PRODUCT MANUAL

ABB i-bus® KNX

HCC/S 2.x.x.1

Heating/cooling circuit controller

Table of contents

1 About this document

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

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1.3 Explanation of symbols

1. 2. ⇨	Instructions in specified sequence and result
▶	Individual actions
a)	Priorities
1)	Processes run by the device in a specific sequence
•	List level 2
–	List level 2

Tab. 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.

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

Example
For use in application, installation and programming examples

Note
For use in tips on use and operation

1.4 2D code

The packaging and the device are labeled with a 2D code. These codes are used for unique identification of the device and include the following information:

- Link to the product page
- Order number
- ABB device serial number

The 2D codes can be read using any mobile device with an appropriate 2D code reader.

By scanning the 2D codes with the ABB Product Scanner, you can open additional digital services.

2 Safety

2.1 General safety instructions

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

2.2 Qualification of the specialist personnel

Programming the device requires detailed specialist knowledge – particularly about the ETS commissioning software – through KNX training courses.

2.3 Proper use

The Heating/Cooling Circuit Controllers HCC/S are intended to be used to control heating/cooling circuits in a KNX environment.

3 Product overview

3.1 Device description

The devices are modular installation devices (MDRC) in pro*M* design. They are designed for installation in electrical distribution boards and small housings with a 35 mm mounting rail (according to EN 60715).

The devices are KNX-certified and can be used as products in a KNX system
→ EU declaration of conformity.

The devices are powered via the bus (ABB i-bus® KNX) and require no additional auxiliary voltage.

The connection to the bus (ABB i-bus® KNX) is made via a KNX bus connection terminal on the front of the housing.

The connections at the inputs or outputs are made via screw terminals
→ terminal designation on the housing.

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

3.1.1 Membrane keypad

Depending on the product variant, the devices can be operated manually using the membrane keypad.

3.2 Product name description

The table below lists the product name descriptions of all devices in the product family.

Abbreviation	Description		
HCC	Heating/cooling circuit controller		
/S	MDRC		
x.	2	=	2-fold
x.	1	=	Analog valve drives (0 … 10 V)
	2	=	Thermoelectric Valve Drives (3-point)
x.	1	=	without manual operation
	2	=	with manual operation
x	x	=	Version number (x = 1, 2, etc.)

Tab. 2: Product name description

3.3 Ordering details

Description	MB	Type	Order no.	Packaging unit [pcs.]	Weight (incl. packaging) [kg]
Heating/cooling circuit controller	8	HCC/S 2.1.1.1	2CDG110218R0011	1	0,28
Heating/cooling circuit controller	8	HCC/S 2.1.2.1	2CDG110219R0011	1	0,29
Heating/cooling circuit controller	8	HCC/S 2.2.1.1	2CDG110220R0011	1	0,29
Heating/cooling circuit controller	8	HCC/S 2.2.2.1	2CDG110221R0011	1	0,29

Tab. 3: Ordering details

3.4 Connections

The devices possess the following connections:

- 10 inputs for sensors
- 2 valve outputs for activating analog and motor-driven valve drives
- 2 pump outputs
- 1 bus connection

The tables below provide an overview of the maximum number of devices that can be connected to the individual product variants.

Valve outputs

	HCC/S 2.1.X.1	HCC/S 2.2.X.1
Analog valve drives (0 … 10 V)	2	
Motor-driven valve drives (3-point)		2

Tab. 4: Valve outputs

Pump outputs

	HCC/S 2.1.X.1	HCC/S 2.2.X.1
Pumps, 1-phase	2	2
Double pump, 1-phase	1	1

Tab. 5: Pump outputs

Physical inputs

	HCC/S 2.1.X.1	HCC/S 2.2.X.1
Binary sensors (floating)	6	6
Temperature sensors	4	4

Tab. 6: Physical inputs

3.4.1 Inputs

Function	a	b	c	d	e	f	g	h	i	j
Temperature sensor										
PT100	x	x				x	x			
PT1000	x	x				x	x			
KT/KTY	x	x				x	x			
KT/KTY user-defined	x	x				x	x			
NTC10k	x	x				x	x			
NTC20k	x	x				x	x			
NI-1000	x	x				x	x			
Binary sensor (floating)			x	x	x			x	x	x
Pump status (floating contact)			x					x		
Pump fault (floating contact)				x					x	
Pump repair switch (floating contact)					x					x

Tab. 7: Function of the inputs

3.4.2 Outputs

3.4.2.1 Valve outputs

HCC/S 2.1.X.1

Function		A	B
Analog valve drives			
	0 … 10 V	x	x
	1 … 10 V	x	x
	2 … 10 V	x	x
	10 … 0 V	x	x
Fault detection (overload/short circuit)		x	x
Automatic closing if pump shut down		x	x

Tab. 8: Function of the valve outputs

HCC/S 2.2.X.1

Function	A	B
Motor-driven valve drive (3-point)	Open	Close
Fault detection (overload)	x	x
Automatic closing if pump shut down	x	x

Tab. 9: Function of the valve outputs

3.4.2.2 Pump outputs

Function		A	B
Individual pump			
	Automatic operation	x	x
	Direct operation	x	x
	Automatic switch off on fault	x	x
Double pump			
	Automatic operation	x	
	Direct operation	x	
	Automatic switch off on fault	x	
	Automatic weekly change	x	
	Automatic change on fault	x	

Tab. 10: Function of the pump outputs

3.5 Heating/Cooling Circuit Controller HCC/S 2.1.1.1

Fig. 1: Device illustration, HCC/S 2.1.1.1

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3.5.1 Dimension drawing

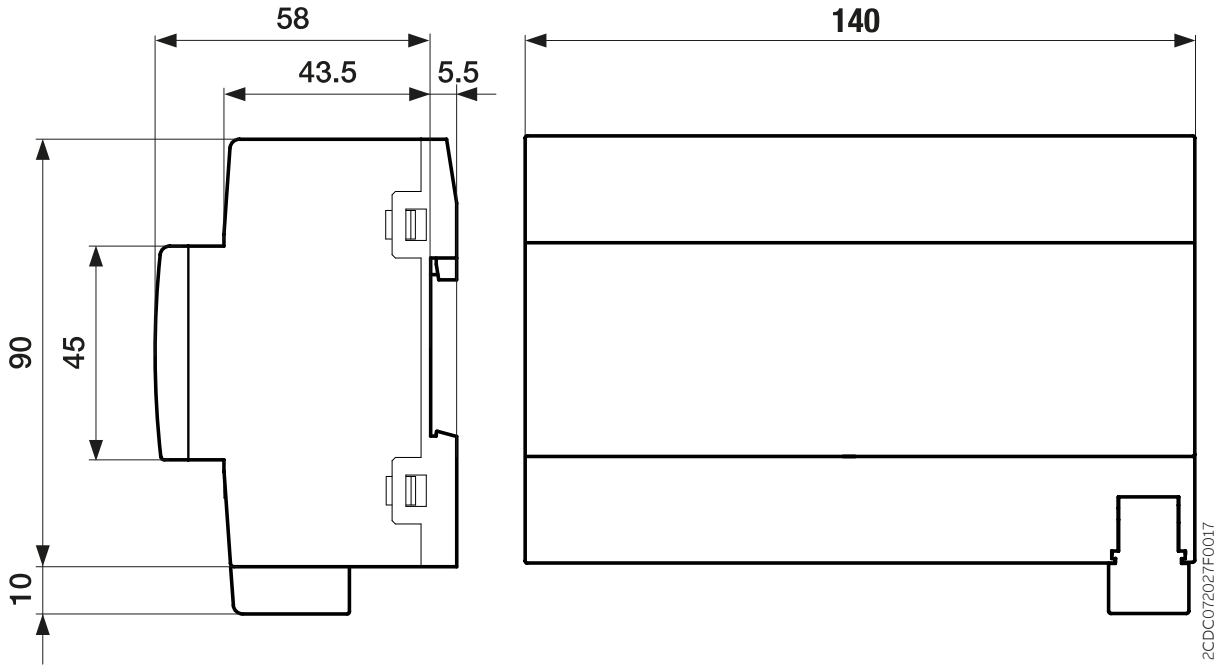

Fig. 2: Dimension drawing

3.5.2 Connection diagram

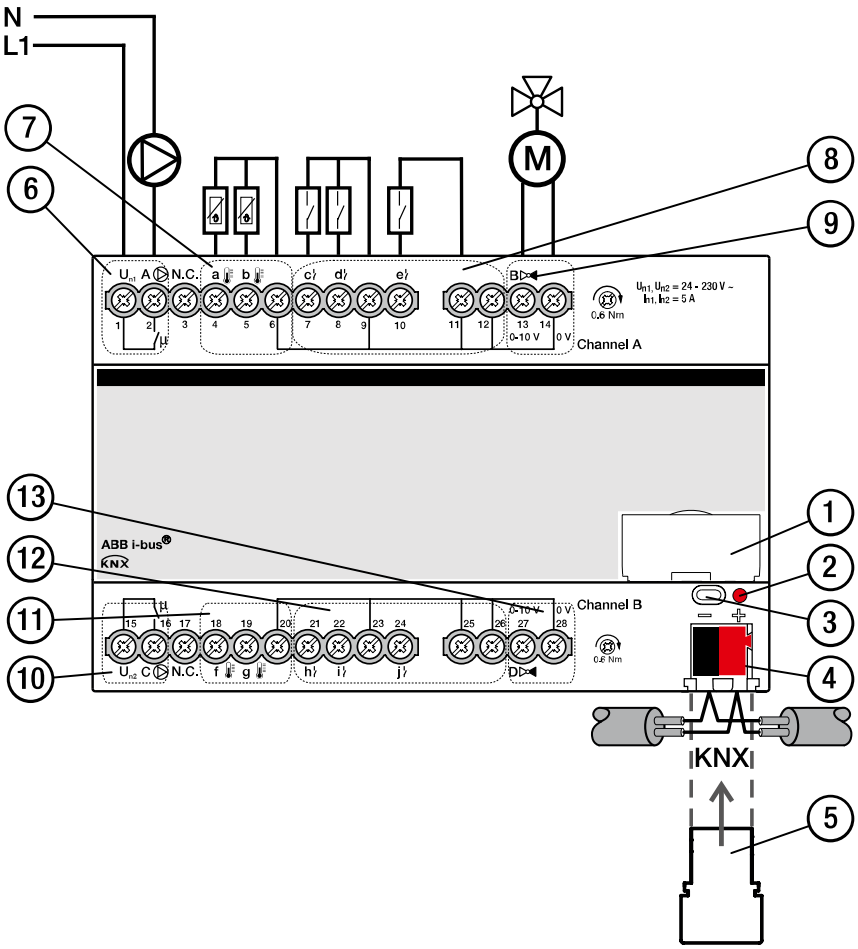

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Fig. 3: Connection diagram, HCC/S 2.1.1.1

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Legend

1 label carrier
2 *Programming* LED
3 *Programming* button
4 Bus connection terminal
5 Cover cap
6 Pump output channel A
7 Temperature input channel A
8 Binary input channel A

9 Valve output channel A
10 Pump output channel B
11 Temperature input channel B
12 Binary input channel B
13 Valve output channel B

3.5.3 Operating and display elements

Operating control/LED	Description/function	Display
 *Programming* button/LED	Assignment of the physical address	LED on: Device in programming mode

Tab. 11: Operating and display elements

3.5.4 Technical data

3.5.4.1 General technical data

		90 × 140 × 63.5 mm (H x W x D)
	Mounting width in space units	8 modules, 17.5 mm each
	Weight	0.24 kg
	Mounting position	Any
	Mounting variant	35 mm mounting rail
	Design	ProM
	Degree of protection	IP 20
	Protection class	II
	Overvoltage category	III
	Pollution degree	2
Materials	Housing	Polycarbonate, Makrolon FR6002, halogen free
Material note	Fire classification	Flammability V-0
Electronics	Rated voltage, bus	30 V DC
	Voltage range, bus	21 … 32 V DC
	Current consumption, bus	< 12 mA
	Power loss, device	≤ 3 W
	Power loss, bus	≤ 0.25 W
	Power loss, relay output 5 A	≤ 0.6 W
	KNX safety extra low voltage	SELV
Connections	Connection type, KNX bus	Plug-in terminal
	Cable diameter, KNX bus	0.6 … 0.8 mm, solid
	Connection type, inputs/outputs	Screw terminal with universal head (PZ 1)
	Pitch	6.35 mm
	Tightening torque, screw terminals	0.5 … 0.6 Nm
	Conductor cross-section, flexible	1 × (0.2 … 2.5 mm²) / 2 × (0.2 … 2.5 mm²)
	Conductor cross section, rigid	1 × (0.2 … 4 mm²) / 2 × (0.2 … 4 mm²)
	Conductor cross section with wire end ferrule without plastic sleeve	1 × (0.25 … 2.5 mm²)
	Conductor cross section with wire end ferrule with plastic sleeve	1 × (0.25 … 4 mm²)
	Conductor cross section with TWIN wire end ferrule	1 × (0.5 … 2.5 mm²)
	Length, wire end ferrule contact pin	≥ 10 mm
Certificates and declarations	Declaration of conformity CE	→ 2CDK508230D2701
Ambient conditions	Operation	-5 … +45 °C
	Transport	-25 … +70 °C
	Storage	-25 … +55 °C
	Humidity	≤ 95 %
	Condensation allowed	No
	Atmospheric pressure	≥ 80 kPa (corresponds to air pressure at 2,000 m above sea level)

Tab. 12: General technical data

3.5.4.2 Inputs - contact scanning

		6
Contact scanning	Scanning current	≤ 1 mA
	Scanning voltage	≤ 12 V DC
Cable length	Between sensor and device input, one-way	≤ 100 m

Tab. 13: Inputs - contact scanning

3.5.4.3 Inputs - temperature sensor

		4
Resistance	Selection	User-defined
	PT 1.000	2-conductor technology
	PT100	2-conductor technology
	KT	1k
	KTY	2k
	NI	1k
	NTC	10k, 20k
Cable length	Between sensor and device input, one-way	≤ 100 m

Tab. 14: Inputs - temperature sensor

3.5.4.4 Valve outputs – analog

		2
	Control signal	0 … 10 V DC
	Signal type	Analog
	Output load	> 10 kohms
	Output tolerance	± 10 %
	Current limitation	Up to 1.5 mA

Tab. 15: Valve outputs – analog

3.5.4.5 Pump outputs – relays 5 A

		2
	Rated voltage U_n	250 V AC
	Rated current I_n (per output)	5 A
	Rated frequency	50/60 Hz
	Back-up protection	≤ 6 A
	Relay type	Bi-stable
Switching currents	AC-1 operation (cos φ = 0.8)	≤ 5 A
	AC-3 operation (cos φ = 0.45)	≤ 5 A
	Switching current at 5 V AC	≥ 0.02 A
	Switching current at 12 V AC	≥ 0.01 A
	Switching current at 24 V AC	≥ 0.07 A
Service life	Mechanical service life	≥ 10^7 switching operations
	AC-1 operation (cos φ = 0.8)	≥ 10^6 switching operations
	AC-3 operation (cos φ = 0.45)	≥ 10^6 switching operations
Switching operations	Switching operations per minute when one relay switches	≤ 500

Tab. 16: Pump outputs – relays 5 A

3.5.4.6 Device type

Device type	Heating/cooling circuit controller	HCC/S 2.1.1.1
	Application	Heating/Cooling Circuit Controller, 0-10 V, 2f/ …
		… = current version number of the application
	Maximum number of group objects	106
	Maximum number of group addresses	255
	Maximum number of assignments	255

Tab. 17: Device type

Note
See software information on the website → www.abb.com/knx.

3.6 Heating/Cooling Circuit Controller HCC/S 2.1.2.1

Fig. 4: Device illustration, HCC/S 2.1.2.1

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3.6.1 Dimension drawing

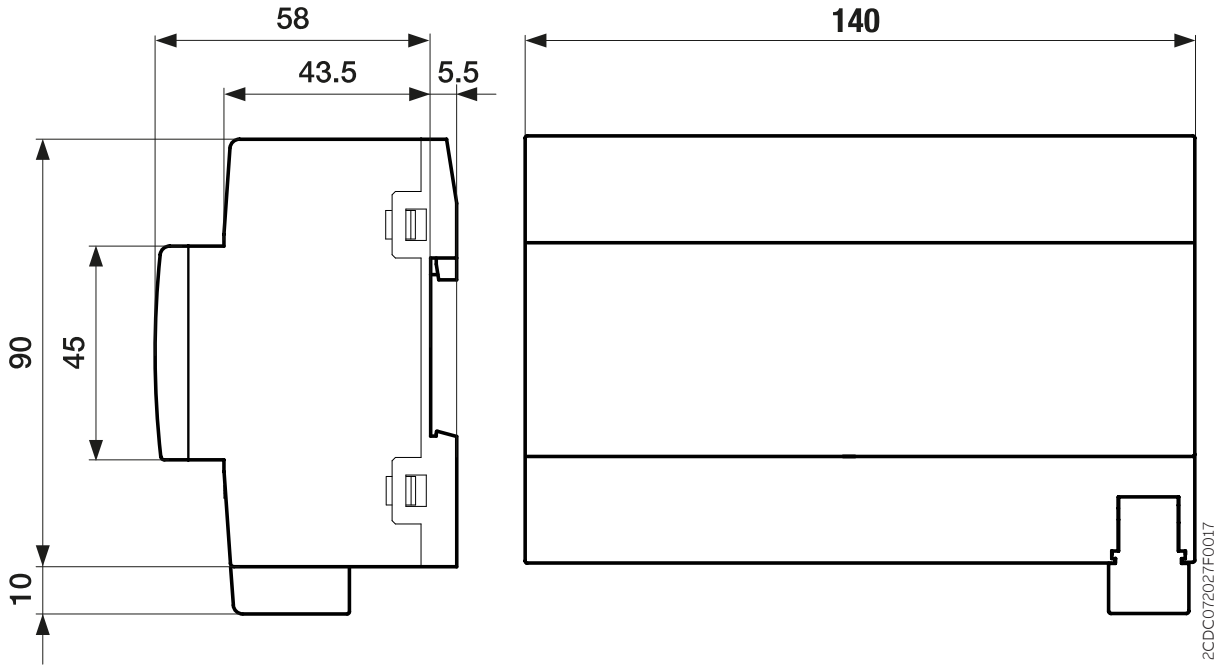

Fig. 5: Dimension drawing

3.6.2 Connection diagram

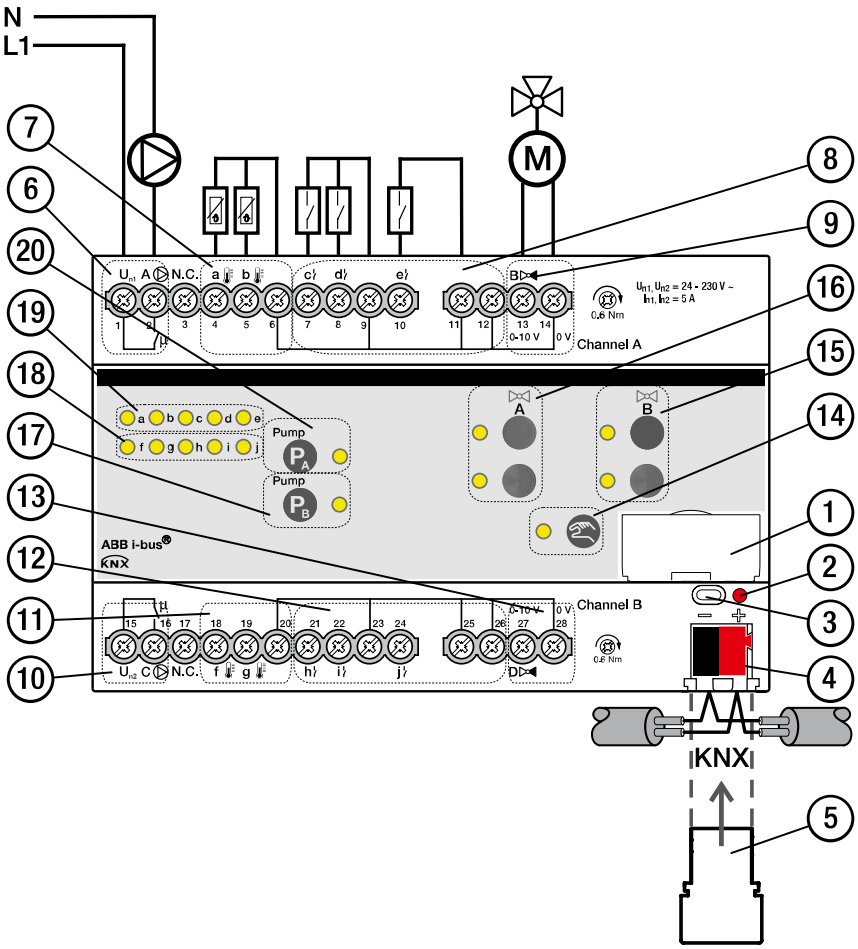

Fig. 6: Connection diagram, HCC/S 2.1.2.1

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Legend

1 label carrier
2 *Programming* LED
3 *Programming* button
4 Bus connection terminal
5 Cover cap
6 Pump output channel A
7 Temperature input channel A
8 Binary input channel A

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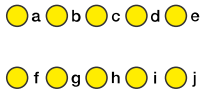
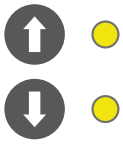
9 Valve output channel A
10 Pump output channel B
11 Temperature input channel B
12 Binary input channel B
13 Valve output channel B
14 *Manual operation* button/LED
15 *Valve output open/close channel B* button/LED
16 *Valve output open/close channel A* button/LED
17 *Pump output open/close channel B* button/LED
18 *Input channel B* LED
19 *Input channel A* LED
20 *Pump output open/close channel A* button/LED

3.6.3 Operating and display elements

Operating control/LED	Description/function	Display
 *Programming* button/LED	Assignment of the physical address	LED on: Device in programming mode

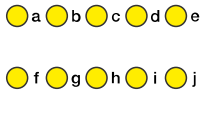
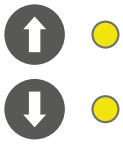
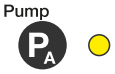
Tab. 18: Operating and display elements

3.6.3.1 Manual mode

Operating control/LED	Description/function	Display
 *Manual operation* button/LED	Activates the *KNX mode* with a short button push	LED On: *Manual operation* active LED Off: *KNX operation* active
 *Input* LED	Indication according to use of the inputs	Binary sensor: • LED On: Contact closed • LED Off: Contact open Temperature sensor: • LED On: Temperature sensor connected • LED flashing: Fault (cable break/short circuit)
 *Valve output open* button/LED	Sets the maximum valve control value (100 %) Resets the output with long button push > 5 s	LED On: Valve control value at 100 % LED flashing: Fault on the output (e.g. overload/short circuit)
 *Valve output close* button/LED	Sets the minimum valve control value (0 %)	LED On: Valve control value at 0 % LED flashing: Fault on the output (e.g. overload/short circuit)
		Both LEDs On: Valve control value between 1 and 99 % Both LEDs flashing: Fault on the output (e.g. overload/short circuit)
Pump  *Pump output open/close* button/LED	Opens/closes the pump output	LED On: Pump output (relay) closed LED Off: Pump output (relay) open
Pump  Pump 	If double pumps are used: Active pump change	LED On: Pump output (relay) closed LED Off: Pump output (relay) open

Tab. 19: Operating and display elements

3.6.3.2 KNX operation

Operating control/LED	Description/function	Display
 *Manual operation* button/LED	Activates the *Manual operation* mode with long button push > 5 s	LED On: *Manual operation* active LED Off: *KNX operation* active LED flashes when button is pushed: *Manual operation* deactivated via ETS
 *Input* LED	Indication according to use of the inputs	Binary sensor: • LED On: Contact closed • LED Off: Contact open Temperature sensor: • LED On: Temperature sensor connected • LED flashing: Fault (cable break/short circuit)
 *Valve output open* button/LED	Button without function	LED On: Valve control value at 100 % LED flashing: Fault on the output (e.g. overload/short circuit)
 *Valve output close* button/LED	Button without function	LED On: Valve control value at 0 % LED flashing: Fault on the output (e.g. overload/short circuit)
		Both LEDs On: Valve control value between 1 and 99 % Both LEDs flashing: Fault on the output (e.g. overload/short circuit)
Pump  *Pump output open/close* button/LED	Button without function	LED On: Pump output (relay) closed LED Off: Pump output (relay) open
Pump  Pump 	Buttons without function	If double pumps are used: LED On: Pump output (relay) closed LED Off: Pump output (relay) open

Tab. 20: Operating and display elements

3.6.4 Technical data

3.6.4.1 General technical data

		90 × 140 × 63.5 mm (H x W x D)
	Mounting width in space units	8 modules, 17.5 mm each
	Weight	0.24 kg
	Mounting position	Any
	Mounting variant	35 mm mounting rail
	Design	ProM
	Degree of protection	IP 20
	Protection class	II
	Overvoltage category	III
	Pollution degree	2
Materials	Housing	Polycarbonate, Makrolon FR6002, halogen free
Material note	Fire classification	Flammability V-0
Electronics	Rated voltage, bus	30 V DC
	Voltage range, bus	21 … 31 V DC
	Current consumption, bus	< 12 mA
	Power loss, device	≤ 3 W
	Power loss, bus	≤ 0.25 W
	Power loss, relay output 5 A	≤ 0.6 W
	KNX safety extra low voltage	SELV
Connections	Connection type, KNX bus	Plug-in terminal
	Cable diameter, KNX bus	0.6 … 0.8 mm, solid
	Connection type, inputs/outputs	Screw terminal with universal head (PZ 1)
	Pitch	6.35 mm
	Tightening torque, screw terminals	0.5 … 0.6 Nm
	Conductor cross-section, flexible	1 × (0.2 … 2.5 mm²) / 2 × (0.2 … 2.5 mm²)
	Conductor cross section, rigid	1 × (0.2 … 4 mm²) / 2 × (0.2 … 4 mm²)
	Conductor cross section with wire end ferrule without plastic sleeve	1 × (0.25 … 2.5 mm²)
	Conductor cross section with wire end ferrule with plastic sleeve	1 × (0.25 … 4 mm²)
	Conductor cross section with TWIN wire end ferrule	1 × (0.5 … 2.5 mm²)
	Length, wire end ferrule contact pin	≥ 10 mm
Certificates and declarations	Declaration of conformity CE	→ 2CDK508231D2701
Ambient conditions	Operation	-5 … +45 °C
	Transport	-25 … +70 °C
	Storage	-25 … +55 °C
	Humidity	≤ 95 %
	Condensation allowed	No
	Atmospheric pressure	≥ 80 kPa (corresponds to air pressure at 2,000 m above sea level)

Tab. 21: General technical data

3.6.4.2 Inputs - contact scanning

		6
Contact scanning	Scanning current	≤ 1 mA
	Scanning voltage	≤ 12 V DC
Cable length	Between sensor and device input, one-way	≤ 100 m

Tab. 22: Inputs - contact scanning

3.6.4.3 Inputs - temperature sensor

		4
Resistance	Selection	User-defined
	PT 1.000	2-conductor technology
	PT100	2-conductor technology
	KT	1k
	KTY	2k
	NI	1k
	NTC	10k, 20k
Cable length	Between sensor and device input, one-way	≤ 100 m

Tab. 23: Inputs - temperature sensor

3.6.4.4 Valve outputs – analog

		2
	Control signal	0 … 10 V DC
	Signal type	Analog
	Output load	> 10 kohms
	Output tolerance	± 10 %
	Current limitation	Up to 1.5 mA

Tab. 24: Valve outputs – analog

3.6.4.5 Pump outputs – relays 5 A

		2
	Rated voltage U_n	250 V AC
	Rated current I_n (per output)	5 A
	Rated frequency	50/60 Hz
	Back-up protection	≤ 6 A
	Relay type	Bi-stable
Switching currents	AC-1 operation (cos φ = 0.8)	≤ 5 A
	AC-3 operation (cos φ = 0.45)	≤ 5 A
	Switching current at 5 V AC	≥ 0.02 A
	Switching current at 12 V AC	≥ 0.01 A
	Switching current at 24 V AC	≥ 0.07 A
Service life	Mechanical service life	≥ 10^7 switching operations
	AC-1 operation (cos φ = 0.8)	≥ 10^6 switching operations
	AC-3 operation (cos φ = 0.45)	≥ 10^6 switching operations
Switching operations	Switching operations per minute when one relay switches	≤ 500

Tab. 25: Pump outputs – relays 5 A

3.6.4.6 Device type

Device type	Heating/cooling circuit controller	HCC/S 2.1.2.1
	Application	Heating-cooling circuit controller, 0-10 V, manual operation, 2f/ …
		… = current version number of the application
	Maximum number of group objects	108
	Maximum number of group addresses	255
	Maximum number of assignments	255

Tab. 26: Device type

Note
See software information on the website → www.abb.com/knx.

3.7 Heating/Cooling Circuit Controller HCC/S 2.2.1.1

Fig. 7: Device illustration, HCC/S 2.2.1.1

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3.7.1 Dimension drawing

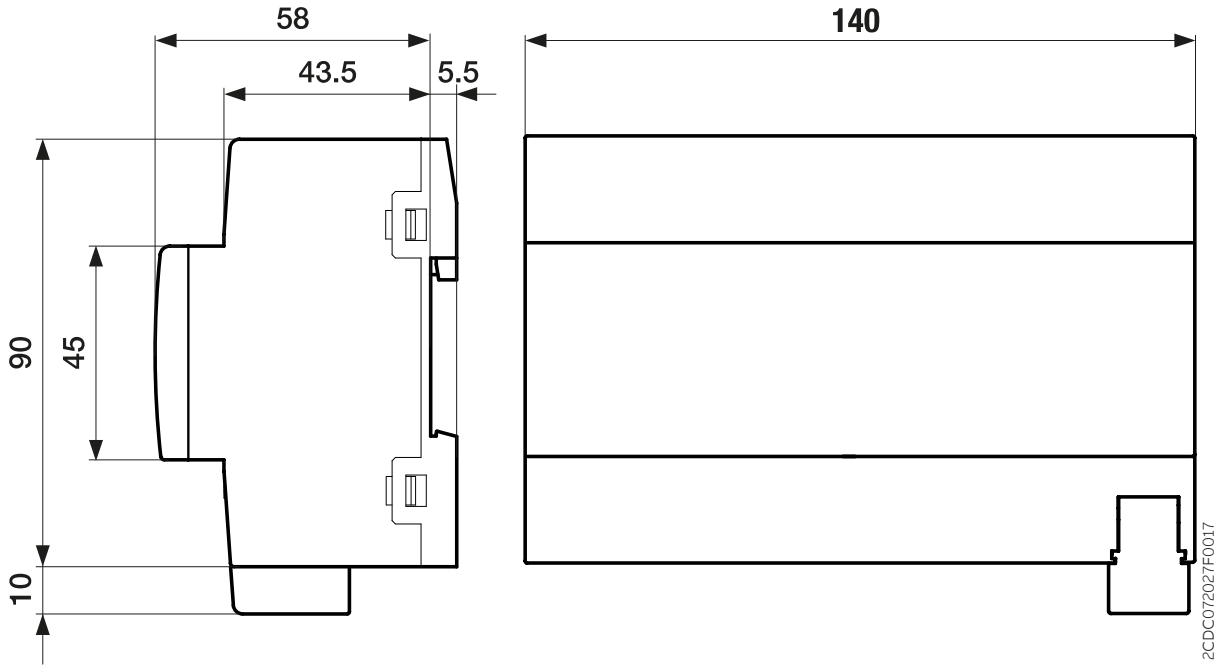

Fig. 8: Dimension drawing

3.7.2 Connection diagram

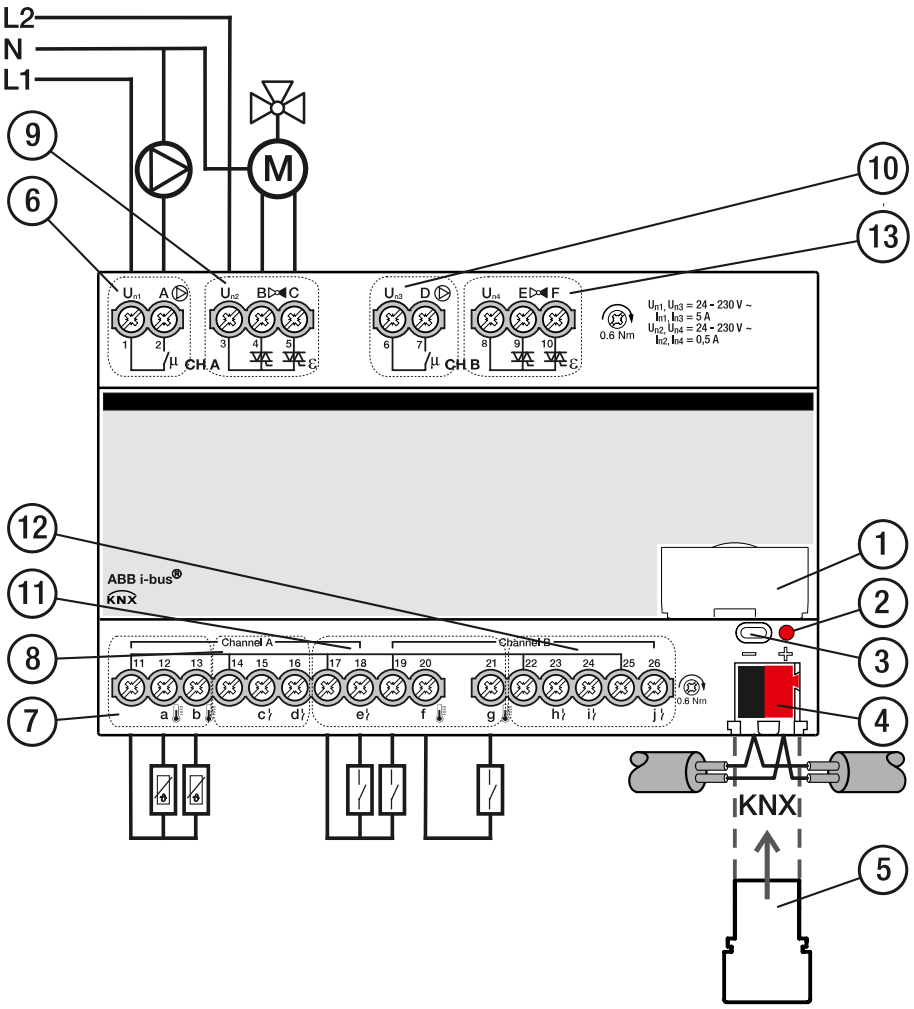

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Fig. 9: Connection diagram, HCC/S 2.2.1.1

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Legend

1 label carrier
2 *Programming* LED
3 *Programming* button
4 KNX bus connection terminal
5 Cover cap
6 Pump output channel A
7 Temperature input channel A
8 Binary input channel A
9 Valve output
10 Pump output channel B
11 Temperature input channel B
12 Binary input channel B
13 Valve output channel B

3.7.3 Operating and display elements

Operating control/LED	Description/function	Display
 *Programming* button/LED	Assignment of the physical address	LED on: Device in programming mode

Tab. 27: Operating and display elements

3.7.4 Technical data

3.7.4.1 General technical data

		90 × 140 × 63.5 mm (H x W x D)
	Mounting width in space units	8 modules, 17.5 mm each
	Weight	0.24 kg
	Mounting position	Any
	Mounting variant	35 mm mounting rail
	Design	ProM
	Degree of protection	IP 20
	Protection class	II
	Overvoltage category	III
	Pollution degree	2
Materials	Housing	Polycarbonate, Makrolon FR6002, halogen free
Material note	Fire classification	Flammability V-0
Electronics	Rated voltage, bus	30 V DC
	Voltage range, bus	21 … 32 V DC
	Current consumption, bus	< 12 mA
	Power loss, device	≤ 3 W
	Power loss, bus	≤ 0.25 W
	Power loss, relay output 5 A	≤ 0.6 W
	KNX safety extra low voltage	SELV
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	Connection type, inputs/outputs	Screw terminal with universal head (PZ 1)
	Pitch	6.35 mm
	Tightening torque, screw terminals	0.5 … 0.6 Nm
	Conductor cross-section, flexible	1 × (0.2 … 2.5 mm²) / 2 × (0.2 … 2.5 mm²)
	Conductor cross section, rigid	1 × (0.2 … 4 mm²) / 2 × (0.2 … 4 mm²)
	Conductor cross section with wire end ferrule without plastic sleeve	1 × (0.25 … 2.5 mm²)
	Conductor cross section with wire end ferrule with plastic sleeve	1 × (0.25 … 4 mm²)
	Conductor cross section with TWIN wire end ferrule	1 × (0.5 … 2.5 mm²)
	Length, wire end ferrule contact pin	≥ 10 mm
Certificates and declarations	Declaration of conformity CE	→ 2CDK508232D2701
Ambient conditions	Operation	-5 … +45 °C
	Transport	-25 … +70 °C
	Storage	-25 … +55 °C
	Humidity	≤ 95 %
	Condensation allowed	No
	Atmospheric pressure	≥ 80 kPa (corresponds to air pressure at 2,000 m above sea level)

Tab. 28: General technical data

3.7.4.2 Inputs - contact scanning

		6
Contact scanning	Scanning current	≤ 1 mA
	Scanning voltage	≤ 12 V DC
Cable length	Between sensor and device input, one-way	≤ 100 m

Tab. 29: Inputs - contact scanning

3.7.4.3 Inputs - temperature sensor

		4
Resistance	Selection	User-defined
	PT 1.000	2-conductor technology
	PT100	2-conductor technology
	KT	1k
	KTY	2k
	NI	1k
	NTC	10k, 20k
Cable length	Between sensor and device input, one-way	≤ 100 m

Tab. 30: Inputs - temperature sensor

3.7.4.4 Valve outputs – motor-driven

		2
	Non-floating	Yes
	Rated voltage U_n	230 V AC
	Voltage range	24 … 230 V AC
	Rated frequency	50/60 Hz
	Rated current I_n	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
	Inrush current at T_u Up to 45 °C	≤ 1.6 A (for 10 s)
		T_u = Ambient temperature
	Minimum load (per output)	1.2 VA

Tab. 31: Valve outputs – motor-driven

3.7.4.5 Pump outputs – relays 5 A

		2
	Rated voltage U_n	250 V AC
	Rated current I_n (per output)	5 A
	Rated frequency	50/60 Hz
	Back-up protection	≤ 6 A
	Relay type	Bi-stable
Switching currents	AC-1 operation (cos φ = 0.8)	≤ 5 A
	AC-3 operation (cos φ = 0.45)	≤ 5 A
	Switching current at 5 V AC	≥ 0.02 A
	Switching current at 12 V AC	≥ 0.01 A
	Switching current at 24 V AC	≥ 0.07 A
Service life	Mechanical service life	≥ 10^7 switching operations
	AC-1 operation (cos φ = 0.8)	≥ 10^6 switching operations
	AC-3 operation (cos φ = 0.45)	≥ 10^6 switching operations
Switching operations	Switching operations per minute when one relay switches	≤ 500

Tab. 32: Pump outputs – relays 5 A

3.7.4.6 Device type

Device type	Heating/cooling circuit controller	HCC/S 2.2.1.1
	Application	Heating/Cooling Circuit Controller, 3-point, 2f/ …
		… = current version number of the application
	Maximum number of group objects	106
	Maximum number of group addresses	255
	Maximum number of assignments	255

Tab. 33: Device type

Note
See software information on the website → www.abb.com/knx.

