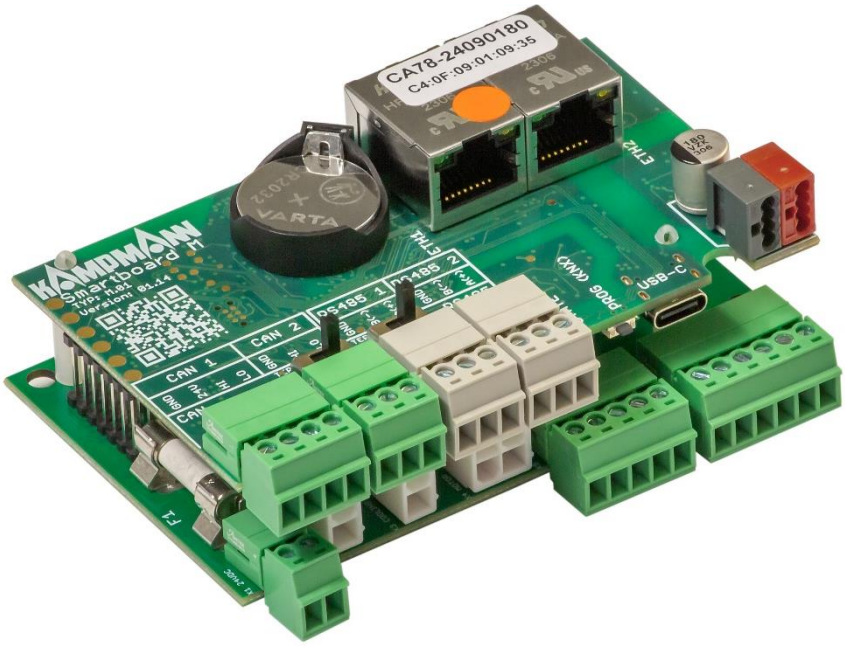
Multi Connect Climate Controller KaControl MC

Functional Description for Secondary Air Units



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1 General

The following chapters explain the functions and parametrisable options for units with the Multi Connect climate controller KaControl MC. All settings can be made via the integrated Webserver or a display (TP2).

The functions are described in separate sections. These sections contain tables with associated parameters and statuses. Parameters and statuses are assigned a unique five-digit number ("ID") and a sequential number ("SubID") for identification purposes.

Up to ten units and a display (TP2) can be coupled via a CAN-bus and operated together as a group. Certain parameters and statuses are generally valid within the group, so they apply equally to every unit in the group. Other parameters and statuses apply to each unit in the group individually. General parameters include the timed switching points of the operating program, while individual parameters include fan speed limits in the respective fan controls. All general parameters and statuses and all individual parameters and statuses are available in each unit within the group and are continuously synchronised. This means that all parameters of all units within the group can be changed and all statuses of all units within the group can be controlled from any unit.

General parameters and statuses and individual parameters and statuses of the respective unit can be found in the "Parameters" and "Statuses" sections. Individual parameters and statuses of all units within the group can be found in the sections "Group unit parameters" and "Statuses of units within the group".

2 Actual values

The actual (current) values of the connected sensors are measured cyclically.

2.1 Statuses

Brief description	ID	Range
Room temperature	20022	-99.9 °C - 99.9 °C
Supply air temperature	20024	-99.9 °C - 99.9 °C
Outside temperature	20026	-99.9 °C - 99.9 °C
2p return temperature	20031	-99.9 °C - 99.9 °C
4p H return temperature	20032	-99.9 °C - 99.9 °C
4p C return temperature	20033	-99.9 °C - 99.9 °C
2p supply temperature	20037	-99.9 °C - 99.9 °C
4p H supply temperature	20038	-99.9 °C - 99.9 °C
4p C supply temperature	20039	-99.9 °C - 99.9 °C
User-defined 1 (NTC)	20969	-99.9 °C - 99.9 °C
User-defined 2 (NTC)	20971	-99.9 °C - 99.9 °C
User-defined 3 (NTC)	20973	-99.9 °C - 99.9 °C
User-defined 4 (NTC)	20975	-99.9 °C - 99.9 °C
User-defined 1 (0-10VDC)	20977	0.0 V - 10.0 V
User-defined 2 (0-10VDC)	20979	0.0 V - 10.0 V
User-defined 3 (0-10VDC)	20980	0.0 V - 10.0 V
User-defined 4 (0-10VDC)	20981	0.0 V - 10.0 V
CU supply temperature	22006	-99.9 °C - 99.9 °C

2.2 Statuses of units within the group

Brief description	ID array(10)	Range
Room temperature	25022	-99.9 °C - 99.9 °C
Supply air temperature	25024	-99.9 °C - 99.9 °C
2p return temperature	25031	-99.9 °C - 99.9 °C
4p H return temperature	25032	-99.9 °C - 99.9 °C
4p C return temperature	25033	-99.9 °C - 99.9 °C
2p supply temperature	25037	-99.9 °C - 99.9 °C
4p H supply temperature	25038	-99.9 °C - 99.9 °C
4p C supply temperature	25039	-99.9 °C - 99.9 °C
User-defined 1 (NTC)	25969	-99.9 °C - 99.9 °C
User-defined 2 (NTC)	25971	-99.9 °C - 99.9 °C
User-defined 3 (NTC)	25973	-99.9 °C - 99.9 °C
User-defined 4 (NTC)	25975	-99.9 °C - 99.9 °C
User-defined 1 (0-10VDC)	25977	0.0 V - 10.0 V
User-defined 2 (0-10VDC)	25979	0.0 V - 10.0 V
User-defined 3 (0-10VDC)	25980	0.0 V - 10.0 V
User-defined 4 (0-10VDC)	25981	0.0 V - 10.0 V

3 Operating program

The current operating program (Day, Boost, Eco or Off) is determined automatically by a combination of ten timer programs and two holiday programs. It can also be selected manually, specified by the BMS or activated via digital inputs.

The ten timer programs consist of seven timer programs for the individual days of the week, one timer program for the days Monday to Friday, one timer program for the days Saturday to Sunday, and one timer program for the days Monday to Sunday. Up to six switching points for activation of the specified operating mode at each of these points can be defined for each timer program.
The switching points are specified in one parameter for the minute and one parameter for the hour. The following settings are possible when specifying the operating program:
0 = Deactivated
1 = Day
2 = Boost
3 = Eco
4 = Off

One holiday program is for annually recurring holidays and public holidays, and the other is for one-off holidays or public holidays. Ten time periods can be defined for both holiday programs. The specified operating program in each case is then activated during these periods.

Automatic switching can be disabled via the “Automatic lock” parameter according to time and date to prevent unintentional switching on, e.g. prior to commissioning. The selection persists even after a power failure. The following settings are possible:
0 = Deactivated (no lock)
1 = Locked (continuously Day)
2 = Locked (continuously Boost)
3 = Locked (continuously Eco)
4 = Locked (continuously Off)

An operating program can be specified via the BMS using the "Manual selection BMS low priority” parameter. The following settings are possible:
1 = Day
2 = Boost
3 = Eco
4 = Off
5 = Deactivated (no input from BMS => internal operating program)

This input can be overridden by "manual selection via buttons with setback time (for example, party mode, extended day operation, inventory etc.)" or "manual selection (manual operation via RC)".

The assigned operating program can be activated or preset via a button connected to a digital input that has been configured accordingly ("Day manual selection button", "Eco manual selection button", "Boost manual selection button" or "Manual selection Off button"). Once the configurable time "Setback time manual selection button" has ended, the input is automatically reset (for example "Party mode", "Extended day mode", "Inventory" etc.). If the configurable time "Setback time manual selection button" is set to 0 minutes, the default setting is not automatically reset. If the default

setting is still activated via the button, pressing the button again deactivates it. If multiple digital inputs are connected to buttons and configured to activate different operating programs and if an operating program is still activated by means of a button, the system always switches to the operating program assigned to the last key pressed. The "Setback time manual selection button" time then restarts.

The "RC manual selection" parameter can be used to activate or specify an operating program manually, e.g. via a room controller (RC). The following settings are possible:
0 = Deactivated
1 = Day
2 = Boost
3 = Eco
4 = Off

At the end of the parametrisable time "Setback time manual selection RC", the default setting resets automatically. If the parametrisable time "Setback time manual selection RC" is set to 0 minutes, the default setting is not automatically reset. If the relevant default setting is changed while it is still active, the corresponding operating program is changed and the time "Setback time manual selection RC" restarts from the beginning.

An operating program can be specified by the BMS via the parameter "Manual selection BMS high priority". The following settings are possible:
1 = Day
2 = Boost
3 = Eco
4 = Off
5 = Deactivated (no input by the BMS => internal operating program)

This default setting cannot be overridden by "Manual selection via button with setback time (for example, Party mode, Extended day mode, Inventory etc.)" or "Manual selection (manual operation via RC)".

If the "Manual selection BMS low priority" or "Manual selection BMS high priority" has been made, they are reset to "Auto" following a power failure. "Manual selection via button with setback time (for example, Party mode, Extended day mode, Inventory etc.)" or "Manual selection (manual operation via RC)" are also reset after a power failure.

The assigned operating program can be activated or preset with a switch connected to a digital input that has been configured accordingly ("Manual selection Day switch", "Manual selection Eco switch", "Manual selection Boost switch" or "Manual selection switch Off"). Switch-on and switch-off delays can also be parametrised in each case. Should multiple digital inputs be parametrised to activate or preset the same operating programs, simple OR logic is used for the respective activations. Should multiple digital inputs be parametrised to activate or specify different operating programs, then the activations are prioritised. Activation of the "Day" operating program has the lowest priority, followed by activation of the "Boost" operating program, activation of the "Eco" operating program and activation of operation program "Off", which has the highest priority.

The status "OP by timer program" indicates the operating program resulting exclusively from the set switching points and the associated operating programs of the ten timer programs.

The status "OP by recurring holiday program" indicates the operating program resulting exclusively from the set time periods and associated operating programs of the ten recurring holiday programs.

The status "OP by one-off holiday program" indicates the operating program resulting exclusively from the set time periods and associated operating programs of the ten one-off holiday programs.

The status "OP by digital input button" indicates whether an operating program is selected manually via a button and if so, which one.

The status "OP by digital input switch" indicates whether an operating program is manually selected via a switch and if so, which one.

The "RC manual selection active" status indicates whether an operating program is selected manually via a room controller (RC).

The "Current operating program" status indicates the final operating program resulting from all conditions.
1 = Day
2 = Boost
3 = Eco
4 = Off

The specified "OP by ..." statuses are:
0 = Deactivated (no selection)
1 = Day
2 = Boost
3 = Eco
4 = Off

The "Remaining time manual selection button min" and "Remaining time manual selection button sec" statuses indicate the remaining setback time of the operating program selected manually via a button.

The "Remaining time manual selection RC min" and "Remaining time manual selection RC sec" statuses indicate the remaining setback time of the operating program selected manually via the room controller (RC).

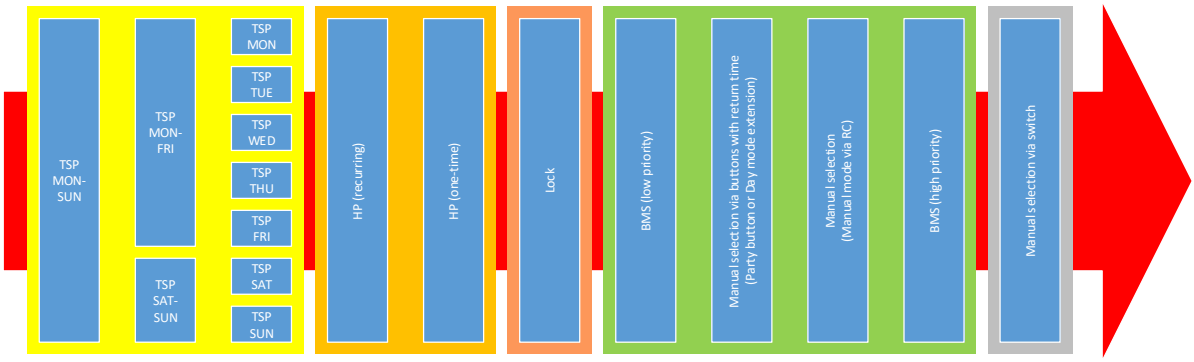
The date and time are set using the parameters "System year setting", "System month setting", "System day setting", "System hour setting", "System minute setting" and "System second setting". These are updated cyclically. Automatic updating of the above parameters can or must be stopped via the "Enter setting" parameter before settings can be entered. Once the settings have been made, the values entered manually must then also be actively applied. The following settings are possible:
0 = Automatically update values
1 = Do not update values automatically
2 = Apply values entered manually

The statuses "System year display", "System month display", "System day display", "System weekday display", "System hour display", "System minute display" and "System second display" show the current date and time.

3.1 Signal flow and priorities

The individual timer programs, two holiday programs, manual selection, input by the BMS and the connection of digital inputs have a fixed priority so that the status of the operating program (Day, Boost, Eco or Off) can be uniquely assigned.

These relationships are shown below, starting with the lowest priority on the left and ending with the highest priority on the right.



The timer program for the days Monday to Sunday has the lowest priority level (11).

The two timer programs for the days Monday to Friday and Saturday to Sunday have the next higher priority level (10).

The seven timer programs for the individual days of the week have the next higher priority level (9).

As soon as a switching point and an associated operating program are entered in a higher-priority timer program, switching points and associated operating programs from lower-priority timer programs are no longer taken into account for the entire period of validity of the respective timer program. Optimum and unique configurations can therefore be obtained using the three different priority levels of the ten timer programs.

The following table shows an example of the "TSP MON-FRI" and "TSP THU" parameter settings and the resulting timer program.

Day:	MON	TUE	WED	THU	FRI	SAT	SUN
Priority 10							
Priority 9	08:00 Day 18:00 Eco						
Priority 8				09:00 Day 19:00 Eco			
Result:	08:00 Day 18:00 Eco	08:00 Day 18:00 Eco	08:00 Day 18:00 Eco	09:00 Day 19:00 Eco	08:00 Day 18:00 Eco		

In the example shown, no switching points and associated operating programs have been defined for Saturday and Sunday. As a result, the operating program is switched to Eco on Friday at 18.00 and remains in Eco for Saturday and Sunday and only switches to the Day operating program on Monday at 08.00.

The following table shows an example of the "TSP MON-SUN", "TSP MON-FRI" and "TSP WED" parameter settings and the resulting timer program.

Day:	MON	TUE	WED	THU	FRI	SAT	SUN
Priority 10	09:00 Day 16:00 Eco						
Priority 9	08:00 Day 18:00 Eco						
Priority 8				08:00 Day 20:00 Eco			
Result:	08:00 Day 18:00 Eco	08:00 Day 18:00 Eco	08:00 Day 18:00 Eco	08:00 Day 20:00 Eco	08:00 Day 18:00 Eco	09:00 Day 16:00 Eco	09:00 Day 16:00 Eco

If a switching point and operating program that is valid from that point on are not defined in any of the ten timer programs, then the "Eco" operating program applies permanently.

The next higher priority (8) after the timer programs is the holiday program for recurring holidays and public holidays.

The next higher priority (7) is the holiday program for one-off holidays and public holidays.

As soon as a period and an associated operating program is entered in a higher-priority holiday program, switching points and associated operating programs from lower-priority timer programs and holiday programs are disregarded for the entire time the holiday program is active.

On the day after holidays and/or public holidays, the operating program resulting from lower-priority timer programs and holiday programs applies from 00:00 (12:00 midnight). The following table shows an example of the "TSP MON-SUN" parameter settings and a recurring holiday or public holiday, and the resulting operating program.

Day:	MON	TUE	WED	THU	FRI	SAT	SUN
Priority 10	09:00 Day 16:00 Boost						
Priority 7				Eco			
Result:	09:00 Day 16:00 Boost	09:00 Day 16:00 Boost	09:00 Day 16:00 Boost	00:00 Eco	00:00 Boost 09:00 Day 16:00 Boost	09:00 Day 16:00 Boost	09:00 Day 16:00 Boost

The "Automatic lock" default setting which may be made has the next higher priority (6).

The operating program specified by the BMS (low priority) has the next higher priority (5). This overrides the timer programs, holiday programs and the "Automatic lock".

The next higher priority (4) is the manual selection of the operation program with setback time (for example "Party mode", "Extended day mode", "Inventory", etc.)

The next higher priority (3) is the manual selection of the operating program (see Manual operation via RC). This overrides the timer programs, holiday programs, the "Automatic lock" or the manual selection of the operating program with setback time.

The next higher priority (2) is the operating program specified by the BMS (high priority). This overrides the timer programs, holiday programs or the "Automatic lock" or manual selections.

The highest priority (1) is the operating program specified by the relevant connected digital inputs.

3.2 Parameter

Brief description	ID	Range	Default
Automatic lock	20117	0 - 4	4
Manual BMS selection low priority	20115	1 - 5	5
Setback time manual selection button	20925	0 min - 300 min	30 min
Manual RC selection	20116	0 - 4	0
Setback time manual RC selection	20119	0 min - 300 min	30 min
Manual BMS selection high priority	20592	1 - 5	5

3.2.1 Timer program

3.2.1.1 Monday

Brief description	ID/SubID	Range	Default
Switching point Mon Hour 1	20124/0	0 h - 23 h	8 h
Switching point Mon Hour 2	20124/1	0 h - 23 h	20 h
Switching point Mon Hour 3	20124/2	0 h - 23 h	0 h
Switching point Mon Hour 4	20124/3	0 h - 23 h	0 h
Switching point Mon Hour 5	20124/4	0 h - 23 h	0 h
Switching point Mon Hour 6	20124/5	0 h - 23 h	0 h
Switching point Mon Minute 1	20125/0	0 min - 59 min	0 min
Switching point Mon Minute 2	20125/1	0 min - 59 min	0 min
Switching point Mon Minute 3	20125/2	0 min - 59 min	0 min
Switching point Mon Minute 4	20125/3	0 min - 59 min	0 min
Switching point Mon Minute 5	20125/4	0 min - 59 min	0 min
Switching point Mon Minute 6	20125/5	0 min - 59 min	0 min
Operating program Mon 1	20126/0	0 - 4	1
Operating program Mon 2	20126/1	0 - 4	3
Operating program Mon 3	20126/2	0 - 4	0
Operating program Mon 4	20126/3	0 - 4	0
Operating program Mon 5	20126/4	0 - 4	0
Operating program Mon 6	20126/5	0 - 4	0

3.2.1.2 Tuesday

Brief description	ID/SubID	Range	Default
Switching point Tue Hour 1	20127/0	0 h - 23 h	8 h
Switching point Tue Hour 2	20127/1	0 h - 23 h	20 h
Switching point Tue Hour 3	20127/2	0 h - 23 h	0 h
Switching point Tue Hour 4	20127/3	0 h - 23 h	0 h
Switching point Tue Hour 5	20127/4	0 h - 23 h	0 h
Switching point Tue Hour 6	20127/5	0 h - 23 h	0 h
Switching point Tue Minute 1	20128/0	0 min - 59 min	0 min
Switching point Tue Minute 2	20128/1	0 min - 59 min	0 min
Switching point Tue Minute 3	20128/2	0 min - 59 min	0 min
Switching point Tue Minute 4	20128/3	0 min - 59 min	0 min
Switching point Tue Minute 5	20128/4	0 min - 59 min	0 min
Switching point Tue Minute 6	20128/5	0 min - 59 min	0 min
Operating program Tue 1	20129/0	0 - 4	1
Operating program Tue 2	20129/1	0 - 4	3
Operating program Tue 3	20129/2	0 - 4	0
Operating program Tue 4	20129/3	0 - 4	0
Operating program Tue 5	20129/4	0 - 4	0
Operating program Tue 6	20129/5	0 - 4	0

3.2.1.3 Wednesday

Brief description	ID/SubID	Range	Default
Switching point Wed Hour 1	20130/0	0 h - 23 h	8 h
Switching point Wed Hour 2	20130/1	0 h - 23 h	20 h
Switching point Wed Hour 3	20130/2	0 h - 23 h	0 h
Switching point Wed Hour 4	20130/3	0 h - 23 h	0 h
Switching point Wed Hour 5	20130/4	0 h - 23 h	0 h
Switching point Wed Hour 6	20130/5	0 h - 23 h	0 h
Switching point Wed Minute 1	20131/0	0 min - 59 min	0 min
Switching point Wed Minute 2	20131/1	0 min - 59 min	0 min
Switching point Wed Minute 3	20131/2	0 min - 59 min	0 min
Switching point Wed Minute 4	20131/3	0 min - 59 min	0 min
Switching point Wed Minute 5	20131/4	0 min - 59 min	0 min
Switching point Wed Minute 6	20131/5	0 min - 59 min	0 min
Operating program Wed 1	20132/0	0 - 4	1
Operating program Wed 2	20132/1	0 - 4	3
Operating program Wed 3	20132/2	0 - 4	0
Operating program Wed 4	20132/3	0 - 4	0
Operating program Wed 5	20132/4	0 - 4	0
Operating program Wed 6	20132/5	0 - 4	0

3.2.1.4 Thursday

Brief description	ID/SubID	Range	Default
Switching point Thu Hour 1	20133/0	0 h - 23 h	8 h
Switching point Thu Hour 2	20133/1	0 h - 23 h	20 h
Switching point Thu Hour 3	20133/2	0 h - 23 h	0 h
Switching point Thu Hour 4	20133/3	0 h - 23 h	0 h
Switching point Thu Hour 5	20133/4	0 h - 23 h	0 h
Switching point Thu Hour 6	20133/5	0 h - 23 h	0 h
Switching point Thu Minute 1	20134/0	0 min - 59 min	0 min
Switching point Thu Minute 2	20134/1	0 min - 59 min	0 min
Switching point Thu Minute 3	20134/2	0 min - 59 min	0 min
Switching point Thu Minute 4	20134/3	0 min - 59 min	0 min
Switching point Thu Minute 5	20134/4	0 min - 59 min	0 min
Switching point Thu Minute 6	20134/5	0 min - 59 min	0 min

Brief description	ID/SubID	Range	Default
Operating program Thu 1	20135/0	0 - 4	1
Operating program Thu 2	20135/1	0 - 4	3
Operating program Thu 3	20135/2	0 - 4	0
Operating program Thu 4	20135/3	0 - 4	0
Operating program Thu 5	20135/4	0 - 4	0
Operating program Thu 6	20135/5	0 - 4	0

3.2.1.5 Friday

Brief description	ID/SubID	Range	Default
Switching point Fri Hour 1	20136/0	0 h - 23 h	8 h
Switching point Fri Hour 2	20136/1	0 h - 23 h	20 h
Switching point Fri Hour 3	20136/2	0 h - 23 h	0 h
Switching point Fri Hour 4	20136/3	0 h - 23 h	0 h
Switching point Fri Hour 5	20136/4	0 h - 23 h	0 h
Switching point Fri Hour 6	20136/5	0 h - 23 h	0 h
Switching point Fri Minute 1	20137/0	0 min - 59 min	0 min
Switching point Fri Minute 2	20137/1	0 min - 59 min	0 min
Switching point Fri Minute 3	20137/2	0 min - 59 min	0 min
Switching point Fri Minute 4	20137/3	0 min - 59 min	0 min
Switching point Fri Minute 5	20137/4	0 min - 59 min	0 min
Switching point Fri Minute 6	20137/5	0 min - 59 min	0 min
Operating program Fri 1	20138/0	0 - 4	1
Operating program Fri 2	20138/1	0 - 4	3
Operating program Fri 3	20138/2	0 - 4	0
Operating program Fri 4	20138/3	0 - 4	0
Operating program Fri 5	20138/4	0 - 4	0
Operating program Fri 6	20138/5	0 - 4	0

3.2.1.6 Saturday

Brief description	ID/SubID	Range	Default
Switching point Sat Hour 1	20139/0	0 h - 23 h	8 h
Switching point Sat Hour 2	20139/1	0 h - 23 h	16 h
Switching point Sat Hour 3	20139/2	0 h - 23 h	0 h
Switching point Sat Hour 4	20139/3	0 h - 23 h	0 h
Switching point Sat Hour 5	20139/4	0 h - 23 h	0 h
Switching point Sat Hour 6	20139/5	0 h - 23 h	0 h
Switching point Sat Minute 1	20140/0	0 min - 59 min	0 min
Switching point Sat Minute 2	20140/1	0 min - 59 min	0 min
Switching point Sat Minute 3	20140/2	0 min - 59 min	0 min
Switching point Sat Minute 4	20140/3	0 min - 59 min	0 min
Switching point Sat Minute 5	20140/4	0 min - 59 min	0 min
Switching point Sat Minute 6	20140/5	0 min - 59 min	0 min
Operating program Sat 1	20141/0	0 - 4	1
Operating program Sat 2	20141/1	0 - 4	3
Operating program Sat 3	20141/2	0 - 4	0
Operating program Sat 4	20141/3	0 - 4	0
Operating program Sat 5	20141/4	0 - 4	0
Operating program Sat 6	20141/5	0 - 4	0

3.2.1.7 Sunday

Brief description	ID/SubID	Range	Default
Switching point Sun Hour 1	20142/0	0 h - 23 h	0 h
Switching point Sun Hour 2	20142/1	0 h - 23 h	0 h
Switching point Sun Hour 3	20142/2	0 h - 23 h	0 h
Switching point Sun Hour 4	20142/3	0 h - 23 h	0 h

Brief description	ID/SubID	Range	Default
Switching point Sun Hour 5	20142/4	0 h - 23 h	0 h
Switching point Sun Hour 6	20142/5	0 h - 23 h	0 h
Switching point Sun Minute 1	20143/0	0 min - 59 min	0 min
Switching point Sun Minute 2	20143/1	0 min - 59 min	0 min
Switching point Sun Minute 3	20143/2	0 min - 59 min	0 min
Switching point Sun Minute 4	20143/3	0 min - 59 min	0 min
Switching point Sun Minute 5	20143/4	0 min - 59 min	0 min
Switching point Sun Minute 6	20143/5	0 min - 59 min	0 min
Operating program Sun 1	20144/0	0 - 4	0
Operating program Sun 2	20144/1	0 - 4	0
Operating program Sun 3	20144/2	0 - 4	0
Operating program Sun 4	20144/3	0 - 4	0
Operating program Sun 5	20144/4	0 - 4	0
Operating program Sun 6	20144/5	0 - 4	0

3.2.1.8 Monday to Friday

Brief description	ID/SubID	Range	Default
Switching point Mon-Fri Hour 1	20145/0	0 h - 23 h	0 h
Switching point Mon-Fri Hour 2	20145/1	0 h - 23 h	0 h
Switching point Mon-Fri Hour 3	20145/2	0 h - 23 h	0 h
Switching point Mon-Fri Hour 4	20145/3	0 h - 23 h	0 h
Switching point Mon-Fri Hour 5	20145/4	0 h - 23 h	0 h
Switching point Mon-Fri Hour 6	20145/5	0 h - 23 h	0 h
Switching point Mon-Fri Minute 1	20146/0	0 min - 59 min	0 min
Switching point Mon-Fri Minute 2	20146/1	0 min - 59 min	0 min
Switching point Mon-Fri Minute 3	20146/2	0 min - 59 min	0 min
Switching point Mon-Fri Minute 4	20146/3	0 min - 59 min	0 min
Switching point Mon-Fri Minute 5	20146/4	0 min - 59 min	0 min
Switching point Mon-Fri Minute 6	20146/5	0 min - 59 min	0 min
Operating program Mon-Fri 1	20147/0	0 - 4	0
Operating program Mon-Fri 2	20147/1	0 - 4	0
Operating program Mon-Fri 3	20147/2	0 - 4	0
Operating program Mon-Fri 4	20147/3	0 - 4	0
Operating program Mon-Fri 5	20147/4	0 - 4	0
Operating program Mon-Fri 6	20147/5	0 - 4	0

3.2.1.9 Saturday and Sunday

Brief description	ID/SubID	Range	Default
Switching point Sat-Sun Hour 1	20148/0	0 h - 23 h	0 h
Switching point Sat-Sun Hour 2	20148/1	0 h - 23 h	0 h
Switching point Sat-Sun Hour 3	20148/2	0 h - 23 h	0 h
Switching point Sat-Sun Hour 4	20148/3	0 h - 23 h	0 h
Switching point Sat-Sun Hour 5	20148/4	0 h - 23 h	0 h
Switching point Sat-Sun Hour 6	20148/5	0 h - 23 h	0 h
Switching point Sat-Sun Minute 1	20149/0	0 min - 59 min	0 min
Switching point Sat-Sun Minute 2	20149/1	0 min - 59 min	0 min
Switching point Sat-Sun Minute 3	20149/2	0 min - 59 min	0 min
Switching point Sat-Sun Minute 4	20149/3	0 min - 59 min	0 min
Switching point Sat-Sun Minute 5	20149/4	0 min - 59 min	0 min
Switching point Sat-Sun Minute 6	20149/5	0 min - 59 min	0 min
Operating program Sat-Sun 1	20150/0	0 - 4	0
Operating program Sat-Sun 2	20150/1	0 - 4	0
Operating program Sat-Sun 3	20150/2	0 - 4	0
Operating program Sat-Sun 4	20150/3	0 - 4	0
Operating program Sat-Sun 5	20150/4	0 - 4	0
Operating program Sat-Sun 6	20150/5	0 - 4	0

3.2.1.10 Monday to Sunday

Brief description	ID/SubID	Range	Default
Switching point Mon-Sun Hour 1	20151/0	0 h - 23 h	0 h
Switching point Mon-Sun Hour 2	20151/1	0 h - 23 h	0 h
Switching point Mon-Sun Hour 3	20151/2	0 h - 23 h	0 h
Switching point Mon-Sun Hour 4	20151/3	0 h - 23 h	0 h
Switching point Mon-Sun Hour 5	20151/4	0 h - 23 h	0 h
Switching point Mon-Sun Hour 6	20151/5	0 h - 23 h	0 h
Switching point Mon-Sun Minute 1	20152/0	0 min - 59 min	0 min
Switching point Mon-Sun Minute 2	20152/1	0 min - 59 min	0 min
Switching point Mon-Sun Minute 3	20152/2	0 min - 59 min	0 min
Switching point Mon-Sun Minute 4	20152/3	0 min - 59 min	0 min
Switching point Mon-Sun Minute 5	20152/4	0 min - 59 min	0 min
Switching point Mon-Sun Minute 6	20152/5	0 min - 59 min	0 min
Operating program Mon-Sun 1	20153/0	0 - 4	0
Operating program Mon-Sun 2	20153/1	0 - 4	0
Operating program Mon-Sun 3	20153/2	0 - 4	0
Operating program Mon-Sun 4	20153/3	0 - 4	0
Operating program Mon-Sun 5	20153/4	0 - 4	0
Operating program Mon-Sun 6	20153/5	0 - 4	0

3.2.2 Holiday program

3.2.2.1 One-off

Brief description	ID/SubID	Range	Default
One-off holiday start date Day 1	20159/0	1 - 31	1
One-off holiday start date Day 2	20159/1	1 - 31	1
One-off holiday start date Day 3	20159/2	1 - 31	1
One-off holiday start date Day 4	20159/3	1 - 31	1
One-off holiday start date Day 5	20159/4	1 - 31	1
One-off holiday start date Day 6	20159/5	1 - 31	1
One-off holiday start date Day 7	20159/6	1 - 31	1
One-off holiday start date Day 8	20159/7	1 - 31	1
One-off holiday start date Day 9	20159/8	1 - 31	1
One-off holiday start date Day 10	20159/9	1 - 31	1
One-off holiday start date Month 1	20160/0	1 - 12	1
One-off holiday start date Month 2	20160/1	1 - 12	1
One-off holiday start date Month 3	20160/2	1 - 12	1
One-off holiday start date Month 4	20160/3	1 - 12	1
One-off holiday start date Month 5	20160/4	1 - 12	1
One-off holiday start date Month 6	20160/5	1 - 12	1
One-off holiday start date Month 7	20160/6	1 - 12	1
One-off holiday start date Month 8	20160/7	1 - 12	1
One-off holiday start date Month 9	20160/8	1 - 12	1
One-off holiday start date Month 10	20160/9	1 - 12	1
One-off holiday end date Day 1	20161/0	1 - 31	1
One-off holiday end date Day 2	20161/1	1 - 31	1
One-off holiday end date Day 3	20161/2	1 - 31	1
One-off holiday end date Day 4	20161/3	1 - 31	1
One-off holiday end date Day 5	20161/4	1 - 31	1
One-off holiday end date Day 6	20161/5	1 - 31	1
One-off holiday end date Day 7	20161/6	1 - 31	1
One-off holiday end date Day 8	20161/7	1 - 31	1
One-off holiday end date Day 9	20161/8	1 - 31	1
One-off holiday end date Day 10	20161/9	1 - 31	1
One-off holiday end date Month 1	20162/0	1 - 12	1
One-off holiday end date Month 2	20162/1	1 - 12	1

Brief description	ID/SubID	Range	Default
One-off holiday end date Month 3	20162/2	1 - 12	1
One-off holiday end date Month 4	20162/3	1 - 12	1
One-off holiday end date Month 5	20162/4	1 - 12	1
One-off holiday end date Month 6	20162/5	1 - 12	1
One-off holiday end date Month 7	20162/6	1 - 12	1
One-off holiday end date Month 8	20162/7	1 - 12	1
One-off holiday end date Month 9	20162/8	1 - 12	1
One-off holiday end date Month 10	20162/9	1 - 12	1
One-off holiday date Year 1	20163/0	2020 - 2099	2020
One-off holiday date Year 2	20163/1	2020 - 2099	2020
One-off holiday date Year 3	20163/2	2020 - 2099	2020
One-off holiday date Year 4	20163/3	2020 - 2099	2020
One-off holiday date Year 5	20163/4	2020 - 2099	2020
One-off holiday date Year 6	20163/5	2020 - 2099	2020
One-off holiday date Year 7	20163/6	2020 - 2099	2020
One-off holiday date Year 8	20163/7	2020 - 2099	2020
One-off holiday date Year 9	20163/8	2020 - 2099	2020
One-off holiday date Year 10	20163/9	2020 - 2099	2020
One-off holiday operating program 1	20164/0	0 - 4	0
One-off holiday operating program 2	20164/1	0 - 4	0
One-off holiday operating program 3	20164/2	0 - 4	0
One-off holiday operating program 4	20164/3	0 - 4	0
One-off holiday operating program 5	20164/4	0 - 4	0
One-off holiday operating program 6	20164/5	0 - 4	0
One-off holiday operating program 7	20164/6	0 - 4	0
One-off holiday operating program 8	20164/7	0 - 4	0
One-off holiday operating program 9	20164/8	0 - 4	0
One-off holiday operating program 10	20164/9	0 - 4	0

3.2.2.2 Recurring

Brief description	ID/SubID	Range	Default
Recurring holiday start date Day 1	20154/0	1 - 31	1
Recurring holiday start date Day 2	20154/1	1 - 31	1
Recurring holiday start date Day 3	20154/2	1 - 31	25
Recurring holiday start date Day 4	20154/3	1 - 31	1
Recurring holiday start date Day 5	20154/4	1 - 31	1
Recurring holiday start date Day 6	20154/5	1 - 31	1
Recurring holiday start date Day 7	20154/6	1 - 31	1
Recurring holiday start date Day 8	20154/7	1 - 31	1
Recurring holiday start date Day 9	20154/8	1 - 31	1
Recurring holiday start date Day 10	20154/9	1 - 31	1
Recurring holiday start date Month 1	20155/0	1 - 12	1
Recurring holiday start date Month 2	20155/1	1 - 12	5
Recurring holiday start date Month 3	20155/2	1 - 12	12
Recurring holiday start date Month 4	20155/3	1 - 12	1
Recurring holiday start date Month 5	20155/4	1 - 12	1
Recurring holiday start date Month 6	20155/5	1 - 12	1
Recurring holiday start date Month 7	20155/6	1 - 12	1
Recurring holiday start date Month 8	20155/7	1 - 12	1
Recurring holiday start date Month 9	20155/8	1 - 12	1
Recurring holiday start date Month 10	20155/9	1 - 12	1
Recurring holiday end date Day 1	20156/0	1 - 31	1
Recurring holiday end date Day 2	20156/1	1 - 31	1
Recurring holiday end date Day 3	20156/2	1 - 31	26
Recurring holiday end date Day 4	20156/3	1 - 31	1
Recurring holiday end date Day 5	20156/4	1 - 31	1
Recurring holiday end date Day 6	20156/5	1 - 31	1

Brief description	ID/SubID	Range	Default
Recurring holiday end date Day 7	20156/6	1 - 31	1
Recurring holiday end date Day 8	20156/7	1 - 31	1
Recurring holiday end date Day 9	20156/8	1 - 31	1
Recurring holiday end date Day 10	20156/9	1 - 31	1
Recurring holiday end date Month 1	20157/0	1 - 12	1
Recurring holiday end date Month 2	20157/1	1 - 12	5
Recurring holiday end date Month 3	20157/2	1 - 12	12
Recurring holiday end date Month 4	20157/3	1 - 12	1
Recurring holiday end date Month 5	20157/4	1 - 12	1
Recurring holiday end date Month 6	20157/5	1 - 12	1
Recurring holiday end date Month 7	20157/6	1 - 12	1
Recurring holiday end date Month 8	20157/7	1 - 12	1
Recurring holiday end date Month 9	20157/8	1 - 12	1
Recurring holiday end date Month 10	20157/9	1 - 12	1
Recurring holiday operating program 1	20158/0	0 - 4	3
Recurring holiday operating program 2	20158/1	0 - 4	3
Recurring holiday operating program 3	20158/2	0 - 4	3
Recurring holiday operating program 4	20158/3	0 - 4	0
Recurring holiday operating program 5	20158/4	0 - 4	0
Recurring holiday operating program 6	20158/5	0 - 4	0
Recurring holiday operating program 7	20158/6	0 - 4	0
Recurring holiday operating program 8	20158/7	0 - 4	0
Recurring holiday operating program 9	20158/8	0 - 4	0
Recurring holiday operating program 10	20158/9	0 - 4	0

3.2.3 Time settings

Brief description	ID	Range	Default
System year setting	21046	1999 - 2099	1999
System month setting	21047	0 - 12	0
System day setting	21048	0 - 31	0
System hour setting	21049	0 - 24	24
System minute setting	21050	0 - 60	60
System second setting	21051	0 - 60	60
Enter setting	21201	0 - 2	0

3.2.4 Switching-on and off delays

Brief description	ID	Range	Default
Day switching-on delay switch	21679	0 s - 900 s	0 s
Day switching-off delay switch	21680	0 s - 900 s	0 s
Eco switching-on delay switch	21681	0 s - 900 s	0 s
Eco switching-off delay switch	21682	0 s - 900 s	0 s
Boost switching-on delay switch	21683	0 s - 900 s	0 s
Boost switching-off delay switch	21684	0 s - 900 s	0 s
Switching-on delay switch Off	21685	0 s - 900 s	0 s
Switching-off delay switch Off	21686	0 s - 900 s	0 s

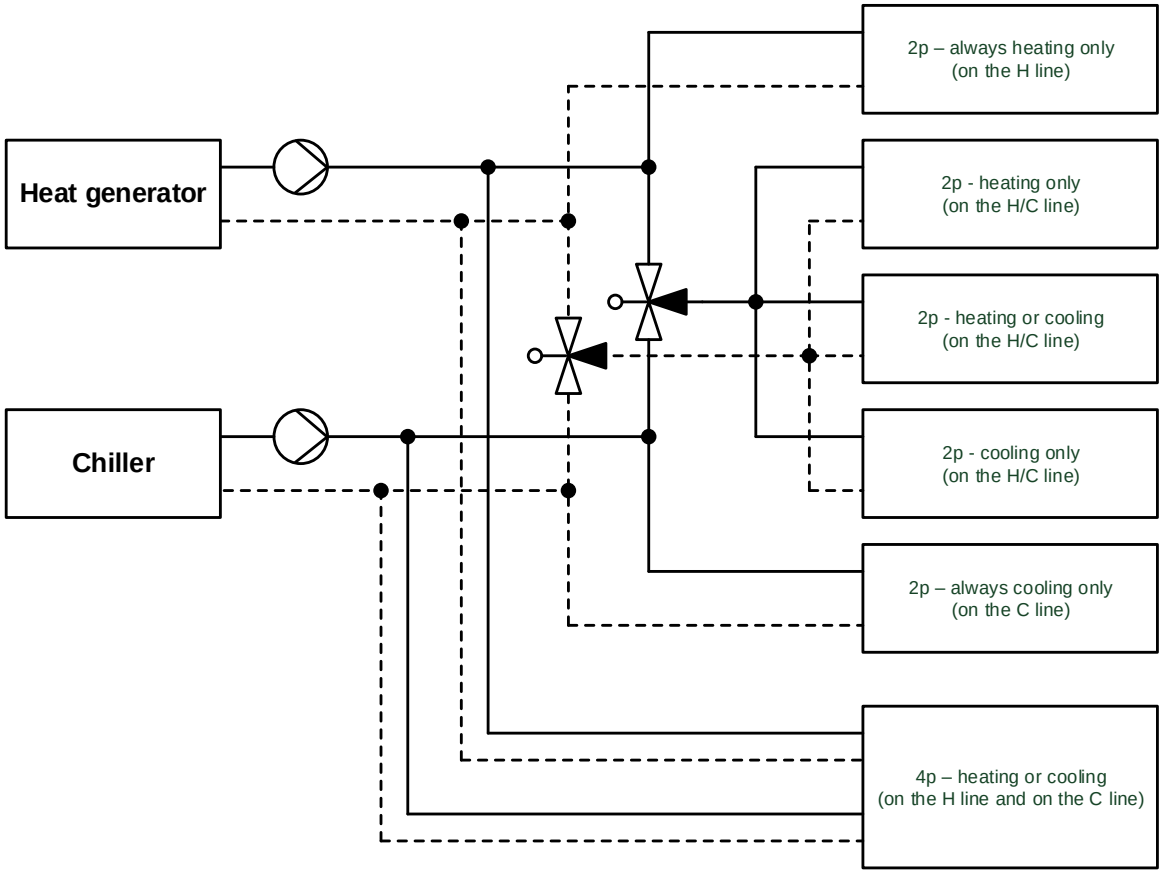
3.3 Statuses

Brief description	ID	Range
Current operating program	20110	1 - 4
OP by timer program	20111	0 - 4
OP by recurring holiday program	20112	0 - 4
OP by one-off holiday program	20113	0 - 4
OP by digital input switch	20114	0 - 4
OP by digital input button	20118	0 - 4
Manual RC selection active	20121	0 - 1

Brief description	ID	Range
Remaining time manual selection button Min	20926	0 min - 300 min
Remaining time manual selection button Sec	20927	0 s - 59 s
RC remaining time manual selection Min	20122	0 min - 300 min
RC remaining time manual selection Sec	20123	0 s - 59 s
System year display	20165	0 - 9999
System month display	20166	1 - 12
System day display	20167	1 - 31
System weekday display	20168	0 - 6
System hour display	20169	0 - 23
System minute display	20170	0 - 59
System second display	20171	0 - 59
Day remaining switching-on time switch	21687	0 s - 900 s
Day remaining switching-off time switch	21688	0 s - 900 s
Eco remaining switching-on time switch	21689	0 s - 900 s
Eco remaining switching-off time switch	21690	0 s - 900 s
Boost remaining switching-on time switch	21691	0 s - 900 s
Boost remaining switching-off time switch	21692	0 s - 900 s
Remaining switching-on time switch Off	21693	0 s - 900 s
Remaining switching-off time switch Off	21694	0 s - 900 s

4 Temperature control

The room temperature or amount of energy supplied is controlled in principle in secondary air units by changing the fan speed, i.e. the volume of air. The valve is either fully closed or fully open.
The room temperature or energy supplied is not controlled when using door air curtains.
With primary air units, the room temperature and energy supplied is essentially controlled by changing the valve position, i.e. the supply air temperature. The fan speed, or volume of air, only increases once the maximum supply air temperature is reached.



To ensure the temperature can be controlled correctly, the hydraulic version (two-pipe or four-pipe unit) and also hydraulic integration in the case of two-pipe unit, (LPHW line, CHW line or LPHW/CHW line) and the permitted operating mode (heating, cooling or heating/cooling) must be defined or configured via the "Operating mode configuration" parameter. Specifying the permissible operating mode prevents cold water (CHW) flowing through a unit that is intended exclusively for heating and is installed in the heating/cooling line, for example, and also prevents the unit being operated with cold water when no hot water (PWW) is available. When configured as a two-pipe unit, depending on the parameter settings, the operating mode is selected either by switching between heating and cooling or, in exceptional cases, by measuring the supply temperature. The following settings are possible:

0 = No heating or cooling operation possible

1 = 2-pipe heating or cooling
Connection of the units to the switchable LPHW/CHW line.
In heating mode, the room can be heated depending on the deviation between the setpoint and actual room temperature.
In cooling mode, the room can be cooled depending on the deviation between the setpoint and the actual room temperature.

2 = 2-pipe HC heating only
Connection of the units to the switchable LPHW/CHW line.
In heating mode, the room can be heated depending on the deviation between the setpoint and actual room temperature.
In cooling mode, cooling is not possible.

3 = 2-pipe HC cooling only
Connection of the units to the switchable LPHW/CHW line.
No heating is possible in heating mode.
In cooling mode, the room can be cooled depending on the deviation between the setpoint and actual room temperature.

4 = 4-pipe heating or cooling
Connection of the units to the LPHW and CHW lines.
The room can be heated or cooled depending on the deviation between the setpoint and actual room temperature and manual selection of the operating mode using the "Mode" parameter.

5 = 2-pipe, always heating only
Connection directly to the LPHW line
The can always be heated in heating mode and in cooling mode depending on the deviation between the setpoint and actual room temperature.

6 = 2-pipe, always cooling only
Connection directly to the CHW line
The room can always be cooled in heating mode and in cooling mode depending on the deviation between the setpoint and actual room temperature.

The "Operating mode configuration" parameter is automatically applied continuously with certain parameter settings and cannot be changed.
More information can be found in section "Heating and cooling with transition time".

The "Unit function" parameter defines whether the unit is a normal secondary air unit with room temperature control, a primary air unit with room temperature control and additional optional outside air component, or a door air curtain without room temperature control. The following settings are possible:
0 = Secondary air unit
1 = Door air curtain
2 = Primary air unit

The parameter "Mode" (manual selection of operating mode) can only be used with four-pipe systems. The following settings are possible:

1 = Heating
2 = Cooling
3 = Auto

The setting options for the "Mode" parameter can be restricted by the "Mode configuration" parameter. The following settings are possible:
0 = Auto only
1 = Auto, heating, cooling without Reset
2 = Auto, heating, cooling with Reset to Auto with a change of operating program

If several units are coupled by means of a CAN-bus and operated jointly in a group, they should preferably always be the same units with the same mode of operation. This would then result in relatively uniform operating behaviour (fan speeds, i.e. perceptible noise, heating or cooling outputs, etc.) In special cases however, different operating modes may also be required for units coupled by means of a CAN-bus and operated together in a group. When heating a room with trench systems (two-pipe units) connected to the heating circuit, and cooling the room by ceiling cassettes (two-pipe units) connected to the cooling circuit, a different operating mode is required for the trench systems as opposed to the ceiling cassettes. A four-pipe group is thus formed by combining two-pipe units with different operating modes. With these kinds of unit setups, only the four-pipe room temperature setpoints apply to all units within the group.

When all units are coupled by means of a CAN-bus and operated together in a group, the four-pipe room temperature setpoints only apply if:

1. The operating mode of a unit is "4 = 4-pipe heating or cooling"
2. The operating mode of a unit is "5 = 2-pipe, always heating only" and the operating mode of another unit is "1 = 2-pipe heating or cooling", "3 = 2-pipe HC cooling only", or "6 = 2-pipe, always cooling only".
3. The operating mode of a unit is "6 = 2-pipe, always cooling only" and the operating mode of another unit is "1 = 2-pipe heating or cooling", "2 = 2-pipe HC heating only", or "5 = 2-pipe, always heating only".
4. The HC operating mode (see section "Heating and cooling with transition time") of a unit is "1 = Heating unit" or "2 = Cooling unit".

In this case, "manual operating mode selection" is also possible using "Mode".
The "setpoint input group" status displays the room temperature setpoint input which depends on the way in the units are set up.
0 = Two-pipe room temperature setpoints
1 = Four-pipe rooms temperature setpoints

The "Condensate response" parameter defines the effect of a fault message from the condensate pump or a signal from the dew point monitor. The following responses are possible:
0 = No response
1 = Valve (CHW) closed
2 = Valve (CHW) closed and fan off in cooling mode
3 = Valve (CHW/LPHW) closed
4 = Valve (CHW/LPHW) closed and fan off

In two-pipe systems, the parameter setting "Valve (CHW) closed" only results in the valve closing if cooling mode is active. By contrast, with the parameter setting

"Valve (CHW/LPHW) closed", the valve closes independently of the operating mode (heating or cooling). This prevents additional condensate forming if the LPHW / CHW switchover valve is positioned incorrectly for example, which can lead to condensate precipitation even if heating mode is active.
In four-pipe systems, the parameter setting "Valve (CHW) closed only results in the CHW valve closing whereas the parameter setting "Valve (CHW/LPHW) closed" results in the CHW valve and LPHW valve closing.

If both the fault and message display for a connected dew point monitor have been deactivated, it is very difficult to determine why the unit is no longer heating or cooling if the dew point monitor develops a fault. In this case, the unit no longer indicates that there is a problem. Consequently, if the dew point monitor develops a fault, troubleshooting will inevitably take longer.

4.1 Parameter

Brief description	ID	Range	Default
Operating mode configuration	20539	0 - 6	0
Unit function	20672	0 - 2	0
Mode	20538	1 - 3	3
Configuration Mode	20043	0 - 2	1
Condensate response	20872	0 - 4	1

4.2 Parameters for units in the group

Brief description	ID array(10)	Range	Default
Operating mode configuration	25539	0 - 6	0
Unit function	25672	0 - 2	0

4.3 Statuses

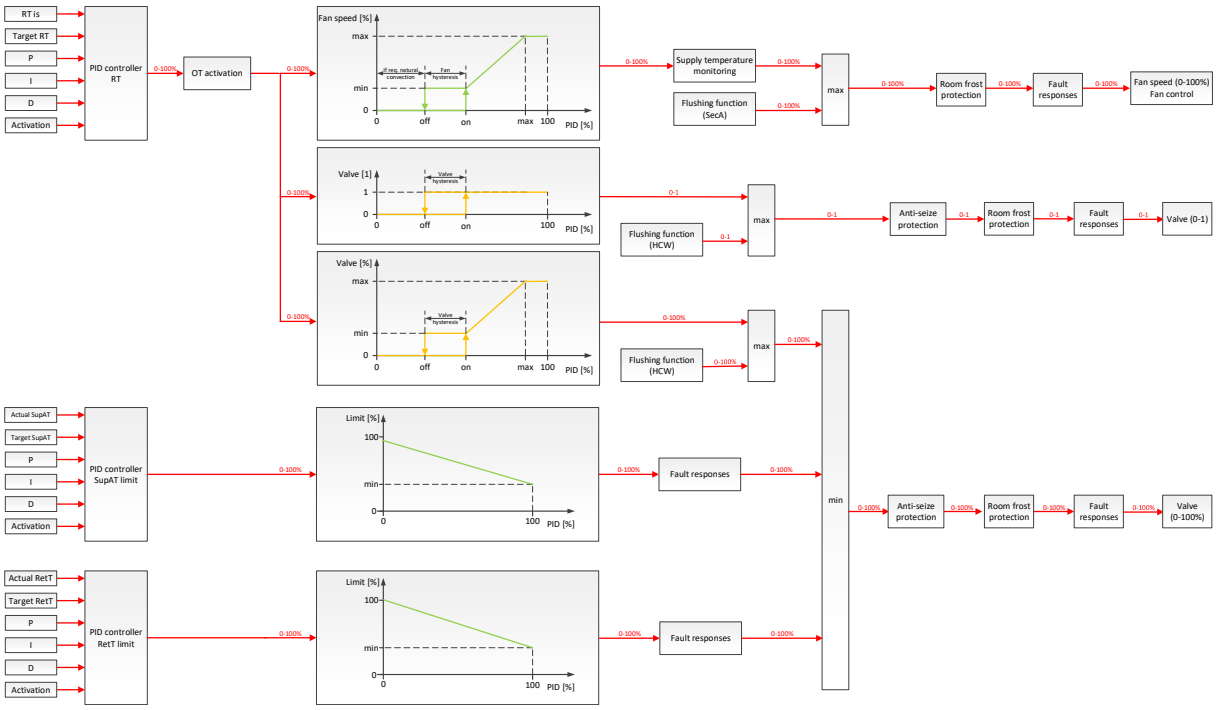
Brief description	ID	Range
Group setpoint input	21330	0 - 1

4.4 Signal flow and priorities

Different signal flows and priorities arise depending on the unit function.

