed 100 % in the manual mode.

ⓘ **Note**

The *Applies control value* option is only available if it has not been deactivated in the *Enable automatic mode based on control value* parameter in the *Fan output* window.

7.4.2.1.2.9 Relay output after ETS download

This parameter does not apply to FCC/S 1.4.1.1.

Options: *Unchanged*
On
Off

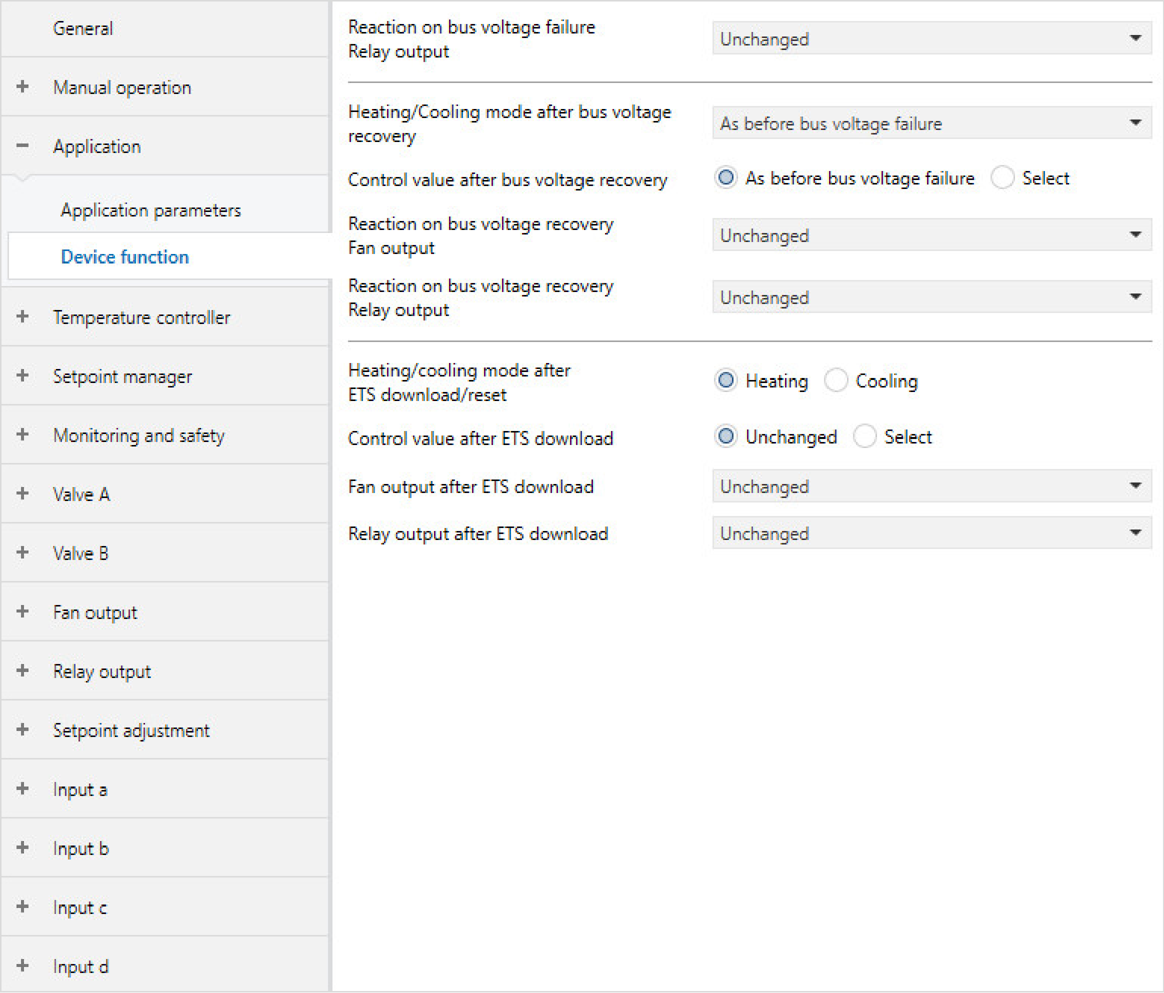
The reaction of the relay output after the download is specified using this parameter.

- *Unchanged*: The relay remains in its actual position after the download.
- *On*: The relay is switched on after the download.
- *Off*: The relay is switched off after the download.

7.4.2.2 FCC/S 1.3.2.1 / 1.5.2.1

The following explanations only apply to

- FCC/S 1.3.2.1
- FCC/S 1.5.2.1



Reaction on bus voltage failure Relay output: Unchanged

Heating/Cooling mode after bus voltage recovery: As before bus voltage failure

Control value after bus voltage recovery: ● As before bus voltage failure ○ Select

Reaction on bus voltage recovery Fan output: Unchanged

Reaction on bus voltage recovery Relay output: Unchanged

Heating/cooling mode after ETS download/reset: ● Heating ○ Cooling

Control value after ETS download: ● Unchanged ○ Select

Fan output after ETS download: Unchanged

Relay output after ETS download: Unchanged

2CDC078013F0218

Fig. 35: DESTO001850

7.4.2.2.1 Selection of Controller

The following parameters are visible if the *Controller* option has been selected in the *Device function* parameter.

7.4.2.2.1.1 Reaction on bus voltage failure Fan output

This parameter is only visible for:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.4.1.1

Options: *Unchanged*
OFF

The reaction of the fan output on bus voltage failure is specified using this parameter.

- *Unchanged*: The currently applicable fan speed is maintained on bus voltage failure.
- *OFF*: The fan is switched off if there is a bus voltage failure.

7.4.2.2.1.2 Reaction on bus voltage failure Relay output

This parameter is not available for the variant FCC/S 1.4.1.1.

Options: *Unchanged*
On
Off

The reaction of the relay output on bus voltage failure is specified using this parameter.

- *Unchanged*: The relay remains in its actual position on bus voltage failure.
- *On*: The relay is switched on if there is a bus voltage failure.
- *Off*: The relay is switched off if there is a bus voltage failure.

7.4.2.2.1.3 Heating/Cooling mode after bus voltage recovery

Options: *As before bus voltage failure*
Heating
Cooling

This parameter is used to specify the mode (heating or cooling) in which the device is to be after bus voltage recovery.

- *As before bus voltage failure*: The device is in the same mode as before bus voltage failure.
- *Heating*: The device is in the heating mode after bus voltage recovery.
- *Cooling*: The device is in the cooling mode after bus voltage recovery.

7.4.2.2.1.4 Control value after bus voltage recovery

Options: *As before bus voltage failure*
Select

This parameter specifies which control value is to apply after bus voltage recovery until the controller has calculated a new control value.

- *As before bus voltage failure*: The same control value as before the bus voltage failure applies.
- *Select*: A control value can be specified. This control value applies until a new control value is calculated/a new control value is received via the bus. The *Control value* dependent parameter is displayed.

ⓘ **Note**

The reaction parameterized here also applies during the sending and switching delay.

After bus voltage recovery it can take up to 2 seconds until the device has started and the outputs can be switched/controlled again.

7.4.2.2.1.4.1 DEPENDENT PARAMETER

Control value

Options: _0_*…100*

This parameter is used to specify the control value that is to apply after bus voltage recovery until a new control value is received.

7.4.2.2.1.5 Reaction on bus voltage recovery Fan output

This parameter is only visible for:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.4.1.1

Options: _Unchanged_
Applies control value
1
2
3

This parameter is used to specify the fan speed that is to apply after bus voltage recovery.

- *Unchanged*: The same fan speed as before/during the bus voltage failure applies. The status of the automatic mode also remains unchanged. The fan follows the valve control value if the automatic mode is active.
- *Applies control value*: The speed is dependent on the valve control value. The automatic mode is active. If the automatic mode was deactivated before the download, it is activated.
- *1*: The fan runs with speed 1 in the manual mode.
- *2*: The fan runs with speed 2 in the manual mode.
- *3*: The fan runs with speed 3 in the manual mode.

7.4.2.2.1.6 Reaction on bus voltage recovery Relay output

This parameter does not apply to FCC/S 1.4.1.1.

Options: _Unchanged_
On
Off

The reaction of the relay output after bus voltage recovery is specified using this parameter.

- *Unchanged*: The relay remains in its actual position after bus voltage recovery.
- *On*: The relay is switched on after bus voltage recovery.
- *Off*: The relay is switched off after bus voltage recovery.

7.4.2.2.1.7 Control value after ETS download

Options: <u>*Unchanged*</u>
Select

This parameter specifies which control value is to apply after a download until the controller has calculated a new control value.

The value specified here applies until a new control value has been received via the bus.

- *Unchanged:* The same control value as before the download applies.
- *Select*: A control value can be specified. This control value then applies until a new control value is calculated/a new control value is received via the bus. The *Control value* dependent parameter is displayed.

—

7.4.2.2.1.7.1 DEPENDENT PARAMETER

Control value

Options: *<u>0</u>…100*

This parameter is used to specify the control value that is to apply after bus voltage recovery until a new control value is received.

7.4.2.2.1.8 Fan output after ETS download

This parameter is only visible for:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.4.1.1

Options: <u>*Unchanged*</u>
Applies control value
1
2
3

This parameter is used to specify the fan speed that is to apply after a download.

- *Unchanged*: The same fan speed as before the download. The status of the automatic mode also remains unchanged. The fan follows the valve control value if the automatic mode is active.
- *Applies control value*: The speed is dependent on the valve control value, the automatic mode is active. If the automatic mode was deactivated before the download, it is activated.
- *1*: The fan runs with speed 1 in the manual mode.
- *2*: The fan runs with speed 2 in the manual mode.
- *3*: The fan runs with speed 3 in the manual mode.

7.4.2.2.1.9 Fan output after ETS download

This parameter is only visible for:

- FCC/S 1.3.1.1
- FCC/S 1.3.2.1
- FCC/S 1.5.1.1
- FCC/S 1.5.2.1

Options: *Unchanged*
Applies control value
33 %
66 %
100 %

This parameter is used to specify the fan speed that is to apply after a download.

- *Unchanged*: The same fan speed as before the download. The status of the automatic mode also remains unchanged. The fan follows the valve control value if the automatic mode is active.
- *Applies control value*: The speed is dependent on the valve control value, the automatic mode is active. If the automatic mode was deactivated before the download, it is activated.
- *33 %*: The fan runs with speed 33 % in the manual mode.
- *66 %*: The fan runs with speed 66 % in the manual mode.
- *100 %*: The fan runs with speed 100 % in the manual mode.

7.4.2.2.1.10 Relay output after ETS download

This parameter does not apply to FCC/S 1.4.1.1.

Options: *Unchanged*
On
Off

The reaction of the relay output after the download is specified using this parameter.

- *Unchanged*: The relay remains in its actual position after the download.
- *On*: The relay is switched on after the download.
- *Off*: The relay is switched off after the download.

7.4.2.2.2 Selection of actuator device

The following parameters are visible if the *Actuator device* option has been selected in the *Device function* parameter.

7.4.2.2.2.1 Reaction on bus voltage failure Fan output

This parameter is only visible for:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.4.1.1

Options: *<u>Unchanged</u>*
OFF

The reaction of the fan output on bus voltage failure is specified using this parameter.

- *Unchanged*: The currently applicable fan speed is maintained on bus voltage failure.
- *OFF*: The fan is switched off if there is a bus voltage failure.

7.4.2.2.2.2 Reaction on bus voltage failure Relay output

This parameter is not available for the variant FCC/S 1.4.1.1.

Options: *<u>Unchanged</u>*
On
Off

The reaction of the relay output on bus voltage failure is specified using this parameter.

- *Unchanged*: The relay remains in its actual position on bus voltage failure.
- *On*: The relay is switched on if there is a bus voltage failure.
- *Off*: The relay is switched off if there is a bus voltage failure.

7.4.2.2.2.3 Control value after bus voltage recovery

Options: *<u>As before bus voltage failure</u>*
Select

The value specified here applies until a new control value has been received via the bus.

- *As before bus voltage failure*: The same control value as before the bus voltage failure applies.
- *Select*: A control value can be specified. This control value applies until a new control value is calculated/a new control value is received via the bus. The *Control value* dependent parameter is displayed.

ⓘ **Note**

The reaction parameterized here also applies during the sending and switching delay.

After bus voltage recovery it can take up to 2 seconds until the device has started and the outputs can be switched/controlled again.

7.4.2.2.2.3.1 DEPENDENT PARAMETER

Control value

Options: <u>*0*</u>*…100*

This parameter is used to specify the control value that is to apply after bus voltage recovery until a new control value is received.

7.4.2.2.2.4 Reaction on bus voltage recovery Fan output

This parameter is only visible for:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.4.1.1

Options: <u>*Unchanged*</u>
Applies control value
1
2
3

This parameter is used to specify the fan speed that is to apply after bus voltage recovery.

- *Unchanged*: The same fan speed as before/during the bus voltage failure applies. The status of the automatic mode also remains unchanged. The fan follows the valve control value if the automatic mode is active.
- *Applies control value*: The speed is dependent on the valve control value. The automatic mode is active. If the automatic mode was deactivated before the download, it is activated.
- *1*: The fan runs with speed 1 in the manual mode.
- *2*: The fan runs with speed 2 in the manual mode.
- *3*: The fan runs with speed 3 in the manual mode.

> ⓘ **Note**
>
> The *Applies control value* option is only available if it has not been deactivated in the *Enable automatic mode based on control value* parameter in the *Fan output* window.

7.4.2.2.2.5 Reaction on bus voltage recovery Fan output

This parameter only applies to:

- FCC/S 1.3.1.1
- FCC/S 1.3.2.1
- FCC/S 1.5.1.1
- FCC/S 1.5.2.1

Options: _Unchanged_
Applies control value
33 %
66 %
100 %

This parameter is used to specify the fan speed that is to apply after bus voltage recovery.

- *Unchanged*: The same fan speed as before bus voltage failure applies. The status of the automatic mode also remains unchanged. The fan follows the valve control value if the automatic mode is active.
- *Applies control value*: The speed is dependent on the valve control value. The automatic mode is active. If the automatic mode was deactivated before the download, it is activated.
- *33 %*: The fan runs with speed 33 % in the manual mode.
- *66 %*: The fan runs with speed 66 % in the manual mode.
- *100 %*: The fan runs with speed 100 % in the manual mode.

> ⓘ **Note**
>
> The *Applies control value* option is only available if it has not been deactivated in the *Enable automatic mode based on control value* parameter in the *Fan output* window.

7.4.2.2.2.6 Control value after ETS download

Options: _Unchanged_
Select

This parameter specifies which control value is to apply after a download until the controller has calculated a new control value.

The value specified here applies until a new control value has been received via the bus.

- *Unchanged:* The same control value as before the download applies.
- *Select*: A control value can be specified. This control value then applies until a new control value is calculated/a new control value is received via the bus. The *Control value* dependent parameter is displayed.

—

7.4.2.2.2.6.1 DEPENDENT PARAMETER

Control value

Options: *_0_…100*

This parameter is used to specify the control value that is to apply after bus voltage recovery until a new control value is received.

7.4.2.2.2.7 Fan output after ETS download

This parameter only applies to:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.4.1.1

Options: *Unchanged*
Applies control value
1
2
3

This parameter is used to specify the fan speed that is to apply after a download.

- *Unchanged*: The same fan speed as before the download. The status of the automatic mode also remains unchanged. The fan follows the valve control value if the automatic mode is active.
- *Applies control value*: The speed is dependent on the valve control value, the automatic mode is active. If the automatic mode was deactivated before the download, it is activated.
- *1*: The fan runs with speed 1 in the manual mode.
- *2*: The fan runs with speed 2 in the manual mode.
- *3*: The fan runs with speed 3 in the manual mode.

> ⓘ **Note**
> The *Applies control value* option is only available if it has not been deactivated in the *Enable automatic mode based on control value* parameter in the *Fan output* window.

7.4.2.2.2.8 Fan output after ETS download

This parameter only applies to:

- FCC/S 1.3.1.1
- FCC/S 1.3.2.1
- FCC/S 1.5.1.1
- FCC/S 1.5.2.1

Options: *Unchanged*
Applies control value
33 %
66 %
100 %

This parameter is used to specify the fan speed that is to apply after a download.

- *Unchanged*: The same fan speed as before the download. The status of the automatic mode also remains unchanged. The fan follows the valve control value if the automatic mode is active.
- *Applies control value*: The speed is dependent on the valve control value, the automatic mode is active. If the automatic mode was deactivated before the download, it is activated.
- *33 %*: The fan runs with speed 33 % in the manual mode.
- *66 %*: The fan runs with speed 66 % in the manual mode.
- *100 %*: The fan runs with speed 100 % in the manual mode.

> ⓘ **Note**
> The *Applies control value* option is only available if it has not been deactivated in the *Enable automatic mode based on control value* parameter in the *Fan output* window.

7.4.2.2.2.9 Relay output after ETS download

This parameter does not apply to FCC/S 1.4.1.1.

Options: <u>*Unchanged*</u>
On
Off

The reaction of the relay output after the download is specified using this parameter.

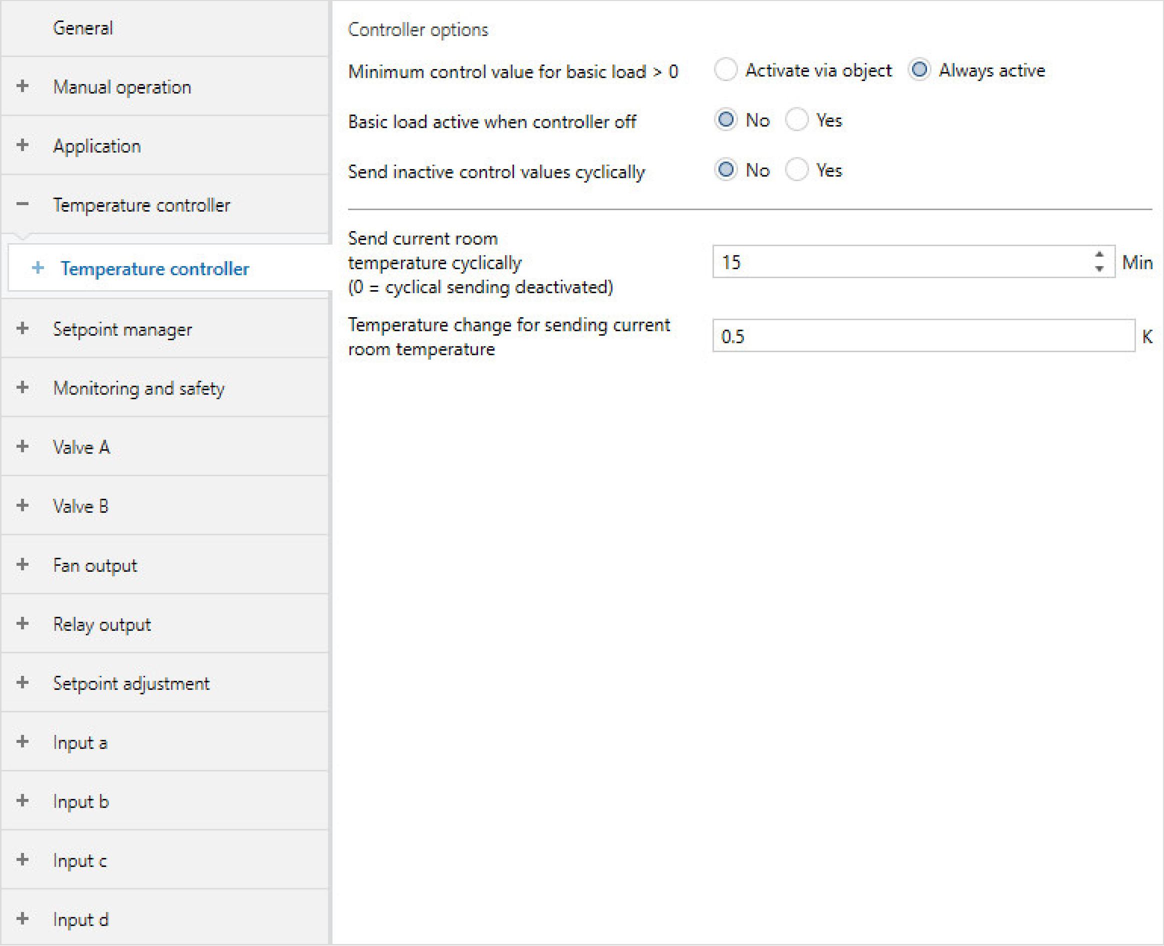
- *Unchanged*: The relay remains in its actual position after the download.
- *On*: The relay is switched on after the download.
- *Off*: The relay is switched off after the download.

7.5 Temperature controller

7.5.1 Temperature controller parameter window

This window is deactivated in the actuator mode and is not visible.

General settings for the temperature controller are made in this window. These settings affect above all the basic load, the sending of control values for the inactive operating mode and the behavior on sending the actual room temperature (actual temperature).



Controller options

Minimum control value for basic load > 0 ○ Activate via object ● Always active

Basic load active when controller off ● No ○ Yes

Send inactive control values cyclically ● No ○ Yes

Send current room temperature cyclically (0 = cyclical sending deactivated) 15 Min

Temperature change for sending current room temperature 0.5 K

Fig. 36: Temperature controller parameter window

7.5.1.1 Minimum control value for basic load > 0

Options: *Activate via object*
Always active

This parameter is used to specify whether the basic load for the individual heating and cooling stages is to be always active or whether it is to be possible to activate or deactivate it via a group object.

- *Activate via object*: On the selection of this option, the *Min. control value (basic load)* function can be activated (1) or deactivated (0) via the *Activate minimum control value (basic load)* group object. If it is activated, then the heating medium is always pumped through the system with at least the minimum control value. If it is deactivated, the control value can be reduced to zero by the controller.
  The dependent *Activate minimum control value (basic load)* group object is enabled.
- *Always active*: On the selection of this option, the basic load is always active

ⓘ **Note**

The settings for the basic load can be specified independently for each stage. This setting is specified in the *Temperature controller - Basic-stage heating, Temperature controller - Additional-stage heating, Temperature controller - Basic-stage cooling, Temperature controller - Additional-stage cooling* parameter window. Here the minimum control value for the basic load that is not allowed to be dropped below is specified.

This value can only be specified for the PI control types.

The basic load is always activated for all stages, but only applies to the currently active heating or cooling operating mode.

A possible application for the basic load is, e.g., floor heating in which a specific control value must not be dropped below to protect the installation.

7.5.1.2 Basic load active when controller off

Options: *No*
Yes

This parameter is used to specify whether the basic load is to be active if the controller has been switched off via the *Request On/Off (master)* group object.

- *No*: The basic load is also switched off if the controller is switched off.
- *Yes*: The basic load remains active even if the controller is switched off.

7.5.1.3 Send inactive control values cyclically

This parameter is enabled if the controller has been parameterized both for heating and for cooling. For this purpose, the *Deactivated* option must not be selected for the two parameters *Basic-stage heating* and *Basic-stage cooling* in the *Application parameters* parameter window.

Options: *No*
Yes

The parameter is used to influence the behavior on sending the controller control value output. This parameter can be used to specify whether the control values for the operating mode not currently active (heating or cooling) are to be sent or not.

This setting is necessary for systems that have only one control value input for heating and cooling. In this situation, both output objects for the control value (*Status Control value Basic-stage heating* and *Status Control value Basic-stage cooling*) must be linked to the same input object.

The cyclic sending of both control values in this situation means that the active and inactive value continuously overwrite each other. To prevent this action from arising, the cyclic sending of the inactive control value can be inhibited.

The following example makes the behavior clear:

- Active operating mode: Heating
- Heating control value: 50 %
- Cooling control value: 0 %
- Sending cycle time: 5 minutes (for both operating modes)
- Valve drive actuator: 2-pipe system for heating and cooling (only one control value input)
  - Sending heating control value: control value received: 50 %
  - Valve drive actuator output control value: 50 %
  - Sending cooling control value: control value received: 0 %
  - Valve drive actuator output control value: 0 %
- *No*: The cyclic sending of the inactive control values is inhibited. Only the control values for the operating mode (heating or cooling) currently active are sent.
- *Yes*: The cyclic sending of the inactive control values remains active. All control values are always sent corresponding to the cycle time selected.

The cycle times for the individual control values can be set in the related parameter window (e.g. Basic-stage heating) in *Extended settings* in the *Send control value cyclically* parameter.

7.5.1.4 Send current room temperature cyclically (0 = cyclical sending deactivated)

Options: *0…15…255*

This parameter is used to specify the cycle with which the room temperature determined is to be sent via the *Actual temperature* group object. This temperature is the room temperature calculated from the different values.

7.5.1.5 Temperature change for sending current room temperature

Options: *00.1…00.5…10.0*

This parameter is used to specify the temperature change after which the room temperature determined is to be sent via the *Actual temperature* group object. If the temperature changes by the value parameterized here, the new value is sent on the bus.

ⓘ **Note**

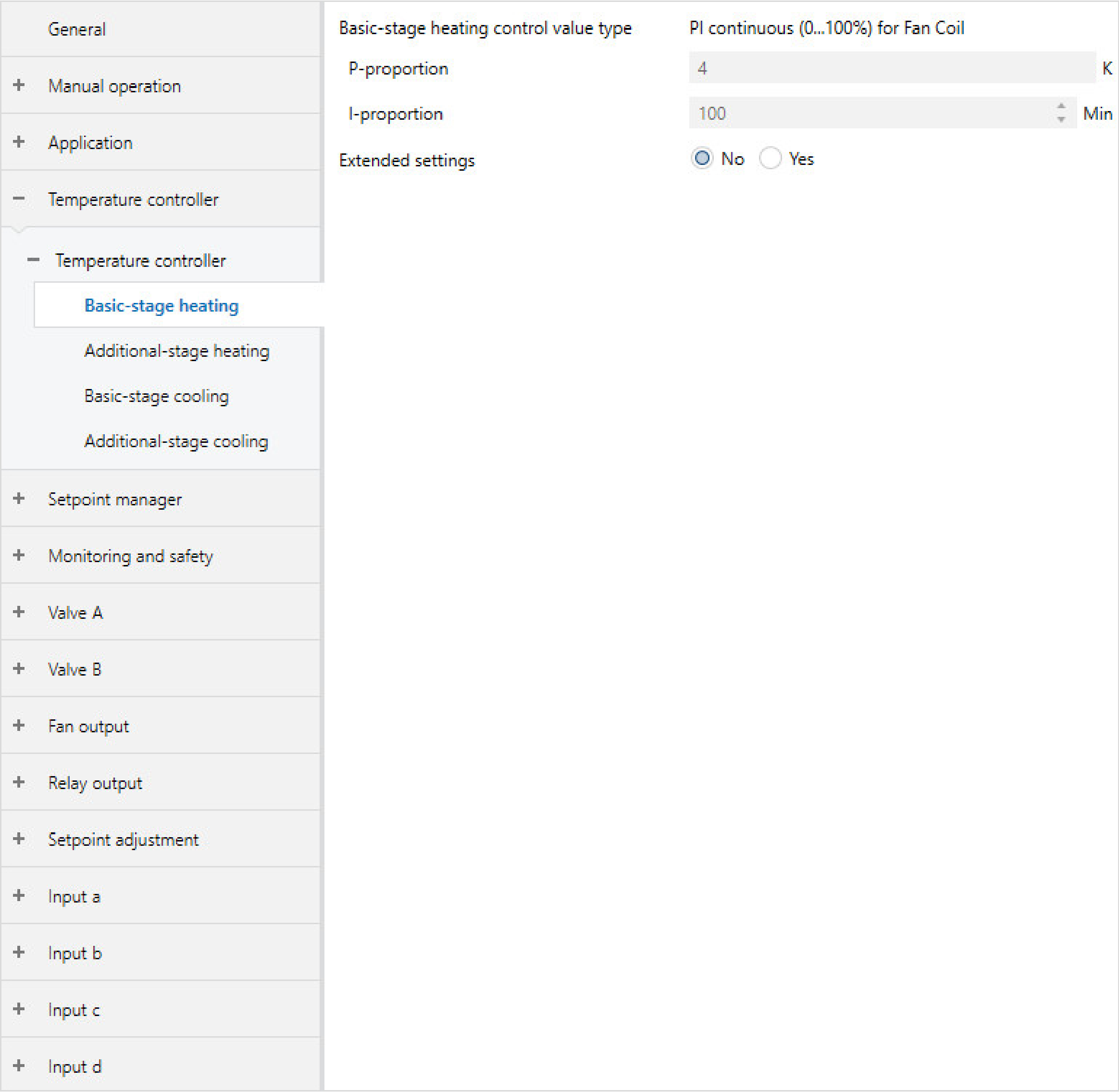
The actual room temperature is made up of various values, depending on the selection in the *Temperature input* parameter (*Application parameters parameter window*). The values measured via the physical device inputs and received via group objects (*External temperature 1* & *External temperature 2*) are used in the calculation. This value is the actual room temperature (actual temperature).

7.5.1.6 Basic-stage heating parameter window

This window is only visible if the *Deactivated* option has not been selected in the *Basic-stage heating* parameter in the *Application parameters* parameter window.

This window is deactivated in the actuator mode and is not visible.

The basic-stage heating of the temperature controller is parameterized in this window. The settings for the control type, limitation of the control range, the behavior on sending the control value and the limit temperature are made.



Basic-stage heating control value type: PI continuous (0...100%) for Fan Coil

P-proportion: 4 K

I-proportion: 100 Min

Extended settings: ● No ○ Yes

Fig. 37: Basic-stage heating

7.5.1.6.1 Basic-stage heating control value type

Options: *2-point 1 bit (On/Off)*
2-point 1 byte (0/100 %)
PI continuous (0…100 %)
PI PWM (On/Off)
PI continuous (0…100 %) for Fan Coil

This parameter is used to specify the control and control value type for the basic-stage heating.

The standard value for the parameter is dependent on the selection in the *Basic-stage heating* and *Actuate basic-stage heating via* parameters (*Application parameters* parameter window).

On the selection of one of the physical device outputs for the actuation of the basic-stage heating or on output via KNX group object, the controller has a fixed pre-configuration that cannot be changed. The pre-configured controller type is dependent here on the option selected in the *Basic-stage heating* parameter.

The only exception is on the selection of *Free configuration*. In this situation, everything can be selected and set freely.

The following table shows the dependencies:

Option selected: Basic-stage heating	**Pre-configured controller type: type of heating control value**	**Controller type can be changed**
Convector (e.g. radiator)	PI continuous (0…100 %)	No
Area (e.g. floor heating)	PI continuous (0…100 %)	No
Electric heater (in room)	2-point 1 bit (On/Off)	No
Free configuration	PI continuous (0…100 %)	Yes
Fan coil unit: electric heater (in fan coil unit)	2-point 1 bit (On/Off)	No
Fan coil unit: Water heating coil	PI continuous (0…100 %) for Fan Coil	No

The differences between the individual controller types are explained in the following:

- *2-point 1 bit (On/Off)*: 2-point control is the simplest form of control. The controller switches on if the room temperature has dropped below a specific level (temperature setpoint minus hysteresis) and off as soon as a specific value (temperature setpoint plus hysteresis) is exceeded. The switch-on and switch-off commands are sent as 1-bit commands.
  The dependent *Status Control value Basic-stage heating* group object is enabled as a 1-bit group object.
- *2-point 1 byte (0/100 %)*: This is also two-point control as above. The difference is that switch-on and switch-off commands are sent as 1-byte values (0 %/100 %).
  The dependent *Status Control value Basic-stage heating* group object is enabled as a 1-byte group object.
- *PI continuous (0…100 %)*: The PI controller adjusts its output value, between 0 % and 100 %, to the difference between the actual value and setpoint and permits exact regulation of the room temperature to the setpoint. It outputs the control value on the bus as a 1-byte value (0...100 %). To reduce the bus load, the control value is only sent if it has changed by a previously specified percentage in relation to the value sent last. In addition, the control value can be sent cyclically.
  The dependent *Status Control value Basic-stage heating* group object is enabled as a 1-byte group object.
- *PI PWM (On/Off)*: This is also a PI controller. The output is as a 1-bit command. For this purpose the control value calculated is implemented using a pulse-pause ratio.
  The dependent *Status Control value Basic-stage heating* group object is enabled as a 1-bit group object.
- *PI continuous (0…100 %) for Fan Coil*: The fan coil controller operates like the PI continuous controller. In addition, the fan output is also actuated in the automatic mode corresponding to the control value for the basic-stage heating.
  The dependent *Status Control value Basic-stage heating* group object is enabled as a 1-byte group object.

ⓘ **Note**

For a detailed description of the individual controller types, see Explanation of controller function, Page 365.

7.5.1.6.1.1 2-point 1 bit (On/Off), 2-point 1 byte (0/100%)

The following parameters are enabled if the *2-point 1 bit (On/Off)* or *2-point 1 byte (0/100%)* option has been selected in the *Basic-stage heating control value type* parameter.

7.5.1.6.1.1.1 Dependent Parameter

Use control value for fan automation

This parameter is only visible if the *Free configuration* option has been selected for the *Basic-stage heating* parameter in the *Application parameters* parameter window.

Options: *No*
Yes

This parameter can be used to specify whether the control value for this stage is also to be used as the control value for the fan automation.

- *No*: The control value is not used for the fan automation.
- *Yes*: The control value is used for the fan automation. If this stage is active and the fan is in the automatic mode, the control value is also used as a control value to actuate the fan.

ⓘ **Note**

If the related stage has a free configuration, the device does not know whether the stage actuated is a fan coil unit or not. However, because the fan automation only makes sense for the fan coil unit stages, an assignment must be made here.

If a free configuration is selected for all 4 control stages and none of the stages is also parameterized for fan automation, the fan automation remains without function.

7.5.1.6.1.1.2 Dependent Parameter

Extended settings

Options: *No*
Yes

Extended settings can be enabled using this parameter. This parameter is displayed on the selection of the *Yes* option.

7.5.1.6.1.1.2.1 Dependent Parameter

Control value direction

This parameter is only visible if the *Via group object* option has been selected for the *Actuate basic-stage heating via* parameter in the *Application parameters* parameter window.

Options: *Normal*
Inverted

This parameter is used to specify the control value direction if it is only output via a group object. The setting is used to actuate NC (normally closed) or NO (normally opened) valves.

If one of the physical device outputs is used to output the control value, this parameter is not displayed because this setting is then made in the related output stage.

- *Normal*: The control value is output normally.
  Control value On/100 % => telegram value On/100 %
  Control value Off/0 % => telegram value Off/0 %
- *Inverted*: The control value is output inverted.
  Control value On/100% => telegram Off/0 %
  Control value Off/0 % => telegram On/100%

7.5.1.6.1.1.2.2 DEPENDENT PARAMETER

Hysteresis

Options: *0.3…0.5…25.5*

This parameter is used to specify the hysteresis that is to apply to the setpoint to prevent continuous switching of the controller.

- Upper switching point = setpoint + hysteresis
- Lower switching point = setpoint – hysteresis

Heating controller:

- If the actual temperature is below the lower switching point, the controller switches on.
- If the actual temperature is above the upper switching point, the controller switches off.

Cooling controller:

- If the actual temperature is below the lower switching point, the controller switches off.
- If the actual temperature is above the upper switching point, the controller switches on.

7.5.1.6.1.1.2.3 DEPENDENT PARAMETER

Send control value cyclically (0 = cyclical sending disabled)

This parameter is only visible on the selection of the *PI continuous (0…100 %)* or *PI continuous (0...100 %) for Fan Coil* option.

Options: *0…15…60*

This parameter is used to specify the cycle time with which the control value is to be sent.

On the selection of the value 0, cyclic sending is deactivated.

7.5.1.6.1.1.2.4 DEPENDENT PARAMETER

Activate temperature limitation

Options: *No*
Yes

A controller limit temperature can be activated using this parameter. Using the limit temperature, the controller's control value for this stage can be set to 0 on reaching a parameterized temperature. In this way, exceeding (heating) or dropping below (cooling) this temperature can be prevented.

An example of the usage of the limit temperature is floor heating, where exceeding a specific temperature must be prevented to protect the material of the floor.

- *No*: The limit temperature is deactivated.
- *Yes*: The limit temperature is activated. The following dependent parameters are also displayed.

—

7.5.1.6.1.1.2.4.1 DEPENDENT PARAMETER

Limit temperature

Options: *20…<u>30</u>…50*

The value set here specifies the limit temperature that is not allowed to be exceeded (heating) or dropped below (cooling). If the temperature reaches this value, the control value is immediately set to 0.

The value set here is compared with the value received via a group object or via one of the physical device inputs (depending on the option selected, in the *Input for temperature limit sensor* parameter).

—

7.5.1.6.1.1.2.4.2 DEPENDENT PARAMETER

Limit temperature hysteresis

Options: *00.5…<u>01.0</u>…05.0*

The hysteresis on the limit temperature specifies the value by which the limit temperature must be dropped below again (heating) or exceeded (cooling) before the controller becomes active again.

—

7.5.1.6.1.1.2.4.3 DEPENDENT PARAMETER

Input for temperature limit sensor

Options: *<u>Via group object</u>*
Via physical device input a
Via physical device input b
Via physical device input c
Via physical device input d

- *Via group object*: The temperature value is received via a dedicated group object. The dependent *Basic-stage heating limit temperature* group object is enabled.
- *Via physical device input x*: The temperature value is acquired via a temperature sensor connected (to the selected input).

> ⓘ **Note**
>
> A temperature sensor must be actually connected to the temperature input selected and the input for the sensor must have been correctly parameterized, otherwise the limit temperature function does not work.
>
> If one of the device inputs is selected here as the input for the limit temperature, this input is no longer used to acquire the room temperature. It is therefore not possible to use the same temperature sensor for the measurement of the room temperature and for the measurement of the limit temperature.

7.5.1.6.1.2 PI continuous (0…100 %), PI PWM (On/Off), PI continuous (0…100 %) for Fan Coil

The following parameters are enabled if the *PI continuous (0…100 %)*, *PI PWM (On/Off)* or *PI continuous (0…100 %) for Fan Coil* option has been selected in the *Basic-stage heating control value type* parameter.

7.5.1.6.1.2.1 Dependent Parameter

I-proportion

Options: *0…<u>100</u>…255*

The standard value depends on the option selected in the *Basic-stage heating* parameter in the *Application parameters* parameter window.

The I-proportion stands for the integral time in a control. The integral proportion causes the room temperature to approach the setpoint slowly and also to reach it finally. Depending on the system type used, the integral time may need to have different values. In principle the following applies: The more sluggish the overall system, the larger the integral time is.

7.5.1.6.1.2.2 Dependent Parameter

P-proportion

Options: *01.0…<u>01.5</u>…10.0*

The standard value depends on the option selected in the *Basic-stage heating* parameter in the *Application parameters* parameter window.

The P-proportion stands for the proportional range in a control. It fluctuates around the setpoint and in a PI control is used to change the speed of the control. The smaller the value set, the faster the control reacts. However, the value should not be set too small because otherwise there may be a risk of overshoot.

7.5.1.6.1.2.3 Dependent Parameter

Use control value for fan automation

This parameter is only visible if the *Free configuration* option has been selected for the *Basic-stage heating* parameter in the *Application parameters* parameter window.

Options: *No*
<u>Yes</u>

This parameter can be used to specify whether the control value for this stage is also to be used as the control value for the fan automation.

- *No*: The control value is not used for the fan automation.
- *Yes*: The control value is used for the fan automation. If this stage is active and the fan is in the automatic mode, the control value is also used as a control value to actuate the fan.

> ⓘ **Note**
>
> If the related stage has a free configuration, the device does not know whether the stage actuated is a fan coil unit or not. However, because the fan automation only makes sense for the fan coil unit stages, an assignment must be made here.
>
> If a free configuration is selected for all 4 control stages and none of the stages is also parameterized for fan automation, the fan automation remains without function.

—

7.5.1.6.1.2.4 DEPENDENT PARAMETER

Extended settings

Options: <u>*No*</u>
Yes

—

7.5.1.6.1.2.4.1 DEPENDENT PARAMETER

Control value direction

This parameter is only visible if the *Via group object* option has been selected for the *Actuate basic-stage heating via* parameter in the *Application parameters* parameter window.

Options: <u>*Normal*</u>
Inverted

This parameter is used to specify the control value direction if it is only output via a group object. The setting is used to actuate NC (normally closed) or NO (normally opened) valves.

If one of the physical device outputs is used to output the control value, this parameter is not displayed because this setting is then made in the related output stage.

- *Normal*: The control value is output normally.
  Control value On/100 % => telegram value On/100 %
  Control value Off/0 % => telegram value Off/0 %
- *Inverted*: The control value is output inverted.
  Control value On/100% => telegram Off/0 %
  Control value Off/0 % => telegram On/100%

—

7.5.1.6.1.2.4.2 DEPENDENT PARAMETER

Control value difference for sending control value

This parameter is only visible on the selection of the *PI continuous (0…100 %)* or *PI continuous (0...100 %) for Fan Coil* option.

Options: *2 %*
<u>*5 %*</u>
10 %
Only send cyclically

The control values for the PI continuous controller 0…100 % are not sent after each calculation, but when there is a difference in the calculation compared to the last value sent and sending is appropriate. This value difference can be entered here.

7.5.1.6.1.2.4.3 DEPENDENT PARAMETER

Send control value cyclically (0 = cyclical sending disabled)

This parameter is only visible on the selection of the *PI continuous (0…100 %)* or *PI continuous (0...100 %) for Fan Coil* option.

Options: *0…15…60*

This parameter is used to specify the cycle time with which the control value is to be sent.

On the selection of the value 0, cyclic sending is deactivated.

> ⓘ **Note**
>
> If the control value is only output via a group object, this value should not be set to 0 because otherwise it will not be ensured that the actuator receives its control value.
>
> In particular, in combination with the *Control value difference for sending control value* parameter and the *Only send cyclically* option that can be selected there, the value 0 is not allowed to be selected. This configuration would mean that the control value is never output.

7.5.1.6.1.2.4.4 DEPENDENT PARAMETER

Heating PWM cycle

This parameter is only visible on the selection of the *PI PWM (On/Off)* option.

Options: *0…15…60*

Using the value set here, the cycle time for the control value for the PWM signal calculated from the PI controller's control value is specified. Depending on the control value, the selected cycle time is divided into an On and Off signal.

Therefore, a control value output of 33 % with a PWM cycle of 15 min signifies an On phase of five minutes and an Off phase of 10 min.

ⓘ **Note**

The value is only sent if the control value changes (from 0 to 1 or vice versa).

At the start of a cycle a 1 is output and, corresponding to the control value, a 0 after the time x.

If the control value is 0 %, on reaching this control value a 0 is output once. The next value is only sent if the control value changes.

Example:
Heating PWM cycle: 15 min
Control value: 33 %

Times	Sent value
0 min	1
5 min	0
15 min	1
20 min	0
30 min	1
…	…

New control value: 0 %

Times	Sent value
60 min	0
75 min	–
90 min	–
…	…

New control value: 66 %

Times	Sent value
120 min	1
130 min	0
135 min	1
145 min	0
…	…

7.5.1.6.1.2.4.5 DEPENDENT PARAMETER

Max. control value

Options: *0…100*

The maximum control value from the PI controller specifies the maximum value that the controller outputs. If a maximum value below 255 is selected, then this value is not exceeded even if the controller calculates a higher control value.

7.5.1.6.1.2.4.6 DEPENDENT PARAMETER

Min. control value (basic load)

Options: *0…100*

The minimum control value from the PI controller specifies the minimum value that the controller outputs. If a minimum value greater than zero is selected, then this value is not dropped below even if the controller calculates a lower control value.

This parameter is used to set a basic load, e.g. for the operation of floor heating. Even if the controller calculates the control value zero, heating medium flows through the floor heating to prevent the floor from cooling down completely.

In the *Temperature controller* parameter window it can be set whether this basic load is to be active permanently or is to be switched via the *Basic load* group object. In addition, it can be set here whether the basic load is also to be active if the controller is switched off.

7.5.1.6.1.2.4.7 DEPENDENT PARAMETER

Activate temperature limitation

Options: *No*
Yes

A controller limit temperature can be activated using this parameter. Using the limit temperature, the controller's control value for this stage can be set to 0 on reaching a parameterized temperature. In this way, exceeding (heating) or dropping below (cooling) this temperature can be prevented.

An example of the usage of the limit temperature is floor heating, where exceeding a specific temperature must be prevented to protect the material of the floor.

- *No*: The limit temperature is deactivated.
- *Yes*: The limit temperature is activated. The following dependent parameters are also displayed.

—

7.5.1.6.1.2.4.7.1 DEPENDENT PARAMETER

Limit temperature

Options: *20…30…50*

The value set here specifies the limit temperature that is not allowed to be exceeded (heating) or dropped below (cooling). If the temperature reaches this value, the control value is immediately set to 0.

The value set here is compared with the value received via a group object or via one of the physical device inputs (depending on the option selected, in the *Input for temperature limit sensor* parameter).

—

7.5.1.6.1.2.4.7.2 DEPENDENT PARAMETER

Limit temperature hysteresis

Options: *00.5…01.0…05.0*

The hysteresis on the limit temperature specifies the value by which the limit temperature must be dropped below again (heating) or exceeded (cooling) before the controller becomes active again.

—

7.5.1.6.1.2.4.7.3 DEPENDENT PARAMETER

I-proportion on limitation

This parameter is only visible if the *PI continuous (0…100 %)*; *PI PWM (On/Off)* or *PI continuous (0…100 %) for Fan Coil* option has been selected in the *Basic-stage heating control value type* parameter.

Options: *Freeze*
Reset

This parameter decides what is to happen to the I-proportion on reaching the limit temperature.

- *Freeze*: The I-proportion is frozen at the actual value. As soon as the controller is active again, it continues to operate with the same I-proportion as before reaching the limit.
- *Reset*: The I-proportion is reset to 0. Once the controller becomes active again, the I-proportion starts at 0.

7.5.1.6.1.2.4.7.4 DEPENDENT PARAMETER

Input for temperature limit sensor

Options: *Via group object*
Via physical device input a
Via physical device input b
Via physical device input c
Via physical device input d

- *Via group object*: The temperature value is received via a dedicated group object. The dependent *Basic-stage heating limit temperature* group object is enabled.
- *Via physical device input x*: The temperature value is acquired via a temperature sensor connected (to the selected input).

ⓘ **Note**

A temperature sensor must be actually connected to the temperature input selected and the input for the sensor must have been correctly parameterized, otherwise the limit temperature function does not work.

If one of the device inputs is selected here as the input for the limit temperature, this input is no longer used to acquire the room temperature. It is therefore not possible to use the same temperature sensor for the measurement of the room temperature and for the measurement of the limit temperature.

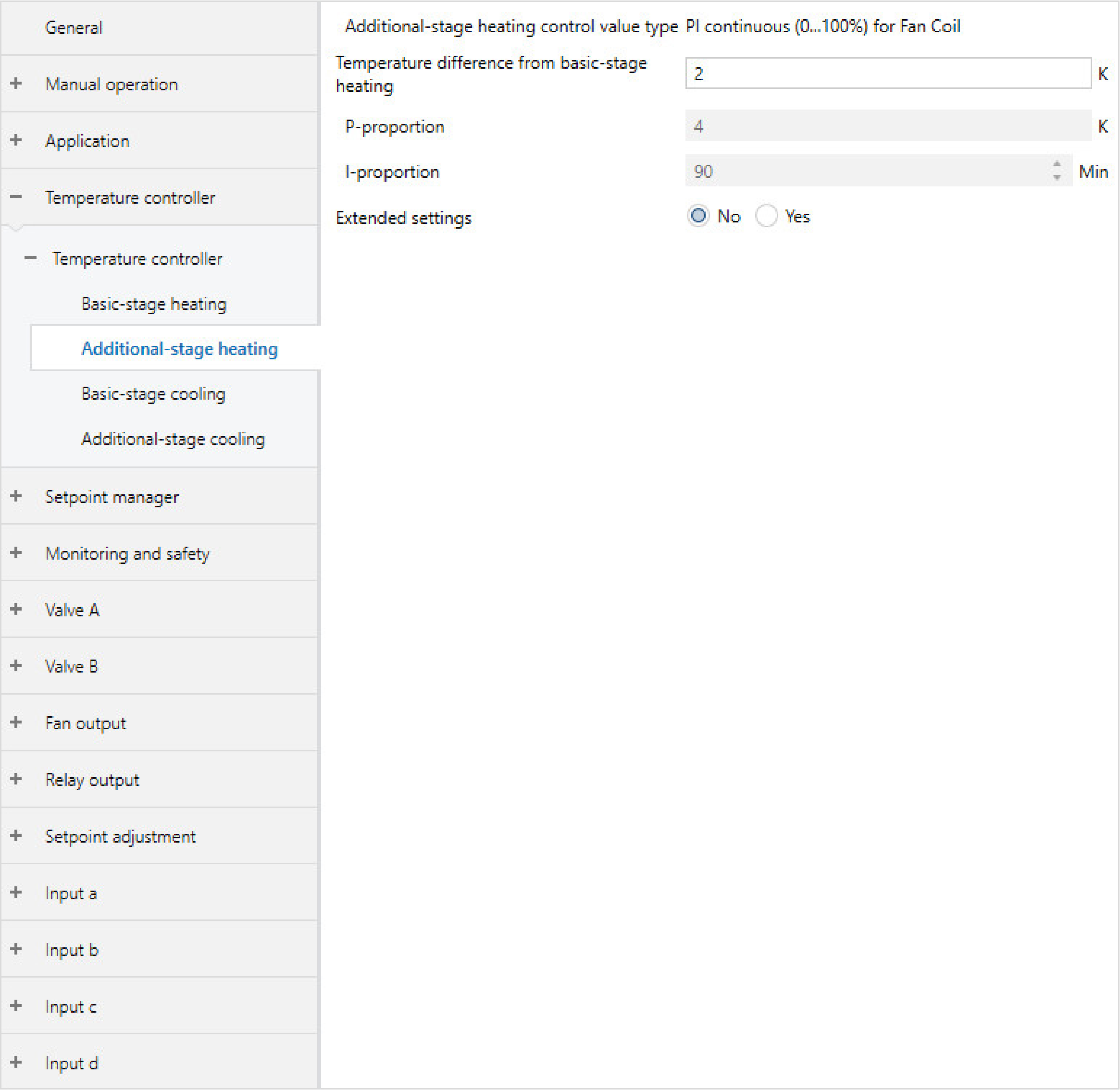
7.5.1.7 Additional-stage heating parameter window

This window is only visible if the *Deactivated* option has not been selected in the *Additional-stage heating* parameter in the *Application parameters* parameter window.

This window is deactivated in the actuator mode and is not visible.

The additional-stage heating of the temperature controller is parameterized in this window. The settings for the control type, limitation of the control range, the behavior on sending the control value and the limit temperature are made.

The additional stage is used as a boost for the basic stage. If there are large deviations between the actual and setpoint temperature, the additional stage is activated to accelerate reaching the setpoint temperature.



Additional-stage heating control value type PI continuous (0...100%) for Fan Coil

Temperature difference from basic-stage heating 2 K

P-proportion 4 K

I-proportion 90 Min

Extended settings ● No ○ Yes

Fig. 38: Additional-stage heating

7.5.1.7.1 Additional-stage heating control value type

Options:
2-point 1 bit (On/Off)
2-point 1 byte (0/100 %)
PI continuous (0…100 %)
PI PWM (On/Off)
PI continuous (0…100 %) for Fan Coil

This parameter is used to specify the control and control value type for the additional-stage heating.

The standard value for the parameter is dependent on the selection in the *Additional-stage heating* and *Actuate additional-stage heating via* parameters (*Application parameters* parameter window).

On the selection of one of the physical device outputs for the actuation of the additional-stage heating, the controller has a fixed pre-configuration that cannot be changed. The pre-configured controller type is dependent here on the option selected in the *Additional-stage heating* parameter.

The only exception is on the selection of *Free configuration*. In this situation, everything can be selected and set freely.

The following table shows the dependencies:

Option selected: Additional-stage heating	**Pre-configured controller type: Additional-stage heating control value type**	**Controller type can be changed**
Convector (e.g. radiator)	PI continuous (0…100 %)	No
Area (e.g. floor heating)	PI continuous (0…100 %)	No
Electric heater (in room)	2-point 1 bit (On/Off)	No
Free configuration	PI continuous (0…100 %)	Yes
Fan coil unit: electric heater (in fan coil unit)	2-point 1 bit (On/Off)	No
Fan coil unit: Water heating coil	PI continuous (0…100 %) for Fan Coil	No

The differences between the individual controller types are explained in the following:

- *2-point 1 bit (On/Off)*: 2-point control is the simplest form of control. The controller switches on if the room temperature has dropped below a specific level (temperature setpoint minus hysteresis) and off as soon as a specific value (temperature setpoint plus hysteresis) is exceeded. The switch-on and switch-off commands are sent as 1-bit commands.
  The dependent *Status Control value Additional-stage heating* group object is enabled as a 1-bit group object.
- *2-point 1 byte (0/100 %)*: This is also two-point control as above. The difference is that switch-on and switch-off commands are sent as 1-byte values (0 %/100 %).
  The dependent *Status Control value Additional-stage heating* group object is enabled as a 1-byte group object.
- *PI continuous (0…100 %)*: The PI controller adjusts its output value, between 0 % and 100 %, to the difference between the actual value and setpoint and permits exact regulation of the room temperature to the setpoint. It outputs the control value on the bus as a 1-byte value (0...100 %). To reduce the bus load, the control value is only sent if it has changed by a previously specified percentage in relation to the value sent last. In addition, the control value can be sent cyclically.
  The dependent *Status Control value Additional-stage heating* group object is enabled as a 1-byte group object.
- *PI PWM (On/Off)*: This is also a PI controller. The output is as a 1-bit command. For this purpose the control value calculated is implemented using a pulse-pause ratio.
  The dependent *Status Control value Additional-stage heating* group object is enabled as a 1-bit group object.
- *PI continuous (0…100 %) for Fan Coil*: The fan coil controller operates like the PI continuous controller. In addition, the fan output is also actuated in the automatic mode corresponding to the control value for the basic-stage heating.
  The dependent *Status Control value Additional-stage heating* group object is enabled as a 1-byte group object.

Note
For a detailed description of the individual controller types, see Explanation of controller function, Page 365.

7.5.1.7.1.1 2-point 1 bit (On/Off), 2-point 1 byte (0/100%)

The following parameters are enabled if the *2-point 1 bit (On/Off)* or *2-point 1 byte (0/100%)* option has been selected in the *Additional-stage heating control value type* parameter.

—

7.5.1.7.1.1.1 DEPENDENT PARAMETER

Temperature difference from basic-stage heating

Options: *00.0…02.0…25.5*

The temperature difference from basic-stage heating specifies the value from which or up to which the additional-stage heating is to be active. If the actual temperature is below the setpoint temperature by the value selected here, the additional stage is active.

This action occurs both if the actual temperature drops below the threshold and if it is already below the threshold.

Example 1:

Temperature difference from basic-stage heating: 2 K

Setpoint temperature: 23 °C

Actual temperature: 19 °C

Additional stage is active until the actual temperature reaches 21 °C.

Example 2:

Temperature difference from basic-stage heating: 2 K

Setpoint temperature: 23 °C

Actual temperature: 22 °C

Additional stage is inactive as long as the actual temperature is above 21 °C.

7.5.1.7.1.1.2 DEPENDENT PARAMETER

Use control value for fan automation

This parameter is only visible if the *Free configuration* option has been selected for the *Additional-stage heating* parameter in the *Application parameters* parameter window.

Options: *No*
Yes

This parameter can be used to specify whether the control value for this stage is also to be used as the control value for the fan automation.

- *No*: The control value is not used for the fan automation
- *Yes*: The control value is used for the fan automation. If this stage is active and the fan is in the automatic mode, the control value is also used as a control value to actuate the fan.

ⓘ **Note**

If the related stage has a free configuration, the device does not know whether the stage actuated is a fan coil unit or not. However, because the fan automation only makes sense for the fan coil unit stages, an assignment must be made here.

If a free configuration is selected for all 4 control stages and none of the stages is also parameterized for fan automation, the fan automation remains without function.

7.5.1.7.1.1.3 DEPENDENT PARAMETER

Extended settings

Options: *No*
Yes

Extended settings can be enabled using this parameter. This parameter is displayed on the selection of the *Yes* option.

7.5.1.7.1.1.3.1 DEPENDENT PARAMETER

Hysteresis

Options: *0.3…0.5…25.5*

This parameter is used to specify the hysteresis that is to apply to the setpoint to prevent continuous switching of the controller.