3.8 Heating/Cooling Circuit Controller HCC/S 2.2.2.1

Fig. 10: Device illustration, HCC/S 2.2.2.1

2CDC071015F0017

3.8.1 Dimension drawing

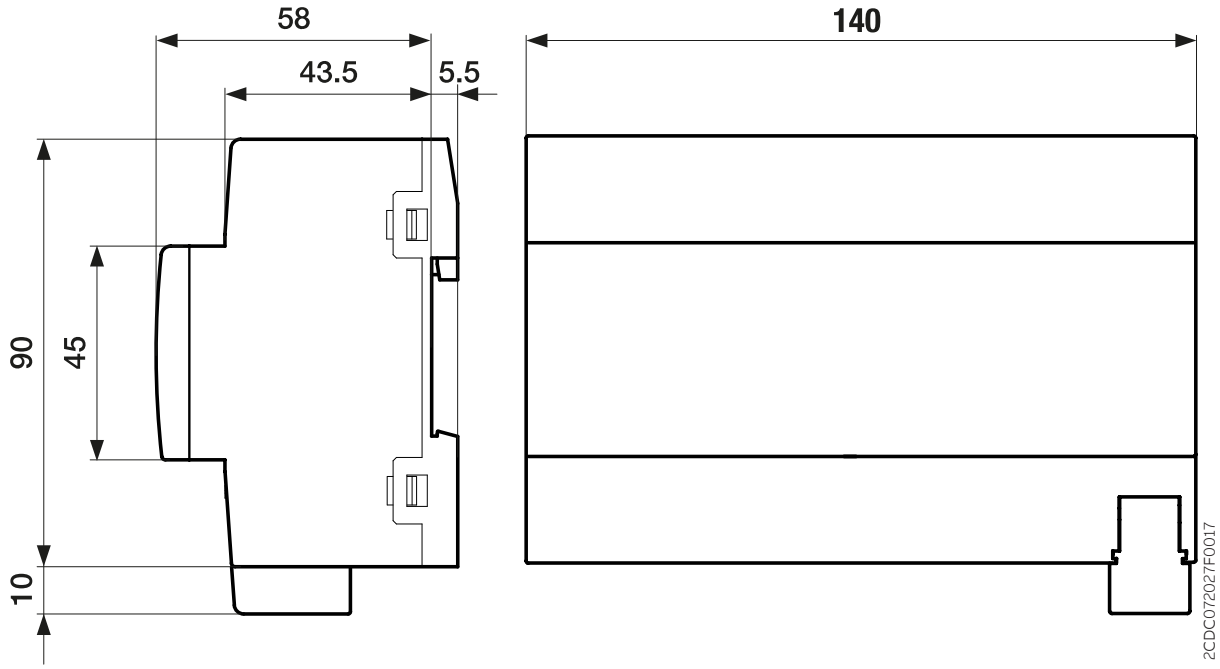


Fig. 11: Dimension drawing

3.8.2 Connection diagram

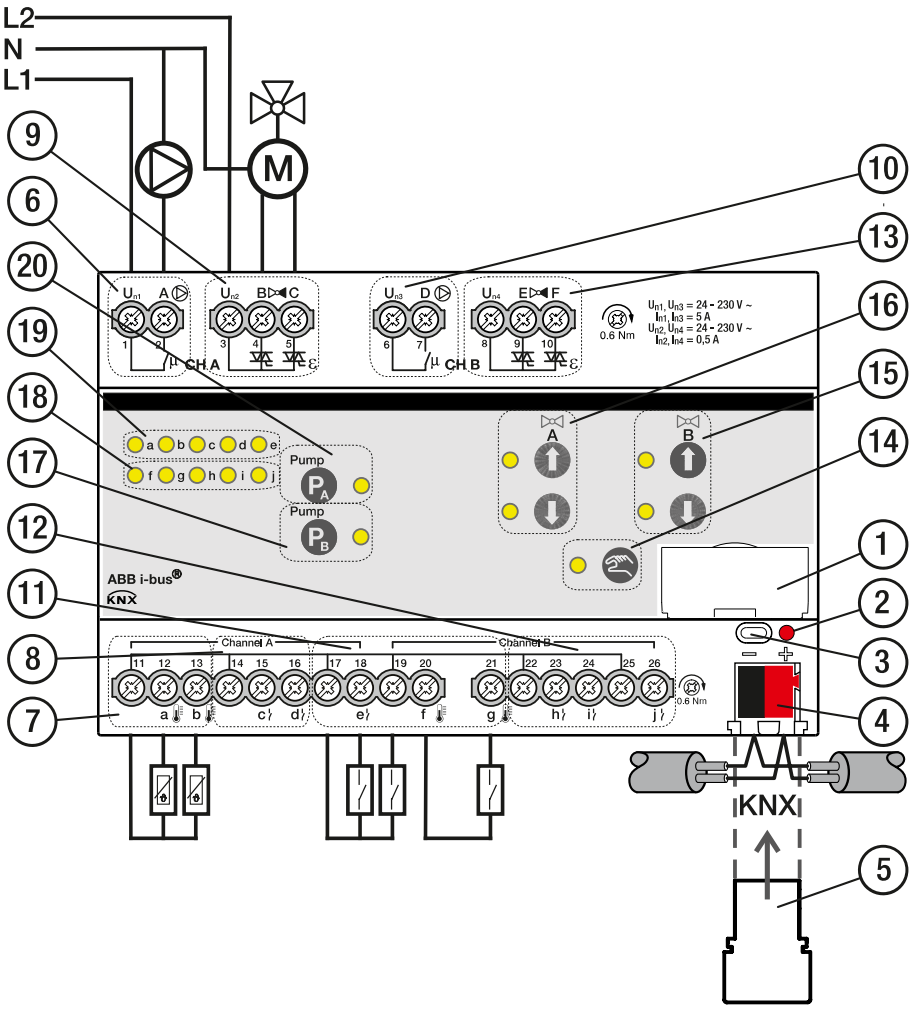


Fig. 12: Connection diagram, HCC/S 2.2.2.1

—

Legend

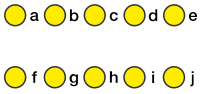
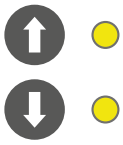
1 label carrier
2 *Programming* LED
3 *Programming* button
4 KNX bus connection terminal
5 Cover cap
6 Pump output channel A
7 Temperature input channel A
8 Binary input channel A
9 Valve output
10 Pump output channel B
11 Temperature input channel B
12 Binary input channel B
13 Valve output channel B
14 *Manual operation* button/LED
15 *Valve output open/close channel B* button/LED
16 *Valve output open/close channel A* button/LED
17 *Pump output open/close channel B* button/LED
18 *Input channel B* LED
19 *Input channel A* LED
20 *Pump output open/close channel A* button/LED

3.8.3 Operating and display elements

Operating control/LED	Description/function	Display
 *Programming* button/LED	Assignment of the physical address	LED on: Device in programming mode

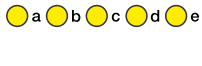
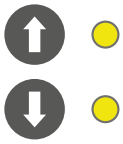
Tab. 34: Operating and display elements

3.8.3.1 Manual mode

Operating control/LED	Description/function	Display
 *Manual operation* button/LED	Activates the *KNX mode* with a short button push	LED On: *Manual operation* active LED Off: *KNX operation* active
 *Input* LED	Indication according to use of the inputs	Binary sensor: • LED On: Contact closed • LED Off: Contact open Temperature sensor: • LED On: Temperature sensor connected • LED flashing: Fault (cable break/short circuit)
 *Valve output open* button/LED	Sets the maximum valve control value (100 %) Resets the output with long button push > 5 s	LED on: Valve control value at 100 % LED flashing: Error on the output (e.g. overload)
 *Valve output close* button/LED	Sets the minimum valve control value (0 %)	LED on: Valve control value at 0 % LED flashing: Error on the output (e.g. overload)
		Both LEDs on: Valve control value between 1 and 99 % Both LEDs flashing: Error on the output (e.g. overload)
Pump  *Pump output open/close* button/LED	Opens/closes the pump output	LED On: Pump output (relay) closed LED Off: Pump output (relay) open
Pump  Pump 	If double pumps are used: Active pump change	LED On: Pump output (relay) closed LED Off: Pump output (relay) open

Tab. 35: Operating and display elements

3.8.3.2 KNX operation

Operating control/LED	Description/function	Display
 *Manual operation* button/LED	Activates the *Manual operation* mode with long button push > 5 s	LED On: *Manual operation* active LED Off: *KNX operation* active LED flashes when button is pushed: *Manual operation* deactivated via ETS
 *Input* LED	Indication according to use of the inputs	Binary sensor: • LED On: Contact closed • LED Off: Contact open Temperature sensor: • LED On: Temperature sensor connected • LED flashing: Fault (cable break/short circuit)
 *Valve output open* button/LED	Button without function	LED on: Valve control value at 100 % LED flashing: Error on the output (e.g. overload)
 *Valve output close* button/LED	Button without function	LED on: Valve control value at 0 % LED flashing: Error on the output (e.g. overload)
		Both LEDs on: Valve control value between 1 and 99 % Both LEDs flashing: Error on the output (e.g. overload)
Pump  *Pump output open/close* button/LED	Button without function	LED On: Pump output (relay) closed LED Off: Pump output (relay) open
Pump  Pump 	Buttons without function	If double pumps are used: LED On: Pump output (relay) closed LED Off: Pump output (relay) open

Tab. 36: Operating and display elements

3.8.4 Technical data

3.8.4.1 General technical data

		90 × 140 × 63.5 mm (H x W x D)
	Mounting width in space units	8 modules, 17.5 mm each
	Weight	0.24 kg
	Mounting position	Any
	Mounting variant	35 mm mounting rail
	Design	ProM
	Degree of protection	IP 20
	Protection class	II
	Overvoltage category	III
	Pollution degree	2
Materials	Housing	Polycarbonate, Makrolon FR6002, halogen free
Material note	Fire classification	Flammability V-0
Electronics	Rated voltage, bus	30 V DC
	Voltage range, bus	21 … 32 V DC
	Current consumption, bus	< 12 mA
	Power loss, device	≤ 3 W
	Power loss, bus	≤ 0.25 W
	Power loss, relay output 5 A	≤ 0.6 W
	KNX safety extra low voltage	SELV
Connections	Connection type, KNX bus	Plug-in terminal
	Cable diameter, KNX bus	0.6 … 0.8 mm, solid
	Connection type, inputs/outputs	Screw terminal with universal head (PZ 1)
	Pitch	6.35 mm
	Tightening torque, screw terminals	0.5 … 0.6 Nm
	Conductor cross-section, flexible	1 × (0.2 … 2.5 mm²) / 2 × (0.2 … 2.5 mm²)
	Conductor cross section, rigid	1 × (0.2 … 4 mm²) / 2 × (0.2 … 4 mm²)
	Conductor cross section with wire end ferrule without plastic sleeve	1 × (0.25 … 2.5 mm²)
	Conductor cross section with wire end ferrule with plastic sleeve	1 × (0.25 … 4 mm²)
	Conductor cross section with TWIN wire end ferrule	1 × (0.5 … 2.5 mm²)
	Length, wire end ferrule contact pin	≥ 10 mm
Certificates and declarations	Declaration of conformity CE	→ 2CDK508233D2701
Ambient conditions	Operation	-5 … +45 °C
	Transport	-25 … +70 °C
	Storage	-25 … +55 °C
	Humidity	≤ 95 %
	Condensation allowed	No
	Atmospheric pressure	≥ 80 kPa (corresponds to air pressure at 2,000 m above sea level)

Tab. 37: General technical data

3.8.4.2 Inputs - contact scanning

		6
Contact scanning	Scanning current	≤ 1 mA
	Scanning voltage	≤ 12 V DC
Cable length	Between sensor and device input, one-way	≤ 100 m

Tab. 38: Inputs - contact scanning

3.8.4.3 Inputs - temperature sensor

		4
Resistance	Selection	User-defined
	PT 1.000	2-conductor technology
	PT100	2-conductor technology
	KT	1k
	KTY	2k
	NI	1k
	NTC	10k, 20k
Cable length	Between sensor and device input, one-way	≤ 100 m

Tab. 39: Inputs - temperature sensor

3.8.4.4 Valve outputs – motor-driven

		2
	Non-floating	Yes
	Rated voltage U_n	230 V AC
	Voltage range	24 … 230 V AC
	Rated frequency	50/60 Hz
	Rated current I_n	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
	Inrush current at T_u Up to 45 °C	≤ 1.6 A (for 10 s)
		T_u = Ambient temperature
	Minimum load (per output)	1.2 VA

Tab. 40: Valve outputs - motor-driven

3.8.4.5 Pump outputs – relays 5 A

		2
	Rated voltage U_n	250 V AC
	Rated current I_n (per output)	5 A
	Rated frequency	50/60 Hz
	Back-up protection	≤ 6 A
	Relay type	Bi-stable
Switching currents	AC-1 operation (cos φ = 0.8)	≤ 5 A
	AC-3 operation (cos φ = 0.45)	≤ 5 A
	Switching current at 5 V AC	≥ 0.02 A
	Switching current at 12 V AC	≥ 0.01 A
	Switching current at 24 V AC	≥ 0.07 A
Service life	Mechanical service life	≥ 10^7 switching operations
	AC-1 operation (cos φ = 0.8)	≥ 10^6 switching operations
	AC-3 operation (cos φ = 0.45)	≥ 10^6 switching operations
Switching operations	Switching operations per minute when one relay switches	≤ 500

Tab. 41: Pump outputs – relays 5 A

3.8.4.6 Device type

Device type	Heating/cooling circuit controller	HCC/S 2.2.2.1
	Application	Heating/Cooling Circuit Controller, 3-point, manual operation, 2f/ …
		… = current version number of the application
	Maximum number of group objects	108
	Maximum number of group addresses	255
	Maximum number of assignments	255

Tab. 42: Device type

Note
See software information on the website → www.abb.com/knx.

4 Function

4.1 Device functions

The following functions for each channel are available for activating heating/cooling circuits:
- Controller channel
- Actuator channel

The two device channels are independent of each other. It is possible to control two different rooms. As an alternative, it is also possible to activate a double pump by combining both channels (channel bundling).

Controller channel

The internal controller is activated in the function as a controller channel. The controller is used to process the data received at the inputs (actual values) or via the bus (ABB i-bus® KNX) (actual values and setpoints). The control values are calculated from the data received and transmitted to the outputs.

Actuator channel

The internal controller is deactivated in the function as an actuator channel. The control values for activating the outputs are calculated by an external controller and received via the bus (ABB i-bus® KNX).

4.2 Software functions

4.2.1 Functional overview

Valve activation

Depending on the product variant, the following valve drives can be activated using the heating/cooling circuit controller HCC/S:
- Motor-driven valve drives (3-point)
- Analog valve drives (0 … 10 V)

Pump activation

Single-phase pumps can be activated directly or depending on the valve control value using the heating/cooling circuit controller HCC/S. Three binary inputs are available per channel for monitoring the pump status. As an alternative, it is also possible to activate a double pump by combining both channels (channel bundling).

Manual operation on the device is additionally possible with the following product variants:
- HCC/S 2.X.2.1

4.2.2 Safety mode

The safety mode is an operating state triggered by the device if cyclical monitoring is activated and the following errors or faults are present:

Fault Supply flow temperature

The following actions will be performed if no valid temperature is measured at the input for longer than one minute:
- Group Object *Fault Supply flow temperature* is set to "Error"
- Value in the parameter *Control value on input fault* becomes valid

If no value is received on group object *Supply flow temperature receipt* during the set time interval (→ parameter *Time interval for cyclical monitoring*), the following actions are carried out:
- Group Object *Fault Supply flow temperature* is set to "Error"
- Value in the parameter *Control value after exceeding monitoring time* becomes valid

The monitoring is activated in the parameter *Monitor supply flow temperature*.

Error Setpoint temperature receipt

If no value is received on the group object *Heating setpoint temperature* or *Cooling setpoint temperature* during the set time interval (→ parameter *Time interval for cyclical monitoring*), the following actions are carried out:
- Group object *Error Setpoint temperature receipt* is set to "Error"
- Values in the following parameters (depending on operating mode) become valid:
  - *Heating setpoint temperature when monitoring time exceeded*
  - *Cooling setpoint temperature when monitoring time exceeded*

The monitoring is activated in the parameter *Monitor receipt of Group Objects "Setpoint temperature heating/cooling"*.

Error Heating/cooling changeover receipt

If no value is received on group object *Heating/cooling changeover* during the set time interval (→ parameter *Time interval for cyclical monitoring*), the following actions are carried out:
- Group object *Error "Heating/cooling changeover" receipt* is set to "Error"
- Value in the parameter *Heating/cooling mode when monitoring time exceeded* becomes valid

The monitoring is activated in the parameter *Monitor receipt of Group Object "Heating/cooling changeover"*.

Error Pump fault receipt

If no value is received on group object *Pump fault* during the set time interval (→ parameter *Time interval for cyclical monitoring*), the following actions are carried out:
- Group object *Error "Pump fault" receipt* is set to "Error"
- The pump remains switched off and cannot be switched on until a new value is received in the group object *Pump fault*

The monitoring is activated in the parameter *Monitor receipt of Group Object "Status Pump fault"*.

Error Pump repair switch receipt

If no value is received on group object *Pump repair switch* during the set time interval (→ parameter *Time interval for cyclical monitoring*), the following actions are carried out:
- Group object *Error "Pump repair switch" receipt* is set to "Error"
- The pump remains switched off and cannot be switched on until a new value is received in the group object *Pump repair switch*

The monitoring is activated in the parameter *Monitor receipt of Group Object "Status Pump repair switch"*.

Error Heating/cooling control value receipt

If no value is received on the group object *Control value Heating* or *Control value Cooling* during the set time interval (→ parameter *Time interval for cyclical monitoring*), the following actions are carried out:
- Group object *Error "Control value" receipt* is set to "Error"
- Value in the parameter *Control value after exceeding monitoring time* becomes valid

The monitoring is activated in the parameter *Monitor receipt of Group Objects "Control value heating/cooling"*.

4.2.3 Pump activation

The pump output can be used to activate a single-phase pump. The pump can be activated in automatic operation or in the direct operation.

The parameter *Switch-off delay* specifies whether the heat/cold generated is still pumped into the heating/cooling circuit after the pump is switched off.

Automatic operation

The pump follows the valve control value in automatic operation. Limitations can be defined in the following parameters:
- *Switch on pump when control value greater than*
- *Switch off pump when control value less than (0 % = deactivated)*

Direct operation

In direct operation the pump is activated via the following Group Objects:
- *Enable/block manual pump override*
- *Override pump*

Note
The value of Group Object *Override pump* becomes active only when manual pump override has been enabled via Group Object *Enable/block manual pump override*.

Direct operation must be enabled in the parameter *Enable manual pump override*.

The parameter *Return from manual pump override to automatic mode* specifies whether direct operation is ended via a Group Object or after a set time has elapsed.

4.3 Integration into i-bus® Tool

i-bus® Tool can be used to read the data from the connected device. It can also be used to simulate values and test the following functions:

- Function of the physical inputs and outputs

If there is no communication between the device and i-bus® Tool, the simulated values cannot be sent on the bus.

For more information → parameter *i-bus® Tool access*.

i-bus® Tool can be downloaded free of charge from the company homepage (www.abb.com/knx).

4.4 Special operating states

The device's reaction if there is a bus voltage failure, after bus voltage recovery and after ETS download can be set in the device parameters.

4.4.1 Reaction on bus voltage failure (BSA)

Bus voltage failure describes the failure of the bus voltage, e.g. due to a power failure.

4.4.2 Reaction after bus voltage recovery

Bus voltage recovery is the state that exists after the bus voltage is restored. The device will restart after bus voltage recovery.

The time set in the parameter *Sending and switching delay after bus voltage recovery* elapses before the device performs an action.

4.4.3 Reaction on ETS reset

ETS reset designates device reset via ETS. An ETS reset restarts the ETS application in the device. ETS reset can be performed in ETS using the Commissioning menu item, in the function *Reset device*.

4.4.4 Reaction on download

Downloading describes loading a modified or updated ETS application onto the device. The device is not ready to operate during a download.

Note

The device will no longer operate after the application is uninstalled or the download is canceled.

▸ Download again.

5 Mounting and installation

5.1 Information about mounting

DANGER – Severe injuries due to touch voltage
Electric feedback from different phase conductors can cause contact voltages and lead to serious injuries.
- Operate the device only in a closed housing (distribution board).
- Disconnect all phases before working on the electrical connection.

The device can be mounted in any position as required on a 35 mm mounting rail.

The electrical connection to the loads is made using screw terminals. The connection to the bus (ABB i-bus® KNX) is made using the bus connection terminal supplied. The terminal designation is located on the housing.

Note
The maximum permissible current consumption on 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.

6 Commissioning

6.1 Prerequisites for commissioning

A PC with ETS and a connection to the bus (ABB i-bus® KNX), e.g. via a KNX interface, are required to commission the device.

- Required ETS version: 4.0 or higher
  - from application V1.1: 5.0 or higher
- Product-specific application: installed

6.2 Commissioning overview

After the bus voltage is activated for the first time, the following factory settings will be selected automatically:
- Physical address of the device: 15.15.255
- ETS application: preloaded

The device can be programmed only using ETS.

Note
The complete ETS application can be downloaded again if required. Downloads may take longer after an application is uninstalled or when changing applications.

6.3 Putting the device into operation

CAUTION
Setting a reversing time that is too short can damage the connected drive.
▸ Observe the technical data of the connected drive.

1. Connect the device to the bus (ABB i-bus® KNX).
2. Switch on bus voltage.
   ⇨ All switching contacts are open.
3. Switch on power supply of the connected loads.

⇨ Device is ready for operation.

6.4 Assignment of the physical address

Note
If it is set in ETS that the application is to be downloaded during programming, the download will begin after assignment of the physical address.

Triggering assignment of the physical address via ETS:
1. Press *Programming* button.
   ⇨ Programming mode active. *Programming* LED lights up.
2. Start programming process in ETS.

⇨ Physical address is assigned. Device restarts.

Note
The device performs an ETS reset during assignment of the physical address. All states are reset.

6.5 Software/application

6.5.1 Download reaction

Depending on the PC, it can take up to 90 seconds for the progress bar to appear during a download.

Using an interface that supports download via "long frames" (e.g. USB/S 1.2 or IPR/S 3.5.1) can greatly shorten the download time.

6.5.2 Copying, exchanging and converting

The following functions can be performed with the ETS application ABB *Update Copy Convert*:

- *Update*: Changes the application program to a higher or lower version while retaining the current configurations
- *Convert*: Transfers/adopts a configuration from an identical or compatible source device
- *Copy channel*: 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

The ETS application ABB *Update Copy Convert* can be downloaded free of charge from the KNX Shop → www.KNX.org.

7 Parameters

7.1 General

Note
ETS (Engineering Tool Software) is used to parameterize the device.

The following sections describe the device parameters based on the parameter windows. The parameter windows have a dynamic design. Parameters are shown or hidden depending on the outputs' parameterization and function.

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

No (checkbox cleared)

Yes (checkbox ticked)

Note
The default values in the ETS application can vary from the values stated in the product manual depending on the product variant.

7.2 Parameter windows

7.2.1 Parameter windows Basic settings

The basic settings for operating the device can be made in this parameter window.

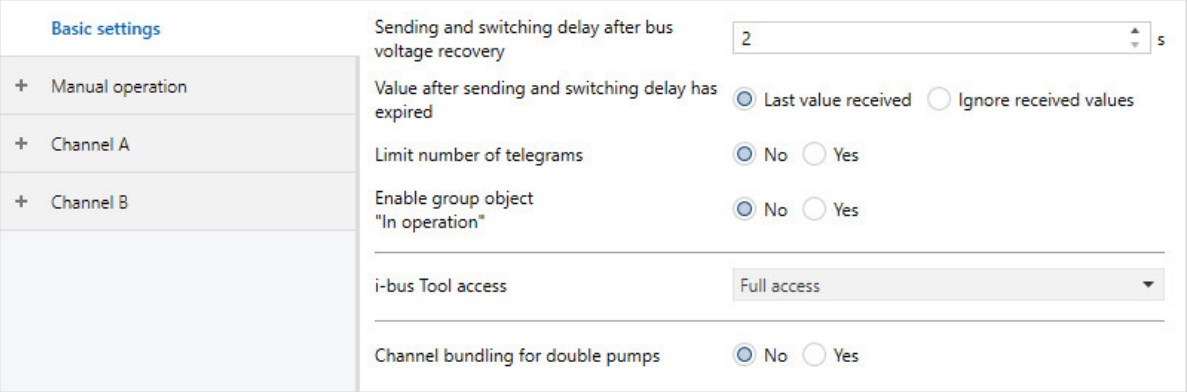


Fig. 13: Parameter window Basic settings

This parameter window includes the following parameters:

→ Sending and switching delay after bus voltage recovery, Page 96
→ Value after sending and switching delay has expired, Page 123
→ Limit number of telegrams, Page 67
  → Maximum number of sent telegrams, Page 83
  → In period (0 = deactivated), Page 77
→ Enable Group Object "In operation", Page 79
  → Send value Group Object "In operation", Page 122
  → Sending cycle, Page 97
→ i-bus® Tool access, Page 125
→ Channel bundling for double pumps, Page 78

Prerequisites for visibility

- The parameter window is always visible.

7.2.2 Parameter windows Manual operation

The following settings can be made in this parameter window:

- Enable operating state *Manual operation*
- Automatically reset the device to operating state *KNX operation*

More information: → Manual operation, Page 141.

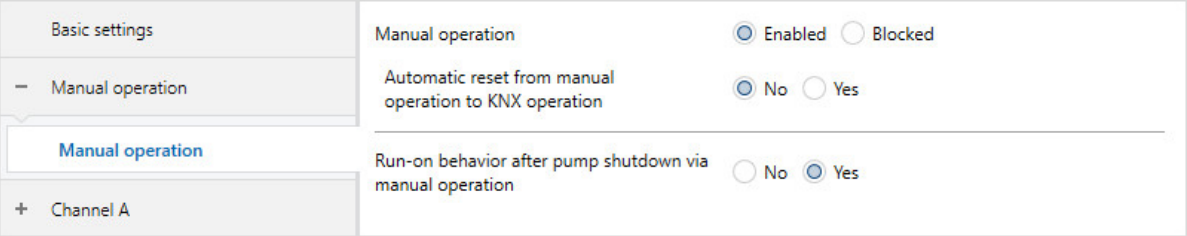


Fig. 14: Parameter window Manual operation

This parameter window includes the following parameters:

→ Manual operation, Page 82
- → Automatic reset from manual operation to KNX operation, Page 69
  - → Automatic reset after, Page 69
- → Run-on behavior after pump shutdown via manual operation, Page 88
- → Permit pump changeover via manual operation, Page 90

Prerequisites for visibility

- Product variants:
  - HCC/S 2.1.2.1
  - HCC/S 2.2.2.1

7.2.3 Parameter windows Channel X

7.2.3.1 Parameter windows Application parameters

The basic device settings can be made in this parameter window.

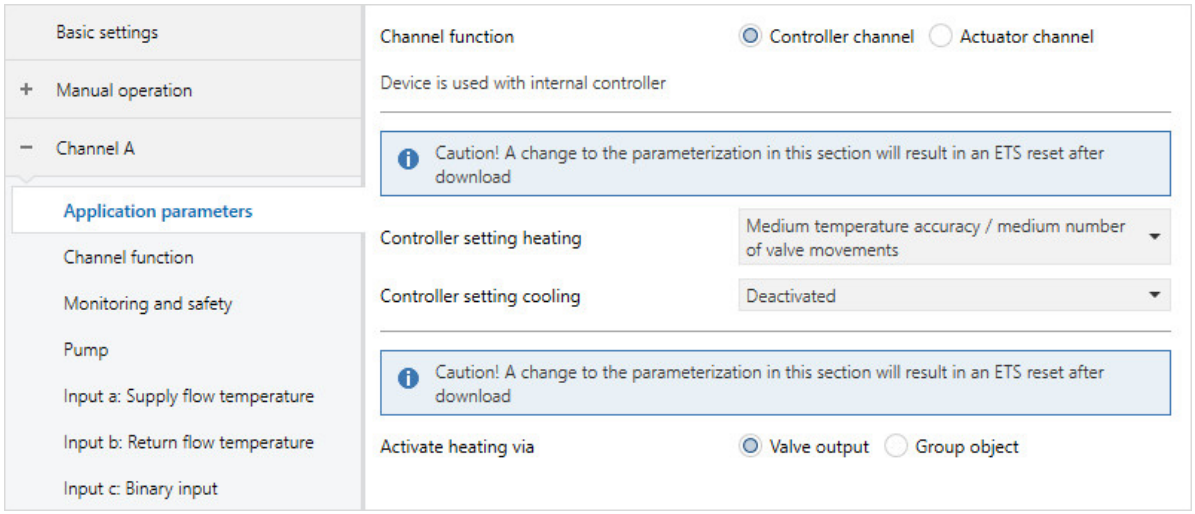


Fig. 15: Parameter window Application parameters

This parameter window includes the following parameters:

→ Channel function, Page 78
- → Controller setting heating, Page 94
  - → Activate Heating via, Page 66
- → Controller setting cooling, Page 95
  - → Activate Cooling via, Page 66

Prerequisites for visibility

- The parameter window is in the parameter window *Channel X*.

7.2.3.2 Parameter windows Channel function

The following settings can be made in this parameter window:

- Reaction after bus voltage recovery
- Reaction after ETS download/reset

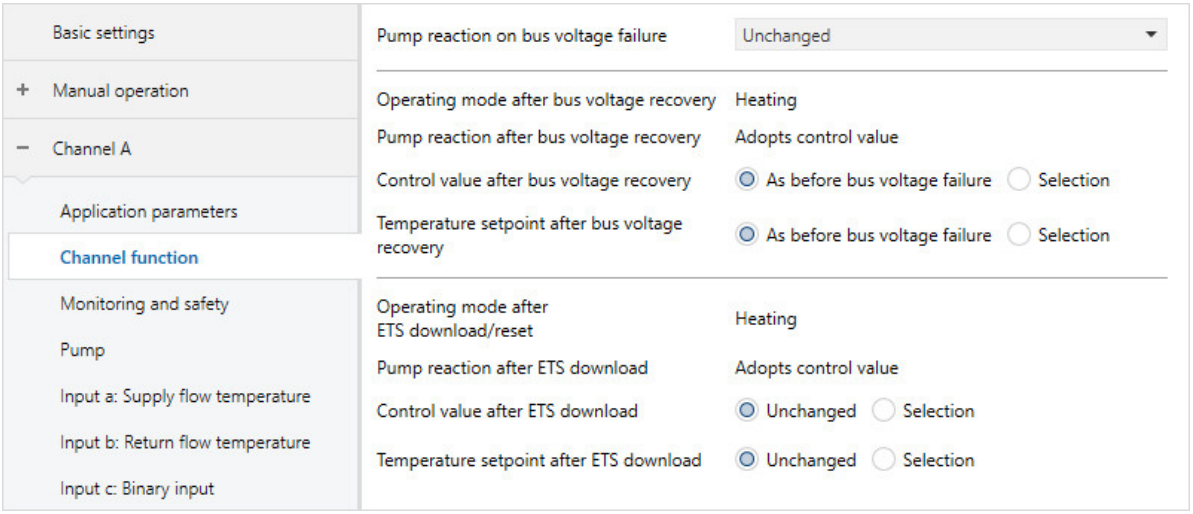


Fig. 16: Channel function parameter window

This parameter window includes the following parameters:

→ Pump reaction on bus voltage failure, Page 90
→ Operating mode after bus voltage recovery, Page 71
→ Pump reaction after bus voltage recovery, Page 91
→ Control value after bus voltage recovery, Page 105
  → control value, Page 103
→ Temperature setpoint after bus voltage recovery, Page 110
  → Heating temperature setpoint, Page 110
  → Cooling temperature setpoint, Page 110
→ Operating mode after ETS download/reset, Page 71
→ Pump reaction after ETS download, Page 91
→ Control value after ETS download, Page 105
→ Temperature setpoint after ETS download, Page 111

Prerequisites for visibility

- The parameter window is in the parameter window *Channel X*.

7.2.3.3 Parameter windows Monitoring and safety

The following settings can be made in this parameter window:

- Forced operation
- Cyclical monitoring

Fig. 17: Monitoring and safety parameter window

This parameter window includes the following parameters:

→ forced operation, Page 125
- → Control value on forced operation, Page 104
- → Pump reaction on forced operation, Page 90
- → Control value on forced operation active "ON", Page 104
- → Pump reaction during forced operation active "ON", Page 91
- → Control value on forced operation active "OFF", Page 104
- → Pump reaction during forced operation active "OFF", Page 91

→ Cyclical monitoring, Page 126
- → Monitor supply flow temperature, Page 117
  - → Control value on input fault, Page 103
  - → Time interval for cyclical monitoring, Page 126
  - → Control value after exceeding monitoring time, Page 103
- → Monitor receipt of Group Objects "Control value heating/cooling", Page 115
- → Monitor receipt of Group Objects "Setpoint temperature heating/cooling", Page 114
  - → Heating setpoint temperature when monitoring time exceeded, Page 98
  - → Cooling setpoint temperature when monitoring time exceeded, Page 98
- → Monitor receipt of Group Object "Heating/cooling changeover", Page 114
  - → Heating/cooling mode when monitoring time exceeded, Page 71
- → Monitor receipt of Group Object "Status Pump fault", Page 113
- → Monitor receipt of Group Object "Status Pump repair switch", Page 113

Prerequisites for visibility

- The parameter window is in the parameter window *Channel X*.

