CS2500

ART.NO. 118044

Contents

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1.   Introduction

1.1.   Document description

This document describes the main functions of the CS2500 automatic control and is divided into different sections for different parts of the system. If you only want to make basic settings to start the ventilation unit, there is a special section describing the startup procedure. If you require more detailed information, select the relevant section in the document.

> ⚠ All electrical connections must be made by an expert.

1.2.   Highlighted boxes

A number of different text boxes are used in the document to draw the user's attention to various things. This may be anything from pure information text to particularly important details to ensure that the system is not used incorrectly. Here is a brief description of the various boxes:

> ⚠ **DANGER!** When a text box is this colour, it means that a life-threatening or serious personal injury may be the consequence of not following the instructions.

> ⚠ **NOTICE!** When a text box is this colour, it means that a poor utilisation ratio or product operating issues may be the consequence of not following the instructions.

> ⚠ **CAUTION!** When a text box is this colour, it means that material damage may be the consequence of not following the instructions.

> ⓘ **INFO!** When a text box is this colour, it means that it contains important information.

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1.3.   System overview

1.3.1.   System structure

The control system is divided into two subgroups:
1. One part that is located in the ventilation unit's unit's switching space
2. One part that is located in a separate control cabinet on the outside of the ventilation unit

①

Terminal blocks for incoming power supply
Fuse for automatic control and fans (not electric heating coil)

Modbus extender - a communication card that connects the ventilation unit's components to the regulator via data communication

Power supply board - a circuit board that distributes the power supply to the ventilation unit's components and makes it possible to connect components to a water heating coil

②

Regulator - the ventilation unit's general control system

Terminal board - a circuit board with terminal blocks for connecting additional components and accessories

HMI - the control panel used to communicate with the regulator

ProPanel   *ProPTouch*
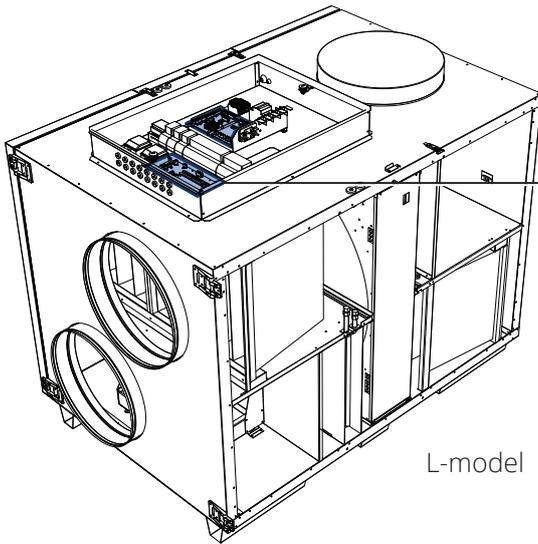
L-model
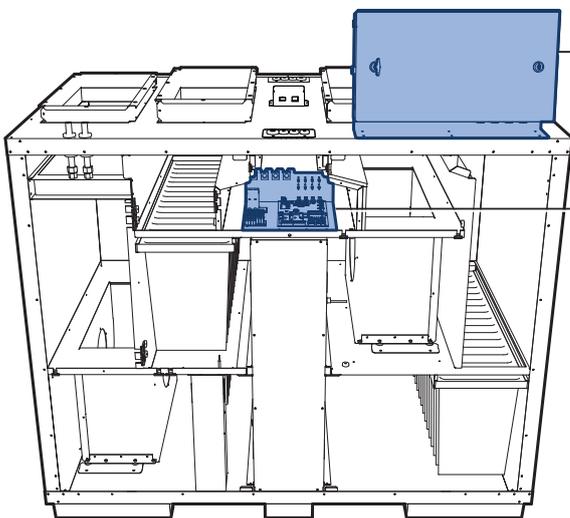
S-model

1.3.2. Ventilation unit's switching space

Modbus extender

A3
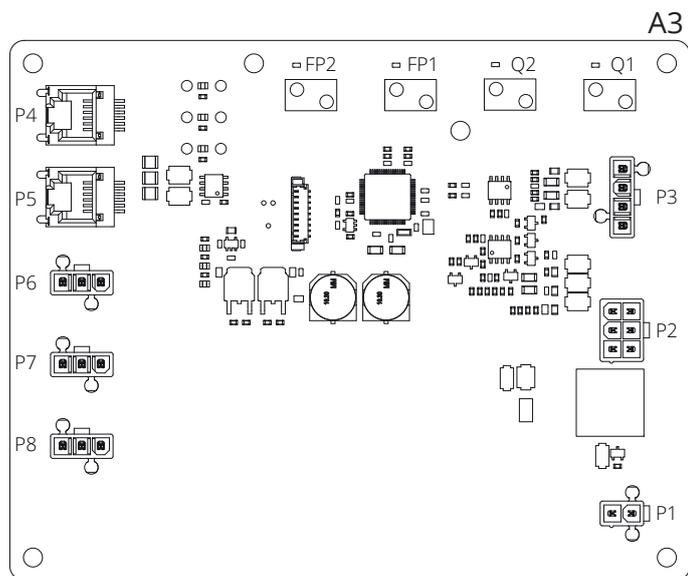
A communication card that connects the ventilation unit's components to the regulator.

The four dip switches and the rotary switches marked 'FACTORY' are factory-set and must not be changed.

The board's components have the following functions.

Component	Function
P1	Power supply
P2	Control signals to electrical afterheater
P3	Control signals to rotor and temperature sensor
P4	Communication connection
P5	Communication connection
P6	Communication connection
P7	Communication connection
P8	Control signals to fans
Q1	Differential pressure monitor for flow measurement on supply air fan
Q2	Differential pressure monitor for flow measurement on extract air fan
FP1	Differential pressure monitor for supply air filter
FP2	Differential pressure monitor for extract air filter

Power supply board

A4
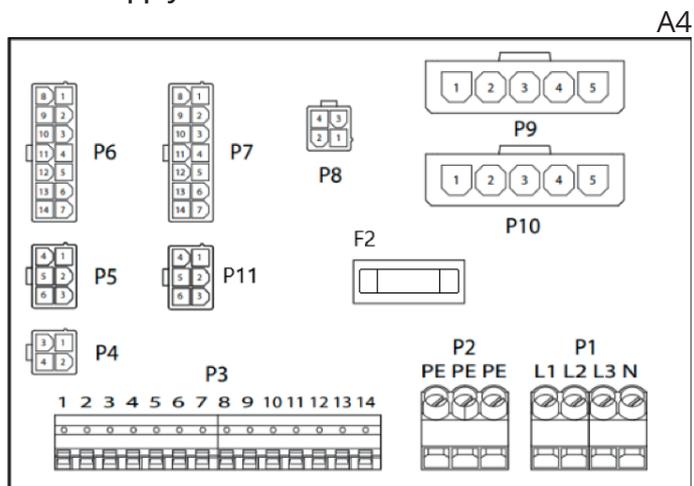
This is a circuit board that distributes the power supply to the components of the ventilation unit (not the electric heating coil) and control cabinet. There is also a terminal block for the return water sensor.

The board's components have the following functions.

Component	Function
P1	Terminal block for power supply
P2	Terminal block for protective earth (PE)
P3	Terminal block for accessories
P4	Supply voltage L1 Out (not in use)
P5	Power supply to control cabinet
P6	Control signals to electric heating coil
P7	Control signals to electric heating coil and return water sensor signal from water heating coil.
P8	Power supply to rotor control
P9	Power supply to supply air fan
P10	Power supply to extract air fan
P11	Power supply to modbus extender
F2	Fuse for circuit board power supply

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Terminal block P3 has the following signals:

Block 3		
Block no.	Function	Type
1	G0	Signal earth, external accessory
2	24VAC	Power supply, external accessory
3	G0	Power supply, external accessory
4	AO 0-10V	(EV heating EB1 control signal) Alternative
5	G0	B5 Temp sensor return water WB1 Signal earth
6	DI	(F10 Overheating thermostat EB1 signal) Alternative
7	AI	B5 Temp sensor return water WB1 signal
8	N/A	(Not used)
9	N	Power supply, external accessory
10	NO	EV2 (Potential-free contact)
11	C	EV2 (Potential-free contact)
12	L1 Out 230V	Power supply, external accessory. Max 4A.
13	N	Power supply, external accessory
14	L1 Out 230V	Power supply, external accessory. Max 4A.

1.3.3. Ventilation unit control cabinet

Regulator

A1

The battery must be installed under the cover.
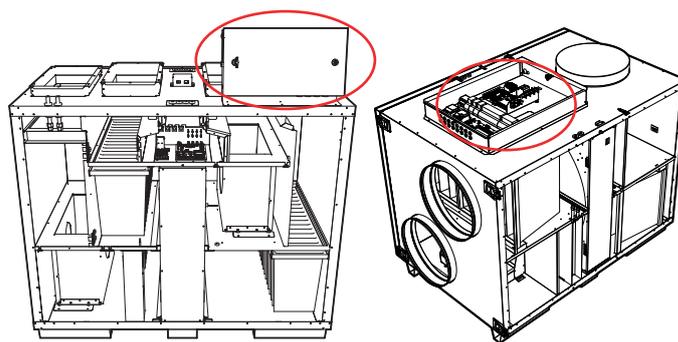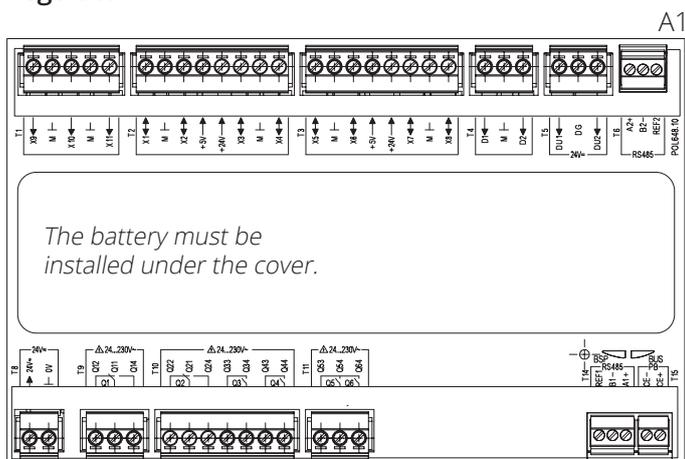
The ventilation unit's control system. This is where the control panel (HMI) and sensors and other components of the ventilation unit are connected. It is also possible to connect an SD memory card to back up or reload configuration settings and parameters for the regulator.

The controller can be supplemented with a backup battery type BR2032 to expand the memory of alarm history etc. in the event of a power failure.

HMI
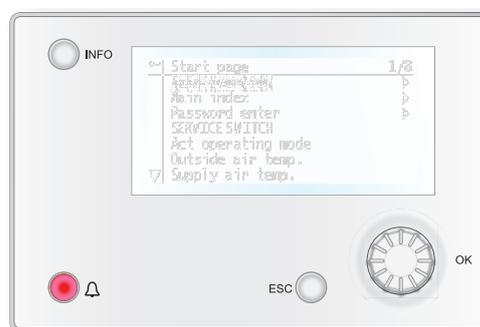
The ProPanel control panel has an 8-line graphic display and you navigate the menu tree by turning a dial. Selections are confirmed by pressing the same button.

The ProTouch control panel has a graphic TFT touch display and you navigate the menu tree by touching the display.

INFO! The ProTouch panel is not mentioned in further detail in this manual. Please see the separate manual for the panel.

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Terminal board

A2
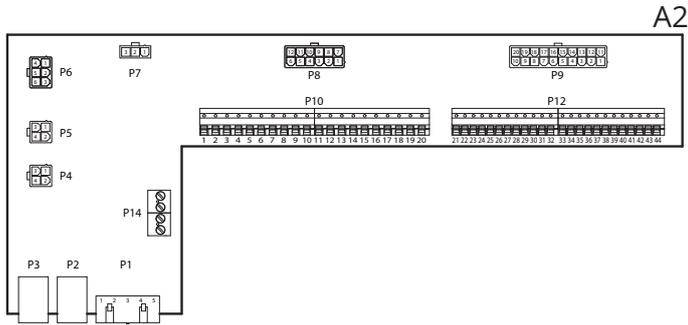
This is a circuit board that connects the components to the regulator. External components such as dampers are connected to this board via the terminal blocks on the board.

The board's components have the following functions.

Component	Function
P1	Connection for power supply
P2	Data communication
P3	Data communication
P4	Connection for external pressure sensor (accessory)
P5	Connection for external pressure sensor (accessory)
P6	Connection for 24V transformer
P7	Data communication
P8	Connection for digital outputs
P9	Connection for control signals
P10	Terminal block for 230V signals
P12	Terminal block for control signals
P14	Terminal block for protective earth (PE)

Terminal block P10 has the following signals:

Block 10		
Block no.	Function	Type
1	L1 Out 230V	Power supply, external accessory
2	N	Power supply, external accessory
3	L 230V	Power supply Outdoor air damper
4	L1 230V	Outdoor air damper ON/OFF
5	N	Power supply Outdoor air damper
6	L230V	Power supply Exhaust air damper
7	L1 230V	Exhaust air damper ON/OFF
8	N	Power supply Exhaust air damper
9	C	DX2 Cooling (potential-free contact)
10	NO	DX2 Cooling (potential-free contact)
11	N/A	(Not used)
12	Alarm C	Buzzer alarm (potential-free contact)

Block 10		
Block no.	Function	Type
13	Alarm NO	Buzzer alarm (potential-free contact)
14	Cooling C	DX1 Cooling/Pump (potential-free contact)
15	Cooling NO	DX1 Cooling/Pump (potential-free contact)
16	L1 Out 230V	Power supply, external accessory
17	Heating NO	EV1 WB1 Pump
18	Heating C	EV1 WB1 Pump
19	N	Power supply, external accessory
20	N/A	(Not used)
		Max 4A load on the relay outputs

Terminal block P12 has the following signals:

Block 12		
Block no.	Function	Type
21	AO 0-10V	Cooling Control signal
22	G0	Cooling Signal earth
23	DI	External control 1 Signal
24	G0	External control 1 Signal earth
25	DI	External control 2 Signal
26	G0	External control 2 Signal earth
27	DI	Alarm Fire/smoke Signal
28	G0	External control 3 Signal earth
29	AI 0-10V	Air quality Signal
30	G0	Air quality Signal earth
31	AO 0-10V	Heating WB1 Control signal valve
32	24VAC	Power supply Fire damper/Alarm Fire/smoke WB1
33	G0	Heating WB1 Signal earth valve
34	DI	External control 3 Signal
35	DI	Fire damper position reset Signal
36	G0	Signal earth
37	AO 0-10V	AUX damper Control signal
38	G0	AUX damper Signal earth
39	DI	F10 Overheating thermostat EB1 Signal
40	G0	F10 Overheating thermostat EB1 Signal earth
41	CE-	KNX bus
42	CE +	KNX bus
43	AI 0-10V	External setpoint Supply air fan
44	AI 0-10V	External setpoint Extract air fan

2. Quick guide

2.1. HMI ProPanel

A central element in the system is the HMI (control panel), where you can adjust settings and take readings. The control panel consists of an 8-line graphic display, indicator lamps and controls for the settings. Here is a short introduction to the control panel showing how to enter the initial settings in the system.
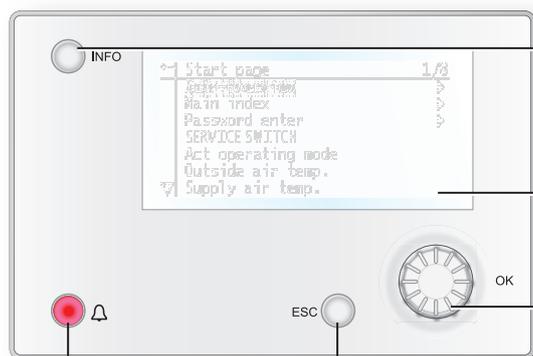
Info button
Press to enter the main menu
· Off = Stop, cool down
· Green lamp, steady = Normal operation
· Flashing green = Starting, Night operation test, Nighttime cooling or Night heating/nighttime cooling.
· Orange lamp, steady = Fire damper exercise
· Alternating green/orange = Manual control

Display
Shows information

Dial
· Turn anticlockwise/clockwise to go up/down in menus or to change values
· Press the button to enter a menu or change a value
· Hold the button down to go directly to the login menu if the value you want to change
· requires login.