- Upper switching point = setpoint + hysteresis
- Lower switching point = setpoint – hysteresis

Heating controller:

- If the actual temperature is below the lower switching point, the controller switches on.
- If the actual temperature is above the upper switching point, the controller switches off.

Cooling controller:

- If the actual temperature is below the lower switching point, the controller switches off.
- If the actual temperature is above the upper switching point, the controller switches on.

—

7.5.1.7.1.1.3.2 DEPENDENT PARAMETER

Send control value cyclically (0 = cyclical sending disabled)

This parameter is only visible on the selection of the *PI continuous (0…100 %)* or *PI continuous (0...100 %) for Fan Coil* option.

Options: *0…15…60*

This parameter is used to specify the cycle time with which the control value is to be sent.

On the selection of the value 0, cyclic sending is deactivated.

—

7.5.1.7.1.1.3.3 DEPENDENT PARAMETER

Activate temperature limitation

Options: *No*
Yes

A controller limit temperature can be activated using this parameter. Using the limit temperature, the controller's control value for this stage can be set to 0 on reaching a parameterized temperature. In this way, exceeding (heating) or dropping below (cooling) this temperature can be prevented.

An example of the usage of the limit temperature is floor heating, where exceeding a specific temperature must be prevented to protect the material of the floor.

- *No*: The limit temperature is deactivated.
- *Yes*: The limit temperature is activated. The following dependent parameters are also displayed.

—

7.5.1.7.1.1.3.3.1 DEPENDENT PARAMETER

Limit temperature

Options: *20…30…50*

The value set here specifies the limit temperature that is not allowed to be exceeded (heating) or dropped below (cooling). If the temperature reaches this value, the control value is immediately set to 0.

The value set here is compared with the value received via a group object or via one of the physical device inputs (depending on the option selected, in the *Input for temperature limit sensor* parameter).

—

7.5.1.7.1.1.3.3.2 DEPENDENT PARAMETER

Limit temperature hysteresis

Options: *00.5…<u>01.0</u>…05.0*

The hysteresis on the limit temperature specifies the value by which the limit temperature must be dropped below again (heating) or exceeded (cooling) before the controller becomes active again.

—

7.5.1.7.1.1.3.3.3 DEPENDENT PARAMETER

Input for temperature limit sensor

Options: *<u>Via group object</u>*
Via physical device input a
Via physical device input b
Via physical device input c
Via physical device input d

- *Via group object*: The temperature value is received via a dedicated group object. The dependent *Additional-stage heating limit temperature* group object is enabled.
- *Via physical device input x*: The temperature value is acquired via a temperature sensor connected (to the selected input).

ⓘ **Note**

A temperature sensor must be actually connected to the temperature input selected and the input for the sensor must have been correctly parameterized, otherwise the limit temperature function does not work.

If one of the device inputs is selected here as the input for the limit temperature, this input is no longer used to acquire the room temperature. It is therefore not possible to use the same temperature sensor for the measurement of the room temperature and for the measurement of the limit temperature.

7.5.1.7.1.2 PI continuous (0…100 %), PI PWM (On/Off), PI continuous (0…100 %) for Fan Coil

The following parameters are enabled if the *PI continuous (0…100 %)*, *PI PWM (On/Off)* or *PI continuous (0…100 %) for Fan Coil* option has been selected in the *Additional-stage heating control value type* parameter.

—

7.5.1.7.1.2.1 DEPENDENT PARAMETER

Temperature difference from basic-stage heating

Options: *00.0…<u>02.0</u>…25.5*

The temperature difference from basic-stage heating specifies the value from which or up to which the additional-stage heating is to be active. If the actual temperature is below the setpoint temperature by the value selected here, the additional stage is active.

This action occurs both if the actual temperature drops below the threshold and if it is already below the threshold.

Example 1:

Temperature difference from basic-stage heating: 2 K

Setpoint temperature: 23 °C

Actual temperature: 19 °C

Additional stage is active until the actual temperature reaches 21 °C.

Example 2:

Temperature difference from basic-stage heating: 2 K

Setpoint temperature: 23 °C

Actual temperature: 22 °C

Additional stage is inactive as long as the actual temperature is above 21 °C.

7.5.1.7.1.2.2 DEPENDENT PARAMETER

P-proportion

Options: *01.0…01.5…10.0*

The standard value depends on the option selected in the *Additional-stage heating* parameter in the *Application parameters* parameter window.

The P-proportion stands for the proportional range in a control. It fluctuates around the setpoint and in a PI control is used to change the speed of the control. The smaller the value set, the faster the control reacts. However, the value should not be set too small because otherwise there may be a risk of overshoot.

7.5.1.7.1.2.3 DEPENDENT PARAMETER

I-proportion

Options: *0…100…255*

The standard value depends on the option selected in the *Additional-stage heating* parameter in the *Application parameters* parameter window.

The I-proportion stands for the integral time in a control. The integral proportion causes the room temperature to approach the setpoint slowly and also to reach it finally. Depending on the system type used, the integral time may need to have different values. In principle the following applies: The more sluggish the overall system, the larger the integral time is.

—

7.5.1.7.1.2.4 Dependent Parameter

Use control value for fan automation

This parameter is only visible if the *Free configuration* option has been selected for the *Additional-stage heating* parameter in the *Application parameters* parameter window.

Options: *No*
Yes

This parameter can be used to specify whether the control value for this stage is also to be used as the control value for the fan automation.

- *No*: The control value is not used for the fan automation
- *Yes*: The control value is used for the fan automation. If this stage is active and the fan is in the automatic mode, the control value is also used as a control value to actuate the fan.

ⓘ **Note**

If the related stage has a free configuration, the device does not know whether the stage actuated is a fan coil unit or not. However, because the fan automation only makes sense for the fan coil unit stages, an assignment must be made here.

If a free configuration is selected for all 4 control stages and none of the stages is also parameterized for fan automation, the fan automation remains without function.

—

7.5.1.7.1.2.5 Dependent Parameter

Extended settings

Options: *No*
Yes

Extended settings can be enabled using this parameter. This parameter is displayed on the selection of the *Yes* option.

—

7.5.1.7.1.2.5.1 Dependent Parameter

Control value direction

This parameter is only visible if the *Via group object* option has been selected for the *Actuate additional-stage heating via* parameter in the *Application parameters* parameter window.

Options: *Normal*
Inverted

This parameter is used to specify the control value direction if it is only output via a group object. The setting is used to actuate NC (normally closed) or NO (normally opened) valves.

If one of the physical device outputs is used to output the control value, this parameter is not displayed because this setting is then made in the related output stage.

- *Normal*: The control value is output normally.
  Control value On/100 % => telegram Off/0 %
  Control value Off/0 % => telegram On/100 %
- *Inverted*: The control value is output inverted.
  Control value On/100 % => telegram Off/0 %
  Control value Off/0 % => telegram On/100 %

7.5.1.7.1.2.5.2 DEPENDENT PARAMETER

Control value difference for sending control value

This parameter is only visible on the selection of the *PI continuous (0…100 %)* or *PI continuous (0...100 %) for Fan Coil* option.

Options: *2 %*
5 %
10 %
Only send cyclically

The control values for the PI continuous controller 0…100 % are not sent after each calculation, but when there is a difference in the calculation compared to the last value sent and sending is appropriate. This value difference can be entered here.

7.5.1.7.1.2.5.3 DEPENDENT PARAMETER

Send control value cyclically (0 = cyclical sending disabled)

This parameter is only visible on the selection of the *PI continuous (0…100 %)* or *PI continuous (0...100 %) for Fan Coil* option.

Options: *0…15…60*

This parameter is used to specify the cycle time with which the control value is to be sent.

On the selection of the value 0, cyclic sending is deactivated.

ⓘ **Note**

If the control value is only output via a group object, this value should not be set to 0 because otherwise it will not be ensured that the actuator receives its control value.

In particular, in combination with the *Control value difference for sending control value* parameter and the *Only send cyclically* option that can be selected there, the value 0 is not allowed to be selected. This configuration would mean that the control value is never output.

7.5.1.7.1.2.5.4 DEPENDENT PARAMETER

Heating PWM cycle

This parameter is only visible on the selection of the *PI PWM (On/Off)* option.

Options: *0…15…60*

Using the value set here, the cycle time for the control value for the PWM signal calculated from the PI controller's control value is specified. Depending on the control value, the selected cycle time is divided into an On and Off signal.

Therefore, a control value output of 33 % with a PWM cycle of 15 min signifies an On phase of five minutes and an Off phase of 10 min.

ⓘ **Note**

The value is only sent if the control value changes (from 0 to 1 or vice versa).

At the start of a cycle a 1 is output and, corresponding to the control value, a 0 after the time x.

If the control value is 0 %, on reaching this control value a 0 is output once. The next value is only sent if the control value changes.

Example:
Heating PWM cycle: 15 min
Control value: 33 %

Times	Sent value
0 min	1
5 min	0
15 min	1
20 min	0
30 min	1
…	…

New control value: 0 %

Times	Sent value
60 min	0
75 min	–
90 min	–
…	…

New control value: 66 %

Times	Sent value
120 min	1
130 min	0
135 min	1
145 min	0
…	…

7.5.1.7.1.2.5.5 Dependent Parameter

Max. control value

Options: *0…<u>100</u>*

The maximum control value from the PI controller specifies the maximum value that the controller outputs. If a maximum value below 255 is selected, then this value is not exceeded even if the controller calculates a higher control value.

7.5.1.7.1.2.5.6 Dependent Parameter

Min. control value (basic load)

Options: *<u>0</u>…100*

The minimum control value from the PI controller specifies the minimum value that the controller outputs. If a minimum value greater than zero is selected, then this value is not dropped below even if the controller calculates a lower control value.

This parameter is used to set a basic load, e.g. for the operation of floor heating. Even if the controller calculates the control value zero, heating medium flows through the floor heating to prevent the floor from cooling down completely.

In the *Temperature controller* parameter window it can be set whether this basic load is to be active permanently or is to be switched via the *Basic load* group object. In addition, it can be set here whether the basic load is also to be active if the controller is switched off.

7.5.1.7.1.2.5.7 Dependent Parameter

Activate temperature limitation

Options: *<u>No</u>*
Yes

A controller limit temperature can be activated using this parameter. Using the limit temperature, the controller's control value for this stage can be set to 0 on reaching a parameterized temperature. In this way, exceeding (heating) or dropping below (cooling) this temperature can be prevented.

An example of the usage of the limit temperature is floor heating, where exceeding a specific temperature must be prevented to protect the material of the floor.

- *No*: The limit temperature is deactivated.
- *Yes*: The limit temperature is activated. The following dependent parameters are also displayed.

—

7.5.1.7.1.2.5.7.1 DEPENDENT PARAMETER

Limit temperature

Options: *20…30…50*

The value set here specifies the limit temperature that is not allowed to be exceeded (heating) or dropped below (cooling). If the temperature reaches this value, the control value is immediately set to 0.

The value set here is compared with the value received via a group object or via one of the physical device inputs (depending on the option selected, in the *Input for temperature limit sensor* parameter).

—

7.5.1.7.1.2.5.7.2 DEPENDENT PARAMETER

Limit temperature hysteresis

Options: *00.5…01.0…05.0*

The hysteresis on the limit temperature specifies the value by which the limit temperature must be dropped below again (heating) or exceeded (cooling) before the controller becomes active again.

—

7.5.1.7.1.2.5.7.3 DEPENDENT PARAMETER

I-proportion on limitation

This parameter is only visible if the *PI continuous (0…100 %)*; *PI PWM (On/Off)* or *PI continuous (0…100 %) for Fan Coil* option has been selected in the *Additional-stage heating control value type* parameter.

Options: *Freeze*
Reset

This parameter decides what is to happen to the I-proportion on reaching the limit temperature.

- Freeze: The I-proportion is frozen at the actual value. As soon as the controller is active again, it continues to operate with the same I-proportion as before reaching the limit.
- Reset: The I-proportion is reset to 0. Once the controller becomes active again, the I-proportion starts at 0.

7.5.1.7.1.2.5.7.4 DEPENDENT PARAMETER

Input for temperature limit sensor

Options: *Via group object*
Via physical device input a
Via physical device input b
Via physical device input c
Via physical device input d

- *Via group object*: The temperature value is received via a dedicated group object. The dependent *Additional-stage heating limit temperature* group object is enabled.
- *Via physical device input x*: The temperature value is acquired via a temperature sensor connected (to the selected input).

ⓘ **Note**

A temperature sensor must be actually connected to the temperature input selected and the input for the sensor must have been correctly parameterized, otherwise the limit temperature function does not work.

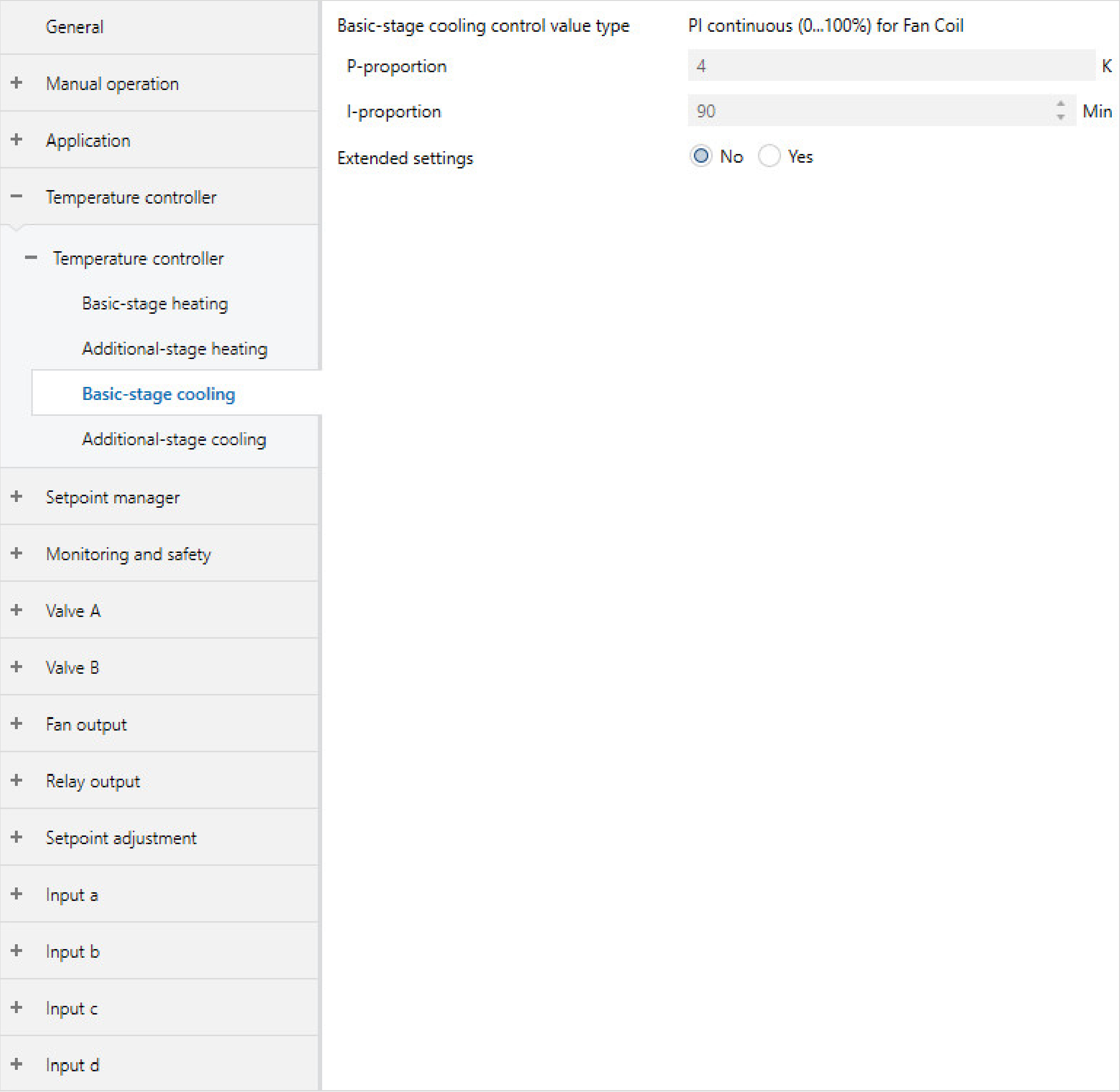
If one of the device inputs is selected here as the input for the limit temperature, this input is no longer used to acquire the room temperature. It is therefore not possible to use the same temperature sensor for the measurement of the room temperature and for the measurement of the limit temperature.

7.5.1.8 Basic-stage cooling parameter window

This window is only visible if the *Deactivated* option has not been selected in the *Basic-stage cooling* parameter in the *Application parameters* parameter window.

This window is deactivated in the actuator mode and is not visible.

The basic-stage cooling of the temperature controller is parameterized in this window. The settings for the control type, limitation of the control range, the behavior on sending the control value and the limit temperature are made.



Basic-stage cooling control value type: PI continuous (0...100%) for Fan Coil

P-proportion: 4 K

I-proportion: 90 Min

Extended settings: ● No ○ Yes

Fig. 39: Basic-stage cooling

7.5.1.8.1 Basic-stage cooling control value type

Options: *2-point 1 bit (On/Off)*
2-point 1 byte (0/100 %)
PI continuous (0…100 %)
PI PWM (On/Off)
PI continuous (0…100 %) for Fan Coil

This parameter is used to specify the control and control value type for the basic-stage cooling.

The standard value for the parameter is dependent on the selection in the *Basic-stage cooling* and *Actuate basic-stage cooling via* parameters (*Application parameters* parameter window).

On the selection of one of the physical device outputs for the actuation of the basic-stage cooling, the controller has a fixed pre-configuration that cannot be changed. The pre-configured controller type is dependent here on the option selected in the *Basic-stage cooling* parameter.

The only exception is on the selection of *Free configuration*. In this situation, everything can be selected and set freely.

The following table shows the dependencies:

Option selected: Basic-stage cooling	**Pre-configured controller type: Type of cooling control value**	**Controller type can be changed**
Area cooling (e.g. cooling ceiling)	PI continuous (0…100 %)	No
Free configuration	PI continuous (0…100 %)	Yes
Fan coil unit: Water heating coil	PI continuous (0…100 %) for Fan Coil	No

The differences between the individual controller types are explained in the following:

- *2-point 1 bit (On/Off)*: 2-point control is the simplest form of control. The controller switches on if the room temperature has dropped below a specific level (temperature setpoint minus hysteresis) and off as soon as a specific value (temperature setpoint plus hysteresis) is exceeded. The switch-on and switch-off commands are sent as 1-bit commands.
  The dependent *Status Control value Basic-stage cooling* group object is enabled as a 1-bit group object.
- *2-point 1 byte (0/100 %)*: This is also two-point control as above. The difference is that switch-on and switch-off commands are sent as 1-byte values (0 %/100 %). The dependent *Status Control value Basic-stage cooling* group object is enabled as a 1-byte group object.
- *PI continuous (0…100 %)*: The PI controller adjusts its output value, between 0 % and 100 %, to the difference between the actual value and setpoint and permits exact regulation of the room temperature to the setpoint. It outputs the control value on the bus as a 1-byte value (0...100 %). To reduce the bus load, the control value is only sent if it has changed by a previously specified percentage in relation to the value sent last. In addition, the control value can be sent cyclically.
  The dependent *Status Control value Basic-stage cooling* group object is enabled as a 1-byte group object.
- *PI PWM (On/Off)*: This is also a PI controller. The output is as a 1-bit command. For this purpose the control value calculated is implemented using a pulse-pause ratio.
  The dependent *Status Control value Basic-stage cooling* group object is enabled as a 1-bit group object.
- *PI continuous (0…100 %) for Fan Coil*: The fan coil controller operates like the PI continuous controller. In addition, the fan output is also actuated in the automatic mode corresponding to the control value for the basic-stage cooling.
  The dependent *Status Control value Basic-stage cooling* group object is enabled as a 1-byte group object.

ⓘ **Note**

For a detailed description of the individual controller types, see Explanation of controller function, Page 365.

7.5.1.8.1.1 2-point 1 bit (On/Off), 2-point 1 byte (0/100%)

The following parameters are enabled if the *2-point 1 bit (On/Off)* or *2-point 1 byte (0/100%)* option has been selected in the *Basic-stage cooling control value type* parameter.

7.5.1.8.1.1.1 DEPENDENT PARAMETER

Use control value for fan automation

This parameter is only visible if the *Free configuration* option has been selected for the *Basic-stage cooling* parameter in the *Application parameters* parameter window.

Options: *No*
<u>Yes</u>

This parameter can be used to specify whether the control value for this stage is also to be used as the control value for the fan automation.

- *No*: The control value is not used for the fan automation
- *Yes*: The control value is used for the fan automation. If this stage is active and the fan is in the automatic mode, the control value is also used as a control value to actuate the fan.

ⓘ **Note**

If the related stage has a free configuration, the device does not know whether the stage actuated is a fan coil unit or not. However, because the fan automation only makes sense for the fan coil unit stages, an assignment must be made here.

If a free configuration is selected for all 4 control stages and none of the stages is also parameterized for fan automation, the fan automation remains without function.

7.5.1.8.1.1.2 DEPENDENT PARAMETER

Extended settings

Options: *<u>No</u>*
Yes

Extended settings can be enabled using this parameter. This parameter is displayed on the selection of the *Yes* option.

7.5.1.8.1.1.2.1 DEPENDENT PARAMETER

Control value direction

This parameter is only visible if the *Via group object* option has been selected for the *Actuate basic-stage cooling via* parameter in the *Application parameters* parameter window.

Options:	*Normal* *Inverted*

This parameter is used to specify the control value direction if it is only output via a group object. The setting is used to actuate NC (normally closed) or NO (normally opened) valves.

If one of the physical device outputs is used to output the control value, this parameter is not displayed because this setting is then made in the related output stage.

- *Normal*: The control value is output normally.
  Control value On/100 % => telegram value On/100 %
  Control value Off/0 % => telegram value Off/0 %
- *Inverted*: The control value is output inverted.
  Control value On/100 % => telegram Off/0 %
  Control value Off/0 % => telegram On/100 %

7.5.1.8.1.1.2.2 DEPENDENT PARAMETER

Hysteresis

Options: *0.3…0.5…25.5*

This parameter is used to specify the hysteresis that is to apply to the setpoint to prevent continuous switching of the controller.

- Upper switching point = setpoint + hysteresis
- Lower switching point = setpoint – hysteresis

Heating controller:

- If the actual temperature is below the lower switching point, the controller switches on.
- If the actual temperature is above the upper switching point, the controller switches off.

Cooling controller:

- If the actual temperature is below the lower switching point, the controller switches off.
- If the actual temperature is above the upper switching point, the controller switches on.

7.5.1.8.1.1.2.3 DEPENDENT PARAMETER

Send control value cyclically (0 = cyclical sending disabled)

This parameter is only visible on the selection of the *PI continuous (0…100 %)* or *PI continuous (0...100 %) for Fan Coil* option.

Options: *0…15…60*

This parameter is used to specify the cycle time with which the control value is to be sent.

On the selection of the value 0, cyclic sending is deactivated.

7.5.1.8.1.1.2.4 DEPENDENT PARAMETER

Activate temperature limitation

Options: *No*
Yes

A controller limit temperature can be activated using this parameter. Using the limit temperature, the controller's control value for this stage can be set to 0 on reaching a parameterized temperature. In this way, exceeding (heating) or dropping below (cooling) this temperature can be prevented.

An example of the usage of the limit temperature is a cooling ceiling, where dropping below a specific temperature must be prevented to protect the material of the ceiling against excessive cooling.

- *No*: The limit temperature is deactivated.
- *Yes*: The limit temperature is activated. The following dependent parameters are also displayed.

7.5.1.8.1.1.2.4.1 DEPENDENT PARAMETER

Limit temperature

Options: *1…10…30*

The value set here specifies the limit temperature that is not allowed to be exceeded (heating) or dropped below (cooling). If the temperature reaches this value, the control value is immediately set to 0.

The value set here is compared with the value received via a group object or via one of the physical device inputs (depending on the option selected, in the *Input for temperature limit sensor* parameter).

7.5.1.8.1.1.2.4.2 DEPENDENT PARAMETER

Limit temperature hysteresis

Options: *00.5…01.0…05.0*

The hysteresis on the limit temperature specifies the value by which the limit temperature must be dropped below again (heating) or exceeded (cooling) before the controller becomes active again.

—

7.5.1.8.1.1.2.4.3 DEPENDENT PARAMETER

Input for temperature limit sensor

Options: _Via group object_
Via physical device input a
Via physical device input b
Via physical device input c
Via physical device input d

- *Via group object*: The temperature value is received via a dedicated group object. The dependent *Basic-stage cooling limit temperature* group object is enabled.
- *Via physical device input x*: The temperature value is acquired via a temperature sensor connected (to the selected input).

> ⓘ **Note**
>
> A temperature sensor must be actually connected to the temperature input selected and the input for the sensor must have been correctly parameterized, otherwise the limit temperature function does not work.
>
> If one of the device inputs is selected here as the input for the limit temperature, this input is no longer used to acquire the room temperature. It is therefore not possible to use the same temperature sensor for the measurement of the room temperature and for the measurement of the limit temperature.

7.5.1.8.1.2 PI continuous (0…100 %), PI PWM (On/Off), PI continuous (0…100 %) for Fan Coil

The following parameters are enabled if the *PI continuous (0…100 %)*, *PI PWM (On/Off)* or *PI continuous (0…100 %) for Fan Coil* option has been selected in the *Basic-stage cooling control value type* parameter.

—

7.5.1.8.1.2.1 DEPENDENT PARAMETER

P-proportion

Options: *01.0…<u>01.5</u>…10.0*

The standard value depends on the option selected in the *Basic-stage cooling* parameter in the Application parameters parameter window.

The P-proportion stands for the proportional range in a control. It fluctuates around the setpoint and in a PI control is used to change the speed of the control. The smaller the value set, the faster the control reacts. However, the value should not be set too small because otherwise there may be a risk of overshoot.

—

7.5.1.8.1.2.2 DEPENDENT PARAMETER

I-proportion

Options: *0…<u>100</u>…255*

The standard value depends on the option selected in the *Basic-stage cooling* parameter in the Application parameters parameter window.

The I-proportion stands for the integral time in a control. The integral proportion causes the room temperature to approach the setpoint slowly and also to reach it finally. Depending on the system type used, the integral time may need to have different values. In principle the following applies: The more sluggish the overall system, the larger the integral time is.

—

7.5.1.8.1.2.3 DEPENDENT PARAMETER

Use control value for fan automation

This parameter is only visible if the *Free configuration* option has been selected for the *Basic-stage cooling* parameter in the *Application parameters* parameter window.

Options: *No*
Yes

This parameter can be used to specify whether the control value for this stage is also to be used as the control value for the fan automation.

- *No*: The control value is not used for the fan automation
- *Yes*: The control value is used for the fan automation. If this stage is active and the fan is in the automatic mode, the control value is also used as a control value to actuate the fan.

ⓘ **Note**

If the related stage has a free configuration, the device does not know whether the stage actuated is a fan coil unit or not. However, because the fan automation only makes sense for the fan coil unit stages, an assignment must be made here.

If a free configuration is selected for all 4 control stages and none of the stages is also parameterized for fan automation, the fan automation remains without function.

—

7.5.1.8.1.2.4 DEPENDENT PARAMETER

Extended settings

Options: *No*
Yes

Extended settings can be enabled using this parameter. This parameter is displayed on the selection of the *Yes* option.

—

7.5.1.8.1.2.4.1 DEPENDENT PARAMETER

Control value direction

This parameter is only visible if the *Via group object* option has been selected for the *Actuate basic-stage cooling via* parameter in the *Application parameters* parameter window.

Options: *Normal*
Inverted

This parameter is used to specify the control value direction if it is only output via a group object. The setting is used to actuate NC (normally closed) or NO (normally opened) valves.

If one of the physical device outputs is used to output the control value, this parameter is not displayed because this setting is then made in the related output stage.

- *Normal*: The control value is output normally.
  Control value On/100 % => telegram value On/100 %
  Control value Off/0 % => telegram value Off/0 %
- *Inverted*: The control value is output inverted.
  Control value On/100 % => telegram Off/0 %
  Control value Off/0 % => telegram On/100 %

7.5.1.8.1.2.4.2 DEPENDENT PARAMETER

Control value difference for sending control value

This parameter is only visible on the selection of the *PI continuous (0…100 %)* or *PI continuous (0...100 %) for Fan Coil* option.

Options: *2 %*
5 %
10 %
Only send cyclically

The control values for the PI continuous controller 0…100 % are not sent after each calculation, but when there is a difference in the calculation compared to the last value sent and sending is appropriate. This value difference can be entered here.

7.5.1.8.1.2.4.3 DEPENDENT PARAMETER

Send control value cyclically (0 = cyclical sending disabled)

This parameter is only visible on the selection of the *PI continuous (0…100 %)* or *PI continuous (0...100 %) for Fan Coil* option.

Options: *0…15…60*

This parameter is used to specify the cycle time with which the control value is to be sent.

On the selection of the value 0, cyclic sending is deactivated.

ⓘ **Note**

If the control value is only output via a group object, this value should not be set to 0 because otherwise it will not be ensured that the actuator receives its control value.

In particular, in combination with the *Control value difference for sending control value* parameter and the *Only send cyclically* option that can be selected there, the value 0 is not allowed to be selected. This configuration would mean that the control value is never output.

7.5.1.8.1.2.4.4 DEPENDENT PARAMETER

Cooling PWM cycle

This parameter is only visible on the selection of the *PI PWM (On/Off)* option.

Options: *0…15…60*

Using the value set here, the cycle time for the control value for the PWM signal calculated from the PI controller's control value is specified. Depending on the control value, the selected cycle time is divided into an On and Off signal.

Therefore, a control value output of 33 % with a PWM cycle of 15 min signifies an On phase of five minutes and an Off phase of 10 min.

ⓘ **Note**

The value is only sent if the control value changes (from 0 to 1 or vice versa).

At the start of a cycle a 1 is output and, corresponding to the control value, a 0 after the time x.

If the control value is 0 %, on reaching this control value a 0 is output once. The next value is only sent if the control value changes.

Example:
Cooling PWM cycle: 15 min
Control value: 33 %

Times	Sent value
0 min	1
5 min	0
15 min	1
20 min	0
30 min	1
…	…

New control value: 0 %

Times	Sent value
60 min	0
75 min	–
90 min	–
…	…

New control value: 66 %

Times	Sent value
120 min	1
130 min	0
135 min	1
145 min	0
…	…

7.5.1.8.1.2.4.5 DEPENDENT PARAMETER

Max. control value

Options: *0…<u>100</u>*

The maximum control value from the PI controller specifies the maximum value that the controller outputs. If a maximum value below 255 is selected, then this value is not exceeded even if the controller calculates a higher control value.

7.5.1.8.1.2.4.6 DEPENDENT PARAMETER

Min. control value (basic load)

Options: *<u>0</u>…100*

The minimum control value from the PI controller specifies the minimum value that the controller outputs. If a minimum value greater than zero is selected, then this value is not dropped below even if the controller calculates a lower control value.

This parameter is used to set a basic load, e.g. for the operation of floor heating. Even if the controller calculates the control value zero, heating medium flows through the floor heating to prevent the floor from cooling down completely.

In the *Temperature controller* parameter window it can be set whether this basic load is to be active permanently or is to be switched via the *Basic load* group object. In addition, it can be set here whether the basic load is also to be active if the controller is switched off.

7.5.1.8.1.2.4.7 DEPENDENT PARAMETER

Activate temperature limitation

Options: *<u>No</u>*
Yes

A controller limit temperature can be activated using this parameter. Using the limit temperature, the controller's control value for this stage can be set to 0 on reaching a parameterized temperature. In this way, exceeding (heating) or dropping below (cooling) this temperature can be prevented.

An example of the usage of the limit temperature is a cooling ceiling, where dropping below a specific temperature must be prevented to protect the material of the ceiling against excessive cooling.

- *No*: The limit temperature is deactivated.
- *Yes*: The limit temperature is activated. The following dependent parameters are also displayed.

—

7.5.1.8.1.2.4.7.1 Dependent Parameter

Limit temperature

Options: *1…10…30*

The value set here specifies the limit temperature that is not allowed to be exceeded (heating) or dropped below (cooling). If the temperature reaches this value, the control value is immediately set to 0.

The value set here is compared with the value received via a group object or via one of the physical device inputs (depending on the option selected, in the *Input for temperature limit sensor* parameter).

—

7.5.1.8.1.2.4.7.2 Dependent Parameter

Limit temperature hysteresis

Options: *00.5…01.0…05.0*

The hysteresis on the limit temperature specifies the value by which the limit temperature must be dropped below again (heating) or exceeded (cooling) before the controller becomes active again.

—

7.5.1.8.1.2.4.7.3 Dependent Parameter

I-proportion on limitation

This parameter is only visible if the *PI continuous (0…100 %)*; *PI PWM (On/Off)* or *PI continuous (0…100 %) for Fan Coil* option has been selected in the *Basic-stage cooling control value type* parameter.

Options: *Freeze*
Reset

This parameter decides what is to happen to the I-proportion on reaching the limit temperature.

- *Freeze*: The I-proportion is frozen at the actual value. As soon as the controller is active again, it continues to operate with the same I-proportion as before reaching the limit.
- *Reset*: The I-proportion is reset to 0. Once the controller becomes active again, the I-proportion starts at 0.

7.5.1.8.1.2.4.7.4 DEPENDENT PARAMETER

Input for temperature limit sensor

Options: <u>*Via group object*</u>
Via physical device input a
Via physical device input b
Via physical device input c
Via physical device input d

- *Via group object*: The temperature value is received via a dedicated group object. The dependent *Basic-stage cooling limit temperature* group object is enabled.
- *Via physical device input x*: The temperature value is acquired via a temperature sensor connected (to the selected input).

ⓘ **Note**

A temperature sensor must be actually connected to the temperature input selected and the input for the sensor must have been correctly parameterized, otherwise the limit temperature function does not work.

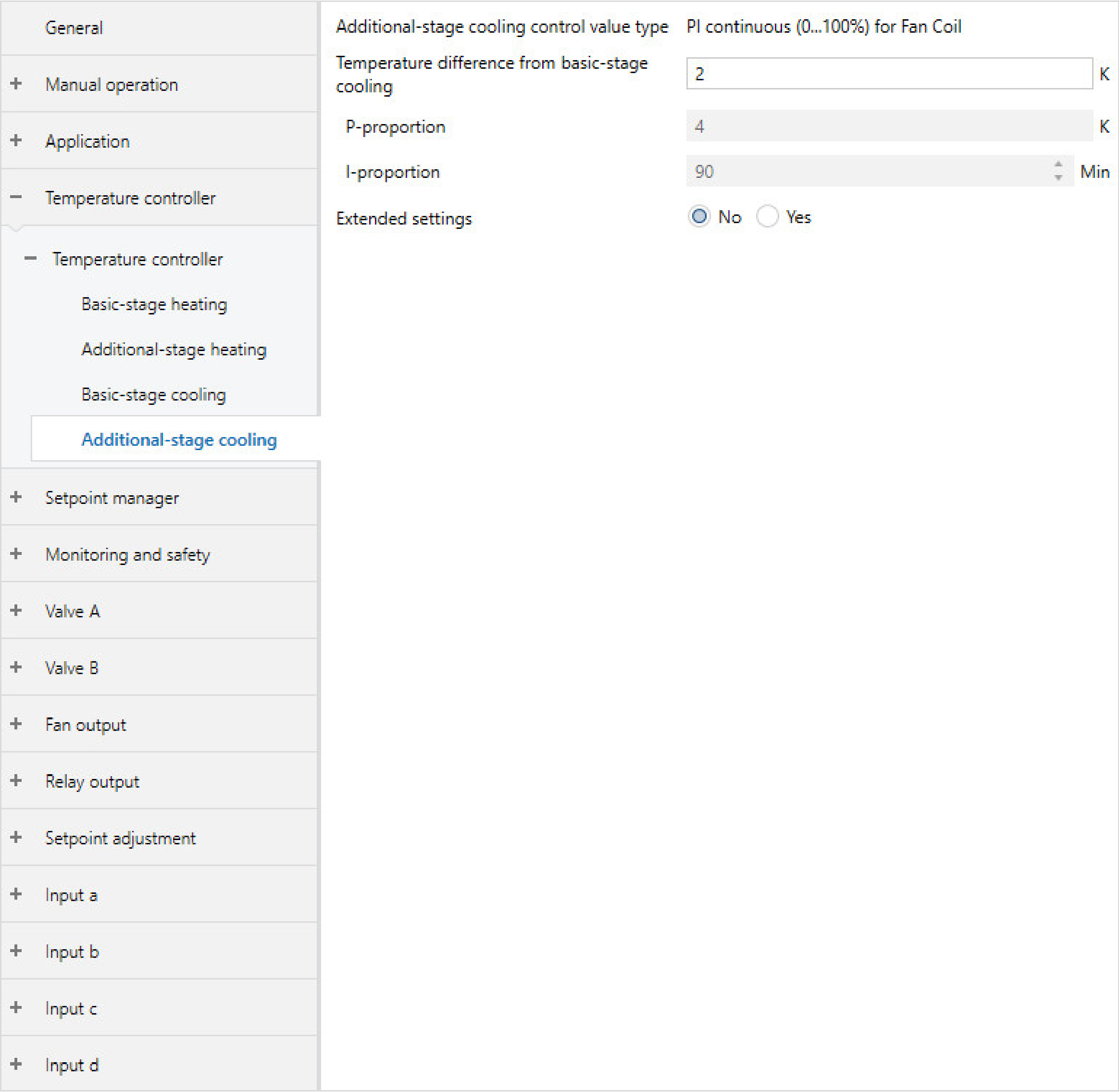
If one of the device inputs is selected here as the input for the limit temperature, this input is no longer used to acquire the room temperature. It is therefore not possible to use the same temperature sensor for the measurement of the room temperature and for the measurement of the limit temperature.

7.5.1.9 Additional-stage cooling parameter window

This window is only visible if the *Deactivated* option has not been selected in the *Additional-stage cooling* parameter in the *Application parameters* parameter window.

This window is deactivated in the actuator mode and is not visible.

The additional-stage cooling of the temperature controller is parameterized in this window. The settings for the control type, limitation of the control range, the behavior on sending the control value and the limit temperature are made.



Additional-stage cooling control value type: PI continuous (0...100%) for Fan Coil

Temperature difference from basic-stage cooling: 2 K

P-proportion: 4 K

I-proportion: 90 Min

Extended settings: ● No ○ Yes

Fig. 40: Additional-stage cooling

7.5.1.9.1 Additional-stage cooling control value type

Options: *2-point 1 bit (On/Off)*
2-point 1 byte (0/100 %)
PI continuous (0…100 %)
PI PWM (On/Off)
PI continuous (0…100 %) for Fan Coil

This parameter is used to specify the control and control value type for the additional-stage heating.

The standard value for the parameter is dependent on the selection in the *Additional-stage cooling* and *Actuate additional-stage cooling via* parameters (*Application parameters* parameter window).

On the selection of one of the physical device outputs for the actuation of the additional-stage heating, the controller has a fixed pre-configuration that cannot be changed. The pre-configured controller type is dependent here on the option selected in the *Additional-stage cooling* parameter.

The only exception is on the selection of *Free configuration*. In this situation, everything can be selected and set freely.

The following table shows the dependencies:

Option selected: Additional-stage cooling	**Pre-configured controller type: Additional-stage cooling control value type**	**Controller type can be changed**
Convector (e.g. radiator)	PI continuous (0…100 %)	No
Area (e.g. cooling ceiling)	PI continuous (0…100 %)	No
Electric heater (in room)	2-point 1 bit (On/Off)	No
Free configuration	PI continuous (0…100 %)	Yes
Fan coil unit: electric heater (in fan coil unit)	2-point 1 bit (On/Off)	No
Fan coil unit: Water heating coil	PI continuous (0…100 %) for Fan Coil	No

The differences between the individual controller types are explained in the following:

- *2-point 1 bit (On/Off)*: 2-point control is the simplest form of control. The controller switches on if the room temperature has dropped below a specific level (temperature setpoint minus hysteresis) and off as soon as a specific value (temperature setpoint plus hysteresis) is exceeded. The switch-on and switch-off commands are sent as 1-bit commands.
  The dependent *Status Control value Additional-stage cooling* group object is enabled as a 1-bit group object.
- *2-point 1 byte (0/100 %)*: This is also two-point control as above. The difference is that switch-on and switch-off commands are sent as 1-byte values (0 %/100 %).
  The dependent *Status Control value Additional-stage cooling* group object is enabled as a 1-byte group object.
- *PI continuous (0…100 %)*: The PI controller adjusts its output value, between 0 % and 100 %, to the difference between the actual value and setpoint and permits exact regulation of the room temperature to the setpoint. It outputs the control value on the bus as a 1-byte value (0...100 %). To reduce the bus load, the control value is only sent if it has changed by a previously specified percentage in relation to the value sent last. In addition, the control value can be sent cyclically.
  The dependent *Status Control value Additional-stage cooling* group object is enabled as a 1-byte group object.
- *PI PWM (On/Off)*: This is also a PI controller. The output is as a 1-bit command. For this purpose the control value calculated is implemented using a pulse-pause ratio.
  The dependent *Status Control value Additional-stage cooling* group object is enabled as a 1-bit group object.
- *PI continuous (0…100 %) for Fan Coil*: The fan coil controller operates like the PI continuous controller. In addition, the fan output is also actuated in the automatic mode corresponding to the control value for the basic-stage heating.
  The dependent *Status Control value Additional-stage cooling* group object is enabled as a 1-byte group object.

> ⓘ **Note**
> For a detailed description of the individual controller types, see Explanation of controller function, Page 365.

7.5.1.9.1.1 2-point 1 bit (On/Off), 2-point 1 byte (0/100%)

The following parameters are enabled if the *2-point 1 bit (On/Off)* or *2-point 1 byte (0/100%)* option has been selected in the *Additional-stage cooling control value type* parameter.

7.5.1.9.1.1.1 DEPENDENT PARAMETER

Temperature difference from basic-stage cooling

Options: *00.0…02.0…25.5*

The temperature difference from basic-stage cooling specifies the value from which or up to which the additional-stage cooling is to be active. If the actual temperature is below the setpoint temperature by the value selected here, the additional stage is active.

This action occurs both if the actual temperature drops below the threshold and if it is already below the threshold.

Example 1:

Temperature difference from basic-stage cooling: 2 K

Setpoint temperature: 23 °C

Actual temperature: 27 °C

Additional stage is active until the actual temperature reaches 25 °C.

Example 2:

Temperature difference from basic-stage cooling: 2 K

Setpoint temperature: 23 °C

Actual temperature: 24 °C

Additional stage is inactive as long as the actual temperature is above 25 °C.

7.5.1.9.1.1.2 DEPENDENT PARAMETER

Use control value for fan automation

This parameter is only visible if the *Free configuration* option has been selected for the *Additional-stage cooling* parameter in the *Application parameters* parameter window.

Options: *No*
Yes

This parameter can be used to specify whether the control value for this stage is also to be used as the control value for the fan automation.

- *No*: The control value is not used for the fan automation
- *Yes*: The control value is used for the fan automation. If this stage is active and the fan is in the automatic mode, the control value is also used as a control value to actuate the fan.

ⓘ **Note**

If the related stage has a free configuration, the device does not know whether the stage actuated is a fan coil unit or not. However, because the fan automation only makes sense for the fan coil unit stages, an assignment must be made here.

If a free configuration is selected for all 4 control stages and none of the stages is also parameterized for fan automation, the fan automation remains without function.

7.5.1.9.1.1.3 DEPENDENT PARAMETER

Extended settings

Options: *No*
Yes

Extended settings can be enabled using this parameter. This parameter is displayed on the selection of the *Yes* option.

7.5.1.9.1.1.3.1 DEPENDENT PARAMETER

Control value direction

This parameter is only visible if the *Via group object* option has been selected for the *Actuate additional-stage cooling via* parameter in the *Application parameters* parameter window.

Options: *Normal*
Inverted

This parameter is used to specify the control value direction if it is only output via a group object. The setting is used to actuate NC (normally closed) or NO (normally opened) valves.

If one of the physical device outputs is used to output the control value, this parameter is not displayed because this setting is then made in the related output stage.

- *Normal*: The control value is output normally.
  Control value On/100 % => telegram Off/0 %
  Control value Off/0 % => telegram On/100 %
- *Inverted*: The control value is output inverted.
  Control value On/100 % => telegram Off/0 %
  Control value Off/0 % => telegram On/100 %

7.5.1.9.1.1.3.2 DEPENDENT PARAMETER

Hysteresis

Options: *0.3…0.5…25.5*

This parameter is used to specify the hysteresis that is to apply to the setpoint to prevent continuous switching of the controller.

- Upper switching point = setpoint + hysteresis
- Lower switching point = setpoint – hysteresis

Heating controller:

- If the actual temperature is below the lower switching point, the controller switches on.
- If the actual temperature is above the upper switching point, the controller switches off.

Cooling controller:

- If the actual temperature is below the lower switching point, the controller switches off.
- If the actual temperature is above the upper switching point, the controller switches on.

7.5.1.9.1.1.3.3 DEPENDENT PARAMETER

Send control value cyclically (0 = cyclical sending disabled)

This parameter is only visible on the selection of the *PI continuous (0…100 %)* or *PI continuous (0...100 %) for Fan Coil* option.

Options: *0…15…60*

This parameter is used to specify the cycle time with which the control value is to be sent.

On the selection of the value 0, cyclic sending is deactivated.

7.5.1.9.1.1.3.4 DEPENDENT PARAMETER

Activate temperature limitation

Options: *No* (default)
Yes

A controller limit temperature can be activated using this parameter. Using the limit temperature, the controller's control value for this stage can be set to 0 on reaching a parameterized temperature. In this way, exceeding (heating) or dropping below (cooling) this temperature can be prevented.

An example of the usage of the limit temperature is a cooling ceiling, where dropping below a specific temperature must be prevented to protect the material of the ceiling against excessive cooling.

- *No*: The limit temperature is deactivated.
- *Yes*: The limit temperature is activated. The following dependent parameters are also displayed.

7.5.1.9.1.1.3.4.1 DEPENDENT PARAMETER

Limit temperature

Options: *1…10…30*

The value set here specifies the limit temperature that is not allowed to be exceeded (heating) or dropped below (cooling). If the temperature reaches this value, the control value is immediately set to 0.

The value set here is compared with the value received via a group object or via one of the physical device inputs (depending on the option selected, in the *Input for temperature limit sensor* parameter).

7.5.1.9.1.1.3.4.2 DEPENDENT PARAMETER

Limit temperature hysteresis

Options: *00.5…01.0…05.0*

The hysteresis on the limit temperature specifies the value by which the limit temperature must be dropped below again (heating) or exceeded (cooling) before the controller becomes active again.

—

7.5.1.9.1.1.3.4.3 DEPENDENT PARAMETER

Input for temperature limit sensor

Options: <u>*Via group object*</u>
Via physical device input a
Via physical device input b
Via physical device input c
Via physical device input d

- *Via group object*: The temperature value is received via a dedicated group object. The dependent *Additional-stage cooling limit temperature* group object is enabled.
- *Via physical device input x*: The temperature value is acquired via a temperature sensor connected (to the selected input).

ⓘ **Note**

A temperature sensor must be actually connected to the temperature input selected and the input for the sensor must have been correctly parameterized, otherwise the limit temperature function does not work.

If one of the device inputs is selected here as the input for the limit temperature, this input is no longer used to acquire the room temperature. It is therefore not possible to use the same temperature sensor for the measurement of the room temperature and for the measurement of the limit temperature.

7.5.1.9.1.2 PI continuous (0…100 %); PI PWM (On/Off), PI continuous (0…100 %) for Fan Coil

The following parameters are enabled if the *PI continuous (0…100 %)*, *PI PWM (On/Off)* or *PI continuous (0…100 %) for Fan Coil* option has been selected in the *Additional-stage cooling control value type* parameter.

—

7.5.1.9.1.2.1 DEPENDENT PARAMETER

Temperature difference from basic-stage cooling

Options: *00.0…<u>02.0</u>…25.5*

The temperature difference from basic-stage cooling specifies the value from which or up to which the additional-stage cooling is to be active. If the actual temperature is below the setpoint temperature by the value selected here, the additional stage is active.

This action occurs both if the actual temperature drops below the threshold and if it is already below the threshold.

Example 1:

Temperature difference from basic-stage cooling: 2 K

Setpoint temperature: 23 °C

Actual temperature: 27 °C

Additional stage is active until the actual temperature reaches 25 °C.

Example 2:

Temperature difference from basic-stage cooling: 2 K

Setpoint temperature: 23 °C

Actual temperature: 24 °C

Additional stage is inactive as long as the actual temperature is above 25 °C.

7.5.1.9.1.2.2 DEPENDENT PARAMETER

P-proportion

Options: *01.0…01.5…10.0*

The standard value depends on the option selected in the *Additional-stage cooling* parameter in the *Application parameters* parameter window.

The P-proportion stands for the proportional range in a control. It fluctuates around the setpoint and in a PI control is used to change the speed of the control. The smaller the value set, the faster the control reacts. However, the value should not be set too small because otherwise there may be a risk of overshoot.

7.5.1.9.1.2.3 DEPENDENT PARAMETER

I-proportion

Options: *0…100…255*

The standard value depends on the option selected in the *Additional-stage cooling* parameter in the *Application parameters* parameter window.

The I-proportion stands for the integral time in a control. The integral proportion causes the room temperature to approach the setpoint slowly and also to reach it finally. Depending on the system type used, the integral time may need to have different values. In principle the following applies: The more sluggish the overall system, the larger the integral time is.

7.5.1.9.1.2.4 DEPENDENT PARAMETER

Use control value for fan automation

This parameter is only visible if the *Free configuration* option has been selected for the *Additional-stage cooling* parameter in the *Application parameters* parameter window.

Options: *No*
Yes

This parameter can be used to specify whether the control value for this stage is also to be used as the control value for the fan automation.

- *No*: The control value is not used for the fan automation
- *Yes*: The control value is used for the fan automation. If this stage is active and the fan is in the automatic mode, the control value is also used as a control value to actuate the fan.

Note

If the related stage has a free configuration, the device does not know whether the stage actuated is a fan coil unit or not. However, because the fan automation only makes sense for the fan coil unit stages, an assignment must be made here.

If a free configuration is selected for all 4 control stages and none of the stages is also parameterized for fan automation, the fan automation remains without function.

7.5.1.9.1.2.5 DEPENDENT PARAMETER

Extended settings

Options: <u>*No*</u>
Yes

Extended settings can be enabled using this parameter. This parameter is displayed on the selection of the *Yes* option.

7.5.1.9.1.2.5.1 DEPENDENT PARAMETER

Control value direction

This parameter is only visible if the *Via group object* option has been selected for the *Actuate additional-stage cooling via* parameter in the *Application parameters* parameter window.

Options: <u>*Normal*</u>
Inverted

This parameter is used to specify the control value direction if it is only output via a group object. The setting is used to actuate NC (normally closed) or NO (normally opened) valves.

If one of the physical device outputs is used to output the control value, this parameter is not displayed because this setting is then made in the related output stage.

- *Normal*: The control value is output normally.
  Control value On/100 % => telegram Off/0 %
  Control value Off/0 % => telegram On/100 %
- *Inverted*: The control value is output inverted.
  Control value On/100 % => telegram Off/0 %
  Control value Off/0 % => telegram On/100 %

7.5.1.9.1.2.5.2 DEPENDENT PARAMETER

Control value difference for sending control value

This parameter is only visible on the selection of the *PI continuous (0…100 %)* or *PI continuous (0...100 %) for Fan Coil* option.

Options: *2 %*
<u>*5 %*</u>
10 %
Only send cyclically

The control values for the PI continuous controller 0…100 % are not sent after each calculation, but when there is a difference in the calculation compared to the last value sent and sending is appropriate. This value difference can be entered here.

7.5.1.9.1.2.5.3 DEPENDENT PARAMETER

Send control value cyclically (0 = cyclical sending disabled)

This parameter is only visible on the selection of the *PI continuous (0…100 %)* or *PI continuous (0...100 %) for Fan Coil* option.

Options: *0…15…60*

This parameter is used to specify the cycle time with which the control value is to be sent.

On the selection of the value 0, cyclic sending is deactivated.

ⓘ **Note**

If the control value is only output via a group object, this value should not be set to 0 because otherwise it will not be ensured that the actuator receives its control value.

In particular, in combination with the *Control value difference for sending control value* parameter and the *Only send cyclically* option that can be selected there, the value 0 is not allowed to be selected. This configuration would mean that the control value is never output.

7.5.1.9.1.2.5.4 DEPENDENT PARAMETER

Cooling PWM cycle

This parameter is only visible on the selection of the *PI PWM (On/Off)* option.

Options: *0…15…60*

Using the value set here, the cycle time for the control value for the PWM signal calculated from the PI controller's control value is specified. Depending on the control value, the selected cycle time is divided into an On and Off signal.

Therefore, a control value output of 33 % with a PWM cycle of 15 min signifies an On phase of five minutes and an Off phase of 10 min.

Note

The value is only sent if the control value changes (from 0 to 1 or vice versa).

At the start of a cycle a 1 is output and, corresponding to the control value, a 0 after the time x.

If the control value is 0 %, on reaching this control value a 0 is output once. The next value is only sent if the control value changes.

Example:
Cooling PWM cycle: 15 min
Control value: 33 %

Times	Sent value
0 min	1
5 min	0
15 min	1
20 min	0
30 min	1
…	…

New control value: 0 %

Times	Sent value
60 min	0
75 min	–
90 min	–
…	…

New control value: 66 %

Times	Sent value
120 min	1
130 min	0
135 min	1
145 min	0
…	…

7.5.1.9.1.2.5.5 Dependent Parameter

Max. control value

Options: *0…<u>100</u>*

The maximum control value from the PI controller specifies the maximum value that the controller outputs. If a maximum value below 255 is selected, then this value is not exceeded even if the controller calculates a higher control value.

7.5.1.9.1.2.5.6 Dependent Parameter

Min. control value (basic load)

Options: *<u>0</u>…100*

The minimum control value from the PI controller specifies the minimum value that the controller outputs. If a minimum value greater than zero is selected, then this value is not dropped below even if the controller calculates a lower control value.

This parameter is used to set a basic load, e.g. for the operation of floor heating. Even if the controller calculates the control value zero, heating medium flows through the floor heating to prevent the floor from cooling down completely.

In the *Temperature controller* parameter window it can be set whether this basic load is to be active permanently or is to be switched via the *Basic load* group object. In addition, it can be set here whether the basic load is also to be active if the controller is switched off.

7.5.1.9.1.2.5.7 Dependent Parameter

Activate temperature limitation

Options: *<u>No</u>*
Yes

A controller limit temperature can be activated using this parameter. Using the limit temperature, the controller's control value for this stage can be set to 0 on reaching a parameterized temperature. In this way, exceeding (heating) or dropping below (cooling) this temperature can be prevented.

An example of the usage of the limit temperature is a cooling ceiling, where dropping below a specific temperature must be prevented to protect the material of the ceiling against excessive cooling.

- *No*: The limit temperature is deactivated.
- *Yes*: The limit temperature is activated. The following dependent parameters are also displayed.

7.5.1.9.1.2.5.7.1 Dependent Parameter

Limit temperature

Options: *1…<u>10</u>…30*

The value set here specifies the limit temperature that is not allowed to be exceeded (heating) or dropped below (cooling). If the temperature reaches this value, the control value is immediately set to 0.

The value set here is compared with the value received via a group object or via one of the physical device inputs (depending on the option selected, in the *Input for temperature limit sensor* parameter).

7.5.1.9.1.2.5.7.2 Dependent Parameter

Limit temperature hysteresis

Options: *00.5…<u>01.0</u>…05.0*

The hysteresis on the limit temperature specifies the value by which the limit temperature must be dropped below again (heating) or exceeded (cooling) before the controller becomes active again.

7.5.1.9.1.2.5.7.3 Dependent Parameter

I-proportion on limitation

This parameter is only visible if the *PI continuous (0…100 %)*; *PI PWM (On/Off)* or *PI continuous (0…100 %) for Fan Coil* option has been selected in the *Additional-stage cooling control value type* parameter.

Options: *<u>Freeze</u>*
Reset

This parameter decides what is to happen to the I-proportion on reaching the limit temperature.

- *Freeze*: The I-proportion is frozen at the actual value. As soon as the controller is active again, it continues to operate with the same I-proportion as before reaching the limit.
- *Reset*: The I-proportion is reset to 0. Once the controller becomes active again, the I-proportion starts at 0.

