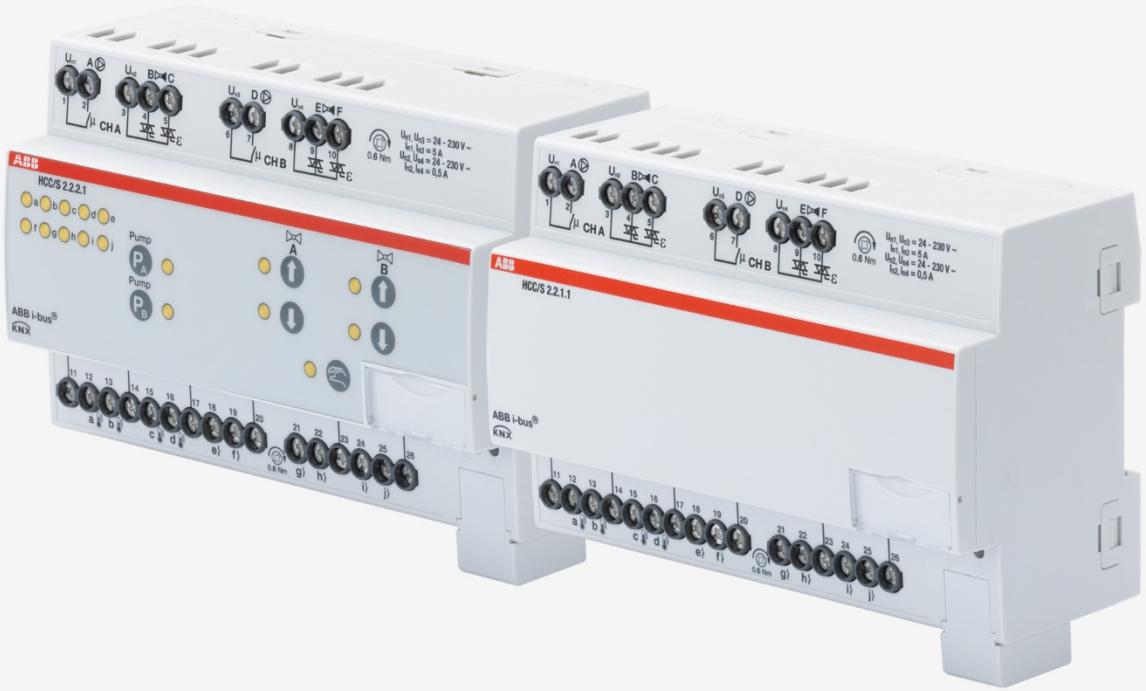
PRODUCT MANUAL

ABB i-bus® KNX

HCC/S 2.x.x.1

Heating/cooling circuit controller



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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 device.

1.2 Legal disclaimer

We reserve the right to make technical changes or modify the contents of this document without prior notice.

The agreed properties are definitive for any orders placed. ABB AG does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

1.3 Explanation of symbols

1.	Instructions in specified sequence
2.	
►	Individual actions
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 –

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 –

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

WARNING –

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

CAUTION –

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

ATTENTION –

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

Example:

Used for application, installation and programming examples

Note

Used for 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 product, the heating/cooling circuit controller, must be installed centrally in an electrical distribution board.

The device is a modular DIN rail component 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 DIN rail components (MDRC) in pro *M* design. The module width of the devices is eight 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. The device connects to the ABB i-bus® KNX via the front bus connection terminal.

The application Engineering Tool Software (ETS) is used for physical address assignment and parametrization.

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

Abbreviation	Description		
H	Heating/		
C	Cooling circuit		
C	Controller		
/S	MDRC		
X	2	=	2-fold
X	1	=	Mixing valve actuation, analog (0…10 V)
	2	=	Mixing valve actuation, 3-point
X	1	=	Without manual operation
	2	=	With manual operation
X	X	=	Version number (x = 1, 2 etc.)

Table 2: Product name description

	HCC/S 2.1.1.1	HCC/S 2.1.2.1	HCC/S 2.2.1.1	HCC/S 2.2.2.1
Channels				
Number of channels	2	2	2	2
Operation				
Manual operation	-	X	-	X
Inputs				
Temperature sensor	4	4	4	4
Contact scanning	6	6	6	6
Outputs				
Pump control (relay)	X	X	X	X
Mixing valve actuation				
0 … 10 V	X	X	-	-
3-point	-	-	X	X

Table 3: Product overview

3.2 Ordering details

Description	MB	Type	Order No.	Packaging unit [pcs.]	Weight 1 pc. [g]
Heating/cooling circuit controller	8	HCC/S 2.1.1.1	2CDG110218R0011	1	280
Heating/cooling circuit controller	8	HCC/S 2.1.2.1	2CDG110219R0011	1	285
Heating/cooling circuit controller	8	HCC/S 2.2.1.1	2CDG110220R0011	1	285
Heating/cooling circuit controller	8	HCC/S 2.2.2.1	2CDG110221R0011	1	290

Table 4: Ordering details

3.3 Heating/cooling circuit controller HCC/S 2.1.1.1, 0-10 V, MDRC

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Fig. 1: Device illustration, HCC/S 2.1.1.1

The device is a modular DIN rail component (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 via the ABB i-bus® KNX and requires no additional auxiliary voltage supply.

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

3.3.1 Dimension drawing

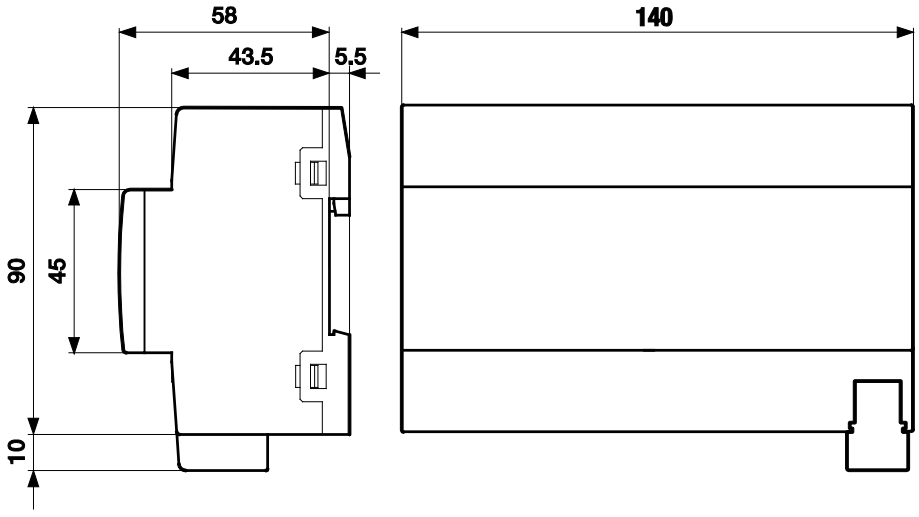

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Fig. 2: Dimension drawing

3.3.2 Connection diagram

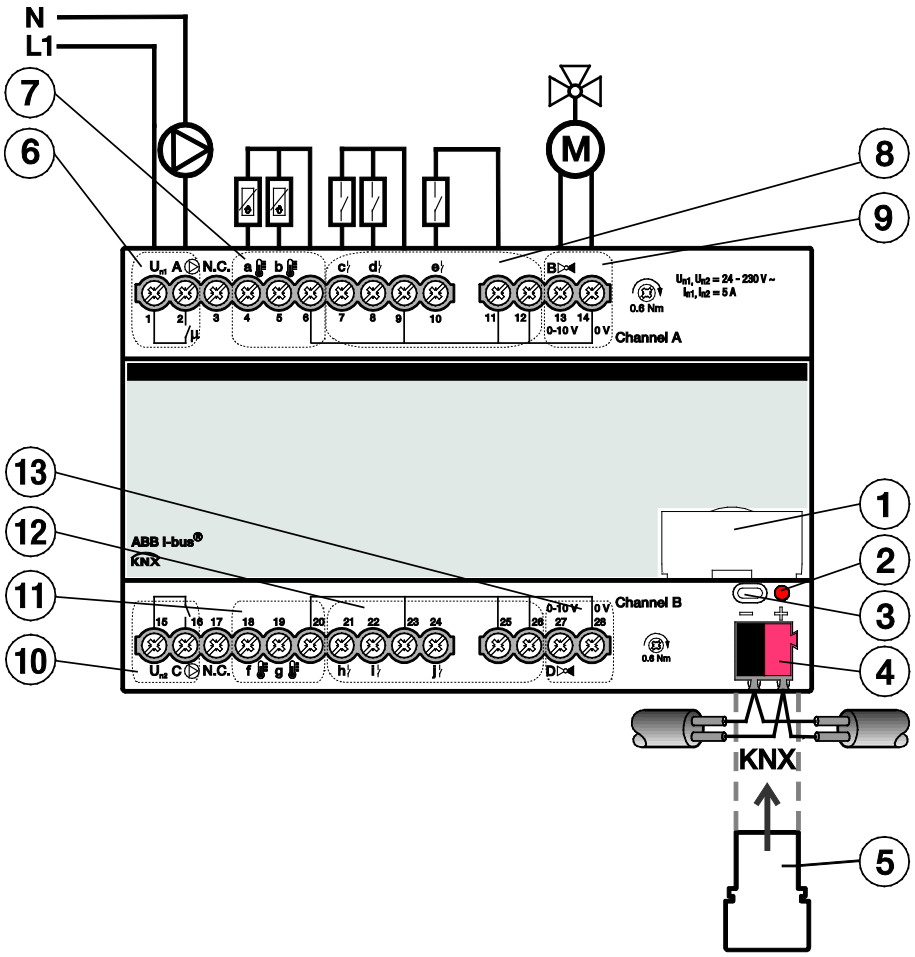

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Fig. 3: Connection diagram HCC/S 2.1.1.1

Legend

1	Label carrier	8	Binary inputs (pump) channel A
2	*KNX programming* LED (red)	9	Valve output channel A
3	*KNX programming* button	10	Relay output pump channel B
4	KNX connection	11	Temperature inputs channel B
5	Cover cap	12	Binary inputs (pump) channel B
6	Relay output pump channel A	13	Valve output channel B
7	Temperature inputs channel A		

3.3.3 Operating and display elements

Button/LED	Description	LED indicator
	Assignment of the physical address	On: device is in programming mode

Table 5: Operating and display elements HCC/S 2.1.1.1

3.3.4 Technical data

3.3.4.1 General technical data

Supply	Bus voltage	21…32 V DC
	Current consumption, bus	< 12 mA
	Power loss, bus	Maximum 250 mW
	Power loss, device	Maximum 3 W
	KNX connection	0.25 W
	Relay 5 A	0.6 W
Connections	KNX	Via bus connection terminal
	Inputs/outputs	Via screw terminals
Connection terminals	Screw terminal	Screw terminal with universal head (PZ1)
	Screw terminal 1	0.2…2.5 mm^2 stranded, 2 x (0.2…2.5 mm^2)
	Screw terminal 2	0.2…4 mm^2 solid, 2 x (0.2…4 mm^2)
	Wire end ferrule without plastic sleeve	0.25…2.5 mm^2
	Wire end ferrule with plastic sleeve	0.25…4 mm^2
	TWIN ferrules	0.25…4 mm^2
	Wire end ferrule contact pin length	Min. 10 mm
	Tightening torque	Max. 0.6 Nm
	Spacing	6.35
Degree of protection and protection class	Degree of protection	IP 20 according to EN 60529
	Protection class	II according to EN 61140
Isolation category	Overvoltage category	III according to EN 60664-1
	Pollution degree	II according 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 atmospheric humidity	95 %, no condensation allowed
	Atmospheric pressure	Atmosphere up to 2,000 m
Design	Modular DIN rail component (MDRC)	Modular installation device
	Design	pro *M*
	Housing/color	Plastic, gray
Dimensions	Dimensions	90 x 140 x 63.5 mm (H x W x D)
	Mounting width in space units	8x modules of 17.5 mm
	Mounting depth	63.5 mm
Mounting	35 mm mounting rail	According to EN 60715
	Mounting position	Any
	Weight	0.24 kg
	Fire classification	Flammability V-0 as per UL94
Approvals	KNX certification	According to EN 50491
	Certification	According to EN 60669
	CE marking	In accordance with the EMC and Low Voltage Directives

Table 6: Technical data, HCC/S 2.1.1.1

3.3.4.2 Device type

Device type	Heating/cooling circuit controller	HCC/S 2.1.1.1
	Application	Heating/cooling circuit controller, 0-10 V, 2-f/…*
	Maximum number of group objects	106
	Maximum number of group addresses	255
	Maximum number of assignments	255

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

Table 7: Device type, HCC/S 2.1.1.1

3.3.4.3 Valve outputs (analog)

Rated values	Quantity	2, non-floating, short-circuit proof
	Control signal	0…10 V DC
	Signal type	Analog
	Output load	> 10 kOhm
	Output tolerance	± 10 %
	Current limitation	Up to 1.5 mA

Table 8: Valve outputs (analog), HCC/S 2.1.1.1

3.3.4.4 Pump outputs (RC 5 A)

Rated values	Quantity	2
	U_n rated voltage	250 V AC (50/60 Hz)
	I_n rated current (per output pair)	5 A
Switching currents	AC3* operation (cos φ = 0.45)	According to EN 60947-4-1
	AC1* operation (cos φ = 0.8)	According to EN 60947-4-1
	Fluorescent lighting load AX	According to EN 60669-1
	Minimum switching capacity at 20 mA	5 V AC
	Minimum switching capacity at 10 mA	12 V AC
	Minimum switching capacity at 7 mA	24 V AC
Service life	DC current switching capacity, resistive load, at 5 A	24 V DC
	Mechanical service life	$>10^7$ cycles
	Electrical service life of switching contacts according to IEC 60947-4-1	$>10^6$ cycles
Operating times	Maximum relay position changes per output and minute if only one relay is switched	> 500

Table 9: Pump outputs (RC 5 A), HCC/S 2.1.1.1

3.3.4.5 Inputs

Rated values	Quantity	10
For temperature measurement	Quantity	4
For contact scanning	Quantity	6
Contact scanning	Scanning current	1 mA
	Scanning voltage	12 V
Resistance	Selection	User-defined
	PT 1000	2-conductor technology
	PT 100	2-conductor technology
	KT	1 k
	KTY	2 k
	NI	1 k
	NTC	10 k
	NTC	20 k
Cable length	Between sensor and device input	Max. 100 m, one-way

Table 10: Inputs, HCC/S 2.1.1.1

3.4 Heating/cooling circuit controller HCC/S 2.1.2.1, 0-10 V, manual operation, MDRC

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Fig. 4: Device illustration, HCC/S 2.1.2.1

The device is a modular DIN rail component (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 via the ABB i-bus® KNX and requires no additional auxiliary voltage supply.

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

3.4.1 Dimension drawing

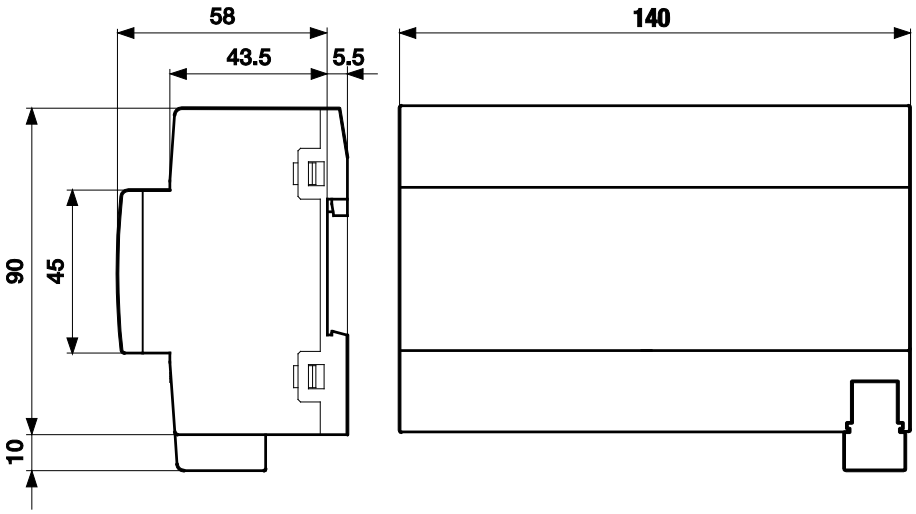

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Fig. 5: Dimension drawing

3.4.2 Connection diagram

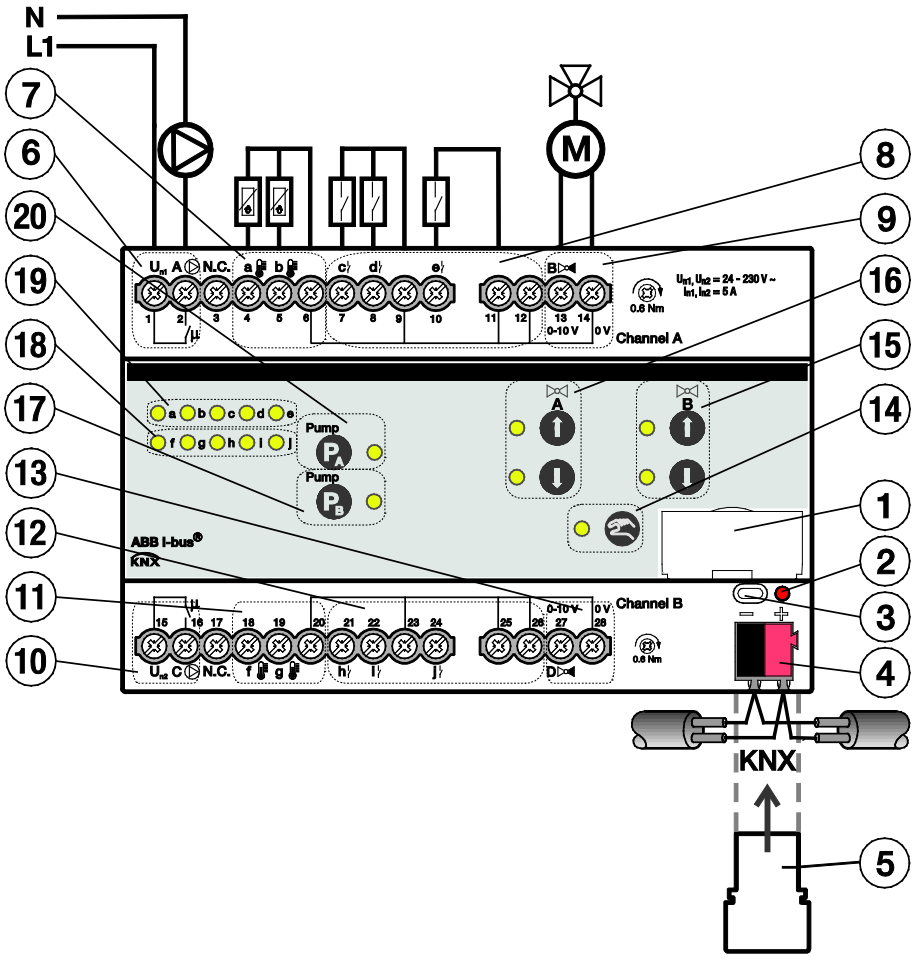

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Fig. 6: Connection diagram, HCC/S 2.1.2.1

Legend

1	Label carrier	11	Temperature inputs channel B
2	*KNX programming* LED (red)	12	Binary inputs (pump) channel B
3	*KNX programming* button	13	Valve output channel B
4	KNX connection	14	Activate manual operation button/LED
5	Cover cap	15	Control valve output channel B button/LED
6	Relay output pump channel A	16	Control valve output channel A button/LED
7	Temperature inputs channel A	17	Enable pump channel B button/LED
8	Binary inputs (pump) channel A	18	Display status inputs channel B LED
9	Valve output channel A	19	Display status inputs channel A LED
10	Relay output pump channel B	20	Enable pump channel A button/LED

3.4.3 Operating and display elements

Button/LED	Description	LED indicator
	Assignment of the physical address	On: device is in programming mode

Table 11: Operating and display elements, HCC/S 2.1.2.1

3.4.3.1 Manual operation

Button/LED	Description	LED indicator
 Open valve output	Maximum valve control value (100 %) set. Reset the output: 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 %
		Both LEDs on: Valve control value is between 1 and 99 %
Pump   Pump   Switch over pump	Relay for the pump output is switched over. Special feature, double pump mode: given corresponding parameterization, pressing one of the pump buttons causes the active pump to change	On: Contact closed Off: Contact open
 Manual operation	Activate KNX mode with a short press of the button.	On: The device is in the manual mode Off: Device is in the KNX mode
 Input a…x	LED indication depending on which inputs are in use	Binary sensor: LED on: Contact closed LED off: Contact open Temperature sensor: LED on: Temperature sensor connected LED flashing: Fault (cable break/ short circuit)

Table 12: Manual operation, HCC/S 2.1.2.1

3.4.3.2 KNX operation

Button/LED	Description	LED indicator
 Open valve output	Button without function	On: Valve control value at 100 % Flashing: Indicates a fault, e.g. overload/short circuit
 Close valve output	Button without function	On: Valve control value at 0 %
		Both LEDs on: Valve control value is between 1 and 99 %
Pump  Pump  Switch over pump	Button without function	On: Contact closed Off: Contact open
 Manual operation	Activate KNX mode with a short press of the button.	On: The device is in the manual mode Off: Device is in the KNX mode
 Input a…x	LED indication depending on which inputs are in use	Binary sensor: LED on: Contact closed LED off: Contact open Temperature sensor: LED on: Temperature sensor connected LED flashing: Fault (cable break/ short circuit)

Table 13: KNX operation, HCC/S 2.1.2.1

3.4.4 Technical data

3.4.4.1 General technical data

Supply	Bus voltage	21…32 V DC
	Current consumption, bus	< 12 mA
	Power loss, bus	Maximum 250 mW
	Power loss, device	Maximum 3 W
	KNX connection	0.25 W
	Relay 5 A	0.6 W
Connections	KNX	Via bus connection terminal
	Inputs/outputs	Via screw terminals
Connection terminals	Screw terminal	Screw terminal with universal head (PZ1)
	Screw terminal 1	0.2…2.5 mm^2 stranded, 2 x (0.2…2.5 mm^2)
	Screw terminal 2	0.2…4 mm^2 solid, 2 x (0.2…4 mm^2)
	Wire end ferrule without plastic sleeve	0.25…2.5 mm^2
	Wire end ferrule with plastic sleeve	0.25…4 mm^2
	TWIN ferrules	0.25…4 mm^2
	Wire end ferrule contact pin length	Min. 10 mm
	Tightening torque	Max. 0.6 Nm
	Spacing	6.35
Degree of protection and protection 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 atmospheric humidity	95 %, no condensation allowed
	Atmospheric pressure	Atmosphere up to 2,000 m
Design	Modular DIN rail component (MDRC)	Modular installation device
	Design	pro *M*
	Housing/color	Plastic, gray
Dimensions	Dimensions	90 x 140 x 63.5 mm (H x W x D)
	Mounting width in space units	8x modules of 17.5 mm
	Mounting depth	63.5 mm
Mounting	35 mm mounting rail	According to EN 60715
	Mounting position	Any
	Weight	0.24 kg
	Fire classification	Flammability V-0 as per UL94
Approvals	KNX certification	According to EN 50491
	Certification	According to EN 60669
	CE marking	In accordance with the EMC and Low Voltage Directives

Table 14: Technical data, HCC/S 2.1.2.1

3.4.4.2 Device type

Device type	Heating/cooling circuit controller	HCC/S 2.1.2.1
	Application	Heating/cooling circuit controller, 0-10 V, manual Operation, 2-f/…*
	Maximum number of group objects	108
	Maximum number of group addresses	255
	Maximum number of assignments	255

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

Table 15: Device type, HCC/S 2.1.2.1

3.4.4.3 Valve outputs (analog)

Rated values	Quantity	2, non-floating, short-circuit proof
	Control signal	0…10 V DC
	Signal type	Analog
	Output load	> 10 kOhm
	Output tolerance	± 10 %
	Current limitation	Up to 1.5 mA

Table 16: Valve outputs (analog), HCC/S 2.1.2.1

3.4.4.4 Pump outputs (RC 5 A)

Rated values	Quantity	2
	U_n rated voltage	250 V AC (50/60 Hz)
	I_n rated current (per output pair)	5 A
Switching currents	AC3* operation (cos φ = 0.45)	According to EN 60947-4-1
	AC1* operation (cos φ = 0.8)	According to EN 60947-4-1
	Fluorescent lighting load AX	According to EN 60669-1
	Minimum switching capacity at 20 mA	5 V AC
	Minimum switching capacity at 10 mA	12 V AC
	Minimum switching capacity at 7 mA	24 V AC
Service life	DC current switching capacity, resistive load, at 5 A	24 V DC
	Mechanical service life	$>10^7$ cycles
	Electrical service life of switching contacts according to IEC 60947-4-1	$>10^6$ cycles
Operating times	Maximum relay position changes per output and minute if only one relay is switched	> 500

Table 17: Pump outputs (RC 5 A), HCC/S 2.1.2.1

3.4.4.5 Inputs

Rated values	Quantity	10
For temperature measurement	Quantity	4
For contact scanning	Quantity	6
Contact scanning	Scanning current	1 mA
	Scanning voltage	12 V
Resistance	Selection	User-defined
	PT 1000	2-conductor technology
	PT 100	2-conductor technology
	KT	1 k
	KTY	2 k
	NI	1 k
	NTC	10 k
	NTC	20 k
Cable length	Between sensor and device input	Max. 100 m, one-way

Table 18: Inputs, HCC/S 2.1.2.1

3.5 Heating/cooling circuit controller HCC/S 2.2.1.1, 3-point, MDRC

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Fig. 7: Device illustration, HCC/S 2.2.1.1

The device is a modular DIN rail component (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 via the ABB i-bus® KNX and requires no additional auxiliary voltage supply.