7.2.3.4 Parameter windows Pump

The following settings can be made in this parameter window:

- Pump reaction defined
- Enable manual pump override
- Defining status monitoring

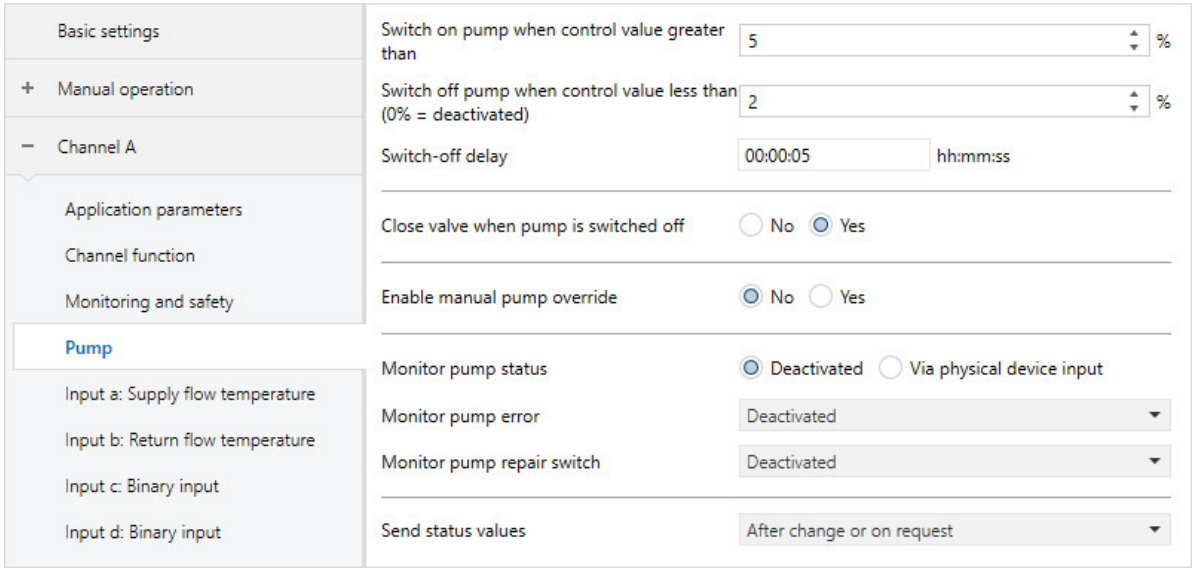


Fig. 18: Pump parameter window

This parameter window includes the following parameters:

→ Switch on pump when control value greater than, Page 89
→ Switch off pump when control value less than (0 % = deactivated), Page 89
→ Switch-off delay, Page 88
→ Close valve when pump is switched off, Page 119
→ Enable manual pump override, Page 83
  → Return from manual pump override to automatic mode, Page 96
  → Reset time, Page 96
→ Monitor pump status, Page 116
→ Monitor pump error, Page 115
→ Monitor pump repair switch, Page 116
→ Send status values [pump], Page 100
  → Send cyclically every, Page 126
→ Usage pump channel X, Page 121
  → Changeover point weekday, Page 118
  → Changeover point time, Page 118
→ Changeover time, Page 118

Prerequisites for visibility

- The parameter window is in the parameter window *Channel X*.

7.2.3.5 Parameter windows Input x: Supply flow temperature

The following settings can be made in this parameter window:

- Parameterizing supply flow temperature input

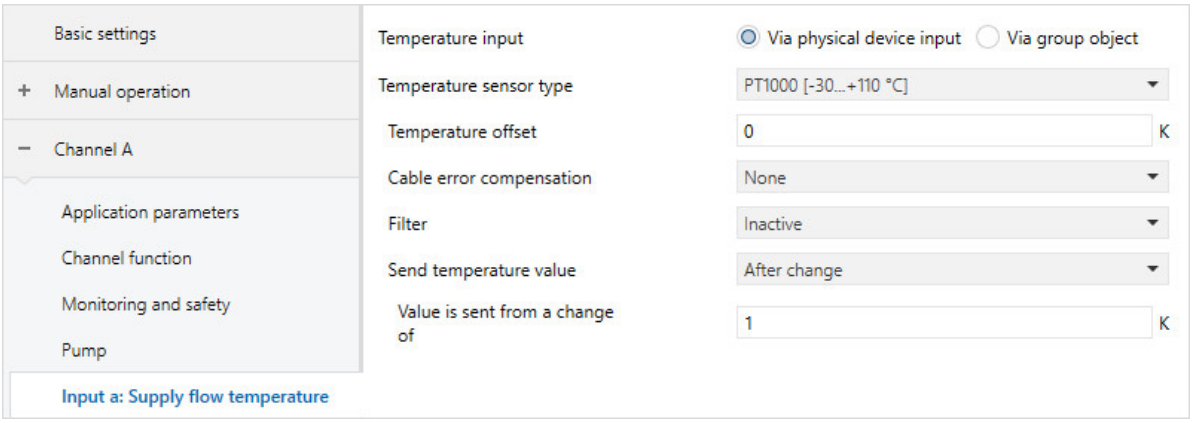


Fig. 19: Parameter window Input x: Supply flow temperature

This parameter window includes the following parameters:

→ Temperature input [supply flow temperature], Page 108
- → Temperature sensor type, Page 109
  - → NTC type, Page 88
  - → KTY type, Page 80
- → Temperature offset, Page 109
- → Cable error compensation, Page 81
  - → Cable length, single distance, Page 81
  - → Cross-section of conductor, value* 0.01 mm², Page 92
  - → Cable resistance (total of fwd and rtn conductor), Page 82
- → Filter, Page 75
- → Send temperature value [supply flow temperature], Page 112
  - → Value is sent from a change of, Page 123
  - → Send cyclically every, Page 126

Prerequisites for visibility

- The parameter window is in the parameter window *Channel X*.

7.2.3.6 Parameter windows Input x: Return flow temperature

The following settings can be made in this parameter window:

- Parameterizing return flow temperature input

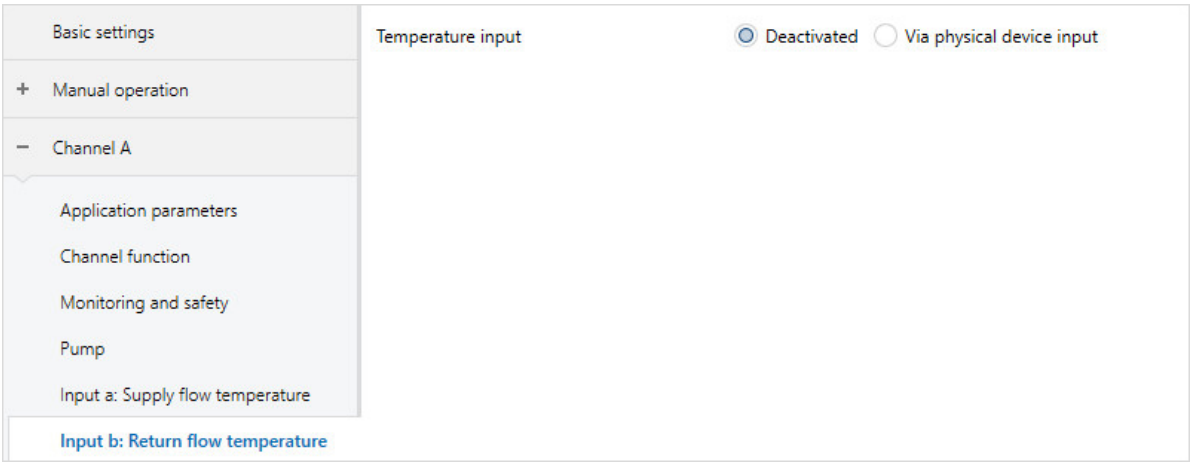


Fig. 20: Parameter window Input x: Return flow temperature

This parameter window includes the following parameters:

→ Temperature input [return flow temperature], Page 108
→ Temperature sensor type, Page 109
→ NTC type, Page 88
→ KTY type, Page 80
→ Temperature offset, Page 109
→ Cable error compensation, Page 81
→ Cable length, single distance, Page 81
→ Cross-section of conductor, value* 0.01 mm², Page 92
→ Cable resistance (total of fwd and rtn conductor), Page 82
→ Filter, Page 75
→ Send temperature value [return flow temperature], Page 111
→ Value is sent from a change of, Page 123
→ Send cyclically every, Page 126

Prerequisites for visibility

- The parameter window is in the parameter window *Channel X*.

7.2.3.7 Parameter windows Input x: Binary input

The following settings can be made in this parameter window:

- Parameterizing binary input

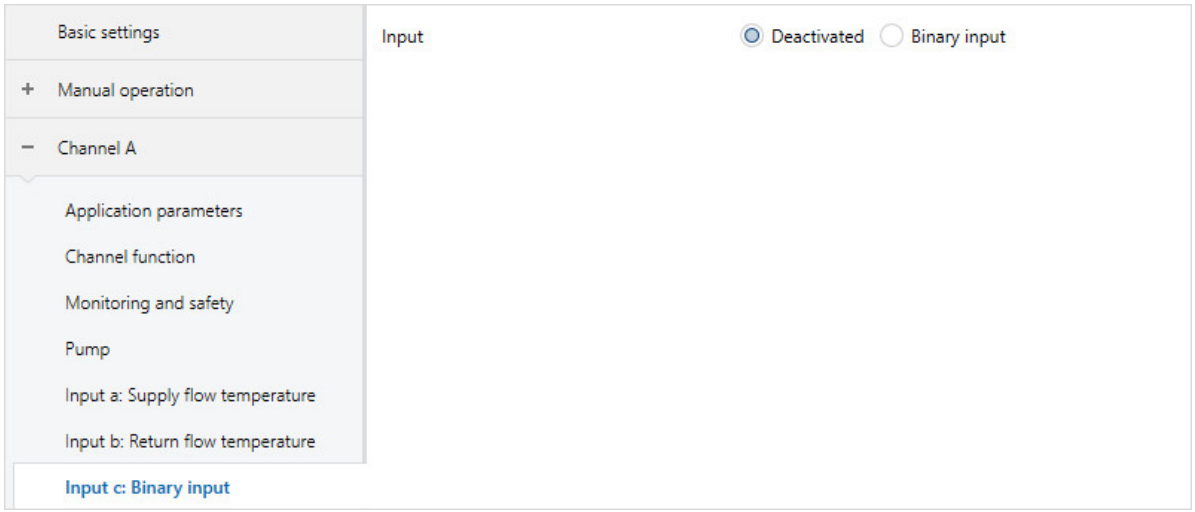


Fig. 21: Parameter window Input x: Binary input

This parameter window includes the following parameters:

→ Input, Page 72
- → Active detected if, Page 66
- → Send status values [pump status input], Page 102
  - → Send cyclically every, Page 126
- → Send status values [pump fault output], Page 101
- → Send status values [pump repair status input], Page 101
- → Distinction between short and long operation, Page 119
  - → Input on operation, Page 73
  - → Long operation after, Page 80
  - → Activate minimum signal duration, Page 85
    - → When opening the contact, Page 70
    - → When closing the contact, Page 70
- → Enable Group Object "Block input", Page 79
- → Reaction on event x, Page 93
- → Send status values [binary input], Page 100
  - → On Group Object value, Page 70
- → Scan input after download, ETS reset or bus voltage recovery, Page 72

Prerequisites for visibility

- The parameter window is in the parameter window *Channel X*.

7.2.3.8 Parameter windows Valve output X (0 ... 10 V)

The basic settings of this valve output can be specified in this parameter window.

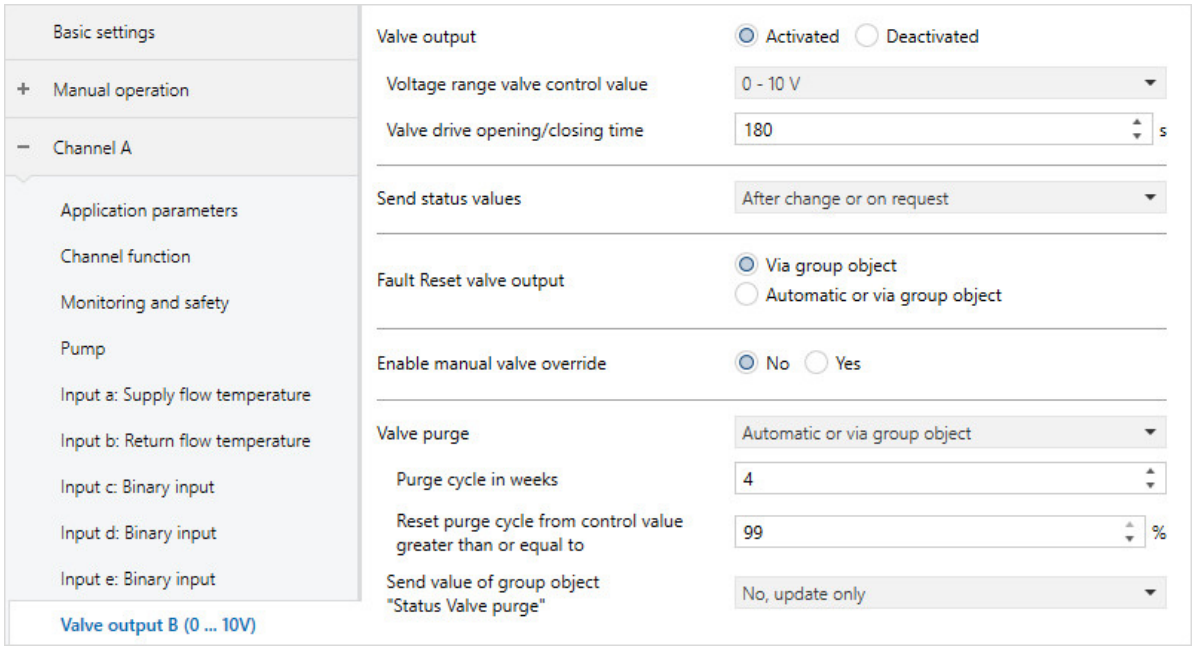


Fig. 22: Parameter window Valve output X (0 ... 10 V)

This parameter window includes the following parameters:

→ Valve output [0 ... 10 V], Page 120
- → Voltage range valve control value, Page 99
- → Valve drive opening/closing time, Page 89
- → Send status values [valve output], Page 102
  - → Send cyclically every, Page 126
- → Reset fault Valve output, Page 106
- → Enable manual valve override, Page 83
- → valve purge, Page 121
  - → Purge cycle in weeks, Page 99
  - → Reset purge cycle from control value greater than or equal to, Page 100
  - → Send value of Group Object "Status Valve purge", Page 122
    - → Send cyclically every, Page 126

Prerequisites for visibility

- Product variants:
  - HCC/S 2.1.1.1
  - HCC/S 2.1.2.1
- The parameter window is in the parameter window *Channel X*.

7.2.3.9 Parameter windows Valve output X

The basic settings of this valve output can be specified in this parameter window.

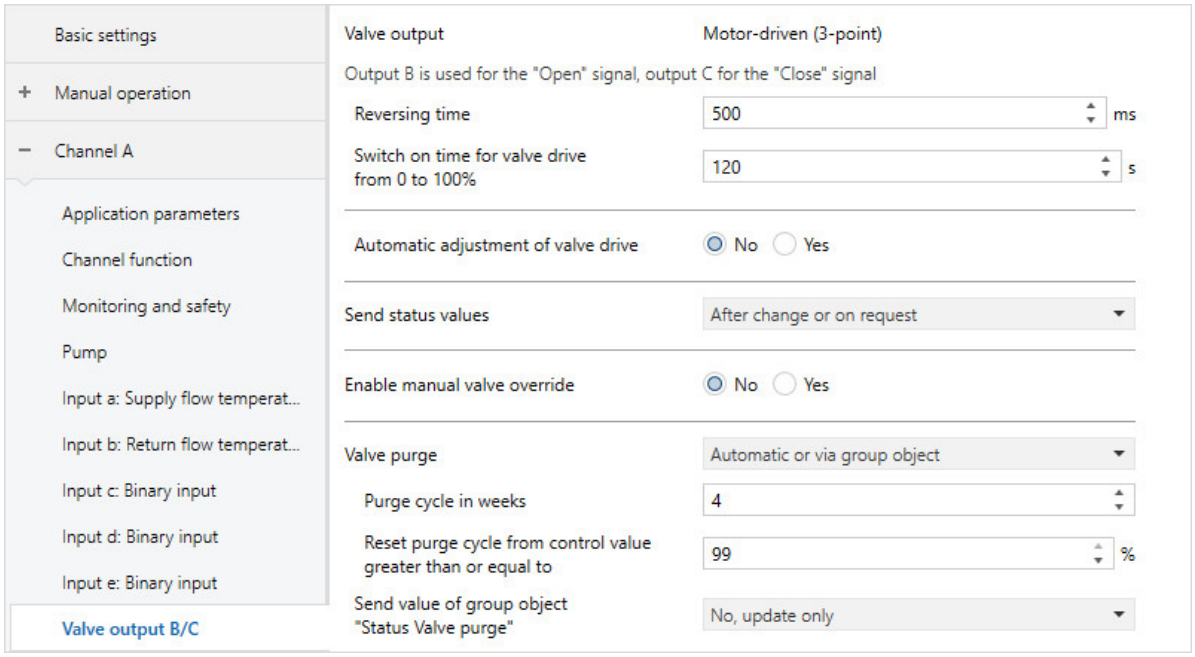


Fig. 23: Parameter window Valve output X

This parameter window includes the following parameters:

→ Valve output, Page 120
- → Reversing time, Page 117
- → Switch on time for valve drive from 0 to 100 %, Page 73
- → Automatic adjustment of valve drive, Page 69
  - → Number of changes until adjustment, Page 67
- → Send status values [valve output], Page 102
  - → Send cyclically every, Page 126
- → Enable manual valve override, Page 83
- → valve purge, Page 121
  - → Purge cycle in weeks, Page 99
  - → Reset purge cycle from control value greater than or equal to, Page 100
  - → Send value of Group Object "Status Valve purge", Page 122

Prerequisites for visibility

- Product variants:
  - HCC/S 2.2.1.1
  - HCC/S 2.2.2.1
- The parameter window is in the parameter window *Channel X*.

7.2.3.10 Parameter windows Temperature controller

The following settings can be made in this parameter window:

- Parameterizing basic load
- Send behavior of control values for the inactive operating mode

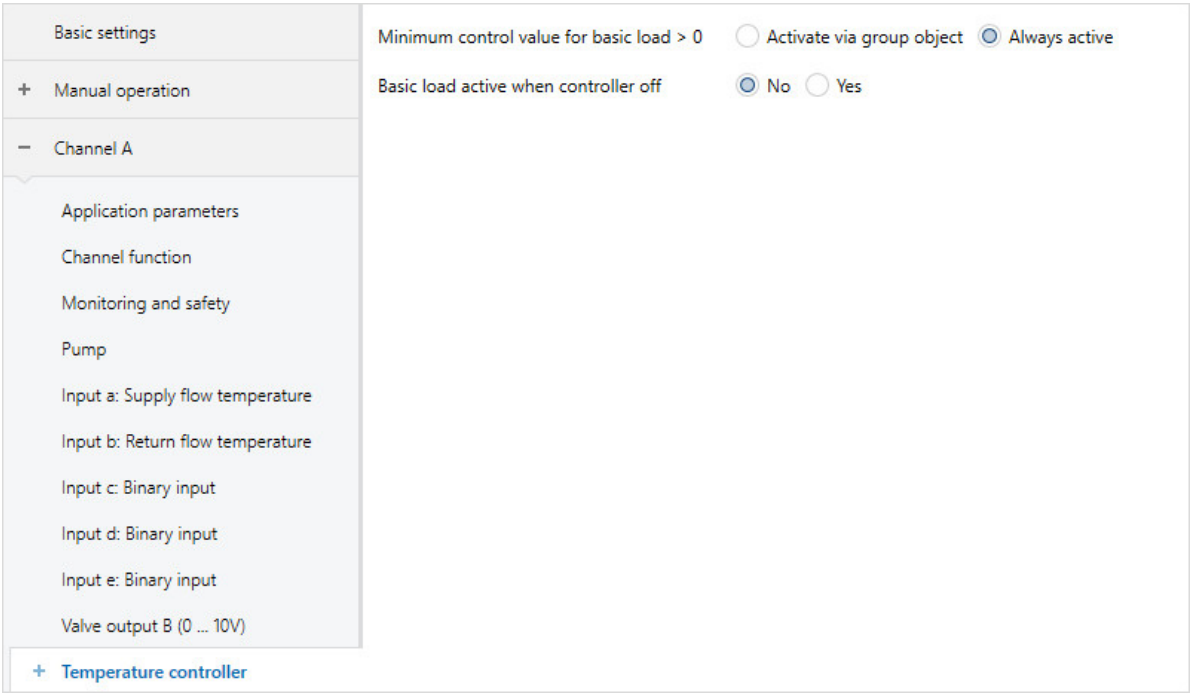


Fig. 24: Parameter window Temperature controller

This parameter window includes the following parameters:

→ Minimum control value for basic load > 0, Page 87
→ Basic load active when controller off, Page 75
→ Send inactive control values cyclically, Page 127

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Controller channel*
- The parameter window is in the parameter window *Channel X*.

7.2.3.10.1 Parameter windows Heating

The following settings can be made in this parameter window:

- Setting control parameters for the heating stage
- Limitation of the control range
- Sending behavior of the control value
- Activating and setting safety shutdown

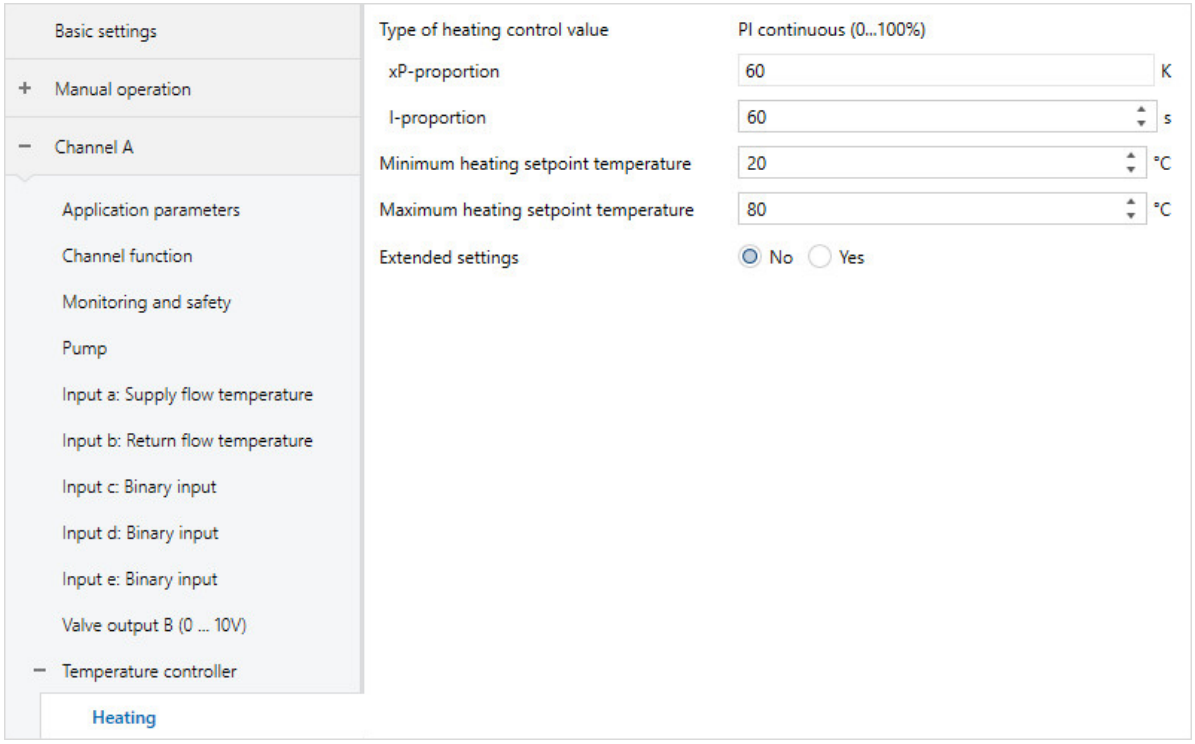


Fig. 25: Heating parameter window

This parameter window includes the following parameters:

→ Type of heating control value, Page 68
- → xP-proportion, Page 124
- → I-proportion, Page 76
- → Minimum heating setpoint temperature, Page 86
- → Maximum heating setpoint temperature, Page 84
- → Extended settings, Page 74
  - → Control value direction, Page 124
  - → Control value difference for sending the control value, Page 106
  - → Cycle for sending the control value (0 = deactivated), Page 128
  - → Maximum control value, Page 85
  - → Minimum control value (basic load), Page 87
  - → Activate safety shutdown, Page 97
    - → Temperature, safety shutdown [heating], Page 107
    - → Safety shutdown hysteresis, Page 76
    - → I-proportion with safety shutdown, Page 77
    - → Receipt of temperature for safety shutdown, Page 74

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- The parameter window is in the parameter window *Channel X* \ Parameter window *Temperature controller*.

7.2.3.10.2 Parameter windows Cooling

The following settings can be made in this parameter window:

- Setting control parameters for the cooling stage
- Limitation of the control range
- Sending behavior of the control value
- Activating and setting safety shutdown

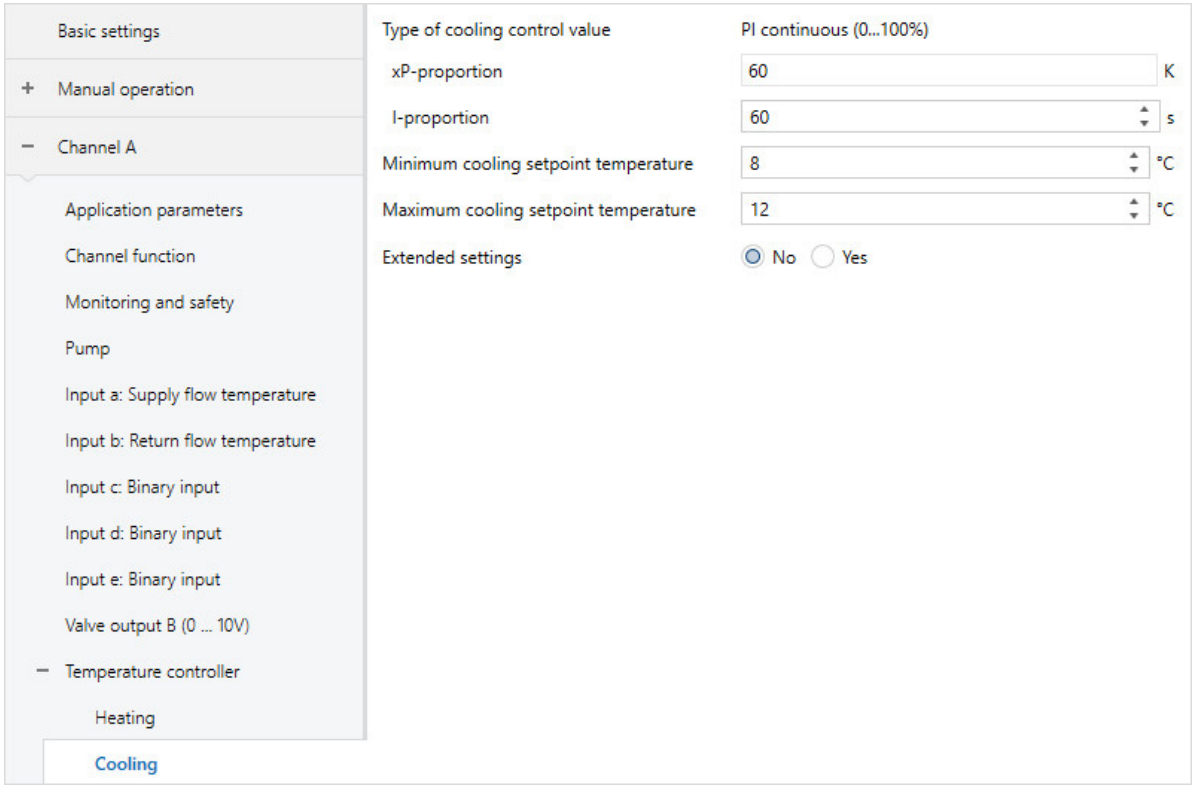


Fig. 26: Cooling parameter window

This parameter window includes the following parameters:

→ Type of cooling control value, Page 68
- → xP-proportion, Page 124
- → I-proportion, Page 76
- → Minimum cooling setpoint temperature, Page 86
- → Maximum cooling setpoint temperature, Page 84
- → Extended settings, Page 74
  - → Control value direction, Page 124
  - → Control value difference for sending the control value, Page 106
  - → Cycle for sending the control value (0 = deactivated), Page 128
  - → Maximum control value, Page 85
  - → Minimum control value (basic load), Page 87
  - → Activate safety shutdown, Page 97
    - → Temperature, safety shutdown [cooling], Page 107
    - → Safety shutdown hysteresis, Page 76
    - → I-proportion with safety shutdown, Page 77
    - → Receipt of temperature for safety shutdown, Page 74

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- The parameter window is in the parameter window *Channel X* \ Parameter window *Temperature controller*.

7.3 Overview of parameters

7.4 Parameter descriptions

7.4.1 Active detected if

This parameter is used to define the sensor contact position that is interpreted as the status "Active".

Option
Contact open
Contact closed

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Monitor pump status* \ Option *Via physical device input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

Or

- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Monitor pump error* \ Option *Via physical device input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

Or

- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Monitor pump repair switch* \ Option *Via physical device input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

7.4.2 Activate Heating via

This parameter is used to define whether the control value for activating the heating circuit is output via the valve output or a Group Object.

Option	
Valve output	The control value is output on the valve output and via Group Object *Status Control value heating*.
Group Object	The control value is output only via Group Object *Status Control value heating*.

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter Device function \ Option Controller
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- The parameter is in the parameter window *Channel X* \ parameter window *Application parameters*.

7.4.3 Activate Cooling via

This parameter is used to define whether the control value for activating the cooling circuit is output via the valve output or a Group Object.

Option	
Valve output	The control value is output on the valve output and via Group Object *Status Control value cooling*.
Group Object	The control value is output via Group Object *Status Control value cooling*.

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter Device function \ Option Controller
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- The parameter is in the parameter window *Channel X* \ parameter window *Application parameters*.

7.4.4 Number of changes until adjustment

This parameter is used to define the number of drive position changes after which automatic adjustment is performed.

The adjustment counter is incremented by 1 after every change.

Note
The following events trigger an additional adjustment:
- Bus voltage recovery
- ETS reset
- Download
- Reset of a corrected fault (via the *Reset* button or via the Group Object *Fault Reset valve output X*)

Option
30 … 500 … 65,535

Prerequisites for visibility
- Product variants:
  - HCC/S 2.2.1.1
  - HCC/S 2.2.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X*
  - Parameter *Valve output* \ Option *Motor-driven (3-point)*
  - Parameter *Automatic adjustment of valve drive* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X*.

7.4.5 Limit number of telegrams

This parameter is used to define whether the number of telegrams sent by the device will be limited. The fewer telegrams sent, the lower the bus load will be.

More information: → Telegram rate limit, Page 159.

Option	
No	The number of telegrams is not limited.
Yes	The following dependent parameters are shown: • *Maximum number of sent telegrams* • *In period (0 = deactivated)*

Prerequisites for visibility
- The parameter is in the parameter window *Basic settings*.

7.4.6 Type of heating control value

This parameter is used to define the control type and control value type for the heating circuit. This parameter is set to the option *PI continuous (0... 100 %)* and cannot be changed.

Option	
PI continuous (0... 100 %)	The following dependent parameters are shown: • *xP-proportion* • *I-proportion* • *Minimum heating setpoint temperature* • *Maximum heating setpoint temperature* The following dependent Group Objects are displayed: • *Status Heating*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Heating*.

7.4.7 Type of cooling control value

This parameter is used to define the control type and control value type for the cooling circuit. This parameter is set to the option *PI continuous (0... 100 %)* and cannot be changed.

Option	
PI continuous (0... 100 %)	The following dependent parameters are shown: • *xP-proportion* • *I-proportion* • *Minimum cooling setpoint temperature* • *Maximum cooling setpoint temperature* The following dependent Group Objects are displayed: • *Status Cooling*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Cooling*.

7.4.8 Automatic reset after

This parameter is used to define the time after which the device is automatically reset to the operating state *KNX operation*.

After the *Manual operation* button is pressed, the device remains in the operating state *Manual operation* until the button is pressed again or the set time expires.

Option

Prerequisites for visibility

- Product variants:
  - HCC/S 2.1.2.1
  - HCC/S 2.2.2.1
- Parameter window *Manual operation*
  - Parameter *Manual operation* \ Option *Enabled*
  - Parameter *Automatic reset from manual operation to KNX operation* \ Option *Yes*
- The parameter is in the parameter window *Manual operation*.

7.4.9 Automatic adjustment of valve drive

This parameter is used to define whether automatic adjustment of the valve drive is used.

Option	
No	Automatic adjustment is not used.
Yes	Automatic adjustment is used. The following dependent parameters are shown: • *Number of changes until adjustment*

Prerequisites for visibility

- Product variants:
  - HCC/S 2.2.1.1
  - HCC/S 2.2.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X* \ Parameter *Valve output* \ Option *Motor-driven (3-point)*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X*.

7.4.10 Automatic reset from manual operation to KNX operation

This parameter is used to define whether the device is reset from the operating state *Manual operation* to the operating state *KNX operation* after an adjustable time.

Option	
No	Automatic reset is deactivated. The operating state can be changed only using the *Manual operation* button.
Yes	The following dependent parameters are shown: • *Automatic reset after*

Prerequisites for visibility

- Product variants:
  - HCC/S 2.1.2.1
  - HCC/S 2.2.2.1
- Parameter window *Manual operation* \ Parameter *Manual operation* \ Option *Enabled*
- The parameter is in the parameter window *Manual operation*.

7.4.11 On Group Object value

This parameter is used to define when the value of the Group Object is sent cyclically.

Option	
0	If the value of the Group Object is 0, this value is sent cyclically after an adjustable time has elapsed.
1	If the value of the Group Object is 1, this value is sent cyclically after an adjustable time has elapsed.
0 or 1	The value of the Group Object is sent cyclically after an adjustable time has elapsed.

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Binary input*
  - Parameter *Input* \ Option *Binary input*
  - Parameter *Send status values [binary input]* \ Option *On change or cyclically*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

7.4.12 When opening the contact

This parameter is used to define how long the contact must be open as a minimum before a reaction is triggered.

Option
0.0 … 1.0 … 100.0 s

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Binary input*
  - Parameter *Input* \ Option *Binary input*
  - Parameter *Distinction between short and long operation* \ Option *No*
  - Parameter *Activate minimum signal duration* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

7.4.13 When closing the contact

This parameter is used to define how long the contact must be closed as a minimum before a reaction is triggered.

Option
0.0 … 1.0 … 100.0 s

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Binary input*
  - Parameter *Input* \ Option *Binary input*
  - Parameter *Distinction between short and long operation* \ Option *No*
  - Parameter *Activate minimum signal duration* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

7.4.14 Heating/cooling mode when monitoring time exceeded

This parameter is used to define which operating mode is activated when the monitoring time is exceeded.

The operating mode remains active until a new value is received on one of the following Group Objects:
- *Heating/cooling changeover* (Controller mode)
- *Heating/cooling changeover* (Actuator mode)

Option
Unchanged
Heating
Cooling

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- Parameter window *Monitoring and safety*
  - Parameter *Cyclical monitoring* \ Option *Activated*
  - Parameter *Monitor receipt of Group Object "Heating/cooling changeover"* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.15 Operating mode after bus voltage recovery

This parameter is used to define which operating mode is activated after bus voltage recovery.

Option
As before bus voltage failure
Heating
Cooling

Prerequisites for visibility
- The parameter is in the parameter window *Channel X* \ parameter window *Channel function*.

7.4.16 Operating mode after ETS download/reset

This parameter is used to define which operating mode is activated after ETS download or reset.

Option
Heating
Cooling

Prerequisites for visibility
- The parameter is in the parameter window *Channel X* \ parameter window *Channel function*.

7.4.17 Input

This parameter is used to define the use of the input.

Note
The inputs are scanned after bus voltage recovery, download or ETS reset. Scanning takes place once the device functions properly again after download, ETS reset or bus voltage recovery. This can take up to 2 seconds. The current status is sent on the bus (ABB i-bus® KNX) after the end of the sending and switching delay.
For binary inputs, the scanning can be defined in the parameter *Scan input after download, ETS reset or bus voltage recovery*.

Option	
Deactivated	The input is deactivated.
Pump status input	The input is used as the pump status input. The following dependent parameters are shown: • *Active detected if* • *Send status values [pump status input]*
Pump error input	The input is used as the pump error input. The following dependent parameters are shown: • *Active detected if* • *Send status values [pump fault output]*
Pump repair status input	The input is used as the pump repair status input. The following dependent parameters are shown: • *Active detected if* • *Send status values [pump repair status input]*
Binary input	The input is used as the binary input. The following dependent parameters are shown: • *Distinction between short and long operation* • *Activate minimum signal duration* • *Enable Group Object "Block input"* • *Reaction on event x* • *Send status values [binary input]* • *Scan input after download, ETS reset or bus voltage recovery* The following dependent Group Objects are displayed: • *Contact position binary input*

Prerequisites for visibility
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

7.4.18 Scan input after download, ETS reset or bus voltage recovery

This parameter is used to define whether the state of the input is scanned after download, ETS reset or bus voltage recovery.

Note
Scanning takes place once the device functions properly again after download, ETS reset or bus voltage recovery. This can take up to 2 seconds. The current status is sent on the bus (ABB i-bus® KNX) after the end of the sending and switching delay.

Option
No
Yes

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Input x: Binary input* \ Parameter *Input* \ Option *Binary input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

7.4.19 Input on operation

This parameter is used to define which state the input assumes when a connected contact is operated.