7.5.1.9.1.2.5.7.4 DEPENDENT PARAMETER

Input for temperature limit sensor

Options: <u>*Via group object*</u>
Via physical device input a
Via physical device input b
Via physical device input c
Via physical device input d

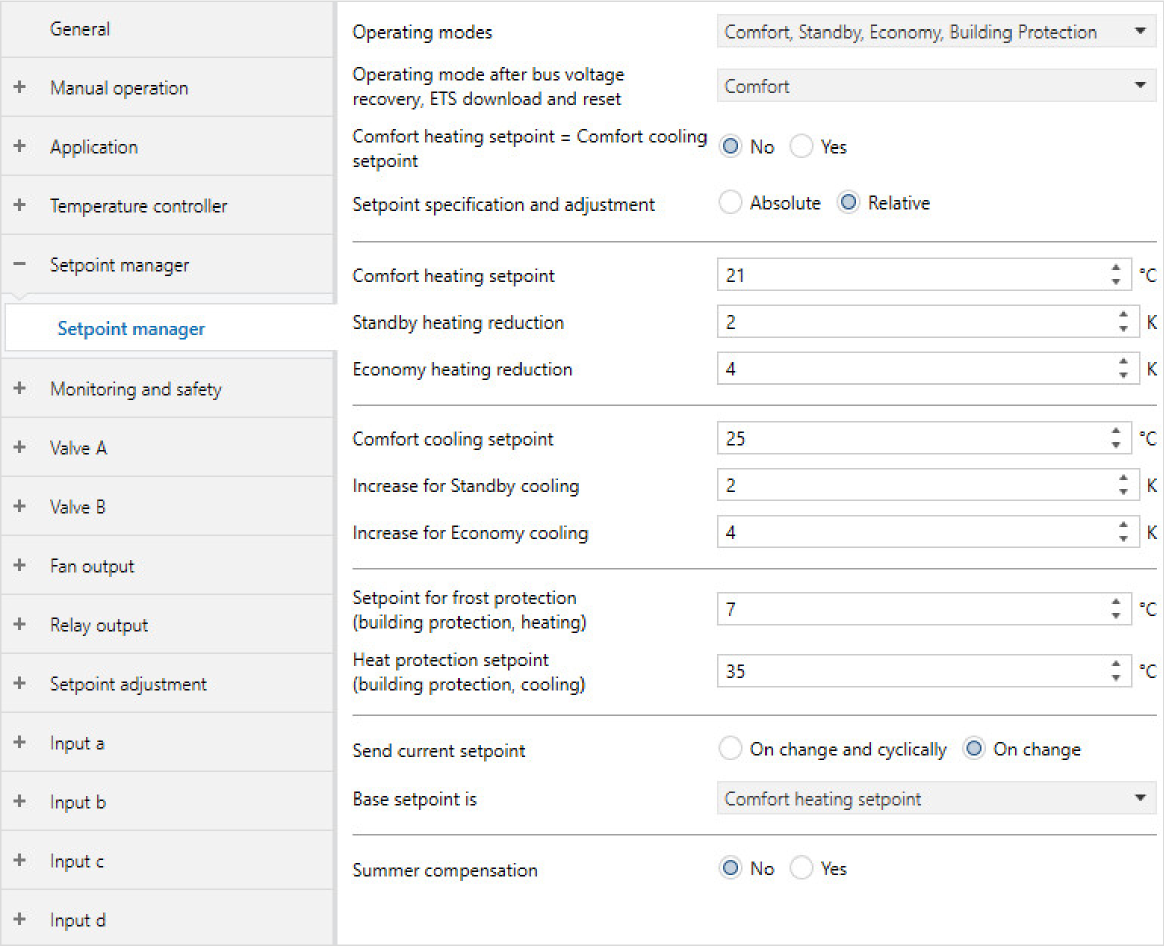
- *Via group object*: The temperature value is received via a dedicated group object. The dependent *Additional-stage cooling limit temperature* group object is enabled.
- *Via physical device input x*: The temperature value is acquired via a temperature sensor connected (to the selected input).

ⓘ **Note**

A temperature sensor must be actually connected to the temperature input selected and the input for the sensor must have been correctly parameterized, otherwise the limit temperature function does not work.

If one of the device inputs is selected here as the input for the limit temperature, this input is no longer used to acquire the room temperature. It is therefore not possible to use the same temperature sensor for the measurement of the room temperature and for the measurement of the limit temperature.

7.6 Setpoint manager parameter window



Operating modes: Comfort, Standby, Economy, Building Protection
Operating mode after bus voltage recovery, ETS download and reset: Comfort
Comfort heating setpoint = Comfort cooling setpoint: ● No ○ Yes
Setpoint specification and adjustment: ○ Absolute ● Relative

Comfort heating setpoint: 21 °C
Standby heating reduction: 2 K
Economy heating reduction: 4 K

Comfort cooling setpoint: 25 °C
Increase for Standby cooling: 2 K
Increase for Economy cooling: 4 K

Setpoint for frost protection (building protection, heating): 7 °C
Heat protection setpoint (building protection, cooling): 35 °C

Send current setpoint: ○ On change and cyclically ● On change
Base setpoint is: Comfort heating setpoint

Summer compensation: ● No ○ Yes

2CDC078019F0218

Fig. 41: Setpoint manager parameter window

7.6.1 Operating modes

Options: <u>*Comfort, Standby, Economy, Building Protection*</u>
Comfort, Standby, Building Protection
Comfort, Building Protection

This parameter is used to select which operating modes are to be used. Depending on the selection, the operating modes not listed are removed.

One possible application for the restriction of the operating modes used is buildings in which, e.g. Economy is not used because the change is always between Comfort and Standby.

If the device is requested via a group object to change to one of the operating modes not available, the device remains in or changes instead to Comfort.

Explanation of the operating modes:

- *Comfort*: The room is used actively by a person/persons. The setpoint temperature is set correspondingly. In the Comfort mode the controller actively attempts to reach the room temperature specified (by heating or cooling).
- *Standby*: On a change to Standby, the temperature is allowed to drop (heating) or increase (cooling) to a specified value.
  Only once this temperature is reached is the heating or cooling activated again. Typically the setpoints are 2-3 °C below/above the Comfort setpoint temperature.
  The Standby mode is also used to increase/reduce the room temperature after a nighttime reduction (Economy) and expected imminent change to the Comfort mode such that it does not take too long to reach the Comfort temperatures.
  The change between Comfort and Standby can be made using the *Operating mode* group object, or, with presence detection in the room, via the *Presence detector (master)* group object. The reception of the presence value always results in a change to Comfort.
- *Economy*: This is also called nighttime reduction. Here the temperatures are allowed to drop (heating) or increase (cooling) to a different, lower/higher setpoint. The purpose is to obtain further energy savings during extended periods without use (e.g. overnight or during the weekend) because less energy must be used to maintain this temperature. The setpoints for Economy are typically 2-3 °C below/above the values for the Standby setpoint temperature.
  The change between Comfort and Standby can be made using the *Operating mode* group object, or, with presence detection in the room, via the *Presence detector (master)* group object. The reception of the presence value always results in a change to Comfort.

7.6.2 Operating mode after bus voltage recovery, ETS download and reset

Options: *Comfort*
Standby
Economy
Building Protection

The parameter defines which operating mode is to apply after bus voltage recovery, ETS download and reset. The operating mode remains active until a new operating mode is set, e.g. via the *Operating mode* group object.

ⓘ **Note**

This operating mode should be defined during the planning phase. If the operating mode is defined incorrectly, there may be a loss of comfort or increased energy consumption.

7.6.3 Comfort heating setpoint = Comfort cooling setpoint

This parameter is enabled if the controller has been parameterized both for heating and for cooling. For this purpose, *Deactivated* must not be selected for the parameters *Basic-stage heating* and *Basic-stage cooling* in the *Application parameters* parameter window.

Options: *No* (default)
Yes

This parameter defines how the comfort values for heating and cooling depend on each other.

- *No*: Two separate comfort setpoints are used for heating and cooling. The related active setpoint is output via the *Current setpoint* object. The changeover between heating and cooling is undertaken using the method defined in the *Application parameters* parameter window in the *Heating/Cooling changeover* parameter. On the selection of the *Automatically* option, the changeover between heating and cooling is dependent on the absolute temperatures set for Comfort heating/cooling.
- *Yes*: The device has one and the same setpoint for heating and cooling in the Comfort mode. The changeover to heating takes place on dropping below the setpoint minus the hysteresis. The changeover to cooling takes place on exceeding the setpoint plus the hysteresis. The hysteresis is parameterizable. The *Comfort heating setpoint* and *Comfort cooling setpoint* parameters are replaced by the *Setpoint for Comfort heating and cooling* parameter. In addition, the *Hysteresis for Toggle heating/cooling* parameter is displayed.

7.6.3.1 Selection of No

—

7.6.3.1.1 DEPENDENT PARAMETER

Comfort heating setpoint

This parameter is only visible if the *Deactivated* option has not been selected for the *Basic-stage heating* parameter in the *Application parameters* parameter window, and the *No* option has been selected for the *Comfort heating setpoint = Comfort cooling setpoint* parameter.

Options: *10…21…40*

This value defines the setpoint for the heating comfort temperature. If the device is in the type of operation heating and is changed to the Comfort operating mode, the device regulates to this temperature.

—

7.6.3.1.2 DEPENDENT PARAMETER

Comfort cooling setpoint

This parameter is only visible if the *Deactivated* option has not been selected for the *Basic-stage cooling* parameter in the *Application parameters* parameter window, and the *No* option has been selected for the *Comfort heating setpoint = Comfort cooling setpoint* parameter.

Options: *10…25…40*

This value defines the setpoint for the comfort cooling temperature. If the device is the type of operation cooling and is changed to the Comfort operating mode, the device regulates to this temperature.

7.6.3.2 Selection of Yes

—

7.6.3.2.1 DEPENDENT PARAMETER

Hysteresis for Toggle heating/cooling

This parameter is only visible if the *Yes* option has been selected for the *Comfort heating setpoint = Comfort cooling setpoint* parameter.

Options: *00.5…02.0…10.0*

The parameter defines the hysteresis for the changeover between heating and cooling. If the room temperature exceeds the setpoint temperature plus hysteresis, the changeover is to cooling. If the room temperature drops below the setpoint temperature minus hysteresis, the changeover is to heating.

ⓘ **Note**

A change between heating and cooling is only possible in the Comfort mode.

—

7.6.3.2.2 DEPENDENT PARAMETER

Setpoint for Comfort heating and cooling

This parameter is only visible if the *Yes* option has been selected for the *Comfort heating setpoint = Comfort cooling setpoint* parameter.

Options: *10…21…40*

This value defines the setpoint for the comfort temperature for heating and cooling. If the operating mode is changed to Comfort, the device regulates to this temperature in both types of operation heating and cooling.

7.6.4 Setpoint specification and adjustment

Options: *Absolute*
Relative

This parameter is used to set the manner in which the setpoints are configured, as well as whether this can be changed.

- *Absolute*: Absolute values are used to enter the values for Standby and Economy heating and Standby and Economy cooling. I.e. the setpoint that is to become active on the activation of the related operating mode is specified. It is possible to change the values parameterized here using a dedicated group object. As such each operating mode setpoint can be changed independent of all other values. There is no common change by the basic setpoint.
  The dependent objects *Comfort heating setpoint*, *Standby heating setpoint*, *Economy heating setpoint*, *Building protection heating setpoint*, *Comfort cooling setpoint*, *Standby cooling setpoint*, *Economy cooling setpoint* and *Building Protection cooling setpoint* are displayed.
  The dependent parameters *Standby heating setpoint*, *Economy heating setpoint*, *Standby cooling setpoint* and *Economy cooling setpoint* are displayed.

ⓘ **Note**

The values entered must, according to the type of operation (heating or cooling), be higher (cooling) or lower (heating) than the Comfort setpoint:

Comfort heating setpoint > Standby heating setpoint > Economy heating setpoint > Setpoint for frost protection (building protection, heating)

Comfort cooling setpoint < Standby cooling setpoint < Economy cooling setpoint < Heat protection setpoint (building protection, cooling)

Failure to observe the sequence for the values may result in incorrect room temperature regulation.

- *Relative*: The setpoints for Standby and Economy heating and Standby and Economy cooling are entered as values relative to the related Comfort heating or Comfort cooling setpoint. It is only possible to change all values at the same time using the *Base setpoint* group object. The base setpoint is defined using the *Base setpoint is* parameter. Depending on the value received via the *Base setpoint* group object, all other values are changed to suit the reduction or increase parameterized.
  It is not possible to change the setpoint for heat protection or the setpoint for frost protection via KNX using this method.
  The dependent *Base setpoint* group object is displayed.
  The dependent parameters *Standby heating reduction*, *Economy heating reduction*, *Increase for Standby cooling*, *Increase for Economy cooling* and *Base setpoint is* are displayed.

7.6.4.1 Selection of Absolute

—

7.6.4.1.1 Dependent Parameter

Standby heating setpoint

This parameter is only visible if the device has been parameterized for heating and the *Deactivated* option has not been selected for the *Basic-stage heating* parameter in the *Application parameters* parameter window, and the *Setpoint specification and adjustment* parameter has been parameterized with the *Absolute* option.

Options: *10…19…40*

This parameter is used to set the temperature that is to apply in the Standby operating mode in the type of operation heating.

ⓘ **Note**

The temperature stated here must be lower than the temperature selected in the *Comfort heating setpoint* or *Setpoint for Comfort heating and cooling* parameter. A temperature that is at least 2 °C lower is recommended.

The controller does not change the type of operation to reach this temperature, instead it ensures this temperature is not dropped below on a reduction in the actual temperature.

—

7.6.4.1.2 Dependent Parameter

Economy heating setpoint

This parameter is only visible if the device has been parameterized for heating and the *Deactivated* option has not been selected for the *Basic-stage heating* parameter in the *Application parameters* parameter window, and the *Setpoint specification and adjustment* parameter has been parameterized with the *Absolute* option.

Options: *10…17…40*

This parameter is used to set the temperature that is to apply in the Economy operating mode in the type of operation heating.

ⓘ **Note**

The temperature stated here must be lower than the temperature selected in the *Standby heating setpoint* parameter. A temperature that is at least 2 °C is recommended.

The controller does not change the type of operation to reach this temperature, instead it ensures this temperature is not exceeded on an increase in the actual temperature.

7.6.4.1.3 DEPENDENT PARAMETER

Standby cooling setpoint

This parameter is only visible if the device has been parameterized for cooling and the *Deactivated* option has not been selected for the *Basic-stage cooling* parameter in the *Application parameters* parameter window, and the *Setpoint specification and adjustment* parameter has been parameterized with the *Absolute* option.

Options: *10…19…40*

This parameter is used to set the temperature that is to apply in the Standby operating mode in the type of operation cooling.

ⓘ **Note**

The temperature stated here must be higher than the temperature selected in the *Comfort cooling setpoint* or *Setpoint for Comfort heating and cooling* parameter. A temperature that is at least 2 °C higher is recommended.

The controller does not change the type of operation to reach this temperature, instead it ensures this temperature is not exceeded on an increase in the actual temperature.

7.6.4.1.4 DEPENDENT PARAMETER

Economy cooling setpoint

This parameter is only visible if the device has been parameterized for cooling and the *Deactivated* option has not been selected for the *Basic-stage cooling* parameter in the *Application parameters* parameter window, and the *Setpoint specification and adjustment* parameter has been parameterized with the *Absolute* option.

Options: *10…17…40*

This parameter is used to set the temperature that is to apply in the Economy operating mode in the type of operation cooling.

ⓘ **Note**

The temperature stated here must be higher than the temperature selected in the *Standby cooling setpoint* parameter. A temperature that is at least 2 °C higher is recommended.

The controller does not change the type of operation to reach this temperature, instead it ensures this temperature is not exceeded on an increase in the actual temperature.

7.6.4.2 Selection of Relative

—

7.6.4.2.1 Dependent Parameter

Standby heating reduction

This parameter is only visible if the device has been parameterized for heating and the *Deactivated* option has not been selected for the *Basic-stage heating* parameter in the *Application parameters* parameter window, and the *Setpoint specification and adjustment* parameter has been parameterized with the *Relative* option.

Options: *0…2…15*

This parameter is used to set the temperature that is to apply in the Standby operating mode in the type of operation heating. This is defined here as the reduction in relation to the Comfort heating setpoint.

ⓘ **Note**

The controller does not change the type of operation to reach this temperature, instead it ensures this temperature is not exceeded on an increase in the actual temperature.

—

7.6.4.2.2 Dependent Parameter

Economy heating reduction

This parameter is only visible if the device has been parameterized for heating and the *Deactivated* option has not been selected for the *Basic-stage heating* parameter in the *Application parameters* parameter window, and the *Setpoint specification and adjustment* parameter has been parameterized with the *Relative* option.

Options: *0…4…15*

This parameter is used to set the temperature that is to apply in the Economy operating mode in the type of operation heating. This is defined here as the reduction in relation to the Comfort heating setpoint.

ⓘ **Note**

The controller does not change the type of operation to reach this temperature, instead it ensures this temperature is not exceeded on an increase in the actual temperature.

—

7.6.4.2.3 DEPENDENT PARAMETER

Increase for Standby cooling

This parameter is only visible if the device has been parameterized for cooling and the *Deactivated* option has not been selected for the *Basic-stage cooling* parameter in the *Application parameters* parameter window, and the *No* option has been selected for the *Comfort heating setpoint = Comfort cooling setpoint* parameter.

Options: *0…2…15*

This value defines the setpoint for the comfort cooling temperature. If the device is the type of operation cooling and is changed to the Comfort operating mode, the device regulates to this temperature.

ⓘ **Note**
The controller does not change the type of operation to reach this temperature, instead it ensures this temperature is not exceeded on an increase in the actual temperature.

—

7.6.4.2.4 DEPENDENT PARAMETER

Increase for Economy cooling

This parameter is only visible if the device has been parameterized for cooling and the *Deactivated* option has not been selected for the *Basic-stage cooling* parameter in the *Application parameters* parameter window, and the *Setpoint specification and adjustment* parameter has been parameterized with the *Relative* option.

Options: *0…4…15*

This parameter is used to set the temperature that is to apply in the Economy operating mode in the type of operation cooling. This is defined here as the increase in relation to the comfort cooling setpoint.

ⓘ **Note**
The controller does not change the type of operation to reach this temperature, instead it ensures this temperature is not exceeded on an increase in the actual temperature.

7.6.4.2.5 DEPENDENT PARAMETER

Base setpoint is

This parameter is only visible if the *Setpoint specification and adjustment* parameter has been parameterized with the *Relative* option.

Options: *Comfort heating setpoint*
Comfort cooling setpoint
Mean value between Comfort heating and cooling

If the device has been configured only for the type of operation heating or the type of operation cooling, the base setpoint is automatically the same as the Comfort setpoint for this stage and can also not be changed.

This parameter is used to define which value corresponds to the base setpoint. It is possible to change the setpoints parameterized for Comfort, Standby and Economy via the KNX bus using the base setpoint. Depending on the option selected, the new base setpoint changes the value selected directly. All other values are changed according to their relative distance from this value. The values parameterized are overwritten with this change.

ⓘ **Note**

It is not possible to change the setpoints for frost protection and heat protection using the base setpoint.

If the basic-stage heating or the basic-stage cooling has been deactivated, the base setpoint is fixed to the other comfort value for the existing type of operation.

7.6.5 Setpoint for frost protection (building protection, heating)

This parameter is only visible if the device has been parameterized for heating and the *Deactivated* option has not been selected for the *Basic-stage heating* parameter in the *Application parameters* parameter window.

Options: *5…7…15*

This parameter is used to set the temperature that is to apply in the Building Protection operating mode in the type of operation heating.

ⓘ **Note**

This setpoint temperature also becomes active if the controller receives the information "Window open", or is deactivated via the *Request On/Off (Master)* group object.

The controller does not change the type of operation to reach this temperature, instead it ensures this temperature is not dropped below on a reduction in the actual temperature.

ⓘ **Note**

This setpoint is used to protect the building and the installation against damage, and at the same time to prevent unnecessary energy wastage. For this reason the temperature should not be selected too low, and also not too high.

An example of this aspect is the opening of a window: As long as the window is open, further heating will waste energy. However, if the outside temperature is very low (e.g. 0 °C), the room temperature will continuously approach this temperature. Here there is a risk of the installation freezing and also frost damage to the equipment in the room. To prevent this situation from arising, the controller becomes active again on reaching the temperature set and attempts to prevent dropping below this temperature.

However, if the setpoint for frost protection is selected too high, the controller starts this attempt much earlier, e.g. at a time that is acceptable during normal airing, and wastes unnecessary energy.

7.6.6 Heat protection setpoint (building protection, cooling)

This parameter is only visible if the device has been parameterized for cooling and the *Deactivated* option has not been selected for the *Basic-stage cooling* parameter in the *Application parameters* parameter window.

Options: *27…35…45*

This parameter is used to set the temperature that is to apply in the Building Protection operating mode in the type of operation cooling.

> ⓘ **Note**
>
> This setpoint temperature also becomes active if the controller receives the information "Window open", "Fill level alarm" or "Dew point alarm", or is deactivated via the *Request On/Off (Master)* group object.
>
> The controller does not change the type of operation to reach this temperature, instead it ensures this temperature is not exceeded on an increase in the actual temperature.

> ⓘ **Note**
>
> This setpoint is used to protect the building and the installation against damage, and at the same time to prevent unnecessary energy wastage. For this reason the temperature should not be selected too high, and also not too low.
>
> An example of this aspect is the opening of a window: As long as the window is open, further cooling will waste energy. However, if the outside temperature is very high (e.g. 50 °C), the room temperature will continuously approach this temperature. Here there is a risk of persons becoming too hot and also damage to the installation and the equipment in the room. To prevent this situation from arising, the controller becomes active again on reaching the temperature set and attempts to prevent exceeding this temperature.
>
> However, if the setpoint for heat protection is selected too high, the controller starts this attempt much earlier, e.g. at a time that is acceptable on opening a window, and wastes unnecessary energy.

7.6.7 Send current setpoint

Options: *On change and cyclically*
On change

This parameter is used to define when the setpoint currently valid is to be sent via the *Current setpoint* group object.

—

7.6.7.1 DEPENDENT PARAMETER

Send current setpoint cyclically

This parameter is only visible if the *On change and cyclically* option has been selected in the *Send current setpoint* parameter.

Options: *00:05…00:15…04:00*

The cycle time with which the current setpoint is to be sent is specified here.

7.6.8 Summer compensation

This parameter is only visible if the device has been parameterized for cooling and the *Deactivated* option has not been selected for the *Basic-stage cooling* parameter in the *Application parameters* parameter window.

Options:	*No* *Yes*

The summer compensation in the device can be activated using this parameter. The summer compensation is used to obtain energy savings by increasing the setpoint depending on the outside temperature to prevent large temperature differences between room and outside temperature and the related risk of a heat shock.

> **Note**
> Information about the function of the summer compensation

- *No*: The summer compensation is deactivated
- *Yes*: The summer compensation is activated. The dependent group objects *Outside temperature for summer compensation* and *Summer compensation active/inactive* are displayed. The dependent parameters *(Lower) starting temperature for summer compensation*, *Setpoint temperature offset when summer compensation starts*, *(Upper) escape temperature for summer compensation* and *Setpoint temperature offset when summer compensation ends* are displayed.

—

7.6.8.1 DEPENDENT PARAMETER

(Lower) starting temperature for summer compensation

This parameter is only visible if the *Yes* option has been selected for the *Summer compensation* parameter.

Options: *10…21…50*

—

7.6.8.2 DEPENDENT PARAMETER

Setpoint temperature offset when summer compensation starts

Options: *00.0…12.7*

—

7.6.8.3 DEPENDENT PARAMETER

(Upper) escape temperature for summer compensation

Options: *10…32…50*

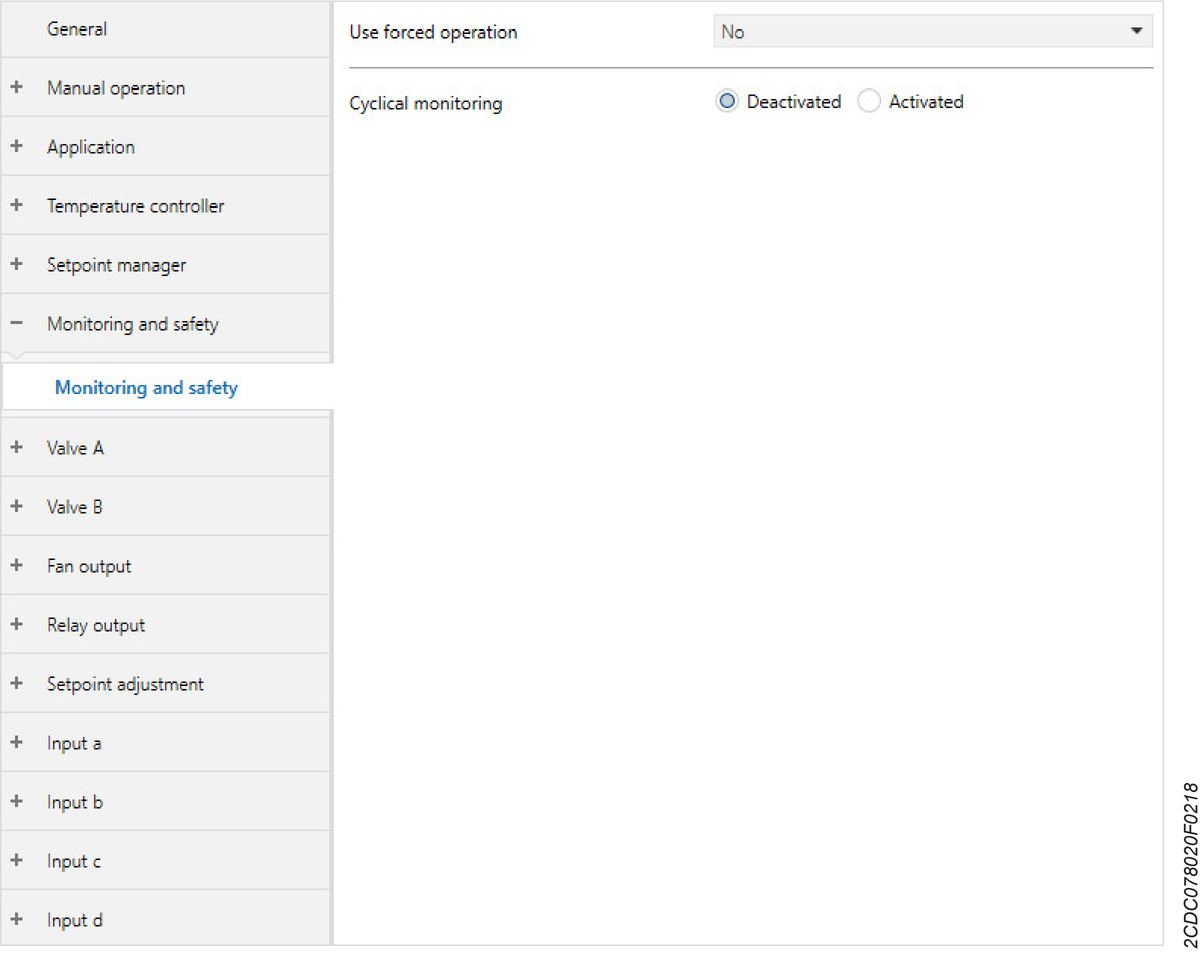
—

7.6.8.4 DEPENDENT PARAMETER

Setpoint temperature offset when summer compensation ends

Options: *0…06.0…12.7*

7.7 Monitoring and safety parameter window



Use forced operation: No

Cyclical monitoring: ● Deactivated ○ Activated

Fig. 42: Monitoring and safety parameter window

7.7.1 Use forced operation

Options: <u>No</u>
Forced operation 1 bit; 1 active
Forced operation 1 bit; 0 active
Forced operation 2 bit

The usage of forced operation can be activated using this parameter. In addition, the selection of the parameter defines which type of forced operation is used.

The forced operation is used to place the outputs on the device in a pre-defined state by switching a 1- or 2-bit group object. Forced operation overrides the normal control of the device (controller, value specifications via group objects). For the device to function normally, forced operation must be actively disabled.

- *Forced operation 1 bit; 1 active*: Forced operation is enabled. The dependent group object *Forced operation 1 bit* is activated.
  Forced operation is activated on receiving a "1" via this group object. If a "0" is received, forced operation is deactivated.
  The dependent parameters *Control value*, *Fan output*, *Relay output* are enabled.
- *Forced operation 1 bit; 0 active*: Forced operation is enabled. The dependent group object *Forced operation 1 bit* is activated.
  Forced operation is activated on receiving a "0" via this group object. If a "1" is received, forced operation is deactivated.
  The dependent parameters *Control value*, *Fan output*, *Relay output* are enabled.
- *Forced operation 2 bit*: Forced operation is enabled. The dependent group object *Forced operation 2 bit* is activated.
  The dependent parameters *Control value for forced operation ON*, *Fan output for forced operation ON*, *Relay output for forced operation ON*, *Control value for forced operation OFF*, *Fan output for forced operation OFF* and *Relay output for forced operation OFF* are enabled.

Note

With forced operation 2 bit there can be two forced operation states (forced operation On and forced operation Off). These states are activated using the 2-bit group object. The first bit defines whether the forced operation is active (bit 1 (high) = 1) or inactive (bit 1 (high) = 0), the second bit decides on the Off (bit 2 (low) = 0) or On (bit 2 (low) = 1) state.

Value	Bit 1	Bit 0	Status
0	0	0	Inactive
1	0	1	Inactive
2	1	0	Forced OFF
3	1	1	Forced ON

Table 31: Forced operation states

For information on the priority of the forced operation in comparison to the other properties of the device, see .

Note

The state of the forced operation is saved on bus voltage failure and retrieved again on bus voltage recovery. If forced operation was active on bus voltage failure, it is also active after bus voltage recovery.

Note

Forced operation is deactivated on an ETS reset.

Forced operation overrides the outputs and places them in a defined state. However, this action has no effect on the control values sent by the controller via the bus or the master/slave communication; this communication continues to take place.
So that an actuator actuated by the controller in this device behaves the same, forced operation must be correspondingly parameterized also on this device and it must be linked to the same group address.

7.7.1.1 Forced operation dependent parameters

The following parameters are available with forced operation activated. On the usage of the *Forced operation 2 bit* option, these parameters are available twice, once for the ON state and once for the OFF state.

7.7.1.1.1 Selection of Controller

The following parameters are visible if the *Controller* option has been selected in the *Device function* parameter.

—

7.7.1.1.1.1 DEPENDENT PARAMETER

Control value / Control value for forced operation ON / Control value for forced operation OFF

Options: *0…100*

This parameter is used to specify the control value that is to apply with forced operation active (for 2-bit in the related state, ON or OFF).

The control value refers only to the valve for the currently active type of operation (heating or cooling).

ⓘ **Note**

If, in the controller mode, both the basic and additional stage are output via the valve outputs (e.g. basic-stage heating = valve A; additional-stage heating = valve B), the value set here is converted into a control value for both stages. Here the range 0…50 % specifies the control value for the basic stage and the range from 51…100 % the control value for the additional stage, if the control value for the basic stage is 100 % at the same time.

Example:

Control value on forced operation	Basic-stage control value	Additional-stage control value
0 %	0 %	0 %
1 %	2 %	0 %
25 %	50 %	0 %
50 %	100 %	0 %
51 %	100 %	2 %
75 %	100 %	50 %
100 %	100 %	100 %

Table 32: Control values

7.7.1.1.1.2 DEPENDENT PARAMETER

Fan output / Fan output for forced operation ON / Fan output for forced operation OFF

This parameter only applies to:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.4.1.1

Options: *Unchanged*
Applies control value
1
2
3

This parameter is used to specify the fan speed that is to apply with forced operation active (for 2-bit in the related state, ON or OFF).

- *Unchanged*: The same fan speed as before the activation of the forced operation applies.
- *Applies control value*: The speed is dependent on the valve control value. The automatic mode is active.
- *1*: The fan runs at speed 1.
- *2*: The fan runs at speed 2.
- *3*: The fan runs at speed 3.

7.7.1.1.1.3 DEPENDENT PARAMETER

Fan output / Fan output for forced operation ON / Fan output for forced operation OFF

This parameter only applies to:

- FCC/S 1.3.1.1
- FCC/S 1.3.1.1
- FCC/S 1.5.1.1
- FCC/S 1.5.2.1

Options: *Unchanged*
Applies control value
33 %
66 %
100 %

This parameter is used to specify the fan speed that is to apply with forced operation active (for 2-bit in the related state, ON or OFF).

- *Unchanged*: The same fan speed as before the activation of the forced operation applies.
- *Applies control value*: The speed is dependent on the valve control value. The automatic mode is active.
- *33 %*: The fan runs at speed 33 %.
- *66 %*: The fan runs at speed 66 %.
- *100 %*: The fan runs at speed 100 %.

7.7.1.1.1.4 DEPENDENT PARAMETER

Relay output / Relay output for forced operation ON / Relay output for forced operation OFF

This parameter does not apply to FCC/S 1.4.1.1.

Options: *Unchanged*
On
Off

This parameter is used to specify the relay state that is to apply with forced operation active (for 2-bit in the related state, ON or OFF).

- *Unchanged*: The relay remains in its current position if forced operation is activated.
- *On*: The relay is switched on if forced operation is activated.
- *Off*: The relay is switched off if forced operation is activated.

ⓘ **Note**

After forced operation has been disabled, the control values specified by the controller apply again directly.

The fan changes to the automatic mode on the deactivation of forced operation.

During forced operation the device continues to receive group objects via the bus, however it does not react to them as long as they do not have a higher priority than forced operation. The device therefore continues to work normally after forced operation is disabled.

7.7.1.1.2 Selection of actuator device

The following parameters are visible if the *Actuator device* option has been selected in the *Device function* parameter.

7.7.1.1.2.1 DEPENDENT PARAMETER

Control value / Control value for forced operation ON / Control value for forced operation OFF

Options: *0…100*

This parameter is used to specify the control value that is to apply with forced operation active (for 2-bit in the related state, ON or OFF).

The control value refers only to the valve for the currently active type of operation (heating or cooling).

ⓘ **Note**

If, in the controller mode, both the basic and additional stage are output via the valve outputs (e.g. basic-stage heating = valve A; additional-stage heating = valve B), the value set here is converted into a control value for both stages. Here the range 0…50 % specifies the control value for the basic stage and the range from 51…100 % the control value for the additional stage, if the control value for the basic stage is 100 % at the same time.

Example:

Control value on forced operation	Basic-stage control value	Additional-stage control value
0 %	0 %	0 %
1 %	2 %	0 %
25 %	50 %	0 %
50 %	100 %	0 %
51 %	100 %	2 %
75 %	100 %	50 %
100 %	100 %	100 %

Table 33: Control values

7.7.1.1.2.2 DEPENDENT PARAMETER

Fan output / Fan output for forced operation ON / Fan output for forced operation OFF

This parameter only applies to:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.2.1.1
- FCC/S 1.2.1.1
- FCC/S 1.4.1.1

Options:	*Unchanged* *Applies control value* *1* *2* *3*

This parameter is used to specify the fan speed that is to apply with forced operation active (for 2-bit in the related state, ON or OFF).

- *Unchanged*: The same fan speed as before the activation of the forced operation applies.
- *Applies control value*: The speed is dependent on the valve control value. The automatic mode is active.
- *1*: The fan runs at speed 1.
- *2*: The fan runs at speed 2.
- *3*: The fan runs at speed 3.

ⓘ **Note**

The *Applies control value* option is only available if it has not been deactivated in the *Enable automatic mode based on control value* parameter in the *Fan output* window.

7.7.1.1.2.3 Dependent Parameter

Fan output / Fan output for forced operation ON / Fan output for forced operation OFF

This parameter only applies to:

- FCC/S 1.3.1.1
- FCC/S 1.3.2.1
- FCC/S 1.5.1.1
- FCC/S 1.5.2.1

Options: *Unchanged*
Applies control value
33 %
66 %
100 %

This parameter is used to specify the fan speed that is to apply with forced operation active (for 2-bit in the related state, ON or OFF).

- *Unchanged*: The same fan speed as before the activation of the forced operation applies.
- *Applies control value*: The speed is dependent on the valve control value. The automatic mode is active.
- *33 %*: The fan runs at speed 33 %.
- *66 %*: The fan runs at speed 66 %.
- *100 %*: The fan runs at speed 100 %.

ⓘ **Note**

The *Applies control value* option is only available if it has not been deactivated in the *Enable automatic mode based on control value* parameter in the *Fan output* window.

7.7.1.1.2.4 Dependent Parameter

Relay output / Relay output for forced operation ON / Relay output for forced operation OFF

This parameter does not apply to FCC/S 1.4.1.1.

Options: *Unchanged*
On
Off

This parameter is used to specify the relay state that is to apply with forced operation active (for 2-bit in the related state, ON or OFF).

- *Unchanged*: The relay remains in its current position if forced operation is activated.
- *On*: The relay is switched on if forced operation is activated.
- *Off*: The relay is switched off if forced operation is activated.

ⓘ **Note**

The currently valid control values apply after the forced operation is disabled.

The fan changes to the automatic mode on the deactivation of forced operation. If this mode is deactivated, the fan changes to the currently valid fan speed.

During forced operation the device continues to receive group objects via the bus, however it does not react to them as long as they do not have a higher priority than forced operation. The device therefore continues to work normally after forced operation is disabled.

7.7.2 Cyclical monitoring

Options: *Deactivated*
Activated

The cyclical monitoring is used to monitor specific, selected group objects for the correct function of the device. For each group object monitored it is possible to define a monitoring time during which the group object monitored must be received.

If the group object is received in the defined time, the monitoring time starts again immediately after the reception of the group object. If the group object is not received in this time, it can be specified how the device is to behave.

- *Deactivated*: The cyclical monitoring is deactivated.
- *Activated*: The cyclical monitoring is activated. The dependent parameters for monitoring the individual group objects are displayed. For each group object it is possible to decide separately whether it is to be monitored or not.

ⓘ **Note**

For all cyclically monitored group objects it is important to set the behavior of the sending device correctly. The group objects must be sent cyclically and the cycle time must be less (= more frequent) than the receive time monitored.

Recommendation: Monitoring time = 2 × sending cycle time

Do not select times that are too low because this configuration can cause a high bus load and the probability of an error increases.

7.7.2.1 Selection of Controller

The following parameters are visible if the *Controller* option has been selected in the *Device function* parameter.

7.7.2.1.1 DEPENDENT PARAMETER

Temperature input monitoring

This parameter is only visible if the *Device function* parameter has been parameterized with the *Controller* option.

Options:	*Deactivated* *On physical device input a* *On physical device input b* *On physical device input c* *On physical device input d* *On group object*

The reception of a temperature value can be monitored using this parameter. Unlike the other group objects to be monitored, here it is also possible to monitor a physical device input instead of a group object. This is possible because the correct function of the temperature input is imperative for the correct function of the device.

- *Deactivated*: The monitoring of the temperature input is deactivated.
- *On physical device input a/b/c/d*: The temperature sensor connected to the input selected is monitored. If the input does not deliver a valid temperature value for more than a minute, the fault value parameterized is used.
  The *Control value on input fault* dependent parameter is displayed.

ⓘ **Note**

For the monitoring to work, the related input must also be parameterized as a temperature sensor and a temperature sensor must be connected to it. This setting is specified in the parameter window for the related input.

So that the temperature sensor connected also has an effect on the controller, the sensor must also be assigned to the controller in the *Application parameters* parameter window in the *Temperature input* parameter by selecting the corresponding options (*Via physical device input* or *Via physical device input and group object*).

Monitoring of one of the physical inputs is not allowed if *Temperature input - Via group object* has been selected in the controller. This will result in the monitoring time being exceeded, because the device inputs are monitored using very short times.

- *On group object*: The *External temperature 1* and *External temperature 2* (only if activated) group objects are monitored. As soon as a new value is received in one of the two group objects, the monitoring time for the related group object starts again.
  The dependent parameters *Time interval for cyclical monitoring* and *Control value after exceeding monitoring time* as well as the *Fault: actual temperature (master)* group object are enabled.

ⓘ **Note**

It is necessary that a value is received in both group objects within the monitoring time to prevent the triggering of the cyclical monitoring.

—

7.7.2.1.1.1 DEPENDENT PARAMETER

Control value after exceeding monitoring time / Control value on input fault

This parameter is only visible if the *Temperature input monitoring* parameter has not been deactivated.

The name of the parameter is dependent on whether the group objects or a physical input is monitored as the temperature input.

Options: *0…25…100*

The control value specified here becomes active if the monitoring time is exceeded or if there is an error on the device input monitored. The control value applies to heating or cooling, depending on which was active at the time of the alarm. In addition, the device changes to the Building Protection operating mode.

The monitoring of the temperature value is important because the controller cannot calculate any control values for the outputs without a valid room temperature value. To protect the system, using this parameter it is possible to specify a certain control value to prevent, e.g., cooling of the room.

The control value set here remains active until the error on the input has been rectified or a new temperature value has been received via the bus.

ⓘ **Note**

If a physical device input is monitored, the device automatically checks every minute whether the input is signaling an error. If this is the case, the device changes to the control value set. For this reason it is not necessary to specify a time for monitoring an input.

—

7.7.2.1.2 DEPENDENT PARAMETER

Monitor receipt of group object "Operating mode"

This parameter is only visible if the *Device function* parameter has been parameterized with the *Controller* option.

Options: *Deactivated*
Activated

The monitoring of the *Operating mode* group object is activated using this parameter. The regular changeover of the operating mode can be monitored using this parameter. Because this changeover is generally triggered by a higher-level device, such as a visualization or building control system, it is therefore also monitored whether the higher-level device is active.

- *Deactivated*: The monitoring of the *Operating mode* group object is deactivated.
- *Activated*: The monitoring of the group object is active. The dependent parameters *Time interval for cyclical monitoring* and *Operating mode after exceeding monitoring time* as well as the *Error: operating mode receipt* group object are enabled.

—

7.7.2.1.2.1 DEPENDENT PARAMETER

Time interval for cyclical monitoring

Options: *00:00:30…00:05:00…18:12:15*

The monitoring time within which the group object must be received is specified using this parameter. Otherwise the *Error: operating mode receipt* alarm object is changed to alarm and the value set in the *Operating mode after exceeding monitoring time* parameter applies.

7.7.2.1.2.2 DEPENDENT PARAMETER

Operating mode after exceeding monitoring time

Options: <u>*Building Protection*</u>
Comfort
Standby
Economy

The selection made here defines which operating mode is to apply on the erroneous reception of the *Operating mode* group object. This mode remains active until a new value is received in the group object monitored.

7.7.2.1.3 DEPENDENT PARAMETER

Monitor receipt of group object "Window contact"

This parameter is only visible if the *Device function* parameter has been parameterized with the *Controller* option.

This parameter is only visible if the *Via group object* option has been selected for the *Window status input* parameter in the *Application parameters* parameter window.

Options: <u>*Deactivated*</u>
Activated

The monitoring of the *Window contact* group object is activated using this parameter. The regular reception of the window status can be monitored using this parameter.

- *Deactivated*: The monitoring of the *Window contact* group object is deactivated.
- *Activated*: The monitoring of the group object is active. The dependent parameter *Time interval for cyclical monitoring* and the *Error: window status receipt* group object are enabled.

7.7.2.1.3.1 DEPENDENT PARAMETER

Time interval for cyclical monitoring

Options: *00:00:30…<u>00:05:00</u>…18:12:15*

The monitoring time within which the group object must be received is specified using this parameter. Otherwise the *Error: window status receipt* alarm object is changed to alarm and the controller reacts as if the window were open. This means that the controller changes over to the Building Protection mode. This mode remains active until a new value is received in the group object monitored.

7.7.2.1.4 DEPENDENT PARAMETER

Monitor receipt of group object "Dew point alarm"

This parameter is only visible if the *Device function* parameter has been parameterized with the *Controller* option.

This parameter is only visible if the *Via group object* option has been selected for the *Dew point status input* parameter in the *Application parameters* parameter window.

Options: *Deactivated*
Activated

The monitoring of the *Dew point alarm* group object is activated using this parameter. The regular reception of the dew point alarm can be monitored using this parameter.

- *Deactivated*: The monitoring of the *Dew point alarm* group object is deactivated.
- *Activated*: The monitoring of the group object is active. The dependent parameter *Time interval for cyclical monitoring* and the *Error: dew point status receipt* group object are enabled.

7.7.2.1.4.1 DEPENDENT PARAMETER

Time interval for cyclical monitoring

Options: *00:00:30…00:05:00…18:12:15*

The monitoring time within which the group object must be received is specified using this parameter. Otherwise the *Error: dew point status receipt* alarm object is changed to alarm and the controller reacts as if the dew point alarm were active. This means that the controller changes to the Building Protection operating mode, which results in the closing of the cooling output. As long as the fill level alarm is active, this mode for cooling cannot be left again. This state remains active until a new value is received in the group object monitored that clears the alarm.

ⓘ **Note**

If the device is changed to the heating mode (on a device that is used for heating and cooling), the device continues to function as before, without the alarm having any effect, because the alarm only relates to cooling.

For more information on the dew point, see .

7.7.2.1.5 DEPENDENT PARAMETER

Monitor receipt of group object "Fill level alarm"

This parameter is only visible if the *Device function* parameter has been parameterized with the *Controller* option.

This parameter is only visible if the *Via group object* option has been selected for the *Dew point status input* parameter in the *Application parameters* parameter window.

Options: *Deactivated*
Activated

The monitoring of the *Fill level alarm* group object is activated using this parameter. The regular reception of the fill level alarm can be monitored using this parameter.

- *Deactivated*: The monitoring of the *Fill level alarm* group object is deactivated.
- *Activated*: The monitoring of the group object is active. The dependent parameter *Time interval for cyclical monitoring* and the *Error: fill level status receipt* group object are enabled.

7.7.2.1.5.1 Dependent Parameter

Time interval for cyclical monitoring

Options: *00:00:30…00:05:00…18:12:15*

The monitoring time within which the group object must be received is specified using this parameter. Otherwise the *Error: fill level status receipt* group object is changed to alarm and the controller reacts as if the fill level alarm were active. This means that the controller sets the control value for cooling to 0. As long as the dew point alarm is active, this control value for cooling cannot be raised again. This state remains active until a new value is received in the group object monitored that clears the alarm.

> ⓘ **Note**
> If the device is changed to the heating mode (on a device that is used for heating and cooling), the device continues to function as before, without the alarm having any effect, because the alarm only relates to cooling.

For more information on the fill level, see .

7.7.2.1.6 Dependent Parameter

Monitor receipt of group object "Toggle heating/cooling"

The parameter is only visible if in the *Heating/Cooling changeover* parameter in the *Application parameters* parameter window, the *Via object only* or *Via object and automatically* option has been selected.

Options: *Deactivated*
Activated

The monitoring of the *Heating/Cooling changeover* group object is enabled using this parameter. The change in the type of operation can be monitored using this parameter.

- *Deactivated*: The monitoring of the *Heating/Cooling changeover* group object is deactivated.
- *Activated*: The monitoring of the group object is active. The dependent parameters *Time interval for cyclical monitoring* and *Heating/cooling mode when monitoring time exceeded* as well as the *Error: heating/cooling receipt* group object are enabled.

7.7.2.1.6.1 Dependent Parameter

Time interval for cyclical monitoring

Options: *00:00:30…00:05:00…18:12:15*

The monitoring time within which the group object must be received is specified using this parameter. Otherwise the *Error: heating/cooling receipt* alarm object is changed to alarm and the value set in the *Heating/cooling mode when monitoring time exceeded* parameter applies.

7.7.2.1.6.2 DEPENDENT PARAMETER

Heating/cooling mode when monitoring time exceeded

Options: *Unchanged*
Heating
Cooling

The selection made here defines which type of operation is to apply on the erroneous reception of the *Heating/Cooling changeover* group object. This type of operation remains active until a new value is received in the group object monitored. If the *Unchanged* option is selected, the current type of operation remains active.

7.7.2.2 Selection of actuator device

The following parameters are visible if the *Actuator device* option has been selected in the *Device function* parameter.

7.7.2.2.1 DEPENDENT PARAMETER

Monitor receipt of group object "Control value"

This parameter is only visible if the *Device function* parameter has been parameterized with the *Controller* option, that is the device is operated with a controller.

Options: *Deactivated*
Activated

With the monitoring of the *Control value* group object, the device can monitor the regular reception of the control value in the actuator mode. If the control value is not received, a pre-defined control value can be set that is used in the currently active type of operation (heating or cooling). With this monitoring it is possible to use a pre-defined control value on the failure of the device that sets the control value, until a new value is received.

- *Deactivated*: The cyclic monitoring of the *Control value* group object is deactivated.
- *Activated*: The cyclic monitoring is activated, the following dependent parameters are also displayed.

7.7.2.2.1.1 DEPENDENT PARAMETER

Time interval for cyclical monitoring

Options: *00:00:30…00:05:00…18:12:15*

The monitoring time within which the group object must be received is specified using this parameter. Otherwise the *Error: control value receipt* alarm object is changed to alarm and the value set in the *Control value after exceeding monitoring time* parameter applies.

7.7.2.2.1.2 DEPENDENT PARAMETER

Control value after exceeding monitoring time

Options: *0…22…100*

The control value set here is valid as soon as a control value has not been received by the device within the monitoring time parameterized. The value set here remains active until a control value has been received again.

7.7.2.2.2 DEPENDENT PARAMETER

Monitor receipt of group object "Toggle heating/cooling"

The parameter is only visible if in the *Heating/Cooling changeover* parameter in the *Application parameters* parameter window, the *Via object only* or *Via object and automatically* option has been selected.

Options: *Deactivated*
Activated

The monitoring of the *Heating/Cooling changeover* group object is enabled using this parameter. The change in the type of operation can be monitored using this parameter.

- *Deactivated*: The monitoring of the *Heating/Cooling changeover* group object is deactivated.
- *Activated*: The monitoring of the group object is active. The dependent parameters *Time interval for cyclical monitoring* and *Heating/cooling mode when monitoring time exceeded* as well as the *Error: heating/cooling receipt* group object are enabled.

7.7.2.2.2.1 DEPENDENT PARAMETER

Time interval for cyclical monitoring

Options: *00:00:30…00:05:00…18:12:15*

The monitoring time within which the group object must be received is specified using this parameter. Otherwise the *Error: heating/cooling receipt* alarm object is changed to alarm and the value set in the *Heating/cooling mode when monitoring time exceeded* parameter applies.

7.7.2.2.2.2 DEPENDENT PARAMETER

Heating/cooling mode when monitoring time exceeded

Options: *Unchanged*
Heating
Cooling

The selection made here defines which type of operation is to apply on the erroneous reception of the *Heating/Cooling changeover* group object. This type of operation remains active until a new value is received in the group object monitored. If the *Unchanged* option is selected, the current type of operation remains active.

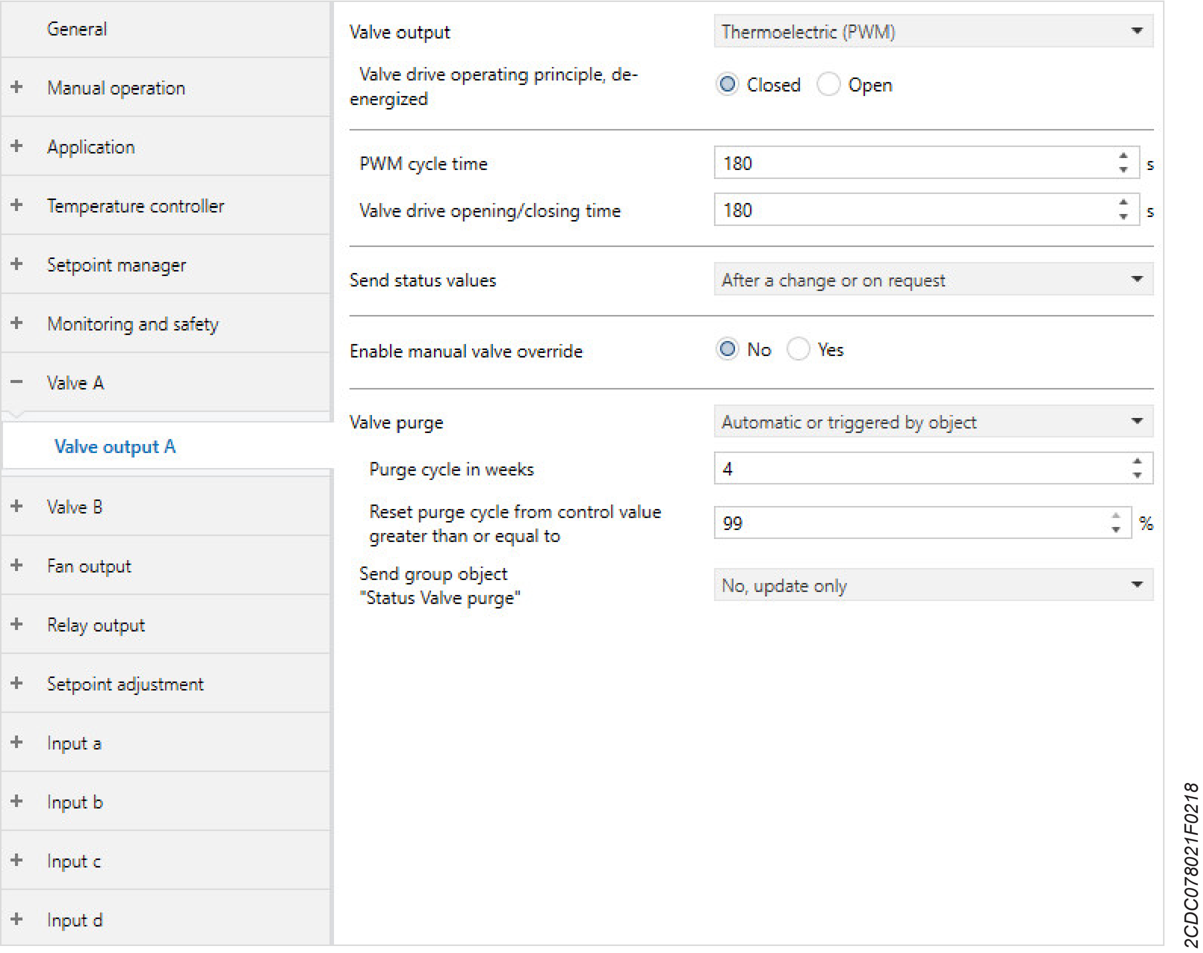
7.8 Valve A

7.8.1 Valve output A parameter window

7.8.1.1 FCC/S 1.1.x.1 / 1.4.1.1 / 1.5.x.1

The following explanations only apply to:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.4.1.1
- FCC/S 1.5.1.1
- FCC/S 1.5.2.1



Valve output: Thermoelectric (PWM)

Valve drive operating principle, de-energized: ● Closed ○ Open

PWM cycle time: 180 s

Valve drive opening/closing time: 180 s

Send status values: After a change or on request

Enable manual valve override: ● No ○ Yes

Valve purge: Automatic or triggered by object

Purge cycle in weeks: 4

Reset purge cycle from control value greater than or equal to: 99 %

Send group object "Status Valve purge": No, update only

Fig. 43: Valve output A parameter window

7.8.1.1.1 Valve output

Options: _Thermoelectric (PWM)_
Motor-driven (3-point)
Open/Close signal
Deactivated

This parameter defines the type of valve that is connected to the output. The control values received (from the internal controller or via the bus) at the valve are converted to the correct output signal depending on the valve type selected. The dependent group objects *Status byte valve A*, *Status Control value* and *Fault: valve output* are displayed as long as the output is not deactivated.

In addition, the parameter defines whether the valve outputs for A and B are parameterized separately or together. If *Thermoelectric (PWM)* or *Open/Close signal* is selected, A and B are two separate channels. If the *Motor-driven (3-point)* option is selected, the channels for the actuation of the valve are combined and parameterized in channel A.

ⓘ **Note**

The control value is assigned to the valve in the *Application – Application parameters* parameter window. Here it is defined which control value from the controller is to be output on which valve output.

ⓘ **Note**

The FCC/S 1.4.1.1 does not have a second valve output and therefore does not have the *Motor-driven (3-point)* option.