Alarm button
· Flashing red = alarm
· Red lamp, steady = alarm acknowledged but remaining

ESC button
· Returns to the previous menu page
· Cancels current editing

2.2. Settings

2.2.1. Introduction

The first time the system is started, you need to go through some simple steps to ensure that the system will function.

If a heating coil has been installed in the ventilation unit, this must be configured in the control system (see heating coil manual). There is a quick menu for accessing the commonest functions on the control panel, Language, Timing program and Set point settings.

2.2.2. Select language

To change the language on delivery:

Start page > Quick menu > Commissioning > Language selection

Select your preferred language.

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2.2.3. Login

In order to make changes to the system, it is normally necessary to log in. There are four authority levels in the system, and three of them are password protected. The level at which the user is currently logged in is shown by the number of keys in the top left hand corner of the display. The menus show more options or fewer, depending on the level at which you are logged in.

The following key symbols will be used from now on in the manual to describe the login level before the different menus/functions can be made visible and editable. The same key symbols are shown at the top left of the control panel.

The following actions are possible at the different levels:

Level 1: No restrictions, no password required.
- Read access to all menus except system parameters, configuration and detail menus.
- Read access to alarm lists and alarm history.

Level 2: End user, password 1000.

One key symbol   ⌐◯━

- All rights as for level 1, plus:
- Read access to all menus except configuration menus.
- Write access to the most important setpoints (Setpoints/Settings > Setpoints).
- Alarms and alarm history can be acknowledged and reset.

Level 3: System administrator, password 2000.

Two key symbol

- All rights as for level 2, plus:
- Rights to all menus except I/O configuration and system settings.

Level 4: OEM, password given only in consultation with the Flexit service organisation.

Three key symbol

- All rights as for level 3, plus:
- Rights to all menus and system settings.

> **Start page > Main menu > Enter PIN**

2.2.4. Set time/time channels

> ⌐◯━ **Start page > Quick menu > SetUp > Date/ Time Input**

2.2.5. Set the calendar and timing program

> ⌐◯━ **Start page > Quick menu > SetUp > Timeswitch program**

General
This section describes functions and settings for the timing program and calendars.

When no object with higher priority (for example Manual control <> Auto) is activated, the system can be switched off or the steps changed via the timing program.
A maximum of six switch-over times can be specified per day.
The calendar stop overrides the calendar exception, which in turn overrides the normal timing program (only in operating mode). Up to 10 periods or exception days can be specified for each calendar.

> ⓘ **NB.** Both setpoints for fan steps and temperature setpoints (comfort /economy) are controlled by the timing program.

2.2.6. Week schedule

Parameter	Value	Function
Present value	---	Switch-over according to schedule
Monday		Shows current command when the current day is Monday. The latest time that can be entered for a day is 23:59. Go to the daily switch-over schedule for Mondays.
Copy schedule	-Mo -Tu-Fr -Tu-Su -Tu -We -Th -Fr - Sa -Su -Ecpt	Copies times for the timing program from Monday to Tuesday-Friday/Tuesday-Sunday. -Passive (no copying). -Copying starts. Return to the display screen. -Exception
Tuesday		Same function as for Monday.
...		...
Sunday		Same function as for Monday.
Exception		Shows current command when the current day is an exception day. Go to the daily switch-over schedule for exception days.
Period: Start		(Only Authority level 3.) Start date for weekly schedule. *,**. 00 means that the weekly schedule is always activated. ---> Activate weekly schedule.
Period: End		(Only Authority level 3.) Start date and time for disabling of weekly schedule.

2.2.7. Day schedule

Parameter	Value	Function
Present value	---	Switch-over according to the schedule when the current weekday is the same as the switch-over day
Day schedule	-Passive -Active	Status for current week or exception day: -Current weekday (system day) is not the same as the switch-over day. -Current weekday (system day) is the same as the switch-over day.
Time-1		This is locked to 00:00
Value-1	Off Eco.St1 Comf.St1 Eco.St2 Comf.St2 Eco.St3 Comf.St3	Indicates the unit's operating mode when Time-1 occurs
Time-2	00:01-23:59	Switch-over time 2. *:* ---> Time inactivated
Value-2 ... Value-6	Off Eco.St1 Comf.St1 Eco.St2 Comf.St2 Eco.St3 Comf.St3	Indicates the unit's operating mode when Time-2 occurs
Time-3 Time-6	00:01-23:59	Switch-over time 3-6. *:* ---> Time deactivated

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2.2.8. Calendar (exceptions and stop)

Exception days can be defined in the calendar.
These can include specific days, periods or weekdays.
Exception days override the weekly schedule.

Calendar exceptions

Switch-over follows the weekly schedule and the exceptions specified in the daily schedule when a switch-over time is activated in the calendar exception.

Calendar stop

The system is turned off when the calendar stop is activated.

Parameter:

Start page > Quick menu > SetUp > Timeswitch program > Calendar execption

Start page > Quick menu > SetUp > Timeswitch program > Calendar fix off

Parameter	Value	Function
Current value	-Passive -Active	Shows whether a calendar time is activated: - No calendar time activated - Calendar time activated
Selection -x	-Date -Interval -Weekday -Passive	Specification of exception type: -A certain day (e.g. 1 May) -A period (e.g. holiday) -A certain weekday -Times are deactivated This value must always be placed last, after the date
-(Start) Date		-Selection-x = interval: Enter the start date for the period -(Selection-x = Date: Enter specific date)
-End date		-Selection-x = interval: Enter the end date for the period The end date must be later than the start date
Weekday		-Selection-x = only weekdays: Enter a weekday.

2.3. Adjust setpoints for speeds and temperatures

Start page > Quick menu > Settings > Setpoints/Settings

Parameter	Function
All settings	>
Comfort htg stpt	Indicates the temperature setpoint for comfort operation (daily operation)
Economy htg stpt	Indicates the temperature setpoint for economy operation (nighttime setback)
Sply fan st 1 stpt	Indicates the supply airflow
Sply fan st 2 stpt	Indicates the supply airflow
Sply fan st 3 stpt	Indicates the supply airflow
Extr fan st 1 stpt	Indicates the extract airflow
Extr fan st 2 stpt	Indicates the extract airflow
Extr fan st 3 stpt	Indicates the extract airflow

2.4. Service switch

The service switch is used to stop the unit for servicing. **NB.** If the electric coil was active when the unit was turned off, there will be 180 seconds run-on time before the unit stops cooling the coil.

Start page > SERVICE SWITCH

Parameter	Function
Auto	The unit is controlled via time channel
Off	Service mode, the unit is stationary

2.5. Extract air regulation

As standard, the unit is configured to regulate the temperature via the supply air, but can easily be configured to regulate this via the extract air instead. To do this, go into the following menu:

Start page > Main menu > Configuration > Configuration 1 > Tmp control mode

Parameter	Function
Supply	Temperature regulation is controlled by the supply air temperature
ExtrSplyC	Temperature regulation is controlled as a function of the extract and supply air sensors and maintains the set extract air temperature

After making a change in a configuration menu, RESTART.

Start page > Main menu > Configuration > Configuration 1 > Restart required! > Execute

RESTART

To adjust limitations to the inlet temperature in the case of extract air regulation.

Start page > Quick menu > Settings > Setpoints/Settings

Parameter	Function
Supply tmp min	Indicates the lowest permitted supply air temperature
Supply tmp max	Indicates the highest permitted supply air temperature,

2.6. Changing the flow display units

The standard setting for the unit is m^3/h, but can easily be changed to l/s. When the units are changed, the setpoint values for airflow are automatically recalculated.

Start page > Main menu > Configuration > Configuration 2 > Flow display

Parameter	Function
No	Not used
l/s	Shows the airflow in l/s
m^3/h	Shows the airflow in m^3/h

After making a change in a configuration menu, RESTART.

Start page > Main menu > Configuration > Configuration 2 > Restart required! > Execute

RESTART

2.7. Alarm handling

If an alarm has been triggered, it will be shown by the flashing alarm symbol. You can get more information by pressing the alarm button. To reset the alarm, press the alarm button twice and select 'Confirm/Reset' and then Execute in the menu.

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3. Backup and program updates

When the system has been fully configured and the parameters have been set, it can be backed up to an SD memory card and/or internally in the regulator, or reset using the data on the memory card or the settings on the regulator. Two different sets of parameters for a configured system can be backed up or reset. For example, you can back up the standard settings (Save factory settings) and adjusted/startup settings (Save startup settings).

The options below can be selected only with the relevant authority level. This is done using menu option:

> **Start page > Main menu > System objects Save/Load**

3.1. Save a configuration

After initiation and adjustment, the parameters and configurations can be saved to the SD card. For example, you can load these values on another process unit with the same basic configuration (operating system, application, control panel, HMI4Web and language/communication).

MAX 32GB
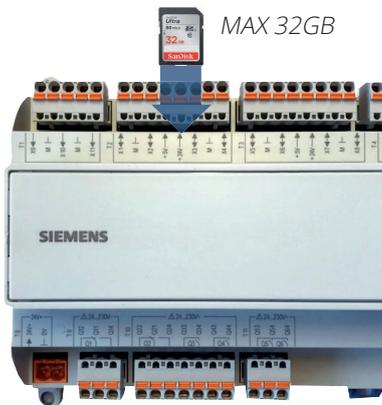
Location of SD memory card

Procedure:
1. Insert a blank SD memory card into the regulator.
2. Backup the values to the memory card.

> **Start page > Main menu >System objects > Save/load > Sett.save > Ext.m. > Execute**

or internally in the controller

> **Start page > Main menu >System objects > Save/load > Sett.service save**

3. Wait until:

> **Start page > Main menu > System objects > Save/load > Ready**

Standard settings (Factory settings) and adjusted settings (Startup settings) are handled in the same way.

3.2. Load a configuration

Procedure:
1. Insert the memory card into the regulator.
2. Load the values from the memory card.

> **Start page > Main menu > System objects > Save/Load > Sett.load > Ext. m > Execute**

or internally in the controller

> **Start page > Main menu > System objects > Save/Load > Sett.service load**

3. Wait until:

> **Start page > Main menu > System objects Save/Load > Ready**

4. Restart the process unit:

> **Start page > Main menu > System objects Save/Load > Restart required! = Execute**

> **RESTART**

Standard settings (Factory settings) and adjusted settings (Startup settings) are handled in the same way.

4.   General functions

Operating modes - Changes
The system can be set into different operating modes.

> **Start page > Main Menu > Unit >**
> **Operating mode > Manual operation**

Manual operation	
No	Unit operating on time switch program
Eco.St1	Unit operating on economy temperature and "Step 1" speed
Comf.St1	Unit operating on comfort temperature and "Step 1" speed
Eco.St2	Unit operating on economy temperature and "Step 2" speed
Comf.St2	Unit operating on comfort temperature and "Step 2" speed
Eco.St3	Unit operating on economy temperature and "Step 3" speed
Comf.St3	Unit operating on comfort temperature and "Step 3" speed

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5. Configuration

On delivery, the ventilation unit is configured and ready. Therefore, no adjustments to the configuration are normally required. If, on the other hand, you have bought a heating battery or other accessory, this must be configured. See the manual for the current accessory.

However, the addition of accessories and other equipment may require a change to the configuration.
Where necessary, there is a more detailed description in this manual or with the accessory.
This section is, therefore, intended more as general information.

The configuration includes the following three steps:
- Configuration 1
- Configuration 2
- Configuration with inputs and outputs

5.1. Configuration 1

If adjustments are needed, 'Configuration 1' is the first step in the configuration.

- Configuration is done sequentially, which means that it is not possible to skip any options.
- Configuration 1 must have been completed and the process unit have been restarted before you continue with Configuration 2.

> **Start page > Main menu > Configuration > Configuration 1**

After making a change in a configuration menu, RESTART

> **Start page > Main menu > Configuration > Configuration 1 > Restart required! > Execute**

🔄 **RESTART**

ⓘ **NB.** The ventilation unit is supplied fully configured and does not normally need to be changed.

Parameter	Value	Function
General		
Expansion modules	No	Only the process unit's inputs and outputs are used.
	One	An expansion module is connected via address 1. DIP switches 5 and 6 on the module must be set to On.
	Two	Two expansion modules are connected via addresses 1 and 2. DIP switch 5 on module 1 and DIP switches 4 and 6 on module 2 must be set to On.
Activate zones	None One Two Three	Option for up to three different temperature zones. **NB.** Requires one or more expansion modules.
Fire alarm	No	No fire alarm.
	Alarm	External fire alarm such as smoke detectors, thermostat, fire alarm control centre, etc.
	Tmp	Internal fire alarm via measurement of normal supply air and extract air temperature when both sensors are accessible. A fire alarm is triggered when one of the two temperatures reaches a specific value.
	Alarm+Tmp	Both fire alarms.