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

3.5.1 Dimension drawing

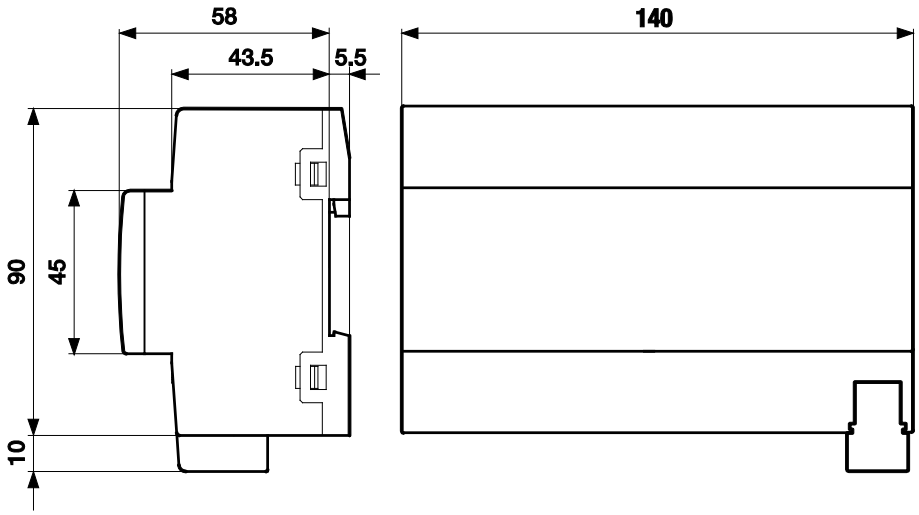

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Fig. 8: Dimension drawing

3.5.2 Connection diagram

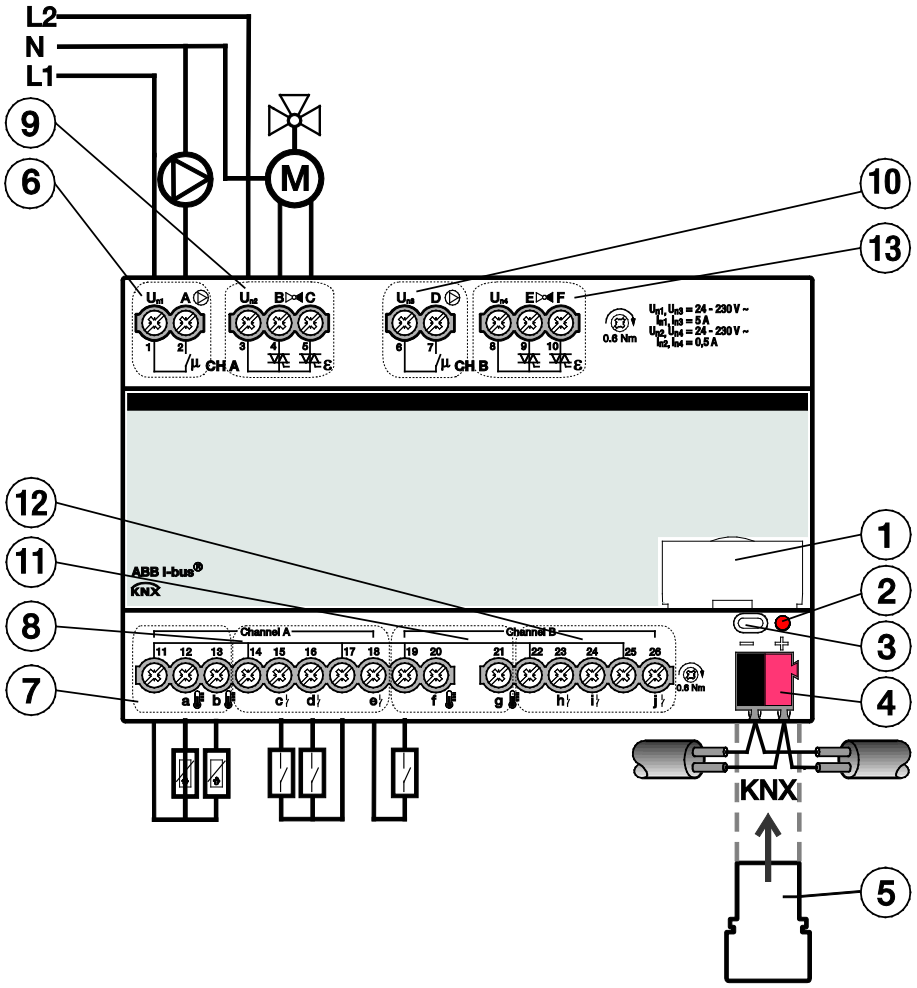

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Fig. 9: Connection diagram, HCC/S 2.2.1.1

Legend

1	Label carrier	8	Binary inputs (pump) channel A
2	*KNX programming* LED (red)	9	Valve output channel A
3	*KNX programming* button	10	Relay output pump channel B
4	KNX connection	11	Temperature inputs channel B
5	Cover cap	12	Binary inputs (pump) channel B
6	Relay output pump channel A	13	Valve output channel B
7	Temperature inputs channel A		

3.5.3 Operating and display elements

Button/LED	Description	LED indicator
	Assignment of the physical address	On: device is in programming mode

Table 19: Operating and display elements, HCC/S 2.2.1.1

3.5.4 Technical data

3.5.4.1 General technical data

Supply	Bus voltage	21…32 V DC
	Current consumption, bus	< 12 mA
	Power loss, bus	Maximum 250 mW
	Power loss, device	Maximum 3 W
	KNX connection	0.25 W
	Relay 5 A	0.6 W
	Electronic outputs	1.2 W
Connections	KNX	Via bus connection terminal
	Inputs/outputs	Via screw terminals
Connection terminals	Screw terminal	Screw terminal with universal head (PZ1)
	Screw terminal 1	0.2…2.5 mm^2 stranded, 2 x (0.2…2.5 mm^2)
	Screw terminal 2	0.2…4 mm^2 solid, 2 x (0.2…4 mm^2)
	Wire end ferrule without plastic sleeve	0.25…2.5 mm^2
	Wire end ferrule with plastic sleeve	0.25…4 mm^2
	TWIN ferrules	0.25…4 mm^2
	Wire end ferrule contact pin length	Min. 10 mm
	Tightening torque	Max. 0.6 Nm
	Spacing	6.35
Degree of protection and protection class	Degree of protection	IP 20 according 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 atmospheric humidity	95 %, no condensation allowed
	Atmospheric pressure	Atmosphere up to 2,000 m
Design	Modular DIN rail component (MDRC)	Modular installation device
	Design	pro *M*
	Housing/color	Plastic, gray
Dimensions	Dimensions	90 x 140 x 63.5 mm (H x W x D)
	Mounting width in space units	8x modules of 17.5 mm
	Mounting depth	63.5 mm
Mounting	35 mm mounting rail	According to EN 60715
	Mounting position	Any
	Weight	0.24 kg
	Fire classification	Flammability V-0 as per UL94
Approvals	KNX certification	According to EN 50491
	Certification	According to EN 60669
	CE marking	In accordance with the EMC and Low Voltage Directives

Table 20: Technical data, HCC/S 2.2.1.1

3.5.4.2 Device type

Device type	Heating/cooling circuit controller	HCC/S 2.2.1.1
	Application	Heating/Cooling Circuit Controller, 3-Point, 2-f/…*
	Maximum number of group objects	106
	Maximum number of group addresses	255
	Maximum number of assignments	255

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

Table 21: Device type, HCC/S 2.2.1.1

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

Rated values	Quantity	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

Table 22: Valve outputs (motor-driven, 3-point), HCC/S 2.2.1.1

3.5.4.4 Pump outputs (RC 5 A)

Rated values	Quantity	2
	U_n rated voltage	250 V AC (50/60 Hz)
	I_n rated current (per output pair)	5 A
Switching currents	AC3* operation (cos φ = 0.45)	According to EN 60947-4-1
	AC1* operation (cos φ = 0.8)	According to EN 60947-4-1
	Fluorescent lighting load AX	According to EN 60669-1
	Minimum switching capacity at 20 mA	5 V AC
	Minimum switching capacity at 10 mA	12 V AC
	Minimum switching capacity at 7 mA	24 V AC
Service life	DC current switching capacity, resistive load, at 5 A	24 V DC
	Mechanical service life	$>10^7$ cycles
	Electrical service life of switching contacts according to IEC 60947-4-1	$>10^6$ cycles
Operating times	Maximum relay position changes per output and minute if only one relay is switched	> 500

Table 23: Pump outputs (RC 5 A), HCC/S 2.2.1.1

3.5.4.5 Inputs

Rated values	Quantity	10
For temperature measurement	Quantity	4
For contact scanning	Quantity	6
Contact scanning	Scanning current	1 mA
	Scanning voltage	12 V
Resistance	Selection	User-defined
	PT 1000	2-conductor technology
	PT 100	2-conductor technology
	KT	1 k
	KTY	2 k
	NI	1 k
	NTC	10 k
	NTC	20 k
Cable length	Between sensor and device input	Max. 100 m, one-way

Table 24: Inputs, HCC/S 2.2.1.1

3.6 Heating/cooling circuit controller HCC/S 2.2.2.1, 3-point, manual operation, MDRC

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Fig. 10: Device illustration, HCC/S 2.2.2.1

The device is a modular DIN rail component (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 via the ABB i-bus® KNX and requires no additional auxiliary voltage supply.

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

3.6.1 Dimension drawing

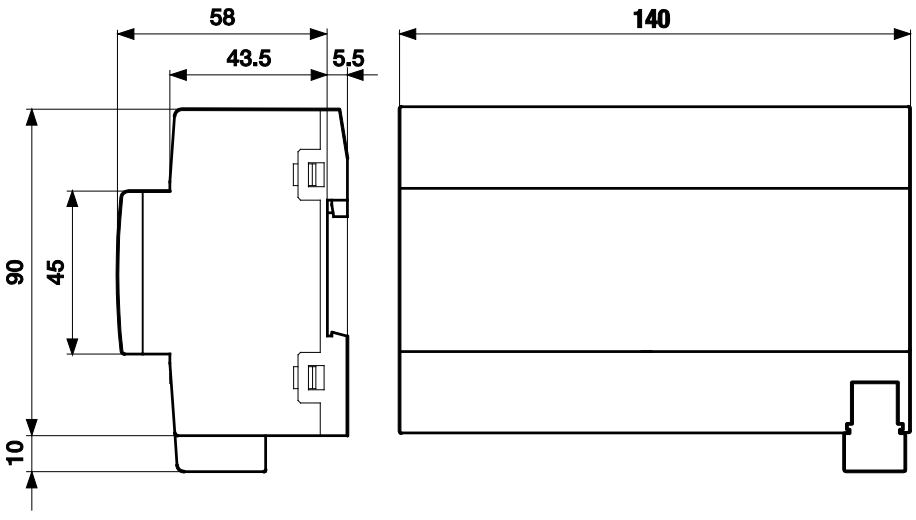

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Fig. 11: Dimension drawing

3.6.2 Connection diagram

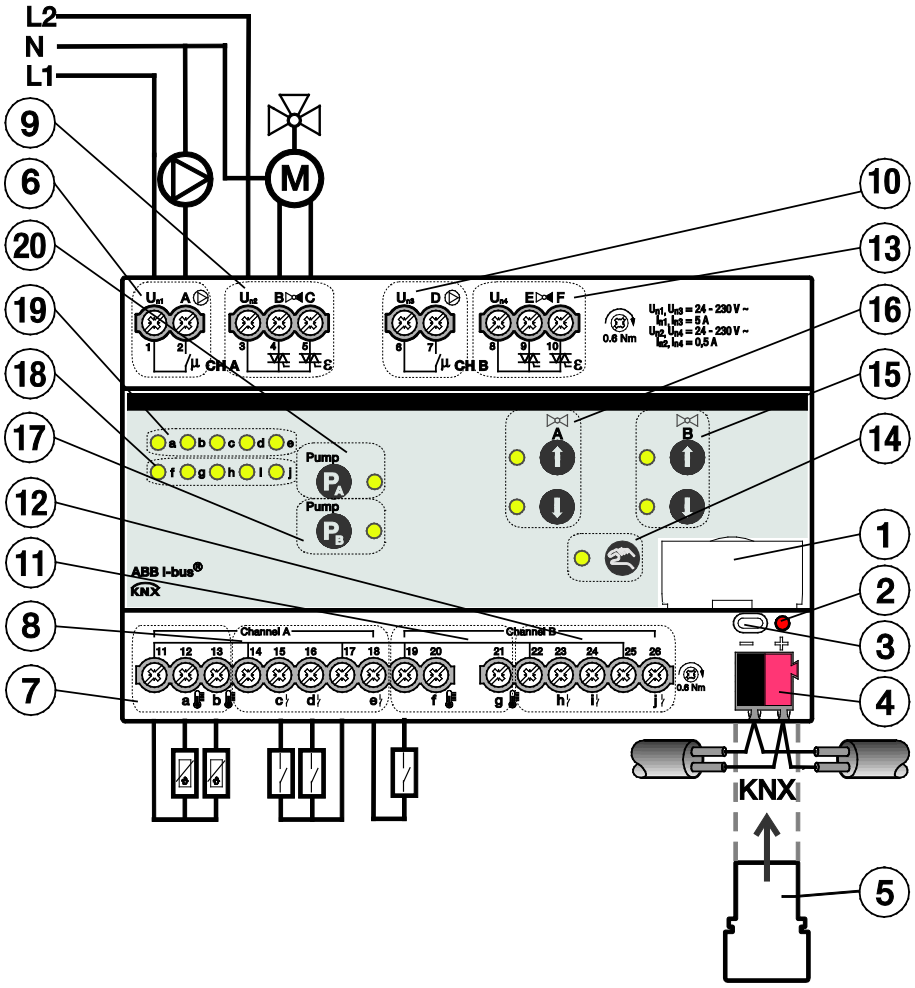

Fig. 12: Connection diagram, HCC/S 2.2.2.1

Legend

1	Label carrier	11	Temperature inputs channel B
2	*KNX programming* LED (red)	12	Binary inputs (pump) channel B
3	*KNX programming* button	13	Valve output channel B
4	KNX connection	14	Activate manual operation button/LED
5	Cover cap	15	Control valve output channel B button/LED
6	Relay output pump channel A	16	Control valve output channel A button/LED
7	Temperature inputs channel A	17	Enable pump channel B button/LED
8	Binary inputs (pump) channel A	18	Display status inputs channel B LED
9	Valve output channel A	19	Display status inputs channel A LED
10	Relay output pump channel B	20	Enable pump channel A button/LED

3.6.3 Operating and display elements

Button/LED	Description	LED indicator
	Assignment of the physical address	On: device is in programming mode

Table 25: Operating and display elements, HCC/S 2.2.2.1

3.6.3.1 Manual operation

Button/LED	Description	LED indicator
 Open valve output	Maximum valve control value (100 %) set. Reset the output: 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 %
		Both LEDs on: Valve control value is between 1 and 99 %
Pump   Pump   Switch over pump	Relay for the pump output is switched over. Special feature, double pump mode: given corresponding parameterization, pressing one of the pump buttons causes the active pump to change	On: Contact closed Off: Contact open
 Manual operation	Activate KNX mode with a short press of the button.	On: The device is in the manual mode Off: Device is in the KNX mode
 Input a…x	LED indication depending on which inputs are in use	Binary sensor: LED on: Contact closed LED off: Contact open Temperature sensor: LED on: Temperature sensor connected LED flashing: Fault (cable break/ short circuit)

Table 26: Manual operation, HCC/S 2.2.2.1

3.6.3.2 KNX operation

Button/LED	Description	LED indicator
 Open valve output	Button without function	On: Valve control value at 100 % Flashing: Indicates a fault, e.g. overload/short circuit
 Close valve output	Button without function	On: Valve control value at 0 %
		Both LEDs on: Valve control value is between 1 and 99 %
Pump  Pump  Switch over pump	Button without function	On: Contact closed Off: Contact open
 Manual operation	Activate KNX mode with a short press of the button.	On: The device is in the manual mode Off: Device is in the KNX mode
 Input a…x	LED indication depending on which inputs are in use	Binary sensor: LED on: Contact closed LED off: Contact open Temperature sensor: LED on: Temperature sensor connected LED flashing: Fault (cable break/ short circuit)

Table 27: KNX operation, HCC/S 2.2.2.1

3.6.4 Technical data

3.6.4.1 General technical data

Supply	Bus voltage	21…32 V DC
	Current consumption, bus	< 12 mA
	Power loss, bus	Maximum 250 mW
	Power loss, device	Maximum 3 W
	KNX connection	0.25 W
	Relay 5 A	0.6 W
	Electronic outputs	1.2 W
Connections	KNX	Via bus connection terminal
	Inputs/outputs	Via screw terminals
Connection terminals	Screw terminal	Screw terminal with universal head (PZ1)
	Screw terminal 1	0.2…2.5 mm^2 stranded, 2 x (0.2…2.5 mm^2)
	Screw terminal 2	0.2…4 mm^2 solid, 2 x (0.2…4 mm^2)
	Wire end ferrule without plastic sleeve	0.25…2.5 mm^2
	Wire end ferrule with plastic sleeve	0.25…4 mm^2
	TWIN ferrules	0.25…4 mm^2
	Wire end ferrule contact pin length	Min. 10 mm
	Tightening torque	Max. 0.6 Nm
	Spacing	6.35
Degree of protection and protection class	Degree of protection	IP 20 according 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 atmospheric humidity	95 %, no condensation allowed
	Atmospheric pressure	Atmosphere up to 2,000 m
Design	Modular DIN rail component (MDRC)	Modular installation device
	Design	pro *M*
	Housing/color	Plastic, gray
Dimensions	Dimensions	90 x 140 x 63.5 mm (H x W x D)
	Mounting width in space units	8x modules of 17.5 mm
	Mounting depth	63.5 mm
Mounting	35 mm mounting rail	According to EN 60715
	Mounting position	Any
	Weight	0.24 kg
	Fire classification	Flammability V-0 as per UL94
Approvals	KNX certification	According to EN 50491
	Certification	According to EN 60669
	CE marking	In accordance with the EMC and Low Voltage Directives

Table 28: Technical data, HCC/S 2.2.2.1

3.6.4.2 Device type

Device type	Heating/cooling circuit controller	HCC/S 2.2.2.1
	Application	Heating/Cooling Circuit Controller, 3-Point, manual Operation, 2-f/…*
	Maximum number of group objects	108
	Maximum number of group addresses	255
	Maximum number of assignments	255

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

Table 29: Device type, HCC/S 2.2.2.1

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

Rated values	Quantity	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

Table 30: Valve outputs (motor-driven, 3-point), HCC/S 2.2.2.1

3.6.4.4 Pump outputs (RC 5 A)

Rated values	Quantity	2
	U_n rated voltage	250 V AC (50/60 Hz)
	I_n rated current (per output pair)	5 A
Switching currents	AC3* operation (cos φ = 0.45)	According to EN 60947-4-1
	AC1* operation (cos φ = 0.8)	According to EN 60947-4-1
	Fluorescent lighting load AX	According to EN 60669-1
	Minimum switching capacity at 20 mA	5 V AC
	Minimum switching capacity at 10 mA	12 V AC
	Minimum switching capacity at 7 mA	24 V AC
Service life	DC current switching capacity, resistive load, at 5 A	24 V DC
	Mechanical service life	$>10^7$ cycles
	Electrical service life of switching contacts according to IEC 60947-4-1	$>10^6$ cycles
Operating times	Maximum relay position changes per output and minute if only one relay is switched	> 500

Table 31: Pump outputs (RC 5 A), HCC/S 2.2.2.1

3.6.4.5 Inputs

Rated values	Quantity	10
For temperature measurement	Quantity	4
For contact scanning	Quantity	6
Contact scanning	Scanning current	1 mA
	Scanning voltage	12 V
Resistance	Selection	User-defined
	PT 1000	2-conductor technology
	PT 100	2-conductor technology
	KT	1 k
	KTY	2 k
	NI	1 k
	NTC	10 k
	NTC	20 k
Cable length	Between sensor and device input	Max. 100 m, one-way

Table 32: Inputs, HCC/S 2.2.2.1

4 Function

4.1 Overview of heating/cooling circuit

A heating/cooling circuit is used to supply the rooms connected with warm or cold water for heating or cooling. Depending on the requirements in the rooms, the temperature in the heating/cooling circuit (supply flow temperature) can be adjusted accordingly.

A heating/cooling circuit here consists of a feed flow (e.g. coming from the heat generator) that goes to the loads (e.g. radiators in the rooms) as the supply flow. There is also a return flow that returns the water from the rooms back to the generator.

The supply and return flow are connected together by a 3-way mixing valve. Here the water from the supply flow is mixed with the cooler (or warmer in the cooling circuit) water to achieve the required supply flow temperature. In addition, a circulating pump ensures that the water circulates in the heating/cooling circuit.

4.2 Functional overview

The HCC is used to control a heating/cooling circuit. It is a two-channel device. A heating circuit, a cooling circuit or a heating/cooling circuit can be controlled using each channel, independent of the other; each channel has a dedicated controller. To cover applications with double pumps (redundancy), the two channels can also be bundled to control two pumps.

A 3-way mixing valve and the pump are actuated for heating/cooling control. The 3-way mixing valve is actuated via 0-10 V or 3-point (two outputs, one for opening, the other for closing the valve). There is a separate variant for each control mode.

To switch the pump, the device has a relay output. The pump is switched on or off directly using this output, or it is used to enable the pump (depending on pump variant). Three binary inputs are available to monitor the pump status. The following pump status messages can be acquired using these inputs:

- Pump running (status of pump)
- Pump fault (pump faulty)
- Pump repair switch (pump shut down manually)

Not all pumps provide all this information, or indeed any of this information on a floating contact. While the information *Pump running* is only acquired for information purposes (e.g. visualization or building management systems), a signal on the other two inputs causes the immediate shutdown of the pump, and a change in the active pump in the double pump mode.

In addition to the monitoring of the pump, the supply flow and return flow temperatures are measured. The supply flow temperature is used for the control (actual temperature), the return flow temperature is only used for information.

The control is a pure PI control for which the P and I proportions must be defined in the parameters. The supply flow temperature setpoint is received via KNX. The control value calculated is passed to the valve and specifies the mixing ratio between supply flow and return flow (the more return flow, the colder, the more supply flow, the warmer).

Further functions included in the device are:

- Pump automatic function: automatic switching on/off of the pump depending on the valve control value
- Manual override of the pump via the bus
- Manual override of the valve via the bus
- Valve purge
- Automatic valve position adjustment (only 3-point)
- Reaction on bus voltage failure: pump
- Reaction on bus voltage recovery: heating/cooling mode, control value
- Reaction after ETS download & reset: heating/cooling mode, control value
- Forced operation: pump and control value
- Cyclical monitoring: setpoint, if received via bus: supply flow temperature, pump status, pump fault, pump repair mode
- Usage of the binary inputs as free binary inputs

The two channels are bundled in the double pump mode. The temperature inputs and the channel B valve output have no effect here. The binary inputs are still available for both pumps. In this situation there is only one heating/cooling circuit and therefore also only one controller. In addition to the functions available for the single channel, there are options and objects for controlling the double pump functionality:

- Automatic change between the pumps
- Changeover reaction on pump change

The following graphic shows an example heating circuit and the function of the heating/cooling circuit controller in this system.

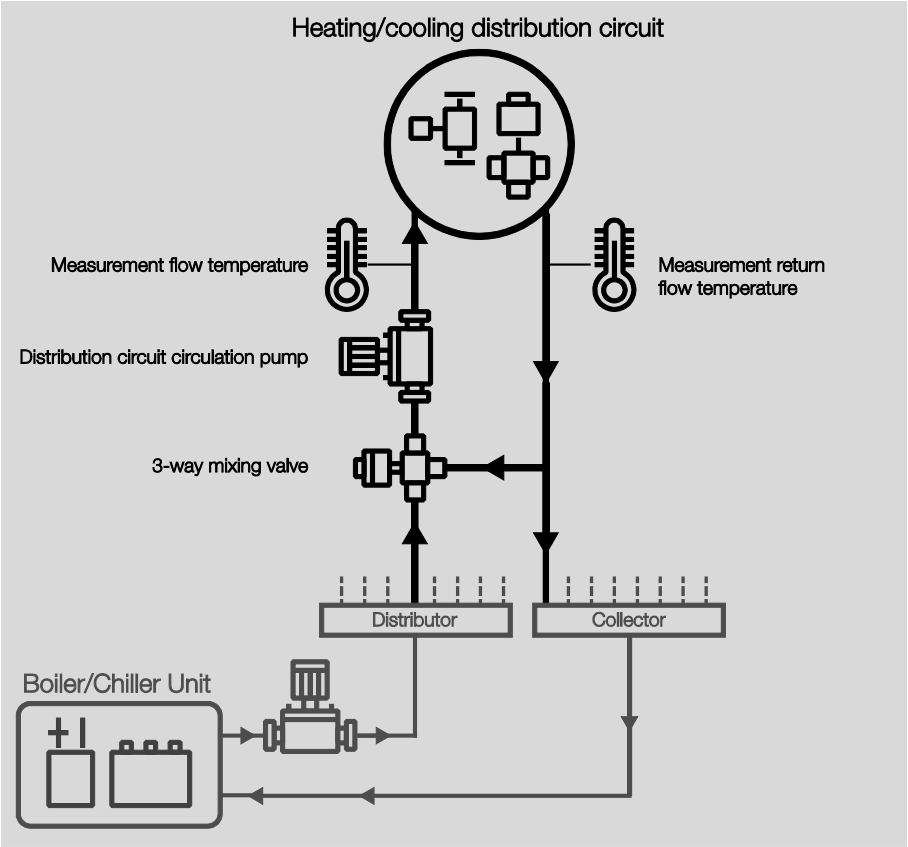

Fig. 13: Heating/cooling distribution circuit

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Function/device	HCC/S 2.1.1.1	HCC/S 2.1.2.1	HCC/S 2.2.1.1	HCC/S 2.2.2.1
Integrated temperature controller for heating or cooling mixing circuits	x	x	x	x
Number of channels	2	2	2	2
Type of valve actuation	0-10 V	0-10 V	3-point (motor-driven)	3-point (motor-driven)
Inputs for sensors per channel	5	5	5	5
Inputs for temperature measurement	2	2	2	2
Inputs for pump status	3	3	3	3
Pump output per channel Relay (5 A)	1	1	1	1
Manual operation	-	x	-	x

Table 33: Functional overview

4.3 Input functions

4.3.1 Temperature inputs

Temperature sensor	
Type	PT 100
	PT 1000
	KT/KTY
	KT/KTY user-defined
	NTC 10 k
	NTC 20 k
	NI-1000

Table 34: Temperature inputs

4.3.2 Binary signal input (floating)

Binary signal input	
Usage	Acquisition of pump status
	Acquisition of pump fault
	Acquisition of pump repair switch
	Free binary signal input

Table 35: Binary signal input (floating)

4.4 Output functions

4.4.1 Valve outputs

4.4.1.1 HCC/S 2.1.1.1 and HCC/S 2.1.2.1

Function	
Analog valve drive	0…10 V
	1…10 V
	2…10 V
	10…0 V

Table 36: Valve outputs HCC/S 2.1.1.1 and HCC/S 2.1.2.1

4.4.1.2 HCC/S 2.2.1.1 and HCC/S 2.2.2.1

Function	
Motor-drive valve drive	Open/closed

Table 37: Valve outputs HCC/S 2.2.1.1 and HCC/S 2.2.2.1

4.4.2 Pump output

Function	
Individual pump	
Switching the pump	X
Switching the pump depending on valve control value	X
Inclusion of pump status (fault + repair switch)	X
Double pump	
Switching the pump	X
Switching the pump depending on valve control value	X
Inclusion of pump status (fault + repair switch)	X
Automatic weekly pump change	X
Pump change on fault	X

Table 38: Pump output

4.5 Integration in the i-bus® Tool

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

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

In addition, values can be simulated for test purposes. If there is no communication, output values are no longer output on 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 supply flow temperature controller.

The device's physical inputs and outputs can be tested via the i-bus® Tool.

You can download the i-bus® Tool free of charge from our homepage (www.abb.de/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's reaction on bus voltage failure/recovery, download and ETS reset can be set in the device parameters.

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. To trigger an ETS reset, go to the ETS *Commissioning* menu and select *Reset device*. This stops and restarts the application.

4.6.1.4 Download

Downloading describes loading a modified or updated application onto the device using ETS.

Note

The device will no longer function after the application is uninstalled or after an interrupted download.

5 Mounting and installation

5.1 Information about mounting

The mounting position for the device can be selected as required.

The electrical connection is implemented using screw terminals. The connection to the bus is implemented using the bus connection terminal supplied. The terminal assignment is given 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 different 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 fitted and removed without auxiliary tools.

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

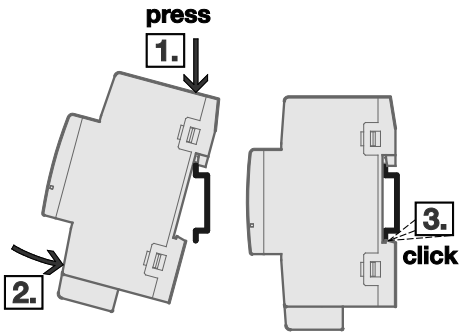

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Fig. 14: Mounting on DIN rail

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 is now mounted on the DIN rail.

▶ 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 reloaded if required. Downloads may take longer after an application is uninstalled or when changing applications.

6 Commissioning

6.1 Prerequisites for commissioning

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.

6.2 Commissioning overview

The application *Heating/cooling circuit controller, 0-10 V, 2-f* is available for the heating/cooling circuit controller HCC/S 2.1.1.1

The application *Heating/cooling circuit controller, 0-10 V, manual operation, 2-f* is available for the heating/cooling circuit controller HCC/S 2.1.2.1

The application *Heating/cooling circuit controller, 3-point, 2-f* is available for the heating/cooling circuit controller HCC/S 2.2.1.1

The application *Heating/cooling circuit controller, 3-point, manual operation, 2-f* is available for the heating/cooling circuit controller HCC/S 2.2.2.1

ETS from version 4 is required to parameterize the device.

For information on how to use the i-bus® Tool, see chapter 4.5 Integration in the i-bus® Tool

The following functions are available:

Function	
Valve output, analog	Actuation of the (3-way) mixing valve for supply flow temperature control Valve purge Manual valve override
Valve output, 3-point	Actuation of the (3-way) mixing valve for supply flow temperature control Valve purge Manual valve override
Pump output	Switching/enabling of the pump depending on the valve control value Manual pump override Double pump mode (by means of channel bundling) • Weekly active pump change • Backup function for the 2nd pump with automatic change • If there is a fault
Inputs (per channel)	2 temperature inputs for the acquisition of supply flow and return flow temperature 3 binary signal inputs for the acquisition of the pump status

Table 39: Functions

6.3 Assignment of the physical address

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 once 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

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/Primary systems.

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: No

Note

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

Note

This is a 2-channel device. Because the two channels have the same function, the function is described based on channel A as an example.

7.2 General parameter window

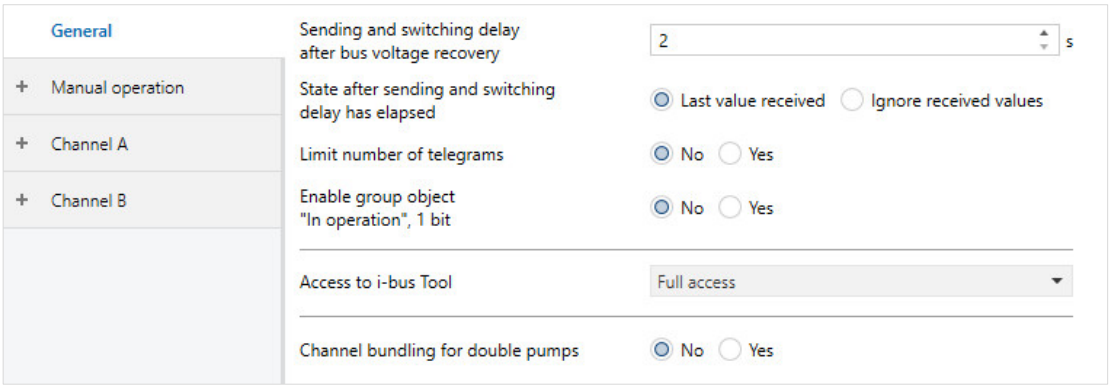

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Fig. 15: General parameter window

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

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 continue reading and the outputs 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.