Option
Open
Closed

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Binary input*
  - Parameter *Input* \ Option *Binary input*
  - Parameter *Distinction between short and long operation* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

7.4.20 Switch on time for valve drive from 0 to 100 %

This parameter is used to set the time the valve drive requires to open the valve completely (from position 0 % to position 100 %).

Note
The time is listed in the technical data for the valve drive and corresponds to the total run time.

Option
10 … 120 … 6000 s

Prerequisites for visibility

- Product variants:
  - HCC/S 2.2.1.1
  - HCC/S 2.2.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X* \ Parameter *Valve output* \ Option *Motor-driven (3-point)*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X*.

7.4.21 Receipt of temperature for safety shutdown

This parameter is used to define how the controller receives the temperature for safety shutdown.

Option	
Via Group Object	The temperature is received via a dedicated Group Object. The following dependent Group Objects are displayed: • *Temperature, safety shutdown heating* • *Temperature, safety shutdown cooling*
Via physical device input x	The temperature is measured via a connected temperature sensor.

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Heating*
  - Parameter *Extended settings* \ Option *Yes*
  - Parameter *Activate safety shutdown* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Heating*.

Or

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Cooling*
  - Parameter *Extended settings* \ Option *Yes*
  - Parameter *Activate safety shutdown* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Cooling*.

7.4.22 Extended settings

This parameter is used to display the extended settings for the parameter window.

Option	
No	The extended settings are not shown. The corresponding parameters are used with the standard values.
Yes	The following dependent parameters are shown: • *Control value direction* • *Control value difference for sending the control value* • *Cycle for sending the control value (0 = deactivated)* • *Maximum control value* • *Minimum control value (basic load)* • *Activate safety shutdown*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Heating*.

Or

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Cooling*.

7.4.23 Filter

This parameter is used to set a floating mean value filter.

More information: → Floating mean value, Page 147.

Option	
Deactivated	The floating mean value filter is deactivated.
Low (floating mean value over 30 seconds)	The mean value filter is active. The mean value is determined over a time of 30 seconds.
Medium (floating mean value over 60 seconds)	The mean value filter is active. The mean value is determined over a time of 60 seconds.
High (floating mean value over 120 seconds)	The mean value filter is active. The mean value is determined over a time of 120 seconds.

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Supply flow temperature* \ Parameter *Temperature input [supply flow temperature]* \ Option *Via physical device input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Supply flow temperature*.

Or

- Parameter window *Channel X* \ Parameter window *Input x: Return flow temperature* \ Parameter *Temperature input [return flow temperature]* \ Option *Via physical device input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Return flow temperature*.

7.4.24 Basic load active when controller off

This parameter is used to define whether the basic load is to be active even if the controller has been switched off via the Group Object *Activate/deactivate control*.

Option
No
Yes

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Controller channel*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller*.

7.4.25 Safety shutdown hysteresis

This parameter is used to define the temperature hysteresis for safety shutdown. The hysteresis specifies the value by which the temperature must be dropped below (*heating*) or exceeded (*cooling*) before the controller becomes active again.

Option
0.5 … 1.0 … 5.0 K

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Heating*
  - Parameter *Extended settings* \ Option *Yes*
  - Parameter *Activate safety shutdown* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Heating*.

Or

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Cooling*
  - Parameter *Extended settings* \ Option *Yes*
  - Parameter *Activate safety shutdown* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Cooling*.

7.4.26 I-proportion

This parameter is used to define the I-proportion for the PI control.

More information: → Basics of PI control, Page 147.

Option
5 … 60 … 600 s

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Heating*.

Or

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Cooling*.

7.4.27 I-proportion with safety shutdown

This parameter is used to define what happens with the I-proportion when the safety shutdown temperature is reached.

More information: → Basics of PI control, Page 147.

Option	
Freeze	The current value of the I-proportion is saved. When the controller becomes active again, the saved value is used for control.
Reset	The I-proportion is reset to 0. When the controller becomes active, the I-proportion starts at 0.

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Heating*
  - Parameter *Extended settings* \ Option *Yes*
  - Parameter *Activate safety shutdown* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Heating*.

Or

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Cooling*
  - Parameter *Extended settings* \ Option *Yes*
  - Parameter *Activate safety shutdown* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Cooling*.

7.4.28 In period (0 = deactivated)

This parameter is used to define the period during which the device sends telegrams. The telegrams are sent as quickly as possible at the start of a period.

More information: → Telegram rate limit, Page 159.

Option
1 s
2 s
5 s
10 s
30 s
1 min

Prerequisites for visibility

- Parameter window *Basic settings* \ Parameter *Limit number of telegrams* \ Option *Yes*
- The parameter is in the parameter window *Basic settings*.

7.4.29 Channel bundling for double pumps

This parameter is used to define whether double pumps are used in the heating/cooling system.

Note
If double pumps are used, operation can be taken over by a backup pump if there is a fault in the main pump.
If double pumps are used, device channel A and channel B are combined. Channel B is renamed Channel B (double pump) in ETS.
The parameterization of the pump on channel B: double pump is identical to the settings for the pump on channel A and the settings are made in the corresponding parameters for channel A. The settings for the cyclical monitoring and the inputs for the second pump are made in channel B: double pump.

Option	
No	The heating/cooling system is not designed for double pumps.
Yes	Device channel A and channel B are combined. Only the cyclical monitoring and the binary inputs h … j can be parameterized in channel B. The following dependent parameters are shown: • *Usage pump channel X* • *Changeover time* The following dependent Group Objects are displayed: • *Status pump master/slave (1=Master, 0=Slave)* • *Master/slave changeover*

Prerequisites for visibility

- The parameter is in the parameter window *Basic settings*.

7.4.30 Channel function

The function of the channel is defined using this parameter.

Option	
Controller channel	The internal controller is active and is used for controlling the channel. The following dependent parameter windows are shown: • *Temperature controller* The following dependent parameters are shown: • *Controller setting heating* • *Controller setting cooling* The following dependent Group Objects are displayed: • *Status Heating/cooling* • Current setpoint • *Activate/deactivate control* • *Status Control*
Actuator channel	The channel is used as an actuator and receives its control values from an external controller. The following dependent Group Objects are displayed: • *Control value Heating* • *Control value Cooling* • *Heating/cooling changeover*

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Application parameters*.

7.4.31 Enable Group Object "Block input"

This parameter enables the Group Object *Block input*.

Option	
No	The Group Object is not enabled.
Yes	The following dependent Group Objects are displayed: • *Block input*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Binary input* \ Parameter *Input* \ Option *Binary input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

7.4.32 Enable Group Object "In operation"

This parameter enables the Group Object *In operation*.

Option	
No	The Group Object is not enabled.
Yes	The following dependent parameters are shown: • *Send value Group Object "In operation"* • *Sending cycle* The following dependent Group Objects are displayed: • *In operation*

Prerequisites for visibility

- The parameter is in the parameter window *Basic settings*.

7.4.33 KTY type

This parameter is used to set the KTY subtype.

> **Note**
> To ensure trouble-free function of the temperature input, the resistance values in the user-defined entry must increase according to the temperature values.
> An incorrect entry results in incorrect output values.

Option	
KTY X	The temperature sensor type KTY X is used. The resistance characteristic is predefined to suit the temperature sensor type selected.
User-defined	The resistance values for the temperature sensor connected can be entered to suit the data sheet for the temperature sensor. The following dependent parameters are shown: • *Resistance in ohms at x °C*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Supply flow temperature*
  - Parameter *Temperature input [supply flow temperature]* \ Option *Via physical device input*
  - Parameter *Temperature sensor type* \ Option *KTY [-15…+110]*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Supply flow temperature*.

Or

- Parameter window *Channel X* \ Parameter window *Input x: Return flow temperature*
  - Parameter *Temperature input [return flow temperature]* \ Option *Via physical device input*
  - Parameter *Temperature sensor type* \ Option *KTY [-15…+110]*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Return flow temperature*.

7.4.34 Long operation after

This parameter is used to define the time from which actuation of a connected contact (e.g. button/switch) is interpreted as long operation.

Option
1.0 … 10.0 s

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Binary input*
  - Parameter *Input* \ Option *Binary input*
  - Parameter *Distinction between short and long operation* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

Or

- Parameter window Inputs \ Parameter window *Input x: Binary input*
  - Parameter *Input* \ Option *Binary input*
  - Parameter *Distinction between short and long operation* \ Option *Yes*
- The parameter is in the parameter window Inputs \ parameter window *Input x: Binary input*.

7.4.35 Cable length, single distance

This parameter is used to set the one-way cable length between sensor and device input.

Option
1.0 … 10.0 … 100.0 m

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Supply flow temperature*
  - Parameter *Temperature input [supply flow temperature]* \ Option *Via physical device input*
  - Parameter *Cable error compensation* \ Option *Via cable length*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Supply flow temperature*.

Or

- Parameter window *Channel X* \ Parameter window *Input x: Return flow temperature*
  - Parameter *Temperature input [return flow temperature]* \ Option *Via physical device input*
  - Parameter *Cable error compensation* \ Option *Via cable length*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Return flow temperature*.

7.4.36 Cable error compensation

This parameter is used to define how cable errors that occur are compensated.

Note
Cable error compensation based on the cable length is possible only for cables with copper conductors.

Option	
None	Cable error compensation is not used.
Via cable length	The following dependent parameters are shown: • *Cable length, single distance* • *Cross-section of conductor, value* 0.01 mm²*
Via cable resistance	The following dependent parameters are shown: • *Cable resistance (total of fwd and rtn conductor)*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Supply flow temperature* \ Parameter *Temperature input [supply flow temperature]* \ Option *Via physical device input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Supply flow temperature*.

Or

- Parameter window *Channel X* \ Parameter window *Input x: Return flow temperature* \ Parameter *Temperature input [return flow temperature]* \ Option *Via physical device input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Return flow temperature*.

7.4.37 Cable resistance (total of fwd and rtn conductor)

This parameter is used to set the cable resistance of the temperature sensor connected.

> **Note**
> To measure the cable resistance correctly, the conductors must be shorted together at the cable end and must not be connected to the input.

Option
0 … 500 … 10,000 mohms

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Supply flow temperature*
  - Parameter *Temperature input [supply flow temperature]* \ Option *Via physical device input*
  - Parameter *Cable error compensation* \ Option *Via cable resistance*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Supply flow temperature*.

Or

- Parameter window *Channel X* \ Parameter window *Input x: Return flow temperature*
  - Parameter *Temperature input [return flow temperature]* \ Option *Via physical device input*
  - Parameter *Cable error compensation* \ Option *Via cable resistance*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Return flow temperature*.

7.4.38 Manual operation

This parameter is used to enable or block manual operation of the device.

Option	
Enabled	The operating states *Manual operation* and *KNX operation* can be switched via the *Manual operation* button or via Group Object *Enable/block manual operation*. The device can be operated using the membrane keypad. The following dependent parameters are shown: • *Automatic reset from manual operation to KNX operation* The following dependent Group Objects are displayed: • *Status Manual operation* • *Enable/block manual operation*
Blocked	Manual operation of the device is blocked.

Prerequisites for visibility

- Product variants:
  - HCC/S 2.1.2.1
  - HCC/S 2.2.2.1
- The parameter is in the parameter window *Manual operation*.

7.4.39 Enable manual pump override

This parameter is used to define whether manual pump override can be enabled via a Group Object.

More information: → Pump activation, Page 43.

Note
The value of Group Object *Override pump* becomes active only when manual pump override has been enabled via Group Object *Enable/block manual pump override*.

Option	
No	Manual pump override cannot be enabled via a Group Object.
Yes	The following dependent parameters are shown: • *Return from manual pump override to automatic mode* The following dependent Group Objects are displayed: • *Enable/block manual pump override* • *Override pump*

Prerequisites for visibility
- The parameter is in the parameter window *Channel X* \ parameter window *Pump*.

7.4.40 Enable manual valve override

This parameter is used to define whether manual valve override can be enabled via a Group Object.

More information: → Manual valve override, Page 150.

Note
The value of Group Object *Override valve control value X* becomes active only when manual valve override has been enabled via Group Object *Enable/block manual valve override X*.

Option	
No	Manual valve override cannot be enabled via a Group Object.
Yes	Manual valve override can be enabled. • *Enable/block manual valve override X* • *Override valve control value X*

Prerequisites for visibility
- Product variants:
  - HCC/S 2.1.1.1
  - HCC/S 2.1.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X (0 ... 10 V)* \ Parameter *Valve output [0 ... 10 V]* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X (0 ... 10 V)*.

Or
- Product variants:
  - HCC/S 2.2.1.1
  - HCC/S 2.2.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X* \ Parameter *Valve output* \ Option *Motor-driven (3-point)*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X*.

7.4.41 Maximum number of sent telegrams

This parameter is used to define the number of telegrams sent within a period that can be set.

The period is defined in the parameter *In period (0 = deactivated)*.

More information: → Telegram rate limit, Page 159.

Option
1 … 20 … 50

Prerequisites for visibility

- Parameter window *Basic settings* \ Parameter *Limit number of telegrams* \ Option *Yes*
- The parameter is in the parameter window *Basic settings*.

7.4.42 Maximum heating setpoint temperature

This parameter is used to define the maximum permissible setpoint temperature in the heating circuit.

Note
If a higher setpoint temperature is received, the controller limits the temperature to the defined value. This can prevent an excessively high supply flow temperature, for example.

Option
10 … 80 … 100 °C

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Heating*.

7.4.43 Maximum cooling setpoint temperature

This parameter is used to define the maximum permissible setpoint temperature in the cooling circuit.

Note
If a higher setpoint temperature is received, the controller limits the temperature to the defined value. This can be used to keep the supply temperature to a low value to allow a quick response to cooling requests, for example.

Option
1 … 12 … 45 °C

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Cooling*.

7.4.44 Maximum control value

This parameter is used to define the maximum control value. The maximum control value is not allowed to be exceeded by the control, even if the controller calculates a higher control value.

Option
0 … 100 %

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Heating* \ Parameter *Extended settings* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Heating*.

Or

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Cooling* \ Parameter *Extended settings* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Cooling*.

7.4.45 Activate minimum signal duration

This parameter is used to define whether the minimum signal duration is activated.

Note
The minimum signal duration indicates the minimum time a contact (e.g. button/switch) must be operated to trigger a reaction. The minimum signal duration prevents unintentional operation from triggering a reaction.

Option	
No	The minimum signal duration is not activated.
Yes	The following dependent parameters are shown: • *When opening the contact* • *When closing the contact*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Binary input*
  - Parameter *Input* \ Option *Binary input*
  - Parameter *Distinction between short and long operation* \ Option *No*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

7.4.46 Minimum heating setpoint temperature

This parameter is used to define the minimum permissible setpoint temperature in the heating circuit.

Note
If a lower setpoint temperature is received, the controller limits the temperature to the defined value. This can be used to maintain a minimum temperature to allow a quick response to heating requests, for example.

Option
10 … 20 … 100 °C

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Heating*.

7.4.47 Minimum cooling setpoint temperature

This parameter is used to define the minimum permissible setpoint temperature in the cooling circuit.

Note
If a lower setpoint temperature is received, the controller limits the temperature to the defined value. This can be used to prevent condensation on the pipes if the supply flow temperature is too low, for example.

Option
1 … 8 … 45 °C

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Cooling*.

7.4.48 Minimum control value (basic load)

This parameter is used to define the minimum control value (basic load) for the controller.

More information: → basic load, Page 147.

Option
0 … 100 %

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Heating* \ Parameter *Extended settings* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Heating*.

Or

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Cooling* \ Parameter *Extended settings* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Cooling*.

7.4.49 Minimum control value for basic load > 0

This parameter is used to define whether the basic load of the heating and cooling stages is always active or whether it is activated via a Group Object.

More information: → basic load, Page 147.

Note

The basic load is activated for all stages, but it applies only to the active operating mode (*Heating* or *Cooling*). The basic load remains active during the operating mode change.
The basic load is set individually for each stage in the corresponding parameter windows → Parameter *Minimum control value (basic load)*.

Option	
Activate via Group Object	The basic load can be activated (1) or deactivated (0) via the Group Object Activate minimum control value (basic load). The following dependent Group Objects are displayed: • Activate minimum control value (basic load)
Always active	The basic load is always active.

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Controller channel*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller*.

7.4.50 Run-on behavior after pump shutdown via manual operation

This parameter is used to define whether the run-on time for the pump is activated after shutdown via manual operation.

Option	
No	The run-on behavior of the pump is inactive.
Yes	The run-on behavior of the pump is active. The run-on time is defined in the parameter *Switch-off delay*.

Prerequisites for visibility

- Product variants:
  - HCC/S 2.1.2.1
  - HCC/S 2.2.2.1
- Parameter window *Manual operation* \ Parameter *Manual operation* \ Option *Enabled*
- The parameter is in the parameter window *Manual operation*.

7.4.51 Switch-off delay

This parameter is used to define the run-on time after switching off the pump.

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

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Pump*.

7.4.52 NTC type

This parameter is used to define the NTC type used.

Note
The resistance value of an NTC20 sensor is 20 kohm at 25 °C. The resistance value of NTC10 sensors is 10 kohm at 25 °C. The individual types differ in the further course of the resistance curves.

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

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Supply flow temperature*
  - Parameter *Temperature input [supply flow temperature]* \ Option *Via physical device input*
  - Parameter *Temperature sensor type* \ Option *NTC*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Supply flow temperature*.

Or

- Parameter window *Channel X* \ Parameter window *Input x: Return flow temperature*
  - Parameter *Temperature input [return flow temperature]* \ Option *Via physical device input*
  - Parameter *Temperature sensor type* \ Option *NTC*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Return flow temperature*.

7.4.53 Valve drive opening/closing time

This parameter is used to set the time the valve drive requires to open the valve completely (from position 0 % to position 100 %) or close it completely.

> **Note**
> The time is listed in the technical data for the valve drive and corresponds to the total run time.

Option
10 … 180 … 900 s

Prerequisites for visibility

- Product variants:
  - HCC/S 2.1.1.1
  - HCC/S 2.1.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X (0 … 10 V)* \ Parameter *Valve output [0 … 10 V]* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X (0 … 10 V)*.

7.4.54 Switch off pump when control value less than (0 % = deactivated)

This parameter is used to define the valve control value from which the pump is switched off.

More information: → Pump activation, Page 43.

Option
0 … 2 … 100 %

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Pump*.

7.4.55 Switch on pump when control value greater than

This parameter is used to define the valve control value from which the pump is switched on.

More information: → Pump activation, Page 43.

Option
0 … 5 … 99 %

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Pump*.

7.4.56 Permit pump changeover via manual operation

This parameter is used to define whether, on the use of double pumps, changeover between the main pump and the backup pump can be performed via manual operation.

> **Note**
> The pump set via manual operation remains active after manual operation is ended.

Option
No
Yes

Prerequisites for visibility

- Product variants:
  - HCC/S 2.1.2.1
  - HCC/S 2.2.2.1
- Parameter window *Basic settings* \ Parameter *Channel bundling for double pumps* \ Option *Yes*
- Parameter window *Manual operation* \ Parameter *Manual operation* \ Option *Enabled*
- The parameter is in the parameter window *Manual operation*.

7.4.57 Pump reaction on bus voltage failure

This parameter is used to define the pump reaction on bus voltage failure.

Option	
On	The pump is switched on.
Off	The pump is switched off.
Unchanged	The state of the pump remains unchanged.

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Channel function*.

7.4.58 Pump reaction on forced operation

This parameter is used to define the pump reaction when 1-bit forced operation is active.

Option	
On	The pump is switched on.
Off	The pump is switched off.
Adopts control value (= pump automatic mode)	The current valve control value for the active operating mode (heating/cooling) is adopted.

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Monitoring and safety* \ Parameter *forced operation* \ Options *Activated 1 bit – 1 active* / *Activated 1 bit – 0 active*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.59 Pump reaction during forced operation active "OFF"

This parameter is used to define the pump reaction if 2-bit forced operation "OFF" is active.

Option	
On	The pump is switched on.
Off	The pump is switched off.
Adopts control value (= pump automatic mode)	The current valve control value for the active operating mode (heating/cooling) is adopted.

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Monitoring and safety* \ Parameter *forced operation* \ Option *Activated 2 bit*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.60 Pump reaction during forced operation active "ON"

This parameter is used to define the pump reaction on active 2-bit forced operation "ON".

Option	
On	The pump is switched on.
Off	The pump is switched off.
Adopts control value (= pump automatic mode)	The current valve control value for the active operating mode (heating/cooling) is adopted.

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Monitoring and safety* \ Parameter *forced operation* \ Option *Activated 2 bit*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.61 Pump reaction after bus voltage recovery

This parameter is used to define the pump reaction after bus voltage recovery.

The parameter is set to the option *Adopts control value (= pump automatic mode)* and cannot be changed.

Option	
Adopts control value (= pump automatic mode)	The current valve control value for the active operating mode (heating/cooling) is adopted.

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Channel function*.

7.4.62 Pump reaction after ETS download

This parameter is used to define the pump reaction after ETS download.

The parameter is set to the option *Adopts control value (= pump automatic mode)* and cannot be changed.

Option	
Adopts control value (= pump automatic mode)	The current valve control value for the active operating mode (heating/cooling) is adopted.

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Channel function*.

7.4.63 Cross-section of conductor, value* 0.01 mm²

This parameter is used to define the cross-section of the conductor to which the temperature sensor is connected.

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

Option
1 … 100 … 150

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Supply flow temperature*
  - Parameter *Temperature input [supply flow temperature]* \ Option *Via physical device input*
  - Parameter *Cable error compensation* \ Option *Via cable length*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Supply flow temperature*.

Or

- Parameter window *Channel X* \ Parameter window *Input x: Return flow temperature*
  - Parameter *Temperature input [return flow temperature]* \ Option *Via physical device input*
  - Parameter *Cable error compensation* \ Option *Via cable length*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Return flow temperature*.

7.4.64 Reaction on event x

This parameter is used to define which value is sent on the Group Object *Contact position binary input* for event 0 / event 1.

Note
The action that triggers event 0 or event 1 depends on the option in the parameter *Distinction between short and long operation*:

- No
  - Event 0 = Opening the contact
  - Event 1 = Closing the contact
- Yes
  - Event 0 = Short operation
  - Event 1 = Long operation

Note
The option *End cyclic transmission* becomes effective only if, in the parameter *Send status values [binary input]*, the option *On change or cyclically* is selected.

Option	
No edge evaluation	The edge (1 → 0 or 0 → 1 change) is not evaluated. A value is not sent.
On	The value 1 is sent.
Off	The value 0 is sent.
Toggle	If the value 0 was sent last, the value 1 is sent. If the value 1 was sent last, the value 0 is sent.
End cyclic transmission	Cyclical transmission of the status value is ended.

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Binary input* \ Parameter *Input* \ Option *Binary input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

7.4.65 Controller setting heating

This parameter is used to define the control behavior for the heating circuit.

More information: → Controller setting, Page 156.

Note
If channel X is used to control a heating circuit and a cooling circuit, both circuits are controlled by the same controller. It is not possible to control both circuits at the same time. The operating modes (*Heating*/ *Cooling*) are changed via the following Group Objects:
- *Heating/cooling changeover* (Controller mode)
- *Heating/cooling changeover* (Actuator mode)

Option	
Deactivated	The device is not used to control a heating circuit.
Free configuration	The control parameters can be set as required. The following dependent parameter windows are shown: • *Heating* The following dependent parameters are shown: • *Activate Heating via* The following dependent Group Objects are displayed: • *Status Control value heating* • *Status Heating* • *Heating setpoint temperature*
Reduced temperature accuracy / few valve movements	The control objective is minimizing the number of valve movements. Control permits a large variation in the setpoint temperature. The control parameters are set accordingly and cannot be changed. The following dependent parameter windows are shown: • *Heating* The following dependent parameters are shown: • *Activate Heating via* The following dependent Group Objects are displayed: • *Status Control value heating* • *Status Heating* • *Heating setpoint temperature*
Medium temperature accuracy / medium number of valve movements	The control objective is minimizing the fluctuation in the setpoint temperature with as few valve movements as possible. The control parameters are set accordingly and cannot be changed. The following dependent parameter windows are shown: • *Heating* The following dependent parameters are shown: • *Activate Heating via* The following dependent Group Objects are displayed: • *Status Control value heating* • *Status Heating* • *Heating setpoint temperature*
High temperature accuracy / many valve movements	The control objective is minimizing the variation in the setpoint temperature. Control permits a large number of valve movements. The control parameters are set accordingly and cannot be changed. The following dependent parameter windows are shown: • *Heating* The following dependent parameters are shown: • *Activate Heating via* The following dependent Group Objects are displayed: • *Status Control value heating* • *Status Heating* • *Heating setpoint temperature*

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Controller channel*
- The parameter is in the parameter window *Channel X* \ parameter window *Application parameters*.

7.4.66 Controller setting cooling

This parameter is used to define the control behavior for the cooling circuit.

More information: → Controller setting, Page 156.

Note
If channel X is used to control a heating circuit and a cooling circuit, both circuits are controlled by the same controller. It is not possible to control both circuits at the same time. The operating modes (*Heating*/*Cooling*) are changed via the following Group Objects:
- *Heating/cooling changeover* (Controller mode)
- *Heating/cooling changeover* (Actuator mode)

Option	
Deactivated	The device is not used to control a cooling circuit.
Free configuration	The control parameters can be set as required. The following dependent parameter windows are shown: • *Cooling* The following dependent parameters are shown: • *Activate Cooling via* The following dependent Group Objects are displayed: • *Status Control value cooling* • *Status Cooling* • *Cooling setpoint temperature*
Reduced temperature accuracy / few valve movements	The control objective is minimizing the number of valve movements. Control permits a large variation in the setpoint temperature. The control parameters are set accordingly and cannot be changed. The following dependent parameter windows are shown: • *Cooling* The following dependent parameters are shown: • *Activate Cooling via* The following dependent Group Objects are displayed: • *Status Control value cooling* • *Status Cooling* • *Cooling setpoint temperature*
Medium temperature accuracy / medium number of valve movements	The control objective is minimizing the fluctuation in the setpoint temperature with as few valve movements as possible. The control parameters are set accordingly and cannot be changed. The following dependent parameter windows are shown: • *Cooling* The following dependent parameters are shown: • *Activate Cooling via* The following dependent Group Objects are displayed: • *Status Control value cooling* • *Status Cooling* • *Cooling setpoint temperature*
High temperature accuracy / many valve movements	The control objective is minimizing the variation in the setpoint temperature. Control permits a large number of valve movements. The control parameters are set accordingly and cannot be changed. The following dependent parameter windows are shown: • *Cooling* The following dependent parameters are shown: • *Activate Cooling via* The following dependent Group Objects are displayed: • *Status Control value cooling* • *Status Cooling* • *Cooling setpoint temperature*

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Controller channel*
- The parameter is in the parameter window *Channel X* \ parameter window *Application parameters*.

7.4.67 Return from manual pump override to automatic mode

This parameter is used to define how the return to automatic mode from manual pump override takes place.

More information: → Pump activation, Page 43.

Option	
Via Group Object	Return to automatic mode takes place only via Group Object *Enable/block manual pump override*.
Via Group Object or automatic	The return to automatic mode takes place via the Group Object *Enable/block manual pump override* or automatically after the reset time set. The following dependent parameters are shown: • *Reset time*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Enable manual pump override* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Pump*.

7.4.68 Reset time

This parameter is used to define the time for the change from manual adjustment to the automatic mode.

The reset time is restarted after each manual adjustment.

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

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Pump*
  - Parameter *Enable manual pump override* \ Option *Yes*
  - Parameter *Return from manual pump override to automatic mode* \ Option *Via Group Object or automatic*
- The parameter is in the parameter window *Channel X* \ parameter window *Pump*.

7.4.69 Sending and switching delay after bus voltage recovery

This parameter is used to define the sending and switching delay after bus voltage recovery.

More information: → Sending or switching delay, Page 156.

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

Option
2 … 255 s

Prerequisites for visibility

- The parameter is in the parameter window *Basic settings*.

7.4.70 Sending cycle

This parameter is used to define the cycle in which the Group Object *In operation* sends a telegram.

Option
00:00:01 … 00:10:00 … 18:12:15 hh:mm:ss

Prerequisites for visibility

- Parameter window *Basic settings* \ Parameter *Enable Group Object "In operation"* \ Option *Yes*
- The parameter is in the parameter window *Basic settings*.

7.4.71 Activate safety shutdown

This parameter is used to define whether the safety shutdown is activated. When the temperature set for the safety shutdown is reached, the controller sets the control value to 0.

Option	
No	The safety shutdown is not activated.
Yes	The following dependent parameters are shown: • *Temperature, safety shutdown [heating]* • *Temperature, safety shutdown [cooling]* • *Safety shutdown hysteresis* • *I-proportion with safety shutdown* • *Receipt of temperature for safety shutdown* The following dependent Group Objects are displayed: • *Status Safety shutdown*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Heating* \ Parameter *Extended settings* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Heating*.

Or

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Cooling* \ Parameter *Extended settings* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Cooling*.

7.4.72 Heating setpoint temperature when monitoring time exceeded

This parameter is used to define a setpoint temperature to be set if the monitoring time is exceeded. The setpoint temperature set is valid until a new setpoint temperature is received via the bus (ABB i-bus® KNX).

Option
20 … 50 … 100 °C

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter Device function \ Option Controller
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Monitoring and safety*
  - Parameter *Cyclical monitoring* \ Option *Activated*
  - Parameter *Monitor receipt of Group Objects "Setpoint temperature heating/cooling"* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.73 Cooling setpoint temperature when monitoring time exceeded

This parameter is used to define a setpoint temperature to be set if the monitoring time is exceeded. The setpoint temperature set is valid until a new setpoint temperature is received via the bus (ABB i-bus® KNX).

Option
1 … 10 … 30 °C

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter Device function \ Option Controller
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Monitoring and safety*
  - Parameter *Cyclical monitoring* \ Option *Activated*
  - Parameter *Monitor receipt of Group Objects "Setpoint temperature heating/cooling"* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.74 Voltage range valve control value

This parameter is used to define the voltage range for the valve control value. The control value calculated by the controller or received via the bus (ABB i-bus® KNX) is converted to a voltage value according to the selected option. The voltage value is used to operate the valve drive.

More information: → Valve drives, Page 158.

Note
Observe technical data for the valve drive.

Option	
0 ... 10 V	Control value 0 % = 0 V … control value 1 % = 0.4 V … control value 100 % = 10 V
1 ... 10 V	Control value 0 % = 0 V … control value 1 % = 1 V … control value 100 % = 10 V
2 ... 10 V	Control value 0 % = 0 V … control value 1 % = 2 V … control value 100 % = 10 V
10 ... 0 V	Control value 0 % = 10 V … control value 100 % = 0 V

Prerequisites for visibility
- Product variants:
  - HCC/S 2.1.1.1
  - HCC/S 2.1.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X (0 ... 10 V)* \ Parameter *Valve output [0 ... 10 V]* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X (0 ... 10 V)*.

7.4.75 Purge cycle in weeks

This parameter specifies the cycle for the automatic valve purge.

More information: → valve purge, Page 160.

The following events reset the purge cycle:
- Valve purge performed
- ETS download
- Bus voltage recovery
- Exceeding the value in the parameter *Reset purge cycle from control value greater than or equal to*

Option
1 ... 4 ... 12

Prerequisites for visibility
- Product variants:
  - HCC/S 2.1.1.1
  - HCC/S 2.1.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X (0 ... 10 V)* \ Parameter *Valve output [0 ... 10 V]* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X (0 ... 10 V)*.

Or
- Product variants:
  - HCC/S 2.2.1.1
  - HCC/S 2.2.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X* \ Parameter *Valve output* \ Option *Motor-driven (3-point)*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X*.

7.4.76 Reset purge cycle from control value greater than or equal to

This parameter is used to define the control value as of which the purge cycle is reset.

More information: → valve purge, Page 160.

Option
1 … 99 %

Prerequisites for visibility

- Product variants:
  - HCC/S 2.1.1.1
  - HCC/S 2.1.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X (0 … 10 V)* \ Parameter *Valve output [0 … 10 V]* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X (0 … 10 V)*.

Or

- Product variants:
  - HCC/S 2.2.1.1
  - HCC/S 2.2.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X* \ Parameter *Valve output* \ Option *Motor-driven (3-point)*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X*.

7.4.77 Send status values [binary input]

This parameter is used to define when the value of the following Group Object is sent on the bus (ABB i-bus® KNX):

- *Contact position binary input*

Option	
On change	The value is sent if there is a change.
On change or cyclically	The value is sent on change or cyclically. The cycle time can be set. The following dependent parameters are shown: • *Send cyclically every* • *On Group Object value*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Binary input* \ Parameter *Input* \ Option *Binary input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

7.4.78 Send status values [pump]

This parameter is used to define when the values of the following Group Objects are sent on the bus (ABB i-bus® KNX):

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

Note

Sending on request can be triggered by the reception of a telegram with the value 0 or 1 on Group Object *Request status values*.

Option	
On change	The value is sent if there is a change.
Cyclically	The value is sent cyclically. The cycle time can be set. The following dependent parameters are shown: • *Send cyclically every*
On change or cyclically	The value is sent on change or cyclically. The cycle time can be set. The following dependent parameters are shown: • *Send cyclically every*
On request	The value is sent on request.
On change or on request	The value is sent on change or on request.
On request or cyclically	The value is sent on request or cyclically. The cycle time can be set. The following dependent parameters are shown: • *Send cyclically every*
On change, on request or cyclically	The value is sent on change, on request or cyclically. The cycle time can be set. The following dependent parameters are shown: • *Send cyclically every*

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Pump*.

7.4.79 Send status values [pump fault output]

This parameter is used to define when the value of the following Group Object is sent on the bus (ABB i-bus® KNX):

- *Pump fault alarm*

Option	
On change	The value is sent if there is a change.
On change or cyclically	The value is sent on change or cyclically. The cycle time can be set. The following dependent parameters are shown: • *Send cyclically every*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Monitor pump error* \ Option *Via physical device input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

7.4.80 Send status values [pump repair status input]

This parameter is used to define when the value of the following Group Object is sent on the bus (ABB i-bus® KNX):

- *Pump repair switch*

Option	
On change	The value is sent if there is a change.
On change or cyclically	The value is sent on change or cyclically. The cycle time can be set. The following dependent parameters are shown: • *Send cyclically every*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Monitor pump repair switch* \ Option *Via physical device input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

7.4.81 Send status values [pump status input]

This parameter is used to define when the value of the following Group Object is sent on the bus (ABB i-bus® KNX):

- *Status pump*

Option	
On change	The value is sent if there is a change.
On change or cyclically	The value is sent on change or cyclically. The cycle time can be set. The following dependent parameters are shown: • *Send cyclically every*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Monitor pump status* \ Option *Via physical device input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

7.4.82 Send status values [valve output]

This parameter is used to define when the values of the following Group Objects are sent on the bus (ABB i-bus® KNX):

- *Status byte Valve X*
- *Fault Valve output X*
- *Fault Valve output X*
- *Status Control value valve X*

Note
Sending on request can be triggered by the reception of a telegram with the value 0 or 1 on Group Object *Request status values*.

Option	
On change	The value is sent if there is a change.
Cyclically	The value is sent cyclically. The cycle time can be set. The following dependent parameters are shown: • *Send cyclically every*
On request	The value is sent on request.
On change or on request	The value is sent on change or on request.
On change, on request or cyclically	The value is sent on change, on request or cyclically. The cycle time can be set. The following dependent parameters are shown: • *Send cyclically every*

Prerequisites for visibility

- Product variants:
  - HCC/S 2.1.1.1
  - HCC/S 2.1.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X (0 ... 10 V)* \ Parameter *Valve output [0 ... 10 V]* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X (0 ... 10 V)*.

Or

- Product variants:
  - HCC/S 2.2.1.1
  - HCC/S 2.2.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X* \ Parameter *Valve output* \ Option *Motor-driven (3-point)*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X*.

7.4.83 control value

This parameter is used to define the control value after bus voltage recovery or ETS download. The set control value is valid until a new control value is calculated by the controller in the controller mode or a new control value is received via the bus (ABB i-bus® KNX) in the actuator mode.

Option
0 … 100 %

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Channel function*
  - Parameter *Control value after bus voltage recovery* \ Option *Selection*
    or
  - Parameter *Control value after ETS download* \ Option *Selection*
- The parameter is in the parameter window *Channel X* \ parameter window *Channel function*.

7.4.84 Control value on input fault

This parameter is used to define the control value set if there is an error on the monitored temperature input. The control value applies only to the active operating mode. The control value is valid until the error is corrected.

Option
0 … 25 … 100 %

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Controller channel*
- Parameter window *Channel X* \ Parameter window *Monitoring and safety*
  - Parameter *Cyclical monitoring* \ Option *Activated*
  - Parameter *Monitor supply flow temperature* \ Option *On physical device input x*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.85 Control value after exceeding monitoring time

This parameter is used to define the control value set if the monitoring time is exceeded. The control value applies only to the active operating mode.