Parameter	Value	Function
Filter alarm	No	No filter alarm.
	Combined	Supply air and extract air filter with common alarm input.
	Supply	Input only for supply air filter alarm.
	Extract	Input only for extract air filter alarm.
	Sply+Extr	Two separate filter alarm inputs for supply air and extract air filters.
Filter alarm analogue	No	No filter alarm.
	Supply	Analogue input for supply air filter alarm only.
	Extract	Analogue input for extract air filter alarm only.
	Sply+Extr	Two separate filter inputs for supply air and extract air filters.
Emergency stop	No	Input for emergency stop. If the signal on this input is TRUE, the system is switched off immediately. No alarm is triggered.
	Yes	
Alarm ackn input	No	Input for acknowledging or resetting an alarm. Open alarms are acknowledged; closed alarms are reset.
	Yes	
Su/Wi input	No	Input for summer/winter switch-over. If the signal on this input is TRUE, summer compensation is selected. Further settings can be made under: Main menu > General func. > Summer-winter mode.
	Yes	
TSP function	No	No timing program.
	Steps	Timing program with possible settings for fan steps (Off and Stx). The parameter Timing program step determines the number of possible steps.
	Steps+Tmp	Timing program with possible settings for fan steps and temperature regulation type (Off, Econ.x and Comf.x). The parameter Timing program step determines the number of possible steps. The temperature mode comfort or economy can be selected for each fan step. Comfort and economy operation have separate setpoints for temperature regulation.
TSP steps	Activation of possible fan steps. This setting controls the number of setpoints for regulated fans.	
	1 Step	Timing program function = Step ---> Possible settings for timing program: Off, St1. Timing program function = Step+Temp ---> Possible settings for timing program: Off, Econ1, Comf1.
	2 Step	Timing program function = Step ---> Possible settings for timing program: Off, St1, St2. Timing program function = Step+Temp ---> Possible settings for timing program: Off, Econ1, Econ2, Comf1, Comf2.
	3 Step	Timing program function = Step ---> Possible settings for timing program: Off, St1, St2, St3. Timing program function = Step+Temp ---> Possible settings for timing program: Off, Econ1, Econ2, Econ3, Comf1, Comf2, Comf3.
Ext control input	None	No external input for operating mode switch-over, timer, button, detector for external control, etc.
	One	One input (e.g. on/off).
	Two	Two inputs (e.g. Auto/Off/St1/St2).
	Three	Three inputs (e.g. Auto/Off/St1/St2/St3).
Alarm outputs	None	No alarm output.
	One	One output (for example for priority and non-priority alarms).
	Two	Two outputs (for priority and non-priority alarms).

Sensor		
Room tmp sensor	Sensor 1	Inputs for room temperature sensors. Select max, min, average or individual value for regulation for one or more sensors in Configuration 2.
	Sensor 2	
	Rm unit 1	
	Rm unit 2	
	QMX 1	
	QMX 2	

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Parameter	Value	Function
Extract air tmp sen	No	Input for extract air sensor.
	Yes	
	Yes+Hold	If the system has been in operation for more than 5 minutes, the max temperature is saved when it is switched off; otherwise the actual temperature is saved. The setting is meaningful only if there is no room sensor and nighttime operation (for example nighttime cooling) without a temperature test is to be used. This setting should not be used with support operation. (Temperature test: the system is started briefly to update the duct sensor temperature.)
Supply tmp sensor	No	Input for supply air sensor.
	Yes	
Outs air tmp sensor	No	Input for sensor for outdoor air temperature.
	Yes	
	Yes+Hold	If the system has been in operation for more than 5 minutes, the min temperature is saved when it is switched off; otherwise the actual temperature is saved. The setting is meaningful only if a sensor is fitted in the duct and nighttime support operation (for example nighttime cooling) is activated, or as a safety function for pump start at low outdoor air temperatures.
Hrec supply air	Yes	Input for extra supply air sensor, which can be used for efficiency measurement.
	No	

Functions		
Exhaust air	Yes	Input for supply air sensor
	No	
Damper	No	No air damper
	Combined	Two air dampers with a common output.
	Outside	Outdoor air damper output.
	Outs+Exh	Two dampers with separate outputs.
	MB Outside	Outdoor air damper via ModBus
	MBOut+Exh	Outdoor+Extract air via ModBus
Fan	Supply	Config supply air fan
	Extract	Config Extract air fan
	SiemensMB	Choose if using siemens Modbus fan control
	EBM MB	Choose if using EBM papst Modbus controled fans
	Danfo.MB	Choose if using Danfoss Modbus controled fans
	Ziehl-Abegg	Choose if using Ziehl.Abegg Modbus controled fans
Fan control mode	Direct	Up to three digital outputs each for direct-drive fans.
	DirectVar	Up to three digital outputs each for frequency-regulated fans with fixed steps.
	Fix Speed	One digital and analogue output each for frequency-regulated fans regulated via modulating analogue outputs (e.g. St1 = 2 V, St2 = 5 V, St3 = 8 V).
	Pressure	One digital and analogue output and one analogue input each for frequency-regulated fans in pressure-regulated systems.
	Flow	One digital and analogue output and one analogue input each for frequency-regulated fans regulated in flow-regulated systems.
	SplySlave	One digital and analogue output each and three analogue inputs for frequency-regulated fans in pressure-regulated systems where the supply air fan is driven depending on the extract air fan.
	ExtrSlave	One digital and analogue output each and three analogue inputs for frequency-regulated fans in pressure-regulated systems where the extract air fan is driven depending on the supply air fan.

Parameter	Value	Function
Tmp control mode	Select the regulation algorithm for temperature regulation	
	Supply	Temperature regulation of supply air only.
	Rm casc.	Cascade regulation of room and supply air temperature.
	ExtrSplyC	Cascade regulation of extract and supply air temperature.
	RmSplyCSu	Cascade regulation of room and supply air temperature in summer; regulation of supply air temperature only in winter.
	ExSplyCSu	Cascade regulation of extract and supply air temperature in summer; regulation of supply air temperature only in winter.
	Room	Room regulation only.
	Extract	Temperature regulation of extract air only.
Hrec damper	Active	Activates function 100% recirculation = 10V output signal to damper
	Invert	Inverts function 100% recirculation = 0V output signal to damper
	MB Exhaust	Extract air damper is ModBus controlled
	MB Outside air	Supply air damper is ModBus controlled
	MB Mix Air	Mixing damper is ModBus controlled
	LimExtrFan	Reduces speed of extract air fan proportionately using the mixing damper. If the damper increases to 60%, the fan decreases to 40%.
Heat recovery	Select heat recovery regulation with rotary heat exchanger, plate heat exchanger or water heat exchanger.	
	No	No heat recovery.
	Wheel	Rotary heat exchanger. One analogue output for regulation of rotary heat exchanger.
	PlateExch	Plate heat exchanger. One analogue output for regulation of regulating air damper.
	WheelInv	Rotary heat exchanger. An analogue output for regulation of rotary heat exchanger. Inverted output signal 100% load = 0V
	PlateInv	Plate heat exchanger. One analogue output for regulation of regulating air damper. Inverted output signal 100% load = 0V
Waterheating	No	No water heating configured
	Yes	Water heating without preheating coil.
	Yes+PreH.TOa	Water heating + preheating controlled by outdoor air temperature
	Yes+PreH.TFr	Water heating + preheating controlled by frost protection temperature
	Yes+Modbus	Switches between analogue output and Siemens ModBus valve
	Yes+PreH.TOa+Modbus	
	Yes+PreH.TFr+Modbus	
Electrical heating	Electric heating register and type of regulation.	
	No	No electric heating register available.
	Analog	Electric heating register with regulation via one analogue output.
	1step	1-step electric heating register with regulation via one analogue and one digital output.
	2step	2-step electric heating register with regulation via one analogue and two digital outputs.
	3stepBin	3-step electric heating register with binary regulation via one analogue and two digital outputs.
Water Heating 2	If no option has been ticked, the water heating is deactivated	
	Yes	Water heating without preheating coil
	+PreH OutsideTemp	Water heating + preheating controlled by outdoor air temperature
	+PreH FrostTemp.	Water heating + preheating controlled by frost protection temperature
	ModBus	Switches between analogue output and Siemens ModBus valve

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Parameter	Value	Function
El Heating 2	Extra electric heating register and type of regulation.	
	No	No extra electric heating register available.
	Analog	Extra electric heating register with regulation via one analogue output.
	1step	Extra 1-step electric heating register with regulation via one analogue and one digital output.
	2step	Extra 2-step electric heating register with regulation via one analogue and two digital outputs.
	3stepBin	Extra 3-step electric heating register with binary regulation via one analogue and two digital outputs.
Cooling	Select cooling register and type of regulation	
	If no option has been ticked, the cooling function is deactivated	
	Water	Analogue output for liquid cooling
	DX 1step	One analogue and one digital output for DX cooling
	DX 2step	One analogue and two digital outputs for DX cooling
	DX 3step	One analogue and two digital outputs (Binary) for DX cooling
	ModBus	ModBus controlled valve in combination with liquid cooling
Cooling 2	Extra cooling register and type of regulation.	
	If no option has been ticked, the cooling function is deactivated	
	Water	Analogue output for liquid cooling
	DX 1step	One analogue and one digital output for DX cooling
	DX 2step	One analogue and two digital outputs for DX cooling
	DX 3step	One analogue and two digital outputs (Binary) for DX cooling
	ModBus	ModBus controlled valve in combination with liquid cooling
Fire damper	Fire damper.	
	No	No fire damper.
	Yes	One digital output and input each for fire damper regulation.
	FollowUnit	One digital output and input each for fire damper regulation. The fire damper is opened when the unit starts and closed when the unit stops.
	2	Same as "Yes" but with 2 fire dampers.
	2+FolwUn	Same as "Yes+FollUnit" but with 2 fire dampers.
	3	Same as "Yes" but with 3 fire dampers.
	3+FolwUn	Same as "Yes+FollUnit" but with 3 fire dampers.
	4	Same as "Yes" but with 4 fire dampers.
	4+FolwUn	Same as "Yes+FollUnit" but with 4 fire dampers.
Firefan	No	Fire fan control deactivated.
	Yes	Fire fan control activated.
External set-point	No	No analogue input for connection of external setpoint or compensation for external setpoint.
	Volt	Input for 0–10 V DC signal.
	Ohm	Input for 0–2500 ohm signal.
	QAA27	Input for QAA27.
	BSG21	Input for BSG21 setpoint compensation.
Configuration 1	With this parameter, the system is activated after parameter settings have been set, i.e. when Configuration 1, Configuration 2 and Config. In/Outputs have been set (value Ready).	
	Not done	The system is locked and cannot be started.
	Done	The system is unlocked after the parameter settings have been set (value Ready for Configuration 2 and Config.In/Outputs), i.e. the system can be started.
Restart required	Execute	The system must be restarted after parameter settings have been set in Configuration 1. Changed settings in Configuration 2 are implemented. After restart, the value is changed automatically from Execute to Passive.

5.2. Configuration 2

NB. The ventilation unit is supplied fully configured and does not normally need to be changed.

If any adjustments are needed, subfunctions for certain parts of the system can be set in Configuration 2.

Preconditions:
Configuration 1 must have been completed, including restart of the regulator.

- Configuration is done sequentially, which means that it is not possible to skip any options
- Configuration 2 must have been completed, including restart of the process unit, before you continue with Config.In/Outputs

Start
If necessary: Enter the password for level 3:

Start page > Log in

Then:

Startpage > Main menu > Configuration > Configuration 2

Parameter	Value	Function
Free cooling	None	Nighttime cooling deactivated.
	12 hours	Starts no earlier than 12 hours before the next active time channel (Startup)
	9 hours	Starts no earlier than 9 hours before the next active time channel (Startup)
	6 hours	Starts no earlier than 6 hours before the next active time channel (Startup)
	3 hours	Starts no earlier than 3 hours before the next active time channel (Startup)
	Always	Can be started at any time
Fan step	1	The fans run at step 1 during nighttime cooling
	2	The fans run at step 2 during nighttime cooling
	3	The fans run at step 3 during nighttime cooling
Tmp start	Starts nighttime support operation. Precondition: The function can be selected only if a room or extract air sensor is available. Temperature motion is activated automatically if only one extract air sensor which holds the values is available. If the extract air sensor holds the values, the temperature is used for start.	
	No	The function is not available.
	Htg	The function is available only for heating.
	Clg	The function is available only for cooling.
	Htg+Clg	The function is available for heating and cooling.
Fan step	1	The fans run at step 1 during support operation.
	2	The fans run at step 1 during support operation.
	3	The fans run at step 1 during support operation.
Boost	Optimum start of the system with heating and cooling via separate setpoints. Precondition: The function can be selected only if a room or extract air sensor is available.	
	No	The function is not available.
	Htg	The function is available only for heating.
	Clg	The function is available only for cooling.
	Htg+Clg	The function is available for heating and cooling.
Tmp start/ OSSTP blk	Block the air damper or extract air fan when the system is started optimally or via temperature delta. **NB.** This function is intended to be used in an emergency situation. **Warning!** A regulating air damper must be in place and be open when the function is selected. Otherwise, the system may suffer damage.	
	None	No blocking.
	Damper	Air dampers remain closed.
	Dmpr+Fan	Air dampers remain closed and only the supply air fan is started.
Damper fdbk	None	No damper return.
	One	Return for supply air damper (or common return for both dampers). Digital input for return.
	Two	Separate return for supply air and extract air dampers. Two digital inputs for return.