Limit number of telegrams

Options: No
Yes

The bus load generated by the device is limited using this parameter. This limit relates to all telegrams sent by the device.

—

Dependent parameter

Maximum number of telegrams

Options: 1…20…50

—

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 parameterized 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 parameterized time. The subsequent sending times correspond to the parameterized time.

Example:

Maximum number of telegrams sent = 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 via the bus every 5 seconds. The telegrams are sent in the order in which they arise (first in – first out).

Enable group object "In operation", 1 bit

Options: No
Yes

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

—

Dependent parameter

Send:

Options: Value 0
Value 1

—

Dependent parameter

Sending cycle time

Options: 00:00:01…00:01:00…18:12:15 hh:mm:ss

This parameter specifies the interval at which the group object *In operation* sends a telegram cyclically.

Note

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

Access to i-bus® Tool

Options: Deactivated
Value display only
Full access

The access for the ABB i-bus® Tool is restricted or completely disabled using this parameter. 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 chapter 4.5 Integration into the i-bus® Tool).

Channel bundling for double pumps

Options: No
Yes

A heating/cooling system with double pump is actuated using this parameter by bundling the two channels in the device.

Double pumps are used for redundancy in the system so that if there is a failure such as a fault on the pump, a second pump can take over operation immediately.

- *No:* The system is not designed for double pumps. The device has two separate, independent channels.
- *Yes:* The channels in the system are bundled to make possible the actuation of the second pump. All parameter pages for channel B are deactivated except the *Monitoring and safety* and *Input h/i/j* parameter pages. Additional parameters are enabled in the *Channel A – Pump* parameter window, as well as the *Master/slave changeover* and *Status pump master/slave (1=Master, 0=Slave)* group objects for the pumps on channels A and B.

Note

On the usage of the double pump mode, the valve output and the temperature inputs for channel B cannot be used.
The pump on channel B is parameterized via the Channel *A – Pump* parameter page and the settings are identical to those for the pump on channel A.

7.3 Manual operation parameter window

Only devices HCC/S 2.1.2.1 and HCC/S 2.2.2.1 have manual operation, and therefore the following setting options.

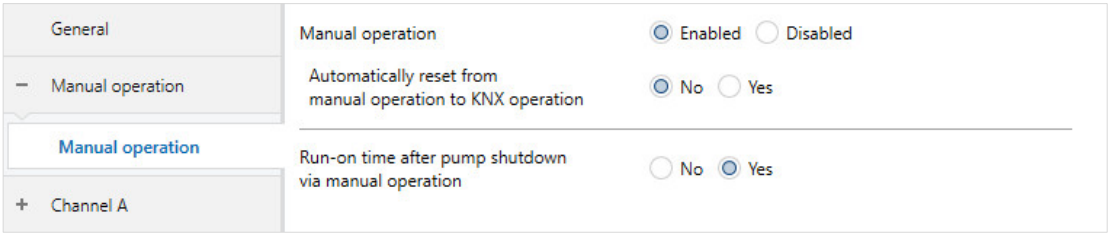

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Fig. 16: Manual operation parameter window

Manual operation

Options: Enabled
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 changed 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.

Automatically reset from manual operation to KNX operation

This parameter is only visible if the *Enabled* option has been selected for the *Manual operation* parameter.

Options: No
Yes

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

- *Yes:* The device is reset to KNX operation depending on the parameterized time.
- *No:* There is no automatic reset to KNX operation.

—

Dependent parameter

Time for automatic reset to KNX operation

Options: 00:00:30…00:05:00…18:12:15 hh:mm:ss

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

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.

—

Dependent parameter

Run-on time after pump shutdown via manual operation

This parameter is only visible if the *Enabled* option has been selected for the *Manual operation* parameter.

Options: No
Yes

This parameter specifies whether, on switching off the pump via manual operation, the run-on time is to be maintained or whether the pump is to be switched off immediately.

- *No:* The run-on time is not taken into account. The pump is switched off immediately.
- *Yes:* The run-on time is taken into account. If the pump is switched off via the manual operation, it is waited until the run-on time has elapsed before the pump is switched off.

—

Dependent parameter

Permit pump changeover via manual operation

This parameter is only visible if the *Enabled* option has been selected for the *Manual operation* parameter, and in the *General* parameter window the *Yes* option has been selected for the *Channel bundling for double pumps* parameter.

Options: No
Yes

This parameter specifies whether, on the usage of the double pump mode, switching between the active and inactive pump is to take place via manual operation.

- *No:* It is not possible to change between the pumps using the manual operation.
- *Yes:* It is possible to change the active and inactive pump using the manual operation. This action is undertaken by pressing the button for the currently inactive pump.

Note

The changeover time set in the parameters is taken into account on changing the pumps.

Note

The pump active after the change is the only state that remains active after the end of manual operation. There is no automatic change back to the pump active before the manual operation.

7.4 Channel A parameter window

7.4.1 Application parameters

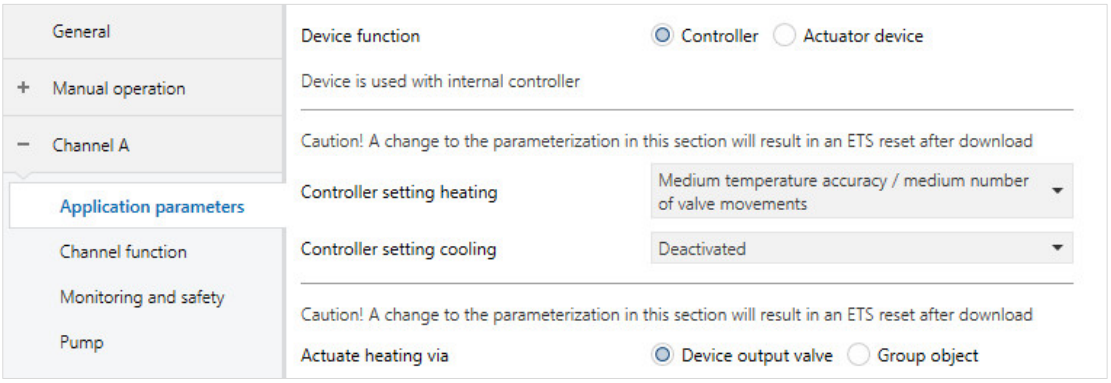

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Fig. 17: Application parameters parameter window

Device function

Options: Controller
Actuator device

This parameter specifies how the device is to be used.

- *Controller*: The device uses the internal controller to determine the control value for the mixing valve. It receives a pre-defined supply flow temperature setpoint via a group object and calculates from this temperature, as well as the actual supply flow temperature, the control value for the 3-way mixing valve.
- *Actuator device:* The device is used purely as actuator; the internal controller is deactivated. The device receives a control value directly via a group object and uses this as the control value for the 3-way mixing valve. The *Temperature controller* parameter page and all subordinate pages are hidden.

Controller setting heating

This parameter is only visible if the *Controller* option has been selected for the *Device function* parameter.

Options:
- Deactivated
- Free configuration
- Reduced temperature accuracy / few valve movements
- Medium temperature accuracy / medium number of valve movements
- High temperature accuracy / many valve movements

This parameter specifies whether the device is to be used for a heating application and how the control behavior is to be configured for this application. Depending on the option selected, the *Temperature controller – Heating* parameter page is pre-parameterized and the control parameters are enabled.

- *Deactivated*: On the selection of this option, the device is not used to control a heating application. The *Temperature controller – Heating* parameter page is deactivated and hidden.
- *Free configuration:* The device is used to control a heating circuit. The control parameters in the *Temperature controller – Heating* parameter window can be set as required.

Note

The person commissioning is responsible for the correct parameterization of the control parameters!

- *Reduced temperature accuracy / few valve movements:* The device is used to control a heating circuit. The control permits a somewhat greater fluctuation in the setpoint temperature with the consequence that the number of valve movements is reduced. The control parameters in the *Temperature controller – Heating* parameter window are set correspondingly and cannot be changed.
- *Medium temperature accuracy / medium number of valve movements:* The device is used to control a heating circuit. The controller attempts to find an equilibrium between maintaining the temperature exactly and the number of valve movements. This type of control is in the middle between the two other pre-defined types of control. The control parameters in the *Temperature controller – Heating* parameter window are set correspondingly and cannot be changed.
- *High temperature accuracy / many valve movements:* The device is used to control a heating circuit. The control attempts to maintain the setpoint temperature as accurately as possible and reacts quickly to fluctuations. This strategy results in an increased number of valve movements. The control parameters in the *Temperature controller – Heating* parameter window are set correspondingly and cannot be changed.

Note

It is not possible to make a definitive statement as to the number of valve movements and the accuracy with which the setpoint temperature is maintained. This issue depends on a large number of different factors in the system, e.g.: fluctuation in the supply flow temperature, size of the heating circuit, distance and number of loads, energy transfer in the heating circuit, etc.
The controller settings suggested are therefore only to be considered recommendations that, under normal conditions, will result in stable control/temperature with the smallest possible number of valve movements at the same time.

Controller setting cooling

This parameter is only visible if the *Controller* option has been selected for the *Device function* parameter.

Options: Deactivated
Free configuration
Reduced temperature accuracy / few valve movements
Medium temperature accuracy / medium number of valve movements
High temperature accuracy / many valve movements

This parameter specifies whether the device is to be used for a cooling application and how the control behavior is to be configured for this application. Depending on the option selected, the *Temperature controller – Cooling* parameter page is pre-parameterized and the control parameters are enabled.

- *Deactivated*: On the selection of this option, the device is not used to control a cooling application. The *Temperature controller – Cooling* parameter page is deactivated and hidden.
- *Free configuration:* The device is used to control a cooling circuit. The control parameters in the *Temperature controller – Cooling* parameter window can be set as required.

Note

The person commissioning is responsible for the correct parameterization of the control parameters!

- *Reduced temperature accuracy / few valve movements:* The device is used to control a cooling circuit. The control permits a somewhat greater fluctuation in the setpoint temperature with the consequence that the number of valve movements is reduced. The control parameters in the *Temperature controller – Cooling* parameter window are set correspondingly and cannot be changed.
- *Medium temperature accuracy / medium number of valve movements:* The device is used to control a cooling circuit. Here the controller attempts to find an equilibrium between maintaining the temperature exactly and the number of valve movements. This type of control is in the middle between the two other pre-defined types of control. The control parameters in the Temperature controller – Cooling parameter window are set correspondingly and cannot be changed.
- *High temperature accuracy / many valve movements:* The device is used to control a cooling circuit. The control attempts to maintain the setpoint temperature as accurately as possible and reacts quickly to fluctuations. This strategy results in an increased number of valve movements. The control parameters in the *Temperature controller – Cooling* parameter window are set correspondingly and cannot be changed.

Note

It is not possible to make a definitive statement as to the number of valve movements and the accuracy with which the setpoint temperature is maintained. This issue depends on a large number of different factors in the system, e.g.: Fluctuation in the supply flow temperature, size of the cooling circuit, distance and number of loads, energy transfer in the cooling circuit, etc.
The types of control suggested are therefore only to be considered recommendations that, under normal conditions, will result in stable control/temperature with the smallest possible number of valve movements at the same time.

Note

If the same device channel is used for a heating application and a cooling application, this heating/cooling circuit is controlled by the same controller. It is therefore not possible to control a heating circuits and a cooling circuit at the same time. To change between heating and cooling it is necessary to changeover the control via the related *Heating/cooling changeover* group object.

Actuate heating via

This parameter is only visible if the *Deactivated* option has not been selected for the *Heating* parameter.

Options: Device output valve
Group object

This parameter specifies how the 3-way mixing valve is to be actuated.

- *Device output valve:* The 3-way mixing valve is actuated directly by the device-internal valve output; the device sends the control value calculated by the controller directly to the valve output.
- *Group object:* The control value is only output via the *Status heating control value* group object. The device-internal valve output is not actuated.

Note

In the controller mode, the control value calculated is output via the *Status heating control value* group object also on the selection of the *Device output valve* option.

Actuate cooling via

This parameter is only visible if the *Deactivated* option has not been selected for the *Cooling* parameter.

Options: Device output valve
Group object

This parameter specifies how the 3-way mixing valve is to be actuated.

- *Device output valve:* The 3-way mixing valve is actuated directly by the device-internal valve output; the device sends the control value calculated by the controller directly to the valve output.
- *Group object:* The control value is only output via the *Status cooling control value* group object. The device-internal valve output is not actuated.

Note

In the controller mode, the control value calculated is output via the *Status cooling control value* group object also on the selection of the *Device output valve* option.

7.4.2 Channel function

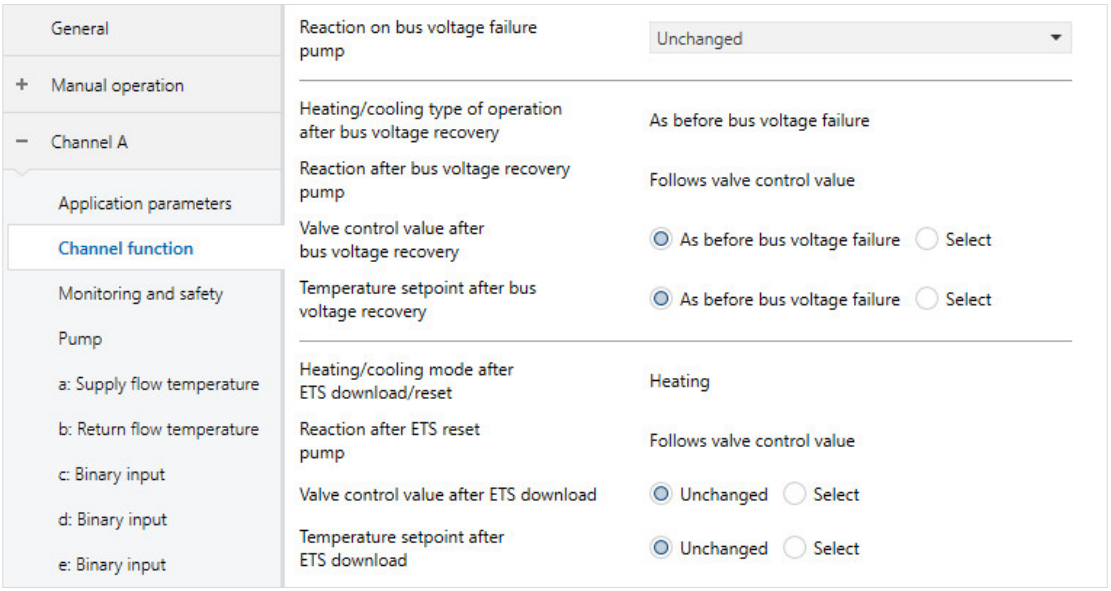

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Fig. 18: Channel function parameter window

Reaction on bus voltage failure pump

Options: Switch on pump
Switch off pump
Unchanged

This parameter specifies the reaction of the pump on bus voltage failure.

- *Unchanged:* The pump remains active in the current state if bus voltage failure occurs.
- *Switch on pump:* The pump is switched on if bus voltage failure occurs.
- *Switch off pump:* The pump is switched off if bus voltage failure occurs

Heating/cooling type of operation after bus voltage recovery

If the *Controller* option has been selected for the *Device function* parameter in the *Application parameters* parameter window, the parameter can only be changed if the *Deactivated* option has not been selected in the *Controller setting heating* and *Controller setting cooling* parameters.

Options: As before bus voltage failure
Heating
Cooling

This parameter specifies the mode 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.

Note

For correct function, the controller always requires a valid setpoint temperature and a valid supply flow temperature.

Reaction after bus voltage recovery pump

This parameter specifies the reaction of the pump after bus voltage recovery. The parameter is set to the *Follows valve control value* option and cannot be changed.

Valve control value after bus voltage recovery

Options: As before bus voltage failure
Selection

The function of this parameter varies depending on whether the device is operated in the actuator or controller mode.

In the controller mode, this parameter specifies which control value is to apply after bus voltage recovery until a valid actual supply flow temperature value is received or a measurement has been made via an input on the device.

In the actuator mode, this parameter specifies which control value is to apply after bus voltage recovery until the external controller has calculated a new control value and sent it to the device via KNX.

- *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 setpoint is received via the bus. The dependent parameter *Control value* is enabled.

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.

Note

On the usage of the safety shutdown (*Temperature controller – Heating/Cooling* parameter window), this function is automatically active after bus voltage recovery or download until it receives a valid temperature value. The controller can only check whether the shutdown must remain active or not based on this value.

—

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 setpoint is received.

Temperature setpoint after bus voltage recovery

This parameter is only visible if the *Controller* option has been selected for the *Device function* parameter in the *Application parameters* parameter window.

Options: As before bus voltage failure
Selection

This parameter specifies which supply flow temperature setpoint is to apply after bus voltage recovery until the controller has received a new setpoint.

- *As before bus voltage failure:* The same setpoint as before the bus voltage failure applies.
- *Select:* A setpoint can be specified. This setpoint applies until a new setpoint is received via the bus. The dependent parameters *Heating* and *Cooling* are enabled.

—

Dependent parameter

Heating

This parameter is only visible if the *Deactivated* option has not been selected for the *Controller setting heating* parameter in the *Application parameters* parameter window.

Options: 20…50…100 °C

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

—

Dependent parameter

Cooling

This parameter is only visible if the *Deactivated* option has not been selected for the *Cooling* parameter in the *Application parameters* parameter window.

Options: 1…10…30 °C

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

Heating/cooling mode after ETS download/reset

This parameter is only visible if the *Controller* option has been selected for the *Device function* parameter in the *Application parameters* parameter window, and the *Deactivated* option has not been selected for the *Heating* and *Cooling* parameters.

Options: Heating
Cooling

This parameter specifies the mode in which the device is to be after ETS download or ETS reset.

- *Heating:* The device is in the *Heating* mode after ETS download or ETS reset.
- *Cooling:* The device is in the *Cooling* mode after ETS download or ETS reset.

Note

For correct function, the controller always requires a valid setpoint temperature and a valid supply flow temperature.

Reaction after ETS reset pump

This parameter specifies the reaction of the pump after ETS download is specified using this parameter. The parameter is set to the *Follows valve control value* option and cannot be changed.

Valve control value after ETS download

Options: Unchanged
Selection

The function of this parameter varies depending on whether the device is operated in the actuator or controller mode.

In the controller mode, this parameter specifies which control value is to apply after ETS download until a valid actual temperature value is received or a measurement has been made via an input on the device.

In the actuator mode, this parameter specifies which control value is to apply after ETS download until the external controller has calculated a new control value and sent it to the device via KNX.

- *Unchanged:* The same valve control value as before the ETS download applies
- *Select:* A valve control value can be specified. The dependent parameter *Control value* is enabled.

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.

Note

On the usage of the safety shutdown (*Temperature controller – Heating/Cooling* parameter window), this function is automatically active after bus voltage recovery or download until it receives a valid temperature value. The controller can only check whether the shutdown must remain active or not based on this value.

—

Dependent parameter

Control value

Options: 0…100 %

This parameter is used to specify the control value that is to apply after ETS download until the calculation of a new setpoint or a new setpoint is received.

Temperature setpoint after ETS download

This parameter is only visible if the *Controller* option has been selected for the *Device function* parameter in the *Application parameters* parameter window.

Options: As before bus voltage failure
Selection

This parameter specifies which temperature setpoint is to apply after ETS download until the controller has received a new setpoint.

- *As before bus voltage failure:* The same setpoint as before the bus voltage failure applies.
- *Select:* A setpoint can be specified. This setpoint applies until a new setpoint is received via the bus. The dependent parameters *Heating* and *Cooling* are enabled.

—

Dependent parameter

Heating

This parameter is only visible if the *Deactivated* option has not been selected for the *Controller setting heating* parameter in the *Application parameters* parameter window.

Options: 20…50…100 °C

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

—

Dependent parameter

Cooling

This parameter is only visible if the *Deactivated* option has not been selected for the *Cooling* parameter in the *Application parameters* parameter window.

Options: 1…10…30 °C

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

7.4.3 Monitoring and safety

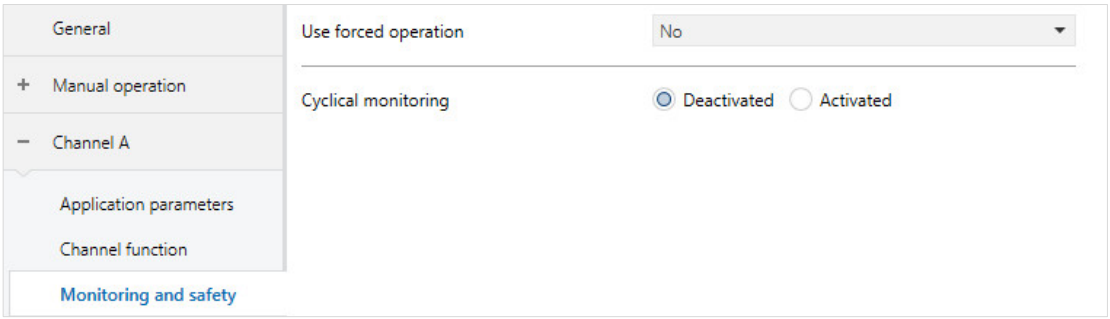

Fig. 19: Monitoring and safety parameter window

Use forced operation

Options: No
Forced operation 1 bit; 1 active
Forced operation 1 bit; 0 active
Forced operation 2 bit

The usage of forced operation is 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* and *Pump state* 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* and *Pump state* 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, Pump state for forced operation ON, Control value for forced operation OFF* and *Pump state for forced operation OFF* are enabled.

Note

With forced operation 2 bit, two forced operation states (forced operation On and forced operation Off) can be used. 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 40: Forced operation states

For information on the priority of the forced operation in comparison to the other properties of the device, see chapter 12.3, Priorities.

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.

Note

If forced operation has been changed from 2 bit to 1 bit (or vice versa), forced operation is deactivated after a download.

Forced operation dependent parameters

The following parameters are available with forced operation activated. The name of the related parameter is dependent on which selection has been made in the *Use forced operation* parameter:

- If the *Forced operation 1 bit; 1 active* option is selected, the dependent parameters *Control value* and *Pump state* are enabled.
- If the *Forced operation 1 bit; 0 active* option is selected, the dependent parameters *Control value* and *Pump state* are enabled.
- If the *Forced operation 2 bit* option is selected, the dependent parameters *Control value for forced operation ON, Pump state for forced operation ON, Control value for forced operation OFF* and *Pump state for forced operation OFF* are enabled.

If the *Forced operation 2 bit* option is selected, these parameters are available twice, once for the ON state and once for the OFF state.

—

Dependent parameter

Control value / Control value for forced operation ON / Control value for forced operation OFF

Options: 0…100 %

The name of the parameter is dependent on which selection has been made in the *Use forced operation* parameter.

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).

—

Dependent parameter

Pump state / Pump state for forced operation ON / Pump state for forced operation OFF

Options: Start pump
Switch off pump
Dependent on the valve control value (corresponds to pump automatic mode)

The name of the parameter is dependent on which selection has been made in the *Use forced operation* parameter.

This parameter is used to specify the pump state that is to apply with forced operation active (for 2-bit in the related state, ON or OFF).

Note

The *Start pump* option is not available for the pump state *Forced operation OFF*
The *Switch off pump* option is not available for the pump state *Forced operation ON*

- *Start pump:* The pump is switched on if forced operation is activated and remains on for the duration of the forced operation.
- *Switch off pump:* The pump is switched off if forced operation is activated and remains off for the duration of the forced operation.
- *Dependent on the valve control value (corresponds to pump automatic mode):* The pump is switched on or off depending on the valve control value set, as a function of the parameterization in the *Pump* parameter window.

Note

The currently valid control values apply after the forced operation is disabled. The pump changes to the pump 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 until forced operation is ended. The device therefore continues to work normally after forced operation is disabled.

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 enabled. 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.

—

Dependent parameter

Monitor supply flow temperature

This parameter is only visible if the *Controller* option has been selected for the *Device function* parameter.

Options: Deactivated
As input for supply flow temperature
Via group object

The reception of the supply flow temperature is 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 supply flow temperature input is imperative for the correct function of the device.

- *Deactivated:* The monitoring of the supply flow temperature is deactivated.
- *As input for supply flow temperature:* The temperature sensor connected to the input 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 and the *Supply flow temperature malfunction* group object are enabled.

  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.
  Monitoring of a physical input is not allowed if temperature acquisition via group object has been selected on the input side. This will result in the monitoring time being exceeded, because the device inputs are monitored using very short times.

- *Via group object:* The *Supply flow temperature via KNX* group object is monitored. As soon as a new value is received on the group object, the monitoring time starts again. The *Time interval for cyclical monitoring* and *Control value after exceeding monitoring time* dependent parameters as well as the *Supply flow temperature malfunction* group object are enabled.

—

Dependent parameter

Time interval for cyclical monitoring

This parameter is only visible if the *Via group object* option has been selected for the *Monitor supply flow temperature* parameter.

Options: 00:00:30…00:05:00…18:12:15 hh:mm:ss

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.

—

Dependent parameter

Control value after exceeding monitoring time / Control value on input fault

This parameter is only visible if the *Monitor supply flow temperature* parameter has not been deactivated.

The name of the parameter is dependent on which selection has been made in the *Monitor supply flow temperature* parameter.

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.

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. Using this parameter, it is possible to specify a certain control value to ensure a minimum flow to protect the system.

The control value set here remains active until the fault on the input has been rectified or a new temperature value has been received via the bus; unless there is an override with a higher priority.

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.

—

Dependent parameter

Monitor receipt of setpoint temperature group object

This parameter is only visible if the *Controller* option has been selected for the *Device function* parameter, the device is therefore operated as a controller.

Options: Deactivated
Activated

With the monitoring of the *Heating setpoint temperature* and *Cooling setpoint temperature* group objects, the device can monitor the regular receipt of the setpoint temperature. If the setpoint is not received, a pre-defined setpoint temperature can be set that is then 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 setpoint, until a new value is received.

- *Deactivated:* The cyclic monitoring of the *Heating setpoint temperature* and *Cooling setpoint temperature* group objects is deactivated.
- *Activated:* The cyclic monitoring is activated, the following dependent parameters are also enabled.

Note

If the device has been parameterized only for heating or only for cooling, only the related *Heating setpoint temperature* or *Cooling setpoint temperature* group object is monitored.

—

Dependent parameter

Time interval for cyclical monitoring

Options: 00:00:30…00:05:00…18:12:15 hh:mm:ss

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.

—

Dependent parameter

Heating setpoint temperature when monitoring time exceeded

This parameter is only visible if the device has been parameterized for *heating*.

Options: 20…50…100 °C

The value set here is valid if a setpoint has not been received by the device within the monitoring time parameterized and remains active until a setpoint is received.

—

Dependent parameter

Cooling setpoint temperature when monitoring time exceeded

This parameter is only visible if the device has been parameterized for *cooling*.

Options: 1…10…30 °C

The value set here is valid if a setpoint has not been received by the device within the monitoring time parameterized and remains active until a setpoint is received.

—

Dependent parameter

Monitor receipt of group objects "Heating control value / Cooling control value"

This parameter is only visible if the *Actuator device* option has been selected for the *Device function* parameter, the device is therefore operated by a controller.

Options: Deactivated
Activated

With the monitoring of the *Heating control value / Cooling control value* group objects, the device can monitor the regular reception of the control value. If the control value is not received, a pre-defined control value can be set that is then used. 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 *Heating control value / Cooling control value* group objects is deactivated.
- *Activated:* The cyclic monitoring is activated, the following dependent parameters are also enabled.

—

Dependent parameter

Time interval for cyclical monitoring

Options: 00:00:30…00:05:00…18:12:15 hh:mm:ss

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.

—

Dependent parameter

Control value after exceeding monitoring time

Options: 0…50…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.

—

Dependent parameter

Monitor receipt of group object "Pump error input"

This parameter is only visible if the *Via group object* option has been selected for the *Monitor pump error* parameter in the *Pump* parameter window.

Options: Deactivated
Activated

The monitoring of the *Pump error input* group object is activated using this parameter. The regular reception of the *pump fault* status can be monitored using this parameter.

- *Deactivated:* The monitoring of the *Pump error input* group object is deactivated.
- *Activated:* The monitoring of the group object is active. The dependent parameter *Time interval for cyclical monitoring* and the *Error: pump error receipt* group object are enabled.

Note

If the device is operated in the double pump mode, the monitoring must be activated separately for pump A and pump B.

—

Dependent parameter

Time interval for cyclical monitoring

Options: 00:00:30…<u>00:05:00</u>…18:12:15 hh:mm:ss

The monitoring time within which the group object must be received is specified using this parameter. Otherwise the *Error: pump error receipt* alarm object is changed to *Alarm* and the controller reacts as if the value 1 had been received in the *Pump error input* group object. This means the device switches off the pump or allows the pump to be switched off because it assumes the pump is faulty.

This mode remains active until a new value is received in the group object monitored.

—

Dependent parameter

Pump repair switch input

This parameter is only visible if the *Via group object* option has been selected for the *Monitor pump repair switch* parameter in the *Pump* parameter window.