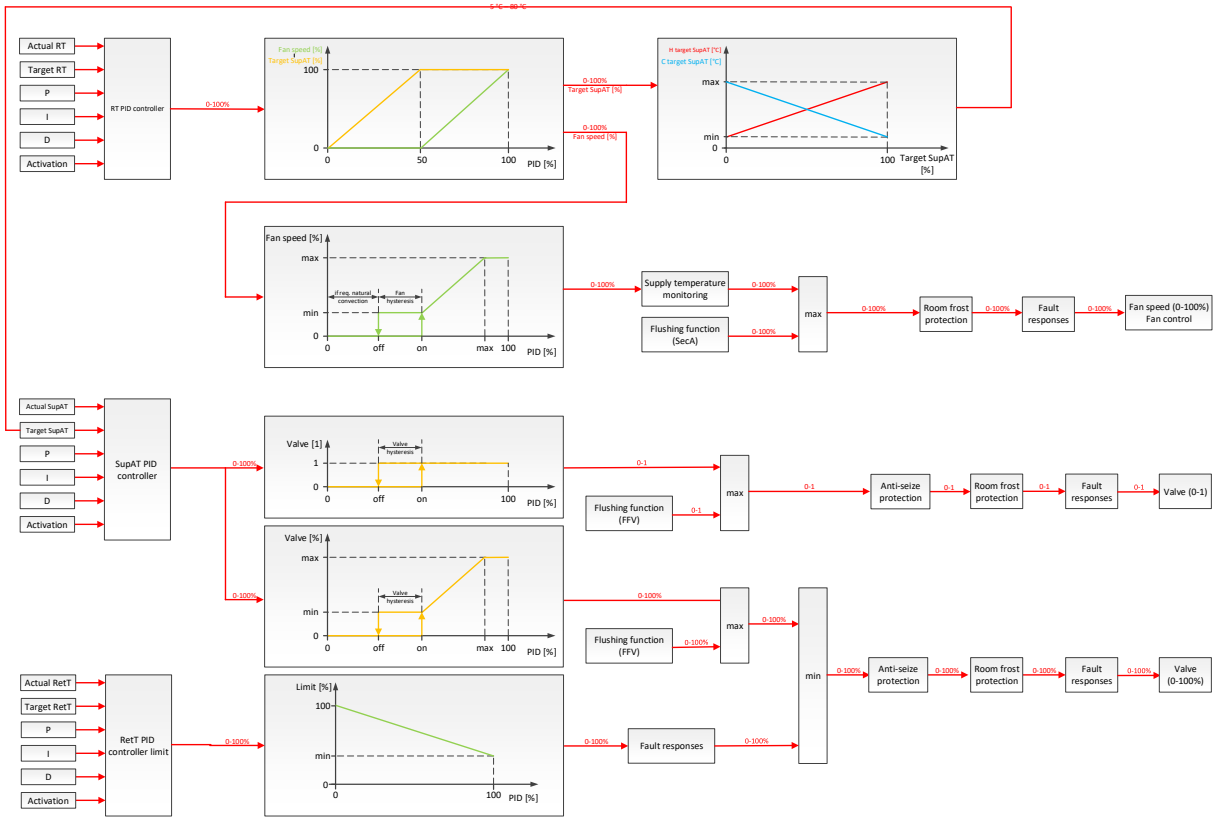
4.4.1 Secondary air unit

The room temperature is controlled by PID control algorithms. By appropriate scaling, the calculated control variable is converted into a speed signal for the fan and into a control signal for the valve. Additional functions are also active with certain unit setups. The individual functions, signal flow, and priorities are shown below:



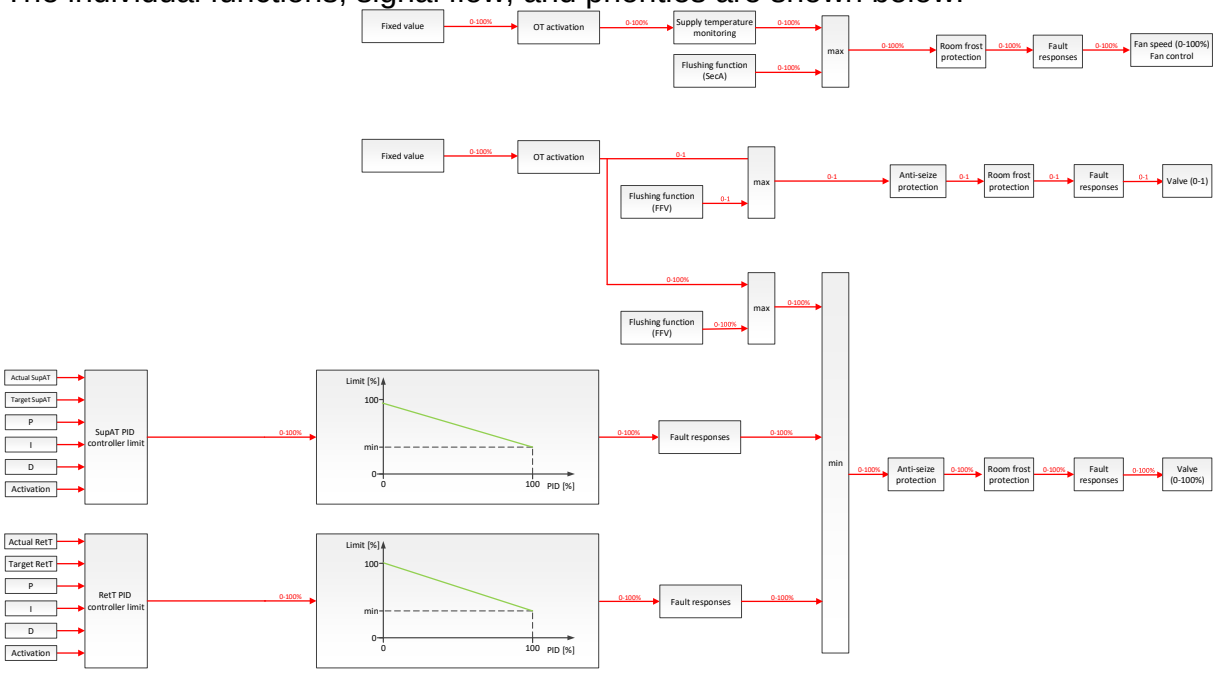
4.4.2 Primary air unit

The room temperature is controlled by PID control algorithms. By appropriate scaling, the calculated control variable is converted into a supply air temperature setpoint (Heating: 0% - 50% PID RT => 0% - 100% Supply air temperature => min SupAT - max SupAP, Cooling: 0% - 50% PIDRT => 100% - 0% Supply air temperature => max SupAT - min SupAT) and into a speed signal for the fan (50% - 100% PID RT => 0% - 100% speed => min speed - max speed). Additional functions are also active with certain unit setups. The individual functions, signal flow and priorities are shown below:



4.4.3 Door air curtain

There is no room temperature control. The fixed control variable is converted into a control signal for the valve by appropriate scaling. Additional functions are also active with certain unit setups.
The individual functions, signal flow, and priorities are shown below:



4.5 Room temperature setpoints

Separate room temperature setpoints and the two statuses (Summer or Winter) and/or the two operating modes (Heating or Cooling) can be specified for each of the three different operating programs (Day, Boost or Eco). All room temperature setpoints are based on an "RT base setpoint". This can be raised or lowered using the general Offset (parameter "RT general Offset") within adjustable limits (parameter "RT general Offset limits"). Additional corresponding offsets are added or subtracted depending on the operating program (Day, Boost or Eco) and status (Summer or Winter) or operating mode (Heating or Cooling). This results in a separate room temperature setpoint for the Day, Eco and Boost operating programs in the winter status and/or in heating operating mode, and a separate room temperature setpoint in summer status and/or cooling operating mode.

An additional "Neutral zone" in which there is no heating or cooling can also be set for each operating program in 4-pipe units. This prevents fluctuating behaviour, i.e. cycling between heating and cooling.

An automatic "Reset" when the operating program changes can be configured for the set general Offset (Parameter "RT general Offset"). The corresponding setting can be entered using the "RT Reset Offset configuration" parameter. The following settings are possible:
0 = No Reset with automatic operating mode change
1 = Reset with automatic operating mode change

With two-pipe units for heating and cooling, "Heating" operating mode corresponds to the "Winter" status and "Cooling" operating mode corresponds to the "Summer" status.

With two-pipe units for heating or cooling only and with four-pipe units, the same parameters can be used to set different setpoints (offsets) for "Winter" status and "Summer" status.

Setpoint calculation for Day operating program, heating operating mode:
2p RT setpoint = RT base setpoint + RT Offset general + RT Offset Day heating

Setpoint calculation for Eco operating program, heating operating mode:
2p RT setpoint = RT base setpoint + RT Offset general + RT Offset Eco heating

Setpoint calculation for Boost operating program, heating operating mode:
2p RT setpoint = RT base setpoint + RT Offset general + RT Offset Boost heating

Setpoint calculation for Day operating program, cooling operating mode:
2p RT setpoint = RT base setpoint + RT Offset general + RT Offset Day cooling

Setpoint calculation for Eco operating program, cooling operating mode:
2p RT setpoint = RT base setpoint + RT Offset general + RT Offset Eco cooling

Setpoint calculation for Boost operating program, cooling operating mode:
2p RT setpoint = RT base setpoint + RT Offset general + RT Offset Boost cooling

The status "2p RT setpoint" shows the currently valid setpoint for two-pipe units depending on the operating program (Day, Boost or Eco) and status (Summer or Winter) and operating mode (Heating or Cooling), as well as the set Offset.

Setpoint calculation for neutral zone cooling:
4p RT setpoint cooling = 2p RT setpoint + 4p neutral zone / 2

Setpoint calculation for neutral zone heating:
4p RT setpoint heating = 2p RT setpoint - 4p neutral zone / 2

The statuses "4p RT setpoint cooling" and "4p RT setpoint heating" show the current valid setpoint for four-pipe units depending on the operating program (Day, Boost or Eco) and status (Summer or Winter) and/or operating mode (Heating or Cooling) and the set Offset and the set neutral zone.

4.5.1 Parameter

Brief description	ID	Range	Default
RT base setpoint	20009	5.0 °C - 40.0 °C	21.0 °C
RT Offset general	20010	-10.0 K - 10.0 K	0.0 K
RT Offset general limits	21233	0.0 K - 10.0 K	3.0 K
RT Offset Day heating	20012	-20.0 K - 20.0 K	0.0 K
RT Offset Eco heating	20014	-20.0 K - 20.0 K	-3.0 K
RT Offset Boost heating	20013	-20.0 K - 20.0 K	-2.0 K
RT Offset Day cooling	20015	-20.0 K - 20.0 K	0.5 K
RT Offset Eco cooling	20017	-20.0 K - 20.0 K	3.5 K
RT Offset Boost cooling	20016	-20.0 K - 20.0 K	2.5 K
4p Day neutral zone	21327	0.0 K - 20.0 K	0.3 K
4p Eco neutral zone	21329	0.0 K - 20.0 K	1.3 K
4p Boost neutral zone	21328	0.0 K - 20.0 K	2.3 K
RT configuration Reset Offset	20011	0 - 1	1

4.5.2 Statuses

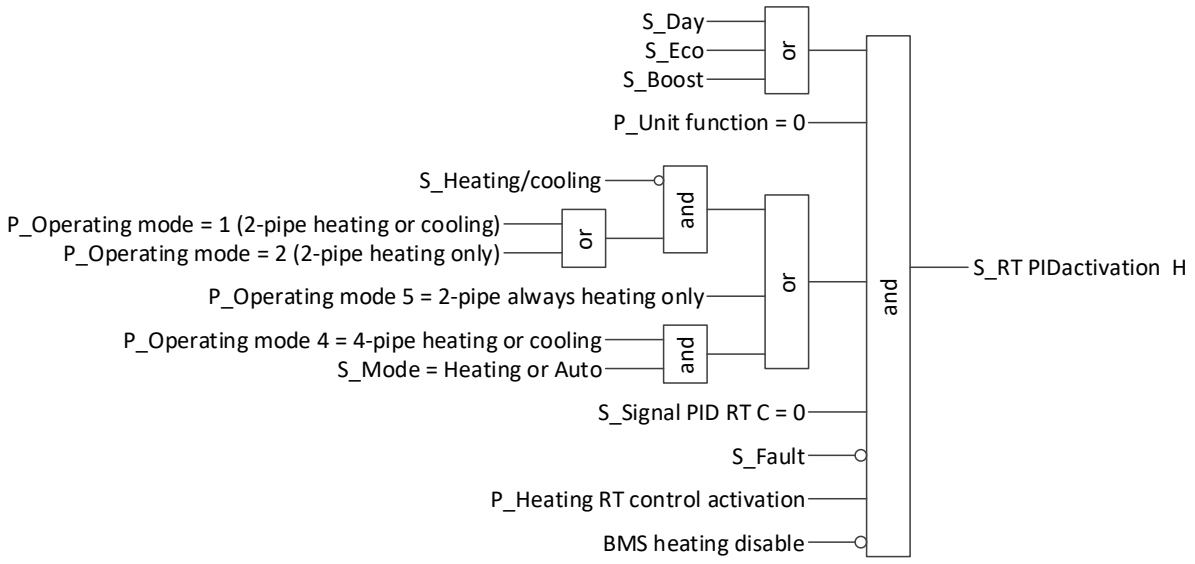
Brief description	ID	Range
2p RT setpoint	20036	-99.9 °C - 99.9 °C
4p heating RT setpoint	20034	-99.9 °C - 99.9 °C
4p cooling RT setpoint	20035	-99.9 °C - 99.9 °C

4.6 Room temperature control PID control algorithms

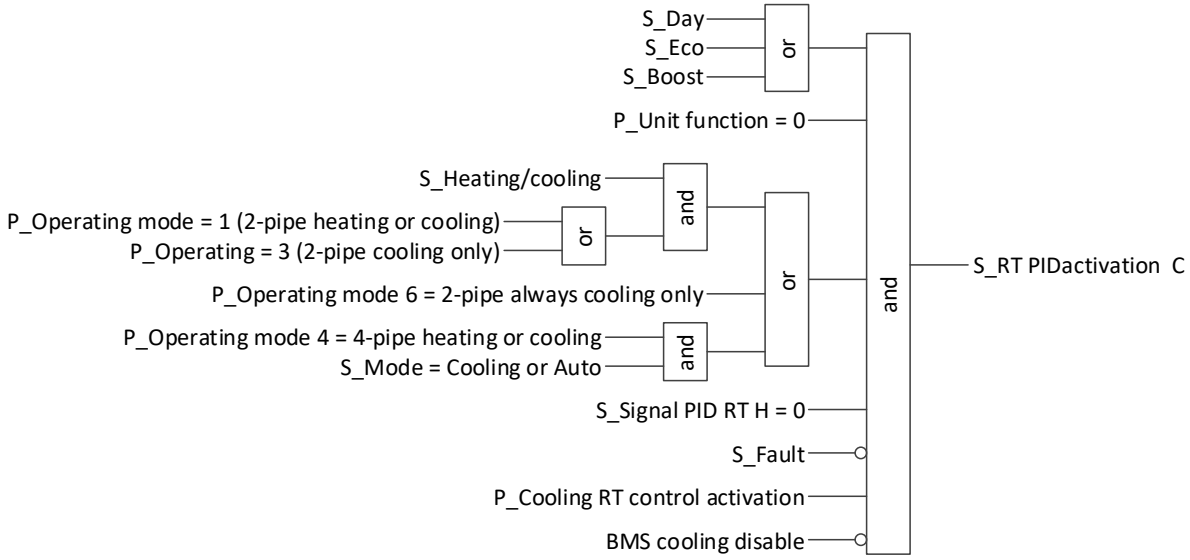
A PID control algorithm with separate parameters (P, I and D component) is available for both heating and cooling operating modes. The two PID control algorithms have directly inverse modes of operation. In heating mode, the calculated control variable increases if the room temperature falls below the setpoint. In cooling mode, the calculated control variable increases if the room temperature setpoint is exceeded. The minimum and control variable of the PID control algorithm is 0%, and the maximum control variable of the PID control algorithm is 100%.
The "PID heating RT activation" parameter can generally be used to activate or deactivate the PID control algorithm for heating mode. An inhibit can be set by the BMS via the parameter "RT inhibit BMS heating". The "RT activation PID heating" status displays whether all conditions for activation of the PID control algorithm for heating mode have been met. The “RT X-W PID heating" status displays the setpoint deviation for heating mode. The "RT signal PID heating" status displays the control variable calculated by the PID control algorithm for heating mode.
The "RT activation PID cooling" parameter can generally be used to activate or deactivate the PID control algorithm for cooling mode. An inhibit can be set by the BMS via the parameter "RT inhibit cooling BMS". The "RT activation PID cooling" status displays whether all conditions for activation of the PID control algorithm for cooling mode have been met. The "RT X-W PID cooling" status shows the setpoint deviation for cooling mode. The "RT signal PID cooling" status displays the control variable calculated by the PID control algorithm for cooling mode.

4.6.1 Secondary air unit

4.6.1.1 Heating activation PID control algorithm

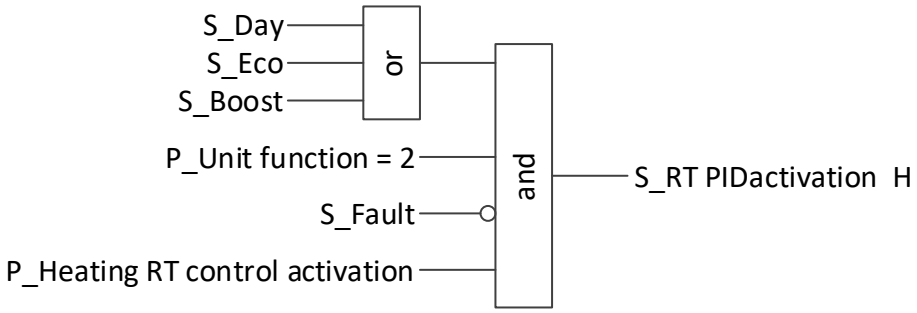


4.6.1.2 Cooling activation PID control algorithm

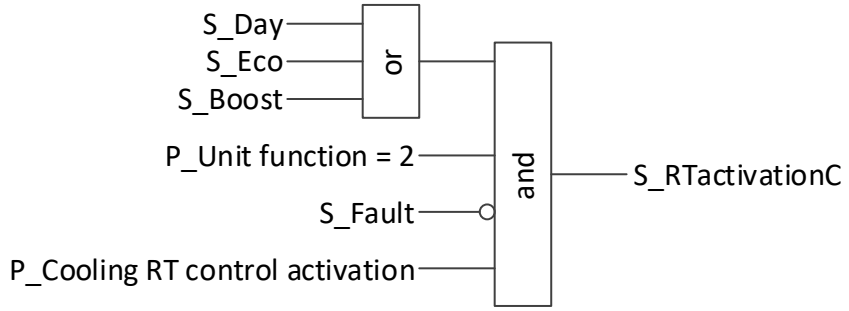


4.6.2 Primary air unit

4.6.2.1 Heating activation PID control algorithm

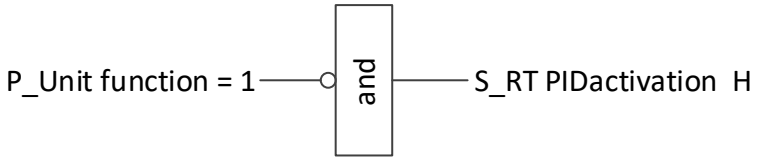


4.6.2.2 Cooling activation PID control algorithm

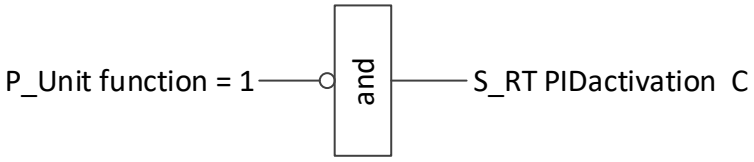


4.6.3 Door air curtain

4.6.3.1 Heating activation PID control algorithm



4.6.3.2 Cooling activation PID control algorithm



4.6.4 Parameters

Brief description	ID	Range	Default
Heating RT P component	20046	0.1 K - 999.9 K	33.0 K
Heating RT I component	20047	0 s - 9999 s	600 s
Heating RT D component	20048	0 s - 9999 s	0 s
Heating RT activation PID	20518	0 - 1	1
Heating RT BMS inhibit	21820	0 - 1	0
Cooling RT P component	20062	0.1 K - 999.9 K	33.0 K
Cooling RT I component	20063	0 s - 9999 s	600 s
Cooling RT D component	20064	0 s - 9999 s	0 s
Cooling RT activation PID	20517	0 - 1	1
Cooling RT BMS inhibit	21821	0 - 1	0

4.6.5 Group unit parameters

Brief description	ID array(10)	Range	Default
Heating RT P component	25046	0.1 K - 999.9 K	33.0 K
Heating RT I component	25047	0 s - 9999 s	600 s
Heating RT D component	25048	0 s - 9999 s	0 s
Heating RT activation PID	25518	0 - 1	1
Cooling RT P component	25062	0.1 K - 999.9 K	33.0 K
Cooling RT I component	25063	0 s - 9999 s	600 s
Cooling RT D component	25064	0 s - 9999 s	0 s
Cooling RT activation PID	25517	0 - 1	1

4.6.6 Statuses

Brief description	ID	Range
Heating RT activation PID	20041	0 - 1
Heating RT signal PID	20104	0.0% - 100.0%
Heating RT X-W PID	20100	-999.9 K - 999.9 K
Cooling RT activation PID	20042	0 - 1
Cooling RT signal PID	20105	0.0% - 100.0%
Cooling RT X-W PID	20101	-999.9 K - 999.9 K

4.6.7 Statuses of units within the group

Brief description	ID array(10)	Range
Heating RT activation PID	25041	0 - 1
Heating RT signal PID	25104	0.0% - 100.0%
Heating RT X-W PID	25100	-999.9 K - 999.9 K
Cooling RT activation PID	25042	0 - 1
Cooling RT signal PID	25105	0.0% - 100.0%
Cooling RT X-W PID	25101	-999.9 K - 999.9 K

4.6.8 Faults

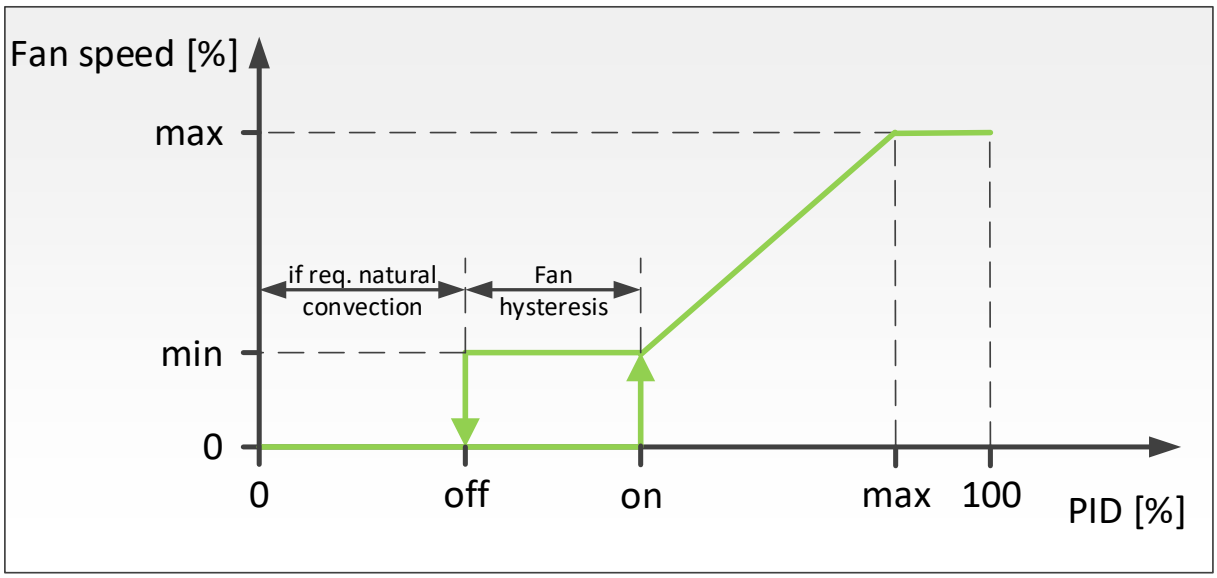
The room temperature control can only work if the room temperature is also measured. If the room temperature control is configured, but no room temperature detection parameters are set, or if the measured value of the RT sensor is outside the valid

range, due to a disconnection or short-circuit of the connection cable for example, the fault "Room temperature sensor limit value" is displayed and room temperature control is not performed. For safety, the valves “4p H valve" and "2p H/C valve" are opened. You can find more information in section "Room temperature detection".

4.7 Fan speed signal conversion

The parameters for conversion or scaling of the control variable of the PID control algorithm to a fan speed signal can be set separately for the three different operating programs (Day, Boost or Eco) and the two statuses (Summer or Winter) or the two operating modes (Heating or Cooling). The minimum fan speed signal is 0%, the maximum fan speed signal is 100%.
The “Fan speed PID on" parameter specifies the control variable of the PID control algorithm above which the fan speed signal is set to the value specified by the “Min fan speed” parameter.
The “Max fan speed PID” parameter specifies the control variable of the PID control algorithm above which the fan speed signal is set to the value defined via the “Max fan speed” parameter.
The “Fan speed off PID” parameter specifies the control variable of the PID control algorithm below which the speed signal is set to the value 0%. Depending on the configuration of the conversion of the control variable into a control signal for the valve, natural convection may result despite a speed signal with the value 0%. If the "Fan speed on PID" and "Fan speed off PID" parameters are both set to the value 0, the fan operates continuously with the value set via the parameter "Min fan speed".

4.7.1 Diagram



4.7.2 Parameters

Brief description	ID	Range	Default
Fan speed PID Day heating on	20050	0.0% - 100.0%	30.0%
Fan speed PID off Day heating	20049	0.0% - 100.0%	10.0%
Day heating max fan speed PID	20051	0.0% - 100.0%	90.0%
Day heating min fan speed	20052	0.0% - 100.0%	20.0%
Day heating max fan speed	20053	0.0% - 100.0%	100.0%
Eco heating fan speed on PID	20503	0.0% - 100.0%	30.0%
Eco heating fan speed off PID	20502	0.0% - 100.0%	10.0%
Eco heating max fan speed PID	20504	0.0% - 100.0%	90.0%

Brief description	ID	Range	Default
Eco heating min fan speed	20505	0.0% - 100.0%	20.0%
Eco heating max fan speed	20506	0.0% - 100.0%	100.0%
Boost heating fan speed on PID	20498	0.0% - 100.0%	30.0%
Boost heating fan speed off PID	20497	0.0% - 100.0%	10.0%
Boost heating max fan speed PID	20499	0.0% - 100.0%	90.0%
Boost heating min fan speed	20500	0.0% - 100.0%	20.0%
Boost heating max fan speed	20501	0.0% - 100.0%	100.0%
Day cooling fan speed on PID	20066	0.0% - 100.0%	30.0%
Day cooling fan speed off PID	20065	0.0% - 100.0%	10.0%
Day cooling max fan speed PID	20067	0.0% - 100.0%	90.0%
Day cooling min fan speed	20068	0.0% - 100.0%	20.0%
Day cooling max fan speed	20069	0.0% - 100.0%	100.0%
Eco cooling fan speed on PID	20481	0.0% - 100.0%	30.0%
Eco cooling fan speed off PID	20480	0.0% - 100.0%	10.0%
Eco cooling max fan speed PID	20482	0.0% - 100.0%	90.0%
Eco cooling min fan speed	20483	0.0% - 100.0%	20.0%
Eco cooling max fan speed	20484	0.0% - 100.0%	100.0%
Boost cooling fan speed on PID	20476	0.0% - 100.0%	30.0%
Boost cooling fan speed off PID	20475	0.0% - 100.0%	10.0%
Boost cooling max fan speed PID	20477	0.0% - 100.0%	90.0%
Boost cooling min fan speed	20478	0.0% - 100.0%	20.0%
Boost cooling max fan speed	20479	0.0% - 100.0%	100.0%

4.7.3 Group unit parameters

Brief description	ID array(10)	Range	Default
Day heating fan speed on PID	25050	0.0% - 100.0%	30.0%
Day heating fan speed off PID	25049	0.0% - 100.0%	10.0%
Day heating max fan speed PID	25051	0.0% - 100.0%	90.0%
Day heating min fan speed	25052	0.0% - 100.0%	20.0%
Day heating max fan speed	25053	0.0% - 100.0%	100.0%
Eco heating fan speed on PID	25503	0.0% - 100.0%	30.0%
Eco heating fan speed off PID	25502	0.0% - 100.0%	10.0%
Eco heating max fan speed PID	25504	0.0% - 100.0%	90.0%
Eco heating min fan speed	25505	0.0% - 100.0%	20.0%
Eco heating max fan speed	25506	0.0% - 100.0%	100.0%
Boost heating fan speed on PID	25498	0.0% - 100.0%	30.0%
Boost heating fan speed off PID	25497	0.0% - 100.0%	10.0%
Boost heating max fan speed PID	25499	0.0% - 100.0%	90.0%
Boost heating min fan speed	25500	0.0% - 100.0%	20.0%
Boost heating max fan speed	25501	0.0% - 100.0%	100.0%
Day cooling fan speed PID on	25066	0.0% - 100.0%	30.0%
Day cooling fan speed PID off	25065	0.0% - 100.0%	10.0%
Day cooling max fan speed PID	25067	0.0% - 100.0%	90.0%
Day cooling min fan speed	25068	0.0% - 100.0%	20.0%
Day cooling max fan speed	25069	0.0% - 100.0%	100.0%
Eco cooling fan speed PID on	25481	0.0% - 100.0%	30.0%
Eco cooling fan speed PID off	25480	0.0% - 100.0%	10.0%
Eco cooling max fan speed PID	25482	0.0% - 100.0%	90.0%
Eco cooling min fan speed	25483	0.0% - 100.0%	20.0%
Eco cooling max fan speed	25484	0.0% - 100.0%	100.0%
Boost cooling fan speed PID on	25476	0.0% - 100.0%	30.0%
Boost cooling fan speed PID off	25475	0.0% - 100.0%	10.0%
Boost cooling max fan speed PID	25477	0.0% - 100.0%	90.0%
Boost cooling min fan speed	25478	0.0% - 100.0%	20.0%
Boost cooling max fan speed	25479	0.0% - 100.0%	100.0%

4.7.4 Statuses

Brief description	ID	Range
Heating fan speed signal	20054	0.0% - 100.0%
Cooling fan speed signal	20070	0.0% - 100.0%

4.7.5 Statuses of units within the group

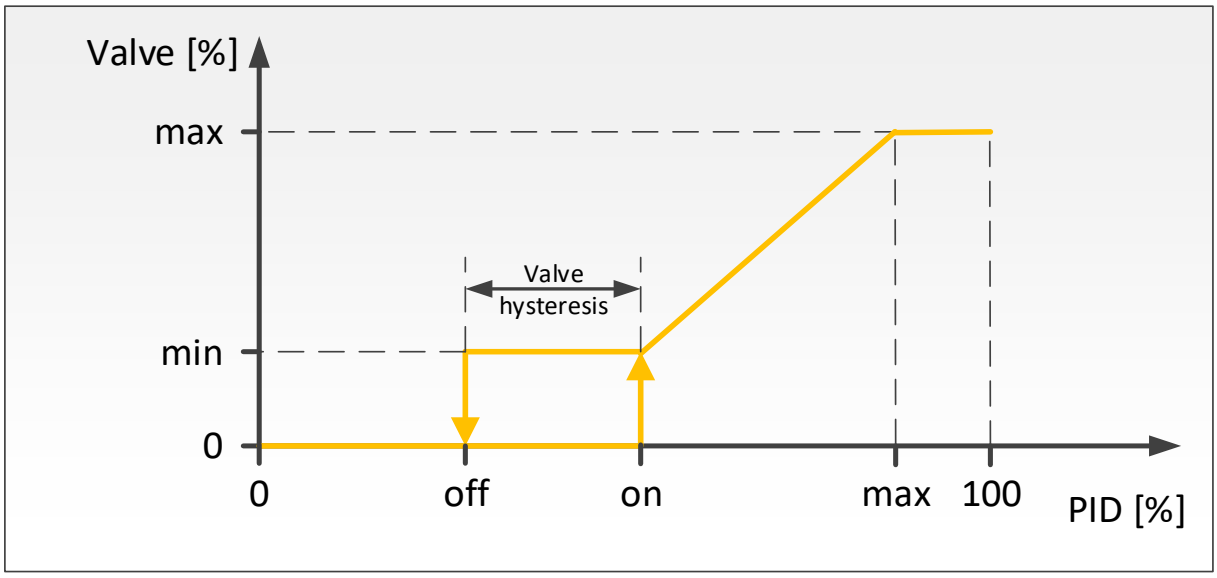
Brief description	ID array(10)	Range
Heating fan speed signal	25054	0.0% - 100.0%
Cooling fan speed signal	25070	0.0% - 100.0%

4.8 Valve control signal conversion

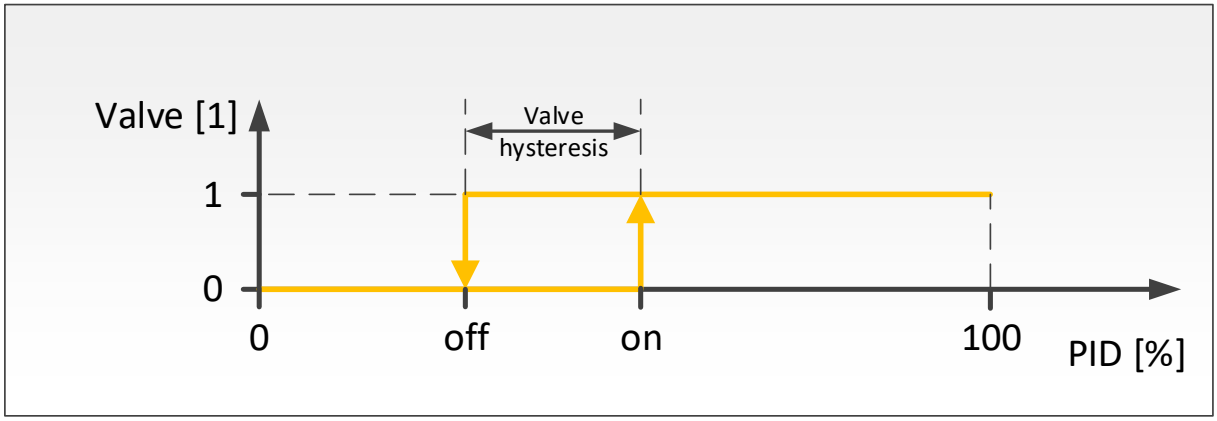
The parameters for conversion or scaling of the control variable of the control algorithm to a fan speed signal can be set separately for the three different operating programs (Day, Boost or Eco) and the two statuses (Summer or Winter) or the two operating modes (Heating or Cooling). The minimum control signal for the valve is 0%, and the maximum control signal for the valve is 100%.
The "Valve on PID" parameter specifies the control variable of the PID control algorithm above which the control signal for the valve is set to the value defined by the “Valve min” parameter.
The "Valve PID max" parameter specifies the control variable of the PID control algorithm above which the control signal for the valve is set to the value defined by the “Valve max” parameter.
The “Valve PID off” parameter specifies the control variable of the PID control algorithm below which the control signal for the valve is set to the value 0%.

The following applies to discreet (open/closed) valve actuators:
The control signal for the valve is either 1 or 0.
The "Valve PID on" parameter specifies the control variable of the PID control algorithm above which the actuating signal for the valve is set to the value 1.
The "Valve PID off" parameter specifies the control variable of the PID control algorithm below which the actuating signal for the valve is set to the value 0.

4.8.1 Diagram (constant)



4.8.2 Diagram (discreet)



4.8.3 Parameters

Brief description	ID	Range	Default
Day heating valve PID on	20056	0.0% - 100.0%	30.0%
Day heating valve PID off	20055	0.0% - 100.0%	10.0%
Day heating max valve PID	20057	0.0% - 100.0%	90.0%
Day heating min valve	20058	0.0% - 100.0%	20.0%
Day heating max valve	20059	0.0% - 100.0%	100.0%
Eco heating valve PID on	20513	0.0% - 100.0%	30.0%
Eco heating valve PID off	20512	0.0% - 100.0%	10.0%
Eco heating max valve PID	20514	0.0% - 100.0%	90.0%
Eco heating min valve	20515	0.0% - 100.0%	20.0%
Eco heating max valve	20516	0.0% - 100.0%	100.0%
Boost heating valve PID on	20508	0.0% - 100.0%	30.0%
Boost heating valve PID off	20507	0.0% - 100.0%	10.0%
Boost heating max valve PID	20509	0.0% - 100.0%	90.0%
Boost heating min valve	20510	0.0% - 100.0%	20.0%
Boost heating max valve	20511	0.0% - 100.0%	100.0%
Day cooling valve PID on	20072	0.0% - 100.0%	30.0%
Day cooling valve PID off	20071	0.0% - 100.0%	10.0%
Day cooling max valve PID	20073	0.0% - 100.0%	90.0%
Day cooling min valve	20074	0.0% - 100.0%	20.0%
Day cooling max valve	20075	0.0% - 100.0%	100.0%
Eco cooling valve PID on	20491	0.0% - 100.0%	30.0%
Eco cooling valve PID off	20490	0.0% - 100.0%	10.0%
Eco cooling max valve PID	20492	0.0% - 100.0%	90.0%
Eco cooling min valve	20493	0.0% - 100.0%	20.0%
Eco cooling max valve	20494	0.0% - 100.0%	100.0%
Boost cooling valve PID on	20486	0.0% - 100.0%	30.0%
Boost cooling valve PID off	20485	0.0% - 100.0%	10.0%
Boost cooling max valve PID	20487	0.0% - 100.0%	90.0%
Boost cooling min valve	20488	0.0% - 100.0%	20.0%
Boost cooling max valve	20489	0.0% - 100.0%	100.0%

4.8.4 Group unit parameters

Brief description	ID array(10)	Range	Default
Day heating valve PID on	25056	0.0% - 100.0%	30.0%
Day heating valve PID off	25055	0.0% - 100.0%	10.0%
Day heating max valve PID	25057	0.0% - 100.0%	90.0%
Day heating min valve	25058	0.0% - 100.0%	20.0%
Day heating max valve	25059	0.0% - 100.0%	100.0%
Eco heating valve PID on	25513	0.0% - 100.0%	30.0%

Brief description	ID array(10)	Range	Default
Eco heating valve PID off	25512	0.0% - 100.0%	10.0%
Eco heating max valve PID	25514	0.0% - 100.0%	90.0%
Eco heating min valve	25515	0.0% - 100.0%	20.0%
Eco heating max valve	25516	0.0% - 100.0%	100.0%
Boost heating valve PID on	25508	0.0% - 100.0%	30.0%
Boost heating valve PID off	25507	0.0% - 100.0%	10.0%
Boost heating max valve PID	25509	0.0% - 100.0%	90.0%
Boost heating min valve	25510	0.0% - 100.0%	20.0%
Boost heating max valve	25511	0.0% - 100.0%	100.0%
Day cooling valve PID on	25072	0.0% - 100.0%	30.0%
Day cooling valve PID off	25071	0.0% - 100.0%	10.0%
Day cooling max valve PID	25073	0.0% - 100.0%	90.0%
Day cooling min valve	25074	0.0% - 100.0%	20.0%
Day cooling max valve	25075	0.0% - 100.0%	100.0%
Eco cooling valve PID on	25491	0.0% - 100.0%	30.0%
Eco cooling valve off PID	25490	0.0% - 100.0%	10.0%
Eco cooling max valve PID	25492	0.0% - 100.0%	90.0%
Eco cooling min valve	25493	0.0% - 100.0%	20.0%
Eco cooling max valve	25494	0.0% - 100.0%	100.0%
Boost cooling valve PID on	25486	0.0% - 100.0%	30.0%
Boost cooling valve PID off	25485	0.0% - 100.0%	10.0%
Boost cooling max valve PID	25487	0.0% - 100.0%	90.0%
Boost cooling min valve	25488	0.0% - 100.0%	20.0%
Boost cooling max valve	25489	0.0% - 100.0%	100.0%

4.8.5 Statuses

Brief description	ID	Range
Constant heating valve control signal	20060	0.0% - 100.0%
Constant cooling valve control signal	20495	0.0% - 100.0%
Discreet heating valve control signal	20061	0 - 1
Discreet cooling valve control signal	20496	0 - 1

4.8.6 Statuses of units within the group

Brief description	ID array(10)	Range
Constant heating valve control signal	25060	0.0% - 100.0%
Constant cooling valve control signal	25495	0.0% - 100.0%
Discreet heating valve control signal	25061	0 - 1
Discreet cooling valve control signal	25496	0 - 1

4.9 Supply air temperature controls

In the "Secondary air unit" or "Door air curtain" configuration (see section "Temperature control"), the supply air temperature is controlled with reference to a fixed value (supply air temperature limit). In the "Primary air unit" configuration, the supply air temperature is controlled with reference to a variable value which depends on the deviation between the setpoint and actual room temperature. (Room/supply air temperature cascade control).

4.9.1 Supply air temperature limit

The supply air temperature limit can only be used if the unit function is set as "Secondary air unit" or "Door air curtain".

In heating mode, the maximum supply air temperature can be limited, and in cooling mode, the minimum supply air temperature can be limited. However, this can only be

used if continuous-acting valves are fitted. Separate default values can be defined for the maximum limit for heating mode and minimum limit for cooling mode in the three different operating programs (Day, Boost or Eco). They are defined by the parameter "Max. SupAT Day heating SupAT, "Max. SupAT Eco heating SupAT", "Max. SupAT Boost heating SupAT", "Min. SupAT Day cooling SupAT", "Min. SupAT Eco cooling SupAT" and "Min. SupAT Boost cooling SupAT".

To limit the supply air temperature, a maximum control signal for the valve is calculated using a PID control algorithm and by scaling the calculated control variable accordingly. A PID control algorithm with separate parameters (P, I and D component) is available for the two operating modes heating and cooling. The two PID control algorithms have directly inverse modes of operation. In heating mode, the calculated control variable increases if the limit value is exceeded. In cooling mode, the calculated control variable increases if the limit is undercut. The minimum control variable of the PID control algorithm is 0%, the maximum control variable of the PID control algorithm is 100%.

Depending on the unit and application, it may be necessary not to completely restrict the water mass flow rate through the valve. The "Heating SupAT min position" or "Cooling SupAT min position" parameters can therefore be used to limit the control signal for the valve actuator.

The "Heating SupAT response configuration" or "Cooling SupAT response configuration" parameter settings determine how the system responds if the supply air temperature detection develops a fault (see subsection "Faults").
The following responses are possible:
0 = No supply air temperature limit in the event of a fault
1 = Fan off and valve closed in the event of a fault

The "Supply air temperature limit" function can be activated or deactivated separately for heating and/or cooling mode by setting the parameters "Heating SupAT activation limit" or "Cooling SupAT activation limit" accordingly.

The "Heating SupAT activation PID" and "Cooling SupAT activation PID" statuses indicate activation of the respective control algorithm.

The "Heating SupAT limit active" and "Cooling SupAT limit active" statuses indicate whether the limit is being actively applied to the control signal for the valve.

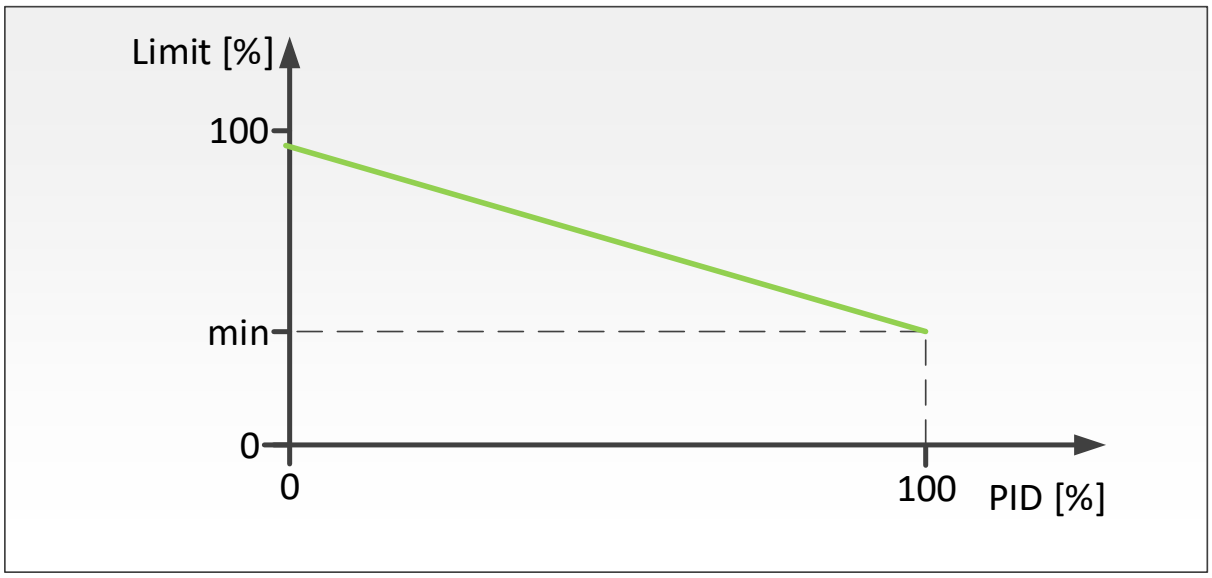
The "Heating SupAT signal PID" or "Cooling SupAT signal PID" statuses show the current output signals calculated by the PID control algorithm.

The "Heating SupAT constant valve signal" and "Cooling SupAT constant valve signal" statuses show the current control signals calculated for the valves. The calculation is based on the output signals calculated by the PID control algorithm and pending faults according to the fault responses currently configured.

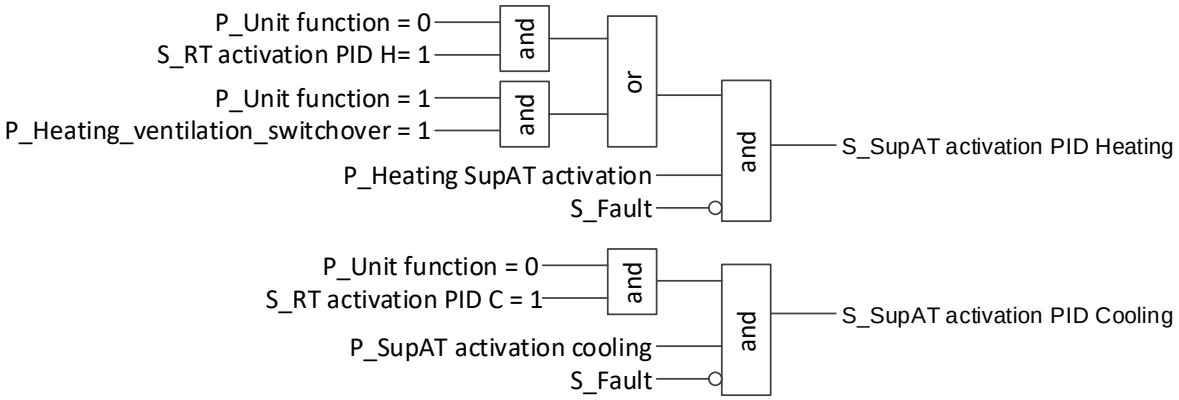
The "Heating SupAT X-W PID" and "Cooling SupAT X-W PID" statuses show the current control deviations that have been calculated.

4.9.1.1 Diagram

The following diagram illustrates the function.



4.9.1.2 Activation



4.9.2 Supply air temperature control

The supply air temperature is controlled using a room/supply air temperature cascade control arrangement and can only be used if the unit has the function of "primary air unit" and continuous-acting valves are installed. The supply air temperature setpoint is calculated by the control signal of the PID control algorithm of the room temperature control and by scaling accordingly.

Separate supply air temperature limit values can be specified for the three different operating programs (Day, Boost or Eco) and the two statuses (Summer or Winter). using the parameters "Min. SupAT Day heating SupAT", "Min. SupAT Eco heating SupAT", "Min. SupAT Boost heating SupAT", "Max. SupAT Day heating SupAT", "Max. SupAT Eco heating SupAT", "Max. SupAT Boost heating SupAT", "Min. SupAT Day cooling SupAT", "Min. SupAT Eco cooling SupAT", Min. SupAT Boost cooling SupAT". "Max. SupAT Day cooling SupAT", "Max. SupAT Eco cooling SupAT" and "Max. SupAT Boost cooling SupAT".

To control the supply air temperature, a control signal for the valve is calculated using a PID control algorithm. A PID control algorithm with separate parameters (P, I and D component) is available for both heating and cooling operating modes. The two control

algorithms have directly inverse modes of operation. In heating mode, the calculated control variable increases if the limit value is exceeded. In cooling mode, the calculated control variable increases if the limit value is undercut. The minimum control variable of the PID control algorithm is 0%, the maximum control variable of the PID control algorithm is 100%.

It is not possible to specify a minimum limit for the valve actuator control signal. During normal operation therefore, the water mass flow rate through the valve may be completely limited.

If the supply air temperature detection develops a fault, the unit is switched off (fan off, valve closed, OA requirement off). Frost protection must be ensured by a frost protection thermostat or by the supply air temperature monitoring function!

The statuses "SupAT setpoint RT SupAT CC min" and "SupAT setpoint RT SupAT CC max" show the current valid limit values depending on the operating program (Day, Boost or Eco) and status (Summer or Winter).

The status "SupAT setpoint RT SupAT CC 2p/4p heating" shows the current valid supply air setpoint depending on the operating program (Day, Boost or Eco), status (Summer or Winter) and the status of the room temperature PID controller. With two-pipe units, it applies to heating and cooling, however, with four-pipe units it applies only to heating. The status "SupAT setpoint RT SupAT CC 4p cooling" applies to cooling. If the room temperature is within the neutral zone for a certain time with four-pipe units, the status "SupAT setpoint RT SupAT CC 2p/4p heating" corresponds to the value of "SupAT setpoint RT SupAT CC min" and the status "SupAT setpoint RT SupAT CC 4p cooling" corresponds to the value of "SupAT setpoint RT SupAT CC max".
The status "SupAT setpoint RT SupAT CC current" shows which supply air temperature setpoint is currently being used for control.
The status "SupAT setpoint RT SupAT CC current group" shows the lowest supply air temperature setpoint in heating mode and the highest supply air temperature setpoint in cooling mode of all units in the group which are currently used for control.

Configurations of the parameters "Heating SupAT activation limit" or "Cooling SupAT temperature limit" do not affect this.

The statuses "Heating SupAT activation PID" and "Cooling SupAT activation PID" indicate the activation of the respective control algorithm.

The statuses "Heating SupAT limit active" and "Cooling SupAT limit active" are not set.

The statuses "Heating SupAT signal PID" and "Cooling SupAT signal PID" display the output signals currently calculated by the PID control algorithm.

The statuses "Heating SupAT constant valve signal" and "Cooling constant valve SupAT signal" show the control signals currently calculated for the valves. The calculation is based on the output signals calculated by the PID control algorithm and pending faults according to the fault responses currently configured.

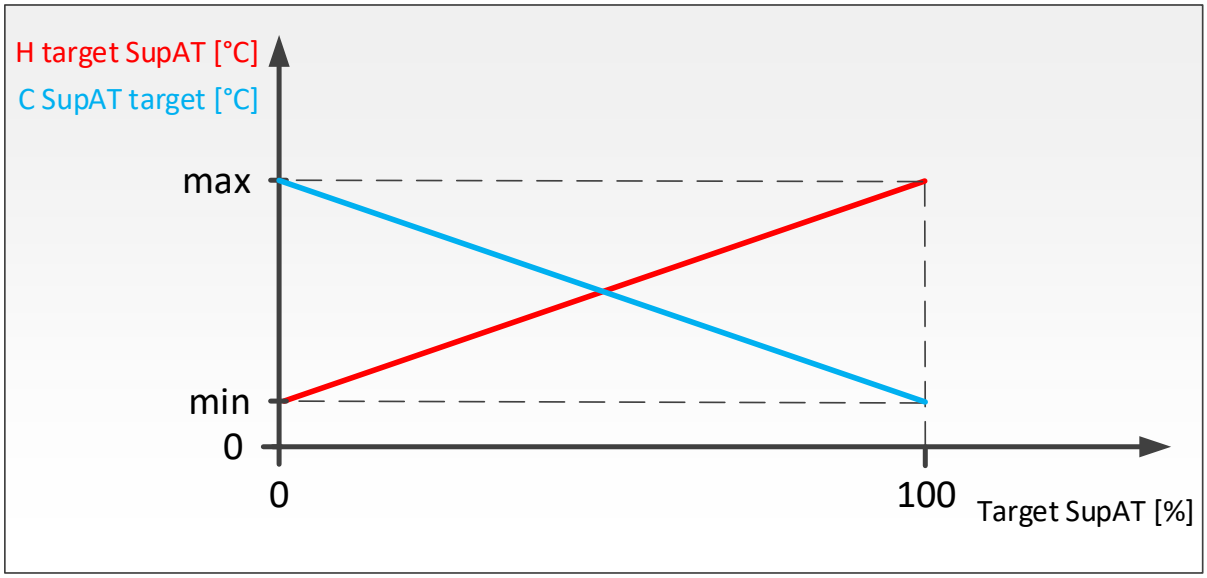
The statuses "Heating SupAT X-W PID" and "Cooling SupAT X-W PID" show the control deviations currently calculated.

The "SupAT waiting time 4p sequence change" parameter can be used to specify an inhibit time to prevent fluctuating behaviour associated with controlling the supply temperature of four-pipe units, i.e. cycling between heating and cooling. The inhibit time must at least elapse once the heating or cooling sequence has dropped to 0% and the respective counter sequence has been activated.

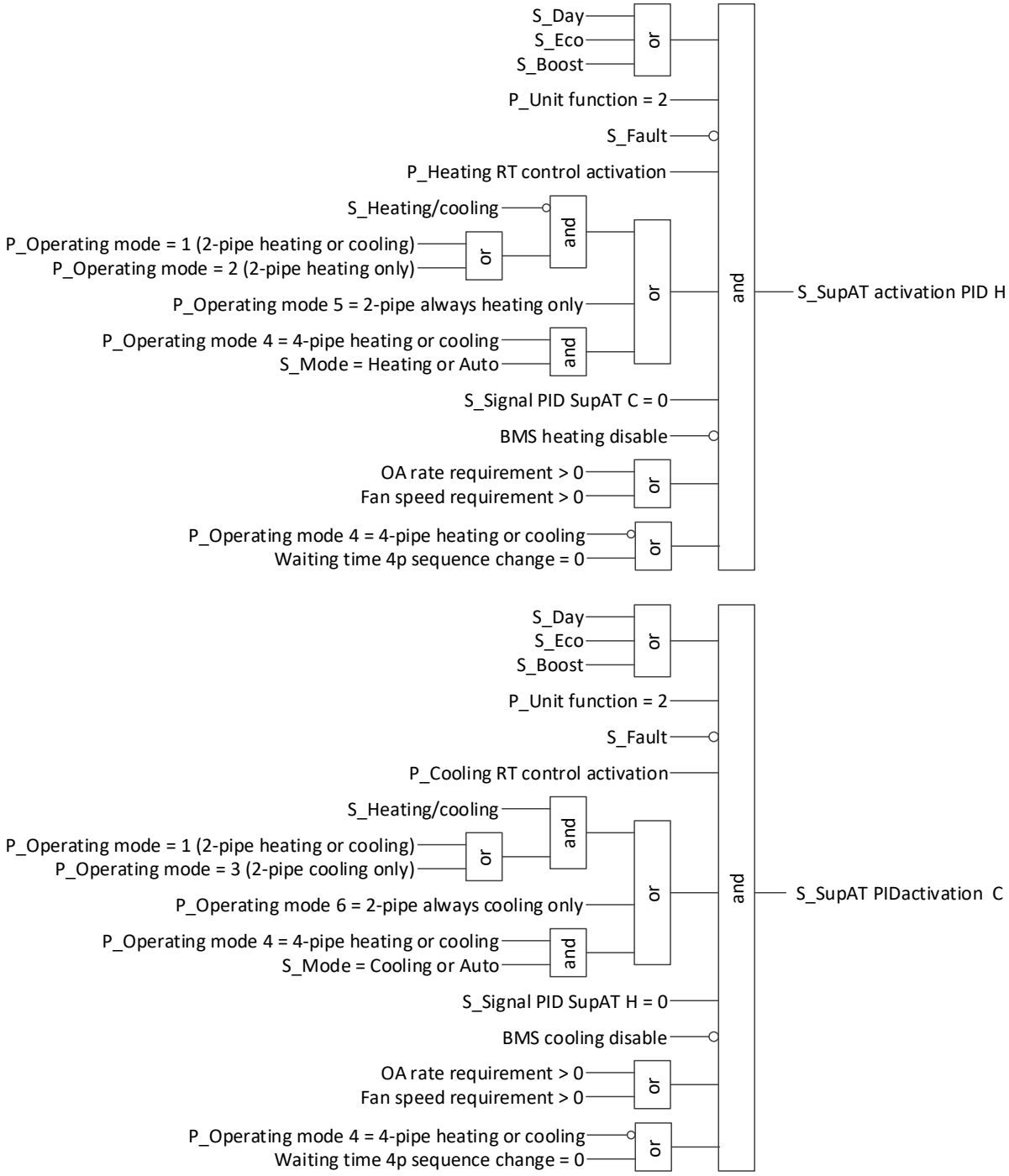
The statuses "SupAT remaining waiting time 4p sequence change Min" and "SupAT remaining waiting time 4p sequence change Sec" show the respective remaining waiting time.

4.9.2.1 Diagram

The function is illustrated in the diagram below.



4.9.2.2 Activation



4.9.3 Supply air temperature monitoring

With primary air units, a malfunction in the central ventilation system (e.g. failure of the rotary heat exchanger) may result in the supply air temperature from the central ventilation system being so low that there is a risk of frost in the heating coil of the primary air unit. The "Heating SupAT frost protection limit value" and the "Cooling SupAT frost protection limit value" parameters can be used to define a supply air temperature limit value for the two operating modes, below which the "Frost protection" fault is triggered. The function can generally be activated or deactivated for the two operating modes using the "Heating SupAT frost protection activation" and "Cooling SupAT frost protection activation" parameters.