Option
0 … 25 … 100 %

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Controller channel*
- Parameter window *Channel X* \ Parameter window *Monitoring and safety*
  - Parameter *Cyclical monitoring* \ Option *Activated*
  - Parameter *Monitor supply flow temperature* \ Option *On Group Object*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.86 Control value on forced operation

This parameter is used to define the control value set if 1-bit forced operation is activated. The control value applies only to the active operating mode. The control value is valid until the forced operation is canceled.

More information: → forced operation, Page 163.

Option
0 ... 100 %

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Monitoring and safety* \ Parameter *forced operation* \ Options *Activated 1 bit – 1 active* / *Activated 1 bit – 0 active*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.87 Control value on forced operation active "OFF"

This parameter is used to define the control value if 2-bit forced operation "OFF" is activated. The control value applies only to the active operating mode. The control value is valid until the forced operation is canceled.

More information: → forced operation, Page 163.

Option
0 ... 100 %

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Monitoring and safety* \ Parameter *forced operation* \ Option *Activated 2 bit*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.88 Control value on forced operation active "ON"

This parameter is used to define the control value set if 2-bit forced operation "ON" is activated. The control value applies only to the active operating mode. The control value is valid until the forced operation is canceled.

More information: → forced operation, Page 163.

Option
0 ... 100 %

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Monitoring and safety* \ Parameter *forced operation* \ Option *Activated 2 bit*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.89 Control value after bus voltage recovery

This parameter is used to define the control value set after bus voltage recovery. The set control value is valid until a new control value is calculated by the controller in the controller mode or a new control value is received via the bus (ABB i-bus® KNX) in the actuator mode.

Note
The reaction set here applies during the sending and switching delay as well.
After bus voltage recovery, it can take up to 2 seconds until the device has started and the outputs can be activated.

Option	
As before bus voltage failure	The last control value before bus voltage failure is applied.
Selection	The control value can be set. The following dependent parameters are shown: • *control value*

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Channel function*.

7.4.90 Control value after ETS download

This parameter is used to define the control value set after ETS download. The set control value is valid until a new control value is calculated by the controller in the controller mode or a new control value is received via the bus (ABB i-bus® KNX) in the actuator mode.

Option	
Unchanged	The last control value before ETS download is applied.
Selection	The control value can be set. The following dependent parameters are shown: • *control value*

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Channel function*.

7.4.91 Control value difference for sending the control value

This parameter is used to define the difference for sending the control value. The calculated control value is sent only if it differs by the set difference from the last control value sent.

Option
2 %
5 %
10 %
Only send cyclically

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Heating* \ Parameter *Extended settings* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Heating*.

Or

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Cooling* \ Parameter *Extended settings* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Cooling*.

7.4.92 Reset fault Valve output

This parameter is used to define how a fault on the valve output is reset.

Option	
Via Group Object	It there is a fault, the valve output is switched off. The fault can be reset only via Group Object *Fault Reset valve output X*.
Automatic or via Group Object	If there is a fault, output of the control value continues. The fault message remains active and can be reset only via Group Object *Fault Reset valve output X*.

Prerequisites for visibility

- Product variants:
  - HCC/S 2.1.1.1
  - HCC/S 2.1.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X (0 ... 10 V)* \ Parameter *Valve output [0 ... 10 V]* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X (0 ... 10 V)*.

7.4.93 Temperature, safety shutdown [heating]

This parameter is used to define the temperature for the *heating* safety shutdown.

When the temperature reaches the set value, the controller sets the control value to 0.

Option
25 … 80 … 100 °C

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Heating*
  - Parameter *Extended settings* \ Option *Yes*
  - Parameter *Activate safety shutdown* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Heating*.

7.4.94 Temperature, safety shutdown [cooling]

This parameter is used to define the temperature for the *cooling* safety shutdown.

When the temperature reaches the set value, the controller sets the control value to 0.

Option
1 … 8 … 30 °C

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Cooling*
  - Parameter *Extended settings* \ Option *Yes*
  - Parameter *Activate safety shutdown* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Cooling*.

7.4.95 Temperature input [return flow temperature]

This parameter is used to define how the device receives the return flow temperature.

Note
The return flow temperature has no influence on the control. The acquisition of the return flow temperature can be used for function testing.

Option	
Deactivated	The input is deactivated.
Via physical device input	The following dependent parameters are shown: • *Temperature sensor type* • *Temperature offset* • *Cable error compensation* • *Filter* • *Send temperature value [return flow temperature]* The following dependent Group Objects are displayed: • *Return flow temperature* • *Error Input*

7.4.96 Temperature input [supply flow temperature]

This parameter is used to define how the controller receives the supply flow temperature.

Note
The possible options depend on the selection in the parameter *Channel function*.

Option	
Deactivated	The input is deactivated.
Via physical device input	The following dependent parameters are shown: • *Temperature sensor type* • *Temperature offset* • *Cable error compensation* • *Filter* • *Send temperature value [supply flow temperature]* The following dependent Group Objects are displayed: • *Supply flow temperature* • *Error Input*
Via Group Object	The following dependent Group Objects are displayed: • *Supply flow temperature receipt*

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Supply flow temperature*.

7.4.97 Temperature offset

This parameter is used to define the offset for the sensor connected to the temperature input.

> **Note**
> The temperature offset can be used to compensate sensor measuring accuracy.

Option
-10.0 ... 0.0 ... +10.0 K

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Supply flow temperature* \ Parameter *Temperature input [supply flow temperature]* \ Option *Via physical device input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Supply flow temperature*.

Or

- Parameter window *Channel X* \ Parameter window *Input x: Return flow temperature* \ Parameter *Temperature input [return flow temperature]* \ Option *Via physical device input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Return flow temperature*.

7.4.98 Temperature sensor type

This parameter specifies which type of temperature sensor is connected. The sensor measuring range is indicated in brackets.

With sensor types NTC and KTY, the subtype must be set as well.

Option	
PT1000 [-30…+110°C]	The temperature sensor type PT1000 is used.
PT100 [-30…+110°C]	The temperature sensor type PT100 is used.
NTC	The temperature sensor type NTC is used. The following dependent parameters are shown: • *NTC type*
KTY [-15…+110]	The temperature sensor type KTY is used. The following dependent parameters are shown: • *KTY type*
NI1000 - 01 [-30…+110°C]	The temperature sensor type NI1000 - 01 is used.
NI1000 - 02 [-30…+110°C]	The temperature sensor type NI1000 - 02 is used.

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Supply flow temperature* \ Parameter *Temperature input [supply flow temperature]* \ Option *Via physical device input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Supply flow temperature*.

Or

- Parameter window *Channel X* \ Parameter window *Input x: Return flow temperature* \ Parameter *Temperature input [return flow temperature]* \ Option *Via physical device input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Return flow temperature*.

7.4.99 Heating temperature setpoint

This parameter is used to define the temperature setpoint for the *Heating* operating mode. The setpoint set is valid until a new setpoint has been received.

Option
20 … 50 … 100 °C

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Channel function*
  - Parameter *Temperature setpoint after bus voltage recovery* \ Option *Selection*
    or
  - Parameter *Temperature setpoint after ETS download* \ Option *Selection*
- The parameter is in the parameter window *Channel X* \ parameter window *Channel function*.

7.4.100 Cooling temperature setpoint

This parameter is used to define the temperature setpoint for the *Cooling* operating mode. The setpoint set is valid until a new setpoint has been received.

Option
1 … 10 … 30 °C

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Channel function*
  - Parameter *Temperature setpoint after bus voltage recovery* \ Option *Selection*
    or
  - Parameter *Temperature setpoint after ETS download* \ Option *Selection*
- The parameter is in the parameter window *Channel X* \ parameter window *Channel function*.

7.4.101 Temperature setpoint after bus voltage recovery

This parameter is used to define the temperature setpoint for *Heating* and *Cooling* after bus voltage recovery.

Option	
As before bus voltage failure	The last temperature setpoint before bus voltage failure is applied.
Selection	The temperature setpoint can be set. The following dependent parameters are shown: • *Heating temperature setpoint* • *Cooling temperature setpoint*

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Channel function*.

7.4.102 Temperature setpoint after ETS download

This parameter is used to define the temperature setpoint for *Heating* and *Cooling* after ETS download.

Option	
Unchanged	The last temperature setpoint before ETS download failure is applied.
Selection	The temperature setpoint can be set. The following dependent parameters are shown: • *Heating temperature setpoint* • *Cooling temperature setpoint*

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Channel function*.

7.4.103 Send temperature value [return flow temperature]

This parameter is used to define when the value of the following Group Object is sent on the bus (ABB i-bus® KNX):

- *Return flow temperature*

Note
Sending on request can be triggered by the reception of a telegram with the value 0 or 1 on Group Object *Request status values*.

Option	
On change	The value is sent if there is a change. The following dependent parameters are shown: • *Value is sent from a change of*
Cyclically	The value is sent cyclically. The cycle time can be set. The following dependent parameters are shown: • *Send cyclically every*
On change or cyclically	The value is sent on change or cyclically. The cycle time can be set. The following dependent parameters are shown: • *Value is sent from a change of* • *Send cyclically every*
On request	The value is sent on request.
On change or on request	The value is sent on change or on request. The following dependent parameters are shown: • *Value is sent from a change of*
On request or cyclically	The value is sent on request or cyclically. The cycle time can be set. The following dependent parameters are shown: • *Send cyclically every*
On change, on request or cyclically	The value is sent on change, on request or cyclically. The cycle time can be set. The following dependent parameters are shown: • *Value is sent from a change of* • *Send cyclically every*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Return flow temperature* \ Parameter *Temperature input [return flow temperature]* \ Option *Via physical device input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Return flow temperature*.

7.4.104 Send temperature value [supply flow temperature]

This parameter is used to define when the value of the following Group Object is sent on the bus (ABB i-bus® KNX):

- *Supply flow temperature*

> **Note**
> Sending on request can be triggered by the reception of a telegram with the value 0 or 1 on Group Object *Request status values*.

Option	
On change	The value is sent if there is a change. The following dependent parameters are shown: • *Value is sent from a change of*
Cyclically	The value is sent cyclically. The cycle time can be set. The following dependent parameters are shown: • *Send cyclically every*
On change or cyclically	The value is sent on change or cyclically. The cycle time can be set. The following dependent parameters are shown: • *Value is sent from a change of* • *Send cyclically every*
On request	The value is sent on request.
On change or on request	The value is sent on change or on request. The following dependent parameters are shown: • *Value is sent from a change of*
On request or cyclically	The value is sent on request or cyclically. The cycle time can be set. The following dependent parameters are shown: • *Send cyclically every*
On change, on request or cyclically	The value is sent on change, on request or cyclically. The cycle time can be set. The following dependent parameters are shown: • *Value is sent from a change of* • *Send cyclically every*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Supply flow temperature* \ Parameter *Temperature input [supply flow temperature]* \ Option *Via physical device input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Supply flow temperature*.

7.4.105 Monitor receipt of Group Object "Status Pump fault"

This parameter is used to define whether the monitoring of Group Object *Pump fault* is activated.

Note
If no value is received on Group Object *Pump fault* during the set time interval (→ parameter *Time interval for cyclical monitoring*), the following actions are carried out:
- Group Object *Error "Pump fault" receipt* is set to "Error"
- The pump remains switched off and cannot be switched on until a new value is received in the Group Object *Pump fault*

Option	
Deactivated	Monitoring is deactivated.
Activated	Monitoring is activated. The following dependent parameters are shown: • *Time interval for cyclical monitoring* The following dependent Group Objects are displayed: • *Error "Pump fault" receipt*

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Monitor pump error* \ Option *Via Group Object*
- Parameter window *Channel X* \ Parameter window *Monitoring and safety* \ Parameter *Cyclical monitoring* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.106 Monitor receipt of Group Object "Status Pump repair switch"

This parameter is used to define whether the monitoring of Group Object *Pump repair switch* is activated.

Note
If no value is received on Group Object *Pump repair switch* during the set time interval (→ parameter *Time interval for cyclical monitoring*), the following actions are carried out:
- Group Object *Error "Pump repair switch" receipt* is set to "Error"
- The pump remains switched off and cannot be switched on until a new value is received in the Group Object *Pump repair switch*

Option	
Deactivated	Monitoring is deactivated.
Activated	Monitoring is activated. The following dependent parameters are shown: • *Time interval for cyclical monitoring* The following dependent Group Objects are displayed: • *Error "Pump repair switch" receipt*

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Monitor pump repair switch* \ Option *Via Group Object*
- Parameter window *Channel X* \ Parameter window *Monitoring and safety* \ Parameter *Cyclical monitoring* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.107 Monitor receipt of Group Object "Heating/cooling changeover"

This parameter is used to define whether the monitoring of Group Object *Heating/cooling changeover* is activated.

Note
If no value is received on Group Object *Heating/cooling changeover* during the set time interval (→ parameter *Time interval for cyclical monitoring*), the following actions are carried out:
- Group Object *Error "Heating/cooling changeover" receipt* is set to "Error"
- Value in the parameter *Heating/cooling mode when monitoring time exceeded* becomes valid

Option	
Deactivated	Monitoring is deactivated.
Activated	Monitoring is activated. The following dependent parameters are shown: • *Time interval for cyclical monitoring* • *Heating/cooling mode when monitoring time exceeded*

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Monitoring and safety* \ Parameter *Cyclical monitoring* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.108 Monitor receipt of Group Objects "Setpoint temperature heating/cooling"

This parameter is used to define whether the monitoring of the following Group Objects is activated:
- *Heating setpoint temperature*
- *Cooling setpoint temperature*

Note
If no value is received on the Group Object *Heating setpoint temperature* or *Cooling setpoint temperature* during the set time interval (→ parameter *Time interval for cyclical monitoring*), the following actions are carried out:
- Group Object *Error Setpoint temperature receipt* is set to "Error"
- Values in the following parameters (depending on operating mode) become valid:
  - *Heating setpoint temperature when monitoring time exceeded*
  - *Cooling setpoint temperature when monitoring time exceeded*

Option	
Deactivated	Monitoring is deactivated.
Activated	Monitoring is activated. The following dependent parameters are shown: • *Time interval for cyclical monitoring* • *Heating setpoint temperature when monitoring time exceeded* • *Cooling setpoint temperature when monitoring time exceeded* The following dependent Group Objects are displayed: • *Error Setpoint temperature receipt*

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Controller channel*
- Parameter window *Channel X* \ Parameter window *Monitoring and safety* \ Parameter *Cyclical monitoring* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.109 Monitor receipt of Group Objects "Control value heating/cooling"

This parameter is used to define whether the monitoring of the following Group Objects is activated:
- *Control value Heating*
- *Control value Cooling*

Note
If no value is received on the Group Object *Control value Heating* or *Control value Cooling* during the set time interval (→ parameter *Time interval for cyclical monitoring*), the following actions are carried out:
- Group Object *Error "Control value" receipt* is set to "Error"
- Value in the parameter *Control value after exceeding monitoring time* becomes valid

Option	
Deactivated	Monitoring is deactivated.
Activated	Monitoring is activated. The following dependent parameters are shown: • *Time interval for cyclical monitoring* • *Control value after exceeding monitoring time* The following dependent Group Objects are displayed: • *Error "Control value" receipt*

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Actuator channel*
- Parameter window *Channel X* \ Parameter window *Monitoring and safety* \ Parameter *Cyclical monitoring* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.110 Monitor pump error

This parameter is used to define whether the pump error switch is monitored. The pump is switched off if a pump error is active.

Note
Monitoring is possible only if a corresponding floating contact is available.

Option	
Deactivated	Monitoring is deactivated.
Via physical device input	The pump error switch is monitored via input x (x = input d for channel A, input i for channel B). The input is set to the option *Pump error input* and cannot be changed. The following dependent Group Objects are displayed: • *Pump fault alarm*
Via Group Object	The pump error switch is monitored via an external device. The error status is received via a Group Object. The following dependent Group Objects are displayed: • *Pump fault*

Prerequisites for visibility
- The parameter is in the parameter window *Channel X* \ parameter window *Pump*.

7.4.111 Monitor pump repair switch

This parameter is used to define whether the pump repair switch is monitored. The pump is switched off when the pump repair switch is active.

Note
Monitoring is possible only if a corresponding floating contact is available.

Option	
Deactivated	Monitoring is deactivated.
Via physical device input	The pump repair switch is monitored via input x (x = input e for channel A, input j for channel B). The input is set to the option *Pump repair status input* and cannot be changed. The following dependent Group Objects are displayed: • *Pump repair switch*
Via Group Object	The pump repair switch is monitored via an external device. The repair status is received via a Group Object. The following dependent Group Objects are displayed: • *Pump repair switch*

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Pump*.

7.4.112 Monitor pump status

This parameter is used to define whether the pump status is monitored.

Note
Monitoring is possible only if a corresponding floating contact is available.

Note
The monitoring has no influence on the control. Status detection can be used for function testing.

Option	
Deactivated	Monitoring is deactivated.
Via physical device input	The pump status is monitored via input x (x = input c for channel A, input h for channel B). The input is set to the option *Pump status input* and cannot be changed. The following dependent Group Objects are displayed: • *Status pump*

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Pump*.

7.4.113 Monitor supply flow temperature

This parameter is used to define whether the reception of a temperature value is monitored.

Option	
Deactivated	Monitoring is deactivated.
On physical device input x	The reception of a temperature value on the physical device input x (x = input a for channel A, input f for channel B) is monitored. The following actions will be performed if no valid temperature is measured at the input for longer than one minute: • Group Object *Fault Supply flow temperature* is set to "Error" • Value in the parameter *Control value on input fault* becomes valid The following dependent parameters are shown: • *Control value on input fault* The following dependent Group Objects are displayed: • *Fault Supply flow temperature*
On Group Object	The following Group Objects are monitored: • *Supply flow temperature receipt* If no value is received on the Group Object within the set time interval, the following actions are carried out: • Group Object *Fault Supply flow temperature* is set to "Error" • Value in the parameter *Control value after exceeding monitoring time* becomes valid The following dependent parameters are shown: • *Time interval for cyclical monitoring* • *Control value after exceeding monitoring time* The following dependent Group Objects are displayed: • *Fault Supply flow temperature*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Controller channel*
- Parameter window *Channel X* \ Parameter window *Monitoring and safety* \ Parameter *Cyclical monitoring* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.114 Reversing time

CAUTION

Setting a reversing time that is too short can damage the connected drive.

▸ Observe the technical data of the connected drive.

This parameter is used to define the duration of the reversing time for the valve drive.

Option
50 … 500 … 1000 ms

Prerequisites for visibility

- Product variants:
  - HCC/S 2.2.1.1
  - HCC/S 2.2.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X* \ Parameter *Valve output* \ Option *Motor-driven (3-point)*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X*.

7.4.115 Changeover time

This parameter specifies the duration of the changeover between the main pump and the backup pump.

- If 0 s are defined, the active pump is switched off and the inactive pump switched on at the same time.
- If −60 s … −1 s are defined, the inactive pump is switched on before switching off the active pump. Both pumps are active for the time defined. If the change takes place because of a pump fault, the inactive pump is switched on immediately.
- If 1 s … 60 s are defined, the active pump is switched off before the inactive pump is switched on. Both pumps are inactive for the time defined. If the change takes place because of a pump fault, the inactive pump is switched on after the time defined has elapsed.

Option
-60 … 0 … 60 s

Prerequisites for visibility

- Parameter window *Basic settings* \ Parameter *Channel bundling for double pumps* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Pump*.

7.4.116 Changeover point time

This parameter specifies the time for the changeover between the main pump and the backup pump.

Option
1 … 24 h

Prerequisites for visibility

- Parameter window *Basic settings* \ Parameter *Channel bundling for double pumps* \ Option *Yes*
- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Usage pump channel X* \ Option *Change weekly*
- The parameter is in the parameter window *Channel X* \ parameter window *Pump*.

7.4.117 Changeover point weekday

This parameter specifies the weekday on which the changeover between the main pump and the backup pump is to be made.

Option
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday

Prerequisites for visibility

- Parameter window *Basic settings* \ Parameter *Channel bundling for double pumps* \ Option *Yes*
- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Usage pump channel X* \ Option *Change weekly*
- The parameter is in the parameter window *Channel X* \ parameter window *Pump*.

7.4.118 Distinction between short and long operation

This parameter is used to define whether a distinction is made between short and long operation of the connected contact (e.g. button).

The following figure shows the distinction:

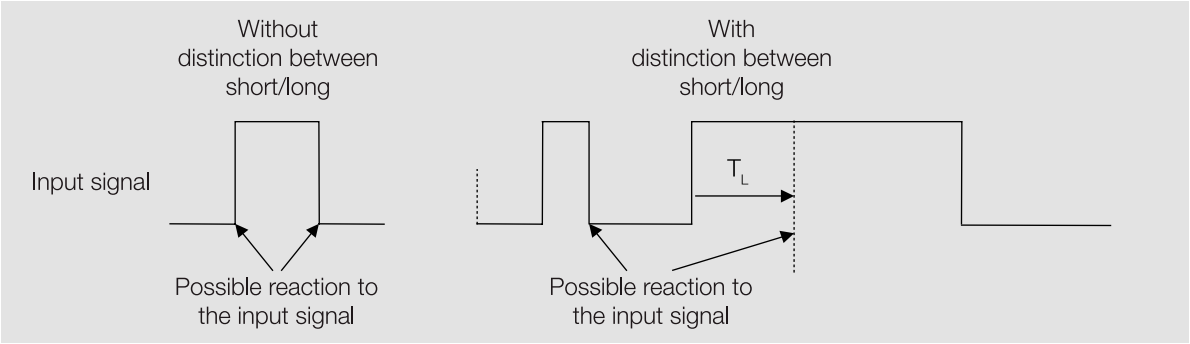


Fig. 27: Distinguishing between short/long operation

Note
T_L is the time from which a long operation is detected.

Option	
No	The following dependent parameters are shown: • *Activate minimum signal duration*
Yes	The following dependent parameters are shown: • *Input on operation* • *Long operation after*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Binary input* \ Parameter *Input* \ Option *Binary input*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Binary input*.

7.4.119 Close valve when pump is switched off

This parameter is used to define whether the valve is closed when the pump is switched off.

Note
If the valve is closed when the pump is switched off, a temperature increase/drop in the heating/cooling circuit after switching back on the pump can be prevented.

Note
If the valve is activated via a Group Object, the valve is not closed. The valve continues to be activated using the control value calculated by the controller.

Option
No
Yes

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Pump*.

7.4.120 Valve output

This parameter is used to define how the valve output is used.

Depending on the valve drive parameterized, the control values received from the internal controller or via the bus (ABB i-bus® KNX) are converted into the corresponding output signal.

More information: → Valve drives, Page 158.

Option	
Motor-driven (3-point)	The control value is converted to an activation signal for a 3-point drive. Valve outputs B and C are interconnected for activation of the valve drive. Valve output B issues the opening signal and valve output C the closing signal. The following dependent parameters are shown: • *Reversing time* • *Switch on time for valve drive from 0 to 100 %* • *Automatic adjustment of valve drive* • *Send status values [valve output]* • *Enable manual valve override* • *valve purge* The following dependent Group Objects are displayed: • *Status byte Valve X* • *Status Control value valve X* • *Fault Valve output X* • *Fault Reset valve output X*
Deactivated	The valve output is deactivated.

Prerequisites for visibility

- Product variants:
  - HCC/S 2.2.1.1
  - HCC/S 2.2.2.1
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X*.

7.4.121 Valve output [0 ... 10 V]

This parameter is used to define how the valve output is used.

More information: → Valve drives, Page 158.

Option	
Activated	The valve output is used as the control value output for a 0 … 10 V valve drive. The following dependent parameters are shown: • *Voltage range valve control value* • *Valve drive opening/closing time* • *Send status values [valve output]* • *Enable manual valve override* • *valve purge* The following dependent Group Objects are displayed: • *Status byte Valve X* • *Status Control value valve X* • *Fault Valve output X* • *Fault Reset valve output X*
Deactivated	The valve output is deactivated.

Prerequisites for visibility

- Product variants:
  - HCC/S 2.1.1.1
  - HCC/S 2.1.2.1
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X (0 ... 10 V)*.

7.4.122 valve purge

This parameter is used to define how the valve purge is activated.

More information: → valve purge, Page 160.

Option	
Deactivated	Valve purge is deactivated.
Automatic or via Group Object	Valve purge takes place automatically in a set cycle. Valve purge can be triggered via a Group Object as well. The following dependent parameters are shown: • *Purge cycle in weeks* • *Reset purge cycle from control value greater than or equal to* • *Send value of Group Object "Status Valve purge"* The following dependent Group Objects are displayed: • *Status Valve purge X* • *Activate valve purge X*
Via Group Object	The valve purge can be triggered via a Group Object. The following dependent parameters are shown: • *Send value of Group Object "Status Valve purge"* The following dependent Group Objects are displayed: • *Status Valve purge X* • *Activate valve purge X*

Prerequisites for visibility

- Product variants:
  - HCC/S 2.1.1.1
  - HCC/S 2.1.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X (0 ... 10 V)* \ Parameter *Valve output [0 ... 10 V]* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X (0 ... 10 V)*.

Or

- Product variants:
  - HCC/S 2.2.1.1
  - HCC/S 2.2.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X* \ Parameter *Valve output* \ Option *Motor-driven (3-point)*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X*.

7.4.123 Usage pump channel X

This parameter is used to define the usage of the pumps if double pumps are used in the heating/cooling circuit.

Option	
Main pump	The pump is used as the main pump. The pump remains active until the backup pump is activated due to a fault or a manual change.
Backup pump	The pump is used as the backup pump. The pump remains inactive until it is activated due to a fault in the main pump or a manual change.
Change weekly	The two pumps are operated alternately to reduce the wear. The change between main pump and backup pump is undertaken weekly at a specified time. The following dependent parameters are shown: • *Changeover point weekday* • *Changeover point time* The following dependent Group Objects are displayed: • *Set time*

Prerequisites for visibility

- Parameter window *Basic settings* \ Parameter *Channel bundling for double pumps* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Pump*.

7.4.124 Send value Group Object "In operation"

This parameter is used to define the value that the Group Object *In operation* sends.

Option
Value 0
Value 1

Prerequisites for visibility

- Parameter window *Basic settings* \ Parameter *Enable Group Object "In operation"* \ Option *Yes*
- The parameter is in the parameter window *Basic settings*.

7.4.125 Send value of Group Object "Status Valve purge"

This parameter is used to define when the value of the following Group Object is sent on the bus (ABB i-bus® KNX):

- *Status Valve purge X*

Note
Sending on request can be triggered by the reception of a telegram with the value 0 or 1 on Group Object *Request status values*.

Option	
No, update only	The value is updated but is not sent.
On change	The value is sent if there is a change.
Cyclically	The value is sent cyclically. The cycle time can be set. The following dependent parameters are shown: • *Send cyclically every*
On request	The value is sent on request.
On change or on request	The value is sent on change or on request.
On change, on request or cyclically	The value is sent on change, on request or cyclically. The cycle time can be set. The following dependent parameters are shown: • *Send cyclically every*

Prerequisites for visibility

- Product variants:
  - HCC/S 2.1.1.1
  - HCC/S 2.1.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X (0 ... 10 V)* \ Parameter *Valve output [0 ... 10 V]* \ Option *Activated*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X (0 ... 10 V)*.

Or

- Product variants:
  - HCC/S 2.2.1.1
  - HCC/S 2.2.2.1
- Parameter window *Channel X* \ Parameter window *Valve output X* \ Parameter *Valve output* \ Option *Motor-driven (3-point)*
- The parameter is in the parameter window *Channel X* \ parameter window *Valve output X*.

7.4.126 Value after sending and switching delay has expired

This parameter is used to define the values that are applicable at the inputs and outputs after expiration of the sending and switching delay.

Option	
Last value received	The inputs and outputs react to the last value received.
Ignore received values	The state of the inputs and outputs remains unchanged until a new value is received after the sending and switching delays have elapsed.

Prerequisites for visibility

- The parameter is in the parameter window *Basic settings*.

7.4.127 Value is sent from a change of

This parameter is used to define the minimum change in the input value for sending the output value on the bus (ABB i-bus® KNX).

Option
0.2 … 1.0 … 10.0 K

Prerequisites for visibility

- The parameter appears at various points in the application. The visibility is dependent on the application and the higher-level parameter.

7.4.128 Resistance in ohms at x °C

These parameters are used to enter the resistance values for the temperature sensor connected. The values entered are used to form a characteristic curve of resistance.

Option
650 … 4,600 ohms

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Input x: Supply flow temperature*
  - Parameter *Temperature input [supply flow temperature]* \ Option *Via physical device input*
  - Parameter *Temperature sensor type* \ Option *KTY [-15…+110]*
  - Parameter *KTY type* \ Option *User-defined*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Supply flow temperature*.

Or

- Parameter window *Channel X* \ Parameter window *Input x: Return flow temperature*
  - Parameter *Temperature input [return flow temperature]* \ Option *Via physical device input*
  - Parameter *Temperature sensor type* \ Option *KTY [-15…+110]*
  - Parameter *KTY type* \ Option *User-defined*
- The parameter is in the parameter window *Channel X* \ parameter window *Input x: Return flow temperature*.

7.4.129 Control value direction

This parameter is used to define the control value for the heating/cooling stage.

More information: → Control value direction, Page 155.

Option	
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 %

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
  - Parameter *Activate Heating via* \ Option *Group Object*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Heating* \ Parameter *Extended settings* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Heating*.

Or

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
  - Parameter *Activate Cooling via* \ Option *Group Object*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Cooling* \ Parameter *Extended settings* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Cooling*.

7.4.130 xP-proportion

This parameter is used to define the xP-proportion for the PI control.

More information: → Basics of PI control, Page 147.

Option
1.0 … 100.0 K

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Heating*.

Or

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Cooling*.

7.4.131 i-bus® Tool access

This parameter is used to define whether the device can be accessed via i-bus® Tool.

More information: → Integration into i-bus® Tool, Page 44.

Option	
Deactivated	Access via i-bus® Tool is deactivated.
Value display only	Values can be displayed via the i-bus® Tool.
Full access	Values can be displayed and changed i-bus® Tool.

Prerequisites for visibility

- The parameter is in the parameter window *Basic settings*.

7.4.132 forced operation

This parameter is used to Activate/Deactivate 1-bit or 2-bit forced operation.

More information: → forced operation, Page 163.

Note
If forced operation is active, operation via Group Objects, manual operation and i-bus® Tool is blocked. Higher-priority functions continue to run → Priorities, Page 144.

Option	
Deactivated	Forced operation is deactivated.
Activated 1 bit – 1 active	Forced operation is activated by the reception of a telegram with the value 1. The following dependent parameters are shown: • *Control value on forced operation* • *Pump reaction on forced operation* The following dependent Group Objects are displayed: • *Forced operation, 1-bit*
Activated 1 bit – 0 active	Forced operation is activated by the reception of a telegram with the value 0. The following dependent parameters are shown: • *Control value on forced operation* • *Pump reaction on forced operation* The following dependent Group Objects are displayed: • *Forced operation, 1-bit*
Activated 2 bit	2-bit forced operation is used. The following dependent parameters are shown: • *Control value on forced operation active "ON"* • *Pump reaction during forced operation active "ON"* • *Control value on forced operation active "OFF"* • *Pump reaction during forced operation active "OFF"* The following dependent Group Objects are displayed: • *Forced operation, 2-bit*

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.133 Send cyclically every

This parameter is used to define the cycle in which the value of the Group Object is sent.

> **Note**
> The possible options and default values depend on the higher-level parameter.

Option
00:00:30 … 00:01:00 … 18:12:15 hh:mm:ss

Prerequisites for visibility

- The parameter appears at various points in the application. The visibility is dependent on the application and the higher-level parameter.

7.4.134 Cyclical monitoring

The cyclical monitoring is activated/deactivated with this parameter.

More information: → Cyclical monitoring, Page 164.

Option	
Deactivated	The cyclical monitoring is deactivated.
Activated	The following dependent parameters are shown: • *Monitor supply flow temperature* • *Monitor receipt of Group Objects "Control value heating/cooling"* • *Monitor receipt of Group Objects "Setpoint temperature heating/cooling"* • *Monitor receipt of Group Object "Heating/cooling changeover"* • *Monitor receipt of Group Object "Status Pump fault"* • *Monitor receipt of Group Object "Status Pump repair switch"*

Prerequisites for visibility

- The parameter is in the parameter window *Channel X* \ parameter window *Monitoring and safety*.

7.4.135 Time interval for cyclical monitoring

This parameter is used to define the time interval during which a value must be received on the monitored Group Object.

More information: → Cyclical monitoring, Page 164.

> **Note**
> The monitoring cycle in the device should be at least quadruple the cyclical sending time of the sending device. As a result, the reactions set will not be triggered immediately if a signal is missing, e.g. due to high bus load.

Option
00:00:30 … 01:00:00 … 18:12:15 hh:mm:ss

Prerequisites for visibility

- The parameter appears at various points in the application. The visibility is dependent on the application and the higher-level parameter.

7.4.136 Send inactive control values cyclically

This parameter is used to define whether the control value for the inactive operating mode is sent cyclically.

Note
On systems with only one control value input for heating and cooling, the Group Objects *Status Control value heating* and *Status Control value cooling* must be connected to the same input Group Object. If the *Yes* option is selected in this parameter, the control values for the active and inactive operating mode overwrite each other.

Example
Active type of operation: *Heating*
Control value Heating: 50 %
Control value Cooling: 0 %
Sending cycle: 5 minutes (for both types of operation)
Send control value *Heating* ⇒ control value received: 50 %
⇒ Valve drive actuator output control value: 50 %
Send control value *Cooling* ⇒ control value received: 0 %
⇒ Valve drive actuator output control value: 0 %

Note
The cycle times can be set in the parameter window of the respective heating/cooling stage → parameter *Cycle for sending the control value (0 = deactivated)*.

Option
No
Yes

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller*.

7.4.137 Cycle for sending the control value (0 = deactivated)

This parameter is used to define the cycle for sending the control value.

> **Note**
> Sending cyclically should not be deactivated to ensure that the actuator receives its control value.
> If, in the parameter *Control value difference for sending the control value*, the option *Only send cyclically* is selected, a value > 0 must be selected.

Option
0 … 15 … 60 min

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Heating* \ Parameter *Extended settings* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Heating*.

Or

- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Cooling* \ Parameter *Extended settings* \ Option *Yes*
- The parameter is in the parameter window *Channel X* \ parameter window *Temperature controller* \ parameter window *Cooling*.