- *Thermoelectric (PWM)*: If the *Thermoelectric (PWM)* option is selected, the output is used for the connection of thermoelectric valves with PWM actuation. For this purpose the control value received is converted into a PWM signal. The parameter for setting the PWM cycle time is displayed.
- *Motor-driven (3-point)*: If this option is selected, valve outputs A and B are combined to make it possible to actuate a motor-driven valve drive. Here output A is used to output the opening signal and output B to output the closing signal.
- *Open/Close signal*: With this selection, the continuous control value is converted into an OPEN or CLOSE signal from a parameterized value. The parameter for entering the threshold value is displayed.
- *Deactivated*: The output is deactivated.

ⓘ **Note**

If a control value has been assigned to the valve in the *Application – Application parameters* parameter window, this control value is not output if the output is deactivated.

7.8.1.1.1.1 Selection of Thermoelectric (PWM)

7.8.1.1.1.1.1 DEPENDENT PARAMETER

Valve drive operating principle, de-energized

This parameter is visible if, in the *Valve output* parameter, the *Thermoelectric (PWM)* or *Open/ Close signal* option has been selected.

Options: *Closed*
Open

This parameter determines the function of the valve drive.

- *Closed*: If no current flows in the valve drive, the valve is closed. If current flows in the valve drive, the valve opens.
- *Open*: If no current flows in the valve drive, the valve opens. If current flows in the valve drive, the valve then closes.

7.8.1.1.1.1.2 DEPENDENT PARAMETER

PWM cycle time

Options: *10…180…900*

For setting the cycle time for the pulse width modulation.

7.8.1.1.1.1.3 DEPENDENT PARAMETER

Valve drive opening/closing time

This parameter is visible if, in the *Valve output* parameter, the *Thermoelectric (PWM)* or *Open/ Close signal* option has been selected.

Options: *10…60…900*

With this parameter, a time is set in seconds that the connected valve requires to move from position 0 % (valve closed) to position 100 % (valve fully open), or the valve requires to move from 100 % to 0 %.

ⓘ **Note**
The time should be taken from the technical data of the valve, and it corresponds with the total runtime.

7.8.1.1.1.2 Selection of Motor-driven (3-point)

—

7.8.1.1.1.2.1 DEPENDENT PARAMETER

Reversing time

Options: *50…<u>500</u>…1,000*

This parameter defines the reversing delay time of the valve drive.

> **ⓘ Note**
> The technical data for the valve drive must be observed.

—

7.8.1.1.1.2.2 DEPENDENT PARAMETER

Switch on time for valve drive from 0 to 100 %

Options: *10…<u>120</u>…6,000*

This parameter sets the time that the output switches on to move the valve drive or the valve from 0 % (closed) to position 100 % (fully opened).

> **ⓘ Note**
> The time required should be taken from the technical data of the valve.

—

7.8.1.1.1.2.3 DEPENDENT PARAMETER

Automatic adjustment of valve drive

Options: *<u>No</u>*
Yes

If the control value 0% is only rarely achieved in ongoing operation, this can lead to inaccuracies in positioning control. This parameter activates automatic adjustment to move the valve drive in a defined manner to the 0% position. This serves as the basis for position adjustment.

- *Yes*: Automatic adjustment is activated. The dependent parameter *Number of changes until adjustment* is displayed.
- *No*: Automatic adjustment is deactivated.

7.8.1.1.1.2.3.1 Dependent Parameter

Number of changes until adjustment

Options: *30…<u>500</u>…65,535*

This parameter determines the number of valve controls after which automatic adjustment is to be triggered.

The adjustment counter is incremented by 1 at the end of a drive adjustment.

ⓘ **Note**

If the parameterized number of valve controls is reached, the reference adjustment is started. The closed position is then moved past by 5 % of the parameterized switch on time based on the last control value for the valve drive (at least 1 second, not more than 60 seconds). This function cannot be interrupted. Thereafter, the currently calculated control value is approached, and the adjustment counter is set to zero.

Example:

Switch on time for valve drive from 0 to 100 %: 100 s

Current control value: 50 %

Reference adjustment to 0 %: 50 s + 5 s

50 s = normal movement time from 50 % to 0 % + 5 s = 5 % of 100 s

The following events trigger a reference adjustment:

- Bus voltage recovery
- ETS reset
- Download
- Reset of a remedied fault (via *Reset* button or via *Reset fault on valve output X* group object)

The output is only actuated if the calculated change in the valve position (based on the opening time for the drive and the change in the control value) is greater than one second. This condition prevents small position changes and protects the drive against unnecessary movements. The wear on the drive is reduced.

7.8.1.1.1.3 Open/close signal

7.8.1.1.1.3.1 Dependent Parameter

Valve drive operating principle, de-energized

This parameter is visible if, in the *Valve output* parameter, the *Thermoelectric (PWM)* or *Open/ Close signal* option has been selected.

Options: *<u>Closed</u>*
Open

This parameter determines the function of the valve drive.

- *Closed*: If no current flows in the valve drive, the valve is closed. If current flows in the valve drive, the valve opens.
- *Open*: If no current flows in the valve drive, the valve opens. If current flows in the valve drive, the valve then closes.

—

7.8.1.1.1.3.2 DEPENDENT PARAMETER

Open if control value greater than or equal to

Options: *1…100*

The output switches ON continuously if the value parameterized here is greater than or equal to the received control value. If a control value less than the parameterized value is received, the output switches OFF.

—

7.8.1.1.1.3.3 DEPENDENT PARAMETER

Valve drive opening/closing time

This parameter is visible if, in the *Valve output* parameter, the *Thermoelectric (PWM)* or *Open/Close signal* option has been selected.

Options: *10…60…900*

With this parameter, a time is set in seconds that the connected valve requires to move from position 0 % (valve closed) to position 100 % (valve fully open), or the valve requires to move from 100 % to 0 %.

ⓘ **Note**

The time should be taken from the technical data of the valve, and it corresponds with the total runtime.

7.8.1.1.2 Send status values

Options: *On request*
On change
Cyclically
After a change or on request
After a change or request and cyclically

This parameter defines when the valve output status value are to be sent. It affects the group objects *Status byte valve A*, *Fault: valve output A* and *Status Control value* for the valve drive.

- *On request*: The valve output status values are sent on the receipt of a command via the *Request status values* group object.
- *On change*: The values are sent on a change in the object values (e.g. change from 0 to 1). With the *Status Control value* group object the values are only sent if the change in the control value is at least 1 %.
- *Cyclically*: If this option is selected, the status values are sent automatically after an adjustable time has elapsed. The *Every* dependent parameter is displayed.
- *After a change or request*: The values are sent on request and on a change.
- *After a change or request and cyclically*: The values are sent on request and on a change and cyclically. The *Every* dependent parameter is displayed.

—

7.8.1.1.2.1 DEPENDENT PARAMETER

Every

Options: *00:00:30…00:05:00…18:12:15*

This parameter is used to set the time after which the status values are to be sent cyclically. The group objects are sent after each cycle.

7.8.1.1.3 Enable manual valve override

Options: <u>*No*</u>
Yes

Manual valve override is enabled using this parameter. This feature is used to specify valve control values directly; the control value from the controller is overridden. This action may be necessary during the commissioning phase, for example, to test the function of the system. A further possible application is the specific overriding of controller.

- *No*: The manual valve override is deactivated
- *Yes*: The manual override is enabled. The two group objects *Enable/disable manual override valve A* and *Override valve control value* are enabled. The former is used to activate or deactivate the manual override. The manual valve control value is specified using the second group object. Only if the manual override has been activated via the first group object is the value in the second group object sent to the valve. As soon as the manual override is ended using the *Enable/disable manual override valve A* group object, the valve output reacts again to the controller (controller mode) or the control values received via the bus (actuator mode).

ⓘ **Note**

As soon as the manual override is activated via the *Enable/disable manual override valve A* group object, the value currently in the *Override valve control value* group object is written to the valve. If, while the override was disabled, a value was written to this group object, this value will become active as soon as the override is enabled.

7.8.1.1.4 Valve purge

Options: *Deactivated*
<u>*Automatic or triggered by object*</u>
Triggered by object

Valve purging by the device is enabled using this parameter. This parameter is used to trigger a device opening and closing cycle during times when the valve is not in use to prevent the valve from seizing.

- *Deactivated*: Valve purging is deactivated.
- *Automatic or triggered by object*: Valve purging can be triggered via a group object or it occurs automatically after an adjustable time has elapsed. The group objects *Status Valve purge* and *Activate valve purge* as well as the parameters *Purge cycle in weeks*, *Reset purge cycle from control value greater than or equal to* and *Send group object "Status Valve purge"* are enabled.
- *Triggered by object*: The valve purging can be triggered via a group object. The group objects *Status Valve purge* and *Activate valve purge* as well as the parameters *Reset purge cycle from control value greater than or equal to* and *Send group object "Status Valve purge"* are enabled.

During the valve purging, the valve is opened completely once and closed again, corresponding to the values set in the *Valve drive opening/closing time* parameter.

The purging cycle time is restarted if automatic valve purging has been activated at start-up of the device.

The purging cycle time will be restarted at the end of the actual purging period. The parameterized period of valve purging is included here.

The purging cycle with an active automatic valve purge is reset and restarted if:

- A manual valve purge is triggered via the group object *Activate purge*.
- The parameterized value (in Reset purge cycle from...) is exceeded. The purging cycle is only restarted once the parameterized value is reached or exceeded.

—

7.8.1.1.4.1 DEPENDENT PARAMETER

Purge cycle in weeks

This parameter is only visible if the *Automatic or triggered by object* option has been selected.

Options: *1…4…12*

The cycle for the automatic valve purging is set using this parameter.

The internal automatic purge timer starts directly after a download. The time is reset with each download.

The time is reset as soon as purging is completed. This can occur either through automatic purging or via the group object *Trigger purge*.

> **Note**
> After bus voltage recovery and download, the automatic purging cycle is restarted. The time before bus voltage failure is not considered.
> If the purge cycle is triggered simultaneously for two valves, the purging is undertaken sequentially and not at the same time.

—

7.8.1.1.4.2 DEPENDENT PARAMETER

Reset purge cycle from control value greater than or equal to

Options: *1…99*

Hereby, the purge cycle is reset to the set control value if it is exceeded.

—

7.8.1.1.4.3 DEPENDENT PARAMETER

Send group object "Status Valve purge"

Options: *No, update only*
On change
Cyclically
On request
After a change or on request
After a change or request and cyclically

This parameter defines when the *Status Valve purge* group object is to be sent.

- *No, update only*: With this option only the object value for the group object is updated, however this value is not sent over the bus.
- *On request*: The valve purging status value is sent on the receipt of a command via the *Request status values* group object.
- *On change*: The value is sent on a change in the object value (e.g. change from 0 to 1).
- *Cyclically*: If this option is selected, the status value is sent automatically after an adjustable time has elapsed. The *Every* dependent parameter is displayed.
- *After a change or request*: The status is sent on request and on a change.
- *After a change or request and cyclically*: The status is sent on request and on a change and cyclically. The *Every* dependent parameter is displayed.

—

7.8.1.1.4.3.1 DEPENDENT PARAMETER

Every

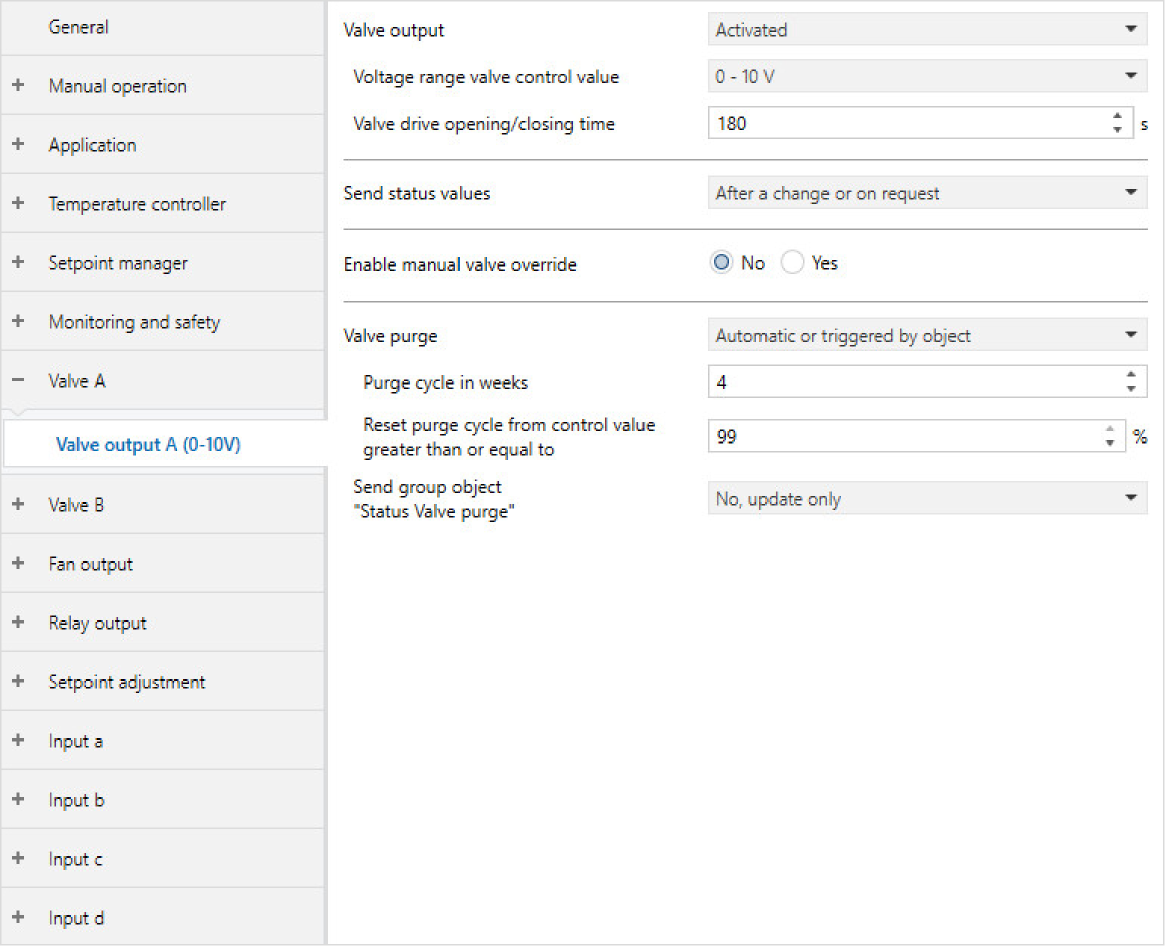
Options: *00:00:30…<u>00:05:00</u>…18:12:15*

This parameter is used to set the time after which the status values are to be sent cyclically. The group objects are sent after each cycle.

7.8.1.2 FCC/S 1.2.x.1 / 1.3.x.1

The following explanations only apply to:

- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.3.1.1
- FCC/S 1.3.2.1



Valve output: Activated

Voltage range valve control value: 0 - 10 V

Valve drive opening/closing time: 180 s

Send status values: After a change or on request

Enable manual valve override: ● No ○ Yes

Valve purge: Automatic or triggered by object

Purge cycle in weeks: 4

Reset purge cycle from control value greater than or equal to: 99 %

Send group object "Status Valve purge": No, update only

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Fig. 44: Valve output A (0-10V) parameter window

7.8.1.2.1 Output A

Options: Activated
Deactivated
Use as VAV damper output

This parameter defines the type of use of valve output A.

> ⓘ **Note**
> The control value is assigned to the valve in the *Application – Application parameters* parameter window. Here it is defined which control value from the controller is to be output on which valve output.

- *Activated*: The output is used as a normal control value for a 0 - 10 V valve. The group objects *Status byte valve A*, *Status Control value*, *Fault: valve output A* and *Reset fault on valve output A* are displayed. The dependent parameters are displayed.
- *Deactivated*: The output is deactivated.

> ⓘ **Note**
> Nevertheless, a control value can still be assigned to the valve in the *Application – Application parameters* parameter window. Because the output is deactivated, this value is not output.

- *Use as VAV damper output*: With this setting the output is used to operate a damper drive using the 0-10 V signal. For this purpose the parameters and group objects for the valve output are deactivated and instead the group objects *Control value VAV damper control A* and *Status Control value* displayed. The dependent parameters *Voltage range VAV damper control value* and *Reaction on bus voltage recovery, ETS download or ETS reset* are displayed.

> ⓘ **Note**
> Nevertheless, a control value can still be assigned to the output in the *Application – Application parameters* parameter window. Although this control value is output, it can cause malfunctions due to the lack of adjustment.

> ⓘ **Note**
> In this mode the output behaves like a normal analog output. The control value received via the bus is output directly in the selected output range. There is no further influence from the controller.

7.8.1.2.1.1 DEPENDENT PARAMETER

Valve type

This parameter indicates whether the valve output is a normal output or this output is used to actuate a 6-way valve. This parameter can be changed using the *Use 6-way valve* parameter in the *Application – Application parameters* parameter window.

- *Normal*: This option is set if the *Use 6-way valve* is parameterized with the *No* option.
- *6-way valve*: This option is set if the *Use 6-way valve* is parameterized with the *Yes* option.

7.8.1.2.1.1.1 DEPENDENT PARAMETER

Voltage range valve control value

This parameter is only displayed if the *Valve type* parameter is parameterized with the *Normal* option.

Options: *0 – 10 V*
1 – 10 V
2 – 10 V
10 – 0 V

This parameter defines the function of the valve output. Depending on the selection, the control value is converted to the corresponding voltage range.

> ⓘ **Note**
>
> Valve drives closed if de-energized (0…10 V; 1…10 V; 2…10 V):
>
> If no current flows in the valve drive, the valve is closed. If current flows in the valve drive, the valve opens.
>
> Valve drives opened if de-energized (10…0 V):
>
> If no current flows in the valve drive, the valve opens. If current flows in the valve drive, the valve then closes.

> ⓘ **Note**
>
> The technical data for the valve drive must be observed.

On the selection of the *1 – 10 V* and *2 – 10 V* options, the output voltage is limited to this range. To make sure that the valve is always closed completely, on the actuation of the valve with 0 % (= closed), the control value 0 V is output nevertheless. If the control value is greater than 0 %, the lower limit (1 V or 2 V) is used directly for the actuation.

If the DPT 5.001 (percent) is used for actuation, the value of the group object may be displayed as 0 %, but the actual value of the group object may be slightly above that and a 0 is only displayed due to the rounding to integer values. This situation can be detected by viewing the hexadecimal value (this is then e.g. 0x0001) or changing to a different DPT (e.g. 5.005).

7.8.1.2.1.1.2 6-way valve

On use as a 6-way valve, the valve output is used for heating and for cooling. The special layout of the 6-way valve makes it possible to use both pipes independent of each other. To safeguard this functionality, the drive control value is divided into a range for cooling and a range for heating. Between these ranges there is a dead zone in which the valve is closed.

If the control value is in the actuation range for cooling, the flow for cooling is opened corresponding to the control value and the flow for heating shut off. The same applies vice versa.

The following illustration shows the relationship between voltage range and control value. The following example values have been selected:

- Voltage for maximum cooling: 2 V
- Voltage for minimum cooling: 5 V
- Voltage for maximum heating: 7 V
- Voltage for minimum heating: 10 V

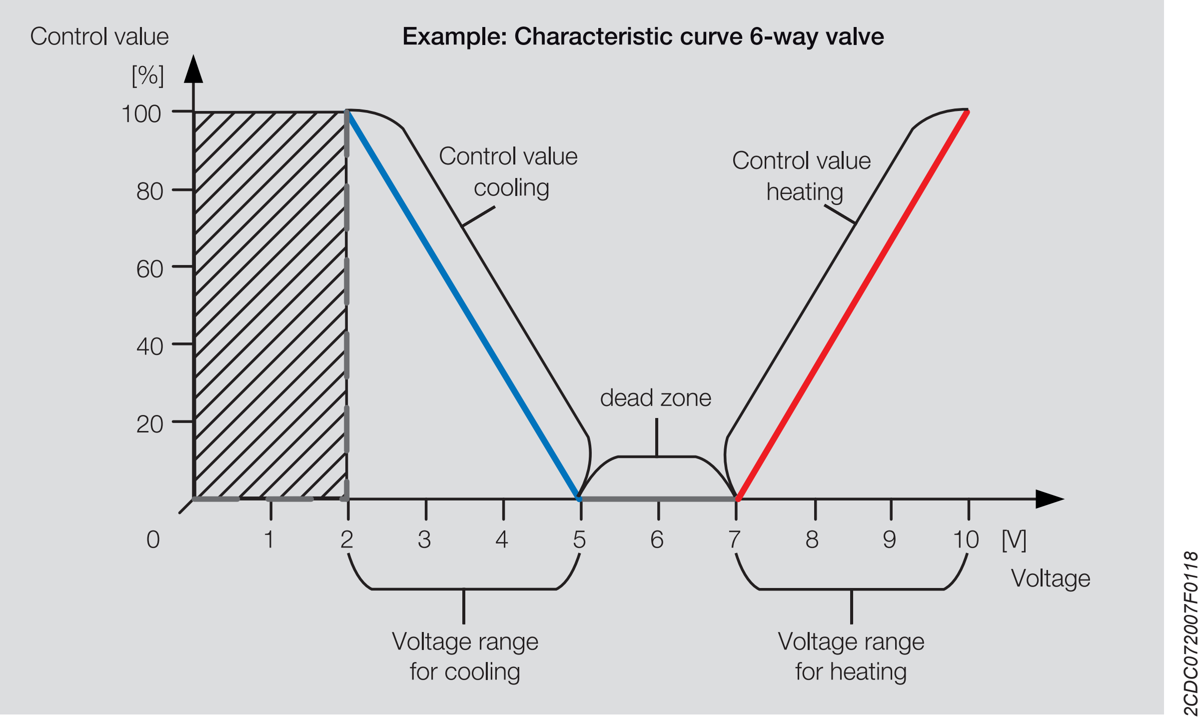


Fig. 45: 6-way valve

7.8.1.2.1.1.2.1 Voltage range for cooling

—

7.8.1.2.1.1.2.1.1 DEPENDENT PARAMETER

Voltage for maximum cooling

This parameter is used to specify the lower limit for the voltage range for the output of the cooling control value.

Options: *0.00…<u>02.00</u>…10.00*

—

7.8.1.2.1.1.2.1.2 DEPENDENT PARAMETER

Voltage for minimum cooling

This parameter is used to specify the upper limit for the voltage range for the output of the cooling control value.

Options: *0.00…<u>05.00</u>…10.00*

7.8.1.2.1.1.2.2 Voltage range for heating

—

7.8.1.2.1.1.2.2.1 DEPENDENT PARAMETER

Voltage for minimum heating

This parameter is used to specify the lower limit for the voltage range for the output of the heating control value.

Options: *0.00…<u>07.00</u>…10.00*

—

7.8.1.2.1.1.2.2.2 DEPENDENT PARAMETER

Voltage for maximum heating

This parameter is used to specify the upper limit for the voltage range for the output of the heating control value.

Options: *0.00…<u>10.00</u>*

—

7.8.1.2.1.1.2.3 Dependent Parameter

Valve drive opening/closing time

Options: *10…180…900*

With this parameter, a time is set in seconds that the connected valve requires to move from position 0 % (valve closed) to position 100 % (valve fully open), or the valve requires to move from 100 % to 0 %.

> ⓘ **Note**
> The time should be taken from the technical data of the valve, and it corresponds with the total runtime.

7.8.1.2.1.2 Use as VAV damper output

—

7.8.1.2.1.2.1 Dependent Parameter

Voltage range VAV damper control value

This parameter is visible if the *Use as VAV damper output* option has been selected in the *Valve output* parameter and the output is used as a valve output.

Options: *0 – 10 V*
1 – 10 V
2 – 10 V
10 – 0 V

This parameter defines the function of the damper control value. Depending on the selection, the control value is converted to the corresponding voltage range.

On the selection of the *1 - 10 V* and *2 - 10 V* options, the output voltage is limited to this range. To make sure that the damper is always closed completely, on the actuation of the output with 0 % (= closed), the control value 0 V is output nevertheless. If the control value is greater than 0 %, the lower limit (1 V or 2 V) is used directly for the actuation.

If the DPT 5.001 (percent) is used for the actuation, the value of the group object may be displayed as 0 %, but the actual value of the group object may be slightly above that and a 0 is only displayed due to the rounding to integer values. This situation can be detected by viewing the hexadecimal value (this is then e.g. 0x0001) or changing to a different DPT (e.g. 5.005).

—

7.8.1.2.1.2.2 Dependent Parameter

Behavior after bus voltage recovery, ETS download and ETS reset

Options: *Unchanged*
Select

The reaction of the VAV damper output after bus voltage recovery, ETS download and ETS reset is specified using this parameter.

- *Unchanged*: If this option is selected, after bus voltage recovery, ETS download and ETS reset the output provides the same voltage as before the event.
- *Select*: If this option is selected, it is possible to set the output voltage after bus voltage recovery, ETS download and ETS reset in the *Control value* parameter.

—

7.8.1.2.1.2.2.1 Dependent Parameter

Control value

Options: _0_…100

This parameter is used to specify the control value that is to be set after bus voltage recovery, ETS download and ETS reset.

Note

The value set after bus voltage recovery, ETS download and ETS reset applies until a new control value is received via the *Control value VAV damper control A* group object.

—

7.8.1.2.1.2.3 Dependent Parameter

Send status values

Options:
On request
On change
Cyclically
After a change or on request
After a change or request and cyclically

This parameter defines when the *Status Control value* for the VAV damper output is to be sent.

- *On request*: The status value is sent on the receipt of a command via the *Request status values* group object.
- *On change*: The value is sent on a change to the control value if the change in the control value is at least 1 %.
- *Cyclically*: If this option is selected, the status value is sent automatically after an adjustable time has elapsed. The *Every* dependent parameter is displayed.
- *After a change or request*: The value is sent on request and on a change.
- *After a change or request and cyclically*: The value is sent on request and on a change and cyclically. The *Every* dependent parameter is displayed.

—

7.8.1.2.1.2.3.1 Dependent Parameter

Every

Options: *00:00:30…00:05:00…18:12:15*

This parameter is used to set the time after which the status values are to be sent cyclically. The group objects are sent after each cycle.

7.8.1.2.2 Send status values

Options: *On request*
On change
Cyclically
After a change or on request
After a change or request and cyclically

This parameter defines when the valve output status value are to be sent. It affects the group objects *Status byte valve A*, *Fault: valve output A* and *Status Control value* for the valve drive.

- *On request*: The valve output status values are sent on the receipt of a command via the *Request status values* group object.
- *On change*: The values are sent on a change in the object values (e.g. change from 0 to 1). With the *Status Control value* group object the values are only sent if the change in the control value is at least 1 %.
- *Cyclically*: If this option is selected, the status values are sent automatically after an adjustable time has elapsed. The *Every* dependent parameter is displayed.
- *After a change or request*: The values are sent on request and on a change.
- *After a change or request and cyclically*: The values are sent on request and on a change and cyclically. The *Every* dependent parameter is displayed.

—

7.8.1.2.2.1 DEPENDENT PARAMETER

Every

Options: *00:00:30…00:05:00…18:12:15*

This parameter is used to set the time after which the status values are to be sent cyclically. The group objects are sent after each cycle.

7.8.1.2.3 Enable manual valve override

Options: *No*
Yes

Manual valve override is enabled using this parameter. This feature is used to specify valve control values directly; the control value from the controller is overridden. This action may be necessary during the commissioning phase, for example, to test the function of the system. A further possible application is the specific overriding of controller.

- *No*: The manual valve override is deactivated
- *Yes*: The manual override is enabled. The two group objects *Enable/disable manual override valve A* and *Override valve control value* are enabled. The former is used to activate or deactivate the manual override. The manual valve control value is specified using the second group object. Only if the manual override has been activated via the first group object is the value in the second group object sent to the valve. As soon as the manual override is ended using the *Enable/disable manual override valve A* group object, the valve output reacts again to the controller (controller mode) or the control values received via the bus (actuator mode).

> ⓘ **Note**
> As soon as the manual override is activated via the *Enable/disable manual override valve A* group object, the value currently in the *Override valve control value* group object is written to the valve. If, while the override was disabled, a value was written to this group object, this value will become active as soon as the override is enabled.

7.8.1.2.4 Valve purge

Options: *Deactivated*
Automatic or triggered by object
Triggered by object

Valve purging by the device is enabled using this parameter. This parameter is used to trigger a device opening and closing cycle during times when the valve is not in use to prevent the valve from seizing.

- *Deactivated*: Valve purging is deactivated.
- *Automatic or triggered by object*: Valve purging can be triggered via a group object or it occurs automatically after an adjustable time has elapsed. The group objects *Status Valve purge* and *Activate valve purge* as well as the parameters *Purge cycle in weeks*, *Reset purge cycle from control value greater than or equal to* and *Send group object "Status Valve purge"* are enabled.
- *Triggered by object*: The valve purging can be triggered via a group object. The group objects *Status Valve purge* and *Activate valve purge* as well as the parameters *Reset purge cycle from control value greater than or equal to* and *Send group object "Status Valve purge"* are enabled.

During the valve purging, the valve is opened completely once and closed again, corresponding to the values set in the *Valve drive opening/closing time* parameter.

The purging cycle time is restarted if automatic valve purging has been activated at start-up of the device.

The purging cycle time will be restarted at the end of the actual purging period. The parameterized period of valve purging is included here.

The purging cycle with an active automatic valve purge is reset and restarted if:

- A manual valve purge is triggered via the group object *Activate purge*.
- The parameterized value (in Reset purge cycle from...) is exceeded. The purging cycle is only restarted once the parameterized value is reached or exceeded.

7.8.1.2.4.1 DEPENDENT PARAMETER

Purge cycle in weeks

This parameter is only visible if the *Automatic or triggered by object* option has been selected.

Options: *1…4…12*

The cycle for the automatic valve purging is set using this parameter.

The internal automatic purge timer starts directly after a download. The time is reset with each download.

The time is reset as soon as purging is completed. This can occur either through automatic purging or via the group object *Trigger purge*.

Note
After bus voltage recovery and download, the automatic purging cycle is restarted. The time before bus voltage failure is not considered.
If the purge cycle is triggered simultaneously for two valves, the purging is undertaken sequentially and not at the same time.

7.8.1.2.4.2 DEPENDENT PARAMETER

Reset purge cycle from control value greater than or equal to

Options: *1…99*

Hereby, the purge cycle is reset to the set control value if it is exceeded.

7.8.1.2.4.3 DEPENDENT PARAMETER

Send group object "Status Valve purge"

Options: *No, update only*
On change
Cyclically
On request
After a change or on request
After a change or request and cyclically

This parameter defines when the *Status Valve purge* group object is to be sent.

- *No, update only*: With this option only the object value for the group object is updated, however this value is not sent over the bus.
- *On request*: The valve purging status value is sent on the receipt of a command via the *Request status values* group object.
- *On change*: The value is sent on a change in the object value (e.g. change from 0 to 1).
- *Cyclically*: If this option is selected, the status value is sent automatically after an adjustable time has elapsed. The *Every* dependent parameter is displayed.
- *After a change or request*: The status is sent on request and on a change.
- *After a change or request and cyclically*: The status is sent on request and on a change and cyclically. The *Every* dependent parameter is displayed.

7.8.1.2.4.3.1 DEPENDENT PARAMETER

Every

Options: *00:00:30…00:05:00…18:12:15*

This parameter is used to set the time after which the status values are to be sent cyclically. The group objects are sent after each cycle.

7.9 Valve B

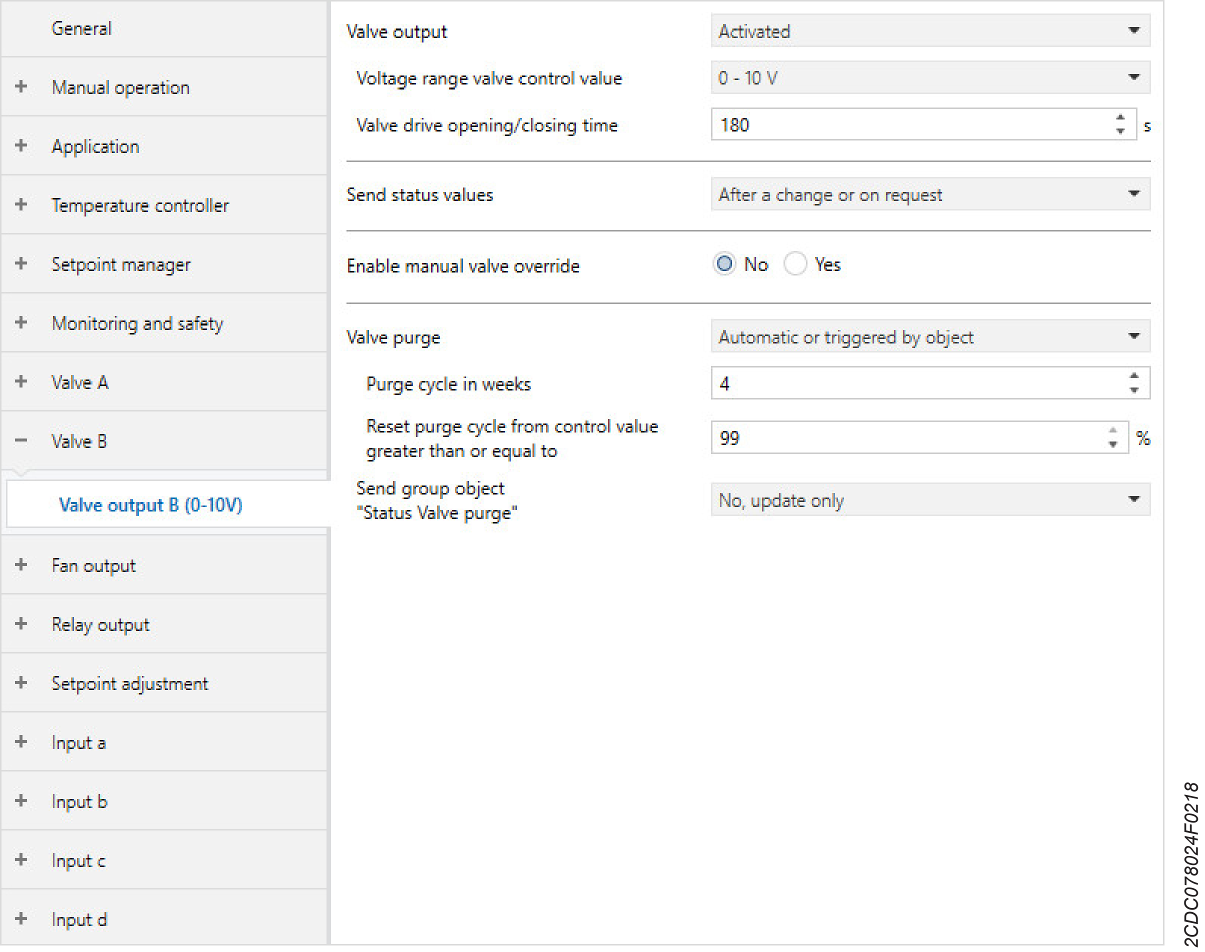
7.9.1 Valve output B parameter window

The FCC/S 1.4.1.1 does not have this parameter window, because it only has one valve output.

7.9.1.1 FCC/S 1.2.x.1 / 1.3.x.1

The following explanations only apply to:

- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.3.1.1
- FCC/S 1.3.2.1



Valve output: Activated

Voltage range valve control value: 0 - 10 V

Valve drive opening/closing time: 180 s

Send status values: After a change or on request

Enable manual valve override: ● No ○ Yes

Valve purge: Automatic or triggered by object

Purge cycle in weeks: 4

Reset purge cycle from control value greater than or equal to: 99 %

Send group object "Status Valve purge": No, update only

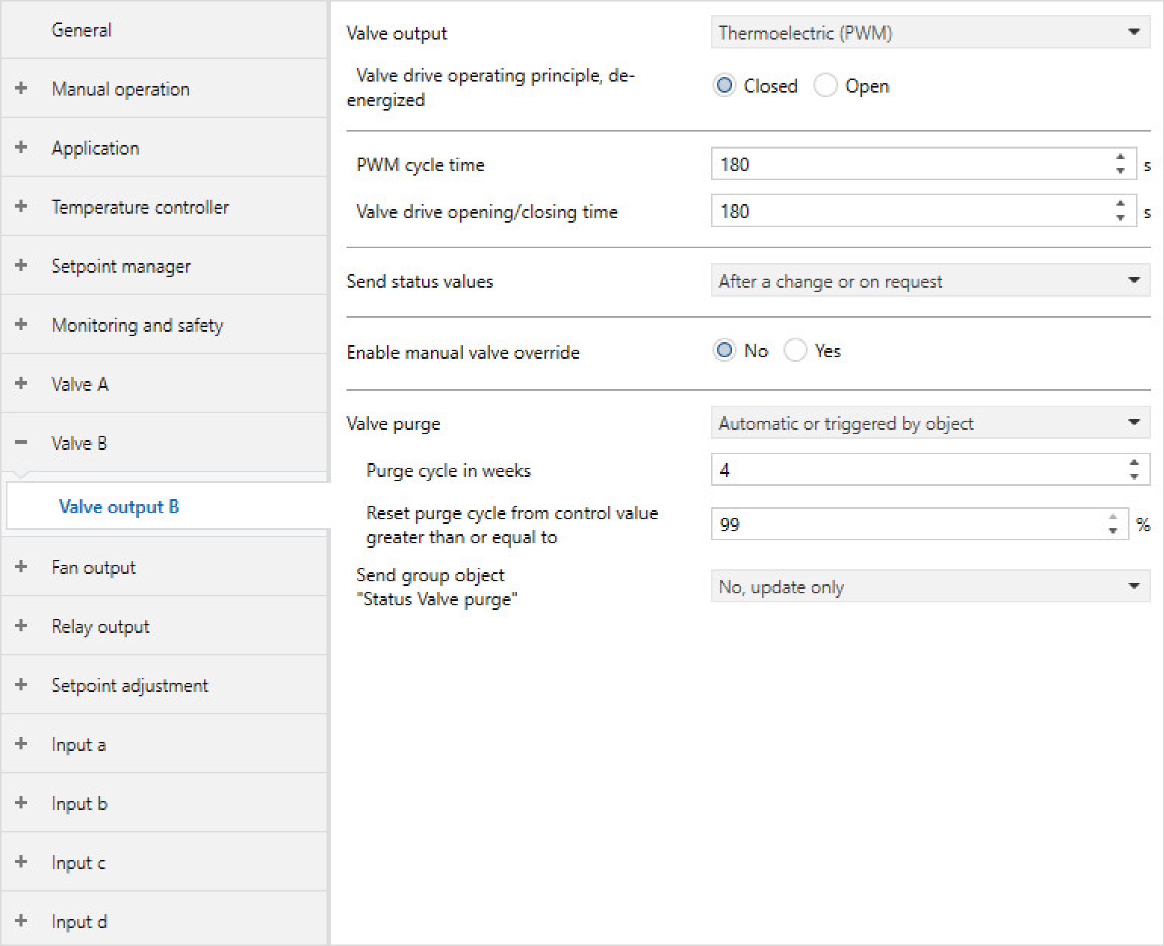
Fig. 46: Valve output B (0-10V) parameter window

The parameters for valve output B are the same as for valve output A. The only exception is the parameterization of valve output A for a 6-way valve. This setting cannot be made for output B. As such the *Valve type* parameter is always set to the *Normal* option.

7.9.1.2 FCC/S 1.1.x.1 / 1.5.x.1

The following explanations only apply to:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.5.1.1
- FCC/S 1.5.2.1



Valve output: Thermoelectric (PWM)

Valve drive operating principle, de-energized: ● Closed ○ Open

PWM cycle time: 180 s

Valve drive opening/closing time: 180 s

Send status values: After a change or on request

Enable manual valve override: ● No ○ Yes

Valve purge: Automatic or triggered by object

Purge cycle in weeks: 4

Reset purge cycle from control value greater than or equal to: 99 %

Send group object "Status Valve purge": No, update only

Fig. 47: Valve output B parameter window

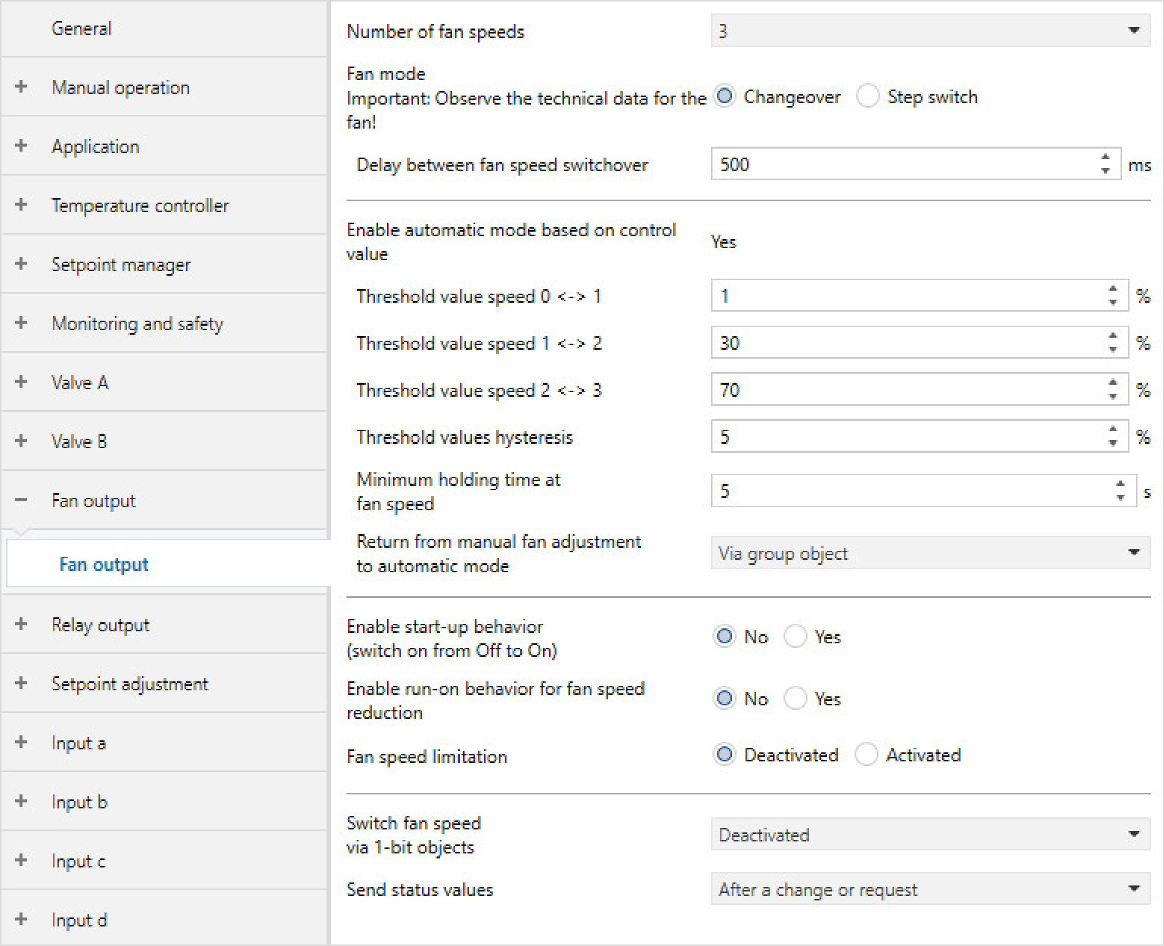
The parameters for valve output B are the same as for valve output A. The only exception is the parameterization of valve output A for a motor-driven valve drive (3-point). In this case the parameters for valve output B are deactivated because the valve output is then used to output the closing signal for the 3-point drive.

7.10 Fan output parameter window

7.10.1 FCC/S 1.1.x.1 / 1.2.x.1 / 1.4.x.1

The explanations below only apply to:

- FCC/S 1.1.1.1
- FCC/S 1.1.2.1
- FCC/S 1.2.1.1
- FCC/S 1.2.2.1
- FCC/S 1.4.1.1



Number of fan speeds: 3

Fan mode
Important: Observe the technical data for the fan!: ● Changeover ○ Step switch

Delay between fan speed switchover: 500 ms

Enable automatic mode based on control value: Yes

Threshold value speed 0 <-> 1: 1 %

Threshold value speed 1 <-> 2: 30 %

Threshold value speed 2 <-> 3: 70 %

Threshold values hysteresis: 5 %

Minimum holding time at fan speed: 5 s

Return from manual fan adjustment to automatic mode: Via group object

Enable start-up behavior (switch on from Off to On): ● No ○ Yes

Enable run-on behavior for fan speed reduction: ● No ○ Yes

Fan speed limitation: ● Deactivated ○ Activated

Switch fan speed via 1-bit objects: Deactivated

Send status values: After a change or request

Fig. 48: Fan output parameter window

7.10.1.1 Number of fan speeds

Options: *1*
2
<u>3</u>

This parameter is used to define how many fan speeds the fan actuated has. If the fan has only 1 or 2 speeds, the output is correspondingly only on 1 or 2 relay outputs. The relay for the 3rd or the 2nd and 3rd speeds is not used in this situation.

7.10.1.2 Fan type of operation (important: observe the technical data for the fan)

Options: <u>*Changeover*</u>
Step switch

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

With changeover switch control, only the corresponding output for the assigned fan speed is switched on.

The delay time between the speed switchover and a minimum dwell time can be parameterized. The latter is only active in automatic operation.

With step switch control, it is impossible for the fan to switch on erratically or suddenly. The individual fan speeds are activated consecutively (outputs switched on) until the required fan speed is reached.

The parameterized delay time between two fan speeds has the effect that the current fan speed must be switched on for at least this time before the next speed is switched on. The parameterized minimum dwell time has the same effect as a changeover switch, i.e. it is only active in automatic mode and is added to the switchover delay.

—

7.10.1.2.1 DEPENDENT PARAMETER

Delay between fan speed switchover

Options: *50…<u>500</u>…5,000*

A switchover delay can be programmed with this parameter. This time is a fan-specific factor and it is always taken into account.

7.10.1.3 Enable automatic mode based on control value

Options: <u>*Yes*</u>
No

This parameter is used to enable automatic fan operation depending on the control value. In this mode the fan automatically follows the control value for the heating/cooling mode currently active. This means that the higher the control value is, the greater the fan speed is as well.

- *Yes*: Automatic operation is activated. The group objects *Activate/deactivate fan automation* and *Status Fan automatic* are enabled. The dependent parameters are displayed.
- *No*: Automatic operation is deactivated. The fan only reacts to control via the fan objects.

ⓘ **Note**

Automatic control is always enabled in the controller mode and cannot be completely deactivated. The purpose of this feature is to ensure the correct function of the device, because otherwise the device would only react to manual adjustment.

If the device is used in the controller mode such that both a basic stage and an additional stage (e.g. heating) are in one fan coil unit, in the automatic mode the fan only follows the control value for the basic stage.

If the additional stage is in a dedicated fan coil unit, this situation can be addressed by activating the automatic mode in the device used there and using the control value for this device.

NOTICE

The device evaluates threshold values in ascending order, i.e. first it checks the threshold value for Off <-> Fan speed 1, then Fan speed 1 <-> Fan speed 2, and so on.

Proper functionality is only assured if the threshold value for OFF <-> Fan speed 1 is less than that for Fan speed 1 <-> Fan speed 2 and this is less than Fan speed 2 <-> Fan speed 3, etc.

—

7.10.1.3.1 DEPENDENT PARAMETER

Threshold value speed 0 <-> 1

Options: *0…<u>1</u>…10*

Here the threshold value, at which switch on of fan speed 1 occurs, is set. If the value in the group object *Control value* is greater than or equal to the parameterized threshold value, fan speed 1 is switched on. If the value is smaller, then it is switched off. If the value is set 0, the fan is only shut down with the control value 0. As soon as the control value is greater than 0, speed 1 is used.

To make sure that the valves are not opened too wide without the fan running, only 10 % can be set here as the maximum value

—

7.10.1.3.2 DEPENDENT PARAMETER

Threshold value speed 1 <-> 2

Options: *1…<u>30</u>…100*

This sets the threshold value at which switch over to fan speed 2 occurs. If the value in the group object *Control value* is greater than or equal to the parameterized threshold value, switch over to fan speed 2 occurs.

7.10.1.3.3 Dependent Parameter

Threshold value speed 2 <-> 3

Options: *1…<u>70</u>…100*

This sets the threshold value at which switchover to fan speed 3 occurs. If the value in the group object *Control value* heating or Control value cooling is greater than or equal to the parameterized threshold value, switchover to fan speed 3 occurs.

7.10.1.3.4 Dependent Parameter

Threshold values hysteresis

Options: *0…<u>5</u>…20*

This sets a hysteresis at which switchover to the next fan speed occurs. The hysteresis applies to all three threshold values.

The setting 0 causes immediate switching without hysteresis.

The entered percentage value is directly added to or subtracted from the percentage value of Threshold value speed x. The result is a new upper or lower threshold value.

Switch threshold top (switch on) = threshold value + hysteresis

Switch threshold bottom (switch off) = threshold value - hysteresis

> ⓘ **Note**
>
> The hysteresis does not apply to switching between speeds 0 and 1.

7.10.1.3.4.1 Example: Three-speed fan, fan control with hysteresis

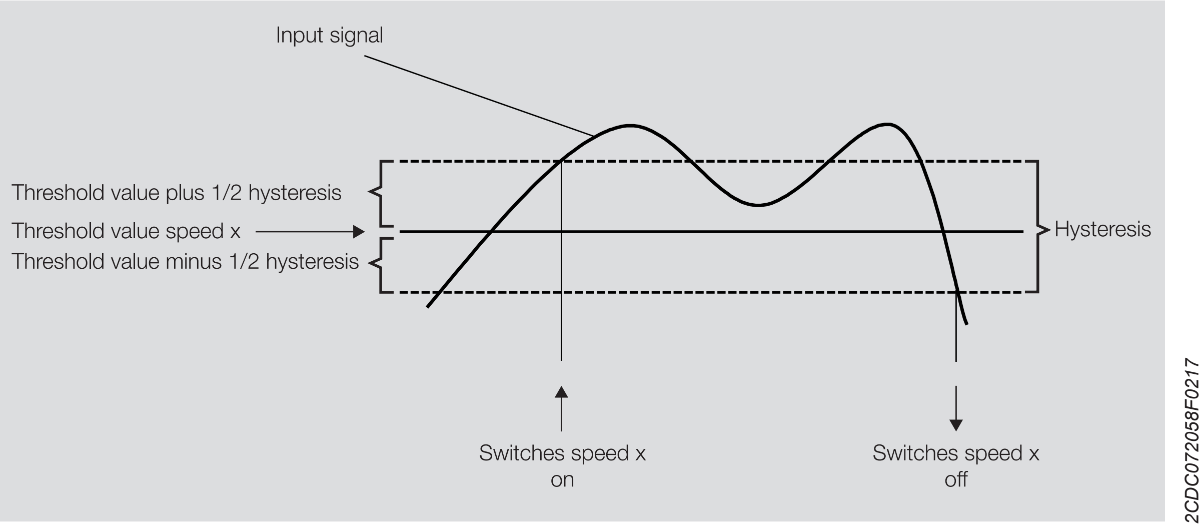


Fig. 49: Fan control with hysteresis

Using hysteresis avoids continual switching between the fan speeds caused by fluctuating input signals around the threshold value.

ⓘ **Note**

Behavior of the fan with overlapping switching thresholds due to usage of hysteresis

1) The hysteresis defines the speed at which the speed set is left.
2) If the speed is left, the new speed is determined using the control value and the switching thresholds. The hysteresis is not taken into account. Control values are rounded to whole percentages by the device.
3) A control value with the value 0 always results in speed 0.

Example 1:

Parametrized:

Threshold OFF <-> Speed 1 = 10 %

Threshold Speed 1 <-> Speed 2 = 20 %

Threshold Speed 2 <-> Speed 3 = 30 %

Hysteresis 15 %

Behavior when ascending from speed 0:

- Speed 0 is left at 25 % (≥ 10 % + hysteresis).
- The new speed is 2 (25 % is between 20 % and 30 %).
- Accordingly, speed 1 is omitted.

Behavior when descending from speed 3:

- Speed 3 transition at 14 % (< 30 % – hysteresis).
- The new speed is 1 (15 % is between 10 and 20 %).
- Accordingly, speed 2 is omitted.

If a switching point is less than or equal to the changeover point 1 <-> 0, the speed is skipped on switching down.

Example 2:

Parametrized:

Threshold OFF <-> Speed 1 = 1 %

Threshold Speed 1 <-> Speed 2 = 10 %

Threshold Speed 2 <-> Speed 3 = 20 %

Hysteresis 20 %

Behavior when descending from speed 3:

- Speed 3 is left at 20 % (40 % - hysteresis)
- New speed is 2
- Speed 2 is left at 0 % (20 % - hysteresis)
- New speed is 0, speed 1 is skipped

ⓘ **Note**

At a speed of 100 %, the highest fan speed is always used. This feature is intended to prevent undesirable incorrect behavior due to erroneous programming.

7.10.1.3.5 Dependent Parameter

Minimum dwell period in fan speed

Options: *0…<u>5</u>…600*

This parameter defines the dwell time for a fan speed until it switches to the next higher or lower fan speed. The entry is made in seconds.

A setting of 0 means instant switching. The minimum relay switching times can be found in the technical data.

The dwell time is only taken into account in automatic operation.

7.10.1.3.6 Dependent Parameter

Return from manual fan adjustment to automatic mode

Options: *<u>Via group object</u>*
Automatic (time)
Via group object or automatic (time)

This parameter is used to define how a return from manual fan adjustment to the automatic mode is to occur.

- *Via group object*: The return to the automatic mode is only via the *Activate/deactivate fan automation* group object.
- *Automatic (time)*: The return is automatic after an adjustable time. The dependent parameter *Reset time* appears.
- *Via group object or automatic (time)*: The reset is both via the *Activate/deactivate fan automation* group object and after an adjustable time. The dependent parameter *Reset time* appears.

7.10.1.3.6.1 Dependent Parameter

Reset time

Options: *00:00:30…01:00:00…18:12:15*

After the time specified here has elapsed, the fan returns to automatic operation.

The time starts again after each manual adjustment of the fan.

7.10.1.4 Enable start-up behavior (switch on from Off to On)

Options: *No*
Yes

This parameter enables the fan to start from the OFF state with a defined fan speed. This fan speed is immediately applied.

- *Yes*: The dependent parameters *Switch on at fan speed* and *Minimum holding time at switch-on speed* are displayed.

In order to guarantee a safe start of the fan motor, it can be useful to start the fan motor first with a higher fan speed. Thus a higher torque for the start-up phase of the fan is achieved.

Note

However, with a step switch, this would mean switching through the other fan speeds consecutively. With the changeover switch the fan speed is switched on right away.

The delay between the switchover of two fan speeds (contact change) is taken into account.

Note

The dwell times, which are taken into account in automatic operation, are inactive and will only be taken into account after the start-up phase.

Note

The start-up behavior is a technical characteristic of the fan. For this reason, this behavior has a higher priority than an active limitation or forced operation.

—

7.10.1.4.1 DEPENDENT PARAMETER

Switch on over fan speed

Options: *1*
2
3

Here you set which speed the fan uses to start from the OFF state.

—

7.10.1.4.2 DEPENDENT PARAMETER

Minimum dwell period in switch on speed

Options: *0…5…600*

This parameter defines the minimum dwell time for one of the switch on speeds.

7.10.1.4.2.1 Example: Start-up behavior of a three-speed fan

The illustration shows the reaction in *automatic operation* with the option *Switch on over fan speed 3*, if the fan receives the telegram from the OFF state to set Fan speed 1.