If the supply air temperature detection develops a fault and the function is activated, the "Frost protection" function is also triggered.

Attention: the supply air temperature is only recorded "point-wise"! Depending on the design of the heating coil (geometry, number of rows, etc.), location of the supply air temperature sensor and the hydraulic integration (constant mass flow rate, supply/return connection, etc.), this protection may be insufficient! A frost protection thermostat is then required!

4.9.4 Parameters

Brief description	ID	Range	Default
Min. SupAT Day heating SupAT	21902	10.0 °C - 80.0 °C	20.0 °C
Min. SupAT Eco heating SupAT	21904	10.0 °C - 80.0 °C	20.0 °C
Min. SupAT Boost heating SupAT	21903	10.0 °C - 80.0 °C	20.0 °C
Max. SupAT Day heating SupAT	20019	10.0 °C - 80.0 °C	40.0 °C
Max. SupAT Eco heating SupAT	20547	10.0 °C - 80.0 °C	40.0 °C
Max. SupAT Boost heating SupAT	20546	10.0 °C - 80.0 °C	40.0 °C
Min. SupAT Day cooling SupAT	20018	5.0 °C - 60.0 °C	15.0 °C
Min. SupAT Eco cooling SupAT	20545	5.0 °C - 60.0 °C	15.0 °C
Min. SupAT Boost cooling SupAT	20544	5.0 °C - 60.0 °C	15.0 °C
Max. SupAT Day cooling SupAT	21899	5.0 °C - 60.0 °C	35.0 °C
Max. SupAT Eco cooling SupAT	21901	5.0 °C - 60.0 °C	35.0 °C
Max. SupAT Boost cooling SupAT	21900	5.0 °C - 60.0 °C	35.0 °C
Heating SupAT P component	20084	0.1 K - 999.9 K	33.0 K
Heating SupAT I component	20085	0 s - 9999 s	600 s
Heating SupAT D component	20086	0 s - 9999 s	0 s
Cooling SupAT P component	20088	0.1 K - 999.9 K	33.0 K
Cooling SupAT I component	20089	0 s - 9999 s	600 s
Cooling SupAT D component	20090	0 s - 9999 s	0 s
Heating SupAT min. position	20087	0.0% - 100.0%	10.0%
Cooling SupAT min. position	20091	0.0% - 100.0%	10.0%
Heating SupAT response configuration	21198	0 - 1	0
Cooling SupAT response configuration	21197	0 - 1	0
SupAT activation heating limitation	20522	0 - 1	0
SupAT activation cooling limitation	20521	0 - 1	0
Heating SupAT frost protection limit value	21907	-10.0 °C - 20.0 °C	8.0 °C
Cooling SupAT frost protection limit value	21908	-10.0 °C - 20.0 °C	2.0 °C
Heating SupAT frost protection activation	21905	0 - 1	0
Cooling SupAT frost protection activation	21906	0 - 1	0
SupAT waiting time 4p sequence change	22017	0 min - 300 min	10 min

4.9.5 Group unit parameters

Brief description	ID array(10)	Range	Default
Min. SupAT Day heating SupAT	26902	10.0 °C - 80.0 °C	20.0 °C
Min. SupAT Eco heating SupAT	26904	10.0 °C - 80.0 °C	20.0°C
Min. SupAT Boost heating SupAT	26903	10.0 °C - 80.0 °C	20.0 °C
Max. SupAT Day heating SupAT	25019	10.0 °C - 80.0 °C	40.0 °C
Max. SupAT Eco heating SupAT	25547	10.0 °C - 80.0 °C	40.0 °C
Max. SupAT Boost heating SupAT	25546	10.0 °C - 80.0 °C	40.0 °C
Min. SupAT Day cooling SupAT	25018	5.0 °C - 60.0 °C	15.0 °C
Min. SupAT Eco cooling SupAT	25545	5.0 °C - 60.0 °C	15.0 °C
Min. SupAT Boost cooling SupAT	25544	5.0 °C - 60.0 °C	15.0 °C
Max. SupAT Day cooling SupAT	26899	5.0 °C - 60.0 °C	35.0 °C
Max. SupAT Eco cooling SupAT	26901	5.0 °C - 60.0 °C	35.0 °C
Max. SupAT Boost cooling SupAT	26900	5.0 °C - 60.0 °C	35.0 °C
Heating SupAT P component	25084	0.1 K - 999.9 K	33.0 K

Brief description	ID array(10)	Range	Default
Heating SupAT I component	25085	0 s - 9999 s	600 s
Heating SupAT D component	25086	0 s - 9999 s	0 s
Cooling SupAT P component	25088	0.1 K - 999.9 K	33.0 K
Cooling SupAT I component	25089	0 s - 9999 s	600 s
Cooling SupAT D component	25090	0 s - 9999 s	0 s
Heating SupAT min. position	25087	0.0% - 100.0%	10.0%
Cooling SupAT min. position	25091	0.0% - 100.0%	10.0%
Heating SupAT response configuration	26198	0 - 1	0
Cooling SupAT response configuration	26197	0 - 1	0
Heating SupAT activation limit value	25522	0 - 1	0
SupAT cooling limitation activation	25521	0 - 1	0
SupAT frost protection heating limit value	26907	-10.0 °C - 20.0 °C	8.0 °C
SupAT frost protection cooling limit value	26908	-10.0 °C - 20.0 °C	2.0 °C
SupAT frost protection heating activation	26905	0 - 1	0
SupAT frost protection cooling activation	26906	0 - 1	0

4.9.6 Statuses

Brief description	ID	Range
Heating SupAT activation PID	20530	0 - 1
Cooling SupAT activation PID	20531	0 - 1
Heating SupAT limit active	21200	0 - 1
Cooling SupAT limit active	21199	0 - 1
Heating SupAT signal PID	20108	0.0% - 100.0%
Cooling SupAT signal PID	20109	0.0% - 100.0%
SupAT signal valve continuous heating	20536	0.0% - 100.0%
SupAT signal valve continuous cooling	20537	0.0% - 100.0%
Heating SupAT X-W PID	20102	-999.9 K - 999.9 K
Cooling SupAT X-W PID	20103	-999.9 K - 999.9 K
SupAT setpoint RT SupAT CC min	21909	0.0 °C - 99.9 °C
SupAT setpoint RT SupAT CC max	21910	0.0 °C - 99.9 °C
SupAT setpoint RT SupAT CC 2p/4p heating	21911	0.0 °C - 99.9 °C
SupAT setpoint RT SupAT CC 4p cooling	21912	0.0 °C - 99.9 °C
SupAT setpoint current RT SupAT CC	22016	0.0 °C - 99.9 °C
SupAT setpoint RT SupAT CC current group	22020	0.0 °C - 99.9 °C
SupAT remaining waiting time 4p sequence change Min	22018	0 min - 300 min
SupAT remaining waiting time 4p sequence change Sec	22019	0 s - 59 s

4.9.7 Statuses of units within the group

Brief description	ID array(10)	Range
Heating SupAT activation PID	25530	0 - 1
Cooling SupAT activation PID	25531	0 - 1
Heating SupAT limitation active	26200	0 - 1
Cooling SupAT limitation active	26199	0 - 1
Heating SupAT signal PID	25108	0.0% - 100.0%
Cooling SupAT signal PID	25109	0.0% - 100.0%
SupAT signal valve continuous heating	25536	0.0% - 100.0%
SupAT signal valve continuous cooling	25537	0.0% - 100.0%
Heating SupAT X-W PID	25102	-999.9 K - 999.9 K
Cooling SupAT X-W PID	25103	-999.9 K - 999.9 K
SupAT setpoint RT SupAT CC min	26909	0.0 °C - 99.9 °C
SupAT setpoint RT SupAT CC max	26910	0.0 °C - 99.9 °C
SupAT setpoint RT SupAT CC 2p/4p heating	26911	0.0 °C - 99.9 °C
SupAT setpoint RT SupAT CC 4p cooling	26912	0.0 °C - 99.9 °C
SupAT setpoint current RT SupAT CC	27016	0.0 °C - 99.9 °C

Brief description	ID array(10)	Range
SupAT remaining waiting time 4p sequence change Min	27018	0 min - 300 min
SupAT remaining waiting time 4p sequence change Sec	27019	0 s - 59 s

4.9.8 Faults

The measured value of the SupAT sensor may be outside the valid range, for example, due to a break or short-circuit in the connecting line. A fault is displayed in this case. To limit the supply air temperature, the response can be parametrised as described above and to control the supply air temperature a fixed response is specified.

4.10 Return temperature limitation

In heating mode, the maximum return temperature can be limited and in cooling mode, the minimum return temperature can be limited. However, this can only be used if continuous-acting valves are fitted. A maximum limit value for heating mode and a minimum limit value for cooling mode can be specified. The "Max. RetT heating RetT" and "Min. RetT cooling RetT" are used for this.

The return temperature is limited by calculating a maximum control signal for the valve using a PID control algorithm and by scaling the calculated control variable for the valve accordingly. A PID control algorithm with separate parameters (P, I and D component) is available for the two modes of operation, heating and cooling. The two control algorithms have directly inverse modes of operation. In heating mode, the calculated control variable increases if the limit value is exceeded. In cooling mode, the calculated control variable increases if the limit value is undercut. The minimum control variable of the PID control algorithm is 0%, and the maximum control variable of the PID control algorithm is 100%. Depending on the unit and application, it may be necessary not to completely restrict the water mass flow rate through the valve. The "Heating RetT min. position" and "Cooling RetT min. position" parameters can therefore be used to specify the minimum valve position. The "Heating RetT response configuration" and "Cooling RetT response configuration" parameters can be used to define the response if a fault develops in the return temperature detection, depending on the operating mode (heating or cooling) (see subsection "Faults").
The following responses are possible:
0 = No return temperature limit in the event of a fault
1 = Fan off and valve closed in the event of a fault

The "Return temperature limitation" function can be activated/deactivated for heating mode and cooling mode separately by configuring the parameters "Heating RetT activation" or "Cooling RetT activation" accordingly.

The statuses "Heating RetT activation PID" and "Cooling RetT activation PID" show that the respective control algorithm has been activated.

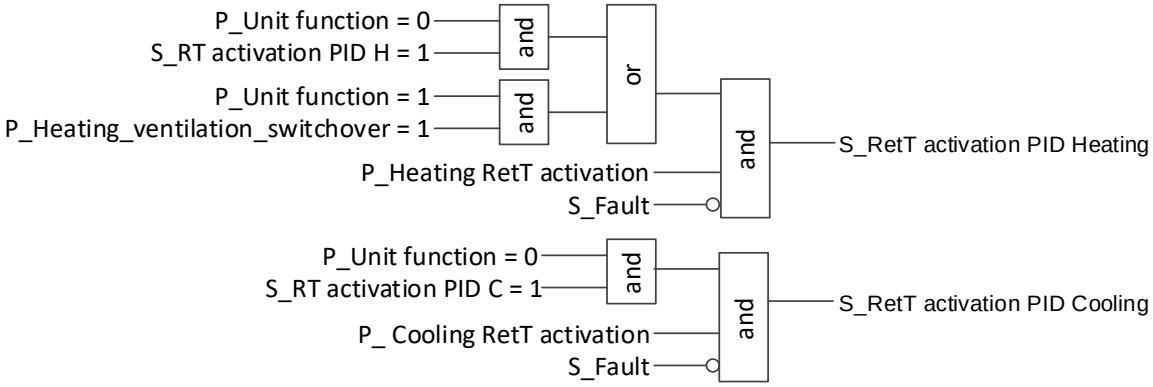
The "Heating RetT active" and “Cooling RetT active" statuses show whether the limit is being actively applied to the control signal for the valve.

The statuses "Heating RetT signal PID" and "Cooling RetT signal PID" show the output signals currently calculated by the PID control algorithm.

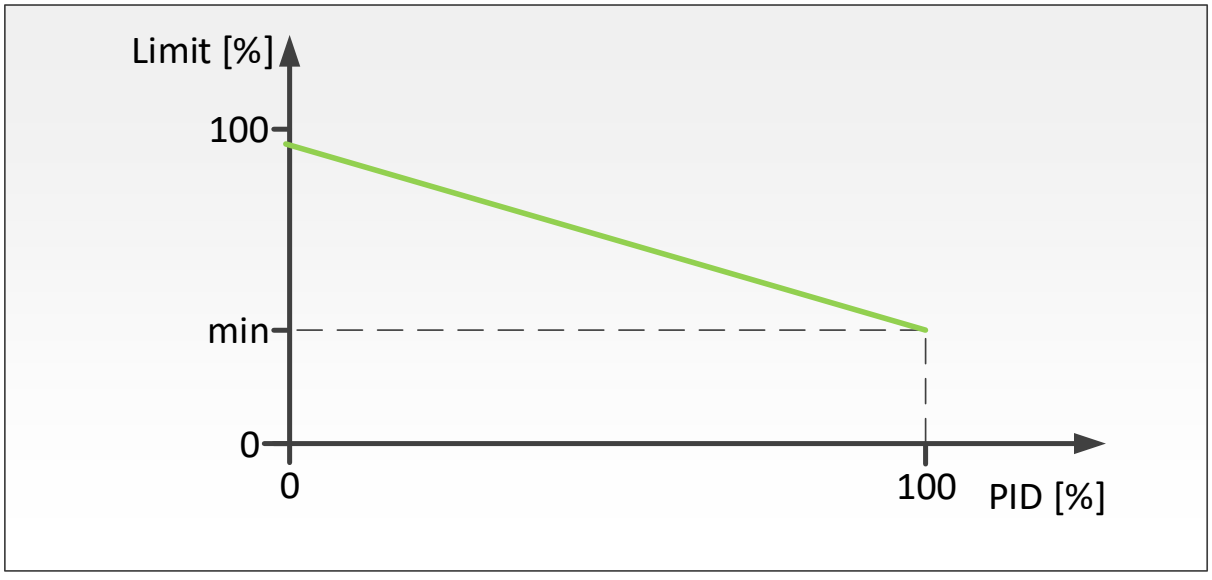
The "RetT signal valve continuous heating" and "RetT signal valve continuous cooling" statuses show the control signals currently calculated for the valves. The calculation is based on the output signals calculated by the PID control algorithm and pending faults according to the fault responses currently configured.

The "Heating RetT X-W PID" and "Cooling "RetT X-W PID" statuses show the control deviations currently calculated.

4.10.1 Activation PID control algorithm RetT limitation



4.10.2 Diagram



4.10.3 Parameters

Brief description	ID	Range	Default
Max. RetT Heating RetT	20550	10.0 °C - 80.0 °C	60.0 °C
Min. RetT Cooling RetT	20549	5.0 °C - 60.0 °C	60.0 °C
Heating RetT P component	20078	0.1 K - 999.9 K	33.0 K
Heating RetT I component	20079	0 s - 9999 s	600 s
Heating RetT D component	20080	0 s - 9999 s	0 s
Cooling RetT P component	20081	0.1 K - 999.9 K	33.0 K
Cooling RetT I component	20082	0 s - 9999 s	600 s
Cooling RetT D component	20083	0 s - 9999 s	0 s
Heating RetT min. position	20560	0.0% - 100.0%	10.0%
Cooling RetT min. position	20559	0.0% - 100.0%	10.0%
Heating RetT response configuration	21226	0 - 1	0
Cooling RetT response configuration	21225	0 - 1	0

Brief description	ID	Range	Default
Heating RetT activation	20520	0 - 1	0
Cooling RetT activation	20519	0 - 1	0

4.10.4 Group unit parameters

Brief description	ID array(10)	Range	Default
Max. RetT Heating RetT	25550	10.0 °C - 80.0 °C	60.0 °C
Min. RetT Cooling RetT	25549	5.0 °C - 60.0 °C	60.0 °C
Heating RetT P component	25078	0.1 K - 999.9 K	33.0 K
Heating RetT I component	25079	0 s - 9999 s	600 s
Heating RetT D component	25080	0 s - 9999 s	0 s
Cooling RetT P component	25081	0.1 K - 999.9 K	33.0 K
Cooling RetT I component	25082	0 s - 9999 s	600 s
Cooling RetT D component	25083	0 s - 9999 s	0 s
Heating RetT min. position	25560	0.0% - 100.0%	10.0%
Cooling RetT min. position	25559	0.0% - 100.0%	10.0%
Heating RetT response configuration	26226	0 - 1	0
Cooling RetT response configuration	26225	0 - 1	0
Heating RetT activation	25520	0 - 1	0
Cooling RetT activation	25519	0 - 1	0

4.10.5 Statuses

Brief description	ID	Range
Heating RetT activation PID	21227	0 - 1
Cooling RetT activation PID	21228	0 - 1
Heating RetT active	21230	0 - 1
Cooling RetT active	21229	0 - 1
Heating RetT signal PID	20596	0.0% - 100.0%
Cooling RetT signal PID	20594	0.0% - 100.0%
RetT signal valve continuous heating	20637	0.0% - 100.0%
RetT signal valve continuous cooling	20636	0.0% - 100.0%
Heating RetT X-W PID	20595	-999.9 K - 999.9 K
Cooling RetT X-W PID	20593	-999.9 K - 999.9 K

4.10.6 Statuses of units within the group

Brief description	ID array(10)	Range
Heating RetT activation PID	26227	0 - 1
Cooling RetT activation PID	26228	0 - 1
Heating RetT active	26230	0 - 1
Cooling RetT active	26229	0 - 1
Heating RetT signal PID	25596	0.0% - 100.0%
Cooling RetT signal PID	25594	0.0% - 100.0%
RetT signal valve continuous heating	25637	0.0% - 100.0%
RetT signal valve continuous cooling	25636	0.0% - 100.0%
Heating RetT X-W PID	25595	-999.9 K - 999.9 K
Cooling RetT X-W PID	25593	-999.9 K - 999.9 K

4.10.7 Faults

Which return temperature sensor is required in each case depends on the hydraulics selected (2p return temperature, 4p heating return temperature, 4p cooling return temperature).
If a "Return temperature limit" is activated, but no multifunctional input is configured as the required corresponding return temperature sensor, the fault "Return temperature limit without RetT sensor" is displayed.

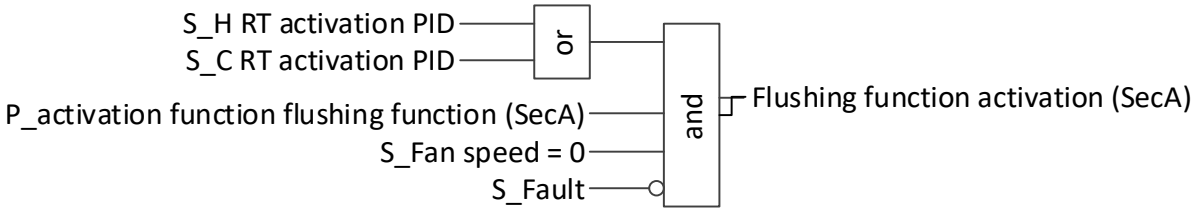
The measured value of the RetT sensor may be outside the valid range, for example, due to a break or short-circuit in the connecting line. A fault is displayed in this case. It is then no longer possible to limit the control signal for the valve, i.e. to limit the return temperature, by means of closed-loop control. The response can be parametrised as described above.

4.11 Fan flushing function (SecA)

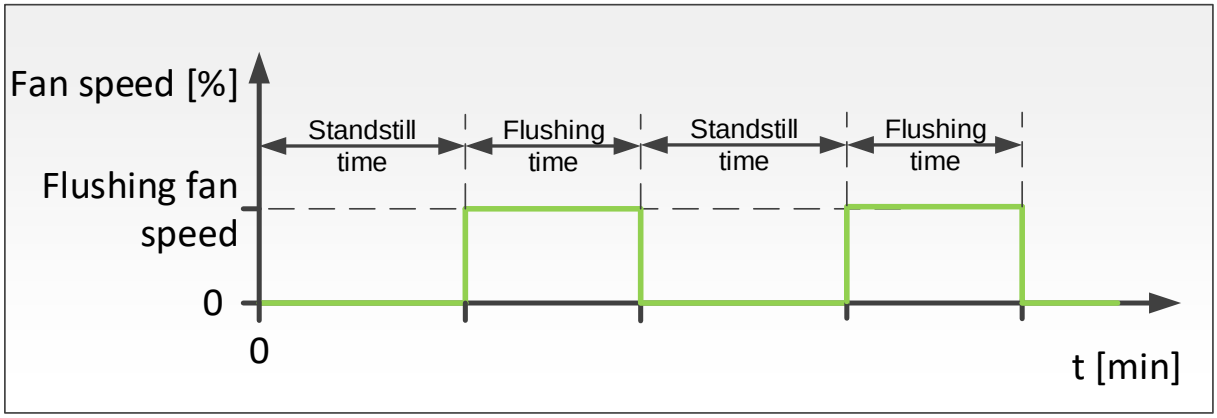
In units, such as chilled water cassettes, the current room temperature can be measured by an intake air sensor. If the fan is not running, the room temperature measured may not be representative due to various factors, such as thermal stratification of the room air, the nature of the unit, or the way in which it is assembled or designed, etc. This can result in the room temperature control not working properly. With the fan flushing function (SecA), the fan is switched on cyclically for a short time so that a representative room temperature can be measured.

The "FSARF standstill time" parameter specifies how long the fan must have been at a standstill before it is switched on.
The "FSARF flushing time" parameter specifies how long the fan is switched on.
The "FSARF flushing fan speed" parameter specifies the speed of the fan when it is switched on.
The "FSARF activation" parameter can generally be used to activate or deactivate the function.
The "FSARF remaining standstill time Min" and "FSARF remaining standstill time Sec" statuses show the remaining standstill time.
The "FSARF remaining flushing time Min" and "FSARF remaining flushing time Sec" statuses show the remaining flushing time.
The "FSARF active" status shows when the fan flushing function (SecA) is active.
The "FSARF standstill active" status shows when the fan (SecA) flushing function is active and is in the "Standstill" phase.
The "FSARF flushing active" status shows when the fan (SecA) flushing function is active and is in the "Flushing" phase.
The "FSARF fan speed signal" status shows the resulting fan speed signal when "SecA fan flushing function" is active in the "Flushing" phase.

4.11.1 Activation



4.11.2 Diagram



4.11.3 Parameters

Brief description	ID	Range	Default
FSARF standstill time	20563	0 min - 900 min	25 min
FSARF flushing time	20566	0 min - 300 min	5 min
FSARF flushing fan speed	20562	0.0% - 100.0%	30.0%
FSARF activation	20561	0 - 1	0

4.11.4 Group unit parameters

Brief description	ID array(10)	Range	Default
FSARF standstill time	25563	0 min - 900 min	25 min
FSARF flushing time	25566	0 min - 300 min	5 min
FSARF flushing fan speed	25562	0.0% - 100.0%	30.0%
FSARF activation	25561	0 - 1	0

4.11.5 Statuses

Brief description	ID	Range
FSARF remaining standstill time Min	20564	0 min - 999 min
FSARF remaining standstill time Sec	20565	0 s - 59 s
FSARF remaining flushing time Min	20567	0 min - 999 min
FSARF remaining flushing time Sec	20568	0 s - 59 s
FSARF active	20569	0 - 1
FSARF standstill active	20570	0 - 1
FSARF flushing active	20571	0 - 1
FSARF fan speed signal	21245	0.0% - 100.0%

4.11.6 Statuses of units within the group

Brief description	ID array(10)	Range
FSARF remaining standstill time Min	25564	0 min - 999 min
FSARF remaining standstill time Sec	25565	0 s - 59 s
FSARF remaining flushing time Min	25567	0 min - 999 min
FSARF remaining flushing time Sec	25568	0 s - 59 s
FSARF active	25569	0 - 1
FSARF standstill active	25570	0 - 1
FSARF flushing active	25571	0 - 1
FSARF fan speed signal	26245	0.0% - 100.0%

4.11.7 Faults

The fan flushing function (SecA) can only work if the room temperature is also measured. If the fan flushing function (SecA) is configured, but no room temperature

detection parameters are set, or if the measured value of the RT sensor is outside the valid range, for instance due to a break or short-circuit in the connection cable, the fault "Room temperature sensor limit value" is displayed and no fan flushing function (SecA) is performed. For safety reasons, the valves "4p H valve" and "2p H/C valve" are opened. More information on this can also be found in section "Room temperature detection".

4.12 Heating/cooling switchover (local)

In two-pipe systems, the selection of the operating mode (heating or cooling) must be predetermined by a heating/cooling switchover, which also controls the supply of the corresponding medium.

The "Operating mode configuration" parameter (see section "Temperature control") defines which operating modes are covered by the respective unit.
This also determines whether the operating mode (heating or cooling) can be preselected by means of "Mode" and whether a heating/cooling switchover must be specified. The following table shows the configurations as well as the resulting options and requirements.

Operating mode configuration	Mode	HC switchover
0 = No heating or cooling operation possible	not possible	not required
1 = 2-pipe heating or cooling	not possible	required
2 = 2-pipe HC heating only	not possible	required
3 = 2-pipe HC cooling only	not possible	required
4 = 4-pipe heating or cooling	possible	not required
5 = 2-pipe, always heating only	not possible	not required
6 = 2-pipe, always cooling only	not possible	not required

The operating mode can be specified via a digital input or BMS interface. When operating modes do not require heating/cooling switchover to be preset, the heating/cooling switchover can be used for winter/summer switchover. This means that separate room temperature setpoints can be configured for the "Day", "Eco" and "Boost" operating programs in "Winter" and "Summer".

In special applications, it may be necessary for heating and cooling units which are supplied with LPHW or CHW via a two-pipe system to define the "Heating" or "Cooling" operating mode by measuring the current supply temperature. This can be the case, for example, if there is no signal line to switch the operating mode from the higher-level control, which also controls the supply of the corresponding medium, to the respective unit.

If several units are coupled by a CAN-bus and are operated together in a group and the "Operating mode configuration" of at least one of the units is set as "1 = 2-pipe heating or cooling", "2 = 2-pipe HC, heating only" or "3 = 2-pipe HC, cooling only", then the operating mode (heating or cooling) must be predetermined by a unit. The corresponding digital input or the ST sensor is connected at one unit and/or the input on the one unit comes from one of its BMS interfaces. The one unit then communicates the current operating mode to the other units in the group via CAN bus.

As soon as the "Operating mode configuration" is set as "1 = 2-pipe heating or cooling", "2 = 2-pipe HC heating only" or "3 = 2-pipe HC cooling only" for at least one unit in the group, the "Incorrect heating cooling configuration fault" is displayed, and the operating mode is fixed as "Heating" or "Winter" if no parameters for HC switchover (via DI, via ST or BMS) are set for any unit.

Regardless of the "Operating mode configuration", a fault is displayed and the operating mode is fixed at "Heating" or "Winter" if the parameters for a HC switchover (via DI, ST or via BMS) are set for more than one unit.

The "HC switchover configuration" parameter must be configured to determine how the operating mode is specified. The following settings are possible:
0 = HC switchover via CAN
1 = HC switchover via DI
2 = HC switchover via ST
3 = HC switchover via BMS

If "HC switchover via BMS" is set, the operating mode can be specified via the parameter "HC switchover BMS input". The "Transition time" and the "Setpoints" that are valid during this time can also be defined. More information can be found in section "Heating and cooling with transition time". The following settings are possible:
1 = Heating
2 = Cooling
3 = Heating transition time
4 = Cooling transition time

If the current supply temperature falls below the value specified via the parameter "Switchover to cooling ST" for the time period specified by the parameter "Switchover waiting time", the system switches to "Cooling" operating mode. Depending on the hydraulic configuration, it may also be necessary to activate the "Valve flushing function (FFV)".

If the current supply temperature exceeds the value specified via the parameter "Switchover to heating ST" for the time period defined via the parameter "Waiting time switchover", the system switches to the "Heating" operating mode. To do so, it may also be necessary to activate the "Valve flushing function" (FFV), depending on the hydraulic configuration.

If a heating/cooling switchover needs to be specified (see table above), the "HC operating mode" status indicates the current operating mode.
0 = Not configured
1 = Heating
2 = Cooling

The status "Switchover to cooling remaining runtime" shows the time remaining until the switchover to "Cooling" operating mode.

The status "Switchover to heating remaining runtime" shows the time remaining until the switchover to "Heating" operating mode.

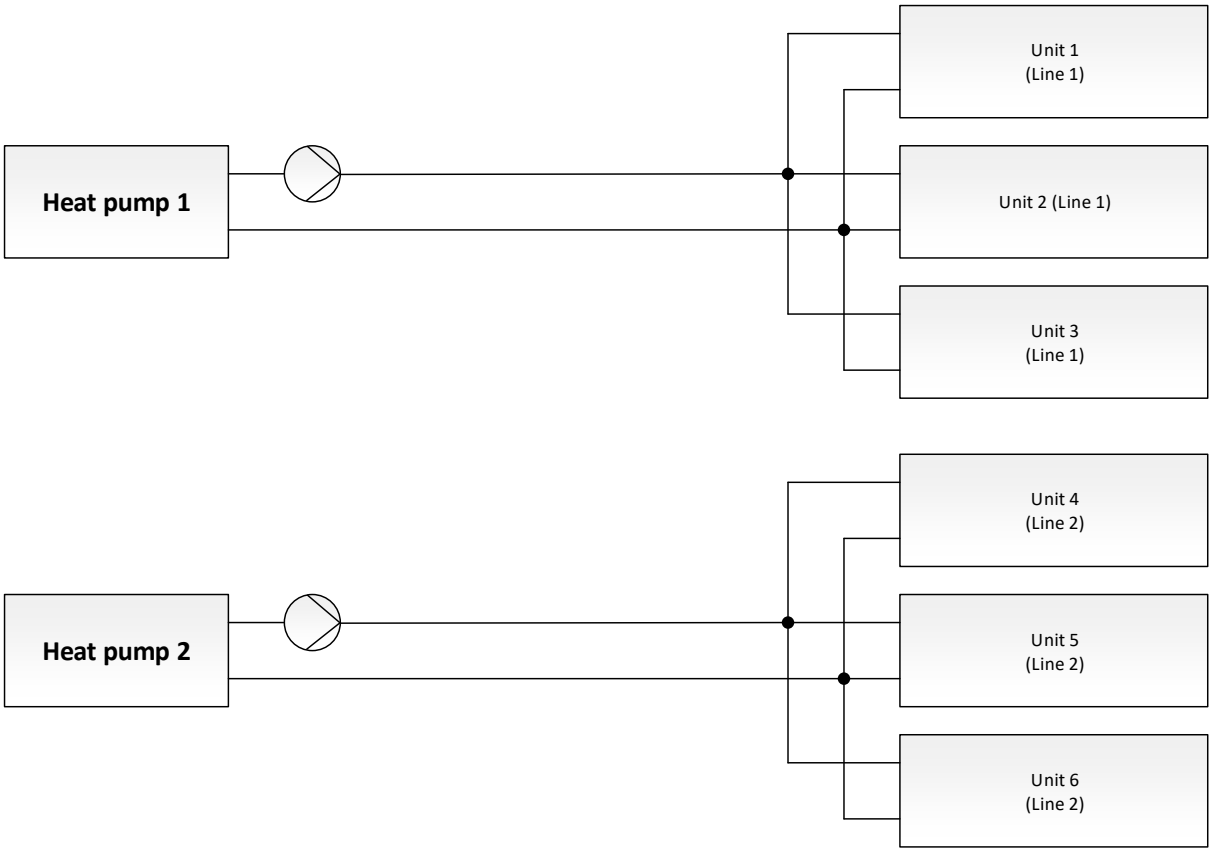
4.12.1 Heating and cooling with transition time

In special cases, heating or cooling units which are supplied with LPHW or CHW via a two-pipe system (operating mode configuration: 1 = 2-pipe heating or cooling), are connected within a group to two different supply lines. Both supply lines are fed by reversible heat pumps which can heat and cool.
The system is designed so that both heat pumps can operate in winter in heating mode and deliver LPHW to all units in the group via both supply lines. All units in the group can then heat.
In summer, both heat pumps can be operated in cooling mode and deliver CHW to all units in the group via both supply lines. All units in the group can then cool.
In the transitional periods, one heat pump can operate in heating mode and the other heat pump can operate in cooling mode. LPHW is supplied to units within the group on one supply line for heating purposes, the units within the group on the other supply line are supplied with CHW for cooling purposes.
This means that all units within the group can provide heating with heat output from both heat pumps in the winter. In summer all units within the group can provide cooling with maximum cooling output from both heat pumps. In the transitional period, some units within the group can provide heating with the heat output from the one heat pump, while other units within the group can provide cooling with the cooling output from the other heat pump.

It is therefore possible to provide heating only in winter mode and cooling only in summer mode, but heating or cooling is possible during the transitional months.

In winter mode, in summer mode and in the transitional months, only the four-pipe room temperature setpoints apply.

The following figure shows an example of the hydraulic integration:



The "Heating/cooling/transitional time" function or default setting is only possible in conjunction with a System Controller or higher-level BMS (ModBus/BACnet), which also controls the necessary switchover of the heat pumps. For this purpose, the parameter "HC switchover configuration" for one unit in the group (see above) must be set to "3 = HC switchover via BMS".

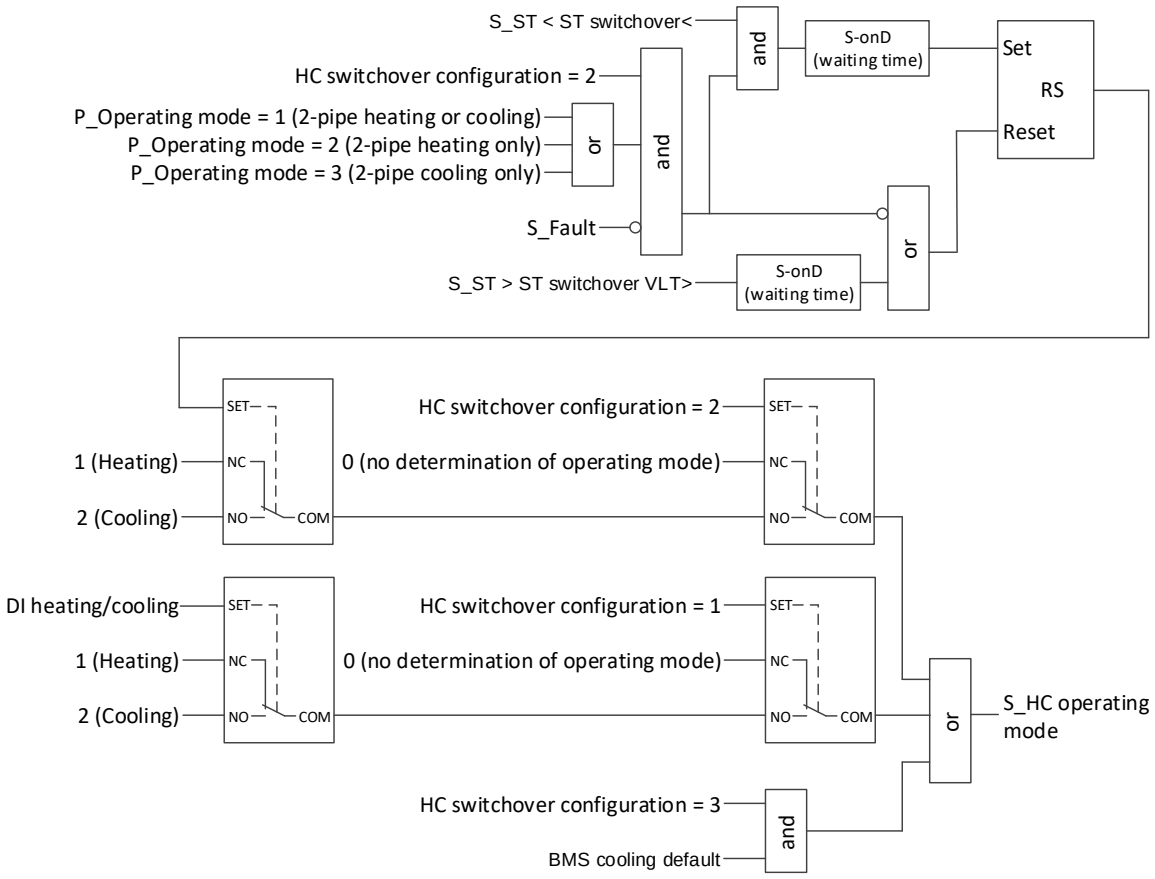
Using the "HC operating mode configuration" parameter, it is necessary to for each unit within the group which supply line or heat pump it is connected to. In other words, whether it is a heating unit or a cooling unit during the transitional period. The following settings are possible:
0 = Not defined
1 = Heating unit
2 = Cooling unit

The System Controller or higher-level BMS specifies the operating mode via the "HC switchover BMS input" parameter (see above). This results in the following relationships with the "HC configuration" parameter settings:

HC operating mode configuration	**HC switchover BMS input**	**Operating mode configuration automatically set continuously**
0 = Not defined	1 = Heating	No definition
	2 = Cooling	No definition
	3 = Heating transitional time	No definition
	4 = Cooling transitional time	No definition
1 = Heating unit	1 = Heating	5 = 2-pipe always heating only (H SW)
	2 = Cooling	6 = 2-pipe always cooling only (C SW)

HC operating mode configuration	HC switchover BMS input	Operating mode configuration automatically set continuously
	3 = Heating transitional time	5 = 2-pipe, always heating only (H SW)
	4 = Cooling transitional time	5 = 2-pipe always heating only (C SW)
2 = Cooling unit	1 = Heating	5 = 2-pipe always heating only (H SW)
	2 = Cooling	6 = 2-pipe always cooling only (C SW)
	3 = Heating transitional time	6 = 2-pipe always cooling only (H SW)
	4 = Cooling transitional time	6 = 2-pipe always cooling only (C SW)

4.12.2 Activation



4.12.3 Parameters

Brief description	ID	Range	Default
HC switchover configuration	20665	0 - 3	0
HC operating mode configuration	21827	0 - 2	0
HC switchover BMS input	20680	1 - 4	1
Switchover to cooling ST	20668	0.0 °C - 60.0 °C	18.0 °C
Switchover to heating ST	20667	0.0 °C - 60.0 °C	28.0 °C
Switchover waiting time	20669	0 s - 300 s	30 s

4.12.4 Group unit parameters

Brief description	ID array(10)	Range	Default
HC switchover configuration	25665	0 - 3	0
HC operating mode configuration	26827	0 - 2	0

4.12.5 Statuses

Brief description	ID	Range
HC operating mode	20666	0 - 2
Switchover to cooling remaining runtime	20671	0 s - 999 s
Switchover to heating remaining runtime	20670	0 s - 999 s

4.12.6 Faults

If "HC switchover via ST" is activated although a multifunctional input is not configured as "2p supply temperature", the "Supply temperature monitoring without ST sensor" fault is displayed.

The measured value of the ST sensor outside the valid range, for example, due to a break or short-circuit in the connecting line. A fault is displayed in this case. Correct detection of the available medium is then no longer possible. In the event of a fault, the status "Operating mode by ST" is defined as the "Heating" operating mode.

4.13 Valve flushing function (FFV)

If the operating mode (heating or cooling) is switched over based on the measurement of the current supply temperature, but only shut-off valves as opposed to three-way valves are fitted, there may be no water mass flow and therefore no temperature change of the LPHW or CHW. The parameters of the valve flushing function (FFV) can be set so the operating mode (heating or cooling) switches over according to the supply temperature.
As a result, the valve is cyclically activated or opened for a short adjustable time in order to measure a representative supply temperature.

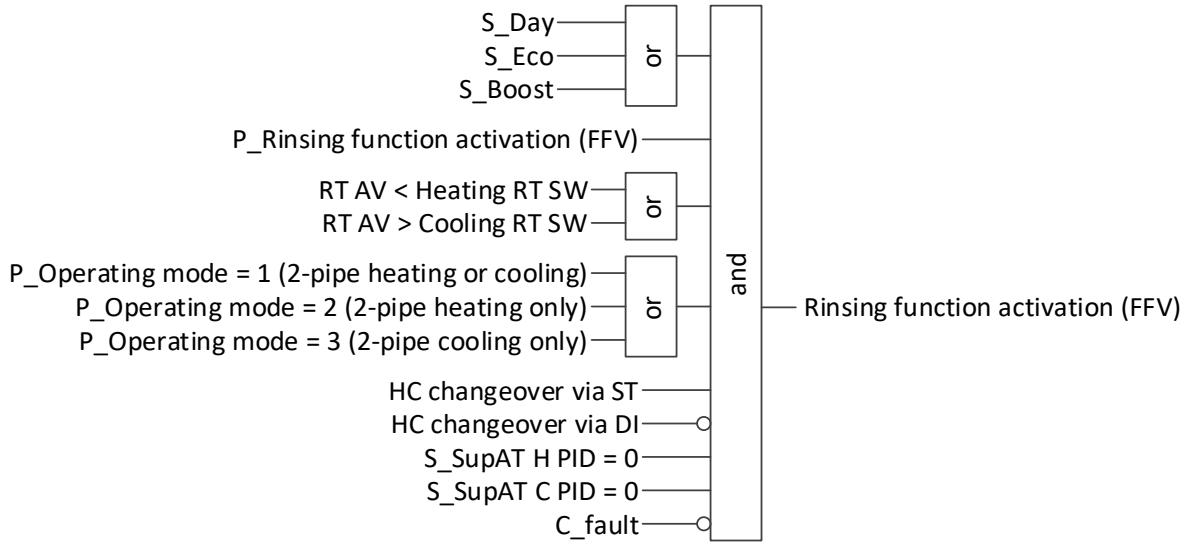
The "PRF HCW standstill time" parameter specifies how long the valve must have been closed before it is opened.
The "PRF HCW standstill time" parameter specifies how long the valve is opened.
The "PRF HCW flushing opening" parameter specifies how far a continuous-acting valve is opened.
The "PRF HCW activation" parameter can generally be used to activate or deactivate the function.
The "PRF HCW remaining standstill time Min" and "PRF HCW remaining standstill time Sec" statuses indicate how much standstill time is left.
The "PRF HCW remaining flushing time Min" and "PRF HCW remaining flushing time Sec" statuses indicate how much flushing time is left.
The "PRF HCW active" status indicates when the valve flushing function (FFV) is active.
The "PRF HCW standstill active" status indicates when the valve flushing function (FFV) is active and is in the "Standstill" phase.
The "PRF HCW flushing active" status indicates when the valve flushing function (FFV) is active and is in the "Flushing" phase.
The "PRF HCW valve signal" status shows the valve opening resulting from the active "Valve flushing function (FFV)" in the "Flushing" phase.

The flushing process is also only performed in the heating operating mode when there is a need for cooling, or in the cooling operating mode when there is a need for heating.

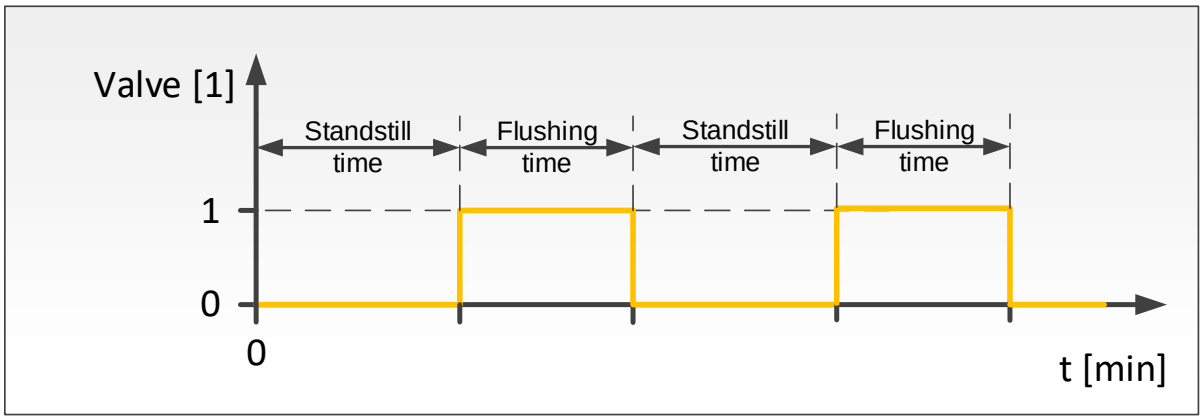
No heating or cooling demand is set during the flushing process!

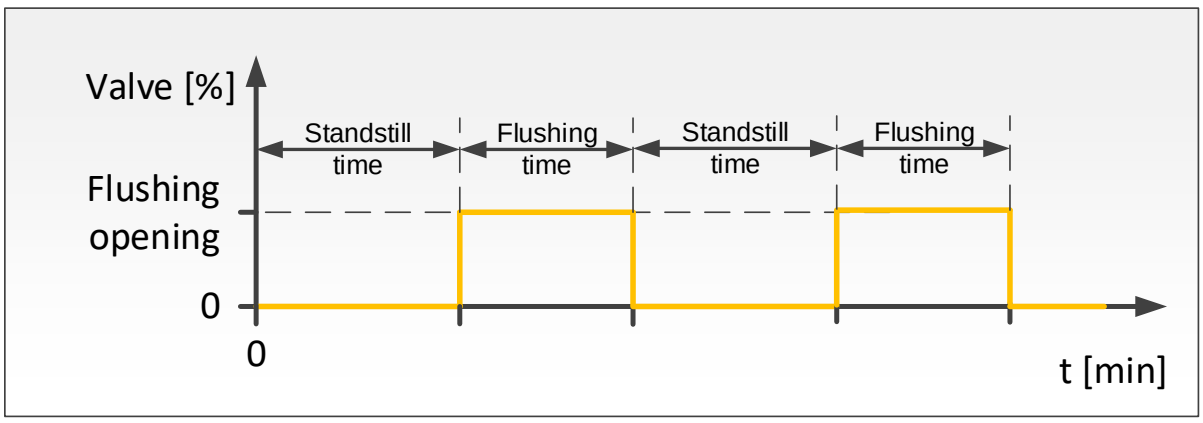
Attention: This function may cause unwanted heating or cooling due to natural convection.

4.13.1 Activation



4.13.2 Diagram





4.13.3 Parameters

Brief description	ID	Range	Default
PRF HCW standstill time	20574	0 min - 900 min	25 min
PRF HCW flushing time	20577	0 min - 300 min	5 min
PRF HCW flushing opening	20573	0.0% - 100.0%	30.0%
PRF HCW activation	20572	0 - 1	0

4.13.4 Group unit parameters

Brief description	ID array(10)	Range	Default
PRF HCW standstill time	25574	0 min - 900 min	25 min
PRF HCW flushing time	25577	0 min - 300 min	5 min
PRF HCW flushing opening	25573	0.0% - 100.0%	30.0%
PRF HCW activation	25572	0 - 1	0

4.13.5 Statuses

Brief description	ID	Range
PRF HCW remaining standstill time Min	20575	0 min - 999 min
PRF HCW remaining standstill time Sec	20576	0 s - 59 s
PRF HCW remaining flushing time Min	20578	0 min - 999 min
PRF HCW remaining flushing time Sec	20579	0 s - 59 s
PRF HCW active	20580	0 - 1
PRF HCW standstill active	20581	0 - 1
PRF HCW flushing active	20582	0 - 1
PRF HCW valve signal	21246	0.0% - 100.0%

4.13.6 Statuses of units within the group

Brief description	ID array(10)	Range
PRF HCW remaining standstill time Min	25575	0 min - 999 min
PRF HCW remaining standstill time Sec	25576	0 s - 59 s
PRF HCW remaining flushing time Min	25578	0 min - 999 min
PRF HCW remaining flushing time Sec	25579	0 s - 59 s
PRF HCW active	25580	0 - 1
PRF HCW standstill active	25581	0 - 1
PRF HCW flushing active	25582	0 - 1
PRF HCW valve signal	26246	0.0% - 100.0%

4.13.7 Faults

The measured value of the ST sensors may be outside the valid range due to a break or short-circuit in the connecting line, for example. In this case, a fault is displayed and the valve flushing function (FFV) is not executed.

4.14 Supply temperature monitoring

Supply air monitoring can be used to deactivate the fan in secondary air units when the supply temperature is too low for heating, or too high for cooling. This prevents the fan motor in secondary air units from running when no heat or cold is available.

Supply air monitoring can be used to deactivate the fan in door air curtains when the supply temperature is too low for heating. This prevents the fan motor of door air curtains from running when there is no heat available.
If multiple secondary air units or door air curtains are coupled by means of a CAN-bus and are operated together in a group, the supply temperature can only be monitored at one secondary air unit or door air curtain, at selected secondary air units or door air curtains, or at each secondary air unit or door air curtain. The parameters of secondary air units or door air curtains without supply air monitoring can be set so they take the supply temperature monitoring of the other secondary air units or door air curtains within the group into consideration. In this case, secondary air units or door air curtains without supply temperature monitoring are locked as soon as at least one secondary air unit or door air curtain with supply temperature monitoring is locked.

The "Heating STM limit value" and "Heating STM hysteresis" parameters specify how high the supply temperature needs to be for the fan to be active in heating mode.
The "Heating STM activation" parameter can be used to activate or deactivate the "Heating supply temperature monitoring" function, and define whether supply temperature monitoring is to be performed using a proprietary supply temperature sensor, or whether the supply temperature monitor of another secondary air unit within the group is to be used. The following settings are possible:
0 = Not activated
1 = On the unit
2 = By other units

The "Cooling STM limit value" and "Cooling STM hysteresis" parameters specify how low the supply temperature must be in order for the fan to be activated in cooling mode.
The "Cooling supply temperature monitoring" function can be activated or deactivated separately it can also be specified whether supply temperature monitoring is to be performed using a proprietary supply temperature sensor or via another secondary air unit equipped with supply temperature monitoring within the group by configuring the "Cooling STM activation" parameter. The following settings are possible:
0 = Not activated
1 = On the unit
2 = By other units

The "Heating STM lock" and "Cooling STM lock" statuses show whether supply temperature monitoring is currently active and the fan is deactivated or locked.

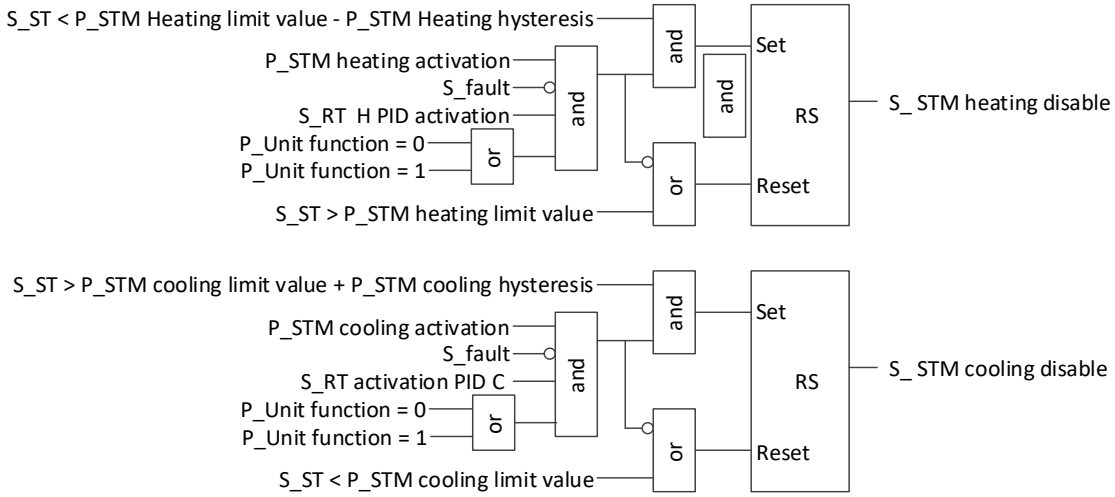
Supply temperature monitoring can be used to suppress the outside air requirement in primary air units if the outside temperatures are too low. This prevents the unintentional triggering of the frost protection fault due to delays in the heat supply, possibly caused by valve running times and long pipelines.

If multiple primary air units are coupled by means of a CAN-bus and operated together in a group, the supply temperature can be monitored at only one primary air unit, at selected primary air units, or at each primary air unit. However, the outside air requirement is suppressed for all primary air units in the group until the set limit values are reached at all primary air units in which supply temperature monitoring parameters are set!

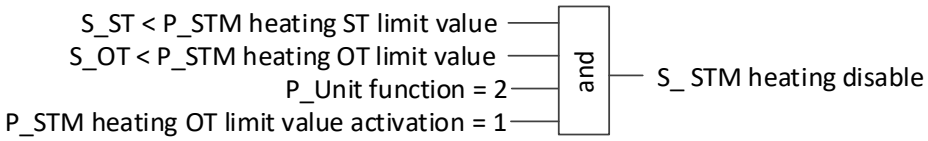
The "Heating OT STM limit value" parameter specifies how far the outside temperature limit must be undercut before supply air temperature monitoring is performed.
The "Heating ST STM limit value" parameter specifies how much the supply temperature must be exceeded before the outside air requirement is suppressed.
The "Heating OT STM activation limit value" parameter can be used to activate or deactivate supply temperature monitoring.
The "Heating STM lock" status shows whether supply temperature monitoring is currently active and the outside air requirement is suppressed.

Note: supply temperature monitoring cannot be provided if the default "Mode" for four-pipe systems (see section "Temperature control") is set to "2 = Cooling"!

4.14.1 Activation of secondary air units and door air curtains



4.14.2 Activation of primary air units



4.14.3 Parameters

Brief description	ID	Range	Default
Heating STM activation	20683	0 - 2	0
Heating STM limit value	20684	0.0 °C - 60.0 °C	28.0 °C
Heating STM hysteresis	20685	0.0 K - 10.0 K	3.0 K
Cooling STM activation	20687	0 - 2	0
Cooling STM limit value	20688	0.0 °C - 60.0 °C	18.0 °C
Cooling STM hysteresis	20689	0.0 K - 10.0 K	3.0 K
Heating ST STM limit value	21913	0.0 °C - 60.0 °C	32.0 °C
Heating OT STM limit value	21914	-20.0 °C - 60.0 °C	12.0 °C
Heating OT STM activation limit value	21915	0 - 1	1

4.14.4 Group unit parameters

Brief description	ID array(10)	Range	Default
Heating STM activation	25683	0 - 2	0
Heating STM limit value	25684	0.0 °C - 60.0 °C	28.0 °C
Heating STM hysteresis	25685	0.0 K - 10.0 K	3.0 K
Cooling STM activation	25687	0 - 2	0
Cooling STM activation	25688	0.0 °C - 60.0 °C	18.0 °C
Cooling STM hysteresis	25689	0.0 K - 10.0 K	3.0 K
Heating ST STM limit value	26913	0.0 °C - 60.0 °C	32.0 °C
Heating OT STM limit value	26914	-20.0 °C - 60.0 °C	12.0 °C
Heating OT STM activation limit value	26915	0 - 1	1

4.14.5 Statuses

Brief description	ID	Range
Heating STM disable	20686	0 - 1
Cooling STM disable	20690	0 - 1

4.14.6 Statuses of units within the group

Brief description	ID array(10)	Range
Heating STM disable	25686	0 - 1
Cooling STM disable	25690	0 - 1

4.14.7 Faults

Which supply temperature sensor is required depends on the selected hydraulic configuration (2p supply temperature, 4p heating supply temperature, 4p cooling supply temperature).
The "Supply temperature monitoring without ST sensor" fault is displayed if "Supply air monitoring using a proprietary supply temperature sensor" is activated, but no multifunctional input is configured as corresponding supply temperature sensor.
The measured value of the ST sensors may be outside the valid range due to a break or short-circuit in the connecting line, for example. In this case, a fault is displayed, and supply temperature monitoring is not carried out.