8 Group Objects

8.1 Overview of Group Objects

Function	Group Object name	Data point type	Length	Flags
Activate minimum control value (basic load)	Channel X – Controller	DPT 1.003	1 bit	C W
Activate valve purge X	Channel X – Valve X	DPT 1.017	1 bit	C W
Activate/deactivate control	Channel X – Controller	DPT 1.001	1 bit	C W
Block input	Channel X – Binary input x	DPT 1.003	1 bit	C W
Contact position binary input	Channel X – Binary input x	DPT 1.001	1 bit	C R T
Control value Cooling	Channel X – Actuator	DPT 5.001	1 byte	C W T U
Control value Heating	Channel X – Actuator	DPT 5.001	1 byte	C W T U
Cooling setpoint temperature	Channel X - Controller	DPT 9.001	2 bytes	C W T U
Current setpoint	Channel X – Controller	DPT 9.001	2 bytes	C R T
Enable/block manual operation	General	DPT 1.003	1 bit	C W
Enable/block manual pump override	Channel X - Pump	DPT 1.003	1 bit	C W
Enable/block manual valve override X	Channel X – Valve X	DPT 1.003	1 bit	C W
Error "Control value" receipt	Channel X - General	DPT 1.005	1 bit	C R T
Error "Heating/cooling changeover" receipt	Channel X - General	DPT 1.005	1 bit	C R T
Error "Pump fault" receipt	Channel X - General	DPT 1.005	1 bit	C R T
Error "Pump repair switch" receipt	Channel X - General	DPT 1.005	1 bit	C R T
Error Input	Channel X – Input x	DPT 1.005	1 bit	C R T
Error Setpoint temperature receipt	Channel X - General	DPT 1.005	1 bit	C R T
Fault Reset valve output X	Channel X – Valve X	DPT 1.015	1 bit	C W
Fault Reset valve output X	Channel X – Valve X	DPT 1.015	1 bit	C W
Fault Supply flow temperature	Channel X – Controller	DPT 1.005	1 bit	C R T
Fault Valve output X	Channel X – Valve X	DPT 1.005	1 bit	C R T
Fault Valve output X	Channel X – Valve X	DPT 1.005	1 bit	C R T
Forced operation, 1-bit	Channel X – General	DPT 1.002	1 bit	C W
Forced operation, 2-bit	Channel X – General	DPT 2.001	2 bit	C W
Heating setpoint temperature	Channel X - Controller	DPT 9.001	2 bytes	C W T U
Heating/cooling changeover	Channel X – Actuator	DPT 1.100	1 bit	C W T U
Heating/cooling changeover	Channel X – Controller	DPT 1.100	1 bit	C W T U
In operation	General	DPT 1.002	1 bit	C R T
Master/slave changeover	Channel X - Pump	DPT 1.017	1 bit	C W
Override pump	Channel X - Pump	DPT 1.001	1 bit	C W
Override valve control value X	Channel X – Valve X	DPT 5.001	1 byte	C W
Pump fault	Channel X – Pump	DPT 1.005	1 bit	C W T U
Pump fault alarm	Channel X – Binary input x	DPT 1.005	1 bit	C R T
Pump repair switch	Channel X – Binary input x	DPT 1.005	1 bit	C R T
Pump repair switch	Channel X – Pump	DPT 1.011	1 bit	C W T U
Request status values	General	DPT 1.017	1 bit	C W
Return flow temperature	Channel X – Input x	DPT 9.001	2 bytes	C R T
Set time	Channel X - Pump	DPT 10.001	3 bytes	C W
Status byte channel	Channel X - General	Non DPT	1 byte	C R T
Status byte Valve X	Channel X – Valve X	Non DPT	1 byte	C R T
Status Control value cooling	Channel X - Controller	DPT 5.001	1 byte	C R T
Status Control value heating	Channel X - Controller	DPT 5.001	1 byte	C R T
Status Control value valve X	Channel X – Valve X	DPT 5.001	1 byte	C R T
Status Control	Channel X – Controller	DPT 1.001	1 bit	C R T
Status Cooling	Channel X - Controller	DPT 1.001	1 bit	C R T
Status Heating	Channel X - Controller	DPT 1.001	1 bit	C R T
Status Heating/cooling	Channel X – Controller	DPT 1.100	1 bit	C R T
Status Manual operation	General	DPT 1.011	1 bit	C R T
Status pump	Channel X – Binary input x	DPT 1.011	1 bit	C R T
Status pump automatic mode	Channel X - Pump	DPT 1.011	1 bit	C R T
Status pump master/slave (1=Master, 0=Slave)	Channel X - Pump	DPT 1.011	1 bit	C R T
Status pump relay	Channel X - Pump	DPT 1.009	1 bit	C R T
Status Safety shutdown	Channel X – Controller	DPT 1.005	1 bit	C R T
Status Valve purge X	Channel X – Valve X	DPT 1.011	1 bit	C R T
Supply flow temperature	Channel X – Input x	DPT 9.001	2 bytes	C R T
Supply flow temperature receipt	Channel X - Controller	DPT 9.001	2 bytes	C W T U
Temperature, safety shutdown cooling	Channel X - Controller	DPT 9.001	2 bytes	C W T U
Temperature, safety shutdown heating	Channel X - Controller	DPT 9.001	2 bytes	C W T U

8.2 Group objects, general

Function	Group Object name	Data point type	Length	Flags
In operation	**General**	**DPT 1.002**	**1 bit**	**C R T**

This Group Object cyclically sends an In operation telegram on the bus (ABB i-bus® KNX). The sending cycle is set in parameter *Sending cycle*.
The telegram value depends on the setting in the parameter *Send value Group Object "In operation"*.
Telegram value:
- 1 = Device in operation
- 0 = Device in operation

Note
Readiness can be monitored by another KNX device using this Group Object. If a telegram is not received, the sending device could be faulty or the bus cable to the transmitting device could be interrupted.

Prerequisites for visibility
- Parameter window *Basic settings* \ Parameter *Enable Group Object "In operation"* \ Option *Yes*

Function	Group Object name	Data point type	Length	Flags
Request status values	**General**	**DPT 1.017**	**1 bit**	**C W**

If a telegram is received on this Group Object, the values of the status Group Objects are sent on the bus (ABB i-bus® KNX).
Telegram value:
- 1 = Send status values
- 0 = Send status values

Note
The values of the status Group Objects are sent only if sending on request is set in the related parameters.

Prerequisites for visibility
- This Group Object is always visible.

Function	Group Object name	Data point type	Length	Flags
Enable/block manual operation	**General**	**DPT 1.003**	**1 bit**	**C W**

The *Manual operation* mode is enabled/blocked using this Group Object.
If *Manual operation* mode is active, it will be ended and blocked with telegram value 0.
Telegram value:
- 1 = Enable manual operation
- 0 = End manual operation and block

Prerequisites for visibility
- Parameter window *Manual operation* \ Parameter *Manual operation* \ Option *Enabled*

Function	Group Object name	Data point type	Length	Flags
Status Manual operation	**General**	**DPT 1.011**	**1 bit**	**C R T**

This Group Object sends the status of the *Manual operation* mode on the bus (ABB i-bus® KNX).
Telegram value:
- 1 = Manual operation active
- 0 = Manual operation inactive

Prerequisites for visibility
- Parameter window *Manual operation* \ Parameter *Manual operation* \ Option *Enabled*

8.3 Group objects, Channel x - General

Function	Group Object name	Data point type	Length	Flags
Status byte channel	**Channel X - General**	**Non DPT**	**1 byte**	**C R T**

This group object sends the following status information on the bus (ABB i-bus® KNX):
- Bit 7: Unused
- Bit 6: Unused
- Bit 5: Unused
- Bit 4: Safety mode (→ Safety mode, Page 42)
  - 1 = Active
  - 0 = Inactive
- Bit 3: Manual operation
  - 1 = Active
  - 0 = Inactive
- Bit 2: Manual valve override
  - 1 = Active
  - 0 = Inactive
- Bit 1: Forced operation
  - 1 = Active
  - 0 = Inactive
- Bit 0: Manual pump override
  - 1 = Active
  - 0 = Inactive

Note
The device is in safety mode after starting, because the controller has not yet received a valid temperature value.

Prerequisites for visibility
- This group object is always visible.

Function	Group Object name	Data point type	Length	Flags
Error "Pump repair switch" receipt	**Channel X - General**	**DPT 1.005**	**1 bit**	**C R T**

The group object sends the error status for the cyclical monitoring of the group object *Pump repair switch* on the bus (ABB i-bus® KNX).
The monitoring cycle is set in the parameter *Time interval for cyclical monitoring*.
Telegram value:
- 1 = Error
- 0 = No error

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Monitor pump repair switch* \ Option *Via Group Object*
- Parameter window *Channel X* \ Parameter window *Monitoring and safety*
  - Parameter *Cyclical monitoring* \ Option *Activated*
- Parameter *Monitor receipt of Group Object "Status Pump repair switch"* \ Option *Activated*

Function	Group Object name	Data point type	Length	Flags
Error "Pump fault" receipt	**Channel X - General**	**DPT 1.005**	**1 bit**	**C R T**

The group object sends the error status for the cyclical monitoring of the group object *Pump fault* on the bus (ABB i-bus® KNX).
The monitoring cycle is set in the parameter *Time interval for cyclical monitoring*.
Telegram value:
- 1 = Error
- 0 = No error

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Monitor pump error* \ Option *Via Group Object*
- Parameter window *Channel X* \ Parameter window *Monitoring and safety*
  - Parameter *Cyclical monitoring* \ Option *Activated*
  - Parameter *Monitor receipt of Group Object "Status Pump fault"* \ Option *Activated*

Function	Group Object name	Data point type	Length	Flags
Error "Control value" receipt	**Channel X - General**	**DPT 1.005**	**1 bit**	**C R T**

The group object sends the error status for the cyclical monitoring of the following group objects on the bus (ABB i-bus® KNX):
- *Control value Heating*
- *Control value Cooling*

The monitoring cycle is set in the parameter *Time interval for cyclical monitoring*.
Telegram value:
- 1 = Error
- 0 = No error

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Actuator channel*
- Parameter window *Channel X* \ Parameter window *Monitoring and safety*
  - Parameter *Cyclical monitoring* \ Option *Activated*
- Parameter *Monitor receipt of Group Objects "Control value heating/cooling"* \ Option *Activated*

Function	Group Object name	Data point type	Length	Flags
Error "Heating/cooling changeover" receipt	**Channel X - General**	**DPT 1.005**	**1 bit**	**C R T**

The group object sends the error status for the cyclical monitoring of the following group objects on the bus (ABB i-bus® KNX):
- *Heating/cooling changeover*
- *Heating/cooling changeover*

The monitoring cycle is set in the parameter *Time interval for cyclical monitoring*.
Telegram value:
- 1 = Error
- 0 = No error

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*

  or
  - Parameter *Channel function* \ Option *Actuator channel*
- Parameter window *Channel X* \ Parameter window *Monitoring and safety*
  - Parameter *Cyclical monitoring* \ Option *Activated*
  - Parameter *Monitor receipt of Group Object "Heating/cooling changeover"* \ Option *Activated*

Function	Group Object name	Data point type	Length	Flags
Error Setpoint temperature receipt	**Channel X - General**	**DPT 1.005**	**1 bit**	**C R T**

The group object sends the error status for the cyclical monitoring of one of the following group objects on the bus (ABB i-bus® KNX):
- *Heating setpoint temperature*
- *Cooling setpoint temperature*

The monitoring cycle is set in the parameter *Time interval for cyclical monitoring*.
Telegram value:
- 1 = Error
- 0 = No error

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Monitoring and safety*
  - Parameter *Cyclical monitoring* \ Option *Activated*
- Parameter *Monitor receipt of Group Objects "Setpoint temperature heating/cooling"* \ Option *Activated*

Function	Group Object name	Data point type	Length	Flags
Forced operation, 1-bit	**Channel X – General**	**DPT 1.002**	**1 bit**	**C W**

This group object is used to activate/deactivate 1-bit forced operation via the bus (ABB i-bus® KNX).
If forced operation is active, the control value and the pump cannot be controlled via KNX commands.
Telegram value:
- Depends on the setting in the parameter *forced operation*

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Monitoring and safety* \ Parameter *forced operation* \ Option *Activated 1 bit – 0 active* / *Activated 1 bit – 1 active*

Function	Group Object name	Data point type	Length	Flags
Forced operation, 2-bit	**Channel X – General**	**DPT 2.001**	**2 bit**	**C W**

This group object is used to activate/deactivate 2-bit forced operation via the bus (ABB i-bus® KNX).
Forced operation is activated/deactivated with bit 1. Bit 0 is used to toggle between the states *Forced operation active "ON"* and *Forced operation active "OFF"*.
If forced operation is active, the control value and the pump cannot be controlled via KNX commands.
Telegram value (bit 1 | bit 0):
- 0 | 0 = Forced operation inactive
- 0 | 1 = Forced operation inactive
- 1 | 0 = Forced operation active "OFF"
- 1 | 1 = Forced operation active "ON"

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Monitoring and safety* \ Parameter *forced operation* \ Option *Activated 2 bit*

8.4 Group objects, Channel X - Valve X

Function	Group Object name	Data point type	Length	Flags
Status Control value valve X	**Channel X – Valve X**	**DPT 5.001**	**1 byte**	**C R T**

This group object sends the valve status (active valve control value) on the bus (ABB i-bus® KNX).
The send behavior depends on the setting in the parameter *Send status values [valve output]*.
Telegram value:
- 0 … 100 %

Note
If DPT 5.001 (percentage) is used for the activation, the value displayed for the group object may vary from the actual value due to rounding differences. The actual value of the group object can be seen by viewing the hexadecimal value (e.g. 0x0001) or by changing to a different DPT (e.g. DPT 5.005) in the ETS.

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Valve output X* \ Parameter *Valve output* \ Option *Motor-driven (3-point)*

or
- Parameter window *Channel X* \ Parameter window *Valve output X (0 ... 10 V)* \ Parameter *Valve output [0 ... 10 V]* \ all options except *Deactivated*

Function	Group Object name	Data point type	Length	Flags
Status Valve purge X	**Channel X – Valve X**	**DPT 1.011**	**1 bit**	**C R T**

This group object sends the valve purge status on the bus (ABB i-bus® KNX).
The send behavior depends on the setting in the parameter *Send value of Group Object "Status Valve purge"*.
Telegram value:
- 1 = Valve purge active
- 0 = Valve purge inactive

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Valve output X* \ Parameter *Valve output* \ Option *Motor-driven (3-point)*

or
- Parameter window *Channel X* \ Parameter window *Valve output X (0 ... 10 V)* \ Parameter *Valve output [0 ... 10 V]* \ all options except *Deactivated*

Function	Group Object name	Data point type	Length	Flags
Status byte Valve X	**Channel X – Valve X**	**Non DPT**	**1 byte**	**C R T**

This group object sends the following status information on the bus (ABB i-bus® KNX):

- Bit 7: Unused
- Bit 6: Unused
- Bit 5: Unused
- Bit 4: Unused
- Bit 3: Valve purge
  - 1 = Active
  - 0 = Inactive
- Bit 2: Forced operation
  - 1 = Active
  - 0 = Inactive
- Bit 1: Fault Valve output
  - 1 = Fault
  - 0 = No fault
- Bit 0: Setpoint/control value
  - 1 = Setpoint/control value not received
  - 0 = Setpoint/control value received

Note

If the *Deactivated* option is selected for one of the following parameters, bit 0 always has the value 0:

- *Monitor receipt of Group Objects "Setpoint temperature heating/cooling"*
- *Monitor receipt of Group Objects "Control value heating/cooling"*

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Valve output X* \ Parameter *Valve output* \ Option *Motor-driven (3-point)*

or

- Parameter window *Channel X* \ Parameter window *Valve output X (0 ... 10 V)* \ Parameter *Valve output [0 ... 10 V]* \ all options except *Deactivated*

Fault Reset valve output X	Channel X – Valve X	DPT 1.015	1 bit	C W

This group object is used to reset a fault on the valve output via the bus (ABB i-bus® KNX) (reset). Resetting is successful only if the fault has been rectified.
Telegram value:

- 1 = Reset fault
- 0 = No reaction

Note

A fault can be reset by restarting the device or by means of ETS reset as well.

Note

On devices with manual operation, a successful reset is indicated on the membrane keypad.
More information → operating and display elements, corresponding sub-chapter of the individual product variant.

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Valve output X (0 ... 10 V)* \ Parameter *Valve output [0 ... 10 V]* \ Option *Activated*

Fault Reset valve output X	Channel X – Valve X	DPT 1.015	1 bit	C W

This group object is used to reset a fault on the valve output via the bus (ABB i-bus® KNX) (reset). Resetting is successful only if the fault has been rectified.
Telegram value:

- 1 = Reset fault
- 0 = No reaction

Note

A fault can be reset by restarting the device or by means of ETS reset as well.

Note

On devices with manual operation, a successful reset is indicated on the membrane keypad.
More information → operating and display elements, corresponding sub-chapter of the individual product variant.

Prerequisites for visibility

- Parameter window *Channel X* \ Parameter window *Valve output X* \ Parameter *Valve output* \ Option *Motor-driven (3-point)*

Function	Group Object name	Data point type	Length	Flags
Fault Valve output X	**Channel X – Valve X**	**DPT 1.005**	**1 bit**	**C R T**

This group object sends a fault messages of the valve output on the bus (ABB i-bus® KNX).
The send behavior depends on the setting in the parameter *Send status values [valve output]*.
The reaction during a fault depends on the setting in the parameter *Reset fault Valve output*:
- *Via Group Object*: It there is a fault, the valve output is switched off. The fault can be reset only via group object *Fault Reset valve output X*.
- *Automatic or via Group Object*: If there is a fault, output of the control value continues. The fault message remains active and can be reset only via group object *Fault Reset valve output X*.

Telegram value:
- 1 = Fault
- 0 = No fault

Note
If the option *Automatic or via Group Object* has been selected in the parameter *Reset fault Valve output*, the telegram value 1 does not necessarily mean that there is currently a fault. The fault message must be reset in all circumstances via group object *Fault Reset valve output X*. If a fault message occurs again after resetting, the installation should be checked.

Note
If there is a fault on the valve output, on devices with manual operation via membrane keypad the following LEDs flash:
- *Switch valve output*
- *Open valve output* (if channel selected)

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Valve output X (0 ... 10 V)* \ Parameter *Valve output [0 ... 10 V]* \ Option *Activated*

Function	Group Object name	Data point type	Length	Flags
Fault Valve output X	**Channel X – Valve X**	**DPT 1.005**	**1 bit**	**C R T**

This group object sends a fault messages of the valve output on the bus (ABB i-bus® KNX).
The send behavior depends on the setting in the parameter *Send status values [valve output]*.
It there is a fault, the output is switched off. The fault can be reset only via group object *Fault Reset valve output X*.
Telegram value:
- 1 = Fault
- 0 = No fault

Note
If there is a fault on the valve output, on devices with manual operation via membrane keypad the following LEDs flash:
- *Switch valve output*
- *Open valve output* (if channel selected)

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Valve output X* \ Parameter *Valve output* \ Option *Motor-driven (3-point)*

Function	Group Object name	Data point type	Length	Flags
Override valve control value X	**Channel X – Valve X**	**DPT 5.001**	**1 byte**	**C W**

This group object is used to receive the setpoint for the manual valve override via the bus (ABB i-bus® KNX).
The value in this group object becomes active only if the override has been enabled by the *Enable/block manual valve override X* group object.
Telegram value:
- 0 … 100 %

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Valve output X*
  - Parameter *Valve output* \ Option *Motor-driven (3-point)*
  - Parameter *Enable manual valve override* \ Option *Yes*

or
- Parameter window *Channel X* \ Parameter window *Valve output X (0 ... 10 V)*
  - Parameter *Valve output [0 ... 10 V]* \ all options except *Deactivated*
  - Parameter *Enable manual valve override* \ Option *Yes*

Function	Group Object name	Data point type	Length	Flags
Activate valve purge X	**Channel X – Valve X**	**DPT 1.017**	**1 bit**	**C W**

This group object can be used to trigger a valve purge.
More information: → valve purge, Page 160.
Telegram value:
- 1 = Trigger valve purge
- 0 = Trigger valve purge

Note
If the valve purge is not performed due to a higher-priority function, the valve purge must be triggered again.

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Valve output X* \ Parameter *Valve output* \ Option *Motor-driven (3-point)*

or
- Parameter window *Channel X* \ Parameter window *Valve output X (0 ... 10 V)* \ Parameter *Valve output [0 ... 10 V]* \ all options except *Deactivated*

Function	Group Object name	Data point type	Length	Flags
Enable/block manual valve override X	**Channel X – Valve X**	**DPT 1.003**	**1 bit**	**C W**

This group object is used to enable/block manual valve override via the bus (ABB i-bus® KNX).
If manual valve override is enabled, the active valve control value is overridden with the value of group object *Override valve control value X*.
If manual valve override is blocked, the following active valve control value applies.
Telegram value:
- 1 = Manual valve override enabled
- 0 = Manual valve override blocked

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Valve output X*
  - Parameter *Valve output* \ Option *Motor-driven (3-point)*
  - Parameter *Enable manual valve override* \ Option *Yes*

or
- Parameter window *Channel X* \ Parameter window *Valve output X (0 ... 10 V)*
  - Parameter *Valve output [0 ... 10 V]* \ all options except *Deactivated*
  - Parameter *Enable manual valve override* \ Option *Yes*

8.5 Group objects, Channel X - Pump

Function	Group Object name	Data point type	Length	Flags
Override pump	**Channel X - Pump**	**DPT 1.001**	**1 bit**	**C W**

This group object is used to switch on or off the pump via the bus (ABB i-bus® KNX) if the manual pump override is enabled via the group object *Enable/block manual pump override*.
Telegram value:
- 1 = Switch on pump
- 0 = Switch off pump

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Enable manual pump override* \ Option *Yes*

Function	Group Object name	Data point type	Length	Flags
Status pump relay	**Channel X - Pump**	**DPT 1.009**	**1 bit**	**C R T**

This group object sends the status of the pump relay on the bus (ABB i-bus® KNX).
The send behavior depends on the setting in the parameter *Send status values [pump]*.
Telegram value:
- 1 = Relay contact closed
- 0 = Relay contact open

Note
The status of the pump relay does not reliably indicate whether the pump is active or inactive.

Prerequisites for visibility
- This group object is always visible.

Function	Group Object name	Data point type	Length	Flags
Pump fault	**Channel X – Pump**	**DPT 1.005**	**1 bit**	**C W T U**

This group object is used to receive a pump fault via the bus (ABB i-bus® KNX).
If a pump fault is received with a pump switched on, the pump is switched off. If a pump fault is received with a pump switched off, the pump cannot be switched on.
Telegram value:
- 1 = Fault
- 0 = No fault

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Monitor pump error* \ Option Via Group Object

Function	Group Object name	Data point type	Length	Flags
Pump repair switch	**Channel X – Pump**	**DPT 1.011**	**1 bit**	**C W T U**

This group object is used to receive the status of the pump repair switch via the bus (ABB i-bus® KNX).
If the "active" (pump repair switch open) status is received with a pump switched on, the pump is switched off. If the "active" (pump repair switch open) status is received with a pump switched off, the pump cannot be switched on.
Telegram value:
- 1 = Active
- 0 = Inactive

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Monitor pump repair switch* \ Option *Via Group Object*

Function	Group Object name	Data point type	Length	Flags
Status pump master/slave (1=Master, 0=Slave)	**Channel X - Pump**	**DPT 1.011**	**1 bit**	**C R T**

If double pumps are used, this group object sends the status of the pump on the bus (ABB i-bus® KNX).
The send behavior depends on the setting in the parameter *Send status values [pump]*.
Telegram value:
- 1 = Main pump (master)
- 0 = Backup pump (slave)

Prerequisites for visibility
- Parameter window *Basic settings* \ Parameter *Channel bundling for double pumps* \ Option *Yes*

Function	Group Object name	Data point type	Length	Flags
Enable/block manual pump override	**Channel X - Pump**	**DPT 1.003**	**1 bit**	**C W**

This group object is used to enable/block the manual pump override via the bus (ABB i-bus® KNX).
If the manual pump override is enabled, the pump can be switched on or off via the group object *Override pump*.
Telegram value:
- 1 = Enable manual pump override
- 0 = Block manual pump override

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Enable manual pump override* \ Option *Yes*

Function	Group Object name	Data point type	Length	Flags
Status pump automatic mode	**Channel X - Pump**	**DPT 1.011**	**1 bit**	**C R T**

This group object sends the status of the pump automatic mode on the bus (ABB i-bus® KNX).
The send behavior depends on the setting in the parameter *Send status values [pump]*.
Telegram value:
- 1 = Pump automatic mode active
- 0 = Pump automatic mode inactive / manual pump override active

Prerequisites for visibility
- This group object is always visible.

Function	Group Object name	Data point type	Length	Flags
Set time	**Channel X - Pump**	**DPT 10.001**	**3 bytes**	**C W**

This group object is used to receive via the bus (ABB i-bus® KNX) the weekday and time.
The weekday and time are used to determine the changeover point for double pumps.
Telegram value:
- DD:hh:mm:ss

Note
The group object value must be updated at regular intervals. If this group object is read, it indicates the last value received. The value may vary from the current device time.

Prerequisites for visibility
- Parameter window Device settings \ Parameter *Channel bundling for double pumps* \ Option *Yes*
- Parameter window *Pump* \ Parameter *Usage pump channel X* \ Option *Change weekly*

Function	Group Object name	Data point type	Length	Flags
Master/slave changeover	**Channel X - Pump**	**DPT 1.017**	**1 bit**	**C W**

This group object is used to changeover the usage of the pumps via the bus (ABB i-bus® KNX). The previous main pump (master) is used as the backup pump. The previous backup pump (slave) is used as the main pump.
Telegram value:
- 1 = Master/slave changeover
- 0 = Master/slave changeover

Prerequisites for visibility
- Parameter window *Basic settings* \ Parameter *Channel bundling for double pumps* \ Option *Yes*

8.6 Group objects, Channel X - Input x

Function	Group Object name	Data point type	Length	Flags
Pump fault alarm	**Channel X – Binary input x**	**DPT 1.005**	**1 bit**	**C R T**

This group object sends an alarm on the bus (ABB i-bus® KNX) if there is a pump fault.
The send behavior depends on the setting in the parameter *Send status values [pump fault output]*.
Telegram value:
- 1 = Pump fault alarm
- 0 = No pump fault alarm

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Monitor pump error* \ Option *Via physical device input*

Function	Group Object name	Data point type	Length	Flags
Pump repair switch	**Channel X – Binary input x**	**DPT 1.005**	**1 bit**	**C R T**

This group object sends the contact position of the pump repair switch on the bus (ABB i-bus® KNX).
The send behavior depends on the setting in the parameter *Send status values [pump repair status input]*.
Telegram value:
- 1 = Pump repair switch open
- 0 = Pump repair switch closed

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Monitor pump repair switch* \ Option *Via physical device input*

Function	Group Object name	Data point type	Length	Flags
Block input	**Channel X – Binary input x**	**DPT 1.003**	**1 bit**	**C W**

This group object is used to block the physical input x.
Telegram value:
- 1 = Block input
- 0 = Enable input

Note
The block on the input is canceled after ETS reset, bus voltage recovery or download.

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Input x: Binary input*
  - Parameter *Input* \ Option *Binary input*
  - Parameter *Enable Group Object "Block input"* \ Option *Yes*

Function	Group Object name	Data point type	Length	Flags
Supply flow temperature	**Channel X – Input x**	**DPT 9.001**	**2 bytes**	**C R T**

This group object sends the temperature value measured at the input on the bus (ABB i-bus® KNX).
The send behavior depends on the setting in the parameter *Send temperature value [supply flow temperature]*.
Telegram value:
- -30 … 110 °C

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Input x: Supply flow temperature* \ Parameter *Temperature input [supply flow temperature]* \ Option *Via physical device input*

Function	Group Object name	Data point type	Length	Flags
Error Input	**Channel X – Input x**	**DPT 1.005**	**1 bit**	**C R T**

This group object monitors receipt of a temperature value at the input and sends a message on the bus (ABB i-bus® KNX).
Telegram value:
- 1 = Error
- 0 = No error

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Input x: Supply flow temperature* \ Parameter *Temperature input [supply flow temperature]* \ Option *Via physical device input*

or
- Parameter window *Channel X* \ Parameter window *Input x: Return flow temperature* \ Parameter *Temperature input [return flow temperature]* \ Option *Via physical device input*

Function	Group Object name	Data point type	Length	Flags
Return flow temperature	**Channel X – Input x**	**DPT 9.001**	**2 bytes**	**C R T**

This group object sends the temperature value measured at the input on the bus (ABB i-bus® KNX).
The send behavior depends on the setting in the parameter *Send temperature value [return flow temperature]*.
Telegram value:
- -30 … 110 °C

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Input x: Return flow temperature* \ Parameter *Temperature input [return flow temperature]* \ Option *Via physical device input*

Function	Group Object name	Data point type	Length	Flags
Status pump	**Channel X – Binary input x**	**DPT 1.011**	**1 bit**	**C R T**

This group object sends the status of the pump on the bus (ABB i-bus® KNX).
The send behavior depends on the setting in the parameter *Send status values [pump status input]*.
Telegram value:
- 1 = Pump on
- 0 = Pump off

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Pump* \ Parameter *Monitor pump status* \ Option *Via physical device input*

Function	Group Object name	Data point type	Length	Flags
Contact position binary input	**Channel X – Binary input x**	**DPT 1.001**	**1 bit**	**C R T**

This group object sends the contact position of the sensor connected to the binary input on the bus (ABB i-bus® KNX).
Telegram value:
- Depends on the setting in the following parameters:
  - *Distinction between short and long operation*
  - *Input on operation*

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window Input x \ Parameter *Input* \ Option *Binary input*

8.7 Group objects, Channel X – Controller

Function	Group Object name	Data point type	Length	Flags
Status Heating/cooling	**Channel X – Controller**	**DPT 1.100**	**1 bit**	**C R T**

This group object sends the status *Heating/cooling* on the bus (ABB i-bus® KNX).
Telegram value:
- 1 = Heating
- 0 = Cooling

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Controller channel*

Function	Group Object name	Data point type	Length	Flags
Heating/cooling changeover	**Channel X – Controller**	**DPT 1.100**	**1 bit**	**C W T U**

This group object is used to receive the change of the operating mode (*heating/cooling*) via the bus (ABB i-bus® KNX).
Telegram value:
- 1 = Heating
- 0 = Cooling

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*

Function	Group Object name	Data point type	Length	Flags
Status Control	**Channel X – Controller**	**DPT 1.001**	**1 bit**	**C R T**

This group object sends the control status on the bus (ABB i-bus® KNX).
Telegram value:
- 1 = Control active
- 0 = Control inactive

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Controller channel*

Function	Group Object name	Data point type	Length	Flags
Activate/deactivate control	**Channel X – Controller**	**DPT 1.001**	**1 bit**	**C W**

This group object is used to activate/deactivate control via the bus (ABB i-bus® KNX).
If control is deactivated, all control values are set to 0.
Telegram value:
- 1 = Activate control
- 0 = Deactivate control

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Controller channel*

Function	Group Object name	Data point type	Length	Flags
Heating setpoint temperature	**Channel X - Controller**	**DPT 9.001**	**2 bytes**	**C W T U**

This group object is used to receive the setpoint temperature for the operating mode *Heating* via the bus (ABB i-bus® KNX).
Telegram value:
- 10 … 100 °C

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*

Function	Group Object name	Data point type	Length	Flags
Cooling setpoint temperature	**Channel X - Controller**	**DPT 9.001**	**2 bytes**	**C W T U**

This group object is used to receive the setpoint temperature for the operating mode *cooling* via the bus (ABB i-bus® KNX).
Telegram value:
- 1 … 45 °C

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*

Function	Group Object name	Data point type	Length	Flags
Temperature, safety shutdown heating	**Channel X - Controller**	**DPT 9.001**	**2 bytes**	**C W T U**

This group object is used to receive the limit temperature for the safety shutdown *heating* via the bus (ABB i-bus® KNX).
The safety shutdown is active when the received temperature value reaches the temperature set in the parameter *Temperature, safety shutdown [heating]*.
Telegram value:
- -273 … 670760 °C

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Heating*
  - Parameter *Extended settings* \ Option *Yes*
  - Parameter *Activate safety shutdown* \ Option *Yes*
  - Parameter *Receipt of temperature for safety shutdown* \ Option *Via Group Object*

Function	Group Object name	Data point type	Length	Flags
Temperature, safety shutdown cooling	**Channel X - Controller**	**DPT 9.001**	**2 bytes**	**C W T U**

This group object is used to receive the limit temperature for the safety shutdown *cooling* via the bus (ABB i-bus® KNX).
The safety shutdown is active when the received temperature value reaches the temperature set in the parameter *Temperature, safety shutdown [cooling]*.
Telegram value:
- -273 … 670760 °C

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Cooling*
  - Parameter *Extended settings* \ Option *Yes*
  - Parameter *Activate safety shutdown* \ Option *Yes*
- Parameter *Receipt of temperature for safety shutdown* \ Option *Via Group Object*

Function	Group Object name	Data point type	Length	Flags
Status Safety shutdown	**Channel X – Controller**	**DPT 1.005**	**1 bit**	**C R T**

This group object sends the status of the safety shutdown of the active operating mode (*heating*/*cooling*) on the bus (ABB i-bus® KNX).
Telegram value:
- 1 = Safety shutdown active
- 0 = Safety shutdown inactive

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*

  or
  - Parameter *Controller setting cooling* \ all options except *Deactivated*
- Parameter window *Channel X* \ Parameter window *Temperature controller* \ Parameter window *Heating* / *Cooling*
  - Parameter *Extended settings* \ Option *Yes*
  - Parameter *Activate safety shutdown* \ Option *Yes*

Function	Group Object name	Data point type	Length	Flags
Status Control value heating	**Channel X - Controller**	**DPT 5.001**	**1 byte**	**C R T**

This group object sends the heating control value on the bus (ABB i-bus® KNX).
Telegram value:
- 0 … 100 %

Note
If DPT 5.001 (percentage) is used for the activation, the value displayed for the group object may vary from the actual value due to rounding differences. The actual value of the group object can be seen by viewing the hexadecimal value (e.g. 0x0001) or by changing to a different DPT (e.g. DPT 5.005) in the ETS.

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*

Status Control value cooling	Channel X - Controller	DPT 5.001	1 byte	C R T

This group object sends the cooling control value on the bus (ABB i-bus® KNX).
Telegram value:
- 0 … 100 %

Note
If DPT 5.001 (percentage) is used for the activation, the value displayed for the group object may vary from the actual value due to rounding differences. The actual value of the group object can be seen by viewing the hexadecimal value (e.g. 0x0001) or by changing to a different DPT (e.g. DPT 5.005) in the ETS.

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*

Supply flow temperature receipt	Channel X - Controller	DPT 9.001	2 bytes	C W T U

This group object is used to receive the supply flow temperature (actual temperature) via the bus (ABB i-bus® KNX).
Telegram value:
- -30 … 110 °C

Note
The value of this group object is evaluated each time the device is restarted.

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Controller channel*
- Parameter window *Channel X* \ Parameter window *Input x: Supply flow temperature* \ Parameter *Temperature input [supply flow temperature]* \ Option *Via Group Object*

Fault Supply flow temperature	Channel X – Controller	DPT 1.005	1 bit	C R T

This group object sends the error status of the cyclical monitoring of the temperature input (physical device input or group object) on the bus (ABB i-bus® KNX).
The telegram with the current status is sent after every change.
Telegram value:
- 1 = Error
- 0 = No error

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Controller channel*
- Parameter window *Monitoring and safety*
  - Parameter *Cyclical monitoring* \ Option *Activated*
  - Parameter *Monitor supply flow temperature* \ all options except *Deactivated*

Status Heating	Channel X - Controller	DPT 1.001	1 bit	C R T

This group object sends the status of the control value Heating on the bus (ABB i-bus® KNX).
Telegram value:
- 1 = Control value Heating > 0
- 0 = Control value Heating = 0

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting heating* \ all options except *Deactivated*

Status Cooling	Channel X - Controller	DPT 1.001	1 bit	C R T

This group object sends the status of the control value Cooling on the bus (ABB i-bus® KNX).
Telegram value:
- 1 = Control value Cooling > 0
- 0 = Control value Cooling = 0

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters*
  - Parameter *Channel function* \ Option *Controller channel*
  - Parameter *Controller setting cooling* \ all options except *Deactivated*

Current setpoint	Channel X – Controller	DPT 9.001	2 bytes	C R T

This group object sends the current setpoint temperature for the active operating mode (*heating/cooling*) on the bus (ABB i-bus® KNX).
The current setpoint temperature corresponds to the *heating/cooling* setpoint temperature and is limited by the minimum/maximum *heating/cooling* setpoint temperature.
Telegram value:
- 1 … 100 °C

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Controller channel*

Function	Group Object name	Data point type	Length	Flags
Activate minimum control value (basic load)	**Channel X – Controller**	**DPT 1.003**	**1 bit**	**C W**

This group object is used to receive the activation of the basic load via the bus (ABB i-bus® KNX).
The basic load is specified in the parameter *Minimum control value (basic load)* and can be parameterized separately for *heating* and *cooling*.
The basic load is always activated jointly for *heating* and *cooling*, however it only applies to the active operating mode.
Telegram value:
- 1 = Basic load active
- 0 = Basic load inactive

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Controller channel*
- Parameter window *Temperature controller* \ Parameter *Minimum control value for basic load > 0* \ Option *Activate via Group Object*

8.8 Group objects, Channel X - Actuator

Function	Group Object name	Data point type	Length	Flags
Control value Heating	**Channel X – Actuator**	**DPT 5.001**	**1 byte**	**C W T U**

This group object is used to receive the control value Heating via the bus (ABB i-bus® KNX). This control value is output via the selected output in operating mode *Heating*.
Telegram value:
- 0 … 100 %

Note
If DPT 5.001 (percentage) is used for the activation, the value displayed for the group object may vary from the actual value due to rounding differences. The actual value of the group object can be seen by viewing the hexadecimal value (this is then e.g. 0x0001) or by changing to a different DPT (e.g. 5.005) in the ETS.

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Actuator channel*

Control value Cooling	Channel X – Actuator	DPT 5.001	1 byte	C W T U

This group object is used to receive the control value Cooling via the bus (ABB i-bus® KNX). This control value is output via the selected output in operating mode *Cooling*.
Telegram value:
- 0 … 100 %

Note
If DPT 5.001 (percentage) is used for the activation, the value displayed for the group object may vary from the actual value due to rounding differences. The actual value of the group object can be seen by viewing the hexadecimal value (this is then e.g. 0x0001) or by changing to a different DPT (e.g. 5.005) in the ETS.

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Actuator channel*

Heating/cooling changeover	Channel X – Actuator	DPT 1.100	1 bit	C W T U

This group object is used to receive the change of the operating mode (*heating*/*cooling*) via the bus (ABB i-bus® KNX).
Telegram value:
- 1 = Heating
- 0 = Cooling

Prerequisites for visibility
- Parameter window *Channel X* \ Parameter window *Application parameters* \ Parameter *Channel function* \ Option *Actuator channel*

9 Operation

Note
The device cannot be operated manually.

9.1 Manual operation

Note
Bear the following points in mind for manual operation:
- Values calculated by the controller or received via the bus (ABB i-bus® KNX) will be overridden.
- Forced operation and safety priorities of the device cannot be overridden.
- Override of the individual function becomes active only after the function has been changed for the first time using the associated button.

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.

The group object *Status Manual operation* indicates whether manual operation is enabled/blocked.

The device is in *KNX operation* after connection to the bus, bus voltage recovery, ETS download or ETS reset. The LED is off.

Complete overview of the control elements → Product overview, Page 10.