Options: <u>Deactivated</u>
Activated

The monitoring of the *Pump repair switch* group object is activated using this parameter. The regular reception of the pump repair switch can be monitored using this parameter.

- *Deactivated*: The monitoring of the Pump repair switch group object is deactivated.
- *Activated:* The monitoring of the group object is active. The *Time interval for cyclical monitoring* dependent parameter and the *Error: repair switch receipt* group object are enabled.

Note

If the device is operated in the double pump mode, the monitoring must be activated separately for pump A and pump B.

—

Dependent parameter

Time interval for cyclical monitoring

Options: 00:00:30…<u>00:05:00</u>…18:12:15 hh:mm:ss

The monitoring time within which the group object must be received is specified using this parameter. Otherwise the *Error: repair switch receipt* alarm object is changed to *Alarm* and the controller reacts as if the value 1 had been received in the *Pump repair switch input* group object. This means the device switches off the switching contact for the pump or allows the contact to be switched off because it assumes the pump has been deactivated by the actuation of the repair switch.

This mode remains active until a new value is received in the group object monitored.

—

Dependent parameter

Monitor receipt of heating/cooling changeover group object

In the controller mode, this parameter is only visible if the *Deactivated* option has not been selected for the *Controller setting heating* and *Controller setting cooling* parameters in the *Application parameters* parameter window.

This parameter is always visible in actuator mode.

Options: <u>Deactivated</u>
Activated

The monitoring of the *Heating/cooling changeover* group object is activated using this parameter. The change in the type of operation between heating and cooling can be monitored using this parameter.

- *Deactivated*: The monitoring of the *Heating/cooling changeover* group object is deactivated.
- *Activated:* The monitoring of the *Heating/cooling changeover* group object is active. The *Time interval for cyclical monitoring* and *Heating/cooling mode after exceeding monitoring time* dependent parameters as well as the *Error: heating/cooling receipt* group object are enabled.

—

Dependent parameter

Time interval for cyclical monitoring

Options: 00:00:30…00:05:00…18:12:15 hh:mm:ss

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* after *exceeding monitoring time* parameter applies.

—

Dependent parameter

Heating/cooling mode after exceeding monitoring time

Options: Unchanged
Heating
Cooling

This parameter specifies 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.

7.4.4 Pump

The settings for the behavior of the pump output and the monitoring of the status of the pump are made on this page.

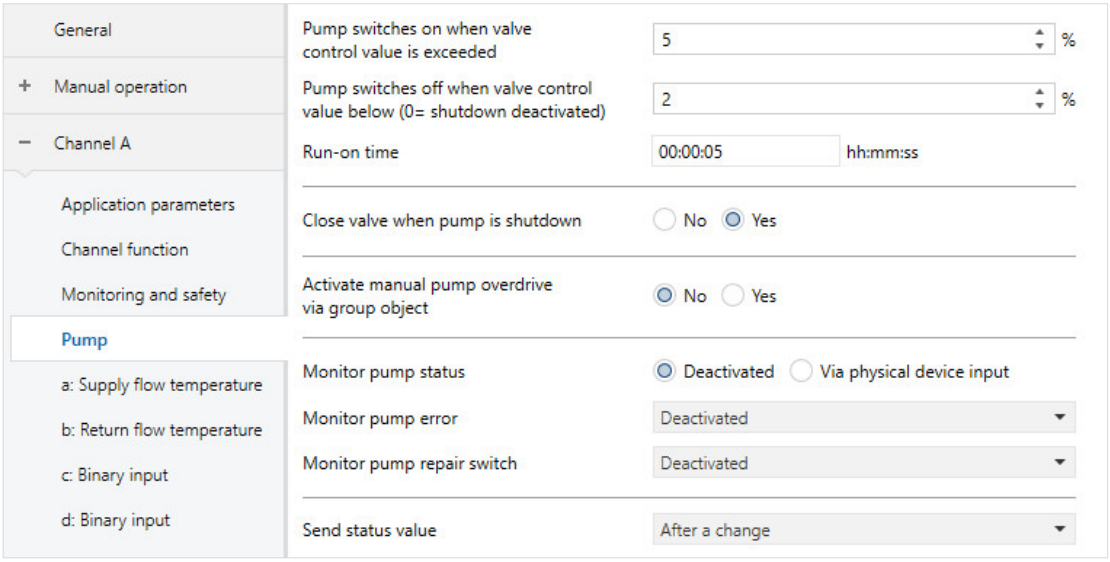

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Fig. 20: Pump parameter window

Pump switches on when valve control value is exceeded

Options: 0…5…99 %

This parameter specifies the valve control value from which the pump is to be switched on. Frequent switching on of the pump at lower valve control values can be prevented using this parameter.

If the valve control value is greater than the value selected here, the pump is switched on; the relay output is closed.

Note

If 0 % is selected as the switch-on threshold, the pump is always switched on immediately if the valve receives a control value greater than 0 %.

Note

If a larger value is selected as the switch-on threshold, the pump may only switch on very late and the valve may already be wide open when this occurs. This situation can cause large temperature fluctuations in the heating/cooling circuit.

Pump switches off when valve control value below (0 %= shutdown deactivated)

Options: 0…2…100 %

This parameter specifies the valve control value from which the pump is to be switched off. This parameter can be used to switch off the pump at small valve control values before the valve is completely closed.

If the valve control value is smaller than the value selected here, the pump is switched off; the relay output is opened.

CAUTION

The selection of an excessively high switch-off threshold will cause the pump to shut down very early and may degrade the function of the pump. It must also be ensured that the shutdown threshold for the pump is lower than the switch-on threshold because otherwise there may be incorrect behavior on switching on and off the pump.

Run-on time

Options: 00:00:00…00:00:05…01:00:00 hh:mm:ss

This parameter specifies the run-on time for the pump after the reception of a shutdown command, or shutdown based on the valve control value.

The pump remains switched on for the time set after the shutdown command.

Note

This parameter also applies if the pump is shut down via manual operation (only HCC/S 2.x.2.1).

Close valve when pump is shutdown

Options: No
Yes

This parameter specifies whether the valve is also to be closed on switching off the pump.

This feature is used, among reasons, so that water with a very different temperature is not pumped into the heating/cooling circuit on switching back on the pump because this situation can cause a large temperature increase/drop.

Note

If a valve is actuated via group object, the external valve is not closed. The control value calculated by the controller is still output.

Activate manual pump overdrive via group object

Options: No
Yes

The manual override of the pump via group object is enabled using this parameter.

- *No:* The manual override of the pump via group object is deactivated
- *Yes:* The manual override of the pump via group object is activated. The *Override pump*, *Pump overdrive via KNX (deactivate/activate)* and *Status pump automatic* group objects as well as the *Return from manual pump control to automatic mode* dependent parameter are enabled.

  Using the group objects it is possible to activate the pump override and then to override the pump using the *Override pump* group object.

The manual pump override can be used to place the pump in a defined state for maintenance purposes or if there is a fault.

Note

It is only possible to override the active pump in the double channel mode. The override is always undertaken via the objects for pump A. The device then switches the active pump depending on the values received.

—

Dependent parameter

Return from manual pump control to automatic mode

Options: Via group object
Via group object or automatic (time)

This parameter specifies how the pump override is to be cleared and the control specified by the device is to become active again.

- *Via group object:* On the selection of this option, the *Pump overdrive via KNX (deactivate/activate*) group object is enabled. It is possible to enable or disable the pump override using this object. If override is enabled, the pump reacts to the command in the *Override pump* group object. If override is disabled, the pump reacts again to the state specified by the device.
- *Via group object or automatic (time):* On the selection of this option, the *Pump overdrive via KNX (deactivate/activate)* group object is enabled. It is possible to activate or deactivate the pump override using this object. If override is activated, the pump reacts to the command in the *Override pump* group object. If override is disabled, the pump reacts again to the state specified by the device. In addition, the dependent parameter *Reset time* is enabled. If overridden, the pump is returned to control by the device after the time parameterized here.

—

Dependent parameter

Reset time

Options: 00:00:30 … 00:05:00 … 18:12:15 hh:mm:ss

The time set here specifies when the pump is to change from overridden operation back to normal operation defined by the device.

Monitor pump status

Options: Deactivated
Via physical device input

This parameter specifies whether the pump status is monitored. The status acquired is output on the bus as status information. There is no evaluation of the status in the device.

Note

This function can only be used for pumps with a floating contact that is closed with the pump running and open with the pump shutdown (or vice versa).

- *Deactivated:* The monitoring of the pump status is deactivated
- *Via physical device input:* The pump status is acquired via one of the inputs on the device (input c for channel A; input h for channel B). The *Pump operating state* group object is enabled. The input (c for channel A; h for channel B) is parameterized as the pump status input. The other settings on the opening/closing behavior as well as how the status is sent are made in the *c: Binary input* (*h: Binary input* for channel B) parameter window.

  Note

  It is to be ensured that the corresponding pump status switch is actually connected to the input; if this is not the case, there will be an erroneous status message.

Monitor pump error

Options: Deactivated
Via physical device input
Via group object

This parameter specifies whether and, if so, how a pump fault switch is monitored. The status acquired is used to check whether the pump is signaling a fault or it is running fault-free.

If the function is used and the device receives an error message via the input, the pump is switched off immediately.

Note

This function can only be used for pumps with a floating contact that reflects the fault status (e.g. no fault: contact closed; fault: contact opened).

- *Deactivated:* The monitoring of the pump fault is deactivated
- *Via physical device input:* The pump fault is acquired via one of the inputs on the device (input d for channel A; input i for channel B). The *Pump fault alarm* group object is enabled. The input (d for channel A; i for channel B) is parameterized as the pump error input. The other settings on the opening/closing behavior as well as how the status is sent are made in the *d: Binary input* (*i: Binary input* for channel B) parameter window.

  Note

  It is to be ensured that the corresponding pump status switch is actually connected to the input; if this is not the case, there will be an erroneous status message.
- *Via group object:* The pump fault switch is acquired via another device and sent via KNX. The *Pump error input* group object is enabled.

Monitor pump repair switch

Options: Deactivated
Via physical device input
Via group object

This parameter specifies whether and, if so, how a pump repair switch is monitored. The status acquired is used to check whether the pump can be switched on.

If the function is used and the device receives via the input the signal that the repair switch is open (the pump is therefore disconnected from the electrical supply or shutdown), the pump relay is opened.

Note

This function can only be used for pumps with a floating contact that reflects the status (e.g. repair switch closed: contact closed; repair switch open: contact opened).

- *Deactivated:* The monitoring of the repair switch is deactivated
- *Via physical device input:* The repair switch is acquired via one of the inputs on the device (input e for channel A; input j for channel B). The *Pump repair switch* group object is enabled. The input (e for channel A; j for channel B) is parameterized as the pump repair status input. The other settings on the opening/closing behavior as well as how the status is sent are made in the *e: Binary input* (*j: Binary input for channel B*) parameter window.

  Note

  It is to be ensured that the corresponding status output from the repair switch is actually connected to the input; if this is not the case, there will be an erroneous status message.

- *Via group object:* The pump repair switch is acquired via another device and sent via KNX. The *Pump repair switch input* group object is enabled.

Send status values

Options: <u>After a change</u>
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 specifies when the pump status values are to be sent. This parameter affects the following pump output group objects:

- *Status pump relay*
- *Status pump master/slave (1=Master; 0=Slave)*
- *Status pump automatic*

- *After a change:* The values are sent after a change in the object values (e.g. change from 0 to 1).
- *Cyclically:* If this option is selected, the status values are sent automatically after an adjustable time has elapsed. The *Every* dependent parameter is enabled.
- *On change and cyclically:* The values are sent after a change and cyclically. The *Every* dependent parameter is enabled.
- *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 after a change.
- *On request and cyclically:* The values are sent on request and cyclically. The *Every* dependent parameter is enabled.
- *After a change or request and cyclically*: The values are sent on request and after a change and cyclically. The *Every* dependent parameter is enabled.

—

Dependent parameter

Every

Options: 00:00:30…<u>00:01:00</u>…18:12:15 hh:mm:ss

This parameter specifies the interval at which the values are sent cyclically.

Operating mode pump channel A / Operating mode pump channel B

This parameter is only visible if the *Yes* option has been selected for the *Channel bundling for double pumps* parameter in the *General* parameter window.

The parameterization for Operating mode pump channel A automatically specifies the indication for Operating mode pump channel B.

Options: Main pump
Backup pump
Change weekly

This parameter specifies the operating mode in which the pump on channel A is to operate in the double pump mode

- *Main pump:* The pump on channel A is the main pump. On switching on the pump, this pump remains active until a manual change is initiated or the pump must be changed due to a fault (e.g. via the monitoring for pump fault). In these cases, operation changes to the pump on channel B.
  - Operating mode pump channel B contains the setting *Backup pump*.
- *Backup pump:* The pump on channel A is the backup pump. If a fault occurs on the main pump (pump channel B) or a manual change is initiated, operation changes to this pump.
  - Operating mode pump channel B contains the setting *Main pump*.
- *Change weekly:* The pumps are operated alternately to reduce the wear. The change is made weekly at a specified time. In addition, the dependent parameters *Changeover point weekday* and *Changeover point time* are enabled. These parameters are used to specify when the change between the two pumps is to take place. In addition, the *Time* group object is enabled. The device synchronizes the time for the changeover via this group object.
  - Operating mode pump channel B contains the setting *Change weekly*.
  - Pump A starts operation after a download.

—

Dependent parameter

Changeover point weekday

This parameter is only visible if the *Change weekly* option has been selected for the *Operating mode pump channel A* parameter.

Options: Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday

This parameter specifies the day of the week on which the changeover between the active and inactive pump is to be made.

—

Dependent parameter

Changeover point time

This parameter is only visible if the *Change weekly* option has been selected for the *Operating mode pump channel A* parameter.

Options: 1…24 h

This parameter specifies the time at which the changeover between the active and inactive pump is to be made. The change is always made on the hour.

Note

It is recommended to select the time for the changeover such that pump inactivity or low pump activity is likely, e.g. 1 o'clock in the morning.

—

Dependent parameter

Changeover time

This parameter is only visible if the *Yes* option has been selected for the *Channel bundling for double pumps* parameter in the *General* parameter window.

Options: - 60 … 0 … 60 s

This parameter specifies the duration of the changeover between the active and inactive pump. The time specified defines the overlap between the two pumps.

- If the option is configured with *0 s*, the active pump is shut down and the inactive pump switched on at the same time
- If a negative time is configured, the inactive pump is switched on already before the active pump is shut down. Both pumps remain active in parallel for the time set.
- If a positive time is configured, the active pump is shut down before the inactive pump is switched on. Only after the time set has elapsed is the previously inactive pump switched on.

Note

If the change is made because of a pump failure, a negative changeover time will cause the backup pump to be switched on immediately. With a positive changeover time, the backup pump is only switched on after this time has elapsed.

7.4.5 a: Supply flow temperature

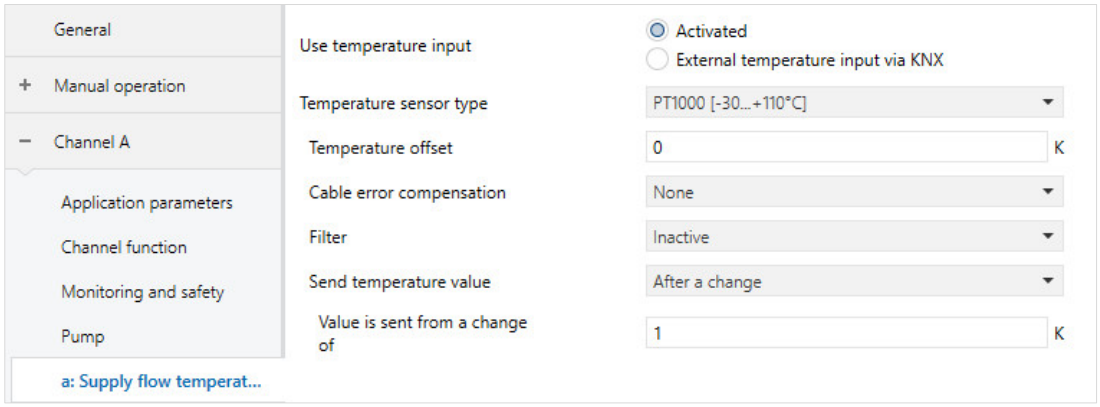

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Fig. 21: a: Supply flow temperature parameter window

Use temperature input

Options: Activated
External temperature input via KNX

This parameter determines how the supply flow temperature is acquired for the control.

- *Activated*: The supply flow temperature is measured via the physical input on the device (input a). The dependent parameters for specifying the temperature sensor and its detailed settings are enabled. The *Input a – Supply flow temperature* and *Input a – Sensor error* group objects are enabled.
- *External temperature input via KNX*: The supply flow temperature is received via KNX. The dependent group object *Supply flow temperature via KNX* is enabled.

On the selection of the *Activated* option, the input is used for the temperature measurement for the supply flow temperature.

If the *Yes* option has been selected for the *Enable safety shutdown* parameter and the *Via physical device input* option selected for the *Temperature input for temperature limit sensor* parameter in the *Temperature controller – Heating* or *Temperature controller - Cooling* parameter window, the value measured here from the temperature sensor is also used to determine the temperature for the safety shutdown.

The temperature value is output via the 2-byte group object *Input x – Supply flow temperature*. It is also possible to 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 – Sensor error*. If a fault occurs, this object changes state from 0 to 1. These two group objects are sent depending on the reaction parameterized in *Send status values*.

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.

—

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 specifies 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.

—

Dependent parameter

NTC type

Options: NTC10-01 [-15…+100°C]
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 NTC 20 has a resistance of 20 kohms. Individual types vary in terms of their resistance curves.

—

Dependent parameter

KTY type

Options:
KT 100 / 110 / 130
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 specifies a pre-defined KTY sensor.

- *User-defined:* The dependent parameter *Resistance at -20…+120 °C* is enabled.

Note

If a KTY sensor is used 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, like those in the preset values, must be in ascending order. An incorrect entry can result in unrealistic output values.

—

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.

—

Dependent parameter

Temperature offset

Options: –10.0…00.0…+10.0 °C

A maximum offset of ±10 °C is added to the recorded temperature using this parameter.

—

Dependent parameter

Cable error compensation

Options: None
Via cable length
Via cable resistance

- *Via cable length*: Cable error is compensated by entering the cable length.

  Note

  Cable error compensation may only be used for copper cables.

- *Via cable resistance:* Cable error is compensated by entering the cable resistance value.

—

Dependent parameter

Cable length, single distance

Options: 01.0…10.0…100.0 m

This parameter specifies the one-way cable length of the temperature sensor connected.

Note

The maximum cable length permitted between the sensor and device input is 100 m.

—

Dependent parameter

Cross-section of conductor, Value * 0.01 mm²

Options: 1…100…150 mm²

This parameter specifies the conductor cross-section of the temperature sensor connected.

Note

The 150 option corresponds to a cross-section of 1.5 mm².

—

Dependent parameter

Cable resistance [total of fwd and rtn conductor]

Options: 0…500…10,000

This parameter specifies the magnitude of the cable resistance of the temperature sensor connected.

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.

—

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: On an erratic change in the sensor signal on the *Medium* setting, it will take 30 seconds for the output value to propagate.

—

Dependent parameter

Send temperature value

Options: <u>After a change</u>
Cyclically
On change and cyclically
On request
After a change or on request
On request and cyclically
After a change or request and cyclically

This parameter specifies how the output value is to 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 if the *General – Request Status values* group object receives a value.

—

Dependent parameter

Value is sent from a change of

This parameter is enabled if an option containing *After a change* has been selected for the *Send temperature value* parameter.

Options: 00.2…01.0…10.0

This parameter specifies the temperature change from which the output value is to be sent.

—

Dependent parameter

Every

This parameter is enabled if an option containing *Cyclically* has been selected for the *Send temperature value* parameter.

Options: 00:00:30…18:12:15 hh:mm:ss

This parameter specifies the interval at which the values are sent cyclically.

7.4.6 b: Return flow temperature

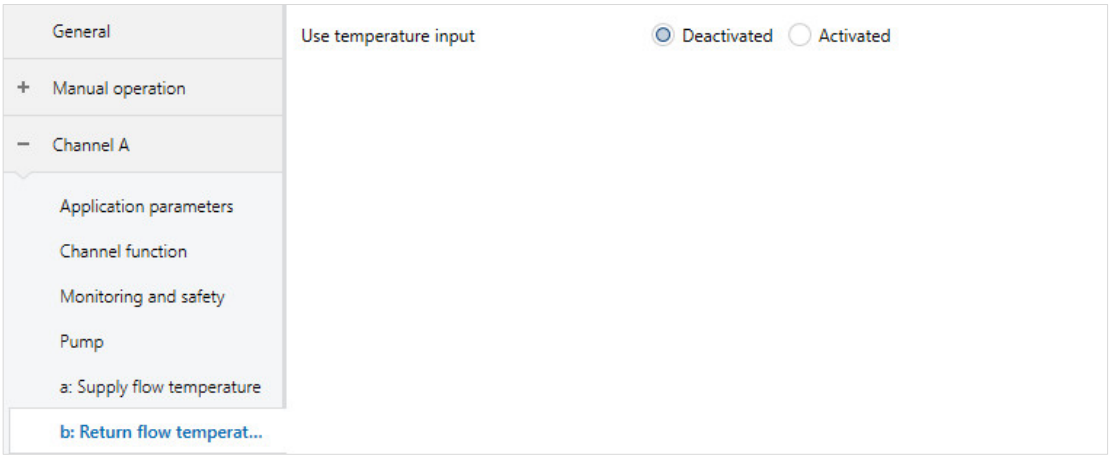

Fig. 22: b: Return flow temperature parameter window

Use temperature input

Options: Activated
Deactivated

The input for the measurement of the return flow temperature is enabled using this parameter. Because the measurement of the return flow temperature is not required for the control, but is only used as information or to check for correct function, this input can also be deactivated.

- *Activated*: The return flow temperature is measured via the physical input on the device (input b). The dependent parameters for specifying the temperature sensor and its detailed settings are enabled. The *Input b – Return flow temperature* and *Input b – Sensor error* group objects are enabled.

The temperature value is output via the 2-byte group object *Input x – Return flow temperature*. It is also possible to 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 – Sensor error*. If a fault occurs, this object changes state from 0 to 1. These two group objects are sent depending on the reaction parameterized in *Send status values* parameter

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.

—

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]

In this parameter it is specified 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.

—

Dependent parameter

NTC type

Options: NTC10-01 [-15…+100°C]
NTC10-02 [-15…+100°C]
NTC10-03 [-15…+100°C]
NTC20 [0…+100°C]

The NTC sensor type is selected using this parameter. An NTC10 sensor has a resistance of 10 kohms at 25 °C. An NTC 20 has a resistance of 20 kohms. Individual types vary in terms of their resistance curves.

—

Dependent parameter

KTY type

Options:
KT 100 / 110 / 130
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

A pre-defined KTY sensor is selected using this parameter.

- *User-defined:* This dependent parameter *Resistance at -20…+120 °C* is enabled.

Note

If a KTY sensor is used 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.

—

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.

—

Dependent parameter

Temperature offset

Options: –10.0…00.0…+10.0 °C

A maximum offset of ±10 °C is added to the recorded temperature using this parameter.

—

Dependent parameter

Cable error compensation

Options: None
Via cable length
Via cable resistance

- *Via cable length*: Cable error is compensated by entering the cable length.

  Note

  Cable error compensation may only be used for copper cables.

- *Via cable resistance:* Cable error is compensated by entering the cable resistance value.

—

Dependent parameter

Cable length, single distance

Options: 01.0…10.0…100.0 m

This parameter specifies the one-way cable length of the temperature sensor connected.

Note

The maximum cable length permitted between the sensor and device input is 100 m.

—

Dependent parameter

Cross-section of conductor, Value * 0.01 mm²

Options: 1…100…150 mm²

This parameter specifies the conductor cross-section of the temperature sensor connected.

Note

The 150 option corresponds to a cross-section of 1.5 mm².

—

Dependent parameter

Cable resistance [total of fwd and rtn conductor]

Options: 0…500…10,000

This parameter specifies the magnitude of the cable resistance of the temperature sensor connected.

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.

—

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: On an erratic change in the sensor signal with the *Medium* setting, it will take 30 seconds for the output value to propagate.

—

Dependent parameter

Send temperature value

Options: <u>After a change</u>
Cyclically
On change and cyclically
On request
After a change or on request
On request and cyclically
After a change or request and cyclically

This parameter specifies how the output value is to 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 if the *General – Request Status values* group object receives a value.

—

Dependent parameter

Value is sent from a change of

This parameter is enabled if an option containing *After a change* has been selected for the *Send temperature value* parameter.

Options: 00.2…01.0…10.0

This parameter specifies the temperature change from which the output value is to be sent.

—

Dependent parameter

Every

This parameter is enabled if an option containing *Cyclically* has been selected for the *Send temperature value* parameter.

Options: 00:00:30…18:12:15 hh:mm:ss

This parameter specifies the interval at which the values are sent cyclically.

7.4.7 c: Binary input

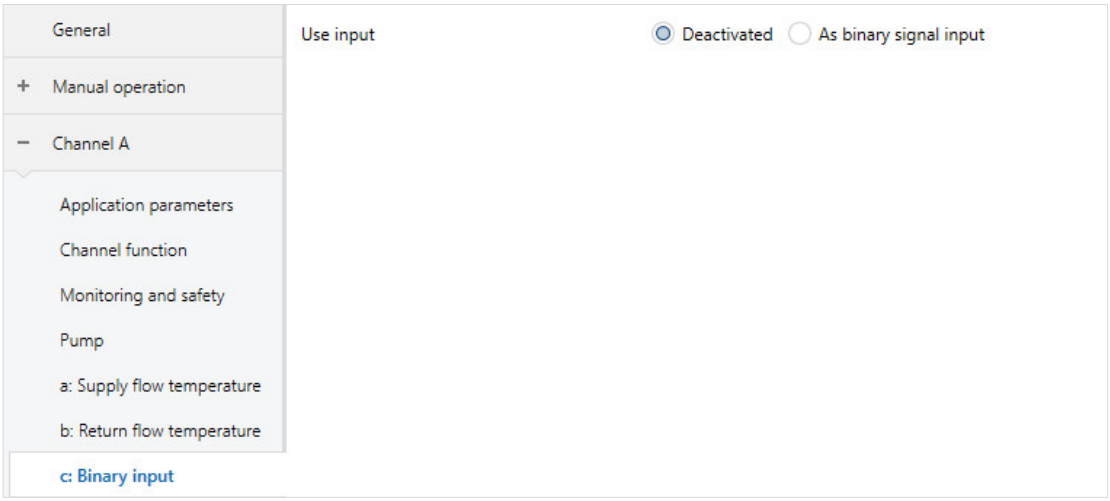

Fig. 23: c: Binary input parameter window

Use input

Options: Deactivated
As pump status input
As binary signal input

This parameter specifies the type of usage of the input.

Note

The *As pump status input* option is dependent on the settings on the *Pump* parameter page and is not available as an option that can be selected freely.

If the *Via physical device input* option is selected for the *Monitor pump status* parameter on the *Pump* parameter page, this parameter has the fixed setting *As pump status input*. This setting can also only be changed on the *Pump* parameter page. In this case the status of the input is included in the control of the pump.

- *Deactivated:* The input is deactivated and is not used
- *As pump status input:* The input is used to acquire the operational state (On/Off) of the pump. This correct function of the pump can be monitored using this information. The *Actively detected if* and *Send status value* dependent parameters as well as the *Pump operating state* group object are enabled.
- *As binary signal input:* The input is used as an arbitrary binary signal input, any binary sensor can be connected. The dependent parameters for setting the input (see chapter 7.6.6, x: Binary signal input), as well as the group object *Switch* are enabled.

—

Dependent parameter

Actively detected if

Options: Contact open
Contact closed

This parameter specifies when the sensor connected to the physical input is to be evaluated as having the state *Pump active*:

- *Contact open:* The pump is active if the contact is open, inactive if the contact is closed.
- *Contact closed:* The pump is active if the contact is closed, inactive if the contact is open.

—

Dependent parameter

Send status value

Options: After a change
On change and cyclically

This parameter defines when the state of the input is to be sent.

- *After a change*: The state of the input is sent after every change.
- *On change and cyclically:* the state of the input is sent after every change and cyclically after a specific interval; the dependent parameter *Send input status cyclically* is enabled.

—

Dependent parameter

Send input status cyclically

Options: 00:00:30…00:05:00…18:12:15 hh:mm:ss

This parameter specifies the interval at which the values are sent cyclically.