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Parameter	Value	Function
Fan steps freq conv	1step	Digital output for activating frequency-regulated fans (always activated)
	2step	An extra digital output for alternative connections which are dependent on fan step 2.
	3step	Two extra digital outputs for alternative connections which are dependent on fan step 3.
Flow display	No	The function is not available.
	l/s	Shows airflow in litres/second.
	m³/h	Shows the airflow in m³/hour.
Fan steps type	Necessary fan regulation output that concerns settings for Fan regulation type, Timing program step and Dig.step freq.conv.	
	Separated	Digital output for each step. Example: Fan regulation type = Direct / Timing program step = 2 / Extract air fan = Yes ---> 4 digital outputs: 2 each for step 1 and step 2, separated for supply air and extract air fans.
	Sep.Comb.	Separate outputs for the first step, common outputs for subsequent steps. Example: Fan regulation type = Pressure reg. / Timing program function = Step+Temp / Timing program step = 3 / Extract air fan = Yes / Dig.step freq.conv = 3. ---> 4 digital outputs: Step 1 as separate activation of frequency-regulated fans, two extra outputs that can be used (Dig.step freq.conv) for step 2 and step 3.
	Binary	The outputs for steps are binarily coded. The setting can be used for Fan regulation type = Direct or Dir.fro. Example: Fan regulation type = Direct / Timing program function = Step+Temp / Timing program step = 3 / Extract air fan = Yes ---> 4 digital outputs: 2 digital outputs each per fan (Step 1 = DO1 TRUE, Step 2 = DO2 TRUE, Step 3 = DO1 and DO2 TRUE).
Fan alarm	Inputs for fan alarm (e.g. thermojunction). Logical 1 = alarm.	
	No	No alarm.
	Combined	Digital input for common alarm.
	Supply	Digital input for supply air fan alarm.
	Extract	Digital input for extract air fan alarm.
	Sply+Extr	Two digital inputs for supply air and extract air fan alarms.
Fan fdbk	Inputs for operating messages from fans (e.g. pressure current guard or relay contact). Logical 1 = activated fan.	
	No	No return.
	Combined	Digital input for common operating messages.
	Supply	Digital input for operating messages for supply air fan.
	Extract	Digital input for operating messages for extract air fan.
	Sply+Extr	Two digital inputs for operating messages for supply air and extract air fans.
Fan deviation alarm	Setpoint or actual value for monitoring pressure or flow. The alarm is triggered in the event of a deviation that remains for a certain period of time.	
	No	No monitoring
	Supply	Monitoring of supply air only.
	Extract	Monitoring of extract air only.
	Sply+Extr	Monitoring of supply and extract air.
Fan comp room tmp	No	Room temperature-dependent fan compensation. Precondition: Room or extract air sensor activated.
	Yes	
Fan comp air qual	No	Air quality-dependent fan compensation. Activation of analogue sensor input
	Yes	

Parameter	Value	Function
Ext. Fan setpoint	No	Function deactivated
	Supply	Supply air fan is regulated via an external setpoint.
	Extract	Extract air fan is regulated via an external setpoint.
	Sply+Extr	Both supply and extract air fans are regulated via an external setpoint.
Ext. SP funct. Supply Fan	Relative	Setpoint compensation.
	Absolute	Main setpoint.
Ext stpt funct.Exh	Relative	Setpoint compensation.
	Absolute	Main setpoint.
Fan comp outs tmp	No	Outdoor air temperature-dependent fan compensation. Precondition: Outdoor air sensor activated.
	Yes	
Fan htg / clg	The fan is used as heating or cooling sequence.	
	No	No sequential fan activation.
	Htg	Fan activation only in connection with heating sequence.
	Clg	Fan activation only in connection with cooling sequence.
	Htg+Clg	Fan activation in connection with both sequences.
Tmp stpt selection	Predefined settings for temperature setpoints:	
	Htg+Dz	Enter heating setpoint and dead zone. Setpoint for cooling = heating setpoint + dead zone.
	Htg/Clg	Setpoints for heating and cooling are entered directly.
	+/- 1/2Dz	Enter base setpoint and dead zone. Heating setpoint = base setpoint – half dead zone. Setpoint for cooling = base setpoint + half dead zone.
	Clg-Dz	Enter setpoint for cooling and dead zone. Heating setpoint = setpoint for cooling –dead zone.
Room temp. mix	Selection of room temperature where there is more than one sensor	
	Average	Average of installed sensors
	Min	Regulates from sensor with lowest temperature
	Max	Regulates from sensor with highest temperature
	Room sensor 1	Regulates from Room sensor 1
	Room sensor 2	Regulates from Room sensor 2
	Room unit 1	Regulates from Room unit 1
	Room unit 2	Regulates from Room unit 2
Floating Min/Max	Indicates a floating supply air limitation as a function of extract air temperature. Requires cascade regulation	
	Yes	Function activated
	No	Function deactivated
Sequence fan clg	Sequence for cooling and fan register, requires fan cooling/heating to be activated	
	Fan-Clg	Increases the fan speed first and then starts the cooling sequence
	Clg-Fan	Starts the cooling sequence first and then the fan speed
Mixing damper sequence	Sequence for heating and mixing damper, requires mixing damper to be activated	
	Damper-Heating	Opens the mixing damper first and then the heating sequence
	Heating-Damper	Runs the heating sequence first and then opens the mixing damper
Deviation alarm tmp	Monitors setpoint/current value for temperature. The alarm is triggered in the event of a deviation that remains for a certain period of time.	
	No	No monitoring
	Supply	Monitoring of supply air only.
	Room Extr	Room and extract air temperature.
	Sply Room	Monitoring of supply air and room temperature.

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Parameter	Value	Function
Su/Wi comp tmp	No	Summer/winter compensation of temperature setpoint.
	Yes	Precondition: Sensor for outdoor air temperature must be available.
Hrec frost protect	No	No frost protection for heat recovery
	Detector	Frost protection via guard. Digital input for frost guard
	TempSensor	Frost protection via sensor. One analogue input for regulated frost protection via setpoint. Rotary heat exchanger and plate heat exchanger: extract air sensor, water heat exchanger: water sensor.
	Temp+Dtctr	Frost protection via sensor and guard. One analogue input for regulated frost protection and one digital input for frost guard.
	PressSnsr	Frost protection via pressure sensor. One analogue input for regulated frost protection via setpoint.
	Pres+Dtctr	Frost protection via pressure sensor and guard. One analogue input for regulated frost protection and one digital input for frost guard.
No Hrec (pump) cmd	No	No pump.
	Yes	Pump without.
	Yes+Kick	Pump with exercise function
Heat recovery alarm	No	No alarm.
	Alarm	Alarm: activation by a digital alarm input: Logical 1 = alarm.
	Fdbk	Reset signal. Digital input for reset. Pulse during operation
	Both	Pump with alarm and reset. Two digital inputs for pump alarm and reset..
Hrec clg recovery	Type of cooling recovery.	
	No	No cold recovery.
	Temp	Cold recovery via difference in outdoor and indoor temperature.
	Enthalpy	Cold recovery via difference in outdoor and indoor enthalpy.
Hrec efficiency	Calculation of heat recovery efficiency. Precondition: Heat recovery (e.g. rotary heat exchanger) must be activated and there must be a sensor for both outdoor air temperature and extract air.	
	No	No calculation of heat recovery efficiency.
	Exhaust	For calculation with extract air sensor: One analogue input for the extract air sensor unless the frost guard has been activated.
	Supply	For calculation with the supply air sensor located immediately behind the heat exchanger: One analogue input for extra supply air sensor.
Aux binary inputs	Input	A digital input solely for display/status
	Alarm	A digital input for triggering the alarm.
	Smoke alarm	A digital input for triggering the smoke alarm.
	Smoke det. dirty	A digital input for dirty smoke detector.
	Fire Fan contr.	Two digital inputs for overriding supply/extract air fans in case of fire/smoke alarm.
Aux tmp sensor	No	No extra analogue input.
	Yes	Extra analogue input for connection of temperature display.
Aux TSP output	No	No extra digital output.
	Yes	One digital aux. output with separate timing program.
AdjDiscrg Aux Analog outp	No	No extra analogue output.
	Fan	Analogue output that generates a 0-10V signal, depending on current fan step.
	AdjDiscrg	Analogue output that generates a 0-10V signal, depending on temperature.
Aux op mode indicat	No	No extra digital output.
	Yes	An extra digital output, the status of which depends on the current operating mode (e.g. Comfort or Off).

Parameter	Value	Function
Configuration 2	With this parameter, the system is activated after parameter settings have been set, i.e. when Configuration 1, Configuration 2 and Config. In/Outputs have been set (value Ready).	
	Done	The system is unlocked after the parameter settings have been set (value Ready for Configuration 2 and Config.In/Outputs), i.e. the system can be started.
	Not Done	The system is locked and cannot be started.
Restart required!	Execute	The system must be restarted after parameter settings have been set in Configuration 2. Changed pre-settings in Config. Inputs/outputs modified. After restart, the value is changed automatically from Execute to Passive.
Air quality damper comp.	Ensures sufficient air quality in case of recirculation. Requires connection of air quality sensor.	
	No	Function deactivated
	Yes	Function activated
Cold recovery. mixing	Cold recovery with mixing damper	
	No	Function activated
	Temp	Cold recovery via difference in outdoor and indoor air temperature
	Enthalpy	Cold recovery via difference in outdoor and indoor enthalpy
Frost guard, heating	Frost guard for water heating	
	No	No frost protection
	Sensor	Frost protection via analogue sensor and a setpoint.
	Sens+2sp	Frost protection via analogue sensor and two setpoints, operating and standby temperatures
	Guard	Frost guard via digital input
	Sens+Guard	Frost guard via digital input and Frost protection via analogue sensor and a setpoint
	2sp+Guard	Frost guard via digital input and Frost protection via analogue sensor and two setpoints, operating and standby temperatures.
Pump water heating	Circulation pump settings	
	No	No pump installed
	Yes	Digital output for circulation pump activated
	Yes+Exercise	Digital output for circulation pump activated and exercise function
Pump alarm water heating	Alarm/reset for circulation pump	
	No	Pump without alarm and reset
	Alarm	Pump with alarm, digital input
	Reset,	Pump with feedback, operating signal
	Alarm+ Reset	Pump with alarm and operating signal
Combi-coil	Selection of coil function for both heating and cooling	
	Normal seq.	One coil for both heating and cooling
	Extra seq.	A coil which can be run as extra heating and extra cooling
	1Valve 1Pump	Coil with combined valve for regulating heating and cooling. One digital output for switching between heating and cooling.
	2Valves 1Pump	Coil with separate valves for regulating heating and cooling. One digital output for switching between heating and cooling.
	Heat pump	Coil with three separate outputs, one analogue and two digital.
	DX Com	Heating pump connection via process bus
	Inv. Valve	Analogue output signal inverted
Yes El htg alarm	Alarm for electric heating coil	
	No	Function deactivated
	Yes	Function activated
Electical heater 2 Pos	Two different steps for electric heating	
	No	Function deactivated
	Yes	Function activated

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Parameter	Value	Function
Cooling pump	Circulation pump settings	
	No	No pump installed
	Yes	Digital output for circulation pump activated
	Yes+Kick	Digital output for circulation pump activated and exercise function
Cooling pump alarm	Alarm/reset for circulation pump	
	No	Pump without alarm and reset
	Alarm	Pump with alarm, digital input
	Fdbk	Pump with feedback, operating signal
	Both	Pump with alarm and operating signal
HP Defrosting	Defrosting function for heat pump	
	No	Function deactivated
	Yes	Function activated
Fire damper reset	Type of reset from fire damper	
	Closed	Reset only in case of closed damper, one digital input
	Clo+Op	Reset in case of both open and closed damper, two digital inputs
	Comb.	Reset in case of both open and closed damper, one digital input
	Closed.inv	Inverted Reset only in case of closed damper, one digital input

5.3. Configuration of inputs and outputs

If any adjustments are needed, subfunctions for certain parts of the system can be set in Configuration 1, Configuration 2 and Configuration of inputs and outputs.

In Config.In/Outputs a physical location is allocated to the inputs and outputs specified in Configuration 1 and Configuration 2. Also, parameter settings are carried out for the current sensor conversion (e.g. Ni1000, Pt1000, 0-10 V = 0–1000 Pa).

Positions in regulator and expansion modules
- Regulator: All single-digit positions, for example X1.
- Modbus extender: xxxxx
- Expansion module 1: All positions X1x, DI1x, DO1x, AO1x, for example X11, DO14
- Expansion module 2: All positions X2x, DI2x, DO2x, AO2x, for example X21, DO24.

Preconditions
Configuration 1 and Configuration 2 must be ready (processing unit must be restarted after each configuration).

Then:

Startpage > Main menu > Configuration > Configuration IOs

NB. The ventilation unit is supplied fully configured and does not normally need to be changed.

NB. The inputs and outputs in the expansion modules can be used if the module has been activated in Configuration 1.

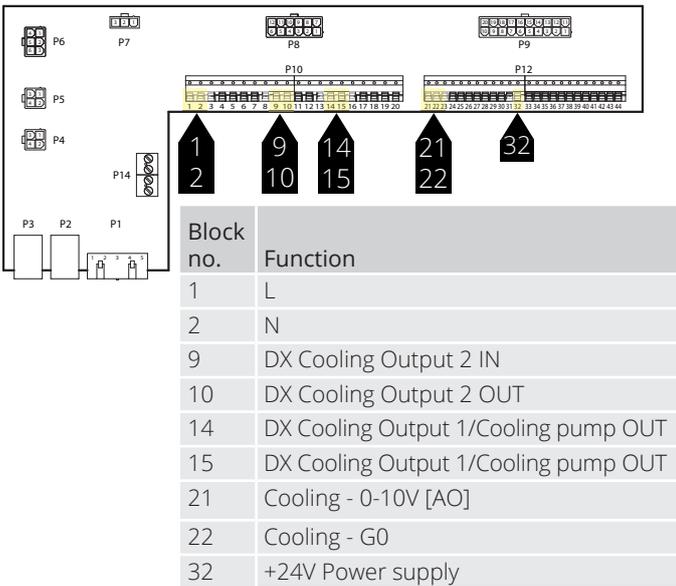| Parameter	Value	Function
Integrations		Internal bus communication
Temperatures		Go to the hardware configuration page for all temperature sensors.
Pressures / flows		Go to the hardware configuration page for all pressure and airflow sensors.
Digital inputs		Go to the hardware configuration page for all digital inputs without alarm function.
Digital alarm		Go to the hardware configuration page for all digital inputs with alarm function.
Other		Go to the hardware configuration page for External setpoint
Outputs damper		Go to the hardware configuration page for supply air, extract air and fire dampers.
Output fans		Go to the hardware configuration page for fans.
Outputs tmp control		Go to the hardware configuration page for heating, cooling, heat recovery, etc.
Outputs alarm		Go to the hardware configuration page for both alarm outputs.
Configuration IOs		Activation of system is activated after parameter settings have been set, i.e. when Configuration 1, Configuration 2 and Config. In/Outputs have been set (value Ready).
	Done	The system is unlocked after the parameter settings have been set and can be started
	Not done	The system is locked and cannot be started.
Restart required!	Execute	The system must be restarted after parameter settings have been set in Config. In/Outputs. Changed presettings in Config.In/Outputs are implemented. After restart, the value is changed automatically back.

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6. Cooling

The settings below only apply to a cooling machine. If you want both heating and cooling via a heat pump, see chapter 13.

DX cooling one step or liquid
As standard, the system is set up to control liquid cooling or two DX steps. Either linear (two cooling machines of equal size) or binary (one small and one large cooling machine). Cooling control in accordance with following guidance.

6.1. Installation

Block no.	Function
1	L
2	N
9	DX Cooling Output 2 IN
10	DX Cooling Output 2 OUT
14	DX Cooling Output 1/Cooling pump OUT
15	DX Cooling Output 1/Cooling pump OUT
21	Cooling - 0-10V [AO]
22	Cooling - G0
32	+24V Power supply

6.2. Configuration - Cooling control

Then go in via the control panel to configure the system For DX cooling control or liquid.

> **Start page > Main menu > Configuration > Configuration 1 > Cooling**

Parameter	Function
Water	Analogue output for liquid cooling
DX 1step	One analogue and one digital output for DX cooling
DX 2step	One analogue and two digital outputs for DX cooling
DX 3step	One analogue and two digital outputs (Binary) for DX cooling

Enter the desired choice and complete with Ready. After making a change in a configuration menu, RESTART.

> **Start page > Main menu > Configuration > Configuration 1 > Restart required! > Execute**

RESTART

6.3. To activate the circulation pump (liquid cooling only)

> **Start page > Main menu > Configuration > Configuration 2 > Cooling pump**

Parameter	Function
No	Pump control deactivated
Yes	Pump control activated
Yes+Kick	Pump control activated + exercise function

To make parameter settings, go to the following menus via the control panel.