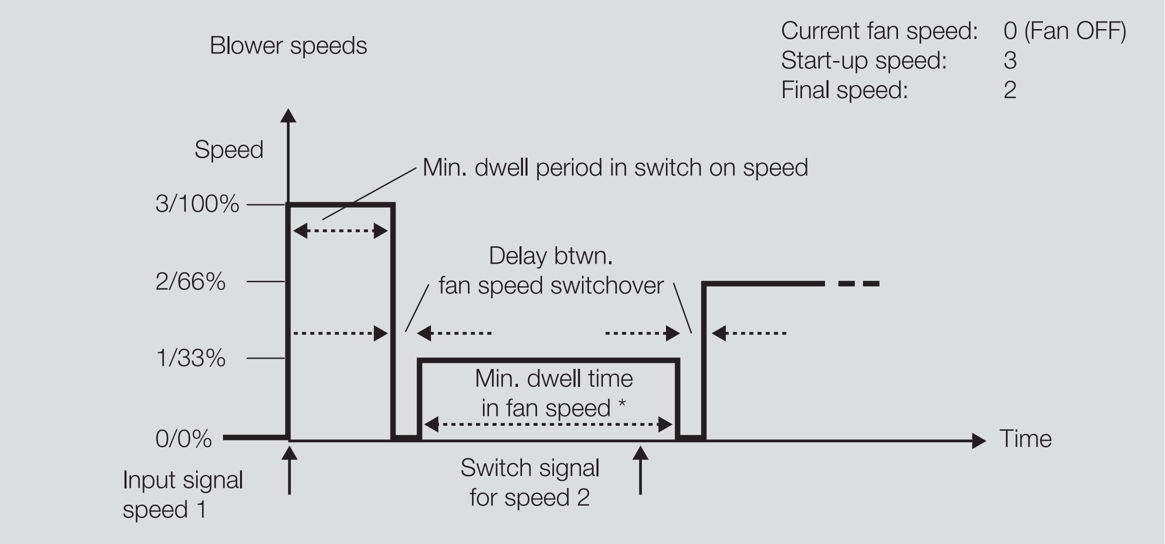


Fig. 50: Start-up behavior of a three-speed fan

* The parameter *Minimum dwell period in fan speed in s [0…65,535]* in the parameter window *Automatic operation* is only active and programmable, if the option *Yes* has been selected in the *Enable automatic operation* parameter. In the parameter window *Fan*, you can find the parameter *Enable automatic operation*.

> ⓘ **Note**
>
> Forced operation remains valid and is taken into account.
>
> The delay time with speed switchover remains active to protect the fan.
>
> If an Off command is received during the start-up time, the fan switches off directly, independent of whether it has already reached the target speed or not.

7.10.1.5 Enable run-on behavior for fan speed reduction

Options: *No*
Yes

This parameter activates a run-on for the fan. If the fan changes to a lower speed, it remains in the previous speed for the parameterized run-on time and only then reduces the speed by one level.

If the fan goes through several speed changes, run-on times are executed successively, adding on those times.

A run-on time of 0 seconds means that run-on is deactivated.

Run-on is executed regardless of where the speed change originates (automatic operation, direct operation, manual procedure, fan switch off).

- *Yes*: The dependent parameters *Run-on speed 1*, *Run-on speed 2* and*Run-on speed 3* are displayed.

—

7.10.1.5.1 DEPENDENT PARAMETER

Run-on speed 1

Options: *0…20…600*

—

7.10.1.5.2 DEPENDENT PARAMETER

Run-on speed 2

Options: *0…20…600*

—

7.10.1.5.3 DEPENDENT PARAMETER

Run-on speed 3

Options: *0…20…600*

7.10.1.6 Fan speed limitation

Options: *<u>Deactivated</u>*
Activated

The fan speed limitation can be used to prohibit certain fan speeds or to freeze the fan at a specific speed.

- Deactivated: The fan speed limitation is deactivated
- Enabled: The fan speed limitation is enabled. The dependent parameters *Limitation 1*, *Limitation 2*, *Limitation 3* are displayed.

7.10.1.6.1 DEPENDENT PARAMETER

Limitation x

The following descriptions apply to the parameters *Limitation 1*, *Limitation 2* and *Limitation 3*.

Options: *3, 2, 1, OFF*
Unchanged
OFF
1
1, OFF
2
2, 1
2, 1, OFF
3
3, 2
3, 2, 1

This parameter specifies which fan speed(s) is(are) set, or cannot be exceeded/dropped below, if limitation is active. The limitations apply both in the manual mode and in the automatic mode.

- *No limitation active*: Everything is possible.
- *Unchanged*: The state is retained.
- *OFF*: Off.
- *1*: Limited to speed 1.
- *1, OFF*: Limited to speed 1 and off.
- *2*: Limited to speed 2.
- *2, 1*: Limited to speeds 2 and 1.
- *2, 1, OFF*: Limited to speed 2, 1 and off.
- *3*: Limited to speed 3.
- *3, 2*: Limited to speed 3 and 2.
- *3, 2, 1*: Limited to speed 3, 2 and 1.

ⓘ **Note**

The parameterized start-up behavior, which is a technical characteristic of the fan, has a higher priority than a limitation, i.e. if a limitation is activated in fan speed 2 and start-up behavior is parameterized with fan speed 3, the following behavior will result: The fan is in the OFF state and receives a control signal for fan speed 1. First the fan goes to speed 3 (start-up speed), then 2, which is specified via the limitation. Due to the limitation, the actual required fan speed 1 will not be reached.

Three limitations are available. These can be used, e.g., to prohibit speed 3 during the night to reduce the noise.

The sequence of the displayed parameters corresponds with their priorities, i.e. the parameter with the highest priority has limitation 1 followed by limitation 2 and 3.

The following points apply to all limitations:

- The limitation need not necessarily apply to one fan speed only. It can also encompass another range of the fan speeds, i.e. only certain fan speeds can be set if the limitation is active. In this way, a limited control is also possible.
- The limitation is activated if a telegram with the value 1 is received on the group object *Limitation*. The limitation is deactivated if a telegram with the value 0 is received on the group object *Limitation*.
- If a limitation is activated, the product switches to the parameterized fan speed regardless of the control value. If another fan speed or a speed outside the "limitation range" is set when the limitation is activated, then the required speed or the limit speed of the range is set.
- After limitations are switched off, the fan speed is recalculated and implemented. This means that during limitation, the product operates normally in the background, the outputs are not changed and implementation only occurs once limitation ends.

ⓘ **Note**

They are prioritized according to the listed sequence. The highest priority is assigned to limitation 1 and the lowest to limitation 3.

7.10.1.7 Switch fan speed via 1-bit objects

Options: Deactivated
Switch off to active fan speed using "0" only
Switch off to any 1-bit fan speed using "0"

Additional group objects for switching the fan may be enabled using this parameter. Using these objects it is possible to control the fan speeds using specific 1-bit group objects.

- *Deactivated*: The additional group objects are deactivated and hidden.
- *Switch off to active fan speed using "0" only*: The additional group objects are enabled. Switching off via these group objects occurs if the Off command ("0") on the switching object is assigned to the currently active speed.
- *Switch off to any 1-bit fan speed using "0"*: The additional group objects are enabled. Switching off via this group object occurs if an Off command ("0") is sent on any of the switching objects.

The following group objects are displayed if the *Switch off to active fan speed using "0" only* or *Switch off to any 1-bit fan speed using "0"* option has been selected:

- *Switch fan speed 1*
- *Switch fan speed 2*
- *Switch fan speed 3*
- *Status Fan speed 1*
- *Status Fan speed 2*
- *Status Fan speed 3*

With the switching object it is possible to control the fan speed (1/2/3) directly. The status objects specify whether the fan speed is currently at the current speed.

ⓘ **Note**

The differentiation between the two switch-off variants ("0" on the active group object or irrespective of which group object) is used to cater for the case that the source of the values for the group objects sends cyclically or all 3 group objects are always sent simultaneously. This situation can result in the fan switching on only briefly or not at all. To prevent this problem from occurring, it is possible to select that the shutdown can only occur via the speed currently active.

Depending on the number of fan speeds selected (see Number of fan speeds, Page 268) it is possible that all group objects may not be visible because only the group objects for the speeds actually used are enabled.

7.10.1.8 Send status values

Options: *On change*
Cyclically
On change and cyclically
On request
After a change or request
On request and cyclically
After a change or request and cyclically

This parameter defines when the fan output status values are to be sent. This parameter affects the following fan output group objects:

- *Status Fan On/Off*
- *Status Fan Speed*
- *Status Fan Speed 1*
- *Status Fan Speed 2*
- *Status Fan Speed 3*
- *Status Fan Automatic*

If the parameter *Switch fan speed via 1-bit objects* is parameterized with the *Deactivated* option, the group objects *Status Fan Speed 1*, *Status Fan Speed 2* and *Status Fan Speed 3* are not displayed.

- *On change*: The values are sent on a change in the object values (e.g. change from 0 to 1). With the *Status Control value* group object, the values are sent if the change in the control value is at least 1 %.
- *Cyclically*: If this option is selected, the status values are sent automatically after an adjustable time has elapsed. The *Every* dependent parameter is displayed.
- *On change and cyclically*: The values are sent on a change and cyclically.
- *On request*: All status values are sent on the receipt of a command via the *Request status values* group object.
- *After a change or request*: The values are sent on request and on a change.
- *On request and cyclically*: The values are sent on a change and cyclically.
- *After a change or request and cyclically*: The values are sent on request and on a change and cyclically. The *Every* dependent parameter is displayed.

—

7.10.1.8.1 DEPENDENT PARAMETER

Every

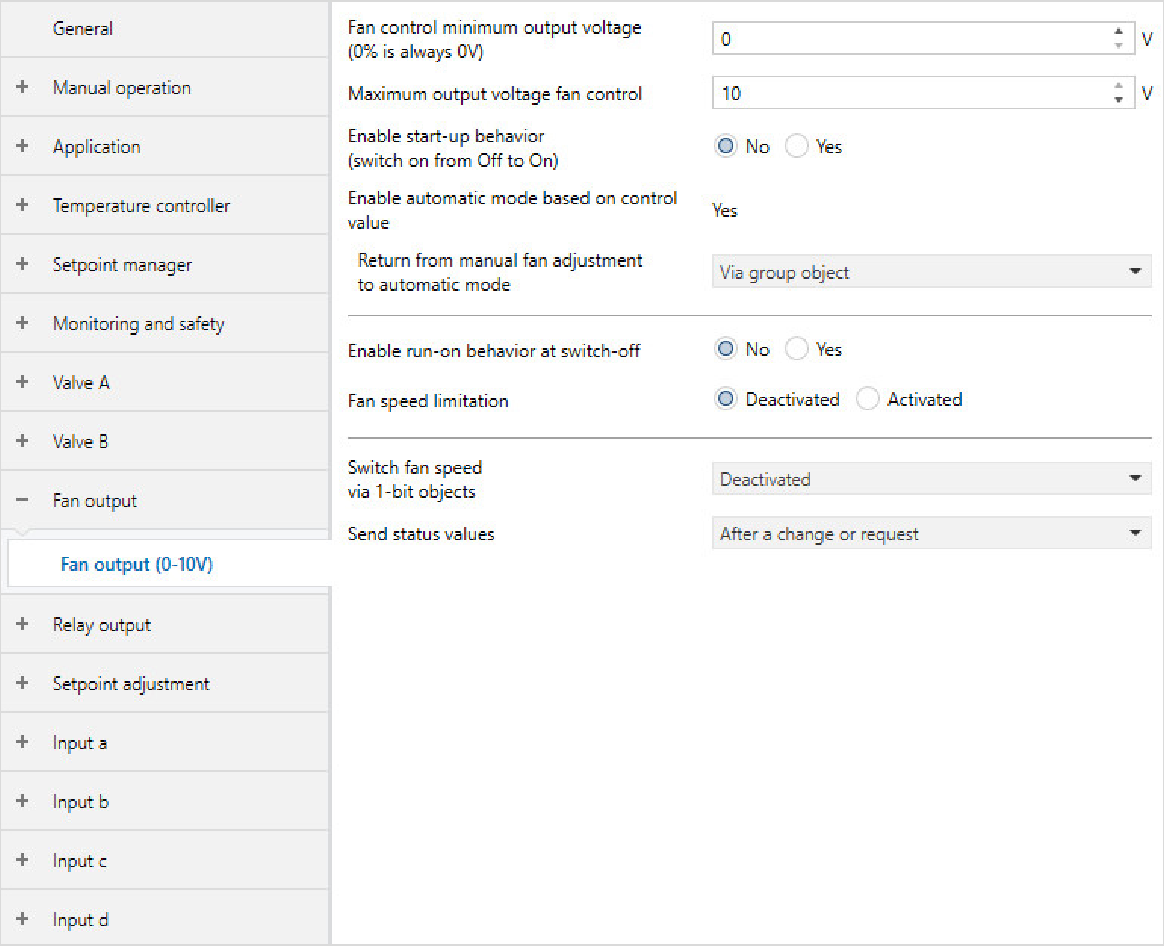
Options: *00:00:30…00:05:00…18:12:15*

This parameter is used to set the time after which the status values are to be sent cyclically. The group objects are sent after each cycle.

7.10.2 FCC/S 1.3.x.1 / 1.5.x.1

The explanations below only apply to:

- FCC/S 1.3.1.1
- FCC/S 1.3.2.1
- FCC/S 1.5.1.1
- FCC/S 1.5.2.1



Fan control minimum output voltage (0% is always 0V): 0 V

Maximum output voltage fan control: 10 V

Enable start-up behavior (switch on from Off to On): ● No ○ Yes

Enable automatic mode based on control value: Yes

Return from manual fan adjustment to automatic mode: Via group object

Enable run-on behavior at switch-off: ● No ○ Yes

Fan speed limitation: ● Deactivated ○ Activated

Switch fan speed via 1-bit objects: Deactivated

Send status values: After a change or request

2CDC078026F0218

Fig. 51: Fan output parameter window

7.10.2.1 Fan control minimum output voltage

Options: *0…10*

This parameter indicates the minimum output voltage used to control the fan.

> ⓘ **Note**
>
> If the fan is controlled at 0%, the output voltage is 0 V.

7.10.2.2 Maximum output voltage fan control

Options: _0_…10

This parameter indicates the maximum output voltage used to control the fan. This voltage operates the fan at its highest speed.

> ⓘ **Note**
>
> The minimum output voltage may not exceed the maximum.

> ⓘ **Note**
>
> Please comply with the technical data for the fan.

7.10.2.3 Enable start-up behavior (switch on from Off to On)

Options: *No* (default)
Yes

This parameter enables the fan to start from the OFF state at a defined speed. This fan speed is immediately applied.

- *Yes*: This displays the dependent parameters *Switch on at speed* and *Minimum dwell time at switch-on speed*.

To guarantee that the fan motor starts up reliably, it can be useful to start it at a higher fan speed initially to increase the torque during start-up.

> ⓘ **Note**
>
> The dwell times, which are taken into account in automatic operation, are inactive and will only be taken into account after the start-up phase.

> ⓘ **Note**
>
> The start-up behavior is a technical characteristic of the fan. For this reason, this behavior has a higher priority than an active limitation or forced operation.

> ⓘ **Note**
>
> Forced operation remains valid and is taken into account.
>
> If an Off command is received during start-up, the fan switches off immediately regardless of whether the required time at start-up speed has elapsed.

—

7.10.2.3.1 DEPENDENT PARAMETER

Switch on at speed

Options: *0…30…100* (default 30)

This setting determines the speed at which the fan starts from the OFF state.

—

7.10.2.3.2 DEPENDENT PARAMETER

Minimum dwell period in switch on speed

Options: *0…5…600* (default 5)

This parameter defines the minimum dwell time for one of the switch on speeds.

7.10.2.4 Enable automatic mode based on control value

Options: *Yes*
No

This parameter is used to enable automatic fan operation depending on the control value. In this mode the fan automatically follows the control value for the heating/cooling mode currently active. This means that the higher the control value is, the greater the fan speed is as well.

- *Yes*: Automatic operation is activated. The group objects *Activate/deactivate fan automation* and *Status Fan automatic* are enabled. The dependent parameters are displayed.
- *No*: Automatic operation is deactivated. The fan only reacts to control via the fan objects.

ⓘ **Note**

Automatic control is always enabled in the controller mode and cannot be completely deactivated. The purpose of this feature is to ensure the correct function of the device, because otherwise the device would only react to manual adjustment.

If the device is used in the controller mode such that both a basic stage and an additional stage (e.g. heating) are in one fan coil unit, in the automatic mode the fan only follows the control value for the basic stage.

If the additional stage is in a dedicated fan coil unit, this situation can be addressed by activating the automatic mode in the device used there and using the control value for this device.

NOTICE

The device evaluates threshold values in ascending order, i.e. first it checks the threshold value for Off <-> Fan speed 1, then Fan speed 1 <-> Fan speed 2, and so on.

Proper functionality is only assured if the threshold value for OFF <-> Fan speed 1 is less than that for Fan speed 1 <-> Fan speed 2 and this is less than Fan speed 2 <-> Fan speed 3, etc.

7.10.2.4.1 Dependent Parameter

Return from manual fan adjustment to automatic mode

Options: *Via group object*
Automatic (time)
Via group object or automatic (time)

This parameter is used to define how a return from manual fan adjustment to the automatic mode is to occur.

- *Via group object*: The return to the automatic mode is only via the *Activate/deactivate fan automation* group object.
- *Automatic (time)*: The return is automatic after an adjustable time. The dependent parameter *Reset time* appears.
- *Via group object or automatic (time)*: The reset is both via the *Activate/deactivate fan automation* group object and after an adjustable time. The dependent parameter *Reset time* appears.

7.10.2.4.1.1 DEPENDENT PARAMETER

Reset time

Options: *00:00:30…01:00:00…18:12:15*

After the time specified here has elapsed, the fan returns to automatic operation.

The time starts again after each manual adjustment of the fan.

7.10.2.5 Run-on behavior when switch-off enabled

Options: *No*
Yes

This parameter activates a run-on for the fan. When run-on is activated, if the fan is switched off by a control value greater than or equal to 20%, the fan continues to run for the parametrized time for a 20% control value before switching off completely.

A run-on time of 0 seconds means that run-on is deactivated.

Run-on is executed regardless of where switch off originates (automatic operation, direct operation, manual procedure, fan switch-off).

- *Yes*: This displays the dependent parameter *Run-on time at fan speed 20%*.

The run-on time dissipates any existing heat from the fan coil unit.

7.10.2.5.1 DEPENDENT PARAMETER

Run-on time at fan speed 20%

Options: *0…20…600*

7.10.2.6 Fan speed limitation

Options: *Deactivated*
Activated

This parameter is used to prohibit certain fan speeds or to freeze the fan at a particular speed.

- *Deactivated*: Fan speed limitation is disabled.
- *Activated*: Fan speed limitation is enabled. It also displays the dependent parameters *Limitation 1 lower limit*, *Limitation 1 upper limit*, *Limitation 2 lower limit*, *Limitation 2 upper limit*, *Limitation 3 lower limit* and *Limitation 3 upper limit*.

7.10.2.6.1 Limitations

When limitation is active, the fan speed can only operate between the values set for the parameter. Limitation applies in both manual and automatic mode.

ⓘ Note

For this function to work, the value of the lower limit must be less than or equal to the value of the upper limit.

If the upper and lower limits are set to the same value, the fan stays permanently at that speed.

ⓘ Note

The parametrized start-up behavior, which is a technical characteristic of the fan, takes priority over limitation. In other words, if limitation is set to start at a fan speed of 40% and a start-up is set to start at 60%, the fan will react as follows: The fan is in the OFF state and receives a control signal to run at 20% speed. Initially, the fan speeds up to 60% (start-up speed), and then switches to 40% as specified by the limitation. The limitation prevents the fan from reaching the fan speed actually required – in this case, 20%.

There are three limitations available. They can be used, e.g., to prohibit speed 3 in hotel rooms during the night so as to reduce background noise.

The sequence of the displayed limitations corresponds with their priorities, i.e. limitation 1 takes highest priority, followed by limitations 2 and 3.

The following points apply to limitations:

- The limitation need not necessarily apply to one fan speed only. It can encompass a range of fan speeds, i.e. only certain speeds can be set if limitation is active. This provides scope for a certain degree of adjustment.
- Limitation is activated when the *Limitation* group object receives a telegram with the value 1, and deactivated when it receives a telegram with the value 0.
- When limitation is activated, the product switches to the parametrized fan speed regardless of the control value. If another speed or a speed outside the limitation range is set when the function is activated, then the fan switches to the required speed, or to the speed limit for the range.
- After a limitation is switched off, fan speed is recalculated and executed. This means that during limitation, the product operates normally in the background, the outputs are not changed and implementation only occurs once limitation ends.

Each of the three limitations used to limit the fan speeds has the same parameters.

ⓘ Note

They are prioritized according to the listed sequence. The highest priority is assigned to limitation 1 and the lowest to limitation 3.

—

7.10.2.6.1.1 DEPENDENT PARAMETER

Limitation x lower limit

Options: *0…100*

This parameter determines the lowest permissible fan speed when limitation is activated.

7.10.2.6.1.2 DEPENDENT PARAMETER

Limitation x upper limit

Options: *0…100*

This parameter determines the highest permissible fan speed when limitation is activated.

7.10.2.7 Switch fan speed via 1-bit objects

Options: *Deactivated*
Switch off to active fan speed using "0" only
Switch off to any 1-bit fan speed using "0"

This parameter enables additional group objects for switching the fan, which make it possible to control the fan speed directly via specific 1-bit group objects.

- *Deactivated*: Deactivates and hides the additional group objects.
- *Switch off to active fan speed using "0" only*: This enables the additional group objects. These objects switch the fan off if the Off command ("0") is assigned to the Switch object for the fan speed that is currently active.
- *Switch off to any 1-bit fan speed using "0"*: This enables the additional group objects. These objects switch the fan off if an Off command ("0") is sent to any of the Switch objects.

The following group objects appear if you select *Switch off to active fan speed using "0"only* or *Switch off to any 1-bit fan speed using "0"*:

- *Switch fan speed 1*
- *Switch fan speed 2*
- *Switch fan speed 3*
- *Status Fan speed 1*
- *Status Fan speed 2*
- *Status Fan speed 3*

The Switch objects enable you to control the relevant fan speed (1/2/3) directly. The Status objects indicate whether the fan speed is now at the current speed.

Since a continuous fan has no specific speeds but may still need to be operated/displayed via 1-bit group objects, each object is assigned a specific value:

- Group objects for Switch fan speed X:
  - *Switch fan speed 1*: 33%
  - *Switch fan speed 2*: 66%
  - *Switch fan speed 3*: 100%
- Group objects for Status Fan speed X:
  - *Status Fan speed 1*: 33%
  - *Status Fan speed 2*: 66%
  - *Status Fan speed 3*: 100%

ⓘ **Note**

The distinction between the two switch off variations ("0" sent to the active or any group object) provides for a scenario where the encoder sends the group objects cyclically, or always sends all 3 group objects simultaneously. This can result in the fan switching on briefly or not at all. To prevent this, the controller can be set to ensure that the fan is only switched off via the active speed at that particular moment.

7.10.2.8 Send status values

Options: *On change*
Cyclically
On change and cyclically
On request
After a change or request
On request and cyclically
After a change or request and cyclically

This parameter defines when the fan output status values are to be sent. This parameter affects the following fan output group objects:

- *Status Fan On/Off*
- *Status Fan Speed*
- *Status Fan Speed 1*
- *Status Fan Speed 2*
- *Status Fan Speed 3*
- *Status Fan Automatic*

If the parameter *Switch fan speed via 1-bit objects* is parameterized with the *Deactivated* option, the group objects *Status Fan Speed 1*, *Status Fan Speed 2* and *Status Fan Speed 3* are not displayed.

- *On change*: The values are sent on a change in the object values (e.g. change from 0 to 1). With the *Status Control value* group object, the values are sent if the change in the control value is at least 1 %.
- *Cyclically*: If this option is selected, the status values are sent automatically after an adjustable time has elapsed. The *Every* dependent parameter is displayed.
- *On change and cyclically*: The values are sent on a change and cyclically.
- *On request*: All status values are sent on the receipt of a command via the *Request status values* group object.
- *After a change or request*: The values are sent on request and on a change.
- *On request and cyclically*: The values are sent on a change and cyclically.
- *After a change or request and cyclically*: The values are sent on request and on a change and cyclically. The *Every* dependent parameter is displayed.

—

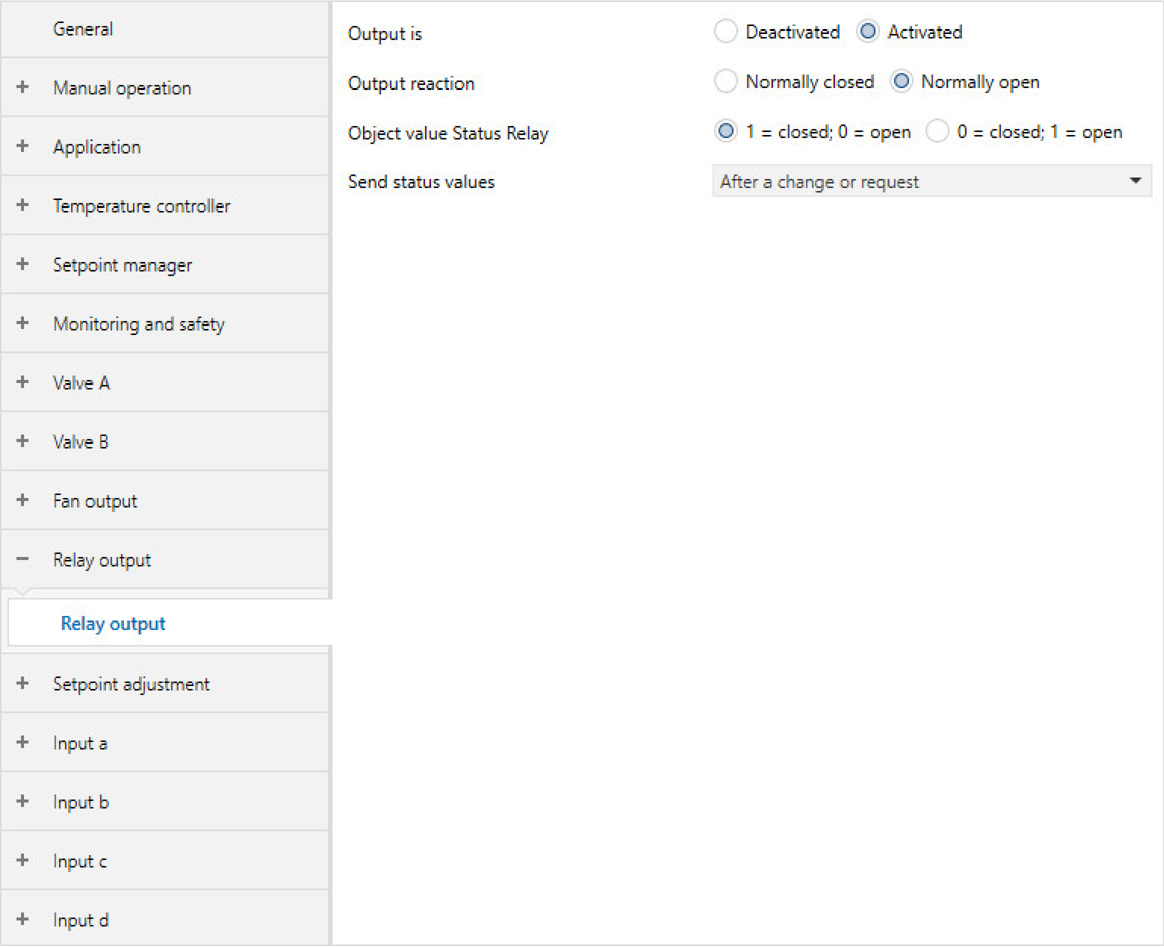
7.10.2.8.1 DEPENDENT PARAMETER

Every

Options: *00:00:30…00:05:00…18:12:15*

This parameter is used to set the time after which the status values are to be sent cyclically. The group objects are sent after each cycle.

7.11 Relay output parameter window



Output is ○ Deactivated ● Activated

Output reaction ○ Normally closed ● Normally open

Object value Status Relay ● 1 = closed; 0 = open ○ 0 = closed; 1 = open

Send status values: After a change or request

Fig. 52: Relay output parameter window

7.11.1 Output is

Options: *Deactivated*
Activated

This parameter activates and deactivates the relay output. When the output is deactivated, the relay can no longer be switched and the associated group objects *Status Relay* and *Switch Relay* are hidden.

ⓘ **Note**

When using the relay output as the initial stage for the controller (for an electric heater), the *Switch relay output independently of fan speed (including when fan = 0)* parameter prevents the relay from switching on if the fan is not running. This protects the installation in that the fan also routes into the room any heat generated by an electric heater. This prevents heat from building up and becoming a fire risk.

If the relay is not in use for heating, it can be used instead to switch any ohmic load provided for in its technical specification.

Parametrizing one of the device outputs to accept binary signal input makes it possible to link the input with the relay output. This in turn means that the output can be operated directly via a connected switch.

—

7.11.1.1 DEPENDENT PARAMETER

Output reaction

Options: *Normally open*
Normally closed

This parameter determines whether the output operates as a normally closed or normally open contact.

- *Normally open*: An ON telegram (1) closes the contact, and an OFF telegram (0) opens it.
- *Normally closed*: An ON telegram (1) opens the contact, and an OFF telegram (0) closes it.

—

7.11.1.2 DEPENDENT PARAMETER

Object value Status Relay

Options: *1 = closed, 0 = open*
0 = closed, 1 = open

This parameter determines the group object value of the switching status (Status Relay).

- *1 = closed, 0 = open*: A closed contact is represented by group object value 1 and an open contact by 0.
- *0 = closed, 1 = open*: A closed contact is represented by group object value 0 and an open contact by 1.

—

7.11.1.3 DEPENDENT PARAMETER

Send status values

Options: *On change*
Cyclically
On change and cyclically
On request
After a change or request
On request and cyclically
After a change or request and cyclically

- *After a change*: Sends the value when the object value changes (e.g. From 0 to 1).
- *Cyclically*: Selecting this option automatically sends the value after a user-definable time period. Displays the dependent parameter *All*.
- *On change and cyclically*: Sends the object value after a change, and cyclically.
- *On request*: Sends the status value when *Request group object Status values* receives a command.
- *After a change or request*: Sends the value both after a change and on request.
- *On request and cyclically*: Sends the value both on request and cyclically.
- *After a change or request and cyclically*: Sends the value after a change, on request and cyclically. Displays the dependent parameter *All*.

7.11.1.3.1 DEPENDENT PARAMETER

Every

Options: *00:00:30…00:05:00…18:12:15*

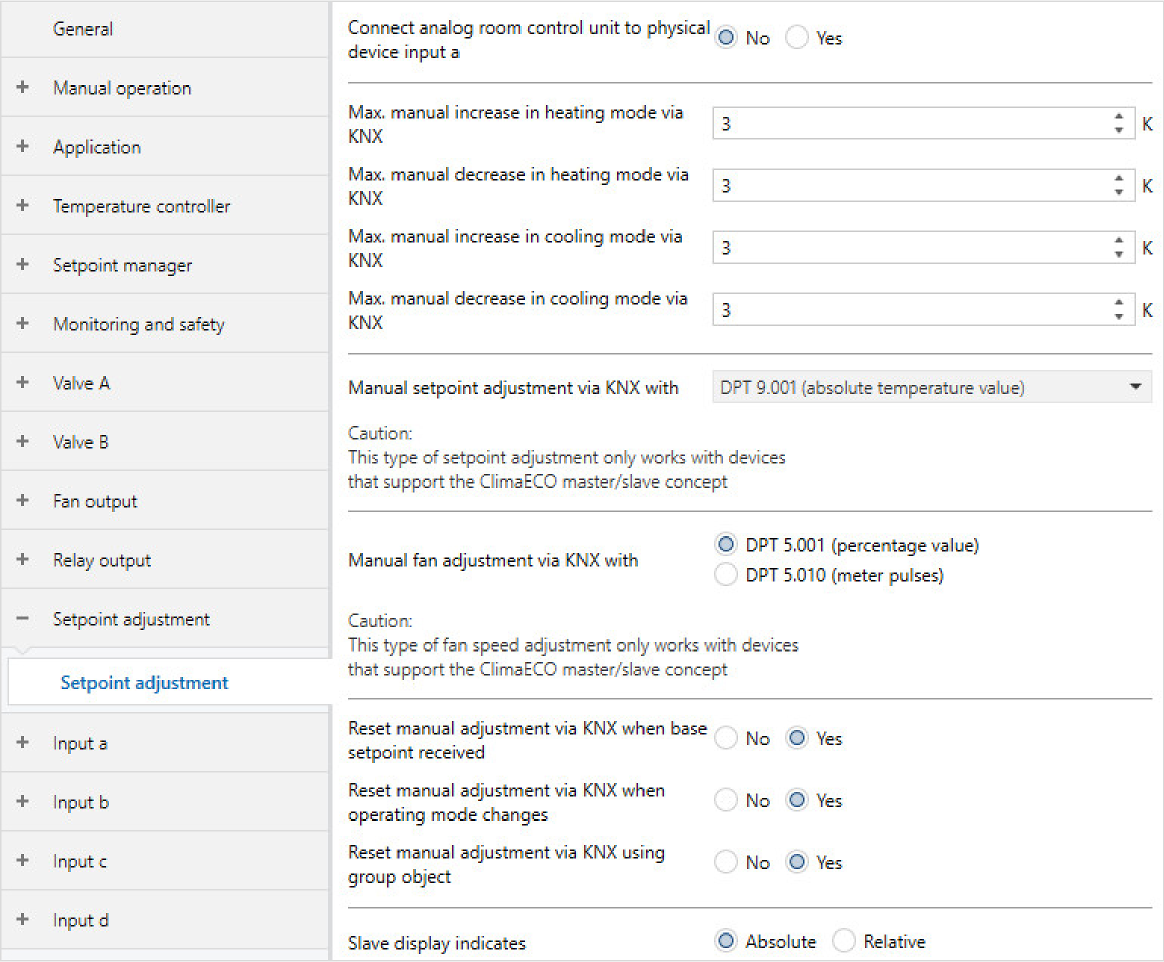
This parameter is used to set the time after which the status values are to be sent cyclically. The group objects are sent after each cycle.

7.12 Setpoint adjustment parameter window

In actuator mode, this window is deactivated and hidden.

The parameters here allow you to determine how room users can adjust setpoints – either via an analog room control unit connected directly to the device, or via KNX.

You can also set which datapoint types to use for setpoint and fan speed adjustment.



Connect analog room control unit to physical device input a ● No ○ Yes

Max. manual increase in heating mode via KNX 3 K

Max. manual decrease in heating mode via KNX 3 K

Max. manual increase in cooling mode via KNX 3 K

Max. manual decrease in cooling mode via KNX 3 K

Manual setpoint adjustment via KNX with DPT 9.001 (absolute temperature value)

Caution:
This type of setpoint adjustment only works with devices that support the ClimaECO master/slave concept

Manual fan adjustment via KNX with ● DPT 5.001 (percentage value) ○ DPT 5.010 (meter pulses)

Caution:
This type of fan speed adjustment only works with devices that support the ClimaECO master/slave concept

Reset manual adjustment via KNX when base setpoint received ○ No ● Yes

Reset manual adjustment via KNX when operating mode changes ○ No ● Yes

Reset manual adjustment via KNX using group object ○ No ● Yes

Slave display indicates ● Absolute ○ Relative

2CDC078028F0218

Fig. 53: Setpoint adjustment parameter window

7.12.1 Connect analog room control unit to physical device input a

Options: <u>*No*</u>
Yes

This parameter determines whether an analog room control unit should be connected to the device in order to adjust setpoints and fan speed.

- *No*: No analog room control unit is connected.
- *Yes*: An analog room control unit is connected to the device.

ⓘ **Note**

Selecting *Yes* means that the device's setpoints can no longer be adjusted with a KNX analog room control unit, and therefore this option also hides the parameters concerned.

When the device is in controller mode, setpoint adjustments made on the analog room control unit are forwarded directly to the internal controller. This setting also hides the group objects *Request setpoint adjustment (master)*, *Confirm setpoint (master)*, *Request fan manually (master)*, *Confirm fan manually (master)*, *Request fan speed (master)* and *Confirm fan speed (master)*.

Device input a is set to *Analog room control unit*. Consequently, this input can only be used to connect the control unit.

The dependent parameters *Maximum setpoint increase* and *Maximum setpoint reduction* appear.

Actuator mode displays the group objects *Request setpoint adjustment (slave)*, *Request fan manually (slave)* and *Request fan speed (slave)*.

These group objects transmit manual adjustments to the controller.

ⓘ **Note**

The group objects used for confirmation are hidden, because the actuator cannot evaluate value confirmation. Caution! This may result in a discrepancy between the analog room control unit and the setpoint/fan speed actually set. Since the analog room control unit is manual and cannot send a value back to the device, someone may set a value that the external controller will not permit.

The easiest way to prevent this is by using the device's own controller instead of an external one. Alternatively, either ensure that changes made via the analog room control unit are implemented by the controller, or accept that discrepancies between the actual setpoint/fan speed and the one set on the device are inevitable.

ⓘ **Note**

Along with the temperature setpoint and fan speed adjustment options, the analog room control unit features a temperature sensor.

To use this, connect the analog room control unit output designated for setpoint and fan speed adjustment (terminal a) to device input a.

It cannot be connected to any other input on the device.

Only connect one analog room control unit to the device. Connecting multiple controllers will cause operating faults.

The analog room control unit still works without the thermostat feature connected.

The temperature reading output can be connected to any other input on the device, but the input concerned must be parametrized for the correct temperature value only:

- Temperature sensor type: NTC
- NTC type NTC 20 [0…+100 °C]

We recommend using device input b for this.

There are two versions of the analog room control unit: one with setpoint and fan adjustment, and one with setpoint adjustment only. The latter can also be connected for use.

The following device variants are available as analog room control units:

- SAF/A 1.0.1-24 Room Temperature and Fan Coil Control Panel
- SAR/A 1.0.1-24 Room Temperature Control Panel

7.12.1.1 Selection of No

—

7.12.1.1.1 DEPENDENT PARAMETER

Max. manual increase in heating mode via KNX

This parameter is only displayed if you select *No* when setting *Connect analog room control unit to physical device input a*.

Options: *0…3…9*

The parameter determines the maximum setpoint increase that can be manually set via KNX in heating mode. You can use the *Request setpoint adjustment* group object to increase the Comfort heating setpoint by a maximum of the value set here.

ⓘ **Note**

If the object receives a value that exceeds this, the maximum possible increase is applied, and a request with the new temperature is sent via KNX on the *Confirm setpoint adjustment* group object.

—

7.12.1.1.2 DEPENDENT PARAMETER

Max. manual reduction in heating mode via KNX

This parameter is only displayed if you select *No* when setting *Connect analog room control unit to physical device input a*.

Options: *0…3…9*

The parameter determines the maximum setpoint reduction that can be manually set via KNX in Heating mode. Use the *Request setpoint adjustment* group object to reduce the Comfort heating setpoint by a maximum of the value set here.

Note

If the object receives a value below this, the maximum possible reduction is applied, and a request with the new temperature is confirmed on the *Confirm setpoint adjustment* group object.

—

7.12.1.1.3 DEPENDENT PARAMETER

Max. manual increase in cooling mode via KNX

This parameter is only displayed if you select *No* when setting *Connect analog room control unit to physical device input a*.

Options: *0…3…9*

The parameter determines the maximum setpoint increase that can be manually set via KNX in Cooling mode. Use the *Request setpoint adjustment* group object to increase the Comfort cooling setpoint by a maximum of the value set here.

Note

If the object receives a value that exceeds this, the maximum possible increase is applied, and a request with the new temperature is sent via KNX on the *Confirm setpoint adjustment* group object.

—

7.12.1.1.4 DEPENDENT PARAMETER

Max. manual reduction in cooling mode via KNX

This parameter is only displayed if you select *No* when setting *Connect analog room control unit to physical device input a*.

Options: *0…3…9*

The parameter determines the maximum setpoint reduction that can be manually set via KNX in cooling mode. You can use the *Request setpoint adjustment* group object to reduce the Comfort cooling setpoint by a maximum of the value set here.

Note

If the object receives a value below this, the maximum possible reduction is applied, and a request with the new temperature is confirmed on the *Confirm setpoint adjustment* group object.

7.12.1.1.5 DEPENDENT PARAMETER

Manual setpoint adjustment via KNX with

This parameter is only displayed if you select *No* when setting *Connect analog room control unit to physical device input a*.

Options:	*DPT 6.010 (meter pulses)* *DPT 9.001 (absolute temperature value)* *DPT 9.002 (relative temperature value)*

This parameter determines the datapoint type used to adjust the setpoint via group objects *Request setpoint adjustment* and *Confirm setpoint adjustment*.

- *DPT 6.010 (meter pulses)*: This is the only viable option if you are using legacy ABB devices.
- *DPT 9.001_(Absolute temperature value)*: This adjusts the setpoint as an absolute temperature value by sending the new temperature required. Likewise, the *Confirm setpoint adjustment* group object sends the new temperature as an absolute value.
- *DPT 9.002 (relative temperature value)*: This adjusts the setpoint as a relative temperature value by sending a target temperature change (e.g. +2 °C). Likewise, the *Confirm setpoint adjustment* group object sends the new temperature as a relative value.

ⓘ **Note**

DPT 9.001 and DPT 9.002 temperature adjustment will not work on legacy ABB devices that do not yet support the latest version of the master/slave concept. For these devices, DPT 6.010 is the only option, which means that other equipment (such as display systems) cannot read the setpoint adjustment.

However, they can read or display the current target temperature via the *Current setpoint* group object.

Before adjusting a setpoint with an analog room control unit, please check which setpoint adjustment format the controller supports.

You can also communicate setpoint changes for implementation on other equipment via the group objects *Base setpoint*, *Comfort heating setpoint* or *Comfort cooling setpoint*.

Caution! Note that changing the base setpoint also changes the Standby and Economy temperatures. To prevent this, use absolute rather than relative setpoint adjustment (*Setpoint manager – Setpoint specification and adjustment*). However, note that with both types of adjustment, the parametrized maximum setpoint increase/reduction limits are no longer taken into account.

7.12.1.1.6 DEPENDENT PARAMETER

Manual fan adjustment via KNX with

This parameter is only displayed if you select *No* when setting *Connect analog room control unit to physical device input a*.

Options: *DPT 5.001 (percentage value)*
DPT 5.010 (meter pulses)

This parameter determines the datapoint type used to adjust the setpoint via group objects *Request fan speed adjustment* and *Confirm fan speed adjustment*.

- *DPT 5.001 (percentage value)*: Selecting this DPT sends the fan adjustment as a 0…100% value. To adjust the fan speed, simply enter the new required value as a percentage.
- *DPT 5.010 (meter pulses)*: This is the only viable option if you are using legacy ABB devices that do not yet support the latest version of the master/slave concept. It is the only way to ensure that the master and slave can communicate. This option sends the fan adjustment as a proprietary value.

ⓘ **Note**

DPT 5.001 fan adjustment will not work on legacy ABB devices that do not yet support the latest version of the master/slave concept. For these devices, DPT 5.010 is the only option, which means that other equipment (such as display systems) cannot read the setpoint adjustment.

However, they can read or display the current fan speed via the *Status Fan speed* group object.

You also have the option to adjust the fan speed at any time with the *Switch fan speed* group object.

7.12.1.1.7 DEPENDENT PARAMETER

Reset manual adjustment via KNX when base setpoint received

This parameter is only displayed if you select *No* when setting *Connect analog room control unit to physical device input a*.

Options: *No*
Yes

Selecting *Yes* when setting this parameter resets manual setpoint adjustment when a value is received via the *Base setpoint* group object.

Selecting *No* adds the manual setpoint adjustment to the new setpoint when a value is received via the *Base setpoint* group object.

Example:

Old base setpoint 21 °C + manual adjustment 1.5 °C = 22.5 °C. Group object receives a new base setpoint of 18 °C + previous manual adjustment of 1.5 °C = 19.5 °C.

7.12.1.1.8 DEPENDENT PARAMETER

Reset manual adjustment via KNX when operating mode changes

This parameter is only displayed if you select *No* when setting *Connect analog room control unit to physical device input a*.

Options:	*No* *Yes*

- *No*: When the device changes operating modes, the manual adjustment is cleared from active parameters and replaced with the parametrized target temperature for the new mode plus any change sent via the Base setpoint group object.

Example:

Comfort temperature 21 °C + manual adjustment 1.5 °C = 22.5 °C. Change to Eco mode with a parametrized temperature of 17 °C. The device adjusts the temperature to 17 °C because the manual adjustment has been cleared.

- *Yes*: This option factors in the manual setpoint adjustment on top of the new operating mode temperature.

Example:

Comfort temperature 21 °C + manual adjustment 1.5 °C = 22.5 °C. Change to Eco mode with a parametrized temperature of 17 °C. The device adjusts the temperature to 18.5 °C because the manual adjustment has been factored in.

7.12.1.1.9 DEPENDENT PARAMETER

Reset manual adjustment via KNX using group object

This parameter is only displayed if you select *No* when setting *Connect analog room control unit to physical device input a*.

Options:	*No* *Yes*

When this option is activated, the manual adjustment can be cleared at any time via the *Reset manual setpoint adjustment* group object.

Selecting *No*hides this group object and you can no longer use it to reset manual setpoint adjustment.

Example:

Resetting manual adjustment of all the devices in a building using a time scheduler in the system.

7.12.1.1.10 DEPENDENT PARAMETER

Slave display indicates

This parameter is only displayed if you select *No* when setting *Connect analog room control unit to physical device input a*.

Options:	*Absolute* *Relative*

This parameter determines whether a slave displays a setpoint as absolute or relative.

7.12.1.2 Selection of Yes

—

7.12.1.2.1 DEPENDENT PARAMETER

Maximum setpoint increase

Options: *0…<u>3</u>…5*

This parameter determines the maximum adjustment that the analog control unit can make when increasing the target temperature in Comfort mode. The Comfort value set cannot be increased by more than this.

> ⓘ **Note**
> The possible temperature adjustment range is from the center position of the rotary knob on the analog room control unit all the way to the right. If the knob is as far to the right as possible, then the increase is as high as possible (e.g. 3 K).

—

7.12.1.2.2 DEPENDENT PARAMETER

Maximum setpoint reduction

Options: *0…<u>3</u>…5*

This parameter determines the maximum adjustment that the analog control unit can make when reducing the target temperature in Comfort mode. The Comfort value set cannot be reduced by more than this.

> ⓘ **Note**
> The possible temperature adjustment range is from the center position of the rotary knob on the analog room control unit all the way to the left. If the knob is as far to the left as possible, the temperature is reduced by the maximum (e.g. 3 K).

7.13 Input x parameter window

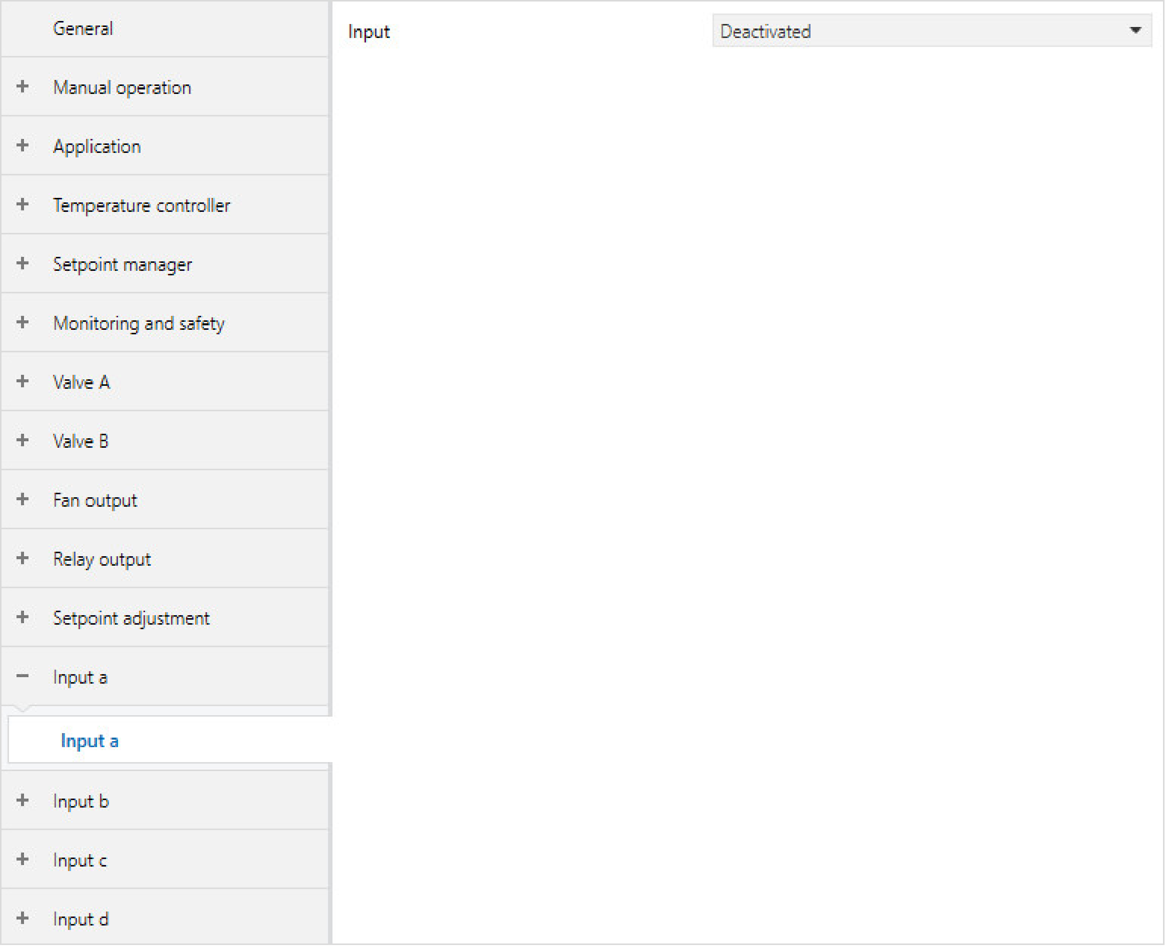
Note

The setting options for inputs a…d are explained below using input a as an example.

The setting options are identical for all inputs.

Note

When using input a to connect an analog room control unit, parametrize the input on the *Setpoint adjustment* page.



Input Deactivated

2CDC078031F0218

Fig. 54: Parameter input x

7.13.1 Input

Options:	<u>*Deactivated*</u> *Window contact* *Dew point sensor* *Fill level sensor* *Temperature sensor* *Binary signal input* *Analog room control unit*

This parameter sets the operating mode for the input. Dependent parameters appear according to the selected option.

7.13.1.1 Window contact

Selecting *Window contact* uses the input to connect a floating contact that monitors the open/closed state of the window. Selecting *Window contact*, *Via physical device input* on the *Application parameters* page takes the status of this input into account in room temperature control. Without this setting, the input value is sent on the bus but not taken into account in the controller.

> ⓘ **Note**
> If several inputs are set to this option and the controller runs an evaluation, all inputs are internally linked by an OR operation. This means that as long as one of the contacts is open, the controller responds as if all of the inputs are open, and only evaluates the window as closed once all contacts signal a closed state.

> ⓘ **Note**
> Inputs are scanned after a bus voltage recovery, download or ETS reset. Their current status is sent on the bus when the sending and switching delay is complete.

—

7.13.1.1.1 DEPENDENT PARAMETER

Window open when

Options: <u>*Contact open*</u>
Contact closed

This parameter determines whether the contact connected to the input is normally open or normally closed.

- *Contact open*: The window is considered open if the contact is open.
- *Contact closed*: The window is considered open if the contact is closed.

—

7.13.1.1.2 DEPENDENT PARAMETER

Send status value

Options: <u>*After a change*</u>
On change and cyclically

- *After a change*: Sends the value only after a change.
- *On change and cyclically*: Sends the value after a change, and cyclically. Enables the dependent parameter *Send input status cyclically*.

7.13.1.1.2.1 DEPENDENT PARAMETER

Send input status cyclically

Options: <u>*00:00:30*</u>*…18:12:15*

7.13.1.2 Dew point sensor

Selecting *Dew point sensor* uses the input to connect a floating contact that monitors the dew point. Selecting *Dew point sensor*, *Via physical device input* on the *Application parameters* page takes the status of this input into account in room temperature control. Without this setting, the input value is sent on the bus but not taken into account in the controller.

ⓘ **Note**
If several inputs are set to this option and the controller runs an evaluation, all inputs are internally linked by an OR operation. This means that as long as one of the contacts is open, the controller responds as if all of the inputs are open. Once all contacts signal no dew point alarm, the controller evaluates this as no alarm.

ⓘ **Note**
Inputs are scanned after a bus voltage recovery, download or ETS reset. Their current status is sent on the bus when the sending and switching delay is complete.

7.13.1.2.1 DEPENDENT PARAMETER

Dew point reached when

Options: *Contact open*
<u>*Contact closed*</u>

This parameter defines how the input reacts if the dew point is evaluated as reached or not reached. You can also define whether the dew point sensor is a normally closed or normally open contact.

- *Contact open*: The dew point is considered reached if the contact is open.
- *Contact closed*: The dew point is considered reached if the contact is closed.

7.13.1.2.2 DEPENDENT PARAMETER

Send status value

Options: <u>*After a change*</u>
On change and cyclically

- *After a change*: Sends the value only after a change.
- *On change and cyclically*: Sends the value after a change, and cyclically. Enables the dependent parameter *Send input status cyclically*.

7.13.1.3 Fill level sensor

Selecting *Fill level sensor* uses the input to connect a floating contact that monitors the fill level of a condensation pan. Selecting *Fill level sensor*, *Via physical device input* on the *Application parameters* page takes the status of this input into account in room temperature control. Without this setting, the input value is sent on the bus but not taken into account in the controller.

ⓘ **Note**

If several inputs are set to this option and the controller runs an evaluation, all inputs are internally linked by an OR operation. This means that as long as one of the contacts is open, the controller responds as if all of the inputs are open. Once all contacts signal no fill level alarm, the controller evaluates this as no alarm.

ⓘ **Note**

Inputs are scanned after a bus voltage recovery, download or ETS reset. Their current status is sent on the bus when the sending and switching delay is complete.

—

7.13.1.3.1 DEPENDENT PARAMETER

Fill level reached when

Options: *Contact open*
Contact closed

This parameter defines how the input reacts if the fill level is evaluated as reached or not reached. You can also define whether the fill level sensor is a normally closed or normally open contact.

- *Contact open*: The fill level is considered reached if the contact is open.
- *Contact closed*: The fill level is considered reached if the contact is closed.

—

7.13.1.3.2 DEPENDENT PARAMETER

Send status value

Options: *After a change*
On change and cyclically

- *After a change*: Sends the value only after a change.
- *On change and cyclically*: Sends the value after a change, and cyclically. Enables the dependent parameter *Send input status cyclically*.

7.13.1.4 Temperature sensor

Selecting *Temperature sensor* uses the input for temperature readings. It can then log either room temperature or a temperature limitation value.

Selecting *Temperature input*, *Via physical device input* on the *Application parameters* page takes the status of this input into account in room temperature control. Without this setting, the input value is sent on the bus but not taken into account in the controller.

In the *Basic-stage heating*, *Additional-stage heating*, *Basic-stage cooling* and *Additional-stage cooling* parameter windows, selecting *Activate temperature limitation*, *Yes* and *Input for temperature limitation sensor*, *Input a* means that the temperature sensor value measured here will only be used for temperature limitation and can no longer be used to measure room temperature.

The temperature value is output via the 2-byte group object *Input x – Temperature*. You can also establish whether there is a fault on the input, e.g. a short circuit or cable break. A fault is reported if the resistance falls below 50 ohms or exceeds 100 kohms.

Faults are reported via the 1-bit group object *Input a – Input fault*. If a fault occurs, this object changes state from 0 to 1. These two objects are sent depending on the reaction parametrized in *Send status values*.

ⓘ **Note**

If several inputs are set to this option and the controller runs an evaluation, it calculates the average value of all the temperature inputs. Temperature inputs used as temperature limitation sensors are excluded from this calculation.

ⓘ **Note**

Inputs are scanned after a bus voltage recovery, download or ETS reset. Their current status is sent on the bus when the sending and switching delay is complete.

7.13.1.4.1 DEPENDENT PARAMETER

Temperature sensor type

Options: *PT1000 [-30…+110 °C]*
PT100 [-30…+110 °C]
NTC
KTY [-15…+110]
NI1000 - 01 [-30…+110 °C]
NI1000 - 02 [-30…+110 °C]

This parameter indicates which type of temperature sensor is connected. Please refer to the sensor's datasheet for technical information. The measurable range for each type of sensor appears in square brackets after the type.

- *NTC*: Selecting this type of sensor opens the dependent parameter window *NTC type* so that you can select an NTC subtype.
- *KTY*: Selecting this type of sensor opens the dependent parameter window *KTY type* so that you can select a KTY subtype.

7.13.1.4.1.1 DEPENDENT PARAMETER

NTC type

Options: <u>*NTC10-01 [-15…+100 C]*</u>
NTC10-02 [-15…+100°C]
NTC10-03 [-15…+100°C]
NTC20 [0…+100°C]

This parameter allows you to choose the NTC sensor type that is connected. An NTC10 sensor has a resistance of 10 kohms at 25 °C. An NTC20 has a resistance of 20 kohms. Individual types vary in terms of their resistance curves.