9.1.1 Activating manual operation

▸ Press and hold the *Manual operation* button for 5 seconds.
⇨ The yellow LED is lit.

9.1.2 Blocking manual operation

The *Manual operation* mode can be blocked in various ways:
- Via the parameter *Manual operation*.
- Via the group object *Enable/block manual operation*.

9.1.3 Ending manual operation

▸ Briefly press the *Manual operation* button.
⇨ The yellow LED is off.

All changes will become invalid when manual operation is deactivated.

10 Maintenance and cleaning

10.1 Maintenance

The devices are maintenance-free if used properly. In the event of damage, e.g. during transport and/or storage, repairs are not allowed to be carried out.

10.2 Cleaning

1. Disconnect devices from the electrical power supply before cleaning.
2. Clean dirty devices using a dry cloth or a slightly damp cloth.

11 Removal and disposal

11.1 Removal

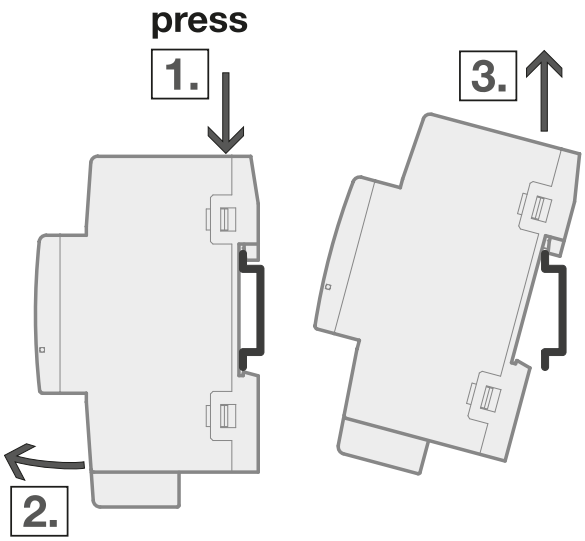


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Fig. 28: Removing from the mounting rail

1. Press on the top of the device.
2. Release the bottom of the device from the mounting rail.
3. Lift the device up and off the mounting rail.

11.2 Environment

Consider environmental protection.

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

The device contains valuable resources 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 Priorities

12.1.1 Priorities for controller mode

Valve

a) Bus voltage failure
b) forced operation
c) i-bus® Tool
d) Operating mode *Manual operation* (only HCC/S 2.X..2.1)
e) Manual valve override
f) Controller mode
g) Bus voltage recovery

Pump

a) Pump safety mode → Safety mode, Page 42
b) Bus voltage failure
c) forced operation
d) i-bus® Tool
e) Operating mode *Manual operation* (only HCC/S 2.X..2.1)
f) Direct pump operation (manual pump override)
g) Automatic pump operation (based on the valve control value)
h) Bus voltage recovery

12.1.2 Priorities for actuator mode

Valve

a) Bus voltage failure
b) forced operation
c) i-bus® Tool
d) Operating mode *Manual operation* (only HCC/S 2.X.2.1)
e) Manual valve override
f) Actuator mode
g) Bus voltage recovery

Pump

a) Pump safety mode
b) Bus voltage failure
c) forced operation
d) i-bus® Tool
e) Operating mode *Manual operation* (only HCC/S 2.X..2.1)
f) Direct pump operation (manual pump override)
g) Automatic pump operation (based on the valve control value)
h) Bus voltage recovery

12.2 Basic knowledge

12.2.1 2-pipe and 4-pipe systems

2-pipe system

In a 2-pipe system, one pipe is used to supply the heating and cooling devices with hot or cold water. Only one operating mode (*Heating* or *Cooling*) can be active in the complete system. Switching between *Heating* and *Cooling* is performed centrally via the bus (ABB i-bus® KNX).

4-pipe system

In a 4-pipe system, two separate pipes are used to supply the heating and cooling devices with hot or cold water. Both operating modes (*Heating* and *Cooling*) can be active in the complete system. The separate pipes permit switching between heating mode and cooling mode. Switching between *Heating* and *Cooling* can be performed automatically via the controller or centrally via the bus (ABB i-bus® KNX).

12.2.2 Basic setpoint

The basic setpoint can be used to change the operating modes *Comfort*, *Standby* and *Economy* via the bus (ABB i-bus® KNX).

The base setpoint shifts the setpoint for the *Comfort* operating mode. The value to which the base setpoint corresponds (*Comfort heating* or *Comfort cooling*) is defined in the parameter Base setpoint is.

By changing the base setpoint, the setpoints assigned to the *Standby* and *Economy* operating modes are also shifted. The relative distances between the setpoints remain unchanged. The setpoints for the *Building Protection* operating modes are not influenced.

The change to the base setpoint applies to both operating modes (*Heating*/ *Cooling*).

Note
If only the *Heating* operating mode or *Cooling* operating mode is configured, the base setpoint corresponds to the respective *Comfort* setpoint.

12.2.3 Explanation of the operating modes

The operating modes are used to adjust the setpoint temperatures to the actual room or building utilization. Switchover between the operating modes usually takes place via a central schedule or via Intelligent Building Control.

Comfort

The operating mode *Comfort* is used if the room is actively utilized (e.g. people in the room). In operating mode *Comfort*, the controller attempts to reach the specified room temperature by heating or cooling.

Standby

The operating mode *Standby* is used to prepare for active room utilization (e.g. before the start of lessons in schools). If the room is not utilized briefly (e.g. if the room is left or during breaks), the operating mode *Standby* can also be used. In operating mode *Standby*, the actual temperature may deviate by a set value from the Comfort temperature. This deviation is usually 2 … 3 K. Heating or cooling is activated if the deviation is exceeded or fallen below.

Note
The operating mode *Standby* can be used as an intermediate stage during the change from *Economy* to *Comfort*.

Example
The operating mode *Economy* is used for automatic nighttime reduction. If it can be anticipated when the Comfort temperature must be reached, the operating mode *Standby* can be used as an intermediate stage. With the intermediate stage, the Comfort temperature is reached sooner at the required time.

Economy

In the operating mode *Economy*, the actual temperature may deviate by a set value from the Comfort temperature. This deviation is usually 5 … 6 K. Heating or cooling is activated if the deviation is exceeded or fallen below.

Unlike the operating mode *Standby*, the operating mode *Economy* is used only if there is no utilization for an extended time (e.g. on weekends).

Building protection

The operating mode *Building Protection* is activated to save energy and nevertheless prevent damage to the building due to cooling/heating if the building is not used for an extended period. Similarly as in the operating modes *Standby* and *Economy*, the temperature may decrease or increase to a value that can be parameterized.

A difference of at least 2 K is recommended for the setpoint temperature levels for *Comfort*, *Standby* and *Economy*. The difference in relation to the setpoint temperatures for *Building Protection* should be greater.

Example

Operating mode	Setpoint temperature (standard values)
Heat Protection (Building Protection cooling)	35 °C
Economy Cooling	29 °C
Standby Cooling	27 °C
Comfort Cooling	25 °C
Comfort Heating	21 °C
Standby Heating	19 °C
Economy Heating	17 °C
Frost Protection (Building Protection heating)	7 °C

Tab. 43: Setpoint temperatures for the operating modes

12.2.4 Weighting of the temperature inputs

If the actual temperature is acquired via several temperature inputs, the values acquired can have different weightings. The weighting can be set in the following parameters:
- Weighting of internal measurement
- Weighting of external measurement 1
- Weighting of external measurement 2

If several internal measured values are acquired (multiple temperature sensors connected to physical device inputs), the measured values are averaged automatically.

Case 1: All measured values are weighted equally.

If all measured values are weighted equally, a mean value is determined from the received temperature values. The mean value is then used as the actual temperature.

Case 2: The measured values are weighted differently – the total is 100 %

The measured values are included in the calculation of the actual temperature based on their weighting.

Example
Value 1: 21 °C; weighting 60 %
Value 2: 24 °C; weighting 40 %
(21 °C × 0.6) + (24 °C × 0.4) = 22.2 °C

Case 3: The measured values are weighted differently – the total is greater than 100 %

The ratio of the measured values is formed based on their weighting. The result is then used as the actual temperature.

Example
Value 1: 21 °C; weighting 80 %
Value 2: 24 °C; weighting 40 %
((21 °C × 0.8) + (24 °C × 0.4)) / (0.8 + 0.4) = 22 °C

12.2.5 Floating mean value

With a floating mean value filter, the output value is calculated as a mean value over a specified time interval (smoothing). The higher the degree of filtering, the smoother the result.

Example
If a time interval of 60 seconds is selected for the floating mean value filter, a mean value is formed from the values from the last 60 seconds. Temperature fluctuations are smoothed, continuous temperature changes become apparent with a delay.

12.2.6 Basics of PI control

P-proportion / xP-proportion

The P-proportion / xP-proportion stands for the proportional range of control. The proportional range fluctuates around the setpoint, and in PI control is used to change the speed of control. The smaller the value set, the faster the control reacts. If the value is too small, there is a risk of overshooting.

I-proportion

The I-proportion (also readjustment time) represents the integral control proportion. The I-proportion causes the room temperature to reach the setpoint. In principle the following applies: the more sluggish the overall system, the larger the integral time is.

12.2.7 basic load

The basic load is used to specify a minimum control value. The basic load is not allowed to be dropped below by the control, even if the controller calculates a lower control value.

Example
Floor heating is to be operated with the minimum control value (basic load) 5 % to protect the installation and to prevent cooling of the floor.

The parameter *Minimum control value for basic load > 0* is used to define whether the basic load is always active or can be activated via a Group Object.

The control value can decrease to 0 % when the basic load is inactive.

The basic load is defined in the parameter *Minimum control value (basic load)* and can be parameterized individually for each heating/cooling stage if the control value for the respective control type is output as a percentage.

Note
The basic load is activated for all stages, but it applies only to the active operating mode (*Heating* or *Cooling*). The basic load remains active during the operating mode change.
The basic load is set individually for each stage in the corresponding parameter windows → Parameter --- FEHLENDER LINK ---.

12.2.8 Heating/cooling circuit

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

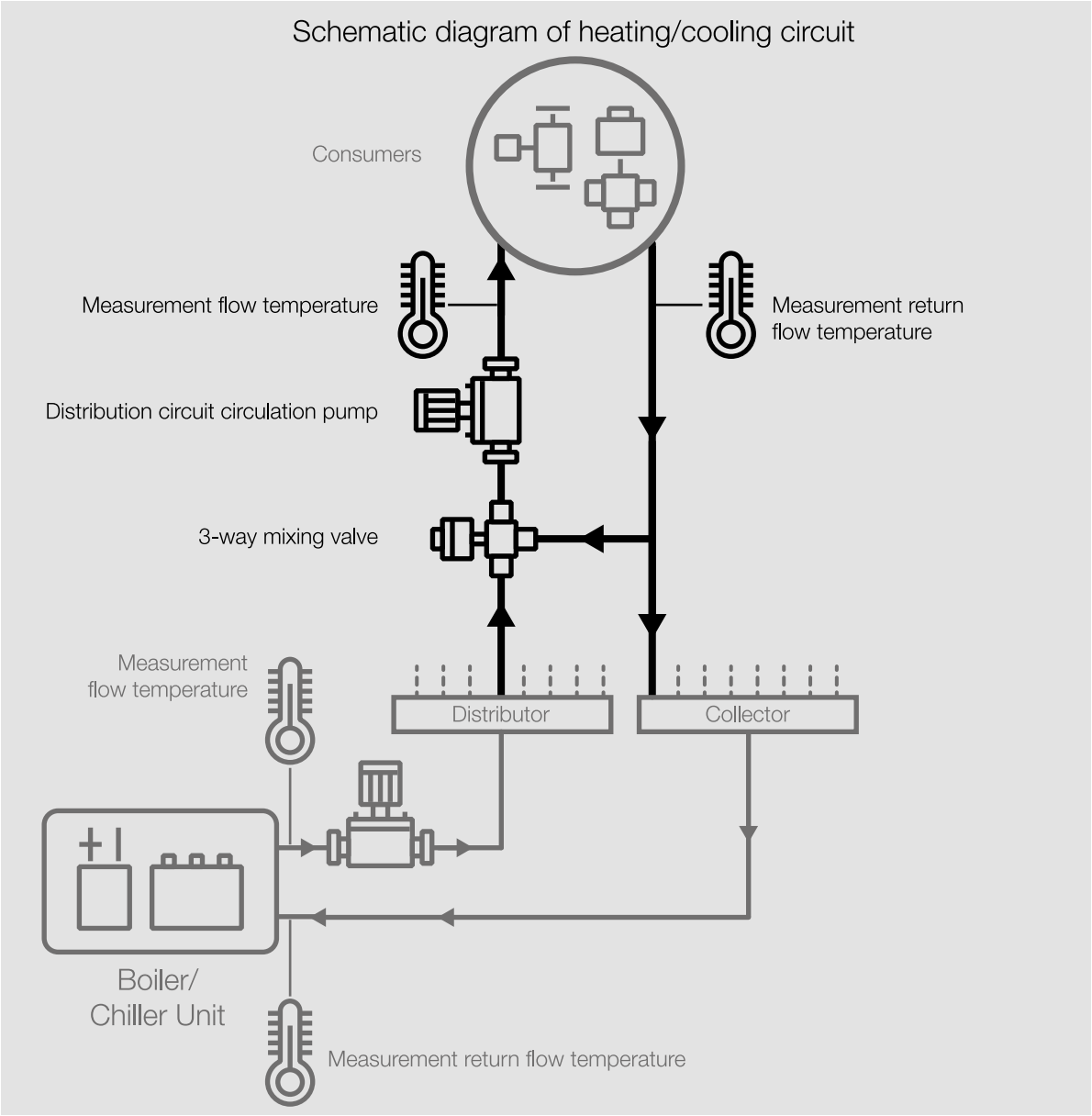


Fig. 29: Heating/cooling circuit

A heating/cooling circuit consists of the following components:

- Supply flow (from the distributor to the load)
- Loads (e.g. radiators in the room)
- Return flow (from the load to the manifold)

The supply and return flow are normally connected together by a 3-way mixing valve. The water from the supply flow is mixed with the water from the return flow to achieve the required supply flow temperature. A circulating pump ensures that the water circulates in the heating/cooling circuit.

12.2.9 Hysteresis

The hysteresis indicates the difference by which a value must change before there is a reaction to the value change (e.g. switch on the heating if temperature drops below setpoint). Hysteresis prevents frequent switching in response to minimal changes. A differentiation is made between single-sided and double-sided hysteresis.

Example
Single-sided hysteresis:
- Setpoint temperature = 22 °C
- Hysteresis = 4 K

The heating is switched on if an actual temperature drops below 18 °C and switched off if an actual temperature exceeds 22 °C.

Double-sided hysteresis:
- Setpoint temperature = 22 °C
- Hysteresis = 4 K

The heating is switched on if an actual temperature drops below 20 °C and switched off if an actual temperature exceeds 24 °C.

12.2.10 Reference adjustment

Adjustment of the valve drive serves as the basis for position activation. The "open" valve position (control value = 100 %) is approached periodically to correct deviations between the control value and the actual valve position.

To ensure that the valve closes completely, the output is activated during a reference adjustment for 5 % longer than necessary due to the switch-on time (→ parameter *Switch on time for valve drive from 0 to 100 %*).

Example
With a switch-on time (t_{On}) of 100 s and a control value of 50 %, the theoretical movement time corresponds to 50 s. The 5 % extension causes the valve to be activated for 55 s ($t_{Adjustment}$).
$t_{Adjustment} = 0.05 \times t_{On} + \text{control value} \times t_{On}$

The reference adjustment cannot be interrupted.

After every reference adjustment, the control value calculated by the controller is activated and the adjustment counter is set to 0.

12.2.11 Manual valve override

During manual valve override, the active control value is overridden. The active control value is the control value calculated by the internal controller or sent via the bus (ABB i-bus® KNX) by an external controller.

If manual valve override is enabled (→ parameter *Enable manual valve override*), the active valve control value is overridden with the value of Group Object *Override valve control value X*.

Possible applications:
- System function test
- Specific override of the active control value

12.2.12 Refreshed KNX state

If an input or an output is blocked by device-specific functions (e.g. manual operation, alarms, block, forced operation, switching delay), it will not react to telegrams received via the bus (ABB i-bus® KNX) while the block is active.

While a block is active, the device processes the telegrams received in the background. Active functions (e.g. staircase lighting, logic, position, brightness value) are executed in the background, but the results are not sent. The actual value is sent to the input or output when the block is canceled.

If the input or output has not received any telegrams via the bus (ABB i-bus® KNX) while a block is active, the input or output will assume the state it was in before the block.

12.2.13 Control types

The following control types are commonly used for activating valves in heating, ventilation and air conditioning technology.

- Continuous control
- Pulse width modulation (PWM)
- 2-point control

12.2.13.1 Overview of control and control-value types

2-point 1 bit (On/Off)

The 2-point controller switches only when the set operating points are reached. The switch-on and switch-off commands are sent as 1-bit values on the bus (ABB i-bus® KNX). The 2-point controller switches as follows:
- Switch-on at setpoint – hysteresis
- Switch-off at setpoint + hysteresis

2-point 1 byte (0/100 %)

Unlike 2-point 1 bit (On/Off), the switch-on and switch-off commands are sent as 1-byte values (0 %/ 100 %) on the bus (ABB i-bus® KNX).

PI continuous (0 ... 100 %)

The PI controller (continuous) adapts its output value to the difference between the actual value and the setpoint. This adaptation permits exact correction of the room temperature to the setpoint. The control value is sent as a 1-byte value (0 … 100 %) on the bus (ABB i-bus® KNX). To reduce the bus load, the control value is sent only if it has changed by a previously specified value.

PI PWM (On/Off)

The PI controller (PWM) converts the calculated control value to a pulse-to-pause ratio. The control value is sent as a 1-bit value on the bus (ABB i-bus® KNX).

12.2.13.2 Basics of PI control

P-proportion / xP-proportion

The P-proportion / xP-proportion stands for the proportional range of control. The proportional range fluctuates around the setpoint, and in PI control is used to change the speed of control. The smaller the value set, the faster the control reacts. If the value is too small, there is a risk of overshooting.

I-proportion

The I-proportion (also readjustment time) represents the integral control proportion. The I-proportion causes the room temperature to reach the setpoint. In principle the following applies: the more sluggish the overall system, the larger the integral time is.

12.2.13.3 2-point controller

A 2-point controller has two output states (On/Off) that change based on the actual value:
- If the actual value is higher than the parameterized setpoint, the associated control value is 0.
- If the actual value is lower than the parameterized setpoint, the associated control value is 1.

As the 2-point controller switches only between the On and Off states, the following applications are possible:
- Activation of a thermoelectric valve connected to a switch actuator or a valve drive actuator
- Activation of an electric heater via a relay output

CAUTION
Each change of the control value causes the relay to switch.
▸ Observe the maximum number of operating cycles (service life).

Example
If the control value changes 10 times per day, this corresponds to 3,650 operating cycles per year.
If the control value changes 50 times per day, this corresponds to 18,250 operating cycles per year.

Using hysteresis

A 2-point controller can quickly correct large control deviations in the command variable (setpoint temperature). As correction is a continuous process, overshooting of the system can occur (exceeding the setpoint temperature). Each 2-point controller features built-in hysteresis to avoid overshooting.

Hysteresis ensures that the control value must change by a certain value before the controller has the outputs adjusted. Hysteresis reduces the number of control value changes. The reduction in changes results in smoother control.

Example
In heating mode, the setpoint is 21 °C and the hysteresis is 1.0 K.
The controller switches on when the temperature falls below 20.5 °C and off when it exceeds 21.5 °C.

The following factors should be considered when setting the hysteresis:
- How quickly can the heater heat the room?
- How quickly can the cooler cool the room?
- How does a person in the room perceive temperatures?

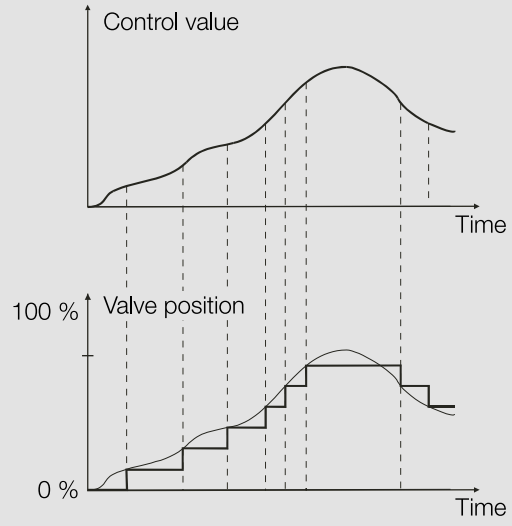
Note
If the selected hysteresis is too small, a switching valve drive will be opened and closed constantly.
If the selected hysteresis is too large, this will lead to excessive temperature fluctuations in the room.

12.2.13.4 Continuous control

Continuous control is the most accurate type of temperature control. At the same time, the positioning frequency of the valve drive can be kept low. Continuous control can be implemented with 3-point electromotor valve drives via 1-byte activation.

Note
With 1-byte activation, the room thermostat specifies a value of 0 … 255 (corresponding to 0 … 100 %). The valve is closed at 0 % and fully opened at 100 %.

With continuous control, the actual and setpoint temperatures are used to calculate a control value to set the ideal temperature. The valve is moved to a position corresponding to the calculated control value. The valve can be fully opened, fully closed or put in any intermediate position.



2CDC072028Fxx19

Fig. 30: Continuous control

12.2.13.5 PI controller (PWM)

The PI controller (PWM) works like a PI controller (continuous) in principle. Unlike the procedure for a continuous controller, the control value is converted to a 1-bit PWM switch-on/switch-off ratio prior to output for a PI controller (PWM).

Example
With a control value of 70 % and a cycle time of 10 minutes, the switch-on time is 7 minutes and the switch-off time is 3 minutes.

Using the PI controller (PWM) the advantages offered by continuous control (precise attainment of the setpoint temperature) can be obtained with drives that are designed only for switch-on/switch-off signals (e.g. thermoelectric drives).

The cycle time of the PWM control value can be set to optimize the control properties of the heating/cooling system. The type of heating/cooling and the valve drive used must be considered when setting the cycle time. The following cycle times are recommended:

- Thermoelectric Valve Drive: 15 minutes
  It takes approx. 2 … 3 minutes to open a control valve fully with a thermoelectric drive (depending on the manufacturer). Other times must be correspondingly adapted to the heating/cooling system.
- Floor heating: 20 minutes
  The time constant of a floor heater is very large (sluggish).
- Water heating: 15 minutes
  A cycle time of 15 minutes produces very good control results.
- Electric convector heater: 10 … 15 minutes
  The cycle time depends on the type of electric heater and the room situation.

12.2.13.6 Pulse width modulation (PWM)

With pulse width modulation, the valve is operated exclusively in the completely open and completely closed positions. In contrast to 2-point control, the position is not controlled via limit values. Control is based on a calculated control value – similar to continuous control.

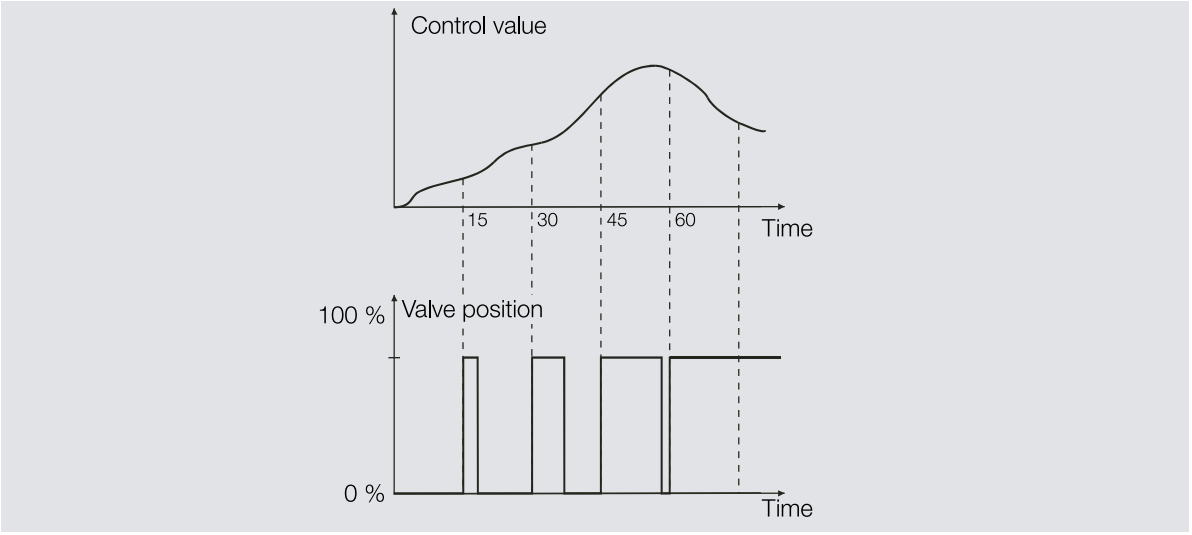


Fig. 31: Pulse width modulation (PWM)

To calculate the control value, the input signal (1-byte control value 0 … 100 %) is converted to a 2-point signal (On/Off signal) with a parameterized cycle time. Based on this PWM calculation, valve actuation is performed via a variable pulse-to-pause ratio.

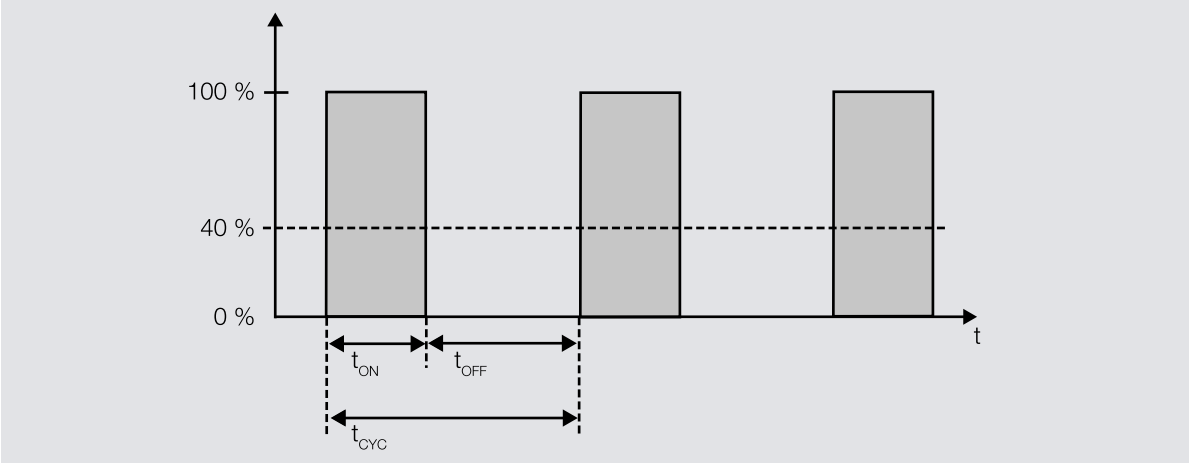


Fig. 32: Activation via a variable pulse-pause ratio

During the time t_{ON} the valve is opened. During the time t_{OFF} the valve is closed. t_{CYC} is the PWM cycle time for continuous control.

With pulse width modulation, the setpoint temperature can be set relatively accurately without pronounced overshooting of the system. However, pulse width modulation leads to frequent positioning operations of the valve drive.

Electromotor or Thermoelectric Valve Drives can be connected to the device when pulse width modulation is used.

Example
- Control value: 20 %
- Cycle time: 15 minutes

The valve is opened for 3 minutes (0.2 × 15) and closed for 12 minutes.

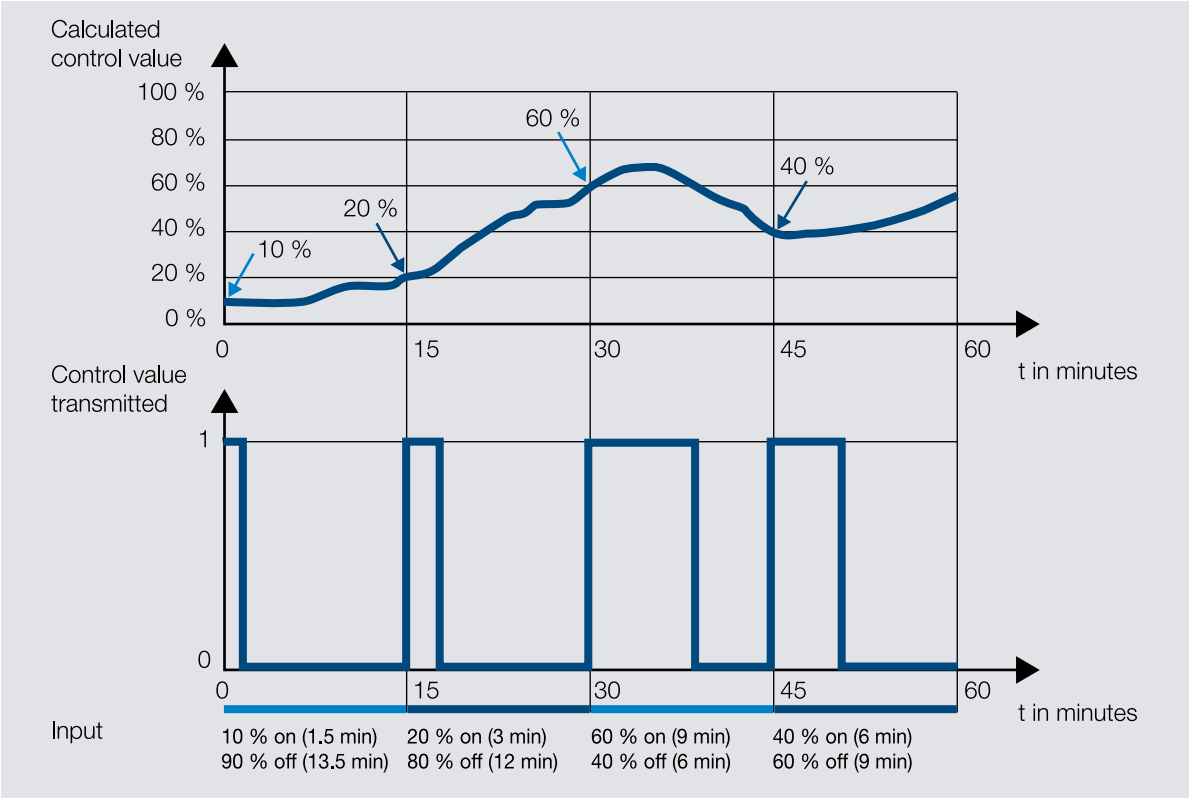


Fig. 33: Pulse width modulation – example

12.2.13.7 Control value direction

If the control value is only output via a Group Object, the output value can be inverted. The inversion of the output value can be necessary to actuate NC (normally closed) or NO (normally opened) valve drives correctly.

Example
- 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 %

If the control value is output via the physical device outputs, the actuation range is set in the related heating/cooling stage. The inversion of the control value in the control is not necessary in this case.

12.2.14 Controller setting

Note
The controller settings suggested are to be considered recommendations that, under ideal conditions, will result in stable control/temperature with the smallest possible number of valve movements. The conditions depend on various factors, e.g. fluctuation in the supply flow temperature, size of the heating/cooling circuit, distance and number of loads, energy transfer in the heating/cooling circuit.

Option in the parameter *Controller setting heating* or *Controller setting cooling*	Preset value in the parameter *xP-proportion* and *I-proportion*	Preset value can be changed
Free configuration	xP-proportion: 60 K I-portion: 60 s	Yes
Reduced temperature accuracy / few valve movements	xP-proportion: 40 K I-portion: 120 s	No
Medium temperature accuracy / medium number of valve movements	xP-proportion: 60 K I-portion: 60 s	No
High temperature accuracy / many valve movements	xP-proportion: 80 K I-portion: 30 s	No

Tab. 44: Controller setting and control parameters

12.2.15 Sending or switching delay

No telegrams are sent on the bus during the sending or switching delay (ABB i-bus® KNX).

Telegrams received (e.g. requests from a visualization system) are sent to the outputs after the sending or switching delay expires. The state of the outputs is set according to the settings in the ETS application or the telegram values of the Group Objects.

Time sequences (e.g. staircase lighting time) are started immediately during the sending or switching delay. If, at the time of reception, the staircase lighting time is shorter than the remaining sending or switching delay, the staircase lighting time elapses during the sending or switching delay. After the sending or switching delay has elapsed, there is no switching command; the staircase lighting is not switched on.

Note
The sending or switching delay includes the device initialization time.

12.2.16 Temperature sensor types

PT100

This sensor type is precise and interchangeable, however it is susceptible to cable errors (e.g. cable resistance or heating of the cable). A terminal resistance as low as 200 milliohms causes a temperature error of 0.5 °C.

PT1000/NI

These sensor types respond just like the PT100, but the influences of cable errors are lower by a factor of 10. These sensor types should be preferred.

KT/KTY/NTC

These sensor types have a low level of accuracy, are interchangeable only under certain circumstances and can be used only for very simple applications.

Characteristic resistances of the most common temperature sensors

Temperature [°C]	PT100 Resistance [Ω]	PT1000 Resistance [Ω]	NTC10-01 Resistance [Ω]	NTC10-02 Resistance [Ω]	NTC10-03 Resistance [Ω]	NTC20 Resistance [Ω]	NI1000-01 Resistance [Ω]	NI1000-02 Resistance [Ω]
110	142.3	1423	511	758	624	818	1557	1688
100	138.5	1385	679	973	817	1114	1500	1618
90	134.7	1347	916	1266	1084	1541	1444	1549
80	130.9	1309	1255	1668	1457	2166	1390	1483
70	127.1	1271	1752	2228	1990	3098	1337	1417
65	125.2	1252	2083	2588	2338	3732	1311	1385
60	123.2	1232	2488	3020	2760	4518	1285	1353
55	121.3	1213	2986	3536	3270	5494	1260	1322
50	119.4	1194	3602	4160	3893	6718	1235	1291
45	117.5	1175	4368	4911	4655	8260	1210	1260
40	115.5	1155	5324	5827	5594	10212	1186	1230
35	113.6	1136	6532	6940	6754	12698	1162	1200
30	111.7	1117	8055	8313	8196	15886	1138	1171
29	111.3	1113	8406	8622	8525	16627	1132	1165
28	111.0	1110	8779	8944	8869	17407	1128	1159
27	110.5	1105	9165	9281	9229	18227	1123	1153
26	110.1	1101	9574	9632	9606	19090	1119	1147
25	109.7	1097	10000	10000	10000	20000	1114	1141
24	109.3	1093	10448	10380	10413	20958	1109	1136
23	109.0	1090	10924	10780	10845	21968	1105	1130
22	108.6	1086	11421	11200	11298	23033	1100	1124
21	108.2	1082	11940	11630	11773	24156	1095	1118
20	107.8	1078	12491	12090	12270	25340	1091	1112
19	107.4	1074	13073	12560	12791	26491	1086	1107
18	107.0	1070	13681	13060	13337	27912	1081	1101
17	106.6	1066	14325	13580	13910	29307	1077	1095
16	106.2	1062	15000	14120	14510	30782	1072	1089
15	105.9	1059	15710	14690	15140	32340	1068	1084
14	105.5	1055	16461	15280	15801	33982	1063	1078
13	105.1	1051	17256	15900	16494	35716	1058	1072
12	104.7	1047	18091	16560	17222	37550	1054	1067
11	104.3	1043	18970	17240	17987	39489	1049	1061
10	103.9	1039	19902	17960	18790	41540	1045	1056
9	103.5	1035	20884	18700	19633	43715	1040	1050
8	103.1	1031	21918	19480	20519	46018	1036	1044
7	102.7	1027	23015	20300	21451	48457	1031	1039
6	102.3	1023	24170	21150	22430	51041	1027	1033
5	101.9	1019	25391	22050	23460	53780	1022	1028
4	101.6	1016	26683	23000	24545	56678	1018	1022
3	101.2	1012	28051	23990	25687	59751	1013	1016
2	100.8	1008	29498	25030	26890	63011	1009	1011
1	100.4	1004	31030	26130	28156	66469	1004	1005
0	100.0	1000	32650	27280	29490	70140	1000	1000
-5	98.0	980	42327	33900	37310	92220	978	973
-10	96.1	961	55329	42470	47540	122260	956	946
-15	94.1	941	72957	53410	61020	163480	935	919
-20	92.2	922	97083	67770	78910	220600	914	893
-25	90.2	902	130422	86430	102900	300400	893	867
-30	88.2	882	176976	111300	135200	413400	872	842

Tab. 45: Characteristic resistances of the most common temperature sensors

Tolerance classes

The tolerance classes for sensor versions PT100 and PT1000 differ. The following table illustrates the individual classes to the standard IEC 60751 (status: 2008):

Description	Tolerance
Class AA	0.10°C + (0.0017 x t)
Class A	0.15 °C + (0.002 x t)
Class B	0.30 °C + (0.005 x t)
Class C	0.60 °C + (0.01 x t)
t = Temperature	

Tab. 46: Tolerance classes

Example
Class B:
Measured-value deviations of ± 0.8 °C at 100 °C are permissible.