4.15 Valve anti-sieze protection

Valves can become stuck if they are not opened for several weeks. This can be prevented by opening them every week for a short time.
The “VASP weekday" parameter defines the day of the week on which the valve is opened. The following settings are possible:
0 = Sunday
1 = Monday
2 = Tuesday
3 = Wednesday
4 = Thursday
5 = Friday
6 = Saturday
The "VASF hour" and "VASF minute" parameters define the time at which the valve is opened.
The "VASF runtime" parameter defines how long the valve is opened.
The "VASF active" status indicates that the valve anti-seize function is activated, and the valve is being actuated.
The "VASF signal (continuous)" indicates that the continuous-acting valve is open due to the active valve anti-seize function.
The "Remaining VASF runtime" status indicates the remaining actuation time due to the valve anti-seize function.
The "VASF activation" parameter can generally be used to activate or deactivate the function.

When defining the runtime, bear in mind that, unlike electro-mechanical actuators, thermoelectric actuators take several minutes to open!

When the anti-seize function is active, continuous servo-drives are actuated at 100%.

Attention: this may cause unwanted heating or cooling due to natural convection. The function enables two-pipe units through which there should only be a flow in heating mode but are connected to a two-pipe system for heating and cooling also briefly to have a flow in the cooling mode. The function also enables two-pipe units through which there should only be a flow in cooling mode but are connected

to a two-pipe system for heating and cooling to also briefly have a flow in heating mode. In four-pipe units, the function can briefly cause flow through the heating coil and cooling coil simultaneously.

4.15.1 Parameters

Brief description	ID	Range	Default
VASF weekday	20584	0 - 6	0
VASF hour	20585	0 - 23	2
VASF minute	20586	0 - 59	0
VASF runtime	20587	0 s - 900 s	20 s
VASF activation	20583	0 - 1	0

4.15.2 Group unit parameters

Brief description	ID array(10)	Range	Default
VASF runtime	25587	0 s - 900 s	20 s

4.15.3 Statuses

Brief description	ID	Range
VASF active	20589	0 - 1
VASF signal (constant)	21235	0.0% - 100.0%
Remaining VASF runtime	20588	0 s - 9999 s

4.15.4 Statuses of units within the group

Brief description	ID array(10)	Range
VASF active	25589	0 - 1
VASF signal (constant)	26235	0.0% - 100.0%
Remaining VASF runtime	25588	0 s - 9999 s

4.16 Room frost protection

Similar to a radiator thermostat, it may be necessary to activate the heating system (room frost protection) when the temperature falls below a certain temperature when switched off (e.g. operating program "Off"), but generally independently of the current operating program. The "RFP setpoint" and "RFP hysteresis" parameters specify the room temperature to be maintained. The fan is activated at a fixed fan speed that can be set using parameter "RFP fan speed". The heating valve opens fully.

Room frost protection can only work if heating medium is also available. The "Operating mode configuration" (see section "Temperature control") defines which operating modes are essentially covered by the respective unit. This also determines whether room frost protection can work.
The following table shows the configurations as well as the resulting options and conditions.

Operating mode configuration	**Room frost protection**
0 = No heating or cooling operation possible	not possible
1 = 2-pipe heating or cooling	only possible when HC operating mode is set to "Heating"
2 = 2-pipe HC heating only	only possible when HC operating mode is set to "Heating"
3 = 2-pipe HC cooling only	not possible

Operating mode configuration	Room frost protection
4 = 4-pipe heating or cooling	generally always possible
5 = 2-pipe, always heating only	generally always possible
6 = 2-pipe, always cooling only	not possible

4.16.1 Parameters

Brief description	ID	Range	Default
RFP setpoint	20660	0.0 °C - 60.0 °C	8.0 °C
RFP hysteresis	20661	0.0 K - 9.9 K	0.5 K
RFP fan speed	20662	0.0% - 100.0%	50.0%
RFP activation	20663	0 - 1	1

4.16.2 Statuses

Brief description	ID	Range
RFP active	20664	0 - 1
RFP signal	21234	0.0% - 100.0%

4.16.3 Statuses of units within the group

Brief description	ID array(10)	Range
RFP active	25664	0 - 1
RFP signal	26234	0.0% - 100.0%

4.16.4 Faults

The "Room frost protection" function can only work if the room temperature is also measured. If the "Room frost protection" function is configured, but no room temperature detection parameters have been set, or if the measured value of the RT sensor is outside the valid range for example due to a break or a short-circuit in the connection cable, the "Room temperature sensor limit value" fault is displayed and the "Room frost protection" function is not carried out. The valves "4p H valve" and "2p H/C valve" are opened as a precaution. For more information refer to section "Room temperature detection".

4.17 Door air curtains

Door air curtains are special types of secondary air units, as they are operated independently of the room temperature and with a constant fan speed. Optionally, they can be operated with a closed valve (ventilation) or with the valve open (heating). A supply air temperature limit can also be set with the version with continuous-acting valve.

The fan speed is specified by manually selecting a fan stage or automatically depending on the operating program. The specified fan speed depending on the operating program can be configured via the parameters mentioned in section "Fan speed signal conversion" (Day heating max fan speed, Eco heating max fan speed, Boost heating max fan speed, Day cooling max fan speed, Eco cooling max fan speed, Boost cooling max fan speed). In this case, the "Cooling" parameters apply to "Ventilation".

The hydraulic integration of a door air curtain must be set using the "Operating mode configuration" parameter, as described in section "Temperature control". Only two settings are permitted for door air curtains. Either "2-pipe always heating only" ("Heating" and "Ventilation" are always possible), or "2-pipe HC heating only"

("Ventilation" is always possible, and "Heating" only when heating/cooling switchover is set to "Heating"). With any other settings, only "Ventilation" is possible!

The fan speed could possibly be increased via a digital input by switching to another operating program with corresponding parameter settings (e.g. Boost mode).

Back-up mode could possibly be effected by the use of the room frost protection function. Only then is room temperature detection also required.

The "Heating ventilation switchover" parameter defines the operating mode. The following settings are possible:
1 = Heating
2 = Ventilation

If several units are coupled by means of a CAN-bus and operated together in a group, the parameters "Door air curtain function" and "Heating ventilation switchover" generally apply and cannot be individually set for each unit. This means that either all the units in the group work as door air curtains or all the units in the group work as "normal" secondary air units or primary air units.

4.17.1 Parameters

Brief description	ID	Range	Default
Heating ventilation switchover	20673	1 - 2	1

4.18 Outside temperature-dependent activation

Especially when using door air curtains, but also in exceptional cases when using secondary air units, it may be necessary to inhibit the fan speed control or valve control.

The "Heating OT inhibit" and "Heating OT hysteresis inhibit" define the outside temperature above which the heating valve is no longer controlled. The function can be activated or deactivated via the parameter "Heating OT activation inhibit".

The "Ventilation H OT inhibit" and "Ventilation H OT hysteresis inhibit" parameters define the outside temperature above which the fan is no longer controlled. The function can be activated or deactivated by the parameter "Ventilation H OT activation inhibit".

The "Cooling OT inhibit" and "Cooling OT hysteresis inhibit" parameters define the outside temperature below which the cooling valve is no longer actuated. The function can be activated or deactivated via the parameter "Cooling OT activation inhibit".

The "Ventilation C OT inhibit" and "Ventilation C OT hysteresis inhibit" parameters define the outside temperature below which the fan is no longer actuated. The function can be activated or deactivated using the "Ventilation C OT activation inhibit" parameter.

The "Heating OT inhibit OT active" status indicates that the outside temperature is so high that the heating valve is no longer actuated.
The "Ventilation H OT inhibit OT active" status indicates that the outside temperature is so high that the fan is no longer actuated.

The "Cooling OT inhibit OT active" status indicates that the outside temperature is so low that the cooling valve is no longer actuated.
The "Ventilation C OT inhibit OT active" status indicates that the outside temperature is so low that the fan is no longer actuated.

4.18.1 Parameters

Brief description	ID	Range	Default
Heating OT inhibit	20676	0.0 °C - 60.0 °C	20.0 °C
Heating OT hysteresis inhibit	20677	0.0 K - 9.9 K	0.5 K
Heating OT activation inhibit	20674	0 - 1	0
H ventilation OT inhibit	20678	0.0 °C - 60.0 °C	25.0 °C
H ventilation OT hysteresis inhibit	20679	0.0 K - 9.9 K	0.5 K
H ventilation OT activation inhibit	20675	0 - 1	0
Cooling OT inhibit	20694	0.0 °C - 60.0 °C	20.0 °C
Cooling OT hysteresis inhibit	20695	0.0 K - 9.9 K	0.5 K
Cooling OT activation inhibit	20692	0 - 1	0
C ventilation OT inhibit	20696	0.0 °C - 60.0 °C	15.0 °C
C ventilation OT hysteresis inhibit	20697	0.0 K - 9.9 K	0.5 K
C ventilation OT activation inhibit	20693	0 - 1	0

4.18.2 Statuses

Brief description	ID	Range
Heating OT inhibit OT active	20681	0 - 1
Cooling OT inhibit OT active	20698	0 - 1
H ventilation OT inhibit OT active	20682	0 - 1
C ventilation OT inhibit OT active	20699	0 - 1

4.18.3 Statuses of units within the group

Brief description	ID array(10)	Range
Heating OT inhibit OT active	25681	0 - 1
Cooling OT inhibit OT active	25698	0 - 1
H ventilation OT inhibit OT active	25682	0 - 1
C ventilation OT inhibit OT active	25699	0 - 1

4.18.4 Faults

The "Outside temperature-dependent activation" function can only work if the outside temperature is also detected. If the "Outside temperature-dependent activation" function is configured, but no outside temperature detection parameters have been set, or if the measured value of the RT sensor is outside the valid range due to a break or short-circuit in the connecting cable for example, the "Outside temperature limit value sensor" fault is displayed and the "Outside temperature-dependent activation" function is not performed. More information on this can also be found in section "Outside temperature detection".

4.19 Six-way valve

Six-way valves can be used to connect and operate two-pipe units for heating and cooling to a four-pipe network. The valve actuator is controlled via a 0-10V control signal that incorporates both the cooling medium (CHW) and also heating medium (LPHW) requirement. The coding of the signal can be programmed. Both the control range and the mode of operation can be individually adapted. It is therefore possible to determine whether 100% of the heating medium passes through when the actuator is controlled by the six-way valve with a 0% signal,

and whether 100% of the cooling medium passes through when the valve is actuated with a 100% signal, or vice-versa.

The "Hmax" and "Hmin" parameters can be used to define the control range of the actuator for heating medium (LPHW).

The "Cmax" and "Cmin" parameters can be used to define the control range of the actuator for cooling medium (CHW).

The following two diagrams show the parameters and elucidate the principle of operation.

The following conditions must be met, otherwise the fault "Incorrect six-way valve configuration" will be displayed and a control voltage of 0% output:

- Hmax < Hmin < Cmin < Cmax
- Cmax < Cmin < Hmin < Hmax

The parameter settings must be carefully chosen to define a control voltage for each status.

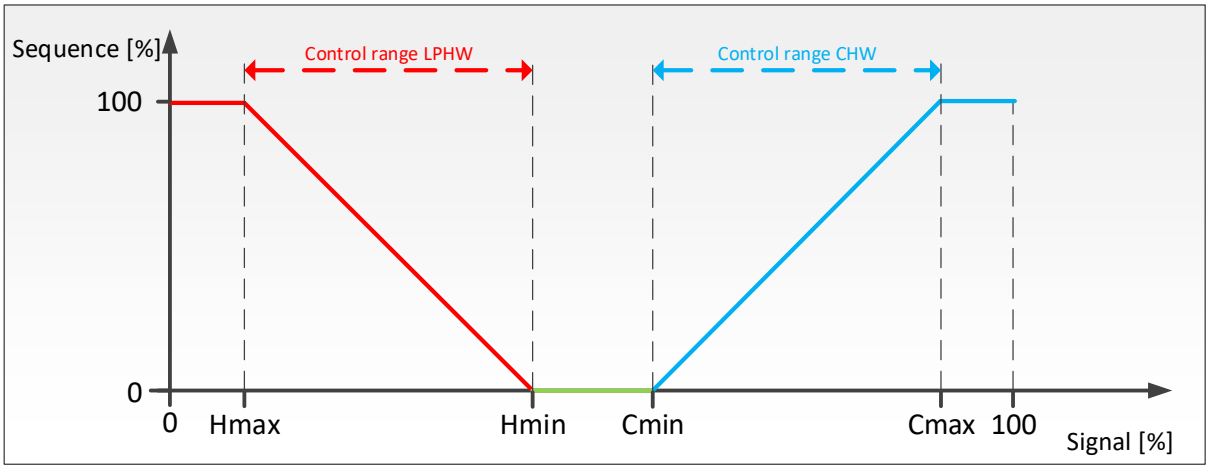
If cooling medium (CHW) or heating medium (LPHW) is not required, the control voltage is output according to the "mean" value obtained from "Cmin" and "Hmin". The following applies: when Hmax < Hmin < Cmin < Cmax

- Control voltage = Hmin + ((Cmin – Hmin) / 2)
- if Cmax < Cmin < Hmin < Hmax
  Control voltage = Cmin + ((Hmin – Cmin) / 2)

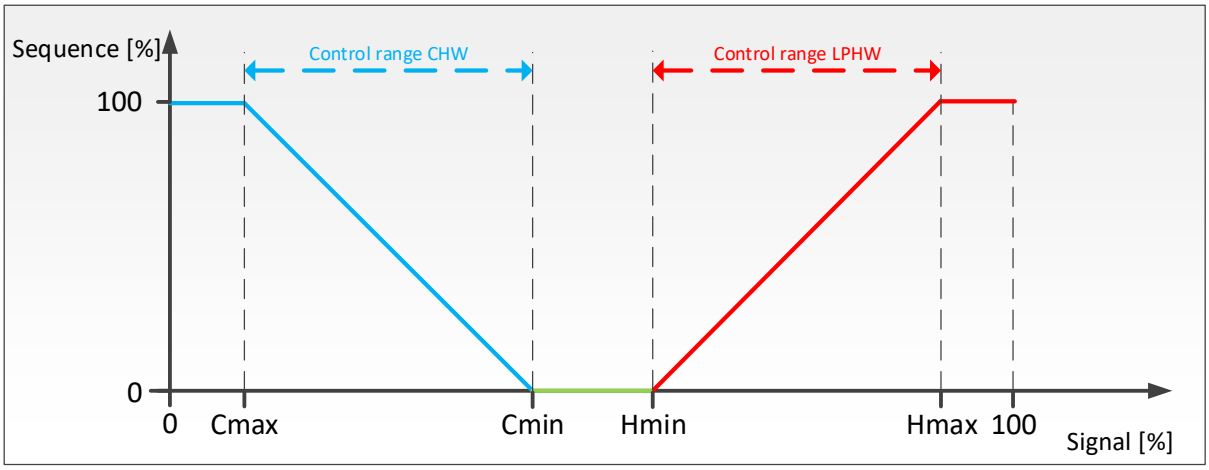
If cooling medium (CHW) and heating medium (LPHW) are required at the same time, only the heating medium requirement (LPHW) is taken into account, regardless of the percentage.

To use a "six-way valve", the "Operating mode configuration" (see section "Temperature control") must be "4 = 4-pipe heating or cooling".

4.19.1 Diagram (0% heating, 100% cooling)



4.19.2 Diagram (0% cooling, 100% heating)



4.19.3 Parameters

Brief description	ID	Range	Default
S-wV Hmin	21247	0.0% - 100.0%	33.0%
S-wV Hmax	21248	0.0% - 100.0%	3.0%
S-wV Cmin	21249	0.0% - 100.0%	67.0%
S-wV Cmax	21250	0.0% - 100.0%	97.0%

4.19.4 Group unit parameters

Brief description	ID array(10)	Range	Default
S-wV Hmin	26247	0.0% - 100.0%	33.0%
S-wV Hmax	26248	0.0% - 100.0%	3.0%
S-wV Cmin	26249	0.0% - 100.0%	67.0%
S-wV Cmax	26250	0.0% - 100.0%	97.0%

4.19.5 Statuses

Brief description	ID	Range
S-wV signal	21251	0.0% - 100.0%

4.19.6 Statuses of units within the group

Brief description	ID array(10)	Range
S-wV signal	26251	0.0% - 100.0%

4.20 Room temperature detection

The room temperature can be detected by a sensor at the analogue input of the unit, by a sensor in the display (TP2) or by the building management system. If several units are coupled by means of a CAN-bus and operated together in a group, the room temperature can be detected by a sensor at the analogue input of each unit, or only at one unit in the group. The room temperature can also be detected via the building management system at each unit or only at one unit in the group.

If the room temperature is detected at only one unit in the group or by a sensor in the display (TP2), the respective unit or the display (TP2) sends the actual room temperature value to the other units in the group via CAN bus.

Room temperature detection is only required for door air curtains when the “Room frost protection” function is enabled.

The system can be set to detect the room temperature via the parameter "RT detection configuration":
0 = CAN bus
1 = Detection via a sensor on the unit
2 = Input by the BMS

If there is a display (TP2) in the group and room temperature detection is set as "CAN bus" for all units in the group, the value determined by the sensor of the display (TP2) is used as the control variable for all units in the group.

If there is no display (TP2) in the group and room temperature detection is set as "CAN bus" for all units in the group, all units in the group are switched off and the fault "Room temperature sensor limit value" is displayed. The valves "4p H valve" and "2p H/C valve" are opened as a precaution.

If, for example, the measured value of the RT sensor ("Detection via sensor on the unit") is outside the valid range due to a break or short-circuit in the connecting cable, or if the value specified by the BMS ("Input by BMS") is outside the valid range or is not written within a specified interval, the fault "Room temperature sensor limit value" is displayed at all units in the group. The valves “4p H valve" and "2p H/C valve" of all units in the group are opened as a precaution.

If the "Detection by sensor on the unit" is set at each unit, there is no common room temperature in the control group and instead each unit uses the room temperature it detects separately as a control variable.

If the measured value of the room temperature sensor ("Detection by sensor on the unit") is outside the valid range due to a break or short-circuit in the connection cable for example, the fault "Room temperature sensor limit value" is displayed at the respective unit. The valves “4p H valve" and "2p H/C valve" of the respective unit are opened as a precaution.

If "Input by the BMS" is set at each unit, there is no common room temperature in the control group, and instead each unit uses the room temperature it transmits separately as a control variable.

If the value specified by the BMS ("Input by BMS") is outside the valid range or is not written within a specified interval, the fault "Room temperature sensor limit value" is displayed at the respective unit. The valves “4p H valve" and "2p H/C valve" of the respective unit are opened as a precaution.

In the event of deviating configurations, the fault "Incorrect room temperature configuration" is displayed.

More information can also be found in section "Critical units".

4.20.1 Parameters

Brief description	ID	Range	Default
RT detection configuration	20025	0 - 2	0
Actual room temperature value by BMS	21164	-99.9 °C - 99.9 °C	5.0 °C

4.20.2 Group unit parameters

Brief description	ID array(10)	Range	Default
RT detection configuration	25025	0 - 2	0

4.21 Outside temperature detection

The outside temperature can be detected by a sensor at the analogue input of the unit or by the building management system. If several units are coupled by means of a CAN-bus and operated together in a group, the outside temperature can only be detected or specified at one unit in the group. The corresponding OT sensor is connected to this unit or the outside temperature is specified at this unit via one of the BMS interfaces. This unit then communicates the outside temperature to the other units in the group via the CAN bus. Deviating configurations are displayed as a fault.

Outside temperature detection can be set using the "OT detection configuration" parameter:
0 = CAN bus
1 = Detection by a sensor on the unit
2 = Input by the BMS

To detect the outside temperature, the option "Detection by a sensor on the unit" or "Input by the BMS" can be selected at one unit in the group. This outside temperature applies for every unit in the group.

If a setting other than "CAN bus" is used at more than one unit, the "Incorrect outside temperature configuration" fault is displayed.

If the "CAN bus" setting is made at each unit, no outside temperature-dependent functions are possible.

More information can also be found in section "Critical units".

4.21.1 Parameters

Brief description	ID	Range	Default
OT detection configuration	20029	0 - 2	0
Actual outside temperature value by BMS	21165	-99.9 °C - 99.9 °C	5.0 °C

4.21.2 Group unit parameters

Brief description	ID array(10)	Range	Default
OT detection configuration	25029	0 - 2	0

4.22 Fault responses

The following faults directly affect the automatic operation of the closed-loop temperature control:
- FP fault (frost protection thermostat)

- RT fault (room temperature sensor)
- SecA TC fault (secondary air fan)
- CAN fault (communication)
- FS fault (fire shut-down priority)
- CP fault (condensate pump)

The fault responses partly depend on certain configurations.
The following table lists the possible faults, resulting responses and assigned priorities. The faults can only occur if a multifunctional input is assigned the corresponding function. As soon as one of the faults is active, automatic mode is deactivated and the signals are set to the stated fixed values.

Fault	Priority	4p H valve	4p C valve	2p H/C valve
FP	1	100% / 1	0% / 0	100%
RT	2	100% / 1	0% / 0	100%
SecA TC	3	0%	0%	0%
CAN	4	0%	0%	0%
FS	5	No influence	No influence	No influence
SupAT	6	Parametrisable (0%)	Parametrisable (0%)	Parametrisable (0%)
CP	7	No influence	Parametrisable (0%)	Parametrisable (0%)

Detailed information on faults caused by CAN communication can be found in section "CAN-Bus"
When the values of the SupAT sensor and RT sensor are outside the prescribed limits, this directly triggers fault responses (see table above). If the values of other sensors are outside the prescribed limits, multiple assignments exist and faults occur due to activated functions whose sensor systems have no parameter settings, a fault response is indirectly triggered. In addition, the values of the non-existent temperature sensors are set to -99.9 °C.

4.23 Output signals

Depending on signal flow, priorities and fault responses, PID control algorithms are overridden which results in deviating statuses.

The request for heat is set as soon as there is a heating requirement, i.e. the corresponding valve is opened.
The request for cooling is set as soon as there is a cooling requirement, i.e. the corresponding valve is opened.

If several units are coupled by means of a CAN-bus and operated together in a group, the request for heat is set as soon as there is a heating requirement by at least one unit in the group.

If several units are coupled by means of a CAN-bus and operated together in a group, the request for cooling is set as soon as there is a cooling requirement by at least one unit in the group.

Heating and cooling requests are not interlocking and are not switched on or off with a time delay.

To support detailed diagnostics, the signals and statuses obtained from closed-loop temperature control are listed according to operating mode.

4.23.1 Statuses

Brief description	ID	Range
4p heating valve signal	20093	0.0% - 100.0%
4p cooling valve signal	20095	0.0% - 100.0%
2p heating cooling valve signal	20188	0.0% - 100.0%
Heating fan signal	20097	0.0% - 100.0%
Cooling fan signal	20099	0.0% - 100.0%
4p heating valve status	20092	0 - 1
4p cooling valve status	20094	0 - 1
2p heating cooling valve status	20187	0 - 1
Heating fan status	20096	0 - 1
Cooling fan status	20098	0 - 1
Heating requirement	21382	0 - 1
Cooling requirement	21383	0 - 1

4.23.2 Statuses of units within the group

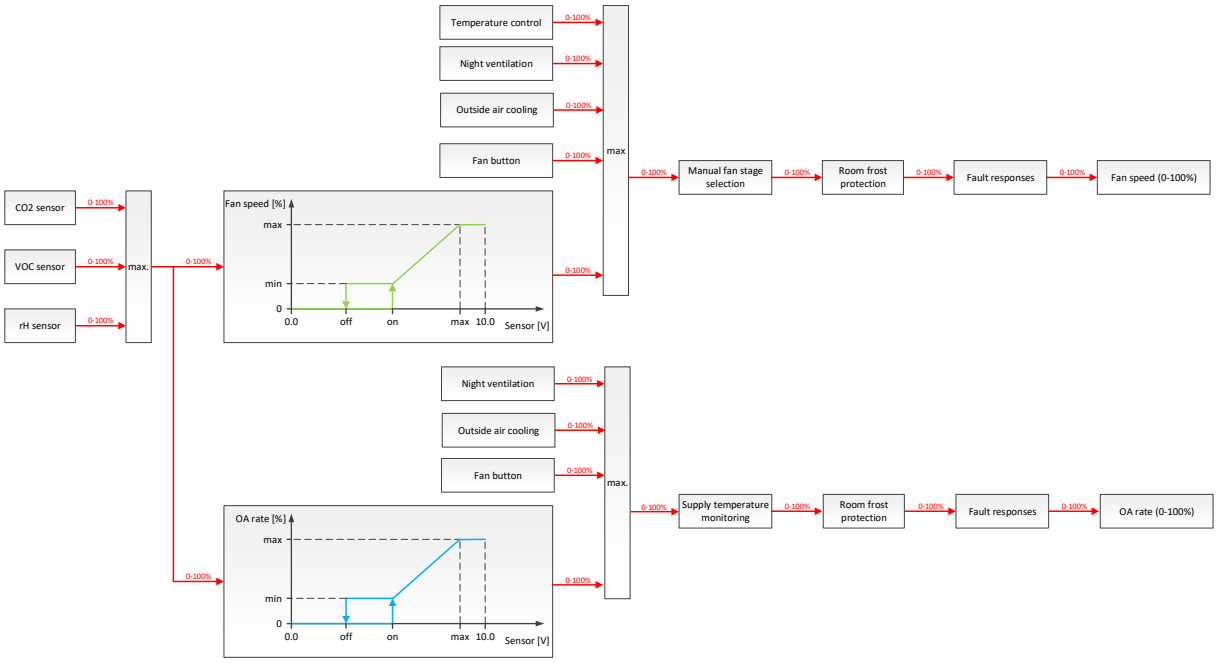
Brief description	ID array(10)	Range
4p heating valve signal	25093	0.0% - 100.0%
4p cooling valve signal	25095	0.0% - 100.0%
2p heating cooling valve signal	25188	0.0% - 100.0%
Heating fan signal	25097	0.0% - 100.0%
Cooling fan signal	25099	0.0% - 100.0%
4p heating valve status	25092	0 - 1
4p cooling valve status	25094	0 - 1
2p heating cooling valve status	25187	0 - 1
Heating fan status	25096	0 - 1
Cooling fan status	25098	0 - 1

5 Fan control

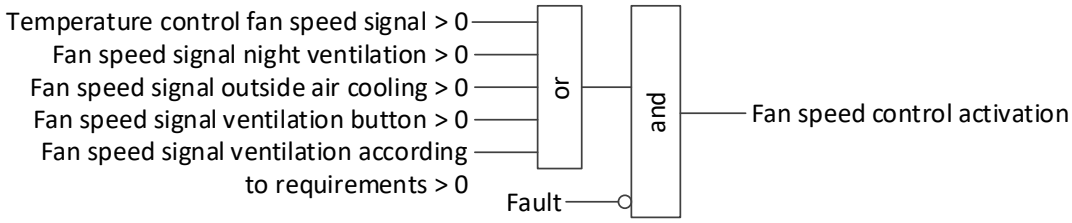
The fan speed can be predetermined automatically by the closed-loop temperature control, by manual stage selection, e.g. using a RC, by the BMS, or by switching a correspondingly configured digital input.

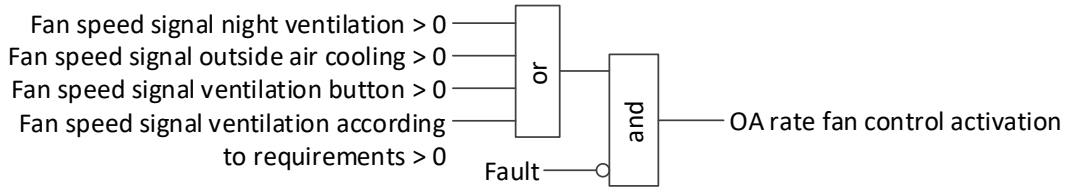
5.1 Signal flow and priorities

The following figure shows the individual functions, signal flow, and priorities:



5.2 Activations





5.3 Primary air

Primary air units are special forms of secondary air units. What makes primary air units special is that they are supplied with outside air from a central ventilation unit with heat recovery. With certain setups, they are therefore operated independently of the room temperature and at a fan speed which is constant or varies according to requirements. They also feature a supply air temperature control so the temperature of the outside

air supplied can also be adjusted if necessary. Continuous-acting valves are required for this. Primary air units can only be operated in conjunction with a central ventilation unit and a System Controller. Supply air temperature control is also active if no outside air is introduced, but heating or cooling is required to adjust the room temperature. Ventilation can be provided as and when required via a CO2, VOC or rH sensor.

Note: if the "Mode" default setting with four-pipe systems (see section "Temperature control") is set to "1 = heating", then the "Cooling" temperature cannot subsequently be adjusted! If the "Mode" default setting with four-pipe systems (see section "Temperature control") is set to "2 = cooling", then the "Heating" temperature cannot subsequently be adjusted! If several units are coupled by means of a CAN-bus and operated together in a group and the units are supplied by different heating and cooling sources (see section "Heating and cooling with transition time"), the temperature sometimes cannot subsequently be adjusted if the system is set up in certain ways. This can result in different supply air temperatures, especially during the transitional months!

The parameter settings for the primary air fan speed and the OA rate should be selected in such a way that the primary air unit always delivers more air than incoming outside air, i.e. a certain amount of secondary air is always recirculated.

If several units are coupled by means of a CAN-bus and operated together in a group, the same fan speed and OA rate requirements generally apply to all units in the group. This cannot be specified individually.

5.3.1 Ventilation according to requirements

A corresponding sensor at the analogue input of the primary air unit can be used to detect the CO2 content. If several units are coupled by means of a CAN-bus and operated together in a group, detection via sensors is only possible at one unit of the group. In the event of deviating configurations, the "Incorrect CO2 sensor configuration" is displayed. To display correctly, the sensor must have a measuring range of 0-2000 ppm ≙ 0-10VDC.

A corresponding sensor at the analogue input of the primary air unit can be used to detect the VOC content. If several units are coupled by means of a CAN-bus and operated together in a group, detection via sensors is only possible at one unit of the group. In the event of deviating configurations, the "Incorrect VOC sensor configuration" is displayed. To display correctly, the sensor must have a measuring range of 0-100 ≙ 0-10VDC.

A corresponding sensor at the analogue input of the primary air unit can be used to detect the rH content. If several units are coupled by means of a CAN-bus and operated together in a group, detection via sensors is only possible at one unit of the group. In the event of deviating configurations, the "Incorrect RH sensor configuration" is displayed. To display correctly, the sensor must have a measuring range of 0-100% ≙ 0-10VDC.

The necessary ventilation according to requirements is calculated using the maximum measured value (0-10V signal) of the sensors for CO2, VOC or rH.

The "X PA Y setpoint configuration" (X: OA rate or fan speed; Y: Day, Boost or Eco) parameters define the operating principles of the calculation algorithms for ventilation according to requirements. The following settings are available:
0 = Not available
1 = Two-point
2 = Continuous (zero)
3 = Continuous (min)

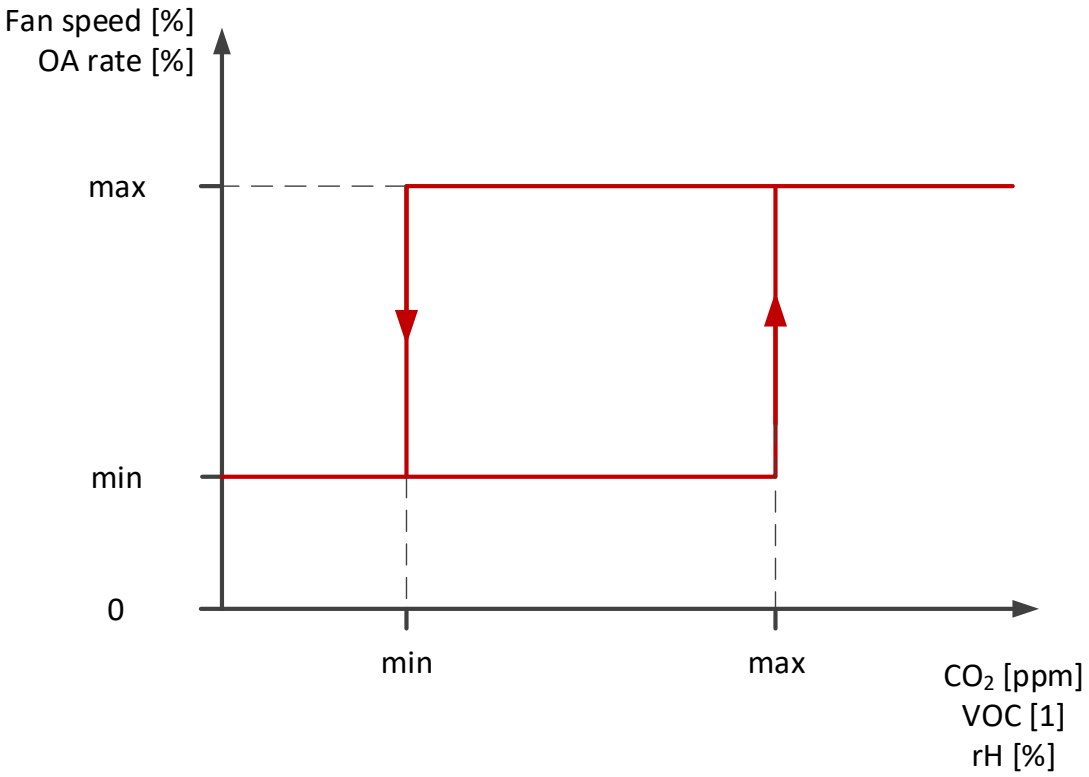
The "X PA Y min sensor setpoint", "X PA Y max sensor setpoint", "X PA Y X min setpoint" and "X PA Y X max setpoint" and, if applicable, "X PA Y hysteresis setpoint" (X: OA rate or fan speed; Y: Day, Boost or Eco) are used to define the limit values for calculation of the on-demand OA rate and fan speed in the individual operating modes.

If a fixed value is required, it can be set by selecting "3 = continuous (min)" and specifying "PA Y fan speed min fan speed setpoint" or "PA Y OA rate min OA rate setpoint" (Y: Day, Boost or Eco).

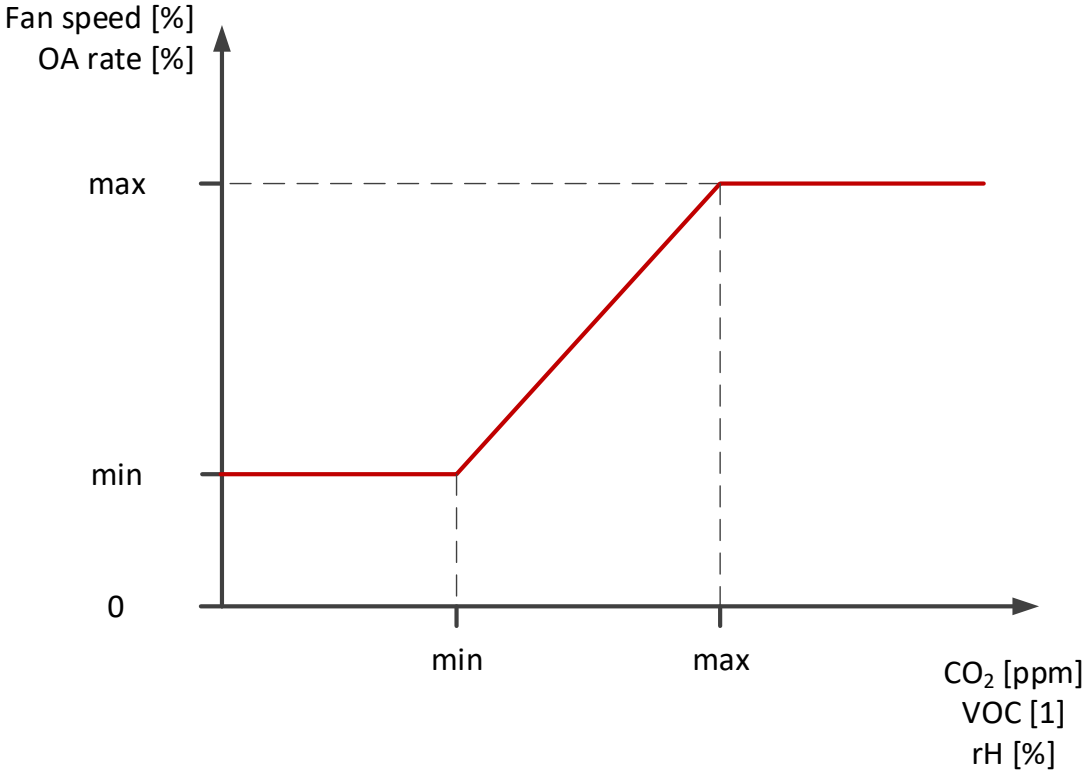
The statuses "PA fan speed setpoint calculated" and "PA OA rate setpoint calculated" indicate the values calculated from the set parameters, the current actual values, and the current operating program.

The diagrams show the operating principle of the different on-demand ventilation algorithms.

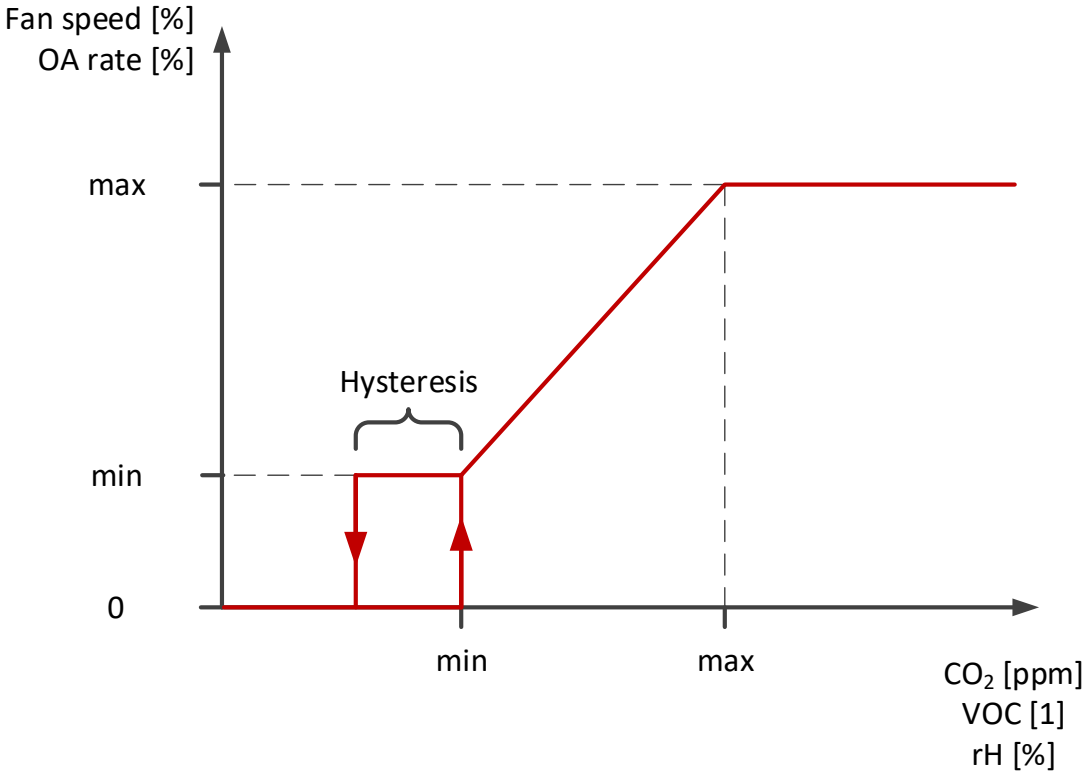
5.3.1.1 "Two-point" on-demand diagram



5.3.1.2 "Continuous min" on-demand diagram



5.3.1.3 "Continuous zero" on-demand diagram



5.3.2 Inrush airing

The "inrush airing" function can be used in the three different operating programs (Day, Boost or Eco) to manually influence on-demand ventilation. Inrush airing can be

activated by pressing a button on the RC and deactivated by pressing it again. Fan speed, OA rate and runtime parameters can be set for inrush airing. When inrush airing is activated, the fan speed and OA rate which are calculated based on the on-demand ventilation are overwritten by the values specified for inrush airing. Inrush airing automatically ends when the runtime elapses. The fan speed and OA rate then revert to those calculated based on the on-demand ventilation for the current operating program. The "inrush airing" function can also be switched on or off by a button or switch connected to a digital input with the relevant parameter settings. Inrush airing does not automatically end when the runtime elapses if a switch is connected or the digital input used has the corresponding parameter settings. Inrush airing is not possible if the operating program is set to "Off".

The "InA button active" parameter can be used to manually trigger intermittent ventilation. The parameter is automatically reset at the end of the runtime. It therefore simultaneously displays the status of the "inrush airing" function.

The “InA fan speed” defines the signal status at which the fan speed is set when the "inrush airing" function is active.
The "InA OA rate" parameter defines the signal status at which the OA rate is set when "inrush airing" is active.
The "InA runtime" parameter defines the runtime after which "inrush airing" automatically ends.
The "Remaining IntV runtime" signal status displays the runtime currently remaining.
The "InA fan speed" status shows the value at which the fan speed is set when "inrush airing" is active.
The "InA OA rate" status indicates the value at which the OA rate is set when "inrush airing" is active.
The "InA switch active" status indicates whether the "inrush airing" function is currently activated by a switch.

5.3.3 Parameters

Brief description	ID	Range	Default
IntV button active	21998	0 - 1	0
IntV fan speed setpoint	21993	0.0% - 100.0%	100.0%
IntV OA rate setpoint	21994	0.0% - 100.0%	100.0%
IntV runtime	21995	0 min - 600 min	15 min

5.3.3.1 Day

Brief description	ID	Range	Default
Day PA sensor min fan speed setpoint	21916	0.0 V - 10.0 V	3.0 V
Day PA sensor max fan speed setpoint	21917	0.0 V - 10.0 V	10.0 V
Day PA fan speed setpoint min fan speed	21918	0.0% - 100.0%	30.0%
Day PA fan speed setpoint max fan speed	21919	0.0% - 100.0%	80.0%
Day PA fan speed setpoint hysteresis	21920	0.0 V - 10.0 V	0.5 V
Day PA OA rate setpoint min sensor	21921	0.0 V - 10.0 V	2.0 V
Day PA OA rate setpoint max sensor	21922	0.0 V - 10.0 V	4.5 V
Day PA OA rate setpoint min OA rate	21923	0.0% - 100.0%	40.0%
Day PA OA rate setpoint max OA rate	21924	0.0% - 100.0%	90.0%
Day PA OA rate setpoint hysteresis	21925	0.0 V - 10.0 V	0.5 V
Day PA fan speed setpoint configuration	21926	0 - 3	0
Day PA OA rate setpoint configuration	21927	0 - 3	0

5.3.3.2 Boost

Brief description	ID	Range	Default
Boost PA fan speed min sensor setpoint	21928	0.0 V - 10.0 V	3.0 V
Boost PA fan speed max sensor setpoint	21929	0.0 V - 10.0 V	10.0 V
Boost PA fan speed setpoint min fan speed	21930	0.0% - 100.0%	30.0%
Boost PA fan speed setpoint max fan speed	21931	0.0% - 100.0%	80.0%
Boost PA fan speed hysteresis setpoint	21932	0.0 V - 10.0 V	0.5 V
Boost PA OA rate setpoint min sensor	21933	0.0 V - 10.0 V	2.0 V
Boost PA OA rate setpoint max sensor	21934	0.0 V - 10.0 V	4.5 V
Boost PA OA rate setpoint min OA rate	21935	0.0% - 100.0%	40.0%
Boost PA OA rate setpoint max OA rate	21936	0.0% - 100.0%	90.0%
Boost PA OA rate hysteresis setpoint	21937	0.0 V - 10.0 V	0.5 V
Boost PA fan speed setpoint configuration	21938	0 - 3	0
Boost PA OA rate setpoint configuration	21939	0 - 3	0

5.3.3.3 Eco

Brief description	ID	Range	Default
Eco PA fan speed setpoint sensor min	21940	0.0 V - 10.0 V	3.0 V
Eco PA fan speed setpoint sensor max	21941	0.0 V - 10.0 V	10.0 V
Eco PA fan speed setpoint min fan speed	21942	0.0% - 100.0%	30.0%
Eco PA fan speed setpoint max fan speed	21943	0.0% - 100.0%	80.0%
Eco PA fan speed hysteresis setpoint	21944	0.0 V - 10.0 V	0.5 V
Eco PA OA rate setpoint sensor min	21945	0.0 V - 10.0 V	2.0 V
Eco PA OA rate setpoint sensor max	21946	0.0 V - 10.0 V	4.5 V
Eco PA OA rate setpoint min OA rate	21947	0.0% - 100.0%	40.0%
Eco PA OA rate setpoint max OA rate	21948	0.0% - 100.0%	90.0%
Eco PA OA rate hysteresis setpoint	21949	0.0 V - 10.0 V	0.5 V
Eco PA fan speed setpoint configuration	21950	0 - 3	0
Eco PA OA rate setpoint configuration	21951	0 - 3	0

5.3.4 Statuses

Brief description	ID	Range
Actual value CO2	21808	0 ppm - 2000 ppm
Actual value rH	21809	0% - 100%
Actual value VOC	21810	0 - 100
PA fan speed setpoint calculated	22012	0.0% - 100.0%
PA OA rate setpoint calculated	22013	0.0% - 100.0%
IntV fan speed	22000	0.0% - 100.0%
IntV OA rate	22001	0.0% - 100.0%
IntV switch active	21999	0 - 1
IntV remaining runtime Min	21996	0 min - 600 min
IntV remaining runtime Sec	21997	0 s - 3600 s
IntV active	22002	0 - 1

5.4 Manual stage selection

The "ManSS manual stage selection" parameter is used for manual stage selection using an RC or via the BMS. The following default settings are therefore possible:
1 = Stage 1 => Fan speed signal 20% (parametrisable)
2 = Stage 2 => Fan speed signal 40% (parametrisable)
3 = Stage 3 => Fan speed signal 60% (parametrisable)
4 = Stage 4 => Fan speed signal 80% (parametrisable)
5 = Stage 5 => Fan speed signal 100% (parametrisable)
6 = Auto => Automatic mode (closed-loop temperature control)
7 = Stage 0 => Fan speed signal 0%

If several units are coupled by means of a CAN-bus and operated together in a group, the fan speed default setting applies equally to all units in the group.

The "ManSS fan speed stage 1", "ManSS fan speed stage 2", "ManSS fan speed stage 3", "ManSS fan speed stage 4" and "ManSS fan speed stage 5" parameters can be used to specify the fan speed signals of the individual stages.

A "Reset" can be input for manual stage selection when changing operating program. The following settings are available for the "Stage selection Reset" parameter:
0 = No Reset when the operating mode is changed
1 = Reset when the operating mode is changed

The following default settings are available when switching digital inputs (switches):
1 = Stage 1 => Fan speed signal 20% (parametrisable)
2 = Stage 2 => Fan speed signal 40% (parametrisable)
3 = Stage 3 => Fan speed signal 60% (parametrisable)
4 = Stage 4 => Fan speed signal 80% (parametrisable)
5 = Stage 5 => Fan speed signal 100% (parametrisable)

Reset is not available for manual stage selection via a digital input.

Connection of digital inputs has a higher priority than "manual stage selection" via RC or BMS. If different fan speed default settings are made via several digital inputs at the same time, the highest fan speed also has the highest priority. If several units are coupled by means of a CAN-bus and operated together in a group and several digital inputs on several units produce different fan speed default settings at the same time, the highest fan speed also has the highest priority.

The "ManSS block stage 0" parameter can be used to block manual selection of stage 0. This can be useful if units without a fan running have no heat or cooling output (natural convection). In cooling mode, unwanted condensate can form when no fan is running. The following settings are possible:
0 = Not blocked
1 = Blocked

If the manual selection of stage 0 is blocked, but stage 0 is manually selected, possibly by an RC or the BMS or by connecting a suitably configured digital input, then the selection is automatically changed to Stage 1.

If room frost protection is active, manually selected stages are overridden.

The fan is only operated at the stage selected manually if there is a heating or cooling requirement, in other words if the fan speed signal from the temperature control is greater than zero. A minimum or maximum limit for the fan speed signal can be indirectly entered into the temperature control. More information can be found in section "Fan speed signal conversion".

5.4.1 Parameters

Brief description	ID	Range	Default
ManSS fan speed stage 1	20172	0.0% - 100.0%	20.0%
ManSS fan speed stage 2	20173	0.0% - 100.0%	40.0%
ManSS fan speed stage 3	20174	0.0% - 100.0%	60.0%
ManSS fan speed stage 4	20175	0.0% - 100.0%	80.0%
ManSS fan speed stage 5	20176	0.0% - 100.0%	100.0%
ManSS block stage 0	21446	0 - 1	0
ManSS manual stage selection	20179	1 - 7	6
ManSS Reset stage selection	20599	0 - 1	0

5.4.2 Group unit parameters

Brief description	ID array(10)	Range	Default
ManSS fan speed stage 1	25172	0.0% - 100.0%	20.0%
ManSS fan speed stage 2	25173	0.0% - 100.0%	40.0%
ManSS fan speed stage 3	25174	0.0% - 100.0%	60.0%
ManSS fan speed stage 4	25175	0.0% - 100.0%	80.0%
ManSS fan speed stage 5	25176	0.0% - 100.0%	100.0%

5.4.3 Statuses

Brief description	ID	Range
ManSS current selection	21271	1 - 7
ManSS fan speed signal	21272	0.0% - 100.0%
ManSS active	21273	0 - 1

5.4.4 Statuses of units within the group

Brief description	ID array(10)	Range
ManSS fan speed signal	26272	0.0% - 100.0%

5.5 Outside air cooling

Outside air cooling makes it possible for primary air units to activate a fan speed and an OA rate with certain temperature configurations in the three operating programs (Day, Boost or Eco) so that cool outside air can be introduced in order to reduce excessively high room temperatures. This may be necessary with on-demand ventilation if the operating mode is set to "Continuous (zero)" for the fan speed and/or for the OA rate. The fan speed and/or OA rate can then be zero due to the CO2, VOC or rH content of the room air.

If outside air cooling is active, supply air temperature control remains active.

In ventilation systems, outside air cooling is usually activated based on the outside temperature or by temperature configurations in relation to the outside temperature.
As primary air units are supplied with outside air from a central ventilation unit with heat recovery, outside air cooling is activated in primary air units depending on the supply air temperature of the central ventilation unit, or on temperature configurations relating to the supply air temperature of the central ventilation unit. The supply air temperature of the central ventilation unit is transmitted to the primary air unit by the System Controller. This ensures the effectiveness of outside air cooling.

The "OAC RTD" and "OAC RTD hysteresis" parameters specify how much the room temperature setpoint deviation must be before outside air cooling is activated.

The "OAC RT SupAT CU" and "OAC RT SupAT CU hysteresis" parameters specify the room temperature and supply air temperature configuration of the central ventilation unit above which outside air cooling is activated.
The "OAC fan speed" parameter defines the fan speed.
The "OAC OA rate" parameter defines the OA rate.
The “Day OAC activation", "Eco OAC activation" and "Boost OAC activation" parameters can be used to fully activate or deactivate outside air cooling for the respective operating mode.

5.5.1 Parameters

Brief description	ID	Range	Default
OAC RTD	21955	0.0 K - 20.0 K	3.0 K
OAC RTD hysteresis	21956	0.0 K - 20.0 K	0.5 K
OAC RT SupAT CU	21957	0.0 K - 20.0 K	3.0 K
OAC RT SupAT CU hysteresis	21958	0.0 K - 20.0 K	0.5 K
OAC fan speed	21959	0.0% - 100.0%	30.0%
OAC OA rate	21960	0.0% - 100.0%	40.0%
Day OAC activation	21952	0 - 1	1
Eco OAC activation	21954	0 - 1	1
Boost OAC activation	21953	0 - 1	1

5.5.2 Statuses

Brief description	ID	Range
OAC active	21961	0 - 1
OAC fan speed signal	21962	0.0% - 100.0%
OAC OA rate signal	21963	0.0% - 100.0%

5.6 Night ventilation

Primary air units have a night ventilation feature for cooling down warm room temperatures that have risen during the day during cool summer nights by introducing cool outside air. The established fan speed and OA rate in the current operating mode (Day, Boost or Eco) are increased if necessary.

There is no supply air temperature control when night ventilation is active.

In ventilation systems, night ventilation is usually activated depending on the outside temperature or temperature configurations in relation to the outside temperature among other things.
As primary air units are supplied with outside air from a central ventilation unit with heat recovery, night ventilation is activated in primary air units depending on the supply air temperature of the central ventilation unit or on temperature configurations relating to the supply air temperature of the central ventilation unit. The supply air temperature of the central ventilation unit is transmitted to the primary air unit by the System Controller. This ensures the effectiveness of the night ventilation.

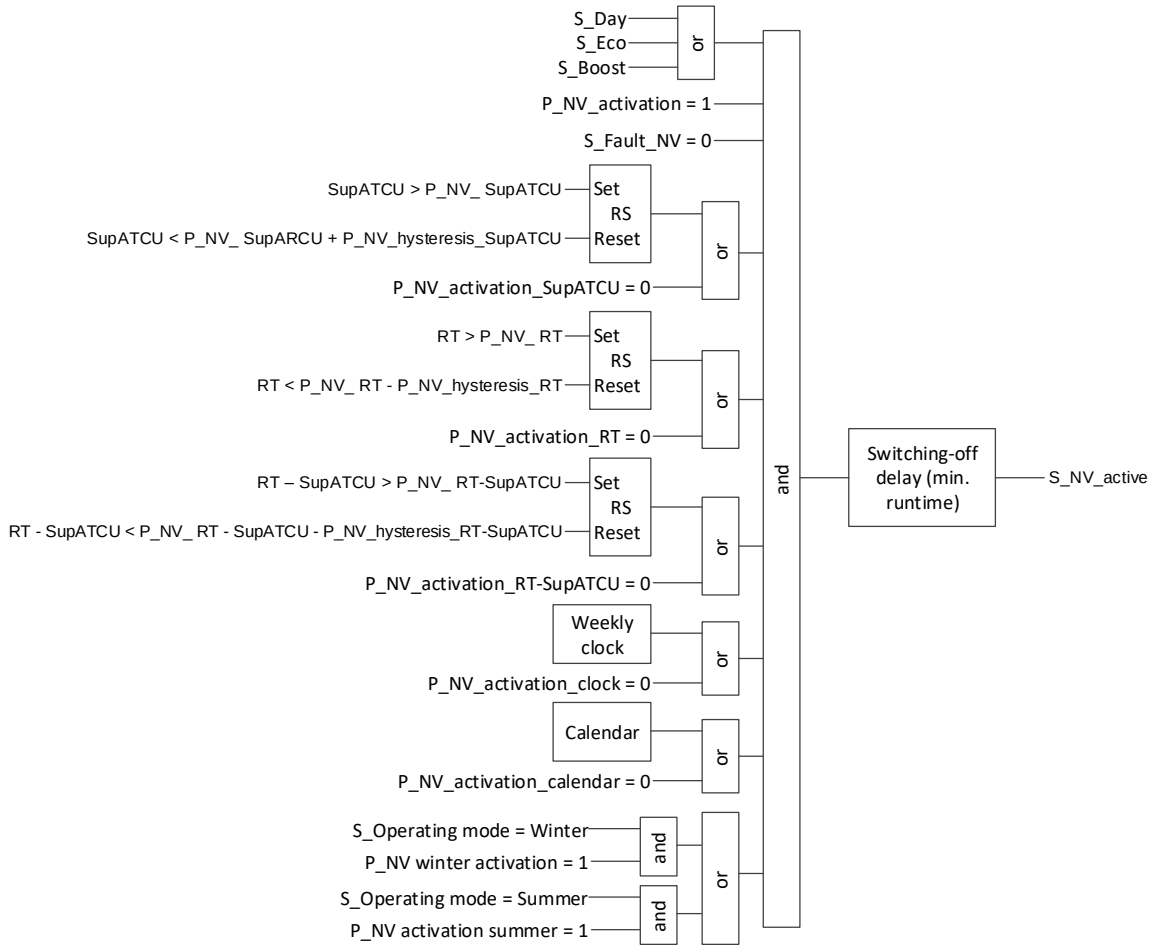
The "NV SupAT CU" and "NV hysteresis SupAT CU" parameters specify the supply air temperature of the central ventilation unit below which night ventilation is activated.
Consideration of the above condition can be activated or deactivated via the "NV SupAT CU activation" parameter.
The "NV RT" and "NV hysteresis RT" parameter specifies the room temperature above which night ventilation is activated.