7.4.8 d: Binary input

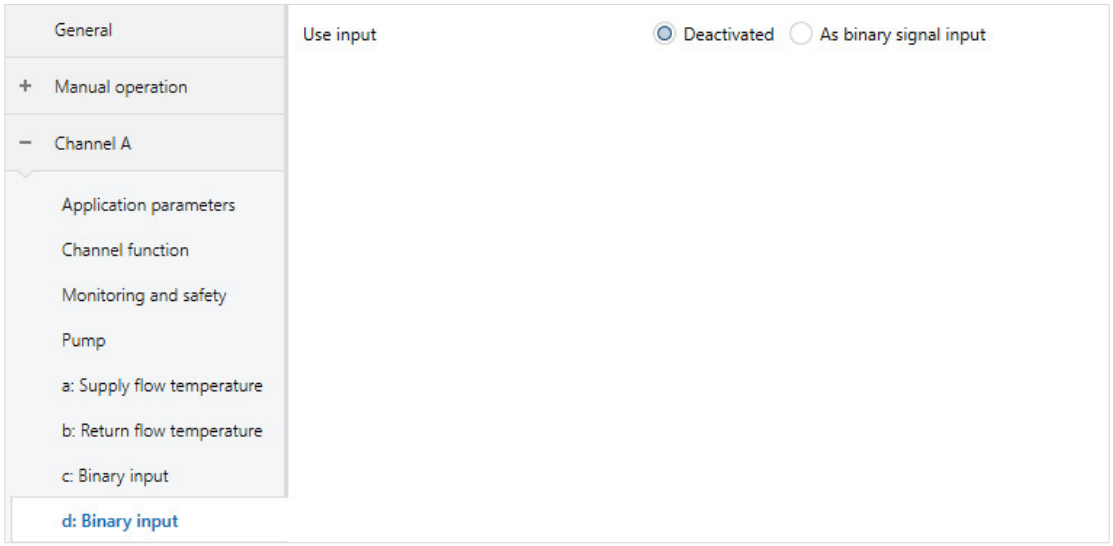

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Fig. 24: d: Binary input parameter window

Use input

Options: Deactivated
As pump error input
As binary signal input

This parameter specifies the type of usage of the input.

Note

The *As pump error input* option is dependent on the settings on the *Pump* parameter page and is not available as an option that can be selected freely.

If the *Via physical device input* option is selected for the *Monitor pump status* parameter on the *Pump* parameter page, this parameter has the fixed setting *As pump error input*. This setting can also only be changed on the *Pump* parameter page. In this case the status of the input is included in the control of the pump.

- *Deactivated:* The input is deactivated and is not used
- *As pump error input:* The input is used to acquire a floating contact on the pump via which the pump can output an internal fault. This correct function of the pump can be monitored using this information. The *Actively detected if* and *Send status value* dependent parameters as well as the *Pump fault alarm* group object are enabled.
- *As binary signal input:* The input is used as an arbitrary binary signal input, any binary sensor can be connected. The dependent parameters for setting the input (see chapter 7.6.6, x: Binary signal input), as well as the group object *Switch* are enabled.

—

Dependent parameter

Actively detected if

Options: Contact open
Contact closed

This parameter specifies when the sensor connected to the physical input is to be evaluated as having the state *Pump active*:

- *Contact open:* There is a pump fault if the contact is open, no fault if the contact is closed.
- *Contact closed:* There is a pump fault if the contact is closed, no fault if the contact is open.

—

Dependent parameter

Send status value

Options: After a change
On change and cyclically

This parameter defines when the state of the input is to be sent.

- *After a change*: The state of the input is sent after every change.
- *On change and cyclically:* the state of the input is sent after every change and cyclically after a specific interval; the dependent parameter *Send input status cyclically* is enabled.

—

Dependent parameter

Send input status cyclically

Options: 00:00:30…00:05:00…18:12:15 hh:mm:ss

This parameter specifies the interval at which the values are sent cyclically.

7.4.9 e: Binary input

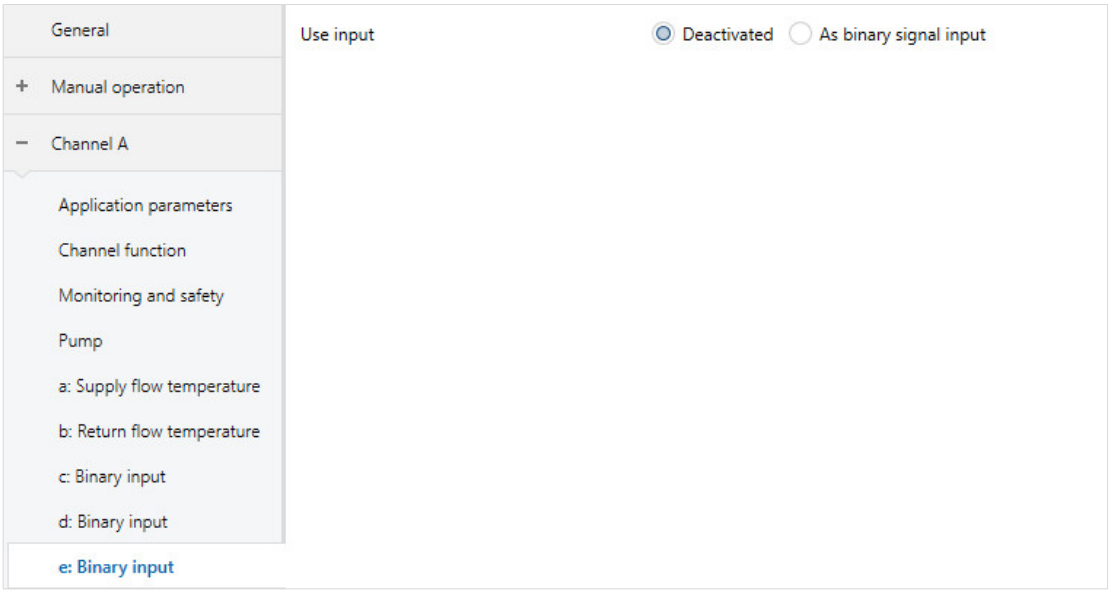

Fig. 25: e: Binary input parameter window

Use input

Options: Deactivated
As pump repair status input
As binary signal input

This parameter specifies the type of usage of the input.

Note

The *As pump repair status input* option is dependent on the settings on the *Pump* parameter page and is not available as an option that can be selected freely.

If the *Via physical device input* option is selected for the *Monitor pump repair switch* parameter on the *Pump* parameter page, this parameter has the fixed setting *As pump repair status input*. This setting can also only be changed on the *Pump* parameter page. In this case the status of the input is included in the control of the pump.

- *Deactivated:* The input is deactivated and is not used
- *As pump repair status input:* The input is used to acquire the state of the pump's repair switch. The repair switch is used to disconnect the pump from the electrical supply during maintenance work etc. If the repair switch has been actuated, it is not possible to use the pump. The *Actively detected if* and *Send status value* dependent parameters as well as the *Pump repair switch* group object are enabled.
- *As binary signal input:* The input is used as an arbitrary binary signal input, any binary sensor can be connected. The dependent parameters for setting the input (see chapter 7.6.6, x: Binary signal input), as well as the group object *Switch* are enabled.

—

Dependent parameter

Actively detected if

Options: Contact open
Contact closed

This parameter specifies when the sensor connected to the physical input is to be evaluated as having the state *repair switch active* (= repair switch actuated):

- *Contact open:* The repair switch has been actuated if the contact is open, the repair switch has not been actuated if the contact is closed.
- *Contact closed:* The repair switch has been actuated if the contact is closed, the repair switch has not been actuated if the contact is open.

—

Dependent parameter

Send status value

Options: After a change
On change and cyclically

This parameter defines when the state of the input is to be sent.

- *After a change*: The state of the input is sent after every change.
- *On change and cyclically:* the state of the input is sent after every change and cyclically after a specific interval; the dependent parameter *Send input status cyclically* is enabled.

—

Dependent parameter

Send input status cyclically

Options: 00:00:30…00:05:00…18:12:15 hh:mm:ss

This parameter specifies the interval at which the values are sent cyclically.

7.4.10 x: Binary signal input

The following parameters are enabled if the *As binary signal input* option has been selected for one of the binary inputs (c…e).

—

Dependent parameter

Maximum dead time

The maximum dead time is 200 ms.

The maximum dead time prevents unwanted multiple actuation of the input, e.g. due to contact bounce.

What is the maximum dead time?

An edge change on the input is evaluated with a maximum dead time (delay) of 200 ms. This time may vary from 0 ms to 200 ms.

Note

No further debouncing is possible.

Example: Maximum dead time of the input signal for a detected edge

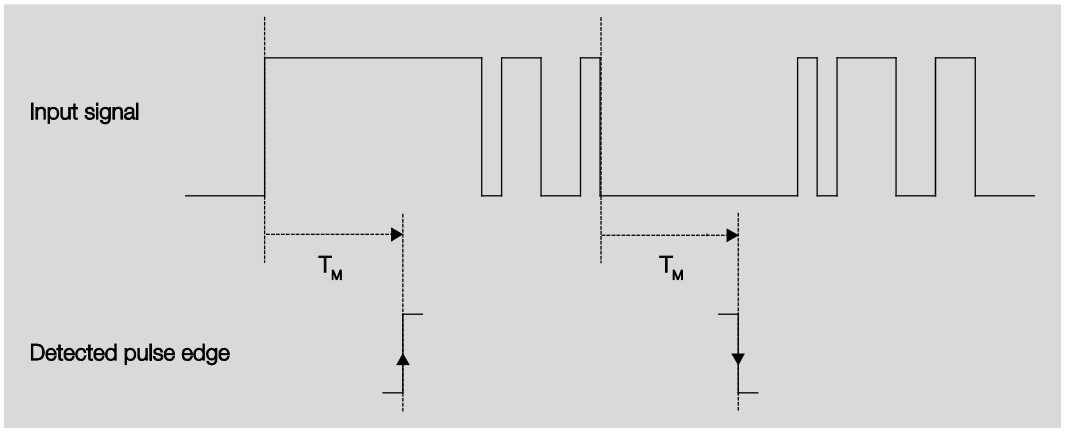

Fig. 26: Maximum dead time of the input signal for a detected edge

After detection of an edge on the input, further edges are ignored for the maximum dead time TD.

—

Dependent parameter

Distinction between long and short operation

Options: No
Yes

This parameter specifies whether the input differentiates between short and long operation.

- *Yes:* After opening/closing the contact, it must first of all be ascertained if a short or long operation has occurred. Then a possible reaction will be triggered.

The following diagram shows the function in detail:

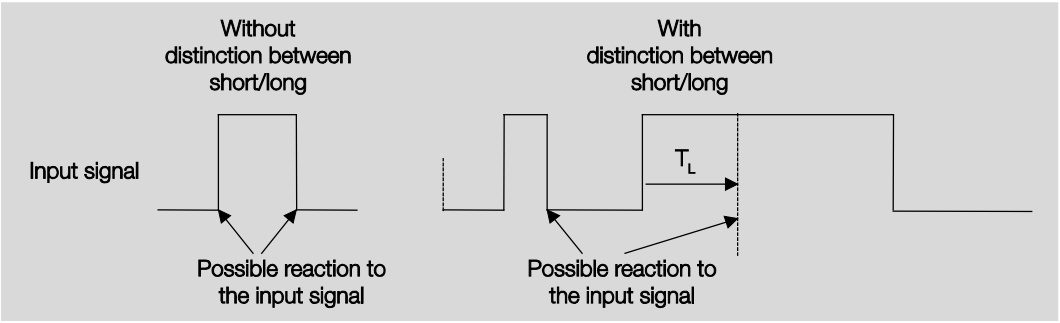

Fig. 27: Distinguishing between a short/long operation

Note

TL is the time from which a long operation is detected.

No

If the *No* option has been selected for the *Distinction between long and short operation* parameter, the following parameters appear:

Note

Opening the contact -> event 0
Closing the contact -> event 1

—

Dependent parameter

Activate minimum signal duration

Options: No
Yes

—

Dependent parameter

When contact opens

Options: 00.0…01.0…100.0

—

Dependent parameter

When closing the contact

Options: 00.0…01.0…100.0

What is the 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 elapse. No telegrams are sent on the bus at this time. The signal on the input is monitored for the minimum signal duration. If a further edge appears on 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 on the input after the minimum signal duration starts, a telegram is sent on the bus after it has elapsed.

Example: Minimum signal duration of the input signal for a detected edge

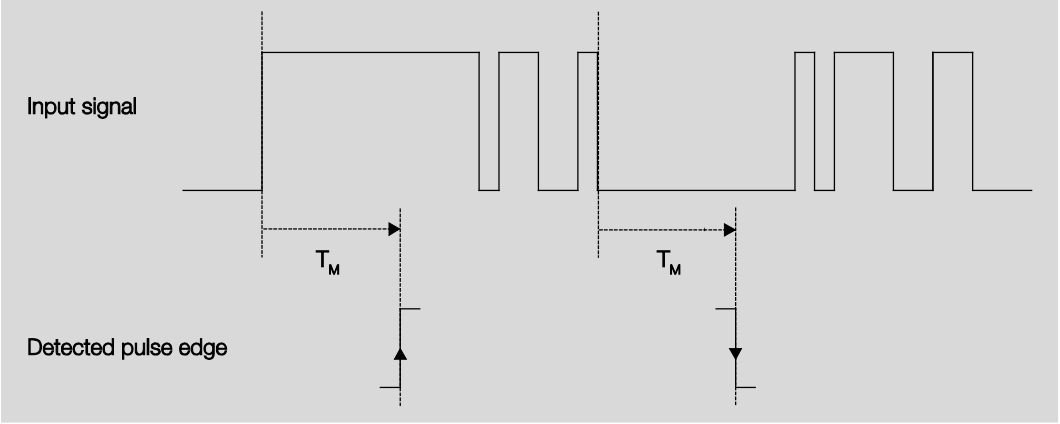

Fig. 28: Minimum signal duration of the input signal for a detected edge

There are only two cases where no further edge changes occur within the minimum signal duration TM 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.

Yes

If the *Yes* option has been selected for the Distinction between long and short operation parameter, the following parameters appear:

Note

Opening the contact -> event 0
Closing the contact -> event 1

—

Dependent parameter

Input on operation

Options: Contact open
Contact closed

- *Open:* The input is open on operation.
- *Closed:* The input is closed on operation.

If a normally open contact is connected to the input, select the Closed option; for a normally closed contact, select the Open option.

—

Dependent parameter

Long operation after

Options: 01.0…10.0

The time period TL after which an operation is considered long is defined here.

—

Dependent parameter

1-bit group object "Disable input"

Options: No
Yes

- *Yes:* The 1-bit group object "Disable input" is enabled. This can be used to disable the input.

If the input is disabled and the *Send cyclically* option is set, the last state is still sent regardless of the disabling. The *Disable* option disables the physical input; sending continues internally.

When the input is disabled 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
- The *Switch* group object can still be written

If the input state changes during the disabled phase, the new group object value is sent immediately after the block is released. If the input state remains the same during the disabled phase, the group object value is not sent. The minimum signal duration does not start until the Block has finished.

Block is deactivated after an ETS reset, a bus voltage recovery or a download.

—

Dependent parameter

Reaction on event X

The following explanations 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 *Yes* option has been selected for the *Distinction between long and short operation* parameter, the reaction occurs with a short or long operation. If the *No* option has been selected, it occurs with each edge change.

Note

If the *End cyclic transmission* option is set, it is important to note that it is only effective if the *Send status value* parameter is set to *On change and cyclically*.

—

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. The *Telegram is repeated every* and *On object value* dependent parameters are enabled.

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. If the Switch group object 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.

—

Dependent parameter

Telegram is repeated every

Options: <u>00:00:30</u>…18:12:15 hh:mm:ss

This parameter specifies the interval at which the values are sent cyclically.

—

Dependent parameter

On object value

Options: 0
1
<u>0 or 1</u>

- *0:* Sends the group object value cyclically if 0.
- *1:* Sends the group object value cyclically if 1.
- *0 or 1:* Sends the group object values 0 or 1 cyclically.

—

Dependent parameter

Scan input after download, ETS reset and bus voltage recovery

Options: No
<u>Yes</u>

- *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.

7.5 Valve output parameter window

7.5.1 HCC/S 2.2.x.1

The explanations below only apply to:

- HCC/S 2.2.1.1
- HCC/S 2.2.2.1

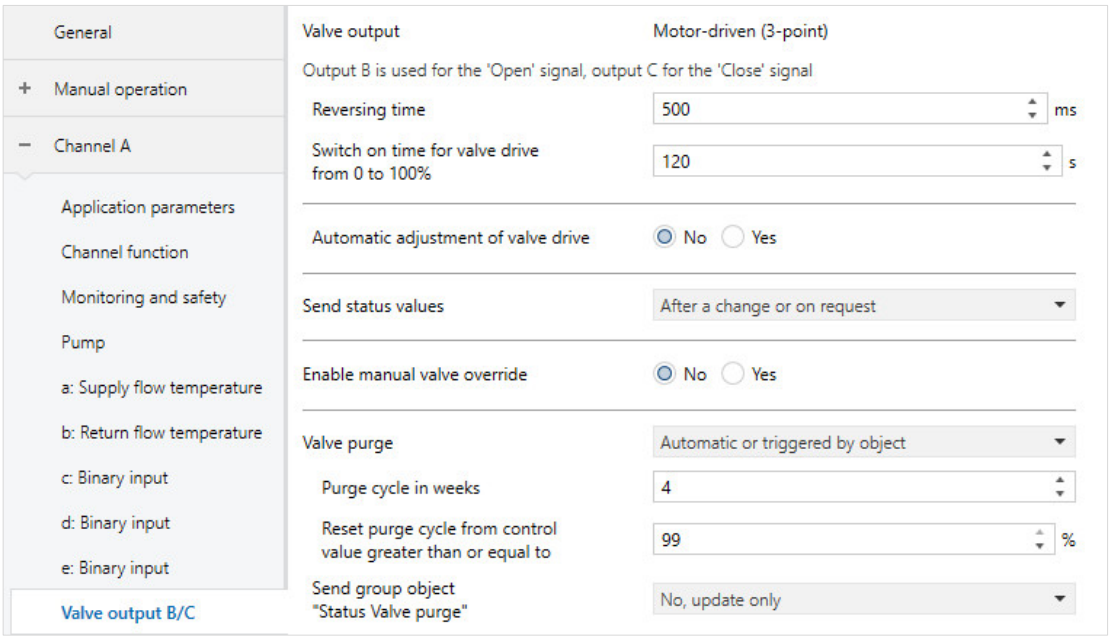

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Fig. 29: Valve output parameter window HCC/S 2.2.x.1

Valve output

Valve output Motor-driven (3-point)

This parameter describes the type of valve drive that is connected to the output. This is a motor-driven valve drive with 3-point control; this means that the valve is actuated via a separate *open* & *close* signal.

The *open* signal is output via one output, the *close* signal is output via a second output.

Note

For channel A, the *open* signal is output via output B, the *close* signal via output C.
For channel B, the *open* signal is output via output E, the *close* signal via output F.

Reversing time

Options: 50…<u>500</u>…1000

This parameter specifies the reversing time for the valve drive.

Note

The technical data for the valve drive must be observed.

Switch on time for valve drive from 0 to 100 %

Options: 10…<u>120</u>…6000

This parameter specifies 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.

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.

- *No:* Automatic adjustment is deactivated.
- *Yes:* Automatic adjustment is activated. The *Number of changes until adjustment* dependent parameter is enabled.

—

Dependent parameter

Number of changes until adjustment

Options: 30…500…65535

This parameter specifies the number of actuations after which automatic adjustment is to be triggered. The adjustment counter is incremented by 1 after an actuation.

If the parameterized number of actuations 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 rectified 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.

Send status values

Options: After a change
Cyclically
On request
<u>After a change or on request</u>
After a change or request and cyclically

This parameter specifies when the valve output status values are to be sent. It affects the *Status byte valve A*, *Fault: valve output* and *Status valve B control value* group objects.

- *After a change:* The values are sent after 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 enabled.
- *On request:* The valve output 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 after a change.
- *After a change or request and cyclically*: The values are sent on request and after a change and cyclically. The *Every* dependent parameter is enabled.

—

Dependent parameter

Every

Options: 00.00:30…<u>00.05:00</u>…18.12:15 hh:mm:ss

This parameter specifies the interval at which the values are sent cyclically.

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 the controller.

- *No:* The manual valve override is deactivated
- *Yes:* The manual override is enabled. The two group objects *Enable/disable manual override valve* 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* group object, the valve output reacts again to the controller (controller mode) or the control values received via the bus (actuator mode). As soon as the manual override is activated via the *Enable/disable manual override valve* group object, the value currently in the *Override valve control value* group object is written to the valve.

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 *Status valve purge* and *Activate valve purge* group objects as well as the *Purge cycle in weeks*, *Reset purge cycle from control value greater than or equal to* and *Send group object "Status Valve purge"* parameters are enabled.
- *Triggered by object:* The valve purging can be triggered via a group object. The *Status valve purge* and *Activate valve purge* group objects as well as the *Reset purge cycle from control value greater than or equal to* and *Send group object "Status Valve purge"* parameters 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 or Valve drive opening 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 duration for the 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 Activate valve purge group object.
- The parameterized value (in Reset purge cycle from...) is exceeded. The purging cycle is only restarted once the parameterized value is reached or dropped below.

—

Dependent parameter

Purge cycle in weeks

This parameter is only visible if the *Automatic* or *triggered by object* option has been selected for the *Valve purge* parameter.

Options: 1…4…12

This parameter specifies the cycle for the automatic valve purge.

The internal automatic purge timer starts immediately after the 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 *Activate valve purge* group object.

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.

—

Dependent parameter

Reset purge cycle from control value greater than or equal to

Options: 1…99 %

The purge cycle is reset if the control value set using this parameter is exceeded.

—

Dependent parameter

Send group object "Status valve purge"

Options: No, update only
After a 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.
- *After a change:* The value is sent after 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 enabled.
- *After a change or request*: The status is sent on request and after a change.
- *After a change or request and cyclically:* The status is sent on request and after a change and cyclically. The *Every* dependent parameter is enabled.

—

Dependent parameter

Every

Options: 00:00:30…00:05:00…18:12:15 hh:mm:ss

This parameter specifies the interval at which the values are sent cyclically.

7.5.2 HCC/S 2.1.x.1

The explanations below only apply to:

- HCC/S 2.1.2.1
- HCC/S 2.1.1.1

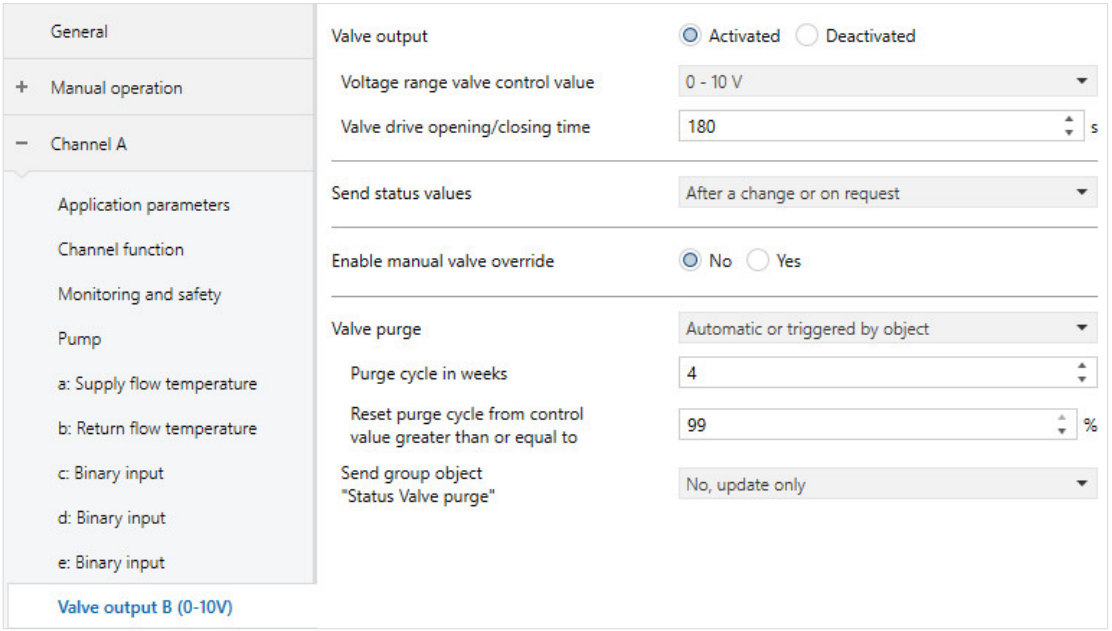

Fig. 30: Valve output parameter window HCC/S 2.1.x.1

Valve output

Options: Activated
Deactivated

- *Activated:* The output is used as a control value output for a 0-10 V valve drive. The *Status byte valve B (B/C)*, *Status valve B (B/C) control value*, *Fault: valve output B (B/C)* and *Reset fault on valve output B (B/C)* group objects as well as the dependent parameters are enabled.

—

Dependent parameter

Voltage range valve control value

Options: 0 – 10 V
1 – 10 V
2 – 10 V
10 – 0 V

The function of the valve output is specified using this parameter. 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).

—

Dependent parameter

Valve drive opening/closing time

Options: 10…<u>180</u>…900 s

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.

Send status values

Options: On request
After a change
Cyclically
<u>After a change or on request</u>
After a change or request and cyclically

This parameter specifies when the valve output status values are to be sent. It affects the *Status byte valve B (B/C)*, *Fault: valve output* and *Status valve B control value* group objects.

- *On request:* The valve output status values are sent on the receipt of a command via the Request status values group object.
- *After a change:* The values are sent after 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 enabled.
- *After a change or request:* The values are sent on request and after a change.
- *After a change or request and cyclically*: The values are sent on request and after a change and cyclically. The *Every* dependent parameter is enabled.

—

Dependent parameter

Every

Options: 00:00:30…00:05:00…18:12:15 hh:mm:ss

This parameter specifies the interval at which the values are sent cyclically.

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 the controller.

- *No:* The manual valve override is deactivated

  Yes: The manual override is enabled. The two group objects *Enable/disable manual override valve* 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* group object, the valve output reacts again to the controller (controller mode) or the control values received via the bus (actuator mode). As soon as the manual override is activated via the *Enable/disable manual override valve* 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.

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 *Status valve purge* and *Activate valve purge* group objects as well as the *Purge cycle in weeks*, *Reset purge cycle from control value greater than or equal to* and *Send group object "Status Valve purge"* parameters are enabled.
- *Triggered by object:* The valve purging can be triggered via a group object. The *Status valve purge* and *Activate valve purge* group objects as well as the *Reset purge cycle from control value greater than or equal to* and *Send group object "Status Valve purge"* parameters 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* or *Valve drive opening 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 duration for the 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 Activate valve purge group object.
- The parameterized value (in Reset purge cycle from...) is exceeded. The purging cycle is only restarted once the parameterized value is reached or dropped below.

—

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

This parameter specifies the cycle for the automatic valve purge.

The internal automatic purge timer starts immediately after the 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 *Activate valve 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.

—

Dependent parameter

Reset purge cycle from control value greater than or equal to

Options: 1…99 %

The purge cycle is reset if the control value set using this parameter is exceeded.

—

Dependent parameter

Send group object "Status valve purge"

Options: No, update only
After a 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.
- *After a change:* The value is sent after a change in the object value (e.g. change from 0 to 1).
- *Cyclically:* Selecting this option automatically sends the value after a user-definable time period. The *Every* dependent parameter is enabled.
- *After a change or request:* The status is sent on request and after a change.
- *After a change or request and cyclically:* The status is sent on request and after a change and cyclically. The *Every* dependent parameter is enabled.

—

Dependent parameter

Every

Options: 00:00:30…00:05:00…18:12:15

This parameter specifies the interval at which the values are sent cyclically.

7.6 Temperature controller parameter window

This parameter window is only visible in the controller mode.

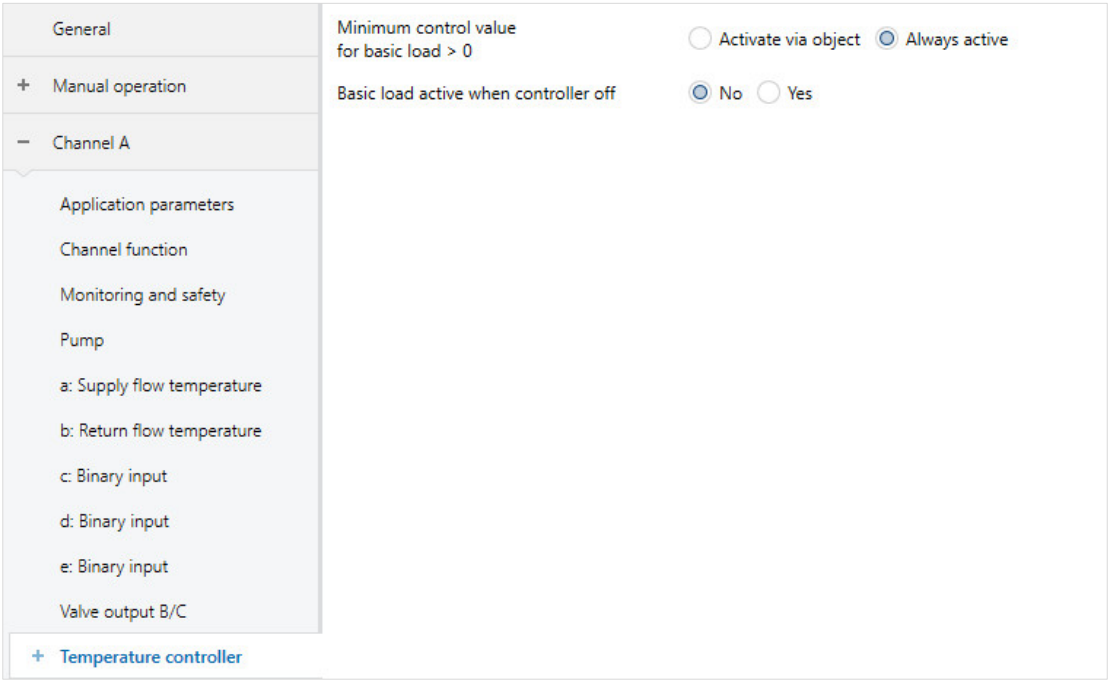

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Fig. 31: Temperature controller parameter window

Minimum control value for basic load > 0

Options: Activate via object
Always active

This parameter specifies 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 group object *Activate minimum control value (basic load)* 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. These settings are specified in the *Temperature controller – Heating/Cooling* parameter window. Here the minimum control value for the basic load that is not allowed to be dropped below is specified.
The basic load is always activated for all stages, but only applies to the active type of operation, heating or cooling.
One sample application for the basic load is floor heating, for which a certain control value must not be dropped below to protect the installation.