12.2.17 Setpoint generator signal

The following table shows the dependence of the options in the parameter Setpoint generator signal on the settings in the following parameters:

- Type of generator activation
- Signal output (voltage to temperature/power)

Setting, parameter Type of generator activation	Setting, parameter Signal output (voltage to temperature/power)	
	Normal	Inverted
Absolute temperature	0 ... 50 ... 100 °C	0 ... 15 ... 100 °C
Temperature offset	-50 ... 0 ... 50 K	-50 ... 0 ... 50 K
Power specified	0 ... 50 ... 100 %	0 ... 50 ... 100 %

Tab. 47: Setpoint generator signal

12.2.18 Valve drives

The valve drives used in heating or cooling systems are usually:

Magnetic or thermoelectric 2-point valve drives.

The valve can only be completely opened (100%) or completely closed (0%) with 2-point valve drives. The valve position is activated via 2-point control (open-close signal) for a magnetic valve drive or pulse width modulation (PWM) for a thermoelectric valve drive.

Thermoelectric 2-point valve drives are adjusted by the thermal expansion of a material caused by a flow of electric current.

2-point valve drives are available in the following variants:

- Normally closed: The valve is closed if no current flows through the valve drive. The valve is opened if current flows through the valve drive.
- Normally open: The valve is opened if no current flows through the valve drive. The valve is closed if current flows through the valve drive.

Motor-driven 3-point valve drives

The valve positions between 0% and 100% are adopted using a motor in 3-point valve drives. A 3-point valve drive is connected to both device valve outputs. The open signal is output on valve output A, the close signal on valve output B. The valve position is activated directly based on the control value, usually in the form of continuous control.

Analog (proportional) valve drives

The valve positions between 0% and 100% are adopted using a motor in analog (proportional) valve drives. Analog (proportional) valve drives are controlled via a 0-10 V signal. The power for the valve drive is normally supplied via 230 V AC or 24 V AC/DC.

Due to aging processes or mechanical inaccuracies in the valve, the valve may not shut completely despite the control value 0%. To prevent this situation from arising, there are valve drives that can be activated via a 0-10 V signal or a 2-10 V signal. With this activation, the output signal is restricted to the corresponding voltage range. To make sure that the valve is always closed completely, the 0 V signal is nevertheless output for the control value 0%. If the control value is greater than 0%, the lower limit (1 V or 2 V) is used directly for the activation.

Activation via 1-10 V signal:
- Control value 0% = 0 V
- Control value 1% = 1 V
- Control value 100% = 10 V

Activation via 2-10 V signal:
- Control value 0% = 0 V
- Control value 1% = 2 V
- Control value 100% = 10 V

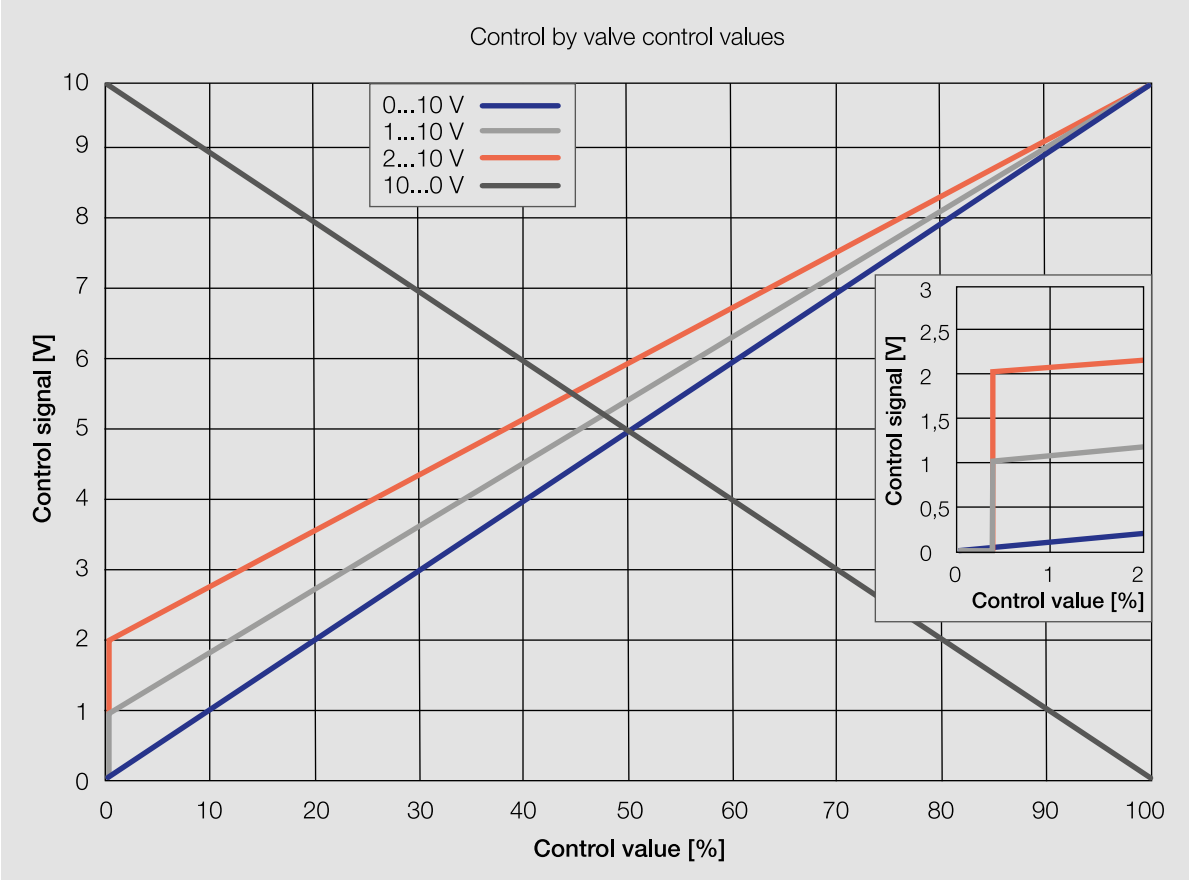


Fig. 34: Control by valve control values

12.2.19 Telegram rate limit

The bus load generated by the device can be limited using the telegram rate limit. This limit relates to all telegrams sent by the device.

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 bus (ABB i-bus® KNX) until the end of the period. A new period commences automatically at the end of the previous period. The telegram counter is reset to zero. Telegrams can be sent again. The Group Object always sends the current telegram value.

The first period (break time) is not precisely predefined. The break time can be anywhere between 0 seconds and the parameterized period. The subsequent periods correspond to the parameterization.

Example
- Number of telegrams = 20
- Maximum number of telegrams per period = 5
- Period = 5 s

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 (ABB i-bus® KNX) every 5 seconds.

12.2.20 Value Read

Using the command "Value Read" the value of the state of a group address in a Group Object can be read. A Group Object can only reply if the "Read" flag is set. The group address first in the Group Object (sending group address) is always sent. The reply is only sent once and can only be understood by the Group Object that triggered the "Value Read" command. The value received is written to the reading Group Object.

12.2.21 valve purge

To prevent the valve from sticking during an extended idle period, the valve is completely opened and closed one time during the valve purge.

The valve can be purged via a Group Object, or automatically after the specified purge cycle.

When automatic valve purge is activated, the following events reset the purge cycle:
- Valve purge performed (automatically or via Group Object)
- Device restart
- ETS download
- KNX voltage recovery
- The value set in the parameter *Reset purge cycle from control value greater than or equal to* is reached. If the value falls below the set value again, the purge cycle restarts.

If valve purge is triggered for several valves simultaneously, the valves will be purged one after the other.

12.2.22 Use of 6-way valve

If a 6-way valve is used, both operating modes (*Heating*/ *Cooling*) in a 4-pipe system are activated together on one valve output. Despite the joint activation, both operating modes can be used independent of each other.

A 6-way valve can be used only if the following prerequisites are met:
- Basic-stage heating is used for a water heating type
- Basic-stage cooling is active

The valve drive for the 6-way valve is connected to valve output A, and the control values for *heating* and *cooling* are issued at this output. The control signal for the drive is given by the two control values and is divided into a range for *heating* and a range for *cooling*. Between the two ranges there is a dead zone in which the valve is closed.

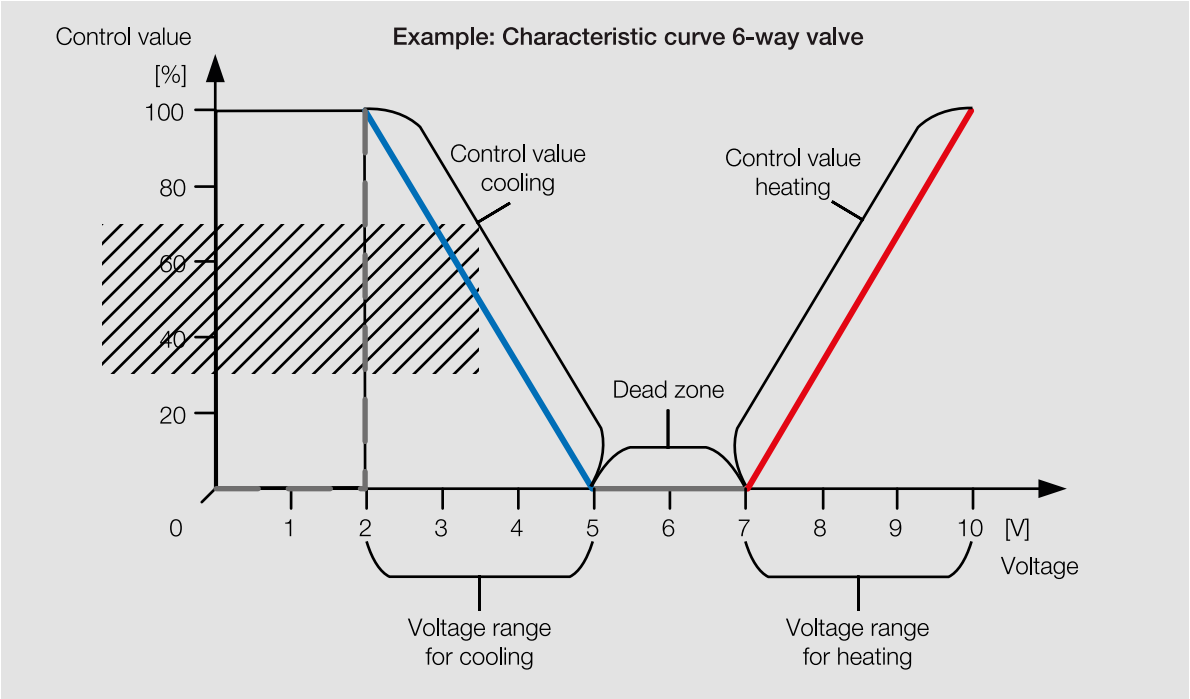


Fig. 35: 6-way valve activation

If the control value is in the voltage range for *heating*, the flow for *heating* is opened to suit the control value and the flow for *cooling* blocked.

If the control value is in the voltage range for *cooling*, the flow for *cooling* is opened to suit the control value and the flow for *heating* blocked.

If the control value is 0 %, the middle of the dead zone is activated. The flow for *heating* and *cooling* is blocked.

12.2.23 Use of an analog room control unit

CAUTION
Connecting several analog room control units will cause malfunctions when the device is operated.

The following functions can be implemented with analog room control units:
- Manual adjustment of the temperature setpoint and (depending on the analog room control unit) the fan speed
- Measurement of the room temperature with a temperature sensor

A separate output is available for each function, Connecting analog room control unit.

The following analog room control units can be connected:
- SAR/A 1.0.1-24 Room Temperature Control Panel
- SAF/A 1.0.1-24 Room Temperature and Fan Coil Control Panel

If the SAF/A room temperature and fan coil control unit is used, the following reaction applies to the settings for the fan speed:
- Automatic: The controller takes over the control of the fan speed corresponding to the control value (fan automatic).
- Fan speed 0: If, in the active operating mode (*Heating*/ *Cooling*), the basic stage or additional stage is used to activate a fan coil unit, the fan is overridden and switched off. All valves assigned to the fan coil unit are also overridden and control value set to 0 %. The fan and valve override has no effect on the control value output by the controller to activate the basic stage or additional stage via Group

Objects. If the controller is in the Building Protection operating mode, there is no override. If the controller changes to the Building Protection operating mode during the override, the override is withdrawn.
- Fan speed 1 ... 3 (for continuous fans: 33 %, 66 %, 100 %): If, in the active operating mode (*Heating*/*Cooling*), the basic stage or additional stage is used to activate a fan coil unit, the fan is overridden to suit the speed set. The override has no effect on the control value.

12.2.23.1 Connecting an analog room control unit in actuator mode

An actuator cannot evaluate the values for setpoint adjustment, and therefore a KNX room control unit with integrated controller must be used in addition to the analog room control unit. The actuator forwards the setpoint adjustment of the analog room control unit to the KNX room control unit, which returns the control value and the fan speed.

The value that the actuator sends to the fan can deviate from the values in the analog room control unit. This deviation is due to the following control panel properties:
- Setpoint adjustments can be made mutually independently in the analog room control unit and in the KNX room control unit.
- The analog room control unit and the KNX room control unit do not communicate with each other.

Example
Hotel guests can control the fan in their room using an analog room control unit.
Hotel employees can use an additional KNX room control unit per hotel room to control all fans centrally, e.g. to implement nighttime reduction after a certain time.

12.2.24 Boiler/chiller

A boiler or chiller is used to generate hot or cold water for heating/cooling the building. The heated or cooled water can be adjusted to suit the demand or the outside temperature.

The boiler/chiller is the link in the building's heating/cooling circuit. It heats or cools the water arriving via the return flow from the rooms and feeds it back to the heating/cooling circuits via the supply flow.

A circulation pump directly after the boiler/chiller ensures that the heated or cooled water is transported to the distributor for the heating/cooling circuits. From there the water is distributed to the individual rooms.

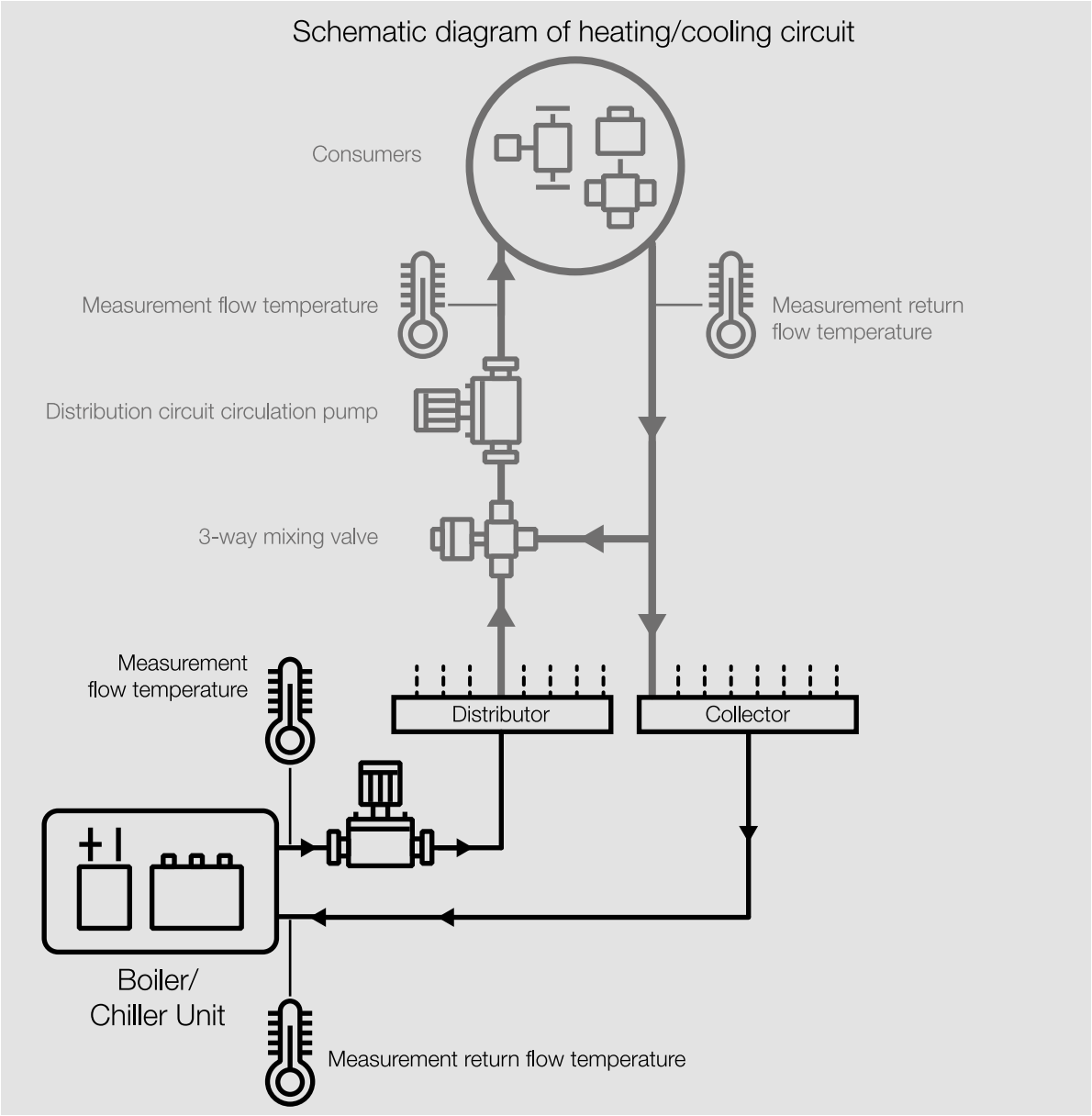


Fig. 36: Boiler/chiller in a heating/cooling circuit

12.2.25 forced operation

The function *Forced operation* can be used to set the device outputs to a defined state and block them. Forced operation is triggered by the switching of a 1- or 2-bit Group Object.

The controller continues to send the control values on the bus (ABB i-bus® KNX) during forced operation.

Note
If forced operation is active, operation via Group Objects, manual operation and i-bus® Tool is blocked. Higher-priority functions continue to run → Priorities, Page 144.

Note
The same forced operation state as for bus voltage failure applies after bus voltage recovery. Forced operation is deactivated on an ETS reset.

Forced operation, 1-bit

A state that is set if forced operation is activated can be parameterized with 1-bit forced operation. It can additionally be defined whether activation is to take place via the value 1 or 0.

Control values and the state of the outputs can be defined in the device-specific parameters → parameter *forced operation*.

Forced operation, 2-bit

With 2-bit forced operation, two states are specified that are set if forced operation is activated. The states are activated via the 2-bit Group Object. The first bit indicates whether forced operation is active (bit 1 (High) = 1) or inactive (bit 1 (High) = 0). The second bit determines the state *Forced operation active "OFF"* (bit 0 (Low) = 0) or *Forced operation active "ON"* (bit 0 (Low) = 1).

State	Bit 1	Bit 0	value
Inactive	0	0	0
Inactive	0	1	1
Active "OFF"	1	0	2
Active "ON"	1	1	3

Tab. 48: Forced operation states

Control values and the state of the outputs can be defined in the device-specific parameters → parameter *forced operation*.

12.2.26 Cyclical monitoring

The reception of a telegram on a Group Object can be monitored using cyclical monitoring. If a telegram is not received on the Group Object within a parameterizable time (monitoring time), the sending device may be faulty or the bus cable to the sending device may be interrupted.

Depending on the device, there are two possible reactions to a missing telegram: either the reaction set in the application-specific parameters; or, on devices without those parameters, the corresponding predefined alarm is triggered.

After receiving a telegram, ETS download, or KNX voltage recovery, the monitoring time is restarted.

Note
The monitoring time should be at least quadruple the cyclical sending time of the sending device. As a result, the set reactions or the alarms will not be triggered immediately if a telegram is missing, e.g. due to high bus load.

13 Appendix

13.1 Scope of delivery

The device is supplied together with the following components:

- 1 x heating/cooling circuit controller
- 1 x installation and operating instructions
- 1 x bus connection terminal (red/black)
- 1 x KNX connection cover cap

13.2 Status byte channel

x = Value 1, applicable
Empty = Value 0, not applicable

Bit no.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Unused	Unused	Unused	Safety mode	Manual 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			
25	19				x	x			x
26	1A				x	x		x	
27	1B				x	x		x	x
28	1C				x	x	x		
29	1D				x	x	x		x
30	1E				x	x	x	x	
31	1F				x	x	x	x	x
32	20			x					
33	21			x					x
34	22			x				x	
35	23			x				x	x
36	24			x			x		
37	25			x			x		x
38	26			x			x	x	
39	27			x			x	x	x
40	28			x		x			
41	29			x		x			x
42	2A			x		x		x	
43	2B			x		x		x	x
44	2C			x		x	x		
45	2D			x		x	x		x
46	2E			x		x	x	x	
47	2F			x		x	x	x	x
48	30			x	x				
49	31			x	x				x
50	32			x	x			x	
51	33			x	x			x	x
52	34			x	x		x		
53	35			x	x		x		x
54	36			x	x		x	x	
55	37			x	x		x	x	x
56	38			x	x	x			
57	39			x	x	x			x
58	3A			x	x	x		x	
59	3B			x	x	x		x	x
60	3C			x	x	x	x		
61	3D			x	x	x	x		x
62	3E			x	x	x	x	x	
63	3F			x	x	x	x	x	x
64	40		x						
65	41		x						x

Bit no.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Unused	Unused	Unused	Safety mode	Manual operation via membrane keypad	Manual valve override	Forced operation	Manual pump override
66	42		x					x	
67	43		x					x	x
68	44		x				x		
69	45		x				x		x
70	46		x				x	x	
71	47		x				x	x	x
72	48		x			x			
73	49		x			x			x
74	4A		x			x		x	
75	4B		x			x		x	x
76	4C		x			x	x		
77	4D		x			x	x		x
78	4E		x			x	x	x	
79	4F		x			x	x	x	x
80	50		x		x				
81	51		x		x				x
82	52		x		x			x	
83	53		x		x			x	x
84	54		x		x		x		
85	55		x		x		x		x
86	56		x		x		x	x	
87	57		x		x		x	x	x
88	58		x		x	x			
89	59		x		x	x			x
90	5A		x		x	x		x	
91	5B		x		x	x		x	x
92	5C		x		x	x	x		
93	5D		x		x	x	x		x
94	5E		x		x	x	x	x	
95	5F		x		x	x	x	x	x
96	60		x	x					
97	61		x	x					x
98	62		x	x				x	
99	63		x	x				x	x
100	64		x	x			x		
101	65		x	x			x		x
102	66		x	x			x	x	
103	67		x	x			x	x	x
104	68		x	x		x			
105	69		x	x		x			x
106	6A		x	x		x		x	
107	6B		x	x		x		x	x
108	6C		x	x		x	x		
109	6D		x	x		x	x		x
110	6E		x	x		x	x	x	
111	6F		x	x		x	x	x	x
112	70		x	x	x				
113	71		x	x	x				x
114	72		x	x	x			x	
115	73		x	x	x			x	x
116	74		x	x	x		x		
117	75		x	x	x		x		x
118	76		x	x	x		x	x	
119	77		x	x	x		x	x	x
120	78		x	x	x	x			
121	79		x	x	x	x			x
122	7A		x	x	x	x		x	
123	7B		x	x	x	x		x	x
124	7C		x	x	x	x	x		
125	7D		x	x	x	x	x		x
126	7E		x	x	x	x	x	x	
127	7F		x	x	x	x	x	x	x
128	80	x							
129	81	x							x
130	82	x						x	
131	83	x						x	x

Bit no.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Unused	Unused	Unused	Safety mode	Manual operation via membrane keypad	Manual valve override	Forced operation	Manual pump override
132	84	x					x		
133	85	x					x		x
134	86	x					x	x	
135	87	x					x	x	x
136	88	x				x			
137	89	x				x			x
138	8A	x				x		x	
139	8B	x				x		x	x
140	8C	x				x	x		
141	8D	x				x	x		x
142	8E	x				x	x	x	
143	8F	x				x	x	x	x
144	90	x			x				
145	91	x			x				x
146	92	x			x			x	
147	93	x			x			x	x
148	94	x			x		x		
149	95	x			x		x		x
150	96	x			x		x	x	
151	97	x			x		x	x	x
152	98	x			x	x			
153	99	x			x	x			x
154	9A	x			x	x		x	
155	9B	x			x	x		x	x
156	9C	x			x	x	x		
157	9D	x			x	x	x		x
158	9E	x			x	x	x	x	
159	9F	x			x	x	x	x	x
160	A0	x		x					
161	A1	x		x					x
162	A2	x		x				x	
163	A3	x		x				x	x
164	A4	x		x			x		
165	A5	x		x			x		x
166	A6	x		x			x	x	
167	A7	x		x			x	x	x
168	A8	x		x		x			
169	A9	x		x		x			x
170	AA	x		x		x		x	
171	AB	x		x		x		x	x
172	AC	x		x		x	x		
173	AD	x		x		x	x		x
174	AE	x		x		x	x	x	
175	AF	x		x		x	x	x	x
176	B0	x		x	x				
177	B1	x		x	x				x
178	B2	x		x	x			x	
179	B3	x		x	x			x	x
180	B4	x		x	x		x		
181	B5	x		x	x		x		x
182	B6	x		x	x		x	x	
183	B7	x		x	x		x	x	x
184	B8	x		x	x	x			
185	B9	x		x	x	x			x
186	BA	x		x	x	x		x	
187	BB	x		x	x	x		x	x
188	BC	x		x	x	x	x		
189	BD	x		x	x	x	x		x
190	BE	x		x	x	x	x	x	
191	BF	x		x	x	x	x	x	x
192	C0	x	x						
193	C1	x	x						x

Bit no.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Unused	Unused	Unused	Safety mode	Manual operation via membrane keypad	Manual valve override	Forced operation	Manual pump override
194	C2	x	x					x	
195	C3	x	x					x	x
196	C4	x	x				x		
197	C5	x	x				x		x
198	C6	x	x				x	x	
199	C7	x	x				x	x	x
200	C8	x	x			x			
201	C9	x	x			x			x
202	CA	x	x			x		x	
203	CB	x	x			x		x	x
204	CC	x	x			x	x		
205	CD	x	x			x	x		x
206	CE	x	x			x	x	x	
207	CF	x	x			x	x	x	x
208	D0	x	x		x				
209	D1	x	x		x				x
210	D2	x	x		x			x	
211	D3	x	x		x			x	x
212	D4	x	x		x		x		
213	D5	x	x		x		x		x
214	D6	x	x		x		x	x	
215	D7	x	x		x		x	x	x
216	D8	x	x		x	x			
217	D9	x	x		x	x			x
218	DA	x	x		x	x		x	
219	DB	x	x		x	x		x	x
220	DC	x	x		x	x	x		
221	DD	x	x		x	x	x		x
222	DE	x	x		x	x	x	x	
223	DF	x	x		x	x	x	x	x
224	E0	x	x	x					
225	E1	x	x	x					x
226	E2	x	x	x				x	
227	E3	x	x	x				x	x
228	E4	x	x	x			x		
229	E5	x	x	x			x		x
230	E6	x	x	x			x	x	
231	E7	x	x	x			x	x	x
232	E8	x	x	x		x			
233	E9	x	x	x		x			x
234	EA	x	x	x		x		x	
235	EB	x	x	x		x		x	x
236	EC	x	x	x		x	x		
237	ED	x	x	x		x	x		x
238	EE	x	x	x		x	x	x	
239	EF	x	x	x		x	x	x	x
240	F0	x	x	x	x				
241	F1	x	x	x	x				x
242	F2	x	x	x	x			x	
243	F3	x	x	x	x			x	x
244	F4	x	x	x	x		x		
245	F5	x	x	x	x		x		x
246	F6	x	x	x	x		x	x	
247	F7	x	x	x	x		x	x	x
248	F8	x	x	x	x	x			
249	F9	x	x	x	x	x			x
250	FA	x	x	x	x	x		x	
251	FB	x	x	x	x	x		x	x
252	FC	x	x	x	x	x	x		
253	FD	x	x	x	x	x	x		x
254	FE	x	x	x	x	x	x	x	
255	FF	x	x	x	x	x	x	x	x

Tab. 49: Status byte channel

13.3 Status byte Valve

x = Value 1, applicable
Empty = Value 0, not applicable

Bit no.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Unused	Unused	Unused	Unused	Valve purge	Forced operation	Fault Valve output	Setpoint/ control value received
0	0								
1	1								x
2	2							x	
3	3							x	x
4	4						x		
5	5						x		x
6	6						x	x	
7	7						x	x	x
8	8					x			
9	9					x			x
10	0A					x		x	
11	0B					x		x	x
12	0C					x	x		
13	0D					x	x		x
14	0E					x	x	x	
15	0F					x	x	x	x
16	10				x				
17	11				x				x
18	12				x			x	
19	13				x			x	x
20	14				x		x		
21	15				x		x		x
22	16				x		x	x	
23	17				x		x	x	x
24	18				x	x			
25	19				x	x			x
26	1A				x	x		x	
27	1B				x	x		x	x
28	1C				x	x	x		
29	1D				x	x	x		x
30	1E				x	x	x	x	
31	1F				x	x	x	x	x
32	20			x					
33	21			x					x
34	22			x				x	
35	23			x				x	x
36	24			x			x		
37	25			x			x		x
38	26			x			x	x	
39	27			x			x	x	x
40	28			x		x			
41	29			x		x			x
42	2A			x		x		x	
43	2B			x		x		x	x
44	2C			x		x	x		
45	2D			x		x	x		x
46	2E			x		x	x	x	
47	2F			x		x	x	x	x
48	30			x	x				
49	31			x	x				x
50	32			x	x			x	
51	33			x	x			x	x
52	34			x	x		x		
53	35			x	x		x		x
54	36			x	x		x	x	
55	37			x	x		x	x	x
56	38			x	x	x			
57	39			x	x	x			x
58	3A			x	x	x		x	
59	3B			x	x	x		x	x
60	3C			x	x	x	x		
61	3D			x	x	x	x		x
62	3E			x	x	x	x	x	
63	3F			x	x	x	x	x	x
64	40		x						
65	41		x						x
66	42		x					x	
67	43		x					x	x

Bit no.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Unused	Unused	Unused	Unused	Valve purge	Forced operation	Fault Valve output	Setpoint/ control value received
68	44		x				x		
69	45		x				x		x
70	46		x				x	x	
71	47		x				x	x	x
72	48		x			x			
73	49		x			x			x
74	4A		x			x		x	
75	4B		x			x		x	x
76	4C		x			x	x		
77	4D		x			x	x		x
78	4E		x			x	x	x	
79	4F		x			x	x	x	x
80	50		x		x				
81	51		x		x				x
82	52		x		x			x	
83	53		x		x			x	x
84	54		x		x		x		
85	55		x		x		x		x
86	56		x		x		x	x	
87	57		x		x		x	x	x
88	58		x		x	x			
89	59		x		x	x			x
90	5A		x		x	x		x	
91	5B		x		x	x		x	x
92	5C		x		x	x	x		
93	5D		x		x	x	x		x
94	5E		x		x	x	x	x	
95	5F		x		x	x	x	x	x
96	60		x	x					
97	61		x	x					x
98	62		x	x				x	
99	63		x	x				x	x
100	64		x	x			x		
101	65		x	x			x		x
102	66		x	x			x	x	
103	67		x	x			x	x	x
104	68		x	x		x			
105	69		x	x		x			x
106	6A		x	x		x		x	
107	6B		x	x		x		x	x
108	6C		x	x		x	x		
109	6D		x	x		x	x		x
110	6E		x	x		x	x	x	
111	6F		x	x		x	x	x	x
112	70		x	x	x				
113	71		x	x	x				x
114	72		x	x	x			x	
115	73		x	x	x			x	x
116	74		x	x	x		x		
117	75		x	x	x		x		x
118	76		x	x	x		x	x	
119	77		x	x	x		x	x	x
120	78		x	x	x	x			
121	79		x	x	x	x			x
122	7A		x	x	x	x		x	
123	7B		x	x	x	x		x	x
124	7C		x	x	x	x	x		
125	7D		x	x	x	x	x		x
126	7E		x	x	x	x	x	x	
127	7F		x	x	x	x	x	x	x
128	80	x							
129	81	x							x
130	82	x						x	
131	83	x						x	x
132	84	x					x		
133	85	x					x		x
134	86	x					x	x	
135	87	x					x	x	x

Bit no.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Unused	Unused	Unused	Unused	Valve purge	Forced operation	Fault Valve output	Setpoint/ control value received
136	88	x				x			
137	89	x				x			x
138	8A	x				x		x	
139	8B	x				x		x	x
140	8C	x				x	x		
141	8D	x				x	x		x
142	8E	x				x	x	x	
143	8F	x				x	x	x	x
144	90	x			x				
145	91	x			x				x
146	92	x			x			x	
147	93	x			x			x	x
148	94	x			x		x		
149	95	x			x		x		x
150	96	x			x		x	x	
151	97	x			x		x	x	x
152	98	x			x	x			
153	99	x			x	x			x
154	9A	x			x	x		x	
155	9B	x			x	x		x	x
156	9C	x			x	x	x		
157	9D	x			x	x	x		x
158	9E	x			x	x	x	x	
159	9F	x			x	x	x	x	x
160	A0	x		x					
161	A1	x		x					x
162	A2	x		x				x	
163	A3	x		x				x	x
164	A4	x		x			x		
165	A5	x		x			x		x
166	A6	x		x			x	x	
167	A7	x		x			x	x	x
168	A8	x		x		x			
169	A9	x		x		x			x
170	AA	x		x		x		x	
171	AB	x		x		x		x	x
172	AC	x		x		x	x		
173	AD	x		x		x	x		x
174	AE	x		x		x	x	x	
175	AF	x		x		x	x	x	x
176	B0	x		x	x				
177	B1	x		x	x				x
178	B2	x		x	x			x	
179	B3	x		x	x			x	x
180	B4	x		x	x		x		
181	B5	x		x	x		x		x
182	B6	x		x	x		x	x	
183	B7	x		x	x		x	x	x
184	B8	x		x	x	x			
185	B9	x		x	x	x			x
186	BA	x		x	x	x		x	
187	BB	x		x	x	x		x	x
188	BC	x		x	x	x	x		
189	BD	x		x	x	x	x		x
190	BE	x		x	x	x	x	x	
191	BF	x		x	x	x	x	x	x
192	C0	x	x						
193	C1	x	x						x
194	C2	x	x					x	
195	C3	x	x					x	x

Bit no.		7	6	5	4	3	2	1	0
8-bit value	Hexadecimal	Unused	Unused	Unused	Unused	Valve purge	Forced operation	Fault Valve output	Setpoint/ control value received
196	C4	x	x				x		
197	C5	x	x				x		x
198	C6	x	x				x	x	
199	C7	x	x				x	x	x
200	C8	x	x			x			
201	C9	x	x			x			x
202	CA	x	x			x		x	
203	CB	x	x			x		x	x
204	CC	x	x			x	x		
205	CD	x	x			x	x		x
206	CE	x	x			x	x	x	
207	CF	x	x			x	x	x	x
208	D0	x	x		x				
209	D1	x	x		x				x
210	D2	x	x		x			x	
211	D3	x	x		x			x	x
212	D4	x	x		x		x		
213	D5	x	x		x		x		x
214	D6	x	x		x		x	x	
215	D7	x	x		x		x	x	x
216	D8	x	x		x	x			
217	D9	x	x		x	x			x
218	DA	x	x		x	x		x	
219	DB	x	x		x	x		x	x
220	DC	x	x		x	x	x		
221	DD	x	x		x	x	x		x
222	DE	x	x		x	x	x	x	
223	DF	x	x		x	x	x	x	x
224	E0	x	x	x					
225	E1	x	x	x					x
226	E2	x	x	x				x	
227	E3	x	x	x				x	x
228	E4	x	x	x			x		
229	E5	x	x	x			x		x
230	E6	x	x	x			x	x	
231	E7	x	x	x			x	x	x
232	E8	x	x	x		x			
233	E9	x	x	x		x			x
234	EA	x	x	x		x		x	
235	EB	x	x	x		x		x	x
236	EC	x	x	x		x	x		
237	ED	x	x	x		x	x		x
238	EE	x	x	x		x	x	x	
239	EF	x	x	x		x	x	x	x
240	F0	x	x	x	x				
241	F1	x	x	x	x				x
242	F2	x	x	x	x			x	
243	F3	x	x	x	x			x	x
244	F4	x	x	x	x		x		
245	F5	x	x	x	x		x		x
246	F6	x	x	x	x		x	x	
247	F7	x	x	x	x		x	x	x
248	F8	x	x	x	x	x			
249	F9	x	x	x	x	x			x
250	FA	x	x	x	x	x		x	
251	FB	x	x	x	x	x		x	x
252	FC	x	x	x	x	x	x		
253	FD	x	x	x	x	x	x		x
254	FE	x	x	x	x	x	x	x	
255	FF	x	x	x	x	x	x	x	x

Tab. 50: Status byte Valve

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