Consideration of the above condition can be activated or deactivated via the "NV activation RT" parameter.
The "NV RT-SupAT CU" and "NV hysteresis RT-SupAT CU" parameters specify the room/supply temperature configuration of the central ventilation unit above which night ventilation is activated.
Consideration of the above condition can be activated or deactivated via the "NV activation RT-SupAT CU" parameter.
The "NV switching point On" and "NV switching point Off" parameters can define a time period during which night ventilation is activated.

In principle, the night ventilation parameters are set so that, with a corresponding temperature configuration, it is switched on late in the evening and switched off the next morning at the latest. The hour and minute can be specified for the two required switching points. A typical scenario would be switch on at 22.00 and switch off at 06.00, for example. With the stored algorithm, the switching-on point is chronologically always before the switching-off point. It does not take the change from one day to the next into account. Unfortunately, this can also lead to incorrect parameter settings if, for example, the switching-on point is set to 23.00 and the switching-off point is set to 22.00. With the corresponding temperature configuration, night ventilation would be switched on at 23.00 and only switched off at 22.00 the next day. For night ventilation to work correctly, when making the parameter settings it is essential to ensure that the switching-on point is before the switching-off point.

Consideration of the above condition can be activated or deactivated via the "NV activation time" parameter.
A period during which night ventilation is activated can be specified via the "NV month On" and "NV month Off" parameters.
Consideration of the above condition can be activated or deactivated via the "NV month activation" parameter.
The "Winter NV activation" parameter can be used to activate night ventilation in heating mode.
The "Summer NV activation" parameter can be used to activate night ventilation in cooling mode.
The "NV activation" parameter can be used to fully activate or deactivate the night ventilation.
The "NV min runtime" parameter defines the minimum night ventilation activation period.
The "NV fan speed" parameter specifies the night ventilation fan speed.
The OA rate is 100% when night ventilation is running.

5.6.1 Activations



5.6.2 Parameters

Brief description	ID	Range	Default
NV SupAT CU	21966	0.0 °C - 30.0 °C	16.0 °C
NV SupAT CU hysteresis	21967	0.0 °C - 20.0 °C	0.5 °C
NV activation SupAT CU	21965	0 - 1	1
NV RT	21969	0.0 °C - 30.0 °C	24.0 °C
NV hysteresis RT	21970	0.0 °C - 20.0 °C	0.5 °C
NV activation RT	21968	0 - 1	1
NV RT-SupAT CU	21972	0.0 °C - 20.0 °C	3.0 °C
NV hysteresis RT-SupAT CU	21973	0.0 °C - 20.0 °C	0.5 °C
RT-SupAT CU NV activation	21971	0 - 1	1
NV switch-on point Hour	21975	0 h - 23 h	23 h
NV switch-on point Minute	21976	0 min - 59 min	0 min
NV switch-off point Hour	21977	0 h - 23 h	5 h
NV switch-off point Minute	21978	0 min - 59 min	0 min
NV activation time	21974	0 - 1	1
NV Month on	21980	1 - 12	5
NV Month off	21981	1 - 12	9
NV Calendar activation	21979	0 - 1	1
NV activation Winter	21982	0 - 1	1
NV activation Summer	21983	0 - 1	1
NV activation	21964	0 - 1	0
NV runtime min	21984	0 min - 300 min	15 min
NV fan speed	21988	0.0% - 100.0%	20.0%

5.6.3 Statuses

Brief description	ID	Range
NV active	21987	0 - 1
Remaining NV runtime Min	21985	0 min - 9999 min
Remaining NV runtime Sec	21986	0 s - 9999 s
NV fan speed signal	21989	0.0% - 100.0%
OA rate NV signal	21990	0.0% - 100.0%

5.7 Filter message

The "Filter message" function is used to display the degree of contamination of filters and to avoid incorrect triggering due to short-term pressure fluctuations that can be caused by gusts of wind, for example. The degree of contamination is detected and measured via a differential pressure switch or differential pressure sensor. The triggering threshold is set directly in the differential pressure switch. If this threshold is exceeded, a discreet signal is output (potential-free contact). The measurement signal is standardised or coded in the differential pressure sensor and output as an analogue signal (0-10VDC). In this case "standardised or coded" means "converted" (e.g. 0-300 Pa correspond to 0-10VDC). The threshold value is then monitored in the downstream open/closed-loop control.
The differential pressure switch (discreet signals) is connected via digital inputs with corresponding parameter settings.
Differential pressure sensors (continuous signals, 0-10VDC) are connected via analogue inputs with corresponding parameter settings.
If the parameters of two or more inputs are set as the same filter message, they are automatically ORed.

The "FM waiting time" parameter defines how long a general filter message (digital or analogue) must be pending before it is also displayed.
The "FM remaining waiting time" status displays the remaining waiting time until the general filter message is triggered.
The “FM 10VDC” parameter defines which differential pressure at the general air filter in Pa corresponds to a sensor signal of 10 V DC. 0 V DC corresponds to a differential pressure of 0 Pa.
The "FM threshold” parameter defines the differential pressure at the general air filter above which a filter message can be output.
The "FM sensor actual value" signal status indicates the differential pressure currently measured at the general air filter.
The "FM sensor signal" status displays the current signal from the differential pressure sensor (0-10VDC).
The “FM switch signal" status shows the current signal from the differential pressure switch (0 or 1).

5.7.1 Parameters

Brief description	ID	Range	Default
FM waiting time	21264	0 s - 900 s	300 s
FM 10 VDC	21265	0 Pa - 1000 Pa	500 Pa
FM threshold	21266	0 Pa - 1000 Pa	120 Pa

5.7.2 Group unit parameters

Brief description	ID array(10)	Range	Default
FM waiting time	26264	0 s - 900 s	300 s

Brief description	ID array(10)	Range	Default
FM 10 VDC	26265	0 Pa - 1000 Pa	500 Pa
FM threshold	26266	0 Pa - 1000 Pa	120 Pa

5.7.3 Statuses

Brief description	ID	Range
FM sensor actual valve	21267	0 Pa - 1000 Pa
FM sensor signal	21268	0.0 V - 10.0 V
FM switch signal	21269	0 - 1
FM remaining waiting time	21270	0 s - 999 s

5.7.4 Statuses of units within the group

Brief description	ID array(10)	Range
FM sensor actual valve	26267	0 Pa - 1000 Pa
FM sensor signal	26268	0.0 V - 10.0 V
FM switch signal	26269	0 - 1
FM remaining waiting time	26270	0 s - 999 s

5.8 Fault responses

The following faults directly affect the automatic operation of the fan control:
- FP fault (frost protection thermostat)
- RT fault (room temperature sensor)
- SecA TC fault (secondary air fan)
- CAN fault (communication)
- FS fault (fire shut-down priority)
- CP fault (condensate pump)

The fault responses are partly dependent on certain configurations.
The following table lists the possible faults, resulting responses and assigned priorities. The faults can only occur if a multifunctional input is assigned the corresponding function. As soon as one of the faults is active, automatic mode is deactivated and the signals are set to the stated fixed values.

Fault	Priority	Fan signal	OA rate signal
FP	1	0%	0%
RT	2	0%	0%
SecA TC	3	0%	0%
CAN	4	0%	0%
FA	5	0%	0%
SupAT	6	Parametrisable (0%)	0%
CP	7	Parametrisable (0%)	(0%)

Detailed information on faults caused by CAN communication can be found in section "CAN-Bus".

If the values of the SupAT sensor and the RT sensor are outside the prescribed limits, fault responses are directly triggered (see above table). A fault response is indirectly triggered if the values of other sensors are outside the prescribed limits, multiple assignments are made or faults arise because functions have been activated without sensors with corresponding parameter settings. In addition, the values of the non-existent temperature sensors are set to -99.9 °C.

5.9 Output signals

Deviating statuses occur depending on signal flow, priorities and fault responses.
Signals and statuses emanating from the fan control are broken down accordingly to support detailed diagnostics

5.9.1 Statuses

Brief description	ID	Range
Fan signal	20597	0.0% - 100.0%
OA rate signal	21991	0.0% - 100.0%
Group OA rate signal	22021	0.0% - 100.0%
Fan status	20598	0 - 1
OA rate status	21992	0 - 1

5.9.2 Statuses of units within the group

Brief description	ID array(10)	Range
Fan signal	25597	0.0% - 100.0%
OA rate signal	26991	0.0% - 100.0%
Fan status	25598	0 - 1
OA rate status	26992	0 - 1

5.10 Operating hours counter

The operating hours of the fan are added up with reference to the speed. One operating hour with a speed of 100% therefore counts as one operating hour, whereas four operating hours with a speed of 25% also count as one operating hour. A limit value can be set for the operating hours recorded. If the operating hours logged exceed the limit value, the event "SecA fan operating hour limit" is displayed. The operating hours logged can be reset. The limit value is not monitored if set to zero hours.

The "SecA fan operating hours" status shows the accumulated operating hours of the SecA fan.
The "SecA fan operating hour limit value" parameter can be used to set the limit value for the operating hours.
The "SecA fan operating hour Reset" parameter can be used to reset the operating hours logged.

5.10.1 Parameters

Brief description	ID	Range	Default
SecA fan operating hours limit value	21695	0 h - 65000 h	0 h
SecA fan operating hours Reset	21696	0 - 1	0

5.10.2 Group unit parameters

Brief description	ID array(10)	Range	Default
SecA fan operating hours limit value	26695	0 h - 65000 h	0 h

Brief description	ID array(10)	Range	Default
SecA fan operating hours Reset	26696	0 - 1	0

5.10.3 Statuses

Brief description	ID	Range
SecA fan operating hours	21697	0 h - 438000 h

5.10.4 Statuses of units within the group

Brief description	ID array(10)	Range
SecA fan operating hours	26697	0 h - 438000 h

6 Settings

6.1 General

6.1.1 Auto save

The "Auto save configuration" parameter defines whether parameter changes are saved automatically (5 seconds after the last change) or must be saved manually. It should be noted that saving changes can delay the response to KNX messages. They may remain unanswered while actively saving changes, especially when using read requests. Therefore, automatic saving processes (including parameter changes, event loggers and trend data recording) may be prevented depending on the activation of the KNX interface. The following settings are available:
0 = Automatic (only if KNX is deactivated)
1 = Manual only
2 = Automatic (even if KNX is activated)

If no automatic saving processes are performed, a basic event logger with up to 50 entries is still available. The corresponding "Event code x" and the associated "Event x timestamp" are saved.

The "Save parameter" parameter can be used to trigger a one-time save operation. The following actions are possible:
0 = No action
1 = Save parameter (flash and NvRam)

6.1.2 Restore points

Current parameter settings can be saved and previously saved parameter settings subsequently loaded to restore a previous system status using restore points. Up to three restore points ("User-specific", "Commissioning" and "Factory setting") can be saved. A system map of the set parameters can therefore be saved after commissioning has been completed, for example. Loading previously saved parameter settings also overwrites the event list. A restore point always contains a system map of all parameters. Only the parameters listed in the following table are not included in the system map:

Brief description	ID
RT base setpoint	20009
General RT Offset	20010
Day heating RT Offset	20012
Boost heating RT Offset	20013
Eco heating RT Offset	20014
Day cooling RT Offset	20015
Boost cooling RT Offset	20016
Eco cooling RT Offset	20017
ManSS manual stage selection	20179
Mode	20538
Heating ventilation switchover	20673
4p Day neutral zone	21327
4p Boost neutral zone	21328
4p Eco neutral zone	21329
Heating RT setpoint	21713
Cooling RT setpoint	21714

The "Load settings" parameter can be used to load parameters from restore points. The following actions are possible:
0 = No action
1 = User-specific (APP_LVL1.dat)
2 = Commissioning (APP_LVL2.dat)
3 = Factory setting (APP_LVL3.dat)
4 = Default values (source code)

The "Save settings" parameter can be used to save parameters at restore points. The following actions are possible:
0 = No action
17 = User-specific (APP_LVL1)
34 = Commissioning (APP_LVL2.dat)
51 = Factory setting (APP_LVL3.dat)

The "Save timestamp settings" status shows the timestamp (UnixTimeStampFormat) of the last save operation of the respective restore point.

6.1.3 Acknowledgement

An existing interlocking shutdown incident (fault, message) can be acknowledged using the parameter "Acknowledgement".

6.1.4 Parameters

Brief description	ID	Range	Default
Auto save configuration	21842	0 - 2	0
Save parameter	21881	0 - 1	0
Load settings	21882	0 - 4	0
Save settings	21883	0 - 240	0
Acknowledgement	20640	0 - 1	0

6.1.5 Statuses

Brief description	ID/SubID	Range
Timestamp APP_LVL 1	21884/0	0 - 4294967294
Timestamp APP_LVL 2	21884/1	0 - 4294967294
Timestamp APP_LVL 3	21884/2	0 - 4294967294

6.2 Information

When factory testing the unit, the serial number of the unit (parameter "Unit serial number") is automatically saved as information. The serial number of the controller (status "Unit controller serial number") is permanently registered at the factory.
When factory testing the unit, the construction project number ("Project number year" and "Project number consecutive number" parameters) is also automatically saved as information. If this is not done at the factory, the project number should be added manually when commissioning the unit.
In addition, a name for the unit (e.g. unit at left window) (parameter "Unit name") can also be entered individually.
If several units are coupled by means of a CAN-bus and operated together in a group, the serial numbers of each unit in the group and of the other units (status "Serial number unit X in the group") and the serial numbers of the controllers of the other units (status "Serial number of control unit 1 in the group") can also be read from each unit in the group. The names of the other units (parameter "Name of unit X in the group")

can be read and also edited from any unit in the group. However, the name is "protected" but can be edited, the changes applied or discarded using the "Change name" parameter. The following settings are possible:
0 = Cancel
1 = Adapt name
2 = Apply name
Further information (firmware and software versions, IDs, etc.) is also displayed.

6.2.1 Parameters

Brief description	ID	Range	Default
Group name	21053	a-z, A-Z, 0-9	0
Project number year	21202	0 - 99	0
Project number consecutive number	21203	0 - 99999	0

6.2.1.1 Unit names

Brief description	ID	Range	Default
Unit name	21437	a-z, A-Z, 0-9	0
Name of unit 1 in the group	21407	a-z, A-Z, 0-9	0
Name of unit 2 in the group	21408	a-z, A-Z, 0-9	0
Name of unit 3 in the group	21409	a-z, A-Z, 0-9	0
Name of unit 4 in the group	21410	a-z, A-Z, 0-9	0
Name of unit 5 in the group	21411	a-z, A-Z, 0-9	0
Name of unit 6 in the group	21412	a-z, A-Z, 0-9	0
Name of unit 7 in the group	21413	a-z, A-Z, 0-9	0
Name of unit 8 in the group	21414	a-z, A-Z, 0-9	0
Name of unit 9 in the group	21415	a-z, A-Z, 0-9	0
Name of unit 10 in the group	21416	a-z, A-Z, 0-9	0
Change name	21439	0 - 2	0

6.2.2 Statuses

Brief description	ID	Range
Application	20007	a-z, A-Z, 0-9
Major SW version	20180	0 - 65000
Minor SW version	20181	0 - 65000
SW version Patch	20182	0 - 65000
Extension SW version	20183	a-z, A-Z, 0-9
Group general fault	20873	0 - 1
Group general message	20896	0 - 1
Group general event	20897	0 - 1
Unit general fault	20907	0 - 1
Unit general message	20908	0 - 1
Unit general event	20909	0 - 1
Number of autosave cycles	20924	0 - 4294967294
Application runtime	21083	0 s - 4294967294 s
Major FW version	21120	0 - 65000
Minor FW version	21121	0 - 65000
Unit product ID	21122	0 - FFFFFFFF
Unit GUID (0)	21123	0 - 4294967294
Unit GUID (1)	21124	0 - 4294967294
Application runtime display	21218	0 s - 4294967294 s
Major FW version display	21331	0 - 65000
Minor FW version display	21332	0 - 65000
Major SW version display visualisation	21869	0 - 65000
Minor SW version display visualisation	21870	0 - 65000
SW version Patch display visualisation	21871	0 - 65000

Brief description	ID	Range
Extension SW version display visualisation	21872	a-z, A-Z, 0-9
Major SW version display	21126	0 - 65000
Minor SW version display	21127	0 - 65000
SW version Patch display	21128	0 - 65000
Extension SW version display	21868	a-z, A-Z, 0-9

6.2.2.1 Serial numbers of units

Brief description	ID	Range
Unit serial number	21438	a-z, A-Z, 0-9

6.2.2.2 Controller serial numbers

Brief description	ID	Range
Unit controller serial number	21125	a-z, A-Z, 0-9

6.2.3 Statuses of units within the group

Brief description	ID array(10)	Range
Major SW version	25180	0 - 65000
Minor SW version	25181	0 - 65000
SW version Patch	25182	0 - 65000
Unit general fault	25907	0 - 1
Unit general message	25908	0 - 1
Unit general event	25909	0 - 1
Application runtime	26083	0 s - 4294967294 s
Major FW version	26120	0 - 65000
Minor FW version	26121	0 - 65000
Unit product ID	26122	0 - FFFFFFFF
Unit GUID (0)	26123	0 - 4294967294
Unit GUID (1)	26124	0 - 4294967294

6.2.3.1 Serial numbers of units

Brief description	ID	Range
Group unit 1 serial number	21397	a-z, A-Z, 0-9
Group unit 2 serial number	21398	a-z, A-Z, 0-9
Group unit 3 serial number	21399	a-z, A-Z, 0-9
Group unit 4 serial number	21400	a-z, A-Z, 0-9
Group unit 5 serial number	21401	a-z, A-Z, 0-9
Group unit 6 serial number	21402	a-z, A-Z, 0-9
Group unit 7 serial number	21403	a-z, A-Z, 0-9
Group unit 8 serial number	21404	a-z, A-Z, 0-9
Group unit 9 serial number	21405	a-z, A-Z, 0-9
Group unit 10 serial number	21406	a-z, A-Z, 0-9

6.2.3.2 Controller serial numbers

Brief description	ID	Range
Group unit 1 controller serial number	21166	a-z, A-Z, 0-9
Group unit 2 controller serial number	21167	a-z, A-Z, 0-9
Group unit 3 controller serial number	21168	a-z, A-Z, 0-9
Group unit 4 controller serial number	21169	a-z, A-Z, 0-9
Group unit 5 controller serial number	21170	a-z, A-Z, 0-9
Group unit 6 controller serial number	21171	a-z, A-Z, 0-9
Group unit 7 controller serial number	21172	a-z, A-Z, 0-9
Group unit 8 controller serial number	21173	a-z, A-Z, 0-9
Group unit 9 controller serial number	21174	a-z, A-Z, 0-9

Brief description	ID	Range
Group unit 10 controller serial number	21175	a-z, A-Z, 0-9
Group controller display serial number	21176	a-z, A-Z, 0-9

6.3 Multifunctional IOs

Individually defined functions can be assigned to all digital and multifunctional inputs as well as all analogue and digital outputs. This is mainly implemented at the factory for each specific unit. The parameters of the multifunctional IO functions are set using corresponding function codes. Depending on the version of the evaluation electronics, up to four different electrical input signals can be evaluated. They are "Analogue NTC", "Analogue 0-10VDC", "Digital GND" and "Digital 24 VDC". The function codes are structured based on the different electrical input signals.

Function code	Input signal
00001 - 04999	Analogue NTC
05001 - 09999	Analogue 0-10VDC
10001 - 19999	Digital GND
20001 - 29999	Digital 24 VDC

There are two different controllers. One for units with continuous valve actuators and one for units with discreet (open/close) valve actuators.
Both controllers have one digital input and five multifunctional inputs. The controller for units with continuous valve actuators also has three analogue outputs. By contrast, the controller for units with discreet (open/close) valve actuators has one analogue output as well as two digital outputs.

An electrical input signal of Typ "Digital GND" can be connected and evaluated at the digital input DI1.

Electrical input signals of Typ "Analogue NTC", "Analogue 0-10VDC", "Digital GND" or "Digital 24 VDC" can be connected and evaluated at the five multifunctional inputs AI1, AI2, AI3, AI4 and AI5. The evaluation electronics has a protective wiring circuit that prevents damage when wiring with 24 V DC, even with a different configuration ("Analogue NTC", "Analogue 0-10VDC", "Digital GND").

0-10VDC electrical output signals can also be connected or output at the three analogue outputs AO1, AO2 and AO3 of the controller for units with continuous valve actuators.

0-10VDC electrical output signals can also be connected or output at the analogue output AO1 and electrical output signals 24 V DC/0.5 A can be connected or output at the two digital outputs DO1 and DO2 of the controller for units with discreet (open/close) valve actuators.

The signals of all outputs can be overridden by manual operation. The "AO AutoManual" (0=Auto, 1= Manual value) and "AO Manual value" (0.0 V - 10.0 V) parameters apply to digital outputs of the "DO AutoManual" (0=Auto, 1=Manual On, 2=Manual Off) parameters and to analogue outputs. The respective statuses "Dox signal" and "AOx signal" show the output signal issued at the output or possibly overridden by manual operation. Active manual mode is displayed as a fault.

ATTENTION: using manual modes renders safety functions (e.g. the heating valve opening when the frost protection thermostat is triggered) ineffective!

The respective "electrical" statuses applied at the inputs are displayed as a "DIx signal" or "AIx signal". The "DIx signal" statuses are displayed independently of the parameter settings of the function (NO or NC). The electrical wiring is critical (Contact closed = 1, Contact open = 0).

6.3.1 User-defined input signals

User-defined input signals can be used to display a total of four non-predefined actual values, signals, statuses or events. The parameters of four digital input signals (NC or NO), four passive analogue input signals (NTC)and four active analogue input signals (0-10VDC) can be set in each case.

The name of the input signals can be specified in the parameters. A maximum of 32 characters (a-z, A-Z, 0-9) can be used when setting the parameters.
The statuses of the digital input signals appear in the list of alarm management statuses.
The statuses of the analogue input signals appear in the list of actual value statuses.

If several units are coupled by means of a CAN-bus and operated together in a group, the name of the respective input signals specified in the parameters applies generally to all units in the group! Individual names cannot be assigned to each unit!

Responses can only be triggered by digital user-defined input signals. The function code of the desired response is specified via the "User-defined function 1 (NO/NC)", "User-defined function 2 (NO/NC)", "User-defined function 3 (NO/NC)" and "User-defined function 4 (NO/NC)" parameters (see Digital input). The possible functions and associated function codes are listed in the following table.

Function code	Description
10000	No function
10001	SupA fan (NC) [Note: function only with OA application]
10002	SupA fan (NO) [Note: function only with OA application]
10003	ExhA fan (NC) [Note: function only with OA application]
10004	ExhA fan (NO) [Note: function only with OA application]
10005	SecA fan (NC)
10006	SecA fan (NO)
10007	Frost protection thermostat (NC)
10008	Frost protection thermostat (NO)
10009	Condensate pump (NC)
10010	Condensate pump (NO)
10011	Rotor (NC) [Note: function only with OA application]
10012	Rotor (NO) [Note: function only with OA application]
10013	Filter (NC)
10014	Filter (NO)
10015	SupA filter (NC) [Note: function only with OA application]
10016	SupA filter (NO) [Note: function only with OA application]
10017	ExhA filter (NC) [Note: function only with OA application]
10018	ExhA filter (NO) [Note: function only with OA application]
10019	OA filter (NC) [Note: function only with OA application]
10020	OA filter (NO) [Note: function only with OA application]
10021	EHC operation (NC) [Note: function only with OA application]
10022	EHC operation (NO) [Note: function only with OA application]
10023	EHC max (NC) [Note: function only with OA application]
10024	EHC max (NO) [Note: function only with OA application]
10025	EHC fault (NC) [Note: function only with OA application]

Function code	Description
10026	EHC fault (NO) [Note: function only with OA application]
10027	EHC AFM (NC) [Note: function only with OA application]
10028	EHC AFM (NO) [Note: function only with OA application]
10029	EHC TM (NC) [Note: function only with OA application]
10030	EHC TM (NO) [Note: function only with OA application]
10031	EHC InA (NC) [Note: function only with OA application]
10032	EHC InA (NO) [Note: function only with OA application]
10033	FS priority 1 (NC)
10034	FS priority 1 (NO)
10035	CSE priority 2 (NC) [Note: function only with OA application]
10036	CSE priority 2 (NO) [Note: function only with OA application]
10037	FS priority 3 (NC) [Note: function only with OA application]
10038	FS priority 3 (NO) [Note: function only with OA application]
10039	Day operating program (NC)
10040	Day operating program (NO)
10041	Boost operating program (NC)
10042	Boost operating program (NO)
10043	Eco operating program (NC)
10044	Eco operating program (NO)
10045	Operating program Off (NC)
10046	Operating program Off (NO)
10047	Day operating program button
10048	Boost operating program button
10049	Eco operating program button
10050	Operating program Off button
10051	Recirculation mode (NC) [Note: function only with OA application]
10052	Recirculation mode (NO) [Note: function only with OA application]
10053	Heat requirement (NC) [Note: function only with OA application]
10054	Heat requirement (NO) [Note: function only with OA application]
10055	Cooling requirement (NC) [Note: function only with OA application]
10056	Cooling requirement (NO) [Note: function only with OA application]
10057	Summer (NC) [Note: function only with OA application]
10058	Summer (NO) [Note: function only with OA application]
10059	Cooling (NC)
10060	Cooling (NO)
10061	Heat generator (NC) [Note: function only with OA application]
10062	Heat generator (NO) [Note: function only with OA application]
10063	Chiller (NC) [Note: function only with OA application]
10064	Chiller (NO) [Note: function only with OA application]
10065	Heat pump (NC) [Note: function only with OA application]
10066	Heat pump (NO) [Note: function only with OA application]
10067	User-defined 1 (NC)
10068	User-defined 1 (NO)
10069	User-defined 2 (NC)
10070	User-defined 2 (NO)
10071	User-defined 3 (NC)
10072	User-defined 3 (NO)
10073	User-defined 4 (NC)
10074	User-defined 4 (NO)
10075	FD 1 closed (NC) [Note: function only with OA application]
10076	FD 1 closed (NO) [Note: function only with OA application]
10077	FD 2 closed (NC) [Note: function only with OA application]
10078	FD 2 closed (NO) [Note: function only with OA application]
10079	FD 3 closed (NC) [Note: function only with OA application]
10080	FD 3 closed (NO) [Note: function only with OA application]
10081	FD 4 closed (NC) [Note: function only with OA application]
10082	FD 4 closed (NO) [Note: function only with OA application]
10083	FD 1 open (NC) [Note: function only with OA application]

Function code	Description
10084	FD 1 open (NO) [Note: function only with OA application]
10085	FD 2 open (NC) [Note: function only with OA application]
10086	FD 2 open (NO) [Note: function only with OA application]
10087	FD 3 open (NC) [Note: function only with OA application]
10088	FD 3 open (NO) [Note: function only with OA application]
10089	FD 4 open (NC) [Note: function only with OA application]
10090	FD 4 open (NO) [Note: function only with OA application]
10091	FD contact (NC) [Note: function only with OA application]
10092	FD contact (NO) [Note: function only with OA application]
10093	Fault acknowledgement button
10094	inrush airing button
10095	inrush airing switch (NC)
10096	inrush airing switch (NO)
10097	Manual stage selection stage 1 (NC)
10098	Manual stage selection stage 1 (NO)
10099	Manual stage selection stage 2 (NC)
10100	Manual stage selection stage 2 (NO)
10101	Manual stage selection stage 3 (NC)
10102	Manual stage selection stage 3 (NO)
10103	Manual stage selection stage 4 (NC)
10104	Manual stage selection stage 4 (NO)
10105	Manual stage selection stage 5 (NC)
10106	Manual stage selection stage 5 (NO)
10107	Manual stage selection Off (NC)
10108	Manual stage selection Off (NO)
10109	OA louvre closed (NC) [Note: function only with OA application]
10110	OA louvre closed (NO) [Note: function only with OA application]
10111	EA louvre closed (NC) [Note: function only with OA application]
10112	EA louvre closed (NO) [Note: function only with OA application]

6.3.2 Analogue input NTC

Inputs whose parameters are set to "Analogue NTC" are monitored for wire breaks and short-circuits. A wire break or short-circuit is displayed as a fault. In addition, a permissible temperature range can be set for each parametrised function. This is also monitored and displayed as a fault when values are outside the prescribed limits. The function code parameters of a function may only be set once for all analogue NTC inputs, otherwise the value is not unique. If, nonetheless, the parameters of a function with the same function code are set several times, a fault is displayed. So the sensor can be adjusted, an Offset in the range of +/- 9.9 K can be set for each analogue NTC input. The possible functions and associated function codes are listed in the following table.

Function code	Name
0	No function
1	Room temperature
2	Supply air temperature
3	Outside temperature
4	Extract air temperature [Note: function only with OA application]
5	2p return temperature
6	4p heating return temperature
7	4p cooling return temperature
8	Heat generator return temperature [Note: function only with OA application]
9	Chiller return temperature [Note: function only with OA application]
10	Heat pump return temperature [Note: function only with OA application]
11	2p supply temperature
12	4p heating supply temperature

Function code	Name
13	4p cooling supply temperature
14	Heat generator supply temperature [Note: function only with OA application]
15	Chiller supply temperature [Note: function only with OA application]
16	Heat pump supply temperature [Note: function only with OA application]
17	User-defined 1 (NTC)
18	User-defined 2 (NTC)
19	User-defined 3 (NTC)
20	User-defined 4 (NTC)

If an exhaust air temperature sensor fitted in the unit is to be used instead of a room temperature sensor, the exhaust air temperature sensor must be connected to a multifunctional input configured as a room temperature sensor. The flushing function may need to be activated to ensure correct detection of the exhaust air temperature and room temperature.

6.3.3 Analogue 0-10VDC input

The function code of a function may only be programmed once for all analogue 0-10VDC inputs, otherwise the value is not unique. If, nonetheless, the parameters of a function are set several times, a fault is displayed. The possible functions and associated function codes are listed in the following table.

Function code	Name
5000	No function
5001	CO2 sensor
5002	VOC sensor
5003	rH sensor
5004	Filter
5005	SupA filter [Note: function only with OA application]
5006	ExhA filter [Note: function only with OA application]
5007	OA filter [Note: function only with OA application]
5008	SupA volumetric flow [Note: function only with OA application]
5009	ExhA volumetric flow [Note: function only with OA application]
5010	SupA duct pressure [Note: function only with OA application]
5011	ExhA duct pressure [Note: function only with OA application]
5012	User-defined 1 (0-10VDC)
5013	User-defined 2 (0-10VDC)
5014	User-defined 3 (0-10VDC)
5015	User-defined 4 (0-10VDC)

6.3.4 Digital GND input

The function code of a function may also be programmed several times for all digital GND inputs. If a function with the same function code is programmed several times, the signals are ORed and merged into a common signal. Function codes can be programmed as NO (normally open) and NC (normally closed) for all digital GND inputs. The possible functions and associated function codes are listed in the following table.

Function code	Name
10000	No function
10001	SupA fan (NC) [Note: function only with OA application]
10002	SupA fan (NO) [Note: function only with OA application]
10003	ExhA fan (NC) [Note: function only with OA application]
10004	ExhA fan (NO) [Note: function only with OA application]
10005	SecA fan (NC)

Function code	Name
10006	SecA fan (NO)
10007	Frost protection thermostat (NC)
10008	Frost protection thermostat (NO)
10009	Condensate pump (NC)
10010	Condensate pump (NO)
10011	Rotor (NC) [Note: function only with OA application]
10012	Rotor (NO) [Note: function only with OA application]
10013	Filter (NC)
10014	Filter (NO)
10015	SupA filter (NC) [Note: function only with OA application]
10016	SupA filter (NO) [Note: function only with OA application]
10017	ExhA filter (NC) [Note: function only with OA application]
10018	ExhA filter (NO) [Note: function only with OA application]
10019	OA filter (NC) [Note: function only with OA application]
10020	OA filter (NO) [Note: function only with OA application]
10021	EHC operation (NC) [Note: function only with OA application]
10022	EHC operation (NO) [Note: function only with OA application]
10023	EHC max (NC) [Note: function only with OA application]
10024	EHC max (NO) [Note: function only with OA application]
10025	EHC fault (NC) [Note: function only with OA application]
10026	EHC fault (NO) [Note: function only with OA application]
10027	EHC AFM (NC) [Note: function only with OA application]
10028	EHC AFM (NO) [Note: function only with OA application]
10029	EHC TM (NC) [Note: function only with OA application]
10030	EHC TM (NO) [Note: function only with OA application]
10031	EHC InA (NC) [Note: function only with OA application]
10032	EHC InA (NO) [Note: function only with OA application]
10033	FS priority 1 (NC)
10034	FS priority 1 (NO)
10035	CSE priority 2 (NC) [Note: function only with OA application]
10036	CSE priority 2 (NO) [Note: function only with OA application]
10037	FS priority 3 (NC) [Note: function only with OA application]
10038	FS priority 3 (NO) [Note: function only with OA application]
10039	Day operating program (NC)
10040	Day operating program (NO)
10041	Boost operating program (NC)
10042	Boost operating program (NO)
10043	Eco operating program (NC)
10044	Eco operating program (NO)
10045	Operating program Off (NC)
10046	Operating program Off (NO)
10047	Day operating program button
10048	Boost operating program button
10049	Eco operating program button
10050	Operating program Off button
10051	Recirculation mode (NC) [Note: function only with OA application]
10052	Recirculation mode (NO) [Note: function only with OA application]
10053	Heat requirement (NC) [Note: function only with OA application]
10054	Heat requirement (NO) [Note: function only with OA application]
10055	Cooling requirement (NC) [Note: function only with OA application]
10056	Cooling requirement (NO) [Note: function only with OA application]
10057	Summer (NC) [Note: function only with OA application]
10058	Summer (NO) [Note: function only with OA application]
10059	Cooling (NC)
10060	Cooling (NO)
10061	Heat generator(NC) [Note: function only with OA application]
10062	Heat generator(NO) [Note: function only with OA application]
10063	Chiller (NC) [Note: function only with OA application]

Function code	Name
10064	Chiller (NO) [Note: function only with OA application]
10065	Heat pump (NC) [Note: function only with OA application]
10066	Heat pump (NO) [Note: function only with OA application]
10067	User-defined 1 (NC)
10068	User-defined 1 (NO)
10069	User-defined 2 (NC)
10070	User-defined 2 (NO)
10071	User-defined 3 (NC)
10072	User-defined 3 (NO)
10073	User-defined 4 (NC)
10074	User-defined 4 (NO)
10075	FD 1 closed (NC) [Note: function only with OA application]
10076	FD 1 closed (NO) [Note: function only with OA application]
10077	FD 2 closed (NC) [Note: function only with OA application]
10078	FD 2 closed (NO) [Note: function only with OA application]
10079	FD 3 closed (NC) [Note: function only with OA application]
10080	FD 3 closed (NO) [Note: function only with OA application]
10081	FD 4 closed (NC) [Note: function only with OA application]
10082	FD 4 closed (NO) [Note: function only with OA application]
10083	FD 1 open (NC) [Note: function only with OA application]
10084	FD 1 open (NO) [Note: function only with OA application]
10085	FD 2 open (NC) [Note: function only with OA application]
10086	FD 2 open (NO) [Note: function only with OA application]
10087	FD 3 open (NC) [Note: function only with OA application]
10088	FD 3 open (NO) [Note: function only with OA application]
10089	FD 4 open (NC) [Note: function only with OA application]
10090	FD 4 open (NO) [Note: function only with OA application]
10091	FD contact (NC) [Note: function only with OA application]
10092	FD contact (NO) [Note: function only with OA application]
10093	Fault acknowledgement button
10094	inrush airing button
10095	inrush airing switch (NC)
10096	inrush airing switch (NO)
10097	Manual stage selection stage 1 (NC)
10098	Manual stage selection stage 1 (NO)
10099	Manual stage selection stage 2 (NC)
10100	Manual stage selection stage 2 (NO)
10101	Manual stage selection stage 3 (NC)
10102	Manual stage selection stage 3 (NO)
10103	Manual stage selection stage 4 (NC)
10104	Manual stage selection stage 4 (NO)
10105	Manual stage selection stage 5 (NC)
10106	Manual stage selection stage 5 (NO)
10107	Manual stage selection Off (NC)
10108	Manual stage selection Off (NO)
10109	OA louvre closed (NC) [Note: function only with OA application]
10110	OA louvre closed (NO) [Note: function only with OA application]
10111	EA louvre closed (NC) [Note: function only with OA application]
10112	EA louvre closed (NO) [Note: function only with OA application]

6.3.5 Digital 24 V DC input

The function code of a function may also be programmed several times for all digital inputs. If a function with the same function code is programmed several times, the signals are ORed and merged into a common signal. Function codes can be programmed as NO (normally open) and as NC (normally closed) for all digital 24 V DC inputs. The possible functions and associated function codes are listed in the following table.

Function code	Name
20000	No function
20001	SupA fan (NC) [Note: function only with OA application]
20002	SupA fan (NO) [Note: function only with OA application]
20003	ExhA fan (NC) [Note: function only with OA application]
20004	ExhA fan (NO) [Note: function only with OA application]
20005	SecA fan (NC)
20006	SecA fan (NO)
20007	Frost protection thermostat (NC)
20008	Frost protection thermostat (NO)
20009	Condensate pump (NC)
20010	Condensate pump (NO)
20011	Rotor (NC) [Note: Function only with OA application]
20012	Rotor (NO) [Note: function only with OA application]
20013	Filter (NC)
20014	Filter (NO)
20015	SupA filter (NC) [Note: function only with OA application]
20016	SupA filter (NO) [Note: function only with OA application]
20017	ExhA filter (NC) [Note: function only with OA application]
20018	ExhA filter (NO) [Note: function only with OA application]
20019	OA filter (NC) [Note: function only with OA application]
20020	OA filter (NO) [Note: function only with OA application]
20021	EHC operation (NC) [Note: function only with OA application]
20022	EHC operation (NO) [Note: function only with OA application]
20023	EHC max (NC) [Note: function only with OA application]
20024	EHC max (NO) [Note: function only with OA application]
20025	EHC fault (NC) [Note: function only with OA application]
20026	EHC fault (NO) [Note: function only with OA application]
20027	EHC AFM (NC) [Note: function only with OA application]
20028	EHC AFM (NO) [Note: function only with OA application]
20029	EHC TM (NC) [Note: function only with OA application]
20030	EHC TM (NO) [Note: function only with OA application]
20031	EHC InA (NC) [Note: function only with OA application]
20032	EHC InA (NO) [Note: function only with OA application]
20033	FS priority 1 (NC)
20034	FS priority 1 (NO)
20035	CSE priority 2 (NC) [Note: function only with OA application]
20036	CSE priority 2 (NO) [Note: function only with OA application]
20037	FS priority 3 (NC) [Note: function only with OA application]
20038	FS priority 3 (NO) [Note: function only with OA application]
20039	Day operating program (NC)
20040	Day operating program (NO)
20041	Boost operating program (NC)
20042	Boost operating program (NO)
20043	Eco operating program (NC)
20044	Eco operating program (NO)
20045	Operating program Off (NC)
20046	Operating program Off (NO)
20047	Day operating program button
20048	Boost operating program button
20049	Eco operating program button
20050	Operating program Off button
20051	Recirculation mode (NC) [Note: function only with OA application]
20052	Recirculation mode (NO) [Note: function only with OA application]
20053	Heat requirement (NC) [Note: function only with OA application]
20054	Heat requirement (NO) [Note: function only with OA application]
20055	Cooling requirement (NC) [Note: function only with OA application]
20056	Cooling requirement (NO) [Note: function only with OA application]

Function code	Name
20057	Summer (NC) [Note: function only with OA application]
20058	Summer (NO) [Note: function only with OA application]
20059	Cooling (NC)
20060	Cooling (NO)
20061	Heat generator(NC) [Note: function only with OA application]
20062	Heat generator(NO) [Note: function only with OA application]
20063	Chiller (NC) [Note: function only with OA application]
20064	Chiller (NO) [Note: function only with OA application]
20065	Heat pump (NC) [Note: function only with OA application]
20066	Heat pump (NO) [Note: function only with OA application]
20067	User-defined 1 (NC)
20068	User-defined 1 (NO)
20069	User-defined 2 (NC)
20070	User-defined 2 (NO)
20071	User-defined 3 (NC)
20072	User-defined 3 (NO)
20073	User-defined 4 (NC)
20074	User-defined 4 (NO)
20075	FD 1 closed (NC) [Note: function only with OA application]
20076	FD 1 closed (NO) [Note: function only with OA application]
20077	FD 2 closed (NC) [Note: function only with OA application]
20078	FD 2 closed (NO) [Note: function only with OA application]
20079	FD 3 closed (NC) [Note: function only with OA application]
20080	FD 3 closed (NO) [Note: function only with OA application]
20081	FD 4 closed (NC) [Note: function only with OA application]
20082	FD 4 closed (NO) [Note: function only with OA application]
20083	FD 1 open (NC) [Note: function only with OA application]
20084	FD 1 open (NO) [Note: function only with OA application]
20085	FD 2 open (NC) [Note: function only with OA application]
20086	FD 2 open (NO) [Note: function only with OA application]
20087	FD 3 open (NC) [Note: function only with OA application]
20088	FD 3 open (NO) [Note: function only with OA application]
20089	FD 4 open (NC) [Note: function only with OA application]
20090	FD 4 open (NO) [Note: function only with OA application]
20091	FD contact (NC) [Note: function only with OA application]
20092	FD contact (NO) [Note: function only with OA application]
20093	Fault acknowledgement button
20094	inrush airing button
20095	Shock ventilation switch (NC)
20096	Shock ventilation switch (NO)
20097	Manual stage selection stage 1 (NC)
20098	Manual stage selection stage 1 (NO)
20099	Manual stage selection stage 2 (NC)
20100	Manual stage selection stage 2 (NO)
20101	Manual stage selection stage 3 (NC)
20102	Manual stage selection stage 3 (NO)
20103	Manual stage selection stage 4 (NC)
20104	Manual stage selection stage 4 (NO)
20105	Manual stage selection stage 5 (NC)
20106	Manual stage selection stage 5 (NO)
20107	Manual stage selection Off (NC)
20108	Manual stage selection Off (NO)
20109	OA louvre closed (NC) [Note: function only with OA application]
20110	OA louvre closed (NO) [Note: function only with OA application]
20111	EA louvre closed (NC) [Note: function only with OA application]
20112	EA louvre closed (NO) [Note: function only with OA application]

6.3.6 User-defined output signals

A status/signal can be defined for certain operating statuses ("Off", "Day cooling", "Eco cooling", "Boost cooling", "Day heating", "Eco heating", and "Boost heating") to control air outlets (e.g. KaMax), continuous volumetric flow controllers, etc., and transmitted via an output.
Two digital output signals or two analogue output signals can be programmed. There are no fault responses that will have a direct effect on the situation in this case. The name of the output signals cannot be set in the parameters.

The "Operating mode configuration" (see section "Temperature control") parameter defines which operating modes are essentially covered by the respective unit.

When selecting the "Operating mode configuration" as "1 = 2-pipe heating of cooling", "2 = 2-pipe HC heating only" or "3 = 2-pipe HC cooling only", "Heating" or "Cooling" is set via the DI, ST or BMS, and consequently is defined for the above user-defined output signals. The digital output "Heating/cooling" then switches to "Heating" or "Cooling" as per the default setting.

When "Operating mode configuration" is configured as "4 = 4-pipe heating or cooling", "Heating" or "Cooling" is then set depending on the two PID control algorithms for heating and for cooling. If the output signal of the PID control algorithm "Heating" is > 0%, "Heating" applies to the user-defined output signals. Accordingly, the digital output "Heating/cooling" then switches to "Heating". If the output signal of the PID control algorithm "Cooling" is > 0%, then "Cooling" applies to the user-defined output signals. Accordingly, the digital output "Heating/cooling" then switches to "Cooling". There is no evaluation or definition within an existing or configured neutral zone and the user-defined output signals and the "Heating/cooling" digital output remain unchanged. If the heating/cooling switchover is used for winter/summer switchover (see section "Heating and cooling with transition time"), the definition depends on this.

When "Operating mode configuration" is configured as "5 = 2-pipe always heating only", operating statuses that are related to "Cooling" are excluded. This means that only the signals of the "Off", "Day heating", "Eco heating" or "Boost heating" operating statuses are assigned to the user-defined output signals.
The "Heating/cooling" digital output is then permanently "Heating".
When the heating/cooling switchover is used for winter/summer switchover (see section "Heating and cooling with transition time"), the definition depends on this. The signals of the "Day cooling", "Eco cooling" or "Boost cooling" operating statuses are also assigned to the user-defined output signals.
The "Heating/cooling" digital output then switches the default setting to "Heating" or "Cooling" accordingly.

When "6 = 2-pipe always cooling only" is selected as the "configuration operating mode", operating statuses that are related to "Heating" are excluded. Therefore, only the signals of the "Off", "Day cooling", "Eco cooling" or "Boost cooling" operating statuses are assigned to the user-defined output signals.
The "Heating/cooling" digital output is then permanently "Cooling".
When the heating/cooling switchover is used for winter/summer switchover (see section "Heating and cooling with transition time"), the definition depends on this. Consequently, the signals of the "Day heating", "Eco heating" or "Boost heating" operating statuses are also assigned to the user-defined output signals.

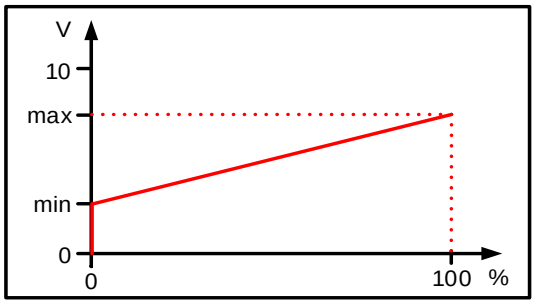
The "heating/cooling" digital output then switches the default setting to "Heating" or "Cooling" accordingly.

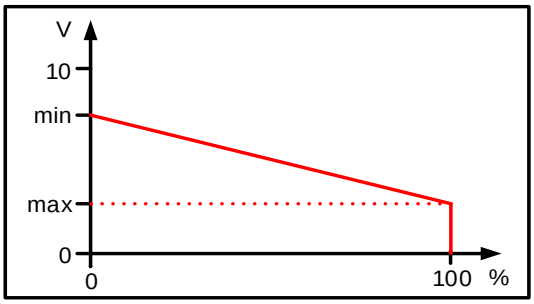
6.3.7 Analogue 0-10VDC output

The possible functions and associated function codes are listed in the following table.

Function code	Name
0	No function
1	SupA fan speed
2	SupA fan speed [Note: function only with OA application]
3	ExhA fan speed [Note: function only with OA application]
4	OA louvre [Note: function only with OA application]
5	EA louvre [Note: function only with OA application]
6	MA louvre [Note: function only with OA application]
7	Waste heat [Note: function only with OA application]
8	Electric heating coil [Note: function only with OA application]
9	K2O [Note: function only with OA application]
10	4p heating valve
11	4p cooling valve
12	2p heating/cooling valve
13	HR/CR [Note: function only with OA application]
14	User-defined 1
15	User-defined 2
16	User-defined 3 [Note: function only with OA application]
17	User-defined 4 [Note: function only with OA application]
18	Heating/cooling six-way valve
19	OA rate (primary air)

The generated signals (0-100%) can subsequently be scaled, for example to control 0-10VDC and 2-10 V DC actuators. This is done by setting the "AOx min" and "AOx max" parameters. The following diagram explains the functional principle.





6.3.8 Non-floating N/O output

The possible functions and associated function codes are listed in the following table.

Function code	Name
0	No function
1	2p heating/cooling valve
2	4p heating valve
3	4p cooling valve
4	Heat requirement (group)
5	Cooling requirement (group)
6	General fault (group)
7	Message (group)
8	HG activation [Note: function only with OA application]
9	Ch activation [Note: function only with OA application]

Function code	Name
10	HP activation [Note: function only with OA application]
11	HC HP (1 = cooling) [Note: function only with OA application]
12	HC valve (1 = cooling) [Note: function only with OA application]
13	HP/HG valve (1 = HG) [Note: function only with OA application]
14	OA louvre [Note: function only with OA application]
15	EA louvre [Note: function only with OA application]
16	MA louvre [Note: function only with OA application]
17	HC secondary pump [Note: function only with OA application]
18	H secondary pump [Note: function only with OA application]
19	C secondary pump [Note: function only with OA application]
20	RecA louvre [Note: function only with OA application]
21	FS priority 1
22	CSE priority 2 [Note: function only with OA application]
23	FS priority 3 [Note: function only with OA application]
24	Day operating program
25	Boost operating program
26	Eco operating program
27	Operating program Off
28	Summer/winter (1 = Summer) [Note: function only with OA application]
29	Heating/cooling (1 = Cooling)
30	FD 1 (1 = open) [Note: function only with OA application]
31	FD 2 (1 = open) [Note: function only with OA application]
32	FD 3 (1 = open) [Note: function only with OA application]
33	FD 4 (1 = open) [Note: function only with OA application]
34	SecA activation
35	SupA activation [Note: function only with OA application]
36	ExhA activation [Note: function only with OA application]
37	Waste heat [Note: function only with OA application]
38	Electric heating coil [Note: function only with OA application]
39	K2O [Note: function only with OA application]
40	HR/CR [Note: function only with OA application]
41	inrush airing
42	HG pump [Note: function only with OA application]
43	Ch pump [Note: function only with OA application]
44	HP pump [Note: function only with OA application]
45	HC pump [Note: function only with OA application]
46	User-defined 1
47	User-defined 2
48	User-defined 3
49	User-defined 4
50	OA rate (primary air)

6.3.9 Statuses in the event of control failure (FailSave)

In rare cases, input signals may no longer be evaluated or updated or open and closed-loop control functions processed correctly. To cater for these kinds of scenarios, for safety reasons "FailSave statuses", i.e. safe statuses which can be adopted in the event of a fault, are defined for the analogue and digital outputs. These depend on the specific configuration of the output.