6.4. Blocking for outdoor air temperature

> **Start page > Main menu > Unit > Temp control > Cooling > Disable by outs tmp**

Parameter	Function
-64.0 to 64.0	Indicates lowest permissible outdoor air temperature for cooling operation

6.5. Cycle times (DX cooling only)

> **Start page > Main menu > Unit > Temperature regulation > Cooling > Direct expansion**

Parameter	Function	Beskrivning
Operation	Auto From Step 1 Step 2 Step 3	Manual operation of output
Min cycle time	0-36000	Minimum initiation time in seconds for cooling machine
Minimum termination time	5-600	Minimum termination time in seconds for cooling machine
Min step time	5-600	Min operating time per step before next step can start
Start step 1	0-100%	Percentage cooling load on the regulator when the different steps kick in
Start step 2	Start step 1 -100%	Percentage cooling force on the regulator when the different steps kick in
Start step 3	Start step 2 -100%	Percentage cooling load on the regulator when the different steps kick in
Hysteresis, termination	0-20%	How far below the initiation level the step will terminate as the cooling requirement goes down

6.6. Cooling limitation as function of fan speed (DX cooling only)

Start page > Main menu > Unit > Temperature regulation > Cooling > Max. signal fan step

Parameter	Function
Fan step 1> 0-100%	Permitted DX cooling output signal when the system is running in step 1 or using the setpoint for step 1
Fan step 2> 0-100%	Permitted DX cooling output signal when the system is running in step 2 or using the setpoint for step 2
Fan step 3> 0-100%	Permitted DX cooling output signal when the system is running in step 3 or using the setpoint for step 3

> EXAMPLE OF COOLING LIMITATION	
Fan step 1 = 30%	The control system limits the cooling load to 30% at fan step 1.
Fan step 2 = 60%	The control system limits the cooling load to 60% at fan step 2.
Fan step 3 = 100%	No limitation of cooling load at fan step 3.

6.7. Setting of temperature setpoints

Start page > Quick menu > Setup > Setpoints/Settings

Parameter	Function
Comfort clg stpt	Indicates the temperature setpoint for comfort operation
Economy clg stpt	Indicates the temperature setpoint for economy operation

7. Temperature regulation

7.1. Extract cascade

As standard, the unit is configured to regulate the temperature via the supply air, but can be reconfigured to regulate this via the extract air.
(Extract air casc). To do this, go into the following menu.

Start page > Main menu > Configuration > Configuration 1 > Tmp control mode

Parameter	Function
Supply	Temperature regulation of supply air only
Rm casc	Temperature regulation is controlled by the extract air temperature.
ExtrSplyC	Cascade regulation of room and supply air temperature
RmSplyCSu	Cascade regulation of extract and supply air temperature
ExSplyCSu	Cascade regulation of extract and supply air temperature in summer; regulation of supply air temperature only in winter
Room	Room regulation only.
Extract	Temperature regulation of extract air only

After making a change in a configuration menu, RESTART.

Start page > Main menu > Configuration > Configuration 1 > Restart required! > Execute

RESTART

7.2. To adjust limitations to the inflow temperature in the case of cascade regulation

Start page > Quick menu > Setup > Setpoints/Settings

Parameter	Function
Supply tmp min	Indicates minimum permitted inflow temperature in supply air
Supply tmp max	Indicates maximum permitted inflow temperature in supply air

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8. Summer/Winter compensation

Summer compensation:
Adjusts the fan/temperature setpoint in relation to regulation of high outdoor air temperatures in summer. E.g. Lowers temperature setpoint and increases fan setpoint.

Winter compensation:
Adjusts the fan/temperature setpoint in relation to regulation of low outdoor air temperatures in winter. E.g. Increases the temperature setpoint and lowers the fan setpoint.

8.1. Adjustment of fan setpoint in case of high/low outdoor air temperatures

Start page > Main menu > Configuration > Configuration 2 > Fan comp outs tmp

Parameter	Function
No	Function deactivated
Yes	Function activated

After making a change in a configuration menu, RESTART.

Start page > Main menu > Configuration > Configuration 2 > Restart required! > Execute

RESTART

8.2. Parameter settings for fan compensation

Start page > Main menu > Unit > Fan control > Act summer comp fan / Act winter comp fan

Parameter	Function
Outs air tmp start	Outdoor air temperature when compensation is activated
Outs air tmp end	Outdoor air temperature when the max (summer) or min (winter) fan setpoint is achieved
Delta	Setpoint change in % E.g. in airflow regulation and summer compensation: Fan setpoint start = 500 l/s Outdoor air temp start = 20 degrees Outdoor air temp end = 30 degrees Delta = 20% Fan setpoint end (at 30 degrees) = 600 l/s

8.3. Adjustment of temperature setpoint in case of high/low outdoor air temperatures

Start page > Main menu > Configuration > Configuration 2 > Su/Wi comp tmp

Parameter	Function
No	Function deactivated
Yes	Function activated

After making a change in a configuration menu, RESTART.

Start page > Main menu > Configuration > Configuration 2 > Restart required! > Execute

RESTART

8.4. Parameter settings for temperature compensation

**Start page > Main menu > Unit > Main setpoint > All settings > Settings tmp ctrl > Tmp setpoints
>Act summer comp tmp
>Act winter comp tmp**

Parameter	Function
Outs air tmp start	Outdoor temperature when compensation is activated
Outs air tmp end	Outdoor air temperature when the max (summer) or min (winter) Fan setpoint is achieved
Delta	Setpoint change in degrees. E.g. in case of temperature regulation and summer compensation: Temperature setpoint start (at 20 degrees) = 22 degrees Outdoor air temp start = 20 degrees Outdoor air temp end = 30 degrees Delta = -5 degrees Temperature setpoint end (at 30 degrees) = 17 degrees

8.5. Settings switch between summer/winter operation

Switches between extract air regulation in summer and supply air regulation in winter. The function can be switched via three different factors, physical input, date or outdoor air temperature

> 🔑 **Start page > Main menu > Configuration > Configuration 1 > Tmp control mode**

Parameter	Function
ExSplyCSu	Extract air regulation in summer and supply air in winter
RmSplyCSu	Room regulation in summer and supply air in winter. **NB.** Requires room sensor as external accessory

8.6. Switch between summer/winter via physical input

> 🔑 **Start page > Main menu > Configuration > Configuration 1 > Su/Wi input**

Parameter	Function
No	Function deactivated
Yes	Switches between summer/winter operation. 1 = summer & 0 = winter

After making a change in a configuration menu, RESTART.

> 🔑 **Start page > Main menu > Configuration > Configuration 1 > Restart required! > Execute**

> ↻ **RESTART**

A physical input must then be connected to the function. There are different inputs to choose between, fire damper reset (fire damper is installed) and external speed control. If fire damper reset is activated, the speed control input is used, and vice versa.

> 🔑 **Start page > Main menu > Configuration > Configuration IOs > Digital inputs > Su/Wi input**

Block no.	Function
P12-32	Signal earth G0
P12-34	D1 Used in case of fire damper reset
P12-35	D4 Used in case of external speed control

Parameter	Function
D1	Used in case of fire damper reset
D4	Used if you have speed 3 via external speed control

If D1 Is selected, the external speed control function must be deactivated. This is done via the following search path.

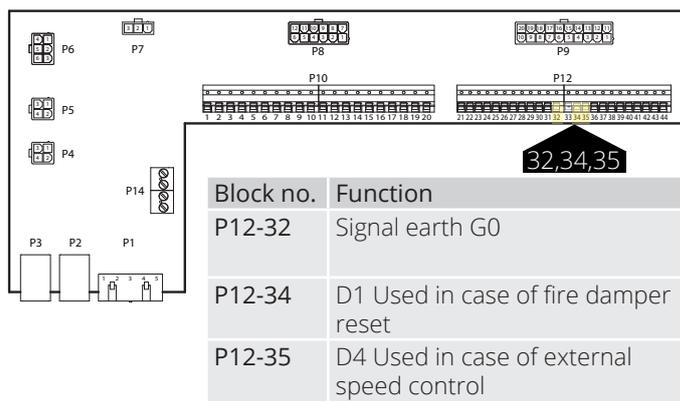> 🔑 **Start page > Main menu > Configuration > Configuration 1 >Ext control input > Two**

Ater making a change in a configuration menu, RESTART.

> 🔑 **Start page > Main menu > Configuration > Configuration 1 > Restart required! > Execute**

> ↻ **RESTART**

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8.7. Switch between summer/winter via date/outdoor air temperature

🔑 **Start page > Main menu > Global functions > State**

Parameter		Function
Status		Display of current operating status
SuWi setting	None	No limitations
	NoHeatSu	No heating in summer state
	NoCoolWi	No cooling in winter state
	Both	No heating in summer state and no cooling in winter state
Outs air tmp damped		Average outdoor air temperature over given time constant
Summer date time		Date/time for switching to summer operation. If * is indicated instead of date/time, the switch is to Outdoor air temp. moderated
Winter date time		Date/time for switching to winter operation. If * is indicated instead of date/time, the switch is to Outdoor air temp. suppressed
Time constant		Time constant for calculating Outdoor air temp. moderated. Set to 0 for 10 seconds to reset moderated outdoor air temperature. Set constantly to 0 for switching to current outdoor air temperature
Outs air tmp summer		Outdoor air temperature for switching to summer operation
Outs air tmp winter		Outdoor air temperature for switching to winter operation

> EXAMPLE
Outdoor air temp. moderated=shows average temperature over the last X hours (24 in this case)
Date/Time summer=*
Date/Time winter=*
Time constant=24
Outdoor air temp. Summer=15
Outdoor air temp. Winter=10
If average temperature is over 15 degrees for 24 hours, the control system switches to summer operation. If the average temperature is under 12 degrees for 24 hours, the control system switches to winter operation. If date and time are shown instead, this will override the temperature settings and the control system will switch to date/time instead.

8.8. Free cooling

Night cooling works so that the unit can start and run at night to cool down the room. Configure as follows:

🔑 **Start page > Main menu > Configuration > Configuration 2 > Free cooling**

Parameter	Function
No	Free cooling deactivated
12 hours	Starts at least 12 hours before the next operating period
9 hours	Starts at least 9 hours before the next operating period
6 hours	Starts at least 6 hours before the next operating period
3 hours	Starts at least 3 hours before the next operating period
Always	Can be started at any time

🔑 **Start page > Main menu > Configuration > Configuration 2 > Free cooling > Fan step**

1	The fans run at step 1 during nighttime cooling
2	The fans run at step 2 during nighttime cooling
3	The fans run at step 3 during nighttime cooling

🔑 **Start page > Main menu > Configuration > Configuration 2 > Restart required! > Execute**

🔄 RESTART

🔑 **Start page > Main menu > Unit > Operating mode > Free cooling**

Parameter	Function
Room tmp setpoint	Shows the current setpoint for room/extract air (only shown when supply air regulation is configured)
Hysteresis	Hysteresis for power on (Power on = Setpoint room + Hysteresis).
Delta	Minimum difference between room/extract air and outdoor air temperature
Min outs tmp	Minimum permitted outdoor air temp for activating nighttime cooling
Min run time	Function deactivated
Fan step	Which fan step will be needed for nighttime cooling

8.9. Support operation

Nighttime support operation prevents the building from overheating or overcooling. This is regulated via a separate setpoint for heating and cooling.
The temperature test starts the unit after a long period of inactivity in order to update the duct sensor temperature. This temperature is used as a criterion for starting free cooling or support operation, and must always be kept updated.

The function is activated automatically when the following conditions are met:

8.9.1. To activate the function

🔑 **Start page > Main menu > Configuration > Configuration 2 > Tmp start**

Parameter	Function
No	Function deactivated
Htg	Function activated for heating
Clg	Function activated for cooling
Htg+Clg	Function activated for both heating and cooling

After making a change in a configuration menu, RESTART

🔑 **Start page > Main menu > Configuration > Configuration 2 > Restart required! > Execute**

↻ **RESTART**

8.9.2. To configure the function

🔑 **Start page > Main menu > Unit > Operating mode > Tmp start**

Parameter	Function
Start stpt cooling	Start temperature for cooling, extract air > Start cooling
Cooling set-point	Supply air setpoint when support operation cooling is activated
Start stpt heating	Start temperature for heating, extract air > Start cooling
Heating set-point	Supply air setpoint when support operation Heating is activated
Hysteresis	Hysteresis for power off: In case of cooling: Extract air< Start cooling - Hysteresis In case of heating: Extract air> Start Heating+ Hysteresis
Minimum off time	Shortest power off time after activation of heating or cooling
Min run time	Shortest cycle time after start
Fan step	Which fan step will be needed for support operation

> EXAMPLE SUPPORT OPERATION COOLING
Start stpt cooling = 25 degrees
Cooling setpoint = 16 degrees
Hysteresis = 3 degrees
Minimum off time = 30 min
Min run time = 15 min
A temperature test is performed and the extract air is 26 degrees. The unit then goes into support operation cooling and regulates the supply air to 16 degrees. The unit stops when the extract air has dropped to 22 degrees (Start cooling – Hysteresis), but no earlier than 15 mins. Support operation starts again no earlier than 30 mins after the last stop.

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8.10. Temperature test for free cooling operation

The function is used when room sensors are installed. The unit then starts up as usual to sense the temperature in the exhaust air. Used to determine whether the unit should continue in night cooling / support mode or not.

Night cooling or support operation must be activated to be able to run temperature tests. See 8.9 or 8.10 to activate the function.

Start page > Main menu > Configuration > Configuration 2 > Free cooling

Start page > Main menu > Configuration > Configuration 2 > +Tmp start

After making a change in a configuration menu, RESTART

Start page > Main menu > Configuration > Configuration 2 > Restart required! > Execute

RESTART

To allow free cooling or support operation, the unit must start up and detect the temperatures. This is configured under:

Configure as follows:

Start page > Main Menu > Unit > Operating mode > Fan-Kick exh tmp

Parameter	Function
Kick time	Time for temperature test
Interval time	How often the temperature test is to be carried out
On time	Operating time for temperature test, **NB.** Not less than 180 seconds.

> EXAMPLE FREE COOLING OPERATION TEMP TEST
Kick time = 23:00
Interval time = 3
On time = 300
The unit is turned on for 300 seconds if it has been turned off for at least 3 hours since 23:00
NB. Exercise time = 24:60 and interval time = 0.0 = no temperature test carried out.

>EXAMPLE NIGHTTIME COOLING
Setpoint room = 22
Hysteresis = 2
Delta = 5
Min outdoor air temp = 10
Min cycle time = 30
A temperature test is performed and the room/extract air is > 24 degrees and the outdoor air temperature between 10 and 17 degrees. The unit starts and stops only when the room/extract air is 22 degrees and at least 30 mins have passed since startup.

