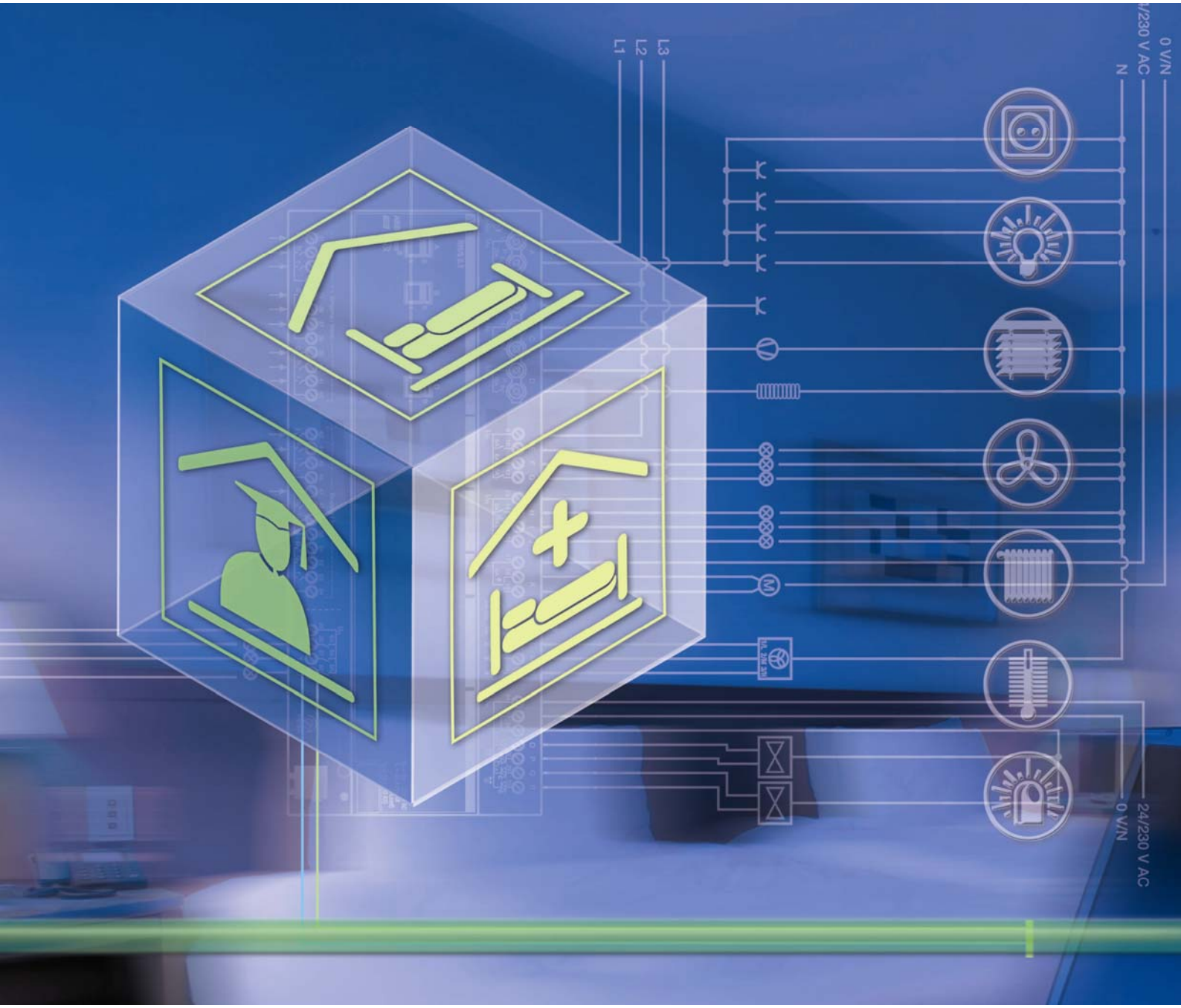
Product Manual

ABB i-bus® KNX
Room Master Basic
RM/S 1.1

Intelligent Installation Systems



This manual describes the function of the Room Master Basic RM/S 1.1.
Subject to changes and errors excepted.

Exclusion of liability:
Despite checking that the contents of this document match the hardware and software, deviations cannot be completely excluded. We therefore cannot accept any liability for this.
Any necessary corrections will be inserted in new versions of the manual.
Please inform us of any suggested improvements.

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1 General

The Room Master Basic RM/S 1.1 provides intelligent engineering technology for hotel rooms and apartments.

Modern buildings require intelligent building engineering technology for safe and efficient operation. Many buildings world-wide already utilise the full potential of networked electrical installations.

Hotels, hospitals, senior citizen and student residential homes, assisted living accommodation and much, much more: the Room Master covers new possibilities for buildings in the residential and hotel sectors.

The Room Master has been developed for all rooms of this type. It covers all requirements of the electrical installation of this application and offers the following functions in compact form:

- Switch lighting
- Control heating/cooling
- Switching of electrical sockets and loads

In addition to these basic functions, further automation functions can be implemented by a combination with a presence detector.
The communication of the devices via the KNX bus also enables control functions as well as sending of emergency signals from the rooms to a control centre.

The integration into a hotel management system enables the efficient management and provision of rooms. For example, when a guest checks out the room is automatically set to standby mode.

This manual provides you with detailed technical information relating to the Room Master Basic, its installation and programming. The application of the device is described using examples.

This manual is divided into the following sections:

Chapter 1	General
Chapter 2	Device technology
Chapter 3	Commissioning
Chapter 4	Planning and application
Chapter A	Appendix

1.1 Room Master: Areas of application

1.1.1 Hotel

The Room Master Basic offers all functions which are required in a modern hotel room. During operation a range of advantages are achieved in comparison to a conventional installation:

- comfortable and simple operation of the room functions by the guests,
- temperature control dependent on the season, external temperature and occupancy,
- transmission of messages to the reception, e.g. panic alarm,
- fast localization of faults in the rooms and simplified room maintenance.

The advantages of the Room Master are obvious not just during operation, but also for planning:

- world-wide use,
- compact design: can be installed in a simple in distribution board together with circuit-breakers, see Configuration of a distribution board with Room Master Basic, page 220.
- a standard solution for many projects.

1.1.2 Hospitals

When used in hospitals and buildings with a similar purpose, the Room Master features many functions which support the efficient operation of a modern operation:

- simple operation of the room functions by the patients, e.g. automatic control of the room climate,
- day/night service,
- remote control of the room and display of the room state in the nurses station,
- fast localization of faults in the rooms and simplified room maintenance.

1.1.3 Residential homes

The Room Master enables comfort and security in residential homes and supports senior citizens in their daily routine:

- simple operation of the room functions,
- automatic control of the room climate,
- automatic transmission of messages to the control station, e.g. window open,
- fast localisation of faults in the rooms,
- indication of room states in the control station,
- day/night service.

1.1.4 Apartments

Apartments gain in both their appeal and the quality of life they offer with the Room Master – decisive factors for sale and rental:

- automatic switching of loads in the room,
- automatic control of heating and cooling,
- comfortable and simple operation of the room functions.

1.2 Product and functional overview

The Room Master Basic RM/S is used as a single room solution specially for hotel rooms. The RM/S 1.1 is used to control the lighting as well as the heating and air conditioning. The input signals are detected via binary inputs or directly via the sensors connected to the KNX.

Hotel management systems can directly access the RM/S via the ABB i-bus® and activate controls in the room. Accordingly, it is possible to quickly adapt the hotel room to individual customers and guests requirements.

The Room Master is a modular installation device with a module width of 8 space units in Pro*M* Design for installation in the distribution board. The connection to the ABB i-bus® is established using the front side bus connection terminal.
The Room Master Basic does not require an auxiliary supply. The assignment of the physical addresses as well as the parameterisation is carried out with Engineering Tool Software ETS (from Version ETS2 V1.3a) with a *.VD2 file. If ETS3 is used a *.VD3 type file or higher must be imported.

Note
The illustrations of the parameter windows in this manual correspond to the ETS3 parameter windows. The user program is optimised for ETS3. In the ETS2 it is possible that the parameter page is automatically split if all parameters are used.

1.2.1 Product overview

The Room Master Basic RM/S 1.1 controls a single-phase fan with up to three fan speeds via a step or changeover control. This ensures that no two fan speeds can be switched on simultaneously with a changeover control. An additional programmable switch-over delay is provided for this purpose. Three-phase drives are not supported.
Electromotor or electro-thermal actuator drives for HEATING and COOLING as well as multi-speed fans can be connected directly to the Room Master. The outputs of the actuator drives (valves) are short-circuit protected by self-restoring fuses.

A separate, floating contact is available for the connection of an auxiliary electrical heating system.
Two outputs are used to supply the power outlets and the lighting.

Three contacts can also be manually operated directly on the Room Master, they are used for supply of power to:

- the power outlets in the room,
- the lighting in the room and
- a connection for switching an auxiliary heating system.

Eight binary inputs are available. These are used to report room information to the Room Master Basic, e.g.:

- signalling contacts for window contact and dew point monitoring,
- switching of auxiliary heating,
- door contacts, card readers,
- transmission of an emergency signal.

The scanning voltage for the binary inputs is provided by the device.
The binary inputs are divided into four groups of two inputs each.

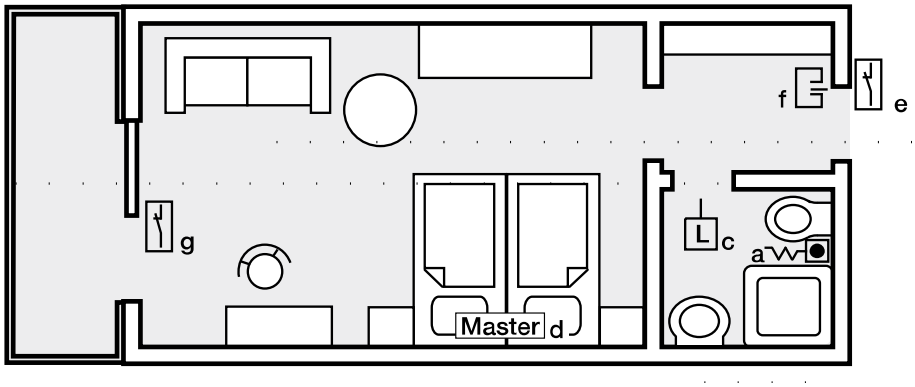
Overview of the number and allocation of the inputs and outputs:

Inputs	RM/S 1.1
Binary via contact scanning	8

Outputs	RM/S 1.1
Switching contact 20 A (16 AX)	1
Switching contact 16 A (10 AX)	2
Switching contact 6 A	3
Electronic 0.5 A	4

1.2.2 Functional overview

Functional overview based on a hotel room:



8 inputs switch	**Designation**	**RM/S 1.1**
Emergency call	a	1
Auxiliary electrical heater	b	1
Water detector	c	1
Master	d	1
Door contact	e	1
Key card	f	1
Window contact	g	1
Drip tray	h	1
1 output with 20 A (16 AX) switch	**Designation**	**RM/S 1.1**
Room supply outlets	A	1
2 outputs with 16 A (10 AX) switch		
Room supply light	B	1
Auxiliary electrical heater	C	1
3 outputs with 6 A switch		
Fan	D, E, F	3
4 outputs with 0.5 A switch		
Valve HEATING	G, H	2
Valve COOLING	I, J	2

2 Device technology

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RM/S 1.1

The Room Master Basic is a modular installation device (MDRC) in Pro*M* design. It is intended for installation in the distribution board on 35 mm mounting rails. The assignment of the physical address as well as the parameter settings is carried out with ETS 2 from version V1.3a or higher.

The device is powered via the ABB i-bus® and does not require and additional auxiliary voltage supply.

The RM/S 1.1 is operational after connection of the bus voltage.

2.1 Technical data

Supply	Bus voltage	21…32 V DC
	Current consumption, bus	< 12 mA (Fan-In 1)
	Leakage loss, bus	Maximum 250 mW
	Leakage loss, device	Maximum 4,85 W*
*The maximum power consumption of the device results from the following specifications:	KNX bus connection	0.25 W
	Relay 20 A	1.0 W
	Relay 16 A	2.0 W
	Relay 6 A	0.6 W
	Electronic outputs 0.5 A	1.0 W
Connections	KNX	Via bus connection terminals 0.8 mm Ø, solid
	Load circuits	Screw terminals with universal head (PZ 1) 0.2…4 mm² stranded, 2 x (0.2…2.5 mm²) 0.2…6 mm² single core, 2 x (0.2…4 mm²)
	Ferrules without/with plastic sleeves	without: 0.25…2.5 mm² with: 0.25…4 mm²
	TWIN ferrules	0.5…2.5 mm² Contact pin length at least 10 mm
	Tightening torque	Maximum 0.8 Nm
	Fans/valves/inputs	Screw terminal, slot head 0.2…2.5 mm² stranded 0.2…4 mm² solid core
	Tightening torque	Maximum 0.6 Nm
Operating and display elements	Programming button/LED	for assignment of the physical address
Enclosure	IP 20	to DIN EN 60 529
Safety class	II	to DIN EN 61 140
Isolation category	Overvoltage category	III to DIN EN 60 664-1
	Pollution degree	2 to DIN EN 60 664-1
KNX safety extra low voltage	SELV 24 V DC	

Temperature range	Operation	-5 °C…+45 °C
	Transport	-25 °C…+70 °C
	Storage	-25 °C…+55 °C
Ambient conditions	Maximum air humidity	93 %, no condensation allowed
Design	Modular installation device (MDRC)	Modular installation device, Pro*M*
	Dimensions	90 x 144 x 64.5 mm (H x W x D)
	Mounting width in space units	8 modules at 18 mm
	Mounting depth	64.5 mm
Installation	On 35 mm mounting rail	to DIN EN 60 715
Mounting position	as required	
Weight	0.4 kg	
Housing/colour	Plastic housing, grey	
Approvals	KNX to EN 50 090-1, -2	Certification
CE mark	in accordance with the EMC guideline and low voltage guideline	

2.1.1 Electronic outputs

Rated values	Number	4, non-isolated, short-circuit proofed
	U_n rated voltage	24…230 V AC (50/60 Hz)
	I_n rated current (per output pair)	0.5 A
	Continuous current	0.5 A resistive load at T_A up to 20 °C
		0.3 A resistive load at T_A up to 60 °C
	Inrush current	Maximum 1.6 A, 10 s at T_A up to 60 °C
		T_A = ambient temperature

2.1.2 Binary inputs

Rated values	Number	8[1)]
	U_n scanning voltage	32 V, pulsed
	I_n scanning current	0.1 mA
	Scanning current I_n at switch on	Maximum 355 mA
	Permissible cable length	≤ 100 m one-way, at cross-section 1.5 mm²

[1)] All binary inputs are internally connected to the same potential.

2.1.3 Outputs
Rated current output 6 A

Rated values	Number	3 contacts
	U_n rated voltage	250/440 V AC (50/60 Hz)
	I_n rated current (per output)	6 A
Switching currents	AC3* operation (cos φ = 0.45) DIN EN 60 947-4-1	6 A/230 V
	AC1* operation (cos φ = 0.8) DIN EN 60 947-4-1	6 A/230 V
	Fluorescent lighting load to DIN EN 60 669-1	6 A/250 V (35 µF)[2)]
	Minimum switching performance	20 mA/5 V
		10 mA/12 V
		7 mA/24 V
	DC current switching capacity (resistive load)	6 A/24 V=
Service life	Mechanical endurance	> 10^7
	Electronic endurance to DIN IEC 60 947-4-1	
	AC1* (240 V/cos φ = 0.8)	> 10^5
	AC3* (240 V/cos φ = 0.45)	> 1.5 x 10^4
	AC5a* (240 V/cos φ = 0.45)	> 1.5 x 10^4
Switching times[1)]	Maximum relay position change per output and minute if only one relay is switched.	2,683

[1)] The specifications apply only after the bus voltage has been applied to the device for at least 10 seconds. Typical delay of the relay is approx. 20 ms.

[2)] The maximum inrush-current peak may not be exceeded.

***What do the terms AC1, AC3 and AC5a mean?**

In Intelligent Installation Systems different switching capacity and performance specifications which are dependent on the special application have become established in industrial and residential systems. These performance specifications are rooted in the respective national and international standards. The tests are defined so that typical applications, e.g. motor loads (industrial) or fluorescent lamps (residential) are simulated.

The specifications AC1 and AC3 are switching performance specifications which have become established in the industrial field.

Typical application:

AC1 – Non-inductive or slightly inductive loads, resistive furnaces (relates to switching of ohmic/resistive loads)

AC3 – Squirrel-cage motors: Stating, switching off motors during running (relates to (inductive) motor load)

AC5a – Switching of electric discharge lamps

These switching performances are defined in the standard DIN EN 60947-4-1 *Contactors and motor-starters - Electromechanical contactors and motor-starters*. The standard describes starter and/or contactors which previously preferably used in industrial applications.

2.1.4 Outputs
Rated current 16 A

Rated values	Number	2
	U_n rated voltage	250/440 V AC (50/60 Hz)
	I_n rated current	16 A
Switching currents	AC3* operation (cos φ = 0.45) DIN EN 60 947-4-1	8 A/230 V
	AC1* operation (cos φ = 0.8) DIN EN 60 947-4-1	16 A/230 V
	Fluorescent lighting load AX to DIN EN 60 669-1	16 A/250 V (70 μF)[2)]
	Minimum switching performance	100 mA/12 V
		100 mA/24 V
	DC current switching capacity (resistive load)	16 A/24 V =
Service life	Mechanical service life	> 3 x 106
	Electronic endurance to DIN IEC 60 947-4-1	
	AC1* (240 V/cos φ = 0.8)	> 10^5
Switching times[1)]	Maximum relay position change per output and minute if only one relay is switched.	313

[1)] The specifications apply only after the bus voltage has been applied to the device for at least 10 seconds. Typical delay of the relay is approx. 20 ms.

[2)] The maximum inrush-current peak may not be exceeded.

***What do the terms AC1, AC3 and AC5a mean?**

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2.1.5 Lamp load output

Lamps	Incandescent lamp load	2300 W
Fluorescent lamp T5 / T8	Uncorrected	2300 W
	Parallel compensated	1500 W
	DUO circuit	1500 W
Low-voltage halogen lamps	Inductive transformer	1200 W
	Electronic transformer	1500 W
	Halogen lamp 230 V	2300 W
Dulux lamp	Uncorrected	1100 W
	Parallel compensated	1100 W
Mercury-vapour lamp	Uncorrected	2000 W
	Parallel compensated	2000 W
Switching performance (switching contact)	Maximum peak inrush-current I_P (150 µs)	400 A
	Maximum peak inrush-current I_P (250 µs)	320 A
	Maximum peak inrush-current I_P (600 µs)	200 A
Number of electronic ballasts (T5/T8, single element)[1)]	18 W (ABB EVG 1 x 58 CF)	23
	24 W (ABB EVG-T5 1 x 24 CY)	23
	36 W (ABB EVG 1 x 36 CF)	14
	58 W (ABB EVG 1 x 58 CF)	11
	80 W (Helvar EL 1 x 80 SC)	10

[1)] For multiple element lamps or other types the number of electronic ballasts must be determined using the peak inrush current of the electronic ballasts.

2.1.6 Output
Rated current 20 A

Rated values	Number	1
	U_n rated voltage	250/440 V AC (50/60 Hz)
	I_n rated current	20 A
Switching currents	AC3* operation (cos φ = 0.45) DIN EN 60 947-4-1	16 A/230 V
	AC1* operation (cos φ = 0.8) DIN EN 60 947-4-1	20 A/230 V
	Fluorescent lighting load AX to DIN EN 60 669-1	20 A/250 V (140 μF)[2)]
	Minimum switching performance	100 mA/12 V
		100 mA/24 V
	DC current switching capacity (resistive load)	20 A/24 V=
Service life	Mechanical service life	> 10^6
	Electronic endurance to DIN IEC 60 947-4-1	
	AC1* (240 V/cos φ = 0.8)	> 10^5
	AC3* (240 V/cos φ = 0.45)	> 3 x 10^4
	AC5a (240 V/cos φ = 0.45)	> 3 x 10^4
Switching times[1)]	Maximum relay position change per output and minute if only one relay is switched.	93

[1)] The specifications apply only after the bus voltage has been applied to the device for at least 10 seconds. Typical delay of the relay is approx. 20 ms.

[2)] The maximum inrush-current peak may not be exceeded.

***What do the terms AC1, AC3 and AC5a mean?**

In Intelligent Installation Systems different switching capacity and performance specifications which are dependent on the special application have become established in industrial and residential systems. These performance specifications are rooted in the respective national and international standards. The tests are defined so that typical applications, e.g. motor loads (industrial) or fluorescent lamps (residential) are simulated.

The specifications AC1 and AC3 are switching performance specifications which have become established in the industrial field.

Typical application:

AC1 – Non-inductive or slightly inductive loads, resistive furnaces (relates to switching of ohmic/resistive loads)

AC3 – Squirrel-cage motors: Stating, switching off motors during running (relates to (inductive) motor load)

AC5a – Switching of electric discharge lamps

These switching performances are defined in the standard DIN EN 60947-4-1 *Contactors and motor-starters - Electromechanical contactors and motor-starters*. The standard describes starter and/or contactors which previously preferably used in industrial applications.

2.1.7 Lamp load output

Lamps	Incandescent lamp load	3680 W
Fluorescent lamp T5 / T8	Uncorrected	3680 W
	Parallel compensated	2500 W
	DUO circuit	3680 W
Low-voltage halogen lamps	Inductive transformer	2000 W
	Electronic transformer	2500 W
	Halogen lamp 230 V	3680 W
Dulux lamp	Uncorrected	3680 W
	Parallel compensated	3000 W
Mercury-vapour lamp	Uncorrected	3680 W
	Parallel compensated	3680 W
Switching performance (switching contact)	Maximum peak inrush-current I_P (150 µs)	600 A
	Maximum peak inrush-current I_P (250 µs)	480 A
	Maximum peak inrush-current I_P (600 µs)	300 A
Number of electronic ballasts (T5/T8, single element)[1)]	18 W (ABB EVG 1 x 58 CF)	26[2)]
	24 W (ABB EVG-T5 1 x 24 CY)	26[2)]
	36 W (ABB EVG 1 x 36 CF)	22
	58 W (ABB EVG 1 x 58 CF)	12[2)]
	80 W (Helvar EL 1 x 80 SC)	10[2)]

[1)] For multiple element lamps or other types the number of electronic ballasts must be determined using the peak inrush current of the electronic ballasts.

[2)] Limited by protection with B16 automatic circuit-breakers.

Application program	Maximum number of communication objects	Maximum number of group addresses	Maximum number of associations
Raum Master, Basic/1	255	255	255

Note

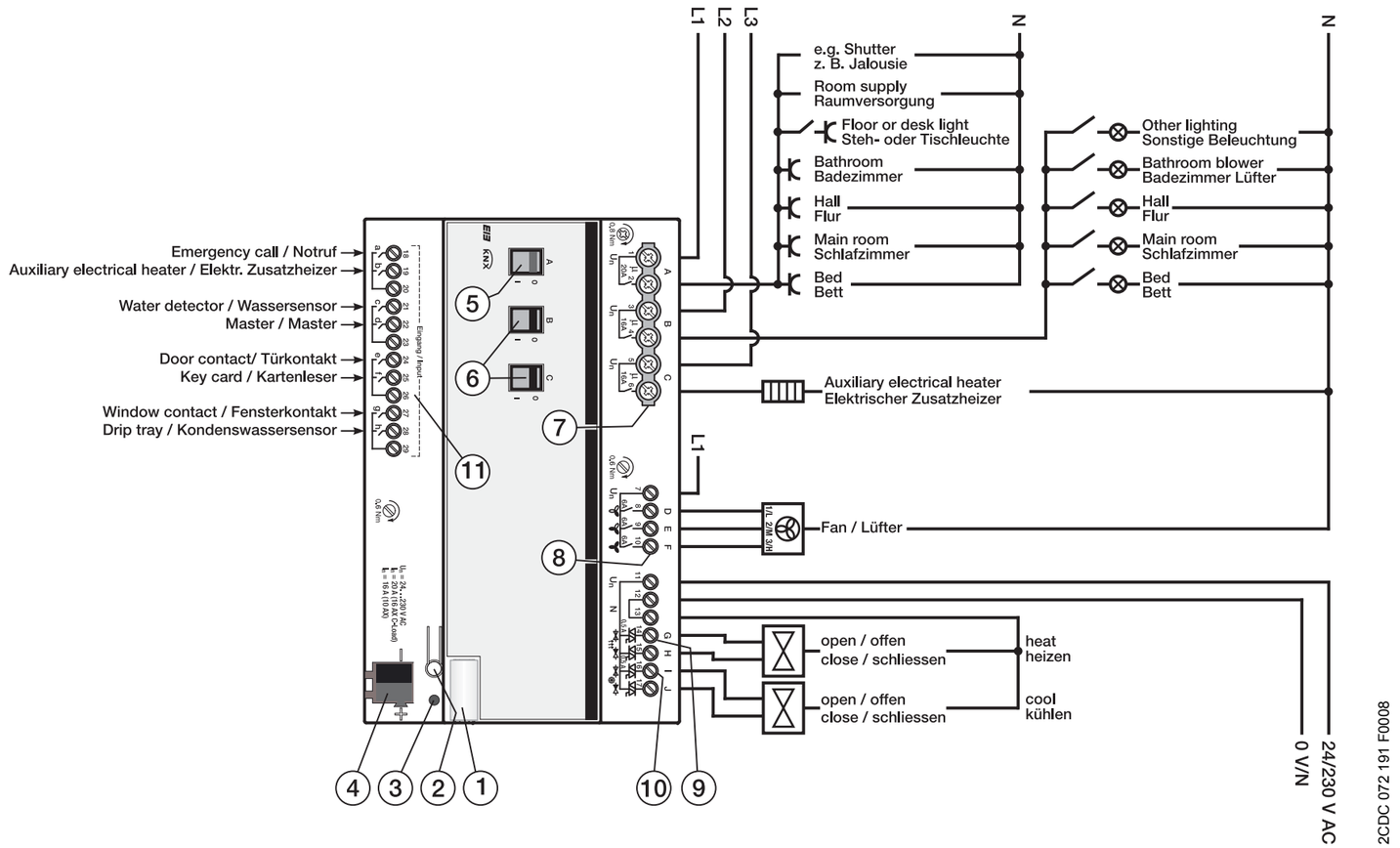
The programming requires EIB Software Tool ETS2 V1.3a or higher.

If ETS3 is used a *.VD3 or higher type file must be imported. The application program is available in the ETS2/ETS3 at ABB/Room automation, Room Master, Basic.

The device does not support the closing function of a project or the KNX device in the ETS. If you inhibit access to all devices of the project with a *BCU code* (ETS3), it has no effect on this device. Data can still be read and programmed.

2.2 Connection schematics

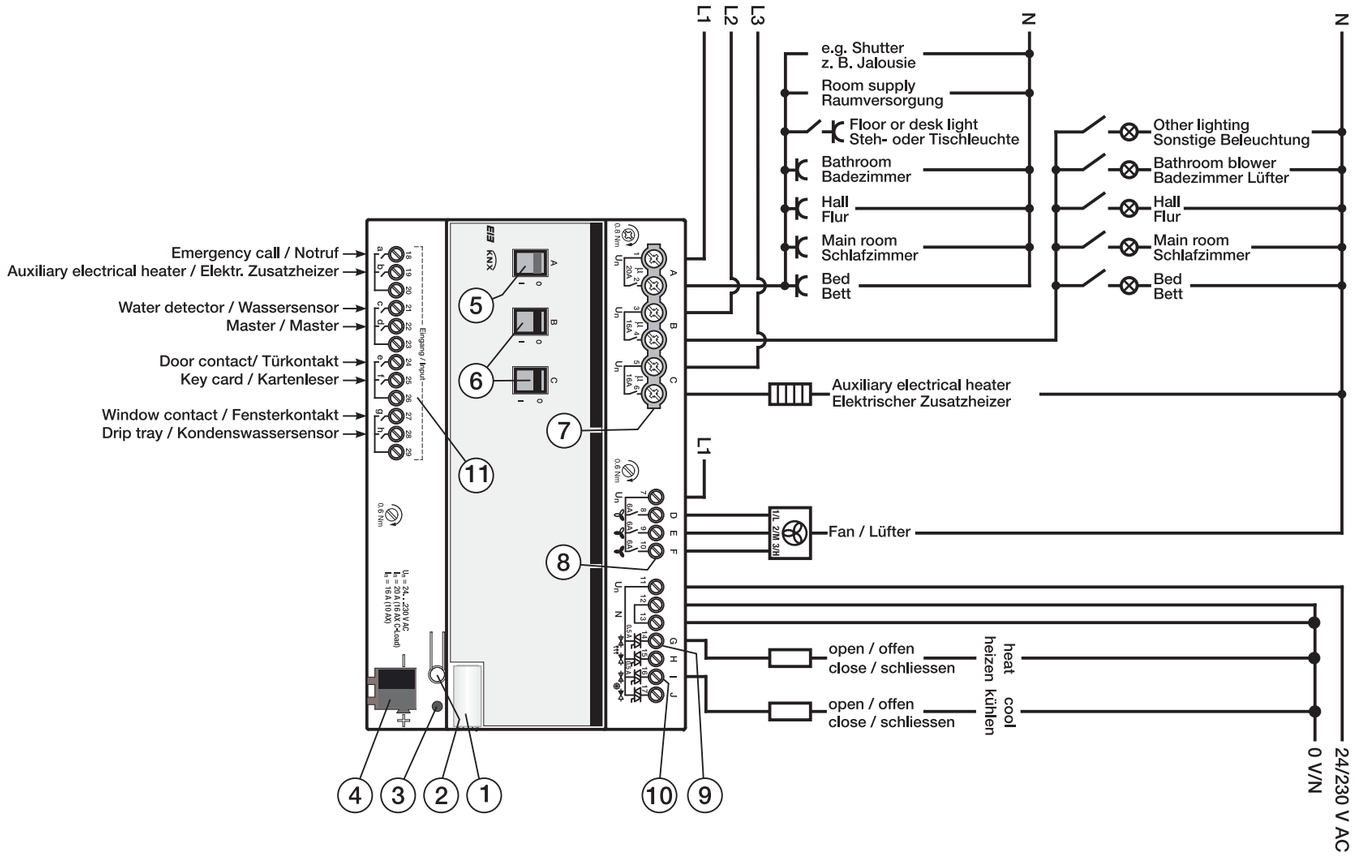
Hotel room example



RM/S 1.1 with electromotor valve drives

1 Label carrier
2 Programming button
3 Programming LED
4 Bus terminal connection
5 Switch position display and manual operation, output (A) 20 A (16 AX)
6 Switch position display and manual operation, output (B, C) 16 A (10 AX)
7 Load circuits, with 2 terminals each
8 Fan (D, E, F)
9 Valve HEATING (G, H)
10 Valve COOLING (I, J)
11 Binary inputs (a, b, c, d, e, f, g, h)

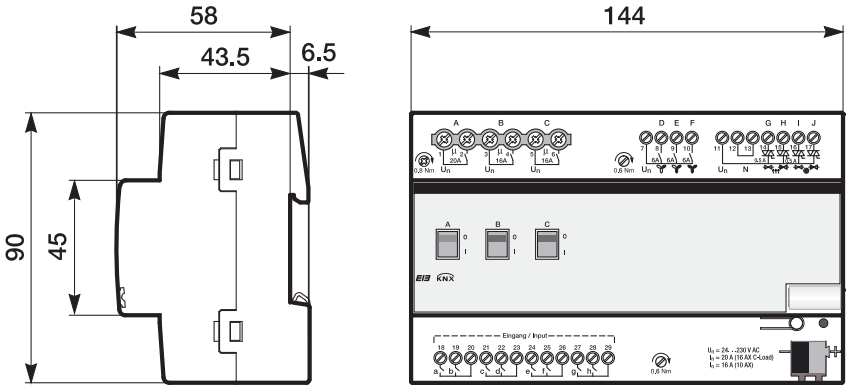
Hotel room example



RM/S 1.1 with electro-thermal valve drives

1 Label carrier
2 Programming button
3 Programming LED
4 Bus terminal connection
5 Switch position display and manual operation, output (A) 20 A (16 AX)
6 Switch position display and manual operation, output (B, C) 16 A (10 AX)
7 Load circuits, with 2 terminals each
8 Fan (D, E, F)
9 Valve HEATING (G, H)
10 Valve COOLING (I, J)
11 Binary inputs (a, b, c, d, e, f, g, h)

2.3 Dimension drawing



2.4 Assembly and installation

The RM/S 1.1 is a modular installation device for quick installation in the distribution board on 35 mm mounting rails to DIN EN 60 715.

The connection to the bus is implemented using the supplied bus connection terminal.

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

Accessibility of the devices for the purpose of operation, testing, visual inspection, maintenance and repair must be provided compliant to DIN VDE 0100-520).

Commissioning requirements

In order to commission the device, a PC with ETS (from ETS2 V1.3a or higher) as well as an interface to the ABB i-bus®, e.g. via a KNX interface, is required.

The device is ready for operation after connection to the bus voltage. No additional auxiliary voltage is required.

The installation and commissioning may only be carried out by electrical specialists. The appropriate norms, guidelines, regulations and specifications should be observed when planning and setting up electrical installations.

- Protect the device from damp, dirt and damage during transport, storage and operation.
- Only operate the device within the specified technical data limits!
- The device should only be operated in an enclosed housing (distribution board)!

Supplied state

The device is supplied with the physical address 15.15.255.
The application program is pre-installed. It is therefore only necessary to load group addresses and parameters during commissioning.

However, the complete application program can be reloaded if required. After a change of application program, after an interrupted download or discharge of the device, a longer downtime may result.

Download behaviour

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

Assignment of the physical address

The assignment and programming of the physical address is carried out in the ETS.

Cleaning

If devices become dirty, they can be cleaned using a dry cloth. Should a dry cloth not remove the dirt, the devices can be cleaned using a slightly damp cloth and soap solution. Corrosive agents or solutions should never be used.

Maintenance

The device is maintenance-free. No repairs should be carried out by unauthorised personnel if damage occurs, e.g. during transport and/or storage. The warranty expires if the device is opened.

3 Commissioning

3.1 Overview

The application program ***Room Master Basic/1*** is available for the Room Master Basic. Programming requires ETS2 version 1.3a or higher.

The following functions are available:

Power outlets (sockets)	For power supply to individual power outlet circuits and other loads.
Lighting	For power supply to individual lighting circuits and other loads.
Electrical auxiliary heater	For control of auxiliary electrical heating, e.g. in the Winter ⇔ Summer transition phase.
Fan	A 3 speed fan is controlled alternately with a two-way connection or with speed switching.
Valve HEATING/COOLING	One valve for HEATING and one valve for COOLING are controlled. The control of the valves can be implemented as PWM (constant) control or as 3-point control (opening and closing). The valve outputs are short circuit protected.
Binary input	8 binary outputs are available, e.g. signalling contacts for window contact and dew point monitoring, switching of the auxiliary heating, door contact, card reader, sending of an emergency signal. The binary inputs are divided into four groups of two inputs each.

The 6 A outputs are available for Fan Coil applications.

This eliminates the danger of destruction of the fan motors by improper switching. The Room Master Basic features relays in each output which are mechanically independent of the other outputs. Switching noises cannot be avoided due to the mechanical nature of the design.

The Room Master Basic is installed centrally in an electrical distribution board. Generally, the Room Master Basic is used in conjunction with a room temperature controller (thermostat) for an individual room temperature control system.
The thermostat sends a control variable which is used to control the fan speeds via the Room Master Basic.

Fan Coil controls

- Fan with three fan speeds
- With changeover or step control
- 2 pipe system HEATING and COOLING
- 2 pipe system HEATING or COOLING
- 3 pipe system
- 4 pipe system

For further information see: Planning and application, page 173

Configuration design types

A Fan Coil unit can be configured as a compact device or a modular installation device:

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

Air supply

Fan Coil units are available as recirculation or a mixed air devices.

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

3.1.1 Functions of the inputs

The following table provides an overview of the functions which are possible using the inputs with the Room Master Basic RM/S 1.1 and the application program *Room Master Basic/1*:

Functions of the inputs	a-h
Switch Sensor / Fault monitoring input	■
Switch/dim sensor	■
Shutter Sensor	■
Value/Forced operation	■

3.1.2 Functions of the outputs

The following table provides an overview of the functions which are possible using the outputs with the Room Master Basic RM/S 1.1 and the application program *Room Master Basic/1*:

Functions of the outputs	A, B, C	D, E, F
Time		
Staircase lighting	■	■
ON/OFF delay	■	■
Flashing		■
Scene		
Assignment of the output in scenes	■	■
Logic		
AND/OR/XOR or GATE	■	
Forced operation		
1 bit or 2 bit	■	■

Note

The outputs D, E and F can be programmed as outputs and as fans. The descriptions of the setting options can be found in the parameter window *D, E, F: Fan (3 x 6 A) multi-level*, page 85.

3.2 Parameters

The parameterisation of the Room Master is implemented using the Engineering Tool Software ETS from version ETS2 V1.3 or higher.
The application program is available in the ETS2 / ETS3 at ABB/Room automation, Room Master, Basic.

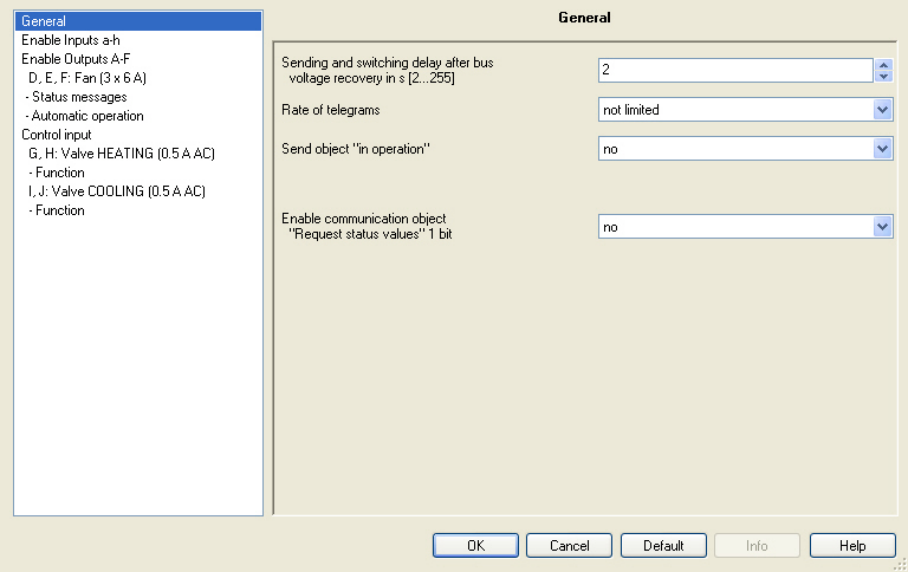
The following chapter describes the parameters of the RM/S 1.1 using the parameter windows. The parameter window features a dynamic structure so that further parameters may be enabled depending on the parameterisation and the function of the outputs.

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

Options: yes
no

3.2.1 Parameter window *General*

Higher level parameters can be set in the *General* parameter window.



Sending and switching delay after bus voltage recovery in s [2…255]

Options: 2…255

Telegrams are only received during the send and switching delay. The telegrams are not processed however and the outputs remain unchanged. No telegrams are sent on the bus.

After the sending and switching delay, telegrams are sent and the state of the outputs are set to correspond to the parameterisation or the communication object values.

If communication objects are read during the sending and switching delay, e.g. by a visualisation system, these read requests are stored and a response is sent after the send and switching delay has been completed.

An initialisation time of about two seconds is included in the delay time. The initialisation time is the time that the processor requires to be ready to function.

How does the device behave with bus voltage recovery?

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

Note
The set switching delay does not act on the electronic outputs (valve HEATING/COOLING)!

Rate of telegrams

Options: not limited
1/2/3/5/10/20 telegrams/second
0.05/0.1/0.2/0.3/0.5 seconds/telegram

- *1/2/3/5/10/20 telegrams/second:* X telegrams per second are sent.
- *0.05/0.1/0.2/0.3/0.5 seconds/telegram:* A telegram is sent every x seconds.

Using this parameter the bus load generated by the device can be limited.

Send object "in operation"

Options: no
send value 0 cyclically
send value 1 cyclically

The *in operation* communication object indicates the correct function of the device on the bus. This cyclic telegram can be monitored by an external device.

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

- *send value 0(1) cyclically:* An additional parameter appears:

  Sending cycle time in s [1…65,535]

  Options: 1…60…65,535

  Here a time interval is set which the communication object *In operation* uses to cyclically send a telegram.

Enable communication object "Request status values" 1 bit

Options: no
yes

- *yes:* A 1 bit communication object *Request status values* is enabled.

Via this communication object all status messages can be requested provided that they have been parameterised with the option *after a change or request*.

With option *yes* the following parameters appear:

recall with object value

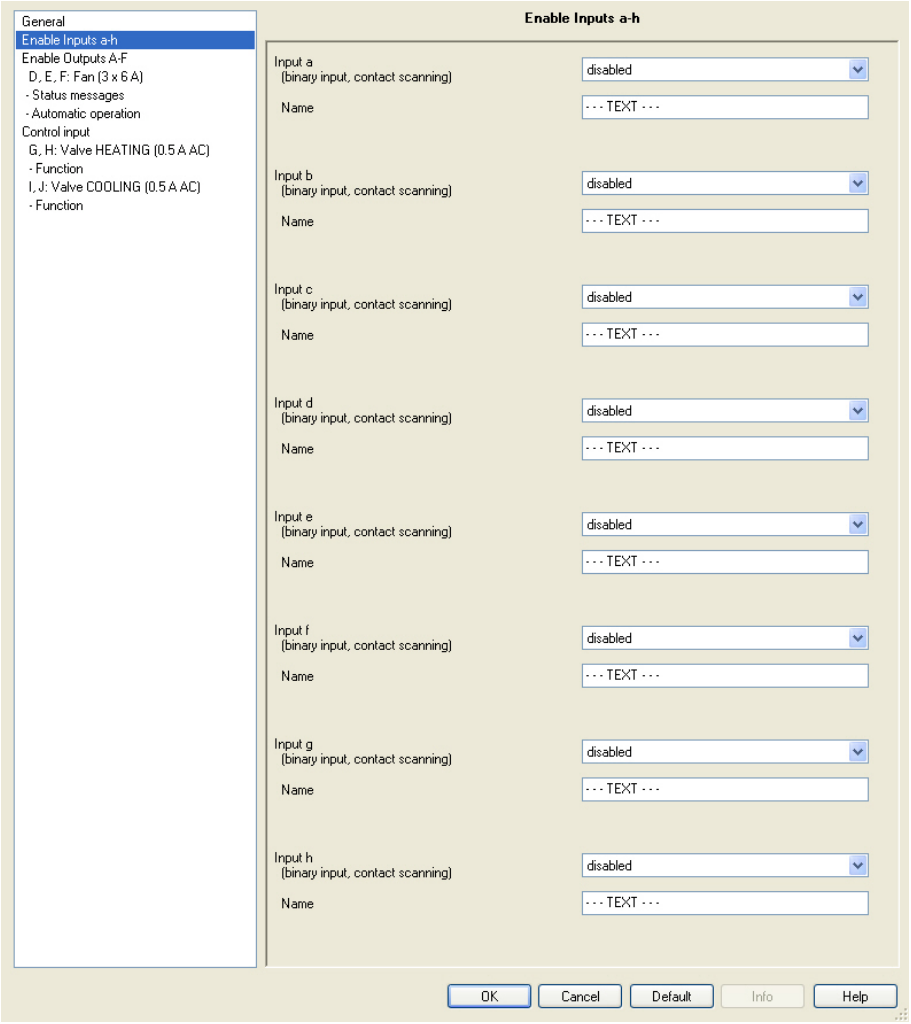
Options: 0
1
0 or 1

- *0:* Sending of the status messages is requested with the value 0.
- *1:* Sending of the status messages is requested with the value 1.
- *0 or 1:* Sending of the status messages is requested with the values 0 or 1.

3.2.2 Parameter window *Enable inputs a-h*

In this parameter window all the settings for *Enabling and designation of the inputs a-h* are undertaken.

Note
In the following the setting possibilities of *Inputs a-h* are explained using input a as an example. The setting possibilities are identical for all inputs.



Input a
(binary input, contact scanning)

Option: disabled
Switch Sensor / Fault monitoring input
Switch/dim sensor
Shutter Sensor
Value/Forced operation

The operating mode of the input is set with this parameter.
The respective parameter window *a: xxx* also becomes visible with the selection of an operating mode.

Designation

Options: - - - TEXT - - -

With this parameter it is possible to enter a text of up to 40 characters in length for identification in the ETS.

Note
The text which is entered is used to provide help, in order to obtain an overview of the inputs when they are fully assigned and to indicate the function assigned to the input. The text is purely for informative purposes and has no further function.

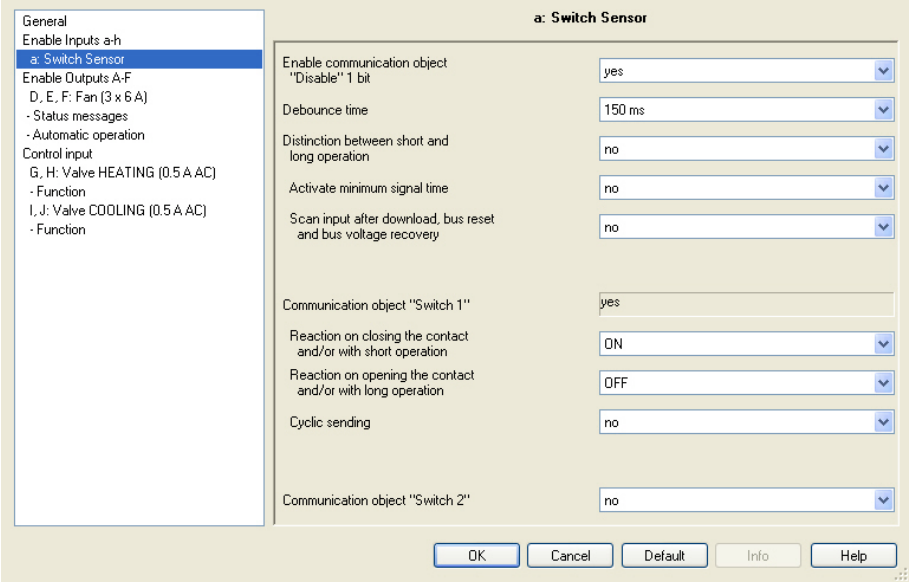
Inputs b-h

Note
The parameter descriptions should be taken from the description of input a!

3.2.2.1 Parameter window *a: Switch Sensor*

In this parameter window all settings are undertaken for parameter window *a: Switch Sensor*.
The explanations also apply for the *Inputs b-f*.

This parameter window is visible if in Parameter window *Enable Inputs a-h*, page 30, the option Switch Sensor/Fault monitoring input in parameter Input a (binary input, contact scanning) has been selected..



Enable communication object "Disable" 1 bit

Options: no
yes

- *yes:* The 1 bit *Block* communication object is enabled.
  This can be used to block the input.

Note
If the input is disabled and the option *Cyclic sending* is set, the last state is still sent regardless of the block. The option block still blocks the physical input, sending continues internally.