6.3.9.1 Analogue 0-10VDC output

Function code	Name	FailSave status
1	SupA fan speed	0% / 0.00 V
2	SupA fan speed [Note: function only with OA application]	0% / 0.00 V
3	ExhA fan speed [Note: function only with OA application]	0% / 0.00 V
4	OA louvre [Note: function only with OA application]	0% / 0.00 V

Function code	Name	FailSave status
5	EA louvre [Note: function only with OA application]	0% / 0.00 V
6	MA louvre [Note: function only with OA application]	0% / 0.00 V
7	Waste heat [Note: function only with OA application]	0% / 0.00 V
8	Electric heating register [Note: function only for OA application]	0% / 0.00 V
9	K2O [Note: function only with OA application]	0% / 0.00 V
10	4p heating valve	100% / 10.00 V
11	4p cooling valve	0% / 0.00 V
12	2p heating/cooling valve	100% / 10.00 V
13	HR/CR [Note: function only with OA application]	0% / 0.00 V
14	User-defined 1	0% / 0.00 V
15	User-defined 2	0% / 0.00 V
16	User-defined 3	0% / 0.00 V
17	User-defined 4	0% / 0.00 V
18	Heating/cooling six-way valve	0% / 0.00 V
19	OA rate (primary air)	0% / 0.00 V

6.3.9.2 Digital non-floating N/O output

Function code	Name	FailSave status
1	2p heating/cooling valve	on
2	4p heating valve	on
3	4p cooling valve	off
4	Heat requirement	on
5	Cooling requirement	off
6	General fault	on
7	Message	off
8	HG activation [Note: function only with OA application]	on
9	Ch activation [Note: function only with OA application]	off
10	HP activation [Note: function only with OA application]	on
11	HC HP [Note: function only with OA application]	off
12	HC valve [Note: function only with OA application]	off
13	HP/HG valve [Note: function only with OA application]	off
14	OA louvre [Note: function only with OA application]	off
15	EA louvre [Note: function only with OA application]	off
16	MA louvre [Note: function only with OA application]	off
17	HC secondary pump [Note: function only with OA application]	on
18	H secondary pump [Note: function only with OA application]	on
19	C secondary pump [Note: function only with OA application]	off
20	RecA louvre [Note: function only with OA application]	off
21	FS priority 1	off
22	CSE priority 2 [Note: function only with OA application]	off
23	FS priority 3 [Note: function only with OA application]	off
24	Day operating program	off
25	Boost operating program	off
26	Eco operating program	off
27	Operating mode Off	off
28	Summer/winter [Note: function only with OA application]	off
29	Heating/cooling	off
30	FD 1 [Note: function only with OA application]	off
31	FD 2 [Note: function only with OA application]	off
32	FD 3 [Note: function only with OA application]	off
33	FD 4 [Note: function only with OA application]	off
34	SecA activation	off
35	SupA activation [Note: function only with OA application]	off
36	ExhA activation [Note: function only with OA application]	off
37	Waste heat [Note: function only with OA application]	off
38	Electric heating coil [Note: function only with OA application]	off

Function code	Name	FailSave status
39	K2O [Note: function only with OA application]	off
40	HR/CR [Note: function only with OA application]	off
41	inrush airing	off
42	HG pump [Note: function only with OA application]	on
43	Ch pump [Note: function only with OA application]	off
44	HP pump [Note: function only with OA application]	on
45	HC pump [Note: function only with OA application]	on
46	User-defined 1	off
47	User-defined 2	off
48	User-defined 3	off
49	User-defined 4	off
50	OA rate (primary air)	off

6.3.10 Coded motor fault

The fan types installed in some unit series (KaCool D AF) output a "coded motor fault" instead of a "simple motor fault" (OK or fault) which communicates specific information via pulses with a specific pulse-pause ratio (see LED flashing code).
The “Detection of secondary fan fault” parameter can be used to activate pulse evaluation. The following settings are possible:
0 = Pulse evaluation not activated ("simple motor fault")
1 = Pulse evaluation activated (“coded motor fault”)
When pulse evaluation is activated, the "SecA fan (NO)" function is permanently set as the digital input DI 1 configuration.
A "coded motor fault" is only evaluated if the fan speed control (SecA fan speed) is higher than 20%.
Fault responses and displays are issued independently of the selection made.
If pulse evaluation is activated, the status "Number of detected pulses" indicates the "coded motor fault". The following list shows the importance of the pulses detected:

- 0 = Fan is rotating and there is no fault message (fan speed > 20%, normal operation)
- 2 = Inverter output power consumption too high
- 3 = Input voltage too low / too high
- 5 = Electronics temperature too high
- 6 = Fan running asynchronously
- 7 = Rotor position fault
- 8 = Fan speed outside the normal range
- 9 = EEPROM error
- 10 = Electronics parameter error
- 255 = Fan is not being actuated (speed < 20%, normal operation) or
  Fan has no supply voltage or
  Fan (fault signal contact) is not connected to the controller

The "Last fan fault code" status stores the number of pulses detected by the last "coded motor fault". The meanings of the pulses detected are explained in the following list:

- 2 = Inverter output power consumption too high
- 3 = Input voltage too low / too high
- 5 = Electronics temperature too high
- 6 = Fan running asynchronously
- 7 = Rotor position fault

8 = Fan speed outside the normal range
9 = EEPROM error
10 = Electronics parameter error

6.3.11 Parameters

6.3.11.1 Multifunctional inputs

6.3.11.1.1 Configuration

Brief description	ID	Range	Default
AI1 function code	20658	0 - 29999	0
AI2 function code	20700	0 - 29999	0
AI3 function code	20702	0 - 29999	0
AI4 function code	20704	0 - 29999	0
AI5 function code	20706	0 - 29999	0
AI1 Offset	20709	-9.9 K - 9.9 K	0.0 K
AI2 Offset	20710	-9.9 K - 9.9 K	0.0 K
AI3 Offset	20711	-9.9 K - 9.9 K	0.0 K
AI4 Offset	20712	-9.9 K - 9.9 K	0.0 K
AI5 Offset	20713	-9.9 K - 9.9 K	0.0 K

6.3.11.2 Digital inputs

6.3.11.2.1 Configuration

Brief description	ID	Range	Default
DI1 function code	20734	10000 - 19999	10000

6.3.11.3 Analogue outputs

6.3.11.3.1 Configuration

Brief description	ID	Range	Default
AO1 function code	21091	0 - 19	0
AO2 function code	21092	0 - 19	0
AO3 function code	21093	0 - 19	0
AO1 AutoManual	21097	0 - 1	0
AO2 AutoManual	21098	0 - 1	0
AO3 AutoManual	21099	0 - 1	0
AO1 Manual value	21103	0.0 V - 10.0 V	0.0 V
AO2 Manual value	21104	0.0 V - 10.0 V	0.0 V
AO3 Manual value	21105	0.0 V - 10.0 V	0.0 V
AA1 min	21109	0.0 V - 10.0 V	0.0 V
AO2 min	21110	0.0 V - 10.0 V	0.0 V
AO3 min	21111	0.0 V - 10.0 V	0.0 V
AO1 max	21115	0.0 V - 10.0 V	10.0 V
AA2 max	21116	0.0 V - 10.0 V	10.0 V
AO3 max	21117	0.0 V - 10.0 V	10.0 V

6.3.11.4 Digital outputs

6.3.11.4.1 Configuration

Brief description	ID	Range	Default
DO1 function code	21067	0 - 50	0
DO2 function code	21068	0 - 50	0
DO1 AutoManualManual value	21075	0 - 2	0
DO2 AutoManualManual value	21076	0 - 2	0

6.3.11.5 User-defined input signals

6.3.11.5.1 Configuration

Brief description	ID	Range	Default
Name user-defined 1 (NO/NC)	20962	a-z, A-Z, 0-9	BB1DE
Name user-defined 2 (NO/NC)	20964	a-z, A-Z, 0-9	BB2DE
Name user-defined 3 (NO/NC)	20966	a-z, A-Z, 0-9	BB3DE
Name user-defined 4 (NO/NC)	20968	a-z, A-Z, 0-9	BB4DE
Name user-defined 1 (NTC)	20946	a-z, A-Z, 0-9	BB1NTC
Name user-defined 2 (NTC)	20948	a-z, A-Z, 0-9	BB2NTC
Name user-defined 3 (NTC)	20950	a-z, A-Z, 0-9	BB3NTC
Name user-defined 4 (NTC)	20952	a-z, A-Z, 0-9	BB4NTC
Name user-defined 1 (0-10VDC)	20954	a-z, A-Z, 0-9	BB10-10
Name user-defined 2 (0-10VDC)	20956	a-z, A-Z, 0-9	BB20-10
Name user-defined 3 (0-10VDC)	20958	a-z, A-Z, 0-9	BB30-10
Name user-defined 4 (0-10VDC)	20960	a-z, A-Z, 0-9	BB40-10
Function user-defined 1 (NO/NC)	21887	10000 - 19999	10000
Function user-defined 2 (NO/NC)	21888	10000 - 19999	10000
Function user-defined 3 (NO/NC)	21889	10000 - 19999	10000
Function user-defined 4 (NO/NC)	21890	10000 - 19999	10000

6.3.11.6 User-defined output signals

6.3.11.6.1 Configuration (digital signals)

Brief description	ID	Range	Default
User-defined signal 1 Off (DO)	21288	0 - 1	0
Day cooling user-defined signal 1 (DO)	21289	0 - 1	0
Eco cooling user-defined signal 1 (DO)	21290	0 - 1	0
Boost cooling user-defined signal 1 (DO)	21291	0 - 1	0
Day heating user-defined signal 1 (DO)	21292	0 - 1	0
Eco heating user-defined signal 1 (DO)	21293	0 - 1	0
Boost heating user-defined signal 1 (DO)	21294	0 - 1	0
User-defined signal 2 Off (DO)	21295	0 - 1	0
Day cooling user-defined signal 2 (DO)	21296	0 - 1	0
Eco cooling user-defined signal 2 (DO)	21297	0 - 1	0
Boost cooling user-defined signal 2 (DO)	21298	0 - 1	0
Day heating user-defined signal 2 (DO)	21299	0 - 1	0
Eco heating user-defined signal 2 (DO)	21300	0 - 1	0
Boost heating user-defined signal 2 (DO)	21301	0 - 1	0

6.3.11.6.2 Configuration (analogue signals)

Brief description	ID	Range	Default
User-defined signal 1 Off (AO)	21274	0.0 V - 10.0 V	0.0 V
Day cooling user-defined signal 1 (AO)	21275	0.0 V - 10.0 V	0.0 V
Eco cooling user-defined signal 1 (AO)	21276	0.0 V - 10.0 V	0.0 V
Boost cooling user-defined signal 1 (AO)	21277	0.0 V - 10.0 V	0.0 V
Day heating user-defined signal 1 (AO)	21278	0.0 V - 10.0 V	0.0 V
Eco heating user-defined signal 1 (AO)	21279	0.0 V - 10.0 V	0.0 V
Boost heating user-defined signal 1 (AO)	21280	0.0 V - 10.0 V	0.0 V
User-defined signal 2 Off (AO)	21281	0.0 V - 10.0 V	0.0 V
Day cooling user-defined signal 2 (AO)	21282	0.0 V - 10.0 V	0.0 V
Eco cooling user-defined signal 2 (AO)	21283	0.0 V - 10.0 V	0.0 V
Boost cooling user-defined signal 2 (AO)	21284	0.0 V - 10.0 V	0.0 V
Day heating user-defined signal 2 (AO)	21285	0.0 V - 10.0 V	0.0 V
Eco heating user-defined signal 2 (AO)	21286	0.0 V - 10.0 V	0.0 V
Boost heating user-defined signal 2 (AO)	21287	0.0 V - 10.0 V	0.0 V

6.3.11.7 Coded motor fault

Brief description	ID	Range	Default
Secondary fan fault detection	21364	0 - 1	0

6.3.12 Group unit parameters

6.3.12.1 Multifunctional inputs

6.3.12.1.1 Configuration

Brief description	ID array(10)	Range	Default
AI1 function code	25658	0 - 29999	0
AI2 function code	25700	0 - 29999	0
AI3 function code	25702	0 - 29999	0
AI4 function code	25704	0 - 29999	0
AI5 function code	25706	0 - 29999	0
AI1 Offset	25709	-9.9 K - 9.9 K	0.0 K
AI2 Offset	25710	-9.9 K - 9.9 K	0.0 K
AI3 Offset	25711	-9.9 K - 9.9 K	0.0 K
AI4 Offset	25712	-9.9 K - 9.9 K	0.0 K
AI5 Offset	25713	-9.9 K - 9.9 K	0.0 K

6.3.12.2 Digital inputs

6.3.12.2.1 Configuration

Brief description	ID array(10)	Range	Default
DI1 function code	25734	10000 - 19999	10000

6.3.12.3 Analogue outputs

6.3.12.3.1 Configuration

Brief description	ID array(10)	Range	Default
AO1 function code	26091	0 - 19	0
AO2 function code	26092	0 - 19	0
AO3 function code	26093	0 - 19	0
AA1 AutoManual	26097	0 - 1	0
AO2 AutoManual	26098	0 - 1	0
AO3 AutoManual	26099	0 - 1	0
AO1 Manual value	26103	0.0 V - 10.0 V	0.0 V
AO2 Manual value	26104	0.0 V - 10.0 V	0.0 V
AO3 Manual value	26105	0.0 V - 10.0 V	0.0 V
AA1 min	26109	0.0 V - 10.0 V	0.0 V
AO2 min	26110	0.0 V - 10.0 V	0.0 V
AO3 min	26111	0.0 V - 10.0 V	0.0 V
AO1 max	26115	0.0 V - 10.0 V	10.0 V
AO2 max	26116	0.0 V - 10.0 V	10.0 V
AO3 max	26117	0.0 V - 10.0 V	10.0 V

6.3.12.4 Digital outputs

6.3.12.4.1 Configuration

Brief description	ID array(10)	Range	Default
DO1 function code	26067	0 - 50	0
DO2 function code	26068	0 - 50	0
DO1 AutoManualManual value	26075	0 - 2	0
DO2 AutoManualManual value	26076	0 - 2	0

6.3.12.5 User-defined output signals

6.3.12.5.1 Configuration (digital signals)

Brief description	ID array(10)	Range	Default
User-defined signal 1 Off (DO)	26288	0 - 1	0
Day cooling user-defined signal 1 (DO)	26289	0 - 1	0
Eco cooling user-defined signal 1 (DO)	26290	0 - 1	0
Boost cooling user-defined signal 1 (DO)	26291	0 - 1	0
Day heating user-defined signal 1 (DO)	26292	0 - 1	0
Eco heating user-defined signal 1 (DO)	26293	0 - 1	0
Boost heatinguser-defined signal 1 (DO)	26294	0 - 1	0
User-defined signal 2 Off (DO)	26295	0 - 1	0
Day cooling user-defined signal 2 (DO)	26296	0 - 1	0
Eco cooling user-defined signal 2 (DO)	26297	0 - 1	0
Boost cooling user-defined signal 2 (DO)	26298	0 - 1	0
Day heating user-defined signal 2 (DO)	26299	0 - 1	0
Eco heating user-defined signal 2 (DO)	26300	0 - 1	0
Boost heating user-defined signal 2 (DO)	26301	0 - 1	0

6.3.12.5.2 Configuration (analogue signals)

Brief description	ID array(10)	Range	Default
User-defined signal 1 Off (AO)	26274	0.0 V - 10.0 V	0.0 V
Day heating user-defined signal 1 (AO)	26275	0.0 V - 10.0 V	0.0 V
Eco cooling user-defined signal 1 (AO)	26276	0.0 V - 10.0 V	0.0 V
Boost cooling user-defined signal 1 (AO)	26277	0.0 V - 10.0 V	0.0 V
Day heating user-defined signal 1 (AO)	26278	0.0 V - 10.0 V	0.0 V
Eco heating user-defined signal 1 (AO)	26279	0.0 V - 10.0 V	0.0 V
Boost heating user-defined signal 1 (AO)	26280	0.0 V - 10.0 V	0.0 V
User-defined signal 2 Off (AO)	26281	0.0 V - 10.0 V	0.0 V
Day cooling user-defined signal 2 (AO)	26282	0.0 V - 10.0 V	0.0 V
Eco cooling user-defined signal 2 (AO)	26283	0.0 V - 10.0 V	0.0 V
Boost cooling user-defined signal 2 (AO)	26284	0.0 V - 10.0 V	0.0 V
Day heating user-defined signal 2 (AO)	26285	0.0 V - 10.0 V	0.0 V
Eco heating user-defined signal 2 (AO)	26286	0.0 V - 10.0 V	0.0 V
Boost heating user-defined signal 2 (AO)	26287	0.0 V - 10.0 V	0.0 V

6.3.12.6 Coded motor fault

Brief description	ID array(10)	Range	Default
Secondary fan fault detection	26364	0 - 1	0

6.3.13 Statuses

6.3.13.1 Multifunctional inputs

Brief description	ID	Range
AI1 signal	20659	-9999.9 - 9999.9
AI2 signal	20701	-9999.9 - 9999.9
AI3 signal	20703	-9999.9 - 9999.9
AI4 signal	20705	-9999.9 - 9999.9
AI5 signal	20707	-9999.9 - 9999.9

6.3.13.2 Digital inputs

Brief description	ID	Range
DI1 signal	20735	0 - 1

6.3.13.3 Analogue outputs

Brief description	ID	Range
AO1 signal	21055	0.0 V - 10.0 V
AO2 signal	21070	0.0 V - 10.0 V
AO3 signal	21071	0.0 V - 10.0 V

6.3.13.4 Digital outputs

Brief description	ID	Range
DO1 signal	21062	0 - 1
DO2 signal	21065	0 - 1

6.3.13.5 Coded motor fault

Brief description	ID	Range
Number of pulses detected	21363	0 - 20
Last fan fault code	21721	0 - 20

6.3.14 Group unit statuses

6.3.14.1 Multifunctional inputs

Brief description	ID array(10)	Range
AI1 signal	25659	-9999.9 - 9999.9
AI2 signal	25701	-9999.9 - 9999.9
AI3 signal	25703	-9999.9 - 9999.9
AI4 signal	25705	-9999.9 - 9999.9
AI5 signal	25707	-9999.9 - 9999.9

6.3.14.2 Digital inputs

Brief description	ID array(10)	Range
DI1 signal	25735	0 - 1

6.3.14.3 Analogue outputs

Brief description	ID array(10)	Range
AO1 signal	26055	0.0 V - 10.0 V
AO2 signal	26070	0.0 V - 10.0 V
AO3 signal	26071	0.0 V - 10.0 V

6.3.14.4 Digital outputs

Brief description	ID array(10)	Range
DO1 signal	26062	0 - 1
DO2 signal	26065	0 - 1

6.3.14.5 Coded motor fault

Brief description	ID array(10)	Range
Number of pulses detected	26363	0 - 20
Last fan fault code	26721	0 - 20

6.4 Alarm management

The "Event x" status displays the signal, which may be delayed.
1 = Event active
2 = Message active

3 = Fault active
4 = Not available or not active

6.4.1 Statuses

Brief description	ID	Range
SecA fan	20524	1 - 4
Frost protection thermostat	20255	1 - 4
Condensate pump	20527	1 - 4
FS priority 1	21256	1 - 4
Day operating program	21025	1 - 4
Boost operating program	21027	1 - 4
Eco operating program	21026	1 - 4
Operating mode Off	21028	1 - 4
Day operating program button	21029	1 - 4
Boost operating program button	21031	1 - 4
Eco operating program button	21030	1 - 4
Operating program Off button	21032	1 - 4
Cooling	21258	1 - 4
User-defined 1	20982	1 - 4
User-defined 2	20983	1 - 4
User-defined 3	20984	1 - 4
User-defined 4	20985	1 - 4
Fault acknowledgement button	21157	1 - 4
Manual stage selection stage 1	21020	1 - 4
Manual stage selection stage 2	21021	1 - 4
Manual stage selection stage 3	21022	1 - 4
Manual stage selection stage 4	21023	1 - 4
Manual stage selection stage 5	21024	1 - 4
Manual stage selection Off	21254	1 - 4
Filter	21259	1 - 4
AO1 manual mode	21061	3 - 4
AO2 manual mode	21082	3 - 4
AO3 manual mode	21084	3 - 4
DO1 manual mode	21063	3 - 4
DO2 manual mode	21069	3 - 4
Multiple assignment of room temperature sensor	20945	3 - 4
Multiple assignment of supply temperature sensor	20970	3 - 4
Multiple assignment of outside temperature sensor	20961	3 - 4
Multiple assignment of 2p return temperature sensor	20967	3 - 4
Multiple assignment of 4p H return temperature sensor	20965	3 - 4
Multiple assignment of 4p C return temperature sensor	20963	3 - 4
Multiple assignment of 2p supply temperature sensor	20951	3 - 4
Multiple assignment of 4p H supply temperature sensor	20949	3 - 4
Multiple assignment of 4p C supply temperature sensor	20947	3 - 4
Multiple assignment of user-defined sensor 1	20953	3 - 4
Multiple assignment of user-defined sensor 2	20955	3 - 4
Multiple assignment of user-defined sensor 3	20957	3 - 4
Multiple assignment of user-defined sensor 4	20959	3 - 4
Multiple assignment of 0-10V user-defined 1	20972	3 - 4
Multiple assignment of 0-10V user-defined 2	20974	3 - 4
Multiple assignment of 0-10V user-defined 3	20976	3 - 4
Multiple assignment of 0-10V user-defined 4	20978	3 - 4
Multiple assignment of 0-10V CO2	21811	3 - 4
Multiple assignment of 0-10V rH	21812	3 - 4
Multiple assignment of 0-10V VOC	21813	3 - 4
Room temperature sensor limit value	20797	3 - 4
Supply air temperature sensor limit value	20806	3 - 4
Outside air temperature sensor limit value	20816	3 - 4

Brief description	ID	Range
2p return temperature sensor limit value	20828	3 - 4
4p H return temperature sensor limit value	20836	3 - 4
4p C return temperature sensor limit value	20844	3 - 4
2p supply temperature sensor limit value	20855	3 - 4
4p H supply temperature sensor limit value	20863	3 - 4
4p C supply temperature sensor limit value	20871	3 - 4
User-defined sensor limit value 1 (NTC)	21041	3 - 4
User-defined sensor limit value 2 (NTC)	21042	3 - 4
User-defined sensor limit value 3 (NTC)	21043	3 - 4
User-defined sensor limit value 4 (NTC)	21044	3 - 4
AI1 short circuit	20986	3 - 4
AI2 short circuit	20987	3 - 4
AI3 short circuit	20988	3 - 4
AI4 short circuit	20989	3 - 4
AI5 short circuit	20990	3 - 4
AI1 wire break	20765	3 - 4
AI2 wire break	20766	3 - 4
AI3 wire break	20767	3 - 4
AI4 wire break	20768	3 - 4
AI5 wire break	20769	3 - 4
Supply air temperature limit without SupAT sensor	21221	3 - 4
Return temperature limit without RetT sensor	21222	3 - 4
Supply temperature monitoring without ST sensor	21223	3 - 4
Outside temperature-dependent activation without OT sensor	21224	3 - 4
Too many write accesses to the hard drive	21085	3 - 4
SB display SW version incompatible	21119	3 - 4
Control restart	21054	3 - 4
Parameter data error	21177	3 - 4
AD converter fault	21178	3 - 4
File system error	21179	3 - 4
System watchdog triggering	21180	3 - 4
CAN participant is not responding	21181	1 - 4
CAN Master is not responding	21182	1 - 4
CAN participant not found	21183	1 - 4
More than one CAN Master	21184	1 - 4
Too many CAN participants	21185	1 - 4
Too many CAN displays	21260	1 - 4
Too many CAN units	21261	1 - 4
Incorrect six-way valve configuration	21252	3 - 4
Incorrect heating cooling configuration	21161	3 - 4
Incorrect room temperature configuration	21162	3 - 4
Incorrect outside temperature configuration	21163	3 - 4
Multiple assignment of 0-10V filter	21255	3 - 4
Applikationswatchdog triggered	21340	3 - 4
BMS HeartBeat	21396	3 - 4
Application error in the group	21431	3 - 4
SecA fan operating hour limit	21698	1 - 4
0-10V control active	21726	1 - 4
Incorrect CO2 sensor configuration	21816	3 - 4
Incorrect VOC sensor configuration	21817	3 - 4
Incorrect rH sensor configuration	21818	3 - 4
BACnet Out Of Service is active	21892	1 - 4
Recover settings error	21894	3 - 4
inrush airing button	22007	1 - 4
inrush airing switch	22009	1 - 4

6.4.2 Statuses of units within the group

Brief description	ID array(10)	Range
SecA fan	25524	1 - 4
Frost protection thermostat	25255	1 - 4
Condensate pump	25527	1 - 4
FS priority 1	26256	1 - 4
Day operating program	26025	1 - 4
Boost operating program	26027	1 - 4
Eco operating program	26026	1 - 4
Operating mode Off	26028	1 - 4
Day operating program button	26029	1 - 4
Boost operating program button	26031	1 - 4
Eco operating program button	26030	1 - 4
Operating program Off button	26032	1 - 4
Cooling	26258	1 - 4
User-defined 1	25982	1 - 4
User-defined 2	25983	1 - 4
User-defined 3	25984	1 - 4
User-defined 4	25985	1 - 4
Fault acknowledgement button	26157	1 - 4
Manual stage selection stage 1	26020	1 - 4
Manual stage selection stage 2	26021	1 - 4
Manual stage selection stage 3	26022	1 - 4
Manual stage selection stage 4	26023	1 - 4
Manual stage selection stage 5	26024	1 - 4
Manual stage selection Off	26254	1 - 4
Filter	26259	1 - 4
AO1 manual mode	26061	3 - 4
AO2 manual mode	26082	3 - 4
AO3 manual mode	26084	3 - 4
DO1 manual mode	26063	3 - 4
DO2 manual mode	26069	3 - 4
Multiple assignment of room temperature sensor	25945	3 - 4
Multiple assignment of supply temperature sensor	25970	3 - 4
Multiple assignment of outside temperature sensor	25961	3 - 4
Multiple assignment of 2p return temperature sensor	25967	3 - 4
Multiple assignment of 4p H return temperature sensor	25965	3 - 4
Multiple assignment of 4p C return temperature sensor	25963	3 - 4
Multiple assignment of 2p supply temperature sensor	25951	3 - 4
Multiple assignment of 4p H supply temperature sensor	25949	3 - 4
Multiple assignment of 4p C supply temperature sensor	25947	3 - 4
Multiple assignment of user-defined sensor 1	25953	3 - 4
Multiple assignment of user-defined sensor 2	25955	3 - 4
Multiple assignment of user-defined sensor 3	25957	3 - 4
Multiple assignment of user-defined sensor 4	25959	3 - 4
Multiple assignment of 0-10V user-defined 1	25972	3 - 4
Multiple assignment of 0-10V user-defined 2	25974	3 - 4
Multiple assignment of 0-10V user-defined 3	25976	3 - 4
Multiple assignment of 0-10V user-defined 4	25978	3 - 4
Multiple assignment of 0-10V CO2	26811	3 - 4
Multiple assignment of 0-10V rH	26812	3 - 4
Multiple assignment of 0-10V VOC	26813	3 - 4
Room temperature sensor limit value	25797	3 - 4
Supply air temperature sensor limit value	25806	3 - 4
Outside air temperature sensor limit value	25816	3 - 4
2p return temperature sensor limit value	25828	3 - 4
4p H return temperature sensor limit value	25836	3 - 4
4p C return temperature sensor limit value	25844	3 - 4

Brief description	ID array(10)	Range
2p supply temperature sensor limit value	25855	3 - 4
4p H supply temperature sensor limit value	25863	3 - 4
4p C supply temperature sensor limit value	25871	3 - 4
User-defined sensor limit value 1 (NTC)	26041	3 - 4
User-defined sensor limit value 2 (NTC)	26042	3 - 4
User-defined sensor limit value 3 (NTC)	26043	3 - 4
User-defined sensor limit value 4 (NTC)	26044	3 - 4
AI1 short circuit	25986	3 - 4
AI2 short circuit	25987	3 - 4
AI3 short circuit	25988	3 - 4
AI4 short circuit	25989	3 - 4
AI5 short circuit	25990	3 - 4
AI1 wire break	25765	3 - 4
AI2 wire break	25766	3 - 4
AI3 wire break	25767	3 - 4
AI4 wire break	25768	3 - 4
AI5 wire break	25769	3 - 4
Supply air temperature limit without SupAT sensor	26221	3 - 4
Return temperature limit without RetT sensor	26222	3 - 4
Supply temperature monitoring without ST sensor	26223	3 - 4
Outside temperature-dependent activation without OT sensor	26224	3 - 4
Too many write accesses to the hard drive	26085	3 - 4
SB display SW version incompatible	26119	3 - 4
Control restart	26054	3 - 4
Parameter data error	26177	3 - 4
AD converter fault	26178	3 - 4
File system error	26179	3 - 4
System watchdog trigger	26180	3 - 4
CAN participant is not responding	26181	1 - 4
CAN Master is not responding	26182	1 - 4
CAN participant not found	26183	1 - 4
More than one CAN Master	26184	1 - 4
Too many CAN participants	26185	1 - 4
Too many CAN displays	26260	1 - 4
Too many CAN units	26261	1 - 4
Incorrect six-way valve configuration	26252	3 - 4
Incorrect heating cooling configuration	26161	3 - 4
Incorrect room temperature configuration	26162	3 - 4
Incorrect outside temperature configuration	26163	3 - 4
Multiple assignment of 0-10V filter	26255	3 - 4
Applikationswatchdog triggered	26340	3 - 4
BMS HeartBeat	26396	3 - 4
Application error in the group	26431	3 - 4
SecA fan operating hour limit	26698	1 - 4
0-10V control active	26726	1 - 4
Incorrect CO2 sensor configuration	26816	3 - 4
Incorrect VOC sensor configuration	26817	3 - 4
Incorrect rH sensor configuration	26818	3 - 4
BACnet Out Of Service is active	26892	1 - 4
Recover settings error	26894	3 - 4
inrush airing button	27007	1 - 4
inrush airing switch	27009	1 - 4

6.4.3 Events via digital inputs

Depending on the unit design, system configuration, scope of functions, customer requirements, etc., the display of events triggered by digital inputs can be prompted in

different ways. The display parameters can therefore be set for each event. The following settings are possible for the "Event x configuration" parameter:
1 = Event (no display)
2 = Message (message display symbol)
3 = Fault (fault display symbol)
4 = Not available or not active
The "Event x waiting time" parameter defines the minimum time for which an event must be pending before it is displayed or until the signal is forwarded to the open and closed-loop control algorithms.
The "Event x remaining waiting time" signal status displays the remaining waiting time.
The "Event x acknowledgement" parameter defines that when an event occurs it is interlocked and must be acknowledged:
0 = No acknowledgement required
1 = Acknowledgement required
If an event is still pending during the acknowledgement, the waiting time does not expire again and the display and response remain unchanged.
The waiting time and acknowledgement parameters can only be set for certain events.

6.4.3.1 Parameters

Brief description	ID	Range	Default
SecA fan event configuration	20723	1 - 4	3
SecA fan event waiting time	20724	0 s - 999 s	2 s
SecA fan event acknowledgement	20722	0 - 1	1
Frost protection thermostat event configuration	20782	1 - 4	3
Frost protection thermostat event waiting time	20783	0 s - 999 s	2 s
Frost protection thermostat event acknowledgement	20781	0 - 1	1
Condensate pump event configuration	20787	1 - 4	3
Condensate pump event waiting time	20788	0 s - 999 s	2 s
Condensate pump event acknowledgement	20786	0 - 1	1
FS priority 1 event configuration	21303	1 - 4	3
FS priority 1 event waiting time	21304	0 s - 999 s	2 s
FA event acknowledgement priority 1	21302	0 - 1	1
Day operating program event configuration	20991	1 - 4	2
Boost operating program event configuration	20993	1 - 4	2
Eco operating program event configuration	20992	1 - 4	2
Operating program Off event configuration	20994	1 - 4	2
Day operating program event configuration button	20995	1 - 4	2
Boost operating program event configuration button	20997	1 - 4	2
Eco operating program event configuration button	20996	1 - 4	2
Operating program Off event configuration button	20998	1 - 4	2
Cooling event configuration	21307	1 - 4	2
User-defined 1 event configuration	21003	1 - 4	2
User-defined 1 event waiting time	21007	0 s - 999 s	2 s
User-defined 1 event acknowledgement	20999	0 - 1	0
User-defined 2 event configuration	21004	1 - 4	2
User-defined 2 event waiting time	21008	0 s - 999 s	2 s
User-defined 2 event acknowledgement	21000	0 - 1	0
User-defined 3 event configuration	21005	1 - 4	2
User-defined 3 event waiting time	21009	0 s - 999 s	2 s
User-defined 3 event acknowledgement	21001	0 - 1	0
User-defined 4 event configuration	21006	1 - 4	2
User-defined 4 event waiting time	21010	0 s - 999 s	2 s
User-defined 4 event acknowledgement	21002	0 - 1	0
Fault acknowledgement event configuration button	21158	1 - 4	2
Manual stage selection stage 1 configuration	21015	1 - 4	2

Brief description	ID	Range	Default
Manual stage selection stage 2 configuration	21016	1 - 4	2
Manual stage selection stage 3 configuration	21017	1 - 4	2
Manual stage selection stage 4 configuration	21018	1 - 4	2
Manual stage selection stage 5 configuration	21019	1 - 4	2
Manual stage selection Off configuration	21253	1 - 4	2
inrush airing event configuration button	22008	1 - 4	2
inrush airing event configuration switch	22010	1 - 4	2

6.4.3.2 Statuses

Note: the statuses of the respective events are listed in section "Alarm management".

Brief description	ID	Range
SecA fan remaining waiting time event	20725	0 s - 999 s
Frost protection thermostat remaining waiting time event	20784	0 s - 999 s
Condensate pump remaining waiting time event	20789	0 s - 999 s
FS priority 1 remaining waiting time event	21305	0 s - 999 s
User-defined 1 remaining waiting time event	21011	0 s - 999 s
User-defined 2 remaining waiting time event	21012	0 s - 999 s
User-defined 3 remaining waiting time event	21013	0 s - 999 s
User-defined 4 remaining waiting time event	21014	0 s - 999 s

6.4.3.3 Statuses of units within the group

Note: the statuses of the respective events are listed in section "Alarm management".

Brief description	ID array(10)	Range
SecA fan remaining waiting time event	25725	0 s - 999 s
Frost protection thermostat remaining waiting time event	25784	0 s - 999 s
Condensate pump remaining waiting time event	25789	0 s - 999 s
FS priority 1 remaining waiting time event	26305	0 s - 999 s
User-defined 1 remaining waiting time event	26011	0 s - 999 s
User-defined 2 remaining waiting time event	26012	0 s - 999 s
User-defined 3 remaining waiting time event	26013	0 s - 999 s
User-defined 4 remaining waiting time event	26014	0 s - 999 s

6.4.4 Events by filter message

The display parameters can be set for each filter message. The following "Filter event configuration" parameter settings are available:
1 = Event (no display)
2 = Message (message display symbol)
3 = Fault (fault display symbol)
4 = Not available or not active
The "Filter event acknowledgement" parameter defines that when a filter message occurs it is interlocked and must be acknowledged:
0 = No acknowledgement required
1 = Acknowledgement required
A waiting time for the delayed display cannot be specified in the parameters at this point. This is done in the Filter message module.

6.4.4.1 Parameters

Brief description	ID	Range	Default
Filter event configuration	21263	1 - 4	2
Filter event acknowledgement	21262	0 - 1	1

6.4.4.2 Statuses

Note: the statuses of the respective events are listed in section "Alarm management".

6.4.5 Sensor monitoring events

The validity of the values measured at all analogue inputs programmed for connection of a sensor is generally checked. If a measured value is invalid, i.e. a break or short-circuit exists, a fault ("AEx short circuit" or "AEx wire break") is immediately displayed. These faults are not interlocking, so they do not have to be acknowledged. The display of faults cannot be deactivated. This would only be possible by changing the parameter settings of the respective analogue input to "No function".
In addition, maximum and minimum permissible temperature parameters can be set for all sensor measured values. A violation of these limits ("min sensor x" and "max sensor x") is also immediately displayed as a fault. These faults ("value x outside prescribed limits") are not interlocking, so do not have to be acknowledged. The display of faults cannot be deactivated. This would only be possible by changing the parameter settings of the respective analogue input to "No function" or by adjusting the respective limit values.

6.4.5.1 Parameters

Brief description	ID	Range	Default
Room temperature min sensor	20794	-99.9 °C - 99.9 °C	-30.0 °C
Supply air temperature min sensor	20803	-99.9 °C - 99.9 °C	-30.0 °C
Outside temperature min sensor	20813	-99.9 °C - 99.9 °C	-30.0 °C
2p return temperature min sensor	20825	-99.9 °C - 99.9 °C	-30.0 °C
4p heating return temperature min sensor	20833	-99.9 °C - 99.9 °C	-30.0 °C
4p cooling return temperature min sensor	20841	-99.9 °C - 99.9 °C	-30.0 °C
2p supply temperature min sensor	20852	-99.9 °C - 99.9 °C	-30.0 °C
4p heating supply temperature min sensor	20860	-99.9 °C - 99.9 °C	-30.0 °C
4p cooling supply temperature min sensor	20868	-99.9 °C - 99.9 °C	-30.0 °C
Room temperature max sensor	20795	-99.9 °C - 99.9 °C	80.0 °C
Supply air temperature max sensor	20804	-99.9 °C - 99.9 °C	80.0 °C
Outside temperature max sensor	20814	-99.9 °C - 99.9 °C	80.0 °C
2p return temperature max sensor	20826	-99.9 °C - 99.9 °C	80.0 °C
4p heating return temperature max sensor	20834	-99.9 °C - 99.9 °C	80.0 °C
4p cooling return temperature max sensor	20842	-99.9 °C - 99.9 °C	80.0 °C
2p supply temperature max sensor	20853	-99.9 °C - 99.9 °C	80.0 °C
4p heating supply temperature max sensor	20861	-99.9 °C - 99.9 °C	80.0 °C
4p cooling supply temperature max sensor	20869	-99.9 °C - 99.9 °C	80.0 °C
User-defined 1 min sensor	21037	-99.9 °C - 99.9 °C	-30.0 °C
User-defined 2 min sensor	21038	-99.9 °C - 99.9 °C	-30.0 °C
User-defined 3 min sensor	21039	-99.9 °C - 99.9 °C	-30.0 °C
User-defined 4 min sensor	21040	-99.9 °C - 99.9 °C	-30.0 °C
User-defined 1 max sensor	21033	-99.9 °C - 99.9 °C	80.0 °C
User-defined 2 max sensor	21034	-99.9 °C - 99.9 °C	80.0 °C
User-defined 3 max sensor	21035	-99.9 °C - 99.9 °C	80.0 °C
User-defined 4 max sensor	21036	-99.9 °C - 99.9 °C	80.0 °C

6.4.5.2 Statuses

Note: the statuses of the respective events are listed in section "Alarm management".

6.4.6 System message events

Active manual operations of the digital and analogue outputs, functions programmed several times for analogue inputs (e.g. two analogue inputs programmed as supply air temperature sensors) as well as activated functions whose requisite sensor technology parameters have not been set (e.g. return temperature control without return temperature sensor) are displayed as a fault. These faults are not interlocking, so they do not have to be acknowledged. The display of faults cannot be deactivated.

The system message "Too many write accesses to the hard drive" is displayed if the parameters saved on the hard drive are frequently accessed within a short time. This can happen if a connection to a higher-level building management system is configured incorrectly, for example. As the hard drive only permits a limited number of saving cycles, automatic storage of parameters on the hard drive is deactivated. This fault is interlocking, so it must be acknowledged. The display of faults cannot be disabled. Following acknowledgement, automatic storage of parameters on the hard drive is re-activated.

The system message "Restart control" is displayed briefly after each restart (e.g. power failure) and resets automatically.

The system message "Parameter data error" is displayed if parameter data saved in the file system cannot be read or written. This fault is not interlocking, so it does not need to be acknowledged. The display of the fault cannot be disabled. The fault can possibly be rectified by restart or Reset of the system. If the fault is continuous or more persistent, it should be checked by Kampmann Service.

The system message "AD converter fault" is displayed if faults occur during the measurement of analogue values or signals in the main processor. This fault is not interlocking, so it does not need to be acknowledged. The display of the fault cannot be disabled. The fault can possibly be rectified by a restart or Reset of the system. If the fault is continuous or more persistent, it should be checked by Kampmann Service.

The system message "File system error" is displayed if data saved in the file system cannot be read or written. This fault is not interlocking, so it does not need to be acknowledged. The display of the fault cannot be disabled. The fault can possibly be rectified by a restart or Reset of the system. If the fault is continuous or more persistent, it should be checked by Kampmann Service.

The tasks running in the main processor are continuously monitored by a system watchdog. If a task is not processed on time or no longer completely processed, the system watchdog triggers a restart or Reset of the system. After that, all tasks should once again be processed completely and on time. The "System watchdog trigger" is not displayed as a fault or message. Interlocking does not take place. No acknowledgement is therefore required. The "System watchdog trigger" is saved in the event list. If the event occurs more often, it should be checked by Kampmann Service.

The time required to process the open and closed-loop control algorithms is continuously monitored by a system watchdog. If processing takes too long, the system message "Applikationswatchdog trigger" is displayed. This fault is not interlocking, so it does not need to be acknowledged. The display of the fault cannot be disabled. The fault can possibly be rectified by a restart or Reset of the system. If the fault is continuous or persistent, it should be checked by Kampmann Service.

The system message "0-10V actuation active" is displayed if the actuation is initiated by a 0-10VDC signal from a higher-level building management system. It is not displayed as a fault or a message. Interlocking does not take place. No acknowledgement is therefore required. The system message "0-10V actuation active" is saved in the event list.

6.4.6.1 Parameters

Brief description	ID	Range	Default
SecA fan operating hours event configuration	21699	1 - 4	3
BACnet Out Of Service event configuration is active	21893	1 - 4	2

6.4.6.2 Statuses

Note: the statuses of the respective events are listed in section "Alarm management".

6.4.7 CAN-bus communication events

Various malfunctions can occur in CAN-bus communication and the corresponding displays can be parametrised. The following settings are available for the "CAN x event configuration" parameter:

1 = Event (no display)
2 = Message (message display symbol)
3 = Fault (fault display symbol)
4 = Not available or not active

The "CAN x event acknowledgement" parameter defines that when a malfunction occurs it is interlocked and must be acknowledged:

0 = No acknowledgement required
1 = Acknowledgement required

A waiting time for the delayed display cannot be specified in the parameters at this point. This is already done in the system (firmware).

The system message "CAN participant is not responding" is displayed if several units, one unit and one display, or several units and one display are coupled by means of a CAN-bus and operated together in a group, and a participant (Slave) does not respond to the Master. Check the bus cabling and the power supply. A unit or display may also be faulty. Once the fault has been rectified, it may also need to be acknowledged, depending on the configuration.

The system message "CAN Master is not responding" is displayed if several units, one unit and one display, or several units and one display are coupled by means of a CAN-bus and operated together in a group and a participant (Slave) does not receive a response from the Master. Check the bus cabling and the power supply. A unit or display may also be faulty. Once the fault has been rectified, it may also need to be acknowledged, depending on the configuration.

The system message "CAN participant not found" is displayed if several units, one unit and one display, or several units and one display are coupled by means of a CAN-bus and operated together in a group and the current number of available CAN-bus participants (Master & Slave) is less than the saved number of available CAN-bus participants (Master & Slave). Check the bus cabling and the power supply. A unit or display may be faulty or a Reset (section "CAN-Bus") required. Once the fault has been rectified, it may also need to be acknowledged, depending on the configuration.

The system message "More than one CAN Master" is displayed when several units, one unit and one display, or several units and one display are coupled by means of a CAN-bus and operated together in a group, and the parameters of more than one unit or display are permanently set as Master. The parameter settings (CAN_MasterMode) must be adjusted. Once the fault has been rectified, it may also need to be acknowledged, depending on the configuration.

The system message "Too many CAN participants" is displayed if several units, one unit and one display, or several units and one display are coupled by means of a CAN-bus and operated together in a group and the number of units or displays exceeds the permitted number for the CAN-bus protocol. Once the fault has been rectified, it may also need to be acknowledged, depending on the configuration.

The system message "Too many CAN displays" is displayed if several units, one unit and one display, or several units and one display are coupled by means of a CAN-bus and operated together in a group, and the number of displays exceeds the permitted number for the application for more than 60 seconds. Check the bus cabling and number of displays. Once the fault has been rectified, it may also need to be acknowledged, depending on the configuration.

The system message "Too many CAN units" is displayed if several units, one unit and one display, or several units and one display are coupled by means of a CAN-bus and operated together in a group, and the number of units exceeds the permitted number for the application. Check the bus wiring and number of units. Once the fault has been rectified, it may also need to be acknowledged, depending on the configuration.

The system message "Application error in the group" is displayed when several units, one unit and one display, or several units and one display are coupled by means of a CAN-bus and operated together in a group, and one unit no longer processes the application properly. In addition, each unit checks the application runtimes of the other units. The system message is displayed if at least one application runtime of another unit does not change for 60 seconds. This is particularly relevant for fault responses from "critical units". Check the other units. Once the fault has been rectified, all units in the group are automatically restarted. An acknowledgement may be required depending on the configuration.

6.4.7.1 Parameters

Brief description	ID	Range	Default
CAN participant is not responding event configuration	21186	1 - 4	3
CAN participant is not responding event acknowledgement	21187	0 - 1	0
CAN Master participant is not responding event configuration	21188	1 - 4	3

Brief description	ID	Range	Default
CAN Master participant is not responding event acknowledgement	21189	0 - 1	0
CAN participant not found event configuration	21190	1 - 4	3
CAN participant not found event acknowledgement	21191	0 - 1	0
More than one CAN Master event configuration	21192	1 - 4	3
More than one CAN Master event acknowledgement	21193	0 - 1	0
Too many CAN participants event configuration	21194	1 - 4	3
Too many CAN participants event acknowledgement	21195	0 - 1	1
Too many CAN displays event configuration	21335	1 - 4	3
Too many CAN displays event configuration	21336	0 - 1	1
Too many CAN units event configuration	21333	1 - 4	3
Too many CAN units event acknowledgement	21334	0 - 1	1
Application error in the group event configuration	21444	1 - 4	3
Application error in the group event acknowledgement	21445	0 - 1	1

6.4.7.2 Statuses

Note: the statuses of the respective events are arranged in section "Alarm management".

6.5 Event memory

The last 250 events are saved in the event memory with date and time. The "Show event number" parameter controls the systematic transfer of the parameters of an event ("Event code", "Day", "Month", "Year", "Hour", "Minute and second") from the array in one-dimensional variables. The meaning of the "Event code" parameter is illustrated in the following table.

Event code	Name
1	Fault acknowledgement button
2	Frost protection thermostat
3	SecA fan
4	Condensate pump
5	AI1 wire break
6	AI2 wire break
7	AI3 wire break
8	AI4 wire break
9	AI5 wire break
10	Room temperature sensor limit value
11	Supply air temperature sensor limit value
12	Outside air temperature sensor limit value
13	2p return temperature sensor limit value
14	4p H return temperature sensor limit value
15	4p C return temperature sensor limit value
16	2p supply temperature sensor limit value
17	4p H supply temperature sensor limit value
18	4p C supply temperature sensor limit value
19	Multiple assignment of room temperature sensor
20	Multiple assignment of 4p C supply temperature sensor
21	Multiple assignment of 4p H supply temperature sensor
22	Multiple assignment of 2p supply temperature sensor
23	Multiple assignment of user-defined sensor 1
24	Multiple assignment of user-defined sensor 2
25	Multiple assignment of user-defined sensor 3
26	Multiple assignment of user-defined sensor 4
27	Multiple assignment of outside temperature sensor
28	Multiple assignment of 4p C return temperature sensor

Event code	Name
29	Multiple assignment of 4p H return temperature sensor
30	Multiple assignment of 2p return temperature sensor
31	Multiple assignment of supply temperature sensor
32	Multiple assignment of 0-10V user-defined 1
33	Multiple assignment of 0-10V user-defined 2
34	Multiple assignment of 0-10V user-defined 3
35	Multiple assignment of 0-10V user-defined 4
36	User-defined 1
37	User-defined 2
38	User-defined 3
39	User-defined 4
40	AI1 short circuit
41	AI2 short circuit
42	AI3 short circuit
43	AI4 short circuit
44	AI5 short circuit
45	Manual stage selection stage 1
46	Manual stage selection stage 2
47	Manual stage selection stage 3
48	Manual stage selection stage 4
49	Manual stage selection stage 5
50	Manual stage selection Off
51	Day operating program
52	Eco operating program
53	Boost operating program
54	Operating mode Off
55	Day operating program button
56	Eco operating program button
57	Boost operating program button
58	Operating program Off button
59	User-defined sensor limit value 1 (NTC)
60	User-defined sensor limit value 2 (NTC)
61	User-defined sensor limit value 3 (NTC)
62	User-defined sensor limit value 4 (NTC)
63	Control restart
64	AA1 manual mode
65	DO1 manual mode
66	DO2 manual mode
67	AO2 manual mode
68	AO3 manual mode
69	Too many write accesses to the hard drive
70	SB display SW version incompatible
71	Incorrect heating cooling configuration
72	Incorrect room temperature configuration
73	Incorrect outside temperature configuration
74	CAN participant is not responding
75	CAN Master is not responding
76	CAN participant not found
77	More than one CAN Master
78	Too many CAN participants
79	Parameter data error
80	AD converter fault
81	File system error
82	System watchdog trigger
83	Supply air temperature limit without SupAT sensor
84	Return temperature limit without RetT sensor
85	Supply temperature monitoring without ST sensor
86	Outside temperature-dependent activation without OT sensor

Event code	Name
87	Incorrect six-way valve configuration
88	Multiple assignment of 0-10V filter
89	FS priority 1
90	Cooling
91	Filter
92	Too many CAN displays
93	Too many CAN devices
94	Applikationswatchdog triggered
95	BMS HeartBeat
96	Application error in the group
97	SecA fan operating hour limit
98	0-10V control active
99	Multiple assignment of 0-10V CO2
100	Multiple assignment of 0-10V VOC
101	Multiple assignment of 0-10V rH
102	Incorrect CO2 sensor configuration
103	Incorrect VOC sensor configuration
104	Incorrect rH sensor configuration

A number is prefixed to the event codes to explain their meaning:
0 = Event start
1 = Message start
2 = Fault start
3 = Event end
4 = Message end
5 = Fault end

Examples:
20001 = Occurrence of a frost protection fault
50001 = End of a frost protection fault
10130 = Occurrence of a filter message
40130 = End of a filter message

6.5.1 Parameters

Brief description	ID/SubID	Range	Default
Show unit 1 event number	20895/0	0 - 249	0
Show unit 2 event number	20895/1	0 - 249	0
Show unit 3 event number	20895/2	0 - 249	0
Show unit 4 event number	20895/3	0 - 249	0
Show unit 5 event number	20895/4	0 - 249	0
Show unit 6 event number	20895/5	0 - 249	0
Show unit 7 event number	20895/6	0 - 249	0
Show unit 8 event number	20895/7	0 - 249	0
Show unit 9 event number	20895/8	0 - 249	0
Show unit 10 event number	20895/9	0 - 249	0

6.5.2 Statuses

Brief description	ID	Range
Event code	20888	0 - 65530
Day	20889	0 - 31
Month	20890	0 - 12
Year	20891	0 - 9999
Hour	20892	0 - 23
Minute	20893	0 - 59

Brief description	ID	Range
Second	20894	0 - 59

6.5.3 Statuses of units within the group

Brief description	ID array(10)	Range
Event code	25888	0 - 65530
Day	25889	0 - 31
Month	25890	0 - 12
Year	25891	0 - 9999
Hour	25892	0 - 23
Minute	25893	0 - 59
Second	25894	0 - 59

6.5.3.1 Last event

Brief description	ID	Range
Event code	20874	0 - 65530
Day	20875	0 - 31
Month	20876	0 - 12
Year	20877	0 - 9999
Hour	20878	0 - 23
Minute	20879	0 - 59
Second	20880	0 - 59

6.5.3.2 All events

The IDs listed in the following table each have 255 SubIDs.
A list of 255 entries is therefore obtained.

Brief description	ID	Range
Event code	20881	0 - 65530
Day	20882	0 - 31
Hour	20883	0 - 23
Minute	20884	0 - 59
Month	20885	0 - 12
Second	20886	0 - 59
Year	20887	0 - 9999

6.6 Fire shut-down

The "Fire shutdown priority 1" function is activated by a multifunctional input with corresponding parameter setting or is specified by the BMS.
The display of a corresponding fault, a corresponding message or corresponding event is the same for both activation types. The "Fire shutdown priority 1" function has no reliability and no functional endurance! While the function "Fire shut-down priority 1" is activated, the SecA fan is switched off. If several units are coupled by means of a CAN-bus and operated together in a group, the SecA fans of all units in the group are switched off while the "Fire shutdown priority 1" function is activated. The "FS BMS input" parameter can be used to activate the "Fire shutdown priority 1" function via the BMS.
0 = Not activated
1 = Activated
After a power failure, the fire shutdown activated by the BMS is deactivated again. Therefore, in the case of activation by the BMS, the parameter should be written cyclically at intervals of a few seconds.

6.6.1 Parameters

Brief description	ID	Range	Default
FS BMS input	21417	0 - 1	0

6.6.2 Statuses

Brief description	ID	Range
Fire shut-down priority 1 active	21326	0 - 1

6.6.3 Group unit statuses

Brief description	ID array(10)	Range
Fire shut-down priority 1 active	26326	0 - 1

6.7 BMS and interfaces

Multiple units can be coupled by means of a CAN-bus and operated together in a group. In addition, several interfaces and protocols are available for connection to the building management system. Licence keys are required to use the protocols Modbus, BACnet and KNX subject to a fee. The licence keys can be entered at the factory or manually afterwards.

6.7.1 CAN-bus

6.7.1.1 General

No more than ten units and one display (TP2) may be connected via CAN bus. If more units and/or more displays (TP2) are connected, an interlocking shutdown of the units occurs and a fault is displayed. A maximum of eleven CAN-bus participants are addressed automatically. One unit is then defined as the Master. The remaining CAN-bus participants are defined as slaves. The number of available CAN-bus participants is saved by each CAN-bus participant. If additional CAN-bus participants are added during operation, automatic addressing takes place once again, and the new number of available CAN-bus subscribers is saved again by each CAN-bus participant. If CAN-bus participants fail during operation (power failure, interruption of CAN-bus communication, etc.) or if CAN-bus participants cannot be reached after a restart, the current number of existing CAN-bus participants is less than the saved number of existing CAN-bus participants. A fault is displayed. The number of existing saved CAN-bus participants can only be reset via the parameter “Reset number of CAN participants". If the parameter is set to "1", the saved number of existing CAN-bus participants is deleted for all CAN-bus participants. After approx. 20 seconds, all existing CAN-bus participants are restarted. This has the same effect as disconnecting all available CAN-bus participants from the power supply for a few seconds. After the restart, the available CAN-bus subscribers are automatically addressed and then saved. However, it is essential to check afterwards whether all existing units have been recognised as available CAN-bus subscribers.

6.7.1.2 Software versions

The software versions (Major and Minor) and the "Type of application" of all CAN-bus participants must be compatible, as otherwise synchronisation of unequal data points can result in critical errors. Each unit therefore checks the compatibility of the software versions of the other units on the CAN bus. If an incompatibility is detected, each unit performs an interlocking shutdown and the "SB display SW version incompatible" fault

is displayed. A "Frost protection function" is no longer possible, as the digital and analogue output configurations could be faulty.
The software versions are checked in the following three situations:

- 60 seconds after the unit has been restarted and there are no errors (see below) in the CAN bus.
- 60 seconds after the CAN-bus has changed from the faulty status to the fault-free status (see below).
- 60 seconds after the CAN status (ID20184) has changed and there are no faults (see below) in the CAN-bus.

Possible faults on the CAN-bus include "CAN participant is not responding", "CAN Master is not responding", "CAN participant not found", "More than one CAN Master" or "Too many CAN participants".
The status "CAN state" indicates, among other things, whether it is a Master or a Slave and whether an address assignment is currently active.
The "Number of participants" status shows how many CAN-bus subscribers are available in the CAN-bus network.
The "Number of units" status shows how many units are available in the CAN-bus network. (A display is not counted as a unit.)

The interlocking shutdown of the units by "Check number of displays" or "Check number of units" as well as "Software version" and "Type of application" cannot be reset simply by an acknowledgement, as any synchronisation of unequal data points that has already taken place cannot be undone.
To acknowledge the fault, the CAN-bus communication between all units must be interrupted. Subsequently, the software versions of all units must be synchronised by Kampmann Service and the factory settings of the complete data set restored. Only then can the CAN-bus communication of all units be restored. Subsequently, all configurations of all units must be checked and, if necessary, adapted.
The "SB display SW version activation check" parameter defines whether the compatibility of the software versions of all units connected via the CAN-bus should be checked continuously or at intervals. The following settings are possible:
0 = No check
1 = Check activated

6.7.1.3 Critical units

If several units are coupled by means of a CAN-bus and operated together in a group, the failure of individual units (e.g. due to a power failure) is usually not critical, and the remaining units can continue to run. However, in some cases all units in the group must be switched off and it may even be necessary to open valves.

The "CAN-bus unit monitoring" parameter can be used to specify whether all units in the group are shut down if individual units in the group have failed, whether the valves "4p H valve" and "2p H/C valve" should also be opened or whether this is only done if the relevant "Critical units" in the group have failed:
0 = Shutdown due to failure of the unit
1 = Shutdown and open valves due to failure of the unit
2 = Shutdown and, if necessary, open valves due to failure of a critical unit.

The failure of individual units in a group will in any case lead to shutdown of all units in the group if digital or analogue inputs with functions that apply across all units are configured or connected on the failed unit.

- If a default setting from the BMS that applies for all units is configured or applied at the failed unit.
- If the heating/cooling switchover is effected by detection of the supply temperature on the failed unit.

Then these are "critical units".
Cross-unit functions or cross-unit specifications are functions or specifications that apply to all units in the group.
They include the following functions or digital input configurations:

- FS priority 1
- Day operating program
- Boost operating program
- Eco operating program
- Operating mode Off
- Cooling
- Manual stage selection stage 1
- Manual stage selection stage 2
- Manual stage selection stage 3
- Manual stage selection stage 4
- Manual stage selection stage 5
- Manual stage selection Off

They include the following functions or analogue input configurations:

- Room temperature (only available at one unit in the group)
- Outside temperature

They include the following functions or BMS default configurations:

- RT default (only available at one unit in the group)
- OA default
- Cooling default

NOTE: BMS defaults, such as "Operating program" or "Manual stage selection", are not monitored and would not lead to the shutdown of all units within the group in the event of a failure of the corresponding unit.

In all cases, failure of individual units in a group not only leads to the shutdown of all units in the group but also causes the valves "4p H valve" and "2p H/C valve" of all units in the group to open if the room temperature of the failed unit is also detected for the other units in the group via an analogue input, or if the room temperature of the failed unit is also specified by the BMS for the other units in the group. These are then "temperature-critical units".

Monitoring the CAN-bus communication by the Master which is automatically determined can detect any failed Slave and trigger a collective fault. Monitoring the CAN-bus communication by each automatically determined Slave can only detect the failed Master and trigger a general fault. Monitoring the CAN-bus communication by each automatically determined Slave cannot therefore detect another automatically determined Slave that has failed. However, as this is necessary to detect failed "critical" units and cannot be done via the general fault, the Master reports the loss of a slave to all slaves (status "Message from the Master that a Slave is offline").

To detect "critical units", each unit checks whether it is a "critical unit" due to its configuration and forwards the result to all other units in the group. The "Critical unit" status displays the result. The "Critical unit" status of the individual units is also saved in each unit ("Critical unit saved x" status).