CS2500

9. Fan regulation

9.1. Select method of regulation

9.1.1. Selection fan regulation method

All fan regulation functions are selected under the menu option:

> **Start page > Main menu > Configuration > Configuration 1 > Fan control mode**

9.1.2. Flow regulation

'Flow regulation' is selected by default. This means that the fans will regulate according to the set airflow in the control system. E.g. l/s or m³/h.

NB. The options 'Direct' and 'Dir. fro' must not be used!

9.1.3. Fixed speed

This means that the fans will regulate according to the set percentage in the control system. E.g. 50%

> **Start page > Main menu > Configuration > Configuration 1 > Restart required! > Execute**
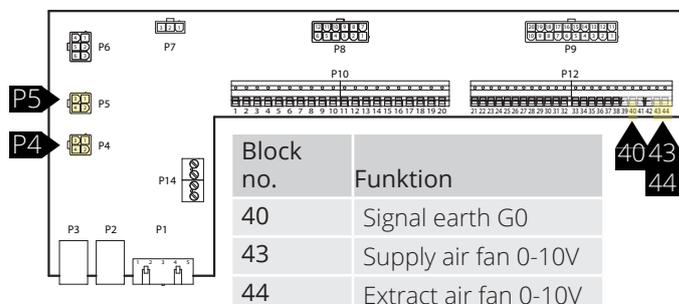
🔄 **RESTART**

Set parameters in the menu option:

> **Start page > Quick menu > Setup > Setpoints/Settings**

Parameter	Function Mengderegulering	Function Fast frekvens
Sply fan st 1 stpt	Airflow l/s or m³/h supply air fan step 1	Speed in % supply air fan step 1
Sply fan st 2 stpt	Airflow l/s or m³/h supply air fan step 1	Speed in % supply air fan step 1
Sply fan st 3 stpt	Airflow l/s or m³/h supply air fan step 1	Speed in % supply air fan step 1
Extr fan st 1 stpt	Airflow l/s or m³/h supply air fan step 1	Speed in % supply air fan step 1
Extr fan st 2 stpt	Airflow l/s or m³/h supply air fan step 1	Speed in % supply air fan step 1
Extr fan st 3 stpt	Airflow l/s or m³/h supply air fan step 1	Speed in % supply air fan step 1

9.2. Pressure control

Before selecting pressure control, one or two pressure sensors must be mounted and connected to the unit. If pressure sensors from Flexit are used, these must be connected to P5 and P4, see accessories manual. When using other makes, these should be connected to Block P12, see table.

Block no.	Funktion
40	Signal earth G0
43	Supply air fan 0-10V
44	Extract air fan 0-10V

Then go in via the control panel to configure the system for pressure control.

> **Start page > Main menu > Configuration > Configuration 1 > Fan control mode**

Parameter	Function
Pressure	Requires two pressure sensors. The fans regulate individually towards their own setpoints
SplySlave	Requires one pressure sensor on the extract air fan. The supply air fan follows the extract air fan with an adjustable slave offset
ExtrSlave	Requires one pressure sensor on the supply air fan. The extract air fan follows the supply air fan with an adjustable slave offset

After making a change in a configuration menu, RESTART.

> **Start page > Main menu > Configuration > Configuration 1 > Restart required! > Execute**

🔄 **RESTART**

9.2.1. Configuration of measurement ranges in pressure sensors

> **Start page > Main menu > Configuration > Configuration IOs > Pressures / flows > Supply air pressure**

Parameter		Function
X7	500Pa	X7 = Physical input (must not be changed). 500Pa = Max set value of connected pressure sensor.
Type	0-10V	Type of signal. Must not be changed.

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![FLEXIT]

Parameter		Function
X8	500Pa	X8 = Physical input (must not be changed). 500Pa = Max set value of connected pressure sensor.
Type	0-10V	Type of signal. Must not be changed.

Setpoint adjustment of pressure.

If Supply Fan or Extract Fan are selected as slaves, only three setpoint steps will be shown.

Parameter	Function
Sply fan st 1 stpt	Setpoint supply air fan speed 1 i Pa
Sply fan st 2 stpt	Setpoint supply air fan speed 2 i Pa
Sply fan st 3 stpt	Setpoint supply air fan speed 3 i Pa
Extr fan st 1 stpt	Setpoint extract air fan speed 1 i Pa
Extr fan st 2 stpt	Setpoint extract air fan speed 2 i Pa
Extr fan st 3 stpt	Setpoint extract air fan speed 3 i Pa

When selecting Supply Fan slave or Extract Fan slave for the fan regulation type, an offset must be set for the selected fan to regulate towards. Supply/extract air fans are pressure regulated. The supply/extract airflow is calculated and regulated towards the slave offset, see e.g.

Explanation:

The offset indicates the difference between the master fan and the slave fan.

> EXAMPLE OFFSET	
Ex 1.	If the offset is 0 l/s, the slave fan will operate with the same airflow as the master fan.
Ex 2.	If the offset is -100 l/s, the slave fan will operate with an airflow 100 l/s less than the master fan.
Ex 3.	If the offset is 100 l/s, the slave fan will operate with an airflow 100 l/s higher than the master fan.

After setting the offset, it may be necessary to adjust the alarm limit for airflow deviations and the acceleration amplification factor on the fan.

9.3.   External setpoint fan

The fans can be controlled directly via an analogue 0-10V input on the control system. A min and max speed/airflow are defined corresponding to 0 and 10V on the input.

Block no.	Function
40	Signal earth G0
43	Supply air fan 0-10V
44	Extract air fan 0-10V
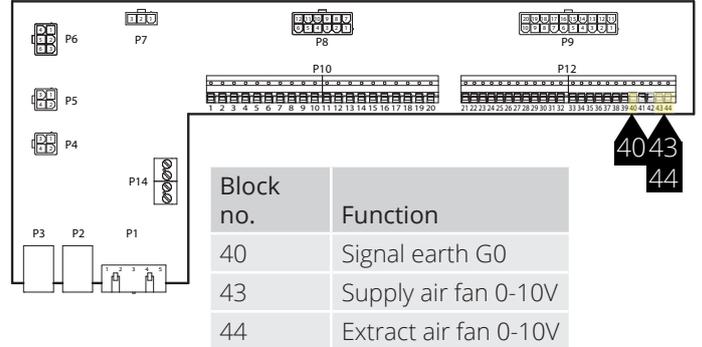
Activated via the following menu choice:

Parameter	Function
No	Not activated:
Supply	External control of supply air fan
Extract	External control of extract air fan
Sply+Extr	External control of both supply air and extract air fans

After making a change in a configuration menu, RESTART.

RESTART

The function has two operating modes:
1. Relative   A basic airflow via steps 1, 2 or 3 for fan operation + relative
2. Absolute   The fan is controlled solely by the 0-10V input and steps 1, 2 and 3 become inactive.

After making a change in a configuration menu, RESTART.

Start page > Main menu > Configuration > Configuration IOs > Restart required! > Execute

RESTART

Start page > Main menu > Configuration > Configuration 2 > Ext stpt funct.Sply Ext stpt funct.Exh

Parameter	Function
Relative	Example of relative. Relative is set to 0V = 0l/s and 10V = 500l/s Step 1 is set to 100 l/s and the input for external setpoint is 0V. The fan will run at 100 l/s Step 2 is set to 300 l/s and the input for external setpoint is 10V. The fan will run at 800 l/s
Absolute	Example of Absolute. Absolute is set to 0V = 100l/s and 10V = 1000l/s The input for external setpoint is 0V. The fan will run at 100 l/s The input for external setpoint is 5V. The fan will run at 500l/s

After making a change in a configuration menu, RESTART.

Start page > Main menu > Configuration > Configuration 2 > Restart required! > Execute

RESTART

After the restart, the unit starts with an alarm: "External setpoint Supply Fan + Extract Fan conf. error" This means that one or two physical inputs need to be defined for the function.
This is done via:

Start page > Main menu > Configuration > Configuration IOs > Other > Ext. setp. SplyFan

Parameter	Function
X7	Defines which input the function should be connected to

Start page > Main menu > Configuration > Configuration IOs > Other > Exh.fan Ext. Setp

Parameter	Function
X8	Defines which input the function should be connected to

9.3.1. Parameter settings for Comp.

**Start page > Quick menu > Setup > Setpoints/Settings > All settings > Fan control > Supply fan/Extract fan**

Parameter	Function
Act supply stpt Act extract stpt	Shows the current setpoint for the supply air/extract air fan, including compensation
Stage 1	Setpoint supply air/extract air fan speed 1
Stage 2	Setpoint supply air/extract air fan speed 2
Stage 3	Setpoint supply air/extract air fan speed 3
Ext stpt curve Y1 - Present value	Scaling of 0-10V signal, speed/airflow at 0V
Ext stpt curve Y2 - Present value	Scaling of 0-10V signal, speed/airflow at 10V
External setpoint Supl.fan Exh.fan	Shows the current setpoint for the 0 -10V input

9.3.2. Parameter settings for Main

Start page > Quick menu > Setpoints/ Settings > All settings > Fan control > Supply air fan/Extract air fan

Parameter	Function
Act supply stpt Act extract stpt	Shows the current setpoint for the Supply air/Extract air fans
Stage 1	Not active
Stage 2	Not active
Stage 3	Not active
Ext stpt curve Y1 - Present value	Scaling of 0-10V signal, speed/airflow at 0V
Ext stpt curve Y2 - Present value	Scaling of 0-10V signal, speed/airflow at 10V
External setpoint Supl.fan Exh.fan	Shows the current setpoint for the 0 -10V input

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9.4.   External fan control via digital inputs
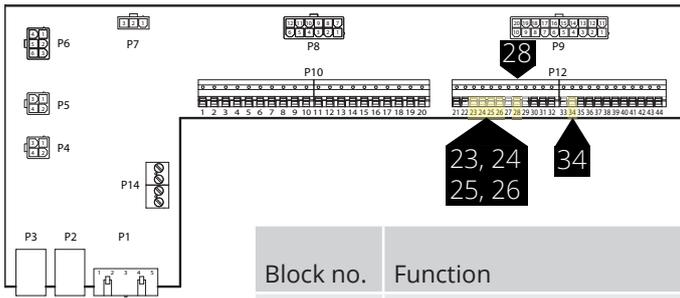
Block no.	Function
23	Eksternstyring 1 (DI)
24	Eksternstyring 1 (G0)
25	Eksternstyring 2 (DI)
26	Eksternstyring 2 (G0)
28	Eksternstyring 3 (G0)
34	Eksternstyring 3 (DI)

Connection of signal(s) for controlling fan speeds from external components. It is possible to connect various types of switch/sensor that have pulsed or fixed positions. By default the regulator is set for switches with fixed values.

Parameter	
External control 1	ON = Speed 1
External control 2	ON = Speed 2
External control 3	ON = Speed 3
External control 1	ON = Stop

9.5.   Fire fan

The unit has a potential-free output for controlling an external fire fan. This requires the installation of an SP90 expansion module.

10. Connection of external equipment

10.1. Fire damper

The unit is able to control and exercise fire dampers. Fire dampers can be included in the unit control; either via autotest or always open. Monitoring of defined end positions is carried out. The current status and operating mode of the fire damper is displayed.

To activate the function.

🔑 **Start page > Main menu > Configuration > Configuration 1 > Fire damper**

Parameter	Function
No	Function deactivated
Yes	Function activated The fire damper will remain open even when the unit has stopped.
FollowUnit	Function activated The fire damper is opened when the unit starts and closed when the unit stops.
2-4	Not used
2-4+FollUnit	Not used

After making a change, a restart must be carried out.

🔑 **Start page > Main menu > Configuration > Configuration 1 > Restart required! > Execute**

↻ **RESTART**

Continue configuring the fire damper feedback.

🔑 **Start page > Main menu > Configuration > Configuration 2 > Fire damper fdbk**

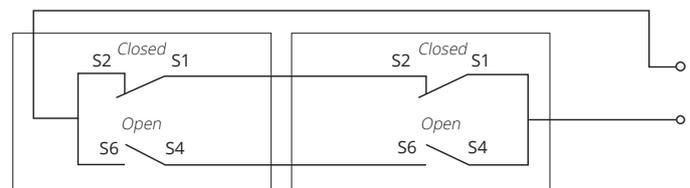| Parameter	Function
Closed	Only one reset for closed damper with NC input
Clsd+Opnd	Not used
Combined	Resets for open and closed position, but only one signal/input with a sequence as follows: 1 (closed) ---> 0 (closes/opens) ---> 1 (open)
Clsd.Inv	Only one reset for closed damper with NO Invert input

After making a change in a configuration menu, RESTART.

🔑 **Start page > Main menu > Configuration > Configuration 2 > Restart required! > Execute**

↻ **RESTART**

Block no.	Funktion
P10-1/9	L power supply to relay contact, Jumper between P10-1 and P10-9 to get 230V to P10-10 during operation
P10-10	L1 (Fire damper ON/OFF)
P10-2	N (Fire damper)
P12-35	Fire damper reset [DI]
P12-32	Fire damper reset REF (24VAC)

Example of connection description for fire damper indication with combined signal for open and closed.

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Fire dampers can be included in the unit control;

> **Start page > Main menu > Unit > Damper control > Fire damper cmd**

Parameter	Value	Function
Operation	Off	Current status for outdoor air damper.
	On	Go to page for all settings of digital outputs.
Feedback opened Feedback closed	OK	Active reset if the damper is closed. This must always be set.
	1 / 2 / 3 /4 + all possible combinations	The numbers indicate which damper has an error. There is only an input for one damper in the control system.
State	N/A	Only possible during configuration
	Closed	Closed
	Cl/Op	Closes/opens.
	Open	Open See example below
Mode	N/A	Only possible during configuration
	OK	OK
	Test	Test mode.
	Alarm	Alarm mode
Opening time	1...600 [s]	Time for damper opening (see product sheet for damper actuator).
Closing time	1...600 [s]	Time for damper closing (see product sheet for damper actuator).
Start manual test	Passive Active	Activate fire damper test manually.
Auto test date/ time	Time, Day of week, Date	Time of automatic start of damper test The autotest is deactivated for Configuration 1 > Fire damper = Yes+FollUnit See example below
Auto test interval	0...36000 [h]	Time interval for automatic damper test. See example below

> EXAMPLE DAMPER COMMAND 0 -> 1:	
When the damper has received a signal to start opening, the damper feedback must give an "open signal" within 15% of the set opening time.	Otherwise an alarm is triggered for lack of movement.
When the damper has received a signal to start opening, the damper feedback must give a "close signal" within 115% of the set opening time.	Otherwise a reset alarm is triggered for open position Damper command 1 -> 0.

> EXAMPLE DAMPER COMMAND 1 -> 0:	
When the damper has received a signal to start closing, the damper feedback must give an "open signal" within 15% of the set closing time.	Otherwise an alarm is triggered for lack of movement.
When the damper has received a signal to start closing, the damper feedback must give a "close signal" within 15% of the set opening time.	Otherwise a reset alarm is triggered for open position Damper command 1 -> 0.