Debounce time

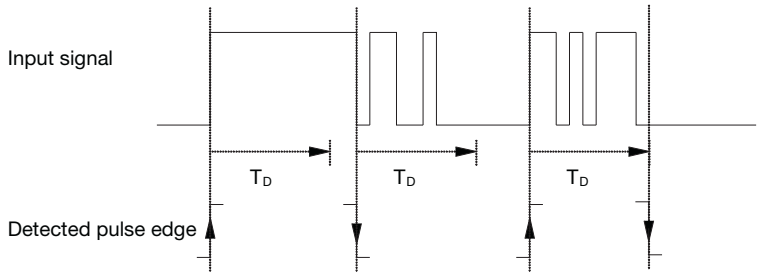
Options: 10/20/30/50/70/100/150 ms

Debouncing prevents unwanted multiple operations of the input, e.g. due to bouncing of the contact.

What is the debounce time?

If an edge is detected at an input, the input will react immediately to this edge, e.g. by sending a telegram. At the same time, the duration of the debounce time T_D starts. The signal on the input is not evaluated within the debounce time duration.

Example: Debounce time of the input signal for a detected edge:



After detection of an edge on the input, further edges are ignored for the debounce time T_D.

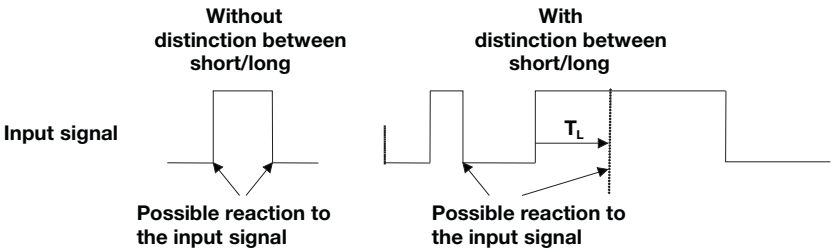
Distinction between short and long operation

Options: yes
no

Using this parameter you set if the input differentiates between short and long operation.

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

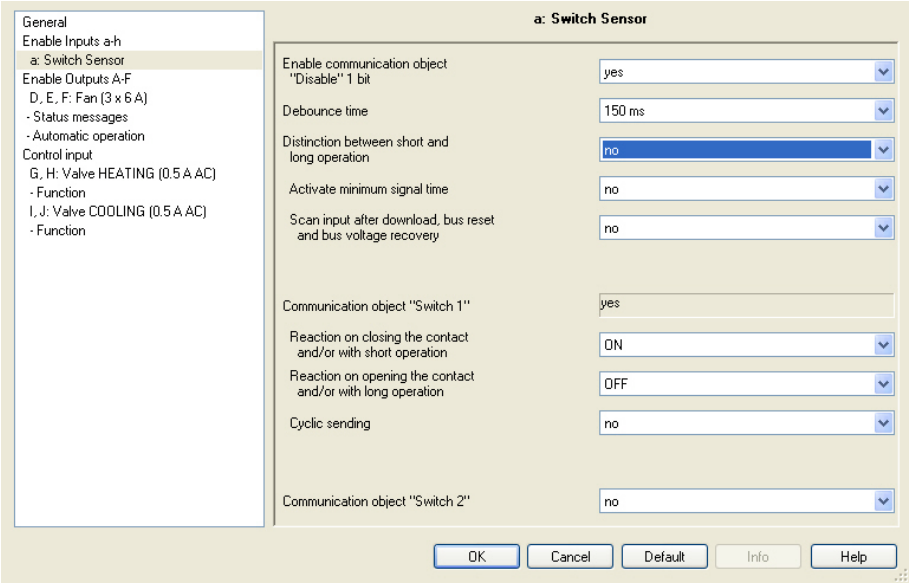
The following drawing shows the function in detail:



T_L is the time duration from where a long operation is detected.

3.2.2.1.1 Parameter *Distinction between short and long operation – no*

If the option *no* is selected with the parameter *Distinction between long and short operation*, the following parameters are visible in parameter window *a: Switch Sensor*, on page 32:



Activate minimum signal time

Options: no
yes

- *yes:* The following parameters appear:

  On closing the contact
  …in value x 0.1 s [0…65,535]

  Options: 1…10…65,535

  On opening the contact
  in value x 0.1 s [0…65,535]

  Options: 1…10…65,535

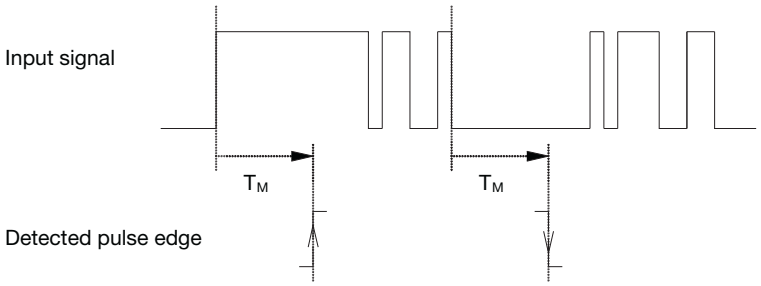
  What is the minimum signal time?

  In contrast to the debounce time, a telegram is only sent after the minimum signal duration has elapsed.

  The individual functions are:

  If an edge is detected on the input, the minimum signal duration will commence. No telegram is sent on the bus at this time. The signal on the input is observed within the minimum signal duration. If a further edge appears at the input during the minimum signal duration, it will be interpreted as a new operation and the minimum signal duration restarts.
  If no further edges occur after begin of the minimum signal duration, a telegram is sent on the bus after the minimum signal duration has timed out.

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



In only two cases, no further edge changes occur within the minimum signal duration T_M after a change of edge. For this reason only both of these are detected as valid.

Scan input after download, bus reset and bus voltage recovery

Options: no
yes

- *yes:* The object value is scanned after a download, bus reset and bus voltage recovery.
- *no:* The object value is not scanned after a download, bus reset and bus voltage recovery.

With option *yes* the following additional parameters appear in the parameter:

Inactive wait state after bus voltage recovery in s [0…30,000]

Options: 0…30,000

Here the waiting time after a bus voltage recovery is set. After the waiting time has elapsed the state on the input terminals is scanned. The input reacts as if the state on the input terminals has just changed.

Note
The inactive waiting time does not add to the actual, adjustable send delay time. This can be set separately.

Communication object “Switch 1”

This parameter is fixed to a *yes* setting.

The communication object *Switch 1* is visible.

Reaction on closing the contact and/or with short operation

Options: ON
OFF
TOGGLE
no reaction
End cyclic sending

Reaction on opening the contact and/or with long operation

Options: ON
OFF
TOGGLE
no reaction
End cyclic sending

The behaviour of communication object is determined here. If the option *yes* has been selected with the parameter *Distinction between short and long operation*, the reaction occurs with a short or long operation. With the option *no* it occurs with each edge change.

Important
If the option *terminate cyclic sending* is set, it is important to note that this is only effective if the option *yes* has only been selected in the following *Cyclic sending* parameter.

Cyclic sending

Options: no
yes

What is cyclic sending?

Cyclic sending enables the communication object *Switch* to send automatically at a fixed interval. If cyclic sending is only carried out for a specific object value (ON or OFF), this condition refers to the value of the communication object. It is therefore possible in principle to start cyclic sending by sending a value to the communication object *Switch*. As this behaviour is unwanted, the flags *Write* and *Update* of the communication object are deleted in the preliminary setting so that they cannot be changed via the bus. If this functionality is required irrespectively, these flags should be set accordingly. When the *Switch* communication object and after bus recovery changes (after the send delay time has elapsed),
the object value is sent immediately on the bus and the transmission cycle time restarts.

- *yes:* Other parameters appear:

Telegram repeated every … in s [1…65,535]

Options: 1…60…65,535

The send cycle time describes the time used between two cyclically sent telegrams.

On object value

Options: 1
0
0 or 1

- *1:* The object value is sent cyclically with 1.
- *0:* The object value is sent cyclically with 0.
- *0 or 1:* The object values 0 and 1 are sent cyclically.

Communication object “Switch 2”

Options: no
yes

- *yes:* The communication object *Switch 2* becomes visible. Additional parameters appear:

Reaction on closing the contact and/or with short operation

Options: ON
OFF
TOGGLE
no reaction

Reaction on opening the contact and/or with long operation

Options: ON
OFF
TOGGLE
no reaction

The behaviour of communication object is determined here. If the option *yes* has been selected with the parameter *Distinction between short and long operation*, the reaction occurs with a short or long operation. With the option *no* it occurs with each edge change.

Note
The parameter *Communication object "Switch 3"* is visible when the parameter *Communication object "Switch 2"* has been selected with *yes*.

Communication object “Switch 3”

Options: no
yes

- *yes:* The communication object *Switch 3* becomes visible. Additional parameters appear:

Reaction on closing the contact and/or with short operation

Options: ON
OFF
TOGGLE
no reaction

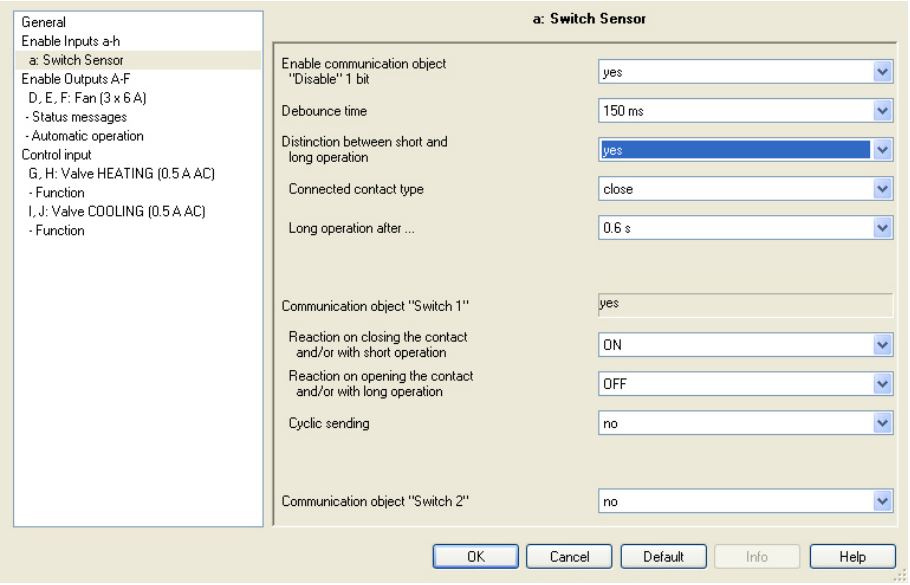
Reaction on opening the contact and/or with long operation

Options: ON
OFF
TOGGLE
no reaction

The behaviour of communication object is determined here. If the option *yes* has been selected with the parameter *Distinction between short and long operation*, the reaction occurs with a short or long operation. With the option *no* it occurs with each edge change.

3.2.2.1.2 Parameter *Distinction between short and long operation – yes*

If the option *yes* is selected with the parameter *Distinction between long and short operation,* the following parameters are visible in parameter window *a: Switch Sensor*, on page 32:



Connected contact type

Options: closed
opened

- *closed:* The input is closed with actuation.
- *opened:* The input is opened with actuation.

If a normally open contact is connected to the input, the option *closed* should be selected; on a normally closed contact the option *open*.

Long operation after…

Options: 0.3/0.4/0.5/0.6/0.8 s
1/1.2/1.5 s
2/3/4/5/6/7/8/9/10 s

Here the time period T_L after which an actuation is considered a “long” operation is defined.

Note
The remaining parameter descriptions can be found in the parameter *Distinction between short and long operation – no*, on page 34.

3.2.2.1.3 Special function *Fault monitoring input*

Note

For the operating mode *Fault monitoring input* the options must be adapted in comparison to the standard settings.
The options *Fault monitoring mode* are listed separately in the following.

In this chapter only the parameters which are relevant for optimum *Fault monitoring input* performance are listed.

All descriptions of the parameter should be taken from parameter window *a: Switch Sensor*, on page 32.

Debounce time

Options: 10/20/30/50/70/100/150 ms
Fault monitoring option: 50 ms

Distinction between short and long operation

Options: yes/no
Fault monitoring option: no

Activate minimum signal time

Options: yes/no
Fault monitoring option: yes

On closing the contact in value x 0.1 s [1…65,535]

Options: 1…10…65,535
Fault monitoring option: 2

On opening the contact in value x 0.1 s [1…65,535]

Options: 1…10…65,535
Fault monitoring option: 2

Note

Depending on the system type, a minimum signal duration of two seconds should be set. With the evaluation for example of coupling switches, generator switches or incoming circuit-breakers from switchgear systems, a smaller minimum signal time of 100 ms for example, may be necessary.

It is essential to co-ordinate the switching times with the operator! Smaller signal/switch times may be required depending on the system.

Scan input after download, bus reset and bus voltage recovery

Options:	Fault monitoring option:
yes/<u>no</u>	yes

Inactive wait state after bus voltage-recovery in s [0…30,000]

Options:	Fault monitoring option:
0…30,000	0

Communication object “Switch 1”

Fixed preset to *yes*.

Reaction on closing the contact and/or with short operation

Options:	Fault monitoring option:
<u>ON</u>	partly adjustable
OFF	
TOGGLE	
no reaction	
terminate cyclic sending	

Reaction on opening the contact and/or with long operation

Options:	Fault monitoring option:
ON	partly adjustable
<u>OFF</u>	
TOGGLE	
no reaction	
terminate cyclic sending	

Cyclic sending

Options:	Fault monitoring option:
yes/<u>no</u>	yes

On object value

Options:	Fault monitoring option:
<u>0</u>	0 or 1
1	
0 or 1	

Telegram repeated every … in s [1…65,535]

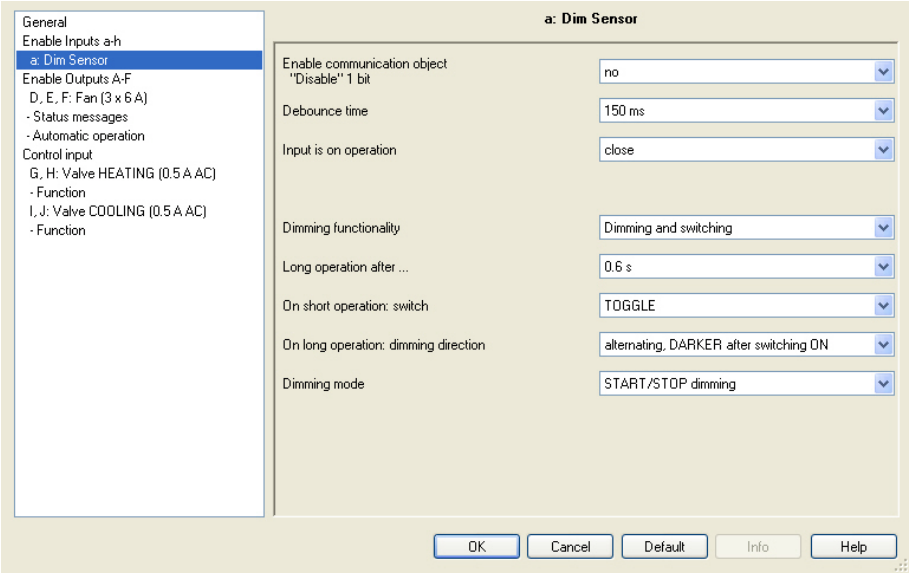
Options:	Fault monitoring option:
1...<u>60</u>...65,535	30

Note
Fault messages are generally passed onto the main bus. With 500 fault messages, the option 30 s means that every 60 ms a telegram is sent on the main line. For this reason it is essential to ensure that the send delay time is set, so that no telegram is lost if the bus voltage fails.

3.2.2.2 Parameter window *a: Dim Sensor*

The operating mode allows the operation of dimmable lighting.

This parameter window is visible if in parameter window *Enable inputs a-h*, page 30, the option Switch/Dim Sensor in parameter *Input a (binary input, contact scanning)* has been selected.



Enable communication object "Disable" 1 bit

Options: no
yes

- *yes:* The 1 bit *Block* communication object is enabled. This can be used to block the input.

Note
If the input is disabled and the option *Cyclic sending* is set, the last state is still sent regardless of the block. The option block still blocks the physical input, sending continues internally.

Debounce time

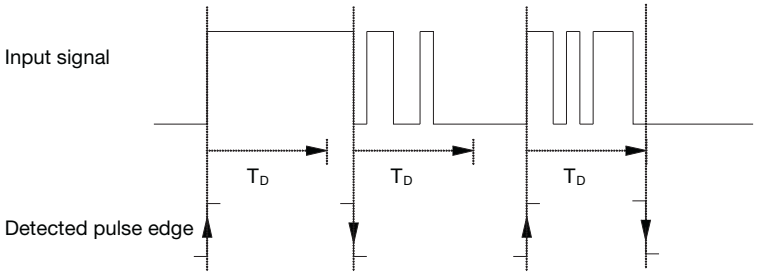
Options: 10/20/30/50/70/100/150 ms

Debouncing prevents unwanted multiple operations of the input, e.g. due to bouncing of the contact.

What is the debounce time?

If an edge is detected at an input, the input will react immediately to this edge, e.g. by sending a telegram. At the same time, the duration of the debounce time T_D starts. The signal on the input is not evaluated within the debounce time duration.

The following example clarifies this:



After detection of an edge on the input, further edges are ignored for the debounce time T_D.

Connected contact type

Options: closed
opened

Here you set if the contact on the input is a normally closed contact or normally open contact.

Dimming functionality

Options: Dimming and switching
Only dimming

With this parameter you define if the lighting can only be dimmed *(Only dimming)* or if additional switching is also permitted *(Dimming and switching)*. In this case a long button bush dims and a short button push switches.

How does 1 button dimming function?

Switch and dim functions can be controlled completely using a single push button. With each long operation alternate BRIGHTER or DARKER dimming occurs, or with short operation alternate switch on or off occurs.

If the communication object *Switch* = 0, a BRIGHTER telegram is sent at all times. In order to evaluate the switch feedback of the actuator, the *Write* flag of the communication object *Switch* is set.

The following table shows the function in detail:

Object value *Switch*	**Value of the last dimming telegram**	**Reaction of the dimming actuation (sends dimming**
OFF	DARKER	BRIGHTER
OFF	BRIGHTER	BRIGHTER
ON	DARKER	BRIGHTER
ON	BRIGHTER	DARKER

The advantage of the *Only dimming* function is that no distinction is made between short and long actuation.
The dim command is initiated immediately after actuation in this way. It is not necessary to wait for a long operation.

How does 2 button dimming function?

If *2 button dimming* is required, the functions of the individual buttons should be set with the parameters *Reaction on short operation* or *Reaction on long operation*, e.g. ON or BRIGHTER.

The user thus has the choice of the buttons to be combined with one another, e.g. to dim a lighting group or the function which the individual buttons should perform in this case.

Furthermore, two inputs are required for 2 button dimming, e.g. *Input a* with short operation with switch ON and long operation for BRIGHTER dimming. *Input* b with short operation for switch OFF and long operation for DARKER dimming.

If the option *Dimming and switching* is selected with the parameter *Dimming functionality*, the parameters *Long operation after…, On short operation: Switch* and *On long operation: Dimming direction* in parameter window *a: Dim sensor* are visible:

Long operation after…

Options: 0.3/0.4/0.5/<u>0.6</u>/0.8/1/1.2/1.5/2/3/4/5/6/7/8/9/10 s

Here the time period T_L after which an actuation is considered a “long” operation is defined.

On short operation: Switch

Options: ON
OFF
<u>TOGGLE</u>
no reaction

This parameter defines if the communication object *Telegram switch TOGGLEs* with short operation (typical: 1 button dimming) or only switches *OFF* or *ON* (typically: 2 button dimming).

- *TOGGLE:* A short operation changes the value of the communication object *Telegram switch*.
- *ON:* With short operation the value 1 is sent.
- *OFF:* With short operation the value 0 is sent.

On long operation: dimming direction

Options: BRIGHTER
DARKER
alternating
alternating, BRIGHTER after switching ON
alternating, DARKER after switching ON

With this parameter you set what the communication object *Dimming* should send on the bus with a long operation.
A long operation changes the value of the communication object *Dimming telegram*.
With 1 button dimming the parameter *alternating* should be set for *Dimming* here. In this case the dimming command is sent which is diametrically opposed to the last dim command.

- *BRIGHTER*: The communication object sends a BRIGHTER command.
- *DARKER*: The communication object sends a DARKER command.
- *alternating*: The communication object alternately sends a BRIGHTER and DARKER command.
- alternating, BRIGHTER after switching ON: The communication object at the first time sends a BRIGHTER telegram after an ON command; thereafter it alternately sends BRIGHTER and DARKER commands.
- *alternating, DARKER after switching ON*: The communication object at the first time sends a DARKER telegram after an ON command; thereafter it alternately sends BRIGHTER and DARKER commands.

Note
If the option *Only dimming* is selected in the *Dimming functionality*, only the parameter *On operation: dimming direction* is visible.

Dimming mode

Options: START/STOP dimming
Dimming steps

- *START/STOP dimming:* The dimming process starts with a telegram BRIGHTER or DARKER and ends with a STOP telegram.

4 bit dimming command:

Decimal	Hexadecimal	Binary	Dim command
0	0	0000	STOP
1	1	0001	100 % DARKER
8	8	1000	STOP
9	9	1001	100 % BRIGHTER

For further information see: Input 4 bit dimming command, page 224

- *Dimming steps:* Dimming telegrams are sent cyclically during a long operation. Cyclic sending is terminated after the end of actuation.

Both of the next parameters only appear if in the parameter *Dimming mode* the option *Dimming steps* has been set.

Brightness change on every sent telegram

Options: 100/50/25/12.5/6.25/3.13/1.56 %

Using this parameter you set the brightness change in percent which is cyclically sent with every dim telegram.

Sending cycle time: Telegram repeated every …

Options: 0.3/0.4/0.5/0.6/0.8/1/1.2/1.5/2/3/4/5/6/7/8/9/10 s

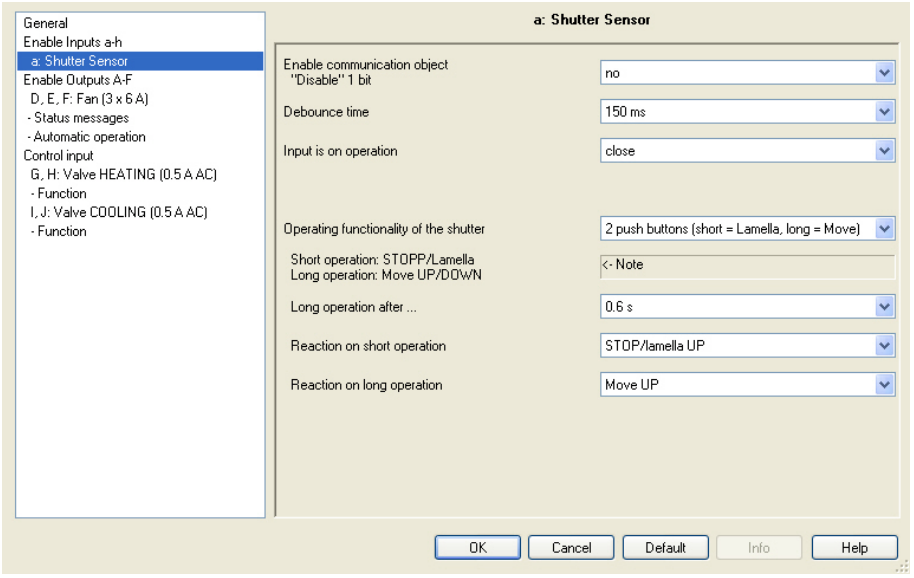
The dimming telegram is sent cyclically during a long operation.
The cycle time for sending corresponds with the time interval between two telegrams during cyclical sending.

Caution
With dimming steps ensure that the set *Sending cycle time* is matched on the dimming actuator in order to enable a smooth dimming process.

3.2.2.3 Parameter window *a: Shutter Sensor*

The operating mode allows the operation of shutters and blinds with buttons or switches.

This parameter window is visible if in parameter window *Enable inputs a-h*, page 30, the option Shutter Sensor in the parameter Input a (binary input, contact scanning) has been selected.



Enable communication object "Disable" 1 bit

Options: no
yes

- *yes:* The 1 bit *Block* communication object is enabled. This can be used to block the input.

Note
If the input is disabled and the option *Cyclic sending* is set, the last state is still sent regardless of the block. The option block still blocks the physical input, sending continues internally.

Debounce time

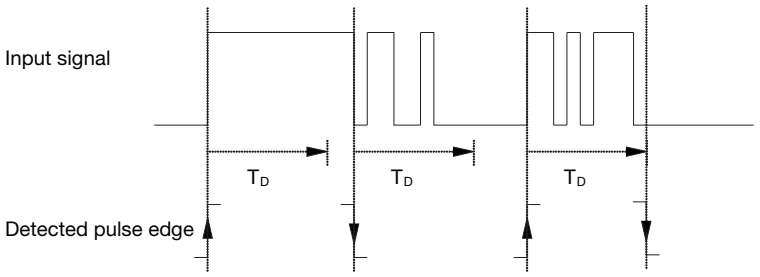
Options: 10/20/30/50/70/100/150 ms

Debouncing prevents unwanted multiple operations of the input, e.g. due to bouncing of the contact.

What is the debounce time?

If an edge is detected at an input, the input will react immediately to this edge, e.g. by sending a telegram. At the same time, the duration of the debounce time T_D starts. The signal on the input is not evaluated within the debounce time duration.

The following example clarifies this:



After detection of an edge on the input, further edges are ignored for the debounce time T_D.

Connected contact type

Options: closed
opened

Here you set if the contact on the input is a normally closed contact or normally open contact.

Operating functionality of the shutter

Options: 1 push buttons (short = Lamella, long = Move)
1 push button (short = Move, long = Lamella)
1 push button (Move only - STOP)
1 switch operation (Move only)
2 push buttons (short = Lamella, long = Move)
2 switches (Move only)
2 push buttons (Move only)
2 push buttons (only Lamella)

The following list provides an overview of the different shutter operating modes:

1 push buttons (short = Lamella, long = Move)	
Short operation	STOP/Lamella; Opposite direction to the last movement command* To return to lamella adjustment, the blind must be moved UP or DOWN briefly.
Long operation	*Move UP* or *Move DOWN*
1 push button (short = Move, long = Lamella)	
Short operation	*Move UP* or *Move DOWN*
Long operation	STOP/Lamella (cyclic sending); Opposite direction to the last movement or stepping command*
1 push button (Move only - STOP)	
On operation	The following commands are sent in sequence: …► *Move UP* ► *STOP/Lamella UP* ► *Move DOWN* ► *STOP/Lamella DOWN* ► … *
1 switch operation (Move only)	
On operation	*Move UP* or *Move DOWN*
End of operation	STOP/Lamella*
2 push buttons (short = Lamella, long = Move)	
Short operation	*STOP/lamella UP* or *…DOWN* (programmable)
Long operation	*Move UP* or *Move DOWN* (programmable)
2 switches (Move only)	
On operation	*Move UP* or *Move DOWN* (programmable)
End of operation	*STOP/Lamella UP* or *DOWN* (programmable)
2 push buttons (Move only)	
On operation	*Move UP* or *Move DOWN* (programmable)
2 push buttons (only Lamella)	
On operation	*STOP/Lamella UP* or *DOWN* (programmable)

* If the actuator indicates the limit position, in 1 button operation the communication object *Shutter UP/DOWN* can be synchronised. If the actuator signals the upper limit position (see communication object *Upper Limit position* or *Lower limit position*), the direction of movement is defined. In 1 push button/switch operation the last direction of movement is determined via the last update of the communication object *Shutter UP/DOWN*

Depending on the selection made in the parameter *Operating functionality of the shutter*, different parameters will appear.

All parameters are described in the following.

Long operation after…

Options: 0.3/0.4/0.5/0.6/0.8/1/1.2/1.5/2/3/4/5/6/7/8/9/10 s

Here the time period T_L after which an actuation is considered a “long” operation is defined.

Telegram "Lamella" is repeated every …

Options: 0.3/0.4/0.5/0.6/0.8/1/1.2/1.5/2/3/4/5/6/7/8/9/10 s

The time duration at which the *Lamella* telegram is repeated is defined here.

Reaction on short operation

Options: STOP/Lamella UP
STOP/Lamella DOWN

Reaction on long operation

Options: Move UP
Move DOWN

It can be set whether the input triggers commands for movement upwards (*UP*) or downwards (*DOWN*).

Reaction on operation

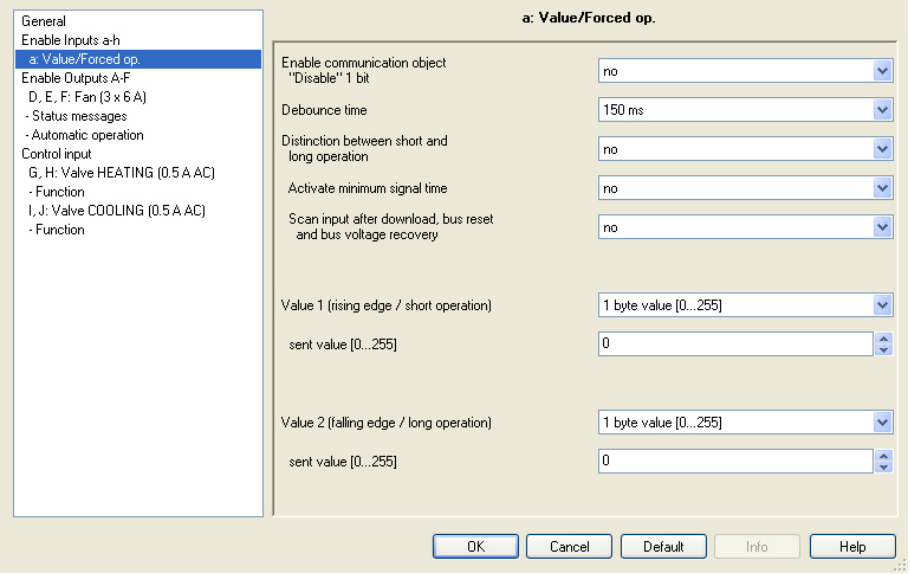
Options: Move UP
Move DOWN

It can be set whether the input triggers commands for movement upwards (*Move UP*) or downwards (*Move DOWN*).

3.2.2.4 Parameter window *a: Value/Forced operation*

This operating mode allows the sending of values of any data types.

This parameter window is visible if in the parameter window *Enable inputs a-h*, page 30, the option Value/Forced operation has been selected in the parameter Input a (binary input, contact scanning).



Enable communication object "Disable" 1 bit

Options: no
yes

- *yes:* The 1 bit *Block* communication object is enabled. This can be used to block the input.

Note
If the input is disabled and the option *Cyclic sending* is set, the last state is still sent regardless of the block. The option block still blocks the physical input, sending continues internally.

Debounce time

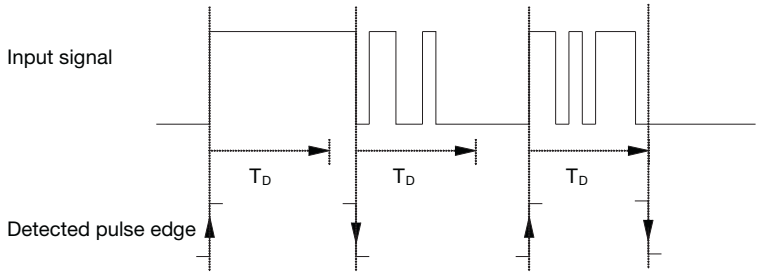
Options: 10/20/30/50/70/100/150 ms

Debouncing prevents unwanted multiple operations of the input, e.g. due to bouncing of the contact.

What is the debounce time?

If an edge is detected at an input, the input will react immediately to this edge, e.g. by sending a telegram. At the same time, the duration of the debounce time T_D starts. The signal on the input is not evaluated within the debounce time duration.

The following example clarifies this:



After detection of an edge on the input, further edges are ignored for the debounce time T_D.

Distinction between short and long operation

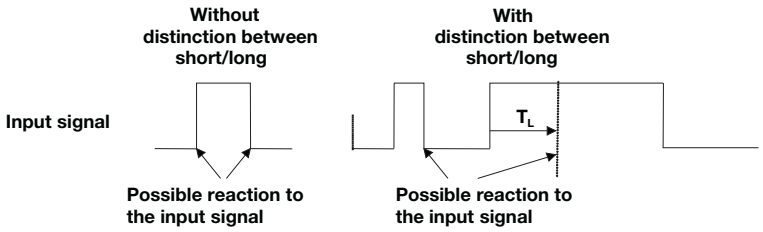
Options: yes
no

Using this parameter you set if the input differentiates between short and long operation.

With option *yes*, after opening/closing of the contact it must first of all be ascertained if a short or long operation has occurred here. Only thereafter will a possible reaction be triggered.

Note
With *Distinction between short and long operation*, two communication objects are visible for each input. One communication object only transmits during short operation, the other communication object only during a long operation.

The following drawing shows the function in detail:

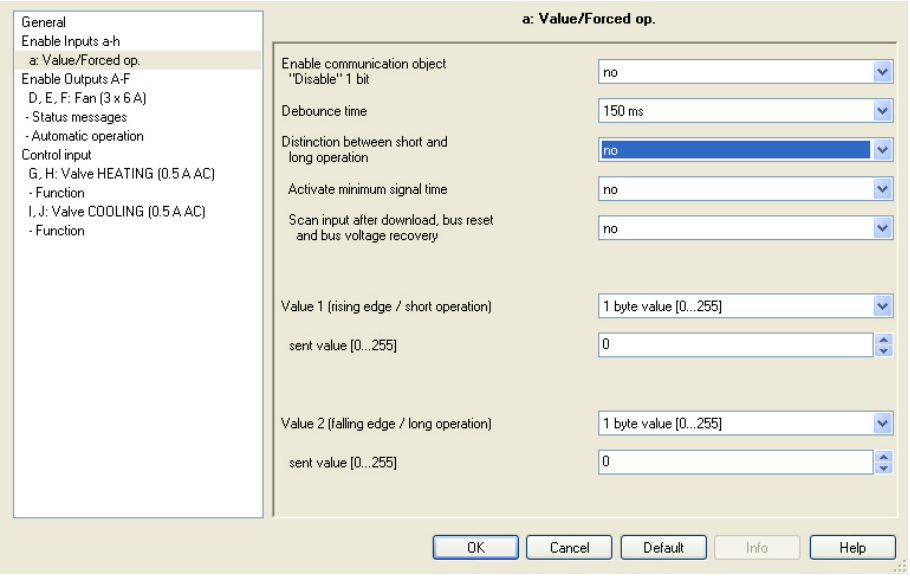


T_L is the time duration from where a long operation is detected.

If the option *no* is selected with the parameter *Distinction between short and long operation*, the following parameters appear:

3.2.2.4.1 Parameter *Distinction between short and long operation – no*

If the option *no* is selected with the parameter difference between long and short operation, the following parameters appear in the parameter window *a: Value/Forced operation, page 51*:



Activate minimum signal time

Options: no
yes

- *yes:* The following parameters appear:

for rising edge
in value x 0.1 s [1…65,535]

Options: 1…10…65,535

Note
A rising edge corresponds to a “normally opened contact function”.

for falling edge
in value x 0.1 s [1…65,535]

Options: 1…10…65,535

Note
A falling edge corresponds to a normally closed contact function.

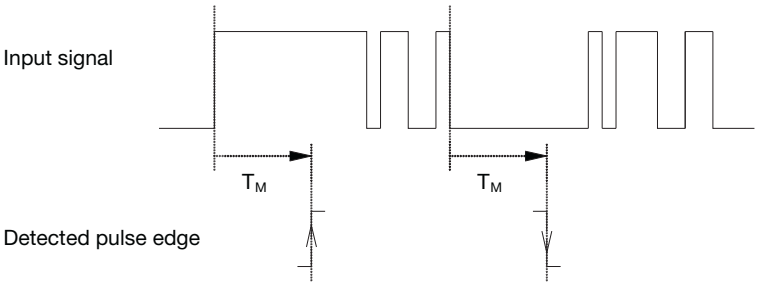
What is the minimum signal time?

In contrast to the debounce time, a telegram is only sent after the minimum signal duration has elapsed.

The individual functions are:

If an edge is detected on the input, the minimum signal duration will commence. No telegram is sent on the bus at this time. The signal on the input is observed within the minimum signal duration. If a further edge appears at the input during the minimum signal duration, it will be interpreted as a new operation and the minimum signal duration restarts.
If no further edges occur after begin of the minimum signal duration, a telegram is sent on the bus after the minimum signal duration has timed out.

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



In only two cases, no further edge changes occur within the minimum signal duration T_M after a change of edge. For this reason only both of these are detected as valid.

Scan input after download, bus reset and bus voltage recovery

Options: no
yes

- *yes:* The object value is scanned after a download, bus reset and bus voltage recovery.
- *no:* The object value is not scanned after a download, bus reset and bus voltage recovery.

With option *yes* the following additional parameters appear in the parameter:

Inactive wait state after bus voltage recovery in s [0…30,000]

Options: 0…30,000

Here the waiting time after a bus voltage recovery is set. After the waiting time has elapsed the state on the input terminals is scanned. The input reacts as if the state on the input terminals has just changed.

Note
The inactive waiting time does not add to the actual, adjustable send delay time. This can be set separately.

Value 1 (rising edge /short operation)

Options: do not send
1 bit value [0/1]
2 bit value [forced operation]
1 byte value [-128…127]
1 byte value [0…255]
1 byte value [8 bit scene]
2 byte value [-32,768…32,767]
2 byte value [0…65,565]
2 byte value [EIB floating point]
3 byte value [time of day, weekday]
4 byte value [-2,147,483,648…2,147,483,647]
4 byte value [0…4,294,967,295]

This parameter serves for defining the data type which is sent when the contact is actuated.

Depending on the selection made in parameter *Value 1 (rising edge/short operation)*, different parameters appear. All parameters are described in the following:

sent value [X]

Options: 0/1
-128…0…127
0…255
-32,768…0…32,767
0…65,535
-100,00…20,00…100,00
-2,147,483,648…0…2,147,483,647
0…4,294,967,295

This parameter defines the value which is sent on actuation.
The value range is dependent on the set data type of the value X.

sent value

Options: ON, activate forced operation
OFF, activate forced operation
Disable forced operation

This parameter defines the value which is sent on actuation.

In the following table the forced operation function is explained:

Bit 1	Bit 0	Acces	Description
0	0	Free	The switch object of the actuator is enabled by the binary input. The assigned sensor can control the actuator via the switch object. The binary input does not control the actuator. Bit 0 of the value of the forced operation object is not evaluated. The forced operation object sends a telegram with the group addresses of the forced operation object and the status of the switch object with every state change of the switch object.
0	1	Free	
1	0	Off	The switch object of the actuator is disabled by the binary input. The assigned sensor can not control the actuator via the switch object. The binary input controls the actuator via the forced operation object. The actuator is switched off. Bit 0 of the value of the forced operation object is evaluated.
1	1	On	The switch object of the actuator is disabled by the binary input. The assigned sensor can not control the actuator via the switch object. The binary input controls the actuator via the forced operation object. The actuator is switched ON.

8 bit scene

Options: 1…64

This parameter defines the scene number which is sent on actuation.

Store/Call scene

Options: call
save

This parameter defines whether the scene is to be recalled or stored.

Hour [0…23]

Options: 0…23

Minute [0…59]

Options: 0…59

Seconds [0…59]

Options: 0…59

With these parameters, the hours, minutes and seconds are set which are to be send when actuated.

Weekday [1 = Mo, 2…6 , 7 = Su]

Options:
0 = no day
1 = Monday
2 = Tuesday
3 = Wednesday
4 = Thursday
5 = Friday
6 = Saturday
7 = Sunday

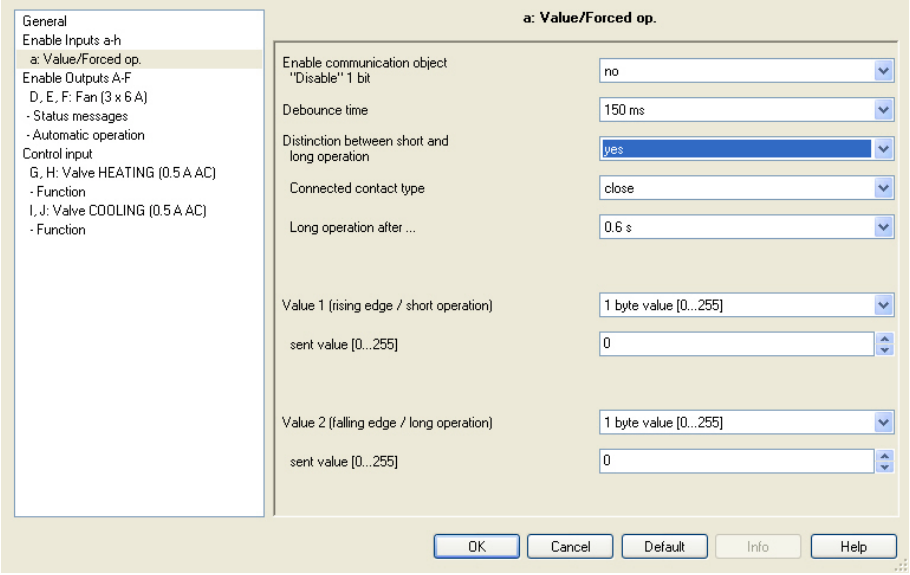
Using these parameters the weekdays which are sent on actuation are set.

Value 2 (falling edge/ long operation)

Note
The parameter descriptions of the parameter *Value 2 (with a rising edge and with short operation)* correspond with those of parameters *Value 1 (with a rising edge and with short operation).*

3.2.2.4.2 Parameter *Distinction between short and long operation – yes*

If the option *yes* is selected with the parameter *Distinction between short and long operation*, the following parameters appear:



Connected contact type

Options: closed
opened

- *closed:* The input is closed with actuation.
- *opened:* The input is opened with actuation.

Long operation after…

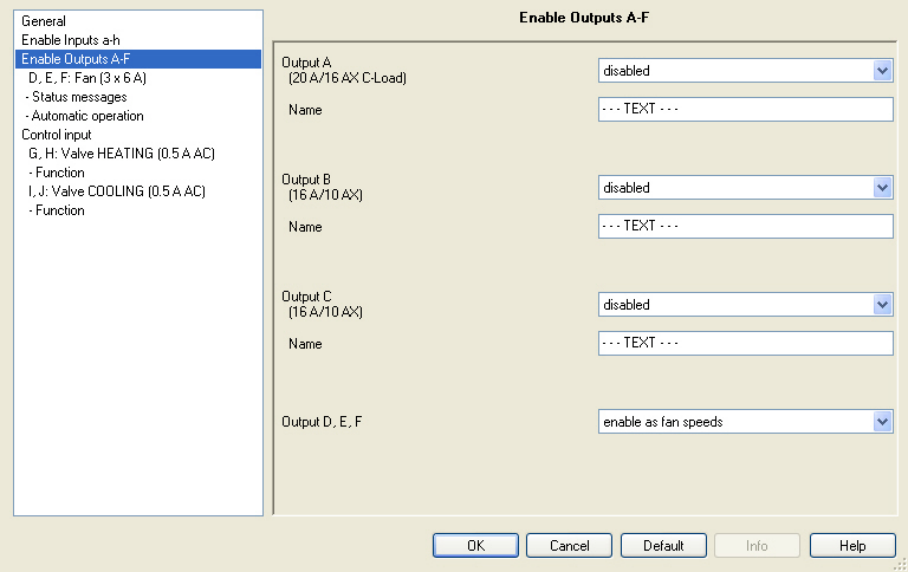
Options: 0.3/0.4/0.5/0.6/0.8 s
1/1.2/1.5 s
2/3/4/5/6/7/8/9/10 s

Here the time period T_L after which an actuation is considered a “long” operation is defined.

Note
The remaining parameter descriptions can be found in the parameter *Distinction between short and long operation – no*, on page 53.

3.2.3 Parameter window *Enable Outputs A-F*

In this parameter window *Outputs A-F* can be enabled.



Output A
(20 A/16 AX C-Load)

Note
In the following the setting possibilities of Outputs A-C are explained using output A as an example. The setting possibilities for outputs A-C are identical.

Options: <u>disabled</u>
enable

- *disabled: Output A (20A/16AX)* is blocked/invisible, no communication objects are visible.
- *enable:* The parameter window *A: Output (20 A/16 AX)* appears. Dependent communication objects become visible.

Designation

Options: - - - TEXT - - -

With this parameter it is possible to enter a text of up to 40 characters in length for identification in the ETS.

Note
The text which is entered is used to provide help, in order to obtain an overview of the inputs when they are fully assigned and to indicate the function assigned to the input. The text is purely for informative purposes and has no further function.

Outputs D, E, F

Note
In the following the setting possibilities of *Outputs D-F* are explained using output D as an example. The setting possibilities for outputs D-F are identical.

Options: enable as outputs
enable as fan speeds

The outputs D, E and F can be programmed as outputs and as fans.

- *enable as outputs:* The outputs D, E and F can be programmed as individual parameters and can be enabled individually.

Note
The outputs D, E, F have no logical connection function.

The descriptions of the parameter setting possibilities and the adjustable communication objects for the *Outputs D-F* do not differ from those of the *Output A,* see parameter window *A: Output (20 A/16 AX C-Load),* page 61.

However, the function *Time* with the *Outputs D-F* has a further adjustment option: *Flashing*.

The function *Flashing* is described using *Output D* as an example.

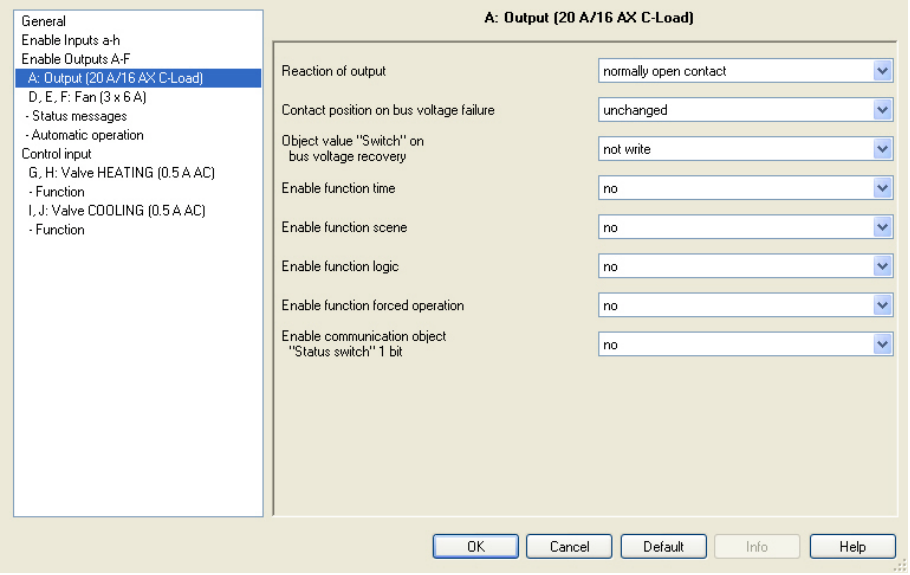
The function *Time* must be enabled for this purpose.

- *enable as fan speeds:* The parameter window D, E, F: Fan (3 x 6 A) appears.

3.2.3.1 Parameter window *A: Output (20 A/16 AX C-Load)*

In this parameter window all settings are undertaken for parameter window *A: Output (20 A/16 AX C-Load)*.
The explanations also apply for the *Outputs B and C*.

This parameter window is visible if in parameter window *Enable Outputs A-F*, page 59, the *Output A (20 A/ 16 AX C-Load)* has been enabled.