7.13.1.4.1.2 DEPENDENT PARAMETER

KTY type

Options: <u>*KT 100 / 110 / 130*</u>
KT 210 / 230
KTY 10-5 / 11-5 / 13-5
KTY 10-6 / 10-62 / 11-6 / 13-6 / 16-6 / 19-6
KTY 10-7 / 11-7 / 13-7
KTY 21-5 / 23-5
KTY 21-6 / 23-6
KTY 21-7 / 23-7
KTY 81-110 / 81-120 / 81-150
KTY 82-110 / 82-120 / 82-150
KTY 81-121 / 82-121
KTY 81-122 / 82-122
KTY 81-151 / 82-151
KTY 81-152 / 82-152
KTY 81-210 / 81-220 / 81-250
KTY 82-210 / 82-220 / 82-250
KTY 81-221 / 82-221
KTY 81-222 / 82-222
KTY 81-251 / 82-251
KTY 81-252 / 82-252
KTY 83-110 / 83-120 / 83-150
KTY 83-121
KTY 83-122
KTY 83-151
User-defined

This parameter allows you to select a predefined KTY sensor.

- *User-defined*: This displays the dependent parameters *Resistance in ohms at -20…+120 °C*.

> ⓘ **Note**
>
> When using a KTY sensor that is not in the list, you can use the *User-defined* option to enter its characteristic.
>
> To ensure that the analog input works properly with respect to user-defined entries, the resistance values as visible for the preset values must be in ascending order.
>
> An incorrect entry can result in unrealistic output values.

7.13.1.4.1.2.1 DEPENDENT PARAMETER

Resistance in ohms at -20…+120 °C

Options: *650…4,600*

A resistance characteristic can be entered via these 8 parameters. Please refer to the sensor manufacturer's technical documentation for this data.

7.13.1.4.1.3 DEPENDENT PARAMETER

Filter

Options: *Inactive*
Low (floating mean value over 30 seconds)
Medium (floating mean value over 60 seconds)
High (floating mean value over 120 seconds)

This parameter sets a filter (floating mean value filter). This can be used to set the output value as a mean value using three different options.

- *Inactive*: Filter is not active
- *Low*: floating mean value over 30 seconds
- *Medium*: floating mean value over 60 seconds
- *High*: floating mean value over 120 seconds

ⓘ **Note**

Using the filter "smooths" the output via the mean value so that it is available for further processing. The filter therefore has immediate effects on thresholds and calculation values. The higher the degree of filtering, the smoother the result. This means that changes to the output value become slower.

Example: An erratic change in the sensor signal on *Medium* will take 30 seconds until the output value is through.

7.13.1.4.2 DEPENDENT PARAMETER

Temperature offset

Options: *-10.0…00.0…+10.0*

A maximum offset of ±10 °C can be added to the recorded temperature with this parameter.

7.13.1.4.3 DEPENDENT PARAMETER

Cable error compensation

Options: *None* (default)
Via cable length
Via cable resistance

- *Via cable length*: Cable error is compensated by entering the cable length.

ⓘ **Note**
This method may only be used for copper cables.

- *Via cable resistance*: Cable error is compensated by entering the cable resistance value.

7.13.1.4.3.1 DEPENDENT PARAMETER

Cable length, one-way distance

01.0…10.0…100.0

Sets the one-way cable length of the connected temperature sensor.

ⓘ **Note**
The maximum cable length permitted between the sensor and device input is 100 m.

7.13.1.4.3.2 DEPENDENT PARAMETER

Cross-section of conductor, Value* 0.01 mm²

Options: *1…100…150*

ⓘ **Note**
The *150* option corresponds to a cross-section of 1.5 mm^2.

The cross-section of the conductor to which the temperature sensor is connected is entered using this parameter.

7.13.1.4.3.3 DEPENDENT PARAMETER

Cable resistance in milliohms [total of forw. and ret. conduct.]

Options: *0…500…10,000*

This parameter sets the cable resistance level of the connected temperature sensor.

ⓘ **Note**
To measure the cable resistance correctly, the conductors must be shorted together at the end of the cable and should not be connected to the analog input.

7.13.1.4.4 DEPENDENT PARAMETER

Filter

Options: <u>*Inactive*</u>
Low (floating mean value over 30 seconds)
Medium (floating mean value over 60 seconds)
High (floating mean value over 120 seconds)

This parameter sets a filter (floating mean value filter). This can be used to set the output value as a mean value using three different options.

- *Inactive*: Filter is not active
- *Low*: floating mean value over 30 seconds
- *Medium*: floating mean value over 60 seconds
- *High*: floating mean value over 120 seconds

ⓘ **Note**

Using the filter "smooths" the output via the mean value so that it is available for further processing. The filter therefore has immediate effects on thresholds and calculation values. The higher the degree of filtering, the smoother the result. This means that changes to the output value become slower.

Example: An erratic change in the sensor signal on *Medium* will take 30 seconds until the output value is through.

7.13.1.4.5 DEPENDENT PARAMETER

Send temperature value

Options: *After a change*
Cyclically
On change and cyclically
On request
After a change or on request
On request and cyclically
<u>*After a change or request and cyclically*</u>

This parameter defines how the output value should be sent.

- *After a change*: Sends the output value after a change.
- *Cyclically*: Sends the output value cyclically.
- *On change and cyclically*: Sends the output value after a change, and cyclically.
- *On request*: Sends the output value on request.
- *After a change or request*: Sends the output value after a change and after a request.
- *On request and cyclically*: Sends the output value on request, and cyclically.
- *After a change or request and cyclically*: Sends the output value after a change, on request, and cyclically.

The value is sent on request when *Group object General – Request Status values* receives a value.

7.13.1.4.5.1 DEPENDENT PARAMETER

Value is sent from a change of

This is displayed if the *Send temperature value* parameter option includes *After a change*.

Options: *00.2…01.0…10.0*

This parameter determines the temperature change that triggers sending the output value.

7.13.1.4.5.2 DEPENDENT PARAMETER

Every

This is displayed if the *Send temperature value* parameter option includes *cyclically*.

Options: *00:00:30…18:12:15*

The interval for cyclic sending is set with this additional parameter.

7.13.1.5 Binary signal input

7.13.1.5.1 DEPENDENT PARAMETER

Maximum dead time

The maximum dead time is 200 ms.

The maximum dead time prevents unwanted multiple operations on the input, e.g. due to bouncing of the contact.

7.13.1.5.1.1 What is maximum dead time?

An edge change at the input is evaluated with a maximum dead time (delay) of 200 ms. This time may vary from 0–200 ms.

ⓘ **Note**

No further bouncing is possible.

7.13.1.5.1.2 Example: Maximum dead time of the input signal for a detected edge

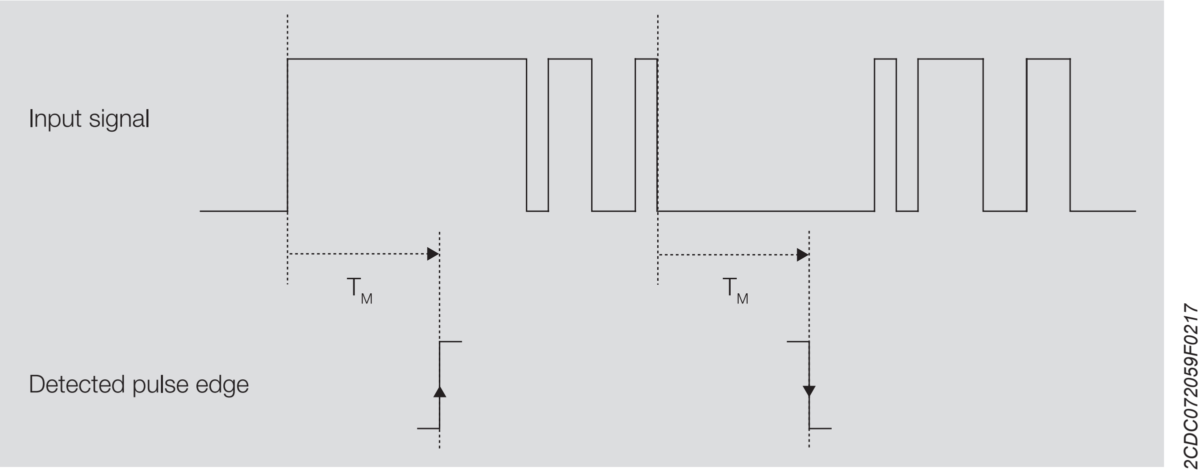


Fig. 55: Maximum dead time of the input signal for a detected edge

After detection of an edge on the input, further edges are ignored for the maximum dead time T_D.

7.13.1.5.2 DEPENDENT PARAMETER

Distinction between long and short operation

Options: <u>*No*</u>
Yes

This parameter determines whether the input differentiates between short and long operation.

- *Yes*: After opening/closing the contact, an initial evaluation determines whether the operation was long or short before triggering any reaction.

The following diagram shows the function in detail:

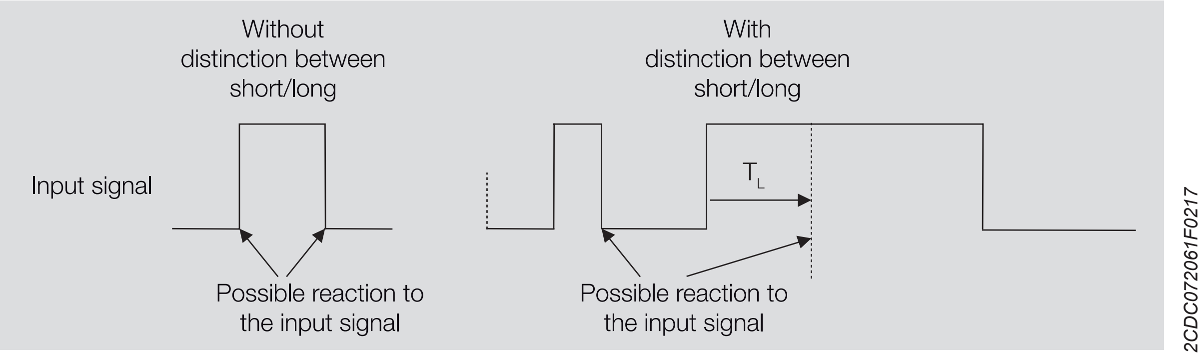
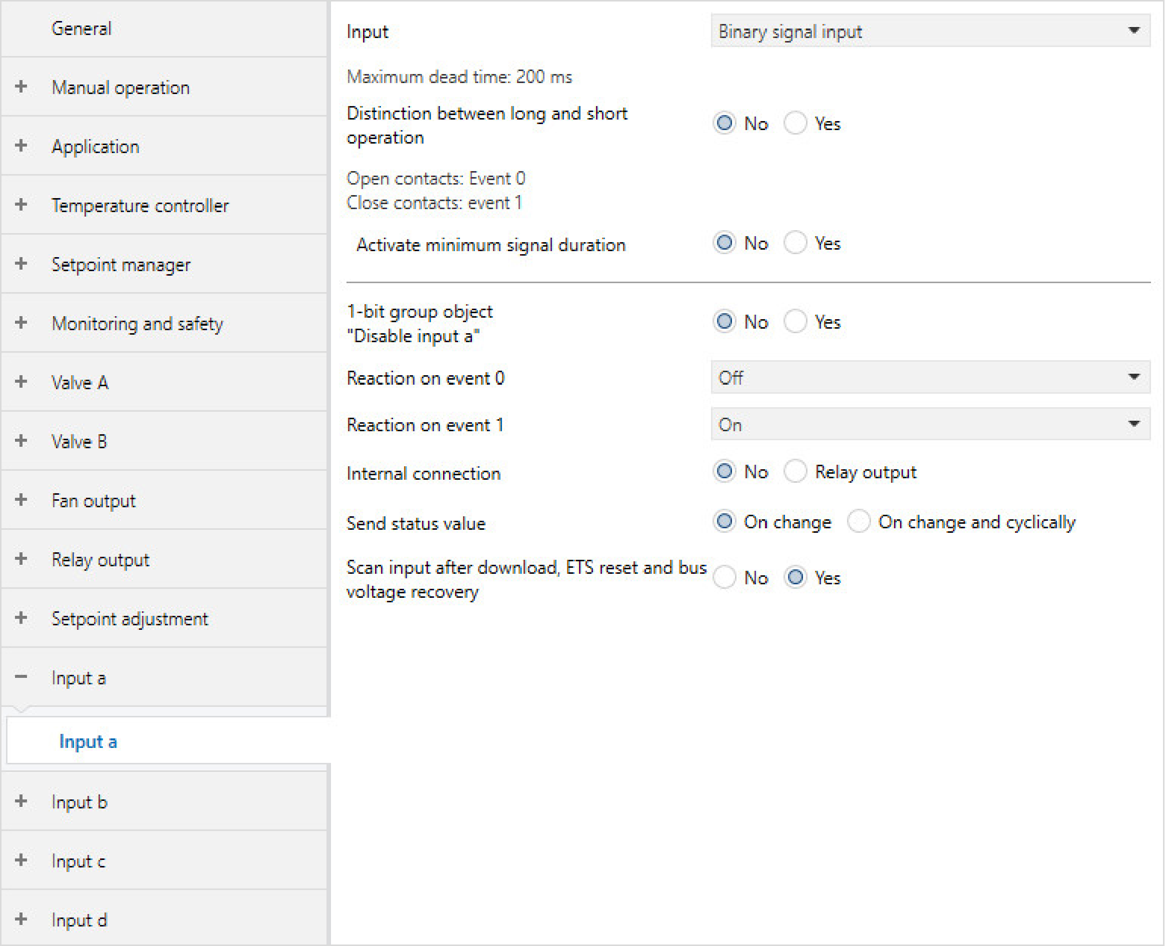


Fig. 56: Distinguishing between a short/long operation

Note
T_L is the time before a long operation is detected.

7.13.1.5.2.1 No

If the parameter *Distinction between long and short operation* is set to *No*, the following parameters appear:



Input: Binary signal input

Maximum dead time: 200 ms

Distinction between long and short operation ● No ○ Yes

Open contacts: Event 0
Close contacts: event 1

Activate minimum signal duration ● No ○ Yes

1-bit group object "Disable input a" ● No ○ Yes

Reaction on event 0: Off

Reaction on event 1: On

Internal connection ● No ○ Relay output

Send status value ● On change ○ On change and cyclically

Scan input after download, ETS reset and bus voltage recovery ○ No ● Yes

2CDC078030F0218

Fig. 57: No

Note

Opening the contact -> event 0

Closing the contact -> event 1

—

7.13.1.5.2.1.1 Dependent Parameter

Activate minimum signal duration

Options: <u>*No*</u>
Yes

—

7.13.1.5.2.1.2 Dependent Parameter

When contact opens

Options: *00.0…<u>01.0</u>…100.0*

—

7.13.1.5.2.1.3 Dependent Parameter

When contact closes

Options: *00.0…<u>01.0</u>…100.0*

7.13.1.5.2.1.4 What is minimum signal duration?

In contrast to the maximum dead time, a telegram only sent once the minimum signal duration has elapsed.

In more detail:

If an edge is detected on the input, the minimum signal duration starts to run. No telegrams are sent on the bus at this time. The signal on the input is observed for the minimum signal duration. If a further edge appears at the input during the minimum signal duration, it is interpreted as a new operation, and the minimum signal duration restarts. If no further edges occur after the minimum signal duration starts, a telegram is sent on the bus after it has elapsed.

7.13.1.5.2.1.5 Example: Minimum signal duration of the input signal for a detected edge

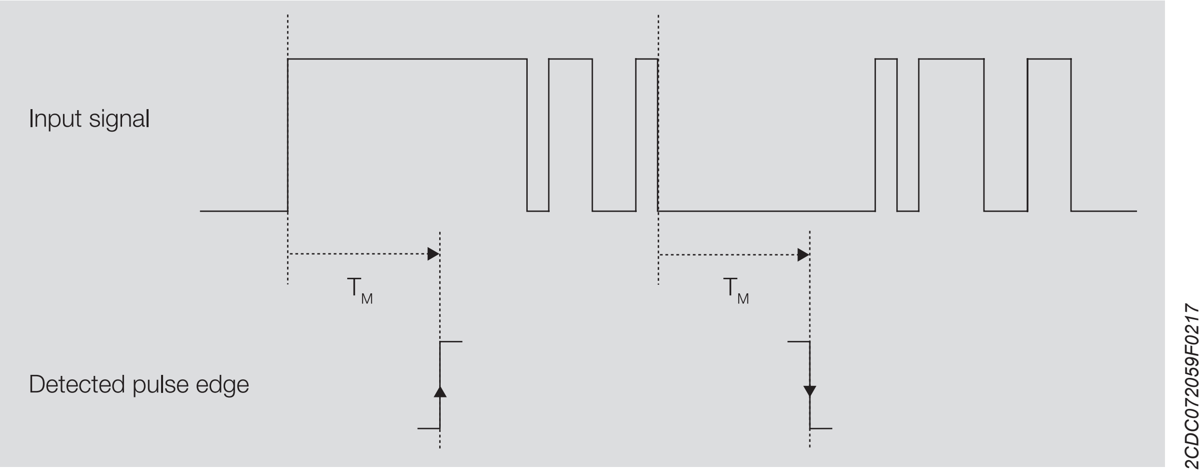


Fig. 58: Minimum signal duration of the input signal for a detected edge

There are only two cases where no further edge changes occur within the minimum signal duration T_M after a change of edge. For this reason, only these two cases are detected as valid.

ⓘ **Note**
The minimum signal duration is not considered after a download and/or ETS reset.

ⓘ **Note**
After a bus voltage recovery, the minimum signal duration starts once the inputs can be scanned. When the sending and switching delay has elapsed, the current state at that point is sent on the bus.

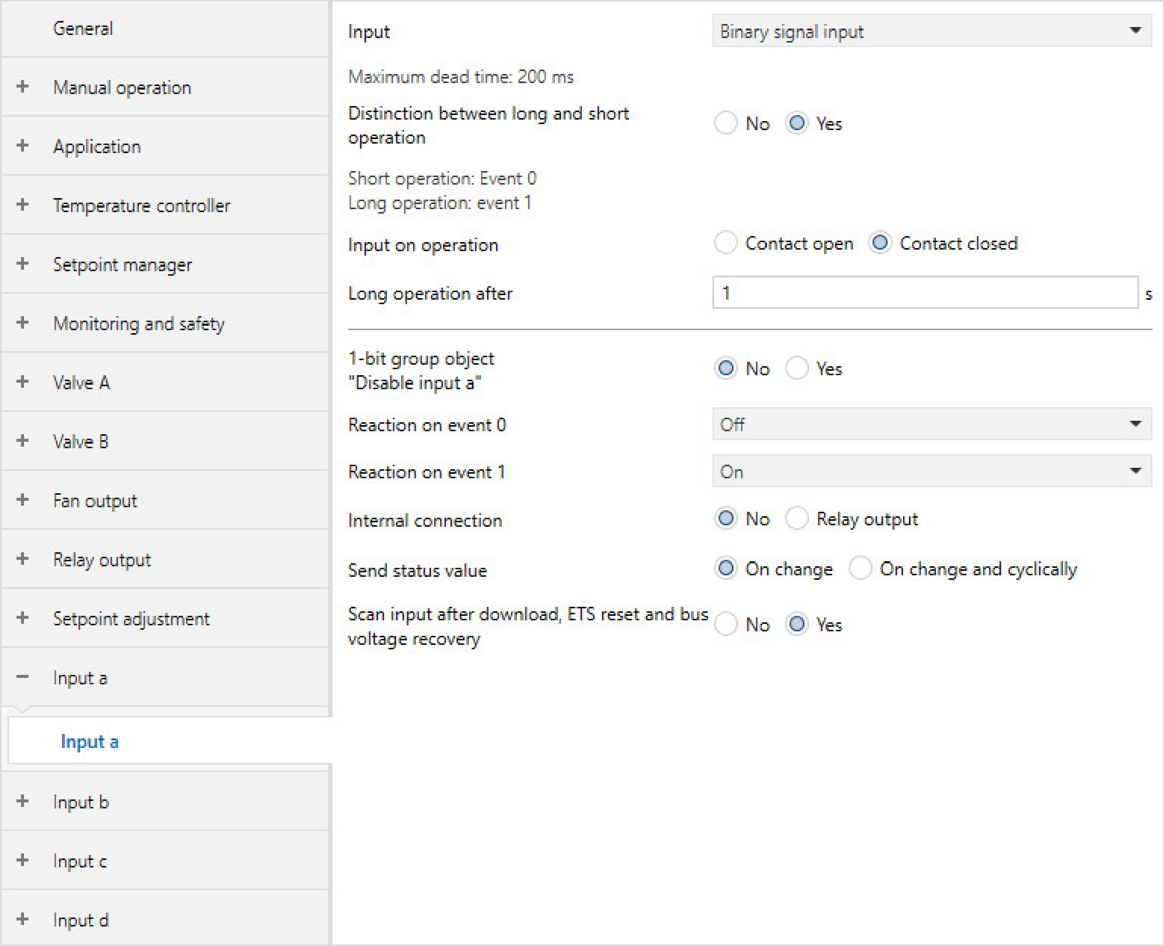
7.13.1.5.2.1.6 DEPENDENT PARAMETER

Activate minimum signal duration

Options: *No*
Yes

7.13.1.5.2.2 Yes

If the parameter *Distinction between long and short operation* is set to *Yes*, the following parameters appear:



Input: Binary signal input

Maximum dead time: 200 ms

Distinction between long and short operation: ○ No ● Yes

Short operation: Event 0
Long operation: event 1

Input on operation: ○ Contact open ● Contact closed

Long operation after: 1 s

1-bit group object "Disable input a": ● No ○ Yes

Reaction on event 0: Off

Reaction on event 1: On

Internal connection: ● No ○ Relay output

Send status value: ● On change ○ On change and cyclically

Scan input after download, ETS reset and bus voltage recovery: ○ No ● Yes

Fig. 59: Yes

Note

Short operation = event 0

Long operation = event 1

7.13.1.5.2.2.1 DEPENDENT PARAMETER

Input on operation

Options: *Contact open*
<u>Contact closed</u>

- *Open*: The operation opens the input.
- *Closed*: The operation closes the input.

If a normally open contact is connected to the input, select *Closed*; for a normally closed contact, select *Open*.

7.13.1.5.2.2.2 DEPENDENT PARAMETER

Long operation after

Options: *01.0…10.0*

The time period T_L after which an operation is considered long is defined here.

7.13.1.5.3 DEPENDENT PARAMETER

Enable group object "Block" 1-bit

Options: *No*
Yes

- *Yes*: Enables the 1-bit group object *Block*. This can be used to disable the input.

Note

If the input is disabled and the option *Send cyclically* is set, the last state is still sent regardless of the block. The *Block* option blocks the physical input; sending continues internally.

Note

When the input is blocked there is essentially no reaction to a signal change on the input, but:

- Waiting for a long button push or a minimum signal duration is suspended
- Parameterized cyclic sending is not interrupted
- It is still possible to write the Switch group object.

If the input state changes during the block phase, the new group object value is sent immediately after the block is released. If the input state remains the same during the block phase, the group object value is not sent.

Note

The minimum signal duration does not start until the Block has finished.

Note

Block is deactivated after an ETS reset, a bus voltage recovery or a download.

7.13.1.5.4 DEPENDENT PARAMETER

Reaction on event X

The following apply to the *Reaction on event 0* and *Reaction on event 1* parameters.

Options: *No edge evaluation*
On
Off
Toggle
End cyclic transmission

The standard value for *Reaction on event 1* is *On*. The standard value for *Reaction on event 0* is *Off*.

This determines how the group object reacts. If the *Distinction between long and short operation* parameter is set to *Yes*, the reaction occurs with a short or long operation. If it is set to *No*, it occurs with each edge change.

ⓘ **Note**

If it is set to *End cyclic transmission*, it is important to note that this is only effective if the *Send status value* parameter is set to *On change and cyclically*.

7.13.1.5.5 DEPENDENT PARAMETER

Internal connection

Options: <u>*No*</u>
Relay output

This parameter establishes a direct connection between the binary input and the relay output, dispensing with the need for group address assignment.

The Status object on the input is updated along with that on the output.

NOTICE

This function allows you to switch the additional relay directly. If the device is being used in controller mode, switching occurs regardless of the function of the controller. If the relay is being used to switch an electric heater, then depending on the application, this can result in the heater being switched on when the fan coil unit is not running, which in turn can lead to the unit overheating.

7.13.1.5.6 DEPENDENT PARAMETER

Send status value

Options: <u>*After a change*</u>
On change and cyclically

- *After a change*: Sends the value only after a change.
- *On change and cyclically*: Sends the value after a change, and cyclically. Displays the dependent parameters *Telegram is repeated every* and *On object value*.

ⓘ **Note**

Cyclic sending

Cyclic sending enables the *Switch* group object to send automatically at a fixed interval. If cyclic sending applies to a specific object value only (ON or OFF), this condition refers to the value of the group object. It is therefore possible in principle to start cyclic sending by sending a value to the *Switch* group object. As this behavior is unwanted, the Write and Update flags of the group object are deleted in the preliminary setting so that they cannot be changed via the bus. If this functionality is required irrespectively, set these flags accordingly. When the group object *Switch* changes and after bus voltage recovery (after the sending delay time has elapsed), the group object value is sent immediately on the bus, and the sending cycle time restarts.

7.13.1.5.6.1 DEPENDENT PARAMETER

Telegram is repeated every

Options: <u>*00:00:30*</u>*…18:12:15*

This additional parameter sets the interval for cyclic sending.

—

7.13.1.5.6.2 DEPENDENT PARAMETER

On object value

Options: *0*
1
0 or 1

- *1*: Sends the group object value 1 cyclically.
- *0*: Sends the group object value 0 cyclically.
- *0 or 1*: Sends the group object values 0 or 1 cyclically.

—

7.13.1.5.7 DEPENDENT PARAMETER

Scan input after download, ETS reset and bus voltage recovery

Options: *No*
Yes

- *No*: The object value is not scanned after a download, ETS reset or bus voltage recovery.
- *Yes*: The object value is scanned after a download, ETS reset or bus voltage recovery.

Note
Scanning starts once the device is ready for normal operation again after the download, ETS reset or bus voltage recovery. This can take up to 2 seconds.

7.13.1.6 Connect analog room control unit

In the *Setpoint adjustment* parameter window, you can set the *Connect analog room control unit to physical device input a* parameter to allow an analog room control unit to be connected to the input. You will not be able to change this in the *Input a* window unless you deactivate your selection in the *Setpoint adjustment* window first.

This setting displays the dependent parameters *Send Status value* and *Send input status cyclically*.

—

7.13.1.6.1 DEPENDENT PARAMETER

Send status value

Options: *After a change*
On change and cyclically

- *After a change*: Sends the value only after a change.
- *On change and cyclically*: Sends the value after a change, and cyclically. Enables the dependent parameter *Send input status cyclically*.

8 Group objects

8.1 Summary of FCC/S group objects

No.	Function	Name	Data Point Type (DPT)	Length	Flags				
					C	R	W	T	U
1	In operation	General	1.002	1 bit	X	X		X	
2	Status byte device	General	Non DPT	1 byte	X	X		X	
3	Not assigned								
4	Request status values	General	1.017	1 bit	X		X		
5	Status Manual operation	General	1.011	1 bit	X	X		X	
6	Enable/disable manual operation	General	1.003	1 bit	X		X		
10	Fan ON/OFF status	Channel – Fan	1.001	1 bit	X	X		X	
11	Status byte fan	Channel – Fan	Non DPT	1 byte	X	X		X	
12	Status Fan automatic	Channel – Fan	1.011	1 bit	X	X		X	
13	Status Fan speed	Channel – Fan	5.001	1 byte	X	X		X	
14	Status Fan speed 1	Channel – Fan	1.001	1 bit	X	X		X	
15	Status Fan speed 2	Channel – Fan	1.001	1 bit	X	X		X	
16	Status Fan speed 3	Channel – Fan	1.001	1 bit	X	X		X	
17	Activate/deactivate fan automation	Channel – Fan	1.003	1 bit	X		X		
18	Switch speed 1	Channel – Fan	1.001	1 bit	X		X		
19	Switch speed 2	Channel – Fan	1.001	1 bit	X		X		
20	Switch speed 3	Channel – Fan	1.001	1 bit	X		X		
21	Switch fan speed	Channel – Fan	5.001	1 byte	X		X		
22	Increase/decrease fan speed	Channel – Fan	1.007	1 bit	X		X		
23	Limitation 1	Channel – Fan	1.003	1 bit	X		X		
24	Limitation 2	Channel – Fan	1.003	1 bit	X		X		
25	Limitation 3	Channel – Fan	1.003	1 bit	X		X		
26	Status byte valve A	Channel – Valve A	Non DPT	1 byte	X	X		X	
27	Status Control value	Channel – Valve A	5.001	1 byte	X	X		X	
28	Fault: valve output	Channel – Valve A	1.002	1 bit	X	X		X	
29	Status Valve purge	Channel – Valve A	1.011	1 bit	X	X		X	
30	Reset fault on valve output	Channel – Valve A	1.015	1 bit	X		X		
31	Activate valve purge	Channel – Valve A	1.017	1 bit	X		X		
32	Enable/disable manual override valve	Channel – Valve A	1.003	1 bit	X		X		
33	Override valve control value	Channel – Valve A	5.001	1 byte	X		X		
34	Control value VAV damper control	Channel – Valve A	5.001	1 byte	X		X		
35	Status byte valve B	Channel – Valve B	Non DPT	1 byte	X	X		X	
36	Status Control value	Channel – Valve B	5.001	1 byte	X	X		X	
37	Fault: valve output	Channel – Valve B	1.002	1 bit	X	X		X	
38	Status Valve purge	Channel – Valve B	1.011	1 bit	X	X		X	
39	Reset fault on valve output	Channel – Valve B	1.015	1 bit	X		X		
40	Activate valve purge	Channel – Valve B	1.017	1 bit	X		X		

No.	Function	Name	Data Point Type (DPT)	Length	Flags				
					C	R	W	T	U
41	Enable/disable manual override valve	Channel – Valve B	1.003	1 bit	X		X		
42	Override valve control value	Channel – Valve B	5.001	1 byte	X		X		
43	Control value VAV damper control	Channel – Valve B	5.001	1 byte	X		X		
44	Status Relay	Channel – Relay	1.009	1 bit	X	X		X	
45	Switch relay	Channel – Relay	1.001	1 bit	X		X		
46	Forced operation 2 bit	Channel – General	2.001	2 bits	X		X		
47	Forced operation 1 bit	Channel – General	1.002	1 bit	X		X		
48	Error: heating/cooling receipt	Channel – General	1.002	1 bit	X	X		X	
49	Error: window status receipt	Channel – General	1.002	1 bit	X	X		X	
50	Error: dew point status receipt	Channel – General	1.002	1 bit	X	X		X	
51	Error: fill level status receipt	Channel – General	1.002	1 bit	X	X		X	
52	Error: operating mode receipt	Channel – General	1.002	1 bit	X	X		X	
53	Temperature	Channel – Input a	9.001	2 bytes	X	X		X	
54	Input error	Channel – Input a	1.002	1 bit	X	X		X	
55	Switch	Channel – Input a	1.001	1 bit	X	X		X	
55	Window contact	Channel – Input a	1.019	1 bit	X	X		X	
55	Dew point alarm	Channel – Input a	1.005	1 bit	X	X		X	
55	Fill level alarm	Channel – Input a	1.005	1 bit	X	X		X	
56	Disable input	Channel – Input b	1.003	1 bit	X		X		
57	Temperature	Channel – Input b	9.001	2 bytes	X	X		X	
58	Input error	Channel – Input b	1.002	1 bit	X	X		X	
59	Switch	Channel – Input b	1.001	1 bit	X	X		X	
59	Window contact	Channel – Input b	1.019	1 bit	X	X		X	
59	Dew point alarm	Channel – Input b	1.005	1 bit	X	X		X	
59	Fill level alarm	Channel – Input b	1.005	1 bit	X	X		X	
60	Disable input	Channel – Input b	1.003	1 bit	X		X		
61	Temperature	Channel – Input c	9.001	2 bytes	X	X		X	
62	Input error	Channel – Input c	1.002	1 bit	X	X		X	
63	Switch	Channel – Input c	1.001	1 bit	X	X		X	
63	Window contact	Channel – Input c	1.019	1 bit	X	X		X	
63	Dew point alarm	Channel – Input c	1.005	1 bit	X	X		X	
63	Fill level alarm	Channel – Input c	1.005	1 bit	X	X		X	
64	Disable input	Channel – Input c	1.003	1 bit	X		X		
65	Temperature	Channel – Input d	9.001	2 bytes	X	X		X	
66	Input error	Channel – Input d	1.002	1 bit	X	X		X	
67	Switch	Channel – Input d	1.001	1 bit	X	X		X	
67	Window contact	Channel – Input d	1.019	1 bit	X	X		X	
67	Dew point alarm	Channel – Input d	1.005	1 bit	X	X		X	
67	Fill level alarm	Channel – Input d	1.005	1 bit	X	X		X	
68	Disable input	Channel – Input d	1.003	1 bit	X		X		
69	Status Heating/Cooling	Channel – Controller	1.100	1 bit	X	X		X	
70	Status Control value Basic-stage heating	Channel – Controller	5.001	1 byte	X	X		X	

No.	Function	Name	Data Point Type (DPT)	Length	Flags				
					C	R	W	T	U
70	Status Control value Basic-stage heating	Channel – Controller	1.001	1 bit	X	X		X	
71	Status Control value Additional-stage heating	Channel – Controller	5.001	1 byte	X	X		X	
71	Status Control value Additional-stage heating	Channel – Controller	1.001	1 bit	X	X		X	
72	Status Control value Basic-stage cooling	Channel – Controller	5.001	1 byte	X	X		X	
72	Status Control value Basic-stage cooling	Channel – Controller	1.001	1 bit	X	X		X	
73	Status Control value Additional-stage cooling	Channel – Controller	5.001	1 byte	X	X		X	
73	Status Control value Additional-stage cooling	Channel – Controller	1.001	1 bit	X	X		X	
74	Not assigned								
75	Actual temperature	Channel – Controller	9.001	2 bytes	X	X		X	
76	External temperature 1	Channel – Controller	9.001	2 bytes	X		X		
77	External temperature 2	Channel – Controller	9.001	2 bytes	X		X		
78	Fault: actual temperature (master)	Channel – Controller	1.002	1 bit	X	X		X	
79	Current setpoint	Channel – Controller	9.001	2 bytes	X	X		X	
80	Operating mode normal (master)	Channel – Controller	20.102	1 byte	X		X	X	X
81	Operating mode override (master)	Channel – Controller	20.102	1 byte	X		X	X	X
82	Window contact (master/slave)	Channel – Controller	1.019	1 bit	X		X		
83	Presence detector (master/slave)	Channel – Controller	1.018	1 bit	X		X		
84	Status Heating	Channel – Controller	1.001	1 bit	X	X		X	
85	Status Cooling	Channel – Controller	1.001	1 bit	X	X		X	
86	Activate minimum control value (basic load)	Channel – Controller	1.003	1 bit	X		X		
87	Heating/Cooling changeover	Channel – Actuator	1.100	1 bit	X		X	X	X
87	Heating/Cooling changeover	Channel – Controller	1.100	1 bit	X		X	X	X
88	Base setpoint	Channel – Controller	9.001	2 bytes	X		X		
89	Reset manual setpoint adjustment	Channel – Controller	1.017	1 bit	X		X		
90	Dew point alarm	Channel – Controller	1.005	1 bit	X		X		
91	Fill level alarm	Channel – Controller	1.005	1 bit	X		X		
92	Outside temperature for summer compensation	Channel – Controller	9.001	2 bytes	X		X		
93	Summer compensation active/inactive	Channel – Controller	1.002	1 bit	X	X		X	
94	Setpoint reached	Channel – Controller	1.002	1 bit	X	X		X	
95	Request On/Off (master)	Channel – Controller	1.001	1 bit	X		X		
96	Confirm On/Off (master)	Channel – Controller	1.001	1 bit	X		X		
97	Setpoint display (master)	Channel – Controller	9.002	2 bytes	X	X		X	
98	Request setpoint adjustment	Channel – Controller	9.001	2 bytes	X		X		
98	Request setpoint adjustment	Channel – Controller	9.002	2 bytes	X		X		
98	Request setpoint adjustment	Channel – Controller	6.010	1 byte	X		X		
98	Request setpoint adjustment	Channel – Actuator	9.001	2 bytes	X		X		
98	Request setpoint adjustment	Channel – Actuator	9.002	2 bytes	X		X		
98	Request setpoint adjustment	Channel – Actuator	6.010	1 byte	X		X		
99	Confirm setpoint (master)	Channel – Controller	9.001	2 bytes	X	X		X	
99	Confirm setpoint (master)	Channel – Controller	9.002	2 bytes	X	X		X	
99	Confirm setpoint (master)	Channel – Controller	6.010	1 byte	X	X		X	
100	Request heating/cooling (master)	Channel – Controller	1.100	1 bit	X		X		

No.	Function	Name	Data Point Type (DPT)	Length	Flags				
					C	R	W	T	U
101	Request fan manually (slave)	Channel – Actuator	1.001	1 bit	X		X		
101	Request fan manually (master)	Channel – Controller	1.001	1 bit	X		X		
102	Confirm fan manually (slave)	Channel – Actuator	1.001	1 bit	X	X		X	
102	Confirm fan manually (master)	Channel – Controller	1.001	1 bit	X		X		
103	Request fan speed (master)	Channel – Controller	5.010	1 byte	X		X		
103	Request fan speed (master)	Channel – Controller	5.001	1 byte	X		X		
103	Request fan speed (slave)	Channel – Actuator	5.010	1 byte	X		X		
103	Request fan speed (slave)	Channel – Actuator	5.001	1 byte	X		X		
104	Confirm fan speed (master)	Channel – Controller	5.010	1 byte	X	X		X	
104	Confirm fan speed (master)	Channel – Controller	5.001	1 byte	X	X		X	
105	Controller RHCC status	Channel – Controller	22.101	2 bytes	X	X		X	
106	Controller HVAC status (master)	Channel – Controller	5.001	1 byte	X	X		X	
107	Current HVAC operating mode	Channel – Controller	20.102	1 byte	X	X		X	
108	Comfort heating setpoint	Channel – Controller	9.001	2 bytes	X		X		
108	Setpoint for Comfort heating and cooling	Channel – Controller	9.001	2 bytes	X		X		
109	Comfort cooling setpoint	Channel – Controller	9.001	2 bytes	X		X		
110	Economy heating setpoint	Channel – Controller	9.001	2 bytes	X		X		
111	Economy cooling setpoint	Channel – Controller	9.001	2 bytes	X		X		
112	Standby heating setpoint	Channel – Controller	9.001	2 bytes	X		X		
113	Standby cooling setpoint	Channel – Controller	9.001	2 bytes	X		X		
114	Building protection heating setpoint	Channel – Controller	9.001	2 bytes	X		X		
115	Building Protection cooling setpoint	Channel – Controller	9.001	2 bytes	X		X		
116	Heating control value	Channel – Actuator	5.001	1 byte	X		X	X	X
117	Cooling control value	Channel – Actuator	5.001	1 byte	X		X	X	X
118	Basic-stage heating limit temperature	Channel – Controller	9.001	2 bytes	X		X	X	X
119	Additional-stage heating limit temperature	Channel – Controller	9.001	2 bytes	X		X	X	X
120	Basic-stage cooling limit temperature	Channel – Controller	9.001	2 bytes	X		X	X	X
121	Additional-stage cooling limit temperature	Channel – Controller	9.001	2 bytes	X		X	X	X

Table 34: Group objects – overview

8.2 Group objects General

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>1</td><td>In operation</td><td>General</td><td>1 bit
DPT 1.002</td><td>C, R, T</td></tr>
<tr><td colspan="5">The group object is enabled if the parameter *Enable group object "In operation" 1 bit* is set to *Yes* in the *General* parameter window.
In order to regularly monitor the presence of the device on the KNX, a telegram In operation is sent cyclically on the bus.
As long as the group object is activated, it sends a parameterizable In operation telegram.
The telegram value depends on the option selected in Parameter *Send*.</td></tr>
<tr><td>2</td><td>Status byte device</td><td>General</td><td>1 byte
Non DPT</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is always enabled and indicates the current device state. It indicates whether the device is working normally or whether manual override is in effect.
This group object maps the following information:
• Bit 0: Operating mode overridden
The controller was overridden via the group object *Operating mode override*.
This bit is always 0 in actuator mode.
– 0: No override
– 1: Override active
• Bit 1: Building Protection
The device is in Building Protection mode due to dew point/fill level alarm or an open window
This bit is always 0 in actuator mode.
– 0: Building protection
– 1: Building protection active
• Bit 2: Forced operation
Forced operation was activated.
– 0: Forced operation inactive
– 1: Forced operation active
• Bit 3: Manual override
The valve was manually overridden via group object.
– 0: Manual override inactive
– 1: Manual override active
• Bit 4: Direct operation/membrane keypad
Manual operation via the device's membrane keypad is active
This option is available only for devices with membrane keypad
– 0: Manual operation inactive
– 1: Manual operation active
• Bit 5: Security Mode
The device is in Security Mode, e.g. due to temperature value or control value failure; a defined control value applies (s. parameter Cyclical monitoring, Page 239).
Note
When in controller mode, the device is also in Security Mode after booting up, because the controller has not yet received a valid temperature value.
This does not depend on whether cyclic monitoring was activated for the temperature.
The device is operating normally when the group object value is 0 (= all individual bits = 0).</td></tr>
<tr><td>3</td><td>Not used</td><td></td><td></td><td></td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>4</td><td>Request status values</td><td>General</td><td>1 bit
DPT 1.017</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is always enabled.
When this group object receives a telegram with the value 0 or 1, all group objects Status are sent on the bus if they were parametrized with *On request*.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>5</td><td>Status Man. operation</td><td>General</td><td>1 bit
DPT 1.011</td><td>C, R, T</td></tr>
<tr><td colspan="5">The group object is enabled if the <i>Manual operation</i> parameter is set to <i>Enabled</i> in the <i>Manual operation</i> parameter window.
This group object indicates whether manual operation is activated on the device.</td></tr>
<tr><td>6</td><td>Enable/disable manual operation</td><td>General</td><td>1 bit
DPT 1.003</td><td>C, W</td></tr>
<tr><td colspan="5">The group object is enabled if the <i>Manual operation</i> parameter is set to <i>Enabled</i> in the <i>Manual operation</i> parameter window.
This group object activates or deactivates manual operation.
If the device is in manual operation, manual operation is deactivated again as soon as the value 0 is received.</td></tr>
</table>

8.3 Group objects Fan

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>10</td><td>Fan ON/OFF status</td><td>Channel – Fan</td><td>1 bit
DPT 1.001</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is always enabled.
The group object value is 1 when the fan control value (speed) is unequal to 0.</td></tr>
<tr><td>11</td><td>Status byte fan</td><td>Channel – Fan</td><td>1 bit
Non DPT</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is always enabled.
This group object indicates the current fan status.
• Bit 0: Fan on
This bit indicates whether the fan is on or off.
– 0: Fan off
– 1: Fan on
• Bit 1: Output error
The bit indicates whether there is an error at the fan output. This may be a short circuit or overload. This can be determined only for analog fan outputs. This group object is always 0 for devices with relay fan output.
– 0: No error
– 1: Error at output
• Bit 2: Forced operation
Indicates whether forced operation is active or not.
– 0: Forced operation inactive
– 1: Forced operation active
• Bit 3: Limitation 1
Limitation 1 is active, and this may limit the fan speed.
– 0: Limitation 1 inactive
– 1: Limitation 1 active
• Bit 4: Limitation 2
Limitation 2 is active, and this may limit the fan speed.
– 0: Limitation 2 inactive
– 1: Limitation 2 active
• Bit 5: Limitation 3
Limitation 3 is active, and this may limit the fan speed.
– 0: Limitation 3 inactive
– 1: Limitation 3 active
• Bit 6: Automatic
The group object indicates whether or not the fan is in automatic mode.
– 0: Automatic mode inactive
– 1: Automatic mode active</td></tr>
<tr><td>12</td><td>Status Fan automatic</td><td>Channel – Fan</td><td>1 bit
DPT 1.011</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is enabled if *Automatic operation* has been enabled in the *Fan output* parameter window.
This group object is always enabled in controller mode.
The group object indicates the status of automatic operation.
Telegram value:
• 0 = Inactive
• 1 = Active</td></tr>
</table>

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>13</td><td>Status Fan speed</td><td>Channel – Fan</td><td>1 byte
DPT 5.001</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is always enabled.
This group object indicates the current fan speed.
The following status values are output for a 3-speed fan:
• Speed 0: 0 (0 %)
• Speed 1: 85 (33 %)
• Speed 2: 170 (66 %)
• Speed 3: 255 (100 %)
The following status values are output for a 2-speed fan:
• Speed 0: 0 (0 %)
• Speed 1: 128 (50 %)
• Speed 2: 255 (100 %)
The following status values are output for a 1-speed fan:
• Speed 0: 0 (0 %)
• Speed 1: 255 (100 %)</td></tr>
<tr><td>14</td><td>Status Fan speed 1</td><td>Channel – Fan</td><td>1 bit
DPT 1.001</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter <i>Switch fan speed via 1-bit objects</i> is set to <i>Switch off to active fan speed using "0" only</i> or <i>Switch off to any 1 bit fan speed using "0"</i> in the <i>Fan speed</i> parameter window.
This indicates whether the fan is at speed 1.
Telegram value:
• 0: Fan speed Off
• 1: Fan speed On</td></tr>
<tr><td>15</td><td>Status Fan speed 2</td><td>Channel – Fan</td><td>1 bit
DPT 1.001</td><td>C, R, T</td></tr>
<tr><td colspan="5">See group object 14
This group object is hidden if only a 1-speed fan was selected.</td></tr>
<tr><td>16</td><td>Status Fan speed 3</td><td>Channel – Fan</td><td>1 bit
DPT 1.001</td><td>C, R, T</td></tr>
<tr><td colspan="5">See group object 14
This group object is hidden if only a 1- or 2-speed fan was selected.</td></tr>
<tr><td>17</td><td>Activate/deactivate fan automation</td><td>Channel – Fan</td><td>1 bit
DPT 1.003</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter <i>Enable automatic mode based on control value</i> is set to <i>Yes</i> in the <i>Fan output</i> parameter window.
This group object is always enabled in controller mode.
Sending the value 1 on this group objects activates automatic mode.
In controller mode, automatic mode can also be activated/deactivated via the group object <i>Request fan manually</i>. This group object is used for slave communication there.
After bus voltage recovery, ETS reset and download, automatic mode can be directly reactivated by selecting the corresponding parameters (see)</td></tr>
</table>

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>18</td><td>Switch speed 1</td><td>Channel – Fan</td><td>1 bit
DPT 1.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter *Switch fan speed via 1-bit objects* is set to *Switch off to active fan speed using "0" only* or *Switch off to any 1 bit fan speed using "0"* in the *Fan speed* parameter window.
The fan changes to the corresponding speed when a 1 is sent on this group object.
The reaction on sending a 0 depends on the selection of the parameter *Switch fan speed via 1 bit group objects*:
• When *Switch off to active fan speed using "0" only* is selected, a 0 switches off the fan only if the fan is running at this fan speed. If not, reception has no effect.
• When the option *Switch off to any 1 bit fan speed using "0"* is selected, receiving a 0 always switches the fan off.</td></tr>
<tr><td>19</td><td>Switch speed 2</td><td>Channel – Fan</td><td>1 bit
DPT 1.001</td><td>C, W</td></tr>
<tr><td colspan="5">See group object 18
This group object is hidden if only a 1-speed fan was selected.</td></tr>
<tr><td>20</td><td>Switch speed 3</td><td>Channel – Fan</td><td>1 bit
DPT 1.001</td><td>C, W</td></tr>
<tr><td colspan="5">See group object 18
This group object is hidden if only a 1- or 2-speed fan was selected.</td></tr>
<tr><td>21</td><td>Switch fan speed</td><td>Channel – Fan</td><td>1 byte
DPT 5.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is always enabled.
This group object sets the fan speed directly.
The speeds are controlled via the following values for a 3-speed fan:
• Speed 0: 0 (0 %)
• Speed 1: 1…85 (1…33 %)
• Speed 2: 85…170 (34…66 %)
• Speed 3: 171…255 (67…100 %)
The speeds are controlled via the following values for a 2-speed fan:
• Speed 0: 0 (0 %)
• Speed 1: 1…128 (1…50 %)
• Speed 2: 129…255 (51…100 %)
The speeds are controlled via the following values for a 1-speed fan:
• Speed 0: 0 (0 %)
• Speed 1: 1…255 (1…100 %)</td></tr>
<tr><td>22</td><td>Increase/decrease fan speed</td><td>Channel – Fan</td><td>1 bit
DPT 1.007</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is always enabled.
With this group object, the fan can be switched one fan speed further up or down via a 1 bit telegram.
This can be done until the maximum or minimum fan speed is reached. The parameterized limitations are taken into account here. Further UP or DOWN telegrams are ignored and not executed.
Telegram value:
• 0 = Switch fan speed DOWN
• 1 = Switch fan speed UP</td></tr>
</table>

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>23</td><td>Limitation 1</td><td>Channel – Fan</td><td>1 bit
DPT 1.003</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter *Fan speed limitation* is set to *Activated* in the *Fan output* parameter window.
Limitation 1 is active when a telegram with the value 1 is received on the group object *Limitation 1*. Limitation 1 is canceled when a telegram with the value 0 is received on the group object *Limitation 1*.
When Limitation 1 is activated, the fan can assume the only the fan speed or speed range as set in the parameter *Limitation 1*.
Telegram value:
• 0 = Limitation x inactive
• 1 = Limitation x active</td></tr>
<tr><td>24</td><td>Limitation 2</td><td>Channel – Fan</td><td>1 bit
DPT 1.003</td><td>C, W</td></tr>
<tr><td colspan="5">See group object 23</td></tr>
<tr><td>25</td><td>Limitation 3</td><td>Channel – Fan</td><td>1 bit
DPT 1.003</td><td>C, W</td></tr>
<tr><td colspan="5">See group object 23</td></tr>
</table>

8.4 Group objects Valve

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>26</td><td>Status byte valve A</td><td>Channel – Valve A</td><td>1 byte
Non DPT</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is enabled as along as the valve output has not been parametrized with *Deactivated*.
This group object indicates the current valve status.
• Bit 0: Setpoint received/control value received
This bit indicates whether or not the valve received a valid control value.
– 0: Setpoint/control value received
– 1: Setpoint/control value not received

Note
This bit retains the value 0 during the entire run time if cyclical monitoring is not used (for the operating mode in controller mode or for the control value in actuator mode), because no cycle time was defined during which a new value must be received.

• Bit 1: Output error
The bit indicates whether there is an error at the valve output. This may be a short circuit or overload.
– 0: No error
– 1: Error at output
• Bit 2: Forced operation
Indicates whether forced operation is active or not.
– 0: Forced operation inactive
– 1: Forced operation active
• Bit 3: Valve purge
The bit indicates whether or not valve purge is active.
– 0: Valve purge inactive
– 1: Valve purge active</td></tr>
<tr><td>27</td><td>Status Control value</td><td>Channel – Valve A</td><td>1 byte
DPT 5.001</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is enabled as along as the valve output has not been parametrized with *deactivated*.
The group object indicates the active valve control value from 0…100 %.</td></tr>
<tr><td>28</td><td>Fault: valve output</td><td>Channel – Valve A</td><td>1 bit
DPT 1.002</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is enabled as along as the valve output has not been parametrized with *Deactivated*.
If there is a fault on the output, e.g. due to short circuit or overloading, the valve selector's LED and, if a channel is selected, the "Open" LED flash. The group object simultaneously sends a telegram with the value 1.
The output is switched off in the event of a fault.
The group object value is 0 after the fault has been remedied.

Note
Indication by LED only on devices with manual operation.</td></tr>
<tr><td>29</td><td>Status Valve purge</td><td>Channel – Valve A</td><td>1 bit
DPT 1.011</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is enabled via the parameter *Valve purge* in the *Valve output A* parameter window unless *Deactivated* is set. The status of the valve purge is displayed via this group object.
The status is sent depending on the option selected in the parameter *Send group object "Status Valve purge"*.
Telegram value:
• 0 = Valve purge inactive
• 1 = Valve purge active</td></tr>
</table>

No.	Function	Group object name	Data Type	Flag
30	Reset fault on valve output	Channel – Valve A	1 bit DPT 1.015	C, W
If there is an active fault on the valve output, a reset can be performed with the telegram value 1 via this group object. A reset is only successful if the fault has been repaired and is no longer present. The LED turns off after it is successfully reset. The fault can also be reset by restarting or by an ETS reset. The device can be restarted by disconnecting and reconnecting the bus voltage. ⓘ **Note** Indication by LED only on devices with manual operation.				
31	Activate valve purge	Channel – Valve A	1 bit DPT 1.017	C, W
This group object is enabled via the parameter *Valve purge* in the *Valve output A* parameter window unless *Deactivated* is set. This group object can initiate a valve purge. ⓘ **Note** A valve purge not undertaken due to a higher priority will no longer be undertaken.				
32	Enable/disable manual override valve	Channel – Valve A	1 bit DPT 1.003	C, W
This group object is enabled by selecting *Yes* in the parameter *Enable manual valve override*. If manual valve override is enabled, the value in group object *Override valve control value* is written directly to the valve output. The value specified by the controller, or specified via a group object *Control value* in actuator mode, is overridden. Telegram value: • 0: Manual override disabled • 1: Manual override enabled When a 0 is received on this group object, manual override is immediately blocked and the value specified by the controller, or specified via group object *Control value* in actuator mode, applies again.				
33	Override valve control value	Channel – Valve A	1 byte DPT 5.001	C, W
This group object is enabled by selecting *Yes* in the parameter *Enable manual valve override*. This group object can send a manual valve control value for overriding the valve, e.g. for test purposes. The value on this group object becomes active only when overriding has been enabled by the group object *Enable/disable manual override valve*. A block via this group object immediately cancels the overridden value.				
34	Control value VAV damper control	Channel – Valve A	1 byte DPT 5.001	C, W
This group object is enabled if the parameter *Valve output* is set to *Use as VAV damper output* in the *Valve output A* parameter window. This group object receives the control valve to be issued via the output. The control value received via the group object is converted to an output voltage in the parametrized range (s. parameter Voltage range VAV damper control value, Page 261) and output. ⓘ **Note** This group object is available only for the devices FCC/S 1.2.x.1 and FCC/S 1.3.x.1.				
35	Status byte valve B	Channel – Valve B	1 byte Non DPT	C, R, T
See group object 26				

No.	Function	Group object name	Data Type	Flag
36	Status Control value	Channel – Valve B	1 byte DPT 5.001	C, R, T
See group object 27				
37	Fault: valve output	Channel – Valve B	1 bit DPT 1.002	C, R, T
See group object 28				
38	Status Valve purge	Channel – Valve B	1 bit DPT 1.011	C, R, T
See group object 29				
39	Reset fault on valve output	Channel – Valve B	1 bit DPT 1.015	C, W
See group object 30				
40	Activate valve purge	Channel – Valve B	1 bit DPT 1.017	C, W
See group object 31				
41	Enable/disable manual override valve	Channel – Valve B	1 bit DPT 1.003	C, W
See group object 32				
42	Override valve control value	Channel – Valve B	1 byte DPT 5.001	C, W
See group object 33				
43	Control value VAV fan damper control	Channel – Valve B	1 byte DPT 5.001	C, W
See group object 34				

8.5 Group objects Relay output

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>44</td><td>Status Relay</td><td>Channel – Relay</td><td>1 bit
DPT 1.009</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter *Output is* is set to *Activated* in the *Relay output* parameter window.
The group object indicates the status of the relay depending on the option selected in the parameter *Object value Status Relay*:
Telegram value:
• 1 = relay closed; 0 = relay open
• 0 = relay closed; 1= relay open
The status is sent depending on the option selected in the parameter *Send status values* (*Relay output* parameter window).</td></tr>
<tr><td>45</td><td>Switch relay</td><td>Channel – Relay</td><td>1 bit
DPT 1.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter *Output is* is set to *Activated* in the *Relay output* parameter window.
This group object switches the relay output.
Telegram value:
• 1: On
• 0: Off
Whether the relay opens or closes depends on the parametrization as a normally closed or normally open contact.</td></tr>
<tr><td colspan="5">**Note**
If the relay output is used as the controller's output drive (for an electric heater), the parameter *Switch relay output independently of fan speed (including when fan = 0)* can be used to prevent the relay from switching on when the fan is not running. This serves to protect the installation by ensuring that the fan always transports the heat produced by an electric heater into the room. This prevents heat build-up and the resulting fire risk.</td></tr>
</table>

8.6 Group objects Channel – General

No.	Function	Group object name	Data Type	Flag
46	Forced operation 2 bit	Channel – General	2 bits DPT 2.001	C, W
This group object is enabled if the parameter *Use forced operation* is set to *Forced operation 2 bit* in the *Monitoring and safety* parameter window. This group object activates and deactivates forced operation. Telegram value (bit 1 | bit 0: Status Forced operation): • 0 | 0: Forced operation inactive • 0 | 1: Forced operation inactive • 1 | 0: Forced operation active; state OFF • 1 | 1: Forced operation active; state ON				
47	Forced operation 1 bit	Channel – General	1 bit DPT 1.002	C, W
The group object is enabled if the parameter *Use forced operation* is set to *Forced operation1 bit*, *0 active* or *Forced operation1 bit*, *1 active* in the *Monitoring and safety* parameter window. This group object activates and deactivates forced operation. Depending on the selected option, forced operation is activated with a 1 or 0 and deactivated with a 0 or 1.				
48	Error: heating/cooling receipt	Channel – General	1 bit DPT 1.002	C, R, T
This group object is enabled if the parameter *Monitor receipt of group object "Toggle heating/cooling"* is set to *Activated* in the *Monitoring and safety* parameter window. This group object changes to the value 1 if the parametrized monitoring time was exceeded without a value being received on the group object. The status changes back to 0 when the group object is received again. The group object is sent on each state change (0 > 1 or 1 > 0).				
49	Error: window status receipt	Channel – General	1 bit DPT 1.002	C, R, T
This group object is enabled if the parameter *Monitor receipt of group object "Window contact"* is set to *Activated* in the *Monitoring and safety* parameter window. This group object changes to the value 1 if the parametrized monitoring time was exceeded without the group object being received. The status changes back to 0 when the group object is received again. The group object is sent on each state change (0 > 1 or 1 > 0).				
50	Error: dew point status receipt	Channel – General	1 bit DPT 1.002	C, R, T
This group object is enabled if the parameter *Monitor receipt of group object "Dew point alarm"* is set to *Activated* in the *Monitoring and safety* parameter window. This group object changes to the value 1 if the parametrized monitoring time was exceeded without the group object being received. The status changes back to 0 when the group object is received again. The group object is sent on each state change (0 > 1 or 1 > 0).				
51	Error: fill level status receipt	Channel – General	1 bit DPT 1.002	C, R, T
This group object is enabled if the parameter *Monitor receipt of group object "Fill level alarm"* is set to *Activated* in the *Monitoring and safety* window. This group object changes to the value 1 if the parametrized monitoring time was exceeded without the group object being received. The status changes back to 0 when the group object is received again. The group object is sent on each state change (0 > 1 or 1 > 0).				