Automatic testing can be carried out at a certain time (day, time) and/or at a certain interval.

> EXAMPLE TEST INTERVAL:	
Auto test date/time = *.* *,*.* / Auto test interval = 24	The test is performed every 24 hours, whatever the time of day.
Auto test date/time = 23.* Mo,*.* / Auto test interval = 47 h	The test is performed every month at 23:00, with the previous test having been held at least 47 hours previously.
Auto test date/time = *.* *,*:* and Auto test interval = 0	No automatic test is carried out. Test sequence = 1

Test mode: The entire aggregate stops. After the period Deferral delay. the outdoor air and exhaust air dampers are closed and fire damper tests are initiated.

The test is run according to the above example of damper maneuver. If everything works as intended, the unit will start up again. Otherwise, the unit continues to stop and an alarm on an incorrect fire damper is activated.

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10.2. Fire/smoke detector

⊶ **Start page > Main menu > Configuration > Configuration 1 > Fire alarm**

Parameter	Function
No	No fire alarm
Alarm	External fire alarm such as smoke detectors, thermostat, fire alarm control centre, etc.
Tmp	Internal fire alarm via measurement of normal supply air and extract air temperature when both sensors are accessible. A fire alarm is triggered when one of the two temperatures reaches a specific value.
Alarm+Tmp	Both fire alarms.

After making a change in a configuration menu, RESTART.

⊶ **Start page > Main menu > Configuration > Configuration 1 > Restart required! > Execute**

↺ **RESTART**

On choice of Tmp or Alarm+Tmp, the alarm limits for temperatures are configured as follows:

⊶ **Start page > Quick menu > Setup > Setpoints/Settings > All settings > Alarm limit set**

Parameter	Function
Supply tmp lim fire	Alarm limit too high supply air temperature.
Extract tmp lim fire	Alarm limit too high extract air temperature.

On choice of Tmp or Alarm+Tmp, the fan regulation is configured as follows.

⊶ **Start page > Main menu > Unit > Fan control> Firemode**

Parameter	Function
Stop	The fans stop in case of fire.
Run Sply	The Supply air fan runs at max. set step, the Extract air fan stops.
Run Exh	The Extract air fan runs at max. set step, the Supply air fan stops.
Run both	Both fans run at the max set step.

Block-nr.	Function
27	Fire/smoke [DI]
32	Fire/smoke +24VDC
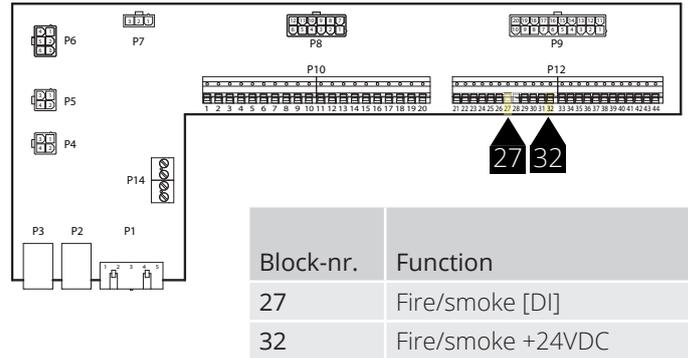
The input is normally open (NO) and triggers an alarm when closed. This can be reconfigured to normally closed (NC) via:

⊶ **Start page > Main menu > Unit > Inputs > Fire > Contact function**

Parameter	Function
NO	Normally open - triggers alarm if input is closed.
NC	Normally closed - triggers alarm if input is opened

10.3. Air quality

Fans (see Fan compensation) are regulated by air quality. The outdoor air volume increases when the carbon dioxide content exceeds a certain value (fan speed increases and the circulation volume decreases if a bypass damper has been installed). The outdoor air volume goes down when the carbon monoxide content exceeds the set value (fan speed decreases and circulation volume goes up).

> **Start page > Main menu > Configuration > Configuration 2 > Fan comp air qual = Yes**

After making a change in a configuration menu, RESTART.

> **Start page > Main menu > Configuration > Configuration 2 > Restart required! > Execute**

RESTART

> **Start page > Main menu > Unit > Air quality control**

Parameter	Value	Function
Controller	0...100[%]	Current regulator value. Go to page for regulator settings.
Function	The output signal must be selected according to the actual need:	
	Normal	Normal for CO_2
	Inverted	Inverted for carbon monoxide.
Setpoint	0...3000 [ppm]	Setpoint for air quality regulation.

Scaling of CO_2 sensor.

> **Start page > Main menu > Configuration > Configuration IOs > Other > Air quality sensor**

Parameter	Value	Function
Air quality sensor	X4	This is the physical input on the regulator and must not be changed.
Scale	2000 ppm	This is the upper limit on the CO_2 sensor. At 10V on the output.
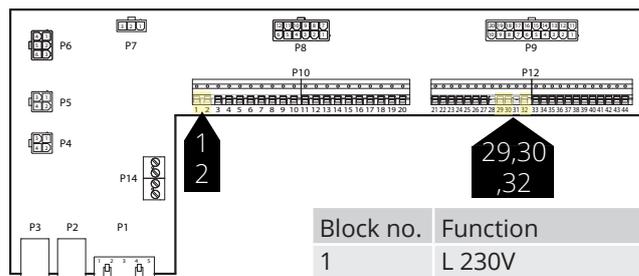
Block no.	Function
1	L 230V
2	N 230V
29	(0-10V)
30	(G0)
32	24VAC

Parameter

The setpoint is set to 800 ppm and the CO_2 sensor detects an actual value of 1000 ppm. The unit then switches up to the speed with the highest set setpoint and operates at that speed until the CO_2 sensor detects an actual value below 800 ppm., when it switches down to the speed set for the current time channel.

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10.4. AUX Damper

The output signal is affected by the speed at which the ventilation unit is operating. The function can be used, e.g., to open a damper when the unit switches to a higher speed. The function must be activated in the control system. This is done via the following menu option.

> **Start page > Main menu > Configuration > Configuration 2**

| Parameter	Value	Function
Aux Analog outp	No	Analogue aux. output that generates a 0-10V signal, depending on current fan step.
	Fan	Output signals can be set for each fan step. E.g. 10% at step 1 and 60% at step 2.
	AdjDiscrg	The output signal will depend on the difference between the supply air temp and the room temp. The setting will determine the difference which will result in 0V and 10V. E.g., Supply air temp-room temp = 5 degrees gives a 7V output signal.

After making a change in a configuration menu, RESTART

> **Start page > Main menu > Configuration > Configuration 2 > Restart**

> ↻ **RESTART**

> **Start page > Main menu > Unit > Auxiliary**

Parameter	Function
Fan step 0	Aux. output signal for unit shutdown (also in case of unit malfunction).
Fan step 1	Aux. output signal for active fan step 1 (setpoint 1 for regulated fans).
Fan step 2	Aux. output signal for active fan step 2 (setpoint 2 for regulated fans).
Fan step 3	Aux. output signal for active fan step 3 (setpoint 3 for regulated fans).
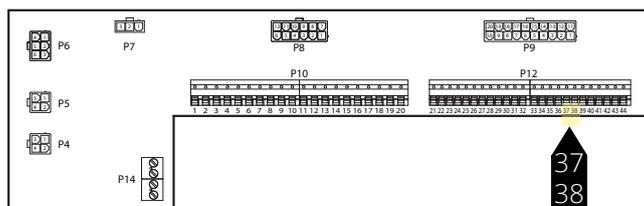
Block no.	Function
37	(0-10V)
38	(G0)

10.5. AUX operating mode indicator

The function of the digital output can be selected. By default, this is the buzzer alarm, but other functions can be selected. See table.

> **Start page > Main menu > Configuration > Configuration 1 > Alarm outputs = None**
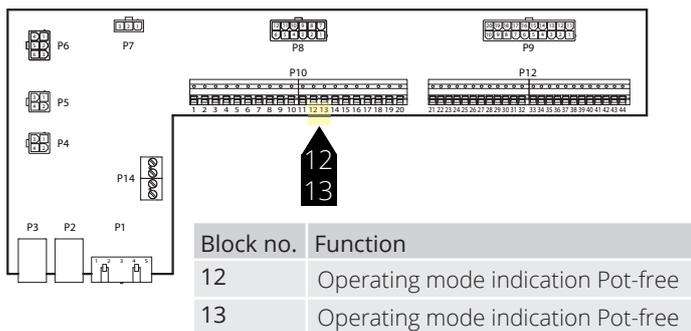
> **Start page > Main menu > Configuration > Configuration 2 > Aux. operating mode starts > Yes**

> **Start page > Main menu > Configuration > Configuration 2 > Restart**
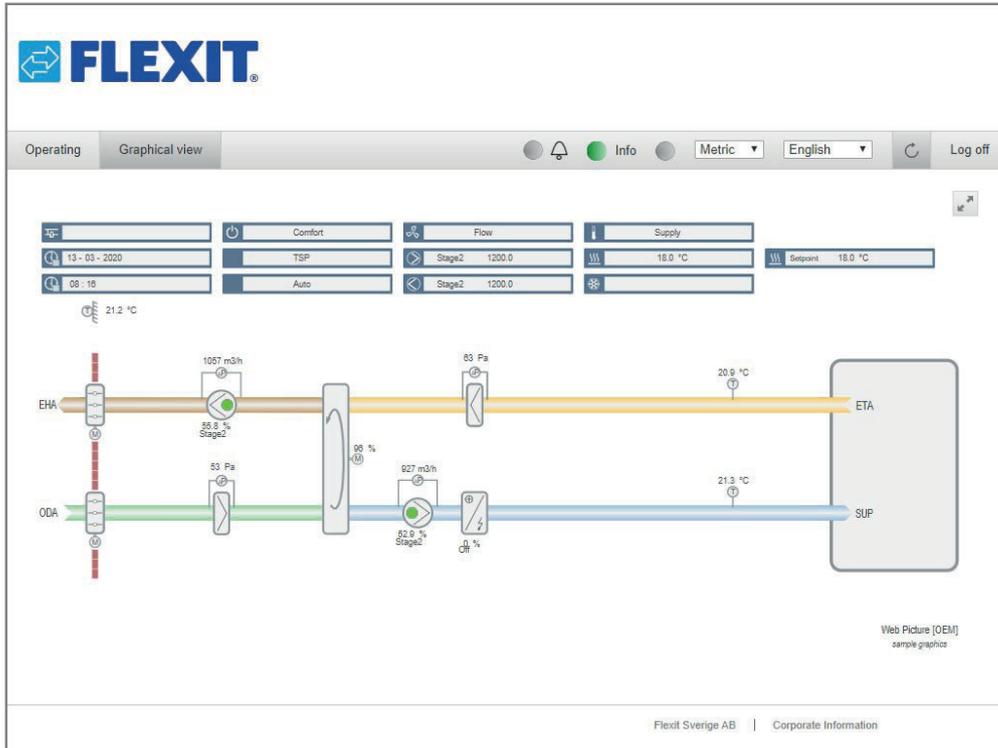
> **Start page > Main menu > Configuration > Configuration IOs > Outputs auxiliary > Aux op mode ind DO = Q1**

> **Start page > Main menu > Unit > Auxiliary > Operating mode indic. selection**

Step	Measure
Off	System switched off.
On/comfort	The unit is switched on or comfort operation.
Economy	Economy operation
Manual:	Manual control activated.
Osstp	Optimum start activated optimisation function).
Nighttime cooling	Nighttime cooling activated.
Support operation	Support operation activated.
Test temp	Temperature test activated.
Damper exercise	Fire damper test activated.
Fire	Fire alarm activated; the system is in fire alarm mode.
Stop	The unit has stopped and has been blocked.
Operation	The unit is in operation (Supply air/Co/Ec/Osstp/Nighttime cooling/Support operation/TestTemp/Startup).
Full heating	Hot water or electric heating register with 100% capacity.
Full recovery	Heating recovery (plate, rotary, water heat exchanger) with 100% capacity.
Full cooling	Cooling with 100% capacity.
Summer	Indicates that the control system is in summer operation.
Winter	Indicates that the control system is in winter operation.
Heating requirements	Indicates that the control system has a requirement for heating (both rotor and/or heating).
Normal operation	Indicates that the control system is in normal operation, no alarms or overrides.

Block no.	Function
12	Operating mode indication Pot-free
13	Operating mode indication Pot-free

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11. Internet

The unit can be controlled via the Internet. This is done by joining the regulator to a network. This is then connected by entering the regulator's IP address into a computer web browser.

To configure the function, access the following:

> **Start page > Main menu > Communication overview > IP-Config > DHCP**

Parameter	Function
Active	The regulator is assigned an IP address from the network.
Passive	A fixed IP address is entered in the regulator.

Information on other settings in the communications menu can be obtained from personnel with network responsibility.

After making a change in a configuration menu, RESTART.

> **Start page > Main menu > Communication overiview > IP-Config. > Restart**

⟳ **RESTART**

After restart, go into:

> **Start page > Main menu > Communication > IP-Config.**

and note **Current IP.**

Open the web browser on a computer connected to the same local network as the unit and enter the IP number in the address field. To log into the web page, use the following information.

Username: ADMIN
Password: SBTAdmin!

Then enter the password 2000 to access the regulator.

12. ModBus TCP/IP & RS485

The unit can be controlled via ModBus, either via TCP/IP or RS485 (RTU) as a standard function in the regulator.

To configure the TCP/IP function, access the following:

> **Start page > Main menu > Communication > IP-Config > DHCP**

Parameter	Function
Active	The regulator is assigned an IP address from the network.
Passive	A fixed IP address is entered in the regulator.

Information on other settings in the communications menu can be obtained from personnel with network responsibility.
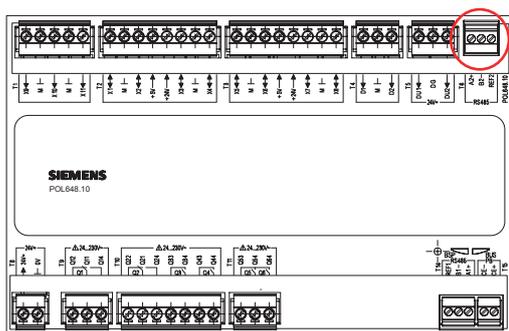
After making a change, a restart must be carried out.

> **Start page > Main menu > Communication overview > IP-Config > Restart**

> **RESTART**

> **Start page > Main menu > Communication > IP-Config.**

and note **Current IP.**

The ModBus parameter list is available for downloading on www.flexit.com

To configure RS485 (RTU), access the following:

> **Start page > Main menu > Communication > ModBus RTU (RS485)**

Parameter	Function
Slave address	Select slave address (1…247): Enter the corresponding ModBus slave address
+RS485:1	Used internally.