Reaction of output

Options: normally open contact
normally closed contact

It can be set in this parameter whether the output operates as a *Normally closed contact* or *Normally open contact*.

- *Normally opened contact:* An ON command (1) closes the contact and an OFF command (0) opens the contact.
- *Normally closed contact:* An ON command (1) opens the contact and an OFF command (0) closes the contact.

Contact position on bus voltage failure

Options: opened
closed
unchanged

The output can adopt a defined state on bus voltage failure using this parameter.

- *opened:* The contact is opened with bus voltage failure.
- *closed:* The contact is closed with bus voltage failure.
- *unchanged:* No change of the contact position.

Note
The reaction on bus voltage failure, recovery and download is to be monitored.

Object value "Switch" on bus voltage recovery

Options: not write
write with 0
write with 1

With this parameter the output can be influenced by the value of the *Switch* communication object on bus voltage recovery.

The *Switch* communication object can be written with either a 0 or 1 when the bus voltage recovers.
The contact position is redefined and set in dependence on the set device parameterisation.

- *not write:* The communication object assumes the value 0. This value remains as it is until modified via the bus. The contact position is only re-evaluated at this time.

Note
The reaction on bus voltage failure, recovery and download is to be monitored. The Room Master draws the energy for switching the contact from the bus. After bus voltage is applied, sufficient energy is only available after about ten seconds in order to switch all contacts simultaneously. Depending on the set transmission and switching delay after recovery of bus voltage set in the parameter window *General*, the individual outputs will only assume the desired contact position after this time. If a shorter time is set, the RM/S will only switch the first contact when sufficient energy is stored in the Room Master, in order to ensure that enough energy is available to immediately bring all outputs safely to the required position with a renewed bus voltage failure

Enable function time

Options: no
yes

- *no:* The parameter window remains disabled and invisible.
- *yes:* The parameter window -*Time* appears.

After the function *Time* has been enabled the parameter window - *Time* is enabled. Further settings can be made here, e.g. on and off delays with staircase lighting.

Note
A more exact description of the function can be found in chapter *Communication objects Output A*, page 169, No. 136.

Enable function scene

Options: no
yes

- *no:* The parameter window remains disabled and invisible.
- *yes:* The parameter window -*Scene* appears.

After the function *Scene* has been enabled the parameter window - *Scene* is enabled. Here you can undertake further settings, e.g. allocation of the output to a scene or standard value.

Enable function logic

Options: no
yes

- *no:* The parameter window remains disabled and invisible.
- *yes:* The parameter window - *Logic* appears.

After the function *Connection/Logic* has been enabled the parameter window - *Time* is enabled. Here further settings can be undertaken, e.g. connection and linking of the connection.

Enable function forced operation

Options: no
yes

This parameter enables forced operation.

A forced operation communication object is available for every output.

The forced operation (a 1 bit or 2 bit communication object per output) sets the output in a defined state – where as long as the forced operation is active – it can only be changed via the forced operation communication object.

The switch state after the end of forced operation can be set using the parameter *Contact position with end of the forced operation*.

- *yes:* Other parameters appear:

Type of object "Forced operation"

Options: 1 bit
2 bit

Using the 2 bit communication object the output state is defined directly via the object value.
The control of the output via the communication object *Switch* is blocked as long as the output is forcibly switched ON or OFF.

The following parameters appear when *1 bit* is selected:

Contact position on forced operation

Options: ON
OFF
unchanged

- *ON:* Contact position of the output during forced operation.
- *OFF:* Contact position of the output during forced operation.
- *unchanged*: Contact position of the output during forced operation.

The options *unchanged, ON* and *OFF* related to the 1 bit forced operation object and determine the switching state of the output during forced operation. The forced operation relates to the 1 bit forced operation object of output X which is available to every output.

Contact position with end of the forced operation

Options: ON
OFF
unchanged
calculate present contact position

This parameter determines the contact position of the relay after the end of forced operation.

- *ON:* The output is switched ON after forced operation has ended
- *OFF:* The output is switched OFF after forced operation has ended
- *unchanged:* The contact position is retained during forced operation or safety priority.
  The contact position only changes when a new calculated switch value is received.
- *calculate present contact position:* After forced operation has ended the value (switch value) is recalculated, the switch position is recalculated and immediately initiated, i.e., the output continues to operate normally in the background during forced operation.

The following parameters appear when *2 bit* is selected:

Contact position with end of the forced operation

Options: ON
OFF
unchanged
calculate present contact position

This parameter determines the contact position of the relay after the end of forced operation.

- *ON:* The output is switched ON after forced operation has ended
- *OFF:* The output is switched OFF after forced operation has ended
- *unchanged:* The contact position is retained during forced operation or safety priority.
  The contact position only changes when a new calculated switch value is received.
- *calculate present contact position:* After forced operation has ended the value (switch value) is recalculated, the switch position is recalculated and immediately initiated, i.e., the output continues to operate normally in the background during forced operation.

The telegram value which is sent via the 2 bit communication object determines the switch position as follows:

Value	Bit 1	Bit 0	State	Description
0	0	0	Free	If the communication object *Forced operation* receives a telegram with the value 0 (binary 00) or 1 (binary 01), the output is enabled and can be actuated via different communication objects.
1	0	1	Free	
2	1	0	Forced OFF	If the communication object *Forced operation* receives a telegram with the value 2 (binary 10), the output of the Room Master is forced OFF and remains disabled until forced operation is again deactivated. Actuation via another communication object is not possible as long as the forced operation is activated. The state of the output at the end of forced operation can be programmed.
3	1	1	Forced ON	If the communication object *Forced operation* receives a telegram with the value 3 (binary 11), the output of the Room Master is forced ON and remains disabled until forced operation is again deactivated. Actuation via another communication object is not possible as long as the forced operation is activated.

Enable communication object "Status switch" 1 bit

Options: no
yes

- *yes:* Further parameters are visible:

  Send object value (Object "Status switch")

  Options: no, update only
  after a change
  after request
  after a change or request

  - *no, update only*: The status is updated but not sent.
  - *after a change:* The status is sent after a change.
  - *after request:* The status is sent after a request.
  - *after a change or request:* The status is sent after a change or a request.

  Object value of contact position (Object "Status switch")

  Options: 1 = closed, 0 = open
  0=closed, 1=open

  With this parameter the communication object value of the switch status (*Status switch*) is defined.

  - *1 = closed, 0 = open* A closed contact is represented by communication object value 1 and an open contact is represented by the value 0.
  - *0=closed, 1=open* A closed contact is represented by communication object value 0 and an open contact is represented by the value 1.

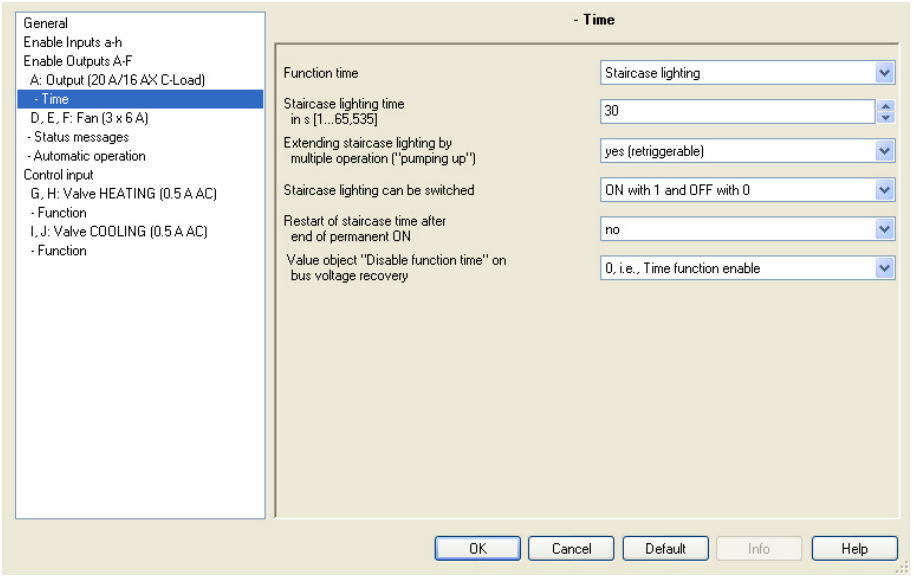
Note
The contact position, and thus the switch status can result from a series of priorities and links.

3.2.3.1.1 Parameter window *A: Output -Time*

In this parameter window all settings for the *Function time* are undertaken: *Staircase lighting* and *switching ON and OFF delay*.

Note
The outputs A-C do not feature a flashing function. ***For flashing function refer to: Parameter window D: Output - Time, Flashing, page 81***

This parameter window is visible if in parameter window *A: Output (20 A/16 AX C-Load)*, page 61, the parameter *Enable function time* has been enabled.



Explanations concerning the time functions and the timing sequences can be found at *Planning and application*, page 173. Please also note the *Function chart*, page 180, originates from the switch and sequence priorities.

Function time

Options: Staircase lighting
Switching ON and OFF delay

This parameter defines the type of *Time* function for each output.

- *Staircase lighting:* The value with which the staircase lighting is switched on and off can be parameterised. The staircase lighting time commences at switch on. It is switched off immediately after the staircase lighting time has been completed.
- switching ON and OFF delay: The output can be switched on or off with a delay via this function.

Note
The function *Staircase lighting* can be recalled via the communication object *Switch*, *Logical connection x* (x = 1, 2) or recalled with a light scene recall.

The following parameter appears with the selection *Staircase lighting*:

Staircase lighting time in s [1…65,535]

Options: 1…30…65,535

The staircase light defines how long the contact is closed – provided that the contact is programmed as a normally open contact – and how long the light remains on after an ON command. The input is made in seconds.

Extending staircase lighting by multiple operation ("pumping up")

Options: **no (not retriggerable)**
yes (retriggerable)
up to max. 2x staircase lighting time
up to max. 3x staircase lighting time
up to max. 4x staircase lighting time
up to max. 5x staircase lighting time

If a further ON telegram is received during the staircase lighting time sequence, the remaining staircase lighting time can be extended by a further period. This is possible by repeated operation of the push button ("pumping up") until the maximum programmed number of retriggering operations is reached. The maximum time can be set to 1, 2, 3, 4 or 5-fold time of the staircase lighting time.

The staircase lighting time is extended by "pumping up" to the maximum time. If some of the time has already timed out, the staircase lighting time can again be extended to the maximum time by "pumping up".
The parameterised maximum time may not however be exceeded.

- *no:* The receipt of an ON telegram is ignored.
  The staircase lighting time continues without modification to completion.
- *yes (retriggerable):* The staircase light time is reset each time by a renewed ON telegram and starts to count again each time. This process can be repeated as often as desired using this selection.
- *Up to max. 2/3/4/5 x staircase lighting time:* The staircase lighting time is extended by the 2/3/4/5-fold staircase lighting time with a renewed ON telegram.

Staircase lighting can be switched

Options: ON with 1 and OFF with 0
ON with 1 no action with 0
ON with 0 or 1, switch OFF not possible

This parameter defines the telegram value used for switching the staircase lighting on and off prematurely.

- *ON with 0 or 1, switch OFF not possible:* The *Staircase lighting* function is switched on independently of the value of the incoming telegram. Premature switch off is not possible.

Restart of staircase time after end of permanent ON

Options: no
yes

- *no:* The lighting switches off if *Permanent ON* is ended.
- *yes:* The lighting remains on and the staircase lighting time restarts.

The function of continuously ON is controlled via the *Permanent ON* communication object value. If the communication object receives a telegram with the value 1, the output is switched ON irrespective of the value of the communication object *Switch* and remains switched on until the communication object *Permanent ON* has the value 0.

Value object "function time disable" on bus voltage recovery

Options: unchanged
1, i.e., function time disable
0, i.e., function time enable

This parameter defines how the time function parameter should behave after bus voltage recovery. With a telegram to the communication object *Disable function time* the function time can be disabled.

- *unchanged:* The function time can continue unchanged.

Note
The state *Function time* is stored with bus voltage failure and continues unchanged after bus voltage recovery.

- *1, i.e., function time disable:* The time function is disabled by a telegram with the value 1.

Note
They can only be enabled via the communication object *function time disable*.

- *0, i.e., function time enable:* The *Function time* is enabled by a telegram with the value 0.

Note
If the staircase light is disabled when the function *time* is operational, the light will stay at ON until it is switched to OFF manually.

How does the staircase light behave with bus voltage failure?

The behaviour at bus voltage failure is determined by the parameter *Reaction on bus voltage failure* in the parameter window *A: Output (20 A/16 AX C-Load)*.

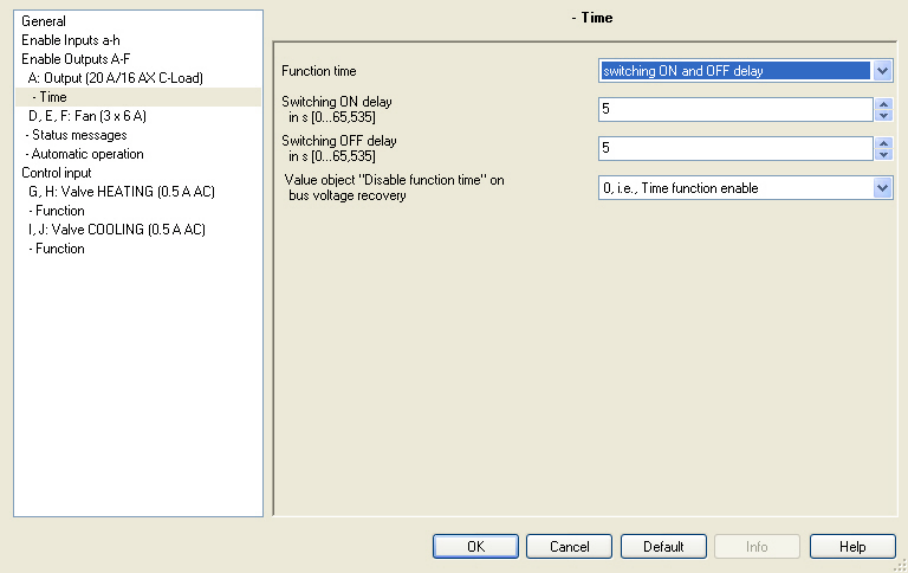
How does the staircase light behave with bus voltage recovery?

The reaction at bus voltage recovery is defined by two conditions:

A By the communication object *function time disable*. If the staircase light is blocked after bus voltage recovery, the staircase light can only be switched on or off via the communication object *Switch*.

B By the parameterisation of the communication object *Switch*. Whether the light is switched on or off with bus voltage recovery depends on the programming of the *Switch* communication object.

The following parameters appear at *switching ON and OFF delay*:



Explanations relating to the on and off delay can be found under *Switching ON and OFF delay*, page 183. You will also find a timing diagram as well as explanations on the effect of various ON and OFF telegrams in combination with the switching ON and OFF delay.

Switching ON delay
in s [0…65,535]

Options: 0…5…65,535

Here you set the time by which an ON command is delayed after switch on.

Switching OFF delay
in s [0…65,535]

Options: 0…5…65,535

Here you set the time by which switch OFF is delayed after a switch OFF command.

Value object "function time disable"
on bus voltage recovery

Options: unchanged
1, i.e., function time disable
0, i.e., function time enable

This parameter defines how the time function parameter should behave after bus voltage recovery. With a telegram to the communication object *Disable function time* the function time can be disabled or enabled.

- *unchanged:* After bus voltage recovery the function time reacts in the same way as before bus voltage failure.
- *1, i.e., function time disable:* The function time is disabled by a telegram with the value 1.
- *0, i.e., function time enable:* The function time is enabled by a telegram with the value 0.

How does the staircase light behave with bus voltage failure?

The behaviour at bus voltage failure is determined by the parameter *Reaction on bus voltage failure* in the parameter window *A: Output (20 A/16 AX C-Load)*.

How does the staircase light behave with bus voltage recovery?

The *Reaction on bus voltage recovery* is defined by two conditions:

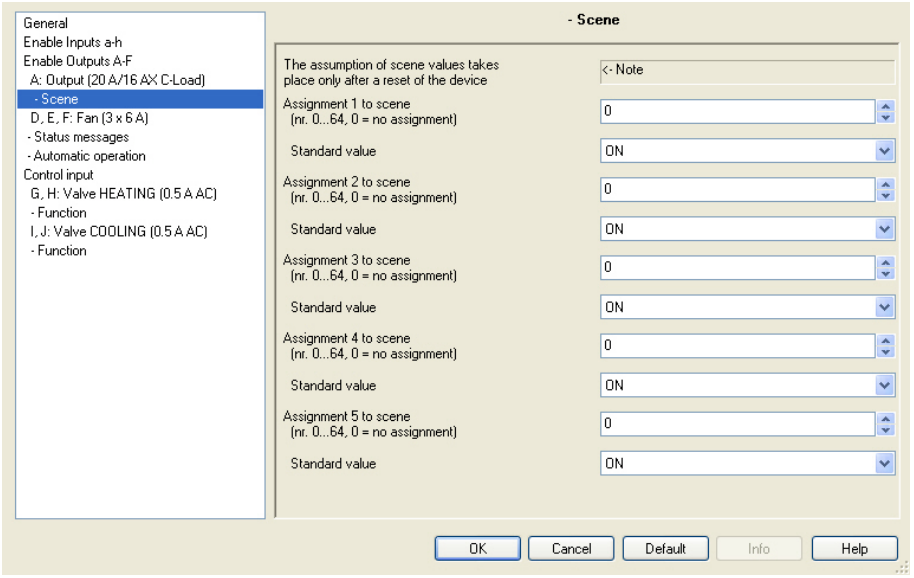
A By the communication object *function time disable*. If the staircase light is blocked after bus voltage recovery, the staircase light can only be switched on or off via the communication object *Switch*.

B By the parameterisation of the communication object *Switch*. Whether the light is switched on or off with bus voltage recovery depends on the programming of the *Switch* communication object.

3.2.3.1.2 Parameter window *A: Output* *-Scene*

In this parameter window all settings for the function *Scene* are undertaken.

This parameter window is visible if in parameter window *A: Output (20 A/16 AX C-Load)*, page 61, the parameter *Enable function scene* has been enabled.



How is a scene set?

Via the communication object *Scene*

- Sets the value for standard values.
- The scene can be recalled.
- The scene can be changed.
- The scene can be saved.

An example:

Scene recall:

- Send value 0-63 for the scene (no. 1-64) to the communication object *Scene*.

Scene change and save:

- Scene no. 24 is assigned to the output with the value ON.
- Scene no. 24 should be assigned to the output with the value OFF:
  - Set the output to OFF with a switch command.
  - Send value 151 (128 + 23) for storage of scene number 24 to the communication object *Scene*.

General values for scene storage:

- 128 + (0-63) for the scene (no. 1-64)
  - The stored scene values are retained until there is a device reset.

Note
After a device reset the parameterised values can be reactivated. ***For further information see: Reset via bus, page 215***

The assumption of scene values takes place only after a reset of the device

This parameter serves as a note or remark.

Assignment 1 to scene (no. 0…64, 0 = no assignment)

Assignment 2 to scene (no. 0…64, 0 = no assignment)

Assignment 3 to scene (no. 0…64, 0 = no assignment)

Assignment 4 to scene (no. 0…64, 0 = no assignment)

Assignment 5 to scene (no. 0…64, 0 = no assignment)

Options: 0…64

Using the scene function up to 64 scenes are managed using just a single group address. With this group address all slaves integrated into a scene are linked via a 1 byte communication object. The following information is contained in a telegram:

- Number of the scene (1…64) as well as
- Command: Call scene or store scene.

The output can be integrated in up to five scenes. So for example, the scene can be switched on in the morning and switched off in the evening or the output can be integrated into light scenes.

If a telegram is received on the communication object *Scene*, the sent scene number is allocated for all outputs which carry out the stored scene position or the current position is stored as the new scene position.

Standard value

Options: ON
OFF

Here you set the state that the output has when the scene is recalled.

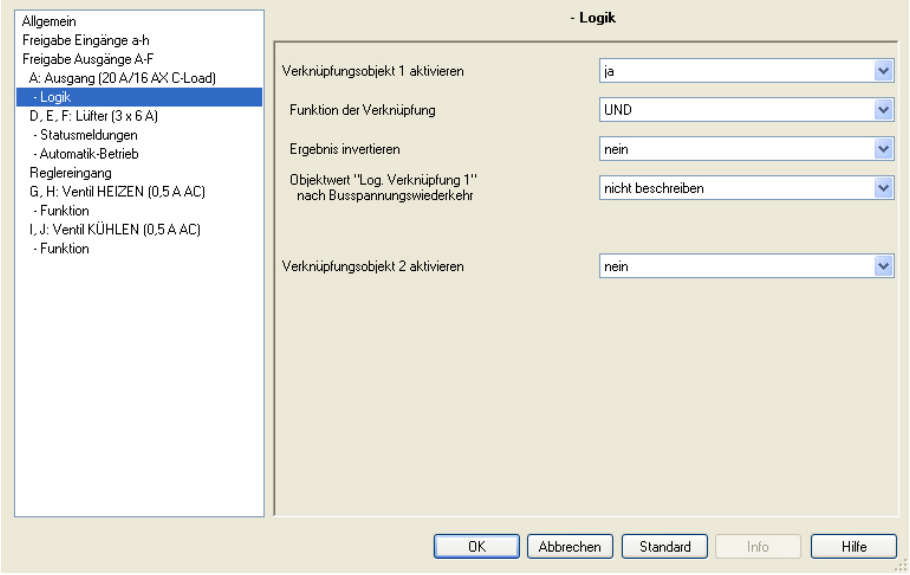
Note
When a scene is recalled: - the function *Time* is restarted. - the *logical connections* are re-evaluated..

For further information see: Communication objects Output A, page 169, Scene function, page 187 and Code table scene (8 Bit), page 223.

3.2.3.1.3 Parameter window *A: Output -Logic*

In this parameter window all settings for the function *Enable function logic* are undertaken.

This parameter window is visible if in parameter window *A: Output (20 A/16 AX C-Load)*, page 61, the parameter *Enable function logic* has been enabled.



The function *Enable function logic* provides up to two logic objects for each output, which can be logically linked with the *Switch* communication object.

The logic is re-calculated when an object value is received. Hereby, the communication object *Logical connection 1* is first of all evaluated with the communication object *Switch*. The result is then logically linked with the communication object *Logical connection 2*.

Explanations for the logical function can be found *Connection/logic*, page 185. Please also observe the *Function chart*, page 180, from which the priorities can be seen.

Logical connection 1 active

Options: no
yes

With these parameters the communication object *Logical connection 1* is enabled.

- *yes:* The following parameters appear:

Function of logical connection

Options: AND
OR
XOR
GATE

The logical function of the communication object *Logical connection 1* is defined with the switch command. All three standard operations (AND, OR, XOR) are possible. Furthermore, the GATE operation can be used to inhibit switch commands.

For further information see: Connection/logic, page 185

Result is inverted

Options: **no**
yes

- *yes:* The result of the logical connection can be inverted.
- *no:* There is no inversion.

Object value "Logical connection 1" after bus voltage recovery

Options: not write
write with 0
write with 1

This parameter defines the value allocated to the communication object *Logical connection 1* with bus voltage recovery.

- *not write:* after bus voltage recovery the value 0 remains in the communication object *Switch*. This value remains as it is until the communication object is modified via the bus. The contact position is only re-evaluated and set at this time. The correct status of the contact position is displayed via the communication object *Status switch* independently of the value of the communication object *Switch*. A precondition however is that no manual switching actions have occurred on the outputs A, B, C or D.

A further parameter appears if GATE is selected with the parameter *Function of logical connection*:

Gate disabled, if object value "Logical connection 1" is

Options: 1
0

This parameter defines the value at which the communication object *Logical connection 1* disables the GATE.

Disabling of the gate means that the telegrams received on the *Switch* communication object are ignored. As long as the GATE is activated, the value which was sent last to the input of the GATE remains on the output. After a gate is blocked, the value which was on the output before the block remains on the output of the gate.

After the gate is enabled this value will be retained until a new value is received.

For further information see: Function chart, page 180

The GATE is disabled after bus voltage failure and remains deactivated after bus voltage recovery.

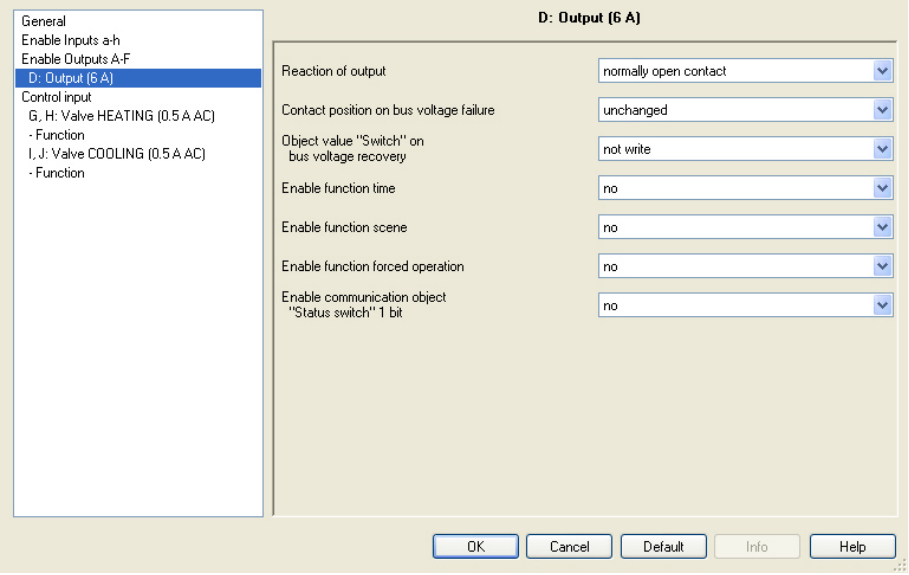
Logical connection 2 active

The same programming options exist as those for parameter *Logical connection 1 active*.

3.2.3.2 Parameter window *D: Output (6 A)*

In this parameter window all settings are undertaken for parameter window *D:* Output (6 A)
The explanations also apply for the *Outputs E-F*.

This parameter window is visible if in the parameter window *Enable Outputs A-F*, page 59, the outputs D, E, F have been parameterised as *enable as outputs* and Output *D: Output (6 A)* has been enabled.



The descriptions of the parameter setting options and the adjustable communication objects for the *Outputs D-F* do not differ from the *Output A.*

However, the function *Time* with the *Outputs D-F* has a further adjustment option: *Flashing*.

The function *Flashing* is described using *Output D* as an example.

The function *Time* must be enabled for this purpose.

Enable function time

Options: no
yes

- *yes:* The parameter window -*Time* appears.
- *no:* The parameter window remains disabled and invisible.

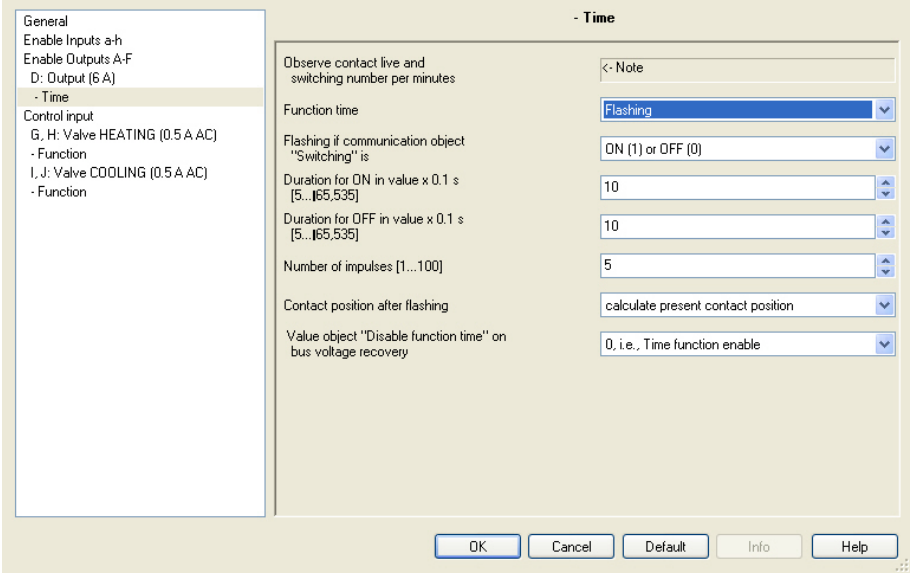
After the function time has been enabled the communication object *Permanent ON* is enabled. The output is switched ON via this communication object. It remains switched ON until a telegram with the value 0 is received by the communication object *Permanent ON*. The functions continue to operate in the background during the Permanent ON phase. The contact position at the end of the Permanent ON phase results from the functions operating in the background.

Note
All other descriptions of the parameter can be found in parameter window *A: Output (20 A/16 AX C-Load)*, on page 61.

3.2.3.2.1 Parameter window *D: Output* *-Time, Flashing*

In this parameter window all settings for the *Function time* are undertaken: *Staircase lighting*, *switching ON and OFF delay* and *Flashing*.

This parameter window is visible if in parameter window *D: Output (6 A)*, page 79, the parameter Enable function time has been enabled.



Observe contact life and switching number per minute.

Note
Refer to the contact life and switching operations per minute, see Technical data, page 11.

Function time

Options: Staircase lighting
Switching ON and OFF delay
Flashing

This parameter defines the type of time function for each output.

- *Staircase lighting:* The staircase lighting is switched via an ON telegram of the communication object *Switch* of output A. The value of the communication object *Switch* can be programmed. The staircase lighting time commences at switch on. It is switched off immediately after the staircase lighting time has been completed.

Note
The function Staircase lighting can be recalled via the communication object *Switch*, *Logical connection x* (x = 1, 2) or recalled with a light scene recall.

- *switching ON and OFF delay:* The output can be switched on or off with a delay via this function.
- *Flashing:* The output starts to flash as soon as the parameterised value is received in the communication object *Switch*. The flashing period can be adjusted via the parameterised time duration for ON or OFF. At the start of the flashing period the output is switched on with a normally open contact and off with a normally closed contact. When a new value is received on the communication object *Switch* the flashing period will recommence.
  The relay state after flashing can be programmed.
  Flashing can be inverted when the output is used as a normally closed contact.
  The communication object *Status switch* indicates the current relay state during flashing.

The following parameter appears with the selection *Flashing*:

Flashing if communication object "Switching" is

Options: ON (1)
OFF (0)
ON (1) or OFF (0)

Here you set the value of the communication object *Switch* at which the output flashes. Flashing is not retriggerable.

- *ON (1):* Flashing starts when a telegram with the value 1 is received on the *Switch* communication object. A telegram with the value 0 ends flashing.
- *OFF (0):* Flashing starts when a telegram with the value 0 is received on the *Switch* communication object. A telegram with the value 1 ends flashing.
- *ON (1) or OFF (0):* A telegram with the value 1 or 0 triggers flashing. Suspension of flashing is not possible in this case.

Duration for ON in value x 0.1 s [5…65,535]

Options: 5…10…65,535

This parameter defines how long the output is switched ON during a flashing period.

Duration for OFF in value x 0.1 s
[5…65,535]

Options: 5…10…65,535

This parameter defines how long the output is switched off during a flashing period.

Number of impulses [1…100]

Options: 1…5…100

This parameter defines the maximum number of pulses. This is useful to avoid unnecessary wear of the contacts caused by flashing.

Contact position after flashing

Options: ON
OFF
calculate present contact position

This parameter defines the state that the parameter should assume after flashing.

- *ON:* The output is switched on after flashing.
- *OFF:* The output is switched off after flashing.
- *calculate present contact position:* The output assumes the switching state which it had before flashing commenced.

For further information see: Function chart, page 180

Value object "function time disable" on bus voltage recovery

Options: unchanged
1, i.e., function time disable
0, i.e., function time enable

This parameter defines how the time function parameter should behave after bus voltage recovery. With a telegram to the communication object *Disable function time* the function time can be disabled.

- *Unchanged:* After bus voltage recovery the function time reacts in the same way as before bus voltage failure.
- *1, i.e., function time disable:* The function time is disabled by a telegram with the value 1.
- *0, i.e., function time enable:* The function time is enabled by a telegram with the value 0.

How does the staircase light behave with bus voltage failure?

The behaviour at bus voltage failure is determined by the parameter *Reaction on bus voltage failure* in the parameter window *A: Output (20 A/16 AX C-Load)*.

How does the staircase light behave with bus voltage recovery?

The reaction at bus voltage recovery is defined by two conditions:

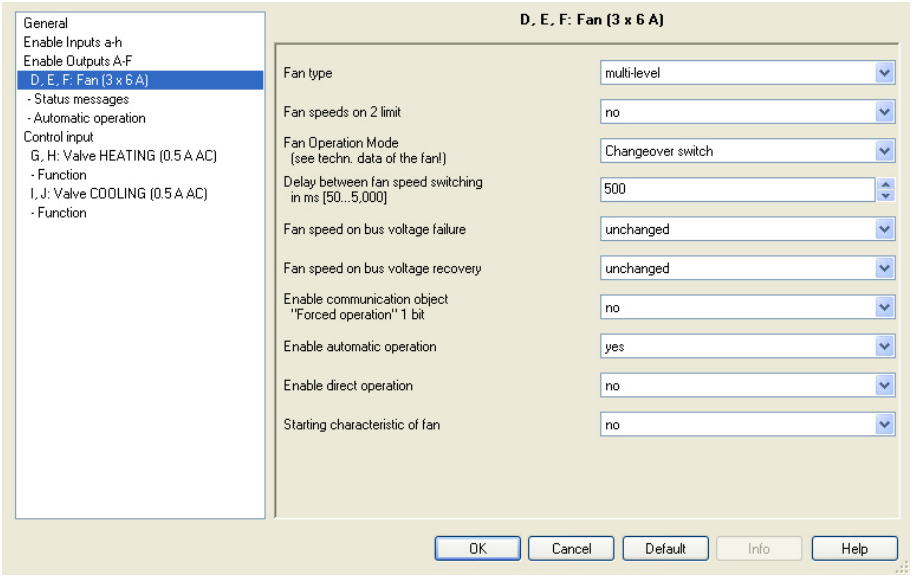
A By the communication object *function time disable*. If the staircase light is blocked after bus voltage recovery, the staircase light can only be switched on or off via the communication object *Switch*.

B By the parameterisation of the communication object *Switch*. Whether the light is switched on or off with bus voltage recovery depends on the programming of the *Switch* communication object.

3.2.3.3 Parameter window *D, E, F: Fan (3 x 6 A) multi-level*

In this parameter window all settings for the *Multi-level fan* are undertaken.

This parameter is visible if in parameter window *Enable Outputs A-F*, page 59, the option *enable as fan speeds* with the parameter *Outputs D, E, F* has been selected.



Fan type

Option: multi-level
one-level

This parameter defines the fan type which is to be controlled.

- *multi-level:* A fan with up to three speeds is controlled.
- *one-level:* A fan with one speed should be controlled.

Fan speeds on 2 limit

Option: no
yes

The fan speeds can be limited to two here. The following settings are the same as those for a three speed fan, but are only limited to two speeds.

- *no:* A three speed fan is controlled.
- *yes:* A two speed fan is controlled via fan speeds 1 and 2. Fan speed 3 is non-functional.

Fan Operation Mode
(see techn. data of the drive!)

Option: Changeover switch
Step switch

The control of the fan is set with this parameter. The mode of fan control should be taken from the technical data of the fan.

How does a two-way changeover circuit function?

Only the corresponding output of the assigned fan speed is switched on with the parameterisation as a changeover switch.

The delay time between the speed switchover and a minimum dwell time in a valve speed are programmable.
The minimum dwell time in a fan speed is only active in automatic mode.

How does speed switching function?

With step switch control, no erratic and sudden switch on of the fan is possible. The individual fan speeds are activated consecutively (outputs switched on) until the required fan speed is achieved.

The parameterised delay time between two fan speeds has the effect that the current fan speed must be switched on for at least this time before the next valve speed is switched on.
The parameterised minimum dwell time in a fan speed has the same effect as a changeover switch, i.e. it is only active in automatic mode and is added to the switchover delay.

- *Changeover switch:* The following parameter appears:

Delay between fan speed switching in ms [50…5,000]

Option: 50…500…5,000

A switchover delay can be programmed with this parameter.
As this time is a fan specific factor, it is always considered.

Fan speed on bus voltage failure

Option: unchanged
OFF

Fan speed on bus voltage recovery

Options: unchanged
OFF
1
2
3

- *unchanged:* The fan speeds of the fan remain unchanged.
- *OFF:* The fan is switched off.
- *1, 2 or 3:* The fan switches to fan speed 1, 2 or 3.

Caution

The RM/S is supplied ex-works with a default setting (factory default). This ensures the fan setting is switched off when the bus voltage is applied to the relay for the first time. Thus, damage to the device due to unintentional switch on during transport, e.g. due to vibration, is avoided.

It is advisable to apply a bus voltage before connecting the fan in order to achieve a defined switch state of the fan. This eliminates the possibility of the destruction of the fan due to an incorrect contact setting.

Enable communication object "Forced operation" 1 bit

Options: no
yes

Through forced operation for example, a recirculation: valve OFF and fan ON can be implemented.

- *yes:* A 1 bit *Forced operation* communication object is enabled. Further parameters appear at the same time:

  Forced operation on object value

  Options: 1
  0

  - *1:* Forced operation is activated by a telegram with value 1.
  - *0:* Forced operation is activated by a telegram with value 0.

Note

During forced operation the settings set in *Automatic operation* are ignored. Automatic operation is updated after forced operation has been rescinded.

Important

Forced operation remains active until:

- the complementary set values are sent.
- the assignment is changed.
- the fan type is changed.

The forced operation is not deactivated, by a download of the application program in which the fan type and the respective group addresses are retained.

The forced operation is reset if an ETS reset has occurred.

Limitation on forced operation

Options: 3, 2, 1, OFF
<u>unchanged</u>
OFF
1
1, OFF
2
2, 1
2, 1, OFF
3
3, 2
3, 2, 1

This parameter sets which fan speed is set with active forced operation or which may not be exceeded or undershot.

- *3, 2, 1, OFF:* Everything is possible.
- *Unchanged:* The state is retained.
- *OFF:* Off.
- *1:* limited to speed 1.*
- *1, OFF:* limited to speed 1 and off.
- *2:* limited to speed 2.*
- *2, 1:* limited to speed 2 and 1.
- *2, 1, OFF:* limited to speed 2, 1 and off.
- *3:* limited to speed 3.*
- *3, 2*: limited to speed 3 and 2.
- *3, 2, 1:* limited to speed 3, 2 and 1.

* The control value is ignored.

Enable automatic operation

Options: no
<u>yes</u>

- *yes: Automatic operation* is enabled. Furthermore the parameter window *- Automatic operation*, page 96 appears.

Enable direct operation

Options: <u>no</u>
yes

- *yes: Direct operation* is enabled. Furthermore the parameter window *- Direct operation*, page 102 appears.

Starting characteristic of fan

Options: no
yes

This parameter enables the fan to start from the OFF state with a defined fan speed. This fan speed is immediately applied.

In order to guarantee a safe start of the fan motor, it can be useful to start the fan motor first with a higher fan speed. Thus a higher torque for the start up phase of the fan is achieved.

Note
A step switch normally means however that the previous fan speeds are usually switched on consecutively. With the changeover switch the fan speed is directly switched on.

The delay between the switchover of two fan speeds (contact change) is considered.

The dwell times in a fan speed which are considered in automatic mode, are inactive and will only be considered after the start up phase.

The start-up behaviour is a technical characteristic of the fan. For this reason this behaviour has a higher priority than an active limitation or forced operation.

With the option *yes* in the parameter *Starting characteristic of fan* the two additional parameters appear:

Switch on over fan speed

Options: 1/2/3

Here you set which fan speed the fan uses to start from the OFF state.

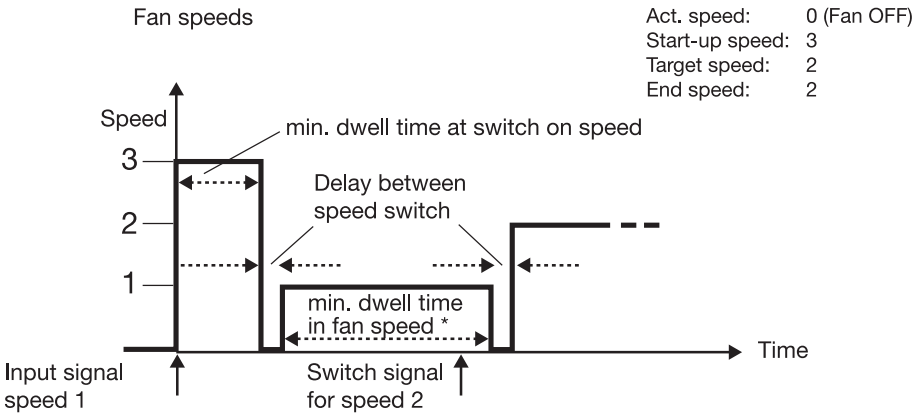
Minimum dwell period in switch on in s [1…65,535]

Options: 1…5…65,535

This parameter defines the minimum dwell time in one of the switch on speeds.

Example: Starting characteristic of a three speed fan

The illustration shows the response in automatic operation with the option *Switch on over fan speed 3*, if the fan receives the command from the OFF state to set *Speed 1*.



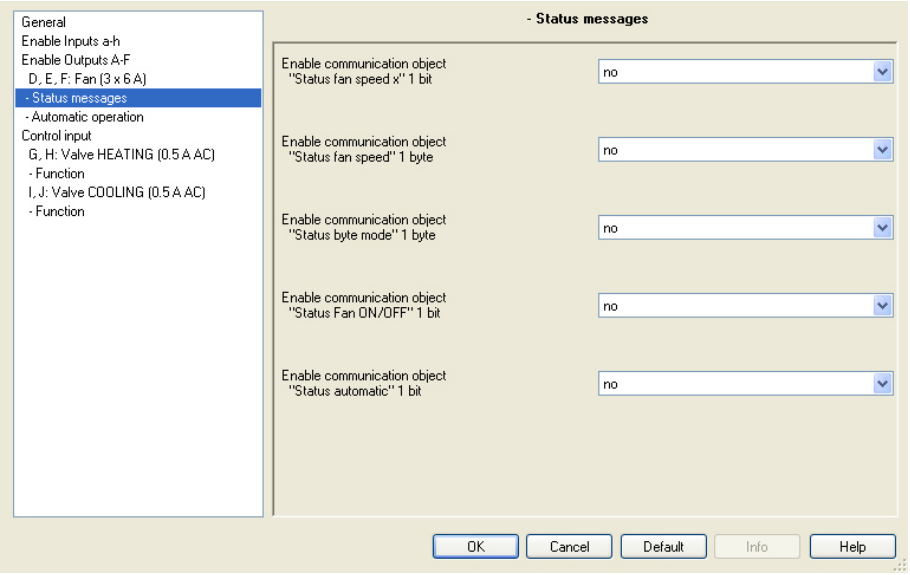
* The parameter *Minimum dwell period in fan speed in s [0…65,535]* in the parameter window *Automatic operation* is only active and programmable, if the option *yes* has been selected in the *Enable automatic operation* parameter. In the parameter window *Fan* you can find the parameter *Enable automatic operation*.

Important
The forced operation remains valid and is considered. The parameterised minimum dwell time in the fan speed for automatic mode is ignored during manual operation. Accordingly, an immediate reaction to the manual operation is detected. The delay time with speed switch over remains active to protect the fan.

3.2.3.3.1 Parameter window - *Status messages*

In this parameter window the *Status messages* are defined.

This parameter is visible if in parameter window *Enable Outputs A-F*, page 59, the option *enable as fan speeds* with the parameter *Outputs D, E, F* has been selected.



Enable communication object "Status fan speed x" 1 bit

Options: no
yes

- *yes:* Three 1 bit communication objects, *Status fan speed x*, x = 1 to 3 are enabled.

The setting of a fan speed is displayed via these communication objects. You can parameterise if the status of a current fan speed or a required fan speed are displayed.

With option *yes* the following parameters appear:

Meaning

Options: current fan speed
required fan speed

This parameter defines whether the status of the *current fan speed* or the *required fan speed* is displayed.

What is the current fan speed?

The *current fan speed* is the speed at which the fan is actually operating.

What is the required fan speed?

The *required fan speed* is the fan speed which has to be achieved, e.g. when the transition and dwell times are completed.

Note
The limitations are included in this observation, i.e. if a limitation allows only fan speed 2 and the fan is operating at fan speed 2, and for example, a telegram to switch up is received, the *required fan speed* remains at 2 as fan speed 3 cannot be achieved due to the limitation.

Send object value

Options: no, update only
<u>after a change</u>
after request
after a change or request

- *no, update only*: The status is updated but not sent.
- *after a change:* The status is sent after a change.
- *after request:* The status is sent after a request.
- *after a change or request:* The status is sent after a change or a request.

Enable communication object "Status fan speed" 1 byte

Options: <u>no</u>
yes

- *yes:* The communication object *Status fan speed* is enabled.

This status byte defines the figure value of the fan speed.

This display can be differentiated with the selection of *current fan speed* from the *required fan speed*. Initially the switchover times, dwell times and the start-up phase must be completed before the *required fan speed* is achieved.

What is the current fan speed?

The *current fan speed* is the speed at which the fan is actually operating.

What is the required fan speed?

The *required fan speed* is the fan speed which has to be achieved, e.g. when the transition and dwell times are completed.

With option *yes* the following parameters appear in the parameter:

Meaning

Options: current fan speed
required fan speed

This parameter defines whether the status of the *current fan speed* or the *required fan speed* is displayed.

Note
The limitations are included in this observation, i.e. if a limitation allows only fan speed 2 and the fan is operating at fan speed 2, and for example, a telegram to switch up is received, the *required fan speed* remains at 2 as fan speed 3 cannot be achieved due to the limitation.

Send object value

Options: no, update only
after a change
after request
after a change or request

- *no, update only*: The status is updated but not sent.
- *after a change:* The status is sent after a change.
- *after request:* The status is sent after a request.
- *after a change or request:* The status is sent after a change or a request.

Enable communication object "Status byte mode" 1 byte

Options: no
yes

- *yes:* The communication object *Status byte mode* is enabled.

From this status byte the states HEATING, COOLING, automatic, forced operation and the four limitations are indicated directly via a 1 bit coding.

For further information see: Status byte fan, Forced operation, page 222

With option *yes* a further parameter appears:

Send object value

Options: no, update only
after a change
after request
after a change or request

- *no, update only*: The status is updated but not sent.
- *after a change:* The status is sent after a change.
- *after request:* The status is sent after a request.
- *after a change or request:* The status is sent after a change or a request.

Enable communication object "Status fan ON/OFF" 1 bit'

Options: no
yes

The communication object *Status fan* can be enabled with this parameter.

Some fans initially require an ON command before they are set to a fan speed from the OFF state. This ON command has effect on a main switch which has to be switched on.
This demand can be implemented with any switch output which is controlled via the *Status fan* communication object. The corresponding switch communication object of the switch actuator should be connected with the *Status fan* communication object.

With option *yes* a further parameter is visible:

Send object value

Options: no, update only
after a change
after request
after a change or request

- *no, update only*: The status is updated but not sent.
- *after a change:* The status is sent after a change.
- *after request:* The status is sent after a request.
- *after a change or request:* The status is sent after a change or a request.

The following parameter only becomes visible if the option *yes* has been selected in the *Enable automatic operatio*n parameter in the *Fan* parameter window.

Enable communication object "Status automatic" 1 bit

Options: no
yes

The communication object *Status automatic* is enabled with this parameter.