Basic load active when controller off

Options: No
Yes

This parameter specifies whether the basic load is to be active if the controller has been switched off via the *Control On/Off* 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.

—

Dependent parameter

Send inactive control values cyclically

Options: No
Yes

This parameter is enabled if the device has been parameterized for both *heating* and *cooling*. For this purpose, the *Deactivated* option is not allowed to be selected for the *Controller setting heating* and *Controller setting cooling* parameters in the *Application parameters* parameter window.

- *No:* The cyclic sending of the inactive control values is inhibited. Only the control values for the type of operation (heating or cooling) 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.

This parameter is used to influence the behavior on sending the controller control value output. This parameter specifies whether the control values for the type of operation not currently active (heating or cooling) are to be sent. 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 heating control value* and *Status cooling control value*) 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 type of operation: Heating
- Heating control value: 50 %
- Cooling control value: 0 %
- Sending cycle time: 5 minutes (for both types of operation)
- Heating/cooling system: 2-pipe system for heating and cooling (only one control value input)
    - Send heating control value: control value received: 50 %
    - Valve drive actuator output control value: 50 %
    - Send cooling control value: control value received: 0 %
    - Valve drive actuator output control value: 0 %

The cycle times for the individual control values can be set in the related parameter window (e.g. *Temperature controller - Heating*) in *Extended settings* in the *Send control value cyclically* parameter.

7.6.1 Heating

This window is only visible if the *Deactivated* option has not been selected for the *Controller setting heating* parameter in the *Application parameters* parameter window.

In actuator mode, this window is deactivated and hidden.

You can parameterize the temperature controller for the heating circuit on this page. The settings for the PI control, limitation of the temperature range, the behavior on sending the control value and the safety shutdown are made.

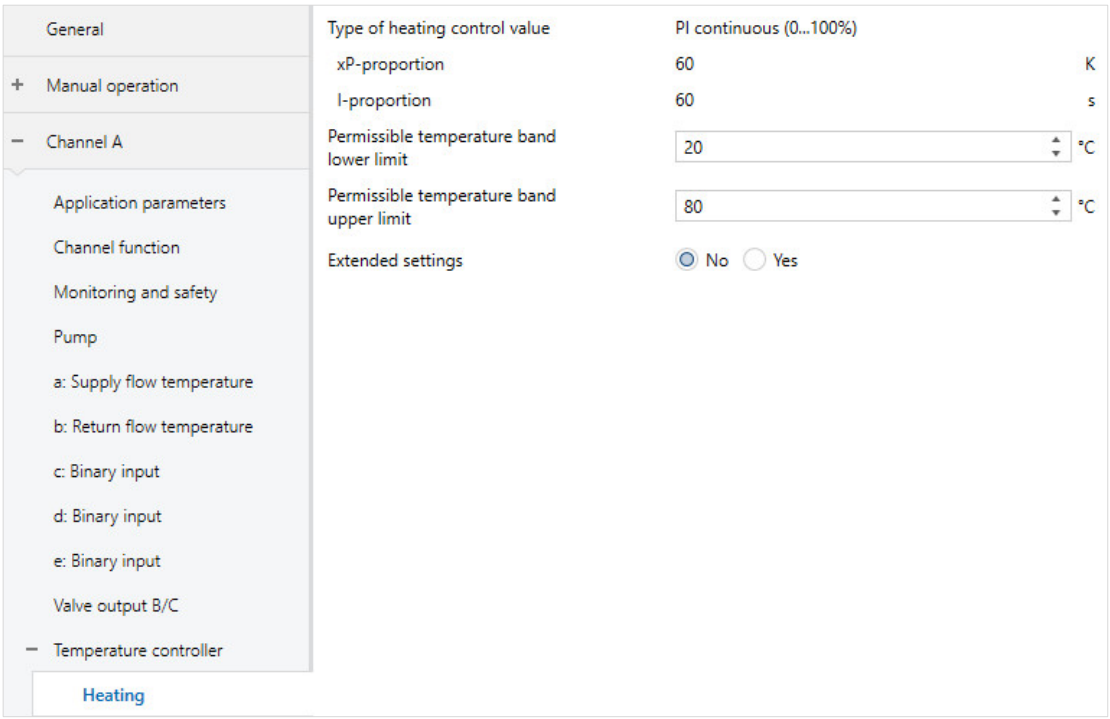

Fig. 31: Heating parameter window

Type of heating control value

Type of heating control value PI continuous (0…100%)

This parameter indicates, together with the next two parameters, how the control is realized. The control is always via a PI controller with fixed P and I proportion. The only exception is the selection of the *Free configuration* option for the *Heating* parameter in the *Application parameters* parameter window. The only exception that allows you to set the parameters as required is the *Free configuration* option.

Option selected: Heating	P and I proportion	P and I proportion can be changed
Free configuration	xP-proportion: 60 K I-proportion: 60 s	Yes
Reduced temperature accuracy / few valve movements	xP-proportion: 40 K I-proportion: 120 s	No
Medium temperature accuracy / medium number of valve movements	xP-proportion: 60 K I-proportion: 60 s	No
High temperature accuracy / many valve movements	xP-proportion: 80 K I-proportion: 30 s	No

Table 41: Type of heating control value

Note

For a description of the individual options for the control, see *Application parameters* parameter window – *Controller setting heating* parameter.

—

Dependent parameter

xP-proportion

Options: 01…60…100 K

The standard value depends on the option selected for the *Controller setting heating* parameter in the *Application parameters* parameter window.

Note

This value can only be changed if the *Free configuration* option is selected for the *Controller setting heating* parameter.

The xP-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.

—

Dependent parameter

I-proportion

Options: 0…60…600 s

The standard value depends on the option selected for the *Controller setting heating* parameter in the *Application parameters* parameter window.

Note

This value can only be changed if the *Free configuration* option is selected for the *Controller setting heating* parameter.

The I-proportion stands for the integral time in a control. The integral proportion causes the supply flow 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.

Permissible temperature band lower limit

Options: 10…20…100 °C

This parameter specifies a minimum temperature in the heating circuit. The controller will always set this temperature as the minimum temperature even if the setpoint temperature is lower. This feature can be used, e.g., to maintain always a minimum temperature in a heating circuit to achieve a quicker response to the heating requirements.

Note

The temperature is only maintained if the type of operation *Heating* is active and the control is switched on.

Permissible temperature band upper limit

Options: 10…80…100 °C

This parameter specifies a maximum temperature in the heating circuit. The controller will not actively exceed this temperature, instead it will always set this temperature as the maximum temperature, even if the setpoint temperature is higher. In this way, e.g. an excessively high supply flow temperature can be prevented.

Note

The temperature is only maintained if the type of operation *Heating* is active and the control is switched on.

—

Dependent parameter

Extended settings

Options: <u>No</u>
Yes

The selection of the *Yes* option enables other settings.

—

Dependent parameter

Control value direction

This parameter is only visible if the *Via group object* option has been selected for the *Actuate heating via* parameter in the *Application parameters* parameter window.

Options: <u>Normal</u>
Inverted

This parameter specifies 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 the valve output on the device 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 value Off/0 %
  Control value Off/0% => telegram value On/100 %

—

Dependent parameter

Control value difference for sending control value

Options: 2%
<u>5%</u>
10%
Only send cyclically

The control values for the 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.

—

Dependent parameter

Send control value cyclically (0 = cyclical sending disabled)

Options: 0…15…60 min

This parameter specifies the interval at which the values are sent cyclically. 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.

—

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.

—

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 sets a basic load, e.g. for the operation of a heating circuit for 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 also 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.

—

Dependent parameter

Enable safety shutdown

Options: No
Yes

This parameter activates a safety shutdown of the controller. Using the safety shutdown, the controller's control value 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 safety shutdown is floor heating, where exceeding a specific temperature must be prevented to protect the material of the floor.

- *No:* The safety shutdown is deactivated.
- *Yes:* The safety shutdown is activated. The following dependent parameters are enabled.

Note

On the usage of the safety shutdown this function is automatically active after bus voltage recovery or download until it receives a valid temperature value. It is only based on this value that the controller can check whether the shutdown must remain active.

—

Dependent parameter

Safety shutdown temperature

Options: 25…<u>80</u>…100 °C

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 *Temperature input for temperature limit sensor* parameter).

—

Dependent parameter

Temperature hysteresis safety shutdown

Options: 00.5…<u>01.0</u>…05.0

The temperature hysteresis for the safety shutdown specifies the value by which the limit temperature must be dropped below again (heating) or exceeded (cooling) before the controller becomes active again.

—

Dependent parameter

I-proportion with safety shutdown

Options: <u>Freeze</u>
Reset

This parameter specified what is to happen to the I-proportion on reaching the safety shutdown 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.

—

Dependent parameter

Temperature input for temperature limit sensor

Options: Via group object
Via physical device input

- *Via group object:* The temperature value is received via a dedicated group object. The dependent group object *Temperature input safety shutdown heating* is enabled.
- *Via physical device input:* The temperature value is acquired via a temperature sensor connected to the input a.

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 safety shutdown function does not work.

7.6.2 Cooling

This window is only visible if the *Deactivated* option has not been selected for the *Controller setting cooling* parameter in the *Application parameters* parameter window.

In actuator mode, this window is deactivated and hidden.

You can parameterize the temperature controller for the cooling circuit on this page. The settings for the PI control, limitation of the temperature range, the behavior on sending the control value and the safety shutdown are made.

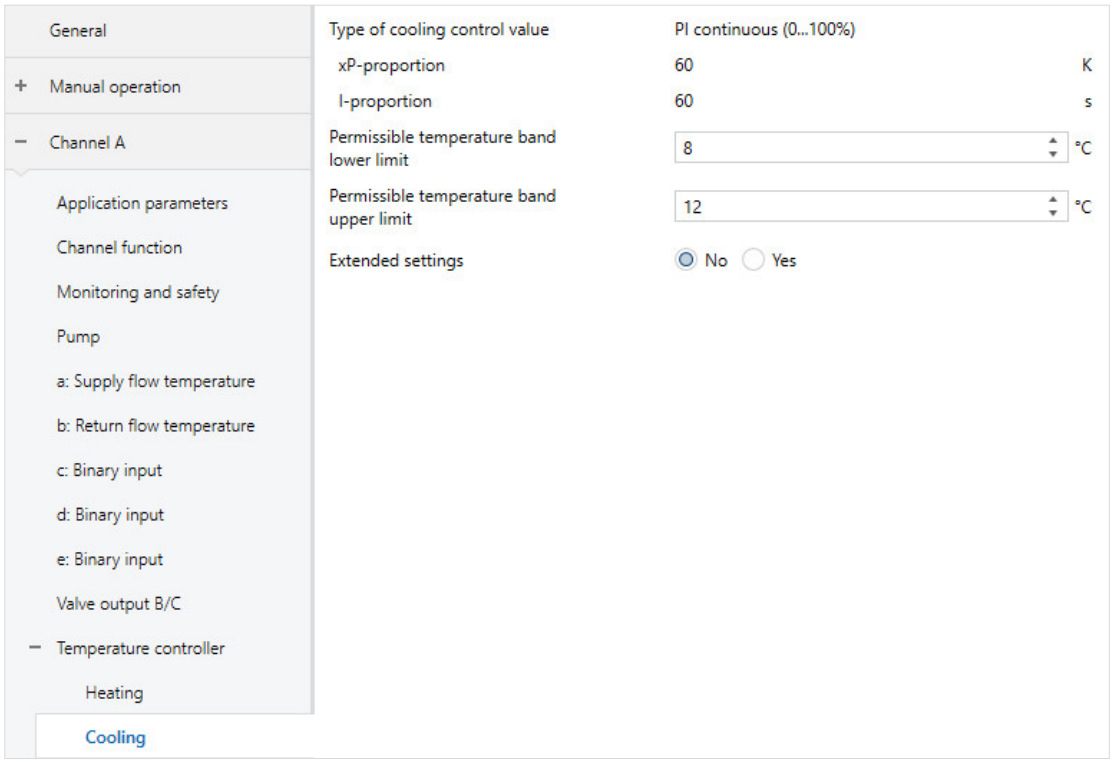

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Fig. 32: Cooling parameter window

Type of cooling control value

Type of cooling control value PI continuous (0…100 %)

This parameter indicates, together with the next two parameters, how the control is realized. The control is always via a PI controller with fixed P and I proportion. The only exception is the selection of the *Free configuration* option for the Cooling parameter in the *Application parameters* parameter window. The only exception that allows you to set the parameters as required is the *Free configuration* option.

Option selected: Cooling	P and I proportion	P and I proportion can be changed
Free configuration	xP-proportion: 60 K I-proportion: 60 s	Yes
Reduced temperature accuracy/ few valve movements	xP-proportion: 40 K I-proportion: 120 s	No
Medium temperature accuracy/ medium number of valve movements	xP-proportion: 60 K I-proportion: 60 s	No
High temperature accuracy/ many valve movements	xP-proportion: 80 K I-proportion: 30 s	No

Table 42: Type of cooling control value

Note

For a description of the individual options for the control, see *Application parameters* parameter window – *Controller setting cooling* parameter.

—

Dependent parameter

xP-proportion

Options: 01.0…<u>01.5</u>…100 K

The standard value depends on the option selected for the *Controller setting cooling* parameter in the *Application parameters* parameter window.

Note

This value can only be changed if the *Free configuration* option is selected for the *Controller setting cooling* parameter.

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.

—

Dependent parameter

I-proportion

Options: 0…<u>100</u>…600 s

The standard value depends on the option selected for the *Controller setting cooling* parameter in the *Application parameters* parameter window.

Note

This value can only be changed if the *Free configuration* option is selected for the *Controller setting cooling* parameter.

The I-proportion stands for the integral time in a control. The integral proportion causes the supply flow 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.

Permissible temperature band lower limit

Options: 1…8…45 °C

This parameter specifies a minimum temperature in the cooling circuit. The controller will always set this temperature as the minimum temperature even if the setpoint temperature is lower. This feature can be used, e.g., to prevent dropping below a minimum temperature in a cooling circuit to counteract condensation.

Note

The temperature is only maintained if the type of operation *Cooling* is active and the control is switched on.

Permissible temperature band upper limit

Options: 1…12…45 °C

This parameter specifies a maximum temperature in the cooling circuit. The controller will not actively exceed this temperature, instead it will always set this temperature as the maximum temperature, even if the setpoint temperature is higher. In this way the supply flow temperature can be maintained at a correspondingly low value to ensure a quick reaction to setpoint changes.

Note

The temperature is only maintained if the type of operation *Cooling* is active and the control is switched on.

—

Dependent parameter

Extended settings

Options: No
Yes

The selection of the *Yes* option enables other settings.

—

Dependent parameter

Control value direction

This parameter is only visible if the *Via group object* option has been selected for the *Actuate cooling via* parameter in the *Application parameters* parameter window.

Options: Normal
Inverted

This parameter specifies 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 the valve output on the device 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 value Off/0 %
  Control value Off/0% => telegram value On/100 %

—

Dependent parameter

Control value difference for sending control value

Options: 2%
5%
10%
Only send cyclically

The control values for the 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.

—

Dependent parameter

Send control value cyclically (0 = cyclical sending disabled)

Options: 0…15…60 min

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.

—

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.

—

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 sets a basic load, e.g. for the operation of a cooling circuit for cooling ceiling.

In the *Temperature controller* parameter window it can also 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.

—

Dependent parameter

Enable safety shutdown

Options: No
Yes

This parameter activates a safety shutdown of the controller. Using the safety shutdown, the controller's control value 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 prevent the formation of moisture under/on the ceiling.

- *No:* The limit temperature is deactivated.
- *Yes:* The limit temperature is activated. The following dependent parameters are enabled.

—

Dependent parameter

Safety shutdown temperature

Options: 1…12…30 °C

This parameter 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 *Temperature input for temperature limit sensor* parameter).

—

Dependent parameter

Temperature hysteresis safety shutdown

Options: 00.5…<u>01.0</u>…05.0

This parameter specifies the value by which the limit temperature must be dropped below again (heating) or exceeded (cooling) before the controller becomes active again.

—

Dependent parameter

I-proportion with safety shutdown

Options: <u>Freeze</u>
Reset

This parameter specified what is to happen to the I-proportion on reaching the safety shutdown 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.

—

Dependent parameter

Temperature input for temperature limit sensor

Options: Via group object
Via physical device input

- *Via group object:* The temperature value is received via a dedicated group object. The dependent group object *Temperature input safety shutdown cooling* is enabled.
- *Via physical device input:* The temperature value is acquired via a temperature sensor connected to the input a.

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 safety shutdown function does not work.

8 Group objects

8.1 Summary of group objects

No.	Object function	Name	DPT	Length	Flags				
					C	R	W	T	U
1	In operation	General	1.002	1 bit	X	X		X	
3	Request status values	General	1.017	1 bit	X		X		
4	Status manual operation	General	1.011	1 bit	X	X		X	
5	Enable/disable manual operation	General	1.003	1 bit	X		X		
10	Forced operation 2 bit	Channel A - General	2.001	2 bit	X		X		
11	Forced operation 1 bit	Channel A - General	1.002	1 bit	X		X		
12	Error: heating/cooling receipt	Channel A - General	1.002	1 bit	X	X		X	
13	Error: setpoint receipt	Channel A - General	1.002	1 bit	X	X		X	
13	Error: control value receipt	Channel A - General	1.002	1 bit	X	X		X	
15	Error: pump error receipt	Channel A - General	1.002	1 bit	X	X		X	
16	Error: repair switch receipt	Channel A - General	1.002	1 bit	X	X		X	
17	Status byte channel	Channel A - General	Non DPT	1 byte	X	X		X	
18	Status byte valve B/C	Channel A - Valve B/C	Non DPT	1 byte	X	X		X	
18	Status byte valve B	Channel A - Valve B	Non DPT	1 byte	X	X		X	
19	Status valve B/C control value	Channel A - Valve B/C	5.001	1 byte	X	X		X	
19	Status valve B control value	Channel A - Valve B	5.001	1 byte	X	X		X	
20	Fault: valve output B/C	Channel A - Valve B/C	1.002	1 bit	X	X		X	
20	Fault: valve output B	Channel A - Valve B	1.002	1 bit	X	X		X	
21	Status valve purge B/C	Channel A - Valve B/C	1.011	1 bit	X	X		X	
21	Status valve purge B	Channel A - Valve B	1.011	1 bit	X	X		X	
22	Reset fault on valve output B/C	Channel A - Valve B/C	1.015	1 bit	X		X		
22	Reset fault on valve output B	Channel A - Valve B	1.015	1 bit	X		X		
23	Activate valve purge B/C	Channel A - Valve B/C	1.017	1 bit	X		X		
23	Activate valve purge B	Channel A - Valve B	1.017	1 bit	X		X		
24	Enable/disable manual override valve B/C	Channel A - Valve B/C	1.003	1 bit	X		X		
24	Enable/disable manual override valve B	Channel A - Valve B	1.003	1 bit	X		X		
25	Override valve control value B/C	Channel A - Valve B/C	5.001	1 byte	X		X		
25	Override valve control value B	Channel A - Valve B	5.001	1 byte	X		X		

No.	Object function	Name	DPT	Length	Flags				
					C	R	W	T	U
27	Override pump	Channel A - Pump	1.001	1 bit	X		X		
28	Status pump relay	Channel A - Pump	1.001	1 bit	X	X		X	
30	Pump error input	Channel A - Pump	1.005	1 bit	X		X		
31	Pump repair switch input	Channel A - Pump	1.011	1 bit	X		X		
32	Status pump master/slave (1=Master; 0=Slave)	Channel A - Pump	1.011	1 bit	X	X		X	
33	Pump overdrive via KNX (deactivate/activate)	Channel A - Pump	1.003	1 bit	X		X		
34	Status pump automatic	Channel A - Pump	1.011	1 bit	X	X		X	
35	Time	Channel A - Pump	10.001	3 bytes	X		X		
36	Master/slave changeover	Channel A - Pump	1.017	1 bit	X		X		
37	Supply flow temperature	Channel A - Input a	9.001	2 bytes	X	X		X	
38	Sensor error	Channel A - Input a	1.005	1 bit	X	X		X	
39	Return flow temperature	Channel A - Input b	9.001	2 bytes	X	X		X	
40	Sensor error	Channel A - Input b	1.005	1 bit	X	X		X	
41	Pump operating state	Channel A - Binary input c	1.011	1 bit	X	X		X	
41	Switch	Channel A - Binary input c	1.001	1 bit	X	X		X	
42	Disable input	Channel A - Binary input c	1.003	1 bit	X		X		
43	Pump fault alarm	Channel A - Binary input d	1.005	1 bit	X	X		X	
43	Switch	Channel A - Binary input d	1.001	1 bit	X	X		X	
44	Disable input	Channel A - Binary input d	1.003	1 bit	X		X		
45	Pump repair switch	Channel A - Binary input e	1.011	1 bit	X	X		X	
45	Switch	Channel A - Binary input e	1.001	1 bit	X	X		X	
46	Disable input	Channel A - Binary input e	1.003	1 bit	X		X		
47	Status heating/cooling	Channel A - Controller	1.100	1 bit	X	X		X	
48	Status heating control value	Channel A - Controller	5.001	1 byte	X	X		X	
50	Status cooling control value	Channel A - Controller	5.001	1 byte	X	X		X	
54	Supply flow temperature via KNX	Channel A - Controller	9.001	2 bytes	X		X		
56	Supply flow temperature malfunction	Channel A - Controller	1.002	1 bit	X	X		X	

No.	Object function	Name	DPT	Length	Flags				
					C	R	W	T	U
57	Current setpoint	Channel A - Controller	9.001	2 bytes	X	X		X	
62	Status heating	Channel A - Controller	1.001	1 bit	X	X		X	
63	Status cooling	Channel A - Controller	1.001	1 bit	X	X		X	
64	Activate minimum control value (basic load)	Channel A - Controller	1.003	1 bit	X		X		
65	Heating/cooling changeover	Channel A - Controller	1.100	1 bit	X		X		
73	Control On/Off	Channel A - Controller	1.001	1 bit	X		X		
74	Status control On/Off	Channel A - Controller	1.001	1 bit	X	X		X	
86	Heating setpoint temperature	Channel A - Controller	9.001	2 bytes	X		X		
87	Cooling setpoint temperature	Channel A - Controller	9.001	2 bytes	X		X		
94	Heating control value	Channel A - Actuator	5.001	1 byte	X		X		
95	Cooling control value	Channel A - Actuator	5.001	1 byte	X		X		
96	Temperature input safety shutdown heating	Channel A - Controller	9.001	2 bytes	X		X	X	X
98	Temperature input safety shutdown cooling	Channel A - Controller	9.001	2 bytes	X		X	X	X
100	Safety shutdown (temperature reached)	Channel A - Controller	1.005	1 bit	X	X		X	
101	Forced operation 2 bit	Channel B - General	2.001	2 bit	X		X		
102	Forced operation 1 bit	Channel B - General	1.002	1 bit	X		X		
103	Error: heating/cooling receipt	Channel B - General	1.002	1 bit	X	X		X	
104	Error: setpoint receipt	Channel B - General	1.002	1 bit	X	X		X	
104	Error: control value receipt	Channel B - General	1.002	1 bit	X	X		X	
106	Error: pump error receipt	Channel B - General	1.002	1 bit	X	X		X	
107	Error: repair switch receipt	Channel B - General	1.002	1 bit	X	X		X	
108	Status byte channel	Channel B - General	Non DPT	1 byte	X	X		X	
109	Status byte valve E/F	Channel B - Valve E/F	Non DPT	1 byte	X	X		X	
110	Status valve E/F control value	Channel B - Valve E/F	5.001	1 byte	X	X		X	
111	Fault: valve output E/F	Channel B - Valve E/F	1.002	1 bit	X	X		X	
112	Status valve purge E/F	Channel B - Valve E/F	1.011	1 bit	X	X		X	
113	Reset fault on valve output E/F	Channel B - Valve E/F	1.015	1 bit	X		X		

No.	Object function	Name	DPT	Length	Flags				
					C	R	W	T	U
114	Activate valve purge E/F	Channel B - Valve E/F	1.017	1 bit	X		X		
115	Enable/disable manual override valve E/F	Channel B - Valve E/F	1.003	1 bit	X		X		
116	Override valve control value E/F	Channel B - Valve E/F	5.001	1 byte	X		X		
118	Override pump	Channel B - Pump	1.001	1 bit	X		X		
119	Status pump relay	Channel B - Pump	1.001	1 bit	X	X		X	
121	Pump error input	Channel B - Pump	1.005	1 bit	X		X		
122	Pump repair switch input	Channel B - Pump	1.011	1 bit	X		X		
123	Status pump master/slave (1=Master; 0=Slave)	Channel B - Pump	1.011	1 bit	X	X		X	
124	Pump overdrive via KNX (deactivate/activate)	Channel B - Pump	1.003	1 bit	X		X		
125	Status pump automatic	Channel B - Pump	1.011	1 bit	X	X		X	
128	Supply flow temperature	Channel B - Input f	9.001	2 bytes	X	X		X	
129	Sensor error	Channel B - Input f	1.005	1 bit	X	X		X	
130	Return flow temperature	Channel B - Input g	9.001	2 bytes	X	X		X	
131	Sensor error	Channel B - Input g	1.005	1 bit	X	X		X	
132	Pump operating state	Channel B - Binary input h	1.011	1 bit	X	X		X	
132	Switch	Channel B - Binary input h	1.001	1 bit	X	X		X	
133	Disable input	Channel B - Binary input h	1.003	1 bit	X		X		
134	Pump fault alarm	Channel B - Binary input i	1.005	1 bit	X	X		X	
134	Switch	Channel B - Binary input i	1.001	1 bit	X	X		X	
135	Disable input	Channel B - Binary input h	1.003	1 bit	X		X		
136	Pump repair switch	Channel B - Binary input j	1.011	1 bit	X	X		X	
136	Switch	Channel B - Binary input j	1.001	1 bit	X	X		X	
137	Disable input	Channel B - Binary input h	1.003	1 bit	X		X		

No.	Object function	Name	DPT	Length	Flags				
					C	R	W	T	U
138	Status heating/cooling	Channel B - Controller	1.100	1 bit	X	X		X	
139	Status heating control value	Channel B - Controller	5.001	1 byte	X	X		X	
141	Status cooling control value	Channel B - Controller	5.001	1 byte	X	X		X	
145	Supply flow temperature via KNX	Channel B - Controller	9.001	2 bytes	X		X		
147	Supply flow temperature malfunction	Channel B - Controller	1.002	1 bit	X	X		X	
148	Current setpoint	Channel B - Controller	9.001	2 bytes	X	X		X	
153	Status heating	Channel B - Controller	1.001	1 bit	X	X		X	
154	Status cooling	Channel B - Controller	1.001	1 bit	X	X		X	
155	Activate minimum control value (basic load)	Channel B - Controller	1.003	1 bit	X		X		
156	Heating/cooling changeover	Channel B - Controller	1.100	1 bit	X		X		
164	Control On/Off	Channel B - Controller	1.001	1 bit	X		X		
165	Status control On/Off	Channel B - Controller	1.001	1 bit	X	X		X	
177	Heating setpoint temperature	Channel B - Controller	9.001	2 bytes	X		X		
178	Cooling setpoint temperature	Channel B - Controller	9.001	2 bytes	X		X		
185	Heating control value	Channel B - Actuator	5.001	1 byte	X		X		
186	Cooling control value	Channel B - Actuator	5.001	1 byte	X		X		
187	Temperature input safety shutdown heating	Channel B - Controller	9.001	2 bytes	X		X	X	X
189	Temperature input safety shutdown cooling	Channel B - Controller	9.001	2 bytes	X		X	X	X
191	Safety shutdown (temperature reached)	Channel B - Controller	1.005	1 bit	X	X		X	

Table 43: Summary of group objects

8.2 Group objects, General

No.	Object function	Name	Data type	Flags
1	**In operation**	**General**	**1 bit** **DPT 1.002**	**C, R, T**
This group object is enabled if the *Yes* option has been selected for the *Enable group object "In operation" 1 bit* parameter in the *General* parameter window. To monitor regularly the presence of the device on the KNX bus, an *In operation* telegram 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*.				
3	**Request status values**	**General**	**1 bit** **DPT 1.017**	**C, W**
This group object is always enabled. If a telegram with the value 0 or 1 is received in this group object, all *Status* group objects are sent on the bus if they were parameterized with the *On request* option.				
4	**Status manual operation**	**General**	**1 bit** **DPT 1.011**	**C, R, T**
This group object is enabled if the *Enabled* option has been selected for the *Manual operation* parameter in the *Manual operation* parameter window. This group object indicates whether manual operation is activated on the device.				
5	**Enable/disable manual operation**	**General**	**1 bit** **DPT 1.003**	**C, W**
This group object is enabled if the *Enabled* option has been selected for the *Manual operation* parameter in the *Manual operation* parameter window. This group object activates or deactivates manual operation. If the device is in the manual mode, manual operation is deactivated again as soon as the value 0 is received.				