0 = offline or not available
1 = Not a critical unit
2 = Critical unit
3 = Critical unit
4 = Critical unit
5 = Critical unit
6 = Critical unit
7 = Critical unit
8 = Critical unit
12 = Temperature-critical unit
13 = Temperature-critical unit
14 = Temperature-critical unit
15 = Temperature-critical unit
16 = Temperature-critical unit
17 = Temperature-critical unit
18 = Temperature-critical unit

Based on the information, each unit has identified each "critical unit" and each "temperature-critical unit" in the group. The number (total) of "critical units" and number (total) of "temperature-critical units" present are calculated in each unit (status "Current number of critical units" or "Current number of temperature-critical units").
In certain cases, the calculated number (total) of "critical units" and of "temperature-critical units" are also saved beyond a power failure (status "Number of critical units saved" and status "Number of temperature-critical units saved").

The following faults are relevant when checking "critical units" and "temperature-critical units":

- the Master reports that a Slave is offline
- CAN participant is not responding
- CAN Master is not responding
- CAN participant not found
- More than one CAN Master
- Too many CAN participants
- Application error in the group

Therefore, if one of the listed faults is active, this represents a "CAN-relevant fault".

If there is no "relevant fault" for at least 60 seconds after a restart or after an acknowledgement, or if the calculated number (total) of available "critical units" has changed (for example by changing a configuration) and there is no "relevant fault", or if the calculated number (total) of available "temperature-critical units" has changed (for example by changing a configuration) and there is no "relevant fault", it is assumed that all units have fully synchronised their parameter sets and the calculated number of "critical units" and the calculated number of "temperature-critical units" have been saved. At the same time, the "Critical unit" status is also saved in the "Critical unit saved" parameter (array).

If there is a "relevant fault" pending, checks must be carried out cyclically to determine whether all "critical units" and all "temperature-critical units" are still communicating. To do so, each "critical unit" transmits its status every 10 seconds as long as a "relevant fault" is pending. However, this is done with changing values in order to be

able to detect changes. A "critical unit" sends the sequence 3, 4, 5, 6, 7, 8 as a "critical unit" status then starts again from the beginning. A "temperature-critical unit" sends the sequence 12, 13, 14, 15, 16, 17, 18 as a "critical unit" status then starts again from the beginning. Each unit then checks at 60-second intervals to see if the statuses sent by the other units have changed. This is used as the basis for recalculating the current number of transmitting "critical units" and current number of transmitting "temperature-critical units", which are in turn compared with the saved number of "critical units" or saved number of "temperature-critical units". If the checking unit detects that a "critical unit" is missing, it switches off. If the checking unit detects that a "temperature-critical unit" is missing, it switches off and opens the valves "4p H valve" and "2p H/C valve".

An explicit fault is not displayed because a "relevant fault" is pending and is displayed. The response can be delayed accordingly due to the test interval of 60 seconds.
The "CAN-bus unit monitoring impact" status shows the result of the check.
0 = No "critical unit" lost
1 = "Critical unit" lost
The "CAN-bus temp-critical unit monitoring impact" status shows the result of the check.
0 = No "temperature-critical unit" lost
1 = "Temperature-critical unit" lost

The saved number of "critical units" and saved number of "temperature-critical units" can be reset using the "Reset number of CAN participants" parameter (see above).

The "Unit x communication status" status is used for CAN-bus communication diagnostics. However, diagnosis can only be performed from the Master unit. With Slave units a reference is made to the Master unit.
0 = offline
1 = online
2 = refer to Master

6.7.1.4 Tasks of the Master

In a CAN-bus network, the following functions are solely provided by the Master:

- Addressing of slaves
- Monitoring of participants and communication status
- Synchronisation of the time setting
- Transmission of the generally applicable actual room temperature value
- Definition of the operating program
- Definition of the generally applicable room temperature setpoints and the Mode (required for 4p groups among others)
- Alarm acknowledgement
- Summary of group general faults, group general messages, and group general events
- Summary of visualisation information
- Summary of system controller information

6.7.1.5 Parameters

Brief description	ID	Range	Default
Reset number of CAN participants	21196	0 - 1	0
SB display SW version activation check	21118	0 - 1	1
CAN-bus unit monitoring	21350	0 - 2	2

6.7.1.6 Statuses

Brief description	ID	Range
CAN state	20184	0 - 100
Number of participants	20185	0 - 100
Number of units	20186	0 - 100
Critical unit	21352	0 - 20
Message from Master that a Slave is offline	21357	0 - 1
Number of critical units saved	21358	0 - 11
Number of temperature-critical units saved	21426	0 - 11
Current number of critical units	21359	0 - 11
Current number of temperature-critical units	21427	0 - 11
CAN-bus unit monitoring impact	21360	0 - 1
Impact of CAN-bus monitoring of temp.-critical unit	21430	0 - 1

Brief description	ID/SubID	Range
Unit 1 communication status	21204/0	0 - 2
Unit 2 communication status	21204/1	0 - 2
Unit 3 communication status	21204/2	0 - 2
Unit 4 communication status	21204/3	0 - 2
Unit 5 communication status	21204/4	0 - 2
Unit 6 communication status	21204/5	0 - 2
Unit 7 communication status	21204/6	0 - 2
Unit 8 communication status	21204/7	0 - 2
Unit 9 communication status	21204/8	0 - 2
Unit 10 communication status	21204/9	0 - 2
Unit 11 communication status	21204/10	0 - 2
Unit 12 communication status	21204/11	0 - 2
Unit 13 communication status	21204/12	0 - 2
Unit 14 communication status	21204/13	0 - 2
Unit 15 communication status	21204/14	0 - 2
Unit 16 communication status	21204/15	0 - 2
Unit 17 communication status	21204/16	0 - 2
Unit 18 communication status	21204/17	0 - 2
Unit 19 communication status	21204/18	0 - 2
Unit 20 communication status	21204/19	0 - 2
Unit 21 communication status	21204/20	0 - 2
Unit 22 communication status	21204/21	0 - 2
Unit 23 communication status	21204/22	0 - 2
Unit 24 communication status	21204/23	0 - 2
Unit 25 communication status	21204/24	0 - 2
Unit 26 communication status	21204/25	0 - 2
Unit 27 communication status	21204/26	0 - 2
Unit 28 communication status	21204/27	0 - 2
Unit 29 communication status	21204/28	0 - 2
Unit 30 communication status	21204/29	0 - 2
Unit 31 communication status	21204/30	0 - 2
Unit 32 communication status	21204/31	0 - 2
Critical unit saved 1	21351/0	0 - 10
Critical unit saved 2	21351/1	0 - 10
Critical unit saved 3	21351/2	0 - 10
Critical unit saved 4	21351/3	0 - 10
Critical unit saved 5	21351/4	0 - 10
Critical unit saved 6	21351/5	0 - 10
Critical unit saved 7	21351/6	0 - 10
Critical unit saved 8	21351/7	0 - 10
Critical unit saved 9	21351/8	0 - 10
Critical unit saved 10	21351/9	0 - 10

6.7.1.7 Statuses of units within the group

Brief description	ID array(10)	Range
Critical unit	26352	0 - 20

6.7.2 Ethernet

The Ethernet interface with two RJ45 ports and integrated switch is used to access the Webserver and for the BMS interfaces with the protocols BACnet IP and Modbus TCP or for a cloud connection. There is no connection to the Wi-Fi network. The components connected to the two RJ45 ports must be on the same network with only one DHCP server. If DHCP is activated ("DHCP Activation" parameter set to 1), the IP address, subnet mask, default gateway and DNS-Server are automatically assigned. If DHCP is not activated ("DHCP Activation" parameter set to 0), the IP address, subnet mask, default gateway and the corresponding DNS-Server can or must be set manually via the corresponding parameters ("IP address", "Subnet mask", "Default gateway" and "DNS-Server"). The "Hostname" can only be set via the Webserver.

6.7.2.1 Parameters

Brief description	ID	Range	Default
DHCP activation	21129	0 - 1	1
IP address Oktett 1	21130	0 - 255	192
IP address Oktett 2	21131	0 - 255	168
IP address Oktett 3	21132	0 - 255	1
IP address Oktett 4	21133	0 - 255	100
Subnet mask Oktett 1	21134	0 - 255	255
Subnet mask Oktett 2	21135	0 - 255	255
Subnet mask Oktett 3	21136	0 - 255	255
Subnet mask Oktett 4	21137	0 - 255	0
Default gateway Oktett 1	21138	0 - 255	0
Default gateway Oktett 2	21139	0 - 255	0
Default gateway Oktett 3	21140	0 - 255	0
Default gateway Oktett 4	21141	0 - 255	0
DNS-Server Oktett 1	21142	0 - 255	0
DNS-Server Oktett 2	21143	0 - 255	0
DNS-Server Oktett 3	21144	0 - 255	0
DNS-Server Oktett 4	21145	0 - 255	0

Brief description	ID/SubID	Range	Default
Link IP address 1st Oktett 1	21706/0	0 - 255	0
Link IP address 1st Oktett 2	21706/1	0 - 255	0
Link IP address 1st Oktett 3	21706/2	0 - 255	0
Link IP address 1st Oktett 4	21706/3	0 - 255	0
Link IP address 1st Oktett 5	21706/4	0 - 255	0
Link IP address 1st Oktett 6	21706/5	0 - 255	0
Link IP address 1st Oktett 7	21706/6	0 - 255	0
Link IP address 1st Oktett 8	21706/7	0 - 255	0
Link IP address 1st Oktett 9	21706/8	0 - 255	0
Link IP address 1st Oktett 10	21706/9	0 - 255	0
Link IP address 1st Oktett 11	21706/10	0 - 255	0
Link IP address 1st Oktett 12	21706/11	0 - 255	0
Link IP address 1st Oktett 13	21706/12	0 - 255	0
Link IP address 1st Oktett 14	21706/13	0 - 255	0
Link IP address 1st Oktett 15	21706/14	0 - 255	0
Link IP address 1st Oktett 16	21706/15	0 - 255	0

Brief description	ID/SubID	Range	Default
Link IP address 1st Oktett 17	21706/16	0 - 255	0
Link IP address 1st Oktett 18	21706/17	0 - 255	0
Link IP address 1st Oktett 19	21706/18	0 - 255	0
Link IP address 1st Oktett 20	21706/19	0 - 255	0
Link IP address 1st Oktett 21	21706/20	0 - 255	0
Link IP address 1st Oktett 22	21706/21	0 - 255	0
Link IP address 1st Oktett 23	21706/22	0 - 255	0
Link IP address 1st Oktett 24	21706/23	0 - 255	0
Link IP address 1st Oktett 25	21706/24	0 - 255	0
Link IP address 1st Oktett 26	21706/25	0 - 255	0
Link IP address 1st Oktett 27	21706/26	0 - 255	0
Link IP address 1st Oktett 28	21706/27	0 - 255	0
Link IP address 1st Oktett 29	21706/28	0 - 255	0
Link IP address 1st Oktett 30	21706/29	0 - 255	0
Link IP address 1st Oktett 31	21706/30	0 - 255	0
Link IP address 1st Oktett 32	21706/31	0 - 255	0
Link IP address 2nd Oktett 1	21707/0	0 - 255	0
Link IP address 2nd Oktett 2	21707/1	0 - 255	0
Link IP address 2nd Oktett 3	21707/2	0 - 255	0
Link IP address 2nd Oktett 4	21707/3	0 - 255	0
Link IP address 2nd Oktett 5	21707/4	0 - 255	0
Link IP address 2nd Oktett 6	21707/5	0 - 255	0
Link IP address 2nd Oktett 7	21707/6	0 - 255	0
Link IP address 2nd Oktett 8	21707/7	0 - 255	0
Link IP address 2nd Oktett 9	21707/8	0 - 255	0
Link IP address 2nd Oktett 10	21707/9	0 - 255	0
Link IP address 2nd Oktett 11	21707/10	0 - 255	0
Link IP address 2nd Oktett 12	21707/11	0 - 255	0
Link IP address 2nd Oktett 13	21707/12	0 - 255	0
Link IP address 2nd Oktett 14	21707/13	0 - 255	0
Link IP address 2nd Oktett 15	21707/14	0 - 255	0
Link IP address 2nd Oktett 16	21707/15	0 - 255	0
Link IP address 2nd Oktett 17	21707/16	0 - 255	0
Link IP address 2nd Oktett 18	21707/17	0 - 255	0
Link IP address 2nd Oktett 19	21707/18	0 - 255	0
Link IP address 2nd Oktett 20	21707/19	0 - 255	0
Link IP address 2nd Oktett 21	21707/20	0 - 255	0
Link IP address 2nd Oktett 22	21707/21	0 - 255	0
Link IP address 2nd Oktett 23	21707/22	0 - 255	0
Link IP address 2nd Oktett 24	21707/23	0 - 255	0
Link IP address 2nd Oktett 25	21707/24	0 - 255	0
Link IP address 2nd Oktett 26	21707/25	0 - 255	0
Link IP address 2nd Oktett 27	21707/26	0 - 255	0
Link IP address 2nd Oktett 28	21707/27	0 - 255	0
Link IP address 2nd Oktett 29	21707/28	0 - 255	0
Link IP address 2nd Oktett 30	21707/29	0 - 255	0
Link IP address 2nd Oktett 31	21707/30	0 - 255	0
Link IP address 2nd Oktett 32	21707/31	0 - 255	0
Link IP address 3rd Oktett 1	21708/0	0 - 255	0
Link IP address 3rd Oktett 2	21708/1	0 - 255	0
Link IP address 3rd Oktett 3	21708/2	0 - 255	0
Link IP address 3rd Oktett 4	21708/3	0 - 255	0
Link IP address 3rd Oktett 5	21708/4	0 - 255	0
Link IP address 3rd Oktett 6	21708/5	0 - 255	0
Link IP address 3rd Oktett 7	21708/6	0 - 255	0
Link IP address 3rd Oktett 8	21708/7	0 - 255	0
Link IP address 3rd Oktett 9	21708/8	0 - 255	0
Link IP address 3rd Oktett 10	21708/9	0 - 255	0

Brief description	ID/SubID	Range	Default
Link IP address 3rd Oktett 11	21708/10	0 - 255	0
Link IP address 3rd Oktett 12	21708/11	0 - 255	0
Link IP address 3rd Oktett 13	21708/12	0 - 255	0
Link IP address 3rd Oktett 14	21708/13	0 - 255	0
Link IP address 3rd Oktett 15	21708/14	0 - 255	0
Link IP address 3rd Oktett 16	21708/15	0 - 255	0
Link IP address 3rd Oktett 17	21708/16	0 - 255	0
Link IP address 3rd Oktett 18	21708/17	0 - 255	0
Link IP address 3rd Oktett 19	21708/18	0 - 255	0
Link IP address 3rd Oktett 20	21708/19	0 - 255	0
Link IP address 3rd Oktett 21	21708/20	0 - 255	0
Link IP address 3rd Oktett 22	21708/21	0 - 255	0
Link IP address 3rd Oktett 23	21708/22	0 - 255	0
Link IP address 3rd Oktett 24	21708/23	0 - 255	0
Link IP address 3rd Oktett 25	21708/24	0 - 255	0
Link IP address 3rd Oktett 26	21708/25	0 - 255	0
Link IP address 3rd Oktett 27	21708/26	0 - 255	0
Link IP address 3rd Oktett 28	21708/27	0 - 255	0
Link IP address 3rd Oktett 29	21708/28	0 - 255	0
Link IP address 3rd Oktett 30	21708/29	0 - 255	0
Link IP address 3rd Oktett 31	21708/30	0 - 255	0
Link IP address 3rd Oktett 32	21708/31	0 - 255	0
Link IP address 4th Oktett 1	21709/0	0 - 255	0
Link IP address 4th Oktett 2	21709/1	0 - 255	0
Link IP address 4th Oktett 3	21709/2	0 - 255	0
Link IP address 4th Oktett 4	21709/3	0 - 255	0
Link IP address 4th Oktett 5	21709/4	0 - 255	0
Link IP address 4th Oktett 6	21709/5	0 - 255	0
Link IP address 4th Oktett 7	21709/6	0 - 255	0
Link IP address 4th Oktett 8	21709/7	0 - 255	0
Link IP address 4th Oktett 9	21709/8	0 - 255	0
Link IP address 4th Oktett 10	21709/9	0 - 255	0
Link IP address 4th Oktett 11	21709/10	0 - 255	0
Link IP address 4th Oktett 12	21709/11	0 - 255	0
Link IP address 4th Oktett 13	21709/12	0 - 255	0
Link IP address 4th Oktett 14	21709/13	0 - 255	0
Link IP address 4th Oktett 15	21709/14	0 - 255	0
Link IP address 4th Oktett 16	21709/15	0 - 255	0
Link IP address 4th Oktett 17	21709/16	0 - 255	0
Link IP address 4th Oktett 18	21709/17	0 - 255	0
Link IP address 4th Oktett 19	21709/18	0 - 255	0
Link IP address 4th Oktett 20	21709/19	0 - 255	0
Link IP address 4th Oktett 21	21709/20	0 - 255	0
Link IP address 4th Oktett 22	21709/21	0 - 255	0
Link IP address 4th Oktett 23	21709/22	0 - 255	0
Link IP address 4th Oktett 24	21709/23	0 - 255	0
Link IP address 4th Oktett 25	21709/24	0 - 255	0
Link IP address 4th Oktett 26	21709/25	0 - 255	0
Link IP address 4th Oktett 27	21709/26	0 - 255	0
Link IP address 4th Oktett 28	21709/27	0 - 255	0
Link IP address 4th Oktett 29	21709/28	0 - 255	0
Link IP address 4th Oktett 30	21709/29	0 - 255	0
Link IP address 4th Oktett 31	21709/30	0 - 255	0
Link IP address 4th Oktett 32	21709/31	0 - 255	0

6.7.2.2 Group unit parameters

Brief description	ID array(10)	Range	Default
DHCP activation	26129	0 - 1	1
IP address Oktett 1	26130	0 - 255	192
IP address Oktett 2	26131	0 - 255	168
IP address Oktett 3	26132	0 - 255	1
IP address Oktett 4	26133	0 - 255	100
Subnet mask Oktett 1	26134	0 - 255	255
Subnet mask Oktett 2	26135	0 - 255	255
Subnet mask Oktett 3	26136	0 - 255	255
Subnet mask Oktett 4	26137	0 - 255	0
Default gateway Oktett 1	26138	0 - 255	0
Default gateway Oktett 2	26139	0 - 255	0
Default gateway Oktett 3	26140	0 - 255	0
Default gateway Oktett 4	26141	0 - 255	0
DNS-Server Oktett 1	26142	0 - 255	0
DNS-Server Oktett 2	26143	0 - 255	0
DNS-Server Oktett 3	26144	0 - 255	0
DNS-Server Oktett 4	26145	0 - 255	0

6.7.2.3 Statuses

Brief description	ID	Range
MAC- address Oktett 1	21151	0 - FF
MAC- address Oktett 2	21152	0 - FF
MAC- address Oktett 3	21153	0 - FF
MAC- address Oktett 4	21154	0 - FF
MAC- address Oktett 5	21155	0 - FF
MAC- address Oktett 6	21156	0 - FF

6.7.2.4 Group unit statuses

Brief description	ID array(10)	Range
MAC- address Oktett 1	26151	0 - FF
MAC- address Oktett 2	26152	0 - FF
MAC- address Oktett 3	26153	0 - FF
MAC- address Oktett 4	26154	0 - FF
MAC- address Oktett 5	26155	0 - FF
MAC- address Oktett 6	26156	0 - FF

6.7.3 USB

The USB interface is used exclusively by service personnel (Factory Customer Service and Contract Customer Service).

6.7.4 0-10VDC

The "0-10V control activation" parameter can be used to enable 0-10VDC control by a higher-level building management system. With two-pipe units, the discreet (open/close) valve and fan can then be controlled via an appropriately coded 0-10VDC signal. With four-pipe units, the discrete (open/close) valve for the cooling coil and the fan or the discreet (open/close) valve for the heating coil and the fan can then be controlled via two appropriately coded 0-10VDC signals.
The following settings are possible:
0 = No default
1 = Default for two-pipe unit
2 = Default for four-pipe unit

If the 0-10V control for a two-pipe unit is activated, all control functions and all safety functions apart from two are deactivated. The equipment can then be controlled via a multifunctional input that is set to the "User-defined 1 (0-10VDC)" function.
The signal at the multifunctional input with the function "User-defined 1 (0-10VDC)" (heating or cooling or heating/cooling) is decoded via the parameters "Day heating fan speed PID On", "Day heating fan speed PID Off", "Day heating max fan speed PID", "Day heating min fan speed", "Day heating max fan speed", "Day heating valve PID On" and "Day heating valve PID Off", which are described in the sections "Fan speed signal conversion" and "Valve control signal conversion"(see above).
If a motor fault is pending, the fan is switched off and the valve closed. If a condensate alarm is pending, the fan is activated at 20% and the valve is closed, regardless of the "Condensate response" configuration.

If the 0-10V control for a four-pipe unit is activated, all control functions and all safety functions apart from two are deactivated. The control can then be activated via a multifunctional input that is set to the "User-defined 1 (0-10VDC)" function and via a multifunctional input that is set to the "User-defined 2 (0-10VDC)" function.
The signal at the multifunctional input with the function "User-defined 1 (0-10VDC)" (heating) is decoded via the parameters "Day heating fan speed PID On", "Day heating fan speed PID Off", "Day heating max fan speed PID", "Day heating min fan speed", "Day heating max fan speed", "Day heating valve PID On" and "Day heating valve PID Off", which are described in the sections "Fan speed signal conversion" and "Valve control signal conversion" (see above).
If a motor fault is pending, the fan is switched off and the valve closed. There is no response if a condensate alarm is pending.

The signal at the multifunctional input with the function "User-defined 2 (0-10VDC)" (cooling) is decoded via the parameters "Day cooling fan speed PID On", "Day cooling fan speed PID Off", "Day cooling max fan speed PID", "Day cooling min fan speed", "Day cooling max fan speed", "Day cooling valve PID On" and "Day cooling valve PID Off", which are described in the sections "Fan speed signal conversion" and "Valve control signal conversion" (see above).
If a motor fault is pending, the fan is switched off and both valves closed. If a condensate alarm is pending, the fan is controlled at 20% and the cooling valve is closed, regardless of the "Condensate response" configuration. The heating valve is unaffected.
The two signals at the multifunctional input 1 and at the multifunctional input 2 are not interlocking. If two different fan speeds are specified, the fan is controlled at the higher speed signal.

6.7.4.1 Parameters

Brief description	ID	Range	Default
0-10V control activation	21365	0 - 2	0

6.7.4.2 Group unit parameters

Brief description	ID array(10)	Range	Default
0-10V control activation	26365	0 - 2	0

6.7.5 Modbus RTU

The "Modbus RTU" interface can be used for the integration of the controller into a higher-level building management system (BMS). A licence key (32 Bit) is required to use the "Modbus RTU" interface and must be entered as a decimal number into the "Modbus RTU LicenceKey" parameter.

The "Modbus RTU activation" parameter is used to generally activate or deactivate communication with the "Modbus RTU" interface. The following settings are possible:
0 = Deactivated
1 = Activated
A parameter change only takes effect after a restart of the controller has been manually triggered! The restart must not be triggered earlier than ten seconds after the parameter change!

If a valid licence key is entered for the Modbus TCP interface but an invalid licence key is entered for the Modbus RTU interface, the "Modbus RTU activation" parameter is permanently deactivated and cannot be activated.

The "Modbus RTU LicenceKey valid" signal status shows whether the licence key is valid and the interface is thus fully functional. If multiple units are coupled by CAN-bus and operated together in a group, all units in the group must have a valid licence key.
0 = Invalid
1 = Valid
2 = Valid, but invalid with another unit in the group

The "Modbus RTU active" signal status displays whether the interface is active.
0 = Not active
1 = Active

If the interface is active but the licence key is not "valid", the functionality of the interface is restricted. Only the "Room temperature" tab can be read and only contains a simulation value. The simulation value is raised by 0.1 K every second from 20.0 °C to 25.9 °C. This enables a general communication test to be carried out even without a licence key. However, if a valid licence key has been entered for Modbus TCP, the Modbus RTU can be used without restrictions.

The "Modbus RTU address" parameter can be used to set the address for accessing the unit via the Modbus RTU interface. An address space of 1 to 200 is available for this.

The "Modbus RTU Baudrate" parameter can be used set the Baudrate of the Modbus RTU interface. The following settings are possible:
0 = 2400
1 = 4800
2 = 9600
3 = 19200
4 = 38400
5 = 57600
A parameter change only takes effect after a restart of the controller has been manually triggered! The restart must not be triggered earlier than ten seconds after the parameter change!

The "Modbus RTU parity" parameter can be used to set the parity of the Modbus RTU interface. The following settings are possible:
0 = None
1 = Even
2 = Odd
A parameter change only takes effect after a restart of the controller has been manually triggered! The restart must not be triggered earlier than ten seconds after the parameter change!

The "Modbus RTU stop bits" parameter can be used to set the number of stop bits for the Modbus RTU interface. The following settings are possible:
0 = 1 stop bit
1 = 2 stop bits
A parameter change only takes effect after a restart of the controller has been manually triggered! The restart must not be triggered earlier than ten seconds after the parameter change!

The available data points can be found in section "BMS data points". The register addresses are listed in the document or in the "Modbus SecA data points" file.

6.7.5.1 Parameters

Brief description	ID	Range	Default
Modbus RTU activation	21146	0 - 1	0
Modbus RTU address	21147	1 - 200	1
Modbus RTU Baudrate	21148	0 - 5	3
Modbus RTU parity	21149	0 - 2	0
Modbus RTU stop bits	21802	0 - 1	0
Modbus RTU LicenceKey	21449	0 - 4294967294	0

6.7.5.2 Group unit parameters

Brief description	ID array(10)	Range	Default
Modbus RTU activation	26146	0 - 1	0
Modbus RTU address	26147	1 - 200	1
Modbus RTU Baudrate	26148	0 - 5	3
Modbus RTU parity	26149	0 - 2	0
Modbus RTU stop bits	26802	0 - 1	0
Modbus RTU LicenceKey	26449	0 - 4294967294	0

6.7.5.3 Statuses

Brief description	ID	Range
Modbus RTU LicenceKey valid	21367	0 - 2
Modbus RTU active	21368	0 - 1
Modbus RTU LicenceKey valid for all units	21897	0 - 1

6.7.5.4 Statuses of units within the group

Brief description	ID array(10)	Range
Modbus RTU LicenceKey valid	26367	0 - 2
Modbus RTU active	26368	0 - 1

6.7.6 Modbus TCP

The "Modbus TCP" interface can be used to integrate the controller into a higher-level building management system (BMS). A licence key (32 Bit) is required to use the "Modbus TCP" interface and must be entered as a decimal number into the "Modbus TCP LicenceKey" parameter.

The "Modbus TCP activation" parameter is used to generally activate or deactivate communication with the "Modbus TCP" interface. The following settings are possible:
0 = Deactivated
1 = Activated
A parameter change only takes effect after a manually triggered restart of the controller! The restart must not be triggered earlier than ten seconds after the parameter change!

If a valid licence key for the Modbus RTU interface is entered, but no valid licence key for the Modbus TCP interface is entered, the "Modbus TCP activation" parameter is permanently deactivated and cannot be activated.

The "Modbus TCP LicenceKey valid" signal status shows whether the licence key is valid and the interface is thus fully functional. If multiple units are coupled by the CAN-bus and operated together in a group, all units in the group must have a valid licence key.
0 = Invalid
1 = Valid
2 = Valid, but invalid with another unit in the group

The "Modbus TCP active" signal status shows whether the interface is active.
0 = Not active
1 = Active

If the interface is active but the licence key is not "valid", the functionality of the interface is restricted. Only the "Room temperature" tab can be read and only contains a simulation value. The simulation value is raised by 0.1 K every second from 20.0 °C to 25.9 °C. This enables a general communication test to be carried out even without a licence key. However, if a valid licence key has been entered for, the can be used without restrictions.

The available data points can be found in section "BMS data points". The register addresses are listed in an external document or in an external file.

6.7.6.1 Parameters

Brief description	ID	Range	Default
Modbus TCP activation	21421	0 - 1	0
Modbus TCP LicenceKey	21448	0 - 4294967294	0

6.7.6.2 Group unit parameters

Brief description	ID array(10)	Range	Default
Modbus TCP activation	26421	0 - 1	0
Modbus TCP LicenceKey	26448	0 - 4294967294	0

6.7.6.3 Statuses

Brief description	ID	Range
ModbusTCP LicenceKey valid	21369	0 - 2
Modbus TCP active	21370	0 - 1
Modbus TCP LicenceKey valid for all units	21898	0 - 1

6.7.6.4 Statuses of units within the group

Brief description	ID array(10)	Range
Modbus TCP LicenceKey valid	26369	0 - 2
Modbus TCP active	26370	0 - 1

6.7.7 BACnet IP

The "BACnet IP" interface can be used to integrate the controller into a higher-level building management system (BMS). A licence key (32 Bit) is required to use the "BACnet IP" interface and must be entered as a decimal number into the "BACnet IP LicenceKey" parameter.

The "BACnet IP activation" parameter is used to generally activate or deactivate communication with the "BACnet IP" interface. The following settings are possible:
0 = Deactivated
1 = Activated
A parameter change only takes effect after a manually triggered restart of the controller! The restart must not be triggered earlier than ten seconds after the parameter change!

The "BACnet IP LicenceKey valid" signal status shows whether the licence key is valid and the interface is thus fully functional. If multiple units are coupled by CAN-bus and operated together in a group, all units in the group must have a valid licence key.
0 = Invalid
1 = Valid
2 = Valid, but invalid with another unit in the group

The "BACnet IP active" signal status displays whether the interface is active.
0 = Not active
1 = Active

If the interface is active but the licence key is not "valid", the functionality of the interface is restricted. In this case only the object (analogue value, name: temperature, description: temperature simulation) can be read. The simulation value is increased each second from 20.0 °C to 25.9 °C. This enables a general communication test to be carried out even without a licence key. The "Temperature simulation" data point is not available with a valid licence key.

The available data points can be found in section "BMS data points". The additional information is listed in an external document (EDE file) or in an external file (EDE file).

6.7.7.1 Parameters

Brief description	ID	Range	Default
BACnet IP LicenceKey	21447	0 - 4294967294	0
BACnet IP activation	21422	0 - 1	0

BACnet IP Device Name	21440	a-z, A-Z, 0-9	SBM
BACnet IP Device Instance	21441	0 - 4194304	999100
BACnet IP Port	21442	0 - 65535	47808

Brief description	ID	Range	Default
Name AI 1	21451	a-z, A-Z, 0-9	RT_actual value_1
Name AI 2	21452	a-z, A-Z, 0-9	RT_actual value_2
Name AI 3	21453	a-z, A-Z, 0-9	RT_actual_value_3
Name AI 4	21454	a-z, A-Z, 0-9	RT_actual value_4
Name AI 5	21455	a-z, A-Z, 0-9	RT_actual_value_5
Name AI 6	21456	a-z, A-Z, 0-9	RT_actual_value_6
Name AI 7	21457	a-z, A-Z, 0-9	RT_actual value_7
Name AI 8	21458	a-z, A-Z, 0-9	RT_actual value_8
Name AI 9	21459	a-z, A-Z, 0-9	RT_actual value_9
Name AI 10	21460	a-z, A-Z, 0-9	RT_actual_value_10
Name AI 11	21461	a-z, A-Z, 0-9	SupAT_actual_value_1
Name AI 12	21462	a-z, A-Z, 0-9	SupAT_actual value_2
Name AI 13	21463	a-z, A-Z, 0-9	SupAT_actual value_3
Name AI 14	21464	a-z, A-Z, 0-9	SupAT_actual value_4
Name AI 15	21465	a-z, A-Z, 0-9	SupAT_actual value_5
Name AI 16	21466	a-z, A-Z, 0-9	SupAT_actual value_6
Name AI 17	21467	a-z, A-Z, 0-9	SupAT_actual value_7
Name AI 18	21468	a-z, A-Z, 0-9	SupAT_actual value_8
Name AI 19	21469	a-z, A-Z, 0-9	SupAT_actual value_9
Name AI 20	21470	a-z, A-Z, 0-9	SupAT_actual value_10
Name AI 21	21471	a-z, A-Z, 0-9	OT_actual value
Name AI 22	21472	a-z, A-Z, 0-9	RetT_2_pipe_actual value
Name AI 23	21473	a-z, A-Z, 0-9	RetT_heating_actual value
Name AI 24	21474	a-z, A-Z, 0-9	RetT_cooling_actual value
Name AI 25	21475	a-z, A-Z, 0-9	ST_2_pipe_actual value
Name AI 26	21476	a-z, A-Z, 0-9	ST_heating_actual value
Name AI 27	21477	a-z, A-Z, 0-9	ST_cooling_actual value
Name AI 28	21478	a-z, A-Z, 0-9	User-defined_1_NTC
Name AI 29	21479	a-z, A-Z, 0-9	User-defined_2_NTC
Name AI 30	21480	a-z, A-Z, 0-9	User-defined_3_NTC
Name AI 31	21481	a-z, A-Z, 0-9	User-defined_4_NTC
Name AI 32	21482	a-z, A-Z, 0-9	User-defined_1_voltage
Name AI 33	21483	a-z, A-Z, 0-9	User-defined_2_voltage
Name AI 34	21484	a-z, A-Z, 0-9	User-defined_3_voltage
Name AI 35	21485	a-z, A-Z, 0-9	User-defined_4_voltage
Name AO 1	21486	a-z, A-Z, 0-9	Signal_heating valve_1
Name AO 2	21487	a-z, A-Z, 0-9	Signal_heating valve_2
Name AO 3	21488	a-z, A-Z, 0-9	Signal_heating valve _3
Name AO 4	21489	a-z, A-Z, 0-9	Signal_heating valve_4
Name AO 5	21490	a-z, A-Z, 0-9	Signal_heating valve_5
Name AO 6	21491	a-z, A-Z, 0-9	Signal_heating valve_6
Name AO 7	21492	a-z, A-Z, 0-9	Signal_heating valve_7
Name AO 8	21493	a-z, A-Z, 0-9	Signal_heating valve_8
Name AO 9	21494	a-z, A-Z, 0-9	Signal_heating valve_9
Name AO 10	21495	a-z, A-Z, 0-9	Signal_heating valve_10
Name AO 11	21496	a-z, A-Z, 0-9	Signal_cooling valve_1
Name AO 12	21497	a-z, A-Z, 0-9	Signal_cooling valve_2
Name AO 13	21498	a-z, A-Z, 0-9	Signal_cooling valve_3
Name AO 14	21499	a-z, A-Z, 0-9	Signal_cooling valve_4
Name AO 15	21500	a-z, A-Z, 0-9	Signal_cooling valve_5
Name AO 16	21501	a-z, A-Z, 0-9	Signal_cooling valve_6
Name AO 17	21502	a-z, A-Z, 0-9	Signal_cooling valve_7
Name AO 18	21503	a-z, A-Z, 0-9	Signal_cooling valve_8
Name AO 19	21504	a-z, A-Z, 0-9	Signal_cooling valve_9

Name AO 20	21505	a-z, A-Z, 0-9	Signal_cooling valve_10
Name AO 21	21506	a-z, A-Z, 0-9	Signal_valve_2_pipe_1
Name AO 22	21507	a-z, A-Z, 0-9	Signal_valve_2_pipe_2
Name AO 23	21508	a-z, A-Z, 0-9	Signal_valve_2_pipe_3
Name AO 24	21509	a-z, A-Z, 0-9	Signal_valve_2_pipe_4
Name AO 25	21510	a-z, A-Z, 0-9	Signal_valve_2_pipe_5
Name AO 26	21511	a-z, A-Z, 0-9	Signal_valve_2_pipe_6
Name AO 27	21512	a-z, A-Z, 0-9	Signal_valve_2_pipe_7
Name AO 28	21513	a-z, A-Z, 0-9	Signal_valve_2_pipe_8
Name AO 29	21514	a-z, A-Z, 0-9	Signal_valve_2_pipe_9
Name AO 30	21515	a-z, A-Z, 0-9	Signal_valve_2_pipe_10
Name AO 31	21516	a-z, A-Z, 0-9	Signal_fan_1
Name AO 32	21517	a-z, A-Z, 0-9	Signal_fan_2
Name AO 33	21518	a-z, A-Z, 0-9	Signal_fan_3
Name AO 34	21519	a-z, A-Z, 0-9	Signal_fan_4
Name AO 35	21520	a-z, A-Z, 0-9	Signal_fan_5
Name AO 36	21521	a-z, A-Z, 0-9	Signal_fan_6
Name AO 37	21522	a-z, A-Z, 0-9	Signal_fan_7
Name AO 38	21523	a-z, A-Z, 0-9	Signal_fan_8
Name AO 39	21524	a-z, A-Z, 0-9	Signal_fan_9
Name AO 40	21525	a-z, A-Z, 0-9	Signal_fan_10
Name AV 1	21526	a-z, A-Z, 0-9	RT_base_setpoint
Name AV 2	21527	a-z, A-Z, 0-9	RT_setpoint_offset
Name AV 3	21528	a-z, A-Z, 0-9	RT_setpoint_2_pipe
Name AV 4	21529	a-z, A-Z, 0-9	RT_setpoint_heating
Name AV 5	21530	a-z, A-Z, 0-9	RT_setpoint_cooling
Name AV 6	21531	a-z, A-Z, 0-9	RT_actual value_BMS
Name AV 7	21532	a-z, A-Z, 0-9	OT_actual value_BMS
Name BO 1	21533	a-z, A-Z, 0-9	Status_heating valve
Name BO 2	21534	a-z, A-Z, 0-9	Status_cooling valve
Name BO 3	21535	a-z, A-Z, 0-9	Status_valve_2_pipe
Name BO 4	21702	a-z, A-Z, 0-9	Heat requirement
Name BO 5	21703	a-z, A-Z, 0-9	Cooling requirement
Name BV 1	21537	a-z, A-Z, 0-9	Alarm acknowledgement
Name BV 2	21538	a-z, A-Z, 0-9	General fault
Name BV 3	21539	a-z, A-Z, 0-9	General message
Name BV 4	21540	a-z, A-Z, 0-9	General event
Name BV 5	21541	a-z, A-Z, 0-9	Heartbeat
Name BV 6	21542	a-z, A-Z, 0-9	Default setting_fire shutdown
Name BV 7	21838	a-z, A-Z, 0-9	Lock_heating
Name BV 8	21839	a-z, A-Z, 0-9	Lock_cooling
Name MV 1	21543	a-z, A-Z, 0-9	Current_operating_program
Name MV 2	21544	a-z, A-Z, 0-9	Operating_Prog_High_Prio
Name MV 3	21545	a-z, A-Z, 0-9	Operating_Prog_Low_Prio
Name MV 4	21546	a-z, A-Z, 0-9	Mode
Name MV 5	21547	a-z, A-Z, 0-9	Heating_ventilation
Name MV 6	21548	a-z, A-Z, 0-9	Manual_stage_selection
Name MV 7	21549	a-z, A-Z, 0-9	Target_heating_cooling
Name MV 8	21550	a-z, A-Z, 0-9	Actual_heating_cooling
Name MV 9	21551	a-z, A-Z, 0-9	Event_fan_SecA
Name MV 10	21552	a-z, A-Z, 0-9	Event_frost_protection
Name MV 11	21553	a-z, A-Z, 0-9	Event_condensate
Name MV 12	21554	a-z, A-Z, 0-9	Event_FA
Name MV 13	21555	a-z, A-Z, 0-9	Event_user-defined_1
Name MV 14	21556	a-z, A-Z, 0-9	Event_user-defined_2
Name MV 15	21557	a-z, A-Z, 0-9	Event_user-defined_3
Name MV 16	21558	a-z, A-Z, 0-9	Event_user-defined_4
Name MV 17	21559	a-z, A-Z, 0-9	Event_filter
Name MV 18	21560	a-z, A-Z, 0-9	Value outside the prescribed limits

Name MV 19	21561	a-z, A-Z, 0-9	System_fault
Name MV 20	21562	a-z, A-Z, 0-9	CAN_fault
Name MV 21	21700	a-z, A-Z, 0-9	Operating_hours_SecA_fan
Name PIV 1	21563	a-z, A-Z, 0-9	General_fault_group
Name PIV 2	21564	a-z, A-Z, 0-9	General_message_group
Description AI 1	21565	a-z, A-Z, 0-9	Room temperature actual value unit 1
Description AI 2	21566	a-z, A-Z, 0-9	Room temperature actual value unit 1
Description AI 3	21567	a-z, A-Z, 0-9	Room temperature actual value unit 1
Description AI 4	21568	a-z, A-Z, 0-9	Room temperature actual value unit 1
Description AI 5	21569	a-z, A-Z, 0-9	Room temperature actual value unit 1
Description AI 6	21570	a-z, A-Z, 0-9	Room temperature actual value unit 1
Description AI 7	21571	a-z, A-Z, 0-9	Room temperature actual value unit 1
Description AI 8	21572	a-z, A-Z, 0-9	Room temperature actual value unit 1
Description AI 9	21573	a-z, A-Z, 0-9	Room temperature actual value unit 9
Description AI 10	21574	a-z, A-Z, 0-9	Room temperature actual value unit 10
Description AI 11	21575	a-z, A-Z, 0-9	Supply air temperature actual value unit 1
Description AI 12	21576	a-z, A-Z, 0-9	Supply air temperature actual value unit 2
Description AI 13	21577	a-z, A-Z, 0-9	Supply air temperature actual value unit 3
Description AI 14	21578	a-z, A-Z, 0-9	Supply air temperature actual value unit 4
Description AI 15	21579	a-z, A-Z, 0-9	Supply air temperature actual value unit 5
Description AI 16	21580	a-z, A-Z, 0-9	Supply air temperature actual value unit 6
Description AI 17	21581	a-z, A-Z, 0-9	Supply air temperature actual value unit 7
Description AI 18	21582	a-z, A-Z, 0-9	Supply air temperature actual value unit 8
Description AI 19	21583	a-z, A-Z, 0-9	Supply air temperature actual value unit 9
Description AI 20	21584	a-z, A-Z, 0-9	Supply air temperature actual value unit 10
Description AI 21	21585	a-z, A-Z, 0-9	Outside temperature actual value
Description AI 22	21586	a-z, A-Z, 0-9	Return temperature 2-pipe system actual value
Description AI 23	21587	a-z, A-Z, 0-9	Return temperature heating actual value
Description AI 24	21588	a-z, A-Z, 0-9	Return temperature cooling actual value
Description AI 25	21589	a-z, A-Z, 0-9	Supply temperature 2-pipe system actual value
Description AI 26	21590	a-z, A-Z, 0-9	Supply temperature heating actual value
Description AI 27	21591	a-z, A-Z, 0-9	Supply temperature cooling actual value
Description AI 28	21592	a-z, A-Z, 0-9	User-defined 1 (NTC)
Description AI 29	21593	a-z, A-Z, 0-9	User-defined 2 (NTC)
Description AI 30	21594	a-z, A-Z, 0-9	User-defined 3 (NTC)
Description AI 31	21595	a-z, A-Z, 0-9	User-defined 4 (NTC)
Description AI 32	21596	a-z, A-Z, 0-9	User-defined 1 (0 - 10 volts)
Description AI 33	21597	a-z, A-Z, 0-9	User-defined 2 (0 - 10 volts)
Description AI 34	21598	a-z, A-Z, 0-9	User-defined 3 (0 - 10 volts)
Description AI 35	21599	a-z, A-Z, 0-9	User-defined 4 (0 - 10 volts)
Description AO 1	21600	a-z, A-Z, 0-9	Heating valve signal unit 1
Description AO 2	21601	a-z, A-Z, 0-9	Heating valve signal unit 2
Description AO 3	21602	a-z, A-Z, 0-9	Heating valve signal unit 3
Description AO 4	21603	a-z, A-Z, 0-9	Heating valve signal unit 4
Description AO 5	21604	a-z, A-Z, 0-9	Heating valve signal unit 5
Description AO 6	21605	a-z, A-Z, 0-9	Heating valve signal unit 6
Description AO 7	21606	a-z, A-Z, 0-9	Heating valve signal unit 7
Description AO 8	21607	a-z, A-Z, 0-9	Heating valve signal unit 8
Description AO 9	21608	a-z, A-Z, 0-9	Heating valve signal unit 9
Description AO 10	21609	a-z, A-Z, 0-9	Heating valve signal unit 10
Description AO 11	21610	a-z, A-Z, 0-9	Cooling valve signal unit 1
Description AO 12	21611	a-z, A-Z, 0-9	Cooling valve signal unit 2
Description AO 13	21612	a-z, A-Z, 0-9	Cooling valve signal unit 3
Description AO 14	21613	a-z, A-Z, 0-9	Cooling valve signal unit 4
Description AO 15	21614	a-z, A-Z, 0-9	Cooling valve signal unit 5
Description AO 16	21615	a-z, A-Z, 0-9	Cooling valve signal unit 6
Description AO 17	21616	a-z, A-Z, 0-9	Cooling valve signal unit 7
Description AO 18	21617	a-z, A-Z, 0-9	Cooling valve signal unit 8
Description AO 19	21618	a-z, A-Z, 0-9	Cooling valve signal unit 9

Description AO 20	21619	a-z, A-Z, 0-9	Cooling valve signal unit 10
Description AO 21	21620	a-z, A-Z, 0-9	2-pipe heating cooling valve signal unit 1
Description AO 22	21621	a-z, A-Z, 0-9	2-pipe heating cooling valve signal unit 2
Description AO 23	21622	a-z, A-Z, 0-9	2-pipe heating cooling valve signal unit 3
Description AO 24	21623	a-z, A-Z, 0-9	2-pipe heating cooling valve signal unit 4
Description AO 25	21624	a-z, A-Z, 0-9	2-pipe heating cooling valve signal unit 5
Description AO 26	21625	a-z, A-Z, 0-9	2-pipe heating cooling valve signal unit 6
Description AO 27	21626	a-z, A-Z, 0-9	2-pipe heating cooling valve signal unit 7
Description AO 28	21627	a-z, A-Z, 0-9	2-pipe heating cooling valve signal unit 8
Description AO 29	21628	a-z, A-Z, 0-9	2-pipe heating cooling valve signal unit 9
Description AO 30	21629	a-z, A-Z, 0-9	2-pipe heating cooling valve signal unit 10
Description AO 31	21630	a-z, A-Z, 0-9	Supply air fan signal unit 1
Description AO 32	21631	a-z, A-Z, 0-9	Supply air fan signal unit 2
Description AO 33	21632	a-z, A-Z, 0-9	Supply air fan signal unit 3
Description AO 34	21633	a-z, A-Z, 0-9	Supply air fan signal unit 4
Description AO 35	21634	a-z, A-Z, 0-9	Supply air fan signal unit 5
Description AO 36	21635	a-z, A-Z, 0-9	Supply air fan signal unit 6
Description AO 37	21636	a-z, A-Z, 0-9	Supply air fan signal unit 7
Description AO 38	21637	a-z, A-Z, 0-9	Supply air fan signal unit 8
Description AO 39	21638	a-z, A-Z, 0-9	Supply air fan signal unit 9
Description AO 40	21639	a-z, A-Z, 0-9	Supply air fan signal unit 10
Description AV 1	21640	a-z, A-Z, 0-9	Temperature base setpoint
Description AV 2	21641	a-z, A-Z, 0-9	Offset room temperature setpoint
Description AV 3	21642	a-z, A-Z, 0-9	2-pipe room temperature setpoint
Description AV 4	21643	a-z, A-Z, 0-9	Room temperature setpoint, heating
Description AV 5	21644	a-z, A-Z, 0-9	Room temperature setpoint, cooling
Description AV 6	21645	a-z, A-Z, 0-9	Target room temperature actual value
Description AV 7	21646	a-z, A-Z, 0-9	Target outside temperature actual value
Description BO 1	21647	a-z, A-Z, 0-9	Heating valve status
Description BO 2	21648	a-z, A-Z, 0-9	Cooling valve status
Description BO 3	21649	a-z, A-Z, 0-9	2-pipe heating cooling valve status
Description BO 4	21704	a-z, A-Z, 0-9	Group heat requirement
Description BO 5	21705	a-z, A-Z, 0-9	Group cooling requirement
Description BV 1	21651	a-z, A-Z, 0-9	Resetting alarm acknowledgement
Description BV 2	21652	a-z, A-Z, 0-9	Group general fault
Description BV 3	21653	a-z, A-Z, 0-9	Group general message
Description BV 4	21654	a-z, A-Z, 0-9	Group general event
Description BV 5	21655	a-z, A-Z, 0-9	Heartbeat trigger
Description BV 6	21656	a-z, A-Z, 0-9	Fire shutdown_specification
Description BV 7	21840	a-z, A-Z, 0-9	Heating controller lock
Description BV 8	21841	a-z, A-Z, 0-9	Cooling controller lock
Description MV 1	21657	a-z, A-Z, 0-9	Current operating program
Description MV 2	21658	a-z, A-Z, 0-9	Operating program high priority target
Description MV 3	21659	a-z, A-Z, 0-9	Operating program low priority target
Description MV 4	21660	a-z, A-Z, 0-9	Temperature control mode
Description MV 5	21661	a-z, A-Z, 0-9	Door air curtain heating ventilation
Description MV 6	21662	a-z, A-Z, 0-9	Manual stage selection target
Description MV 7	21663	a-z, A-Z, 0-9	Heating cooling target
Description MV 8	21664	a-z, A-Z, 0-9	Heating cooling actual value
Description MV 9	21665	a-z, A-Z, 0-9	Secondary air fan event
Description MV 10	21666	a-z, A-Z, 0-9	Frost protection thermostat event
Description MV 11	21667	a-z, A-Z, 0-9	Condensate event
Description MV 12	21668	a-z, A-Z, 0-9	Fire shutdown event
Description MV 13	21669	a-z, A-Z, 0-9	User-defined 1 event
Description MV 14	21670	a-z, A-Z, 0-9	User-defined 2 event
Description MV 15	21671	a-z, A-Z, 0-9	User-defined 3 event
Description MV 16	21672	a-z, A-Z, 0-9	User-defined 4 event
Description MV 17	21673	a-z, A-Z, 0-9	Filter event
Description MV 18	21674	a-z, A-Z, 0-9	Limit value, short-circuit, wire break

Description MV 19	21675	a-z, A-Z, 0-9	System fault
Description MV 20	21676	a-z, A-Z, 0-9	CAN fault
Description MV 21	21701	a-z, A-Z, 0-9	SecA fan operating hours limit
Description PIV 1	21677	a-z, A-Z, 0-9	Group general fault
Description PIV 2	21678	a-z, A-Z, 0-9	Group general message

6.7.7.2 Group unit parameters

Brief description	ID array(10)	Range	Default
BACnet IP LicenceKey	26447	0 - 4294967294	0
BACnet IP activation	26422	0 - 1	0
BACnet IP Device Instance	26441	0 - 4194304	999100
BACnet IP Port	26442	0 - 65535	47808

6.7.7.3 Statuses

Brief description	ID	Range
BACnetIP LicenceKey valid	21371	0 - 1
BACnet IP active	21372	0 - 1
BACnet IP LicenceKey valid for all units	21896	0 - 1

6.7.7.4 Statuses of units within the group

Brief description	ID array(10)	Range
BACnetIP LicenceKey valid	26371	0 - 1
BACnet IP active	26372	0 - 1

6.7.8 BMS data points

When connecting to BMS systems (Modbus RTU, Modbus TCPand BACnet IP), it may be necessary to monitor communication with the BMS in order to assume a safe state in the event of a failure. A "BMS HeartBeat" which is to be written cyclically can therefore be activated in order to check the system is alive. If this parameter is not written within a specified time, the fault "BMS HeartBeat" is displayed and the system assumes a safe state:
The SecA fan is switched off.
The "BMS HeartBeat" fault is not interlocking and therefore does not have to be acknowledged. The display of the fault cannot be deactivated.

The "BMS Heartbeat runtime" parameter defines the time within which the “BMS HeartBeat" parameter must be written at least once to ensure the system is alive. Setting the "BMS Heartbeat runtime" parameter to 0 s deactivates the function. The "BMS Heartbeat remaining runtime" signal status shows the remaining time.

A number of events were summarised as ORed for forwarding to the BMS. A number of statuses were "bit-coded" for forwarding to the BMS.

The "BMS limit value short-circuit wire break" status indicates whether a value is outside the prescribed limits, or a short-circuit, or wire break is present at a sensor. An accurate diagnosis at the unit must then be carried out.
The "BMS system fault" status displays whether a system fault is pending. An accurate diagnosis at the unit must then be carried out.
The "BMS CAN fault" status shows whether a CAN fault is present. An accurate diagnosis at the unit must then be carried out.

If several units are coupled by means of a CAN-bus and operated together in a group, the "BMS group general fault (bit-coded)" status indicates whether a fault is pending and also the affected unit in the group:

Bit	Brief description	ID/SubID
2^0	General fault unit 1	25907/0
2^1	General fault unit 2	25907/1
2^2	General fault unit 3	25907/2
2^3	General fault unit 4	25907/3
2^4	General fault unit 5	25907/4
2^5	General fault unit 6	25907/5
2^6	General fault unit 7	25907/6
2^7	General fault unit 8	25907/7
2^8	General fault unit 9	25907/8
2^9	General fault unit 10	25907/9
2^{10}		
2^{11}		
2^{12}		
2^{13}		
2^{14}		
2^{15}		

If several units are coupled by means of a bus and operated together in a group, the "BMS group general fault (bit-coded)" status indicates whether a fault is pending and also the affected unit in the group:

Bit	Brief description	ID/SubID
2^0	General message unit 1	25908/0
2^1	General message unit 2	25908/1
2^2	General message unit 3	25908/2
2^3	General message unit 4	25908/3
2^4	General message unit 5	25908/4
2^5	General message unit 6	25908/5
2^6	General message unit 7	25908/6
2^7	General message unit 8	25908/7
2^8	General message unit 9	25908/8
2^9	General message unit 10	25908/9
2^{10}		
2^{11}		
2^{12}		
2^{13}		
2^{14}		
2^{15}		

6.7.8.1 Parameters

Brief description	ID	Range	Default
BMS Heartbeat runtime	21394	0 s - 60000 s	0 s
BMS HeartBeat	21385	0 - 1	0

6.7.8.2 Statuses

Brief description	ID	Range
BMS Heartbeat remaining runtime	21395	0 s - 60000 s
BMS limit value short-circuit wire break	21384	3 - 4
BMS system error	21388	3 - 4
BMS CAN error	21389	3 - 4

Brief description	ID	Range
BMS group general fault (bit-coded)	21386	0 - 65535
BMS group general message (bit-coded)	21387	0 - 65535
BMS room temperature simulation	21819	-99.9 °C - 99.9 °C

6.7.8.3 Statuses of units within the group

Brief description	ID array(10)	Range
BMS limit value short-circuit wire break	26384	3 - 4
BMS system error	26388	3 - 4
BMS CAN error	26389	3 - 4

6.7.8.4 Data point list

The following table shows the data points which can be accessed by connected BMS systems (Modbus RTU, Modbus TCP and BACnet IP).