8.7 Group objects Inputs

No.	Function	Group object name	Data Type	Flag
52	Error: operating mode receipt	Channel – General	1 bit DPT 1.002	C, R, T
This group object is enabled if the parameter *Monitor receipt of group object "Operating mode"* is set to *Activated* in the *Monitoring and safety* parameter window. This group object changes to the value 1 if the parametrized monitoring time was exceeded without the group object being received. The status changes back to 0 when the group object is received again. The group object is sent on each state change (0 > 1 or 1 > 0).				
53	Temperature	Channel – Input a	2 bytes DPT 9.001	C, R, T
This group object is enabled if the parameter *Input* is set to *Temperature sensor* in the *Input a* parameter window. This group object sends the temperature value measured at the input on the bus depending on the reaction parametrized in the parameter *Send temperature value*.				
54	Input error	Channel – Input a	1 bit DPT 1.002	C, R, T
This group object is enabled if the parameter *Input* is set to *Temperature sensor* in the *Input a* parameter window. This group object is also enabled if the parameter *Connect analog room control unit to physical device input a* is set to *Yes* in the *Setpoint adjustment* parameter window. This group object changes its status to 1 if a fault (idling or short circuit) is found at the input and it is therefore no longer possible to send measured values. If there is not fault at the input, this group object value is 0.				
55	Switch	Channel – Input a	1 bit DPT 1.001	C, R, T
This group object is enabled if the parameter *Input* is set to *Binary signal input* in the *Input a* parameter window. Depending on the selected parametrization, this group object indicates the contact position of the binary sensor connected to the input.				
55	Window contact	Channel – Input a	1 bit DPT 1.005	C, R, T
This group object is enabled if the parameter *Input* is set to *Window contact* in the *Input a* parameter window. Depending on the selected parametrization, this group object indicates the state of the window contact connected to the input.				
55	Dew point alarm	Channel – Input a	1 bit DPT 1.005	C, R, T
This group object is enabled if the parameter *Input* is set to *Dew point sensor* in the *Input a* parameter window. Depending on the selected parametrization, this group object indicates the state of the dew point sensor connected to the input.				
55	Fill level alarm	Channel – Input a	1 bit DPT 1.005	C, R, T
This group object is enabled if the parameter *Input* is set to *Fill level sensor* in the *Input a* parameter window. Depending on the selected parametrization, this group object indicates the state of the fill level sensor connected to the input.				

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>56</td><td>Disable input</td><td>Channel – Input a</td><td>1 bit
DPT 1.003</td><td>C, R, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter *Input* is set to *Binary signal input* in the *Input a* parameter window.
The physical input is enabled or disabled via the group object *Disable input*.</td></tr>
<tr><td colspan="5">ⓘ **Note**
When the input is blocked there is fundamentally no reaction to a signal change on the input, but:
• Waiting for a long button operation or a minimum signal duration is suspended.
• Parameterized cyclic transmission is not interrupted.
• The group object *Switch* can still be written.
If the input state changed during the blocking phase, this leads to immediate sending of the new group object value after enabling. If the input state remains the same during the blocking phase, the group object value is not sent.</td></tr>
<tr><td colspan="5">Telegram value:
• 0 = Enable input a
• 1 = Block input a</td></tr>
<tr><td>57…60</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Input b</td></tr>
<tr><td>61…64</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Input c</td></tr>
<tr><td>65…68</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Input d</td></tr>
</table>

8.8 Group objects Controller

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>69</td><td>Status Heating/Cooling</td><td>Channel – Controller</td><td>1 bit
DPT 1.100</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is enabled if the controller was parametrized for both heating and cooling. For this purpose, *Deactivated* must not be selected for the parameters *Basic-stage heating* and *Basic-stage cooling* in the *Application parameters* parameter window.
This group object is hidden in actuator mode.
The group object indicates whether the system is currently heating or cooling. Heating/cooling switchover takes place for controlled devices depending on this group object.
Telegram value:
• 0: Cooling
• 1: Heating</td></tr>
<tr><td>70</td><td>Status Control value Basic-stage heating</td><td>Channel – Controller</td><td>1 byte / 1 bit
DPT 5.001 / 1.001</td><td>C, R, T</td></tr>
<tr><td colspan="5">The group object is enabled if *Deactivated* was not selected for the parameter *Basic-stage heating* in the *Application parameters* parameter window.
This group object is hidden in actuator mode.
The group object data point type depends on the selected application and the associated control.
Output is via a 1-byte value (DPT 5.001) when the following control types are selected:
• 2-point 1 byte (0/100 %)
• PI continuous (0…100 %)
• PI continuous (0…100 %) for Fan Coil
Output is via a 1-bit value (DPT 1.001) when the following control types are selected:
• 2-point 1 bit (On/Off)
• PI PWM (On/Off)</td></tr>
<tr><td colspan="5">This group object outputs the control value for Basic-stage heating.
Use of a physical device output (e.g. valve) for basic-stage heating.
• The group object contains the control value that the controller uses to control the output.
Basic-stage heating is controlled only via group object (no internal use):
• The group object sends the control value for controlling a different actuator.</td></tr>
</table>

No.	Function	Group object name	Data Type	Flag
71	Status Control value Additional-stage heating	Channel – Controller	1 byte / 1 bit DPT 5.001 / 1.001	C, R, T

The group object is enabled if *Deactivated* was not selected for the parameter *Additional-stage heating* in the *Application parameters* parameter window.

This group object is hidden in actuator mode.

The group object data point type depends on the selected application and the associated control.

Output is via a 1-byte value (DPT 5.001) when the following control types are selected:

- 2-point 1 byte (0/100 %)
- PI continuous (0…100 %)
- PI continuous (0…100 %) for Fan Coil

Output is via a 1-bit value (DPT 1.001) when the control types are selected:

- 2-point 1 bit (On/Off)
- PI PWM (On/Off)

Note

The control type is preselected by the parameter Parameter *Additional-stage heating* in this case. A certain type of control is preset depending on the selected application. The control type is freely selectable if *Free configuration* is selected in this parameter.

This group object outputs the control value for Additional-stage heating.

Use of a physical device output (e.g. valve) for Additional-stage heating.

- The group object contains the control value that the controller uses to control the output.

Additional-stage heating is controlled only via group object (no internal use):

- The group object sends the control value for controlling a different actuator.

Note

Depending on the input group objects of the actuator, it could be necessary to change the output of the control value between 1 byte and 1 bit. This is performed via the parameters described above.

Note

Cyclical sending and sending on change of the group object can be set under *Extended settings* in the *Room thermostat – Basic-stage heating* parameter window.

No.	Function	Group object name	Data Type	Flag
72	Status Control value Basic-stage cooling	Channel – Controller	1 byte / 1 bit DPT 5.001 / 1.001	C, R, T

The group object is enabled if *Deactivated* was not selected for the parameter *Basic-stage cooling* in the *Application parameters* parameter window.

This group object is hidden in actuator mode.

The group object data point type depends on the selected application and the associated control.

Output is via a 1-byte value (DPT 5.001) when the following control types are selected:

- 2-point 1 byte (0/100 %)
- PI continuous (0…100 %)
- PI continuous (0…100 %) for Fan Coil

Output is via a 1-bit value (DPT 1.001) when the following control types are selected:

- 2-point 1 bit (On/Off)
- PI PWM (On/Off)

Note

The control type is preselected by the parameter Parameter *Additional-stage cooling* in this case. A certain type of control is preset depending on the selected application. The control type is freely selectable if *Free configuration* is selected in this parameter.

This group object outputs the control value for Basic-stage cooling.

Use of a physical device output (e.g. valve) for Basic-stage cooling.

- The group object contains the control value that the controller uses to control the output.

Basic-stage cooling is controlled only via group object (no internal use):

- The group object sends the control value for controlling a different actuator.

Note

Depending on the input group objects of the actuator, it could be necessary to change the output of the control value between 1 byte and 1 bit. This is performed via the parameters described above.

Note

Cyclical sending and sending on change of the group object can be set under Extended settings in the *Room thermostat – Basic-stage heating* parameter window.

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>73</td><td>Status Control value Additional-stage cooling</td><td>Channel – Controller</td><td>1 byte / 1 bit
DPT 5.001 / 1.001</td><td>C, R, T</td></tr>
<tr><td colspan="5">The group object is enabled if "Deactivated" was not selected for the parameter "Additional-stage cooling" in the "Application parameters" parameter window.
This group object is hidden in actuator mode.
The group object data point type depends on the selected application and the associated control.
Output is via a 1-byte value (DPT 5.001) when the following control types are selected:
• 2-point 1 byte (0/100 %)
• PI continuous (0…100 %)
• PI continuous (0…100 %) for Fan Coil
Output is via a 1-bit value (DPT 1.001) when the following control types are selected:
• 2-point 1 bit (On/Off)
• PI PWM (On/Off)

ⓘ **Note**
The control type is preselected by the parameter *Additional-stage cooling* in this case. A certain type of control is preset depending on the selected application. The control type is freely selectable if *Free configuration* is selected in this parameter.

This group object outputs the control value for Additional-stage cooling.
Use of a physical device output (e.g. valve) for Additional-stage cooling.
• The group object contains the control value that the controller uses to control the output.
Additional-stage cooling is controlled only via group object (no internal use):
• The group object sends the control value for controlling a different actuator.

ⓘ **Note**
Depending on the input group objects of the actuator, it could be necessary to change the output of the control value between 1 byte and 1 bit. This is performed via the parameters described above.

ⓘ **Note**
Cyclical sending and sending on change of the group object can be set under Extended settings in the *Room thermostat – Basic-stage heating* parameter window.</td></tr>
<tr><td>74</td><td>Not assigned</td><td></td><td></td><td></td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>75</td><td>Actual temperature</td><td>Channel – Controller</td><td>2 bytes
DPT 9.001</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is always enabled in controller mode.
This group object is hidden in actuator mode.
This group object indicates the current actual temperature value (room temperature) that the controller is using.
This value consists of the value(s) measured via the physical device inputs and the values received via the two group objects *External temperature 1* and *External temperature 2*.
The values recorded via the inputs are averaged, and this mean value is then combined with the values received via the group object. A weighting factor can be defined for the combination process.
The transmission reaction of this group object is set in the *Room thermostat* parameter window.

ⓘ **Note**
This group object can also be used for display on analog room control units and visual display systems.</td></tr>
</table>

No.	Function	Group object name	Data Type	Flag
76	External temperature 1	Channel – Controller	2 bytes DPT 9.001	C, W, R

This group object is enabled if the parameter *Temperature input* is set to *Via group object* or *Via physical device input and group object* in the *Application parameters* parameter window.

This group object cannot be activated in actuator mode.

This group object can receive a temperature value via the KNX bus to be included in determining the actual temperature (room temperature).

> ⓘ **Note**
>
> This group object value is evaluated after the device is restarted.

No.	Function	Group object name	Data Type	Flag
77	External temperature 2	Channel – Controller	2 bytes DPT 9.001	C, W

This group object is enabled if the parameter *Temperature input* is set to *Via group object* or *Via physical device input and group object* and the *Number of temperature input objects* is set to *2* in the *Application parameters* parameter window.

This group object cannot be activated in actuator mode.

This group object can receive a temperature value via the KNX bus to be included in determining the actual temperature (room temperature).

> ⓘ **Note**
>
> This group object value is evaluated after the device is restarted.

No.	Function	Group object name	Data Type	Flag
78	Fault: actual temperature (master)	Channel – Controller	1 bit DPT 1.002	C, R, T

This group object if the parameter *Temperature input monitoring* is not set to *Deactivated* in the *Monitoring and safety* parameter window.

This group object cannot be activated in actuator mode.

If the temperature monitoring time of the input is exceeded or if a fault is found on the monitored input, the group object changes the status to 1 to indicate the fault.

This group object is sent on every status change.

Telegram value:

- 0: No fault
- 1: Fault: actual temperature

> ⓘ **Note**
>
> If a slave is used:
>
> To indicate fault mode, this group object must be connected to the slave's group object *Fault: actual temperature (slave)*.

No.	Function	Group object name	Data Type	Flag
79	Current setpoint	Channel – Controller	2 bytes DPT 9.001	C, R, T

This group object is always visible in controller mode.

This group object is hidden in actuator mode.

The group object outputs the current setpoint temperature value.

This consists of the current operating mode and the manual setpoint adjustment.

The group object is controlled by manually changing the setpoint or by changing the operating mode, the basic setpoint temperature and the setpoint temperature for the individual operating modes.

No.	Function	Group object name	Data Type	Flag
80	Operating mode normal (master)	Channel – Controller	1 byte DPT 20.102	C, W, T, U

This group object is always visible in controller mode.

This group object is hidden in actuator mode.

The group object receives the operating mode to be set as a 1-byte value.

Telegram value:

- 1: Comfort
- 2: Standby
- 3: Economy
- 4: Frost/heat protection

The operating mode switches between different operating states of the room:

- Comfort: Room occupied. The setpoint temperature is set to a default value perceived as pleasant by most users.
- Standby: Room is briefly/recently vacant. The setpoint temperature is decreased (heating) or increased (cooling)
- Economy: The room is us unused for an extended period (e.g. overnight), and the temperature is markedly decreased (heating) or increased (cooling).
- Frost/heat protection: The room or building is unused for and extended period (e.g. school during vacation). The setpoint temperatures are adjusted to the minimum (heating – frost protection) or maximum (cooling – heat protection) values that are still acceptable without damaging the installation.

Switchover between the operating modes usually takes place via a central schedule or via Intelligent Building Control.

Note

The group objects and states *Override mode*, *Fill level alarm*, *Dew point alarm*, *Window contact*, *Request On/Off (Master)*, *Presence detector* and *Operating mode* (listed in decreasing priority) determine the controller's setpoint in addition to manual setpoint adjustment and basic setpoint adaptation.

Note

If a slave is used:

To indicate the operating mode on a slave, this group object must be connected to the slave's group object *Operating mode (slave)*.

No.	Function	Group object name	Data Type	Flag
81	Operating mode override (master)	Channel – Controller	1 byte DPT 20.102	C, W, T, A

This group object is always visible in controller mode.

This group object is hidden in actuator mode.

The group object receives the operating mode to be set as a 1-byte value.

Telegram value:

- 0: Automatic/no override
- 1: Comfort
- 2: Standby
- 3: Economy
- 4: Frost/heat protection

The group object overrides the room's operating mode. The operating mode set here overrides all other priorities except for the reaction on bus voltage failure.

For example, this group object can override a malfunction on a connected sensor (e.g. faulty window contact) that would actually cause the operating mode to change.

ⓘ **Note**

For the device to function normally and react normally to adjustment by the user, this group object must be set to the value *0 Automatic/no override*.

ⓘ **Note**

The group objects and states *Override mode*, *Fill level alarm*, *Dew point alarm*, *Window contact*, *Request On/Off (Master)*, *Presence detector* and *Operating mode* (listed in decreasing priority) determine the controller's setpoint in addition to manual setpoint adjustment and basic setpoint adaptation.

ⓘ **Note**

If a slave is used:

To indicate the operating mode on a slave, this group object must be connected to the slave's group object *Operating mode overridden (slave)*.

No.	Function	Group object name	Data Type	Flag
82	Window contact (master/slave)	Channel – Controller	1 bit DPT 1.019	C, W

This group object is enabled if the parameter *Window status input* is set to *Via group object* in the *Application parameters* parameter window.

This group object is hidden in actuator mode.

This group object can receive the window status via KNX.

Telegram value:

- 0: Window closed
- 1: Window open

This group object changes the device's operating mode to frost/heat protection when the "window open" information is received.

A higher-priority group object can override the operating mode.

ⓘ **Note**

The group objects and states *Override mode*, *Fill level alarm*, *Dew point alarm*, *Window contact*, *Request On/Off (Master)*, *Presence detector* and *Operating mode* (listed in decreasing priority) determine the controller's setpoint in addition to manual setpoint adjustment and basic setpoint adaptation.

ⓘ **Note**

If a slave is used:

To indicate the operating mode on a slave, the group address associated with this group object must also be connected to the slave's group object *Window contact (slave)*.

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>83</td><td>Presence detector (master/ slave)</td><td>Channel – Controller</td><td>1 bit
DPT 1.018</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is always enabled in controller mode.
This group object is hidden in actuator mode.
This group object can receive the presence status (person in the room) via KNX.
Telegram value:
• 0: Room vacant
• 1: 1: Room occupied
When the presence information is received, this group object changes the device's operating mode to Comfort. When the room vacant information is received the operating mode is set back to the operating mode set via the group object <i>Operating mode</i>.
A higher-priority group object can override the operating mode.
ⓘ Note
If a slave is used:
To indicate the operating mode on a slave, the group address associated with this group object must also be connected to the slave's group object <i>Presence detector (slave)</i>.</td></tr>
<tr><td>84</td><td>Status Heating</td><td>Channel – Controller</td><td>1 bit
DPT 1.001</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is enabled if the controller was parametrized for heating. For this purpose, <i>Deactivated</i> must not be selected for the parameter <i>Basic-stage heating</i> in the <i>Application parameters</i> parameter window.
This group object is hidden in actuator mode.
The device uses the group object to indicate whether it is currently active in the operating mode, i.e. whether the control value is greater than 0.
Telegram value:
• 0: Heating control value = 0
• 1: Heating control value > 0</td></tr>
<tr><td>85</td><td>Status Cooling</td><td>Channel – Controller</td><td>1 bit
DPT 1.001</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is enabled if the controller was parametrized for cooling. For this purpose, <i>Deactivated</i> must not be selected for the parameter <i>Basic-stage cooling</i> in the <i>Application parameters</i> parameter window.
This group object is hidden in actuator mode.
The device uses the group object to indicate whether it is currently active in the operating mode, i.e. whether the control value is greater than 0.
Telegram value:
• 0: Cooling control value = 0
• 1: Cooling control value > 0</td></tr>
</table>

No.	Function	Group object name	Data Type	Flag
86	Activate minimum control value (basic load)	Channel – Controller	1 bit DPT 1.003	C, W
The group object is enabled if the parameter *Minimum control value for basic load > 0* is set to *Activate via group object* in the *Temperature controller* parameter window. This group object is hidden in actuator mode. Sending the value 1 on this group objects activates the basic load. The basic load is a minimum control value that must not be fallen below. The basic-load value can be defined for each heating and cooling stage, but only for control types for which the control value is output with 0…100 %. The basic load is always activated jointly for all stages, but it is active only for the active heating or cooling mode in each case. The control value can decrease to 0 % again when the basic load is inactive. One sample application for the basic load is floor heating, for which a certain control value must not be fallen below to protect the installation. Telegram value: • 0: Basic load inactive • 1: Basic load active				
87	Heating/Cooling changeover	Channel – Controller	1 bit DPT 1.100	C, W, T, A
This group object is enabled if the controller was parametrized for both heating and cooling. For this purpose, *Deactivated* must not be selected for the parameters *Basic-stage heating* and *Basic-stage cooling* in the *Application parameters* parameter window. Additionally, the parameter *Heating/Cooling changeover* must be set to *Only via group object* or *Via slave or group object*. This group object changes between heating and cooling modes. If *Via slave and via object* is selected, changeover can be performed either via this group object or via the control option of a slave. The current operating mode can be changed via the group object at any time. Telegram value: • 0: Cooling • 1: Heating				
87	Heating/Cooling changeover	Channel – Actuator	1 bit DPT 1.100	C, W, T, U
This group object is enabled if the actuator was parametrized for both heating and cooling. For this purpose, *Deactivated* must not be selected for the parameters *Basic-stage heating* and *Basic-stage cooling* in the *Application parameters* parameter window. This group object changes between heating and cooling modes. Changing between heating and cooling is possible only via this group object in actuator mode. The respective control value is considered active and is sent to the selected output depending on this group object value. Incoming group objects on the inactive control value are not processed during this time. Telegram value: • 0: Cooling • 1: Heating				

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>88</td><td>Base setpoint</td><td>Channel – Controller</td><td>2 bytes
DPT 9.001</td><td>C, W</td></tr>
<tr><td colspan="5">The group object is enabled if the parameter <i>Setpoint specification and adjustment</i> is set to <i>Relative</i> in the <i>Setpoint manager</i> parameter window.
This group object is hidden in actuator mode.
This group object can change the parametrized basic setpoint. This can shift the the setpoints assigned to the individual operating modes (Comfort, Standby, Economy). The relative distances between the setpoints remain the same, the the Comfort value is shifted accordingly.
Depending on the selection in the parameter <i>Base setpoint is</i>, the base setpoint is the <i>Comfort heating setpoint</i>, <i>Comfort cooling setpoint</i> or the <i>Mean value between Comfort heating and Comfort cooling</i>.
The basic setpoint is set to the temperature value received via this group object. However, the value must not lie outside the value range valid for the basic setpoint (10…40 °C).
The setpoint temperatures for frost and heat protection remain unaffected by this change.</td></tr>
<tr><td>89</td><td>Reset manual setpoint adjustment</td><td>Channel – Controller</td><td>1 bit
DPT 1.017</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter <i>Connection of an analog room control unit to physical device input a</i> in the <i>Setpoint adjustment</i> parameter window is set to <i>No</i>.
This group object is hidden in actuator mode.
This group object can reset the setpoint adjustment performed via KNX (via the group object <i>Request setpoint adjustment</i>). Activating this group object resets the setpoints to the parametrized setpoints.</td></tr>
<tr><td>90</td><td>Dew point alarm</td><td>Channel – Controller</td><td>1 bit
DPT 1.005</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter <i>Dew point status input</i> is set to <i>Via group object</i> in the <i>Application parameters</i> parameter window.
The device must be parametrized for cooling or heating mode for this parameter to be visible.
This group object is hidden in actuator mode.
This group object can receive the dew point status via KNX.
Telegram value:
• 0: Dew point alarm inactive
• 1: Dew point alarm active
When the dew point alarm information is received, this group object changes the device's operating mode to heat protection to protect the building.

Note
Dew formation, which occurs when reaching the dew point temperature, can damage the building substance.
The alarm is valid as long as the device is in cooling mode or until the alarm is canceled by reception of the value 0.
The operating mode is recalculated when changing to Heating mode. Heating can take place as normal, because the dew point is not a problem during heating.
A higher-priority group object can override the operating mode.
The group objects and states <i>Override mode</i>, <i>Fill level alarm</i>, <i>Dew point alarm</i>, <i>Window contact</i>, <i>Request On/Off (Master)</i>, <i>Presence detector</i> and <i>Operating mode</i> (listed in decreasing priority) determine the controller's setpoint in addition to manual setpoint adjustment and basic setpoint adaptation.

Note
If a slave is used:
To indicate the operating mode on a slave, the group address associated with this group object must also be connected to the slave's group object <i>Dew point alarm (slave)</i>.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>91</td><td>Fill level alarm</td><td>Channel – Controller</td><td>1 bit
DPT 1.005</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter <i>Fill level sensor input</i> is set to <i>Via group object</i> in the <i>Application parameters</i> parameter window.
The device must be parametrized for cooling or heating mode for this parameter to be visible.
This group object is hidden in actuator mode.
This group object can receive the fill level status via KNX.
Telegram value:
• 0: Fill level alarm inactive
• 1: Fill level alarm active
When the fill level alarm information is received, this group object changes the device's operating mode to heat protection to protect the building.

Note
The fill level alarm message means that the fill level in the condensate tray has exceeded a predefined limit. More condensate formation would cause the condensate tray to overflow and thereby damage the building.
The alarm is valid as long as the device is in cooling mode or until the alarm is canceled by reception of the value 0.
The operating mode is recalculated when changing to Heating mode. Heating can take place as normal, because the dew point is not a problem during heating.
A higher-priority group object can override the operating mode.
The group objects and states <i>Override mode</i>, <i>Fill level alarm</i>, <i>Dew point alarm</i>, <i>Window contact</i>, <i>Request On/Off (Master)</i>, <i>Presence detector</i> and <i>Operating mode</i> (listed in decreasing priority) determine the controller's setpoint in addition to manual setpoint adjustment and basic setpoint adaptation.

Note
If a slave is used:
To indicate the operating mode on a slave, the group address associated with this group object must also be connected to the slave's group object <i>Dew point alarm (slave)</i>.</td></tr>
<tr><td>92</td><td>Outside temperature for summer compensation</td><td>Channel – Controller</td><td>2 bytes
DPT 9.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter <i>Summer compensation</i> in the <i>Setpoint management</i> parameter window is parametrized with <i>Yes</i>.
This group object is hidden in actuator mode.
This group object receives the outside temperature so that the device can check whether or not summer compensation must be active.
For this purpose, a starting temperature from which summer compensation must become active is set using a parameter.
For a more detailed description of summer compensation:</td></tr>
<tr><td>93</td><td>Summer compensation active/ inactive</td><td>Channel – Controller</td><td>1 bit
DPT 1.002</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter <i>Summer compensation</i> in the <i>Setpoint management</i> parameter window is parametrized with <i>Yes</i>.
This group object is hidden in actuator mode.
This group object indicates whether summer compensation is active.
Telegram value:
• 0: Summer compensation inactive
• 1: Summer compensation active</td></tr>
</table>

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>94</td><td>Setpoint reached</td><td>Channel – Controller</td><td>1 bit
DPT 1.002</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is always visible in controller mode.
This group object is hidden in actuator mode.
This group object signals on the bus that the set setpoint has been reached in Comfort mode. The function is started by activating Comfort or Presence mode.
This group object value is 0 as long as the setpoint has not been reached.
The state changes from 1 to 0 when switching over to another operating mode or setting a new setpoint.
Telegram value:
• 0: Comfort setpoint not reached
• 1: Comfort setpoint reached</td></tr>
<tr><td>95</td><td>Request On/Off (master)</td><td>Channel – Controller</td><td>1 bit
DPT 1.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is always visible in controller mode.
This group object is hidden in actuator mode.
This group object can switch the controller off. The controller changes to frost/heat protection operating mode when the value 0 is received. This causes control to switch off (except if the frost/heat protection temperatures have already been reached). All control values are set to 0.
The device activates itself automatically when the frost/heat protection temperatures are reached.
Control can also be reactivated by sending the value 1 on this group object.
Additionally, the slave can use this group object to request the controller (master) to switch of control. Switch-off and non-switch-off is confirmed via the group object *Confirm On/Off (master)*.
Telegram value:
• 0: Deactivate control (Off)
• 1: Activate control (On)

ⓘ **Note**
If a slave is used:
This group object must be connected to the corresponding group object of the slave for master/slave operation to function.</td></tr>
<tr><td>96</td><td>Confirm On/Off (master)</td><td>Channel – Controller</td><td>1 bit
DPT 1.001</td><td>C, W, R</td></tr>
<tr><td colspan="5">This group object is always visible in controller mode.
This group object is hidden in actuator mode.
The device signals whether control is active (On) or inactive (Off) using this group object.
Telegram value:
• 0: Control active (On)
• 1: Control inactive (Off)</td></tr>
<tr><td>97</td><td>Setpoint display (master)</td><td>Channel – Controller</td><td>2 bytes
DPT 9.002</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is always visible in controller mode.
This group object is hidden in actuator mode.
This group object synchronizes between the controller (master) and the slave. This group object must be connected to the slave's group object of the same name for this purpose.
This group object transmits the setpoint to be displayed.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>98</td><td>Request setpoint adjustment</td><td>Channel – Controller</td><td>2 bytes / 2 bytes / 1 byte
DPT 9.001 / 9.002 / 6.010</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter <i>Connection of an analog room control unit to physical device input a</i> in the <i>Setpoint adjustment</i> parameter window is set to <i>No</i>.
This group object is hidden in actuator mode.
The group object transmits a setpoint change between the controller (master) and the slave or any other device. This group object can adjust setpoints within the permitted limits (see parameters Max. manual increase in heating mode via KNX, Page 293, Max. manual reduction in heating mode via KNX, Page 294, Max. manual increase in cooling mode via KNX, Page 294, Max. manual reduction in cooling mode via KNX, Page 294).
The group object's data point type depends on the data point type selected in the parameter <i>Manual setpoint adjustment via KNX with</i> in the <i>Setpoint adjustment</i> parameter window.
The type of DPTs used can be selected to ensure usability of setpoint adjustment with other devices as well.
DPT 6.010 must be selected for existing systems and for ABB devices that do not use the current controller version (ClimaECO master/slave concept) yet. With this method, the temperature is converted to an integer value before it is sent and the adjustment is transmitted in steps.
With newer devices, the DPTs 9.001 or 9.002 can be selected for the purpose of absolute or relative setpoint adjustment via temperature values.
The setpoint temperature (e.g. 22 °C) or the change in the setpoint temperature (z.B. +2 °C) must be sent to the group object for this purpose.

ⓘ Note
All ABB devices still support adjustment via DPT 6.010.

If the required temperature is outside the permitted setpoint range, the maximum/minimum possible value will be set. For this purpose, the master device checks the received value and returns the set value via the group object <i>Confirm setpoint adjustment (master)</i>.

ⓘ Note
If a slave is used:
This group object must be connected to the corresponding group object of the slave for master/slave operation to function.</td></tr>
<tr><td>98</td><td>Request setpoint adjustment</td><td>Channel – Actuator</td><td>2 bytes / 2 bytes / 1 byte
DPT 9.001 / 9.002 / 6.010</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the device was parametrized for actuator mode and the parameter <i>Connection of an analog room control unit to physical device input a</i> is set to <i>Yes</i> in the <i>Setpoint adjustment</i>.
The group object sends a setpoint change of the analog room control unit connected to the actuator to the controller.
The group object's data point type depends on the data point type selected in the parameter <i>Manual setpoint adjustment via KNX with</i> in the <i>Setpoint adjustment</i> parameter window.
The type of DPT used can be selected to ensure usability of setpoint adjustment with other devices as well.
DPT 6.010 must be selected for the existing systems and for ABB devices that do not use the current controller version (ClimaECO master/slave concept) yet. With this method, the temperature is converted to an integer value before it is sent and the adjustment is transmitted in steps.
With newer devices, the DPTs 9.001 or 9.002 can be selected for the purpose of absolute or relative setpoint adjustment via temperature values. The setpoint temperature (e.g. 22 °C) or the change in the setpoint temperature (z.B. +2 °C) must be sent to the group object for this purpose.

ⓘ Note
All ABB devices still support adjustment via DPT 6.010.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>99</td><td>Confirm setpoint adjustment (master)</td><td>Channel – Controller</td><td>2 bytes / 2 bytes / 1 byte
DPT 9.001 / 9.002 / 6.010</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter *Connection of an analog room control unit to physical device input a* in the *Setpoint adjustment* parameter window is set to *No*.
This group object is hidden in actuator mode.
The group object transmits a setpoint change between the controller (master) and the slave or any other device. This group object confirms a setpoint adjustment requested via the group object *Request setpoint adjustment* so that the new value becomes known to the requesting device as well.
Refer to group object 95 for the various data point types. The data point type of this group object depends on the same settings.
ⓘ **Note**
If a slave is used:
This group object must be connected to the corresponding group object of the slave for master/slave operation to function.</td></tr>
<tr><td>100</td><td>Request heating/cooling (master)</td><td>Channel – Controller</td><td>1 bit
DPT 1.100</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is visible in controller mode only if the parameter *Heating/Cooling changeover* is set to *Via slave and via group object* in the *Application parameters* parameter window.
This group object is hidden in actuator mode.
This group object synchronizes between the controller (master) and the slave. This group object must be connected to the slave's group object of the same name for this purpose.
The group object synchronizes the heating/cooling status between the controller (master) and the slave.</td></tr>
<tr><td>101</td><td>Request fan manually (slave)</td><td>Channel – Actuator</td><td>1 bit
DPT 1.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if, in actuator mode, the parameter *Connection of an analog room control unit to physical device input a* in the *Setpoint adjustment* parameter window is set to *Yes*.
This group object is hidden in controller mode.
When an analog room control unit is connected, this group object establishes communication between the actuator and the controller. The analog room control unit can adjust the fan automation in this mode. The adjustment is then transmitted to the controller via this group object.
This group object requests changing out of/into fan automation.
The group object must be connected to the controller's (master's) group object of the same name for this purpose.</td></tr>
</table>

No.	Function	Group object name	Data Type	Flag
102	Confirm fan manually (slave)	Channel – Actuator	1 bit DPT 1.001	C, R, T

This group object is enabled if, in actuator mode, the parameter *Connection of an analog room control unit to physical device input a* in the *Setpoint adjustment* parameter window is set to *Yes*.

This group object is hidden in controller mode.

When an analog room control unit is connected, this group object establishes communication between the actuator and the controller. The analog room control unit can adjust the fan automation in this mode. The adjustment is then transmitted to the controller via this group object.

The controller (master) uses this group object to inform the actuator (slave) whether changeover to fan automation or from fan automation has taken place.

ⓘ **Note**

The analog room control unit is only an adjustment option, so the feedback cannot be indicated via this group object. However, it is required for proper device functioning.

ⓘ **Note**

Discrepancies between the indication and the device reaction can occur during actuator operation with connected analog room control unit.

If an adjustment is made on a different KX analog room control unit, this is sent to the actuator to which the analog room control unit is connected. However, the analog room control unit cannot receive/set this information. The old indication therefore remains unchanged.

The following example makes this clear:

State: Active fan speed 3; automatic mode

1) KNX analog room control unit 1 Adjustment in manual mode and speed 1
2) The controller sends the adjustment to the actuator: Fan speed 1, manual
3) The actuator changes to fan speed 1, but the analog room control unit continues to indicate automatic operation

The problem can be avoided by using the device connected to the analog room control unit in controller mode. This excludes other analog room control units via which adjustments and thus adaptations via KNX are possible. The analog room control unit is the sole control unit in this case.

No.	Function	Group object name	Data Type	Flag
102	Confirm fan manually (master)	Channel – Controller	1 bit DPT 1.001	C, W

This object is visible in controller mode.

This group object permits communication between the master and an analog room control unit (slave).

The controller (master) uses this group object to inform the actuator (slave) whether changeover to fan automation or from fan automation has taken place.

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>103</td><td>Request fan speed (master)</td><td>Channel – Controller</td><td>1 byte / 1 byte
DPT 5.010 / 5.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter *Connection of an analog room control unit to physical device input a* in the *Setpoint adjustment* parameter window is set to *No*.
This group object is hidden in actuator mode.
The group object transmits a change in the fan speed between the controller (master) and the slave or any other device.
The group object's data point type depends on the data point type selected in the parameter *Manual fan speed adjustment via KNX with* in the *Setpoint adjustment* parameter window.
The type of DPT used can be selected to ensure usability of fan speed adjustment with other devices as well.
DPT 5.010 must be selected for existing systems and for ABB devices that do not use the current controller version (ClimaECO master/slave concept) yet. The fan speed adjustment is transmitted in steps with this method.
DPT 5.001 can be selected on newer devices, and the fan speed thereby can be transmitted directly as a percentage.
Note
All ABB devices still support adjustment via DPT 5.010.
Note
It might not be possible to set the required fan speed if limitations were activated for the fan.
Note
If a slave is used:
This group object must be connected to the corresponding group object of the slave for master/slave operation to function.</td></tr>
<tr><td>103</td><td>Request fan speed (slave)</td><td>Channel – Actuator</td><td>1 byte / 1 byte
DPT 5.010 / 5.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if, in actuator mode, the parameter *Connection of an analog room control unit to physical device input a* in the *Setpoint adjustment* parameter window is set to *Yes*.
This group object is hidden in controller mode.
When an analog room control unit is connected, this group object establishes communication between the actuator and the controller. The analog room control unit can adjust the fan speed in this mode. The adjustment is then transmitted to the controller via this group object.
This group object requests changing to a certain fan speed.
The group object must be connected to the controller's (master's) group object of the same name for this purpose.</td></tr>
<tr><td>104</td><td>Confirm fan speed (master)</td><td>Channel – Controller</td><td>1 byte / 1 byte
DPT 5.010 / 5.001</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter *Connection of an analog room control unit to physical device input a* in the *Setpoint adjustment* parameter window is set to *No*.
This group object is hidden in actuator mode.
The group object transmits a change in the fan speed between the controller (master) and the slave or any other device.
The controller (master) uses this group object to inform the connected devices whether the requested fan speed is permitted or to inform them about the current fan speed.
Refer to group object 100 for the various data point types. The data point type of this group object depends on the same settings.
Note
If a slave is used:
This group object must be connected to the corresponding group object of the slave for master/slave operation to function.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>105</td><td>Controller RHCC status</td><td>Channel – Controller</td><td>2 bytes
DPT 22.101</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is always visible in controller mode.
This group object is hidden in actuator mode.
The group object outputs the heating/cooling operating mode, active/inactive operation,
frost and heat alarm, as well as any malfunction (failure of actual temperature measurement) according to the specification
for the RHCC (Room Heating Cooling Controller) status.</td></tr>
<tr><td>106</td><td>Controller HVAC status (master)</td><td>Channel – Controller</td><td>1 byte
DPT 5.001</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is always visible in controller mode.
This group object is hidden in actuator mode.
This group object must be connected to the slave's group object of the same name. The group object synchronizes between the controller (master) and the slave.
The group object transmits the current operating mode, heating/cooling operating mode,
active/inactive operation, frost alarm and the dew point alarm to the slave.
The group object synchronizes the heating/cooling status between the controller (master) and the slave.</td></tr>
<tr><td>107</td><td>Current HVAC operating mode</td><td>Channel – Controller</td><td>1 bit
DPT 20.102</td><td>C, R, T</td></tr>
<tr><td colspan="5">This group object is always visible in controller mode.
This group object is hidden in actuator mode.
This group object outputs the currently valid HVAC operating mode after evaluation of all priorities and influences. The group object indicates the current controller operating mode.
The group object sends the current operating mode as a 1-byte value.
Telegram value:
• 1: Comfort
• 2: Standby
• 3: Economy
• 4: Frost/heat protection</td></tr>
<tr><td>108</td><td>Comfort heating setpoint</td><td>Channel – Controller</td><td>2 bytes
DPT 9.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter <i>Setpoint specification and adjustment</i> is set to <i>Absolute</i> and <i>Comfort heating setpoint = Comfort cooling setpoint</i> is set to <i>No</i> in the <i>Setpoint manager</i> parameter window.
This group object is hidden in actuator mode.
This group object can directly influence and overwrite the stored setpoint for Comfort heating. The value received via this group object is permanently stored and serves as the new Comfort heating setpoint. Manual setpoint adjustment acts on this setpoint.
The value must lie in the valid value range of 10…40 °C. A value outside this range is limited to this range.</td></tr>
<tr><td>108</td><td>Setpoint for Comfort heating and cooling</td><td>Channel – Controller</td><td>2 bytes
DPT 9.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter <i>Setpoint specification and adjustment</i> is set to <i>Absolute</i> and the parameter <i>Comfort heating setpoint = Comfort cooling setpoint</i> is set to Yes in the <i>Setpoint manager</i> parameter window.
This group object is hidden in actuator mode.
This group object can directly influence and overwrite the stored setpoint for Comfort heating and cooling. The value received via this group object is permanently stored and serves as the new Comfort heating and cooling setpoint. Manual setpoint adjustment acts on this setpoint.
The value must lie in the valid value range of 10…40 °C. A value outside this range is limited to this range.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>109</td><td>Comfort cooling setpoint</td><td>Channel – Controller</td><td>2 bytes
DPT 9.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter *Setpoint specification and adjustment* is set to *Absolute* and *Comfort heating setpoint = Comfort cooling setpoint* is set to *No* in the *Setpoint manager* parameter window.
This group object is hidden in actuator mode.
This group object can directly influence and overwrite the stored setpoint for Comfort cooling. The value received via this group object is permanently stored and serves as the new Comfort cooling setpoint. Manual setpoint adjustment acts on this setpoint.
The value must lie in the valid value range of 10…40 °C. A value outside this range is limited to this range.</td></tr>
<tr><td>110</td><td>Economy heating setpoint</td><td>Channel – Controller</td><td>2 bytes
DPT 9.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter *Setpoint specification and adjustment* in the *Setpoint manager* parameter window is parametrized with *Absolute*.
This group object is hidden in actuator mode.
This group object can directly influence and overwrite the stored setpoint for Economy heating. The value received via this group object is permanently stored and serves as the new Economy heating setpoint. Manual setpoint adjustment acts on this setpoint.
The value must lie in the valid value range of 10…40 °C. A value outside this range is limited to this range.
The value must be less than the value for comfort heating. If a value is not below this value, the device will automatically classify it below this value.</td></tr>
<tr><td>111</td><td>Economy cooling setpoint</td><td>Channel – Controller</td><td>2 bytes
DPT 9.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter *Setpoint specification and adjustment* in the *Setpoint manager* parameter window is parametrized with *Absolute*.
This group object is hidden in actuator mode.
This group object can directly influence and overwrite the stored setpoint for Economy cooling. The value received via this group object is permanently stored and serves as the new Economy cooling setpoint. Manual setpoint adjustment acts on this setpoint.
The value must lie in the valid value range of 10…40 °C. A value outside this range is limited to this range.
The value must be greater than the value for comfort cooling. If a value is not below this value, the device will automatically classify it below this value.</td></tr>
<tr><td>112</td><td>Standby heating setpoint</td><td>Channel – Controller</td><td>2 bytes
DPT 9.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter *Setpoint specification and adjustment* in the *Setpoint manager* parameter window is parametrized with *Absolute*.
This group object is hidden in actuator mode.
This group object can directly influence and overwrite the stored setpoint for Standby heating. The value received via this group object is permanently stored and serves as the new Standby heating setpoint. Manual setpoint adjustment acts on this setpoint.
The value must lie in the valid value range of 10…40 °C. A value outside this range is limited to this range.
The value must be less than the value for comfort heating. If a value is not below this value, the device will automatically classify it below this value.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>113</td><td>Standby cooling setpoint</td><td>Channel – Controller</td><td>2 bytes
DPT 9.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter *Setpoint specification and adjustment* in the *Setpoint manager* parameter window is parametrized with *Absolute*.
This group object is hidden in actuator mode.
This group object can directly influence and overwrite the stored setpoint for Standby cooling. The value received via this group object is permanently stored and serves as the new Standby cooling setpoint. Manual setpoint adjustment acts on this setpoint.
The value must lie in the valid value range of 10…40 °C. A value outside this range is limited to this range.
The value must be greater than the value for comfort cooling. If a value is not below this value, the device will automatically classify it below this value.</td></tr>
<tr><td>114</td><td>Building protection heating setpoint</td><td>Channel – Controller</td><td>2 bytes
DPT 9.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter *Setpoint specification and adjustment* in the *Setpoint manager* parameter window is parametrized with *Absolute*.
This group object is hidden in actuator mode.
This group object can directly influence and overwrite the stored setpoint for building protection heating (frost protection). The value received via this group object is permanently stored and serves as the new building protection heating setpoint. Manual setpoint adjustment acts on this setpoint.
The value must lie in the valid value range of 5…15 °C. A value outside this range is limited to this range.
The value must be less than the value for comfort heating. If a value is not below this value, the device will automatically classify it below this value.</td></tr>
<tr><td>115</td><td>Building Protection cooling setpoint</td><td>Channel – Controller</td><td>2 bytes
DPT 9.001</td><td>C, W</td></tr>
<tr><td colspan="5">This group object is hidden in actuator mode.
This group object can directly influence and overwrite the stored setpoint for building protection cooling (heat protection). The value received via this group object is permanently stored and serves as the new building protection cooling setpoint. Manual setpoint adjustment acts on this setpoint.
The value must lie in the valid value range of 27…45 °C. A value outside this range is limited to this range.
The value must be greater than the value for comfort cooling. If a value is not below this value, the device will automatically classify it below this value.</td></tr>
<tr><td>116</td><td>Heating control value</td><td>Channel – Actuator</td><td>1 byte
DPT 5.001</td><td>C, W, T, U</td></tr>
<tr><td colspan="5">This group object is enabled if, in actuator mode, the parameter *Basic-stage heating* is set to *Fan Coil Unit* in the *Application parameters* parameter window.
This group object is hidden in controller mode.
This group object receives the control value for heating in actuator mode.
This control value is issued on the selected output when heating operation is active.</td></tr>
<tr><td>117</td><td>Cooling control value</td><td>Channel – Actuator</td><td>1 byte
DPT 5.001</td><td>C, W, T, U</td></tr>
<tr><td colspan="5">This group object is enabled if, in actuator mode, the parameter *Basic-stage cooling* is set to *Fan Coil Unit* in the *Application parameters* parameter window.
This group object is hidden in controller mode.
This group object receives the control value for cooling in actuator mode.
This control value is issued on the selected output when cooling operation is active.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Function</th><th>Group object name</th><th>Data Type</th><th>Flag</th></tr>
<tr><td>118</td><td>Basic-stage heating limit temperature</td><td>Channel – Controller</td><td>2 bytes
DPT 9.001</td><td>C, W, T, U</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter <i>Activate temperature limitation</i> is set to <i>Yes</i> in the <i>Temperature controller – Basic-stage heating</i> parameter window and the parameter <i>Input for limit temperature sensor</i> is set to <i>Via group object</i>.
This group object is hidden in controller mode.
This group object receives the limit temperature for Basic-stage heating. The temperature value received here is used to evaluate the limit temperature. The limit becomes active when the temperature set in the parameter <i>Limit temperature</i> is exceeded.</td></tr>
<tr><td>119</td><td>Additional-stage heating limit temperature</td><td>Channel – Controller</td><td>2 bytes
DPT 9.001</td><td>C, W, T, U</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter <i>Activate temperature limitation</i> is set to <i>Yes</i> in the <i>Temperature controller – Additional-stage heating</i> parameter window and the parameter <i>Input for limit temperature sensor</i> is set to <i>Via group object</i>.
This group object is hidden in controller mode.
This group object receives the limit temperature for Additional-stage heating. The temperature value received here is used to evaluate the limit temperature. The limit becomes active when the temperature set in the parameter <i>Limit temperature</i> is exceeded.</td></tr>
<tr><td>120</td><td>Basic-stage cooling limit temperature</td><td>Channel – Controller</td><td>2 bytes
DPT 9.001</td><td>C, W, T, U</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter <i>Activate temperature limitation</i> is set to <i>Yes</i> in the <i>Temperature controller – Basic-stage cooling</i> parameter window and the parameter <i>Input for limit temperature sensor</i> is set to <i>Via group object</i>.
This group object is hidden in controller mode.
This group object receives the limit temperature for Basic-stage cooling. The temperature value received here is used to evaluate the limit temperature. The limit becomes active when the temperature set in the parameter <i>Limit temperature</i> is fallen below.</td></tr>
<tr><td>121</td><td>Additional-stage cooling limit temperature</td><td>Channel – Controller</td><td>2 bytes
SPT 9.001</td><td>C, W, T, U</td></tr>
<tr><td colspan="5">This group object is enabled if the parameter <i>Activate temperature limitation</i> is set to <i>Yes</i> in the <i>Temperature controller – Additional-stage cooling</i> parameter window and the parameter <i>Input for temperature limit sensor</i> is set to <i>Via group object</i>.
This group object is hidden in controller mode.
This group object receives the limit temperature for Additional-stage cooling. The temperature value received here is used to evaluate the limit temperature. The limit becomes active when the temperature set in the parameter <i>Limit temperature</i> is fallen below.</td></tr>
</table>

9 Operation

9.1 Manual operation

Special device functions can be undertaken using the operating keys on the membrane keypad. Operation via the membrane keypad is available and functions identically for all devices FCC/S 1.x.2.1.

For a complete overview of the control elements, see Product Overview.

Manual operation facilitates on-site operation of the device. Manual operation is enabled as standard and can be switched on and off using the *Manual operation* button.

Manual operation can be permanently deactivated in the ETS.
The group object *Status Manual operation* indicates whether manual operation is enabled/disabled.

Switching on manual operation:

► Press and hold the *Manual operation* button for 5 seconds until the yellow LED lights up continuously.

Switching off manual operation:

► Briefly press the *Manual operation* button.

⇨ The yellow LED goes off.

The device is in KNX operation after connection to the KNX, bus voltage recovery, ETS download or ETS reset. The LED is off.

ⓘ **Note**

The LED remains of if manual operation is disabled in general or disabled via the group object *Enable/disable manual operation*.

Switchover from *KNX operation* to the *Manual operation* mode does not occur.

ⓘ **Note**

The control values calculated by the controller or received via KNX are overridden and ignored during manual operation.

Changes due to manual operation are valid only while manual operation is active.

Manual operation cannot override forced operation or a safety state of the device.

Any override of the individual functions becomes effective only when they are changed for the first time by pressing a button. Until then, the outputs continue to react to values received from the controller or via KNX.
Another consequence of this is that the fan, unless it was adjusted by a press of the fan button, will continue to follow the valve control value if this is adjusted via manual operation.

10 Maintenance and cleaning

10.1 Cleaning

The voltage supply to the device must be switched off before cleaning. If devices become dirty, they can be cleaned using a dry cloth or a cloth dampened with a soapy solution. Corrosive agents or solutions must never be used.

10.2 Maintenance

The device is maintenance-free. In the event of damage (e.g. during transport and/or storage), do not carry out any repairs.

11 Disassembly and disposal

11.1 Removal

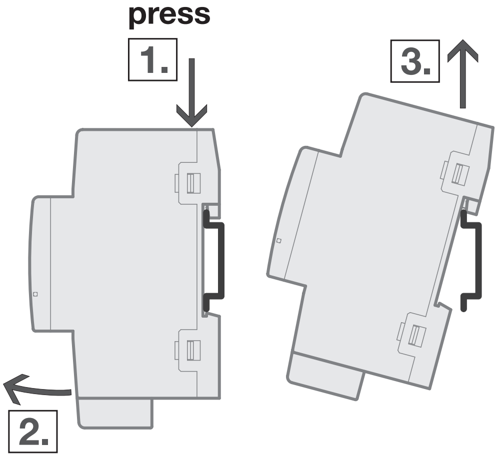


Fig. 60: Removal from the DIN rail

1. Press on the top of the device.
2. Release the bottom of the device from the DIN rail.
3. Lift the device up and off the DIN rail.

11.2 Environment

Consider environmental protection.

Used electrical and electronic devices must not be disposed of as domestic waste.

The device contains valuable resources that can be recycled. Therefore, please bring the device to a suitable recycling center. All packaging materials and devices are provided with markings and test seals for proper disposal. Always dispose of packaging material and electrical devices or their components at collection points or disposal companies authorized for this purpose. The products comply with the statutory requirements, particularly the law on electrical and electronic equipment and the REACH regulation. (EU directive 2012/19/EU WEEE and 2011/65/EU RoHS) (EU REACH regulation and the law implementing the regulation (EC) no.1907/2006)

12 Planning and application

12.1 Introduction

In this chapter you will find some tips and application examples for practical use of the device.

Application examples and practical tips on the topic of temperature control, valve drives, characteristic curve adjustment etc., can be found in the Application manual Heating/Ventilation/Air-Conditioning at https://www.abb.com/knx

12.2 Fan output

In this section, the function charts and application explanations for the fan outputs are explained.

12.2.1 Fan operation FCC/S 1.1.x.1 , FCC/S 1.2.x.1 and FCC/S 1.4.1.1

A single-phase fan, a blower or a convector can be controlled with the fan output. In combination with valve control, 2- or 4-pipe systems can be implemented. The fans are controlled via a 3-stage speed controller. For this purpose, three windings are tapped off the fan motor. The resulting fan speed is dependent on the tapping selected. For control purposes, at least one 3-stage changeover switch with zero position is usually used. For the switching function control type, it must be ensured that two contacts are not switched on simultaneously. This switch is mapped with a group of outputs in the device.

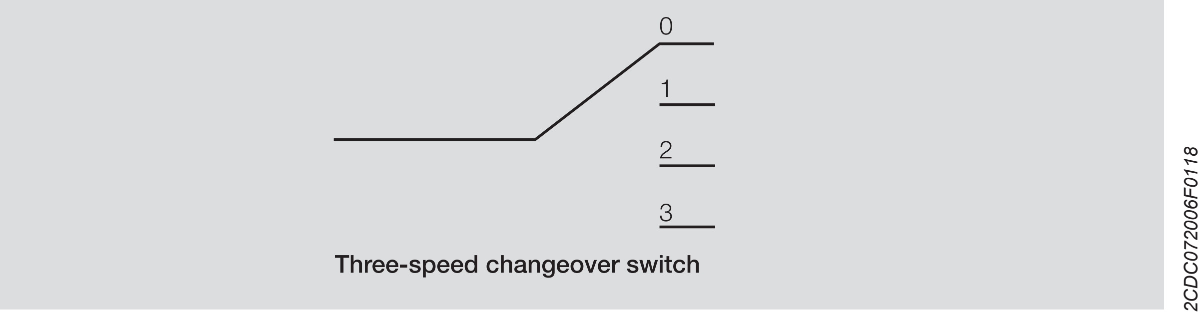


Fig. 61: Fan operation

The device is controlled in accordance with the following schematic principle:

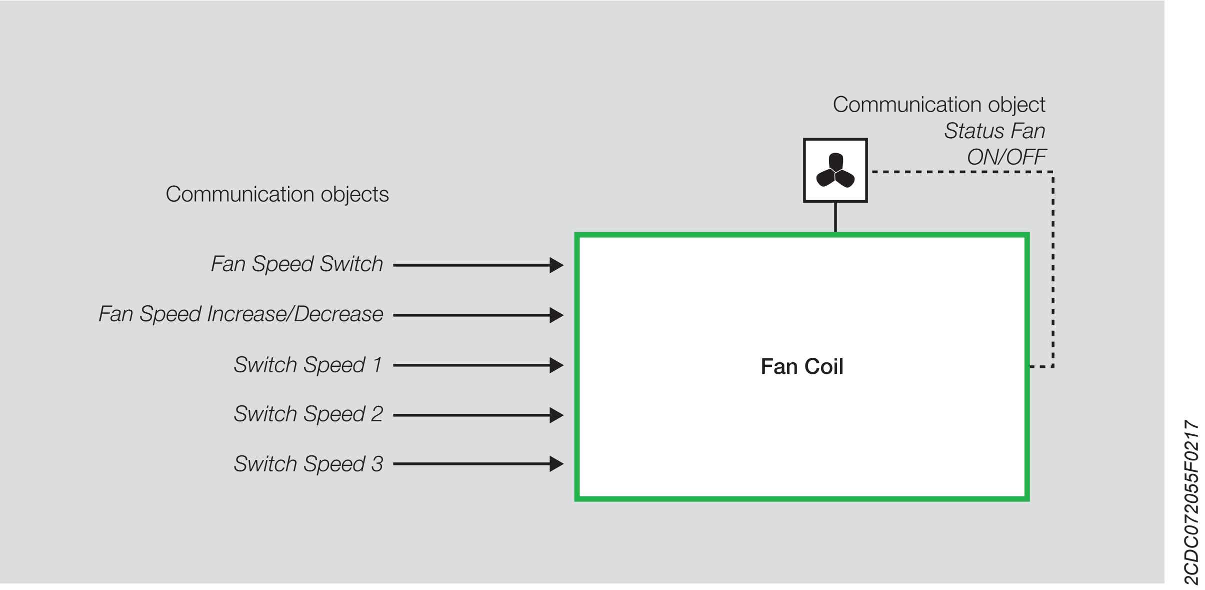


Fig. 62: 2CDC072055F0217

With three *Switch speed x* (x = 1, 2, or 3) group objects that are independent of each other, the fan stages are controlled via the outputs of the Fan Coil Actuator.