Telegram value 1 = Room Master is in automatic operation
0 = automatic operation switched off

- *yes:* An additional parameter appears:

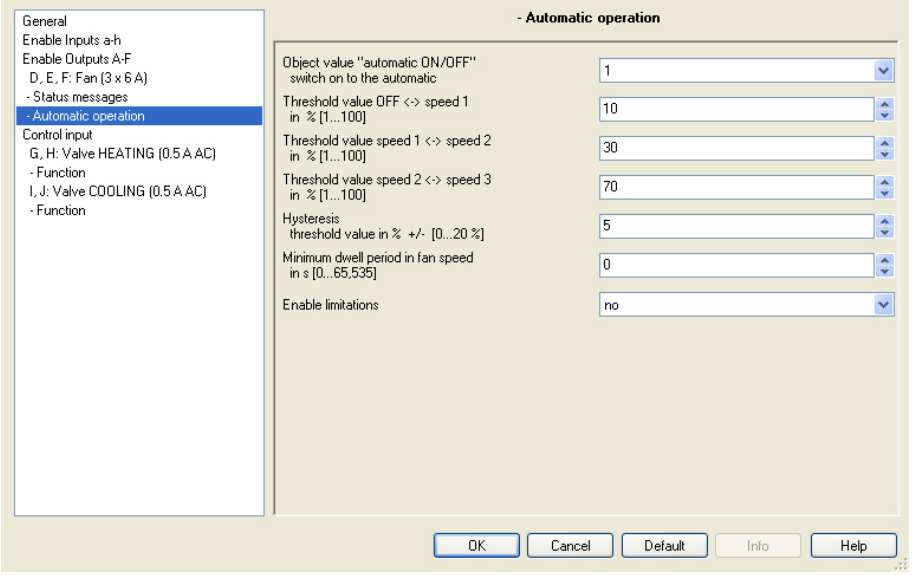
Send object value

Options: no, update only
<u>after a change</u>
after request
after a change or request

- *no, update only*: The status is updated but not sent.
- *after a change:* The status is sent after a change.
- *after request:* The status is sent after a request.
- *after a change or request:* The status is sent after a change or a request.

3.2.3.3.2 Parameter window *- Automatic operation*

This parameter window is visible if in parameter window *D, E, F: Fan (3 x 6 A)* the option *yes* has been selected in the *Enable automatic operation* parameter.



In this parameter window the threshold values for switchover of the fan speed are defined. Furthermore, the limitations can also be enabled.

Important
The Room Master evaluates the threshold values in ascending order, i.e. first of all the threshold value for *OFF <-> Fan speed 1* is checked followed by *Fan speed 1 <-> Fan speed 2* etc. The correct method of function is only assured if the threshold value for *OFF <-> Fan speed 1* is less than the threshold value *Fan speed 1 <-> Fan speed 2* and this is less than *Fan speed 2 <-> Fan speed 3, etc.*

Object value “Automatic ON/OFF” switch on to the automatic

Options: 1 / 0

This parameter defines how to react to a telegram.

- *1:* Automatic is activated by a telegram with value 1.
- *0:* Automatic is activated by a telegram with value 0.

Threshold value OFF <-> speed 1
in % [1…100]

Options: 1…10…100

Here the threshold value is set at which switch on of fan speed 1 occurs. If the value in the control value communication object is greater than or equal to the parameterised threshold value, fan speed 1 is switched on. If the value is less, it is switched off.

Threshold value speed 1 <-> speed 2
in % [1…100]

Options: 1…30…100

Here the threshold value at which switch over to fan speed 2 occurs is set. If the value in the control value communication object is greater than the parameterised threshold value, switch over to fan speed 2 occurs.

Threshold value speed 2 <-> speed 3
in % [1…100]

Options: 1…70…100

Here the threshold value at which switch over to fan speed 3 occurs is set. If the value in the communication object *Control value HEATING* or *Control value COOLING* is greater than the parameterised threshold value, switch over to fan speed 3 occurs.

Hysteresis
threshold value in % +/- [0…20 %]

Options: 0…5…20

Here a hysteresis is set at which switchover to the next fan speed occurs. The hysteresis applies for all three threshold values.

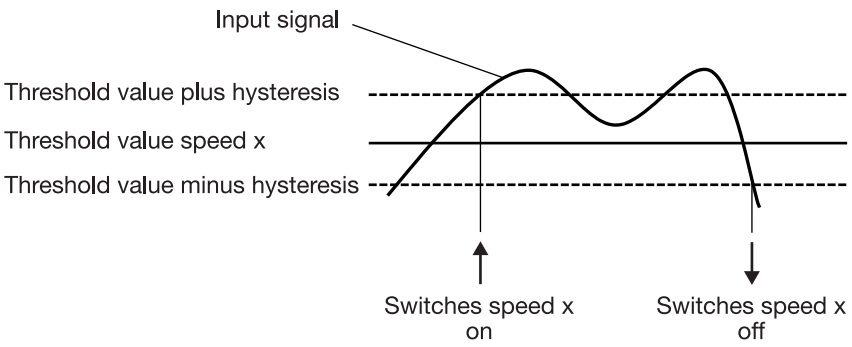
The setting 0 causes immediate switching without hysteresis.

The entered percentage value is directly added, to or subtracted from, the percentage value of the *Fan speed x threshold value*. The result equals the new upper or lower threshold.

Switch threshold top (switch on) = threshold value + hysteresis

Switch threshold bottom (switch off) = threshold value + hysteresis

Example: Three speed fan, hysteresis with fan control



Using hysteresis a continuous switching between the fan speeds around the threshold value with deviating input signals can be avoided.

Important

How does the fan react if the switch thresholds overlap by the use of hysteresis?

1) The hysteresis defines from which point the set speed transition occurs.
2) If the speed transition occurs, the new speed is determined using the control value and the set switch thresholds. The hysteresis is not considered.
3) A control variable with the value 0 always results in speed 0.

An example:

Parameterised: Threshold value off <-> speed 1 = 10 %
Threshold value 1 <-> speed 2 = 20 %
Threshold value 2 <-> speed 3 = 30 %
Hysteresis 15 %

Behaviour when ascending from speed 0:
– Speed 0 transition at 25 % (≥ 10 % + hysteresis).
– The new speed is 2 (25 % is between 20 and 30 %).
– Accordingly speed 1 is omitted.

Behaviour when descending from speed 3:
– Speed 3 transition at 14 % (< 30 % – hysteresis).
– The new speed is 1 (15 % is between 10 and 20 %).
– Accordingly speed 2 is omitted.

Minimum dwell period in fan speed in s [0…65,535]

Options: 0…30…65,535

This parameter defines the dwell time for a fan speed of the fan until it switches to the next higher or lower fan speed.
The input is made in seconds.

A setting of 0 means non-delayed switching. The minimum switch times of the relay can be found in the Technical data, on page 11.

The dwell time in a fan speed is only considered in automatic mode.

Enable limitations

Option: no
yes

- *yes:* Further parameters become visible:

At the same time, 4 communication objects for limitation of the fan speed are enabled:

- *Limitation 1*, e.g. for frost/heat protection
- *Limitation 2,* e.g. for comfort operation
- *Limitation 3,* e.g. for night shutdown
- *Limitation 4,* e.g. for standby operation

Speed ranges (limitations) are defined for the fan with the speed limitation function which may not be exceeded or undershot.

Four limitations are available. They can be used for example for the control of various operating modes, e.g. frost/heat protection, comfort, night shut down and standby. In normal cases the thermostat takes these operating modes into account in its control variable for the actuator.

Important
The parameterised starting behaviour which is a technical characteristic of the fan has a higher priority than a limitation or forced operation, i.e. if a limitation is activated in fan speed 2 and a start-up behaviour is parameterised via fan speed 3, the following behaviour will result: The fan is in the OFF state and receives a control signal for fan speed 1. Initially the fan operates at fan speed 3 (start-up speed) and then proceeds to fan speed 2 which is defined by the limitation. The actual required fan speed 1 will not be achieved due to the limitation.

The sequence of the displayed parameters corresponds with their priorities, i.e. the parameters with the highest priority has limitation 1 followed by limitation 2, 3 and 4.

Note
The fault operation, e.g. as with a malfunction of the thermostat has a lower priority than the fan limitation, i.e. by a limitation of the fan speed during a thermostat malfunction only the upper or the lower limit of the fan limitation can be set at best.

When automatic mode is exited, e.g. by a manual action, the limitations 1 to 4 are inactive.

The set limitations are reactivated after automatic operation is reactivated.

The following points apply for limitations:

- The fan speed and valve position can be parameterised independently.
- The limitation need not necessarily apply to one fan speed only. It can also encompass another range of the fan speeds, i.e. only certain fan speeds can be set if the limitation is active. In this way a limited control is also possible.
- The limitation is activated if a telegram with the value 1 is received on the limitation object. The limitation is deactivated if a telegram with the value 0 is received on the limitation object. A manual action ends automatic mode.
- If a limitation is activated, the Room Master switches to the parameterised fan speed regardless of the control value. If during the activation of the limitation another fan speed or a fan speed outside the range of the “limitation range” is set, the required fan speed or the limit fan speed of the range is set.
- After switch off of the limitations, the fan speed and the communication objects for valve control are recalculated and executed. This means that during limitation the Room Master operates normally in the background, the outputs are not changed and implementation only occurs after the end of limitation.

There are the same parameters for each of the individual four limitations used to limit the fan speeds.

Important
The priority is according to the listed sequence. The highest priority is assigned to limitation 1, e.g. Frost/Heat protection; the lowest priority is assigned to limitation 4, e.g. standby operation.

Fan speed with limitation 1
Fan speed with limitation 2
Fan speed with limitation 3
Fan speed with limitation 4

Options: 3, 2, 1, OFF
unchanged
OFF
1
1, OFF
2
2, 1
2, 1, OFF
3
3, 2
3, 2, 1

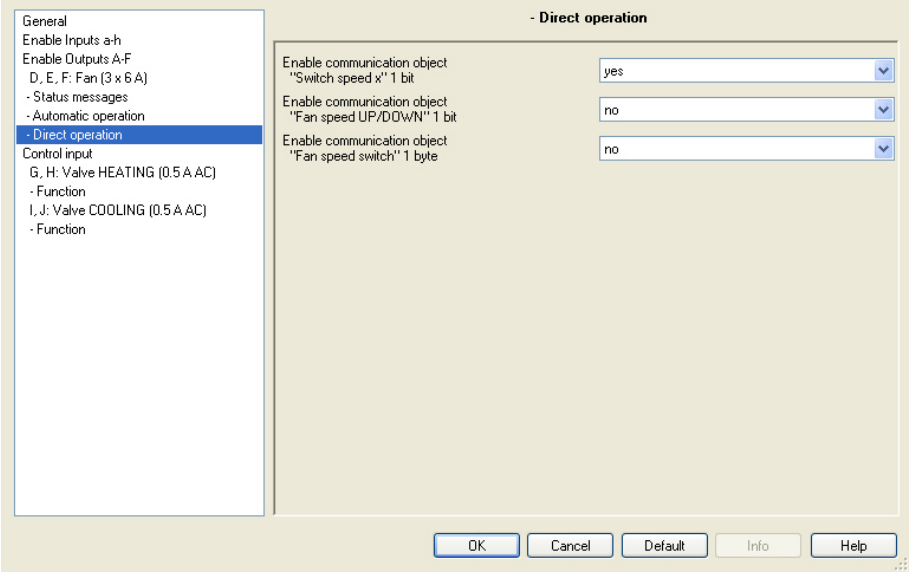
With this parameter you set which fan speed is set with active limitation, or which speed is not exceeded or undershot.

- *3, 2, 1, OFF:* Everything is possible.
- *Unchanged:* The state is retained.
- *OFF:* Off.
- *1:* limited to speed 1.*
- *1, OFF:* limited to speed 1 and off.
- *2:* limited to speed 2.*
- *2, 1:* limited to speed 2 and 1.
- *2, 1, OFF:* limited to speed 2, 1 and off.
- *3:* limited to speed 3.*
- *3, 2*: limited to speed 3 and 2.
- *3, 2, 1:* limited to speed 3, 2 and 1.

* The control value is ignored.

3.2.3.3.3 Parameter window - *Direct operation*

This parameter window is visible if in parameter window *D, E, F, Fan (3 x 6 A)* the option *yes* has been selected in the *Enable direct operation* parameter.



Enable communication object "Switch speed x" 1 bit

Options: no
yes

- *yes:* Three 1 bit communication objects *Speed 1*, *Speed 2* and *Speed 3* are enabled.

The Room Master receives a setting command via these communication objects.

Telegram value 1 = Fan speed x is switched on
0 = Fan speed x is switched off

If several ON/OFF commands are received consecutively in a short period of time at various *Fan speed 1-3* communication objects, the value last received by the fan control is the decisive value. An OFF command to one of the three communication objects, Fan speed 1-3, switches off the fan completely.

Important
The forced operation remains valid and is considered. The parameterised minimum dwell time in the fan speed for automatic mode is ignored during manual operation. Accordingly, an immediate reaction to the manual operation is detected. The delay time with speed switch over remains active to protect the fan.

Enable communication object
”Fan speed UP/DOWN" 1 bit

Options: no
yes

- *yes:* A 1 bit *Fan speed UP/DOWN* communication object is enabled.

Telegram value 1 = a fan speed is switched UP
0 = a fan speed is switched DOWN

If the maximum fan speed is achieved and a further telegram with the value 1 is received, the fans speed will remain as it is.

Important
The forced operation remains valid and is considered.
The parameterised minimum dwell time in the fan speed for automatic mode is ignored during manual operation. Accordingly, an immediate reaction to the manual operation is detected.
The delay time with speed switch over remains active to protect the fan.

With multiple manual UP or DOWN switching the target speed will be increased or reduced by a speed step. This is possible until the maximum or minimum possible speed is achieved. Further UP or DOWN commands are ignored and not executed.
Each new switching command initiates a new calculation of the target speed. This means that a target speed changes by a switching command until this is achieved..

Enable communication object
"Switch speed" 1 byte

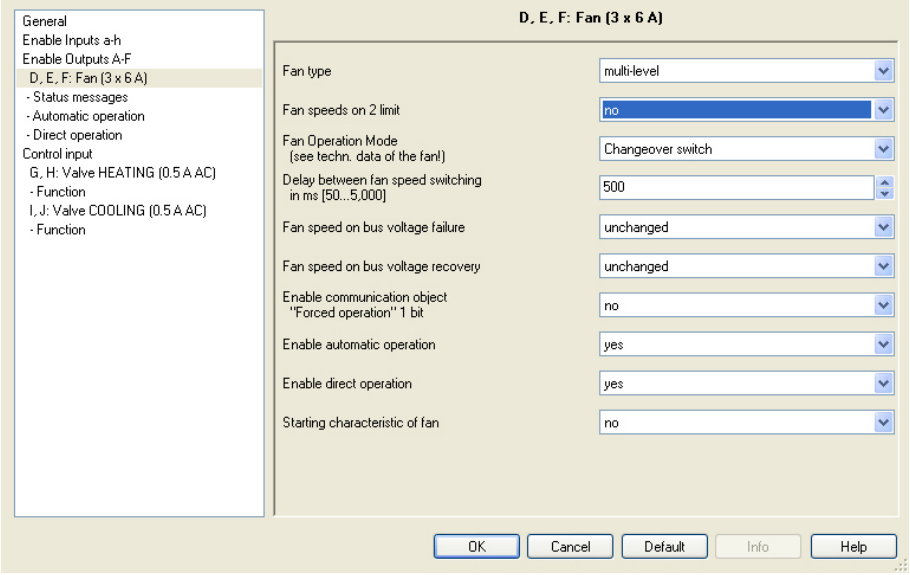
Options: no
yes

- *yes:* A 1 byte *Switch speed* communication object is enabled.

3.2.3.4 Parameter window *D, E, F: Fan (3 x 6 A) two speed*

In this parameter window all settings for the *Two-level fan* are undertaken.

This parameter is visible if in parameter window *Enable Outputs A-F*, page 59, the option *enable as fan speeds* with the parameter *Outputs D, E, F* has been selected.



If a fan with two fan speeds is to be controlled via the RM/S, the following parameters must be set:

- Select in the parameter window *D, E, F Fan (3 x 6 A) in the p*arameter *Fan type*, the option *multi-level*.
- The parameter *Fan speed on 2 limit* must be selected with *yes*.

Now a two speed fan is controlled via fan speeds 1 and 2.

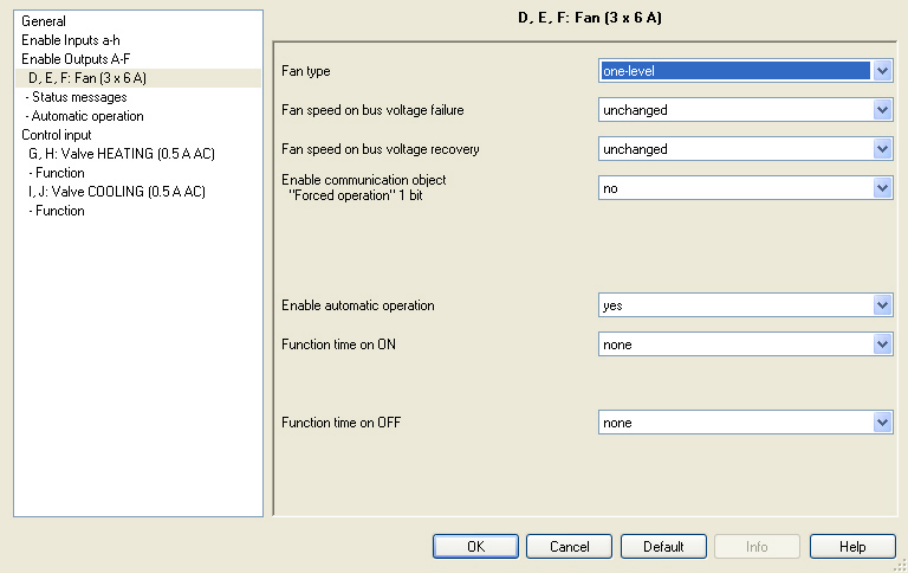
Fan speed 3 with all its parameters and options is now non-functional.

Note
Further parameters and their settings can be found in parameter window *D, E, F: Fan (3 x 6 A) multi-level, page 85*.

3.2.3.5 Parameter window *D, E, F: Fan (3 x 6 A) one-level*

In this parameter window all settings for the *one-level fan* are undertaken.

This parameter is visible if in parameter window *Enable Outputs A-F*, page 59, the option *enable as fan speeds* with the parameter *Outputs D, E, F* has been selected.



Fan type

Option: multi-level
one-level

The fan type to be controlled is set with this parameter.

If a fan with up to three speeds is to be controlled, the option multi-level must be selected.

If a fan with one speed is to be controlled, the option one-level must be selected.

Fan speed on bus voltage failure

Option: unchanged
OFF
ON

The behaviour of the fan with a bus voltage failure is defined here.

Fan speed on bus voltage recovery

Options: unchanged
OFF
ON

The behaviour of the fan on bus voltage recovery is defined here.

- *unchanged:* The fan speed of the fan remains unchanged.
- *OFF:* The fan is switched off.
- *ON:* The fan is switched on.

Caution

The RM/S is supplied ex-works with a default setting (factory default). This ensures the fan setting is switched off when the bus voltage is applied to the relay for the first time.
Thus, damage to the device due to unintentional switch on during transport, e.g. due to vibration, is avoided.

It is advisable to apply a bus voltage before connecting the fan in order to achieve a defined switch state of the fan. This eliminates the possibility of the destruction of the fan due to an incorrect contact setting.

Enable communication object "Forced operation" 1 bit

Options: no
yes

- *yes:* A 1 bit *Forced operation* communication object is enabled. Further parameters appear at the same time:

  Forced operation on object value

  Options: 1
  0

  - *1:* Forced operation is activated by a telegram with value 1.
  - *0:* Forced operation is activated by a telegram with value 0.

  Behaviour with forced operation

  Options: unchanged
  OFF
  ON

  This parameter defines how the fan should respond with forced operation.

Enable automatic operation

Options: no
yes

- *yes:* Automatic mode is enabled; an additional - *Automatic operation* parameter window appears.

Function time on ON

Options: none
switching delay
minimum time

The function *Time* at fan ON is defined with this.

- *none:* The time function is executed.
- *switching delay:* The fan is switched on using this delay.
- *minimum time:* The fan remains ON for at least this time.

With option *switching delay* the following parameters appear:

Time in s [1…65,535 x 0.1]

Options: 1…20…65,535

The fan is switched on using this delay.

With option *minimum time* the following parameters appear:

Time in s [1…65,535]

Options: 1…20…65,535

The fan remains ON for at least this time.

Function time on OFF

Options: none
switching delay
minimum time

The function *Time* at fan OFF is defined with this.

- *none:* The time function is executed.
- *switching delay:* The fan is switched off using this delay.
- *minimum time:* The fan remains OFF for at least this time.

With option *switching delay* the following parameters appear:

Time in s [1…65,535 x 0.1]

Options: 1…20…65,535

The fan is switched off using this delay.

With option *minimum time* the following parameters appear:

Time in s [1…65,535]

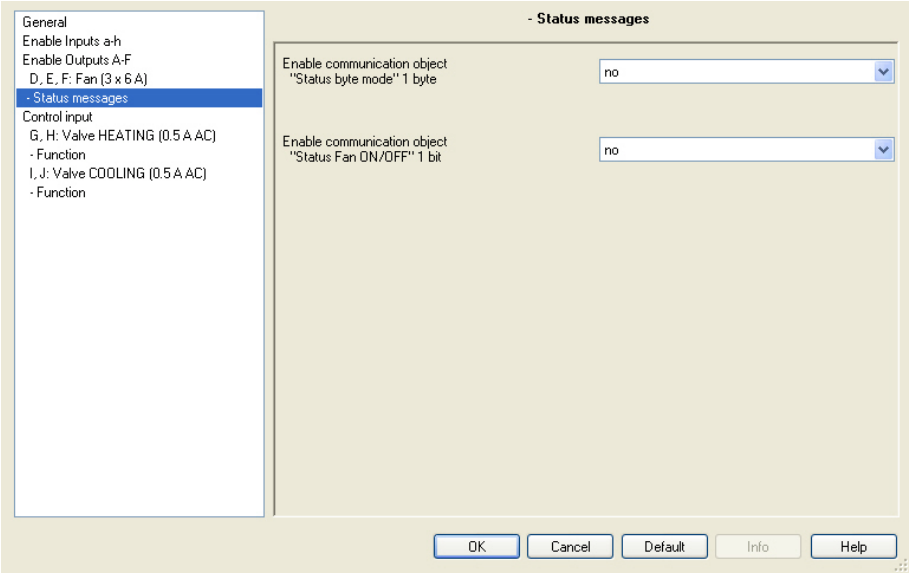
Options: 1…20…65,535

The fan remains OFF for at least this time.

3.2.3.5.1 Parameter window - *Status messages*

In this parameter window the *Status messages* are defined.

This parameter is visible if in parameter window *Enable Outputs A-F*, page 59, the option *enable as fan speeds* with the parameter *Outputs D, E, F has been selected*.



Enable communication object "Status byte mode" 1 byte

Options: no
yes

- *yes:* The communication object *Status byte mode* is enabled.

From this status byte the states HEATING, COOLING, automatic, forced operation and the four limitations are indicated directly via a 1 bit coding.

For further information see: Status byte fan, forced operation, page 222

With option *yes* a further parameter appears:

Send object value

Options: no, update only
after a change
after request
after a change or request

- *no, update only*: The status is updated but not sent.
- *after a change:* The status is sent after a change.
- *after request:* The status is sent after a request.
- *after a change or request:* The status is sent after a change or a request.

Enable communication object "Status fan ON/OFF" 1 bit'

Options: no
yes

The communication object *Status fan* can be enabled with this parameter.

Some fans initially require an ON command before they are set to a fan speed from the OFF state. This ON command has effect on a main switch which has to be switched on.
This demand can be implemented with any switch output which is controlled via the *Status fan* communication object. The corresponding switch communication object of the switch actuator should be connected with the *Status fan* communication object.

With option *yes* a further parameter appears:

Send object value

Options: no, update only
after a change
after request
after a change or request

- *no, update only*: The status is updated but not sent.
- *after a change:* The status is sent after a change.
- *after request:* The status is sent after a request.
- *after a change or request:* The status is sent after a change or a request.

The following parameter only appears when in parameter window *D, E, F:* the option *yes* has been selected in the *Automatic operatio*n parameter in the *L, M, N, Fan (3 x 6 A)* parameter window:

Enable communication object "Status automatic" 1 bit

Options: no
yes

The communication object *Status automatic* is enabled with this parameter.

Telegram value 1 = automatic operation active
0 = automatic operation inactive

- *yes:* The following parameter appears:

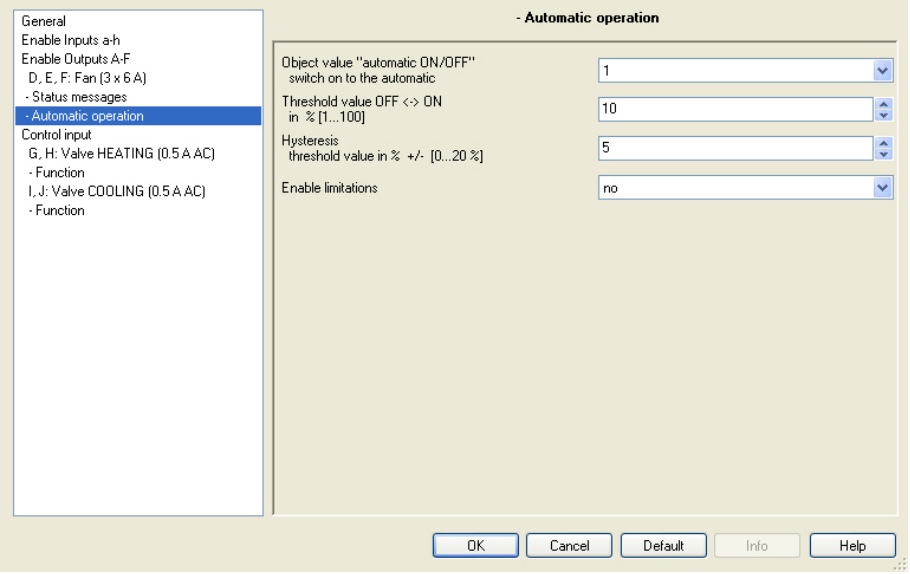
Send object value

Options: no, update only
after a change
after request
after a change or request

- *no, update only*: The status is updated but not sent.
- *after a change:* The status is sent after a change.
- *after request:* The status is sent after a request.
- *after a change or request:* The status is sent after a change or a request.

3.2.3.5.2 Parameter window - *Automatic operation*

This parameter window is visible if in parameter window *D, E, F: Fan (3 x 6 A)* the option *yes* has been selected in the *Enable automatic operation* parameter.



In this parameter window the threshold values for switchover of the fan speed are defined. Furthermore, the limitations can also be enabled.

The corresponding valve control communication object receives the value 1 if a fan speed is set. If a fan speed is not set the communication object will receive the value 0.

Object value “Automatic ON/OFF” switch on to the automatic

Options: 1
0

This parameter defines how to react to a telegram.

- *1:* Automatic is activated by a telegram with value 1.
- *0:* Automatic is activated by a telegram with value 0.

Threshold value OFF <-> ON in % [1…100]

Options: 1…10…100

Here the threshold value at which switch on occurs is defined. If the value in the control value communication object is greater than or equal to the parameterised threshold value, it is switched on. If the value is less, then it is switched off.

Hysteresis
threshold value in % +/- [0…20%]

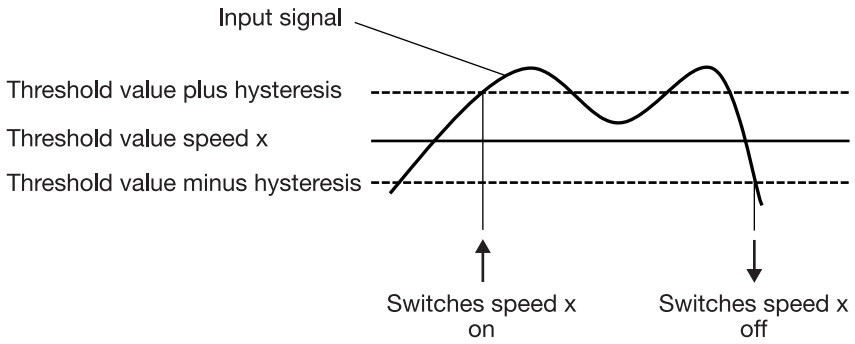
Options: 0…5…20

Here a hysteresis is set at which switchover to the next fan speed occurs. The hysteresis applies for all three threshold values.

The setting 0 causes immediate switching without hysteresis.

The entered percentage value is directly added, to or subtracted from, the percentage value of the *Fan speed x threshold value*. The result equals the new upper or lower threshold.

Example, a three speed fan, hysteresis with fan control



Using hysteresis a continuous switching between the fan speeds around the threshold value with deviating input signals can be avoided.

Enable limitations

Option: no
yes

- *yes:* Other parameters appear:

At the same time, 4 communication objects for limitation of the fan speed are enabled:

- *Limitation 1*, e.g. for frost/heat protection
- *Limitation 2,* e.g. for comfort operation
- *Limitation 3,* e.g. for night shutdown
- *Limitation 4,* e.g. for standby operation

Speed ranges (limitations) are defined for the fan with the speed limitation function which may not be exceeded or undershot.

Four limitations are available. This can be used for example for the control of various operating modes such as frost/heat protection, night shut down and standby. In normal cases the thermostat takes these operating modes into account in its control variable for the Room Master.

Important
The parameterised starting behaviour which is a technical characteristic of the fan has a higher priority than a limitation or forced operation, i.e. if a limitation is activated in fan speed 2 and a start-up behaviour is parameterised via fan speed 3, the following behaviour will result: The fan is in the OFF state and receives a control signal for fan speed 1. Initially the fan operates at fan speed 3 (start-up speed) and then proceeds to fan speed 2 which is defined by the limitation. The actual required fan speed 1 will not be achieved due to the limitation.

The sequence of the displayed parameters corresponds with their priorities, i.e. the parameters with the highest priority has limitation 1 followed by limitation 2, 3 and 4.

Note
The fault operation, e.g. as with a malfunction of the thermostat has a lower priority than the fan limitation, i.e. by a limitation of the fan speed during a thermostat malfunction only the upper or the lower limit of the fan limitation can be set at best.

When automatic mode is exited, e.g. by a manual action, the limitations 1 to 4 remain.

The following points apply for limitations:

- The fan speed and valve position can be parameterised independently.
- The limitation need not necessarily apply to one fan speed only.
  It can also encompass another range of the fan speeds, i.e. only certain fan speeds can be set if the limitation is active. In this way a limited control is also possible.
- The limitation is activated if a telegram with the value 1 is received on the limitation object. The limitation is deactivated if a telegram with the value 0 is received on the limitation object. A manual action ends automatic mode.
- If a limitation is activated, the Room Master switches to the parameterised fan speed regardless of the control value. If during the activation of the limitation another fan speed or a fan speed outside the range of the “limitation range” is set, the required fan speed or the limit fan speed of the range is set.
- After switch off of the limitations, the fan speed and the communication objects for valve control are recalculated and executed. This means that during limitation the Room Master operates normally in the background, the outputs are not changed and implementation only occurs after the end of limitation.

There are the same parameters for each of the individual four limitations used to limit the fan speeds. The priority is according to the listed sequence. The highest priority is assigned to limitation 1, e.g. Frost/Heat protection; the lowest priority is assigned to limitation 4, e.g. standby operation.

Fan speed with limitation 1
Fan speed with limitation 3

Options: inactive
unchanged
OFF
ON

With this parameter you set which fan speed is set with active limitation, or which speed is not exceeded or undershot.

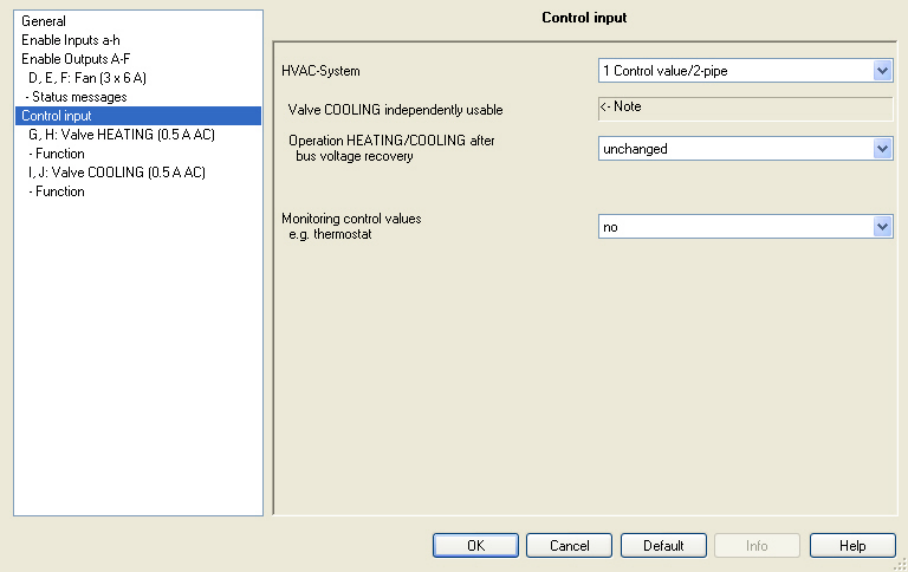
Fan speed with limitation 2
Fan speed with limitation 4

Options: inactive
unchanged
OFF
ON

With this parameter you set which fan speed is set with active limitation, or which speed is not exceeded or undershot.

3.2.4 Parameter window *Control input*

In this parameter window all settings for the *Control input* are undertaken.



HVAC-System

Options: [1 Control value/2-pipe](#)
[1 Control value/4-pipe, with switching object.](#)
[2 Control values/2-pipe](#)
[2 Control values/2-pipe, with switching object](#)
[2 Control values/4-pipe](#)

This parameter defines the pipe system which is used with the Room Master.

The individual functions are described in the following chapters.

Important
If a valve is deactivated due to a conversion of the HVAC system, the valve will be fully closed. A correction curve which may be set will be ignored!

Monitoring control values e.g. thermostat

Options: no
yes

- *yes:* The communication object *Fault control value* is enabled. Hereby for example, a thermostat can be cyclically monitored.

Note
During a fault (emergency operation) when the control signal from the thermostat is no longer received, the Room Master autonomously performs a [Pulse width modulation – calculation](#), page 212 ([Pulse width modulation (PWM)](#), page 210). For this purpose the Room Master uses the programmable PWM cycle time.

With option *yes* in parameter *Monitoring control values, e.g. thermostat,* further parameters appear:

Monitoring time in s [30…65,535]

Options: 30…120…65,535

With this parameter, the time used to monitor all telegrams on the input/setting values of the RM/S is set: Communication objects *Control value HEATING*, *Control value COOLING* or *Control value HEATING/COOLING*.

If a setting variable is not received within the parameterised time, a communication malfunction has occurred and emergency operation is activated.

Important
It must be assured that the monitoring time is set to at least factor 3 larger than the set sending time of the thermostat.

The reaction of the RM/S to a setting value not received can be defined in the following parameters.

Send object value\ (Object "Control value fault" 1 bit)

Options: no, update only
after a change
after request
after a change or request

- *no, update only*: The status is updated but not sent.
- *after a change:* The status is only sent after a change.
- *after request:* The status is only sent after a request.
- *after a change or request:* The status is sent after a change or a request.

Control value after control fault in [0…100] %

Options: 0…30…100

This control value in percent can be set with a control value fault should the control fail (emergency operation).

3.2.4.1 HVAC system – *1 Control value/2 pipe*

If option *1 Control value/2 pipe* is selected, additional parameters appear:

Valve COOLING independently usable

This parameter serves as a note or remark.

Valve COOLING

The cooling valve can be used additionally and independently via the communication object *Control value COOLING (extra!)*. The valve COOLING is not monitored in the process.

Valve HEATING

Via communication object *Control value HEATING/COOLING* the valve HEATING and the fan are controlled.

For further information see: Configuration of a HVAC system with Fan Coil units, page 192

Operation HEATING/COOLING after bus voltage recovery

Options: unchanged
HEATING
COOLING

Using this parameter the reaction after bus voltage recovery is set.

- *unchanged:* After bus voltage recovery the state which existed before bus voltage failure is re-established.
- *HEATING:* After bus voltage recovery the *HEATING* state is set.
- *COOLING:* After bus voltage recovery the *COOLING* state is set.

3.2.4.2 HVAC-System – *1 Control value/4 pipe, with switching object*

If option *1 Control value/4 pipe, with switching object* is selected, additional parameters appear:

Toggle via separate object

This parameter serves as a note or remark.

Valve HEATING/COOLING

Using communication object *Control value HEATING/COOLING*, the valves HEATING/COOLING and the fans are controlled.

Toggle between HEATING and COOLING is implemented via the separate communication object *Toggle HEATING/COOLING*.

The corresponding inactive/non-actuated valve is thus automatically closed when toggled.

For further information see: Configuration of a HVAC system with Fan Coil units, page 192

Operation HEATING/COOLING after bus voltage recovery

Options: unchanged
HEATING
COOLING

Using this parameter the reaction after bus voltage recovery is set.

- *unchanged:* After bus voltage recovery the state which existed before bus voltage failure is re-established.
- *HEATING:* After bus voltage recovery the *HEATING* state is set.
- *COOLING:* After bus voltage recovery the *COOLING* state is set.

Object value for HEATING the object "Toggle, HEATING / COOLING"

Options: 1
0

With this parameter you set the object value used to toggle between HEATING and COOLING.

- *1:* As soon as a telegram with the value 1 is received, HEATING is activated and COOLING is deactivated.
- *0:* As soon as a telegram with the value 0 is received, HEATING is activated and COOLING is deactivated.

3.2.4.3 HVAC System – *2 Control values/2 pipe*

If option *2 Control values/2 pipe* is selected, additional parameters appear:

Toggle via automatically
Valve COOLING not usable

This parameter serves as a note or remark.

Valve HEATING/Valve COOLING

Toggling between HEATING and COOLING is implemented by updating the control values. The HEATING/COOLING status is then set accordingly.

Note
The switch over between HEATING/COOLING should occur exclusively with the respective thermostat. Here only HEATING or COOLING are active dependent on the last active received control value. If a control with a value > 0 is received, the fan and the corresponding valve are controlled. - The other valve is closed. - If a control value with a value = 0 is received, this is ignored if the other control value > 0.

Caution
With a 2 pipe HVAC system both the *Control value HEATING* as well as the *Control value COOLING* act on the heating valve (electronic outputs G, H). Please note that always the last control value received controls the heating valve. For 2 pipe systems only the communication objects for the HEATING valve are relevant. The communication objects in conjunction with the COOLING valve, e.g. status, forced operation or valve purge are not effective.

For further information see: Configuration of a HVAC system with Fan Coil units, page 192

Operation HEATING/COOLING after bus voltage recovery

Options: unchanged
HEATING
COOLING

Using this parameter the reaction after bus voltage recovery is set.

- *unchanged:* After bus voltage recovery the state which existed before bus voltage failure is re-established.
- *HEATING:* After bus voltage recovery the *HEATING* state is set.
- *COOLING:* After bus voltage recovery the *COOLING* state is set.

3.2.4.4 HVAC System – *2 Control values/2 pipe, with switching object*

If option *2 Control values/2 pipe, with switching object* is selected, additional parameters appear:

Toggle via separate object
Valve COOLING not usable

This parameter serves as a note or remark.

Valve HEATING/Valve COOLING

The valve is controlled via the communication object *Control value HEATING*.

Toggle between HEATING and COOLING is implemented via the separate communication object *Toggle HEATING/COOLING*.

Caution

With a 2 pipe HVAC system both the *Control value HEATING* as well as the *Control value COOLING* act on the heating valve (electronic outputs G, H). Please note that always the last control value and the switching object received controls the heating valve.

For 2 pipe systems only the communication objects for the HEATING valve are relevant.

The communication objects in conjunction with the COOLING valve, e.g. status, forced operation or valve purge are not effective.

For further information see: Configuration of a HVAC system with Fan Coil units, page 192

Operation HEATING/COOLING after bus voltage recovery

Options: unchanged
HEATING
COOLING

Using this parameter the reaction after bus voltage recovery is set.

- *unchanged:* After bus voltage recovery the state which existed before bus voltage failure is re-established.
- *HEATING:* After bus voltage recovery the *HEATING* state is set.
- *COOLING:* After bus voltage recovery the *COOLING* state is set.

Object value for HEATING the object "Toggle HEATING/COOLING"

Options: 1
0

With this parameter you set the object value used to toggle between HEATING and COOLING.

- *1:* As soon as a telegram with the value 1 is received, HEATING is activated and COOLING is deactivated.
- *0:* As soon as a telegram with the value 0 is received, HEATING is activated and COOLING is deactivated.

3.2.4.5 HVAC System – *2 Control values/4 pipe*

If option *2 Control values/4 pipe* is selected additional parameters appear:

Toggle via automatically

This parameter serves as a note or remark.

Valve HEATING/Valve COOLING

The HEATING valve is controlled via the communication object *Control value HEATING*.

The COOLING valve is controlled via the communication object *Control value COOLING*.

Toggling between HEATING and COOLING is implemented by updating the control values. The HEATING/COOLING status is then set accordingly.

Note
The switch over between HEATING/COOLING should occur exclusively with the respective thermostat. Here only HEATING or COOLING are active dependent on the last active received control value. If a control with a value > 0 is received, the fan and the corresponding valve are controlled. - The other valve is closed. - If a control value with a value = 0 is received, this is ignored if the other control value > 0.

For further information see: Configuration of a HVAC system with Fan Coil units, page 192

Operation HEATING/COOLING after bus voltage recovery

Options: unchanged
HEATING
COOLING

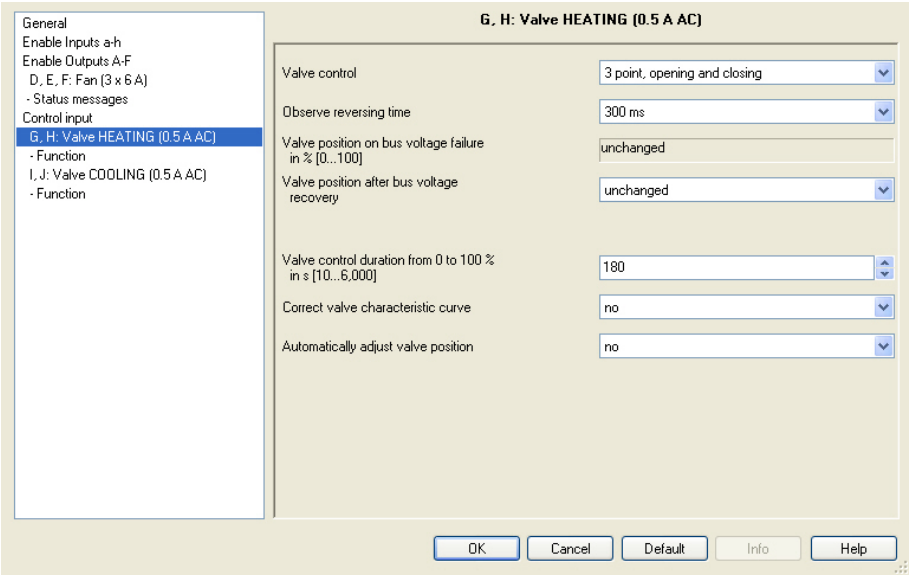
Using this parameter the reaction after bus voltage recovery is set.

- *unchanged:* After bus voltage recovery the state which existed before bus voltage failure is re-established.
- *HEATING:* After bus voltage recovery the *HEATING* state is set.
- *COOLING:* After bus voltage recovery the *COOLING* state is set.

3.2.5 Parameter window *G, H: Valve HEATING (0.5 A AC) – 3 point, opening and closing*

In this parameter window all settings for the *Valve HEATING* are undertaken.

This parameter appears if the option *3 point, opening and closing* has been selected in the parameter *Valve control*.



Valve control

Options: Continuous, PWM
3 point, opening and closing

With this parameter the properties of the connected valve are set (Pulse width modulation (PWM), page 210).

Observe reversing time

Options: no
100/300/500/700/1,000 ms

A reversing time pause is set via this parameter.

The time should be taken from the technical data of the valve.

Valve position on bus voltage failure in % [0…100]

Note: unchanged

The valve remains unchanged at its position with a bus voltage failure.

Valve position after bus voltage recovery

Option: unchanged
select

Using this parameter the position of the valves after bus voltage recovery can be set.

- *select:* An additional parameter appears:

Valve position in % [0…100]

Option: 0…100

Using this parameter the position of the valves after bus voltage recovery can be set as a percentage.

Valve control duration from 0 to 100 % in s [10…6,000]

Option: 10…180…6,000

With this parameter a time is set in seconds which the connected valve requires to move from position 0 % (valve closed) to position 100 % (valve fully open).

The time should be taken from the technical data of the valve.

Correct valve characteristic curve

Option: no
yes

If the option yes is set in the parameter, the parameter window *- Curve, page 132,* in which the valve is set appears.

Automatically adjust valve position

Option: no
yes

- *yes:* Furthermore, the parameters *Number of valve controls up to adjustment [1…65,535]* appears.
- ***no:*** **Nothing happens.**

Note
A manual triggering of the adjustment is not possible!

Adjust with control value 0 %

Any action with control value 0 % is executed as an adjustment, i.e.:

- The valve is fully closed regardless of the curve.
- The closing position is exceeded by 5 % of the total time, max. one minute.
- This function cannot be interrupted!
- Thereafter, the current valve position is approached and the adjustment counter is set to zero.

The following applies with automatic adjustment

- The adjustment counter is incremented by 1 every time the valve stops.
- If the parameterised limit of the adjustment counter is exceeded in the closing direction, the adjustment starts
- If higher priorities are activated at the time of automatic adjustment, the adjustment will be performed later.
- The adjustment is interrupted by higher priority events.
- The valve is fully closed regardless of the curve.

- The closing position is exceeded by 5 % of the total time, max. one minute.
  This function cannot be interrupted!
  Thereafter, the current valve position is approached and the adjustment counter is set to zero.

Note
A valve adjustment has occurred if a control of the drive has actually been undertaken. If priorities and curves prevent this, the adjustment counter will not change.

Reference movement

A reference movement can be understood as a complete closing of the valve.

Referencing is undertaken after:

- Every reset of the bus.
- A change of version.
- Every reset of an un-parameterised device
- A download with modified adjustment time.

The following should be considered:

- Referencing cannot be interrupted.
- The closing position is exceeded by 5 % of the total time, max. one minute.
- After the reference movement, the current valve position is moved to and the adjustment counter is set to zero.