Table 44: Group objects, General

8.3 Group objects, Channel - General

No.	Object function	Name	Data type	Flags
10	**Forced operation 2 bit**	**Channel A - General**	**2 bit** **DPT 2.001**	**C, W**
This group object is enabled if the *Forced operation 2 bit* option has been selected for the *Use forced operation* parameter in the *Monitoring and safety* parameter window. This group object activates and deactivates forced operation. Telegram value: (Bit 1 | Bit 0: Status of 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				
11	**Forced operation 1 bit**	**Channel A - General**	**1 bit** **DPT 1.002**	**C, W**
This group object is enabled if the *Forced operation 1 bit; 0 active* or *Forced operation 1 bit; 1 active* option has been selected for the parameter *Use forced operation* 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.				
12	**Error: heating/cooling receipt**	**Channel A - General**	**1 bit** **DPT 1.002**	**C, R, T**
This group object is enabled if the *Activated* option has been selected for the *Monitor receipt of heating/cooling changeover group object* parameter in the *Monitoring and safety* parameter window. This group object changes to the value 1 if the parameterized monitoring time has elapsed without the receipt of a value via 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).				
13	**Error: setpoint receipt**	**Channel A - General**	**1 bit** **DPT 1.002**	**C, R, T**
This group object is enabled if the *Activated* option has been selected for the *Monitor receipt of setpoint temperature group object* parameter in the *Monitoring and safety* parameter window. If the group object is not received in the time parameterized there, a change is made to the error state and in this way the failure to receive the group object signaled. Telegram value: 1: Error/object not received 0: No error/object received				

No.	Object function	Name	Data type	Flags
13	**Error: control value receipt**	**Channel A - General**	**1 bit** **DPT 1.002**	**C, R, T**
This group object is enabled if the *Activated* option has been selected for the *Monitor receipt of group object "Control value"* parameter in the *Monitoring and safety* parameter window. If the group object is not received in the time parameterized there, a change is made to the error state and in this way the failure to receive the group object signaled. Telegram value: 1: Error/object not received 0: No error/object received				
15	**Error: pump error receipt**	**Channel A - General**	**1 bit** **DPT 1.002**	**C, R, T**
This group object is enabled if the *Activated* option has been selected for the *Monitor receipt of pump error group object* parameter in the *Monitoring and safety* parameter window. If the group object is not received in the time parameterized there, a change is made to the error state and in this way the failure to receive the group object signaled. Telegram value: 1: Error/object not received 0: No error/object received				
16	**Error: repair switch receipt**	**Channel A - General**	**1 bit** **DPT 1.002**	**C, R, T**
This group object is enabled if the *Activated* option has been selected for the *Monitor receipt of pump repair mode group object* parameter in the *Monitoring and safety* parameter window. If the group object is not received in the time parameterized there, a change is made to the error state and in this way the failure to receive the group object signaled. Telegram value: 1: Error/object not received 0: No error/object received				

No.	Object function	Name	Data type	Flags
17	**Status byte channel**	**Channel A - General**	**1 byte** **Non DPT**	**C, R, T**

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: Manual pump override
  The pump has been overridden manually via a group object
  - 0: Manual override inactive
  - 1: Manual override active
- Bit 1: Forced operation
  Forced operation has been activated.
  - 0: Forced operation inactive
  - 1: Forced operation active
- Bit 2: Manual override
  The valve has been overridden manually via a group object.
  - 0: Manual override inactive
  - 1: Manual override active
- Bit 3: 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 4: Safety mode
  The device is in the safety mode, e.g. due to temperature value or control value failure;
  a pre-defined control value (see Cyclical monitoring parameter) applies.

Note

The device is also in safety mode after booting up if it is in the controller mode because the controller has not yet received a valid temperature value.
This aspect 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).

No.	Object function	Name	Data type	Flags
101	**Forced operation 2 bit**	**Channel B - General**	**2 bit** **DPT 2.001**	**C, W**
This group object is enabled if the *Forced operation 2 bit* option has been selected for the *Use forced operation* parameter in the *Monitoring and safety* parameter window. This group object activates and deactivates forced operation. Telegram value: (Bit 1 | Bit 0: Status of 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				
102	**Forced operation 1 bit**	**Channel B - General**	**1 bit** **DPT 1.002**	**C, W**
This group object is enabled if the *Forced operation 1 bit; 0 active* or *Forced operation 1 bit; 1 active* option has been selected for the parameter *Use forced operation* 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.				
103	**Error: heating/cooling receipt**	**Channel B - General**	**1 bit** **DPT 1.002**	**C, R, T**
This group object is enabled if the *Activated* option has been selected for the *Monitor receipt of heating/cooling changeover group object* parameter in the *Monitoring and safety* parameter window. This group object changes to the value 1 if the parameterized monitoring time has elapsed without the receipt of a value via 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).				
104	**Error: setpoint receipt**	**Channel B - General**	**1 bit** **DPT 1.002**	**C, R, T**
This group object is enabled if the *Activated* option has been selected for the *Monitor receipt of setpoint temperature group object* parameter in the *Monitoring and safety* parameter window. If the group object is not received in the time parameterized there, a change is made to the error state and in this way the failure to receive the group object signaled. Telegram value: 1: Error/object not received 0: No error/object received				

No.	Object function	Name	Data type	Flags
104	**Error: control value receipt**	**Channel B - General**	**1 bit** **DPT 1.002**	**C, R, T**
This group object is enabled if the *Activated* option has been selected for the *Monitor receipt of group object "Control value"* parameter in the *Monitoring and safety* parameter window. If the group object is not received in the time parameterized there, a change is made to the error state and in this way the failure to receive the group object signaled. Telegram value: 1: Error/object not received 0: No error/object received				
106	**Error: pump error receipt**	**Channel B - General**	**1 bit** **DPT 1.002**	**C, R, T**
This group object is enabled if the *Activated* option has been selected for the *Monitor receipt of pump error group object* parameter in the *Monitoring and safety* parameter window. If the group object is not received in the time parameterized there, a change is made to the error state and in this way the failure to receive the group object signaled. Telegram value: 1: Error/object not received 0: No error/object received				
107	**Error: repair switch receipt**	**Channel B - General**	**1 bit** **DPT 1.002**	**C, R, T**
This group object is enabled if the *Activated* option has been selected for the *Monitor receipt of pump repair mode group object* parameter in the *Monitoring and safety* parameter window. If the group object is not received in the time parameterized there, a change is made to the error state and in this way the failure to receive the group object signaled. Telegram value: 1: Error/object not received 0: No error/object received				

No.	Object function	Name	Data type	Flags
108	**Status byte channel**	**Channel A - General**	**1 byte** **Non DPT**	**C, R, T**

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: Manual pump override
  The pump has been overridden manually via a group object
  - 0: Manual override inactive
  - 1: Manual override active
- Bit 1: Forced operation
  Forced operation has been activated.
  - 0: Forced operation inactive
  - 1: Forced operation active
- Bit 2: Manual override
  The valve has been overridden manually via a group object.
  - 0: Manual override inactive
  - 1: Manual override active
- Bit 3: 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 4: Safety mode
  The device is in the safety mode, e.g. due to temperature value or control value failure;
  a pre-defined control value (see Cyclical monitoring parameter) applies.

Note

The device is also in safety mode after booting up if it is in the controller mode because the controller has not yet received a valid temperature value.

This aspect 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).

Table 45: Group objects, Channel - General

8.4 Group objects, Valve

No.	Object function	Name	Data type	Flags
18	**Status byte valve B/C** **Status byte valve B**	**Channel A - Valve B/C** **Channel A - Valve B**	**1 byte** **Non DPT**	**C, R, T**

This group object is enabled if the *Deactivated* option has not been selected for the valve output.

This group object indicates the current valve status.

- Bit 0: Setpoint received/control value received
  This bit indicates whether or not the valve has 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 heating setpoint temperature/cooling setpoint temperature in controller mode or for the control value in actuator mode), because no cycle time has been defined during which a new value must be received.

- Bit 1: Output error
  The bit indicates whether there is an error on 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

19	**Status control value B/C** **Status control value B**	**Channel A - Valve B/C** **Channel A - Valve B**	**1 byte** **DPT 5.001**	**C, R, T**

This group object is enabled if the *Deactivated* option has not been selected for the valve output.

This group object indicates the current valve control value as a value from 0…100 %.

No.	Object function	Name	Data type	Flags
20	**Fault: valve output B/C** **Fault: valve output B**	**Channel A - Valve B/C** **Channel A - Valve B**	**1 bit** **DPT 1.002**	**C, R, T**
This group object is enabled if the *Deactivated* option has not been selected for the valve output. If there is a fault on the output, e.g. due to short circuit or overload, the "Open" LED for the valve output flashes. At the same time the group object sends a telegram with the value 1. The output is switched off in the event of a fault. The group object has the value 0 after the fault has been rectified. **Note** Indication by LED only on devices with manual operation.				
21	**Status valve purge B/C** **Status valve purge B**	**Channel A - Valve B/C** **Channel A - Valve B**	**1 bit** **DPT 1.011**	**C, R, T**
This group object is enabled if the *Deactivated* option has not been selected for the *Valve purge* parameter in the *Valve output B/C* parameter window. The status of the valve purge is displayed via this group object. The status is sent depending on the option selected in the *Send group object "Status valve purge"* parameter. Telegram value: 1: Valve purge active 0: Valve purge inactive				
22	**Reset fault on valve output B/C** **Reset fault on valve output B**	**Channel A - Valve B/C** **Channel A - Valve B**	**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, ETS download, 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.				

No.	Object function	Name	Data type	Flags
23	**Activate valve purge B/C** **Activate valve purge B**	**Channel A - Valve B/C** **Channel A - Valve B**	**1 bit** **DPT 1.017**	**C, W**
This group object is enabled if the *Deactivated* option has not been selected for the *Valve purge* parameter in the *Valve output B/C* parameter window. A valve purge can be initiated using this group object. **Note** A valve purge not undertaken due to a higher priority will no longer be undertaken.				
24	**Enable/disable manual valve override B/C** **Enable/disable manual override valve B**	**Channel A - Valve B/C** **Channel A - Valve B**	**1 bit** **DPT 1.003**	**C, W**
This group object is enabled if the *Yes* option has been selected for the *Enable manual valve override* parameter. If manual valve override is enabled, the value in the *Override valve control value* group object is written directly to the valve output. The value specified by the controller, or specified via a *Control value* group object in actuator mode, is overridden. Telegram value: 1: Manual override enabled 0: Manual override disabled When a 0 is received via this group object, manual override is immediately disabled and the value specified by the controller, or specified via the *Control value* group object in actuator mode, applies again.				
25	**Override valve control value B/C** **Override valve control value B**	**Channel A - Valve B/C** **Channel A - Valve B**	**1 byte** **DPT 5.001**	**C, W**
This group object is enabled if the *Yes* option has been selected for the *Enable manual valve override* parameter. This group object can send a manual valve control value for overriding the valve, e.g. for test purposes. The value of this group object becomes active only if the override has been enabled by the *Enable/disable manual override valve* group object. A disable via this group object immediately cancels the value overridden.				

No.	Object function	Name	Data type	Flags
109	**Status byte valve E/F**	**Channel B - Valve E/F**	**1 byte** **Non DPT**	**C, R, T**

This group object is enabled if the *Deactivated* option has not been selected for the valve output.
This group object indicates the current valve status.

- Bit 0: Setpoint received/control value received
  This bit indicates whether or not the valve has 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 heating setpoint temperature/cooling setpoint temperature in controller mode or for the control value in actuator mode), because no cycle time has been defined during which a new value must be received.

- Bit 1: Output error
  The bit indicates whether there is an error on 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

No.	Object function	Name	Data type	Flags
110	**Status valve E/F control value**	**Channel B - Valve E/F**	**1 byte** **DPT 5.001**	**C, R, T**

This group object is enabled if the *Deactivated* option has not been selected for the valve output.
This group object indicates the current valve control value as a value from 0…100 %.

No.	Object function	Name	Data type	Flags
111	**Fault: valve output E/F**	**Channel B - Valve E/F**	**1 bit** **DPT 1.002**	**C, R, T**

This group object is enabled if the *Deactivated* option has not been selected for the valve output.

If there is a fault on the output, e.g. due to short circuit or overload, the "Open" LED for the valve output flashes. At the same time the group object sends a telegram with the value 1.

The output is switched off in the event of a fault.

The group object has the value 0 after the fault has been rectified.

Note

Indication by LED only on devices with manual operation.

No.	Object function	Name	Data type	Flags
112	**Status valve purge E/F**	**Channel B - Valve E/F**	**1 bit** **DPT 1.011**	**C, R, T**

This group object is enabled if the *Deactivated* option has not been selected for the *Valve purge* parameter in the *Valve output E/F* parameter window.

The status of the valve purge is displayed via this group object.

The status is sent depending on the option selected in the *Send group object "Status valve purge"* parameter.

Telegram value:

1: Valve purge active

0: Valve purge inactive

No.	Object function	Name	Data type	Flags
113	**Reset fault on valve output E/F**	**Channel B - Valve E/F**	**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, ETS download, 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.

No.	Object function	Name	Data type	Flags
114	**Activate valve purge E/F**	**Channel B - Valve E/F**	**1 bit** **DPT 1.017**	**C, W**
This group object is enabled if the *Deactivated* option has not been selected for the *Valve purge* parameter in the *Valve output E/F* parameter window. A valve purge can be initiated using this group object. **Note** A valve purge not undertaken due to a higher priority will no longer be undertaken.				
115	**Enable/disable manual override valve E/F**	**Channel B - Valve E/F**	**1 bit** **DPT 1.003**	**C, W**
This group object is enabled if the *Yes* option has been selected for the *Enable manual valve override* parameter. If manual valve override is enabled, the value in the *Override valve control value* group object is written directly to the valve output. The value specified by the controller, or specified via a *Control value* group object in actuator mode, is overridden. Telegram value: 1: Manual override enabled 0: Manual override disabled When a 0 is received via this group object, manual override is immediately disabled and the value specified by the controller, or specified via the *Control value* group object in actuator mode, applies again.				
116	**Override valve control value E/F**	**Channel B - Valve E/F**	**1 byte** **DPT 5.001**	**C, W**
This group object is enabled if the *Yes* option has been selected for the *Enable manual valve override* parameter. This group object can send a manual valve control value for overriding the valve, e.g. for test purposes. The value of this group object becomes active only if the override has been enabled by the *Enable/disable manual override valve* group object. A disable via this group object immediately cancels the value overridden.				

Table 46: Group objects, Valve

8.5 Group objects, Pump

No.	Object function	Name	Data type	Flags
27	**Override pump**	**Channel A – Pump**	**1 bit** **DPT 1.001**	**C, W**
This group object is enabled if the *Yes* option has been selected for the *Activate manual pump override via group object* parameter in the *Pump* parameter window. The pump can be switched on and off using this group object if override is active. The device only reacts to this object if the override has been enabled via the *Pump overdrive via KNX (deactivate/activate)* group object. Telegram value: 1: Switches on the pump 0: Switches off the pump				
28	**Status pump relay**	**Channel A – Pump**	**1 bit** **DPT 1.001**	**C, R, T**
This group object indicates the status of the pump relay. This status provides information on whether the device has switched on or off the pump. **Note** Caution! The status of this group object does not reliably indicate whether the pump is active or inactive, instead only whether it has been switched on or off. To acquire the state of the pump reliably, the pump must be polled, e.g. using a floating contact. Telegram value: 1: Pump relay closed 0: Pump relay open				
30	**Pump error input**	**Channel A – Pump**	**1 bit** **DPT 1.005**	**C, W**
This group object is enabled if the *Via group object* option has been selected for the *Monitor pump error* parameter in the *Pump* parameter window. The fault state of the pump can be received via this group object and evaluated by the device. If the pump is switched on and the fault status of the pump changes to active, the pump is shut down immediately. If the pump is switched off, but the fault status is active, the pump cannot be switched on. Telegram value: 1: Pump fault active 0: Pump fault inactive				

No.	Object function	Name	Data type	Flags
31	**Pump repair switch input**	**Channel A – Pump**	**1 bit** **DPT 1.011**	**C, W**
This group object is enabled if the *Via group object* option has been selected for the *Monitor pump repair switch* parameter in the *Pump* parameter window. The status of the repair switch for the pump can be received via this group object and evaluated by the device. If the pump is switched on and the status of the repair switch does not change to the operational state active, the pump is shut down again because the repair switch shuts down the supply to the pump. If the pump is switched off, but the repair switch is active, the pump cannot be switched on. Telegram value: 1: Repair switch active 0: Repair switch inactive				
32	**Status pump master/slave (1=Master; 0=Slave)**	**Channel A – Pump**	**1 bit** **DPT 1.011**	**C, R, T**
This group object is enabled if the *Yes* option has been selected for the *Channel bundling for double pumps* parameter in the *General* parameter window. This group object indicates whether the pump is currently the active pump (main pump), or the inactive pump (backup pump). Telegram value: 1: Pump is the active pump (main pump/master) 0: Pump is the inactive pump (backup pump/slave)				
33	**Pump overdrive via KNX (deactivate/activate)**	**Channel A – Pump**	**1 bit** **DPT 1.003**	**C, W**
This group object is enabled if the *Yes* option has been selected for the *Activate manual pump override via group object* parameter in the *Pump* parameter window. This group object can be used to enable or deactivate pump override via KNX. Telegram value: 1: Pump override is enabled 0: Pump override is disabled/ended				

No.	Object function	Name	Data type	Flags
34	**Status pump automatic**	**Channel A – Pump**	**1 bit** **DPT 1.011**	**C, R, T**
This group object is enabled if the *Yes* option has been selected for the *Activate manual pump override via group object* parameter in the *Pump* parameter window. This group object indicated whether the pump has been overridden, or whether it is in the automatic mode. Telegram value: 1: Pump is in the automatic mode 0: Pump is overridden **Note** The status of this group object is dependent on whether the pump has been overridden via the *Override pump* group object; not whether the override has been enabled or disabled via *Pump overdrive via KNX (deactivate/activate)*.				
35	**Time**	**Channel A – Pump**	**3 bytes** **DPT 10.001**	**C, W**
This group object is enabled if the *Yes* option has been selected for the *Channel bundling for double pumps* parameter in the *General* parameter window, and the *Change weekly* option has been selected for the *Operating mode pump channel A* parameter in the *Pump* parameter window. This group object is used to receive the time to determine the correct time for changing over between the active and inactive pump.				
36	**Master/slave changeover**	**Channel A – Pump**	**1 bit** **DPT 1.017**	**C, W**
This group object is enabled if the *Yes* option has been selected for the *Channel bundling for double pumps* parameter in the *General* parameter window. A change between the master/main pump and the slave/backup pump can be triggered using this group object. Master pump and slave pump change roles on triggering. Telegram value: 1: A change between master and slave is triggered 0: A change between master and slave is triggered				

No.	Object function	Name	Data type	Flags
118	**Override pump**	**Channel B – Pump**	**1 bit** **DPT 1.001**	**C, W**
This group object is enabled if the *Yes* option has been selected for the *Activate manual pump override via group object* parameter in the *Pump* parameter window. The pump can be switched on and off using this group object if override is active. The device only reacts to this group object if the override has been enabled via the *Pump overdrive via KNX (deactivate/activate)* group object. Telegram value: 1: Switches on the pump 0: Switches off the pump				
119	**Status pump relay**	**Channel B – Pump**	**1 bit** **DPT 1.001**	**C, R, T**
This group object indicates the status of the pump relay. This status provides information on whether the device has switched on or off the pump. **Note** Caution! The status of this group object does not reliably indicate whether the pump is active or inactive, instead only whether it has been switched on or off. To acquire the state of the pump reliably, the pump must be polled, e.g. using a floating contact. Telegram value: 1: Pump relay closed 0: Pump relay open				
121	**Pump error input**	**Channel B – Pump**	**1 bit** **DPT 1.005**	**C, W**
This group object is enabled if the *Via group object* option has been selected for the *Monitor pump error* parameter in the *Pump* parameter window. The fault state of the pump can be received via this group object and evaluated by the device. If the pump is switched on and the fault status of the pump changes to active, the pump is shut down immediately. If the pump is switched off, but the fault status is active, the pump cannot be switched on. Telegram value: 1: Pump fault active 0: Pump fault inactive				

No.	Object function	Name	Data type	Flags
122	**Pump repair switch input**	**Channel B – Pump**	**1 bit** **DPT 1.011**	**C, W**
This group object is enabled if the *Via group object* option has been selected for the *Monitor pump repair switch* parameter in the *Pump* parameter window. The status of the repair switch for the pump can be received via this group object and evaluated by the device. If the pump is switched on and the status of the repair switch does not change to the operational state active, the pump is shut down again because the repair switch shuts down the supply to the pump. If the pump is switched off, but the repair switch is active, the pump cannot be switched on. Telegram value: 1: Repair switch active 0: Repair switch inactive				
123	**Status pump master/slave (1=Master; 0=Slave)**	**Channel B – Pump**	**1 bit** **DPT 1.011**	**C, R, T**
This group object is enabled if the *Yes* option has been selected for the *Channel bundling for double pumps* parameter in the *General* parameter window. This group object indicates whether the pump is currently the active pump (main pump), or the inactive pump (backup pump). Telegram value: 1: Pump is the active pump (main pump/master) 0: Pump is the inactive pump (backup pump/slave)				
124	**Pump overdrive via KNX (deactivate/activate)**	**Channel B – Pump**	**1 bit** **DPT 1.003**	**C, W**
This group object is enabled if the *Yes* option has been selected for the *Activate manual pump override via group object* parameter in the *Pump* parameter window. This group object can be used to enable or deactivate pump override via KNX. Telegram value: 1: Pump override is enabled 0: Pump override is disabled/ended				
125	**Status pump automatic**	**Channel B – Pump**	**1 bit** **DPT 1.011**	**C, R, T**
This group object is enabled if the *Yes* option has been selected for the *Activate manual pump override via group object* parameter in the *Pump* parameter window. This group object indicated whether the pump has been overridden, or whether it is in the automatic mode. Telegram value: 1: Pump is in the automatic mode 0: Pump is overridden **Note** The status of this group object is dependent on whether the pump has been overridden via the *Override pump* group object; not whether the override has been enabled or disabled via *Pump overdrive via KNX (deactivate/activate)*.				

Table 47: Group objects, Pump

8.6 Group objects, Inputs

No.	Object function	Name	Data type	Flags
37	**Supply flow temperature**	**Channel A – Input a**	**2 bytes** **DPT 9.001**	**C, R, T**
This group object is enabled if, in the *a: Supply flow temperature* parameter window, the *Temperature sensor* option has been selected for the *Use temperature input* parameter. The temperature value measured on the input is sent on the bus using this group object depending on the reaction parameterized in the *Send temperature value* parameter.				
38	**Sensor error**	**Channel A – Input a**	**1 bit** **DPT 1.005**	**C, R, T**
This group object is enabled if, in the *a: Supply flow temperature* parameter window, the *Temperature sensor* option has been selected for the *Use temperature input* parameter. This group object changes its status to 1 if a fault (open circuit or short circuit) is found on the input and it is therefore no longer possible to send measured values. If there is no fault on the input, this group object value is 0.				
39	**Return flow temperature**	**Channel A – Input b**	**2 bytes** **DPT 9.001**	**C, R, T**
This group object is enabled if, in the *b: Supply flow temperature* parameter window, the *Temperature sensor* option has been selected for the *Use temperature input* parameter. The temperature value measured on the input is sent on the bus using this group object depending on the reaction parameterized in the *Send temperature value* parameter.				
40	**Sensor error**	**Channel A – Input b**	**1 bit** **DPT 1.005**	**C, R, T**
This group object is enabled if, in the *b: Supply flow temperature* parameter window, the *Temperature sensor* option has been selected for the *Use temperature input* parameter. This group object changes its status to 1 if a fault (open circuit or short circuit) is found on the input and it is therefore no longer possible to send measured values. If there is no fault on the input, this group object value is 0.				
41	**Pump operating state**	**Channel A – Binary input c**	**1 bit** **DPT 1.011**	**C, R, T**
This group object is enabled if the *Via physical device input* option has been selected for the *Monitor pump status* parameter in the *Pump* parameter window This group object indicates the pump operating status polled on a floating contact on the pump. Telegram value: 1: Pump operating contact closed/pump is running 0: Pump operating contact open/pump is not running				
41	**Switch**	**Channel A – Binary input c**	**1 bit** **DPT 1.001**	**C, R, T**
This group object is enabled if, in the c: Binary input parameter window, the As binary signal input option has been selected for the Use input parameter. Depending on the selected parametrization, this group object indicates the contact position on the binary sensor connected to the input.				

No.	Object function	Name	Data type	Flags
42	**Disable input**	**Channel A – Binary input c**	**1 bit** **DPT 1.003**	**C, W**

This group object is enabled if, in the *c: Binary input* parameter window, the *As binary signal input* option has been selected for the *Use input* parameter.

The physical input is enabled or disabled via this group object.

Note

If the input is disabled, there is fundamentally no reaction to a signal change on the input, but:

- Waiting for a long button push or a minimum signal duration is terminated.
- Parameterized cyclic transmission is not interrupted.
- The Switch group object can still be written.

If the input state changed during the disabled phase, the new group object value is sent immediately after enabling. If the input state remains the same during the disabled phase, the group object value is not sent.

Telegram value:

1: Disable input a

0: Enable input a

43	**Pump fault alarm**	**Channel A – Binary input d**	**1 bit** **DPT 1.005**	**C, R, T**

This group object is enabled if the *Via physical device input* option has been selected for the *Monitor pump error* parameter in the *Pump* parameter window.

This group object indicates the pump fault status polled on a floating contact on the pump.

Telegram value:

1: Pump fault contact closed/fault

0: Pump fault contact open/no fault

43	**Switch**	**Channel A – Binary input d**	**1 bit** **DPT 1.001**	**C, R, T**

This group object is enabled if, in the *d: Binary input* parameter window, the *As binary signal input* option has been selected for the *Use input* parameter.

Depending on the selected parametrization, this group object indicates the contact position on the binary sensor connected to the input.

No.	Object function	Name	Data type	Flags
44	**Disable input**	**Channel A – Binary input d**	**1 bit** **DPT 1.003**	**C, W**
This group object is enabled if, in the *d: Binary input* parameter window, the *As binary signal input* option has been selected for the *Use input* parameter. The physical input is enabled or disabled via this group object. **Note** If the input is disabled, there is fundamentally no reaction to a signal change on the input, but: • Waiting for a long button push or a minimum signal duration is terminated. • Parameterized cyclic transmission is not interrupted. • The Switch group object can still be written. If the input state changed during the disabled phase, the new group object value is sent immediately after enabling. If the input state remains the same during the disabled phase, the group object value is not sent. Telegram value: 1: Disable input a 0: Enable input a				
45	**Pump repair switch**	**Channel A – Binary input e**	**1 bit** **DPT 1.011**	**C, R, T**
This group object is enabled if the *Via physical device input* option has been selected for the *Monitor pump repair switch* parameter in the *Pump* parameter window. This group object indicates the repair switch status polled on a floating contact on the repair switch. Telegram value: 1: Pump repair switch open/pump disconnected 0: : Pump repair switch closed/pump in operation				
45	**Switch**	**Channel A – Binary input e**	**1 bit** **DPT 1.001**	**C, R, T**
This group object is enabled if, in the *e: Binary input* parameter window, the *As binary signal input* option has been selected for the *Use input* parameter. Depending on the selected parametrization, this group object indicates the contact position on the binary sensor connected to the input.				