Alternatively, fan control can be performed via the 1-byte group object *Switch fan speed* or via the group object *Increase/decrease fan speed*.

Some fan control systems require an additional central switch-on mechanism (main switch) in addition to speed switching. Another output of the device may be used for this. The output must be linked to the group object *Fan ON/OFF status*. This will switch on the main switch if at least one fan speed is set. The main switch is also switched off when the fan is OFF (*Fan ON/OFF status= 0*).

12.2.1.1 Fan with changeover switch

Fans are usually controlled with a changeover switch.
The following control table results for a three-stage fan, which simulates the device with a group of switch outputs:

	Terminal C	**Terminal D**	**Terminal E**
OFF	0	0	0
Fan speed 1	1	0	0
Fan speed 2	0	1	0
Fan speed 3	0	0	1

Table 35: Terminal assignment

12.2.1.2 Fan in speed switching

In some cases, the fan is controlled via a step switch. The following control table results for a three-speed fan, which simulates the device with its outputs:

	Terminal C	Terminal D	Terminal E
OFF	0	0	0
Fan speed 1	1	0	0
Fan speed 2	1	1	0
Fan speed 3	1	1	1

Table 36: Terminal assignment

12.2.2 Fan operation FCC/S 1.3.X.1 and 1.5.X.1

A continuous fan, a blower or a convector can be controlled with the fan output. The fan is controlled via a 0...10 V output. This allows the fan to be controlled flexibly depending on the required speed.

The fan is controlled via the group object *Switch fan speed*. Alternatively, the fan can be switched to the speeds 1 = 33 %, 2 = 66 % and 3 = 100 % via the 1 bit objects *Switch speed x* (x = 1, 2, 3).

Some fan control systems require an additional central switch-on mechanism (main switch) in addition to speed switching. Another output of the device may be used for this. The output must be linked to the group object *Fan ON/OFF status*. This will switch on the main switch if at least one fan speed is set.

The main switch is also switched off when the fan is OFF (Fan ON/OFF status = 0).

12.2.3 Automatic operation

With automatic fan control, the fan speed is set automatically depending on the control value. For example, the following control value ranges can be programmed for the corresponding fan speeds:

Actuating value	Fan speed
0…9 %	0 (fan off)
10…39 %	1
40…69 %	2
70…100 %	3

Table 37: Fan speed depending on the control value

If the fan is a continuous fan, it follows the valve control value directly in automatic mode. Example: control value 50 % = fan speed 50 %.

Automatic mode is always active when the device is operated in controller mode. Automatic mode is enabled as standard when the device is operated in actuator mode and control takes place with a room thermostat, but it can be permanently deactivated in the "Fan output" parameter window.

The fan leaves automatic mode as soon as the fan speed is adjusted manually. Return depends on the set parametrization. The fan can automatically return to automatic mode after a defined time.

A group object can also switch the device to automatic mode.

12.2.4 Direct operation

In direct operation, the fan can be controlled via a slave device in controller mode. It can also be influenced via the group objects *Switch fan speed* and *Switch speed x* (x=1, 2, 3).

On a fan with speed switching or changeover switching, the individual speed is controlled as follows:
The speeds are controlled via the following values for a 3-speed fan:

- Speed 0: 0 (0 %)
- Speed 1: 1…85 (1…33 %)
- Speed 2: 86…170 (34…67 %)
- Speed 3: 171…255 (68…100 %)

The speeds are controlled via the following values for a 2-speed fan:

- Speed 0: 0 (0 %)
- Speed 1: 1…128 (1…50 %)
- Speed 2: 129…255 (51…100 %)

The speeds are controlled via the following values for a 1-speed fan:

- Speed 0: 0 (0 %)
- Speed 1: 1…255 (1…100 %)

With a continuous fan, the desired speed is entered directly and transmitted to the fan.

1-byte value	Percent	Hexadecimal	Binary value bit 76543210	Fan speed
0	0	00	00000000	0 (OFF)
1…85	1 %…33 %	55	00000001 … 01010101	Fan speed 1
86…170	34 %…67 %	AA	01010110 … 10101010	Fan speed 2
171…255	68 %…100 %	FF	10101011 … 11111111	Fan speed 3

Table 38: Fan speed depending on the entered value

12.2.5 Switchover between automatic and direct operation

Switchover between automatic operation and direct operation is possible. The changeover to manual fan control is implemented via a 1 bit value or automatically after a certain time period elapses. The fan speed is switched in accordance with the 1-byte value received.

Fan control is changed back to automatic operation if a 1 is received on the respective group object.

The current status of automatic operation is fed back via a 1 bit value.

12.2.6 Speed switching logic

The control value for changing the speed is calculated as follows:

- Switching up: control value ≥ threshold + 1/2 hysteresis
- Switching down: control value ≥ threshold + 1/2 hysteresis

The value 0 is an exception. If this is selected as the switchover point between 0 and 1, switching up (0 > 1) takes place only from a control value greater than 0 and switching down (1 > 0) only from a control value equal to zero.
The following additionally applies:

- Switching always takes place to the highest speed with 100 %
- The fan is always switched off at 0 %.

The following example describes the sequence of speed switchover depending on the control value and the parametrized thresholds and hysteresis values.

Threshold value speed 0 <-> 1	0
Threshold value speed 1 <-> 2	30
Threshold value speed 2 <-> 3	70
Threshold hysteresis	10

The following switchover points apply:

Control value	Fan speed
0 %	0
1 %	1
10 %	1
34 %	1
35 %	2
36 %	2
50 %	2
74 %	2
75 %	3
76 %	3
85 %	3
100 %	3

Table 39: Switching up

Control value	Fan speed
100 %	3
99 %	3
80 %	3
66 %	3
65 %	2
64 %	2
50 %	2
26 %	2
25 %	1
24 %	1
15 %	1
1 %	1
0 %	0

Table 40: Switching down

12.2.7 Fan operation functional diagram

The following illustration indicates the sequence in which the fan control functions are processed. Group objects that lead to the same box have the same priority and are processed in the sequence in which the telegrams are received.

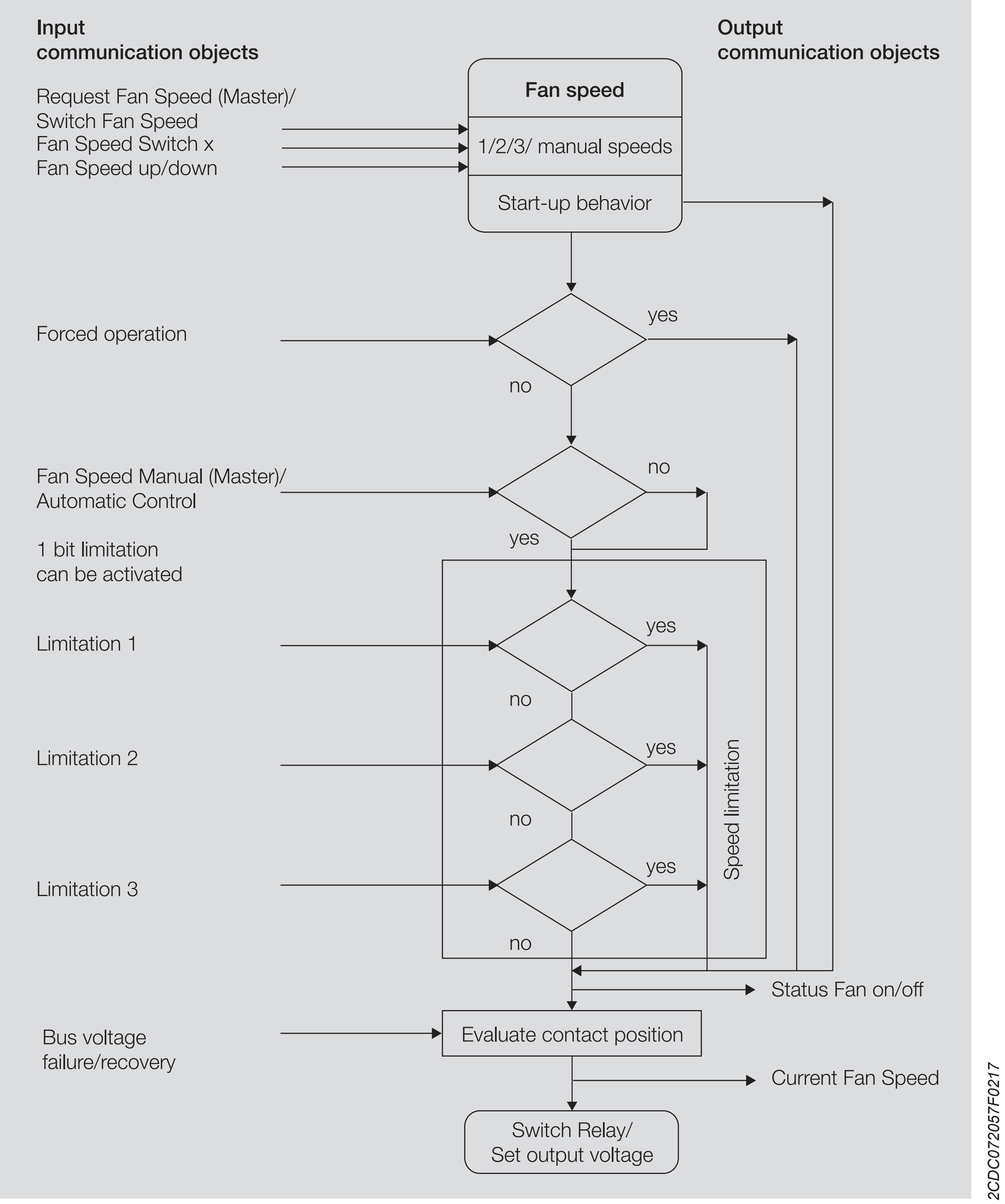


Fig. 63: Fan operation functional diagram

12.3 Valve drives, valves and controllers

12.3.1 Electromotor Valve Drives

Electromotor Valve Drives open and close valves via a small electric motor. Electromotor Valve Drives are offered as proportional or as 2 or 3-way valve drives.

Proportional valve drives are controlled via an analog signal, e.g. 0…10 V. 2 or 3-point valve drives are controlled via switching of the supply voltage.

2-point valve drives are controlled via the values Open and Close. The valve knows only the states "Open" and "Closed". 2-point valves are controlled via a 2-point control or pulse width modulation (PWM).

3-point valve drives are connected via three connecting cables. The opening and closing lines are connected to terminals A and B. Using 3-point control value drives, the valve can be opened by any desired percentage and this position can be retained without further energy expenditure. If the valve does not move, no voltage is applied to the motor.

The control usually used in most cases is continuous control.

12.3.2 Electrothermal Valve Drives

Electrothermal Valve Drives are adjusted due to heat expansion of a material caused by a flow of electric current. Electrothermal Valve Drives are controlled by pulse width modulation or two-point control.

Electrothermal Valve Drives are offered in the de-energized closed and de-energized open variants. Depending on the variant, the valve is opened when voltage is applied and closed when no voltage is applied, or vice versa.

Electrothermal Valve Drives are connected via two connection cables to the device.

12.3.3 Compatibility with different drive types

For information about the compatibility of individual device variants with the respective drive types, see Product Overview, Page 11.

12.3.4 Control types

The following control types are commonly used for the control of valves in heating, air-conditioning and ventilation applications:

- Continuous control
- Pulse width modulation (PWM)
- 2-point control

12.4 Priorities

12.4.1 Controller mode

Valve

a) Bus voltage failure
b) Operating mode overridden
c) Safety (dew point or filling level sensor or window contact)
d) Forced operation
e) i-bus Tool
f) Direct operation via membrane keypad (only FCC/S 1.x.2.1)
g) Manual valve override
h) Normal mode Control (operating mode normal/presence)
i) Bus voltage recovery

Fan

a) Bus voltage failure
b) Operating mode overridden
c) Safety (dew point or filling level sensor or window contact)

d) Forced operation
e) i-bus Tool
f) Direct operation via membrane keypad (only FCC/S 1.x.2.1)
g) Manual fan adjustment (including limitation)
h) Control value for automatic operation
i) Bus voltage recovery

The device is overridden by the operating mode (overridden) or safety.

Relay
a) Bus voltage failure
b) Operating mode overridden (only if valve is used for control; no other effect)
c) Safety (dew point or fill level sensor or window contact) (only if valve is used for control; no other effect)
d) Forced operation
e) i-bus Tool
f) Direct operation via membrane keypad (only FCC/S 1.x.2.1)
g) Manual relay control
h) Control value for control (only if valve is used for control; no other effect)
i) Bus voltage recovery

12.4.2 Actuator mode

Valve
a) Bus voltage failure
b) Forced operation
c) i-bus Tool
d) Direct operation via membrane keypad (only FCC/S 1.x.2.1)
e) Manual valve override
f) Control value normal mode
g) Bus voltage recovery

Fan
a) Bus voltage failure
b) Forced operation
c) i-bus Tool
d) Direct operation via membrane keypad (only FCC/S 1.x.2.1)
e) Manual fan adjustment (including limitation)
f) Control value for automatic operation
g) Bus voltage recovery

Relay
a) Bus voltage failure
b) Forced operation
c) i-bus Tool
d) Direct operation via membrane keypad (only FCC/S 1.x.2.1)
e) Manual relay control
f) Bus voltage recovery

12.5 Explanation of controller function

The various control types possible with this device are described below.

12.5.1 2-point controller

A 2-point controller possesses two output states (On/Off) that change depending on the actual value. If the actual value is higher than the parametrized setpoint, the associated control value is 0. If the actual value is less than the parametrized setpoint, the associated control value is 1. Application for a 2-point controller:

- As the control value oscillates only between the two On and Off states, the controller can control an electrothermal valve connected to a switch actuator or a valve drive actuator.
- Control of an electric heater via a relay output, as a distinction is also made only between On and Off with this heater.

NOTICE

The number of relay operating cycles must be observed. The relay switches each time the control value changes. The maximum number of relay operating cycles, particularly under load, is limited. This can quickly exceed the relay's service life, especially when controlling an electric heater (which often represents high loads).

Example:

If the control value changes only ten times per day, this already amounts to 3,650 operating cycles per year.

If the control value changes 50 times per day, this already amounts to 18,250 operating cycles per year.

A 2-point controller can quickly compensate for control deviations in case of large changes in the command variable (setpoint temperature). However, it never settles and it tends to lead to system overshoot (exceeding the setpoint temperature) in this process. In oder to avoid overshooting the initial states, 2-point controllers always feature integrated hysteresis that fluctuates around the setpoint.

The function of hysteresis is to allow the control value to switch only when the control value is exceeded/fallen below by a certain value. This reduces number of control value changes and therefore leads to smoother control.

Correctly adjusting the hysteresis can also limit the number of relay operating cycles.

Example:

If the heating-operation setpoint is 21 °C and the hysteresis is 1.0 K, the controller will switch on when the temperature falls below 20.5 °C and will switch off again when the temperature exceeds 21.5 °C.

The parameter *Hysteresis* should be set based on the following factors:

- How quickly the heater can heat the room or how quickly the cooler can cool it
- How people in the room perceive the temperature.

ⓘ **Note**

The selected hysteresis should not be too small, because a switching valve drive would constantly open and close in this case.

The selected hysteresis should not be too large, because the temperature fluctuations in the room would be too large in this case.

12.5.1.1 Pulse width modulation (PWM)

With pulse width modulation, the valve is operated as with 2-point control exclusively in the positions fully opened and fully closed. In contrast to 2-point control, the position is not controlled via limit values, but rather by calculated control values similar to continuous control.

The control value is fixed for a timed cycle and recalculated in the duration for valve opening. The control value 20% at a cycle time of 15 minutes, for example, will be converted to a valve opening time of three minutes. The control value 50% results in a valve opening time of 7.5 minutes.

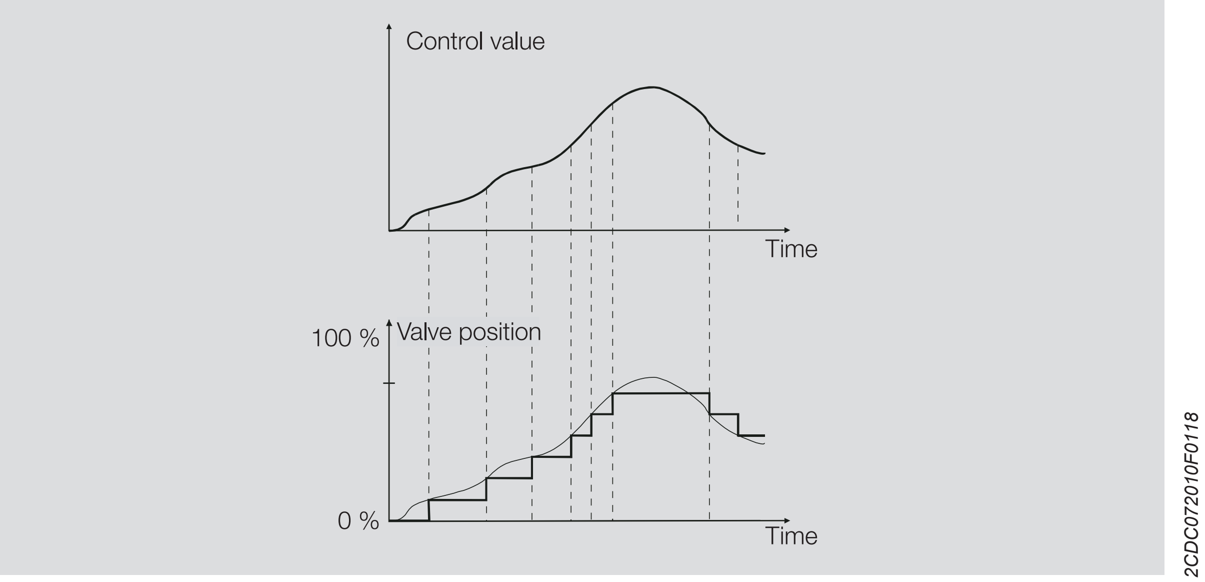


Fig. 64: Pulse width modulation (PWM)

With pulse width modulation, a relatively accurate setting of the temperature can be achieved without any resulting overshoots. Simple valve drives can be used. The positioning frequency of the control value is relatively high.

Pulse width modulation can be used with the device in conjunction with Electromotor or Electrothermal Valve Drives.

12.5.1.1.1 Example

When the device receives a 1-byte control value (continuous control) as an input signal, this value together with the parameterized cycle time from a PWM calculation is converted into a signal for 2-point control (ON-OFF-ON).

With PWM control, the received control value (0...100 %) calculated in the control algorithm is converted to a pulse width modulation. The conversion is based on a constant cycle time. If the device receives a control value of 20 % and the cycle time is 15 minutes, the valve will be opened for 3 minutes (20 % of 15 minutes) and closed for 12 minutes (80 % of 15 minutes).

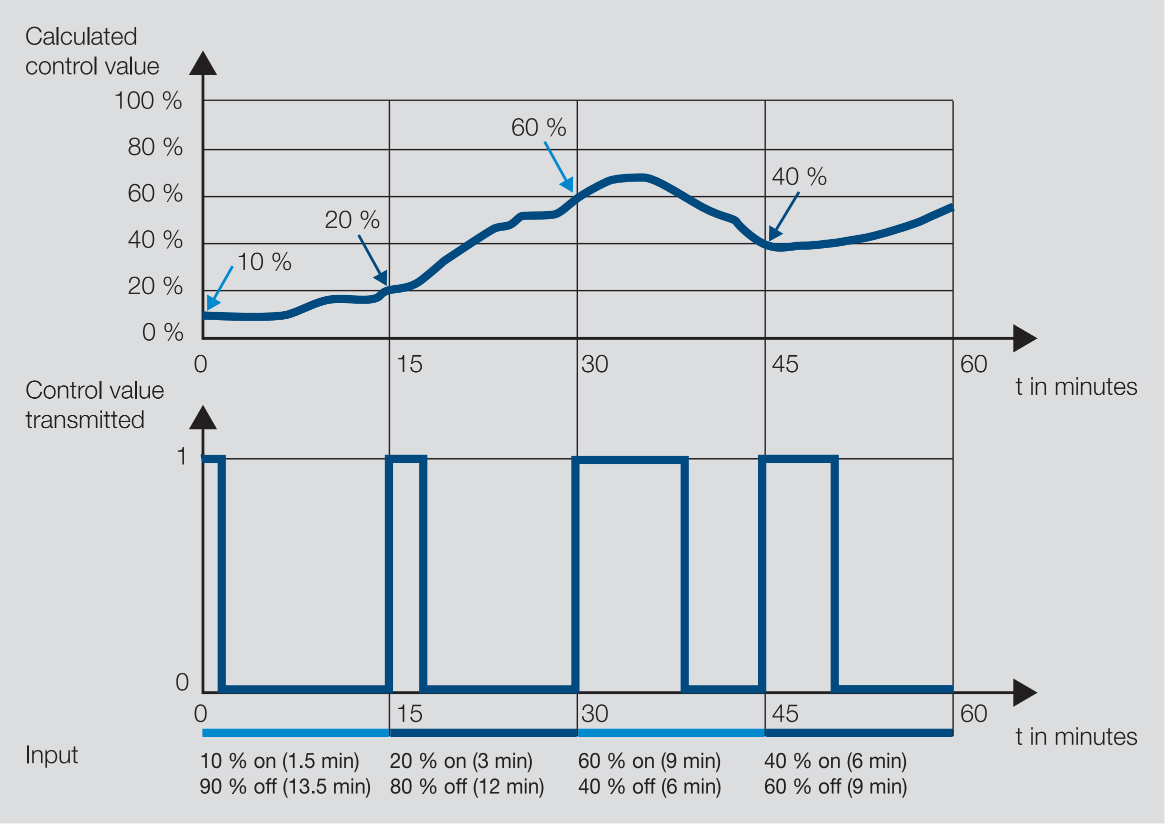


Fig. 65: Example

12.5.1.1.2 Calculation

With pulse width modulation, control is implemented by a variable mark-space ratio.

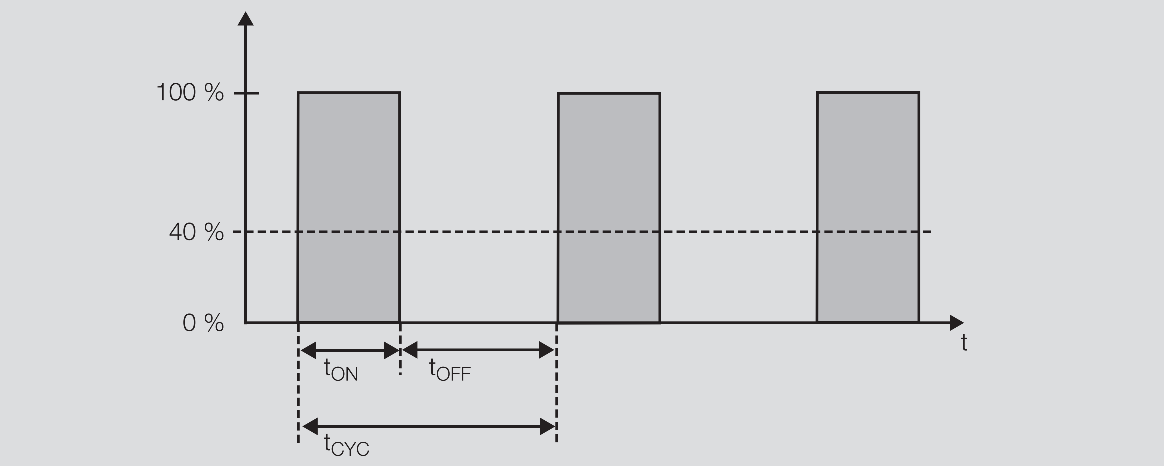


Fig. 66: Calculation

During the time t_{ON} the valve is opened and during the time t_{OFF} it is closed.

On account of $t_{ON} = 0.4 \times t_{CYC}$ the valve is set to about 40 %. t_{CYC} is the so-called PWM cycle time for continuous control.

12.5.2 PI controller (continuous)

12.5.2.1 Continuous control

With continuous control, a control value is calculated based on the target temperature and the actual temperature, and is used to optimally set the temperature. The valve is brought to a position corresponding to the calculated control value. With this method the valve can be fully opened, fully closed and even positioned in every intermediate position.

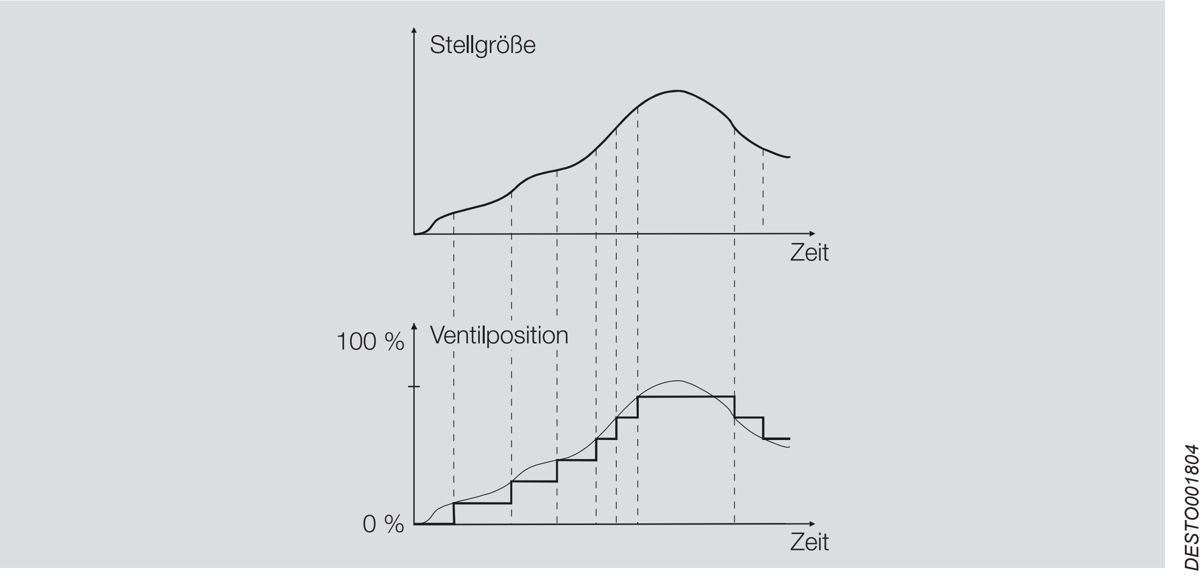


Fig. 67: Continuous control

Continuous control is the most precise form of temperature control. At the same time, the positioning frequency of the valve drive can be kept low. Continuous control can be implemented with the device for Electromotor 3-Point Valve Drives. This is implemented via 1-byte control.

ⓘ **Note**

What is 1-byte control?
For 1-byte control, a value of 0…255 (corresponds to 0%…100%) is preset by the room thermostat. The valve is fully closed at 0 % and fully open at 100 %, for example.

12.5.3 PI controller (PWM)

The PI controller (PWM) basically operates exactly like the PI controller (continuous). The only difference is that the control value of a PI controller (PWM) is converted to a 1 bit PWM switch-on/switch-off ratio before it is output.

If a control value of 70 % is output and the preset cycle time is 10 minutes, the switch-on time will be 7 minutes and the switch-off time will be 3 minutes.

Using the PI controller (PWM) transfers the advantages offered by continuous control (precise attainment of the setpoint temperature) to drives that are designed only for switch-on/switch-off signals (e.g. electrothermal drives).

The "PWM control value cycle time" is adjustable to optimize the control characteristics of the heating or cooling system. The type of heating or cooling and the valve drive used must be taking into account.

- Electrothermal Valve Drive:
  Depending on the manufacturer, it takes around 2 to 3 minutes to open a control valve with electrothermal drive. A cycle time of 15 minutes has proven useful in practice. Other times must be correspondingly adapted to the heating/cooling system.
- Floor heating:
  The time constant of a floor heater is very large (sluggish). A cycle time of 20 minutes suffices.
- Water heating:
  A cycle time of 15 minutes produces excellent control results.
- Electric convector heating:
  Depending on the electric heating and the room situation, cycle times between 10 and 15 minutes are recommended.

12.5.4 PI controller (continuous) for Fan Coil

This controller works the same way as the PI controller (continuous). Additionally, however, the fan output integrated into the device is controlled in order to control a fan coil unit.

13 Appendix

13.1 Scope of delivery

The Fan Coil Controller is supplied together with the following components. The delivered items should be checked against the list below:

- 1 x Fan Coil Controller, alternatively:
  - FCC/S 1.1.1.1: Fan Coil Controller, 2 × PWM, 3-speed, MDRC
  - FCC/S 1.1.2.1: Fan Coil Controller, 2 × PWM, 3-speed, manual operation, MDRC
  - FCC/S 1.2.1.1: Fan Coil Controller, 2 × 0…10 V, 3-speed, MDRC
  - FCC/S 1.2.2.1: Fan Coil Controller, 2 × 0…10 V, 3-speed, manual operation, MDRC
  - FCC/S 1.3.1.1: Fan Coil Controller, 3 × 0…10 V, MDRC
  - FCC/S 1.3.2.1: Fan Coil Controller, 3 × 0…10 V, manual operation, MDRC
  - FCC/S 1.4.1.1: Fan Coil Controller, 1 × PWM, 3-speed, MDRC
  - FCC/S 1.5.1.1: Fan Coil Controller, 2 × PWM, 0…10 V, MDRC
  - FCC/S 1.5.2.1: Fan Coil Controller, 2 × PWM, 0…10 V, manual operation, MDRC
- 1 x installation and operating instructions
- 1 x bus connection terminal (red/black)
- 1x KNX connection cover cap

13.2 Status byte fan

Bit No.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Not assigned	Automatic mode	Limitation 3	Limitation 2	Limitation 1	Force operation active/inactive	Output error	Fan On/Off
0	0								
1	1								X
2	2							X	
3	3							X	X
4	4						X		
5	5						X		X
6	6						X	X	
7	7						X	X	X
8	8					X			
9	9					X			X
10	0A					X		X	
11	0B					X		X	X
12	0C					X	X		
13	0D					X	X		X
14	0E					X	X	X	
15	0F					X	X	X	X
16	10				X				
17	11				X				X
18	12				X			X	
19	13				X			X	X
20	14				X		X		
21	15				X		X		X
22	16				X		X	X	
23	17				X		X	X	X
24	18				X	X			
25	19				X	X			X
26	1A				X	X		X	
27	1B				X	X		X	X
28	1C				X	X	X		
29	1D				X	X	X		X
30	1E				X	X	X	X	
31	1F				X	X	X	X	X
32	20			X					
33	21			X					X
34	22			X				X	
35	23			X				X	X
36	24			X			X		
37	25			X			X		X
38	26			X			X	X	
39	27			X			X	X	X
40	28			X		X			
41	29			X		X			X
42	2A			X		X		X	
43	2B			X		X		X	X
44	2C			X		X	X		
45	2D			X		X	X		X
46	2E			X		X	X	X	
47	2F			X		X	X	X	X
48	30			X	X				
49	31			X	X				X
50	32			X	X			X	
51	33			X	X			X	X
52	34			X	X		X		
53	35			X	X		X		X
54	36			X	X		X	X	
55	37			X	X		X	X	X
56	38			X	X	X			
57	39			X	X	X			X
58	3A			X	X	X		X	
59	3B			X	X	X		X	X
60	3C			X	X	X	X		
61	3D			X	X	X	X		X
62	3E			X	X	X	X	X	
63	3F			X	X	X	X	X	X
64	40		X						
65	41		X						X
66	42		X					X	
67	43		X					X	X
68	44		X				X		
69	45		X				X		X
70	46		X				X	X	
71	47		X				X	X	X
72	48		X			X			
73	49		X			X			X
74	4A		X			X		X	
75	4B		X			X		X	X
76	4C		X			X	X		
77	4D		X			X	X		X
78	4E		X			X	X	X	
79	4F		X			X	X	X	X
80	50		X		X				
81	51		X		X				X
82	52		X		X			X	
83	53		X		X			X	X
84	54		X		X		X		
85	55		X		X		X		X
86	56		X		X		X	X	
87	57		X		X		X	X	X
88	58		X		X	X			
89	59		X		X	X			X
90	5A		X		X	X		X	
91	5B		X		X	X		X	X
92	5C		X		X	X	X		
93	5D		X		X	X	X		X
94	5E		X		X	X	X	X	
95	5F		X		X	X	X	X	X
96	60		X	X					
97	61		X	X					X
98	62		X	X				X	
99	63		X	X				X	X
100	64		X	X			X		
101	65		X	X			X		X
102	66		X	X			X	X	
103	67		X	X			X	X	X
104	68		X	X		X			
105	69		X	X		X			X
106	6A		X	X		X		X	
107	6B		X	X		X		X	X
108	6C		X	X		X	X		
109	6D		X	X		X	X		X
110	6E		X	X		X	X	X	
111	6F		X	X		X	X	X	X
112	70		X	X	X				
113	71		X	X	X				X
114	72		X	X	X			X	
115	73		X	X	X			X	X
116	74		X	X	X		X		
117	75		X	X	X		X		X
118	76		X	X	X		X	X	
119	77		X	X	X		X	X	X
120	78		X	X	X	X			
121	79		X	X	X	X			X
122	7A		X	X	X	X		X	
123	7B		X	X	X	X		X	X
124	7C		X	X	X	X	X		
125	7D		X	X	X	X	X		X
126	7E		X	X	X	X	X	X	
127	7F		X	X	X	X	X	X	X
128	80	X							
129	81	X							X
130	82	X						X	
131	83	X						X	X
132	84	X					X		
133	85	X					X		X
134	86	X					X	X	
135	87	X					X	X	X
136	88	X				X			
137	89	X				X			X
138	8A	X				X		X	
139	8B	X				X		X	X
140	8C	X				X	X		
141	8D	X				X	X		X
142	8E	X				X	X	X	
143	8F	X				X	X	X	X
144	90	X			X				
145	91	X			X				X
146	92	X			X			X	
147	93	X			X			X	X
148	94	X			X		X		
149	95	X			X		X		X
150	96	X			X		X	X	
151	97	X			X		X	X	X
152	98	X			X	X			
153	99	X			X	X			X
154	9A	X			X	X		X	
155	9B	X			X	X		X	X
156	9C	X			X	X	X		
157	9D	X			X	X	X		X
158	9E	X			X	X	X	X	
159	9F	X			X	X	X	X	X
160	A0	X		X					
161	A1	X		X					X
162	A2	X		X				X	
163	A3	X		X				X	X
164	A4	X		X			X		
165	A5	X		X			X		X
166	A6	X		X			X	X	
167	A7	X		X			X	X	X
168	A8	X		X		X			
169	A9	X		X		X			X
170	AA	X		X		X		X	
171	AB	X		X		X		X	X
172	AC	X		X		X	X		
173	AD	X		X		X	X		X
174	AE	X		X		X	X	X	
175	AF	X		X		X	X	X	X
176	B0	X		X	X				
177	B1	X		X	X				X
178	B2	X		X	X			X	
179	B3	X		X	X			X	X
180	B4	X		X	X		X		
181	B5	X		X	X		X		X
182	B6	X		X	X		X	X	
183	B7	X		X	X		X	X	X
184	B8	X		X	X	X			
185	B9	X		X	X	X			X

Bit No.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Not assigned	Automatic mode	Limitation 3	Limitation 2	Limitation 1	Force operation active/inactive	Output error	Fan On/Off
186	BA	X		X	X	X		X	
187	BB	X		X	X	X		X	X
188	BC	X		X	X	X	X		
189	BD	X		X	X	X	X		X
190	BE	X		X	X	X	X	X	
191	BF	X		X	X	X	X	X	X
192	C0	X	X						
193	C1	X	X						X
194	C2	X	X					X	
195	C3	X	X					X	X
196	C4	X	X				X		
197	C5	X	X				X		X
198	C6	X	X				X	X	
199	C7	X	X				X	X	X
200	C8	X	X			X			
201	C9	X	X			X			X
202	CA	X	X			X		X	
203	CB	X	X			X		X	X
204	CC	X	X			X	X		
205	CD	X	X			X	X		X
206	CE	X	X			X	X	X	
207	CF	X	X			X	X	X	X
208	D0	X	X		X				
209	D1	X	X		X				X
210	D2	X	X		X			X	
211	D3	X	X		X			X	X
212	D4	X	X		X		X		
213	D5	X	X		X		X		X
214	D6	X	X		X		X	X	
215	D7	X	X		X		X	X	X
216	D8	X	X		X	X			
217	D9	X	X		X	X			X
218	DA	X	X		X	X		X	
219	DB	X	X		X	X		X	X
220	DC	X	X		X	X	X		
221	DD	X	X		X	X	X		X
222	DE	X	X		X	X	X	X	
223	DF	X	X		X	X	X	X	X
224	E0	X	X	X					
225	E1	X	X	X					X
226	E2	X	X	X				X	
227	E3	X	X	X				X	X
228	E4	X	X	X			X		
229	E5	X	X	X			X		X
230	E6	X	X	X			X	X	
231	E7	X	X	X			X	X	X
232	E8	X	X	X		X			
233	E9	X	X	X		X			X
234	EA	X	X	X		X		X	
235	EB	X	X	X		X		X	X
236	EC	X	X	X		X	X		
237	ED	X	X	X		X	X		X
238	EE	X	X	X		X	X	X	
239	EF	X	X	X		X	X	X	X
240	F0	X	X	X	X				
241	F1	X	X	X	X				X
242	F2	X	X	X	X			X	
243	F3	X	X	X	X			X	X
244	F4	X	X	X	X		X		
245	F5	X	X	X	X		X		X
246	F6	X	X	X	X		X	X	
247	F7	X	X	X	X		X	X	X
248	F8	X	X	X	X	X			
249	F9	X	X	X	X	X			X
250	FA	X	X	X	X	X		X	
251	FB	X	X	X	X	X		X	X
252	FC	X	X	X	X	X	X		
253	FD	X	X	X	X	X	X		X
254	FE	X	X	X	X	X	X	X	
255	FF	X	X	X	X	X	X	X	X

13.3 Status byte Valve

Bit No.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Not assigned	Not assigned	Not assigned	Not assigned	Valve purge	Forced operation	Output error	Setpoint received
0	0								
1	1								X
2	2							X	
3	3							X	X
4	4						X		
5	5						X		X
6	6						X	X	
7	7						X	X	X
8	8					X			
9	9					X			X
10	0A					X		X	
11	0B					X		X	X
12	0C					X	X		
13	0D					X	X		X
14	0E					X	X	X	
15	0F					X	X	X	X
16	10				X				
17	11				X				X
18	12				X			X	
19	13				X			X	X
20	14				X		X		
21	15				X		X		X
22	16				X		X	X	
23	17				X		X	X	X
24	18				X	X			
25	19				X	X			X
26	1A				X	X		X	
27	1B				X	X		X	X
28	1C				X	X	X		
29	1D				X	X	X		X
30	1E				X	X	X	X	
31	1F				X	X	X	X	X
32	20			X					
33	21			X					X
34	22			X				X	
35	23			X				X	X
36	24			X			X		
37	25			X			X		X
38	26			X			X	X	
39	27			X			X	X	X
40	28			X		X			
41	29			X		X			X
42	2A			X		X		X	
43	2B			X		X		X	X
44	2C			X		X	X		
45	2D			X		X	X		X
46	2E			X		X	X	X	
47	2F			X		X	X	X	X
48	30			X	X				
49	31			X	X				X
50	32			X	X			X	
51	33			X	X			X	X
52	34			X	X		X		
53	35			X	X		X		X
54	36			X	X		X	X	
55	37			X	X		X	X	X
56	38			X	X	X			
57	39			X	X	X			X
58	3A			X	X	X		X	
59	3B			X	X	X		X	X
60	3C			X	X	X	X		
61	3D			X	X	X	X		X
62	3E			X	X	X	X	X	
63	3F			X	X	X	X	X	X
64	40		X						
65	41		X						X
66	42		X					X	
67	43		X					X	X
68	44		X				X		
69	45		X				X		X
70	46		X				X	X	
71	47		X				X	X	X
72	48		X			X			
73	49		X			X			X
74	4A		X			X		X	
75	4B		X			X		X	X
76	4C		X			X	X		
77	4D		X			X	X		X
78	4E		X			X	X	X	
79	4F		X			X	X	X	X
80	50		X		X				
81	51		X		X				X
82	52		X		X			X	
83	53		X		X			X	X
84	54		X		X		X		
85	55		X		X		X		X
86	56		X		X		X	X	
87	57		X		X		X	X	X
88	58		X		X	X			
89	59		X		X	X			X
90	5A		X		X	X		X	
91	5B		X		X	X		X	X
92	5C		X		X	X	X		
93	5D		X		X	X	X		X
94	5E		X		X	X	X	X	
95	5F		X		X	X	X	X	X
96	60		X	X					
97	61		X	X					X
98	62		X	X				X	
99	63		X	X				X	X
100	64		X	X			X		
101	65		X	X			X		X
102	66		X	X			X	X	
103	67		X	X			X	X	X
104	68		X	X		X			
105	69		X	X		X			X
106	6A		X	X		X		X	
107	6B		X	X		X		X	X
108	6C		X	X		X	X		
109	6D		X	X		X	X		X
110	6E		X	X		X	X	X	
111	6F		X	X		X	X	X	X
112	70		X	X	X				
113	71		X	X	X				X
114	72		X	X	X			X	
115	73		X	X	X			X	X
116	74		X	X	X		X		
117	75		X	X	X		X		X
118	76		X	X	X		X	X	
119	77		X	X	X		X	X	X
120	78		X	X	X	X			
121	79		X	X	X	X			X
122	7A		X	X	X	X		X	
123	7B		X	X	X	X		X	X
124	7C		X	X	X	X	X		
125	7D		X	X	X	X	X		X
126	7E		X	X	X	X	X	X	
127	7F		X	X	X	X	X	X	X
128	80	X							
129	81	X							X
130	82	X						X	
131	83	X						X	X
132	84	X					X		
133	85	X					X		X
134	86	X					X	X	
135	87	X					X	X	X
136	88	X				X			
137	89	X				X			X
138	8A	X				X		X	
139	8B	X				X		X	X
140	8C	X				X	X		
141	8D	X				X	X		X
142	8E	X				X	X	X	
143	8F	X				X	X	X	X
144	90	X			X				
145	91	X			X				X
146	92	X			X			X	
147	93	X			X			X	X
148	94	X			X		X		
149	95	X			X		X		X
150	96	X			X		X	X	
151	97	X			X		X	X	X
152	98	X			X	X			
153	99	X			X	X			X
154	9A	X			X	X		X	
155	9B	X			X	X		X	X
156	9C	X			X	X	X		
157	9D	X			X	X	X		X
158	9E	X			X	X	X	X	
159	9F	X			X	X	X	X	X
160	A0	X		X					
161	A1	X		X					X
162	A2	X		X				X	
163	A3	X		X				X	X
164	A4	X		X			X		
165	A5	X		X			X		X
166	A6	X		X			X	X	
167	A7	X		X			X	X	X
168	A8	X		X		X			
169	A9	X		X		X			X
170	AA	X		X		X		X	
171	AB	X		X		X		X	X
172	AC	X		X		X	X		
173	AD	X		X		X	X		X
174	AE	X		X		X	X	X	
175	AF	X		X		X	X	X	X
176	B0	X		X	X				
177	B1	X		X	X				X
178	B2	X		X	X			X	
179	B3	X		X	X			X	X
180	B4	X		X	X		X		
181	B5	X		X	X		X		X
182	B6	X		X	X		X	X	
183	B7	X		X	X		X	X	X
184	B8	X		X	X	X			
185	B9	X		X	X	X			X
186	BA	X		X	X	X		X	
187	BB	X		X	X	X		X	X
188	BC	X		X	X	X	X		
189	BD	X		X	X	X	X		X
190	BE	X		X	X	X	X	X	
191	BF	X		X	X	X	X	X	X
192	C0	X	X						
193	C1	X	X						X
194	C2	X	X					X	
195	C3	X	X					X	X
196	C4	X	X				X		
197	C5	X	X				X		X

Bit No.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Not assigned	Not assigned	Not assigned	Not assigned	Valve purge	Forced operation	Output error	Setpoint received
198	C6	X	X				X	X	
199	C7	X	X				X	X	X
200	C8	X	X			X			
201	C9	X	X			X			X
202	CA	X	X			X		X	
203	CB	X	X			X		X	X
204	CC	X	X			X	X		
205	CD	X	X			X	X		X
206	CE	X	X			X	X	X	
207	CF	X	X			X	X	X	X
208	D0	X	X		X				
209	D1	X	X		X				X
210	D2	X	X		X			X	
211	D3	X	X		X			X	X
212	D4	X	X		X		X		
213	D5	X	X		X		X		X
214	D6	X	X		X		X	X	
215	D7	X	X		X		X	X	X
216	D8	X	X		X	X			
217	D9	X	X		X	X			X
218	DA	X	X		X	X		X	
219	DB	X	X		X	X		X	X
220	DC	X	X		X	X	X		
221	DD	X	X		X	X	X		X
222	DE	X	X		X	X	X	X	
223	DF	X	X		X	X	X	X	X
224	E0	X	X	X					
225	E1	X	X	X					X
226	E2	X	X	X				X	
227	E3	X	X	X				X	X
228	E4	X	X	X			X		
229	E5	X	X	X			X		X
230	E6	X	X	X			X	X	
231	E7	X	X	X			X	X	X
232	E8	X	X	X		X			
233	E9	X	X	X		X			X
234	EA	X	X	X		X		X	
235	EB	X	X	X		X		X	X
236	EC	X	X	X		X	X		
237	ED	X	X	X		X	X		X
238	EE	X	X	X		X	X	X	
239	EF	X	X	X		X	X	X	X
240	F0	X	X	X	X				
241	F1	X	X	X	X				X
242	F2	X	X	X	X			X	
243	F3	X	X	X	X			X	X
244	F4	X	X	X	X		X		
245	F5	X	X	X	X		X		X
246	F6	X	X	X	X		X	X	
247	F7	X	X	X	X		X	X	X
248	F8	X	X	X	X	X			
249	F9	X	X	X	X	X			X
250	FA	X	X	X	X	X		X	
251	FB	X	X	X	X	X		X	X
252	FC	X	X	X	X	X	X		
253	FD	X	X	X	X	X	X		X
254	FE	X	X	X	X	X	X	X	
255	FF	X	X	X	X	X	X	X	X

13.4 Status byte device

Bit No.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Not assigned	Not assigned	Security Mode	Direct operation via membrane keypad	Manual valve override	Forced operation	Building protection Dew point/Fill level/Window	Operating mode overridden
0	0								
1	1								X
2	2							X	
3	3							X	X
4	4						X		
5	5						X		X
6	6						X	X	
7	7						X	X	X
8	8					X			
9	9					X			X
10	0A					X		X	
11	0B					X		X	X
12	0C					X	X		
13	0D					X	X		X
14	0E					X	X	X	
15	0F					X	X	X	X
16	10				X				
17	11				X				X
18	12				X			X	
19	13				X			X	X
20	14				X		X		
21	15				X		X		X
22	16				X		X	X	
23	17				X		X	X	X
24	18				X	X			
25	19				X	X			X
26	1A				X	X		X	
27	1B				X	X		X	X
28	1C				X	X	X		
29	1D				X	X	X		X
30	1E				X	X	X	X	
31	1F				X	X	X	X	X
32	20			X					
33	21			X					X
34	22			X				X	
35	23			X				X	X
36	24			X			X		
37	25			X			X		X
38	26			X			X	X	
39	27			X			X	X	X
40	28			X		X			
41	29			X		X			X
42	2A			X		X		X	
43	2B			X		X		X	X
44	2C			X		X	X		
45	2D			X		X	X		X
46	2E			X		X	X	X	
47	2F			X		X	X	X	X
48	30			X	X				
49	31			X	X				X
50	32			X	X			X	
51	33			X	X			X	X
52	34			X	X		X		
53	35			X	X		X		X
54	36			X	X		X	X	
55	37			X	X		X	X	X
56	38			X	X	X			
57	39			X	X	X			X
58	3A			X	X	X		X	
59	3B			X	X	X		X	X
60	3C			X	X	X	X		
61	3D			X	X	X	X		X
62	3E			X	X	X	X	X	
63	3F			X	X	X	X	X	X
64	40		X						
65	41		X						X
66	42		X					X	
67	43		X					X	X
68	44		X				X		
69	45		X				X		X
70	46		X				X	X	
71	47		X				X	X	X
72	48		X			X			
73	49		X			X			X
74	4A		X			X		X	
75	4B		X			X		X	X
76	4C		X			X	X		
77	4D		X			X	X		X
78	4E		X			X	X	X	
79	4F		X			X	X	X	X
80	50		X		X				
81	51		X		X				X
82	52		X		X			X	
83	53		X		X			X	X
84	54		X		X		X		
85	55		X		X		X		X
86	56		X		X		X	X	
87	57		X		X		X	X	X
88	58		X		X	X			
89	59		X		X	X			X
90	5A		X		X	X		X	
91	5B		X		X	X		X	X
92	5C		X		X	X	X		
93	5D		X		X	X	X		X
94	5E		X		X	X	X	X	
95	5F		X		X	X	X	X	X
96	60		X	X					
97	61		X	X					X
98	62		X	X				X	
99	63		X	X				X	X
100	64		X	X			X		
101	65		X	X			X		X
102	66		X	X			X	X	
103	67		X	X			X	X	X
104	68		X	X		X			
105	69		X	X		X			X
106	6A		X	X		X		X	
107	6B		X	X		X		X	X
108	6C		X	X		X	X		
109	6D		X	X		X	X		X
110	6E		X	X		X	X	X	
111	6F		X	X		X	X	X	X
112	70		X	X	X				
113	71		X	X	X				X
114	72		X	X	X			X	
115	73		X	X	X			X	X
116	74		X	X	X		X		
117	75		X	X	X		X		X
118	76		X	X	X		X	X	
119	77		X	X	X		X	X	X
120	78		X	X	X	X			
121	79		X	X	X	X			X
122	7A		X	X	X	X		X	
123	7B		X	X	X	X		X	X
124	7C		X	X	X	X	X		
125	7D		X	X	X	X	X		X
126	7E		X	X	X	X	X	X	
127	7F		X	X	X	X	X	X	X
128	80	X							
129	81	X							X
130	82	X						X	
131	83	X						X	X
132	84	X					X		
133	85	X					X		X
134	86	X					X	X	
135	87	X					X	X	X
136	88	X				X			
137	89	X				X			X
138	8A	X				X		X	
139	8B	X				X		X	X
140	8C	X				X	X		
141	8D	X				X	X		X
142	8E	X				X	X	X	
143	8F	X				X	X	X	X
144	90	X			X				
145	91	X			X				X
146	92	X			X			X	
147	93	X			X			X	X
148	94	X			X		X		
149	95	X			X		X		X
150	96	X			X		X	X	
151	97	X			X		X	X	X
152	98	X			X	X			
153	99	X			X	X			X
154	9A	X			X	X		X	
155	9B	X			X	X		X	X
156	9C	X			X	X	X		
157	9D	X			X	X	X		X
158	9E	X			X	X	X	X	
159	9F	X			X	X	X	X	X
160	A0	X		X					
161	A1	X		X					X
162	A2	X		X				X	
163	A3	X		X				X	X
164	A4	X		X			X		
165	A5	X		X			X		X
166	A6	X		X			X	X	
167	A7	X		X			X	X	X
168	A8	X		X		X			
169	A9	X		X		X			X
170	AA	X		X		X		X	

Bit No.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Not assigned	Not assigned	Security Mode	Direct operation via membrane keypad	Manual valve override	Forced operation	Building protection Dew point/Fill level/Window	Operating mode overridden
171	AB	X		X		X		X	X
172	AC	X		X		X	X		
173	AD	X		X		X	X		X
174	AE	X		X		X	X	X	
175	AF	X		X		X	X	X	X
176	B0	X		X	X				
177	B1	X		X	X				X
178	B2	X		X	X			X	
179	B3	X		X	X			X	X
180	B4	X		X	X		X		
181	B5	X		X	X		X		X
182	B6	X		X	X		X	X	
183	B7	X		X	X		X	X	X
184	B8	X		X	X	X			
185	B9	X		X	X	X			X
186	BA	X		X	X	X		X	
187	BB	X		X	X	X		X	X
188	BC	X		X	X	X	X		
189	BD	X		X	X	X	X		X
190	BE	X		X	X	X	X	X	
191	BF	X		X	X	X	X	X	X
192	C0	X	X						
193	C1	X	X						X
194	C2	X	X					X	
195	C3	X	X					X	X
196	C4	X	X				X		
197	C5	X	X				X		X
198	C6	X	X				X	X	
199	C7	X	X				X	X	X
200	C8	X	X			X			
201	C9	X	X			X			X
202	CA	X	X			X		X	
203	CB	X	X			X		X	X
204	CC	X	X			X	X		
205	CD	X	X			X	X		X
206	CE	X	X			X	X	X	
207	CF	X	X			X	X	X	X
208	D0	X	X		X				
209	D1	X	X		X				X
210	D2	X	X		X			X	
211	D3	X	X		X			X	X
212	D4	X	X		X		X		
213	D5	X	X		X		X		X
214	D6	X	X		X		X	X	
215	D7	X	X		X		X	X	X
216	D8	X	X		X	X			
217	D9	X	X		X	X			X
218	DA	X	X		X	X		X	
219	DB	X	X		X	X		X	X
220	DC	X	X		X	X	X		
221	DD	X	X		X	X	X		X
222	DE	X	X		X	X	X	X	
223	DF	X	X		X	X	X	X	X
224	E0	X	X	X					
225	E1	X	X	X					X
226	E2	X	X	X				X	
227	E3	X	X	X				X	X
228	E4	X	X	X			X		
229	E5	X	X	X			X		X
230	E6	X	X	X			X	X	

Bit No.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Not assigned	Not assigned	Security Mode	Direct operation via membrane keypad	Manual valve override	Forced operation	Building protection Dew point/Fill level/Window	Operating mode overridden
231	E7	X	X	X			X	X	X
232	E8	X	X	X		X			
233	E9	X	X	X		X			X
234	EA	X	X	X		X		X	
235	EB	X	X	X		X		X	X
236	EC	X	X	X		X	X		
237	ED	X	X	X		X	X		X
238	EE	X	X	X		X	X	X	
239	EF	X	X	X		X	X	X	X
240	F0	X	X	X	X				
241	F1	X	X	X	X				X
242	F2	X	X	X	X			X	
243	F3	X	X	X	X			X	X
244	F4	X	X	X	X		X		
245	F5	X	X	X	X		X		X
246	F6	X	X	X	X		X	X	
247	F7	X	X	X	X		X	X	X
248	F8	X	X	X	X	X			
249	F9	X	X	X	X	X			X
250	FA	X	X	X	X	X		X	
251	FB	X	X	X	X	X		X	X
252	FC	X	X	X	X	X	X		
253	FD	X	X	X	X	X	X		X
254	FE	X	X	X	X	X	X	X	
255	FF	X	X	X	X	X	X	X	X

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