For further information see: Priorities with, …, page 217

Number of valve controls up to adjustment [1...65,535]

Option: 1…100…65,535

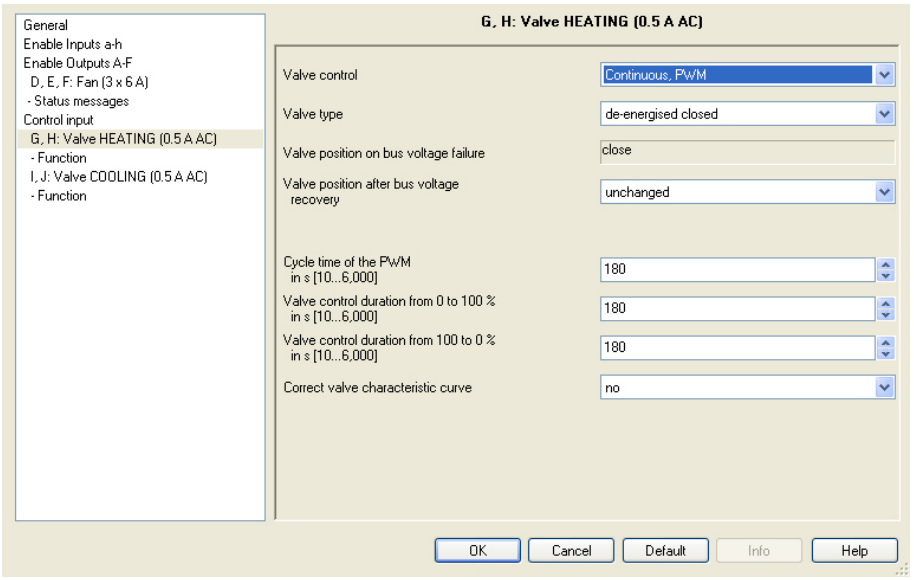
With this parameter the number of operations (valve controls) after which automatic adjustment is undertaken can be set.

Note
All actions greater than zero (motor does not move) are counted. The number should be taken from the technical data of the valve manufacturer.

3.2.6 Parameter window *G, H: Valve HEATING (0.5 A AC) – Continuous, PWM*

This parameter appears if the option *Continuous, PWM* has been selected in the *Valve control* parameter.

Pulse width modulation (PWM), page 210



Valve type

Options: de-energised closed
de-energised opened

Using this parameter the valve type for the connected valve is set.

How does a de-energised closed (normally closed) valve behave?

If no current flows in the control circuit the valve is closed. The valve is opened as soon as current flows in the control circuit.

How does a de-energised opened (normally open) valve behave?

If no current flows in the control circuit the valve is opened.
The valve is closed as soon as current flows in the control circuit.

- *de-energised closed:* The following parameter appears:

  Valve position on bus voltage failure

  Option: closed

  This option is intended as a marker. The valve remains closed at bus voltage failure.

- *de-energized opened:* The following parameter appears:

  Valve position on bus voltage failure

  Option: opened

  This option is intended as a marker. The valve remains opened at bus voltage failure.

Valve position on bus voltage recovery

Option: unchanged
select

Using this parameter the position of the valves after bus voltage recovery can be set.

- *select:* An additional parameter appears:

  Valve position in % [0…100]

  Option: 0…100

  Using this parameter the position of the valves after bus voltage recovery can be set as a percentage.

Cycle time of the PWM in s [10…6,000]

Option: 10…180…6,000

This is used to set the cycle time of the PWM control.

Important
The minimum pulse length is defined as 0.5 seconds so that with very short cycle times (< 1 min.), there are very short switch on times (with small percentage values) or switch off times (with higher percentage values).

Valve control duration from 0 to 100 % in s [10…6,000]

Option: 10…180…6,000

With this parameter a time is set in seconds which the connected valve requires to move from position 0 % (valve closed) to position 100 % (valve fully open).

Note
The time should be taken from the technical data of the valve and corresponds with the total runtime.

Valve control duration from 100 to 0 % in s [10…6,000]

Option: 10…180…6,000

With this parameter, a time is set in seconds which the connected valve requires to move from position 100 % (valve open) to position 0 % (valve fully closed).

Note
The time should be taken from the technical data of the valve and corresponds with the total runtime.

Fast heat up/cool down

In addition to the adjustable time, an additional time is determined in dependence on the change in control value. Thus, faster heat up or cool down of a room is achieved.
The difference between the current and the new control value is ascertained for determination of the additional time.
The additional time is dependent on how large the control value change should be from the current control value to the new control value.

Example
If the change in the control value ascends, i.e. the current control value is at 10 % and the new control value is at 20 %, fast heat up is activated. If the change in the control value descends, i.e. the current control value is at 60 % and the new control value is at 40 %, fast cool down is activated.

For further information see: Fast heat up/cool down, page 218

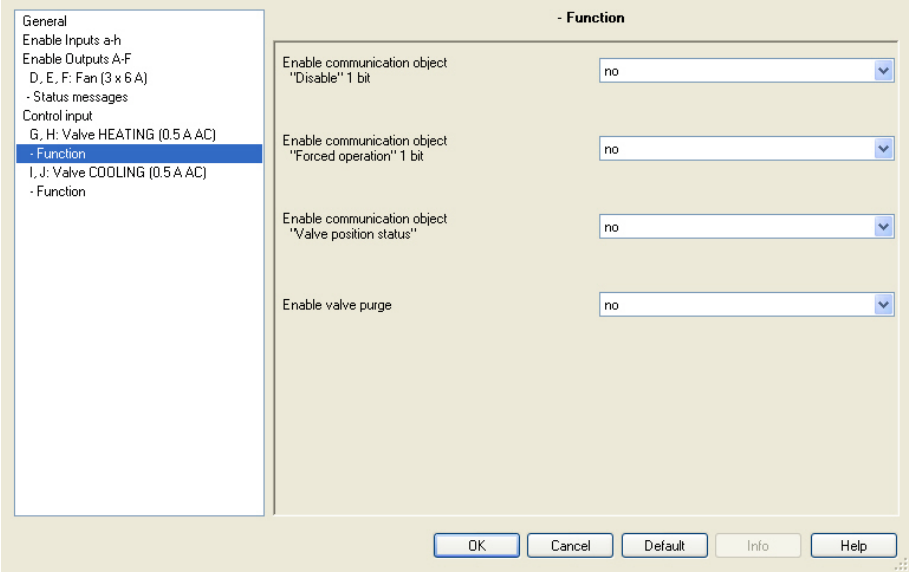
Correct valve characteristic curve

Option: no
yes

If the option yes is set in the parameter, the parameter window *- Curve, page* 132*,* in which the valve is set, appears.

3.2.6.1 Parameter window - *Function*

Various communication objects can be enabled in the parameter window - *Function*.



Enable communication object "Disable" 1 bit

Options: no
yes

- *yes:* The 1 bit communication object *Block* is enabled and can then be used for blocking.

With option *yes* the following parameters appear:

Disable on object value

Options: 1
0

Here you set the object value used to block the valve.

Enable communication object "Forced operation" 1 bit

Options: no
yes

- *yes:* The 1 bit communication object *Forced operation* is enabled and can then be used for forced operation.

Note
The characteristic curve adjustment is also active with forced operation.

With option *yes* the following parameters appear:

Forced operation on object value

Options: 1
0

Here you set the object value used to forcibly operate the valve.

Valve position on forced operation in % [0…100]

Options: 0…30…100

Here the forced operation of the valve position in percent is set.

Note
The characteristic curve adjustment is also active with forced operation.

Enable communication object "Valve position status"

Options: no
1 bit
1 byte

Note
The valve position status is sent immediately after the control value is received.

- *1 bit:* The following parameters appear:

  Send object value

  Options: no, update only
  after a change
  after request
  after a change or request

  - *no, update only*: The status is updated but not sent.
  - *after a change:* The status is sent after a change.
  - *after request:* The status is sent after a request.
  - *after a change or request:* The status is sent after a change or a request.

  Object value with valve position >0

  Options: 1
  0

- *1 byte:* The following parameter appears:

Send object value

Options: no, update only
<u>after a change</u>
after request
after a change or request

- *no, update only*: The status is updated but not sent.
- *after a change:* The status is sent after a change.
- *after request:* The status is sent after a request.
- *after a change or request:* The status is sent after a change or a request.

Enable valve purge

Options: <u>no</u>
yes

- *yes:* The 1 bit *Trigger valve purge* communication object is enabled.

Note
If the valve purge is interrupted by a higher priority, it will restart after the completion of the priority task, unless, for example, the control value was 100 % or it was active for the duration of the purge time due to the higher priority. The valve position for purging is always the control value 100 %. A correspondingly matched curve is considered. ***For further information see: Priorities with ..., page 217***

With option *yes* the following parameters are visible:

Enable communication object "Status valve purge" 1 bit

Options: <u>no</u>
yes

- *yes:* The 1 bit *Status valve purge* communication object is enabled.

The status of the valve purge and the following additional parameters appear via this communication object.

Send object value

Options: no, update only
<u>after a change</u>
after request
after a change or request

- *no, update only*: The status is updated but not sent.
- *after a change:* The status is sent after a change.
- *after request:* The status is sent after a request.
- *after a change or request:* The status is sent after a change or a request.

Note
The status is sent immediately as soon as a new control value is received.

Duration of valve purge in min.
[1…255]

Options: 1…10…255

The time duration for the valve purge is set with this parameter. In this time the valve is fully opened. When the time has elapsed, the state before the purge is re-established.

Note
The opening time of the valve must be considered when entering the purge time. The characteristic curve correction is active for the valve purging time.

Automatic valve purge

Options: no
yes

- *yes:* The following parameters appear:

  Purge cycle in weeks
  [1…12]

  Options:1…6…12

  The counter for automatic purging starts to run when the parameter is downloaded. The time is reset each time it is downloaded.

  The time is reset as soon as purging is completed. This can occur either through automatic purging or via the communication object *Trigger valve purge*.

Note
Purging can also be triggered via the bus with the communication object *Trigger valve purge*. After bus voltage recovery and download the purge cycle continues, the bus failure time – the time for which the bus actually failed – is not considered. The purging cycle will restart if *Purge cycle in weeks [1…12]* is changed after the download.

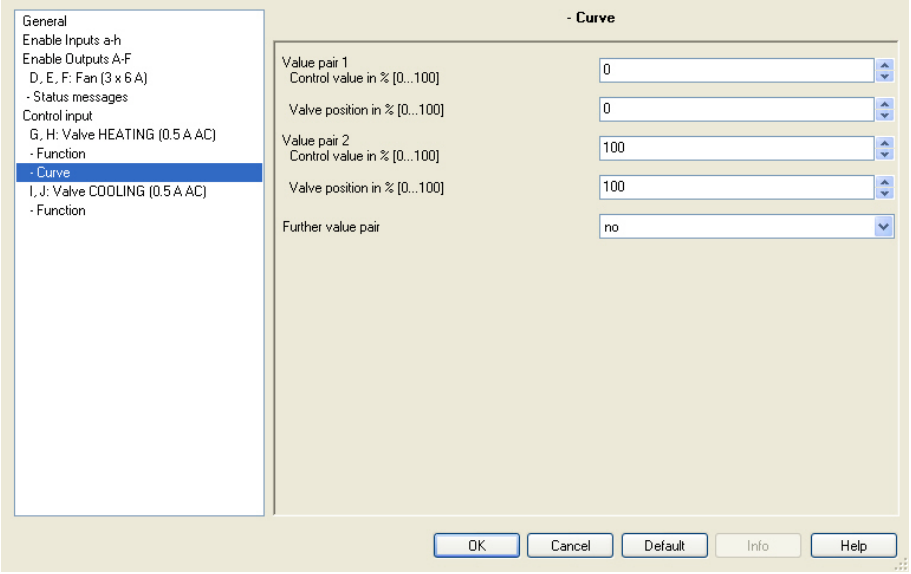
  Reset purge cycle
  from control value in % [1…99]

  Options:1…99

  Hereby the purge cycle from the set control value is reset.

3.2.6.2 Parameter window - *Curve*

The parameter window *Curve* is visible if in parameter window *Valve HEATING* the parameter *Correct valve characteristic curve* has been selected with the option *yes*.



The following must be considered with the curve entries:

- The value pairs can be entered in any sequence. They are sorted in ascending order of the control value in the device and intermediate values are interpolated.
- If value pairs have the same control value, the value pair with the largest value position applies. All other value pairs are ignored..
- The value pair with the smallest valve position applies for the correction of the smaller control values.
- If no value pair has been entered for the control value 0 %, the valve position of the first value pair applies for all control values from 0 to the first value pair.
- If no value pair has been entered for the control value 100 %, the valve position from the last value pair up to 100 % applies for the last value pair.

Note
The characteristic curve adjustment is also active with forced operation.

Caution
A parameterisation of the value pair with the same control value leads to an undefined state and should be strictly avoided. Otherwise it can lead to destruction of the HVAC system.

Value pair 1
Control value in % [0…100]

Options: 0…100

Valve position in % [0…100]

Options: 0…100

Value pair 2
Control value in % [0…100]

Options: 0…100

Valve position in % [0…100]

Options: 0…100

Value pair 1 forms the lower limit and value pair 2 forms the upper limit of the curve.

The possibility of activating other value pairs allows different curve characteristics to be realised.

For further information see: Valve curve, page 206

A total of four value pairs can be set.

Further value pair

Options: no
yes

- *yes:* A further value pair can be set.

Value pair 3
Control value in % [0…100]

Options: 0…50…100

Valve position in % [0…100]

Options: 0…50…100

Further value pair

Options: no
yes

- *yes:* A further value pair can be set.

Value pair 4
Control value in % [0…100]

Options: 0…50…100

Valve position in % [0…100]

Options: 0…50…100

3.2.7 Parameter window *I, J: Valve COOLING (0.5 A AC)*

The setting options of valve COOLING do not differentiate from those of valve HEATING.

The descriptions of the parameter setting options and adjustable communication objects for the valve COOLING are described under parameter window *G, H: Valve HEATING (0.5 A AC) – 3 point, opening and closing*, page 122.

3.2.8 Commissioning without bus voltage

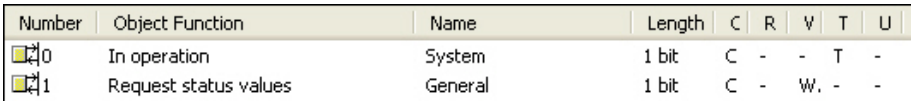
How is the device switched on and put into operation?

The device can be made operational by applying an auxiliary voltage from the power supply (NTI).

3.3 Communication objects

Note
As standard the write flag (with the exception of 1 bit communication objects) are deleted with the object values. Thus the object value cannot be changed via the bus. If this function is required, the Write flag must be set in the ETS. The object value is overwritten with the parameterised value after bus voltage recovery.

3.3.1 General



Number	Object Function	Name	Length	C	R	W	T	U
0	In operation	System	1 bit	C	-	-	T	-
1	Request status values	General	1 bit	C	-	W	-	-

No.	Function	Object name	Data type	Flags
0	**In operation**	**System**	**EIS 1, 1 bit** **DPT 1.002**	**C, T**

The communication object is enabled if in parameter window *General* the the setting *Sent "In operation" object* is selected with the option *send value 0 cyclically* or *send value 1 cyclically*.

In order to regularly monitor the presence of the Room Master on the ABB i-bus®, a monitoring telegram can be sent cyclically on the bus.
As long as the communication object is activated it sends an *in operation* telegram.

Telegram value: 1 = system in operation with option *send value 1 cyclically*
0 = system in operation with option *send value 0 cyclically*

1	**Request status values**	**General**	**EIS 1, 1 bit** **DPT 1.017**	**C, W**

The communication object is enabled if in parameter window *General* the parameter *Enable communication object "Request status values" 1 bit* has been selected with option *yes*.

If a telegram with the value x (x = 0; 1; 0 or 1) is received in the communication object, all status objects are sent on the bus, as long as these have not been programmed with the option *after a change* or *after request* or *after a change or request*.

The following function results for the value x = 1:

Telegram value: 1 = all status messages are sent.
0 = nothing happens.

2…9				

Not assigned.

3.3.2 Communication objects
D, E, F: Fan (3 x 6 A)

Note
All three fan speeds can be parameterised individually as outputs D, E, and F. The descriptions of the communication objects for this purpose can be under communication objects *Outputs*, page 168. The descriptions of the setting possibilities can be found in parameter window *Enable Outputs A-F*, page 59.

3.3.2.1 Communication objects
Multi-level fan

Number	Object Function	Name	Length	C	R	W	T	U
10	Fan speed switch	Fan	1 Byte	C	-	W	-	-
11	Switch speed 1	Fan	1 bit	C	-	W	-	-
12	Switch speed 2	Fan	1 bit	C	-	W	-	-
13	Switch speed 3	Fan	1 bit	C	-	W	-	-
14	Fan speed UP/DOWN	Fan	1 bit	C	-	W	-	-
15	Status fan ON/OFF	Fan	1 bit	C	-	-	T	-
16	Status fan speed	Fan	1 Byte	C	R	-	T	-
17	Status fan speed 1	Fan	1 bit	C	R	-	T	-
18	Status fan speed 2	Fan	1 bit	C	R	-	T	-
19	Status fan speed 3	Fan	1 bit	C	R	-	T	-
21	Limitation 1	Fan	1 bit	C	-	W	-	-
22	Limitation 2	Fan	1 bit	C	-	W	-	-
23	Limitation 3	Fan	1 bit	C	-	W	-	-
24	Limitation 4	Fan	1 bit	C	-	W	-	-
25	Forced operation	Fan	1 bit	C	-	W	-	-
26	Automatic ON/OFF	Fan	1 bit	C	-	W	-	-
27	Status automatic	Fan	1 bit	C	R	-	T	-
28	Status byte mode	Fan	1 Byte	C	R	-	T	-

No.	Function	Object name	Data type	Flags
10	**Fan speed switch**	**Fan**	**EIS 6, 1 byte DPT 5.010**	**C, W**

This communication object is enabled if in parameter window *D, E, F: Fan (3 x 6 A)* the parameter *Enable direct operation* and *Enable communication object "Switch speed" 1 byte* are selected with option *yes*..

With this communication object the fan can be switched on via a 1 byte communication object of a fan speed. If another fan speed is switched on at this point it will be switched off. A new fan speed is switched on taking the start-up phase into consideration.

Limitations through forced operation are retained Automatic operation is disabled. A renewed activation of automatic mode occurs via the communication objects *Automatic ON/OFF.*

The following telegram values result:

1 byte value	Hexadecimal	Binary value bit 76543210	Fan speed
0	00	00000000	0 (OFF)
1	01	00000001	Fan speed 1
2	02	00000010	Fan speed 2
3	03	00000011	Fan speed 3
>3	>03	>00000011	Values greater than 3 are ignored

No.	Function	Object name	Data type	Flags
11	**Switch speed 1**	**Fan**	**EIS 1, 1 bit DPT 1.001**	**C, W**
This communication object is enabled if in parameter window *D, E, F: Fan (3 x 6 A)* the parameter *Enable direct operation* is selected with option *yes* and *Enable communication object "Switch speed x" 1 bit* has been selected with option *yes*. Via the 1 bit communication object the Room Master can receive a control value for fan speed 1. Limitations through forced operation are retained Automatic operation is disabled. A renewed activation occurs via the communication objects *Automatic ON/OFF.* If several ON commands are received consecutively in a short period of time at various *Fan speed 1-3* communication objects, the value last received by the fan control is the decisive value. An OFF command to one of the three communication objects, Fan speed 1-3, switches off the fan completely. Telegram value: 0 = fan OFF 1 = fan ON in speed 1				
12	**Speed 2**			
See communication object 11				
13	**Speed 3**			
See communication object 11				

No.	Function	Object name	Data type	Flags
14	**Fan speed up/down**	**Fan**	**EIS 1, 1 bit** **DPT 1.007**	**C, W**

This communication object is enabled if in parameter window *D, E, F: Fan (3 x 6 A)* the parameter *Enable direct operation* and *Enable communication object "Fan speed UP/DOWN" 1 bit* have been selected with option *yes*..

With this communication object the fan can be switched one fan speed further up or down via a 1 bit telegram. Switching (UP/DOWN) is determined by the telegram value.

With multiple manual UP or DOWN switching the target speed will be increased or reduced by a speed step. This is possible until the maximum or minimum possible speed is achieved. Further UP/DOWN commands are ignored and not executed.
Each new switching command initiates a new calculation of the target speed.

Telegram value: 0 = switch fan speed DOWN
1 = switch fan speed UP

No.	Function	Object name	Data type	Flags
15	**Status fan ON/OFF**	**Fan**	**EIS 1, 1 bit** **DPT 1.001**	**C, T**

This communication object is enabled if in parameter window *Status messages* the parameter *Enable communication object "Status fan ON/OFF" 1 bit* have been selected with option *yes*.

The communication object receives the communication object value 1 (ON), if at least one fan speed is not equal to zero (OFF). The value of the communication object is sent if not equal to zero. This communication object thus defines the status of the fan, whether it is switched on or off.

Telegram value: 0 = OFF
1 = ON

Note
Some fans require an ON command before you set a fan speed. Using the communication object *Status fan ON/OFF,* the fan can for example, be switched on centrally with a switch actuator via the main switch.

No.	Function	Object name	Data type	Flags
16	**Status fan speed**	**Fan**	**noEIS, 1 byte DPT 5.010**	**C, R, T**

This communication object is enabled if in parameter window *Status messages* the parameter *Enable communication object "Status fan speed" 1 byte* has been selected with option *yes*.

You can parameterise whether only the communication object value is updated or if they are only sent on the bus after a change or on request. It is possible to parameterise if the actual or required stages are displayed with the status object.

With this communication object it is possible for example to display the fan speed on the display as a direct figure value.

The following telegram values apply for the 1 byte object:

Figure value	Hexadecimal	Binary value bit 76543210	Fan speed
0	00	00000000	0 (OFF)
1	01	00000001	Fan speed 1
2	02	00000010	Fan speed 2
3	03	00000011	Fan speed 3

No.	Function	Object name	Data type	Flags
17	**Status fan speed 1**	**Fan**	**EIS 1, 1 bit DPT 1.001**	**C, R, T**

This communication object is enabled if in parameter window *Status messages* the parameter *Enable communication object "Status fan speed x" 1 bit* has been selected with option *yes*.

It is possible to parameterise if a communication object value is only updated and not sent, sent on request, or only sent when changed.

Furthermore, you can parameterise if the status should indicate a current fan speed or a required fan speed.
With this communication object is possible to display the fan speed in a visualisation or to indicate it on a display.

Telegram value: 0 = fan speed OFF
1 = fan speed ON

No.	Function	Object name	Data type	Flags
18	**Status fan speed 2**			

See communication object 17

No.	Function	Object name	Data type	Flags
19	**Status fan speed 3**			

See communication object 17

No.	Function	Object name	Data type	Flags
20				

Not assigned.

No.	Function	Object name	Data type	Flags
21	**Limitation 1**	**Fan**	**EIS 1, 1 bit DPT 1.003**	**C, W**

This communication object is enabled if in parameter window *Automatic operation* the parameter *Enable limitations* has been selected with the option *yes*.

Note
Limitation 1 is only active in automatic mode.

The limitation 1 is active if a telegram with the value 1 is received on the communication object *Limitation 1.* The *Limitation 1* is deactivated if a telegram with the value 0 is received on the communication object *Limitation 1*

When *Limitation 1* is activated, the fan can only assume the fan speed or fan speed ranges as parameterised in *Fan speed with limitation 1*. The valve position is independently programmable from the fan limitation.

Telegram value: 0 = limitation x inactive
1 = limitation x active

22	**Limitation 2**			

See communication object 21

23	**Limitation 3**			

See communication object 21

24	**Limitation 4**			

See communication object 21

25	**Forced operation**	**Fan**	**EIS 1, 1 bit DPT 1.003**	**C, W**

This communication object is enabled if in parameter window *D, E, F: Fan (3 x 6 A)* the parameter *Enable communication object "Forced operation" 1 bit* is selected with the option *yes.*

If a forced operation is activated, the Room Master switches independently from the control value and its parameterised Limitation 1-4 to forced operation.

The fan speed and valve position(s) during forced operation can be parameterised individually from one another.

Telegram value: 0 = no forced operation
1 = forced operation

No.	Function	Object name	Data type	Flags
26	**Automatic ON/OFF**	**Fan**	**EIS 1, 1 bit** **DPT 1.003**	**C, W**

This communication object is enabled if in parameter window *D, E, F: Fan (3 x 6 A)* *the Automatic operation* has been selected.

If automatic mode is enabled, it will be activated by an ON telegram with the value 1 on this communication object after an ETS reset.
Automatic mode is switched off, if a telegram is received on a “manual communication object”.

Manual communication objects are:

- Fan: Switch speed
- Fan: Speed x (x = 1, 2, 3), Fan speed switch
- Fan: Fan speed up/down
- Fan: Limitation x (x = 1, 2, 3 or 4)

During forced operation the automatic mode remains active; however, it is only operated within the allowed limits.

If the value 1 is set in the parameter:

Telegram value: 0 = automatic operation OFF
1 = automatic operation ON

If the value 0 is set in the parameter:

Telegram value: 0 = automatic operation ON
1 = automatic operation OFF

No.	Function	Object name	Data type	Flags
27	**Status automatic**	**Fan**	**EIS 1, 1 bit** **DPT 1.003**	**C, R, W**

This communication object is enabled if in parameter window *Status messages* the parameter *Enable communication object "Status automatic" 1 bit* is selected with option *yes*..

It is possible to parameterise if a communication object value is only updated and not sent, sent on request, or only sent when changed.

The communication object indicates the status of the automatic mode.

Telegram value: 0 = inactive
1 = activated

No.	Function	Object name	Data type	Flags
28	**Status byte mode**	**Fan**	**noEIS, 1 byte noDPT**	**C, R, T**

This communication object is enabled if in parameter window *Status messages* the parameter *Enable communication object "Status byte mode" 1 byte* is selected with option *yes*.

The operating state of the fan can be displayed or sent on the bus via this communication object. It is possible to parameterise if a communication object value is only updated and not sent, sent on request, or only sent when changed.

Bit sequence: 76543210

Bit 7: Forced operation
Telegram value 0: inactive
1: active

Bit 6: Limitation 1
Telegram value 0: inactive
1: active

Bit 5: Limitation 2
Telegram value 0: inactive
1: active

Bit 4: Limitation 3
Telegram value 0: inactive
1: active

Bit 3: Limitation 4
Telegram value 0: inactive
1: active

Bit 2: Thermostat fault
Telegram value 0: inactive
1: active

Bit 1: Automatic
Telegram value 0: inactive
1: active

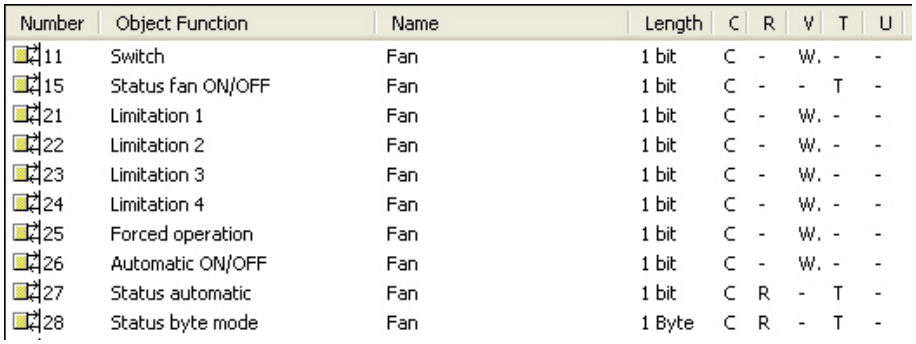
Bit 0: HEATING/COOLING
Telegram value 0: COOLING
1: HEATING

Note

Bit 0: If toggling between HEATING and COOLING is undertaken automatically using control variables, the status HEATING/COOLING is only switched in bit 0 if a value > 0 is received on the control value.

For further information see: Status byte fan, forced operation, page 222

3.3.2.2 Communication objects
Fan one-level



Number	Object Function	Name	Length	C	R	W	T	U
11	Switch	Fan	1 bit	C	-	W	-	-
15	Status fan ON/OFF	Fan	1 bit	C	-	-	T	-
21	Limitation 1	Fan	1 bit	C	-	W	-	-
22	Limitation 2	Fan	1 bit	C	-	W	-	-
23	Limitation 3	Fan	1 bit	C	-	W	-	-
24	Limitation 4	Fan	1 bit	C	-	W	-	-
25	Forced operation	Fan	1 bit	C	-	W	-	-
26	Automatic ON/OFF	Fan	1 bit	C	-	W	-	-
27	Status automatic	Fan	1 bit	C	R	-	T	-
28	Status byte mode	Fan	1 Byte	C	R	-	T	-

No.	Function	Object name	Data type	Flags
10				
Not assigned.				
11	**Switch**	**Fan**	**EIS 1, 1 bit DPT 1.001**	**C, W**
This communication object is enabled if in parameter window *D, E, F: Fan (3 x 6 A)* the parameter *Fan type* has been selected with the option *one-level*.. With this 1 bit communication object the fan can be switched on or off. Limitations through forced operation are retained Automatic operation is disabled. A renewed activation occurs via the communication objects *Automatic ON/OFF.* If several ON commands with the value 1 are received, the value last received for the fan control is decisive. An OFF command switches the fan fully off. Telegram value: 0 = fan OFF 1 = fan ON				
12… 14				
Not assigned.				

No.	Function	Object name	Data type	Flags
15	**Status fan ON/OFF**	**Fan**	**EIS 1, 1 bit** **DPT 1.001**	**C, T**

This communication object is enabled if in parameter window *Status messages* the parameter *Enable communication object "Status fan ON/OFF" 1 bit* have been selected with option *yes*.

The communication object receives the communication object value 1 (ON), if the fan speed is not equal to zero (OFF). The value of the communication object is updated and sent when the fan speed is changed.

This communication object thus defines the status of the fan, whether it is switched on or off. It can also be used for control of a main switch for the fan.

Telegram value: 0 = OFF
1 = ON

Note
Some fans require an ON command before you set a fan speed. Using the communication object *Status fan ON/OFF,* the fan can for example, be switched on centrally with a switch actuator via the main switch.

16… 20				

Not assigned.

21	**Limitation 1**	**Fan**	**EIS 1, 1 bit** **DPT 1.003**	**C, W**

This communication object is enabled if in parameter window *Automatic operation* the parameter *Enable limitations* has been selected with the option *yes*.

Note
Limitation 1 is only active in automatic mode.

The limitation 1 is active if a telegram with the value 1 is received on the communication object *Limitation 1.* The *Limitation 1* is deactivated if a telegram with the value 0 is received on the communication object *Limitation 1*

When *Limitation 1* is activated, the fan can only assume the set fan speed or speed range in the parameter window *Fan limitation*.
The valve position is independently programmable from the fan limitation.

Telegram value: 0 = limitation x inactive
1 = limitation x active

22	**Limitation 2**			

See communication object 21

23	**Limitation 3**			

See communication object 21

24	**Limitation 4**			

See communication object 21

No.	Function	Object name	Data type	Flags
25	**Forced operation**	**Fan**	**EIS 1, 1 bit** **DPT 1.003**	**C, W**

This communication object is enabled if in parameter window *D, E, F: Fan (3 x 6 A)* the parameter *Enable communication object "Forced operation" 1 bit* is selected with the option *yes.*

If a forced operation is activated, the Room Master switches independently from the control value and its parameterised Limitation 1-4 to forced operation.

The fan speed and valve position(s) during forced operation can be parameterised individually from one another.

Telegram value: 0 = no forced operation
1 = forced operation

No.	Function	Object name	Data type	Flags
26	**Automatic ON/OFF**	**Fan**	**EIS 1, 1 bit** **DPT 1.003**	**C, W**

This communication object is enabled if in parameter window *D, E, F: Fan* the option *yes* has been selected in the *Automatic operatio*n parameter in the *L, M, N, Fan (3 x 6 A)* parameter window:

If automatic mode is enabled, it will be activated on this communication object with the value 1 after a download, bus reset or via a telegram.
Automatic mode is switched off, if a signal is received on a “manual communication object”.

Manual communication objects are:

- Fan: Switch speed
- Fan: Speed x (x = 1, 2, 3), Fan speed switch
- Fan: Fan speed up/down
- Fan: Limitation x (x = 1, 2, 3 or 4)

During forced operation the automatic mode remains active; however, it is only operated within the allowed limits.

If the value 1 is set in the parameter:

Telegram value: 0 = automatic operation OFF
1 = automatic operation ON

If the value 0 is set in the parameter:

Telegram value: 0 = automatic operation ON
1 = automatic operation OFF

No.	Function	Object name	Data type	Flags
27	**Status automatic**	**Fan**	**EIS 1, 1 bit** **DPT 1.003**	**C, R, W**

This communication object is enabled if in parameter window *Status messages* the parameter *Enable communication object "Status automatic" 1 bit* is selected with option *yes*..

It is possible to parameterise if a communication object value is only updated and not sent, sent on request, or only sent when changed.

The communication object indicates the status of the automatic mode.

Telegram value: 0 = inactive
1 = activated

No.	Function	Object name	Data type	Flags
28	**Status byte mode**	**Fan**	**noEIS, 1 byte noDPT**	**C, R, T**

This communication object is enabled if in parameter window *Status messages* the parameter *Enable communication object "Status byte mode" 1 byte* is selected with option *yes*.

The operating state of the fan can be displayed or sent on the bus via this communication object. It is possible to parameterise if a communication object value is only updated and not sent, sent on request, or only sent when changed.

Bit sequence: 76543210

Bit 7: Forced operation
Telegram value 0: inactive
1: active

Bit 6: Limitation 1
Telegram value 0: inactive
1: active

Bit 5: Limitation 2
Telegram value 0: inactive
1: active

Bit 4: Limitation 3
Telegram value 0: inactive
1: active

Bit 3: Limitation 4
Telegram value 0: inactive
1: active

Bit 2: Thermostat fault
Telegram value 0: inactive
1: active

Bit 1: Automatic
Telegram value 0: inactive
1: active

Bit 0: HEATING/COOLING
Telegram value 0: COOLING
1: HEATING

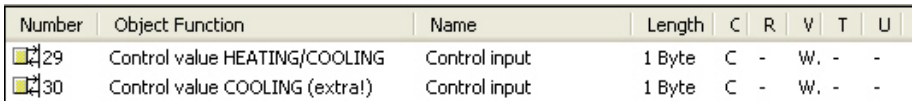
Note

Bit 0: If toggling between HEATING and COOLING is undertaken automatically using control variables, the status HEATING/COOLING is only switched in bit 0 if a value > 0 is received on the control value.

For further information see: Status byte fan, forced operation, page 222

3.3.3 Control input

3.3.3.1 Communication objects
HVAC System
1 Control value/2 pipe



Number	Object Function	Name	Length	C	R	W	T	U
29	Control value HEATING/COOLING	Control input	1 Byte	C	-	W.	-	-
30	Control value COOLING (extra!)	Control input	1 Byte	C	-	W.	-	-

No.	Function	Object name	Data type	Flags
29	**Control value HEATING/COOLING**	**Control input**	**EIS 6, 1 byte DPT 5.001**	**C, W**

This communication object is enabled if in parameter window *Control input* the parameter *HVAC System* has been selected with the option *1 Control value/2 pipe*.

Using this communication object the control value HEATING or COOLING is predefined as a 1 byte % value.

Telegram value: 0 % = OFF, no heating or cooling
100 % = ON, largest control value, maximum heating or cooling

No.	Function	Object name	Data type	Flags
30	**Control value COOLING (extra!)**	**Control input**	**EIS 6, 1 byte DPT 5.001**	**C, W**

Note
Independent of communication object 30, the COOLING valve can be additionally controlled without monitoring via the communication object 31.

This communication object is enabled if in parameter window *Control input* the parameter *HVAC System* has been selected with the option *1 Control value/2 pipe*.

Using this communication object the control value COOLING is predefined as a 1 byte % value.

Telegram value: 0 % = OFF, no cooling
100 % = ON, largest control value, maximum cooling

No.	Function	Object name	Data type	Flags
31				

Not assigned.

3.3.3.2 Communication objects *HVAC System 1 Control value/4 pipe, with switching object*

Number	Object Function	Name	Length	C	R	V	T	U
29	Control value HEATING/COOLING	Control input	1 Byte	C	-	W.	-	-
31	Toggle HEATING/COOLING	Control input	1 bit	C	-	W.	-	-

No.	Function	Object name	Data type	Flags
29	**Control value HEATING/COOLING**	**Control input**	**EIS 6, 1 byte DPT 5.001**	**C, W**

This communication object is enabled if in parameter window *Control input* the parameter *HVAC System* has been selected with the option *1 Control values/4 pipe, with switching object.*

Using this communication object the control value HEATING or COOLING is predefined as a 1 byte % value.

Telegram value: 0% = OFF, no heating or cooling
100% = ON, largest control value, maximum heating or cooling

No.	Function	Object name	Data type	Flags
30				

not assigned.

No.	Function	Object name	Data type	Flags
31	**Toggle HEATING/COOLING**	**Control input**	**EIS 6, 1 bit DPT 1.100**	**C, W**

This communication object is enabled if in parameter window *Control input* the parameter *HVAC System* has been selected with the option *1 Control values/4 pipe, with switching object.*

If the value 1 is set in the parameter:

Telegram value: 0 = COOLING deactivated
1 = HEATING activated

If the value 0 is set in the parameter:

Telegram value: 0 = HEATING activated
1 = COOLING deactivated

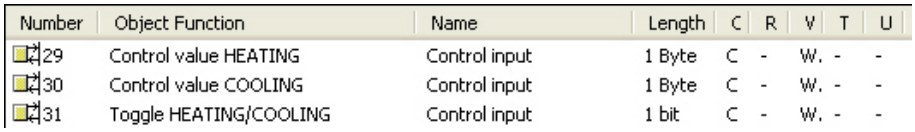
Note
If communication object 31 *Toggle HEATING/COOLING – Control input* receives a value, the monitoring time is started.

3.3.3.3 Communication objects
HVAC System
2 Control values/2 pipe

Number	Object Function	Name	Length	C	R	V	T	U
29	Control value HEATING	Control input	1 Byte	C	-	W.	-	-
30	Control value COOLING	Control input	1 Byte	C	-	W.	-	-

No.	Function	Object name	Data type	Flags
29	**Control value HEATING**	**Control input**	**EIS 6, 1 byte DPT 5.001**	**C, W**
This communication object is enabled if in parameter window *Control input* the parameter *HVAC System* has been selected with the option *2 Control values/2 pipe*. Using this communication object the control value HEATING is predefined as a 1 byte % value. Telegram value: 0 % = OFF, no heating 100 % = ON, largest control value, maximum heating				
30	**Control value COOLING**	**Control input**	**EIS 6, 1 byte DPT 5.001**	**C, W**
This communication object is enabled if in parameter window *Control input* the parameter *HVAC System* has been selected with the option *2 Control value/2 pipe*. Using this communication object the control value COOLING is predefined as a 1 byte % value. Telegram value: 0 % = OFF, no cooling 100 % = ON, largest control value, maximum cooling				
31				
Not assigned.				

3.3.3.4 Communication objects *HVAC System 2 Control values/2 pipe, with switching object*



Number	Object Function	Name	Length	C	R	V	T	U
29	Control value HEATING	Control input	1 Byte	C	-	W.	-	-
30	Control value COOLING	Control input	1 Byte	C	-	W.	-	-
31	Toggle HEATING/COOLING	Control input	1 bit	C	-	W.	-	-

No.	Function	Object name	Data type	Flags
29	**Control value HEATING**	**Control input**	**EIS 6, 1 byte DPT 5.001**	**C, W**

This communication object is enabled if in parameter window *Control input* the parameter *HVAC System* has been selected with the option *2 Control values/2 pipe, with switching object.*

Using this communication object the control value HEATING is predefined as a 1 byte % value.

Telegram value: 0 % = OFF, no heating
100 % = ON, largest control value, maximum heating

No.	Function	Object name	Data type	Flags
30	**Control value COOLING**	**Control input**	**EIS 6, 1 byte DPT 5.001**	**C, W**

This communication object is enabled if in parameter window *Control input* the parameter *HVAC System* has been selected with the option *2 Control values/2 pipe, with switching object.*

Using this communication object the control value COOLING is predefined as a 1 byte % value.

Telegram value: 0 % = OFF, no cooling
100 % = ON, largest control value, maximum cooling

No.	Function	Object name	Data type	Flags
31	**Toggle HEATING/COOLING**	**Control input**	**EIS 6, 1 bit DPT 1.1000**	**C, W**

This communication object is enabled if in parameter window *Control input* the parameter *HVAC System* has been selected with the option *2 Control values/2 pipe, with switching object.*

If the value 1 is set in the parameter:

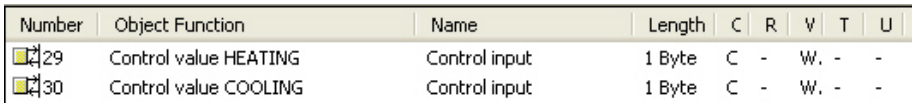
Telegram value: 0 = COOLING deactivated
1 = HEATING activated

If the value 0 is set in the parameter:

Telegram value: 0 = HEATING activated
1 = COOLING deactivated

Note
If communication object 31 *Toggle HEATING/COOLING – Control input* receives a value, the monitoring time is started.

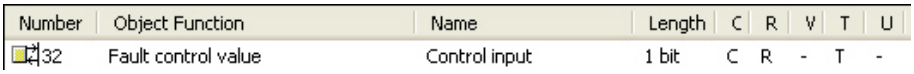
3.3.3.5 Communication objects
HVAC System
2 Control values/4 pipe



Number	Object Function	Name	Length	C	R	V	T	U
29	Control value HEATING	Control input	1 Byte	C	-	W.	-	-
30	Control value COOLING	Control input	1 Byte	C	-	W.	-	-

No.	Function	Object name	Data type	Flags
29	**Control value HEATING**	**Control input**	**EIS 6, 1 byte DPT 5.001**	**C, W**
This communication object is enabled if in parameter window *Control input* the parameter *HVAC System* has been selected with the option *2 Control value/2 pipe*. Using this communication object the control value HEATING is predefined as a 1 byte % value. Telegram value: 0 % = OFF, no heating 100 % = ON, largest control value, maximum heating				
30	**Control value COOLING**	**Control input**	**EIS 6, 1 byte DPT 5.001**	**C, W**
This communication object is enabled if in parameter window *Control input* the parameter *HVAC System* has been selected with the option *2 Control value/2 pipe*. Using this communication object the control value COOLING is predefined as a 1 byte % value. Telegram value: 0 % = OFF, no cooling 100 % = ON, largest control value, maximum cooling				
31				
Not assigned.				

3.3.3.6 Communication object *Fault control value*



Number	Object Function	Name	Length	C	R	V	T	U
32	Fault control value	Control input	1 bit	C	R	-	T	-

No.	Function	Object name	Data type	Flags
32	**Fault control value**	**Control input**	**EIS 1, 1 bit** **DPT 1.005**	**C, R, T**

This communication object is enabled if in parameter window *Control input* the parameter *Monitoring control values e.g. thermostat* has been selected with the option *yes*.

This communication object indicates a malfunction of the control value, e.g. of a thermostat.

The Fan Coil control reports a fault and assumes the safety position with the communication object *Fault control value*. This safety position affects the fan speed and the valves.

Telegram value: 0 = no fault
1 = fault

Note
If for the communication object value *Control value HEATING, Control value COOLING* or *Control value, HEATING/COOLING* no value is sent for a parameterised time, a fault of the thermostat is assumed. If communication object 32 *Toggle HEATING/COOLING – Control input* receives a value, the monitoring time is started.

3.3.4 Communication objects
Valve HEATING

Number	Object Function	Name	Length	C	R	V	T	U
33	Block	Valve HEATING	1 bit	C	-	W.	-	-
34	Forced operation	Valve HEATING	1 bit	C	-	W.	-	-
35	Trigger valve purge	Valve HEATING	1 bit	C	-	W.	-	-
36	Status valve purge	Valve HEATING	1 bit	C	R	-	T	-
37	Status valve position	Valve HEATING	1 bit	C	R	-	T	-
38	Overload	Valve HEATING	1 bit	C	-	-	T	-

No.	Function	Object name	Data type	Flags
33	**Block**	**Valve HEATING**	**EIS 1, 1 bit** **DPT 1.003**	**C, W**

This communication object is enabled if in parameter window - *Function* the parameter *Enable communication object "Disable" 1 bit* has been selected with option *yes*.

The valve is disabled with this communication object.
If the block is enabled, the highest priority is retained and the current control value is retained, i.e., the valve remains stationary. Movement to a target position which may not have yet been achieved will be performed to completion. If the block is removed, the target position which has been set without the block is approached.

Telegram value: 0 = valve not blocked
1 = valve blocked

No.	Function	Object name	Data type	Flags
34	**Forced operation**	**Valve HEATING**	**EIS 1, 1 bit** **DPT 1.003**	**C, W**

This communication object is enabled if in parameter window - *Function* the parameter *Enable communication object "Forced operation" 1 bit* is selected with option *yes*..

This communication object sets the output in a defined state and blocks it. If the value 1 is received, forced operation is activated and the output triggers the programmed valve position. If the value 0 is received forced operation ends. The contact position is retained until the RM/S receives a new setting signal.

Telegram value: 0 = end forced operation
1 = start forced operation

No.	Function	Object name	Data type	Flags
35	**Trigger valve purge**	**Valve HEATING**	**EIS 1, 1 bit** **DPT 1.017**	**C, W**

This communication object is enabled if in parameter window - *Function* the parameter *Enable valve purge* has been selected with the option *yes*.

The valve purge is triggered using this communication object.

Telegram value: 0 = end valve purge, valve will be closed
1 = start valve purge, valve will be opened

Note for value 0
A purge currently underway is interrupted. A purge not undertaken due to a higher priority will no longer be undertaken. The purge cycle with automatic valve purge will be restarted.

36	**Status valve purge**	**Valve HEATING**	**EIS 1, 1 bit** **DPT 1.003**	**C, R, T**

This communication object is enabled if in parameter window - *Function* the parameter *Enable valve purge* and *Enable communication object "Status valve purge" 1 bit* is selected with option *yes*.

The status of the valve purge is visible via this communication object.

Telegram value: 0 = valve purge not active
1 = valve purge active

Note
The status is displayed as soon as a purge has been activated. The status remains active even when the purge has been interrupted, e.g. by a priority.

37	**Status valve position**	**Valve HEATING**	**EIS 1, 1 bit** **DPT 1.001**	**C, R, T**

This communication object is enabled if in parameter window - *Function* the parameter *Enable communication object "Status valve position"*, the option *1 bit* has been selected.

The status of the valve position is visible via this communication object.
Hereby, the target position where the valve should move to is always transferred.

Telegram value: 0 = valve position equal to 0
1 = valve position not equal to 0

No.	Function	Object name	Data type	Flags
37	**Status valve position**	**Valve HEATING**	**EIS 5, 1 byte DPT 5.001**	**C, R, T**
This communication object is enabled if in parameter window - *Function* the parameter *Enable communication object "Status valve position"*, the option *1 byte* has been selected. The status of the valve position is visible via this communication object. Hereby, the target position where the valve should move to is always transferred. Telegram value: 0…255 = valve position is displayed directly as a figure value				
38	**Overload**	**Valve HEATING**	**EIS 1, 1 bit DPT 1.005**	**C, R, T**
This communication object is always visible. The communication object sends a 1 with a fault, e.g. through a thermal overload on the output of the valve HEATING. Telegram value: 1 = there is a fault on the output *Valve HEATING*. 0 = fault acknowledgement.				

3.3.5 Communication objects *Valve COOLING*

The communication objects of the valve COOLING do not differ from those of the valve HEATING.

The descriptions of the parameter setting options and adjustable communication objects for the Valve COOLING are described under parameter window *G, H: Valve HEATING (0.5 A AC) – 3 point, opening and closing*, page 122 or under communication objects *Valve HEATING*, page 155.

The communication objects valve Cooling have the nos. 39-44.