Parameter	Function
+RS485:2	Enter the output for the regulator
Baud rate	Select transfer speed:
Parity	Select parity: No, even or odd parity
Stop bit	Select stop bits: One or two stop bits
Delay	Delay between question sent and bus reply
Response timeout	Select response timeout: Settings access time for master Master must provide read access within this period, otherwise an alarm is triggered
Unit alarm	What type of alarm
Alarm address	Which slave issues the alarm

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13. DX heating/cooling

The control system is able to control a heat pump for heating and cooling, which is connected to a ducted coil. It can be used both as a free-standing unit or in sequence beforehand with the internal electric coil, which can then be used as peak heating and/or as reserve heating while the heat pump is defrosting.

For the function to operate, I/O module SP90 must be installed and configured. See accessories manual

If you wish to use the internal electric-powered coils, these must be installed/configured as shown in the manual supplied with the coils.

13.1. Configuration of control system

Start page > Main menu > Configuration > Configuration 1 > Water Heating 2

Parameter	Function
Yes	Additional heating activated
+PreH Outside-Temp.	Additional heating with preheating based on outdoor air temperature. Analogue heating valve output.
+PreH Frost-Temp	Additional heating with preheating based on frost protection temperature.
ModBus	Switches between analogue output and Siemens ModBus valve

Select ´Yes´ to activate the function and then ´Ready´.

Start page > Main menu > Configuration > Configuration 1 > Cooling 2

Parameter	Function
Water	Additional cooling via 0-10V signal
DX 1step	Additional cooling Off/On 1 step
DX 2step	Additional cooling Off/On 2 step
DX 3step	Additional cooling Off/On 3 step
ModBus	Switches between analogue output and Siemens ModBus valve

Select ´Water´ and then Ready to activate the 0-10V output signal for the function.
After making a change in a configuration menu, RESTART.

Start page > Main menu > Configuration > Configuration 1 > Restart

RESTART

The unit will show an alarm on startup. This can be removed by the configuration shown further down.

Start page > Main menu > Configuration > Configuration 2 > Water Heating 2 pump

Parameter	Function
No	No Off/On signal to pump
Yes	Off/On signal to pump
Yes+Kick	Off/On signal to pump + exercise motion

Start page > Main menu > Configuration > Configuration 2 > HP Defrost

Select ´Yes´on both heating and cooling. Use to signal a heating/cooling requirement to the heating pump.

Start page > Main menu > Configuration > Configuration 2 > HP Defrost

Parameter	Function
No	Defrosting function deactivated
Yes	Defrosting function activated

Select ´Yes´. Used to lock the output signal to the heat pump and if necessary activate electric heating (if connected) when defrosting the heat pump.

Start page > Main menu > Configuration > Configuration 2 > Water heating 2 control

Parameter	Function
StandAlone	Regulation seeks its own temperature setpoint
Seq H-Heating2	Regulation uses the sequence electrical heating - heat pump
Seq Heating2-H	Regulation uses the sequence heat pump - electrical heating

Select ´Seq Heating2-H´ to force the regulation to operate using the sequence Heat pump first and electrical heating second.

Start page > Main menu > Configuration > Configuration 2 > Cooling 2 control

Parameter	Function
Standalone	Regulation seeks its own temperature setpoint
Sequence	Regulation uses the sequence before or after ordinary cooling regulation

Select ´Sequence´ to force the regulation to operate in sequence with heat recovery and heating.

> **Start page > Main menu > Configuration > Configuration 2 > Combi-coil**

Parameter	Function	
Combi-coil	Selection of coil function for both heating and cooling	
	Normal seq.	One coil for both heating and cooling
	Extra seq.	A coil which can be run as extra heating and extra cooling
	1Valve 1Pump	Coil with combined valve for regulating heating and cooling. One digital output for switching between heating and cooling.
	2Valves 1Pump	Coil with separate valves for regulating heating and cooling. One digital output for switching between heating and cooling
	Heat pump	Coil with three separate outputs, one analogue and two digital.
	DX Com	Heating pump connection via process bus
	Inv. valve	Analogue output signal inverted

Select ´Extra seq´ and then Ready to send the same signal (0-10V) to the heat pump for both heating and cooling.
After making a change in a configuration menu, RESTART.

> **Start page > Main menu > Configuration > Configuration 2 > Restart**

> RESTART

After restarting, an alarm will appear on the regulator requiring configuration of which input is connected to the heat pump defrosting function. This is done via:

> **Start page > Main menu > Configuration > Configuration IOs > Digital inputs > HP Defrost**

Parameter	Function
D4	Block P12-35

Select ´D4´ This will connect block P12-35 on the A2 circuit board to the function. The input is also used for resetting the fire damper. If both functions are used, contact Support to configure a new input.

For the output that alternates between heating and cooling to work, the pump output must be configured differently.
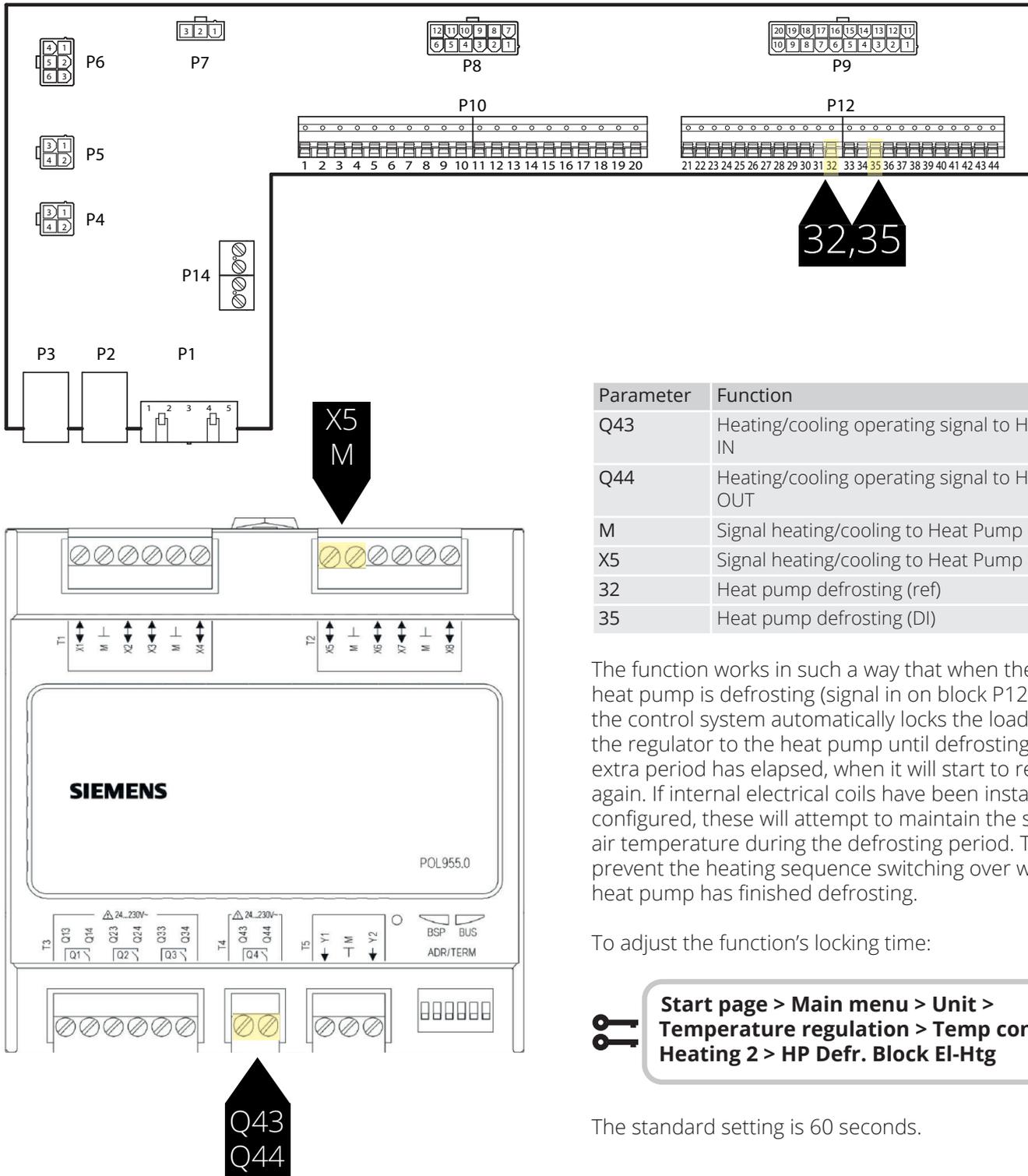
> **Start page > Main menu > Unit > Outputs > Heating 2 pump cmd > Contact function > NO/NC**

Set this to NO

> **Start page > Main menu > Unit > Outputs > Cooling 2 pump cmd > Contact function > NO/NC**

Set this to NC

13.2. Installation

Parameter	Function
Q43	Heating/cooling operating signal to Heat Pump IN
Q44	Heating/cooling operating signal to Heat Pump OUT
M	Signal heating/cooling to Heat Pump (G0)
X5	Signal heating/cooling to Heat Pump (0 -10V)
32	Heat pump defrosting (ref)
35	Heat pump defrosting (DI)

The function works in such a way that when the heat pump is defrosting (signal in on block P12-35), the control system automatically locks the load from the regulator to the heat pump until defrosting plus an extra period has elapsed, when it will start to regulate again. If internal electrical coils have been installed and configured, these will attempt to maintain the supply air temperature during the defrosting period. This is to prevent the heating sequence switching over when the heat pump has finished defrosting.

To adjust the function's locking time:

Start page > Main menu > Unit > Temperature regulation > Temp control > Heating 2 > HP Defr. Block El-Htg

The standard setting is 60 seconds.

14. Combi battery

The unit is able to control a combined liquid coil which is operated as heating coil in winter and a cooling coil in summer. Make sure that valves and pump and frost guard are connected as instructed below.

14.1. Installation

P3

B5

Heating/cooling

Art.no. 116493

Art.no. 117208

Starter 0-10V

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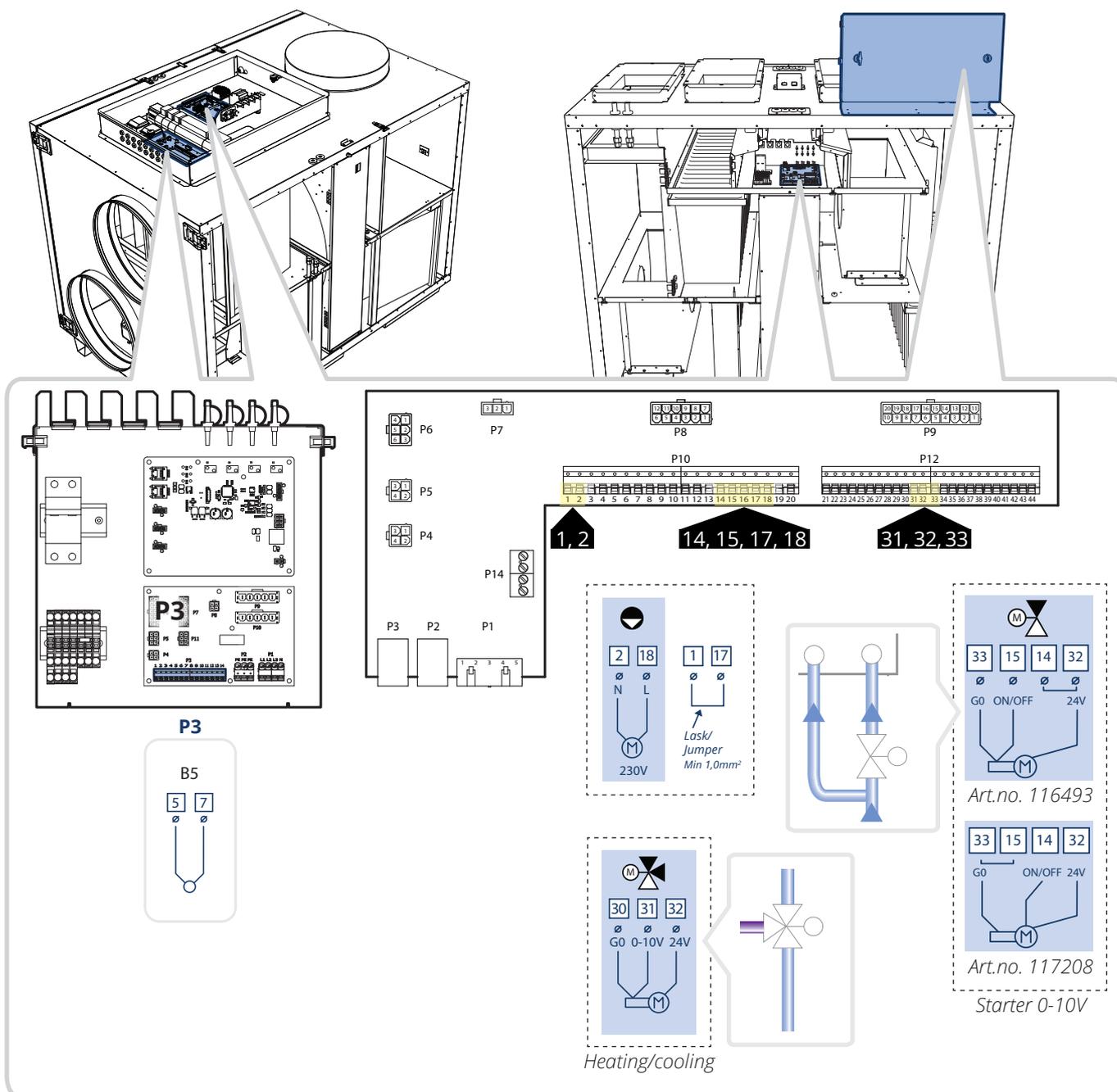
14.2. Configuration

Then go in via the control panel to configure the unit as described below.

Start page > Main menu > Configuration > Configuration 1 > Type of Heater

Parameter	Function
Water	Water heating without preheating coil

Start page > Main menu > Configuration > Configuration 1 > Cooling

Parameter	Function
Water	Analogue output for liquid cooling

Start page > Main menu > Configuration > Configuration 1 > Restart

RESTART

Then select for heating and cooling to operate in normal sequence, with a combined regulator valve for both heating and cooling.

Start page > Main menu > Configuration > Configuration 2 > Combi coil

Parameter	Function
1 Active	One coil for both heating and cooling
1Vlv 1Pu	Coil with combined valve for regulating heating and cooling. One digital output for switching between heating and cooling.

Start page > Main menu > Configuration > Configuration 2 > Restart

RESTART

To set the valve switching between heating and cooling operation.

Start page > Main menu > Configuration > Configuration 2 > Aux. operating mode starts > Yes

Start page > Main menu > Configuration > Configuration > Restart

Start page > Main menu > Unit > Auxiliary > Op mode outp select

Parameter	Function
Summer	Output to valve 2 (switches between heating and cooling) activated when the unit enters summer operation.
Winter	Output to valve 2 (switches between heating and cooling) activated when the unit enters winter operation.

Other settings between summer and winter operation, see Sections 8.6 and 8.7.

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