No.	Object function	Name	Data type	Flags
46	**Disable input**	**Channel A – Binary input e**	**1 bit** **DPT 1.003**	**C, W**
This group object is enabled if, in the *e: Binary input* parameter window, the *As binary signal input* option has been selected for the *Use input* parameter. The physical input is enabled or disabled via this group object. **Note** If the input is disabled, there is fundamentally no reaction to a signal change on the input, but: • Waiting for a long button push or a minimum signal duration is terminated. • Parameterized cyclic transmission is not interrupted. • The Switch group object can still be written. If the input state changed during the disabled phase, the new group object value is sent immediately after enabling. If the input state remains the same during the disabled phase, the group object value is not sent. Telegram value: 1: Disable input a 0: Enable input a				
128	**Supply flow temperature**	**Channel B – Input f**	**2 bytes** **DPT 9.001**	**C, R, T**
This group object is enabled if, in the *f: Supply flow temperature* parameter window, the *Temperature sensor* option has been selected for the *Use temperature input* parameter. The temperature value measured on the input is sent on the bus using this group object depending on the reaction parameterized in the *Send temperature value* parameter.				
129	**Sensor error**	**Channel B – Input f**	**1 bit** **DPT 1.005**	**C, R, T**
This group object is enabled if, in the *f: Supply flow temperature* parameter window, the *Temperature sensor* option has been selected for the *Use temperature input* parameter. This group object changes its status to 1 if a fault (open circuit or short circuit) is found on the input and it is therefore no longer possible to send measured values. If there is no fault on the input, this group object value is 0.				
130	**Return flow temperature**	**Channel B – Input g**	**2 bytes** **DPT 9.001**	**C, R, T**
This group object is enabled if, in the *g: Return flow temperature* parameter window, the *Temperature sensor* option has been selected for the *Use temperature input* parameter. The temperature value measured on the input is sent on the bus using this group object depending on the reaction parameterized in the *Send temperature value* parameter.				

No.	Object function	Name	Data type	Flags
131	**Sensor error**	**Channel B – Input g**	**1 bit** **DPT 1.005**	**C, R, T**
This group object is enabled if, in the *g: Return flow temperature* parameter window, the *Temperature sensor* option has been selected for the *Use temperature input* parameter. This group object changes its status to 1 if a fault (open circuit or short circuit) is found on the input and it is therefore no longer possible to send measured values. If there is no fault on the input, this group object value is 0.				
132	**Pump operating state**	**Channel B – Binary input h**	**1 bit** **DPT 1.011**	**C, R, T**
This group object is enabled if the *Via physical device input* option has been selected for the *Monitor pump status* parameter in the *Pump* parameter window This group object indicates the pump operating status polled on a floating contact on the pump. Telegram value: 1: Pump operating contact closed/pump is running 0: Pump operating contact open/pump is not running				
132	**Switch**	**Channel B – Binary input h**	**1 bit** **DPT 1.001**	**C, R, T**
This group object is enabled if, in the *h: Binary input* parameter window, the *As binary signal input* option has been selected for the *Use input* parameter. Depending on the selected parametrization, this group object indicates the contact position on the binary sensor connected to the input.				
133	**Disable input**	**Channel B – Binary input h**	**1 bit** **DPT 1.003**	**C, W**
This group object is enabled if, in the *h: Binary input* parameter window, the *As binary signal input* option has been selected for the *Use input* parameter. The physical input is enabled or disabled via this group object. **Note** If the input is disabled, there is fundamentally no reaction to a signal change on the input, but: • Waiting for a long button push or a minimum signal duration is terminated. • Parameterized cyclic transmission is not interrupted. • The Switch group object can still be written. If the input state changed during the disabled phase, the new group object value is sent immediately after enabling. If the input state remains the same during the disabled phase, the group object value is not sent. Telegram value: 1: Disable input a 0: Enable input a				

No.	Object function	Name	Data type	Flags
134	**Pump fault alarm**	**Channel B – Binary input i**	**1 bit** **DPT 1.005**	**C, R, T**
This group object is enabled if the *Via physical device input* option has been selected for the *Monitor pump error* parameter in the *Pump* parameter window. This group object indicates the pump fault status polled on a floating contact on the pump. Telegram value: 1: Pump fault contact closed/fault 0: Pump fault contact open/no fault				
134	**Switch**	**Channel B – Binary input i**	**1 bit** **DPT 1.001**	**C, R, T**
This group object is enabled if, in the *i: Binary input* parameter window, the *As binary signal input* option has been selected for the *Use input* parameter. Depending on the selected parametrization, this group object indicates the contact position on the binary sensor connected to the input.				
135	**Disable input**	**Channel B – Binary input i**	**1 bit** **DPT 1.003**	**C, W**
This group object is enabled if, in the *i: Binary input* parameter window, the *As binary signal input* option has been selected for the *Use input* parameter. The physical input is enabled or disabled via this group object. **Note** If the input is disabled, there is fundamentally no reaction to a signal change on the input, but: • Waiting for a long button push or a minimum signal duration is terminated. • Parameterized cyclic transmission is not interrupted. • The Switch group object can still be written. If the input state changed during the disabled phase, the new group object value is sent immediately after enabling. If the input state remains the same during the disabled phase, the group object value is not sent. Telegram value: 1: Disable input a 0: Enable input a				

No.	Object function	Name	Data type	Flags
136	**Pump repair switch**	**Channel B – Binary input j**	**1 bit** **DPT 1.011**	**C, R, T**
This group object is enabled if the *Via physical device input* option has been selected for the *Monitor pump repair switch* parameter in the *Pump* parameter window. This group object indicates the repair switch status polled on a floating contact on the repair switch. Telegram value: 1: Pump repair switch open/pump disconnected 0: : Pump repair switch closed/pump in operation				
136	**Switch**	**Channel B – Binary input j**	**1 bit** **DPT 1.001**	**C, R, T**
This group object is enabled if, in the *j: Binary input* parameter window, the *As binary signal input* option has been selected for the *Use input* parameter. Depending on the selected parametrization, this group object indicates the contact position on the binary sensor connected to the input.				
137	**Disable input**	**Channel B – Binary input j**	**1 bit** **DPT 1.003**	**C, W**
This group object is enabled if, in the *j: Binary input* parameter window, the *As binary signal input* option has been selected for the *Use input* parameter. The physical input is enabled or disabled via this group object. **Note** If the input is disabled, there is fundamentally no reaction to a signal change on the input, but: • Waiting for a long button push or a minimum signal duration is terminated. • Parameterized cyclic transmission is not interrupted. • The Switch group object can still be written. If the input state changed during the disabled phase, the new group object value is sent immediately after enabling. If the input state remains the same during the disabled phase, the group object value is not sent. Telegram value: 1: Disable input a 0: Enable input a				

Table 48: Group objects, Inputs

8.7 Group objects, Controller

No.	Object function	Name	Data type	Flags
47	**Status heating/cooling**	**Channel A - Controller**	**1 bit** **DPT 1.100**	**C, R, T**
This group object is enabled if the *Deactivated* option has not been selected for the *Controller setting heating* and *Controller setting cooling* parameters in the *Application parameters* parameter window. This group object is hidden in actuator mode. This 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: 1: Heating 0: Cooling				
48	**Status heating control value**	**Channel A - Controller**	**1 byte** **DPT 5.001**	**C, R, T**
This group object is enabled if the *Deactivated* option has not been selected for the *Controller setting heating* parameter in the *Application parameters* parameter window. This group object is hidden in actuator mode. This group object outputs the control value for heating. Use of a physical device output for heating: • The group object contains the control value that the controller uses to actuate the output. Actuation of heating only via group object (no internal use): • The control value for controlling a different actuator is sent using this group object.				
50	**Status cooling control value**	**Channel A - Controller**	**1 byte** **DPT 5.001**	**C, R, T**
This group object is enabled if the *Deactivated* option has not been selected for the *Controller setting cooling* parameter in the *Application parameters* parameter window. This group object is hidden in actuator mode. This group object outputs the control value for cooling. Use of a physical device output for cooling: • The group object contains the control value that the controller uses to actuate the output. Actuation of the cooling only via group object (no internal use): • The control value for controlling a different actuator is sent using this group object.				

No.	Object function	Name	Data type	Flags
54	**Supply flow temperature via KNX**	**Channel A - Controller**	**2 bytes** **DPT 9.001**	**C, W**
This group object is enabled if, in the *a: Supply flow temperature* parameter window, the *Via group object* option has been selected for the *Use temperature input* parameter. This group object cannot be activated in actuator mode. The supply flow actual temperature is received via the KNX bus using this group object; this value is then used as the basis for the control of the supply flow temperature. **Note** This group object value is evaluated after the device is restarted.				
56	**Supply flow temperature malfunction**	**Channel A - Controller**	**1 bit** **DPT 1.002**	**C, R, T**
This group object is enabled if the *Deactivated* option has not been selected for the *Monitor supply flow temperature* parameter in the *Monitoring and safety* parameter window. This group object cannot be activated in actuator mode. If the temperature monitoring time for the input is exceeded, or if a fault is detected 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: 1: Fault: actual temperature 0: No fault				
57	**Current setpoint**	**Channel A - 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. This group object outputs the current setpoint temperature.				
62	**Status heating**	**Channel A - Controller**	**1 bit** **DPT 1.001**	**C, R, T**
This group object is enabled if the *Deactivated* option has not been selected for the *Controller setting heating* parameter in the *Application parameters* parameter window. This group object is hidden in actuator mode. The device indicates via this group object whether it is currently in the "active" type of operation, i.e. whether the control value is greater than 0. Telegram value: 1: Heating control value > 0 0: Heating control value = 0				

No.	Object function	Name	Data type	Flags
63	**Status cooling**	**Channel A - Controller**	**1 bit** **DPT 1.001**	**C, R, T**
This group object is enabled if the *Deactivated* option has not been selected for the *Controller setting cooling* parameter in the *Application parameters* parameter window. This group object is hidden in actuator mode. The device indicates via this group object whether it is currently in the "active" type of operation, i.e. whether the control value is greater than 0. Telegram value: 1: Cooling control value > 0 0: Cooling control value = 0				
64	**Activate minimum control value (basic load)**	**Channel A - Controller**	**1 bit** **DPT 1.003**	**C, W**
This group object is enabled if the *Activate via object* option has been selected for the *Minimum control value for basic load > 0* parameter in the *Temperature controller* parameter window. This group object is hidden in actuator mode. Sending the value 1 via this group objects activates the basic load. The basic load is a minimum control value that must not be dropped below. The basic load value can be specified separately for the heating circuit and cooling circuit control. The basic load is always activated jointly for all stages, but it is active only for the active type of operation *heating* or *cooling* 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 dropped below to protect the installation. Telegram value: 1: Basic load active 0: Basic load inactive				
65	**Heating/cooling changeover**	**Channel A - Controller**	**1 bit** **DPT 1.100**	**C, W**
This group object is enabled if the controller has been parameterized for both heating and for cooling. For this purpose, *Deactivated* must not be selected for the *Controller setting heating* and *Controller setting cooling* parameters in the *Application parameters* parameter window. This group object changes between heating and cooling types of operation. Telegram value: 1: Heating 0: Cooling				

No.	Object function	Name	Data type	Flags
73	**Control On/Off**	**Channel A - Controller**	**1 bit** **DPT 1.001**	**C, W**
This group object is always visible in controller mode. This group object is hidden in actuator mode. This controller can be switched off using this group object. On the reception of the value 0, the controller changes to the "Inactive mode". This situation causes control to switch off. All control values are set to 0. Control can be reactivated by sending the value 1 via this group object. Telegram value: 1: Activate control (On) 0: Deactivate control (Off)				
74	**Status control On/Off**	**Channel A - Controller**	**1 bit** **DPT 1.001**	**C, R, T**
This group object is always visible in controller mode. This group object is hidden in actuator mode. Using this group object the device signals whether control is currently active (On) or inactive (Off). Telegram value: 1: Control inactive (Off) 0: Control active (On)				
86	**Heating setpoint temperature**	**Channel A - Controller**	**2 bytes** **DPT 9.001**	**C, W**
This group object is enabled if the *Deactivated* option has not been selected for the *Controller setting heating* parameter in the *Application parameters* parameter window. Via this group object the controller receives the setpoint temperature for the heating circuit that is then used for control.				
87	**Cooling setpoint temperature**	**Channel A - Controller**	**2 bytes** **DPT 9.001**	**C, W**
This group object is enabled if the *Deactivated* option has not been selected for the *Controller setting cooling* parameter in the *Application parameters* parameter window. Via this group object the controller receives the setpoint temperature for the cooling circuit that is then used for control.				
94	**Heating control value**	**Channel A - Actuator**	**1 byte** **DPT 5.001**	**C, W**
This group object is enabled if the *Actuator device* option has been selected for the *Device function* parameter in the *Application parameters* parameter window. Via this group object the device receives, if it is operated as an actuator, the control value that is to be used to actuate the valve.				

No.	Object function	Name	Data type	Flags
95	**Cooling control value**	**Channel A - Actuator**	**1 byte** **DPT 5.001**	**C, W**
This group object is enabled if the *Actuator device* option has been selected for the *Device function* parameter in the *Application parameters* parameter window. Via this group object the device receives, if it is operated as an actuator, the control value that is to be used to actuate the valve.				
96	**Temperature input safety shutdown heating**	**Channel A - Controller**	**2 bytes** **DPT 9.001**	**C, W, T, U**
This group object is enabled if the *Yes* option has been selected for the *Enable safety shutdown* parameter in the *Temperature controller – Heating* parameter window, and the *Via group object* option has been selected for the *Temperature input for temperature limit sensor* parameter. This group object is hidden in controller mode. The limit temperature for *heating* is received via this group object. The temperature value received here is used to evaluate the limit temperature. The limit becomes active when the temperature set in the *Limit temperature* parameter is exceeded.				
98	**Temperature input safety shutdown cooling**	**Channel A - Controller**	**2 bytes** **DPT 9.001**	**C, W, T, U**
This group object is enabled if the *Yes* option has been selected for the *Enable safety shutdown* parameter in the *Temperature controller – Cooling* parameter window, and the *Via group object* option has been selected for the *Temperature input for temperature limit sensor* parameter. This group object is hidden in controller mode. The limit temperature for *cooling* is received via this group object. The temperature value received here is used to evaluate the limit temperature. The limit becomes active when the temperature set in the *Limit temperature* parameter is dropped below.				
100	**Safety shutdown (temperature reached)**	**Channel A - Controller**	**1 bit** **DPT 1.005**	**C, R, T**
This group object is enabled if the *Yes* option has been selected for the *Enable safety shutdown* parameter in the *Temperature controller – Heating* parameter window or in the *Temperature controller – Cooling* parameter window. This group object indicates whether the safety temperature parameterized has been exceeded or dropped below in the currently active type of operation (heating or cooling) and therefore the safety shutdown has been triggered. Telegram value: 1: Safety shutdown active/triggered 0: Safety shutdown inactive/ not triggered				

No.	Object function	Name	Data type	Flags
138	**Status heating/cooling**	**Channel B - Controller**	**1 bit** **DPT 1.100**	**C, R, T**
This group object is enabled if the *Deactivated* option has not been selected for the *Controller setting heating* and *Controller setting cooling* parameters in the *Application parameters* parameter window. This group object is hidden in actuator mode. This 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: 1: Heating 0: Cooling				
139	**Status heating control value**	**Channel B - Controller**	**1 byte** **DPT 5.001**	**C, R, T**
This group object is enabled if the *Deactivated* option has not been selected for the *Controller setting heating* parameter in the *Application parameters* parameter window. This group object is hidden in actuator mode. This group object outputs the control value for heating. Use of a physical device output for heating: • The group object contains the control value that the controller uses to actuate the output. Actuation of heating only via group object (no internal use): The control value for controlling a different actuator is sent using this group object.				
141	**Status cooling control value**	**Channel B - Controller**	**1 byte** **DPT 5.001**	**C, R, T**
This group object is enabled if the *Deactivated* option has not been selected for the *Controller setting cooling* parameter in the *Application parameters* parameter window. This group object is hidden in actuator mode. This group object outputs the control value for cooling. Use of a physical device output for cooling: • The group object contains the control value that the controller uses to actuate the output. Actuation of the cooling only via group object (no internal use): The control value for controlling a different actuator is sent using this group object.				

No.	Object function	Name	Data type	Flags
145	**Supply flow temperature via KNX**	**Channel B - Controller**	**2 bytes DPT 9.001**	**C, W**
This group object is enabled if, in the *a: Supply flow temperature* parameter window, the *Via group object* option has been selected for the *Use temperature input* parameter. This group object cannot be activated in actuator mode. The supply flow actual temperature is received via the KNX bus using this group object; this value is then used as the basis for the control of the supply flow temperature. **Note** This group object value is evaluated after the device is restarted.				
147	**Supply flow temperature malfunction**	**Channel B - Controller**	**1 bit DPT 1.002**	**C, R, T**
This group object is enabled if the *Deactivated* option has not been selected for the *Monitor supply flow temperature* parameter in the *Monitoring and safety* parameter window. This group object cannot be activated in actuator mode. If the temperature monitoring time for the input is exceeded, or if a fault is detected 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: 1: Fault: actual temperature 0: No fault				
148	**Current setpoint**	**Channel B - 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. This group object outputs the current setpoint temperature.				
153	**Status heating**	**Channel B - Controller**	**1 bit DPT 1.001**	**C, R, T**
This group object is enabled if the *Deactivated* option has not been selected for the *Controller setting heating* parameter in the *Application parameters* parameter window. This group object is hidden in actuator mode. The device indicates via this group object whether it is currently in the "active" type of operation, i.e. whether the control value is greater than 0. Telegram value: 1: Heating control value > 0 0: Heating control value = 0				

No.	Object function	Name	Data type	Flags
154	**Status cooling**	**Channel B - Controller**	**1 bit** **DPT 1.001**	**C, R, T**
This group object is enabled if the *Deactivated* option has not been selected for the *Controller setting cooling* parameter in the *Application parameters* parameter window. This group object is hidden in actuator mode. The device indicates via this group object whether it is currently in the "active" type of operation, i.e. whether the control value is greater than 0. Telegram value: 1: Cooling control value > 0 0: Cooling control value = 0				
155	**Activate minimum control value (basic load)**	**Channel B - Controller**	**1 bit** **DPT 1.003**	**C, W**
This group object is enabled if the *Activate via object* option has been selected for the *Minimum control value for basic load > 0* parameter in the *Temperature controller* parameter window. This group object is hidden in actuator mode. Sending the value 1 via this group objects activates the basic load. The basic load is a minimum control value that must not be dropped below. The basic load value can be specified separately for the heating circuit and cooling circuit control. The basic load is always activated jointly for all stages, but it is active only for the active type of operation *heating* or *cooling* 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 dropped below to protect the installation. Telegram value: 1: Basic load active 0: Basic load inactive				
156	**Heating/cooling changeover**	**Channel B - Controller**	**1 bit** **DPT 1.100**	**C, W**
This group object is enabled if the controller has been parameterized for both heating and for cooling. For this purpose, *Deactivated* must not be selected for the *Controller setting heating* and *Controller setting cooling* parameters in the *Application parameters* parameter window. This group object changes between heating and cooling types of operation. Telegram value: 1: Heating 0: Cooling				

No.	Object function	Name	Data type	Flags
164	**Control On/Off**	**Channel B - Controller**	**1 bit** **DPT 1.001**	**C, W**
This group object is always visible in controller mode. This group object is hidden in actuator mode. This controller can be switched off using this group object. On the reception of the value 0, the controller changes to the "Inactive mode". This situation causes control to switch off. All control values are set to 0. Control can be reactivated by sending the value 1 via this group object. Telegram value: 1: Activate control (On) 0: Deactivate control (Off)				
165	**Status control On/Off**	**Channel B - Controller**	**1 bit** **DPT 1.001**	**C, R, T**
This group object is always visible in controller mode. This group object is hidden in actuator mode. Using this group object the device signals whether control is currently active (On) or inactive (Off). Telegram value: 1: Control inactive (Off) 0: Control active (On)				
177	**Heating setpoint temperature**	**Channel B - Controller**	**2 bytes** **DPT 9.001**	**C, W**
This group object is enabled if the *Deactivated* option has not been selected for the *Controller setting heating* parameter in the *Application parameters* parameter window. Via this group object the controller receives the setpoint temperature for the heating circuit that is then used for control.				
178	**Cooling setpoint temperature**	**Channel B - Controller**	**2 bytes** **DPT 9.001**	**C, W**
This group object is enabled if the *Deactivated* option has not been selected for the *Controller setting cooling* parameter in the *Application parameters* parameter window. Via this group object the controller receives the setpoint temperature for the cooling circuit that is then used for control.				
185	**Heating control value**	**Channel B - Actuator**	**1 byte** **DPT 5.001**	**C, W**
This group object is enabled if the *Actuator device* option has been selected for the *Device function* parameter in the *Application parameters* parameter window. Via this group object the device receives, if it is operated as an actuator, the control value that is to be used to actuate the valve.				

No.	Object function	Name	Data type	Flags
186	**Cooling control value**	**Channel B - Actuator**	**1 byte** **DPT 5.001**	**C, W**
This group object is enabled if the *Actuator device* option has been selected for the *Device function* parameter in the *Application parameters* parameter window. Via this group object the device receives, if it is operated as an actuator, the control value that is to be used to actuate the valve.				
187	**Temperature input safety shutdown heating**	**Channel B - Controller**	**2 bytes** **DPT 9.001**	**C, W, T, U**
This group object is enabled if the *Yes* option has been selected for the *Enable safety shutdown* parameter in the *Temperature controller – Heating* parameter window, and the *Via group object* option has been selected for the *Temperature input for temperature limit sensor* parameter. This group object is hidden in controller mode. The limit temperature for *heating* is received via this group object. The temperature value received here is used to evaluate the limit temperature. The limit becomes active when the temperature set in the *Limit temperature* parameter is exceeded.				
189	**Temperature input safety shutdown cooling**	**Channel B - Controller**	**2 bytes** **DPT 9.001**	**C, W, T, U**
This group object is enabled if the *Yes* option has been selected for the *Enable safety shutdown* parameter in the *Temperature controller – Cooling* parameter window, and the *Via group object* option has been selected for the *Temperature input for temperature limit sensor* parameter. This group object is hidden in controller mode. The limit temperature for *cooling* is received via this group object. The temperature value received here is used to evaluate the limit temperature. The limit becomes active when the temperature set in the *Limit temperature* parameter is dropped below.				
191	**Safety shutdown (temperature reached)**	**Channel B - Controller**	**1 bit** **DPT 1.005**	**C, R, T**
This group object is enabled if the *Yes* option has been selected for the *Enable safety shutdown* parameter in the *Temperature controller – Heating* parameter window or in the *Temperature controller – Cooling* parameter window. This group object indicates whether the safety temperature parameterized has been exceeded or dropped below in the currently active type of operation (heating or cooling) and therefore the safety shutdown has been triggered. Telegram value: 1: Safety shutdown active/triggered 0: Safety shutdown inactive/ not triggered				

Table 49: Group objects, Controller

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 HCC/S 2.x.2.1.

For a complete overview of the control elements, see chapter 3.1, 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 ETS. The *Status manual operation* group object 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 illuminates 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

If manual operation is generally disabled or disabled via the *Enable/ disable manual operation* group object, the LED remains off.
A switchover from *KNX operation* to the *Manual operation* type of operation 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. The only exception here is the change in the active pump in the double pump mode. If such a change is made via the manual operation, the change remains even after the deactivation of the manual operation.
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.

10 Maintenance and cleaning

10.1 Maintenance

The device is maintenance-free. In the event of damage (e.g. during transport and/or storage), do not carry out any repairs.

10.2 Cleaning

The supply of electrical power 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.

11 Disassembly and disposal

11.1 Removal

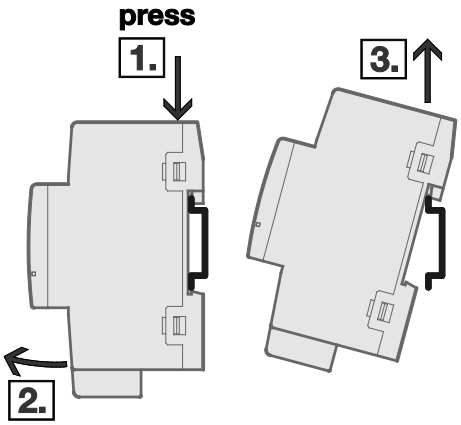


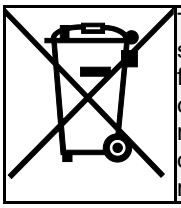
Fig. 33: Removal from the DIN rail

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

Give consideration to the protection of the environment.

Used electrical and electronic devices must not be disposed of as domestic waste.



The device contains valuable raw materials that can be recycled. Therefore, please take 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 www.abb.com/knx.

12.2 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.

3-point valve drives are connected via three connecting cables. The opening and closing wires are connected to terminals A and B. Using 3-point valve drives, the valve can be opened by any desired percentage and this position can be retained without the application of any further energy. If the valve does not move, there is no voltage applied to the motor.

12.3 Priorities

12.3.1 Controller mode

Valve

a) Bus voltage failure
b) Forced operation
c) i-bus Tool
d) Direct operation via membrane keypad (only HCC/S 2.x.2.1)
e) Manual valve override
f) Normal operation of control
g) Bus voltage recovery

Pump

a) Safety mode of pump on fault and repair
b) Bus voltage failure
c) Forced operation
d) i-bus Tool
e) Direct operation via membrane keypad (only HCC/S 2.x.2.1)
f) Manual pump override
g) Pump automatic mode (depending on the valve control value)
h) Bus voltage recovery

12.3.2 Actuator mode

Valve

a) Bus voltage failure
b) Forced operation
c) i-bus Tool
d) Direct operation via membrane keypad (only HCC/S 2.x.2.1)
e) Manual valve override
f) Control value normal mode
g) Bus voltage recovery

Pump

a) Safety mode of pump on fault and repair
b) Bus voltage failure
c) Forced operation
d) i-bus Tool
e) Direct operation via membrane keypad (only HCC/S 2.x.2.1)
f) Manual pump override
g) Pump automatic mode (depending on the valve control value)
h) Bus voltage recovery

12.4 PI controller (continuous)

12.4.1 Continuous control

With continuous control, a control value is calculated based on the setpoint temperature and the actual temperature, and is used to set the temperature optimally. 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.

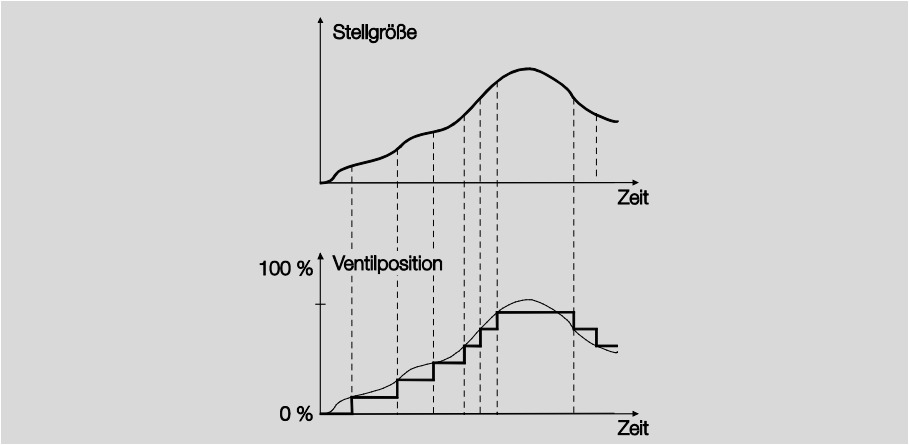


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Fig. 34: Continuous control

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. It is implemented via 1-byte actuation.

Note

What is 1-byte actuation?
For 1-byte actuation, 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.

12.4.2 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 into a 1-bit PWM on/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 on/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 appropriate 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 is sufficient.
- 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.

12.4.3 PI controller (continuous) for fan coil unit

This controller works the same way as the PI controller (continuous). Additionally however, depending on the control value, the fan output integrated into the device is controlled to be able to control a fan coil unit.

13 Appendix

13.1 Scope of delivery

The heating/cooling circuit controller is supplied together with the following components. The items delivered should be checked against the list below

- 1 Heating/cooling circuit controller, alternatively:
  - HCC/S 2.1.1.1: Heating/cooling circuit controller, 0…10 V, MDRC
  - HCC/S 2.1.2.1: Heating/cooling circuit controller, 0…10 V, manual operation, MDRC
  - HCC/S 2.2.1.1: Heating/cooling circuit controller, 3-point, MDRC
  - HCC/S 2.2.2.1: Heating/cooling circuit controller, 3-point, 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 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

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
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

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
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

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	

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							

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	

63	3F			X	X	X	X	X	X
64	40		X						
65	41		X						X

129	81	X							X
130	82	X						X	
131	83	X						X	X

195	C3	X	X					X	X
196	C4	X	X				X		
197	C5	X	X				X		X

Table 50: Status byte valve

13.3 Status byte channel

Bit No.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Not assigned	Not assigned	Not assigned	Safety mode	Direct operation via membrane keypad	Manual valve override	Forced operation	Manual pump override
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			

Bit No.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Not assigned	Not assigned	Not assigned	Safety mode	Direct operation via membrane keypad	Manual valve override	Forced operation	Manual pump override
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	

Bit No.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Not assigned	Not assigned	Not assigned	Safety mode	Direct operation via membrane keypad	Manual valve override	Forced operation	Manual pump override
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		

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

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

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

Table 51: Status byte channel

13.4 Notes

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