3.3.6 Communication objects Inputs a-h

The communication objects of all *Inputs* do not differentiate from one another and are explained using *Input a*.

The descriptions of the parameter setting options of *Inputs a-r* are described from parameter window *Enable Inputs a-h*, on page 30.

The communication objects *Input a* have the nos. 45-49.

The communication objects *Input b* have the nos. 50-54.

The communication objects *Input c* have the nos. 55-59.

The communication objects *Input d* have the nos. 60-64.

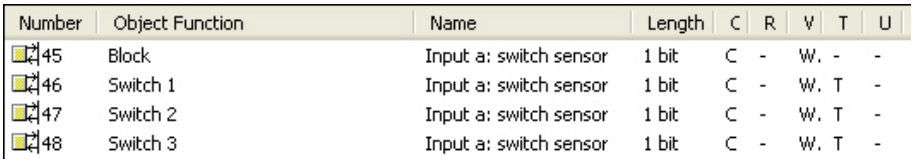
The communication objects *Input e* have the nos. 65-69.

The communication objects *Input f* have the nos. 70-74.

The communication objects *Input g* have the nos. 75-79.

The communication objects *Input h* have the nos. 80-84.

3.3.6.1 Communication objects *Switch sensor*



Number	Object Function	Name	Length	C	R	V	T	U
45	Block	Input a: switch sensor	1 bit	C	-	W.	-	-
46	Switch 1	Input a: switch sensor	1 bit	C	-	W.	T	-
47	Switch 2	Input a: switch sensor	1 bit	C	-	W.	T	-
48	Switch 3	Input a: switch sensor	1 bit	C	-	W.	T	-

No.	Function	Object name	Data type	Flags
45	**Block**	**Input a: Switch Sensor**	**EIS 1, 1 bit DPT 1.003**	**C, W**

This communication object is enabled if in parameter window *a: Switch sensor* the parameter *Enable communication object "Disable" 1 bit* has been selected with option *yes*.

Using the communication object *Block* the input can be blocked or enabled. With activated communication object *Block* the inputs are blocked.

Note

When the input is blocked there is fundamentally no reaction to a signal change on the input, but:

– Waiting for a long button operation or a minimum signal duration is suspended.

– Parameterised *Cyclic sending* is not interrupted.

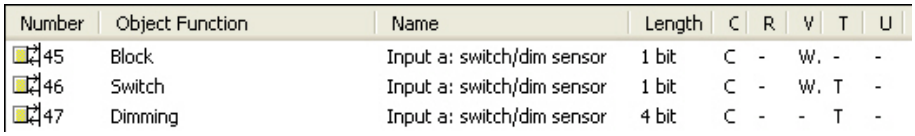
– The description of the communication object *Switch x* is still possible.

If the input state changes during the blocked phase, this leads to immediate sending of the new object value after enabling. If the input state remains the same during the blocking phase
the object value is not sent.

Telegram value: 0 = enable input a
1 = block input a

No.	Function	Object name	Data type	Flags
46	**Switch 1**	**Input a: Switch Sensor**	**EIS 1, 1 bit DPT 1.001**	**C, W, T**
This communication object is enabled if in the parameter window *Enable inputs a-h* the parameter *Input a (binary input, contact scanning)* has been selected with the option *Switch sensor / fault monitoring input*. In accordance with the parameter setting, this communication object can be switched by actuation of the input to ON, OFF or TOGGLE. With toggle the previous value, e.g. 1, is toggled directly to the value 0. The communication object can be sent cyclically, e.g. for life sign monitoring of the sensor. **Note** The communication object can be written to externally. Thus cyclic sending is interrupted or may not be possible depending on the parameter setting. No further communication objects are visible with the setting. Telegram value: 0 = OFF 1 = ON				
47	**Switch 2**			
See communication object 46.				
48	**Switch 3**			
See communication object 46.				
49				
Not assigned.				

3.3.6.2 Communication objects *Switch/Dim sensor*



Number	Object Function	Name	Length	C	R	W	T	U
45	Block	Input a: switch/dim sensor	1 bit	C	-	W	-	-
46	Switch	Input a: switch/dim sensor	1 bit	C	-	W	T	-
47	Dimming	Input a: switch/dim sensor	4 bit	C	-	-	T	-

No.	Function	Object name	Data type	Flags
45	**Block**	**Input a: Switch/dim sensor**	**EIS 1, 1 bit DPT 1.003**	**C, W**

This communication object is enabled if in parameter window *a: Switch/dim sensor* the parameter *Enable communication object "Disable" 1 bit* has been selected with option *yes*.

Using the communication object *Block* the input can be blocked or enabled. With activated communication object *Block* the inputs are blocked.

Note

When the input is blocked there is fundamentally no reaction to a signal change on the input, but:

– Waiting for a long button operation or a minimum signal duration is suspended.

– Parameterised *Cyclic sending* is interrupted with dimming steps.

– The description of the communication object *Switch x* is still possible.

When enabling an input, a change of the signal states (as opposed to before the block) leads to immediate processing, e.g.:

– The minimum actuation or detection of a long/short button push starts.

– Communication objects send their value if necessary.

Telegram value: 0 = enable input a
1 = block input a

No.	Function	Object name	Data type	Flags
46	**Switch**	**Input a: Switch/dim sensor**	**EIS 1, 1 bit DPT 1.001**	**C, W, T**

This communication object is enabled if in the parameter window *Enable inputs a-h* the parameter *Input a (binary input, contact scanning)* has been selected with the option *Switch/Dim sensor*.

In accordance with the parameter setting, this communication object can be switched by actuation of the input to ON, OFF or TOGGLE.
With toggle the previous value, e.g. 1, is toggled directly to the value 0.
With parameter setting *TOGGLE* the communication object as the non-sending group address should be linked with the switch feedback of the dimming actuator (updating of the switching state).

Note
The communication object can be written to externally. Thus cyclic sending is interrupted or may not be possible depending on the parameter setting. No further communication objects are visible with the setting.

Telegram value: 0 = OFF
1 = ON

47	**Dimming**	**Input a: Switch/dim sensor**	**EIS2, 4 bit DTP 3.007**	**C, T**

This communication object is enabled if in the parameter window *Enable inputs a-h* the parameter *Input a (binary input, contact scanning)* has been selected with the option *Switch/Dim sensor*.

A long operation at the input has the effect that *BRIGHTER* or *DARKER* dim commands are sent via this communication object on the bus. A STOP command is sent and the cyclic sending of dim commands is stopped at the end of actuation with START-STOP-DIMMING.

48				

Not assigned.

49				

Not assigned.

3.3.6.3 Communication objects *Shutter sensor*

Number	Object Function	Name	Length	C	R	W	T	U
45	Block	Input a: shutter sensor	1 bit	C	-	W	-	-
46	Shutter UP/DOWN	Input a: shutter sensor	1 bit	C	-	W	T	-
47	STOP/lamella adjustment	Input a: shutter sensor	1 bit	C	-	-	T	-
48	Upper limit position	Input a: shutter sensor	1 bit	C	-	W	-	-
49	Lower limit position	Input a: shutter sensor	1 bit	C	-	W	-	-

No.	Function	Object name	Data type	Flags
45	**Block**	**Input a: Shutter Sensor**	**EIS 1, 1 bit DPT 1.003**	**C, W**

This communication object is enabled if in parameter window *a: Shutter Sensor* the parameter *Enable communication object "Disable" 1 bit* has been selected with option *yes*.

Using the communication object *Block* the input can be blocked or enabled. With activated communication object *Block* the inputs are blocked.

Note

When the input is blocked there is fundamentally no reaction to a signal change, but:

– Waiting for a long button operation or a minimum signal duration is suspended.

– Parameterised *Cyclic sending* is interrupted.

– Communication objects continue to be updated and sent if necessary.

When enabling an input, a change of the signal states (as opposed to before the block) leads to immediate processing, e.g.:

– The minimum actuation or detection of a long/short button push starts.

– Communication objects send their current value if necessary.

Telegram value: 0 = enable input a
1 = block input a

46	**Shutter UP/DOWN**	**Input a: Shutter Sensor**	**EIS7, 1 bit DTP 1.008**	**C, W, T**

This communication object is enabled if in the parameter window *Enable inputs a-h* the parameter *Input a (binary input, contact scanning)* has been selected with the option *Shutter sensor*.

This communication object sends a shutter motion command UP or DOWN on the bus.
By receiving telegrams the device also recognises movement commands of another sensor, e.g. parallel operation.

Telegram value: 0 = UP
1 = DOWN

No.	Function	Object name	Data type	Flags
47	**STOP/lamella adjustment**	**Input a: Shutter Sensor**	**EIS7, 1 bit DTP 1.007**	**C, T**

This communication object is enabled if in the parameter window *Enable inputs a-h* the parameter *Input a (binary input, contact scanning)* has been selected with the option *Shutter sensor*.

This communication object sends a STOP command or lamella adjustment.

Telegram value: 0 = STOP/lamella adjustment UP
1 = STOP/lamella adjustment DOWN

No.	Function	Object name	Data type	Flags
48	**Upper limit position**	**Input a: Shutter Sensor**	**EIS1, 1 bit DTP 1.002**	**C, W**

This communication object is enabled if in the parameter window *Enable inputs a-h* the parameter *Input a (binary input, contact scanning)* has been selected with the option *Shutter sensor*.

With this communication object the feedback of a shutter actuator which indicates whether the shutter is located in the upper end position can be integrated.

Note
The communication object is important for 1-button operation (synchronisation).

Telegram value: 0 = Shutter is not in upper end position.
1 = Shutter has reached the upper end position.

No.	Function	Object name	Data type	Flags
49	**Lower limit position**	**Input a: Shutter Sensor**	**EIS1, 1 bit DTP 1.002**	**C, W**

This communication object is enabled if in the parameter window *Enable inputs a-h* the parameter *Input a (binary input, contact scanning)* has been selected with the option *Shutter sensor*.

With this communication object the feedback of a shutter actuator which indicates whether the shutter is located in the lower end position can be integrated.

Note
The communication object is important for 1-button operation (synchronisation).

Telegram value: 0 = Shutter is not in lower end position.
1 = Shutter has reached the lower end position.

3.3.6.4 Communication objects *Value/forced operation*

Number	Object Function	Name	Length	C	R	W	T	U
45	Block	Input a: sent value	1 bit	C	-	W	-	-
46	Value 1, unsigned	Input a: value/forced op.	1 Byte	C	-	-	T	-
47	Value 2, unsigned	Input a: value/forced op.	1 Byte	C	-	-	T	-

No.	Function	Object name	Data type	Flags
45	**Block**	**Input a: Value/forced operation**	**EIS 1, 1 bit DPT 1.003**	**C, W**

This communication object is enabled if in parameter window *a: Value/forced operation* the parameter *Enable communication object "Disable" 1 bit* has been selected with option *yes*.

Using the communication object *Block* the input can be blocked or enabled. With activated communication object *Block* the inputs are blocked.

Note

When the input is blocked there is fundamentally no reaction to a signal change, but:

– Waiting for a long button operation or a minimum signal duration is suspended.

– The parameter setting *8 bit scene* is ended with saving.

– Communication objects continue to be updated and sent if necessary.

When enabling an input, a change of the signal states (as opposed to before the block) leads to immediate processing, e.g.:

– The minimum actuation or detection of a long/short button push starts.

– Communication objects send their current value if necessary.

Telegram value: 0 = enable input a
1 = block input a

No.	Function	Object name	Data type	Flags
46	**Value 1**	**Input a:** **Value/forced operation**	**EIS variable** **DPT variable**	**C, T**

This communication object is enabled if in the parameter window *Enable inputs a-h* the parameter *Input a (binary input, contact scanning)* has been selected with the option *Value/forced operation*.

This communication object sends a value on the bus with short operation when opening or closing of the contact. The value and data type can be freely set in the parameters.

1 bit value [0/1]	EIS 1	DPT 1.001 switch command
2 bit value [0…3]	EIS 8	DPT 2.001 forced operation
1 byte value [-128…127]	EIS 14	DPT 6.010 value
1 byte value [0…255]	EIS 6	DPT 5.010 value
1 byte value [8 bit scene]	EIS 6	DPT 18.001 control scene
2 byte value [-32.768…32.767]	EIS 10	DPT 7.001 value
2 byte value [0…65,535]	EIS 10	DPT 8.001 value
2-byte value [EIB floating point]	EIS 5	DPT 9.001 temperature
3 byte value [time of day, weekday]	EIS 3	DPT 10.001 time of day, weekday
4 byte value [0…4.294.967.295]	EIS 11	DPT 12.001 value
4 byte value [-2,147,483,648…2,147,483,647]	EIS 11	DPT 13.001 value

47	**Value 2**			

See communication object 46.

48… **49**				

Not assigned.

3.3.7 Communication objects *Outputs*

The communication objects of all *Outputs* differentiate from one another with the exception of the communication objects *Logical connection 1* and *Logical connection 2*. They are explained using *Output A*.

The descriptions of the parameter setting options of Outputs A-U are described from parameter window *Enable Outputs A-F*, on page 59.

The communication objects *Output A* have the nos. 85-92.

The communication objects *Output B* have the nos. 93-100.

The communication objects *Output C* have the nos. 101-108.

The communication objects *Output D* have the nos. 10-15.

The communication objects *Output E* have the nos. 16-21.

The communication objects *Output F* have the nos. 22-27.

The communication objects Valve *HEATING G, H* have the nos. 33-38.

The communication objects *Valve Cooling I, J* have the nos. 39-44.

Note

The outputs L, M and N can be programmed as outputs and as fans. The descriptions of the communication objects for this purpose can be found at *D, E, F: Fan (3 x 6 A)*, page 137.

The descriptions of the setting possibilities can be found in parameter window *Enable Outputs A-F*, page 59.

3.3.7.1 Communication objects
Output A

Number	Object Function	Name	Length	C	R	W	T	U
85	Switch	Output A	1 bit	C	-	W	-	-
86	Permanent ON	Output A	1 bit	C	-	W	-	-
87	Disable function time	Output A	1 bit	C	-	W	-	-
88	Scene	Output A	1 Byte	C	-	W	-	-
89	Forced operation	Output A	1 bit	C	-	W	-	-
90	Status switch	Output A	1 bit	C	R	-	T	-
91	Logical connection 1	Output A	1 bit	C	-	W	-	-
92	Logical connection 2	Output A	1 bit	C	-	W	-	-

No.	Function	Object name	Data type	Flags
85	**Switch**	**Output A**	**EIS 1, 1 bit DPT 1.001**	**C, W**

This communication object is enabled if in the parameter window *Enable Outputs A-F* the parameter *Output A (20 A/ 16 AX C-Load)* has been enabled.

This communication object is used for switching of the output ON/OFF.
The device receives a switch command via the switch object.

Normally opened contact:

Telegram value 1 = switch ON
0 = switch OFF

Normally closed contact:

Telegram value 1 = switch OFF
0 = switch ON

Note

With logical connections or forced operations a modification of the *Switch* communication object does not necessarily lead to a change of the contact position.

For further information see: Function chart, page 180

No.	Function	Object name	Data type	Flags
86	**Permanent ON**	**Output A**	**EIS 1, 1 bit** **DPT 1.003**	**C, W**

This communication object is enabled if in parameter window *A: Output (20 A/16 AX C-Load)* the parameter *Enable function time* has been selected with the option *yes*..

With this communication object the output can be forcibly switched on.

If the communication object is assigned with the value 1, the output is switched on irrespective of the value of the object *Switch* and remains switched on until the communication object *Permanent ON* has the value 0. After ending the permanent ON state, the state of the communication object *Switch* is used.

Permanent ON only switched ON and “masks” the other functions. This means that the other functions (e.g. staircase) continue to run in the background but do not initiate a switching action. After the end of *permanent ON* the switching state which would result without the permanent ON function becomes active. For the Staircase lighting function the response after *Permanent ON* is parameterised in Parameter window *A: Output - Time*, page 67.

This communication object can be used for example to allow the service or maintenance and cleaning personnel to initiate a permanent ON. The device receives a switch command via the switch object.

Permanent ON becomes inactive after a download or bus voltage recovery.

Telegram value 1 = activates permanent ON mode
0 = deactivates permanent ON mode

No.	Function	Object name	Data type	Flags
87	**Disable function time**	**Output A**	**EIS 1, 1 bit** **DPT 1.003**	**C, W**

This communication object is enabled if in parameter window *A: Output (20 A/16 AX C-Load)* the parameter *Enable function time* has been selected with the option *yes*..

After bus voltage recovery, in parameter window *Output A -Time* the communication object value with the parameter *Object value “Disable time function”* can be determined.

With the blocked function *Time* the output can only be switched on or off, the function *Staircase lighting* is not triggered.

Telegram value 1 = staircase light disabled
0 = staircase light enabled

The contact position at the time of disabling and enabling is retained and will only be changed with the next switch command to the communication object *Switch*.

No.	Function	Object name	Data type	Flags
88	**Scene**	**Output A**	**1 byte Non EIS** **DPT 18.001**	**C, W**

This communication object is enabled if in parameter window *A: Output (20 A/16 AX C-Load)* the parameter *Enable function scene* has been selected with the option *yes*..

Using this 8 bit communication object a scene command can be sent using a coded telegram. The telegram contains the number of the respective scene as well as the information if the scene is to be recalled, or if the current switch state is to be assigned to the scene.

Telegram format (1 byte): MXSSSSSS
(MSB) (LSB)

M: 0 – scene is recalled
1 – scene is stored (if allowed)
X: not used
S: Number of the scene (1-64: 00000000 … 00111111)

KNX 1 byte telegram value		Meaning
Decimal	**Hexadecimal**	
00 or 64 01 or 65 02 or 66 … 63 or 127	00h or 40h 01h or 41h 02h or 42h … 3Fh or 7Fh	Call scene 1 Call scene 2 Call scene 3 … Call scene 64
128 or 192 129 or 193 130 or 194 … 191 or 255	80h or B0h 81h or B1h 82h or B2h … AFh or FFh	Store scene 1 Store scene 2 Store scene 3 … Store scene 64

For further information see: Scene function, page 187 and Code table scene (8 Bit), page 222.

No.	Function	Object name	Data type	Flags
89	**Forced operation**	**Output A**	**1 bit (EIS 1)** **DPT 1.003**	**C, W**

This communication object is enabled if in parameter window *A: Output (20 A/16 AX C-Load)* the parameter *Enable function forced operation* has been selected with the option *yes* and the parameter *Type of object "Forced operation"* has been selected with 1 bit.

If the object receives the value 1, the output is forcibly set to the parameterised switch position which has been set in the parameter window *Output A (20 A/16 AX C-Load)*. The forced positioning of the contact should remain until forced operation is ended. This is then the case when a 0 is received via the communication object *Forced operation*.

Please note that the function *Forced operation* and a bus failure have a higher priority on the switching state, see Function chart, page 180.

No.	Function	Object name	Data type	Flags
89	**Forced operation**	**Output A**	**2 bit (EIS 8)** **DPT 2.001**	**C, W**
This communication object is enabled if in parameter window *A: Output (20 A/16 AX C-Load)* the parameter *Enable function forced operation* has been selected with the option *yes* and the parameter *Type of object "Forced operation"* has been selected with 2 bits. The output can be forcibly operated via this communication object (e.g. by a higher-level control). The object value directly defines the forced position of the contact: 0 or 1 = The output is not forcibly operated. 2 = The output is forcibly switched off 3 = The output is forcibly switched on				
90	**Status switch**	**Output A**	**EIS 1, 1 bit** **DPT 1.001**	**C, R, T**
This communication object is enabled if in parameter window *A: Output (20 A/16 AX C-Load)* the parameter *Enable communication object "Status switch" 1 bit* has been selected with the option *yes.* You can parameterise whether the communication object value *no, update only*, *after a change* or *after request* is sent on the bus. The communication object value directly indicates the current contact position of the switching relay. The status value can be inverted. Telegram value 1 = relay ON or OFF depending on the parameterisation 0 = Relay OFF or ON depending on the parameterisation				
91	**Logical connection 1**	**Output A**	**1 bit (EIS 1)** **DPT 1.002**	**C, W**
This communication object is enables if in the parameter window *-Logic* the parameters *Logical connection 1 active* has been selected with *yes*. The parameter window - *Logic* is enabled in the parameter window *A: Output (20 A/16 AX C-Load).* Using this communication object the output of the first of two logic objects can be assigned. The logical connection is defined in the parameter window *-Logic*. Initially the switch object is then logically linked with the communication object *Logical connection 1*. The result of this is then logically linked with the communication object *Logical connection 2*. ***For further information see: Connection/Logic, page 185***				
92	**Logical connection 2**	**Output A**	**1 bit (EIS 1)** **DPT 1.002**	**C, W**
See communication object 141.				

4 Planning and application

In this section you will find a description of different types of fans, blowers and fan coil controls. Here also are some tips and application examples are described for practical use of the device.

4.1 Input

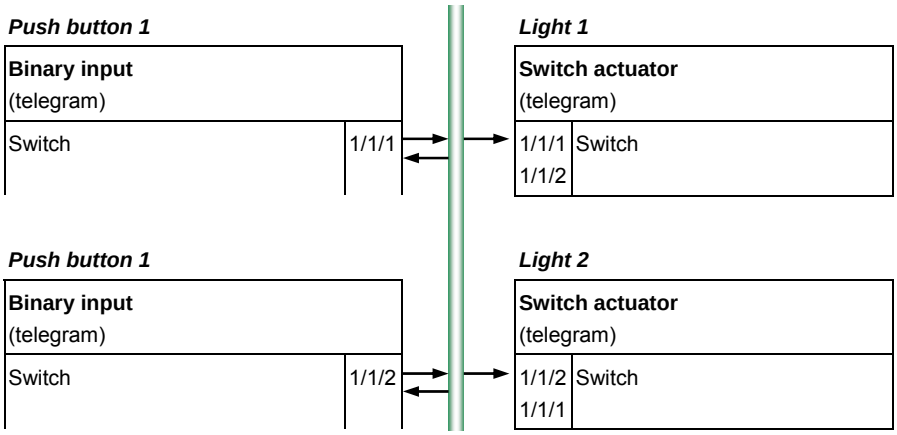
In this chapter the central function and the application explanations for the inputs are explained. The inputs are equipped with the binary contact scanning function.

4.1.1 Operation with central function (Switch light)

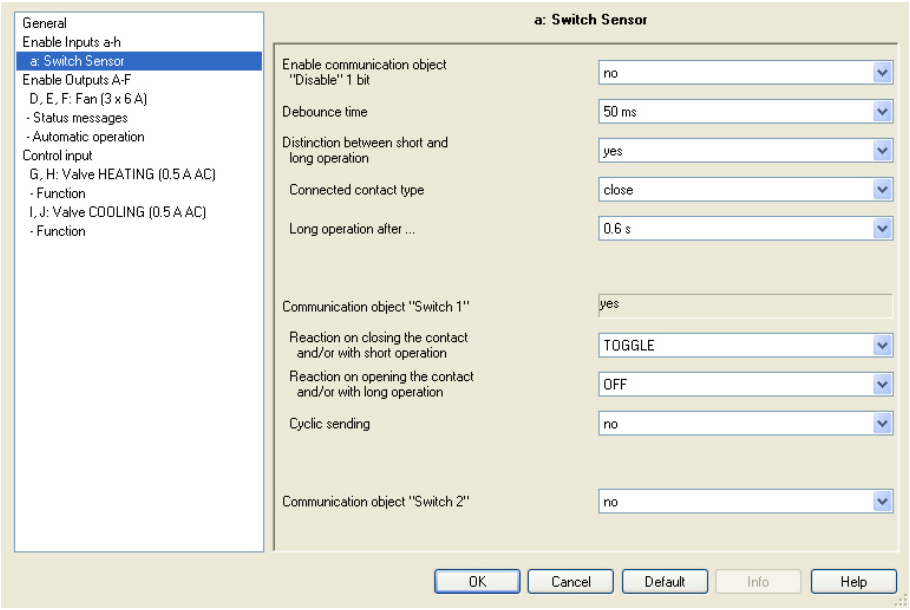
1 button operation

A short operation switches the lighting ON or OFF. A long operation switches the lighting OFF centrally.

Logical connection of the group addresses:



In parameter window *a: Switch Sensor* the settings for button 1 appear as follows:



Short operation: TOGGLE

Long operation: OFF

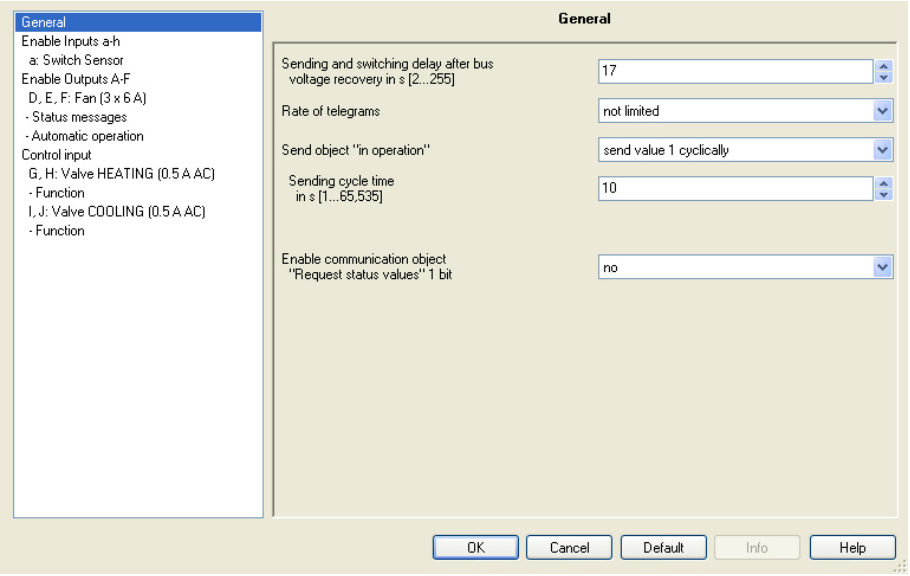
4.1.2 Fault monitoring input

In a switchgear system two incoming circuit-breakers, a coupling switch and a generator switch are to be monitored.

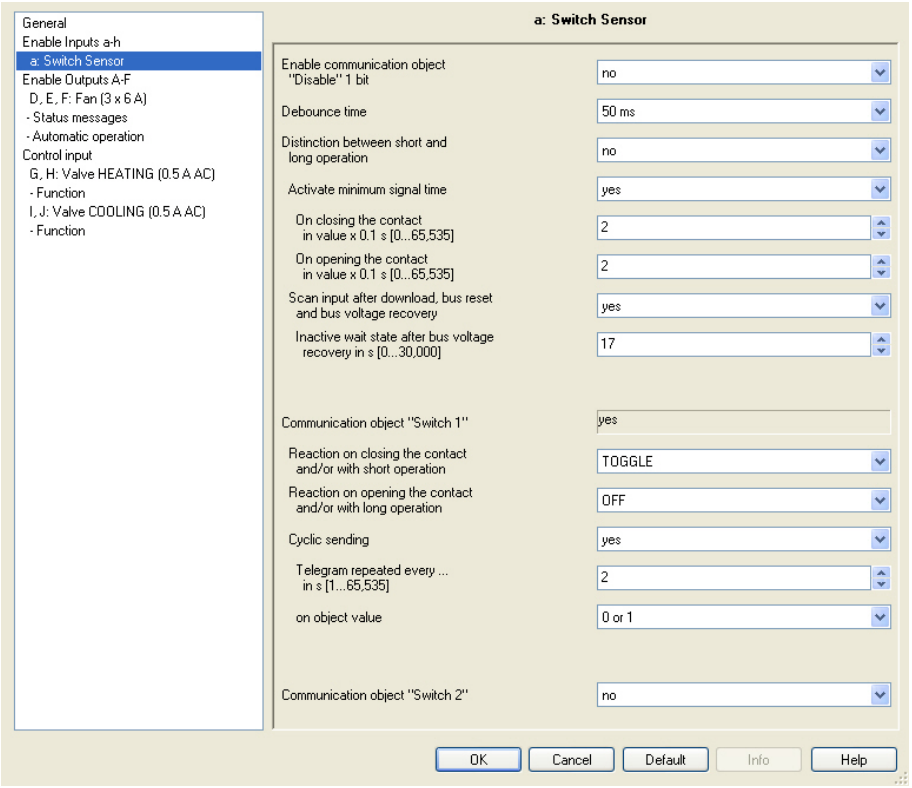
For monitoring purposes the input sends a cyclic *In operation* telegram every 10 s. The inactive waiting time and the send delay time should each be set to at least 17 s. Every 30 seconds and when closing the contact an ON telegram is sent, and when opening the contact an OFF telegram is sent.

Incoming circuit breaker:	Minimum signal time 200 ms
Coupling switch:	Minimum signal time 200 ms
Generator switch:	Minimum signal time 200 ms

In the *General* parameter window the settings appear as follows:



In the *a:Switch Sensor* parameter window the settings appear as follows:

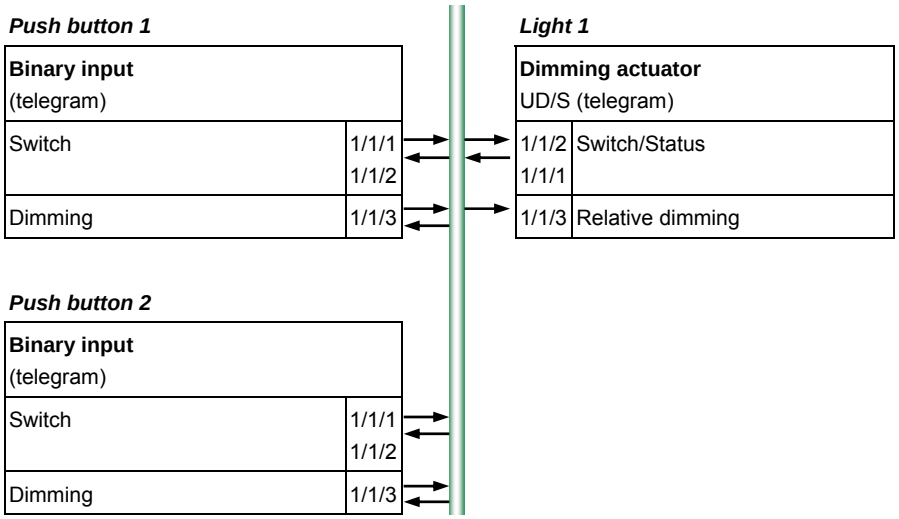


4.1.3 Operation of the illumination (dimming lights)

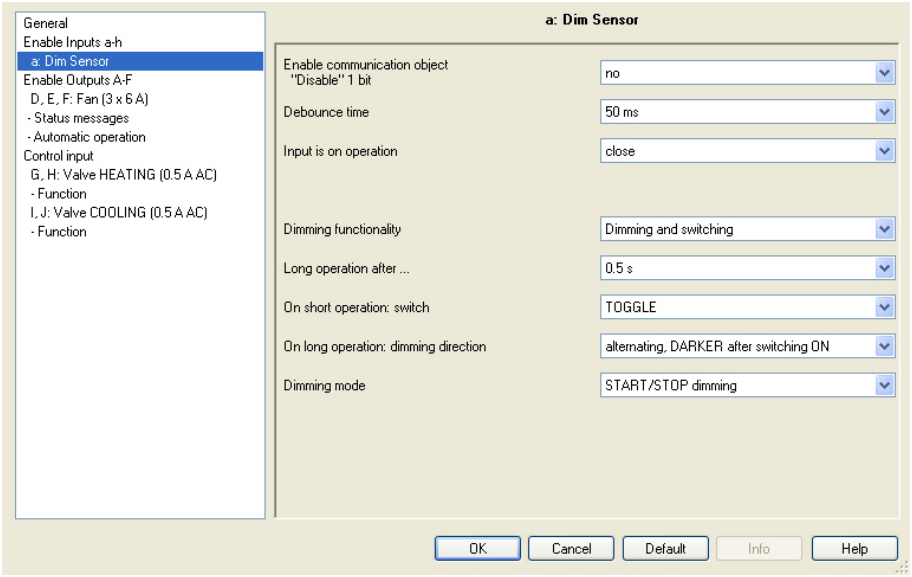
1 button operation

A short operation switches ON or OFF the lighting, a longer operation dims BRIGHTER or DARKER alternately (contrary to the last dimming process). Both buttons operate the same lighting.

Logical connection of the group addresses:



In parameter window *a: Dim Sensor* the settings for button 1 and button 2 appear as follows:



2 button operation

The same group address logical connection is also suitable for 2 button dimming. Modification of the parameters:

On short operation: Switch = ON or OFF

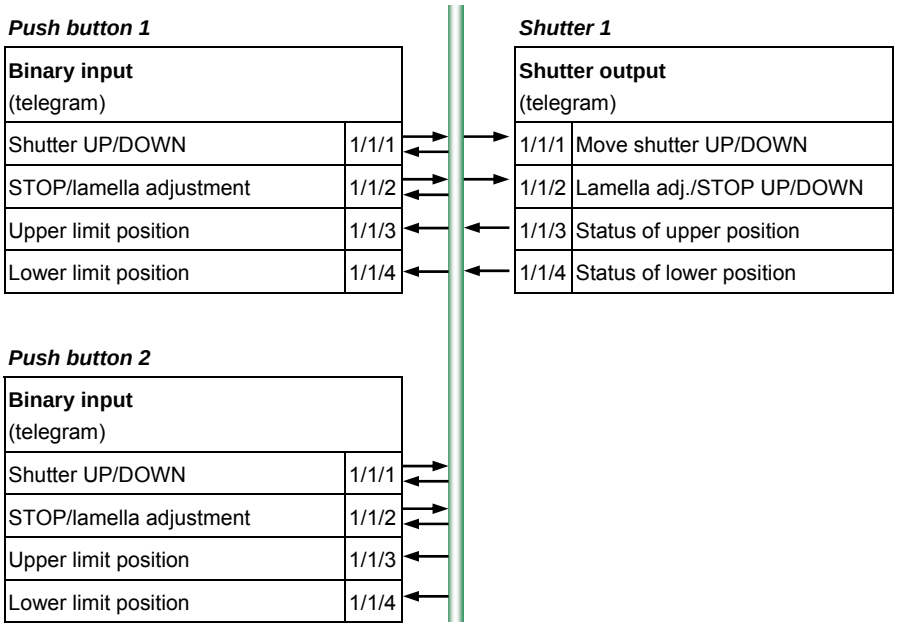
On long operation: dimming direction = Dim BRIGHTER or Dim DARKER

4.1.4 Operation of shutters

1 button operation

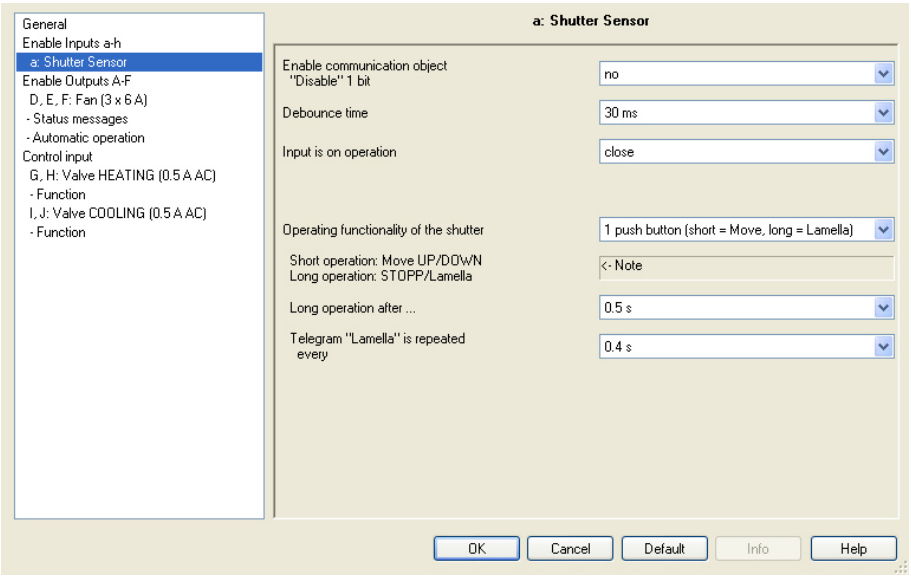
Push button 1 and push button 2 operate shutter 1 from different locations. With a short button operation the shutter moves (in the opposite direction to the last movement); a long operation offsets the louvre.

Logical connection of the group addresses:



* Feedback is signalled to the binary input via the communication objects *Upper limit position* and *Lower limit position* to indicate if the shutter actuator is in the end position. If this is not possible 2 button operation is recommended.

In parameter window *a: Shutter Sensor* the settings for button 1 and button 2 appear as follows:



2 button operation

Push button 1 and push button 2 operate shutter 1 from one location. With long operation the shutter moves DOWN (push button 1) or UP (push button 2). With short operation the louvre will CLOSE (push button) or OPEN (push button 2) by a step.

Logical connection of the group addresses:

Push button 1 (downwards)

Binary input BE/S (telegram)	
Shutter UP/DOWN	1/1/1
STOP/lamella adjustment	1/1/2
Upper limit position	1/1/3
Lower limit position	1/1/4

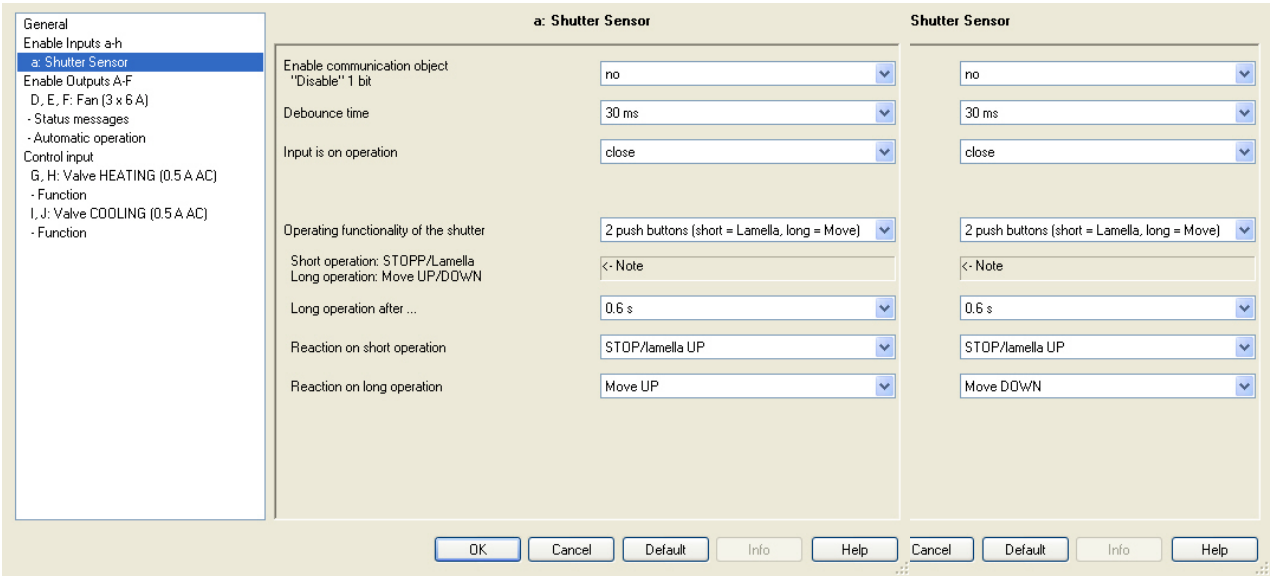
Shutter 1

Shutter output (telegram)	
1/1/1	Move shutter UP/DOWN
1/1/2	Lamella adj./STOP UP/DOWN
1/1/3	Status Position top
1/1/4	Status Position bottom

Push button 2 (upwards)

Binary input BE/S (telegram)	
Shutter UP/DOWN	1/1/1
STOP/lamella adjustment	1/1/2
Upper limit position	1/1/3
Lower limit position	1/1/4

In parameter window *a: Shutter Sensor* the settings for button 1 and button 2 appear as follows:

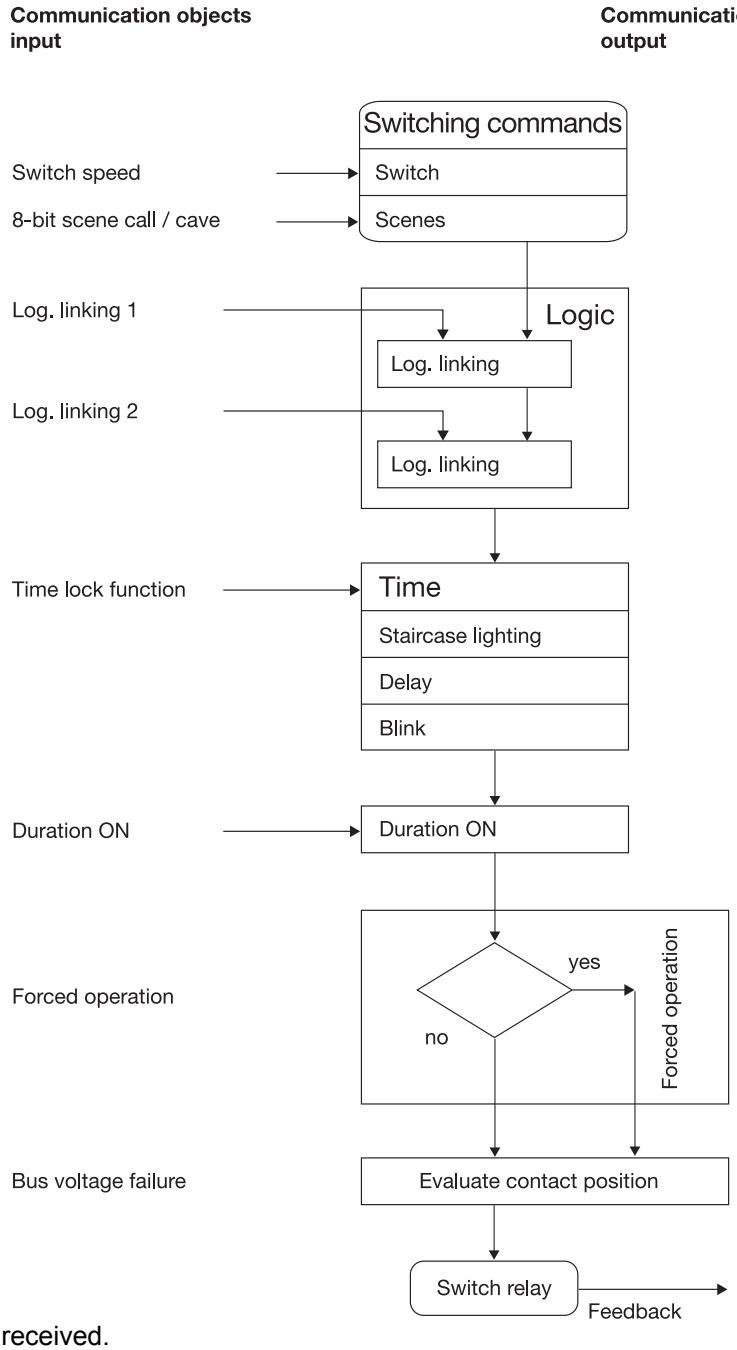


4.2 Output

In this chapter the function charts and the application explanations for the outputs are explained.

4.2.1 Function chart

The following illustration indicates the sequence in which the functions are processed. Communication objects, which lead to the same box have the same priority and are processed in the sequence in which the telegrams are



received.

Note
If a telegram is received via the communication object *Switch*, this is connected to both logical objects if they are activated. The result of this action serves as the input signal for the function time. If this is not blocked, a corresponding switch signal is generated, e.g. delay or flashing. Before the switch command of the relay is reached, the forced operation is checked and executed as a priority if necessary. Subsequently, the switching action is only dependent on the state of the bus voltage. The relay is switched if a switching action allows it.

4.2.2 Function time

The function *Time* can be enabled (value 0) and disabled (value 1) via the bus (1 bit communication object *Disable function time*). The output operates without a delay as long as the function *Time* is disabled.

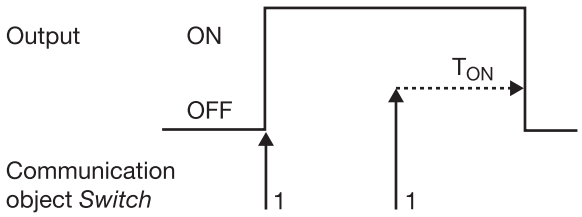
Different functions can be realised using the function time:

- Staircase lighting
- Switching ON and OFF delay
- Flashing

You can switch for example between functions, e.g. staircase lighting function (night time operation) and normal ON/OFF switch function (daytime operation).

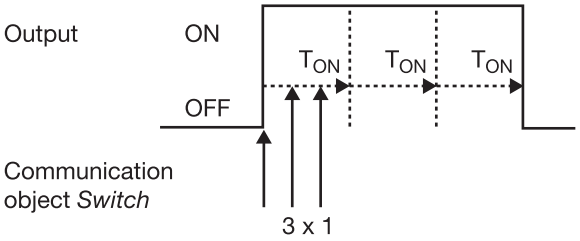
4.2.2.1 Staircase lighting

After the staircase lighting time T_{ON} the output switches off automatically. For every telegram with the value 1 the time restarts (“retrigger function”), if the parameter *Extending staircase lighting by multiple operation ("pumping up")* *A: Output - Time*, page 67, is set to *no, no pump up possible*.



The response is the fundamental response of the staircase lighting function

Via “pumping up” – actuation of the push button several time in succession – the user can adapt the staircase lighting to current needs. The maximum duration of the staircase lighting time can be set in the parameters.

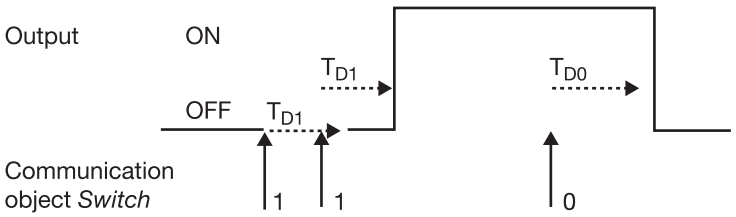


If the device receives a further ON command when the staircase lighting is switched on, the staircase lighting time is added to the remaining period.

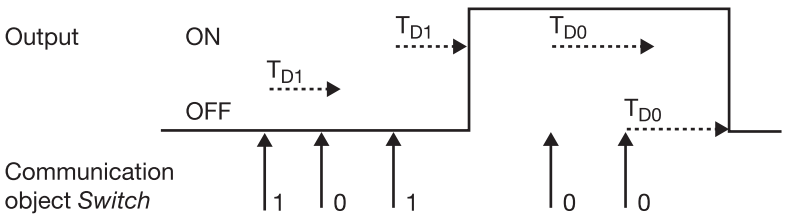
4.2.2.2 Switching ON and OFF delay

The switching ON and OFF delay delays switch on or switch off of the output.

Example 1:



Example 2:



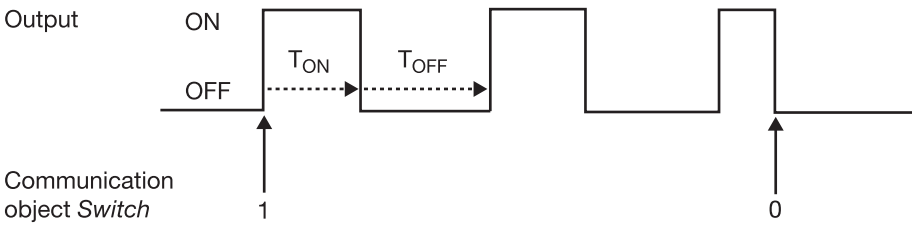
The delay time T_{D1} or T_{D0} starts after a switch command and after it has timed out the output executes the switch command.

If a new ON telegram with the value 1 is received during the switch on delay, the time of the switch on delay starts again. The same applies with switch off for the switch off delay. If a new OFF telegram with the value 0 is received during the switch off delay, the time of the switch off delay starts again.

Note
If the device receives an OFF command during the switch on delay T_{D1}, an ON command is ignored.

4.2.2.3 Flashing

The output can flash when the output is switched on and off periodically.

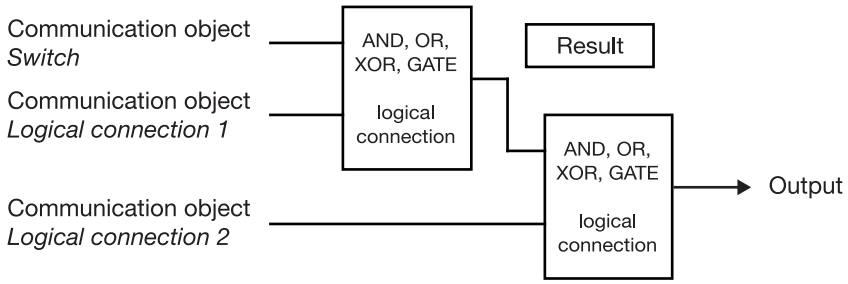


The switch on time (T_{ON}) and switch off time (T_{OFF}) during flashing can be programmed.

Note
The contact life of the contacts should be considered and can be found in the technical data. A limitation of the number of switching operations with the parameter *Number of impulses* may be useful. Furthermore, a delay in the switching sequence is possible caused by the limited availability of switching energy with very frequent switching. The possible number of switching operations should be considered.

4.2.3 Connection/logic

With the function *Connection/Logic* it is possible to connect the switching of the output with certain conditions. Two connection objects are available:



At first the communication object *Logical connection 1* is evaluated with the communication object *Switch*. The result of this is then logically linked with the communication object *Logical connection 2*.

The following logic functions are possible:

Object values						Explanations
Logical function	**Switch**	**Connection 1**	**Result**	**Connection 2**	**Output**	
AND	0 0 1 1	0 1 0 1	0 0 0 1	0 1 0 1	0 0 0 1	The result is 1 if both input values are 1. The output is 1 if both input values are 1.
OR	0 0 1 1	0 1 0 1	0 1 1 1	0 1 0 1	0 1 1 1	The result is 1 if one of both input values is 1.
XOR	0 0 1 1	0 1 0 1	0 1 1 0	0 1 0 1	0 0 1 1	The result is 1 when both input values have a different value.
GATE	0 0 1 1	closed open closed open	0 1	closed open closed open	0 1	The object *Switch* is only allowed through if the GATE (connection) is open. Otherwise the receipt of the object *Switch* is ignored.

The logic function is always re-calculated when an object value is received.

Gate function example

- The GATE logic is programmed so that a disable is implemented as soon as the communication object *Logical connection x* receives a 0.
- The output of the logical connection is 0.
- The communication object *Logical connection 1* receives a 0, i.e. the GATE blocks.
- The communication object *Switch* receives 0, 1, 0, 1. The output of the logical connection remains 0.
- The communication object *Logical connection x* receives a 1, i.e., the GATE is enabled if it is set in the parameters.
- The output of the logical connection is recalculated.

Note

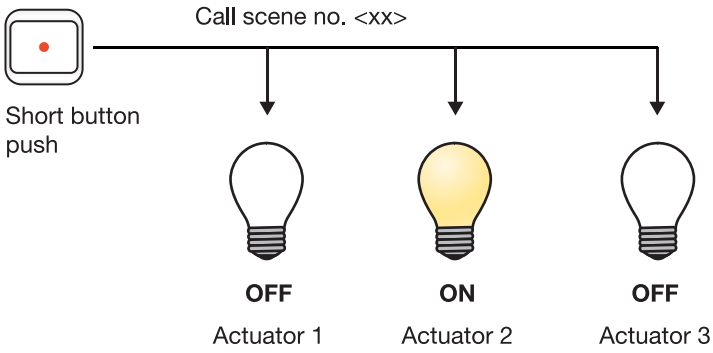
If telegrams are received on the communication object *Switch* during the block, they will not be stored.

For this reason the output or the event remain unchanged when the GATE is enabled.

The output switches if the GATE is enabled and a telegram is received on the *Switch* communication object.

4.2.4 Scene function

With the scene using 8 bits the push button issues the Room Master with the instruction to call a scene. The scene is not stored in the push button but rather in the Room Master.



A scene number is sent with the telegram value which must correspond with the scene number in the parameters of the Room Master.

Up to 64 different scenes are managed via a single group address.
The scene telegram contains the call or store functions of a scene.

In the following the scene function is described which controls multiple KNX devices.

With the scene it is possible to retrieve one of 64 scenes or to connect multiple KNX devices in a scene. The scene can be retrieved or stored using a single telegram. It is a prerequisite that all the operating devices are parameterised with the same scene number.

Each KNX device involved receives the scene telegram and independently controls the scenes values. Using the Room Master for example, the outputs are switched on or off, the shutter moves to a determine position.

Up to 64 different scenes can be managed via a single KNX group address. The following information is contained in a scene telegram:

- Number of the scene (1…64)
- Call scene / store scene

For further information see: Code table scene (8 bit), page 223

Benefits
The function *Scene* with ABB i-bus® devices offers the following decisive advantage: All settings to be undertaken in a scene are stored in the device. Therefore, they must not be sent via the KNX when a scene is called, and only a figure value which has been assigned to this scene is necessary. This considerably reduces the load on the bus and prevents unnecessary telegram traffic on the KNX.

Note
The scene numbering 1 to 64 is retrieved via the KNX with a telegram number 0 to 63. For corresponding scene coding see Code table scene (8 bit), page 223.

4.3 Heating, ventilation, climate control with Fan Coil units

The Room Master RM/S controls single-phase fans, blowers or fan coil units. Three speed single phase fans with step or changeover control are possible.

Special fan properties such as switchover pauses, dwell times and a start-up phase can be parameterised. Up to two input variables for heating and cooling signals are available, e.g. for a thermostat.

The separate fan and valve parameterisation in the RM/S provides a maximum in flexibility and very many combination possibilities for various applications in the heating, ventilation and air-conditioning (HVAC) field.

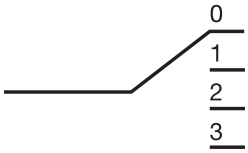
4.3.1 Terms

Fan Coil unit is a term used for a valve convector or blower convection unit.

The Fan Coil unit is connected to a central heating and cooling water supply and generates the desired temperature for the room.
A room can be heated, cooled and ventilated using a Fan Coil unit.

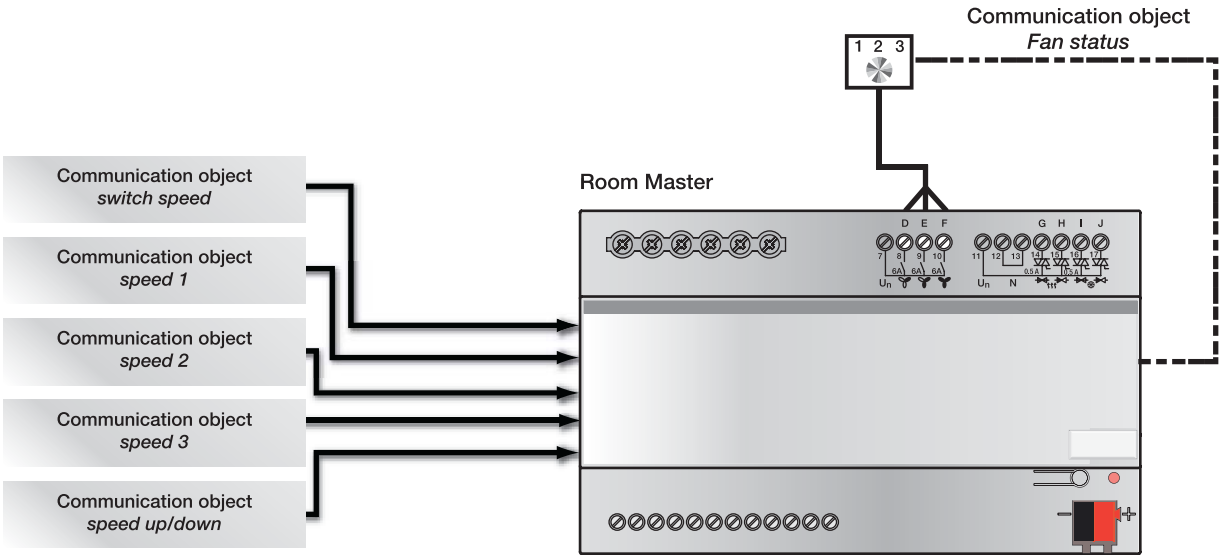
4.3.2 Fan operation

In fan operation a single phase fan, blower or convector can be controlled. In combination with a valve control 2, 3 or 4 pipe system can be implemented.
The fans are controlled via a 3 stage speed controller. For this purpose 3 windings are tapped off of the fan motor. The speed which results is dependent on the tap-off. It must be ensured that two contacts are not switched on simultaneously with a changeover control. For control purposes at least one three stage changeover switch with zero position is usually used. This switch is mapped with a group of outputs in the Room Master.



Three speed changeover switch

The control of the RM/S is implemented in accordance with the following schematic principle:



With three *Fan speed x switch* (x = 1, 2, or 3) communication objects that are independent of each other, the fan stages are controlled via the outputs of the Room Master.

Alternatively, the fan control can be implemented via a 1 byte communication object *Switch speed* or via the communication object *Fan speed UP/DOWN*.

Some ventilation controls require an additional central switch on mechanism (main switch) in addition to the stage switch. This can be implemented with a further output of the Room Master.
The output must be linked to the *communication object Status Fan ON/OFF*. Hereby, the main switch is switched on if at least one fan speed is set. If the fan is OFF (*Status Fan ON/OFF* = 0), the main switch is also switched off.

4.3.2.1 Fan in a changeover configuration

Control of a fan is usually implemented with a changeover switch.

The following control table results for a three-stage fan, which simulates the RM/S with a group of switch outputs:

	Output L	Output M	Output N
OFF	0	0	0
Fan speed 1	1	0	0
Fan speed 2	0	1	0
Fan speed 3	0	0	1

4.3.2.2 Fan with speed switching

In some cases the fan is controlled via a step switch. The following control table results for a three-speed fan, which simulates the RM/S with its outputs:

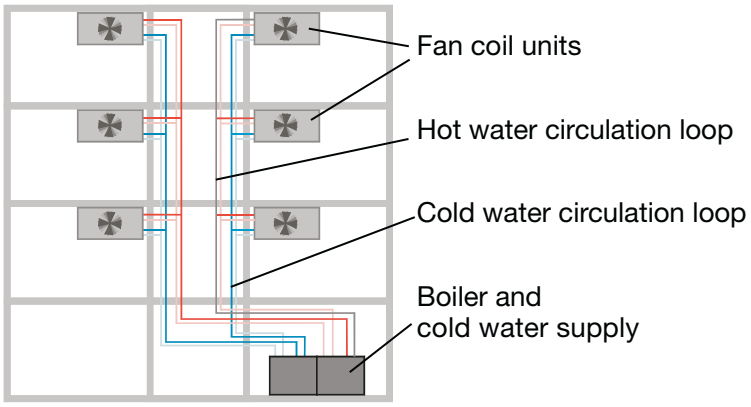
	Output L	Output M	Output N
OFF	0	0	0
Fan speed 1	1	0	0
Fan speed 2	1	1	0
Fan speed 3	1	1	1

The step switch cannot be switched on rapidly. If for example, fan speed 3 is to be switched on from the OFF state, fan speeds 1 and 2 must be controlled with the associated dwell times first.

4.3.3 Configuration of a HVAC system with Fan Coil units

A HVAC system with Fan Coil units (HVAC = heating, ventilation, air-conditioning) consists of a central heating and cooling water system. The Fan Coil units are installed in rooms and directly connected to the heating and cooling circuit.

4.3.4 Design of a Fan Coil unit

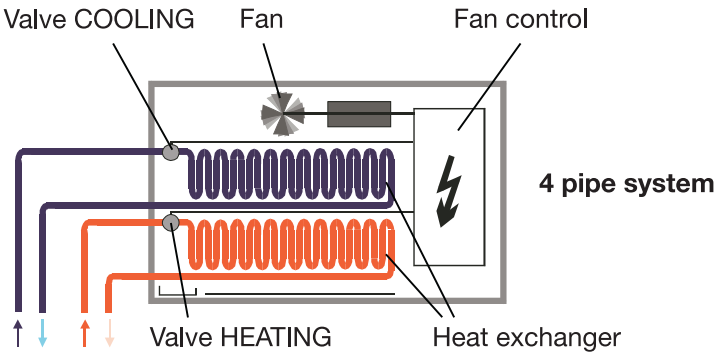


The Fan Coil unit consists of a fan or blower-convector and one or two heat exchangers, which emit heating or cooling power to the room.

If only one heat exchanger and one heating or cooling circuit is available, you have a 2 pipe system.

If two heat exchangers with two separate heating and cooling circuits are in use, you have a 4 pipe system. The Room Master directly controls the fan.

The heat exchanger and the fan are the most important components of a Fan Coil unit. Heating or cooling water flows in the heat exchanger depending on the desired room temperature. The flow of water through the heat exchanger is controlled via the valves.

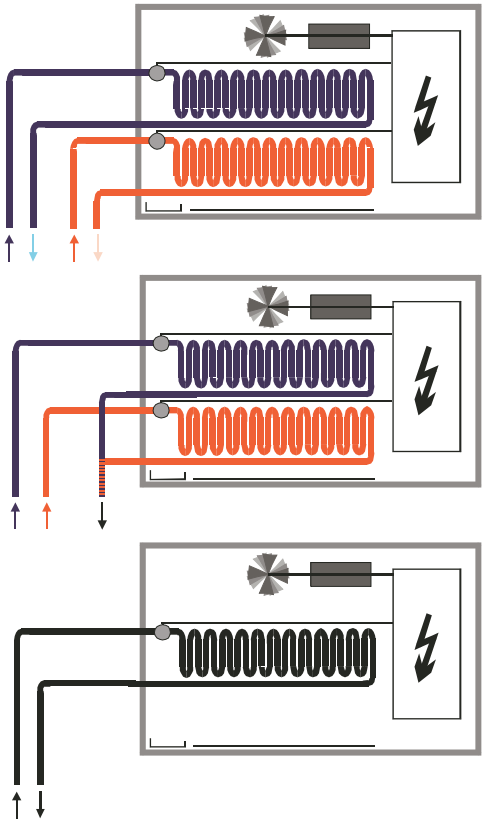


The fan blows air past the heat exchanger and into the room through a filter. The air is heated or cooled in the heat exchangers and thus generates the desired room temperature.
The fan is driven by a motor. The motor and the valves are controlled by a Room Master.

The water condensation which results during cooling collects in a condensation water trough.

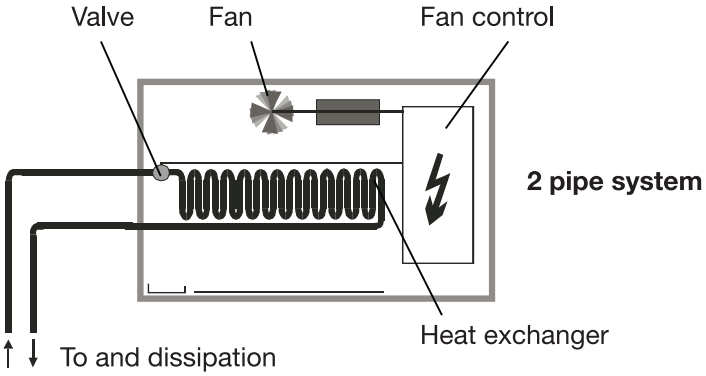
4.3.5 Pipe systems

A Fan Coil unit can be configured as a 4, 3 or 2 pipe system.



4.3.5.1 2 pipe system, configuration

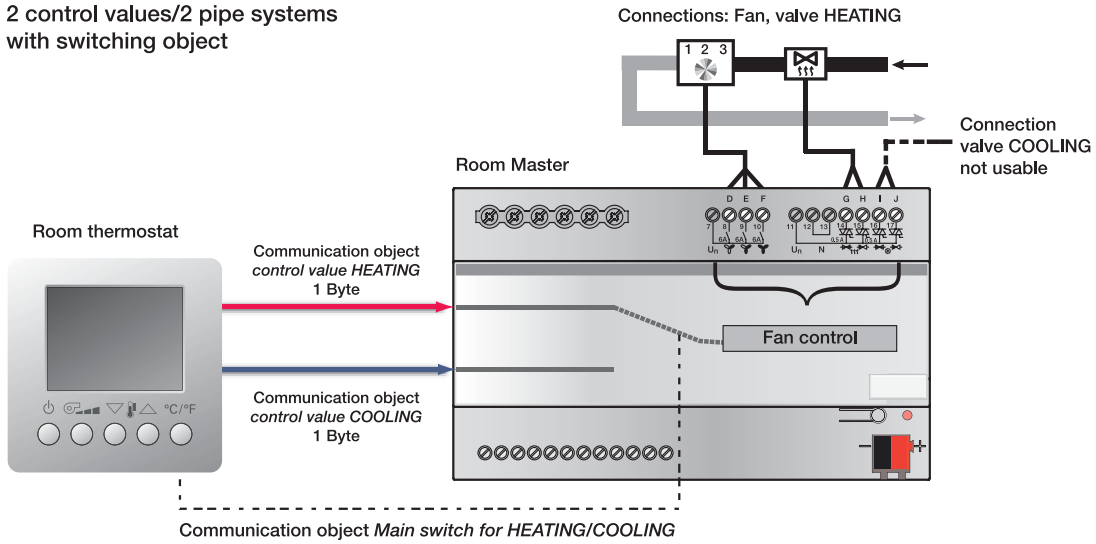
The 2 pipe system consists of just a single water circuit which is heated or cooled alternately to suit the season. In a 2 pipe Fan Coil unit there is only one heat exchanger with a valve.



Note
In some HVAC systems cooling is undertaken exclusively with a 2 pipe Fan Coil unit. The heating function is undertaken by a conventional heater or an electrical heater.

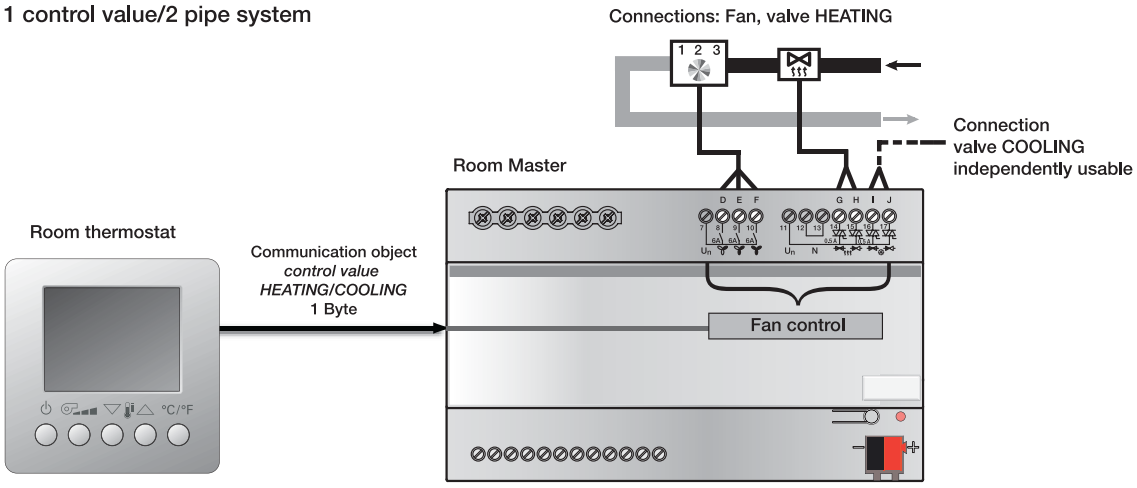
4.3.5.2 2 pipe system HEATING and COOLING

In this system only one heat exchanger is available for HEATING and COOLING. Depending on the weather, warm or cold water is supplied centrally to the pipe system (2 pipes). The Room Master or the thermostat is informed if warm or cold water is currently flowing through the system. Depending on this setting both control values act on just a single valve. The thermostat decides which control value (HEATING/COOLING) is actively sent. The RM/S controls the fan speed and only one valve.



4.3.5.3 2 pipe system HEATING or COOLING

In this system one heat exchanger is available for HEATING or COOLING. The control value for HEATING or COOLING is provided by a thermostat. Only warm or only cold water is supplied centrally to the pipe system (2 pipes). Depending on this setting one control value acts on one valve. The thermostat sends the control value (HEATING/COOLING) and the RM/S controls the fan speed and the valve.



Note
Both 2 pipe systems can be established using a 3 speed fan or blower. Depending on the control value (1 byte or 1 bit) which is sent from a thermostat, the Fan Coil Actuator determines the corresponding fan speeds via programmable threshold values.

For a continuous control value (1 byte; 0…100 %) the threshold values for the fan speeds can be defined for example as follows:

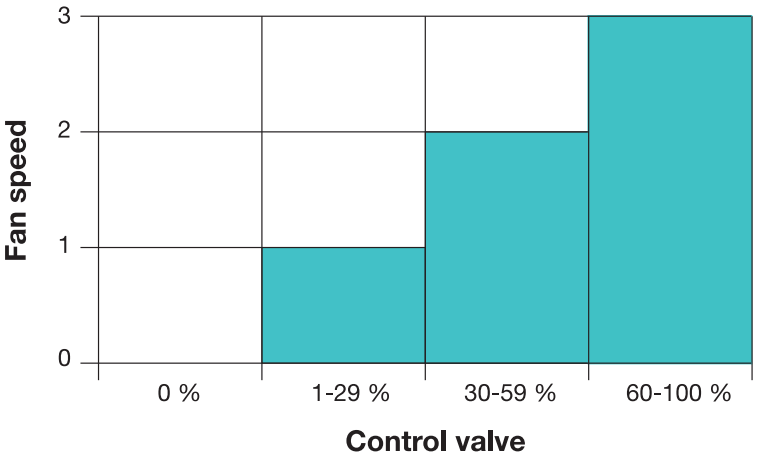
Example

Three speed fan:

Fan speed 1: 1… 29 %
Fan speed 2: 30… 59%
Fan speed 3: 60…100%

Switch thresholds in the RM/S:

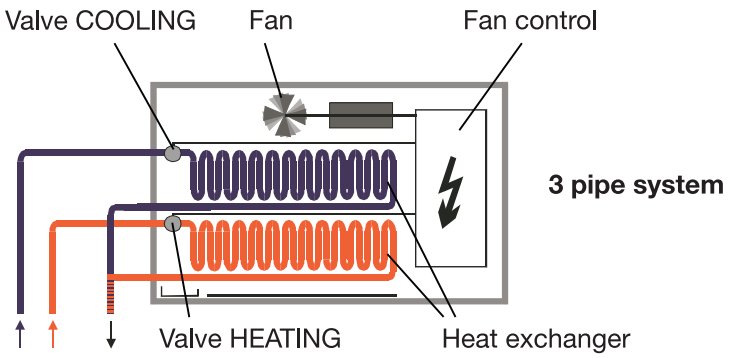
Off -> fan speed 1 = 1%
Fan speed 1 -> 2 = 30%
Fan speed 2 -> 3 = 60%



4.3.5.4 3 pipe system, configuration

The 3 pipe system has a similar design to the 4 pipe system. There is a separate inlet for heating and cooling water as well as two separate heat exchangers with one valve each. In contrast to a 4 pipe system the 3 pipe system has a common return for heating and cooling water.

The Room Master directly controls the fan and provides two communication objects for control of the valves.

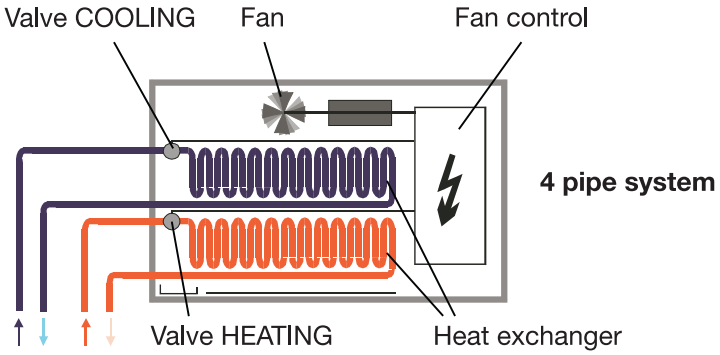


4.3.5.5 4 pipe system, configuration

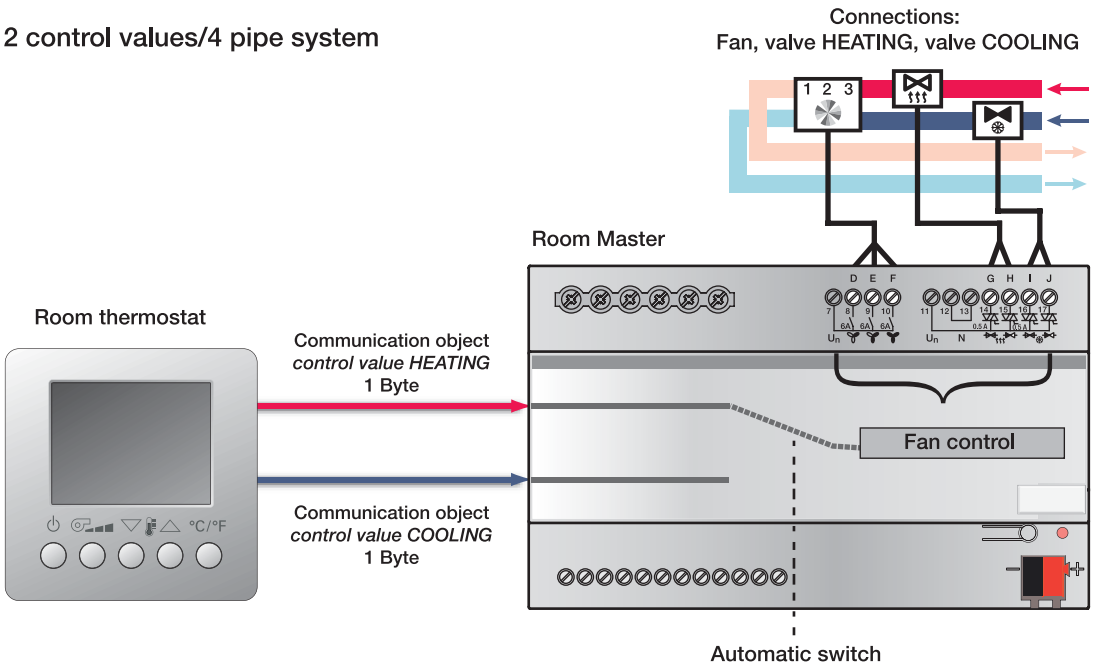
In a 4 pipe system two separate heat exchangers (for HEATING and COOLING) are available. Warm and cold water is provided centrally to two separate pipe systems (of 2 pipes each).

The thermostat onsite decides if heating or cooling is applied. The thermostat sends a separate heating and cooling signal.

The Room Master directly controls the fan.

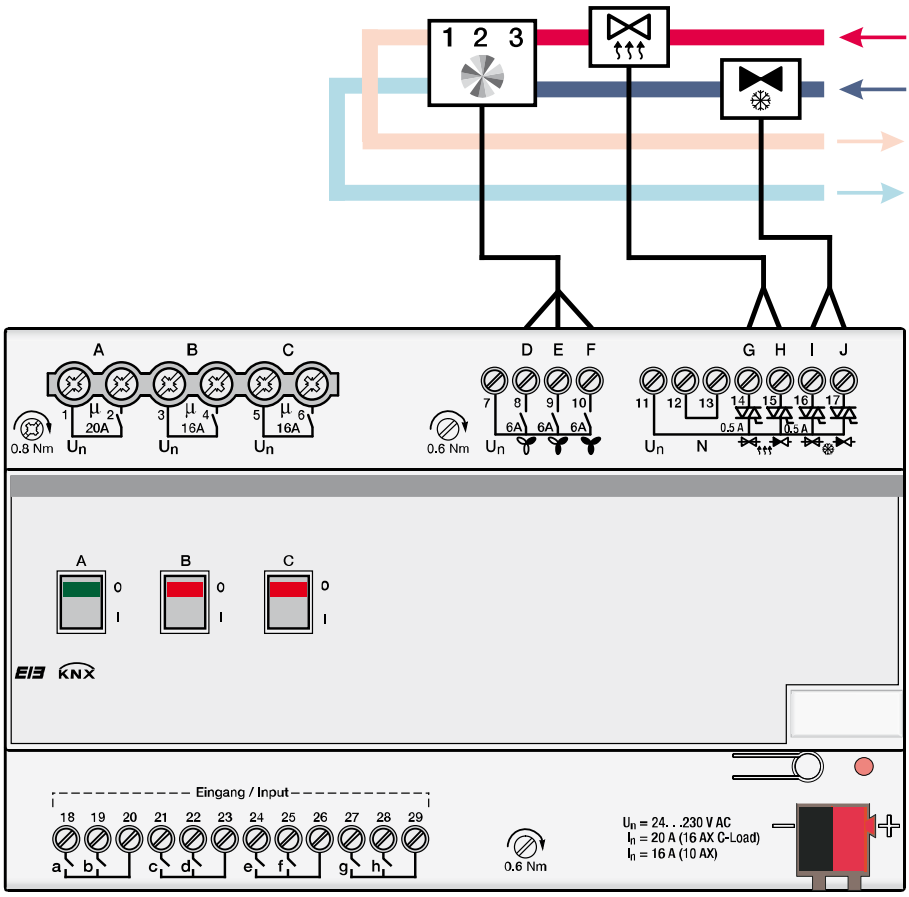


2 control values/4 pipe system



4.4 System configuration with the Room Master

In this function the Room Master is used for control of the heating and cooling valve as well as for switching the fan outputs. The temperature detection and regulation is undertaken by a thermostat.



Even the offset of the set point value as well as changeover of the operating modes is implemented by the thermostat. The sensors can be connected directly to the Room Master in order to consider the monitoring of the condensed water and the window contact.

In order to correctly implement this function the thermostat must send the actual setting value as well as the corresponding operating mode to the Room Master via the bus.

4.4.1 Automatic operation

A fan drive is connected directly to the Room Master. The fan is switched via three floating contacts. A single speed, two speed or three speed fan can be connected.

The fan speed is set automatically in dependence on the control value. For example, the following control value ranges can be programmed for the corresponding fan speeds:

Control value	Fan speed
0… 9 %	0 (fan off)
10… 39 %	1
40… 69 %	2
70…100 %	3

Important
The Room Master RM/S is purely an input and output device which does not have a controller for a thermostat.

Control of the room temperature is implemented using a thermostat which generally detects the room temperature. The RM/S primarily controls a fan and valves. In addition to a manual control via the communication objects *Fan speed x*, *Fan speed switch* or *Fan speed UP/DOWN*, the Room Master can also operate in automatic mode together with a thermostat. Communication objects *Control value HEATING*, *Control value COOLING* or when operating with just a single input variable, the object *Control value HEATING/COOLING,* are available.

The automatic mode is enabled in the parameter window *Fan* with the parameter *Enable automatic operation*. Depending on the HVAC system, this is set in the parameter window *Control input* and the respective control value objects are enabled.

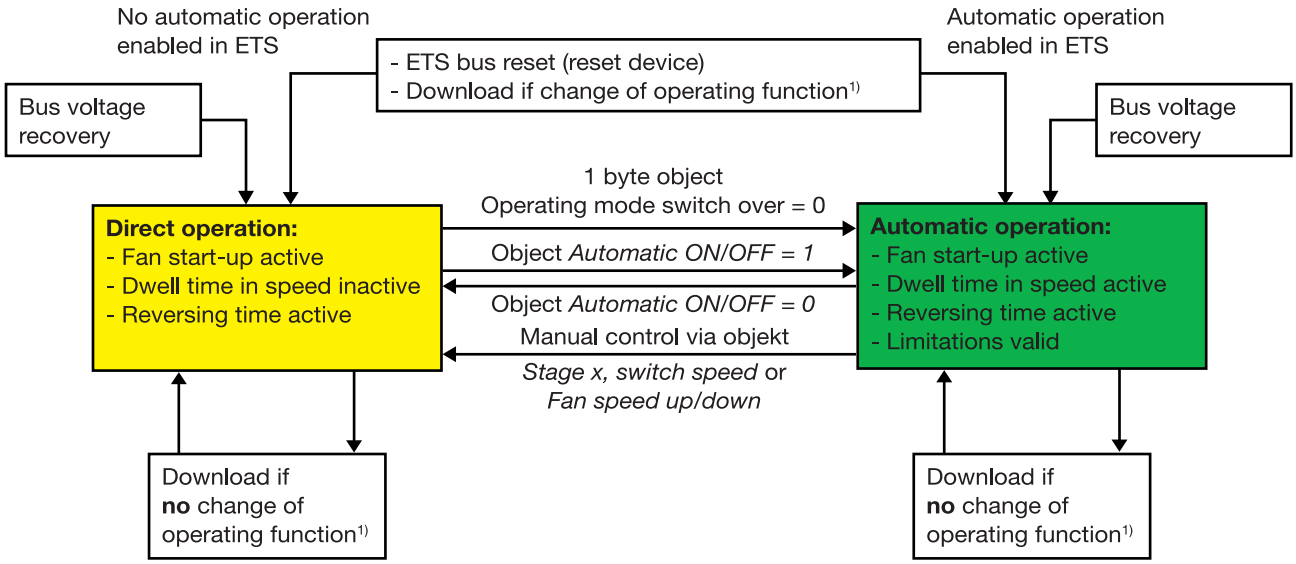
An automatic operation parameterised in the ETS only becomes active after the first download. With a subsequent download the automatic operating state (active, inactive) is retained as it was before the download. There is however an exception when system properties such as HVAC systems, fan control (changeover, step control) or the fan stage count has been changed (1/2/3). In these cases the automatic mode is activated if the automatic mode has been enabled in the ETS.

Automatic mode is switched off either by a manual setting command via the communication objects *Speed x (x = 1, 2, 3)*, *Fan speed switch* or *Fan speed UP/DOWN,* or if a telegram with the value 0 is received via the communication object *Automatic ON/OFF*.

The automatic operation can be reactivated by the communication object *Automatic ON/OFF*.

An activation of one of the four limitations or the forced operation does not end automatic operation. By using a range limit (several fan speeds are permissible), a limited automatic control with several fan speeds is possible.

The following functional diagram shows the relationship between automatic and manual operation of the Room Master.



1) An operating function can occur on the one hand by the change from HEATING to COOLING, by the switchover of the number of fan speeds, by the switchover from a step to changeover switch or via the switchover to another HVAC system.

4.4.2 Direct operation

With direct fan control via the ABB i-bus®, a fan drive is connected directly to the Room Master and switched via three floating contacts. A single speed, two speed or three speed fan can be connected.

The Room Master sets the fan speed in accordance with the value received via the ABB i-bus®. The value is received as a 1 byte value. The conversion of the received 1 byte value to the fan speed occurs as with the automatic fan control via the parameterised threshold values.

1 byte value	Fan speed
0… 9 %	0 (fan off)
10… 39 %	1
40… 69 %	2
70…100 %	3

4.4.3 Switchover between automatic and direct operation

In the Room Master you can switch between automatic operation and direct operation. The changeover to manual fan control is implemented via a 1 bit value. The fan stage is switched in accordance with the received 1 byte value.

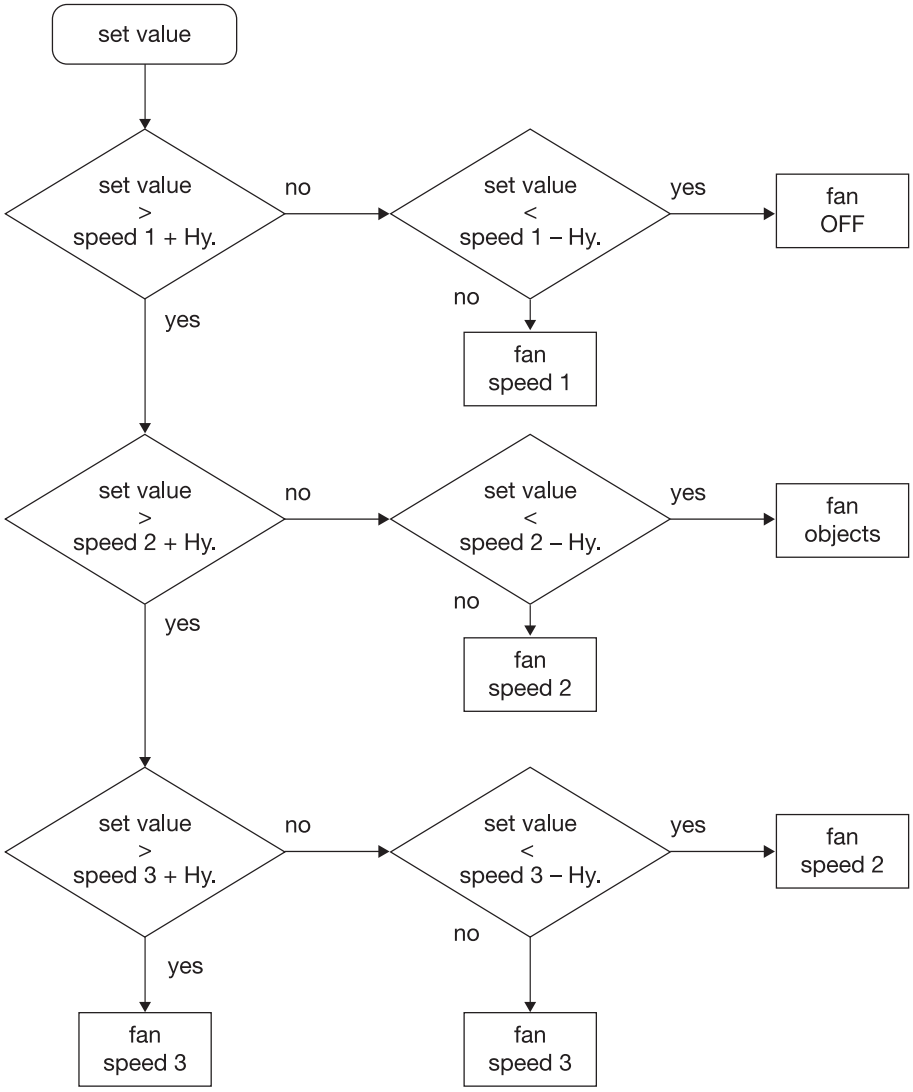
The fan control is changed back to automatic operation if a 1 is received in the respective communication object.

The current status of automatic operation is fed-back via a 1 bit value.

4.4.4 Logic of the stage switching

The following illustration indicates the logic of a switchover stage for a Room Master in dependence on the control values and the parameterised threshold values and hysteresis.

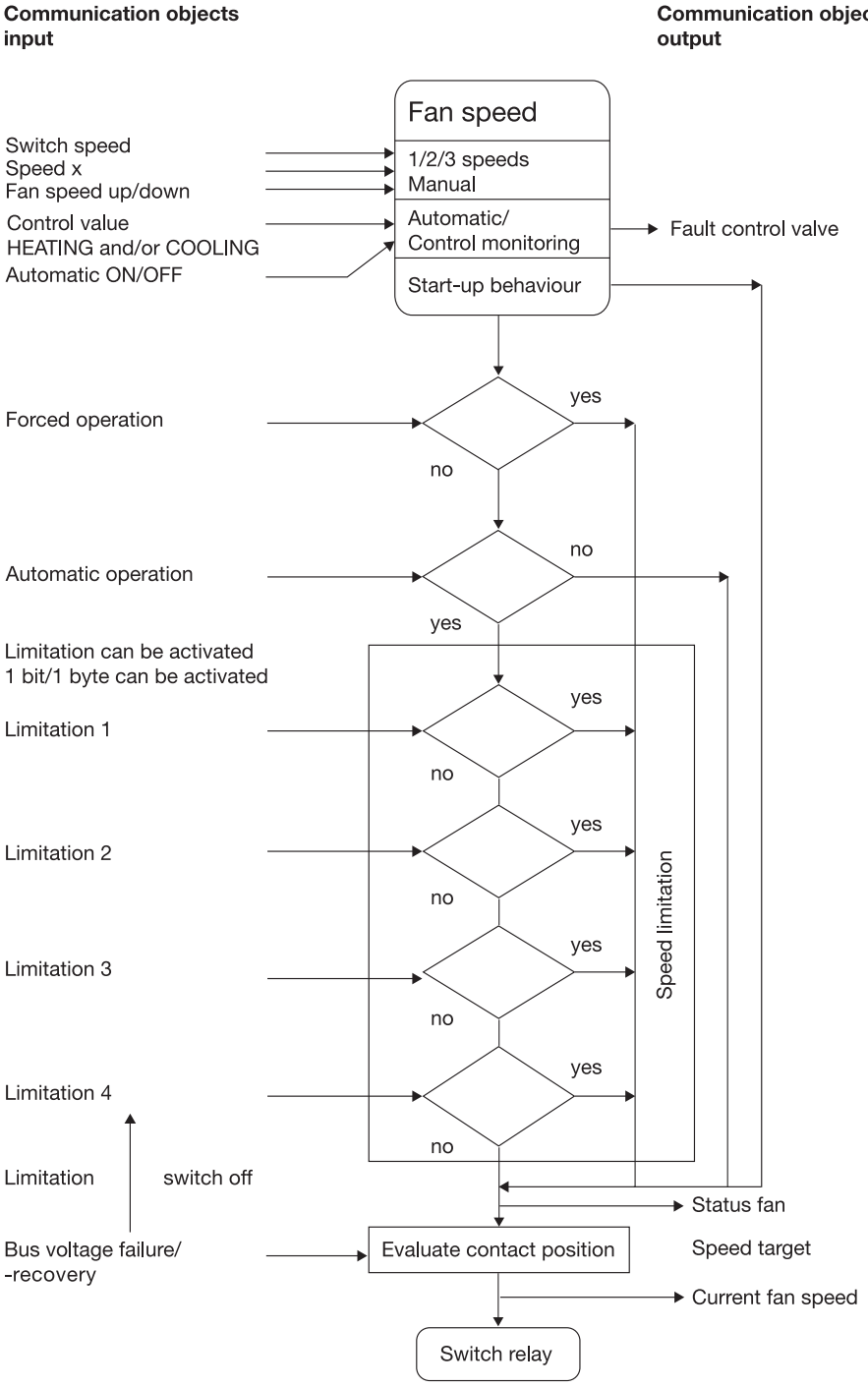
The diagram relates to a three speed fan without parameterised fan limitations. The fan limitations are only relevant after the fan speed has been determined and do not change the flow chart.



Hy. = Hysteresis
If fan speed x – Hysteresis < 0 % the fan speed x – Hysteresis = 1 %
If fan speed x + Hysteresis > 100 % the fan speed x + Hysteresis = 99 %

4.4.5 Fan operation functional diagram

The following illustration indicates the sequence in which the functions of the fan control are processed. Communication objects, which lead to the same box have the same priority and are processed in the sequence in which the telegrams are received.



4.5 Valve drives, valves and controller

4.5.1 Electromotor valve drives

Electromotor valve drives open and close valves via a small electric motor. Electromotor valve drives are offered as proportional or as 2 or 3-way valve drives.

Proportional valve drives are controlled via an analogue signal, e.g. 0-10 V. They can not be controlled with the Room Master.
2 or 3-point valve drives are controlled via switching of the supply voltage.

2-point valve drives are controlled via the commands OPEN and CLOSE. The valve can be completely open or completely closed.
2-point valve drives can not be controlled with the Room Master.

The Room Master supports the control of electric motor 3-point valve drives. These are connected via three connection cables to the Room Master: Neutral conductor, switched phase to OPEN,
switched phase for CLOSE. Using 3-point control valve drives, the valve can be opened by any desired percentage and the position can be retained over an extended period. If the valve does not move, no voltage is applied to the motor.

The valve is opened wide enough to allow the exact quantity of hot or cold water to flow that is required to bring the heat exchanger to the required temperature. Thus the valve is controlled via the valve opening (0…100 %).

4.5.2 Electro-thermal valve drives

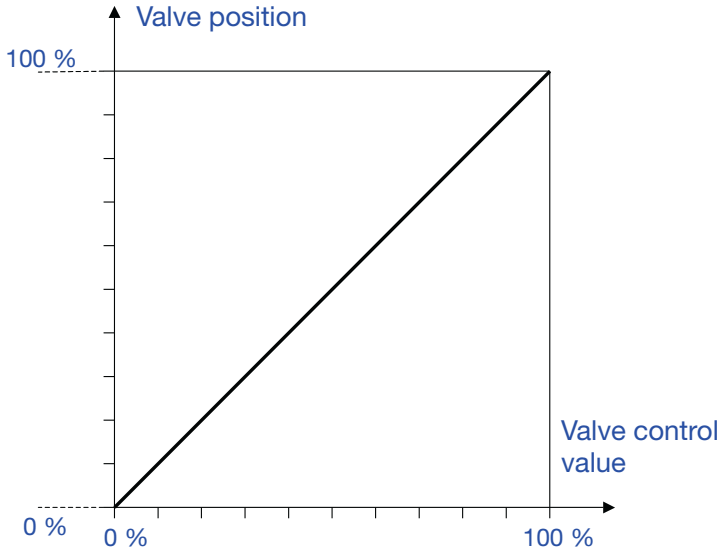
Electro-thermal drives are adjusted due to heat expansion of a material caused by a flow of electric current. Electro-thermal valve drives are controlled by pulse width modulation.
The Room Master supports the control of electro-thermal valve drives via pulse width modulation.

Electro-thermal valve drives are offered in the *de-energised closed* and *de-energized opened* variants. Depending on the variant, the valve is opened when voltage is applied and closed when no voltage is applied, or vice versa.

Electro-thermal valve drives connected via two connection cables to the Room Master.

4.5.3 Valve curve

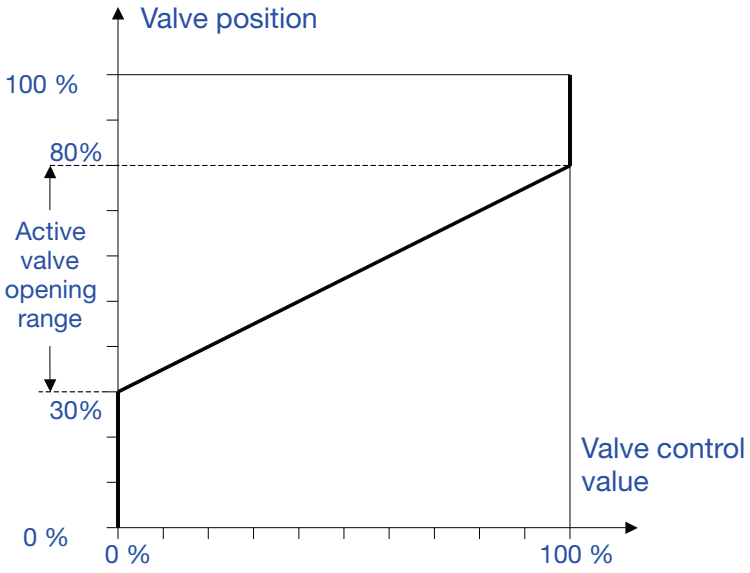
The Room Master controls valves with linear valve curves. The valve control is matched linearly to the control value.
The valve is closed with a control value of 0 %, i.e. also 0 %.
The valve is fully open with a control value of 100 %, i.e. also 100 %.
The same ratio also applies for all intermediate values.



Linear valve curve

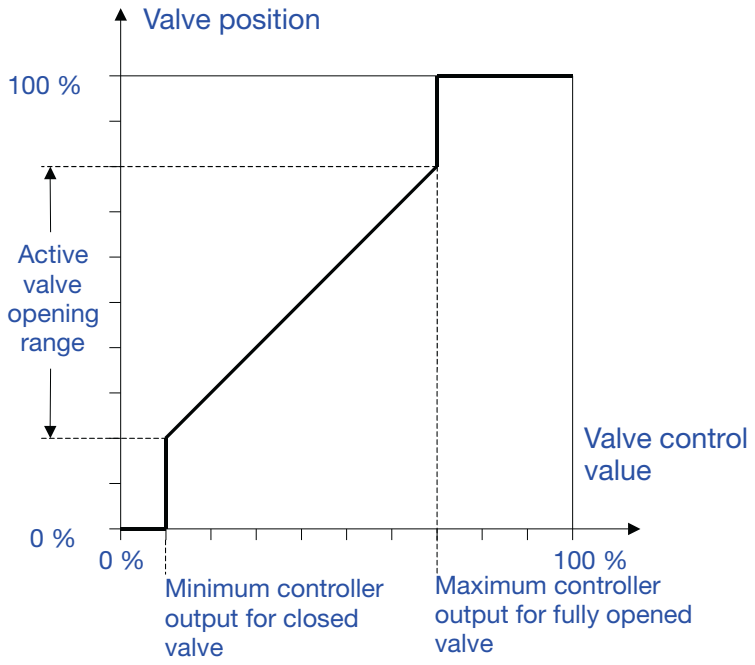
These valve curves can be matched for different valve types. Many valves for example, have practically no flow when barely opened and achieve maximum flow at 60-80 %. Furthermore, many valves emit an annoying whistling sound at low flows.

These effects can be taken into consideration by limitation of the active valve opening range. The positioning frequency of the valve drive may also be reduced by this limitation.



Limitation of the active valve opening range

A further adaption of the valve curve is implemented via the limitation of the valve control value. The valve output does not react in the upper and lower range due to this limitation. Thus for example, a valve movement with a minimal heating or cooling requirement can be avoided.



Limitation of the valve control value

A further adaption of the curve can be undertaken in the parameter window *Curve* which is separately adjustable for the heating and the cooling valve. The control value can be adapted to the valve characteristic curve using the adjustable parameters. The positioning frequency of the valve drive may also be reduced by this function.

A reduction of the positioning frequency reduces the current requirement for positioning and increases the service life of the valve. However, a reduced positioning frequency will also impair the accuracy of the temperature control.

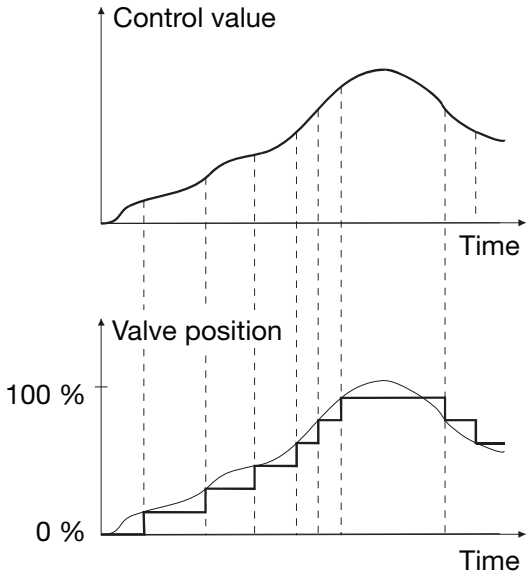
4.5.4 Control types

The following control types are commonly used for the control of valves in heating, air-conditioning and ventilation applications.

- Continuous control
- Pulse width modulation (PWM)
- Pulse width modulation – calculation

4.5.4.1 Continuous control

With continuous control, a control value is calculated based on the target temperature and the actual temperature, and is used for optimum control of the temperature. The valve is brought to a position which complies with the calculated control value. With this method the valve can be fully opened, fully closed and even positioned in every intermediate position.



Continuous control is the most precise form of temperature control. At the same time the positioning frequency of the valve drive can be kept low. Continuous control can be implemented with the Room Master for electro-motor 3-point valve drives.
This is implemented via a 1 byte control.

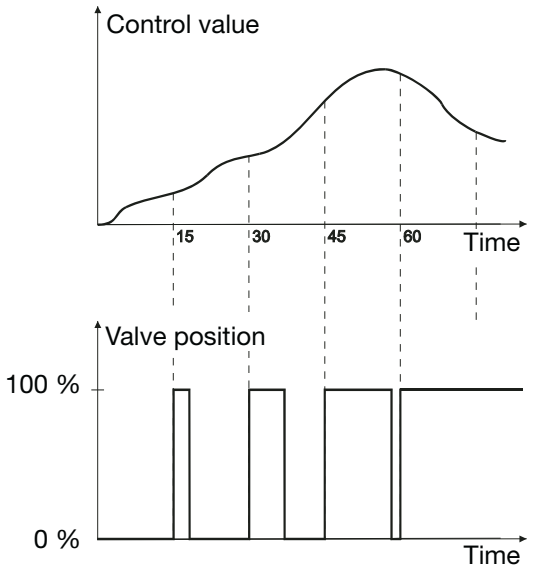
What is a 1 byte control?

For 1 byte control, a control value of 0…255 (corresponds to 0 %…100 %) is preset by the room thermostat. At 0 % for example, the valve is closed and at 100 % it is fully opened.

4.5.4.2 Pulse width modulation (PWM)

With pulse width modulation the valve is operated as with 2-point control exclusively in the positions *fully opened* and *fully closed*. In contrast to a 2 point control the position is not controlled via limit values, but rather by calculated control values similar to continuous control.

The control value is fixed for a timed cycle and recalculated in the duration for valve opening. The control value 20 % at a cycle time of 15 minutes, for example, will be recalculated for a valve opening time of three minutes. The control value 50 % results in a valve opening time of 7.5 minutes.

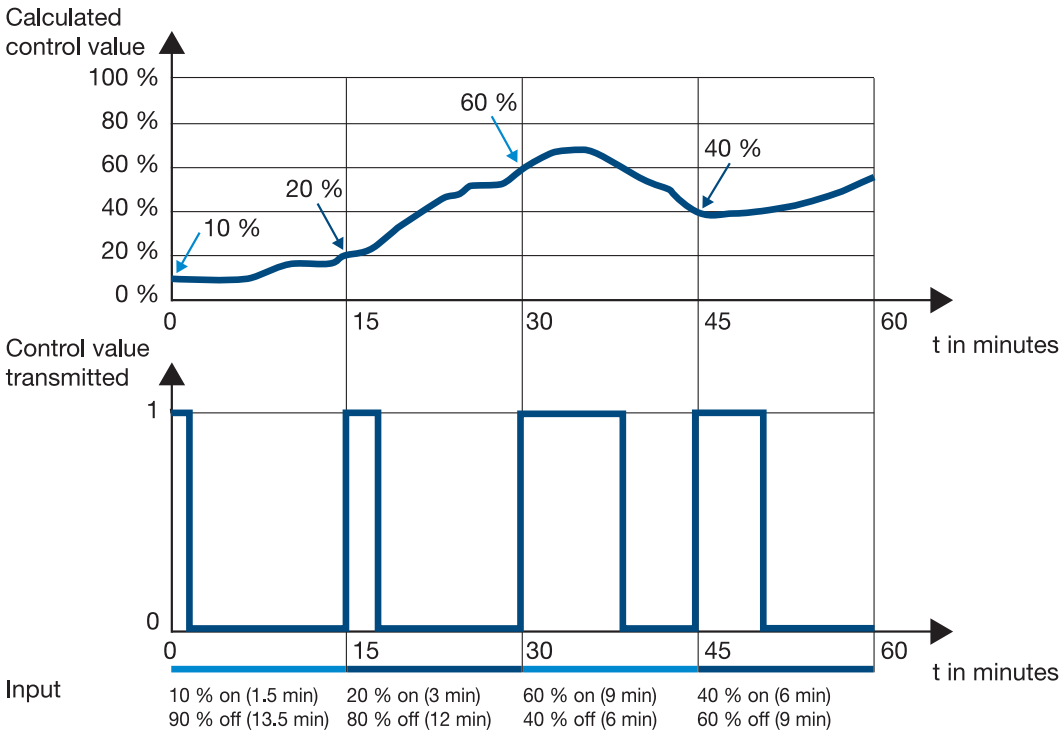


With pulse width modulation a relatively accurate control of the temperature can be achieved without any resulting overshoots. Simple, attractively-priced control valves can be used. The positioning frequency of the control valve is relatively high.

Pulse width modulation can be used with the Room Master in conjunction with electro-thermal valve drives.

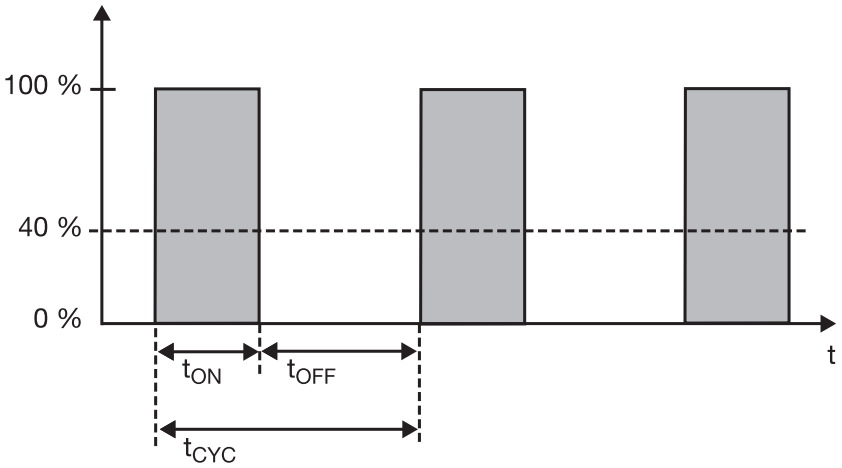
An example of this is when the RM/S receives a 1 byte control value (continuous control) as an input signal, and this value together with the parameterised cycle time from a PWM calculation is converted into a signal for a 2-point control (on - off - on).

With PWM control, the received control value (0…100 %) calculated in the control algorithm is converted to a pulse width modulation.
The conversion is based on a constant cycle time. If the RM/S for example, receives a control value of 20 %, then for a cycle time of 15 minutes the valve will be opened for three minutes (20 % of 15 minutes) and closed for 12 minutes (80 % of 15 minutes).



4.5.4.3 Pulse width modulation – calculation

With pulse width modulation the control is implemented by a variable mark-space ratio.



During the time t_{ON} the valve is opened and during the time t_{OFF} it is closed. Due to t_{ON} = 0.4 x t_{CYC} the valve is set to about 40 % on. t_{CYC} is the so-called PWM cycle time for continuous control.

4.6 Behaviour with, …

4.6.1 Bus voltage recovery

General

- At bus voltage recovery the object values can be parameterised, if not they are set to the value 0.
- Timers are out of operation and should be restarted.
- Status objects are sent as long as the option *after a change* has been set.
- The contact position is not known with 100 % certainty after bus voltage recovery. It is assumed that the contact position has not changed during the bus failure (no manual operation possibilities occur). Only after a new switch event is the contact position known to the Room Master.
- The send delay is only active at bus voltage recovery!

Switch contact output

- The object value *Staircase lighting time* remains unchanged as before bus voltage failure.
- The object value *Disable function time* is independent of the selected option.
- The object value *Permanent ON* remains unchanged as before bus voltage failure.
- The switch contact output switches as follows:
    - After the set object value *Switch* with bus voltage recovery.
    - If the parameter *Object value "Switch" at bus voltage recovery* is not parameterised, the behaviour at bus voltage failure is decisive.
    - If none of the two above options are selected, the last position is retained as with bus voltage failure.

Note
If a staircase lighting time was active at bus voltage failure, it will restart.

Inputs

- The inactive waiting time is only active at bus voltage recovery.

Valves

- The purging cycle restarts if it was active before the failure.
- The priorities blocking, forced operation, purging and adjustment are re-established and executed as priorities.

  The priorities are defined as follows:

  1. Reference movement
  2. Communication object *Block*
  3. Communication object *Forced operation*
  4. Valve Purge
  5. Adjustment
  6. Control values

Note
Here 1 corresponds to the highest priority.

- The value parameterised for bus voltage recovery is only carried out if no higher priority (with the exception of manual operation/reference run) was active before the failure. If during bus voltage recovery and an active priority a new *control value* is received, it will replace the *Control value* which was defined in the parameterisation.

4.6.2 Reset via bus

What is an ETS reset?

Generally and ETS reset is defined as a reset of the device via the ETS.
The ETS reset is initiated in the ETS3 under the menu point *Commissioning* with the function *Reset device*.
This stops the user program and it is restarted.

Switch contact output

- The object value *Staircase lighting time* receives its parameterised value.
- The object value *Disable function time* is 0, i.e., function *Time* is not blocked.
- The object value *Permanent ON* is 0, i.e., permanent on is not active.
- The switch contact output goes to the safely opened state.

Note
For all resets after delivery including the first download, the response will comply with that of a reset via the bus. A send and switch delay is not executed. All states are reset.

4.6.3 Download

General

After a change of the fan control (speed control or changeover control) of the fan type, a full reset of the Room Master is required in order to avoid incorrect function. This full reset has the same effect as reset of the device in the ETS.
In this case the objects are normally written with the value 0. The timers stop and are set to 0.
Status objects are set to 0 (with the exception of automatic, if it is active) and contacts are opened.

With the normal download, where no re-parameterisation of the fan type and fan control has occurred, an action has the effect that in the ideal case no unwanted reactions are initiated and thus normal operation is not influenced. Object values remain unchanged. Timer will not operate and must only be restarted. Status values are updated and sent. The contact position remains unchanged and only changes with the next switch command.

Note
After a download with a change, the application complies in behaviour to a reset of the device in the ETS.

Switch contact output

The object value *Staircase lighting time* remains unchanged.

The object value *Disable function time* remains unchanged.

Exceptions: The object value is set to 0 if there is no assignment to the communication object.

Note
Otherwise the block for the function *Time* is removed, if the object *Disable function time* is not available. The switch contact output will otherwise use the new parameters.

The object value *Permanent ON* remains unchanged.

The switch contact output remains unchanged.

4.6.4 Reaction on bus voltage failure

After the contact positions have set with bus voltage failure, the Room Master remains functional until the bus voltage recovers.

Only the energy for a non-delayed switching action is available when the bus voltage fails for each output. Reversing times, dwell times and start-up behaviour cannot be considered. For this reason, it is only possible for the fan at bus voltage recovery to retain the fan speed (unchanged) or to switch off.

The special behaviour is described in the following table.

4.7 Priorities with, …

4.7.1 Valve HEATING/COOLING

The priorities are defined as follows:

1. Reference movement
2. Communication object *Block*
3. Communication object *Forced operation*
4. Valve Purge
5. Adjustment
6. Control values

Note
Here 1 corresponds to the highest priority.

4.8 Fast heat up/cool down

4.8.1 Heat up

If the new valve position is greater than the current position during heat up, the contact will close immediately.

The closing time is calculated from:

- T_{up} = Valve adjustment duration from 0 to 100%
- V_{cur} = Current valve position [0…255]
- V_{new} = New valve position [0…255]
- T_{new} = Switch on time of the PWM at the new valve position
- T_{cyc} = PWM cycle time
- T_{+1} = Is added on the way to V_{new} at every position passed through

Calculation of the closing time

$$T_{neu} = \frac{T_{zyk}}{255 * V_{neu}}$$

$$T_{+1} = \frac{T_{auf}}{255} * \frac{V_{act}}{255}$$

Calculation of the closing time at switchover

$$T = T_{neu} + \left(T_{+1}\left[beiV_{act}\right]\right) + \left(T_{+1}\left[beiV_{act}+1\right]\right) + \ldots + \left(T_{+1}\left[beiV_{neu}\right]\right)$$

This means:

- For a movement from 0…99 % the contact remains closed for about T_{up} + T_{cyc}.
- For a change in the lower % range it results in significantly shorter closing times than for changes in the upper % range.
- Thereafter the contact is opened in accordance with the new PWM cycle and the PWM cycle is started.

4.8.2 Cooling down

If the new valve position is less than the current position during cooling down, the contact will open immediately.

The opening time is calculated from:

- T_{down} = Valve adjustment duration from 100 to 0 %
- V_{cur} = Current valve position [0…255]
- V_{new} = New valve position [0…255]
- T_{new} = Switch off time of the PWM at the new valve position
- T_{cyc} = PWM cycle time
- T_{+1} = Is added on the way to V_{new} at every position passed through

Calculation of the opening time

$$T_{neu} = \frac{T_{zyk}}{255 * (255 - V_{neu})}$$

$$T_{+1} = \frac{T_{ab}}{255} * \frac{255 - V_{act}}{255}$$

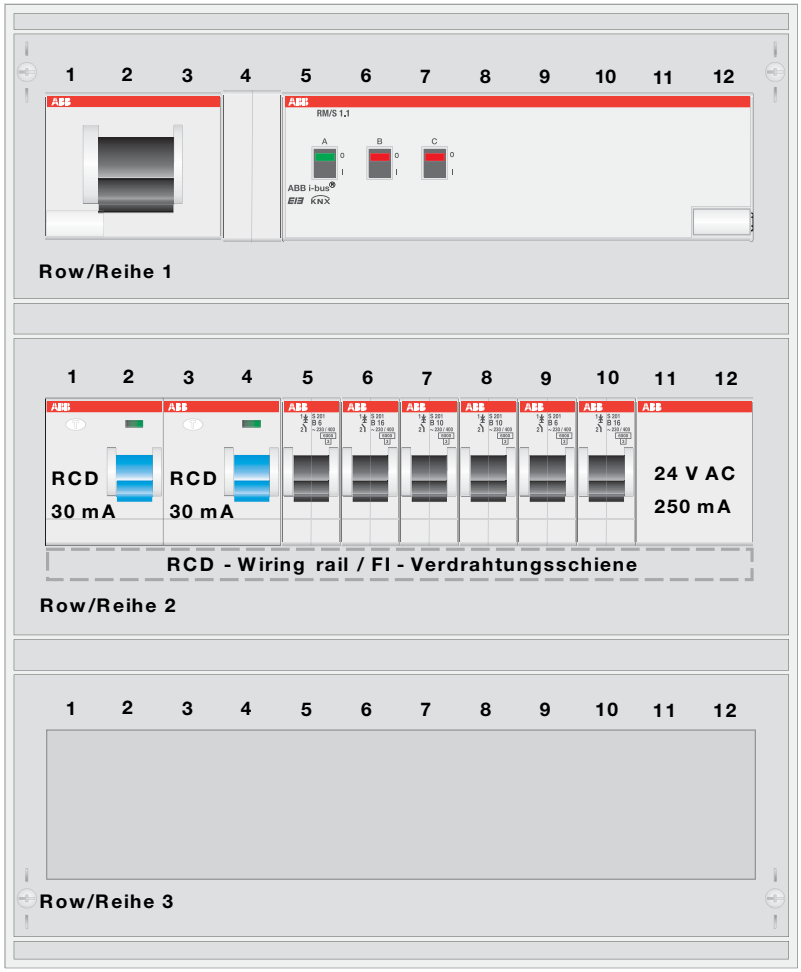
Calculation of the opening time at switchover

$$T = T_{neu} + (T_{+1}[beiV_{act}]) + (T_{+1}[beiV_{act} + 1]) + ... + (T_{+1}[beiV_{neu}])$$

This means:

- For a movement from 99…0 % the contact remains opened for about $T_{down} + T_{cyc}$.
- For a change in the lower % range it results in significantly shorter opening times than for changes in the upper % range.
- Thereafter the contact is opened in accordance with the new PWM cycle and the PWM cycle is started.

4.9 Configuration of a distribution board with Room Master Basic



Row 1

1-3	Main switch 16 A
4	Free
5-12	Room Master

Row 2

1-4	RCCB
5 (6 A)	Power supply (bell system transformer)
6 (16 A)	Power outlet circuit
7 (10 A)	Light circuit + shutter
8 (10 A)	Electrical heating/auxiliary output
9 (6 A)	Fan Coil (HVAC)
10 (16 A)	Power outlet circuit
11-12	Bell system transformer (TS24/8-12-24)

Row 3

1-12	Free

A Appendix

A.1 Scope of delivery

The Room Master Basic is supplied together with the following components. The delivered items should be checked according to the following list.

- 1 pc. RM/S 1.1, Room Master Basic, MDRC
- 1 pc. Installation and operating instructions
- 1 pc. Bus connection terminal (red/black)

A.2 Status byte fan, forced/operation

Bit No.		7	6	5	4	3	2	1	0
8 bit value	Hexadecimal	Forced operation	Limitation 1	Limitation 2	Limitation 3	Limitation 4	Thermostat fault	Automatic	HEATING/COOLING
0	00								
1	01								■
2	02							■	
3	03							■	■
4	04						■		
5	05						■		■
6	06						■	■	
7	07						■	■	■
8	08					■			
9	09					■			■
10	0A					■		■	
11	0B					■		■	■
12	0C					■	■		
13	0D					■	■		■
14	0E					■	■	■	
15	0F					■	■	■	■
16	10				■				
17	11				■				■
18	12				■			■	
19	13				■			■	■
20	14				■		■		
21	15				■		■		■
22	16				■		■	■	
23	17				■		■	■	■
24	18				■	■			
25	19				■	■			■
26	1A				■	■		■	
27	1B				■	■		■	■
28	1C				■	■	■		
29	1D				■	■	■		■
30	1E				■	■	■	■	
31	1F				■	■	■	■	■
32	20			■					
33	21			■					■
34	22			■				■	
35	23			■				■	■
36	24			■			■		
37	25			■			■		■
38	26			■			■	■	
39	27			■			■	■	■
40	28			■		■			
41	29			■		■			■
42	2A			■		■		■	
43	2B			■		■		■	■
44	2C			■		■	■		
45	2D			■		■	■		■
46	2E			■		■	■	■	
47	2F			■		■	■	■	■
48	30			■	■				
49	31			■	■				■
50	32			■	■			■	
51	33			■	■			■	■
52	34			■	■		■		
53	35			■	■		■		■
54	36			■	■		■	■	
55	37			■	■		■	■	■
56	38			■	■	■			
57	39			■	■	■			■
58	3A			■	■	■		■	
59	3B			■	■	■		■	■
60	3C			■	■	■	■		
61	3D			■	■	■	■		■
62	3E			■	■	■	■	■	
63	3F			■	■	■	■	■	■
64	40		■						
65	41		■						■
66	42		■					■	
67	43		■					■	■
68	44		■				■		
69	45		■				■		■
70	46		■				■	■	
71	47		■				■	■	■
72	48		■			■			
73	49		■			■			■
74	4A		■			■		■	
75	4B		■			■		■	■
76	4C		■			■	■		
77	4D		■			■	■		■
78	4E		■			■	■	■	
79	4F		■			■	■	■	■
80	50		■		■				
81	51		■		■				■
82	52		■		■			■	
83	53		■		■			■	■
84	54		■		■		■		
85	55				■		■		■

Bit No.		7	6	5	4	3	2	1	0
8 bit value	Hexadecimal	Forced operation	Limitation 1	Limitation 2	Limitation 3	Limitation 4	Thermostat fault	Automatic	HEATING/COOLING
86	56		■		■		■	■	
87	57		■		■		■	■	■
88	58		■		■	■			
89	59		■		■	■			■
90	5A		■		■	■		■	
91	5B		■		■	■		■	■
92	5C		■		■	■	■		
93	5D		■		■	■	■		■
94	5E		■		■	■	■	■	
95	5F		■		■	■	■	■	■
96	60		■	■					
97	61		■	■					■
98	62		■	■				■	
99	63		■	■				■	■
100	64		■	■			■		
101	65		■	■			■		■
102	66		■	■			■	■	
103	67		■	■			■	■	■
104	68		■	■		■			
105	69		■	■		■			■
106	6A		■	■		■		■	
107	6B		■	■		■		■	■
108	6C		■	■		■	■		
109	6D		■	■		■	■		■
110	6E		■	■		■	■	■	
111	6F		■	■		■	■	■	■
112	70		■	■	■				
113	71		■	■	■				■
114	72		■	■	■			■	
115	73		■	■	■			■	■
116	74		■	■	■		■		
117	75		■	■	■		■		■
118	76		■	■	■		■	■	
119	77		■	■	■		■	■	■
120	78		■	■	■	■			
121	79		■	■	■	■			■
122	7A		■	■	■	■		■	
123	7B		■	■	■	■		■	■
124	7C		■	■	■	■	■		
125	7D		■	■	■	■	■		■
126	7E		■	■	■	■	■	■	
127	7F		■	■	■	■	■	■	■
128	80	■							
129	81	■							■
130	82	■						■	
131	83	■						■	■
132	84	■					■		
133	85	■					■		■
134	86	■					■	■	
135	87	■					■	■	■
136	88	■				■			
137	89	■				■			■
138	8A	■				■		■	
139	8B	■				■		■	■
140	8C	■				■	■		
141	8D	■				■	■		■
142	8E	■				■	■	■	
143	8F	■				■	■	■	■
144	90	■			■				
145	91	■			■				■
146	92	■			■			■	
147	93	■			■			■	■
148	94	■			■		■		
149	95	■			■		■		■
150	96	■			■		■	■	
151	97	■			■		■	■	■
152	98	■			■	■			
153	99	■			■	■			■
154	9A	■			■	■		■	
155	9B	■			■	■		■	■
156	9C	■			■	■	■		
157	9D	■			■	■	■		■
158	9E	■			■	■	■	■	
159	9F	■			■	■	■	■	■
160	A0	■		■					
161	A1	■		■					■
162	A2	■		■				■	
163	A3	■		■				■	■
164	A4	■		■			■		
165	A5	■		■			■		■
166	A6	■		■			■	■	
167	A7	■		■			■	■	■
168	A8	■		■		■			
169	A9	■		■		■			■
170	AA	■		■		■		■	
171	DOW	■		■		■		■	■

Bit No.		7	6	5	4	3	2	1	0
8 bit value	Hexadecimal	Forced operation	Limitation 1	Limitation 2	Limitation 3	Limitation 4	Thermostat fault	Automatic	HEATING/COOLING
172	AC	■		■		■	■		
173	AD	■		■		■	■		■
174	AE	■		■		■	■	■	
175	AF	■		■		■	■	■	■
176	B0	■		■	■				
177	B1	■		■	■				■
178	B2	■		■	■			■	
179	B3	■		■	■			■	■
180	B4	■		■	■		■		
181	B5	■		■	■		■		■
182	B6	■		■	■		■	■	
183	B7	■		■	■		■	■	■
184	B8	■		■	■	■			
185	B9	■		■	■	■			■
186	BA	■		■	■	■		■	
187	BB	■		■	■	■		■	■
188	BC	■		■	■	■	■		
189	BD	■		■	■	■	■		■
190	BE	■		■	■	■	■	■	
191	BF	■		■	■	■	■	■	■
192	C0	■	■						
193	C1	■	■						■
194	C2	■	■					■	
195	C3	■	■					■	■
196	C4	■	■				■		
197	C5	■	■				■		■
198	C6	■	■				■	■	
199	C7	■	■				■	■	■
200	C8	■	■			■			
201	C9	■	■			■			■
202	CA	■	■			■		■	
203	CB	■	■			■		■	■
204	CC	■	■			■	■		
205	CD	■	■			■	■		■
206	CE	■	■			■	■	■	
207	CF	■	■			■	■	■	■
208	D0	■	■		■				
209	D1	■	■		■				■
210	D2	■	■		■			■	
211	D3	■	■		■			■	■
212	D4	■	■		■		■		
213	D5	■	■		■		■		■
214	D6	■	■		■		■	■	
215	D7	■	■		■		■	■	■
216	D8	■	■		■	■			
217	D9	■	■		■	■			■
218	DA	■	■		■	■		■	
219	DB	■	■		■	■		■	■
220	DC	■	■		■	■	■		
221	DD	■	■		■	■	■		■
222	DE	■	■		■	■	■	■	
223	DF	■	■		■	■	■	■	■
224	E0	■	■	■					
225	E1	■	■	■					■
226	E2	■	■	■				■	
227	E3	■	■	■				■	■
228	E4	■	■	■			■		
229	E5	■	■	■			■		■
230	E6	■	■	■			■	■	
231	E7	■	■	■			■	■	■
232	E8	■	■	■		■			
233	E9	■	■	■		■			■
234	EA	■	■	■		■		■	
235	EB	■	■	■		■		■	■
236	EC	■	■	■		■	■		
237	ED	■	■	■		■	■		■
238	EE	■	■	■		■	■	■	
239	EF	■	■	■		■	■	■	■
240	F0	■	■	■	■				
241	F1	■	■	■	■				■
242	F2	■	■	■	■			■	
243	F3	■	■	■	■			■	■
244	F4	■	■	■	■		■		
245	F5	■	■	■	■		■		■
246	F6	■	■	■	■		■	■	
247	F7	■	■	■	■		■	■	■
248	F8	■	■	■	■	■			
249	F9	■	■	■	■	■			■
250	FA	■	■	■	■	■		■	
251	FB	■	■	■	■	■		■	■
252	FC	■	■	■	■	■	■		
253	FD	■	■	■	■	■	■		■
254	FE	■	■	■	■	■	■	■	
255	FF	■	■	■	■	■	■	■	■

empty = value 0

■ = value 1, applicable

A.3 Code table scene (8 bit)

Bit No.		7	6	5	4	3	2	1	0		
8-bit-Wert	Hexadecimal	Call	not defined	Scene number	Scene number	Scene number	Scene number	Scene number	Scene number	Scene number	Call (A)
0	00									1	A
1	01								■	2	A
2	02							■		3	A
3	03							■	■	4	A
4	04						■			5	A
5	05						■		■	6	A
6	06						■	■		7	A
7	07						■	■	■	8	A
8	08					■				9	A
9	09					■			■	10	A
10	0A					■		■		11	A
11	0B					■		■	■	12	A
12	0C					■	■			13	A
13	0D					■	■		■	14	A
14	0E					■	■	■		15	A
15	0F					■	■	■	■	16	A
16	10				■					17	A
17	11				■				■	18	A
18	12				■			■		19	A
19	13				■			■	■	20	A
20	14				■		■			21	A
21	15				■		■		■	22	A
22	16				■		■	■		23	A
23	17				■		■	■	■	24	A
24	18				■	■				25	A
25	19				■	■			■	26	A
26	1A				■	■		■		27	A
27	1B				■	■		■	■	28	A
28	1C				■	■	■			29	A
29	1D				■	■	■		■	30	A
30	1E				■	■	■	■		31	A
31	1F				■	■	■	■	■	32	A
32	20			■						33	A
33	21			■					■	34	A
34	22			■				■		35	A
35	23			■				■	■	36	A
36	24			■			■			37	A
37	25			■			■		■	38	A
38	26			■			■	■		39	A
39	27			■			■	■	■	40	A
40	28			■		■				41	A
41	29			■		■			■	42	A
42	2A			■		■		■		43	A
43	2B			■		■		■	■	44	A
44	2C			■		■	■			45	A
45	2D			■		■	■		■	46	A
46	2E			■		■	■	■		47	A
47	2F			■		■	■	■	■	48	A
48	30			■	■					49	A
49	31			■	■				■	50	A
50	32			■	■			■		51	A
51	33			■	■			■	■	52	A
52	34			■	■		■			53	A
53	35			■	■		■		■	54	A
54	36			■	■		■	■		55	A
55	37			■	■		■	■	■	56	A
56	38			■	■	■				57	A
57	39			■	■	■			■	58	A
58	3A			■	■	■		■		59	A
59	3B			■	■	■		■	■	60	A
60	3C			■	■	■	■			61	A
61	3D			■	■	■	■		■	62	A
62	3E			■	■	■	■	■		63	A
63	3F			■	■	■	■	■	■	64	A

Bit No.		7	6	5	4	3	2	1	0		
8-bit-Wert	Hexadecimal	Save	not defined	Scene number	Scene number	Scene number	Scene number	Scene number	Scene number	Scene number	Save (S)
128	80	■								1	S
129	81	■							■	2	S
130	82	■						■		3	S
131	83	■						■	■	4	S
132	84	■					■			5	S
133	85	■					■		■	6	S
134	86	■					■	■		7	S
135	87	■					■	■	■	8	S
136	88	■				■				9	S
137	89	■				■			■	10	S
138	8A	■				■		■		11	S
139	8B	■				■		■	■	12	S
140	8C	■				■	■			13	S
141	8D	■				■	■		■	14	S
142	8E	■				■	■	■		15	S
143	8F	■				■	■	■	■	16	S
144	90	■			■					17	S
145	91	■			■				■	18	S
146	92	■			■			■		19	S
147	93	■			■			■	■	20	S
148	94	■			■		■			21	S
149	95	■			■		■		■	22	S
150	96	■			■		■	■		23	S
151	97	■			■		■	■	■	24	S
152	98	■			■	■				25	S
153	99	■			■	■			■	26	S
154	9A	■			■	■		■		27	S
155	9B	■			■	■		■	■	28	S
156	9C	■			■	■	■			29	S
157	9D	■			■	■	■		■	30	S
158	9E	■			■	■	■	■		31	S
159	9F	■			■	■	■	■	■	32	S
160	A0	■		■						33	S
161	A1	■		■					■	34	S
162	A2	■		■				■		35	S
163	A3	■		■				■	■	36	S
164	A4	■		■			■			37	S
165	A5	■		■			■		■	38	S
166	A6	■		■			■	■		39	S
167	A7	■		■			■	■	■	40	S
168	A8	■		■		■				41	S
169	A9	■		■		■			■	42	S
170	AA	■		■		■		■		43	S
171	DO	■		■		■		■	■	44	S
172	AC	■		■		■	■			45	S
173	AD	■		■		■	■		■	46	S
174	AE	■		■		■	■	■		47	S
175	AF	■		■		■	■	■	■	48	S
176	B0	■		■	■					49	S
177	B1	■		■	■				■	50	S
178	B2	■		■	■			■		51	S
179	B3	■		■	■			■	■	52	S
180	B4	■		■	■		■			53	S
181	B5	■		■	■		■		■	54	S
182	B6	■		■	■		■	■		55	S
183	B7	■		■	■		■	■	■	56	S
184	B8	■		■	■	■				57	S
185	B9	■		■	■	■			■	58	S
186	BA	■		■	■	■		■		59	S
187	BB	■		■	■	■		■	■	60	S
188	BC	■		■	■	■	■			61	S
189	BD	■		■	■	■	■		■	62	S
190	BE	■		■	■	■	■	■		63	S
191	BF	■		■	■	■	■	■	■	64	S

empty = value 0

■ = value 1, applicable

Note
All combinations not listed or indicated are invalid.

A.4 Input
4 bit dimming command

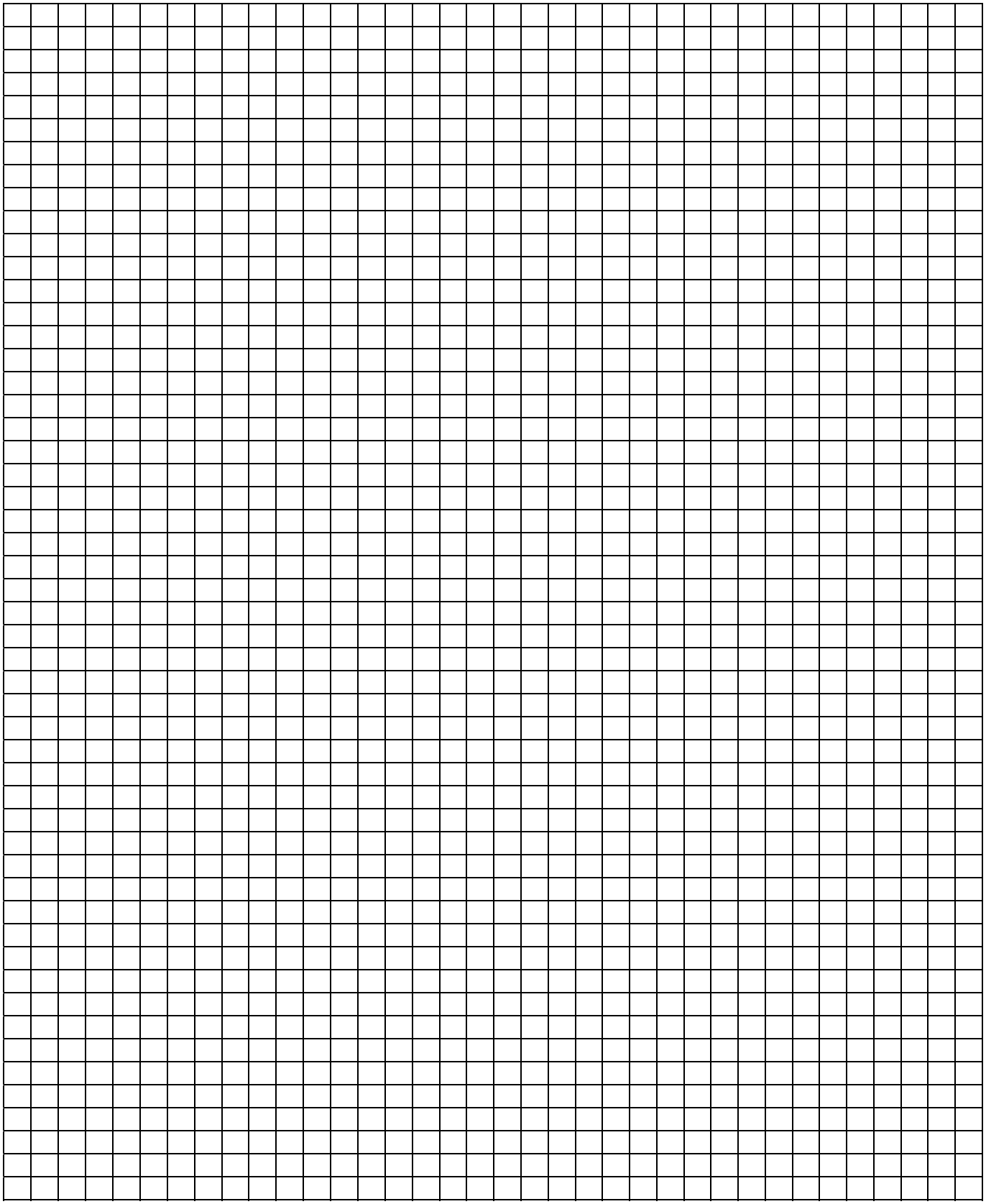
The following table describes the 4 bit dim command:

Dec.	Hex.	Binary	Dim command
0	0	0000	STOP
1	1	0001	100 % DARKER
2	2	0010	50 % DARKER
3	3	0011	25 % DARKER
4	4	0100	12.5 % DARKER
5	5	0101	6.25 % DARKER
6	6	0110	3.13 % DARKER
7	7	0111	1.56 % DARKER
8	8	1000	STOP
9	9	1001	100 % BRIGHTER
10	A	1010	50 % BRIGHTER
11	B	1011	25 % BRIGHTER
12	C	1100	12.5 % BRIGHTER
13	D	1101	6.25 % BRIGHTER
14	E	1110	3.13 % BRIGHTER
15	F	1111	1.56 % BRIGHTER

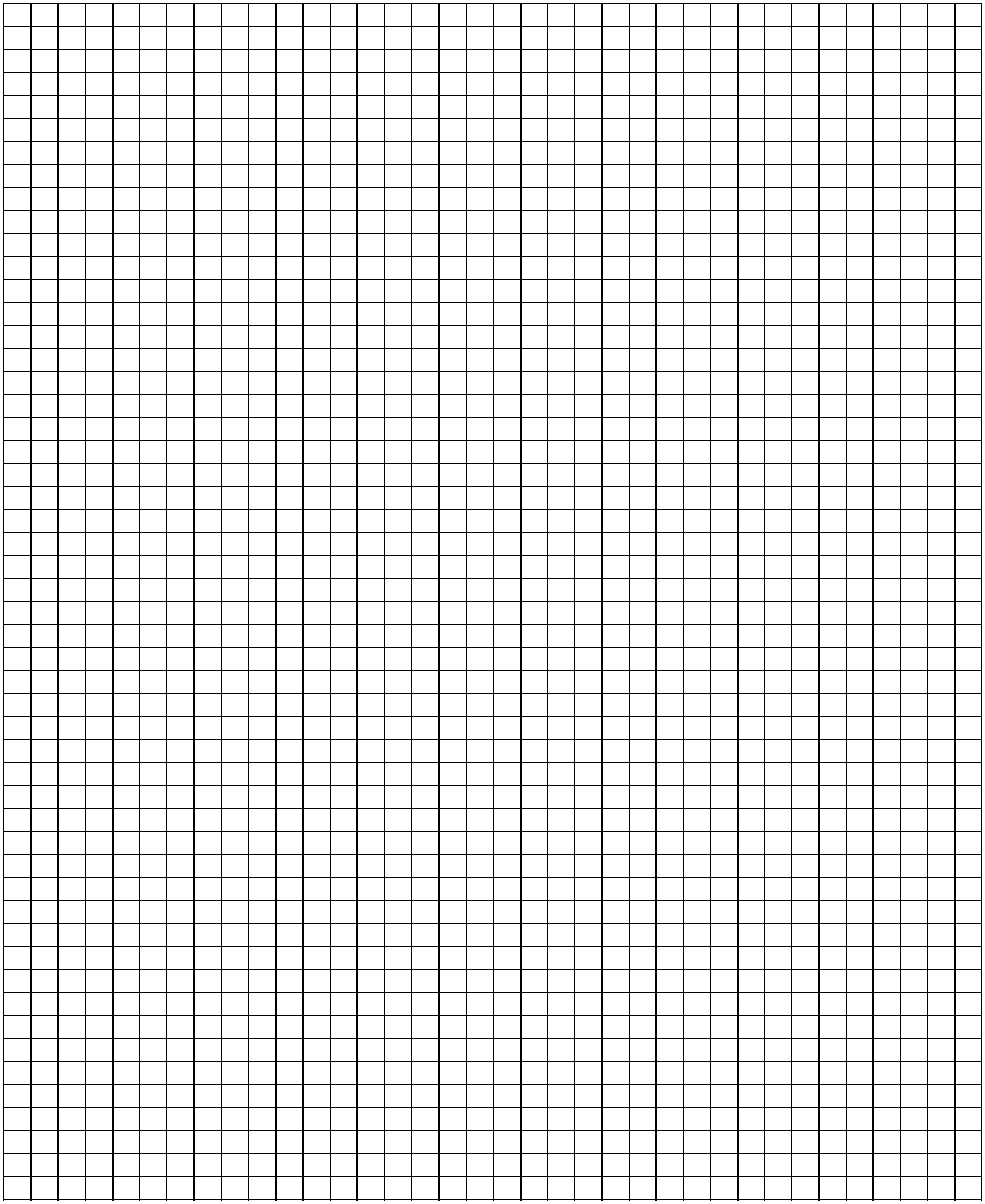
A.5 Ordering information

Short description	Designation	Order No.	bbn 40 16779 EAN	Price group	Weight 1 pc. [kg]	Packaging [pc.]
RM/S 1.1	Room Master Basic, MDRC	2CDG 110 094 R0011	**665 56 8**	26	0.4	1

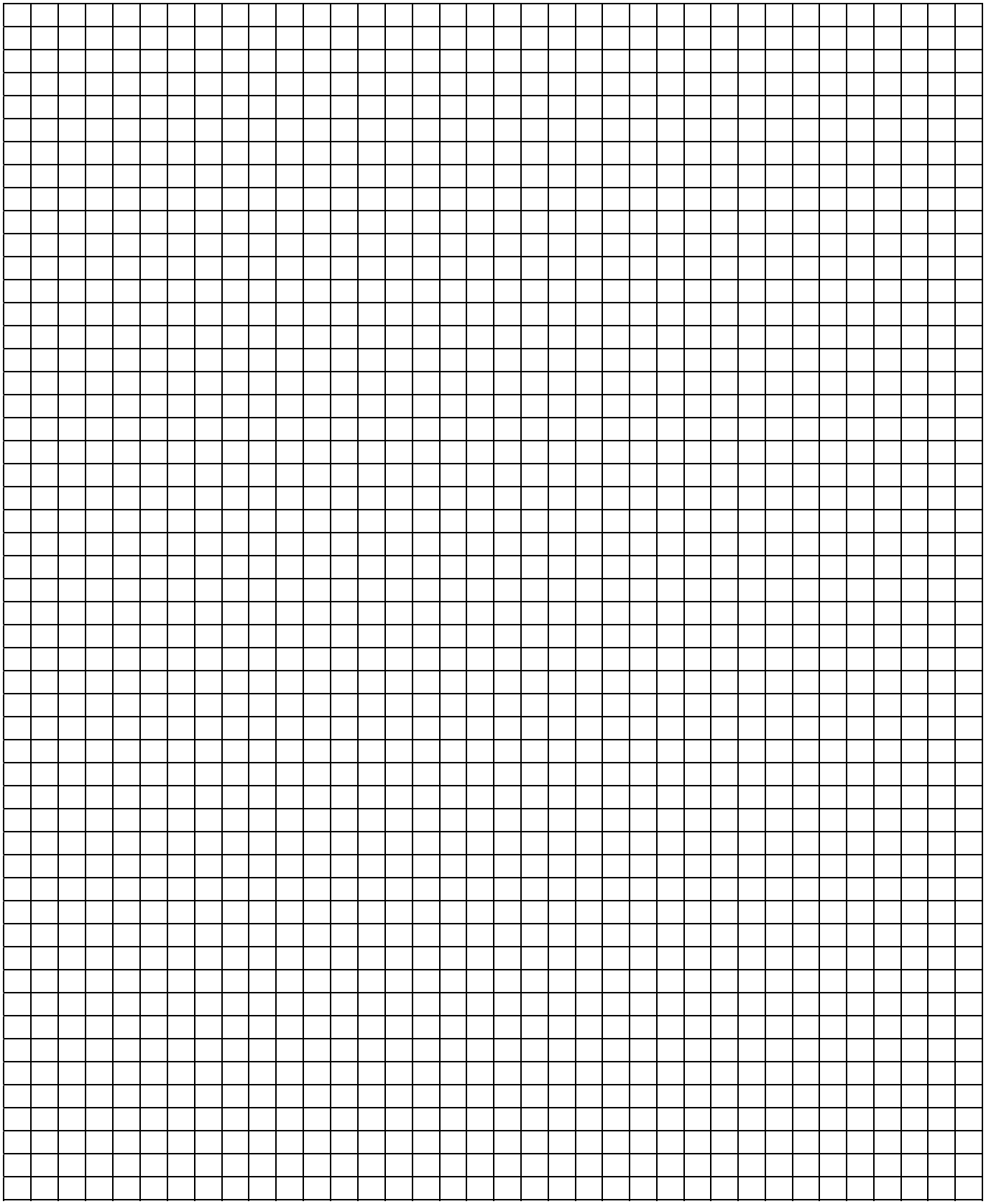
A.6 Notes



A.7 Notes



A.8 Notes



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