Brief description	ID/SubID	RO/RW
Room temperature unit 1	25022/0	RO
Room temperature unit 2	25022/1	RO
Room temperature unit 3	25022/2	RO
Room temperature unit 4	25022/3	RO
Room temperature unit 5	25022/4	RO
Room temperature unit 6	25022/5	RO
Room temperature unit 7	25022/6	RO
Room temperature unit 8	25022/7	RO
Room temperature unit 9	25022/8	RO
Room temperature unit 10	25022/9	RO
Supply air temperature unit 1	25024/0	RO
Supply air temperature unit 2	25024/1	RO
Supply air temperature unit 3	25024/2	RO
Supply air temperature unit 4	25024/3	RO
Supply air temperature unit 5	25024/4	RO
Supply air temperature unit 6	25024/5	RO
Supply air temperature unit 7	25024/6	RO
Supply air temperature unit 8	25024/7	RO
Supply air temperature unit 9	25024/8	RO
Supply air temperature unit 10	25024/9	RO
Outside temperature	20026/0	RO
2p return temperature	20031/0	RO
4p H return temperature	20032/0	RO
4p C return temperature	20033/0	RO
2p supply temperature	20037/0	RO
4p H supply temperature	20038/0	RO
4p C supply temperature	20039/0	RO
User-defined 1 (NTC)	20969/0	RO
User-defined 2 (NTC)	20971/0	RO
User-defined 3 (NTC)	20973/0	RO
User-defined 4 (NTC)	20975/0	RO
User-defined 1 (0-10VDC)	20977/0	RO
User-defined 2 (0-10VDC)	20979/0	RO
User-defined 3 (0-10VDC)	20980/0	RO
User-defined 4 (0-10VDC)	20981/0	RO
2p RT setpoint	20036/0	RO
4p heating RT setpoint	20034/0	RO
4p cooling RT setpoint	20035/0	RO
4p heating unit 1 valve signal	25093/0	RO
4p heating unit 2 valve signal	25093/1	RO

Brief description	ID/SubID	RO/RW
4p heating unit 3 valve signal	25093/2	RO
4p heating unit 4 valve signal	25093/3	RO
4p heating unit 5 valve signal	25093/4	RO
4p heating unit 6 valve signal	25093/5	RO
4p heating unit 7 valve signal	25093/6	RO
4p heating unit 8 valve signal	25093/7	RO
4p heating unit 9 valve signal	25093/8	RO
4p heating unit 10 valve signal	25093/9	RO
4p cooling unit 1 valve signal	25095/0	RO
4p cooling unit 2 valve signal	25095/1	RO
4p cooling unit 3 valve signal	25095/2	RO
4p cooling unit 4 valve signal	25095/3	RO
4p cooling unit 5 valve signal	25095/4	RO
4p cooling unit 6 valve signal	25095/5	RO
4p cooling unit 7 valve signal	25095/6	RO
4p cooling unit 8 valve signal	25095/7	RO
4p cooling unit 9 valve signal	25095/8	RO
4p cooling unit 10 valve signal	25095/9	RO
2p heating cooling unit 1 valve signal	25188/0	RO
2p heating cooling unit 2 valve signal	25188/1	RO
2p heating cooling unit 3 valve signal	25188/2	RO
2p heating cooling unit 4 valve signal	25188/3	RO
2p heating cooling unit 5 valve signal	25188/4	RO
2p heating cooling unit 6 valve signal	25188/5	RO
2p heating cooling unit 7 valve signal	25188/6	RO
2p heating cooling unit 8 valve signal	25188/7	RO
2p heating cooling unit 9 valve signal	25188/8	RO
2p heating cooling unit 10 valve signal	25188/9	RO
Unit 1 fan signal	25597/0	RO
Unit 2 fan signal	25597/1	RO
Unit 3 fan signal	25597/2	RO
Unit 4 fan signal	25597/3	RO
Unit 5 fan signal	25597/4	RO
Unit 6 fan signal	25597/5	RO
Unit 7 fan signal	25597/6	RO
Unit 8 fan signal	25597/7	RO
Unit 9 fan signal	25597/8	RO
Unit 10 fan signal	25597/9	RO
Group general fault	20873/0	RO
Group general message	20896/0	RO
Group general event	20897/0	RO
4p heating valve status	20092/0	RO
4p cooling valve status	20094/0	RO
2p heating cooling valve status	20187/0	RO
Current operating program	20110/0	RO
HC operating mode	20666/0	RO
SecA fan	20524/0	RO
Frost protection thermostat	20255/0	RO
Condensate pump	20527/0	RO
FS priority 1	21256/0	RO
User-defined 1	20982/0	RO
User-defined 2	20983/0	RO
User-defined 3	20984/0	RO
User-defined 4	20985/0	RO
Filter	21259/0	RO
Value outside the prescribed limits, short-circuit, wire break	21384/0	RO
System fault	21388/0	RO

Brief description	ID/SubID	RO/RW
CAN error	21389/0	RO
Group general fault bit field	21386/0	RO
Group general message bit field	21387/0	RO
RT base setpoint	20009/0	RW
General RT Offset	20010/0	RW
Actual room temperature value by BMS	21164/0	RW
Actual outside temperature value by BMS	21165/0	RW
Acknowledgement	20640/0	RW
Heartbeat	21385/0	RW
Manual BMS selection high priority	20592/0	RW
Manual BMS selection low priority	20115/0	RW
Mode (Temperature control)	20538/0	RW
Heating ventilation switchover (door air curtain)	20673/0	RW
ManSS manual stage selection	20179/0	RW
HC switchover BMS specification	20680/0	RW
BMS fire shutdown specification	21417/0	RW
BMS heating RT lock	21820	RW
BMS cooling RT lock	21821	RW
SecA fan operating hours limit	21698/0	RO
Heat requirement	21382	RO
Cooling requirement	21383	RO

The following table shows the data points which can be accessed by connected BMS systems (only Modbus RTU and Modbus TCP, but not BACnet IP).

Brief description	ID/SubID	RO/RW
Function 1 - Remote OFF	21716/0	RO
Function 1 - Heating/cooling	21717/0	RO
Function 1 - Fire alarm control panel	21719/0	RO
Function 1 - Filter maintenance	21720/0	RO
Function 1 - 2p heating/cooling valve (including FS priority 1)	21807/0	RO
OA rate	21991/0	RO
SupAT setpoint current RT SupAT CC	22016/0	RO

6.7.9 KNX

Units equipped with KaControl MC technology can be integrated into KNX TP networks via an entry in the ETS database. The database entry contains the necessary parameters for configuring the unit and the communication objects used for data exchange. Press the "Prog (KNX)" button for half a second to program the unit using ETS.

A licence key (32 Bit) is required to use the "KNX TP" interface and must be entered as a decimal number into the "KNX TP Licence Key" parameter.

The "KNX TP activation" parameter can be used to generally activate or deactivate communication with the "KNX TP" interface. The following settings are possible:
0 = Deactivated
1 = Activated
A parameter change only takes effect after a manually triggered restart of the controller! The restart must not be triggered earlier than ten seconds after the parameter change!

The signal status "KNX TP Licence Key valid" displays whether the licence key is valid and the interface is thus fully functional. If multiple units are coupled by CAN-bus and operated together in a group, all units in the group must have a valid licence key.
0 = Invalid
1 = Valid
2 = Valid, but invalid with another unit in the group

The signal status "KNX TP active" displays whether the interface is active.
0 = Not active
1 = Active

If the interface is active but the licence key is not "valid", the functionality of the interface is restricted. Then only the communication object "Room temperature (feedback)" can be read, which then contains a simulation value. The simulation value is raised from by 0.1 K each second from 20.0 °C to 25.9 °C. This enables a general communication test to be carried out even without a licence key.

The available parameters and communication objects can be found in the ETS database entry and the associated documentation. The associated documentation also contains supplementary information.

Even if only one of several units that are coupled by means of a CAN-bus and operated together in a group, is integrated into a KNX TP network, this is not in keeping with the fundamental concept of the KNX. Therefore, group functions are not supported. It is not possible to access parameters and statuses of other units.

6.7.9.1 Parameters

Brief description	ID	Range	Default
KNX TP Licence Key	21450	0 - 4294967294	0
KNX TP activation	21443	0 - 1	0
KNX TP programming mode activation	21845	0 - 1	0
Activate Day KNX	21852	0 - 1	0
Activate Boost KNX	21853	0 - 1	0
Activate Eco KNX	21854	0 - 1	0
Activate Off KNX	21855	0 - 1	0
Heating / cooling switchover KNX	21856	0 - 1	0
Override of outputs by KNX	21858	0 - 255	0
Override of AO 1 by KNX	21859	0 - 100	0
Override of AO 2 by KNX	21860	0 - 100	0
Override of AO 3 by KNX	21861	0 - 100	0
Override of DO 1 by KNX	21862	0 - 1	0
Override of DO 2 by KNX	21863	0 - 1	0
Activation of input configuration by KNX	21864	0 - 255	0

6.7.9.2 Group unit parameters

Brief description	ID array(10)	Range	Default
KNX TP Licence Key	26450	0 - 4294967294	0
KNX TP activation	26443	0 - 1	0
KNX TP programming mode activation	26845	0 - 1	0

6.7.9.3 Statuses

Brief description	ID	Range
KNX TP Licence Key valid	21373	0 - 1
KNX TP active	21374	0 - 1
KNX TP Licence Key valid for all units	21895	0 - 1
analogue output 1 signal	21874	0% - 100%
analogue output 2 signal	21875	0% - 100%
analogue output 3 signal	21876	0% - 100%
User-defined 1 (0-10VDC)	21877	0% - 100%
User-defined 2 (0-10VDC)	21878	0% - 100%
User-defined 3 (0-10VDC)	21879	0% - 100%
User-defined 4 (0-10VDC)	21880	0% - 100%
KNX TP programming mode active	21846	0 - 1
KNX TP LED status	21847	0 - 255
User-defined 1 KNX	21848	0 - 1
User-defined 2 KNX	21849	0 - 1
User-defined 3 KNX	21850	0 - 1
User-defined 4 KNX	21851	0 - 1
Heating / cooling status KNX	21857	0 - 1
Alarm (8-bit)	21865	0 - 255

6.7.9.4 Statuses of units within the group

Brief description	ID array(10)	Range
KNX TP Licence Key valid	26373	0 - 1
KNX TP active	26374	0 - 1
KNX TP programming mode active	26846	0 - 1
KNX TP LED status	26847	0 - 255

6.7.10 Licences

To prevent unauthorised users from determining the licence key using brute force methods, a licence key can only be entered ten seconds after the controller has been restarted. Only five successive attempts to enter a licence key are permitted. Afterwards, a restart of the controller is required in order to be able to enter further licence keys.

6.7.11 WebServer

The integrated Webserver is used to perform simple operations as well as comprehensive programming. Access is password-protected. Views and function scopes at the highest level can be programmed. Information on operation can be found in section "Visualisation".

The "Webserver activation" parameter can generally be used to activate or deactivate the Webserver. The following settings are possible:
0 = Deactivated
1 = Activated

The "Overview page display" parameter can be used to configure the Webserver so that an overview page is displayed when it is accessed. The following settings are possible:
0 = Show overview page
1 = Do not show overview page

The KaControl MC Webserver unit overview provides an overview of up to 32 units equipped with KaControl MC technology.

If this parameter is active, the overview page represents the start page of the respective unit. For clarity of overview, this page should therefore only be activated for one unit.

The unit overview can be accessed via the IP address of the unit in which this view is activated. Depending on the unit configuration, it may be necessary to enter the password for UserLevel 1 or higher.

For a unit to be displayed on the overview page, a network connection must be established between the units and the corresponding IP address of the unit must be configured in the parameters of the Webserver link IP address table.

The tile of a unit provides the following information in this view.

If the Kampmann logo is highlighted in green, the unit is available in the network. There is no active fault and no active message on this unit.

If the Kampmann logo is highlighted in yellow, the unit is available in the network. There is no active fault but there is an active message on this unit.

If the Kampmann logo is highlighted in red, the unit is available in the network. There is an active fault in this unit.

If the Kampmann logo is not highlighted, no network connection can be established between the active unit (the unit called up in the browser) and the affected unit.

The name of the unit is displayed as a heading in the tile next to the logo. Each unit can thus be described uniquely. The unit name must be configured directly with the respective unit.

The IP address appears in the tile to uniquely identify all units in the network.

Clicking on a tile opens the Webserver of the selected unit in a new tab. The overview page should only be activated for one unit so that the user does not switch between the overview pages of the individual units. The views and operation of a unit / group are described in the following sections.

6.7.11.1 Parameters

Brief description	ID	Range	Default
Webserver activation	21420	0 - 1	1
Overview page display	21806	0 - 1	0

6.7.11.2 Group unit parameters

Brief description	ID array(10)	Range	Default
Webserver activation	26420	0 - 1	1
Overview page display	26806	0 - 1	0

6.7.12 Wi-Fi

The Wi-Fi interface can be used to access the controller directly by opening a stand-alone Wi-Fi network (Access point Mode). However, the Wi-Fi interface can also be integrated into an existing Wi-Fi network (Station Mode)

6.7.12.1 Station Mode

The “Wi-Fi Station Enable” parameter can generally be used to activate or deactivate integration into an existing Wi-Fi network. The following settings are possible:
0 = Deactivated
1 = Activated
The “Wi-Fi Station SSID” parameter can be used to enter the SSID (max. 32 characters) required for integration into an existing Wi-Fi network.
The “Wi-Fi Station Password" parameter can be used to enter the password (max. 32 characters) required for integration into an existing Wi-Fi network.
The “Wi-Fi Station Encryption” parameter can be used to enter the encryption required for integration into an existing Wi-Fi network. The following settings are possible:
0 = None
1 = WEP
2 = WPA
3 = WPA2
If DHCP is activated (parameter "Wi-Fi Station DHCP" to 1), the IP address, subnet mask, default gateway and DNS-Server are automatically assigned. If DHCP is not activated (parameter "Wi-Fi Station DHCP" set to 0), the IP address, subnet mask, standard gateway and the corresponding DNS-Server parameters ("W-Fi Station IP address", "Wi-Fi Station subnet mask", "Wi-Fi Station standard gateway" and "Wi-Fi Station DNS-Server") can or must be set manually.

6.7.12.1.1 Parameters

Brief description	ID	Range	Default
Wi-Fi Station Enable	21728	0 - 1	0
Wi-Fi Station SSID	21729	a-z, A-Z, 0-9	CA79-X
Wi-Fi Station Password	21730	a-z, A-Z, 0-9	
Wi-Fi Station Encryption	21731	0 - 3	3
Wi-Fi Station DHCP	21732	0 - 1	1

Brief description	ID/SubID	Range	Default
Wi-Fi Station IP Address Oktett 1	21733/0	0 - 255	0
Wi-Fi Station IP Address Oktett 2	21733/1	0 - 255	0
Wi-Fi Station IP Address Oktett 3	21733/2	0 - 255	0
Wi-Fi Station IP Address Oktett 4	21733/3	0 - 255	0
Wi-Fi Station Subnet Mask Oktett 1	21734/0	0 - 255	0
Wi-Fi Station Subnet Mask Oktett 2	21734/1	0 - 255	0

Brief description	ID/SubID	Range	Default
Wi-Fi Station Subnet Mask Oktett 3	21734/2	0 - 255	0
Wi-Fi Station Subnet Mask Oktett 4	21734/3	0 - 255	0
Wi-Fi Station Standard Gateway Oktett 1	21735/0	0 - 255	0
Wi-Fi Station Standard Gateway Oktett 2	21735/1	0 - 255	0
Wi-Fi Station Standard Gateway Oktett 3	21735/2	0 - 255	0
Wi-Fi Station Standard Gateway Oktett 4	21735/3	0 - 255	0
Wi-Fi Station DNS-Server Oktett 1	21736/0	0 - 255	0
Wi-Fi Station DNS-Server Oktett 2	21736/1	0 - 255	0
Wi-Fi Station DNS-Server Oktett 3	21736/2	0 - 255	0
Wi-Fi Station DNS-Server Oktett 4	21736/3	0 - 255	0

6.7.12.1.2 Group unit parameters

Brief description	ID array(10)	Range	Default
Wi-Fi Station Enable	26728	0 - 1	0

6.7.12.2 Access pointMode

The “Wi-Fi Access Point Enable” parameter can generally be used to activate or deactivate a stand-alone Wi-Fi network. The following settings are possible:
0 = Deactivated
1 = Activated

The stand-alone Wi-Fi network can also be activated or deactivated with a button. To do this, the button must be pressed and held until the LED has changed colour four times. This takes about three seconds. The "Wi-Fi access point activation button" parameter represents the corresponding setting or the current status:
0 = Deactivated
1 = Activated
The Wi-Fi remains switched on for 120 minutes then switches off automatically.

However, the stand-alone Wi-Fi can also be activated or deactivated by switching the supply voltage off and on in a specific way. The procedure is as follows:

- off (at least 10 seconds)
- on (exactly 10 seconds)
- off (at least 10 seconds)
- on (exactly 10 seconds)
- off (at least 10 seconds)
- on (exactly 10 seconds)
- off (at least 10 seconds)
- on

The "Wi-Fi access point activation restart" parameter represents the corresponding setting or current status:
0 = Deactivated
1 = Activated

The Wi-Fi stays on for ten minutes then switches off automatically. If it is needed for longer, the stand-alone Wi-Fi must be operated continuously using the "Wi-Fi Access Point Enable" parameter. However, it does not switch off automatically afterwards. If this is the case, the stand-alone Wi-Fi network must be switched off using the "Wi-Fi Access Point Enable" parameter.

If the stand-alone Wi-Fi network is active, the Webserver with the IP address 192.168.1.100 can be called up. The SSID of the network is predefined and is

a combination of the text "SmartboardM", a four-digit hardware identifier, and the eight-digit serial number of the controller (e.g."SmartboardM-ca78-24030131"). The IP address range is also predefined with 192.168.1.x/24.

The "Wi-Fi Access Point Password" parameter can be used to enter a password (max. 32 characters) for dialling into the network.
The "Wi-Fi Access Point Encryption" parameter can be used to enter an encryption for dialling into the network. The following settings are possible:
0 = None
1 = WPS
2 = WPS2
3 = WPS3

6.7.12.2.1 Parameters

Brief description	ID	Range	Default
Wi-Fi Access Point Enable	21742	0 - 1	0
Wi-Fi Access Point Activation Button	21752	0 - 1	0
Wi-Fi Access Point Activation Restart	21815	0 - 1	0
Wi-Fi Access Point Password	21744	a-z, A-Z, 0-9	
Wi-Fi Access Point Encryption	21745	0 - 3	0

6.7.12.2.2 Group unit parameters

Brief description	ID array(10)	Range	Default
Wi-Fi Access Point Enable	26742	0 - 1	0
Wi-Fi Access Point Activation Button	26752	0 - 1	0
Wi-Fi Access Point Activation Restart	26815	0 - 1	0

6.8 Visualisation

The unit and the user can interact via a display (TP2) or the integrated Webserver, for example. The visualisation, operation and menu navigation of both systems is generally identical (deviations are marked) and can be adapted to the specific unit and project.
The display (TP2) communicates with the units of the group via CAN bus. Power (24 V DC) is supplied by a unit.
The Webserver of a unit can be accessed in a number of ways. The access point of the unit can be activated so that a Wi-Fi connection can be established between the terminal device and the unit. The required configuration is described in section "Wi-Fi". Furthermore, a Ethernet connection can also be established. The Ethernet interface which is required for this is configured as described in section "Ethernet". If a connection can be established between the terminal device and the unit, the Webserver can be accessed via the IP address or the host name "SmartboardM". Microsoft Edge or Google Chrome Internet browsers are recommended.

6.8.1 Start page

Depending on the parameters "Display time Off" and "Display time jump back to start page", the start page is loaded on the display and energy-saving mode is activated, provided there is no further user interaction. These times can be configured for the different user levels. Energy-saving mode refers exclusively to the display (TP2).
The view of the start page can be individually configured via the "Display standby" parameter. The following displays are possible:
0 = Nothing.
1 = Current room temperature
2 = Date & time
3 = Kampmann logo

If the web server or display (TP2) view is in energy-saving mode, the start page can be activated by pressing once. The main view can be displayed by pressing again. User level 1 is activated in the main view. If access to the main view is to be protected, the user can adjust the default password for user level 1. The required configuration is described in section "Passwords and additional information". In this case, the main views can be accessed after entering the password.

If the unit develops a fault, this is visualised by an alarm symbol on the start page. The alarm symbol flashes cyclically for the duration of a fault. In the event the unit develops a fault, a detailed description is provided in the fault overview. The “Flashing fault / message" parameter allows the user to influence the behaviour of the visualisation on the display (TP2) in the event of a fault. The following displays are possible:
0 = Fault / Message flashes continuously
1 = Fault / message without flashing
2 = Fault / message flashes, the flashing is paused for 24 h by acknowledging

If there is a message from the unit, this is visualised by a warning symbol on the start page. The warning icon flashes cyclically while a message is present. When messages are issued by the unit, the detailed description of active messages can be found in the message overview. The user can influence the behaviour of the visualisation on the display (TP2) when a message is issued via the “Flashing fault / message” parameter. The following displays are possible:
0 = Fault / message flashes continuously
1 = Fault / message without flashing
2 = Fault / message flashes, the flashing is paused for 24 h by acknowledging

If faults and messages occur at the same time, the faults are displayed first.

If an event (silent message) occurs in the unit, this is not indicated by additional symbols in the main views. A detailed description of the active events can be accessed via the event page in the Expert menu.

The “Display fault" parameter describes a display fault (TP2). This is also indicated by an alarm symbol on the start page. It is not necessary to acknowledge these faults. The following faults can occur:
Bit 0 (value 1) = CAN-bus communication faulty
Bit 1 (value 2) = Runtime of a control operation stopped
Bit 2 (value 4) = Display application faulty
Bit 5 (value 32) = Runtime of all control operations stopped

6.8.2 Main view

The current statuses of the unit are displayed in the main view. In general, the view is subdivided into a header, main area and footer. The header and footer are identical in the upcoming views, the main area shows the different unit or group parameters.
The following information is displayed in the header.
The "Day display" parameter can be used to display a button that activates the Day operating program. The following options are available:
0 = No display
1 = Display button in the header
2 = Display button in the main area

3 = Display button in the header with pop-up to call up the start page or switch off the unit
The "Target operating mode after Day mode" parameter can be used to configure which operating mode should be activated if the user presses the button even though Day mode is already active. The following options are available:
1 = Day mode
2 = Boost mode
3 = Eco mode
4 = Off

The "Boost display" parameter can be used to display a button that activates the Boost operating program. The following options are available:
0 = No display
1 = Display the button in the header
2 = Display the button in the main area
The "Target operating mode after Boost mode" parameter can be used to configure which operating mode should be activated if the user presses the button even though Boost mode is already active. The following options are available:
1 = Day mode
2 = Boost mode
3 = Eco mode
4 = Off

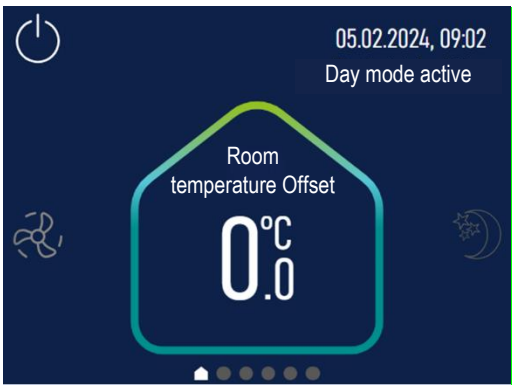
The "Eco display" parameter can be used to display a button that activates the Eco operating program. The following options are available:
0 = No display
1 = Display button in the header
2 = Display button in the main area
The "Target operating mode after Eco mode" parameter can be used to configure which operating mode should be activated if the user presses the button even though Eco mode is already active. The following options are available:
1 = Day mode
2 = Boost mode
3 = Eco mode
4 = Off

The "Operating program display time activation" parameter provides the option of making further adjustments to the display in the header. The following options are available:
Bit 0 (value 1) = Display date and time
Bit 1 (value 2) = Display active operating program
Bit 2 (value 4) = Display unit name
Bit 3 (value 8) = Display return button to go back to the start page

The corresponding icons are displayed in the footer in the event of a fault or message. The pages in the main area are arranged side by side. Pagination dots indicate which page the user is on.

Which information is displayed in the main area depends on the individual view in the visualisation. This is described below. In general, actual values and statuses of the system can be read out and setpoint default settings adjusted.

6.8.2.1 Overview page



The overview page displays actual values, statuses and setpoints in the areas of temperature control, fan control and operating program. Exactly which information displayed depends on the specific configuration of the project and unit. In general, the current statuses of an entire group are displayed. The “Zone unit selection” parameter allows the user to access an individual unit in the main view. The following settings are possible:
0 = Inactive
1 = Active

The “Display main view” parameter can be used to adjust the value displayed in the house. The following options are available:
0 = Nothing.
1 = Absolute room temperature setpoint
Shows the current room temperature default setting for the temperature zone as an absolute value (the neutral zone in 4-pipe operation is not taken into account in the display). If the unit is in "Off" mode, "OFF" is displayed instead of the room temperature setpoint.
2 = Relative room temperature setpoint
Shows the current room temperature default setting for the temperature zone as a relative increase / decrease with reference to the room temperature setpoint. If the unit is in "Off" mode, "OFF" is displayed instead of the room temperature setpoint.
3 = Actual room temperature value
Shows the room temperature currently measured in the temperature zone. If the room temperature is recorded individually by each unit in the temperature zone, the value measured by the master unit is displayed. If the room temperature is detected via the integrated sensor of the display (TP2), the current measured value is shown in the parameter "Actual room temperature display". If the temperature is recorded via a sensor at the display, the "Room temperature Offset display" parameter can be used to adjust the sensor.
4 = Current fan speed
Shows the fan stage currently set for the temperature zone. If the unit is in "Off" mode, "OFF" is displayed instead of the fan stage.

System statuses that can influence the behaviour of the temperature control are displayed in plain text in the lower area of the house. The following functions are displayed via the parameter "Temperature control active functions display” when they are active:

- Heating supply air temperature limitation
- Heating return temperature limitation
- Fan flushing function
- Heating supply temperature monitoring
- Valve anti-seize protection
- Heating OT inhibit OT active
- Cooling OT inhibit OT active
- Ventilation cooling OT inhibit OT active
- Cooling supply air temperature limitation
- Cooling return temperature limitation
- Valve flushing function
- Cooling supply temperature monitoring
- Room frost protection
- Heating OT inhibit OT active
- Ventilation heating OT inhibit OT active
- Day switching-on delay

- Boost switching-on delay
- Switching-on delay Off
- Boost switching-off delay
- Switching-off delay Off
- User-defined 2 (NO/NC)
- User-defined 4 (NO/NC)
- Eco switching-on delay
- Day switching-off delay
- Eco switching-off delay
- User-defined 1 (NO/NC),
- User-defined 3 (NO/NC)
-

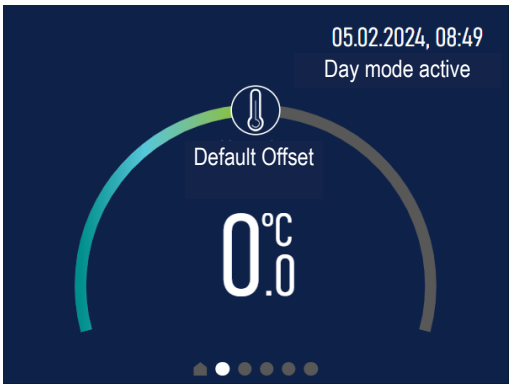
If the unit develops a fault, this is indicated by a flashing alarm symbol in the house. Pressing the alarm symbol calls up the Fault menu (User level 1 is sufficient).

If there is currently a message on the unit, this is indicated by a flashing warning symbol in the house. Pressing the warning symbol calls up the Messages menu (User level 1 is sufficient). If both messages and faults are present at the unit, faults are displayed first.

The left-hand status bar shows the current statuses of the fan, OA rate, heating and cooling valve. If the functions (heating, cooling, ventilation, airing) are available due to the hydraulic integration and configuration of the unit, the corresponding symbols are displayed. As soon as the outputs of the respective actuator are activated, the symbols are actively displayed. Flashing symbols indicate that supply temperature monitoring for the respective valve is active.
Clicking on the symbols opens a pop-up window containing descriptions of the current statuses in plain text.

Active operating programs of the unit appear in the right-hand status bar. The display can be activated via parameters "External Eco display" and "External Boost display". Clicking on the icons opens a pop-up window containing descriptions of the current statuses in plain text.

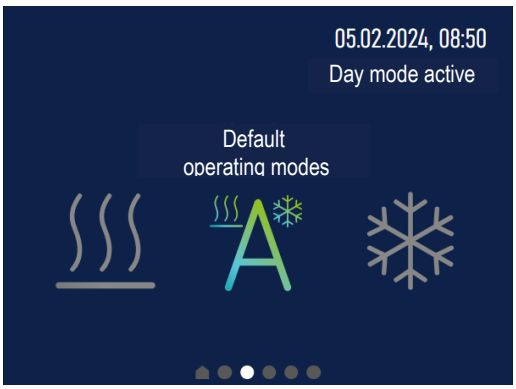
6.8.2.2 Temperature setpoint input



The user can set the required room temperature using a Slider on the "Temperature setpoint input" page. The set value is displayed in the Slider. The page can be hidden using parameter “Manual temperature setpoint selection activation". The following settings are possible:
0 = Inactive
1 = Active

The “Type of setpoint setting” parameter defines how the setpoint can be set. The following settings are possible:
0 = absolute
1 = relative
The absolute setpoint displayed is calculated from the basic setpoint, the RT offset of the operating modes and the general Offset. The neutral zone for 4-pipe operation is not taken into account in the display.
Regardless of the type of setpoint setting, the increment by which the setpoint can be adjusted via the Slider can be set via the "Setpoint change increment" parameter.

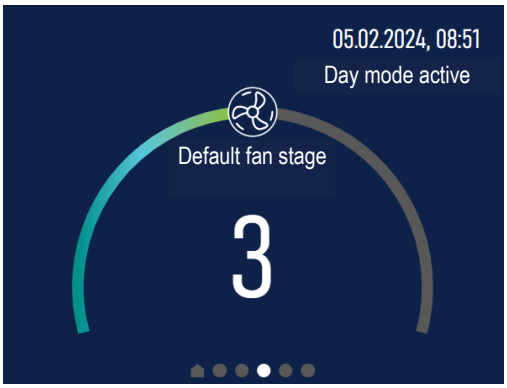
6.8.2.3 Default operating mode



The user can specify the required operating mode (Heating, Cooling, Automatic) on the "Default operating mode" page. The page can be activated via the parameter "Heating cooling Mode manual selection activation". The following settings are possible:
Bit 0 (value 1) = Heating symbol display
Bit 1 (value 2) = Cooling symbol display
Bit 2 (value 3) = Automatic symbol display

The parameter value must be set to 7 if the symbols for the Heating, Cooling and Automatic operating modes are to be displayed.
Regardless of the visualisation configuration, the hydraulic integration and configuration of the units and the group must ensure manual switching between operating modes (parameter "Group default setpoint = 1").

6.8.2.4 Fan control setpoint input



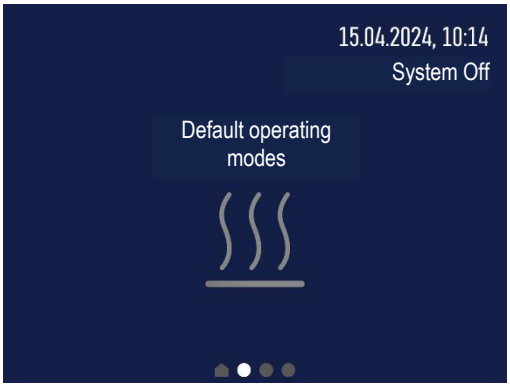
Users can set the desired fan stage on the “Fan control setpoint input” page via a Slider. The set value is displayed in the Slider. The page can be hidden via the “Fan stage manual selection activation" parameter. The following settings are possible:
0 = Inactive
1 = Active

The number of possible fan stages can be configured via the “Number of fan stages” parameter. The following settings are possible:
0 = Stage 0
1 = Stage 0, Stage 1
2 = Stage 0, Stage 1, Stage 2
3 = Stage 0, Stage 1, ..., Stage 3
4 = Stage 0, Stage 1, ..., Stage 4
5 = Stage 0, Stage 1, ..., Stage 5

Fan stage 0 (fan off) can be deactivated with the "Disable fan stage 0" parameter. The Auto fan stage can be hidden with the "Enable fan automatic mode display" parameter. The following settings are possible:
0 = Inactive
1 = Active

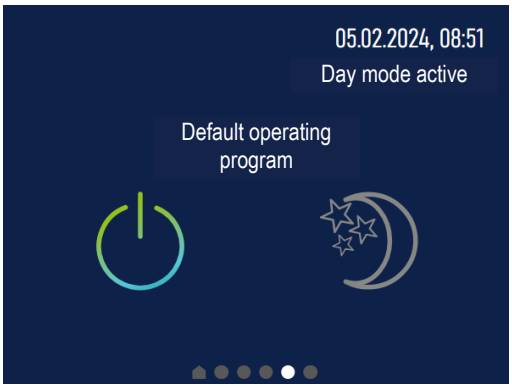
If Automatic mode is set by higher-level systems in the parameters for example, this also appears on the display if Enable fan automatic mode display is deactivated. A manual fan stage can still be set using the Slider.

6.8.2.5 Specification of heating for door air curtains



The user can activate heating mode for door air curtains on the page "Specify heating for door air curtains". The heating symbol is then actively displayed.Heating mode can be deactivated if the door air curtain is to be used for ventilation. The button is displayed as inactive. The page can be hidden via the "Enable heating ventilation DAC manual selection activation" parameter. The following settings are possible:
0 = Inactive
1 = Active

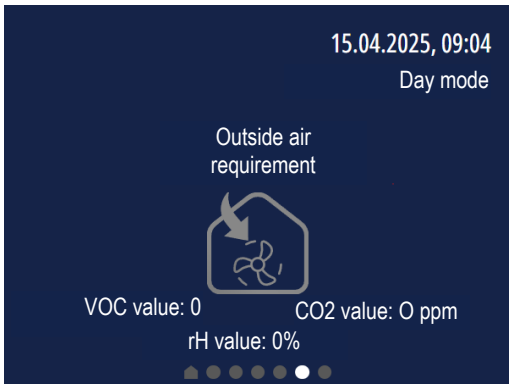
6.8.2.6 Default operating program



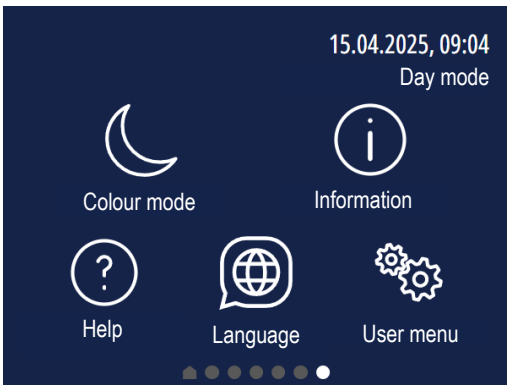
The user can specify the desired operating program (Off, Day mode, Boost mode, Eco mode) on the "Default operating program" page. The page can be hidden via the parameter "Enable manual selection of operating program". The following settings are possible:
0 = Inactive
1 = Active

The configuration of the button shown and the associated functions is described in section .

6.8.2.7 Default ventilation



6.8.2.8 User menu



The "User menu" offers the option of adjusting the colour display, viewing unit information, viewing user help (only in the Webserver view), changing the language or calling up the "Expert menu".

The colour mode can be individually adapted for each terminal device in the visualisation. The following options are available:
0 = Dark Mode
1 = Light Mode
2 = Kampmann Mode

All relevant parameters for the manufacturer, the project and the installed units can be viewed in the Information view.

A quick-reference guide can be called up by pressing the Help button, which describes the operation quickly and clearly. The "Help display activation" parameter can be used to show or hide the button. The following settings are possible:
0 = Inactive
1 = Active

The Language button can be displayed via the "Toggle language activation" parameter. The following options are available:
0 = Inactive
1 = Active

The “Language selection” parameter describes the selected language. The following options are available:
0 = German
1 = English
2 = Polish
3 = Dutch
4 = French
5 = Italian

The user can open the "Expert menu" via the Settings button. The password is required for UserLevel 2 or higher.

6.8.3 Expert menu

The user can access actual values, setpoints, operating programs, operating statuses, messages, malfunctions, access rights and settings in the Expert menu. The parameters displayed in this menu are adapted to the configuration of the units and group.

6.8.3.1 Actual values

The Actual values menu comprises the areas temperatures, ventilation and operating hours. Temperature readings are displayed in the Temperatures area, depending on the configuration of the sensors. The current fan speeds are displayed in the Ventilation area. The runtimes for the control and display (TP2) applications are displayed in seconds in the operating hours area.

6.8.3.2 Setpoints

The Setpoints menu displays the temperature control setpoints. The appropriate temperature offset can be set here for all operating modes. The current control setpoint used as reference by the unit is also displayed.

6.8.3.3 Operating program

Users can set the required parameters for the timer program themselves in the Operating program menu. The current operating program (Day, Boost, Eco or Off) comes into existence automatically due to the combination of ten timer programs and two holiday programs.
The ten timer programs consist of seven timer programs for the individual days of the week, a timer program for the days Monday to Friday, a timer program for the days Saturday to Sunday, and a timer program for the days Monday to Sunday. Up to six switching points can be defined for each timer program at which the operating program specified in each case can be activated.
The minute is specified in one parameter and the hour is specified in another parameter. The following settings are available when specifying the operating program in each case:
0 = Deactivated
1 = Day
2 = Boost
3 = Eco
4 = Off

A holiday program is required for annually recurring holidays or public holidays and the other holiday program is for one-off holidays or public holidays. Ten periods can be defined for the two holiday programs during which the relevant operating program is activated.

6.8.3.4 Operating statuses

The Operating statuses menu is intended to give the user a quick overview of all functions and operating statuses that can influence the behaviour of the unit. The menu is divided into the submenus Temperature control, Fan control, Heating / Cooling and Inputs / Outputs.

The Temperature control submenu comprises the areas Signals, Decreases / Increases and Output signals.
The calculated signals for control of the valves from the temperature control are displayed in the Signals area.
Functions that influence the control of the valves are listed in the Decreases / Increases area.
Statuses of the output signals which are affected by the PID control algorithms as well as all decreases, increases, signal flows, priorities and fault responses are displayed in the Output signals area.

The Fan control submenu comprises the areas Fan stage selection, Filter messages, and Output signals.
The fan stage currently set is displayed in the Fan stage selection area.
Parameters that affect the Filter message function are listed in the Filter messages section.
Statuses of the output signals which are affected by the PID control algorithms as well as all decreases, increases, signal flows, priorities and fault responses are displayed in the Output signals area.

The Heating / cooling submenu comprises the General and Heating / cooling switchover areas.
The operating mode configuration and the heating mode / cooling mode status are actively displayed in the General area.
The parameter to configure the heating / cooling switchover is displayed in the Heating / cooling switchover area.

The Inputs / outputs submenu comprises the areas Multifunctional IOs, Digital inputs, Analogue outputs and Digital outputs.
The statuses of the inputs / outputs are displayed in the Multifunctional IOs area, regardless of the function assigned to the input / output.
The statuses of the inputs are displayed in the Digital inputs area, regardless of the function assigned to the inputs.
The statuses of the outputs are displayed in the Analogue outputs area, regardless of the function assigned to the outputs.
The statuses of the outputs are displayed in the Digital outputs area, regardless of the function assigned to the outputs.

6.8.3.5 Events

The Events menu shows a list of all units in the temperature zone. Units where an event currently exists are actively displayed. Event-free units are displayed as inactive. Selecting a unit displays a list of active events (silent faults). Active events are not displayed on the overview pages or the start page. All active events, messages and faults can be acknowledged in this menu. The Event logger menu can also be displayed.

6.8.3.6 Messages

The Messages menu shows a list of all units in the temperature zone. Units where a message is currently present are actively displayed. Units with no messages are displayed as inactive. Selecting a unit displays a list of active messages. Active messages are displayed on the overview pages or the start page accompanied by the warning symbol. All active events, messages and faults can be acknowledged in this menu. The Event logger menu can also be displayed.

6.8.3.7 Faults

The Faults menu shows a list of all units in the temperature zone. Units where a fault is present are actively displayed. Units with no faults are inactively displayed. Selecting a unit displays a list of active faults. Active faults are displayed on the overview pages or the start page accompanied by the fault symbol. All active events, messages and faults can be acknowledged in this menu. The Event logger menu can also be displayed.

6.8.3.8 Event logger

The Event logger menu can be accessed via the Events, Messages, or Faults menus. The menu shows a list of the 250 most recent events / messages / faults that have occurred (hereafter all referred to as events). The events are separated into blocks each with 10 entries. Each event contains a timestamp, event type (fault / message / event) and a description of the event in plain text.

6.8.3.9 Parameter menu

The user can access the Service or Manufacturer user level of the menu via the Parameter menu button. The Firmware menu can also be accessed from the display (TP2).
All system parameters are visualised clearly in the Parameter menu. The Firmware menu shows a list of the relevant firmware parameters of the display (TP2).

6.8.3.10 Access rights

Users can use the Access rights menu to adapt users' passwords and activate the Wi-Fi interface (AccessPoint).

The Passwords submenu displays a list of the passwords approved for the active user level. Users have the option of assigning an individual password (4 digits) for each user level. If a password is assigned multiple times, the user can only use this password to log into the user level with the lower priority. A more detailed description of the user level can be found in section "Passwords and additional information".
In the Wi-Fi Access Point submenu, the user can activate the Wi-Fi of the individual units.

6.8.3.11 Trend data (only available on the Webserver)

The Trend data menu can be used to display the trend data saved locally on the unit in a chart. The time range and data series to be displayed can be configured on the right-hand side. The data series are subdivided into groups containing parameters with the same units. Each group displayed is assigned a separate y-axis. Individual parameters or entire groups can be displayed or hidden using the symbol (👁/🚫). In total, up to 32 different parameters can be logged and saved on the unit.

6.8.3.12 Configuration (only available on the Webserver)

The Configuration menu comprises a quick configuration for commissioning the units, a monitor view, an IO test and test report compilation feature. In addition, users can choose between the “Easy”, “Advanced” and “Service” modes. The selected mode influences the available range of functions.
The "Easy" view permits access to the quick configuration, the monitor and the IO tests. The most important parameters can be configured using the quick configuration.
The "Advanced" view expands on the quick configuration with additional parameters.
A comprehensive quick configuration is available in the "Service" view. There is also an option to load and save parameter sets. Test reports can be created for the unit or the entire group.

6.8.3.12.1 Quick configuration

The quick configuration is used for guided commissioning of the unit. The first step is to select whether the unit is a secondary air unit, a door air curtain, a primary air unit or a 0-10V control. This is followed by the configuration of the unit which is broken down into individual categories. Parameter values can be set using text boxes,

drop-down menus or checkboxes. Once the settings in the category have been made, they are transferred to the unit by pressing the "Apply parameters" button. If no changes are made in a category, it is possible to move to the next category using the "Continue without modifying" button.
At the end of the quick configuration, a window opens where the user can navigate back to the Expert menu, save the parameter set of the unit, or switch back to the quick configuration.

6.8.3.12.2 Monitor

The Monitor view provides an overview of the current statuses and parameter values. Unit selection allows the user to switch between the unit currently connected via Ethernet or Wi-Fi (online device) and the units in the group (Unit X).

6.8.3.12.3 IO tests

The IO test page shows the functions of all inputs and outputs of the unit.
If an input or output is configured, the current signal is also displayed. Configured outputs can also be controlled via manual mode.

6.8.3.12.4 Test reports

A distinction is made between test reports for a single unit or for an entire group.
Information resulting from the configuration of the unit or group is automatically included in the reports and cannot be adjusted manually. Additional information can / must be added manually via appropriate input screens.
There is an option to save an interim status, load a saved interim status or export the report as a PDF document. Corresponding buttons are available in the header of the page.

6.8.4 User level

When interacting with the display (TP2) or the Webserver, views, controls and parameters are enabled or disabled depending on the active user group. An individual password can be configured for each user group. If several user groups are assigned an identical password, the user group with the lowest user level is activated once the password has been entered. The following table shows an overview of the user groups.

UserLevel	User group	Authorisation	Password
1	User	Access to the • Main views • Active events including the event logger • Active messages including the event logger • Active faults including the event logger	0000
2	Export	Access to the • Main views • Actual values • Setpoints • Operating programs • Operating statuses • Active events including the event logger • Active messages including the event logger • Active faults including the event logger • Access rights • Trend data	0071

UserLevel	User group	Authorisation	Password
3	Service	Access to the • Main views • Actual values • Setpoints • Operating programs • Operating statuses • Active events including the event logger • Active messages including the event logger • Active faults including the event logger • Parameter menu • Password adjustments • Trend data • Configuration	0710
4	Manufacturer	Access to the • Main views • Actual values • Setpoints • Operating programs • Operating statuses • Active events including the event logger • Active messages including the event logger • Active faults including the event logger • Parameter menu with extended access • Password adjustments • Trend data • Configuration	9658

6.8.5 Parameters

Brief description	ID/SubID	Range	Default
Time display Off 1	21418/0	0 min - 120 min	1 min
Time display Off 2	21418/1	0 min - 120 min	2 min
Time display Off 3	21418/2	0 min - 120 min	3 min
Time display Off 4	21418/3	0 min - 120 min	4 min
Time display Off 5	21418/4	0 min - 120 min	5 min
Time display jump back to start page 1	21419/0	0 min - 120 min	1 min
Time display jump back to start page 2	21419/1	0 min - 120 min	2 min
Time display jump back to start page 3	21419/2	0 min - 120 min	3 min
Time display jump back to start page 4	21419/3	0 min - 120 min	4 min
Time display jump back to start page 5	21419/4	0 min - 120 min	5 min

Brief description	ID	Range	Default
Standby display	20634	0 - 3	3
Fault / message flashing	21205	0 - 2	0
Day display	20620	0 - 3	0
Target operating mode after Day mode	21353	1 - 4	3
Boost display	20920	0 - 2	0
Target operating mode after Boost mode	21355	1 - 4	1
Eco display	20621	0 - 2	0
Target operating mode after Eco mode	21354	1 - 4	1
Operating program time display activation	21432	1 - 15	1
Group unit selection	20632	0 - 1	0
Main view display	20622	0 - 4	1
Eco external display	20623	0 - 1	1
Boost external display	20922	0 - 1	0
Temperature setpoint manual selection activation	20639	0 - 1	1
Type of setpoint setting	20619	0 - 1	1

Setpoint change increment	20630	0.5 K - 9.9 K	1.0 K
Heating cooling Mode manual selection activation	20635	0 - 7	0
Fan stage manual selection activation	20691	0 - 1	1
Number of fan stages	20624	0 - 5	5
Fan automatic mode display	20921	0 - 1	1
DAC heating manual selection activation	21366	0 - 1	0
Operating program manual selection activation	20618	0 - 1	0
Help display activation	21217	0 - 1	0
Toggle language activation	22014	0 - 1	0
Outside air requirement activation	22003	0 - 1	0
Languages selection	22015	0 - 5	0
Offset room temperature display	22022	-9.9 K - 9.9 K	0.0 K

6.8.6 Statuses

Brief description	ID	Range
Display error	21381	0 - 255
Actual room temperature value display	20914	-99.9 °C - 99.9 °C
Temperature control active function display	21425	a-z, A-Z, 0-9

6.9 Special functions

Special functions are used to meet specific customer requirements.

6.9.1 Function 1

Default "Setpoint room temperature heating" as an absolute setpoint via ModBus, default "Setpoint room temperature cooling" as an absolute setpoint via Modbus and default "Heating/cooling" with the value range 0 - 1 via ModBus as well as the five statuses "Remote OFF", "Heating/cooling", "Fire alarm control panel", "Filter maintenance" and "Status 2p valve heating cooling (incl. FS priority 1)" as additional ModBus data points. Manual setpoint shift by means of display (TP2) maximum 2.0 K up to the setpoint of the inverse operating mode, Reset "Manual setpoint shift" when the "Heating RT setpoint", "Cooling RT setpoint" or "Heating/cooling" default settings are changed.

The "Heating RT setpoint" and "Cooling RT setpoint" parameter specifications only have an effect on the "Day" operating program. To ensure correct operation, the "Automatic lock" parameter (see section "Operating program") must therefore be set to "1 = Lock (permanently Day)".

The function can be activated or deactivated via the "Function 1 activation" parameter.
0 = Deactivated
1 = Activated

When the function is activated, the parameter "RT basic setpoint" (see section " Room temperature setpoints") is fixed at 21.0 °C and can no longer be changed. This means that any optionally connected display (TP2) can no longer be used to change the absolute setpoint. A relative setpoint change would only be possible via an optionally connected display (TP2) with the parameter "General RT Offset" (see section "Room temperature setpoints") within the limits specified in the "General RT Offset limits" parameter (see section "Room temperature setpoints"). However, the following conditions apply:

- In "Heating" mode, a relative setpoint change is only possible up to a minimum difference of 2.0 K between the resulting setpoint and the specified "Cooling room temperature setpoint".
- In "Cooling" mode, a relative setpoint change is only possible up to a minimum difference of 2.0 K between the resulting setpoint and the specified "Heating room temperature setpoint".
- The relative setpoint change is automatically reset if the "Heating RT setpoint", "Cooling RT setpoint" or "Heating/cooling" default settings are changed.

The "Day heating RT Offset" parameter is automatically calculated based on the set parameter "RT base setpoint" and the default parameter "Heating RT setpoint". It is not possible to directly change the parameter "Day heating RT Offset".
The "Day cooling RT Offset" parameter is automatically calculated based on the set parameter "RT base setpoint" and the default parameter "Cooling RT setpoint". It is not possible to directly change the parameter "Day cooling RT Offset".
The "Heating/cooling function 1 default" parameter is used to switch between operating modes. The "HC BMS switchover default" parameter (see section "Heating/cooling switchover (local)") cannot be used.

The "Remote OFF" status is set when the "Current operating program" status is "4 = Off".

The “Heating/cooling” status is set when the “HC operating mode" status is “2 = Cooling”.

The "Fire alarm control panel" status is set when the "Fire shutdown priority 1 active" status is "1 = active".

The "Filter maintenance" status is set when the "SecA fan operating hour limit" status is "1 = Event active", "2 = Message active" or "3 = Fault active" or when the "Filter" status is "1 = Event active", "2 = Message active" or "3 = Fault active".

The "2p heating cooling valve (including FS priority 1" status is set when the "2p heating cooling valve" status is "1 = active" and the "Fire shutdown priority 1 active" status is "0 = not active".

6.9.1.1 Parameters

Brief description	ID	Range	Default
Heating RT setpoint	21713	5.0 °C - 40.0 °C	21.0 °C
Cooling RT setpoint	21714	5.0 °C - 40.0 °C	26.0 °C
Function 1 activation	21715	0 - 1	0
Heating/cooling function 1 default	21718	0 - 1	0

6.9.1.2 Statuses

Brief description	ID	Range
Remote OFF	21716	0 - 1
Heating/cooling	21717	0 - 1
Fire alarm control panel	21719	0 - 1
Filter maintenance	21720	0 - 1
2p heating cooling valve (including FS priority 1)	21807	0 - 1

6.9.1.3 Statuses of units within the group

Brief description	ID array(10)	Range
Remote OFF	26716	0 - 1

Brief description	ID array(10)	Range
Heating/cooling	26717	0 - 1
Fire alarm control panel	26719	0 - 1
Filter maintenance	26720	0 - 1
2p heating cooling valve (including FS priority 1)	26807	0 - 1

6.10 Manufacturer level

6.10.1 LED flashing code

The current unit status is visualised by the LED:
LED flashes green: Control in normal operation, no message, no fault
LED flashes orange: Control in normal operation, message
LED flashes red: Control in normal operation, fault

The function differs when KNX communication is activated:
LED off: Normal operation or unit off
LED on: KNX Programming mode
LED flashes briefly: Bus fault, LED goes out briefly.
Bus fault in programming mode

6.10.2 Passwords and additional information

0071 Password level 1
0710 Password level 2
7108 Password level 3
9658 Password level 4
2032 FW Display (fix)

If someone changes a password and accidentally chooses the same password for the inferior and superior password, it will not be possible to access the higher-level menu (change inferior password, then use the same password for the higher-level menu, change the password and then change the inferior password again).

6.10.2.1 Parameters

Brief description	ID	Range	Default
Save parameter	20002	0 - 4	0
Password UserLevel 1	20916	0 - 9999	0
Password UserLevel 2	20917	0 - 9999	71
Password UserLevel 3	20918	0 - 9999	7108
Password UserLevel 4	20919	0 - 9999	9658
Unit serial number (read/write)	21754	a-z, A-Z, 0-9	KSAX
Flash CMD FW	21150	0 - 3	0

6.10.2.2 Group unit parameters

Brief description	ID array(10)	Range	Default
Flash CMD FW	26150	0 - 3	0
Autosave configuration	26842	0 - 2	0

6.10.2.3 Statuses

Brief description	ID	Range
Checksum application Smartboard	20020	0 - 65534
Checksum application display	20021	0 - 65534

Brief description	ID	Range
Global actual room temperature value	20027	-99.9 °C - 99.9 °C
Last number of saving cycles	20923	0 - 10000000
Detected as second display	21113	0 - 1

Brief description	ID/SubID	Range
Timestamp event 1	21843/0	0 - 4294967294
Timestamp event 50	21843/49	0 - 4294967294
Event code 1	21844/0	0 - 65534
Event code 50	21844/49	0 - 65534

6.10.2.4 Statuses of units within the group

Brief description	ID array(10)	Range
Unit checksum application	25020	

6.11 Trend data

32 Trend data is saved locally and can be viewed on the Webserver.

7 Additional information

7.1 Save parameter

Changes to parameters are only permanently saved automatically 5 seconds after the last change!

8 System configuration

The precise system configuration must be defined using appropriate parameters to ensure the open and closed-loop control algorithms are working correctly. Most unit-specific parameters are factory preset. Only system-specific parameters may need to be set accordingly when commissioning the unit.

During commissioning, the parameters must be checked to ensure the settings are compatible with the system configuration and desired mode of operation.

9 List of abbreviations

Abbreviation	Description
2p	Hydraulic two-pipe system
4p	Hydraulic 4-pipe system
AO	Analogue output
ExhA	Exhaust air
AD	Analogue Digital
AI	Analogue input
OT	Outside temperature
OA	Outside air
FS	Fire shutdown
OP	Operating program
RTL	Return temperature limit
FD	Fire damper
VASP	Valve anti-seize protection
SATL	Supply air temperature limit
DO	Digital output
D-band	Derivative component
DI	Digital input
TUE	Tuesday
THU	Thursday
S-onD	Switching-on delay
FM	Filter message
EA	Extract air
HP	Holiday program
FRI	Friday
FP	Frost protection
BMS	Building management system
H	Heating
HC	Heating Cooling
HC	Heating Cooling
I component	Integral component
COM	Commissioning
AV	Actual value
C	Cooling
Ch	Chiller
CP	Condensate pump
WED	Wednesday
MON	Monday
ManSS	Manual stage selection
Multifunctional IOs	Multifunctional inputs/outputs
P	Parameter
P component	Proportional component
CHW	Chilled water
LPHW	Low pressure hot water
RC	Room controller
RFP	Room frost protection
RetT	Return temperature
RT	Room temperature
SAT	Saturday
SB-display	Smartboard display
PFF HCW	Pump flushing function hot and cold water
FSARF	Fan secondary air flushing function
SUN	Sunday
SW	Setpoint
S-wV	Six-way valve

Abbreviation	Description
SW version	Software version
tempcrt	Temperature-critical
TC	Thermal contact
DAC	Door air curtain
RecA	Recirculating air
ST	Supply temperature
STM	Supply temperature monitoring
HG	Heat generator
S	Status
TSP	Timer switching program
SupA	Supply air
SupAT	Supply air temperature

10 Revision index

Version:	Revision: