GB

EXcon Instructions

VEX4000 Automatic



Original instructions

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EXHAUSTO

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1. Product information

Symbols and terms

Prohibition symbol

Failure to observe instructions marked with a prohibition symbol may result in serious or fatal injury.

Danger symbol

Failure to observe instructions marked with a danger symbol may result in personal injury and/or damage to the unit.

Concepts

These instructions use the following names for airflows as specified in DS447-2013:

- Supply air
- Extract air
- Outdoor air
- Exhaust air
- Recirculation

Scope of the instruction manual

This instruction manual is for use with EXHAUSTO VEX-type air handling units, hereinafter called EXcon. Please refer to the product instructions regarding accessories and extra equipment.

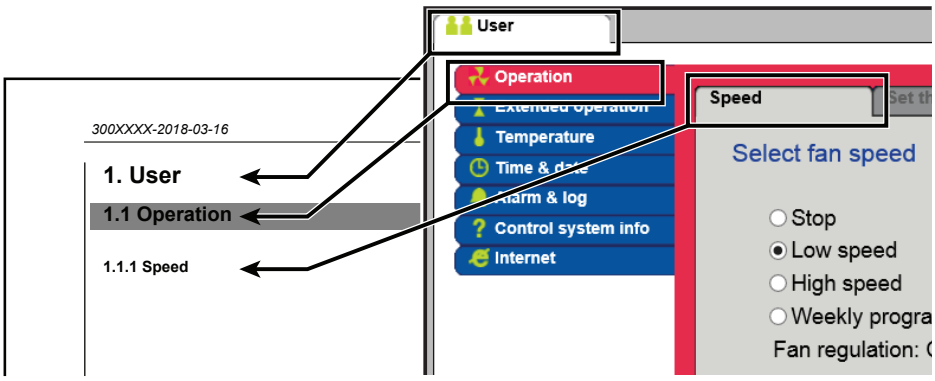
The instructions must be fully observed to ensure personal safety and to protect the equipment and ensure its correct operation. EXHAUSTO A/S accepts no liability for accidents caused by equipment not used in accordance with the manual's instructions and recommendations.

Screen images

In this instruction manual there are screen displays which are meant to help the user and indicate where on the web interface the user is currently. These screen displays are examples and settings, which will usually not be identical to the used VEX unit's settings on this web user interface.

Headers/web user interface

This guidance is structured such that the section headers correspond to the tabs on the web user interface.
See example below:



1.1 Software version

Software version

Denne vejledning er gældende for følgende version og op efter:

- Master SW version: AE 6.31
- HMI Touch panel SW: 1.42

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Den aktuelle software version for VEX-aggregatet kan ses på web brugerfladen i menuen: **Bruger > Om styringen.**

Den aktuelle software version for både Master og HMI kan ses på HMI'en i menuen: **Indstillinger > Om styringen.**

1.2 Application

Browser

The EXcon web user interface can be used via:

- Explorer 10 and 11
- Chrome
- Edge
- Firefox

The EXcon control system controls and monitors the functions of the VEX unit.
EXcon can be operated via:

- Touch control panel (simple operation and settings)
- PC browser (advanced operation, settings and configuration)

This allows the following applications:

- A local PC can be connected to the VEX unit.
- The VEX unit can connect to a local area network (LAN) and be controlled by a PC connected to the LAN.
- The VEX unit can be connected to the internet and accessed by external PCs.

1.2.1 Browsing history

The **Temporary internet files** folder (or cache) is used by the web browser to save content from websites on the computer's hard drive, so that they can be displayed quickly.
This cache means that the web browser only has to retrieve the content that has changed since the website in question was last displayed, instead of retrieving all of a site's content every time it is to be displayed.

Delete browsing history

Step	Action
1	Start Web browser
2	Click on the **Functions** tab and select **Internet settings**
3	Click on **delete...**
Keep data for favourite websites: • If the address on the EXcon web user interface is added as a **Favourite**, it may **not** be ticked. **Temporary internet files and website files:** • **Must** be ticked.	
4	Click on **Delete** when the required data has been selected.

2. Operation and passwords

Operation

Operation of the VEX unit typically makes use of several user interfaces – depending on requirements and situations. Changes made using the HMI Touch remote control can be seen on the browser immediately, and vice versa. Operation and adjustment of the VEX unit can thus be flexibly and suitably adapted to the given situations.

User levels

Users of the online user interface can log in as one of three user types. These are user, installer and service. Service is the highest level, with most rights and access to most setting adjustments. Different user types and levels are not used in connection with use and operation via BACnet or Modbus. As an option LonWorks may also be used.

2.1 User interfaces

The VEX unit can be set up and controlled via the EXcon web user interface, the EXcon HMI Touch remote control, Modbus or BACnet. As an option LonWorks may also be used, this requires a LON-module to be installed.

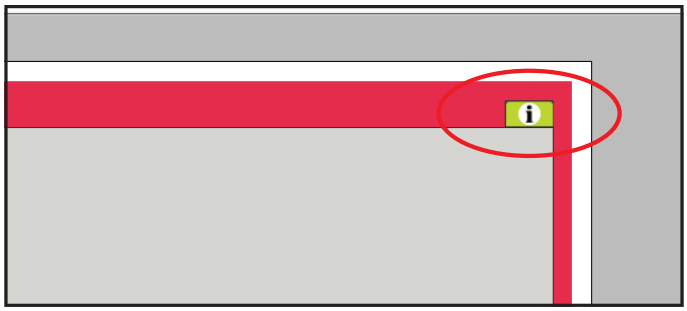
2.1.1 Online user interface

The web user interface permits setup and control of all functions in the VEX unit. Depending on requirements and user type, users may log in on one of three user levels, with corresponding passwords and rights.

Log-in procedure

1. Open a browser
2. Enter the IP address of the VEX unit *(See - Communication setup)*
3. Enter a username and password *(See - Passwords)*

On pages which offer help, the help functions are opened and closed by clicking the **'I'** button in the top right-hand corner.



2.1.2 HMI Touch control panel

The HMI permits adjustment of the basic functions. The HMI can be mounted on the VEX unit or in the room as room control.
For changes to settings and operation with the HMI, see the EXcon HMI Touch instructions.

2.1.3 Modbus

Configuration and operation via Modbus is performed with the configuration program selected by the user.
For more information and a list of parameters, see the **Modbus protocol.**

2.1.4 LonWorks

Configuration and operation via LonWorks is performed with the configuration program selected by the user.
For more information and a list of parameters, see the **LON protocol.**

2.1.5 BACnet

Configuration and operation via BACnet is performed with the configuration program selected by the user. For more information and a list of parameters, see the **BACnet protocol.**

2.2 Passwords

2.2.1 Online user interface

A login at a higher level also gives access to the underlying level's menus.

The following login and password are factory settings on the web user interface:

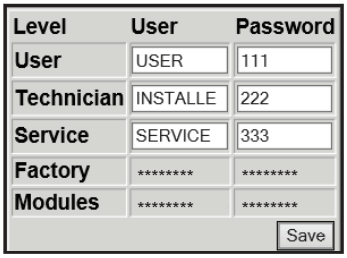
Level	User name	Password
User	USER	111
Installer	INSTALLE	222
Service	SERVICE	333
Factory	Contact EXHAUSTO	
EXcon Modules	Contact EXHAUSTO	

Letters in the password are case-sensitive.

Change password

It is possible to change the username and password for User Level on the web user interface. For more information, see under: **User > Internet > Login**

To change the password for Installer and Service levels you will need to log in at Factory Level. Contact EXHAUSTO for more information.

Step	Action	Screen image
1	Log in via a web browser at Factory Level: **Factory > Settings > Login.**	
2	Enter a username and password for the levels that it is wished to change, max. 8 characters.	
3	Press **Save** to save the settings.	

2.2.2 HMI Touch control panel

There are no access levels for operating the HMI.
However, a LOGIN code is required for resetting to factory settings, and for configuration and settings for certain parameters.

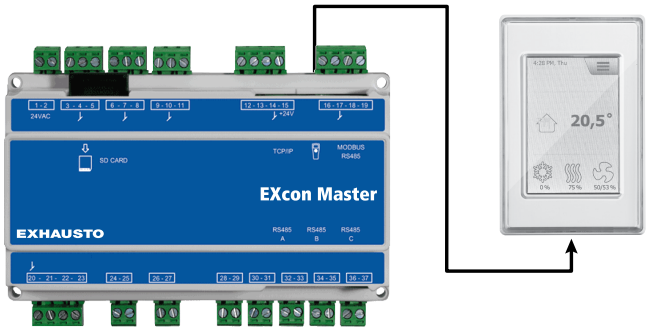
Contact EXHAUSTO for more information.

3. Communication setup

3.1 HMI Touch control panel

Connect HMI Touch control panel

Check that the cable between the HMI and the EXcon Master is correctly connected as shown below.



1. Turn on the Master
2. Check that the HMI display has lit up
3. Wait about 30 seconds until the control system is ready

At least one active alarm will often appear on the HMI display when starting up the Master.
Remove alarms by pressing **ESC**.

3.1.1 Set language

NB:

Language settings can be changed without knowledge of the LOGIN code.

Step	Action
1	Press the HMI menu icon in the top right-hand corner of the home page.
2	Select **Settings**, and then **Language**
3	Mark the desired language and return to the home page.

3.1.2 Set IP address

To allow communication between the Master and a directly connected PC, the Internet settings must be entered.
The Master be set to for either **Static** or **DHCP** IP address via the HMI.

For further information, see **Configuration of communication**.

NB:

Changes to IP address settings can only be made by service technicians with knowledge of the LOGIN code.

Step	Action
1	Press the HMI menu icon in the top right-hand corner of the home page.
2	Select **Communication**
3	Mark one of the parameters which it is wished to change.
4	To set the chosen parameter,enter the LOGIN code and select ✓.

3.2 Updating of software

3.2.1 Software updating with HMI Touch panel

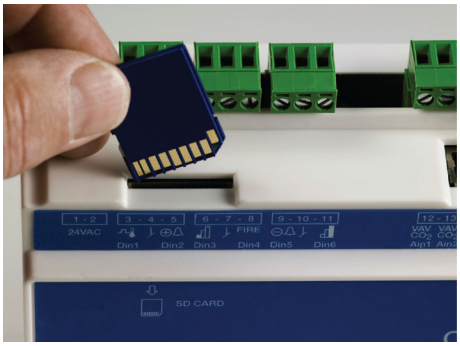
Use SD card

In the event of software in the VEX unit needing to be updated, this is done via an SD card. Follow the sequence below to update the software.

NB! All settings that are already saved in the software are kept.

NB:

Software updates should only be made by service technicians with knowledge of the LOGIN code.

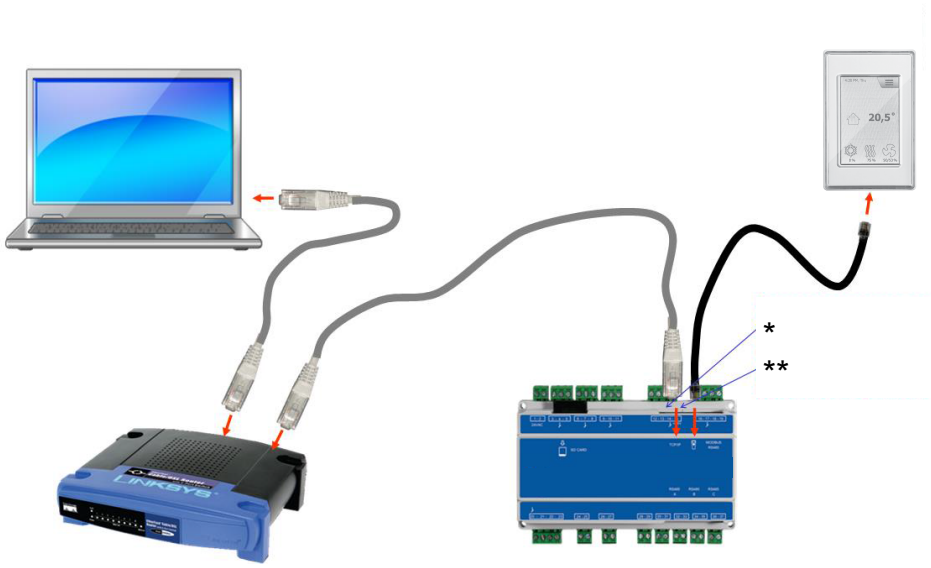
Step	Action	NB:
1	Copy 3 files (.tar. + gz and .crc.file) to an SD card.	The files must be placed in the root directory on the SD card and not in sub-directories.
2	Ensure that the Master is powered up.	
3	Ensure that the HMI is connected	Check that there is light on the display.
4	Place the SD card in the card reader in the Master.	
5	Click on the HMI menu's icon in the top right-hand corner of the home page and select **Updating**.	SD card found. Please wait...
6	Select ✓ and enter the LOGIN code if updating is required.	Updating is running. Please wait...
it is very important that the UPDATING PROCESS IS COMPLETED before clicking on the screen again When the updating process is complete, the screen will automatically revert to the home page.		

3.3 Configuration of communication

3.3.1 Configuration WITH router

If communication is configured WITH router on the TCP/IP network, the PC is automatically assigned an IP address by the network or router. Using the HMI, set the IP address to **DHCP**

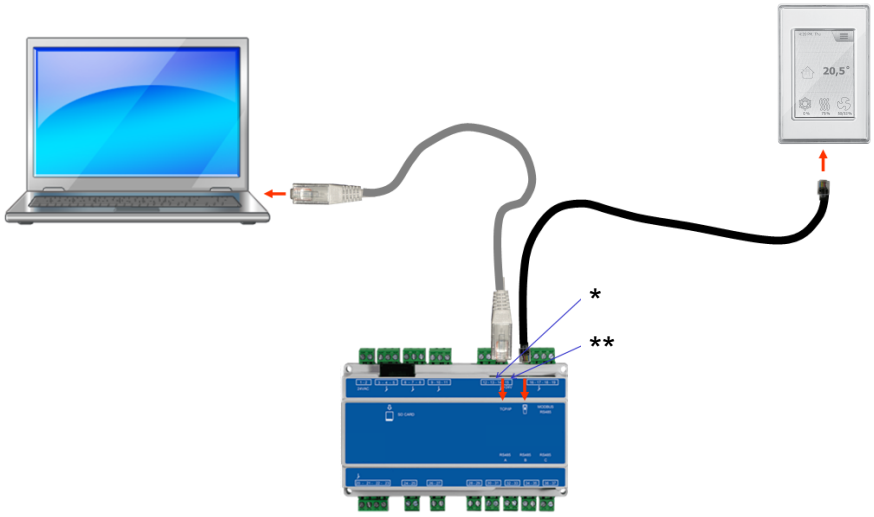
*Yellow LED: Lights up when LAN connection is OK
** Green LED: Flashes when communication is active.



3.3.2 Configuration WITHOUT router

If communication is configured WITHOUT router, the PC must be set to **Static** IP address. Using the HMI, also set the IP address to **Static** and set the required IP address (e.g. 192.168.1.100).

*Yellow LED: Lights up when LAN connection is OK
** Green LED: Flashes when communication is active.



For Windows 7 users

Step	Action
1	Select **Network and sharing centre** on the control panel.
2	Under the menu on the left-hand side, select **Edit network card settings.**
3	Right-click on the **LAN connection** icon, and select properties. If it asks for administrator password, contact the system administrator.
4	Mark TCP/IPv4 (Internet Protocol Version 4), select properties.

Step	Action
5	Select Use following IP address and enter the IP address which the network card is to have (e.g 192.168.1.100). The IP address may not be the same as set in the control system, but must be in the same network mask. **NB!** Be aware that it is the wired network card that is to be configured.
6	Press OK to end.

For Windows 8 and 10 users

Step	Action
1	Start Internet Explorer.
2	Check whether Internet Explorer is set up for Proxy server: Select **Functions >Internet settings > connections.**
3	Select **LAN settings.**
4	If the **Use a proxy server for LAN** field has been ticked, this must be removed. Click on **OK.**
5	Open **Control Panel > Network and Internet > Network and Sharing Centre > Edit settings for network card.**
6	Right-click on the LAN connection used and then on **properties.** If it asks for administrator password, contact the system administrator.
7	Mark**Internet protocol TCP/IP.**
8	Select **Properties.**
9	Select Use following IP address and enter the IP address which the network card is to have (e.g 192.168.1.100). The IP address may not be the same as set in the control system, but must be in the same network mask. **NB!** Be aware that it is the wired network card that is to be configured.
10	Press OK to end.

3.3.3 Start Web browser

Control of the VEX unit from the web user interface supports:

- Internet Explorer 10 and 11 (no compatibility display)
- Edge
- Chrome
- Firefox

Step	Action
1	Start the browser
2	Enter IP address in the address line and press **Enter**
When the Log-in image is displayed, the connection to EXcon Master has been created.	
	
3	Enter the Username/Password which gives access to the desired operation level. For further information, see **Web user interfaces** under **Access codes.**
4	Select language and press the Login button.
When you have logged in, the **User > Operation** tab will be displayed. Inactive tabs are shown with a grey background colour/grey text. They are activated depending on the settings made on the current or related pages.	

4. Starting up the VEX unit for operation

The Modbus connectors must not be connected or removed while the units are powered up. Both Modbus units must be switched off before making changes, otherwise the units may be damaged.

During commissioning, it may be necessary to work with the control system boxes open. Components in these boxes must only be touched with electrically-insulated tools.

Before doing any work on motor controls or motor cables and terminal boxes, the power supply must be switched off for at least five minutes to allow the capacitors to discharge.

Before commissioning begins

- Check that the supply voltage is connected
- Log in to service level, see chapter **Passwords**.

4.1 Getting started

Commissioning

When logged in, then follow the below sequence in order to get started with commissioning.

Step	Action	Level
1	Select operating mode - it is the recommended to select **Low speed** during startup.	User
2	Set/activate operation settings	Installer
3	Set safety function settings:	
3A	• Fire -> Ventilation > Fire alarm (temperature sensor/accessories)	Installer
3B	• Air handling unit > Fire alarm (temperature sensor/standard)	Service
3C	• Air handling unit > Settings > Click on the water heating coil (accessories) > Frost protection	Service
4	Select operating mode - Low/Medium/High, Weekly program or Calendar. Set Weekly program/Calendar if this type of operating mode is required.	User

5. User settings

5.1 User parameters

The VEX unit can be set to accept changing requirements for temperatures, air changes, logging of alarms, etc. Many settings are entered once and for all, but others are intended for shorter periods. The EXcon web user interface creates a starting point for which parameters are described.

NB: There is a difference between levels on the user interfaces in terms of which parameters are available and where they are located.

User interface	Menus	Parameters/tab sheets
User ->	Operation >	Speed
		Set the program
		Basic program
		Daily schedule
		Exceptions
		Calendar
	Extended operation ->	Set minute timer
	Temperature >	Setpoint
	Time & date ->	Settings
	Alarm & log >	Alarms
		Alarm log
		Alarm forecast
		Data log
		Status
		Zones
	About the control system ->	Version
	Internet ->	IP address
		E-mail (Email)
		Login

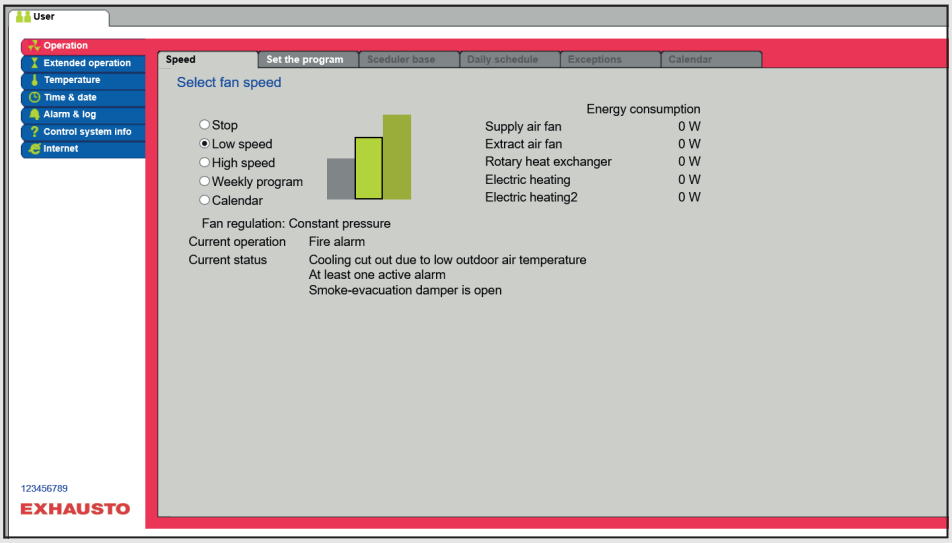
5.2 Operation

Parameters for the menu **Operation** are used to determine the speed of air changes and the times for switching between the different speeds.

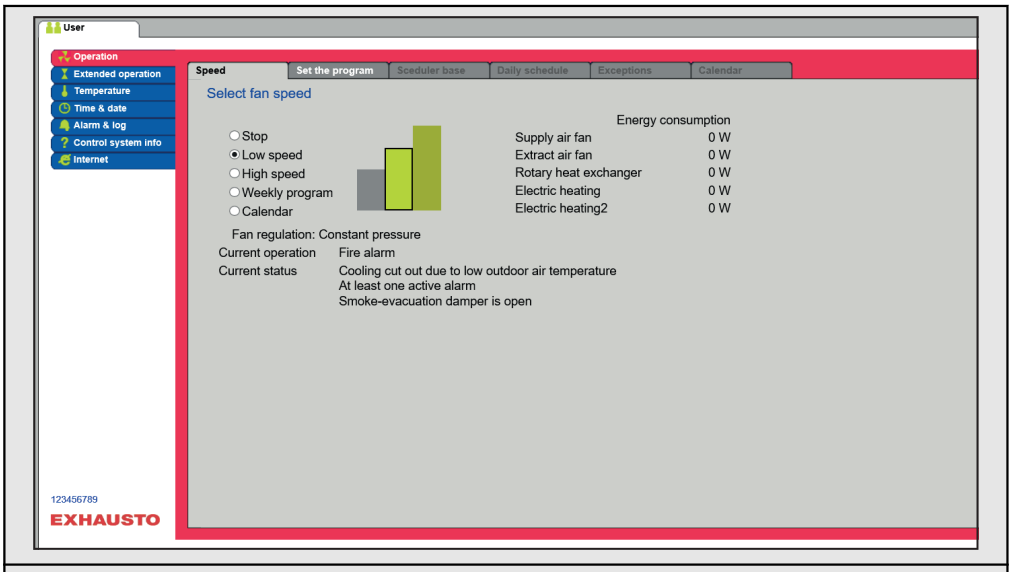
The VEX unit may be in one of four operating modes: stopped, low, medium or high speed.
It can be programmed to follow one of three weekly programs, or the calendar can be used for more detailed operating settings.

The current mode can be temporarily overridden by means of extended operation.

5.2.1 Speed

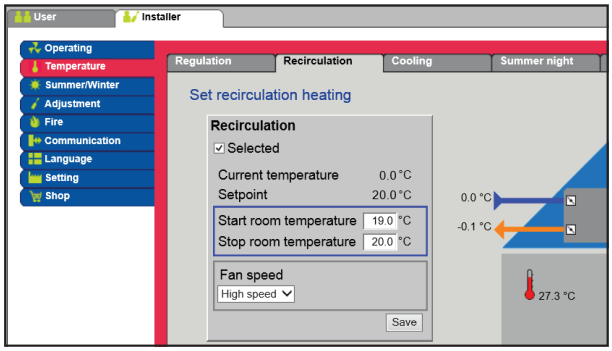


Select fan speed	
Stop	The VEX unit has stopped. ● Safety features er still active. ● Damper to the outside air is closed. **Please note!** By using the setting **Stop**, it is possible to override/restart the VEX unit via the web user interface, HMI Touch control panel/manual terminal, BACnet or Modbus. During service and maintenance, the VEX unit must be stopped by: ● using the setting for **Service stop** on the HMI Touch panel home page. or ● using the setting for **SERVICE** under: **User > Fan operation** in the manual terminal.
Low speed	The VEX unit runs at a constant speed in accordance with the set parameters for **Low speed**. ● There is no access for setting operating times in the weekly program or calendar. If the digital input for **High speed** is activated, the VEX unit will start and run for the set time. The time is set under: **Installer > Operations > External high.**
Medium speed	The VEX unit runs at a constant speed in accordance with the set parameters for **Medium speed**. ● There is no access for setting operating times in the weekly program or calendar. NB: In order to activate the **Medium speed** setting, the function must be selected under: **EXcon Modules > Configure > Settings**
High speed	The VEX unit runs at a constant speed in accordance with the set parameters for **High speed**. ● There is no access for setting operating times in the weekly program or calendar.
Weekly program	The VEX unit runs in accordance with the set weekly program. ● Access is permitted for setting operating times in the weekly program. Although the VEX unit may be stopped according to set weekly program, it can still start automatically according to the below settings.



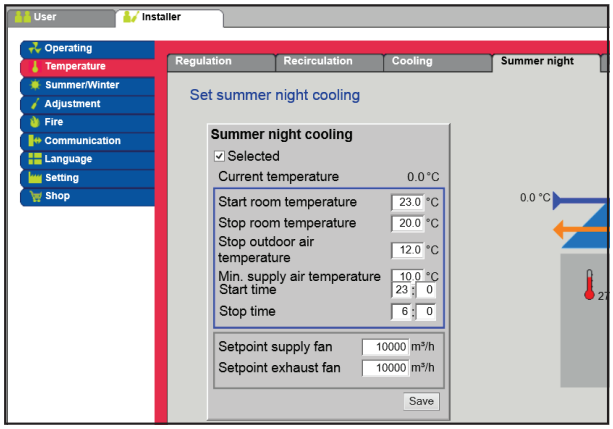
Select fan speed	
Calendar	The VEX unit runs in accordance with the set calendar. • Access is permitted for setting operating times in the calendar. Although the VEX unit may be stopped according to calendar, it can still start automatically according to the settings below.

"Installer > Recirculation

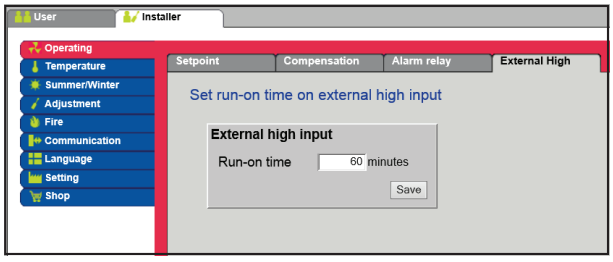
Settings	
If, under **Installer > Temperature > Recirculation**, **recirculation** is selected, the VEX unit will start if the room temperature falls below the set value in **Start room temperature**.	

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Installer > Summer night

Settings	
If, under **Installer > Temperature > Summer night**, **summer night cooling** is selected, the VEX unit will start according to the set parameters for summer night cooling.	

Installer > External high

Settings	
If the digital input for High speed is activated, the VEX unit will start and run for the set time. The time is set under: Installer > Operations > External high.	

5.2.2 Set the program

For access to this parameter, select **Weekly program** under: **Operation > Speed.**
The settings will be overridden by any period of extended operation, or cancelled if the VEX unit is set to follow something other than the weekly program.
The parameter uses timelines, in which a maximum of four operating periods can be set per line. Each operating period indicates a time during which a requested operating mode is active.



Set weekly program
Whole week • Operating at the same times on every day of the week.
Weekday & weekend • Operation at the same times on Monday to Friday, with other times on Saturday-Sunday.
Daily program • Operating at individual times on every day of the week.

Click on  the symbol in the top right-hand corner for more information.

Calendar

The calendar function allow operating times to be set for a year or more.
An operating pattern can be set for normal operation of the unit.
At the same time, special operating modes in connection with planned holidays, public holidays or special opening days can be set.

The calendar function consists of four tabs:

- Basic program
- Daily schedule
- Exceptions
- Calendar

To use the calendar, all four tabs must be set.

Colours on buttons

For buttons in the parameters Daily schedule, Exceptions and Calendar, the following colour rules apply:

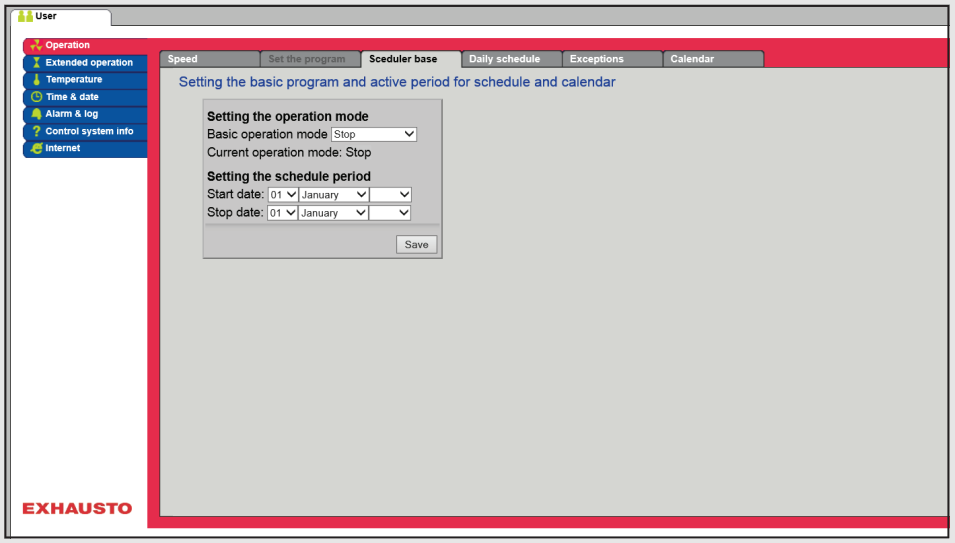
- Light grey - the button is active and can be set.
- Green - at least one activity has been set.
- Dark green - no activities have been set.

The settings will be overridden by any period of extended operation, or cancelled if the VEX unit is set to follow something other than the calendar.

5.2.3 Basic program

For access to this parameter, **Calendar** must be selected under: **Operation > Speed.**

The basic program is used for setting the operating mode which the unit is to run, e.g. at night, in holiday periods or other stop periods.
The period for which the basic program is to run for is also set here.



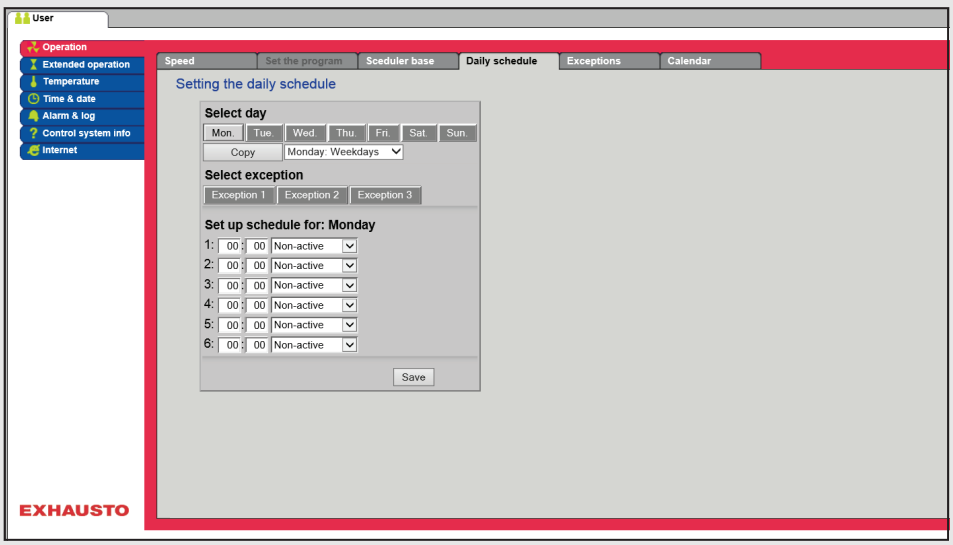
Operating mode settings - basic operating mode	
Stop	The unit has stopped. Frost protection and other safety functions are active.
Low speed	The unit is in operation in accordance with Low Speed settings **(Installer > Operation > Set point)**
Medium speed	The unit is in operation in accordance with the settings for Medium Speed **(Installer > Operation > Set Point)**
High speed	The unit is in operation in accordance with the settings for High Speed **(Installer > Operation > Set Point)**
Extended stop	The unit has stopped. Frost protection and other safety functions are active. The unit can be started - if the operating conditions are fulfilled for ● Summer night cooling ● Minimum night temperature - or by other override functions
Table for period settings	
Start date	The start and stop dates indicate the period when the settings in the **Daily schedule, Exceptions** and **Calendar** tabs are active. Outside the given period, the settings in **Basic operating mode** are automatically applied.
Stop date	
Press **Save** to save the settings.	

Click on the  symbol in the top right-hand corner for more information.

5.2.4 Daily schedule

For access to this parameter, **Calendar** must be selected under: **Operation > Speed.**

The Daily schedule is used for setting the operating pattern laid down as standard in the periods where the unit is running normal operation.
It is subsequently possible to set up to three exceptions, in which the operating pattern deviates from normal operation.



Select day - Set up schedule	
Step	**Action**
1	Select day and set up schedule by setting operating times and modes. For a description of the possible operating modes, see the Chapter **Basic program**
	Repeat step 1 for each week day if different settings are desired for the different days.
2	Use the copy function if the same setting is desired for all the days of the week or week-days. **NB! Even if the copy function is used, the days can later be individually changed if the same operating pattern is not desired.**
Select exception - Set up schedule	
1	Select exception and set up schedule by setting operating times and modes. For a description of the possible operating modes, see the Chapter **Basic program** **NB! As a rule, it is recommended to select the exceptions first which take up the shortest time, and leave the longer lasting exceptions to last.**
Press **Save** to save the settings.	

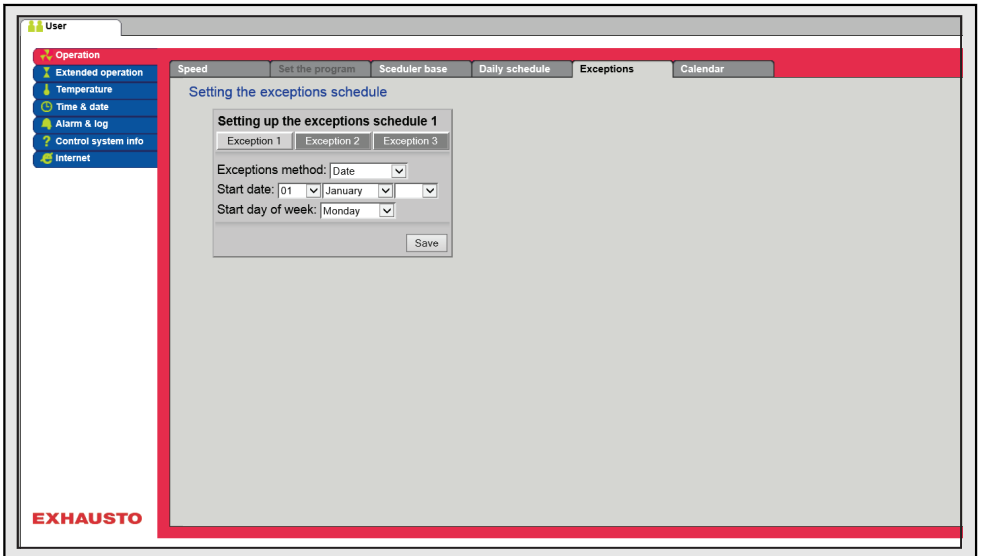
Click on the  symbol in the top right-hand corner for more information.

5.2.5 Exceptions

For access to this parameter, **Calendar** must be selected under: **Operation > Speed.**

Exceptions is used to set when exceptions 1-3 are to be active.

- Exception 1 has first priority
- Exception 2 has second priority
- Exception 3 has third priority



Select and set the exception method	
Not active	Exception has been deactivated and is not in use
Date	Exception is set to one particular date. • Start date • Start day of week **NB. It is important to set the day of the week correctly for the selected date.**
Date interval	Exception is active within the selected start/stop dates. • Start date • Stop date

Day of the week	Exception is active within the selected selected week in the selected month.
	• Start date
	  • 1-7 = First week in the selected month
	  • 8-14 = Second week in the selected month
	  • 15-21 = Third week in the selected month
	  • 22-28 = Fourth week in the selected month
	  • 29-31 = Fifth week in the selected month
	  • Last 7 days = The last week in the selected month
	  • Every day = Every day in the selected month
	• Start day of week
	
	The start day of the week indicates the day in the specified week on which the exception starts to be active.

Calendar	The exception is specified to follow the calendar as set in the **Calendar** parameter **NB. No more than one exception may be set using the Calendar exception method.**
Press **Save** to save the settings.	

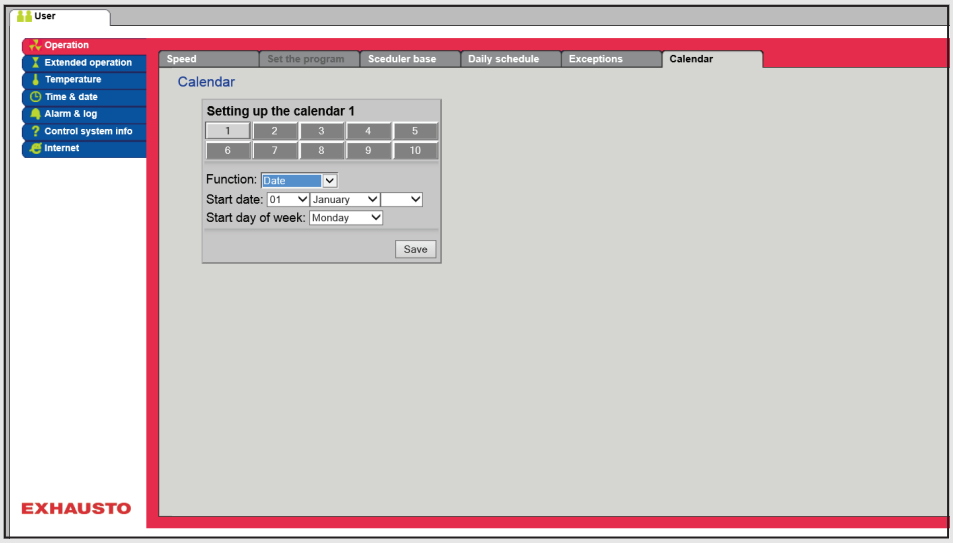
Click on the  symbol in the top right-hand corner for more information.

5.2.6 Calendar

For access to this parameter, **Calendar** must be selected under: **Operation > Speed.**

Calendar is used to set when an exception is to be active, if calendar has been selected as the exception method.

Up to 10 periods or dates (calendar numbers) may be set for when the exception is to be active.



Select and set calendar number	
Not active	Calendar number has been deactivated and is not in use
Date	Calendar number is set to one particular date. • Start date • Start day of week **NB. It is important to set the day of the week correctly for the selected date.**
Date interval	Calendar number is active within the selected start/stop dates. • Start date • Stop date

Day of the week	The calendar number is active within the selected week in the selected month.
	• Start date
	  • 1-7 = First week in the selected month
	  • 8-14 = Second week in the selected month
	  • 15-21 = Third week in the selected month
	  • 22-28 = Fourth week in the selected month
	  • 29-31 = Fifth week in the selected month
	  • Last 7 days = The last week in the selected month
	  • Every day = Every day in the selected month
	• Start day of week
	
	The start day of the week indicates the day in the specified week on which the calendar number starts to be active

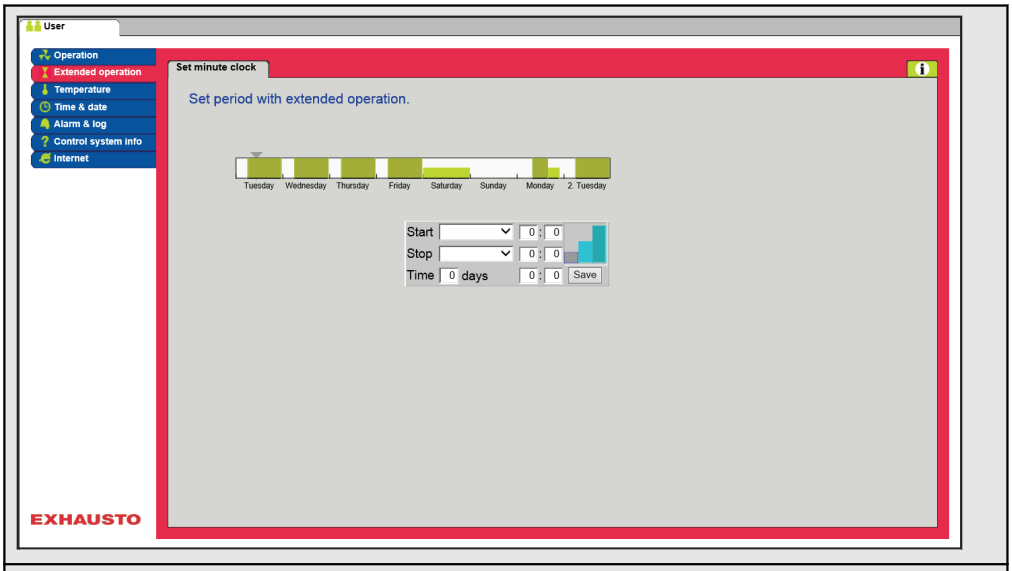
Press **Save** for each setup/calendar number before proceeding to the next number, in order to save the settings.	

Click on the  symbol in the top right-hand corner for more information.

5.3 Extended operation

The parameter for the menu **Extended operation** is used to override the current operating mode in the VEX unit for a period of up to a week from the current time.
When the period runs out, operation will automatically continue according to the weekly program or calendar.

5.3.1 Set minute clock



Set extended operation

Enter the values in the white fields or use the mouse/marker to select the period in the "bar".

Click on the symbol in the top right-hand corner for more information.

5.4 Temperature

The **Temperature** parameter is used to indicate the desired temperature which the VEX unit must maintain in the rooms served.

The temperature which the VEX unit attempts to maintain is regulated by the selected regulation mode. This is primarily done by regulation of heating/cooling coils or by recovery and by regulating the airflow.

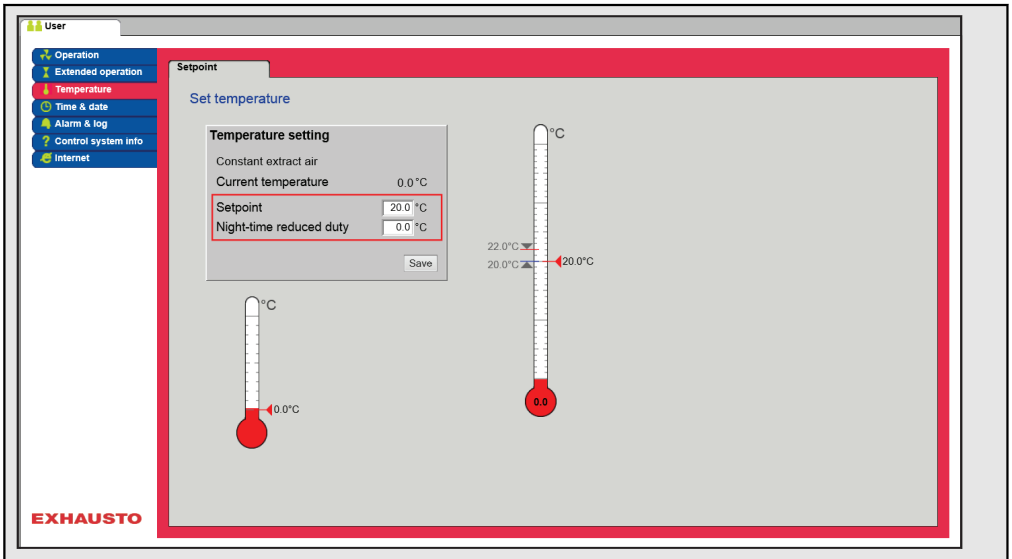
5.4.1 Setpoint

Set the setpoint temperature for the selected regulation mode. Setpoint temperatures can be set for each of the four regulation modes:

- Constant supply air
- Constant extract air
- Constant room
- Constant supply/extract difference

NB:

The desired regulation mode must be selected when setting the setpoint temperature. The regulation mode is selected under: **Installer > Temperature > Regulation**

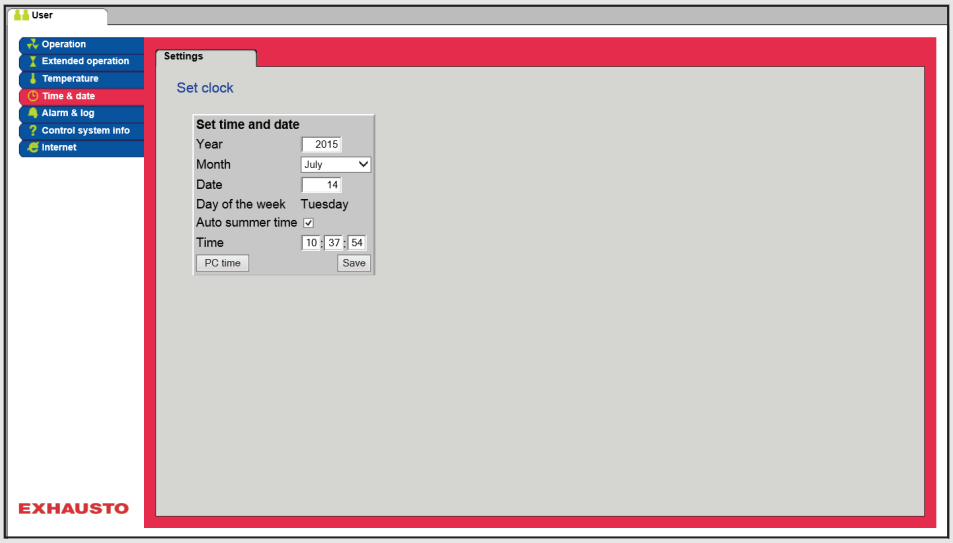


Set the temperature	
Setpoint	Set the setpoint for supply air temperature. Applies to the temperature regulations: • Constant supply air • Constant extract air • Constant room
	Set the desired setpoint for differences between the supply air and extract air temperature. Applies to temperature regulation: • Constant supply/extract difference
Night-time reduced duty	Set outdoor temperature for night-time reduced duty. Applies to the temperature regulation methods: • Constant supply air • Constant extract air • Constant room
Night-time reduced duty is the number of degrees the EXcon control system allows the temperature setpoint to be raised/reduced by, before it starts to heat/cool to maintain the setpoint temperature. **Please note!**Night-time reduced duty has no effect on: • temperature regulation supply/extract difference • operating modes **High** and **Medium**	
Press **Save** to save the settings.	

5.5 Time and date

The parameters for the menus **Time and date** are used to set the control system clock. The clock is used for controlling the selected operating program and for logging alarms.

5.5.1 Settings



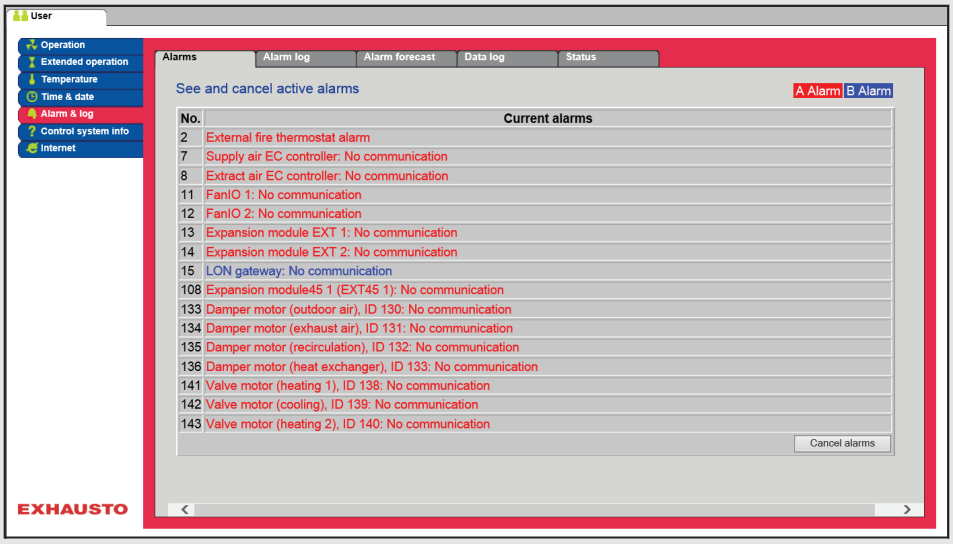
Set time and date	
Manual setting	• current year • current month • current date • select/deselect automatic summer/winter time changeover. • current time
Automatic configuration	• PC time: Retrieve current time and date from connected PC
Press **Save** to save the settings.	

5.6 Alarm and log

The parameters in the menu **Alarm and Log** are used to log alarms and operating data which have occurred since the last startup of the VEX unit. A log is kept of which alarms have occurred, which alarms are nearing their limit values and operating data history. The logged alarms can be reviewed via the web user interface or the HMI. If BACnet or Modbus are being used the logged alarms will also be available. Apart from current alarms, the online user interface also shows impending alarms and the logged operating data.

5.6.1 Alarms

Whether an alarm will activate a shutdown will depend on the type of alarm. A distinction is made between A alarms and B alarms, where A alarms activate a shutdown.



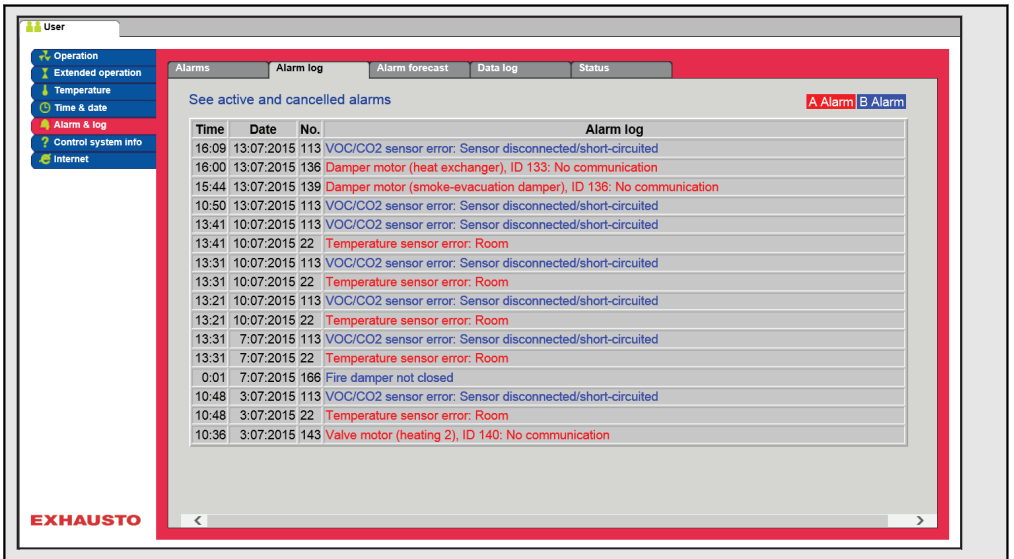
List of current alarms in the system

- Red alarm text is A alarms
- Blue alarm text is B alarms

Press **Cancel alarms** to acknowledge alarms. The list and the active alarms which are still active are restored and displayed.

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5.6.2 Alarm log



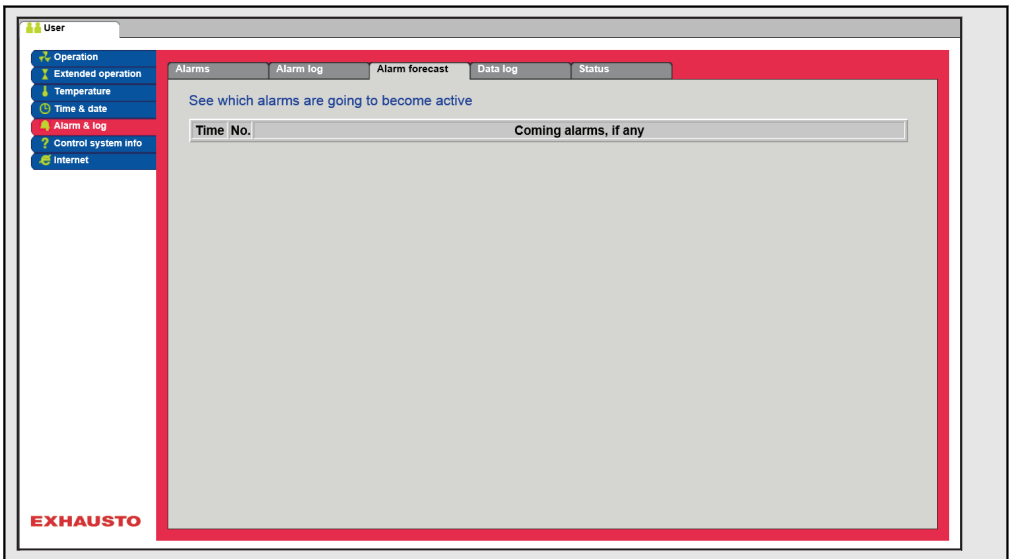
Time	Date	No.	Alarm log
16:09	13:07:2015	113	VOC/CO2 sensor error: Sensor disconnected/short-circuited
16:00	13:07:2015	136	Damper motor (heat exchanger), ID 133: No communication
15:44	13:07:2015	139	Damper motor (smoke-evacuation damper), ID 136: No communication
10:50	13:07:2015	113	VOC/CO2 sensor error: Sensor disconnected/short-circuited
13:41	10:07:2015	113	VOC/CO2 sensor error: Sensor disconnected/short-circuited
13:41	10:07:2015	22	Temperature sensor error: Room
13:31	10:07:2015	113	VOC/CO2 sensor error: Sensor disconnected/short-circuited
13:31	10:07:2015	22	Temperature sensor error: Room
13:21	10:07:2015	113	VOC/CO2 sensor error: Sensor disconnected/short-circuited
13:21	10:07:2015	22	Temperature sensor error: Room
13:31	7:07:2015	113	VOC/CO2 sensor error: Sensor disconnected/short-circuited
13:31	7:07:2015	22	Temperature sensor error: Room
0:01	7:07:2015	166	Fire damper not closed
10:48	3:07:2015	113	VOC/CO2 sensor error: Sensor disconnected/short-circuited
10:48	3:07:2015	22	Temperature sensor error: Room
10:36	3:07:2015	143	Valve motor (heating 2), ID 140: No communication

List of the last 16 alarms which have appeared in the system.

- Time and date of alarms is shown.

5.6.3 Alarm forecast

Alarms which are approaching the set limit values are shown in the **Alarm forecast** tab. If the limit values are exceeded, these alarms are moved to the list of current alarms and the alarm log is updated.

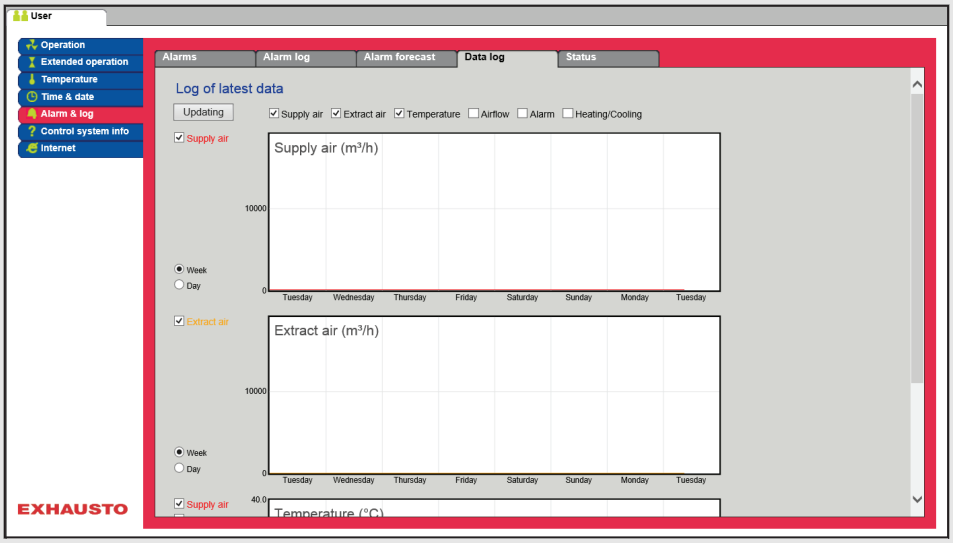


List of alarms which are approaching the set limit values

Example:
If the pressure drop over a filter goes over the set alarm value, the alarm will be delayed for the set time period and shown on this list.
If the pressure drop is still above the set value after the set time period, the alarm is deleted from this list and shown on the **Alarms** list

For more information about A and B alarms, alarm limits and alarm delays, see the document **Alarm summary - EXcon control system**

5.6.4 Datalog



The VEX unit's values are stored in a log database for one week

The desired groups for display can be selected by ticking them off:

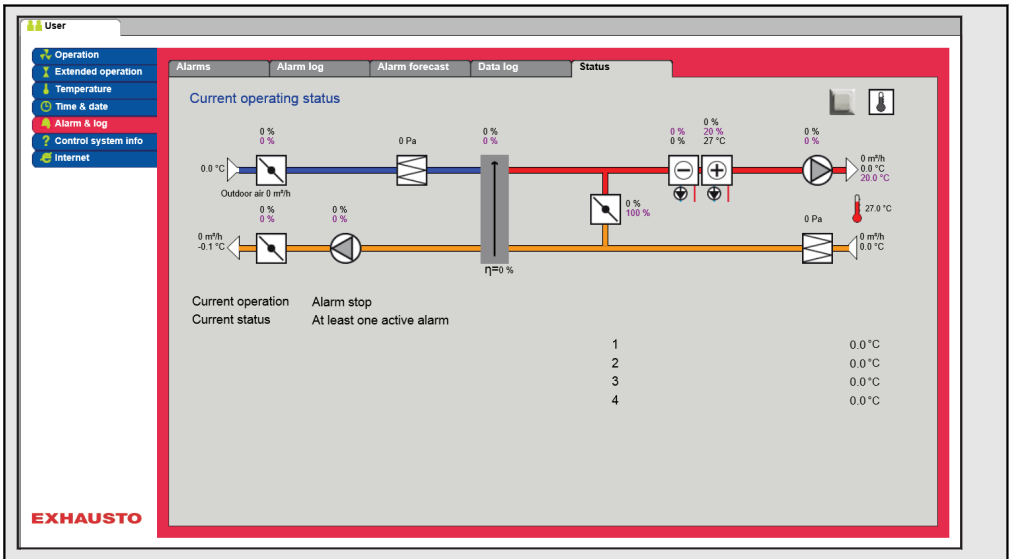
- Supply air (m^3/h) or (Pa) in case of pressure control
- Extract air (m^3/h) or (Pa) in case of pressure control
- Temperature (°C)
- Airflow (m^3/h)
- Active alarms (number)
- Heat/Recovery/Cooling (%)

Within each group the desired values for display can be selected.

Select **Week** or **Day** to show log values from last week or the last 24 hours.

Click the display window with a left-hand mouse key for enlarged scale display.

5.6.5 Status



List of current alarms in the system.

The screen shows the VEX unit's current status and operating mode.

- Values in black print show current values.
- Values in purple print show estimated values.

Click the icons/components for further information on parameter settings.

5.6.6 Zones

This parameter shows the status of all values in the different zones.

NB:

It is not possible to change values at this level. All settings are made with the HMI Touch control panel or via the menu **Service > Zones** on the web user interface

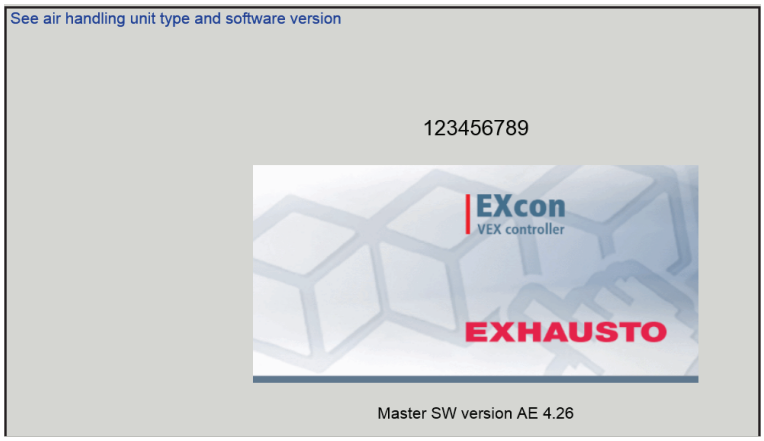
Reference

For further information on setting the zones, refer to the accompanying guidelines **EXcon zone control**

5.7 About the control system

Parameters in the menu **About the control system** contain information about which software version is controlling the VEX unit.

5.7.1 Version



- The name and software version number of the control system in the VEX unit are shown.
- This must be quoted in connection with technical support.

The name of the unit is given in the field 'Unit name' under **Factory > Factory > Retrieve/Save**

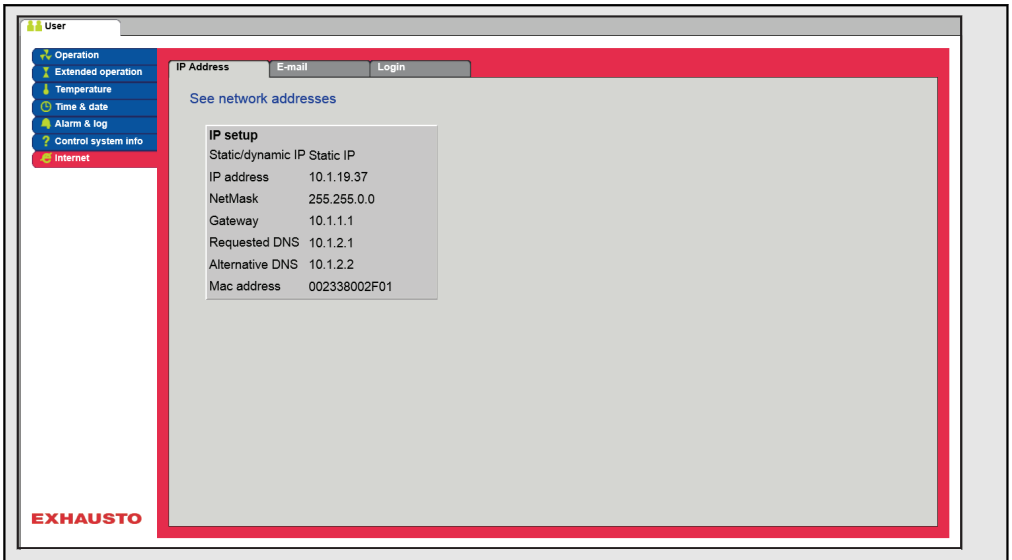
5.8 Internet

The parameters in the **Internet** menu make it possible to view the setup of IP address, set up e-mail communication and to modify the login.

5.8.1 IP Address

This parameter shows the current IP address and the settings used for communication with the VEX unit via a network.

- Changing this will require access at installer level on the online user interface.
- The parameter can be changed on the HMI Touch control panel with the LOGIN code.

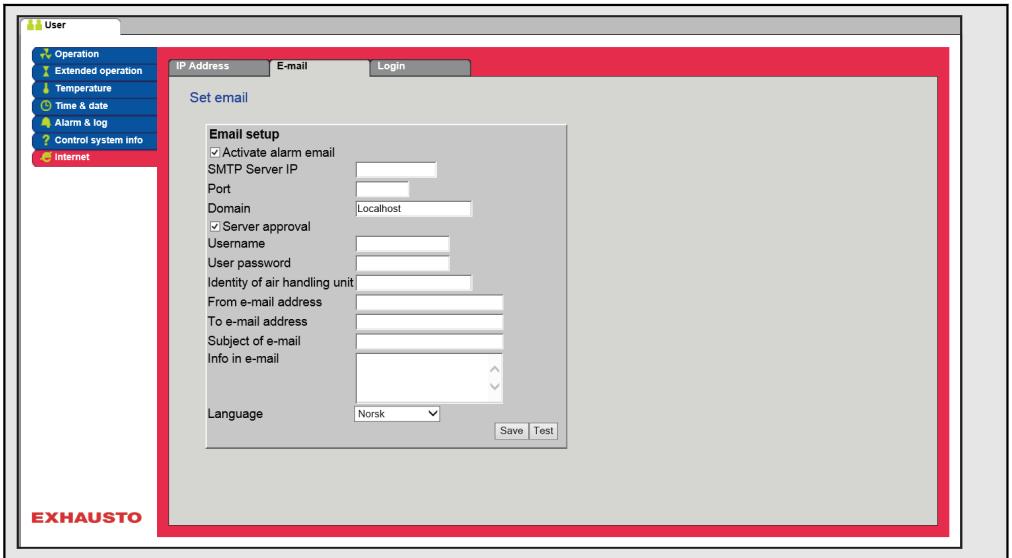


See network addresses - IP setup	
Static/Dynamic IP	Shows whether a static IP address is used or whether a dynamic IP address is being assigned.
IP Address	Shows the IP address assigned to the VEX unit.
Netmask	Shows the subnet mask to which the VEX unit is linked.
Gateway	Shows the gateway address which the VEX unit uses.
Requested DNS	Shows the primary name server which the VEX unit uses.
Alternative DNS	Shows the secondary name server which the VEX unit uses.
Mac address	Shows the hardware address for the electronics in the VEX unit.

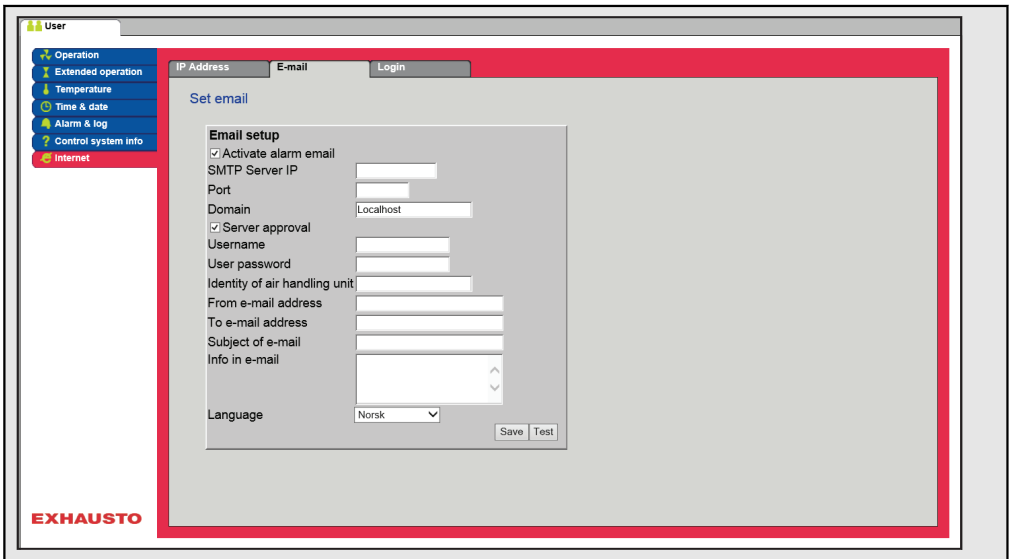
5.8.2 Email

This parameter is used for setting up email communication from the VEX unit.

- Email is sent automatically to the contact person if errors arise on the VEX unit.
- The parameter can be set only via the online user interface.



Settings	Values	Description
SMTP server IP	xxx.xxx.xxx.xxx	Indicate the address on the SMTP server for sending e-mails. The address can be obtained from the network administrator or provider. If access requires the address to be set up on the SMTP server, mark the field **Server approval**.
Port	Port 25 is standard	State port number for the SMTP server.
Domain	Optional	Enter the domain name for Excon control system.
Server approval	To/From	Indicate whether approval is required for logging into the SMTP server.
User name	abc... [79 characters]	Enter user name for the VEX unit on SMTP server.
User password	abc... [79 characters]	Enter password for SMTP server.
Unit identity	abc... [79 characters]	A description of the air handling unit/the VEX unit. E.g. its location.
From e-mail address	abc@abc.abc [79 characters]	Enter sender's address.
To e-mail address	abc@abc.abc abc1@abc1.abc1; .. [80 characters]	Enter recipients' addresses. Where several recipients are entered, these should be separated by semicolons (;).
Subject of e-mail	abc... [79 characters]	Enter subject for emails. For example **Error on air handling unit in Building 2**
Info in e-mail	abc... [364 characters]	Enter longer text message, describing, e.g., where the VEX unit is located, passwords, location of access keys, contact persons, telephone numbers, special circumstances, etc.
Language	Danish, English, German, Swedish, Norwegian, Spanish, French, Polish, Russian, Italian, Dutch, Finnish.	Select language of text in messages sent from the VEX unit.

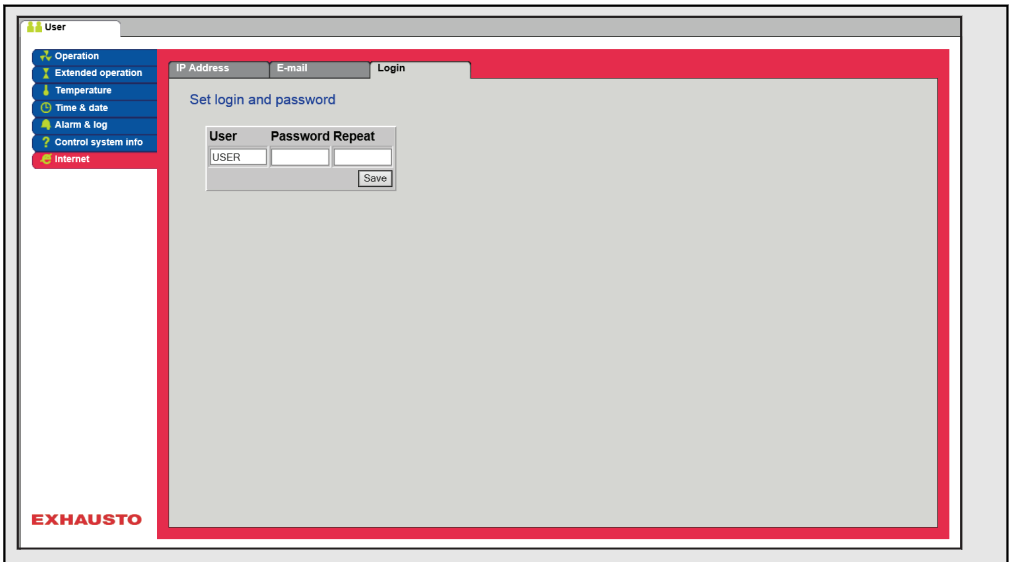


Settings	Values	Description

Press **Save** to save the settings.
Press **Test** to test the configuration of email/send a test email.

5.8.3 Login

This parameter is for changing the password used to log into the VEX unit.



Set login and password

- Enter a password of minimum eight characters and with small and capital letters, as well as numbers and special symbols.
- The parameter can be set only via the online user interface.

6. Installer settings

6.1 Installer parameters

When installing the VEX unit there are a number of parameters which need setting up to meet the required functions. These are parameters which the ordinary user seldom or never needs to know about. The installer should review and set these parameters at the time of installation.

The online user interface is the starting point for the parameters described.

NB: There is a difference between user interfaces in terms of which parameters are available and where they are located.

User interface	Menus	Parameters/tab sheets
Installer >	Operation >	Setpoint
		Compensation
		Alarm relay
		External high
	Temperature >	Regulation
		Recirculation
		Cooling
		Summer night
		Humidity sensor
		Humidifier
		Heating
	Summer/winter >	Compensation
		Summer/winter changeover
	Initial adjustments >	Setpoint
	Fire >	Ventilation
		Fire damper
		Smoke evacuation
	Communication >	Internet
		Modbus
		Lon
		BACnet
	Language>	Set
	Settings >	Download
		Air handling unit
	Shop >	Fan
		Recirculation
		Heating 1
		Heating 2, limit
		Heating 2, start-up
		Cooling
	External rotary selector >	Configuration

6.2 Regulation methods

EXcon is able to control the VEX unit in various ways. The two main regulation methods are airflow regulation and temperature regulation, which in turn can be broken down into 11 alternatives for airflow regulation and four alternatives for temperature regulation.
See the following sections for a more detailed description of the regulation methods.

6.2.1 Airflow regulation

Method	Description	NB:
Constant pressure (VAV)	The pressure is held constant in the supply and extract air ducts.	Requires external pressure sensors
Constant airflow	The supply and extract airflows are held constant at the set value.	
Extract air slave	The pressure is held constant in the supply air duct. The supply airflow is measured and the extract airflow is regulated to the same value, in slave mode.	Requires an external pressure sensor in the supply air duct
Supply air slave	The pressure is held constant in the extract air duct. The extract airflow is measured and the supply airflow is regulated to the same value, in slave mode.	Requires an external pressure sensor in the extract air duct
Constant VOC/CO_2	The CO_2 content in the air is held constant at the set CO_2 volume (ppm). A minimum and maximum airflow are defined. A difference between the supply and extract airflow may be incorporated.	Requires external CO_2 sensor This method cannot be selected if under **EXcon modules > Settings** , **Modulated recirculation** has been selected.
Fan Optimiser (damper angle control VAV)	The supply and extract airflows are regulated automatically via a 0-10 V control system directly from an external regulator in a so-called damper control unit (of Fan Optimiser type).	The airflow regulation range is limited by the set min. and max. values.
Fan optimiser slave	The supply airflow is regulated automatically via a 0-10 V control system direct from an external regulator in a so-called damper control unit (of Fan Optimiser type). The extract airflow is controlled by the supply air in slave mode and can be offset.	The airflow regulation range is limited by the set min. and max. values.
Constant motor speed %	The speed of the fans is controlled individually according to the entered setpoints.	
Dynamic pressure	The pressure in the ducts and the airflow are regulated dynamically within the set min. and max. values.	Requires two pressure sensors, one in the supply air duct and one in the extract air duct and airflow measurement.
0-10V extract air slave	The supply airflow is measured by an external 0-10V signal and the extract airflow is regulated to the same value, with an offset option.	Not supplied by EXHAUSTO
0-10V supply air slave	The extract airflow is measured by an external 0-10V signal and the supply airflow is regulated to the same value, with an offset option.	Not supplied by EXHAUSTO

6.2.2 Temperature regulation

Method	Description
Constant supply air temperature	The supply air temperature is held constant at the set value.

Method	Description
Constant extract air temperature	The extract air temperature is held constant at the set value. Minimum and maximum supply air temperatures can be set.
Constant room temperature	The room air temperature is held constant at the set value. Minimum and maximum supply air temperatures can be set. **Please note!**Requires external room sensor
Constant extract/supply air difference	The supply air temperature is held constantly lower than the extract air temperature at the set temperature difference. Min. and maxi. supply air temperature can be configured.

6.3 Operation

6.3.1 Setpoint - Fan control

This parameter in the **Operations** menu indicates the setpoints for regulating the fans. The online user interface shows the current operation and alarm status together with the settings. The current values for airflows generated by the VEX unit are also shown.

Constant pressure

- Supply air and return fans are regulated according to the pressure measured in the respective supply and extract air duct.
- The VEX unit must be fitted with two separate PTH pressure transmitters, one in the supply air duct and one in the extract air duct.

Possible settings

- **Constant pressure – WITHOUT modulated recirculation**
- **Constant pressure – WITH modulated recirculation**
- **Constant pressure – WITH VOC/CO_2 Intermittent recirculation WITHOUT modulated recirculation**

For all three settings, the following applies:

Max. airflow

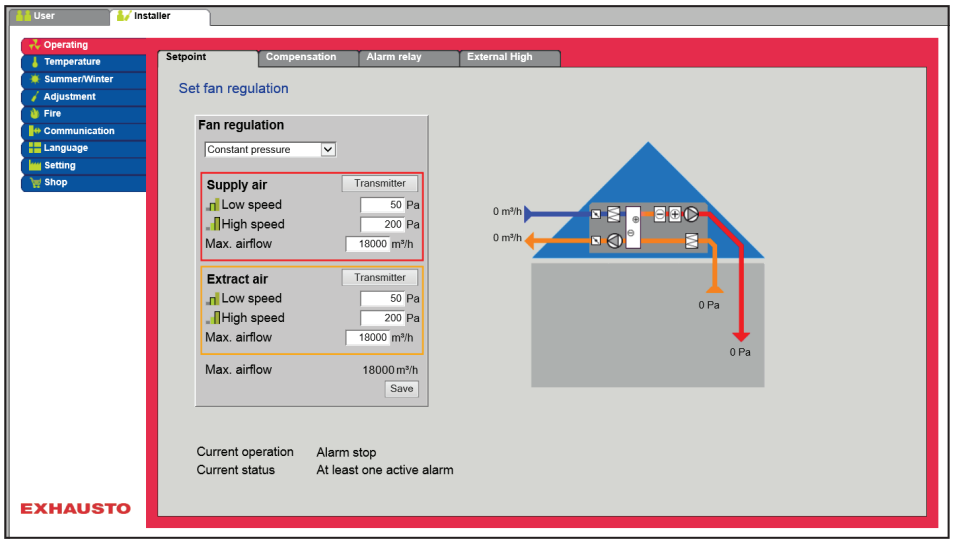
The airflow has a higher priority than the pressure/speed setpoint entered, i.e. if the desired pressure setpoint for pressure/speed is not achieved before the maximum entered airflow is reached, it is the airflow which limits further increase of the fan speed.

NB! The max. airflow cannot be set to a higher value than the max. unit airflow as set under: **Factory > Settings > Supply air/Extract air**.

Minimum airflow

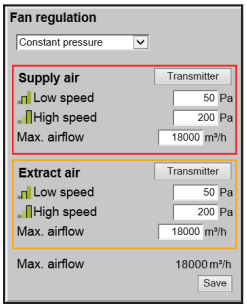
The minimum airflow is permanently set in the EXcon control system to 15% of the maximum airflow, and the minimum airflow has higher priority than the configured setpoint for pressure/speed.

Constant pressure – WITHOUT modulated recirculation



Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Normal** must be selected.

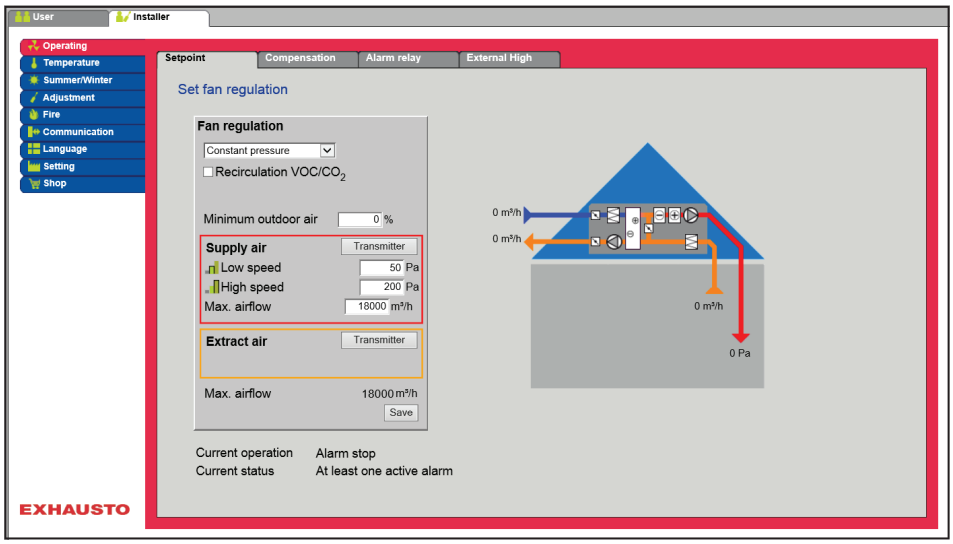


Fan regulation (supply/extract air):

- Low speed: Set the desired setpoint for duct pressure at Low speed
- High speed: Set the desired setpoint for duct pressure at high speed
- Max. airflow: Set the maximum airflow

Click on **Save** to save the settings.

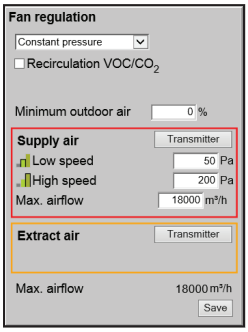
Constant pressure – WITH modulated recirculation



- The exhaust fan follows the same speed (slave) as the supply air fan.

Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Modulated recirculation** must be selected.
- Factory > Configuration > Mechanical: **Recirculation damper** must be configured.
- Mark the field **Recirculation VOC/CO_2**

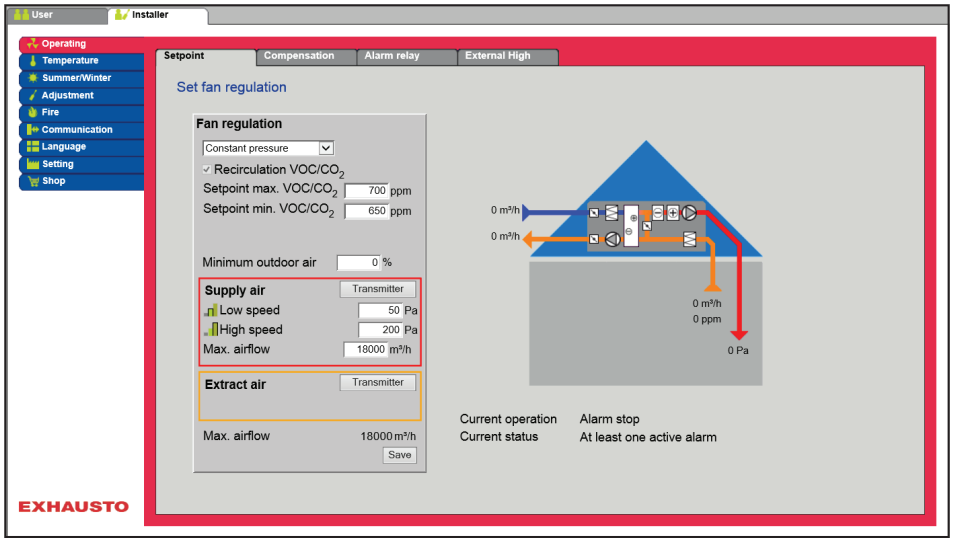


Fan regulation (supply air):

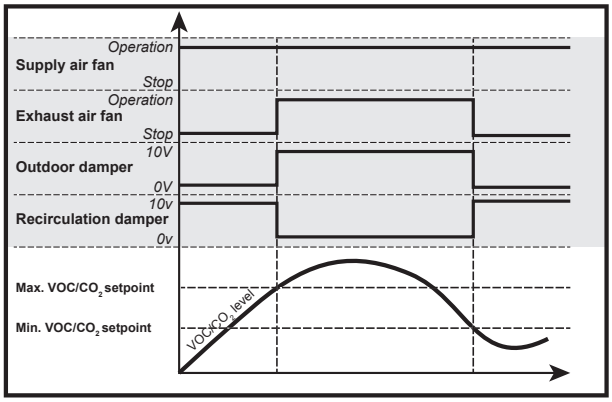
- Setpoint max. VOC/CO_2: Set the setpoint for max. VOC/CO_2
- Minimum outdoor air: Set the percentage of minimum outdoor air for modulated recirculation
- Low speed: Set the desired setpoint for duct pressure at Low speed
- High speed: Set the desired setpoint for duct pressure at high speed
- Max. airflow: Set the maximum airflow

Click on **Save** to save the settings.

Constant pressure – WITH VOC/CO_2 Intermittent recirculation

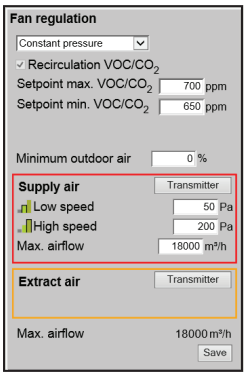


- The exhaust air fan only operates at VOC/CO_2 levels above **Setpoint max. VOC/CO_2**.
- The exhaust fan follows the same speed (slave) as the supply air fan.
- At measured values below **Setpoint min. VOC/CO_2** the exhaust fan is stopped and the VEX unit runs full recirculation. See figure below.



Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Modulated Recirculation** and **VOC/CO_2 Intermittent Recirculation** must be selected.



Fan regulation (supply air):

- Setpoint max. VOC/CO_2: Set the setpoint for max. VOC/CO_2
- Setpoint min. VOC/CO_2: Enter setpoint for min. VOC/CO_2
- Minimum outdoor air: This parameter **MUST** be set at 0% to stop the exhaust fan at VOC/CO_2 values below **Setpoint min VOC/CO_2**.
- Low speed: Set the desired setpoint for duct pressure at Low speed
- High speed: Set the desired setpoint for duct pressure at high speed
- Max. airflow: Set the maximum airflow

Click on **Save** to save the settings.

Constant airflow

- Supply air and return fans are regulated according to the airflow measured in the respective supply and extract air duct.
- Airflows are measured/estimated by measuring the difference between the static and dynamic pressure over the fans.
- The difference between the static and dynamic pressure is measured with pressure transmitters via either EXcon FanIO or PTH.

Possible settings

- **Constant airflow – WITHOUT modulated recirculation**
- **Constant airflow – WITH modulated recirculation**
- **Constant airflow – WITH VOC/CO_2 Intermittent recirculation WITHOUT modulated recirculation**

For all three settings, the following applies:

Max. airflow

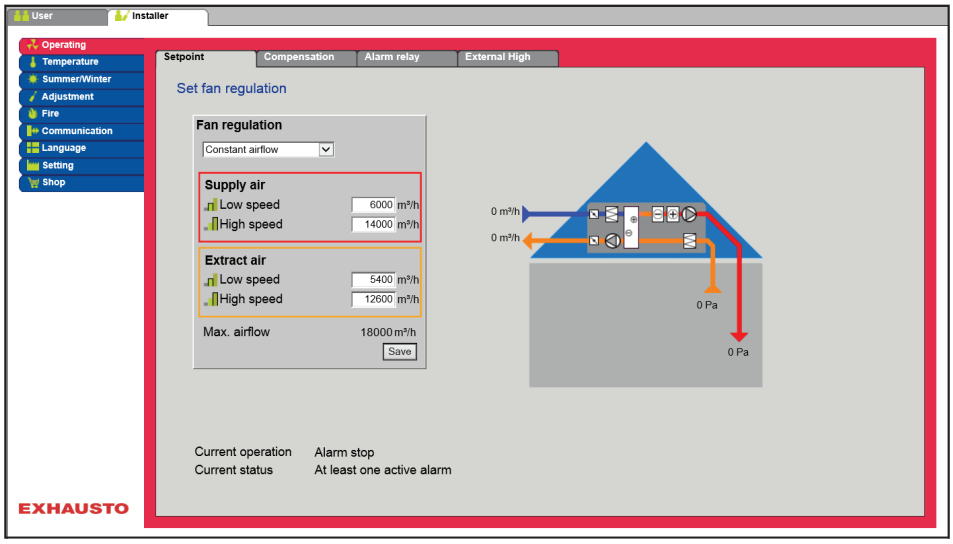
Maximum airflow for the VEX unit is set under: **Factory > Settings > Supply air/Extract air**.

Minimum airflow

Minimum airflow is permanently set in the EXcon control system as 15% of the maximum airflow. Setpoints for **Low** and **High** can thus never be set to less than this value.

VEX size	Min. Qv (m3/t) heating	Min. Qv (l/s) heating	Min. Qv (m3/t) cooling	Min. Qv (l/s) cooling
4010	768	213	1510	419
4020	1101	306	1510	419
4030	1741	484	2000	556
4040	2022	562	3000	833
4050	2409	669	4000	1111
4060	3046	846	5000	1389
4070	3635	1010	6000	1667
4080	4557	1266	7000	1944
4090	5888	1636	8500	2361
4100	7347	2041	10000	2778

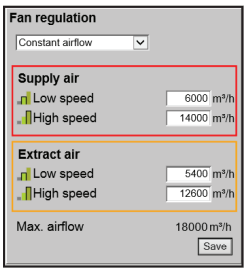
Constant airflow – WITHOUT modulated recirculation



EXHAUSTO

Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Normal** must be selected.

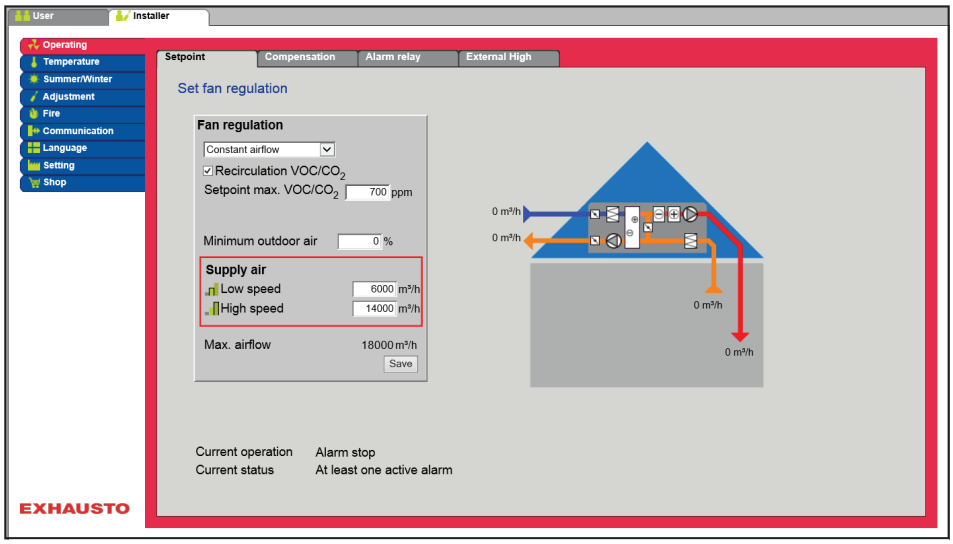


Fan regulation (supply/extract air):

- Low speed: Enter the desired setpoint for flow at low speed
- High speed: Enter the desired setpoint for flow at high speed

Click on **Save** to save the settings.

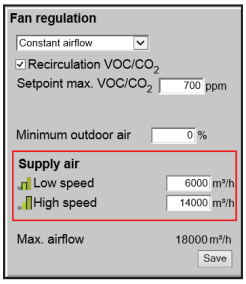
Constant airflow – WITH modulated recirculation



- The exhaust fan follows the same speed (slave) as the supply air fan.

Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Modulated recirculation** must be selected.
- Factory > Configuration > Mechanical: **Recirculation damper** must be configured.
- Mark the field **Recirculation VOC/CO_2**

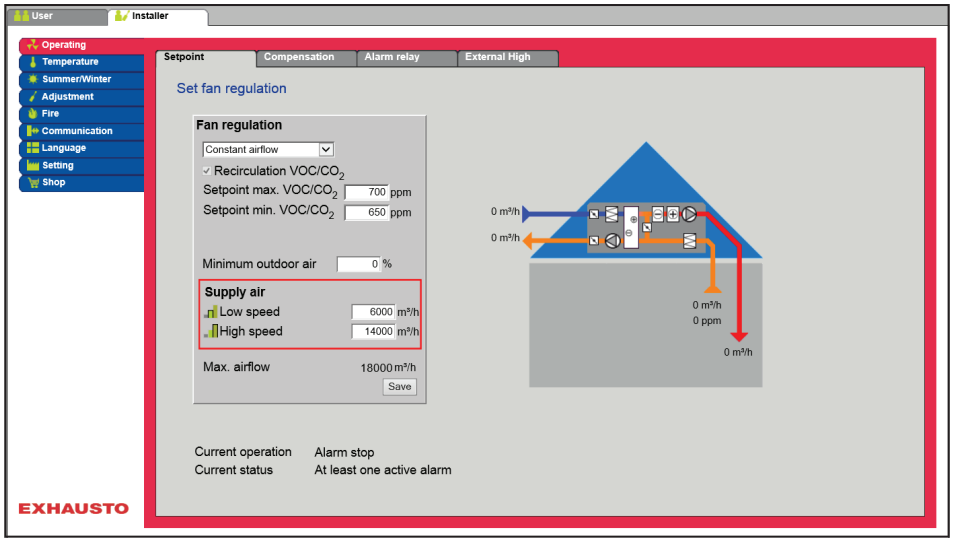


Fan regulation (supply air):

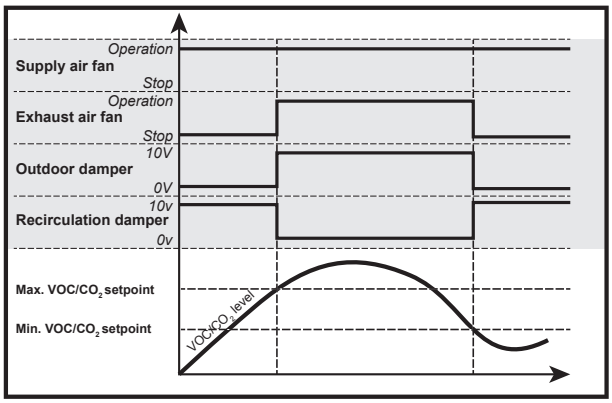
- Setpoint max. VOC/CO_2: Set the setpoint for max. VOC/CO_2
- Minimum outdoor air: Set the percentage of minimum outdoor air for modulated recirculation
- Low speed: Enter the desired setpoint for flow at low speed
- High speed: Enter the desired setpoint for flow at high speed

Click on **Save** to save the settings.

Constant airflow - WITH VOC/CO_2 Intermittent recirculation

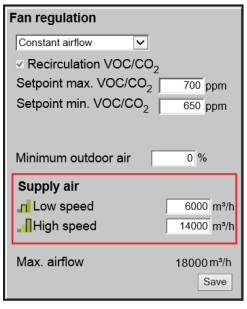


- The exhaust air fan only operates at VOC/CO_2 levels above **Setpoint max. VOC/CO_2**.
- The exhaust fan follows the same speed (slave) as the supply air fan.
- At measured values below **Setpoint min. VOC/CO_2** the exhaust fan is stopped and the VEX unit runs full recirculation. See figure below.



Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Modulated Recirculation** and **VOC/CO_2 Intermittent Recirculation** must be selected.



Fan regulation (supply air):

- Setpoint max. VOC/CO_2: Set the setpoint for max. VOC/CO_2
- Setpoint min. VOC/CO_2: Enter setpoint for min. VOC/CO_2
- Minimum outdoor air: This parameter **MUST** be set at 0% to stop the exhaust fan at VOC/CO_2 values below **Setpoint min VOC/CO_2**.
- Low speed: Enter the desired setpoint for flow at low speed
- High speed: Enter the desired setpoint for flow at high speed

Click on **Save** to save the settings.

Extract air slave

- The supply air fan is regulated in accordance with pressure in the supply air duct and the extract air fan is regulated as a slave of the supply air fan with the possibility of offset.
- The VEX unit must be fitted with two separate PTH pressure transmitters the supply air duct.

Possible settings

- **Extract air slave – WITHOUT modulated recirculation**
- **Extract air slave – WITH modulated recirculation**
- **Extract air slave - MED VOC/CO_2 Intermittent recirculation WITHOUT modulated recirculation**

For all three settings, the following applies:

Max. airflow

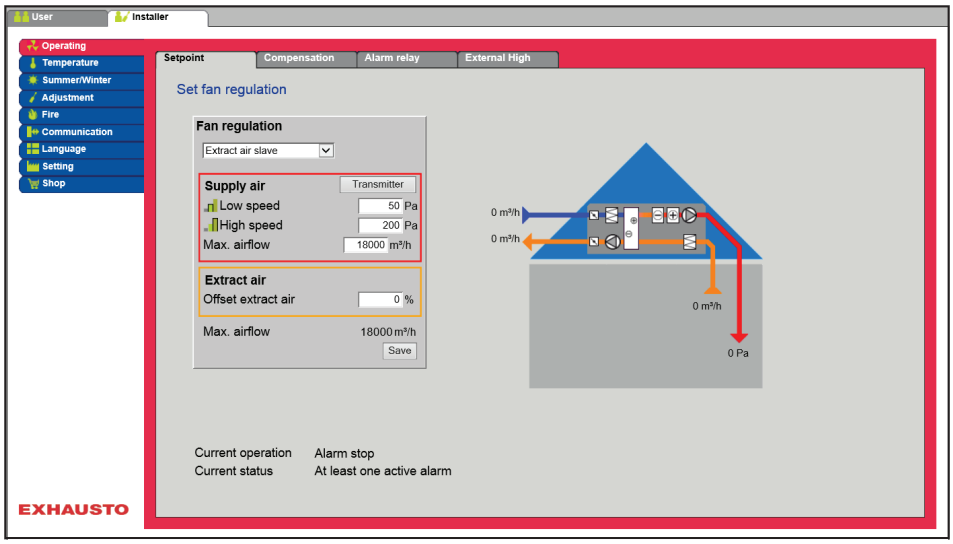
The airflow has a higher priority than the pressure/speed setpoint entered, i.e. if the desired pressure setpoint for pressure/speed is not achieved before the maximum entered airflow is reached, it is the airflow which limits further increase of the fan speed.

NB! The max. airflow cannot be set to a higher value than the max. unit airflow as set under: **Factory > Settings > Supply air**.

Minimum airflow

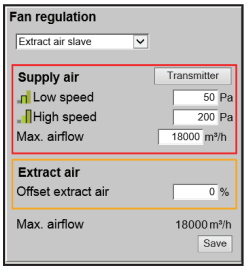
The minimum airflow is permanently set in the EXcon control system to 15% of the maximum airflow, and the minimum airflow has higher priority than the configured setpoint for pressure/speed.

Extract air slave – WITHOUT modulated recirculation



Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Normal** must be selected.



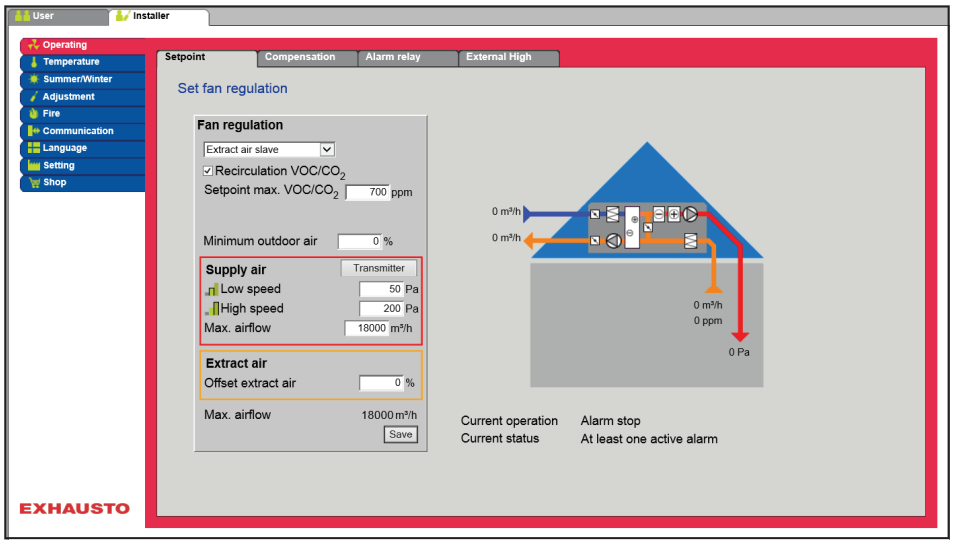
Fan regulation (supply/extract air):

- Low speed: Set the desired setpoint for duct pressure at Low speed
- High speed: Set the desired setpoint for duct pressure at high speed
- Max. airflow: Set the maximum airflow
- Offset extract air: Extract air follows the supply airflow, with an offset at a set value

Click on **Save** to save the settings.

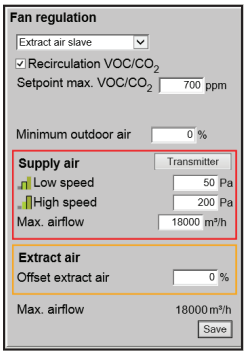
EXHAUSTO

Extract air slave – WITH modulated recirculation



Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Modulated recirculation** must be selected.
- Factory > Configuration > Mechanical: **Recirculation damper** must be configured.
- Mark the field **Recirculation VOC/CO_2**

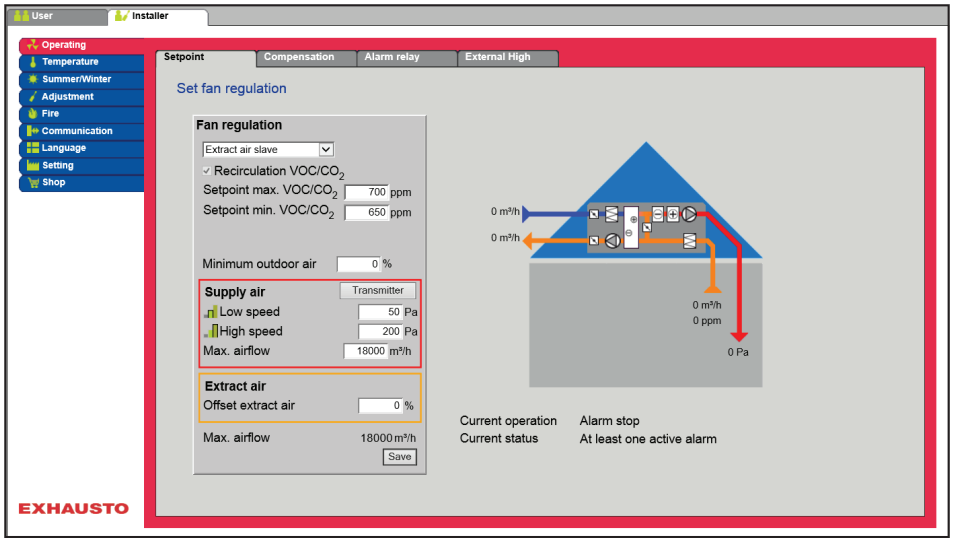


Fan regulation (supply/extract air):

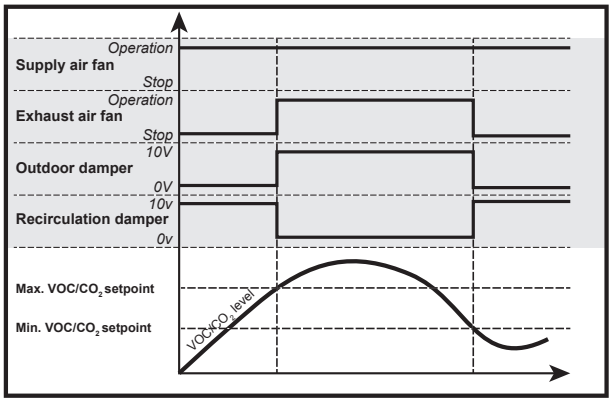
- Setpoint max. VOC/CO_2: Set the setpoint for max. VOC/CO_2
- Minimum outdoor air: Set the percentage of minimum outdoor air for modulated recirculation
- Low speed: Set the desired setpoint for duct pressure at Low speed
- High speed: Set the desired setpoint for duct pressure at high speed
- Max. airflow: Set the maximum airflow
- Offset extract air: Extract air follows the supply airflow, with an offset at a set value

Click on **Save** to save the settings.

Extract air slave - WITH VOC/CO_2 Intermittent reirculation

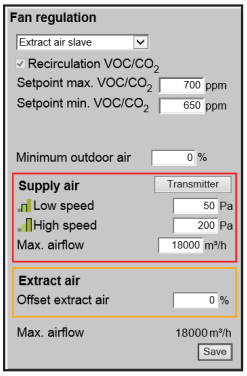


- The exhaust air fan only operates at VOC/CO_2 levels above **Setpoint max. VOC/CO_2**.
- At measured values below **Setpoint min. VOC/CO_2** the exhaust fan is stopped and the VEX unit runs full recirculation. See figure below.



Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Modulated Recirculation** and **VOC/CO_2 Intermittent Recirculation** must be selected.



Fan regulation (supply/extract air):

- Setpoint max. VOC/CO_2: Set the setpoint for max. VOC/CO_2
- Setpoint min. VOC/CO_2: Enter setpoint for min. VOC/CO_2
- Minimum outdoor air: This parameter **MUST** be set at 0% to stop the exhaust fan at VOC/CO_2 values below **Setpoint min VOC/CO_2**.
- Low speed: Set the desired setpoint for duct pressure at Low speed
- High speed: Set the desired setpoint for duct pressure at high speed
- Max. airflow: Set the maximum airflow
- Offset extract air: Extract air follows the supply airflow, with an offset at a set value

Click on **Save** to save the settings.

Supply air slave

- The exhaust air fan is regulated in accordance with pressure in the extract air duct and the supply air fan is regulated as a slave of the exhaust air fan with the possibility of offset.
- The VEX unit must be fitted with two separate PTH pressure transmitters the extract air duct.

Possible settings

- **Supply air slave – WITHOUT modulated recirculation**

For this setting, the following applies:

Max. airflow

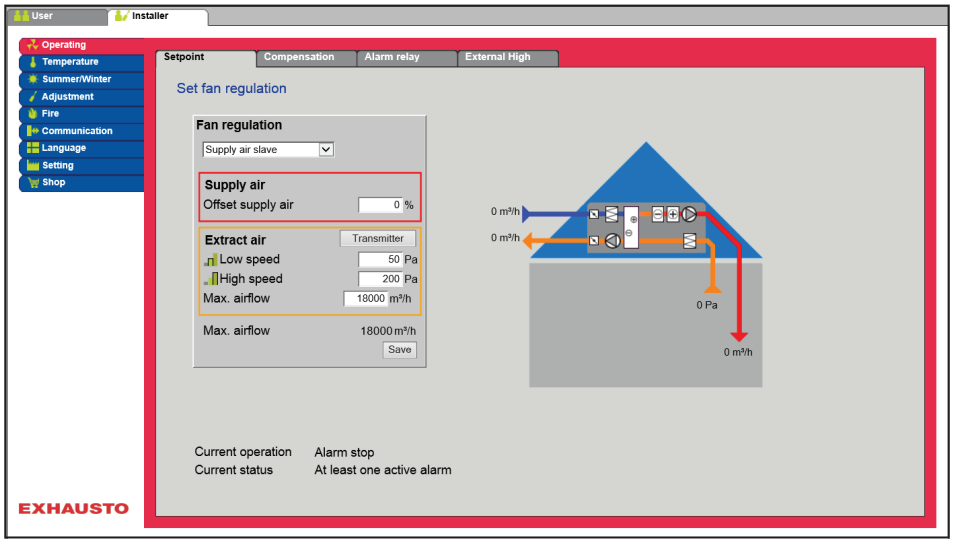
The airflow has a higher priority than the pressure/speed setpoint entered, i.e. if the desired pressure setpoint for pressure/speed is not achieved before the maximum entered airflow is reached, it is the airflow which limits further increase of the fan speed.

NB! The max. airflow cannot be set to a higher value than the max. unit airflow as set under: **Factory > Settings > Supply air**.

Minimum airflow

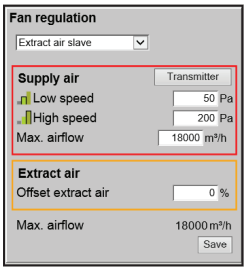
The minimum airflow is permanently set in the EXcon control system to 15% of the maximum airflow, and the minimum airflow has higher priority than the configured setpoint for pressure/speed.

Supply air slave – WITHOUT modulated recirculation



Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Normal** must be selected.



Fan regulation (supply/extract air):

- Offset supply air: Supply air follows the extract airflow, with an offset at a set value
- Low speed: Set the desired setpoint for duct pressure at Low speed
- High speed: Set the desired setpoint for duct pressure at high speed
- Max. airflow: Set the maximum airflow

Click on **Save** to save the settings.

Constant VOC/CO_2

- The VEX unit must be configured with a VOC/CO_2sensor.
- The VOC/CO_2 sensor is either a room sensor or duct sensor (located in the extract air duct) and configured under: EXcon modules > Configure > Analogue in/out.

Possible settings

- **Constant VOC/CO_2 - WITHOUT modulated recirculationExtract air slave – WITH modulated recirculation**

For this setting, the following applies:

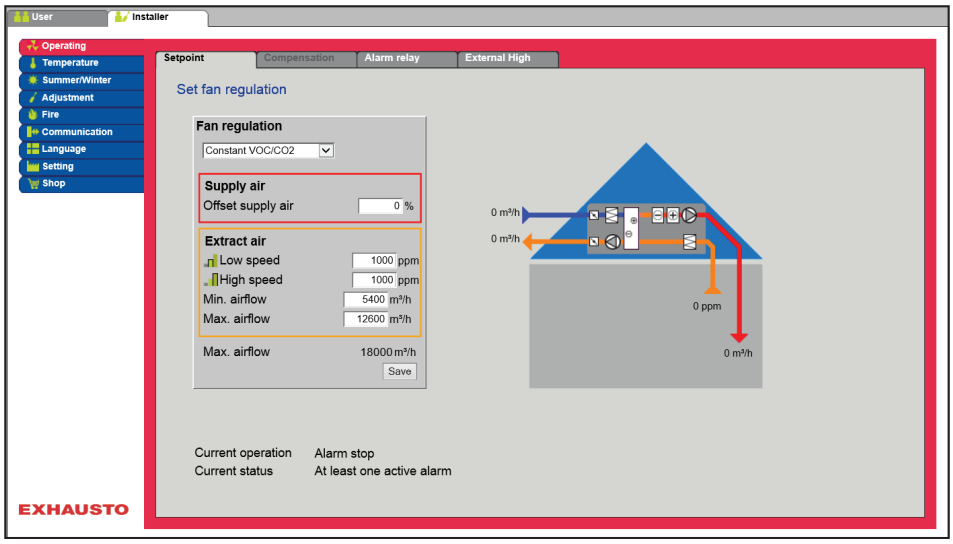
Minimum airflow

NB! The minimum airflow cannot be set to a lower value than 15% of the maximum airflow.

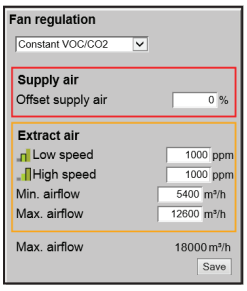
Max. airflow

NB! The min. airflow cannot be set to a higher value than the max. airflow as set under: Factory > Settings > Extract air.

Constant VOC/CO_2 - WITHOUT modulated recirculation



- The function is used to maintain a constant/maximum VOC/CO_2 level in a room or extract air duct.
- At a VOC/CO_2 level above the setpoint value, the extract air will be increased by modulation of the maximum airflow.
- At a VOC/CO_2 level below the setpoint value, the extract air will be decreased by modulation to the minimum airflow
- The supply airflow follows the extract airflow with a set offset (+/- %).



Fan regulation (supply/extract air):

- Offset supply air: Supply air follows the extract airflow, with an offset at a set value
- Low speed: Set the desired setpoint for duct pressure at Low speed
- High speed: Set the desired setpoint for duct pressure at high speed
- Min. airflow: Set the minimum airflow
- Max. airflow: Set the maximum airflow

Click on **Save** to save the settings.

Fan Optimiser

- The airflow/fan speed is regulated individually in the supply air and extract air by a 0-10V signal from the Belimo Fan Optimiser.

Possible settings

- **Fan optimiser - WITHOUT modulated recirculation**
- **Fan optimiser – WITH modulated recirculation**
- **Fan optimiser - WITH VOC/CO_2 Intermittent recirculation WITHOUT modulated recirculation**

Applies to all three settings:

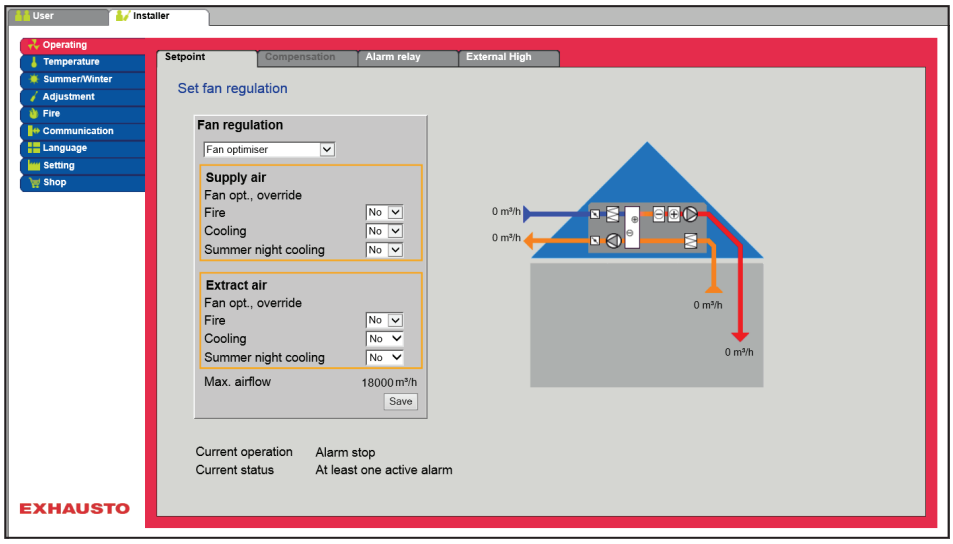
Override, supply air

Fire	**No:** No active override in the event of a fire alarm
	Yes: In the event of fire, the analogue output **Fan optimiser, supply air** is overridden to 0V or 10V, depending on the fans' setting below: **Installer > Fire > Fire damper** . ● If the setting is 0% for both fans, the output is overridden to 10V and the dampers to the outside are closed. ● If the setting is 0% for only one of the fans, the output is overridden to 0V and the dampers to the outside are open.
Cooling	**No:** No active overrides on activation of cooling need.
	Yes: In the event of cooling needs, the analogue output **Fan optimiser, supply air** is overridden to 0V, the digital output **Fan optimiser, supply air** is connected and the dampers are opened
Summer night cooling	**No:** No active overrides in connection with activation of summer night cooling.
	Yes: When summer night cooling is activated, the analogue output **Fan optimiser, supply air** is overridden to 0V, the digital output **Fan optimiser, supply air**is connected, and the dampers are opened.

Override, extract air

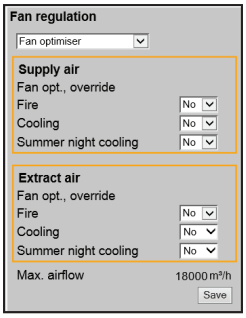
Fire	**No:** No active override in the event of a fire alarm
	Yes: In the event of a fire, the analogue output **Fan optimiser, extract air** is overridden to 0V or 10V, depending on the fans' settings below: **Installer > Fire > Fire damper** . ● If the setting is 0% for both fans, the output is overridden to 10V and the dampers to the outside are closed. ● If the setting is 0% for only one of the fans, the output is overridden to 0V and the dampers to the outside are open.
Cooling	**No:** No active overrides on activation of cooling need.
	Yes: In the event of a need for cooling, the analogue output **Fan optimiser, extract air** is overridden to 0V, the digital output. **Fan optimiser, extract air** is connected and the dampers are opened.
Summer night cooling	**No:** No active overrides in connection with activation of summer night cooling.
	Yes: When summer night cooling is activated, the analogue output **Fan optimiser, extract air** is overridden to 0V, the digital output **Fan optimiser, extract air** is connected and the dampers are opened

Fan optimiser - WITHOUT modulated recirculation



Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Normal** must be selected.

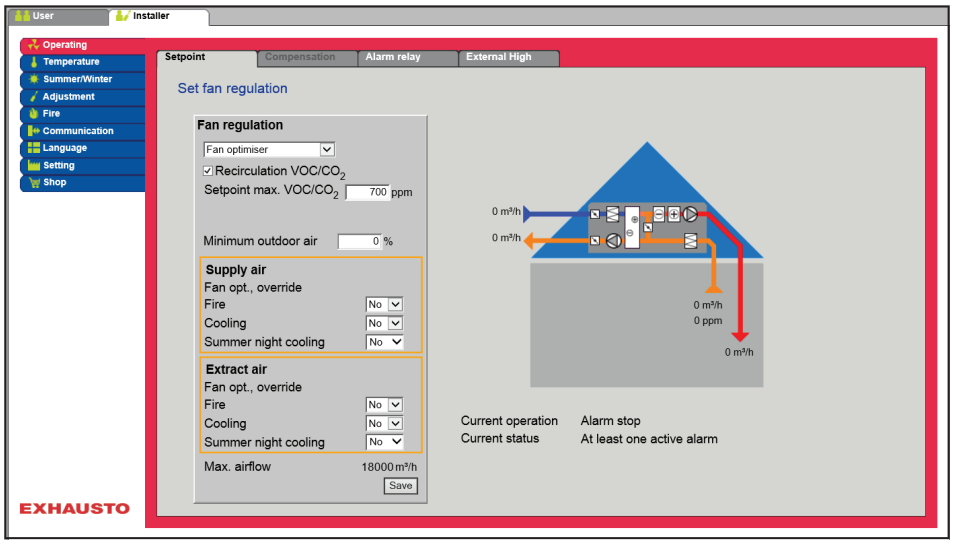


Fan regulation (supply/extract air):

- Fan optimiser override, supply/extract air, see Table "Applicable to all three settings"

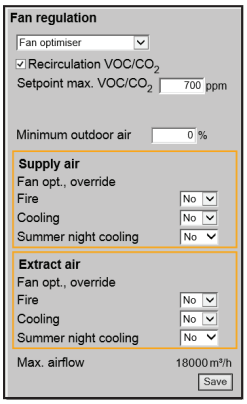
Click on **Save** to save the settings.

Fan Optimiser – WITH modulated recirculation



Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Modulated recirculation** must be selected.
- Factory > Configuration > Mechanical: **Recirculation damper** must be configured.
- Mark the field **Recirculation VOC/CO_2**

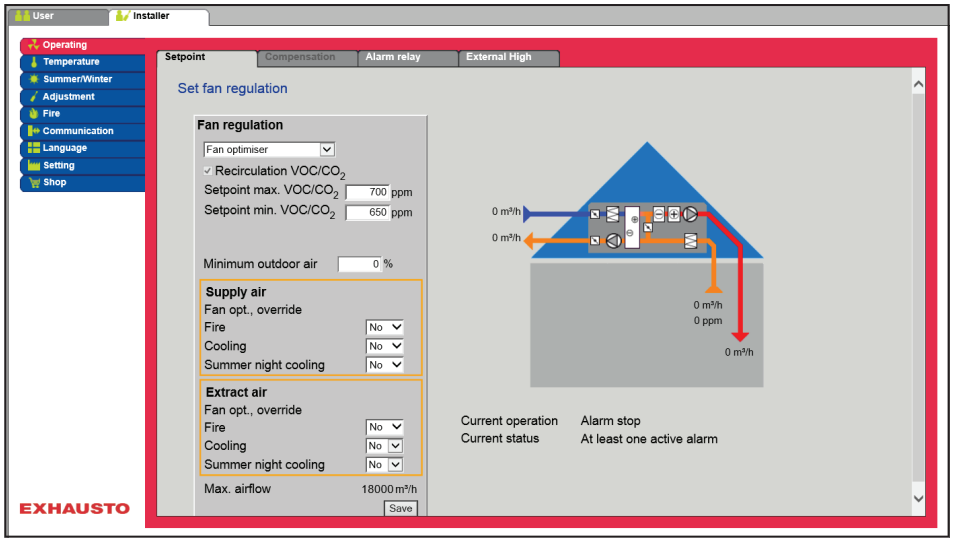


Fan regulation (supply/extract air):

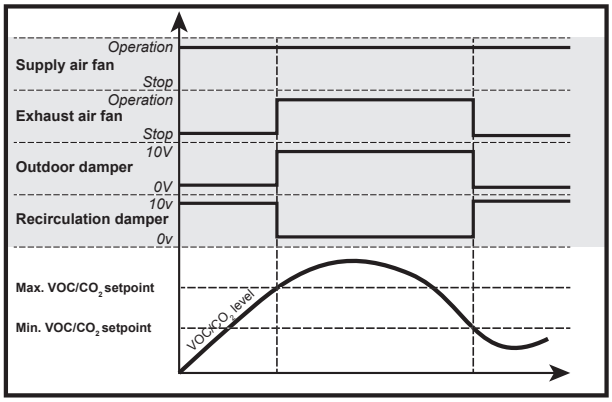
- Setpoint max. VOC/CO_2: Set the setpoint for max. VOC/CO_2
- Minimum outdoor air: Set the percentage of minimum outdoor air for modulated recirculation
- Fan optimiser override, supply/extract air, see Table "Applicable to all three settings"

Click on **Save** to save the settings.

Fan optimiser – WITH VOC/CO_2 Intermittent recirculation

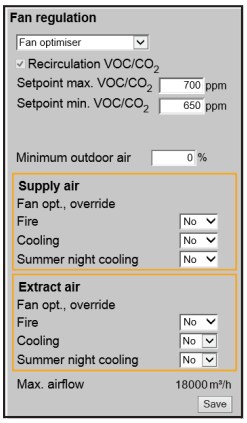


- The exhaust air fan only operates at VOC/CO_2 levels above **Setpoint max. VOC/CO_2**.
- At measured values below **Setpoint min. VOC/CO_2** the exhaust fan is stopped and the VEX unit runs full recirculation. See figure below.



Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Modulated Recirculation** and **VOC/CO_2 Intermittent Recirculation** must be selected.



Fan regulation (supply air):

- Setpoint max. VOC/CO_2: Set the setpoint for max. VOC/CO_2
- Setpoint min. VOC/CO_2: Enter setpoint for min. VOC/CO_2
- Minimum outdoor air: This parameter **MUST** be set at 0% to stop the exhaust fan at VOC/CO_2 values below **Setpoint min VOC/CO_2**.
- Fan optimiser override, supply/extract air, see Table "Applicable to all three settings"

Click on **Save** to save the settings.

For more general information on the Belimo Fan Optimiser, visit
www.belimo.com
or go directly by using this link:
www.belimo.eu/pdf/e/COU24-A-MP_2_2_en.pdf

Fan optimiser slave

- The airflow/fan speed is regulated individually in the supply air by a 0-10V signal from the Belimo Fan Optimiser.
- When the extract air fan is operating it follows the supply air fan with a set offset (+/-%).

Possible settings

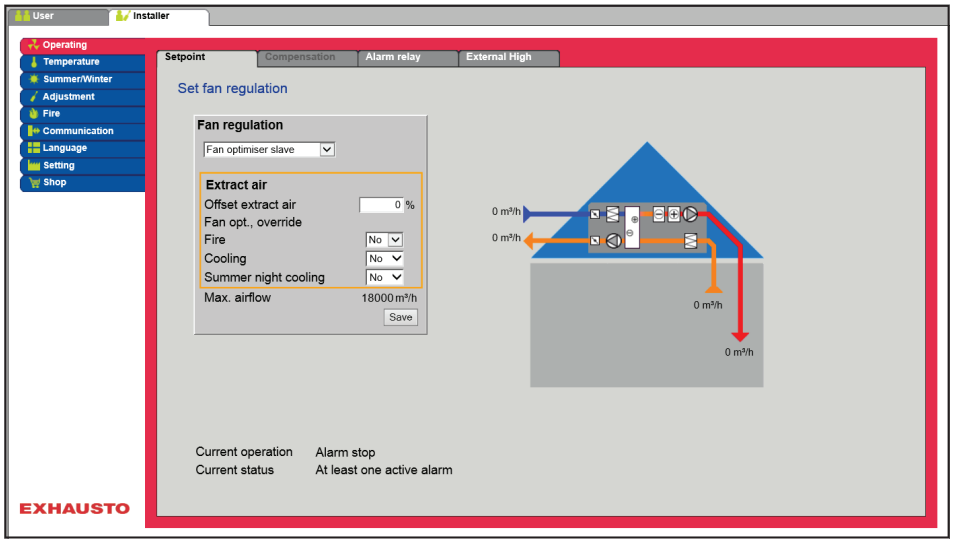
- **Fan optimiser slave - WITHOUT modulated recirculation**
- **Fan optimiser slave – WITH modulated recirculation**
- **Fan optimiser slave - WITH VOC/CO_2 Intermittent recirculation WITHOUT modulated recirculation**

Applies to all three settings:

Override, extract air

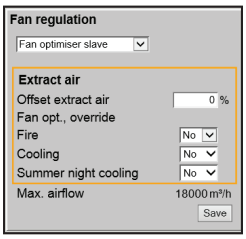
Fire	**No:** No active override in the event of a fire alarm
	Yes: In the event of a fire, the analogue output **Fan optimiser, extract air** is overridden to 0V or 10V, depending on the fans' settings below: **Installer > Fire > Fire damper** . • If the setting is 0% for both fans, the output is overridden to 10V and the dampers to the outside are closed. • If the setting is 0% for only one of the fans, the output is overridden to 0V and the dampers to the outside are open.
Cooling	**No:** No active overrides on activation of cooling need.
	Yes: In the event of a need for cooling, the analogue output **Fan optimiser, extract air** is overridden to 0V, the digital output. **Fan optimiser, extract air** is connected and the dampers are opened.
Summer night cooling	**No:** No active overrides in connection with activation of summer night cooling.
	Yes: When summer night cooling is activated, the analogue output **Fan optimiser, extract air** is overridden to 0V, the digital output **Fan optimiser, extract air** is connected and the dampers are opened

Fan optimiser slave - WITHOUT modulated recirculation



Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Normal** must be selected.

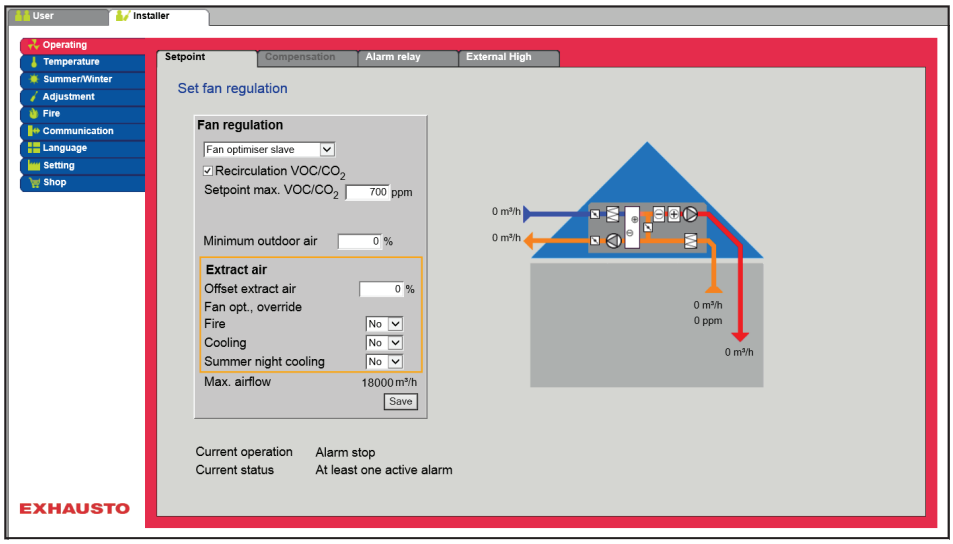


Fan regulation (extract air):

- Offset: Extract air follows the supply airflow, with an offset at a set value
- Fan optimiser override, extract air, see Table "Applicable to all three settings"

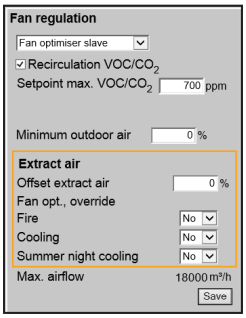
Click on **Save** to save the settings.

Fan Optimiser slave – WITH modulated recirculation



Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Modulated recirculation** must be selected.
- Factory > Configuration > Mechanical: **Recirculation damper** must be configured.
- Mark the field **Recirculation VOC/CO_2**

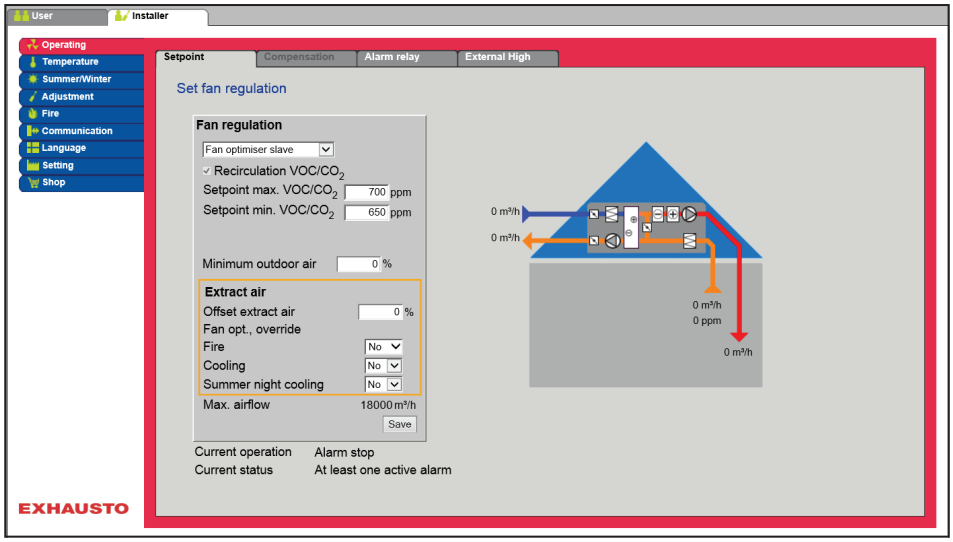


Fan regulation (extract air):

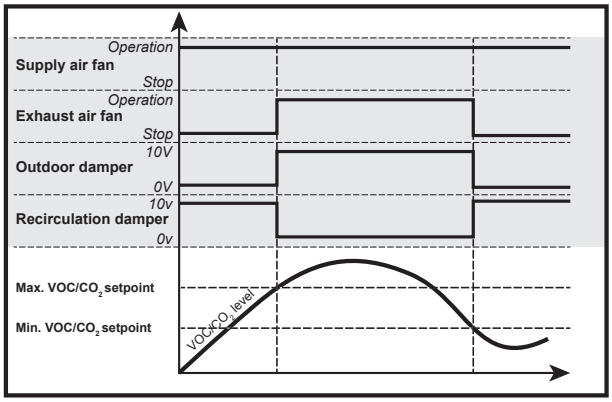
- Setpoint max. VOC/CO_2: Set the setpoint for max. VOC/CO_2
- Minimum outdoor air: Set the percentage of minimum outdoor air for modulated recirculation
- Fan optimiser slave override, extract air, see Table "Applicable to all three settings"

Click on **Save** to save the settings.

Fan optimiser slave – WITH VOC/CO_2 Intermittent recirculation

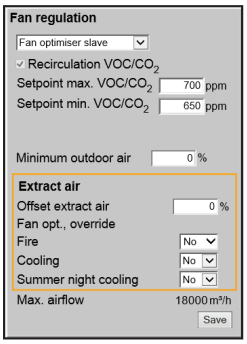


- The exhaust air fan only operates at VOC/CO_2 levels above **Setpoint max. VOC/CO_2**.
- At measured values below **Setpoint min. VOC/CO_2** the exhaust fan is stopped and the VEX unit runs full recirculation. See figure below.



Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Modulated Recirculation** and **VOC/CO_2 Intermittent Recirculation** must be selected.



Fan regulation (supply air):

- Setpoint max. VOC/CO_2: Set the setpoint for max. VOC/CO_2
- Setpoint min. VOC/CO_2: Enter setpoint for min. VOC/CO_2
- Minimum outdoor air: This parameter **MUST** be set at 0% to stop the exhaust fan at VOC/CO_2 values below **Setpoint min VOC/CO_2**.
- Fan optimiser override, supply/extract air, see Table "Applicable to all three settings"

Click on **Save** to save the settings.

For more general information on the Belimo Fan Optimiser, visit
www.belimo.com
or go directly by using this link:

www.belimo.eu/pdf/e/COU24-A-MP_2_2_en.pdf

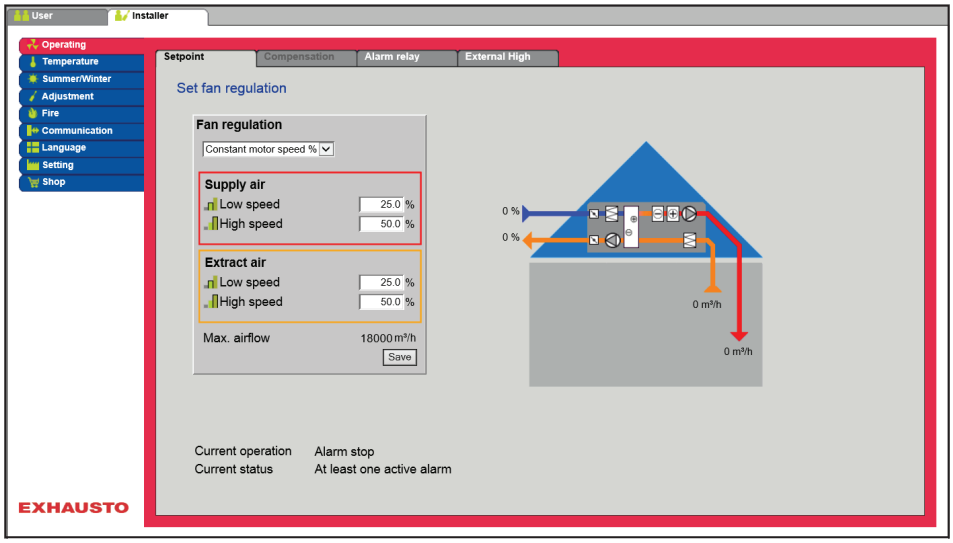
Constant motor speed %

- The speed of the fans is controlled individually according to the entered setpoints for the revolutions per minute.

Possible settings

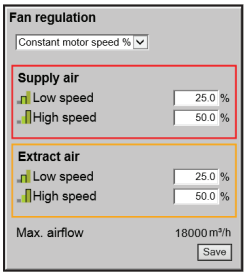
- **Constant motor speed % – WITHOUT modulated recirculation**
- **Constant motor speed % – WITH modulated recirculation**
- **Constant motor speed % - WITH VOC/CO_2 Intermittent recirculation WITHOUT modulated recirculation**

Constant motor speed % – WITHOUT modulated recirculation



Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Normal** must be selected.

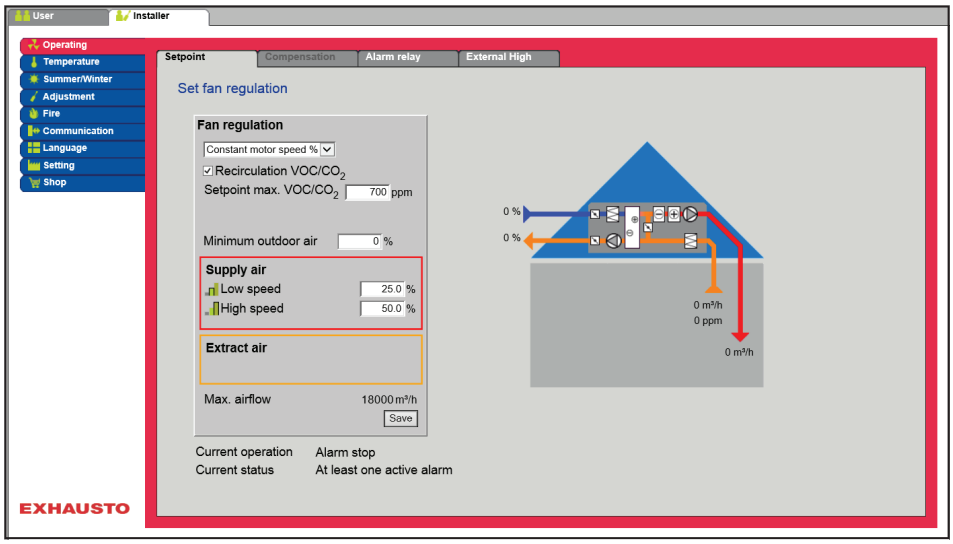


Fan regulation (supply/extract air):

- Low speed: Set the desired setpoint for fan speed in % in case of at low speed
- High speed: Set the desired setpoint for fan speed in % in case of at high speed

Click on **Save** to save the settings.

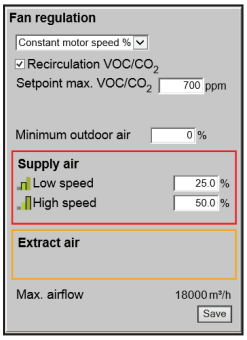
Constant motor speed % – WITH modulated recirculation



- The exhaust fan follows the same speed (slave) as the supply air fan.

Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Modulated recirculation** must be selected.
- Factory > Configuration > Mechanical: **Recirculation damper** must be configured.
- Mark the field **Recirculation VOC/CO_2**

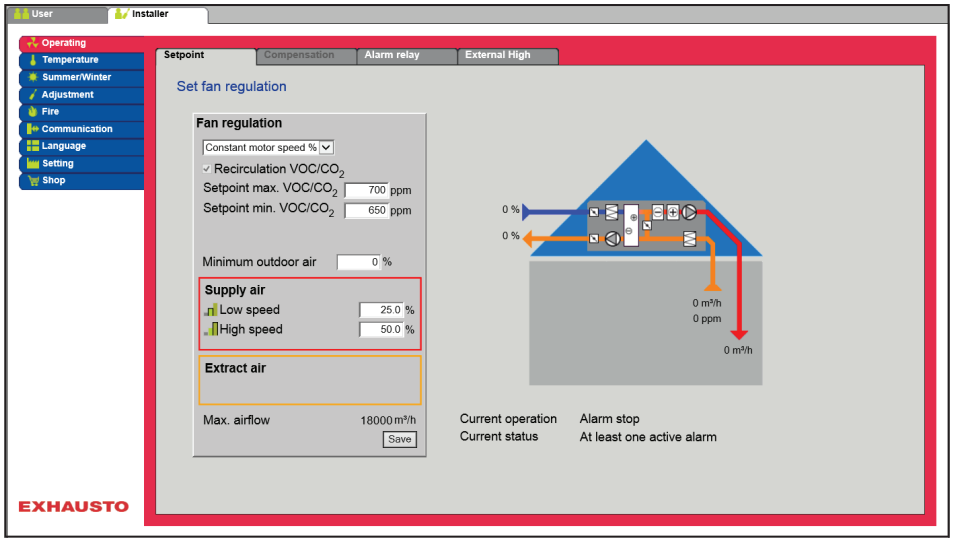


Fan regulation (supply air):

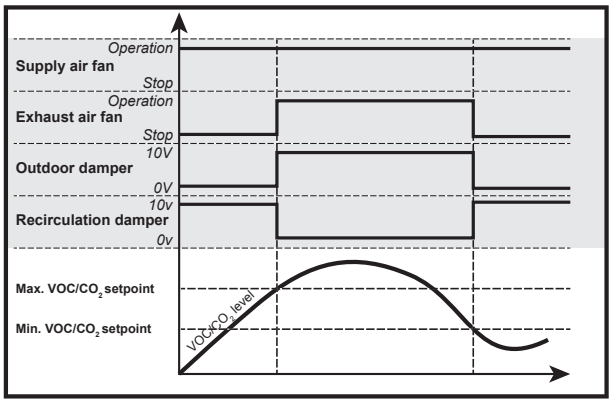
- Setpoint max. VOC/CO_2: Set the setpoint for max. VOC/CO_2
- Minimum outdoor air: Set the percentage of minimum outdoor air for modulated recirculation
- Low speed: Enter the desired setpoint for flow at low speed
- High speed: Enter the desired setpoint for flow at high speed

Click on **Save** to save the settings.

Constant motor speed – WITH VOC/CO_2 Intermittent recirculation

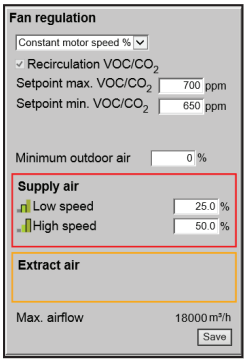


- The exhaust air fan only operates at VOC/CO_2 levels above **Setpoint max. VOC/CO_2**.
- The exhaust fan follows the same speed (slave) as the supply air fan.
- At measured values below **Setpoint min. VOC/CO_2** the exhaust fan is stopped and the VEX unit runs full recirculation. See figure below.



Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Modulated Recirculation** and **VOC/CO_2 Intermittent Recirculation** must be selected.



Fan regulation (supply air):

- Setpoint max. VOC/CO_2: Set the setpoint for max. VOC/CO_2
- Setpoint min. VOC/CO_2: Enter setpoint for min. VOC/CO_2
- Minimum outdoor air: This parameter **MUST** be set at 0% to stop the exhaust fan at VOC/CO_2 values below **Setpoint min VOC/CO_2**.
- Low speed: Enter the desired setpoint for flow at low speed
- High speed: Enter the desired setpoint for flow at high speed

Click on **Save** to save the settings.

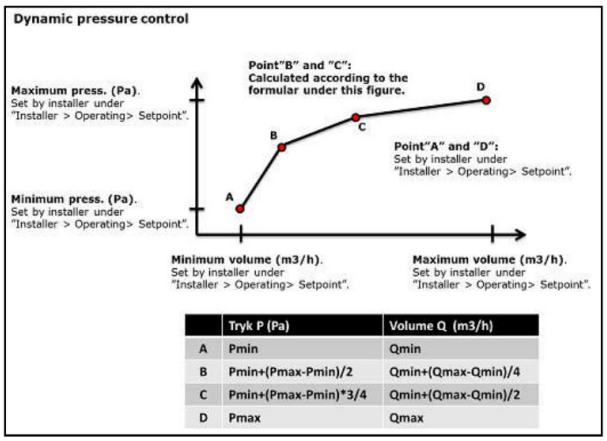
6.3.2 Dynamic pressure aDCV

The Dynamic Pressure function (aDCV) is an energy efficient control method that controls the dynamic duct pressure in relation to the airflow.

Unlike the **Constant pressure** regulation type, the **Dynamic pressure (aDVC)** regulators also take into account the actual airflow in the pressure calculations and calculate a new pressure setpoint:

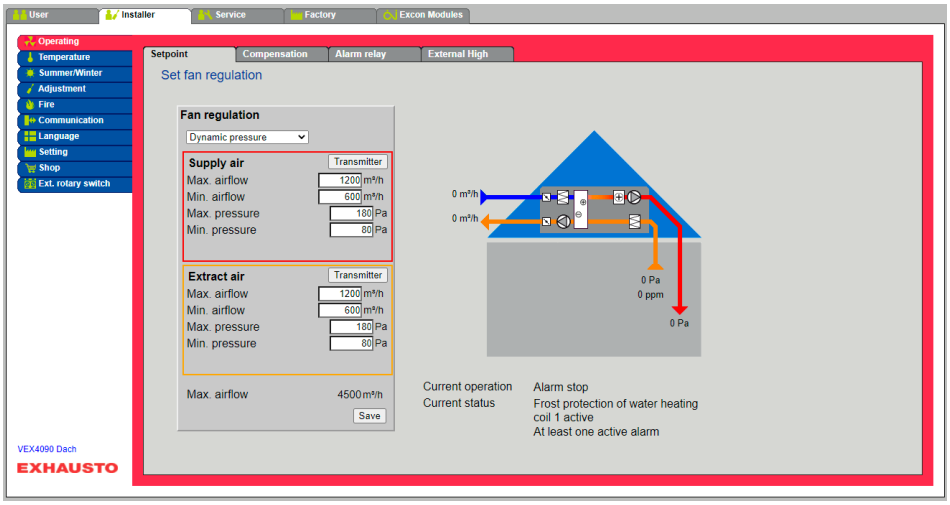
- Supply air and exhaust air fans are regulated according to the dynamic pressure measured in the respective supply and extract air ducts.
- The VEX unit must be fitted with two separate PTH pressure transmitters, one in the supply air duct and one in the extract air duct.
- The unit must be supplied with airflow control (AFC)

NB. The actual setpoint for **Dynamic pressure (aDVC)** is calculated according to the formulas in a predefined pressure/flow curve.



	Tryk P (Pa)	Volume Q (m3/h)
A	Pmin	Qmin
B	Pmin+(Pmax-Pmin)/2	Qmin+(Qmax-Qmin)/4
C	Pmin+(Pmax-Pmin)*3/4	Qmin+(Qmax-Qmin)/2
D	Pmax	Qmax

For fan regulation 'Dynamic pressure' without modulated re-circulation, the following applies:
The EXcon control system continuously calculates setpoints between the minimum and maximum values of the pressure in the ducts. The speed of the fans is thereby also continuously regulated and provides an energy-efficient control method.



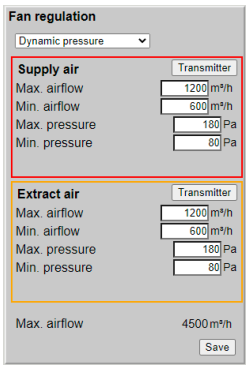
NB!

The maximum airflow cannot be set at a higher value than the maximum airflow set as below: **Factory > Settings > Supply air/Extract air**.

Minimum airflow cannot be set at less than 15% of maximum airflow.

Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Normal** must be selected.



Fan regulation (supply/extract air):

- Max. airflow: The set maximum airflow.
- Min. airflow: Set minimum airflow.
- Maximum pressure Set maximum pressure
- Minimum pressure Set minimum pressure

Press **Save** to save the settings.

Tips for commissioning with 'Dynamic pressure' (aDCV)

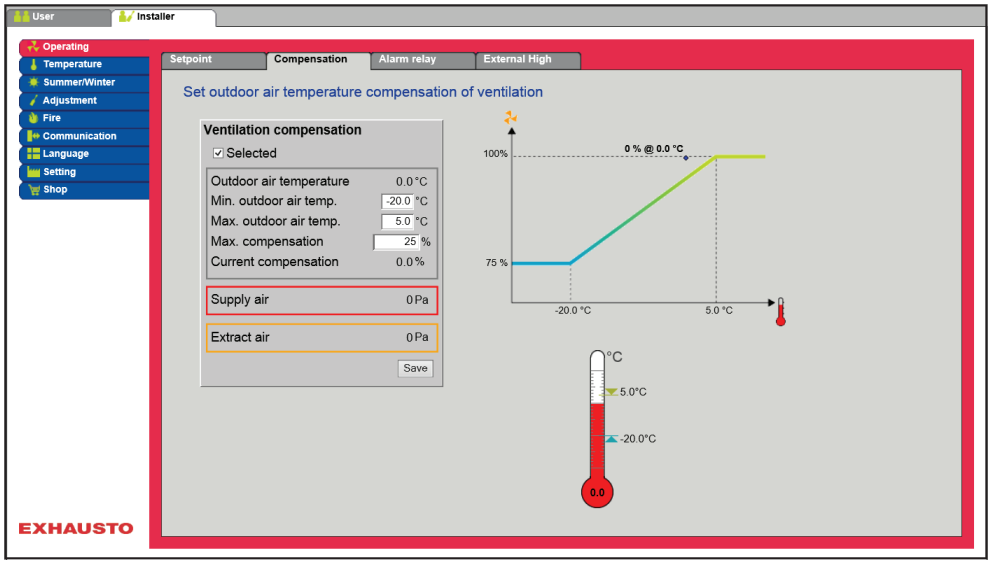
If you commission the system with aDCV activated, the airflow and duct pressure will continuously adapt to the system, which takes a long time.
This is how you do it:

- 1. The zones are commissioned at e.g. 200 Pa, where the system maintains the same pressure in the duct.
  2. The zones must be commissioned according to basic ventilation.
  3. Once commissioning is complete, the fan regulation is changed to Dynamic Pressure. Then the aDCV will adjust to the duct pressure necessary to maintain the same airflow.
  4. If necessary, you can check the zones and fine-tune them.
  5. When the individual zones are forced, aDCV will automatically increase the duct pressure and airflow.

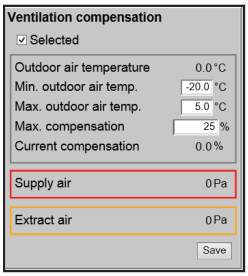
6.3.3 Compensation

This parameter in the **Operation** menu allows compensation for fan speed depending on the outdoor temperature.

Regulation modes - can Compensation be selected?	
Constant pressure	Yes
Constant airflow	Yes
Supply air slave	Yes
Extract air slave	Yes
Constant VOC/CO_2	No
Fan Optimiser	No
Fan optimiser slave	No
Constant motor speed %	No
Dynamic pressure	Yes



- Where outdoor air temperature is falling, the fan speed may be lowered in accordance with the entered curve.
- The entered setpoint will be offset according to the entered compensated setpoint when the outdoor air temperature is within the set compensation curve.
- The outdoor air temperature is measured with an outdoor air temperature sensor or a sensor in the outdoor air intake.



Ventilation compensation:

- Min. outdoor air temperature: Set the outdoor temperature for full compensation
- Max. outdoor air temperature Set the outdoor temperature for start compensation setpoint for duct pressure at high speed
- Max. compensation: Maximum setpoint reduction as a % at minimum outdoor air temperature

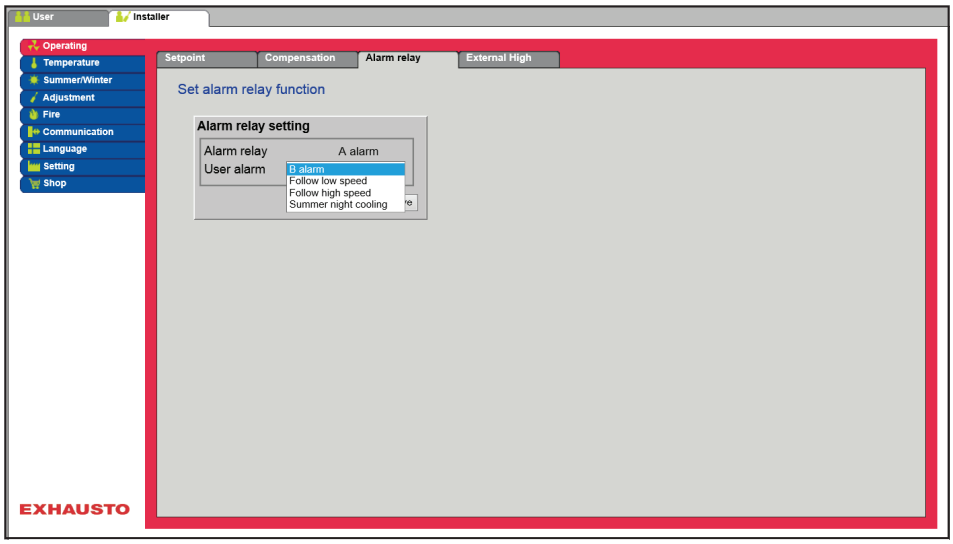
Click on **Save** to save the settings.

6.3.4 Alarm relay

With this parameter in the menu **Operation** the function alarm relay to be used may be selected **User alarm** must be set. The EXcon system has two digital outputs of which one is always configured to follow the A-alarms.

Alarm relay functions

- In addition to alarms, alarm relay functions can also be used to monitor the operation of e.g. an extra fan.



Alarm relay setting

- The two digital outputs are configured under **EXcon Modules > Configure > Digital in/out.**

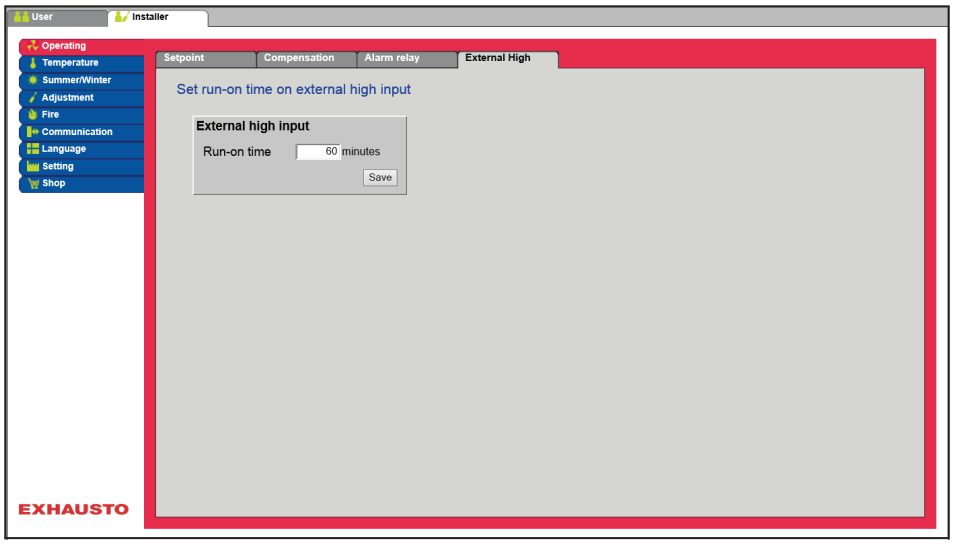
B Alarm	The digital output configured for the B alarm relay follows B alarms.
Follow low speed	The digital output configured for the B alarm relay follows low speed. The A alarm relay is activated by both A alarms and B alarms.
Follow high speed	The digital output configured for the B alarm relay follows high speed. The A alarm relay is activated by both A alarms and B alarms.
Summer night cooling	The digital output configured for the B alarm relay follows summer night cooling. The A alarm relay is activated by both A alarms and B alarms.

Press **Save** to save the settings.

6.3.5 External High

With this parameter in the menu **Operation** it is possible to increase the fan speed temporarily for a limited period of time.

- If the VEX unit has stopped, activation of the digital input will start the VEX unit at high speed for the set period of time.
- If the VEX unit is operating at low speed, the VEX unit will change to high speed for the set period of time.
- If the VEX unit is already at high speed in relation to the set weekly program, the VEX unit will remain at high speed for the set time.
- A alarms always have a higher priority.



Prerequisite for set-up

- The digital input is configured to the function under: **EXcon Modules > Configure > Digital in/out - High speed**.

External high input

- Run-on time: Set the time that the VEX unit is to run at high speed.

Press **Save** to save the settings.

6.4 Temperature

6.4.1 Regulation

This parameter in the menu **Temperature** can be used for controlling and regulating the temperature. The temperature can be set to perform regulation according to the following operating modes:

- Constant supply air
- Constant extract air
- Constant room
- Constant supply air/extract air difference

External setpoint

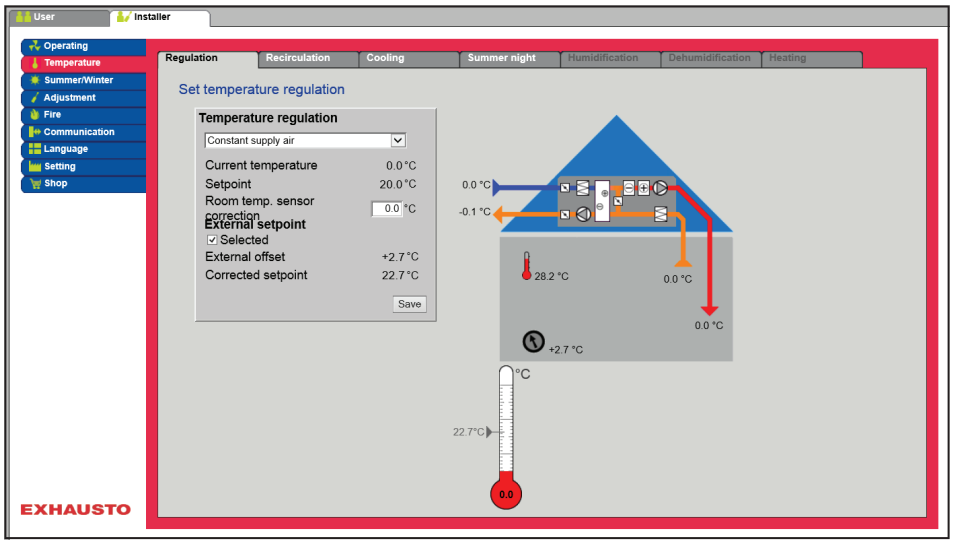
External setpoint allows the entered setpoint for the supply air temperature to be offset +/-5°C by means of a setpoint setter at an external location, e.g. in the room.

Mark in order to see:

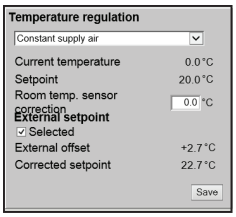
- Shown only when the input **Temp. setpoint offset** is configured under: **EXcon modules > Configure > Analogue in/out.**

Please note! Cannot be selected in the regulation mode Constant supply/extract air difference.

Constant supply air



- Temperature is regulated according to constant supply air temperature, as measured by the sensor in the supply air duct.
- The setpoint for supply air temperature is set under:**User > Temperature > Setpoint.**

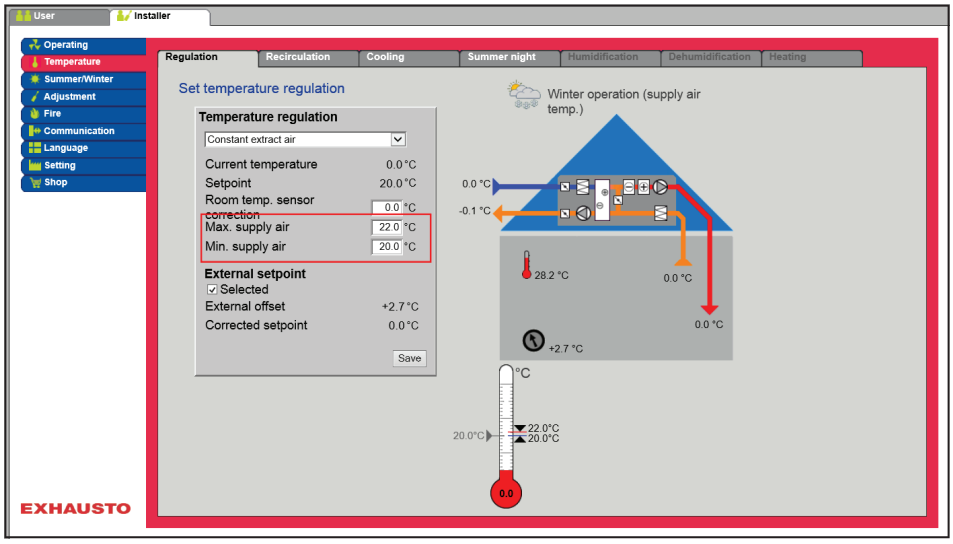


Temperature regulation:

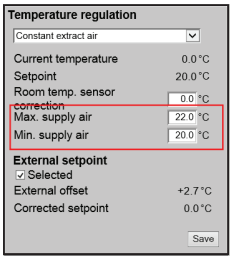
- Room temperature sensor correction: Set correction value for the room temperature sensor Settings range +/-3°C.

Click on **Save** to save the settings.

Constant extract air



- Temperature is regulated according to constant extract air temperature, as measured by the sensor in the extract air duct.
- The setpoint for supply air temperature is set under:**User > Temperature > Setpoint.**

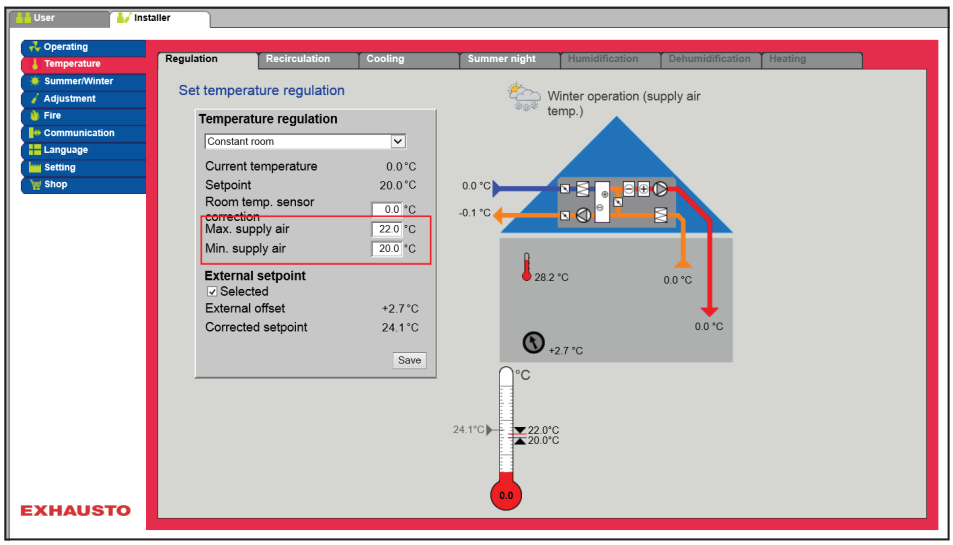


Temperature regulation:

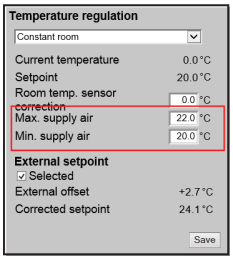
- Room temperature sensor correction: Set correction value for the room temperature sensor Settings range +/-3°C.
- Max. supply air: Set max. permitted temperature for supply air
- Min. supply air: Set min. permitted temperature for supply air

Click on **Save** to save the settings.

Constant room



- Temperature is regulated according to constant room temperature, as measured by the sensor in the room.
- The setpoint for supply air temperature is set under:**User > Temperature > Setpoint.**

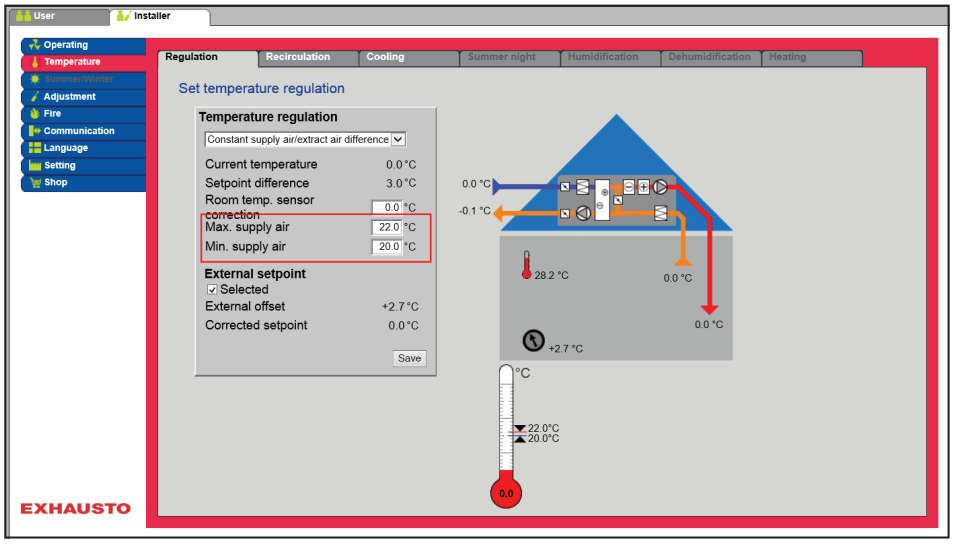


Temperature regulation:

- Room temperature sensor correction: Set correction value for the room temperature sensor Settings range +/-3°C.
- Max. supply air: Set max. permitted temperature for supply air
- Min. supply air: Set min. permitted temperature for supply air

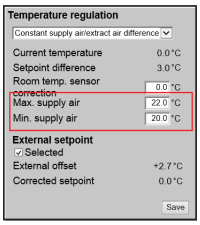
Click on **Save** to save the settings.

Constant supply/extract difference



- The temperature is regulated according to the difference between the supply air temperature and the extract air temperature.

EXHAUSTO



Temperature regulation:

- Room temperature sensor correction: Set correction value for the room temperature sensor Settings range +/-3°C.
- Max. supply air: Set max. permitted temperature for supply air
- Min. supply air: Set min. permitted temperature for supply air

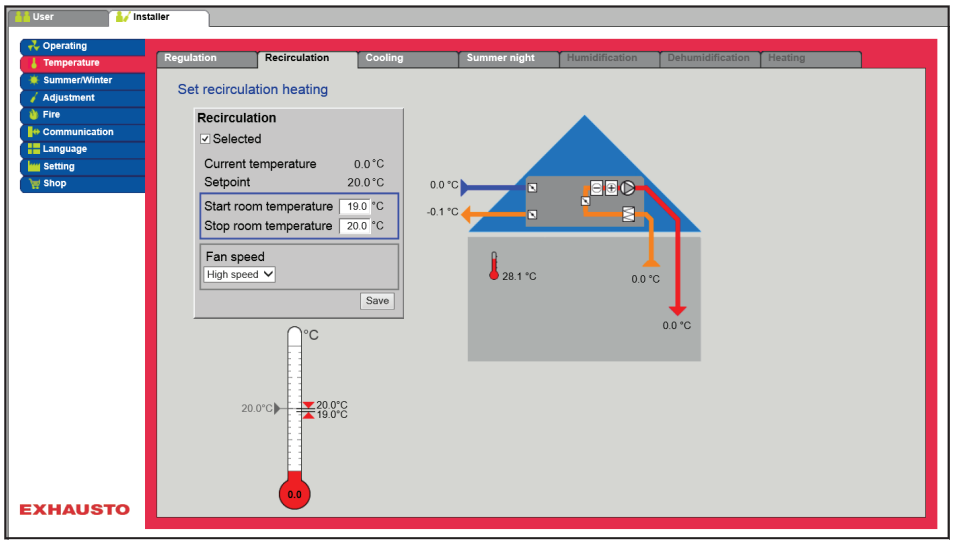
Click on **Save** to save the settings.

External outdoor air temperature sensor

The external outside air temperature sensor is used in all functions where the outside air temperature is included in the EXcon control system and can replace the channel mounted outside air temperature sensor.
The external outside air temperature must be configured under: **EXcon modules > Settings > Temperature/Pressure > Outdoor air temperature** (external sensor).
To achieve the best measuring results, the sensor should be mounted on a north-facing wall.

6.4.2 Recirculation (Night heating with recirculation)

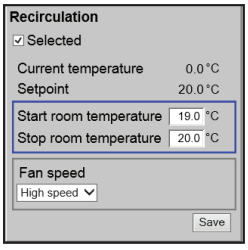
With this parameter in the menu **temperature** it is ensured that the room temperature does not fall below the set value when the unit has stopped for the night.



- The VEX unit starts up with the recirculation damper open and thus recirculates the air in the room.
- The recirculated air is heated by the heating coil.

Prerequisite for set-up

- Factory > Configuration > Mechanical: **Recirculation damper** must be configured
- Excon modules >Configure >Temperature/Pressure: **Room sensor** must be configured (Room temperature)
- EXcon Modules > Configure > Settings: **Modulated recirculation** must be selected



Recirculation

- Start room temperature: The VEX unit starts when the room temperature is at a value below the setpoint.
- Stop room temperature: The VEX unit stops when the room temperature is at a value above the setpoint.
- Fan speed:
  - Low speed – the VEX unit runs at low speed during night-time heating.
  - High speed – the VEX unit runs at high speed during night-time heating.

Click on **Save** to save the settings.

6.4.3 Cooling

With this parameter in the menu **temperature** it is ensured that active cooling is only used under certain pre-set conditions.

Possible cooling modes

- **Water cooling**
- **External DX cooling**
- **DX cooling**
- **DX cooling and RHP heat pump**

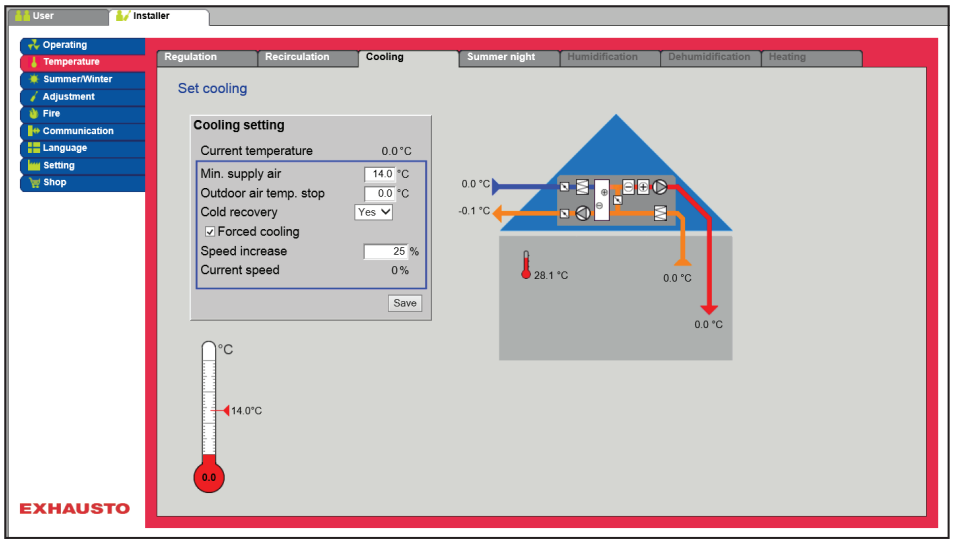
For all cooling modes, the following applies:

Cold recovery

This function must **not** be selected in a VEX unit with an IC section

When cold recovery is selected, the heat recovery (crossflow heat exchanger or rotary heat exchanger) will also be used as cold recovery.
The function will be activated when the outdoor air temperature is higher than the room temperature or the extract air temperature.

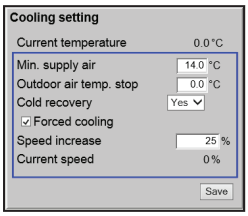
Water cooling/External DX cooling



Prerequisite for set-up

One of the following cooling types must be installed and configured:

- **Water cooling**
- **External DX Cooling**

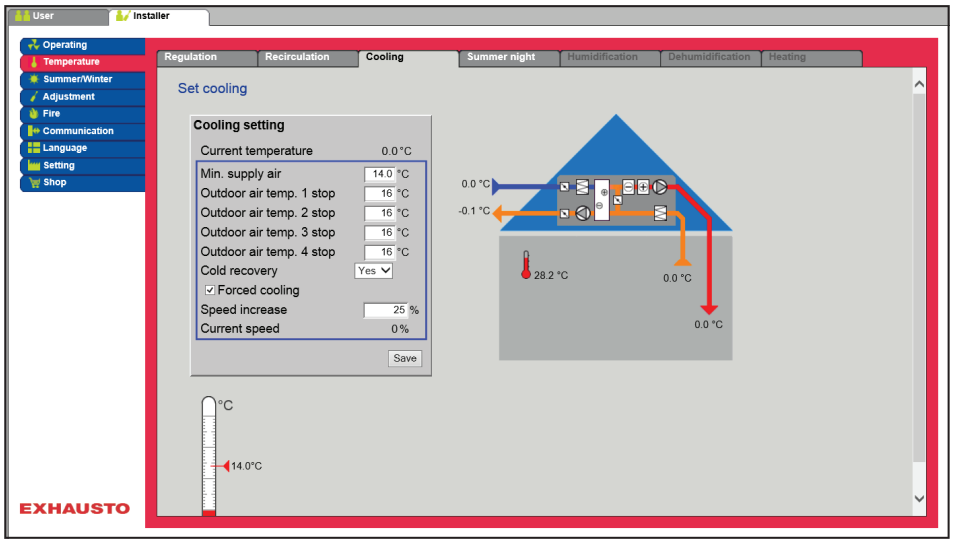


Cooling setting:

- **Minimum supply air** : Setpoint for the minimum supply air temperature when cooling is active.
- **Outdoor temperature stop**: When outdoor temperature is below the entered setpoint, cooling stops.
- **Cooling recovery** Select Yes/No
- **Forced cooling**: When this option is selected, the airflow will be increased when cooling is active.
- **Speed increase**: The fan speed will increase by the entered percentage when cooling is active. Max. airflow has higher priority.

Click on **Save** to save the settings.

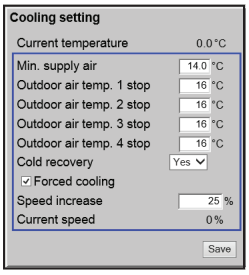
DX cooling/DX cooling and RHP heat pump



Prerequisite for set-up

The following cooling mode must be installed and configured:

- **DX cooling**
- **DX cooling and RHP heat pump**



Cooling setting:

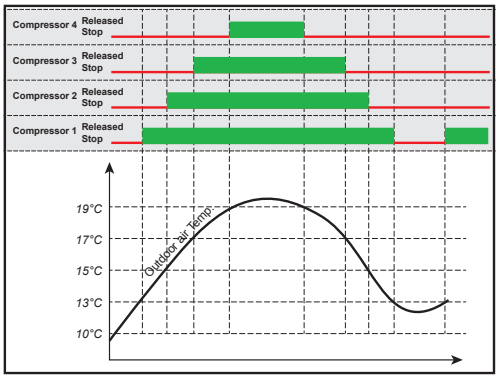
- **Minimum supply air**: Setpoint for the minimum supply air temperature when cooling is active.
- **Outdoor air temperature 1 stop**: Compressor 1 stops if the outdoor air temperature is lower than stop temperature 1.
- **Outdoor air temperature 2 stop**: Compressor 2 stops if the outdoor air temperature is lower than stop temperature 2.
- **Outdoor air temperature 3 stop**: This setting is not used.
- **Outdoor air temperature 4 stop**: This setting is not used.
- **Cooling recovery** Select Yes/No
- **Forced cooling**: When this option is selected, the airflow will be increased when cooling is active.
- **Speed increase**: The fan speed will increase by the entered percentage when cooling is active. Max. airflow has higher priority.

Click on **Save** to save the settings.

Energy-saving function

Settings **Outdoor temperature 1-4 stops** are intended to prevent the compressors or cooling steps from cutting in if the outdoor air temperature is lower than the set value This will ensure that there are no more compressors in operation than are necessary for maintaining the desired temperature in the supply air duct or the room.

In the selected example, all four compressors will be in operation when the outdoor air temperature is over 19°C.

Compressor 1 will be released for operation when outdoor air temperature is over 13°C	
Compressor 2 will be released for operation when outdoor air temperature is over 15°C	
Compressor 3 will be released for operation when outdoor air temperature is over 17°C	
Compressor 4 will be released for operation when outdoor air temperature is over 19°C	
The values shown are the release signals for the compressors. Ultimately, the current cooling requirement from the temperature control system will start up the compressors.	

Enthalpy

In general

In principle, the generation of a cooling effect is four times more expensive than the generation of heating effect. For economy, it is therefore important to use the cooling effect to cool the air which it will be most energy efficient to use the cooling on. Enthalpy is an expression of the air's energy content, and the air's enthalpy content is calculated by measuring the air's temperature and the relative humidity.

Enthalpy control system

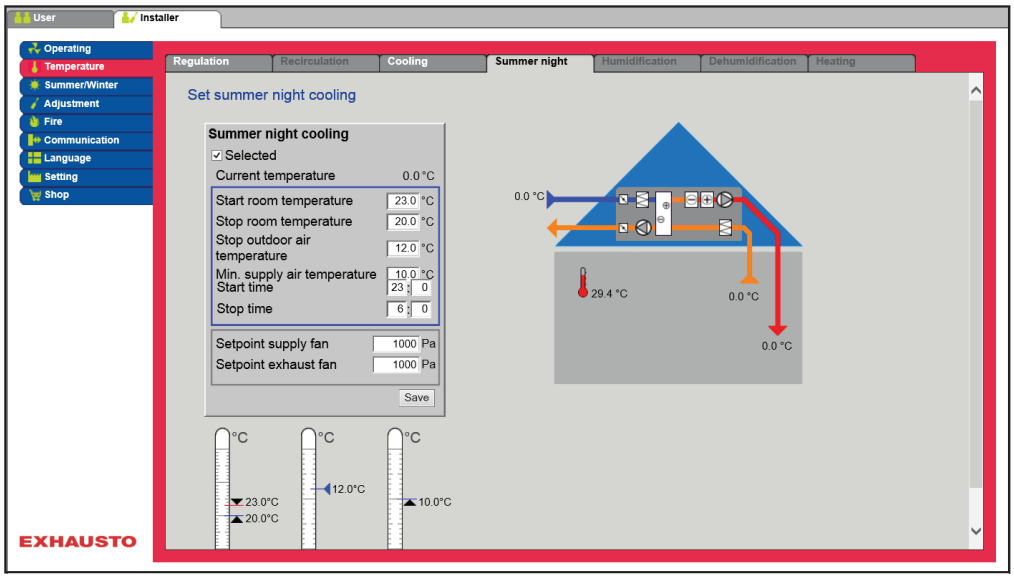
The EXcon control system has an Enthalpy control system which is used to obtain the most energy-efficient use of the cooling control system. By placing the combined conditions of humidity sensors and temperature sensors in the recirculation and extract air, the two airflow's enthalpy content will be calculated. In the event of a cooling requirement, the air (outdoor air or extract air) with the lowest energy/enthalpy will always be used for cooling. By controlling the cooling according to the energy content of the air, the energy used for cooling is reduced to a minimum.
To allow the EXcon control system to control cooling according to the enthalpy content, the VEX unit must as a minimum be configured with modulating recirculation/recirculation dampers, two HTH humidity sensors and active cooling. The function is automatically connected when the above minimum requirements are satisfied.

6.4.4 Summer night (Free cooling)

With this parameter in the menu **temperature** a room may be cooled down with outdoor air without use of active cooling.

The **Summer night** function may only be selected if an outdoor air temperature sensor is mounted and configured and for the following temperature regulation modes:

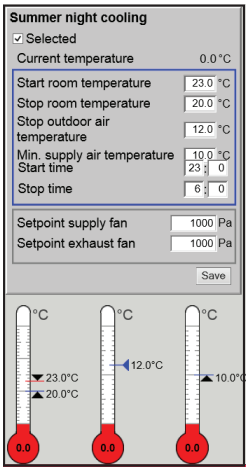
- Constant supply air
- Constant extract air
- Constant room



Pre-conditions

Summer night cooling is activated only if all the following settings are met:

- If there has been no heat from the heating coil for more than 60 minutes in total over the latest time period between 12.00 and 23.59
- Outdoor air temperature is above the set value **Outdoor stop temperature**
- Room temperature is above the set value **Start room temperature** .
- Outdoor air temperature must at least be >2 °C lower than the room temperature.



Summer night cooling:

- Start room temperature: Summer night cooling starts at a higher room temperature than the set value **Start room temperature**
- Stop room temperature: Summer night cooling stops at a lower room temperature than the set value **Stop room temperature**
- Stop outdoor air temperature: Summer night cooling stops at a lower outdoor air temperature than **Outdoor stop temperature**
- Min. supply air: Set the minimum temperature of the supply air when summer night cooling is active.

  The heat exchanger is used to ensure that minimum supply air can be maintained.
- Start time: Set the earliest time that summer night cooling may start. **Settings range: Hours 20.00 – 02.00**
- Stop time: Set the latest time that summer night cooling may stop. **Settings range: Hours 03.00 – 08.00**
- Setpoint supply air fan: Set the setpoint for supply air fan during summer night cooling
- Setpoint extract air fan: Set the setpoint for the extract air fan during summer night cooling

Click on **Save** to save the settings.

Summer night cooling with temperature sensor

When the air handling unit is configured with a room temperature sensor, it will continuously monitor the room temperature and start the VEX unit as needed within the set **Start/Stop time**.

Summer night cooling without temperature sensor

If the air handling unit is not configured with a room sensor, but only with a temperature sensor for extract air, the VEX unit will start up at the set **Start time.** The air handling unit will be in operation for 10 minutes when the current room/extract air temperature is measured.

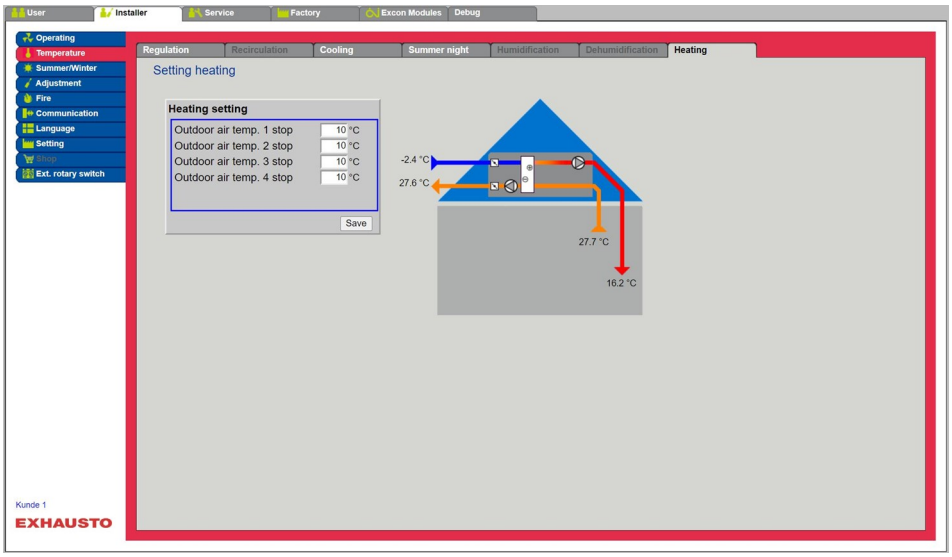
If the conditions for summer night cooling are satisfied, the VEX unit will remain in operation until the stop conditions are satisfied.

If the conditions for summer night cooling are not satisfied, the VEX unit will stop after 10 minutes of operation. This start up is only done once, and occurs at the set **Start time**.

6.4.5 RHP Heat and heat setting

Heating

This tab is only available when under: **Factory>Configuration>Mechanical**, **DX cooling and RHP heat pump** (Integrated heat pump) is selected.



When the heat pump (RHP) is in operation for heat production for the unit, the compressors will run as a heat pump and supply heating, which is added to the supply air.

Energy-saving function

Settings **Outdoor temperature 1-4 stops** are intended to prevent the compressors or cooling steps from cutting in if the outdoor air temperature is lower than the set value This will ensure that there are no more compressors in operation than are necessary for maintaining the desired temperature in the supply air duct or the room.

In the selected example, all four compressors will be in operation when the outdoor air temperature is over 19°C.

Compressor 1 will be released for operation when outdoor air temperature is over 13°C

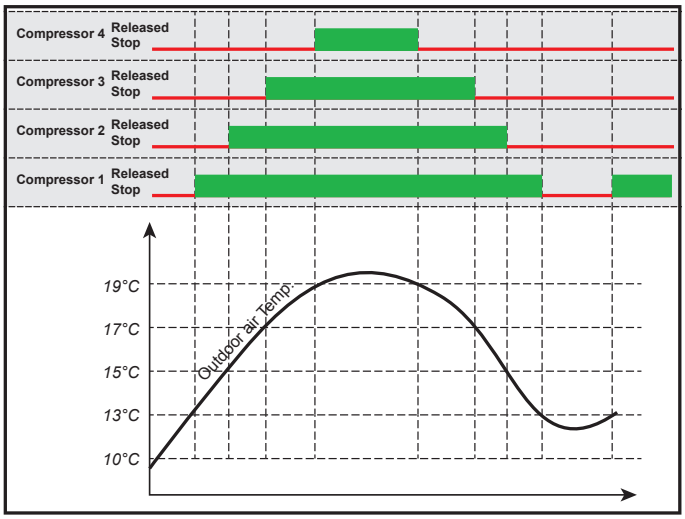
Compressor 2 will be released for operation when outdoor air temperature is over 15°C

Compressor 3 will be released for operation when outdoor air temperature is over 17°C

Compressor 4 will be released for operation when outdoor air temperature is over 19°C

The values shown are the release signals for the compressors.

Ultimately, the current cooling requirement from the temperature control system will start up the compressors.



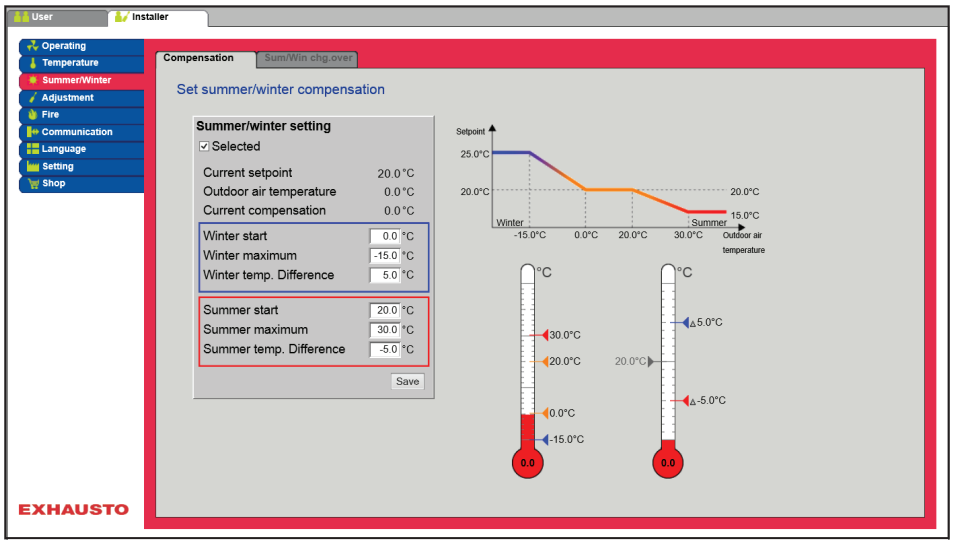
6.5 Summer/Winter

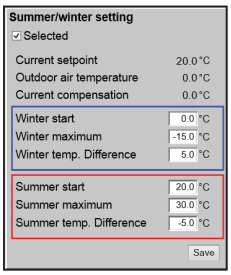
6.5.1 Compensation

With this parameter in the menu **Summer/Winter** it is possible for the selected temperature setpoint for supply air to be offset in relation to the outdoor temperature in summer and/or winter.

The function **Compensation** may only be selected with the following temperature regulation modes:

- Constant supply air
- Constant extract air
- Constant room





Summer/winter setting:

- **Summer/winter setting:** Select whether compensation is to be active by entering a tick.
- **Winter start**: Set the outdoor air temperature for when the winter compensation must begin.
- **Winter maximum**: Set the outdoor air temperature for when the winter compensation must be at maximum.
- **Winter temp. difference**: Set the number of degrees the setpoint temperature for supply air is increased in case of maximum winter compensation.
- **Summer start :** Set the outdoor air temperature for when the summer compensation must begin.
- **Summer maximum :** Set the outdoor air temperature for when the summer compensation must be at maximum.

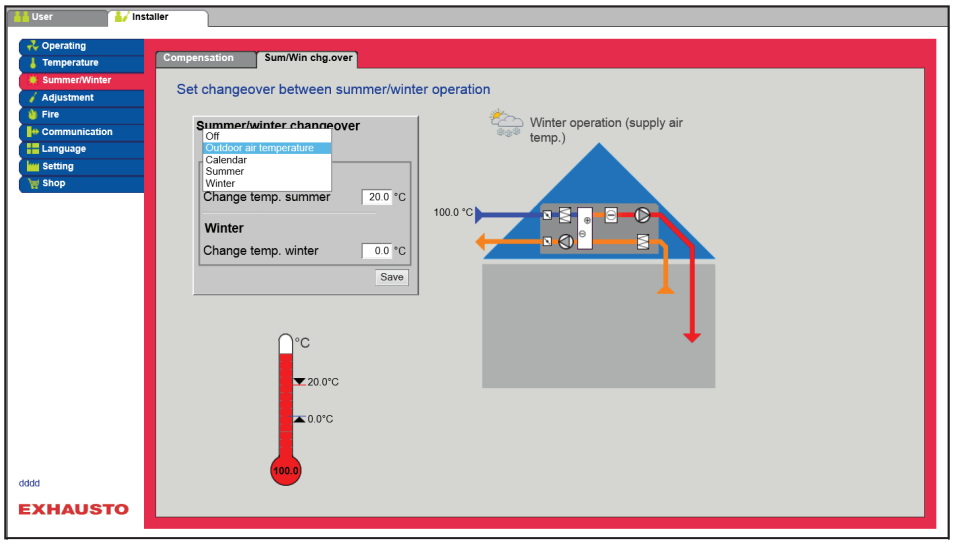
Click on **Save** to save the settings.

6.5.2 Summer/winter changeover

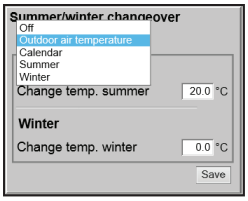
With this parameter in the menu **Summer/Winter** it is possible to select automatic switching between different operating modes depending on the outdoor temperature, or according to the calendar.

The function **Summer/winter changeover** may only be selected with the following temperature regulation modes:

- Constant extract air
- Constant room



- The regulation mode switch between constant room temperature during winter operation and constant supply air temperature during summer operation.



Summer/winter changeover:

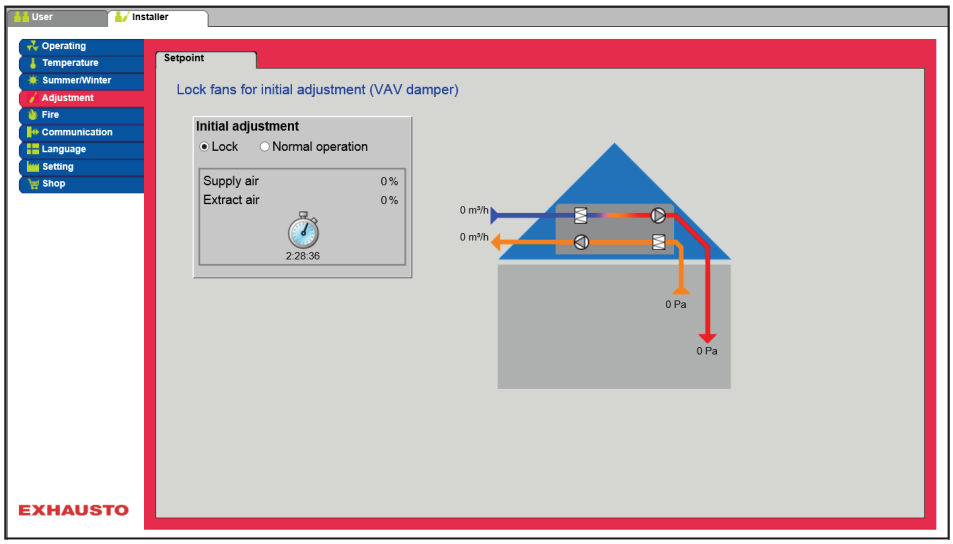
- **From :** No changeover between operating modes
- **Outdoor temperature**: speed: Set the desired setpoint for duct pressure at high speed
  - **Summer:** Regulation mode
  - **Winter:** Regulation mode
- **Calendar**: The regulation form changes between summer and winter operation in accordance with the set dates in the calendar.
- **Summer:** Constant summer operation (Room temperature)
- **Winter:** Constant winter operation (Supply air temperature)

Click on **Save** to save the settings.

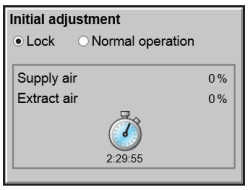
6.6 Initial adjustment

6.6.1 Setpoint

With this parameter in the menu **Initial adjustment** it is possible to lock the fan/airflow during commissioning work, in connection with VAV installations.



- The speed is locked at the values entered under the **Fire** tab.



Initial adjustment:

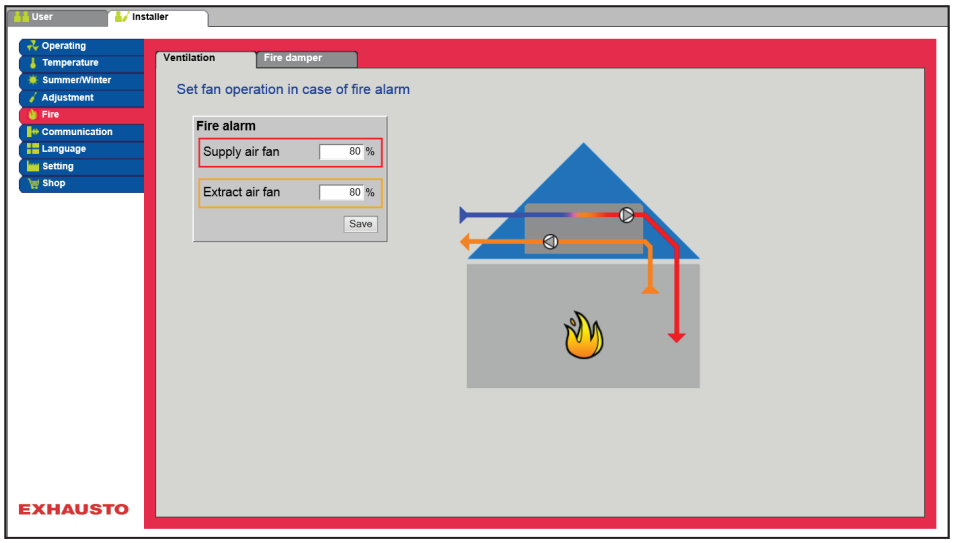
- When selecting **Lock**, time limits can be selected by clicking the clock.
- The time can be adjusted between 2½ and 8 hours.
- The function is automatically cancelled when the time expires and the VEX unit returns to normal operation.

Safety: Frost protection of the heating coil is active – ordinary temperature regulation is not active.

6.7 Fire

6.7.1 Ventilation

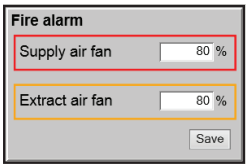
This parameter in the **Fire** menu is a function used in case of fire alarm, e.g. from a central fire alarm unit (ABA) or smoke detectors.
The function can also be used for smoke evacuation and fireman's stop, if a 3-position selector is installed and configured.



- The function is activated when the digital input **Fire alarm (fire setpoint)** is opened.

Prerequisite for set-up

- EXcon Modules > Configure > Digital in/out: **Fire alarm (fire setpoint)** must be configured.



Set fan operation in case of fire alarm

- If the setting is 0% for both fans, the dampers towards the outside are closed.
- If just one of the values is >0%, both dampers will be open.
- The fan is forced to run at the set speed when the fire alarm is activated.
- **Automatic reset of fireman's stop:** Mark that the alarm will automatically be reset after activation of the input **Fire stop**.
- **Heat exchanger stop:** Mark in order to stop the heat exchanger in the event of a fire alarm.

Click on **Save** to save the settings.

NB: The selected operating mode of the fans should meet regulatory standards.

Fire stop (fireman's stop)

The function is used in case of fire e.g. emergency stop or smoke detectors in the outdoor air duct.

Pre-conditions for setting

- EXcon Modules > Configure > Digital in/out: **Fire stop** must be configured.

When the input is activated/opened:

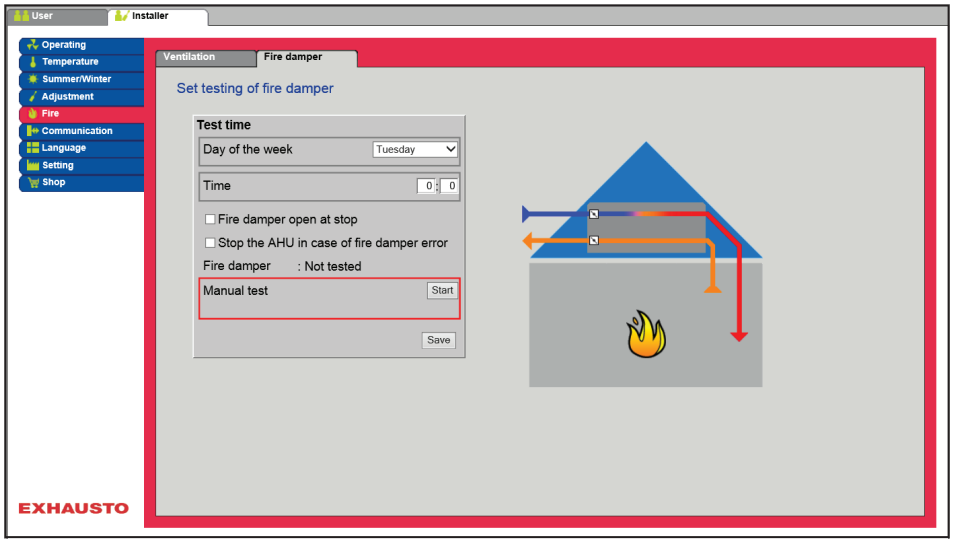
- the VEX unit stops.
- Any overrides and operating modes are cancelled.
- Heat recovery stops.
- No alarms are activated.
- If the VEX unit is in the fire damper test, this test stops.
- HMI and web user interface notify **Current status**: **External fire stop**.

6.7.2 Fire damper test

This parameter in the **Fire** menus can be used for automatic function testing of the building's fire dampers.
The function can also be used for smoke evacuation.

NB:

According to DS428 dampers must be is functions tested/exercised automatically at least every 7 days. However, the test must be performed manually once a year.



Test with one digital input

For testing fire dampers:

- EXcon Modules > Configure > Digital in/out: Digital output/**Fire damper test** must be configured.
- EXcon Modules > Configure > Digital in/out: Digital input/**Fire damper closed** must be configured.

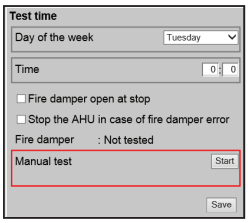
If the fire dampers to not report back to the digital input **Fire damper closed** that they are closed within 180 seconds, an alarm is activated that the **fire damper test** failed. The digital input is connected to the damper actuators and their feedback contact for closed damper.

Test with two digital inputs

Besides the above-mentioned, a digital input may also be configured:

- EXcon Modules > Configure > Digital in/out: Digital input/**Fire damper open** must be configured.

An alarm be also be activated for failure to report in case of open fire dampers. The test will be performed in accordance with the timetable below. When the test is activated, the digital relay output **Fire damper test** will open.



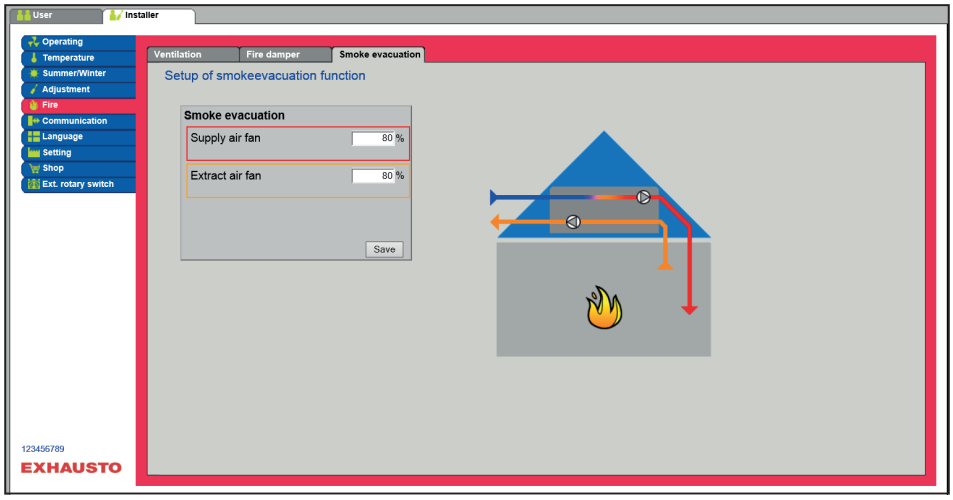
Set testing of fire damper

- **Day of the week:**
  - **None** = No fixed time for testing fire dampers. Testing can be performed by activating **Start manual test**
  - **Every day**
  - **Every 2nd day**
  - **Monday > Sunday**
- **Time:** Set time for test
- **Fire damper open at stop:** When the VEX unit has stopped (e.g. at night), a tick in the field here selects whether the fire dampers are to be open or closed.
  - Open = ticked
  - Closed = no tick
- **Stop the air handling unit in case of fire damper test error:** Select/deselect if the VEX unit must stop in case of errors in the fire damper test.
- **Manual test:** Activate **Start** to initiate a manual test

Click on **Save** to save the settings.

If smoke evacuation dampers are connected, these will always be opposite the fire dampers.

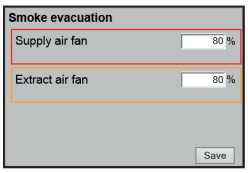
6.7.3 Smoke evacuation



- The function is activated when the digital input **Smoke evacuation function/external bypass** is opened.

Prerequisite for set-up

- EXcon Modules > Configure > Digital in/out: Digital input/**Smoke evacuation function/external bypass** must be configured.
- Factory > Configuration > Mechanical: **Smoke evacuation damper** must be selected.



Set fan operation in case of smoke evacuation

- If the setting is 0% for both fans, the dampers towards the outside are closed.
- If just one of the values is >0%, both dampers will be open.
- The fans are forced to run at the set speed when the smoke evacuation function is activated.

Click on **Save** to save the settings.

NB:

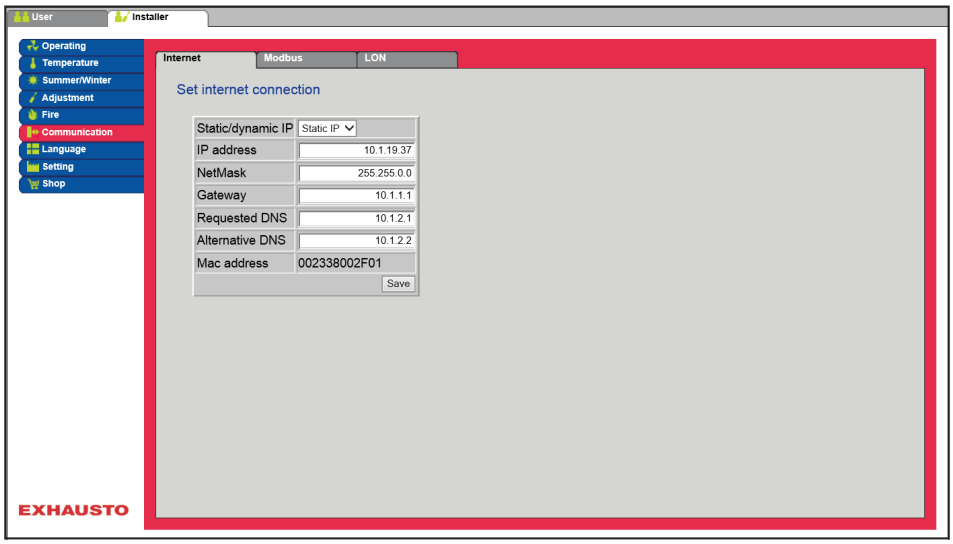
The selected operating mode of the fans should meet regulatory standards.

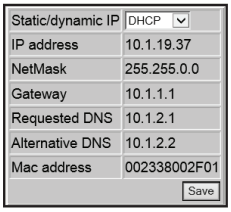
6.8 Communication

Internet - Modbus

The parameters in the **Communication** menu are used to set the Internet connection and external connection of Modbus or BACnet.

6.8.1 Internet

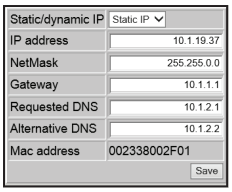




Internet connection DHCP

- Select DHCP. The IP address is allocated by the DHCP server on the local network or from the Internet.

Click on **Save** to save the settings.



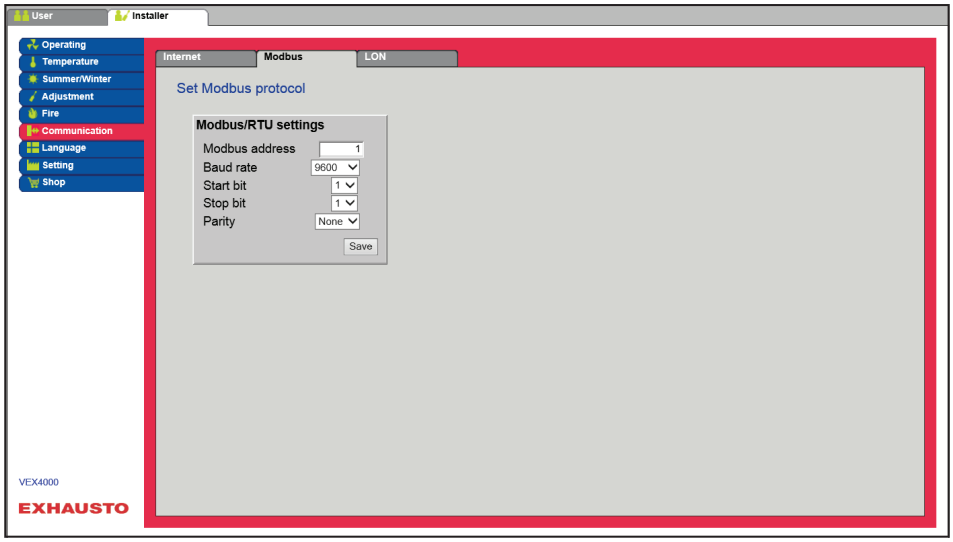
Internet connection Static

The installer will indicate the following communication parameters:

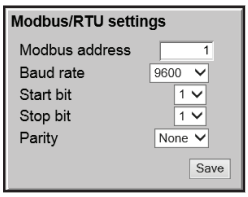
- IP address
- Netmask
- Gateway
- Requested DNS
- Alternative DNS

Click on **Save** to save the settings.

6.8.2 Modbus



- Settings for external Modbus RTU.
- Modbus RTU for external connection of Modbus for e.g. BMS unit.



Set Modbus/RTU

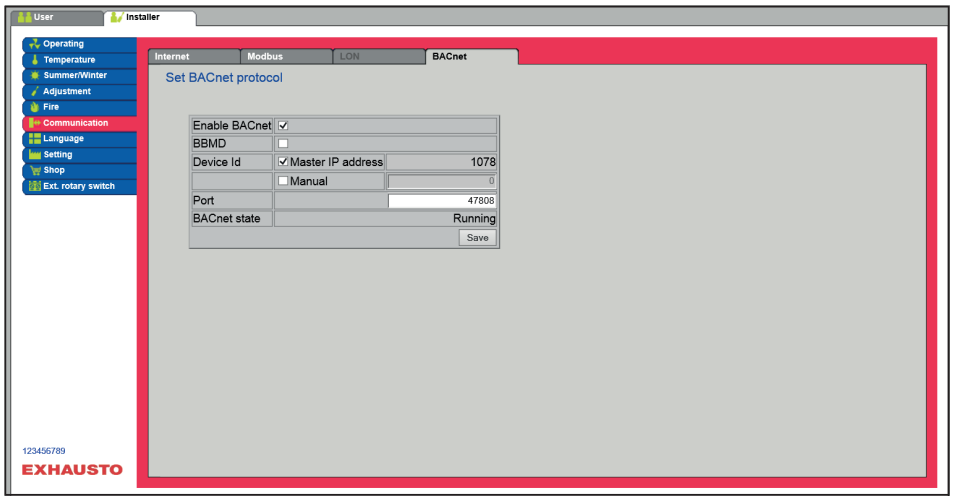
- Modbus address
- Baud rate **(9600, 19200, 38400 baud)**
- Start bit – Settings range: **1**
- Stop bit – Settings range: **1** or **2**
- Parity – Settings range: **None - Even - Odd**

Click on **Save** to save the settings.

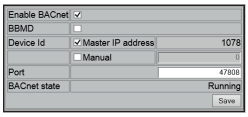
6.8.3 LON

If LON is selected, it is possible to see information about the LON gateway.
For further information please see the LON protocol.

6.8.4 BACnet



- BACnet TCP/IP for external connection of BACnet to e.g. BMS/CTS systems.



Set BACnet TCP/IP

- Activate BACnet (Factory setting is "Active")
- Unit ID
  - Master IP address: The BACnet Object Identifier is formed from the Master IP address (see the BACnet protocol)
  - Manual setting of the BACnet Object Identifier
- Port – Setting of the BACnet Server port

Click on **Save** to save the settings.

6.9 Language

6.9.1 Set

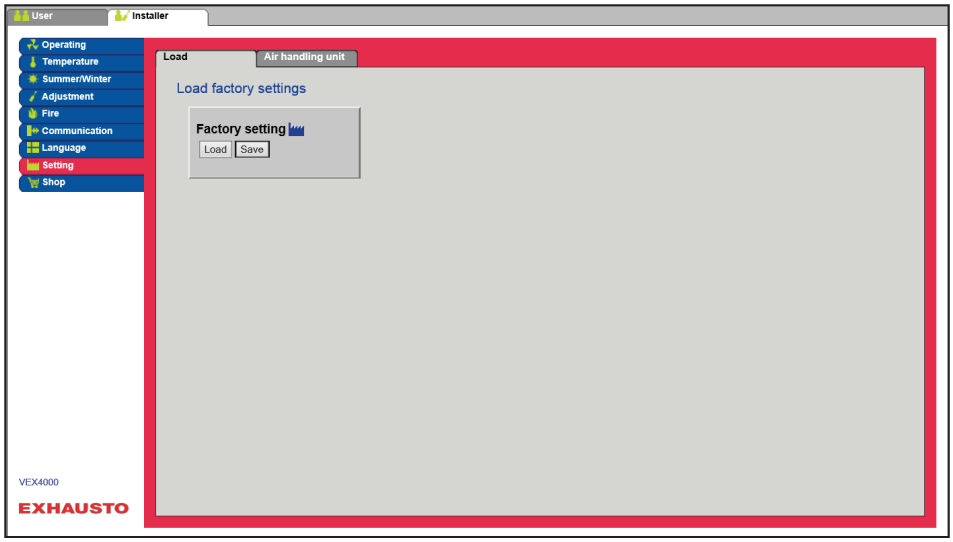
In the menu **Language** select the required language on the web user interface.



Select the required language

6.10 Setting

6.10.1 Download



- The factory settings input with the **Download** button are the EXHAUSTO factory settings saved under **EXcon modules > Factory> Download/Save**.
- The factory settings can also be restored with the hand-held terminal, see the instructions: **EXcon Hand-held terminal - Menus and alarms**.

Load

It is possible to download/reload the last saved settings on the control system using the **Retrieve**button.

Save

The **Save** button can be used to save the user and installer settings that have been defined in addition to the original EXHAUSTO factory settings
The settings are saved as a .txt file and can be saved on a hard disk, a server, a network, a USB stick or a standard SD card. The settings are also saved on the Master.

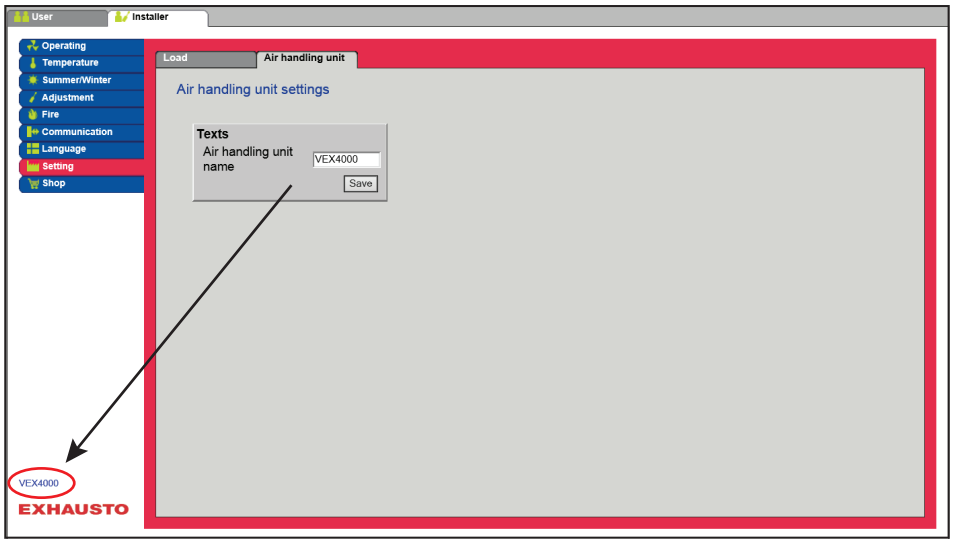
If the settings are saved on a standard SD card, it is possible to copy the saved settings to another Master by using the SD card reader.

To copy settings to a Master with an SD card, it is important that only this settings file is present on the SD card (the user_factory_settings.txt name may be used, but it must be a file with a .txt extension).

⚠ **Only one .txt file may be present on the SD card. If an updating program (xxx.tar.gz and xxx.crc) is also present, these are the files which are copied to the EXcon Master.**

6.10.2 Air handling unit

With this parameter in the menu **Configuration** there is a possibility to name the unit/VEX unit.



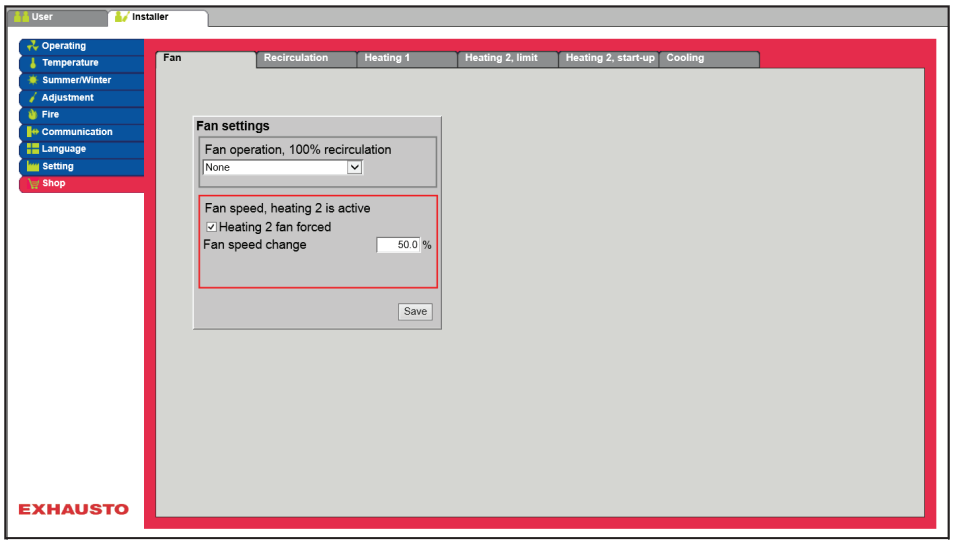
- Enter the unit name in the white field and press **Save**.
- The selected name will appear in the bottom left-hand corner and in the login screen.

6.11 Shop

Shop functions

Prerequisite for set-up

- EXcon Modules > Configure > Settings: **Shop functions** must be selected.

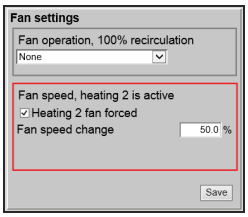


Energy saving

In the shop functions there is a possibility to select and deselect different energy saving functions, and thereby reduce the energy consumption. Depending on the power supply, excess heat etc. from e.g. the refrigeration equipment, the VEX unit can be set to when and in which situations energy consumption and energy saving should have a higher priority than comfort in the shop.

6.11.1 Fan

When the VEX unit is in operation with 100% circulation and there is a need for heating, the airflow can be reduced or increased.



Fan operation, 100% recirculation

- **None**: No change, VEX unit remains on the set airflow/speed.
- **Change from low to high speed**: Airflow changes from low to high speed with 100% recirculation and heating requirements.
  (This heats the shop up faster and provides higher air replacement)
- **Change from high to low speed**: Airflow changes from high to low speed with 100% recirculation and heating requirements.
  (This saves energy and reduces loss of heat)

Fan speed, heating 2 is active:

- **Heating 2 fan forced**: Mark to activate the function.

The function **Heating 2 fan forcing**, it is possible to reduce or increase the fan speed.

- If the speed is reduced while **Heating 2** is active, the reduced air volume will be able to be heated with less energy from **Heating 2**. The heating time will be lengthened.
- If the speed is increased while **Heating 2** is active, the increased air volume will reach comfort level faster.

- **Fan speed change :** Set the fan's speed increase or reduction (-25% to +50%)
  - Negative value between -25% and 0% = Energy saving
  - Positive value between 0% and 50% = more energy is used

Click on **Save** to save the settings.

NB:

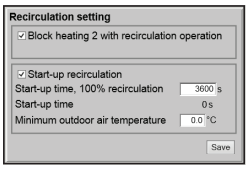
CO_2 level has a higher priority. If CO_2 is too high, the reduction/increase of the fan speed will be ignored.

6.11.2 Recirculation

The parameters for the recirculation function are used during the start of the VEX unit if it shows in the morning after that it stopped during the night.

Pre-conditions for setting

- EXcon modules > Configure > Temperature/Pressure: The temperature sensor for outdoor air must be configured.



Recirculation setting:

- **Heating 2 blocking during recirculation operation:** When marked, **Heating 2** will be blocked when the VEX unit runs recirculation.
- **Start-up recirculation:** During marking, the VEX unit will run with recirculation when the shop is heated in the morning.
- **Start-up time, 100% recirculation:** Set the time (in sec.) where the VEX unit must run with recirculation.
- **Minimum outdoor air temperature:** Set min. outdoor temperature.

  The recirculation function will only be active if the outside air temperature is **under** the set value. If the outdoor air temperature is **over** the set value, the VEX unit will begin normally.

Press **Save** to save the settings.

6.11.3 Heating 1

Heating 1 is most often a water heating coil that is supplied with excess heat from the refrigeration equipment that is used for cooling and freezer display cabinets in the shop.

Possible settings

Water heating coil type:

- **Standard**
- **Splitter**
- **Copy**

For all three settings, the following applies:

Return water limit

Settings in the function **Return water limitation** prevent the motor value in the heating coil **Heating 1** from opening if the return water from the heating coil is not warm enough.

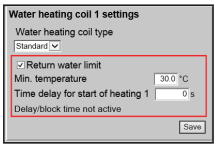
Min. temperature

Setting the **Min. temperature** ensures that the temperature in the return water from **Heating 1** is higher than the set value before the motor valve for **Heating 1** is opened. If the temperature of the return water is **below** the set value, the motor valve for **Heating 1** will close and the heat requirement will temporarily be transferred to **Heating 2**.

Time delay for start of Heating 1

When the time for the temporarily transferred heating requirement for **Heating 2** expires, the control system will revert to **Heating 1**. The control system now monitors the temperature of the return water from **Heating 1** for 5 minutes (fixed set time).
If the temperature is **above** the set value for **Min. temperature**, the heating requirement will remain on **Heating 1**.
If the temperature is **below** the set value, the heat requirement will once again be temporarily transferred to **.Heating 2**

Standard



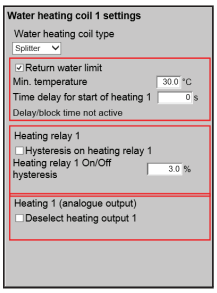
Water heating coil 1 settings:

- **Water heating coil type:** At the **Standard** setting, **Heating 1** is a single water heating coil and the motor valve is controlled with a 0-10V signal.
- **Return water limitation:** Mark to activate the function.
- **Min. temperature:** Set minimum temperature for return water from the heating coil **Heating 1**.
- **Time delay for start of heating 1:** Set up how long the temporary heating requirement should be transferred to **Heating 2**.

Press **Save** to save the settings.

Splitter

- The first analogue output (output 1) controls the motor valve on the heating coil via its 0-10V signal on the first 0-50% heating requirements.
- The second analogue output (output 2) controls the capacitor valve via its 0-10V signal on the final 50-100% heating requirements.
- When the motor valve is 100% open and the temperature is still too low, the second analogue output will open for the capacitor valve.



Water heating coil 1 settings:

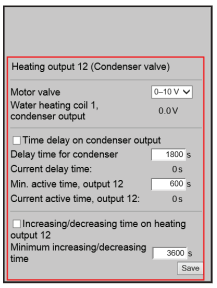
- **Water heating coil type:** In the **Splitter** setting, 0-100% of the heating requirements from the internal temperature regulator is divided into two analogue outputs (0-10V). (0-10V)
- **Return water limitation:** Mark to activate the function.
- **Min. temperature:** Set minimum temperature for return water from the heating coil **Heating 1**.
- **Time delay for start of heating 1:** Set up how long the temporary heating requirement should be transferred to **Heating 2**.

Heating relay 1

- **Hysteresis at heating relay 1:** Mark to activate the function
- **Heating relay 1 On/Off hysteresis:** Set hysteresis at heating relay 1

Heating 1 (analogue output)

- **Heating output 1 disconnected:** Mark to activate the function.
  The analogue output **Heating 1** is deactivated and the analogue output will always be 0.0V.



Water heating coil 1 settings - Splitter continued:

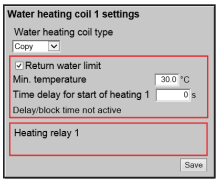
- **Heating output 12 (Capacitor valve):** Settings for the parameters for the capacitor valve depend upon the refrigeration equipment's construction.
- **Motor valve:** Set actuator control signal (0-10V/2-10V)
- **Time delay on capacitor output:** Mark to activate the function. Note that this function is cancelled if there is an alarm from the heating recovery unit or **Heating 1**.
- **Delay time for capacitor:** Set delay time for **Heating 1**/capacitor output 12.
- **Min. active time, output 12:** Set minimum active time for **Heating 1**/capacitor output 12.
- **Increasing/decreasing time on heating output:** Mark to activate the function.
- **Minimum increasing/decreasing time:** Set increasing/decreasing time for connecting/disconnecting on heating output 12/capacitor

NB! If the function **Increasing/decreasing time** is active and the fan speed is set to **Stop**, the unit will only stop when the **Minimum increasing/decreasing time** has expired.

Click on **Save** to save the settings.

Copy

- The first analogue output (output 1) controls the motor valve on the heating coil via its 0-10V signal on 0-100% heating requirement.
- The second analogue output (output 12) follows the same signal and is thus a copy of output 1.



Water heating coil 1 settings:

- **Water heating coil type:** In the **Copy** setting, 0-100% heating requirement from the internal temperature regulator is divided into two analogue outputs. The two outputs follow the same 0–10V signal.
- **Return water limitation:** Mark to activate the function.
- **Min. temperature:** Set minimum temperature for return water from the heating coil **Heating 1**.
- **Time delay for start of heating 1:** Set up how long the temporary heating requirement should be transferred to **Heating 2**.

Click on **Save** to save the settings.

6.11.4 Heating 2, limit

Heating 2 is usually an electric heating coil. The EXcon control system can be set to automatically reduce or delay transfer of heating requirements to **Heating 2**.

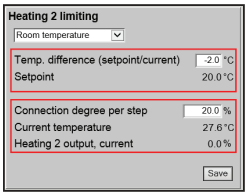
Possible settings

Heating 2 limiting:

- **None**
- **Room temperature**
- **Outdoor air temperature**

Room temperature

- By limiting the room temperature, the difference between setpoint for room temperature and current temperature is set.
- The larger the difference between setpoint and current temperature, the less the limit on transfer of heating requirements to **Heating 2**.



Heating 2 limiting:

- Select **Room temperature**
- **Temp. difference (setpoint/current):** Set the difference between setpoint and current room temperature for incremental connection of **Heating 2**.
  - The interval between release of each connection step is fixed at 1°C.
- **Connection degree per step:** Set up connection degree per released step.
  - The degree of connection [%] is increased with this value for each connection step [°C].

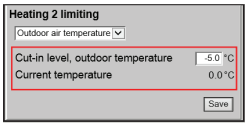
Click on **Save** to save the settings.

NB:

This function is cancelled if there is an alarm from the heating recovery unit or **Heating 1**.

Outdoor air temperature

- By limiting outdoor air temperature, you set which outside air temperature the heating requirement should be transferred to **Heating 2**.
- If the outdoor air temperature is **below** the set value, **Heating 2** will be activated.



Heating 2 limiting:

- Select **Outdoor air temperature**
- **Connection level:** Set up level for which outdoor air temperature the heating requirement may be transferred to **Heating 2**.

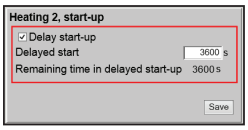
Click on **Save** to save the settings.

NB:

This function is cancelled if there is an alarm from the heating recovery unit or **Heating 1**.

6.11.5 Heating 2, start-up

To limit the use of **Heating 2** and thereby save energy, it is possible to set up a time delay for the transfer of heating requirements from **Heating 1** to **Heating 2**.



Heating 2, start-up:

- **Delay start-up:** When marked, transfer of heating requirements to **Heating 2** is delayed for the set time.
- **Delayed start:** Set up the time delay for transfer of heating requirements to **Heating 2**.
  - Setting range 0-7200 sec. (0-120 min.)

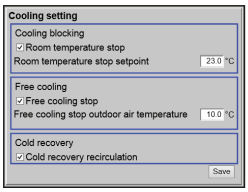
Click on **Save** to save the settings.

NB:

This function is cancelled if there is an alarm from the heating recovery unit or **Heating 1**.

6.11.6 Cooling

The parameters for cooling functions can block/limit the use of cooling and thus save energy.



Cooling setting:

- **Cooling blocking:** The function is used to block the connection of cooling even though there is a cooling requirement.
- **Room temperature stop:** Mark to activate the function.
- **Room temperature stop setpoint:** Set up setpoint for the room temperature where the cooling is blocked.
  - During room temperature lower than set up setpoint, cooling is blocked.
- **Free cooling:** This function is used to limit cooling with fresh air. Energy saving has a higher priority than comfort level, i.e. a higher room temperature in the shop is accepted for a period of time.
- **Free cooling stop:** Mark to activate the function.
- **Free cooling stop outdoor air temperature:** Set up setpoint for the outside air temperature where cooling with fresh air is stopped.
  - If the outdoor air temperature falls **below** this setpoint, cooling with fresh air will stop.
- **Cooling recovery** The function must ensure that a minimum amount of outside air is used if the outside air is >1°C higher than the room temperature.

  The following requirements must be met for the function to be activated:
  - Analogue (0–10 V) damper actuators must be used.
  - External outdoor air temperature sensor must be fitted and configured.
  - The VEX unit may not be configured with DX cooling or a heat pump.
- **Cold recovery recirculation:** Mark to activate the function.

Click on **Save** to save the settings.

---

7. Service settings

7.1 Service parameters

During service on the VEX unit, it is possible to override, adjust and set up components, and see connections/plug connections on the Master, Fan IO and extension modules. The online user interface is the starting point for the parameters described.

NB: There is a difference between user interfaces in terms of which parameters are available and where they are located.

User interface	Menus	Parameters/tab sheets
Service >	Unit>	Status
		Settings
		Fire alarm
	Master >	Master
	Fan IO >	Fan-IO 1
		Fan-IO 2
	Extension >	EXT. 1
		EXT. 2
		EXT. 3
		EXT. 4
		EXT. 5
		EXT. 45 1
		EXT. 45 2
		EXT.45.3
	PTH6202-2	PTH6202-2#1
		PTH6202-2#2
		PTH6202-2#3
		PTH6202-2#4
		PTH6202-2#5
	Alarm log	Alarms
		Alarm log
		Alarm forecast
		Data log
	Zones	Zone 1
	Zones	Zone 2
	Zones	Zone 3
	Zones	Zone 4
	Zones	Settings

IMPORTANT when servicing

Do not open the service doors until the supply voltage has been disconnected at the isolation switch (OFF position) and the fans have stopped. The isolation switch is located on the door of the heat exchanger section. When the isolation switch is in the OFF position, the light inside the VEX unit can still be switched on and the service socket in the panel can be used. Everything else on the VEX unit is de-energised.



There is an extra and separate built-in isolation switch on the door to the electric heating coil. The unit with the electric heating coil therefore has two isolation switches, both of which must be interrupted to ensure that the unit is de-energised!

NB:

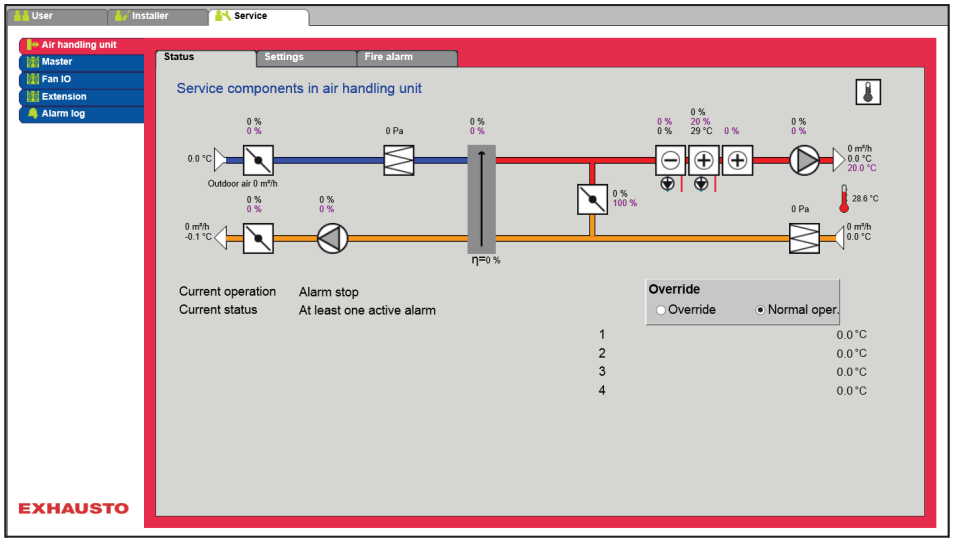
Before opening the doors, ensure that the air handling unit has stopped operating for at least five minutes, because the fans have run-on time.

7.2 Air handling unit

7.2.1 Status

The **Status** parameter in the **Unit** menu provides an overview of components and the VEX unit's current status and operating state. It is also possible to override the components in a given period of time.

- Values with black script are current values.
- Values with purple script are calculated values.



EXHAUSTO

Override

The **Override** function can be used to control the components for a given period of time. This can be used during service and maintenance tasks. For the function to be used, there may not be active alarms on the VEX unit.



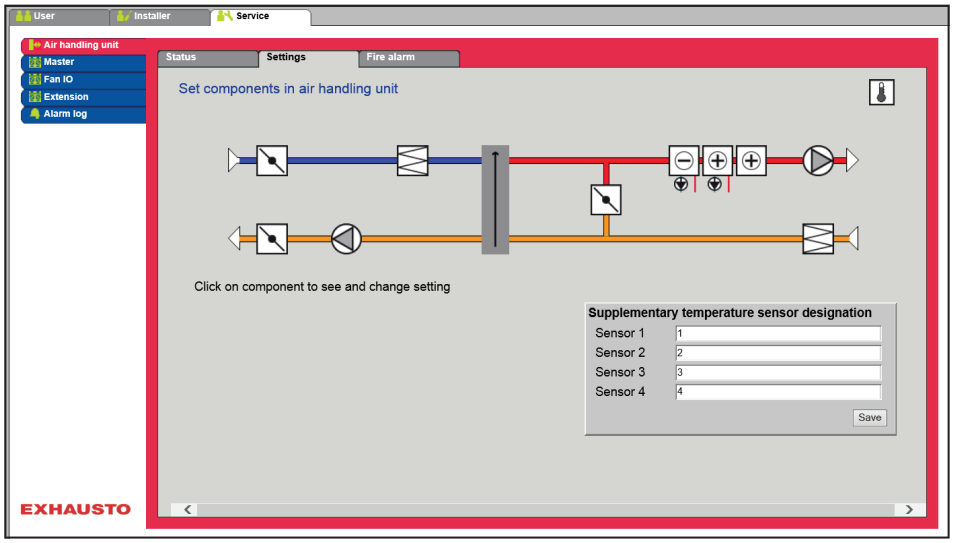
Override:

- Click on the component that must be overridden
- Mark **Override** to change from normal operation.
- Enter the value of the parameter that the component must be overridden with.
- Click on **Override** to activate/save the entered value.
- Click on the clock to set up the period of time for which the override must be active. (The clock begins with a period of time of 1 hour and it is increased with an interval of 1 hour for each click)

Override is terminated automatically when the time expires or by setting the control mode back to **Normal**.

7.2.2 Settings

The **Settings** parameter in the **Unit** menus is used to set the individual components. Click on component to see and change setting.

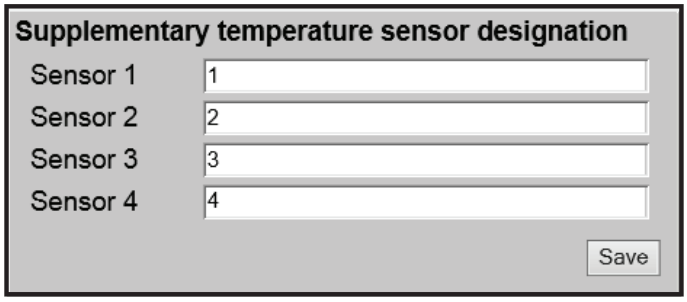


Pre-conditions for setting

- Factory > Mechanical: The component must be selected.
- EXcon modules > Configure: The necessary configurations of inputs and outputs must be made.

Naming of additional temperature sensors

The additional sensors can be freely named with text/numbers. The name that is indicated here is also the name that appears on the status side under **Service > Unit > Status** and at the location under which the sensor inputs are configured: **EXcon modules > Configure > Temperature/Pressure**



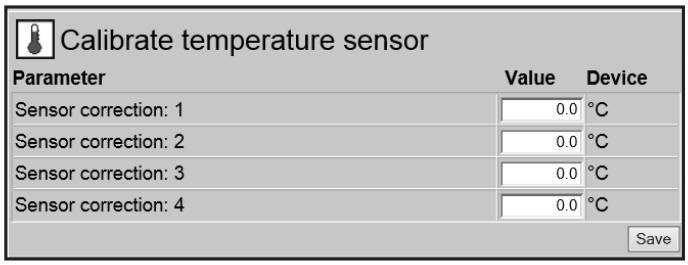
- Name the configured additional temperature sensors.

Press **Save** to save the settings.

Temperature sensor correction

Prerequisite for calibration

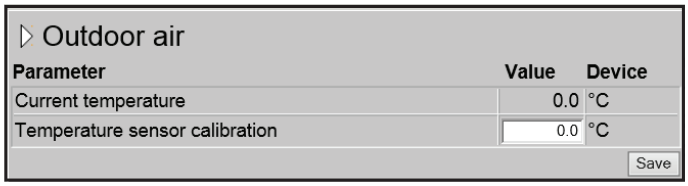
- EXcon modules > Configure > Temperature/Pressure: The sensors must be configured before they can be corrected.



- Correct each of the temperature sensors individually. Settings range: -**3.5** to **+3.5 °C**

Press **Save** to save the settings.

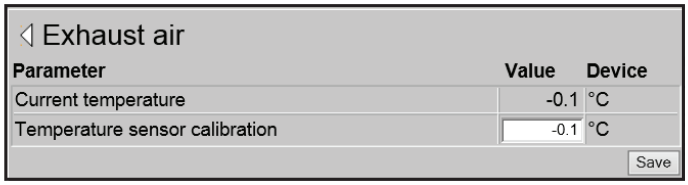
Outdoor air - temperature sensor



- Set calibration value for the temperature sensor: Settings range: -**3.5** to **+3.5 °C**

Press **Save** to save the settings.

Exhaust air - temperature sensor



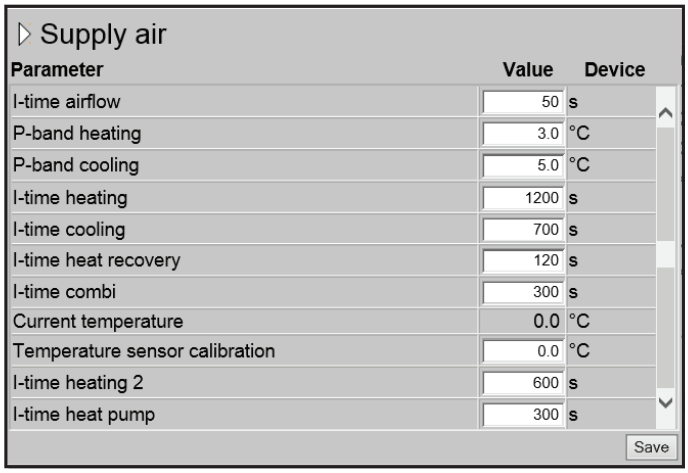
- Set calibration value for the temperature sensor: Settings range: -**3.5** to **+3.5 °C**

Press **Save** to save the settings.

Supply air

The settings below are valid for the following temperature forms of regulation:

- Constant supply air
- Constant supply air/extract air difference



- **I-time airflow:** Set I-time for the regulation of fan/regulator.*
- **P-band heating:** Set P-band for the regulation of heating coil/regulator.
- **P-band cooling:** Set P-band for the regulation of cooling coil/regulator.
- **I-time heating:** Set I-time for the regulation of heating coil/regulator.
- **I-time cooling:** Set I-time for the regulation of cooling coil/regulator.
- **I-time heat recovery:** Set I-time for the regulation of heat exchangers/regulator.
- **I-time combi:** Set I-time for the regulation of combi coil/regulator.
- **Current temperature:** Displays current supply air temperature.
- **Temperature sensor calibration:** Set calibration value for the temperature sensor.
- **I-time heating 2:** Set I-time for the regulation of heating coil 2/regulator.
- **I-time heat pump:** Set I-time for the heat pump/regulator.

Press **Save** to save the settings.

I-time

During reduction of I-time [sec], the regulator reacts with more power.
* In systems with ALC, “I-time airflow” should not be changed. Contact support if necessary.

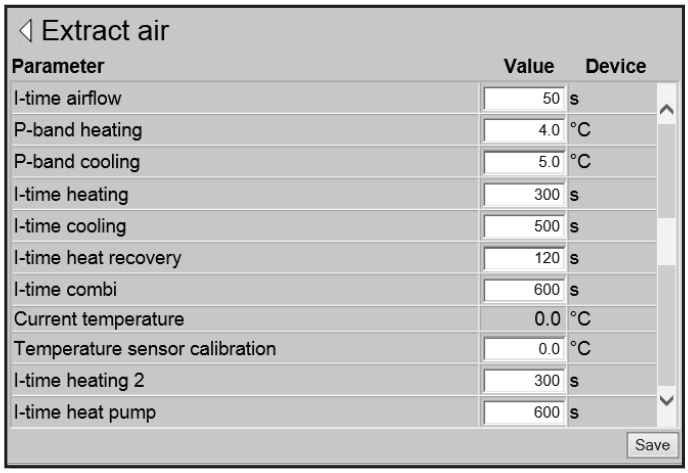
P-band

During reduction of P-band [°C], the regulator reacts more aggressively.

Extract air

The settings below are valid for the following temperature forms of regulation:

- Constant extract air
- Constant room



- **I-time airflow:** Set I-time for the regulation of fan/regulator.*
- **P-band heating:** Set P-band for the regulation of heating coil/regulator.
- **P-band cooling:** Set P-band for the regulation of cooling coil/regulator.
- **I-time heating:** Set I-time for the regulation of heating coil/regulator.
- **I-time cooling:** Set I-time for the regulation of cooling coil/regulator.
- **I-time heat recovery:** Set I-time for the regulation of heat exchangers/regulator.
- **I-time combi:** Set I-time for the regulation of combi coil/regulator.
- **Current temperature:** Displays current supply air temperature.
- **Temperature sensor calibration:** Set calibration value for the temperature sensor.
- **I-time heating 2:** Set I-time for the regulation of heating coil 2/regulator.
- **I-time heat pump:** Set I-time for the heat pump/regulator.

Press **Save** to save the settings.

I-time

During reduction of I-time [sec], the regulator reacts with more power.
* In systems with ALC, “I-time airflow” should not be changed. Contact support if necessary.

P-band

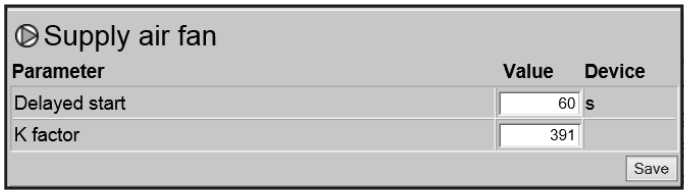
During reduction of P-band [°C], the regulator reacts more aggressively.

7.2.3 Fans

Supply air fan

The settings below are valid for the following motor controllers:

- EC Controller (EC-DV)
- 2 x EC Controller (2xEC-DV)



- **Delayed start:** Set time delay for start of supply air fan, measured from start-up of exhaust air fan.
- **K factor:** Set K-factor as a constant for recalculation from fan pressure to airflow.

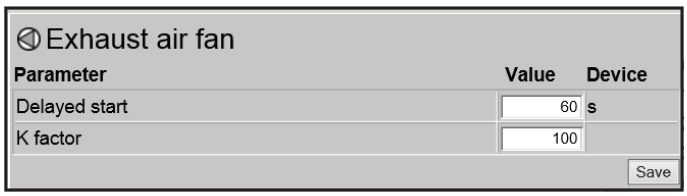
For more information, see the chapter **Determinatin of airflow** in Assembly and Installation instructions

Press **Save** to save the settings.

Exhaust air fan

The settings below are valid for the following motor controllers:

- EC Controller (EC-DV)
- 2 x EC Controller (2xEC-DV)



- **Delayed start:** Set time delay for start of exhaust air fan, measured from start-up of heat exchangers.
- **K factor:** Set K-factor as a constant for recalculation from fan pressure to airflow.

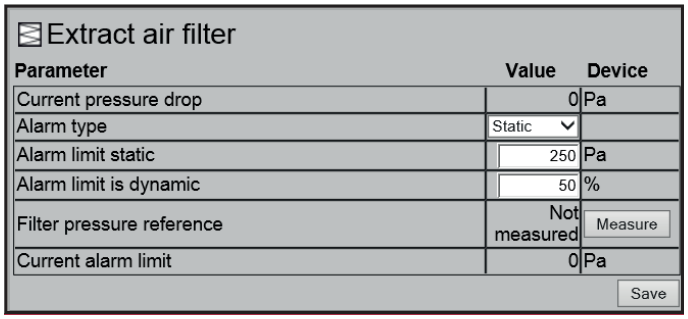
For more information, see the chapter **Determination of airflow** in Assembly and Installation instructions.

Press **Save** to save the settings.

7.2.4 Filters

Extract air/supply air filter

The settings below for filter monitoring with pressure transmitters are valid for both extract air and supply air filters, which can be set up individually.



- **Alarm type:** Select alarm type
  - **Static**: A filter alarm (B-alarm) is given if the alarm limit that has been set in **Alarm limit static** is exceeded.
  - **Dynamic**: A filter alarm (B alarm) is given if the loss of pressure over the filter exceeds the set value in **Alarm limit dynamic**. This is in relation to the measurement on a new filter.
- **Alarm limit static:** Set the static alarm limit for allowed pressure loss over the filter. Alarm type must be set to **Static**.
- **Alarm limit dynamic:** Set the dynamic alarm limit for how high the pressure loss may be in relation to the pressure loss over a new filter. Alarm limit must be set to **Dynamic**. See **Dynamic filter monitoring** for further information.
- **Filter pressure reference:** During start-up of a new unit, or after change of filter, a new measurement of the filter must be conducted. See **Dynamic filter monitoring** for further information.

Press **Save** to save the settings.

Dynamic filter monitoring

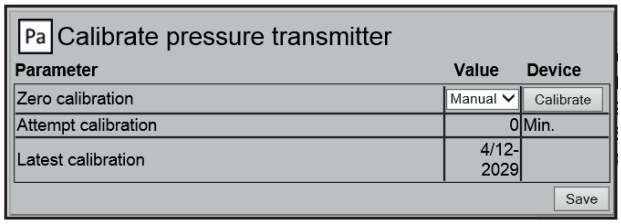
This function can be used if the filter monitoring occurs with pressure transmitters.
The loss of pressure is measured over a completely new filter and thus knows the EXcon control system pressure loss characteristic on a new filter.

- **Filter pressure reference:** Press **Measure**

Pressing **Measure** stops all fans. Thereafter, they are started again slowly from 0 > 100%. Simultaneously, during this start-up, the loss of pressure is registered over the filter.

- **Alarm limit dynamic:** Thereafter set up as a percentage-wise higher value in relation to the loss of pressure over a completely new filter. The function is performed on both filters at the same time. Then measurement must also occur one time on one of the filters.

7.2.5 Calibrate pressure transmitter



- **Zero calibration:**
  - **Manual**: Set to **Manual** and activate the Calibrate button. The unit stops temporarily and the zero calibration is performed.
  - **Auto:** Zero calibration is carried out automatically every time the unit is stopped.

Press **Save** to save the settings.

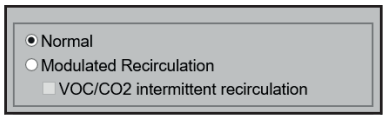
7.2.6 Damper

Settings

The setting possibilities for dampers/damper actuators depend on which configuration has been selected under: **EXcon Modules > Configure > Settings**
The following settings apply to:

- **Outdoor air damper**
- **Exhaust damper**
- **Recirculation damper**

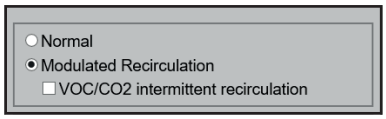
Normal



- The damper actuator is **On/Off** controlled.

There is no possibility for settings on the damper actuator. There is only possibility for testing the damper actuator.

Modulated recirculation

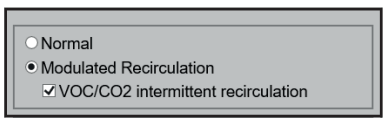


- The damper actuator has modulated control via modbus.

During modulated recirculation, it is only possible to select/deselect **Exhaust and outdoor air dampers** together.

See the following sections for settings for the damper actuator.

Modulated recirculation - VOC/CO_2 Intermittent recirculation



- The damper actuator has modulated control via modbus.

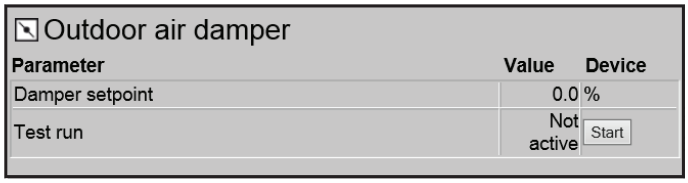
During VOC/CO_2 2 intermittent recirculation, it is not possible to deselect **Recirculation damper** or **Exhaust and outdoor air damper.**

See the following sections for settings for the damper actuator.

Press **Save** to save the settings.

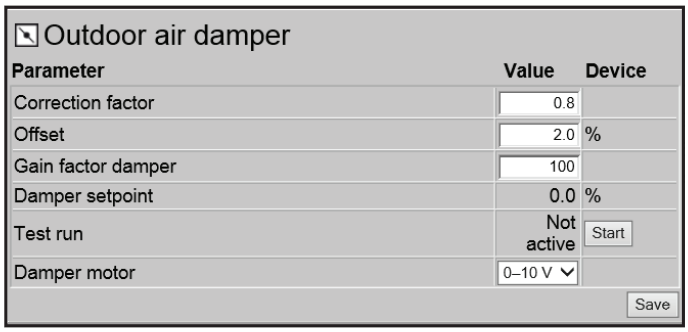
Outdoor air damper

Normal



- **Damper setpoint:** Displays 0 or 100% (on/off).
- **Test sequence:** Press **Start** to start the test sequence for the damper motor. (Only applicable to the Belimo modbus damper actuator)

Recirculation with/ without VOC/CO2 intermittent recirculation

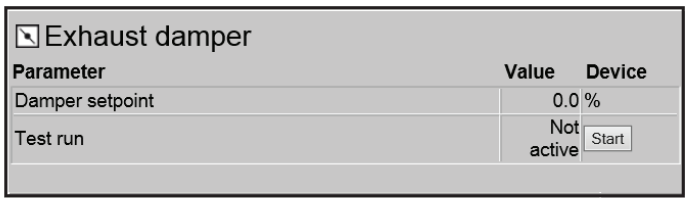


- **Correction factor:** Set the correction factor. The correction factor corrects for nonlinearity in the damper. When the value is 1, the factor is neutral.
- **Offset:** Press **Start** to start the test sequence for the damper motor. (Only applicable to the Belimo modbus damper actuator)
- **Amplification factor damper:** Set amplification factor
  - Factor > 100 = more powerful signal.
  - Factor < 100 = weaker signal.
  - Factor = 100 = neutral.
- **Test sequence:** Press **Start** to start the test sequence for the damper motor. (Only applicable to the Belimo modbus damper actuator)
- **Damper actuator:** Set up MUST be 0–10V.

Press **Save** to save the settings.

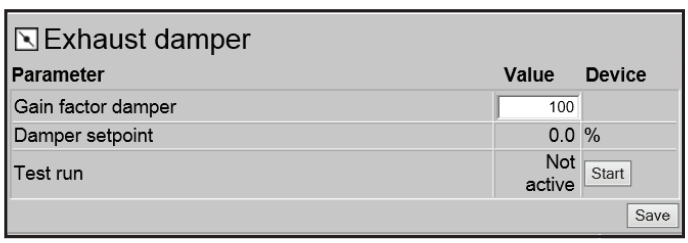
Exhaust damper

Normal



- **Test sequence:** Press **Start** to start the test sequence for the damper motor. (Only applicable to the Belimo modbus damper actuator)

Recirculation with/ without VOC/CO2 intermittent recirculation



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- **Amplification factor damper:** Set amplification factor
  - Factor > 100 = more powerful signal.
  - Factor < 100 = weaker signal.
  - Factor = 100 = neutral.
- **Test sequence:** Press **Start** to start the test sequence for the damper motor. (Only applicable to the Belimo modbus damper actuator)

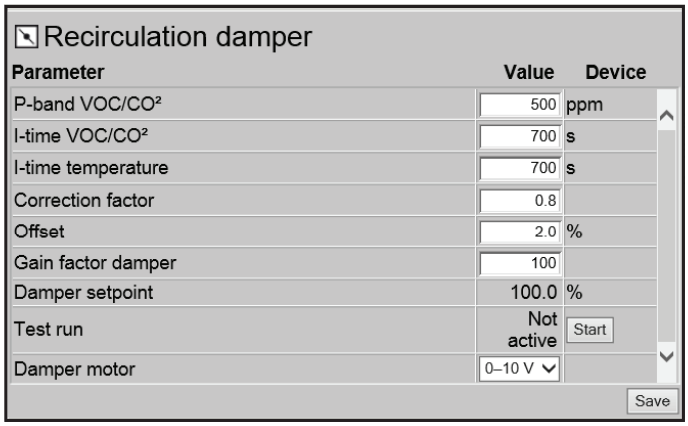
Press **Save** to save the settings.

Recirculation damper

Normal

Damper actuator for recirculation is **On/Off** controlled and only used in connection with night heating. A room temperature sensor must be fitted and configured.

Modulated recirculation



- **P-band VOC/CO_2:** Set P-band for the regulation of VOC/CO_2.
- **I-time temperature:** Set I-time for the regulation of the temperature.
- **Correction factor:** Set the correction factor. The correction factor corrects for nonlinearity in the damper. When the value is 1, the factor is neutral.
- **Offset:** Set zero-point offset When setting the offset , the opening of the damper is kickstarted.
- **Amplification factor damper:** Set amplification factor
  - Factor > 100 = more powerful signal.
  - Factor < 100 = weaker signal.
  - Factor = 100 = neutral.
- **Test sequence:** Press **Start** to start the test sequence for the damper motor. (Only applicable to the Belimo modbus damper actuator)
- **Damper actuator:** Set up MUST be 0–10V.

Press **Save** to save the settings.

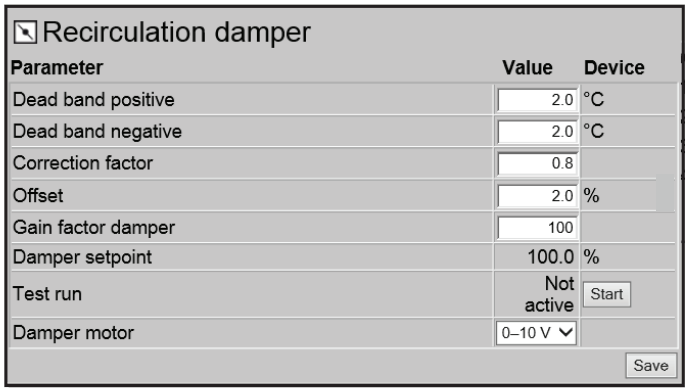
I-time

During reduction of I-time [sec], the regulator reacts with more power.

P-band

During reduction of P-band [°C], the regulator reacts more aggressively.

Modulated recirculation - with VOC/CO_2 intermittent recirculation

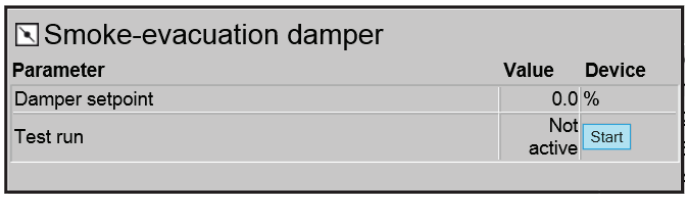


- **P-band VOC/CO_2:** Set P-band for the regulation of VOC/CO_2.
- **I-time temperature:** Set I-time for the regulation of the temperature.
- **Correction factor:** Set the correction factor. The correction factor corrects for nonlinearity in the damper. When the value is 1, the factor is neutral.
- **Offset:** Set zero-point offset When setting the offset , the opening of the damper is kickstarted.
- **Amplification factor damper:** Set amplification factor
  - Factor > 100 = more powerful signal.
  - Factor < 100 = weaker signal.
  - Factor = 100 = neutral.
- **Test sequence:** Press **Start** to start the test sequence for the damper motor. (Only applicable to the Belimo modbus damper actuator)
- **Damper actuator:** Set up MUST be 0–10V.

Press **Save** to save the settings.

Smoke-evacuation damper

Damper opens in alarm mode **Fire alarm.** The damper can only be configured as a modbus damper.



- **Damper setpoint:** Displays calculated setpoint for damper position. (Only applicable with the Belimo modbus damper actuator)

Damper setpoint can be overridden for a given period of time under: **Service > Unit> Status.**
Select override and set the period of time.
Enter value for **Damper setpoint**

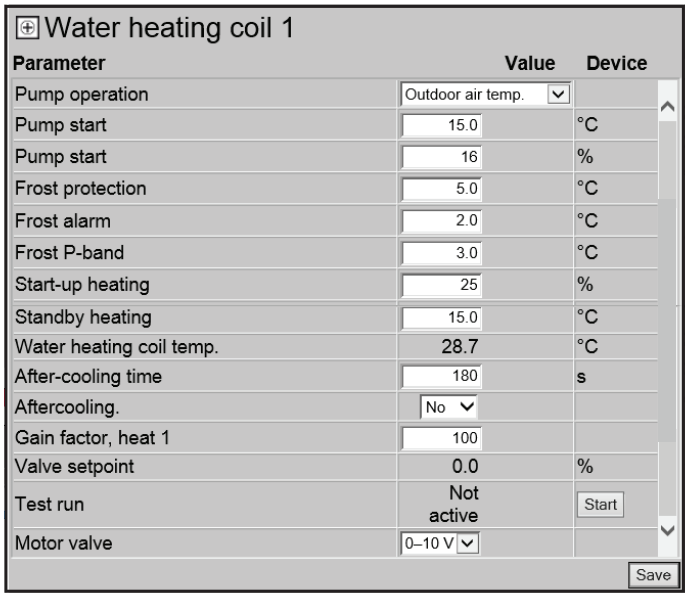
- **Test sequence:** Press **Start** to start the test sequence for the damper motor. (Only applicable to the Belimo modbus damper actuator)
- **Delayed start of smoke evacuation fan and bypass damper:** Set the time delay.

Press **Save** to save the settings.

7.2.7 Heating

Water heating coil 1

The water heating coil is used to increase the temperature of the supply air if the recovered heat does not supply enough.



- **Pump operation:**
  - **Constant:** The pump runs constantly when there is tension on EXcon Master.
  - **Auto:** Pump operates with heating requirement
  - **Outdoor air temperature:** The pump runs when the outside air temperature falls **below** the set value in **Pump start** or when there is a heat requirement.
  - **Heating requirement:** The pump starts when the motor valve is opened more than the set value.

Pump motioning: If the pump has not been started for the last 24 hours, it will become motioned in 1 minute regardless of the heating requirement. This is to combat the pump getting stuck.

- **Pump start:** Set temperature for the pump to start. The pump starts at outdoor air temperatures below the set value. During pump operation, **Outdoor air temperature** must be selected.
- **Pump start:** Set values for the pump to start. The pump starts when the motor valve is opened more than the set percentage rate. During pump operation, **Heating requirement** must be selected.
- **Frost protection:** Set the temperature on return water from the heating coil where the motor valve must be 100% open. Opening of the motor valve begins when the temperature comes below the set value +**Frost P-band**.
- **Frost alarm:** Sets at which temperature a frost alarm must be given. Lower temperatures on return water from the heating coil than set value trigger the frost alarm.
- **Frost P band:** Set the temperature on the P band. Frost protection of the heating coil starts when the temperature falls below the set value + the set value in the parameter **Frost protection**.
- **Start-up heating:** Set the value for opening the motor valve during the start-up sequence. This overriding of the motor valve ceases when the start-up sequence is completed and the supply air fan has reached its setpoint for airflow.
- **Standby heating:** Set the minimum temperature for return water from the heating coil during standby. During standby/stop of the unit, the motor valve will ensure that the temperature does not reach below the set value.
- **Aftercooling time:** Set the aftercooling time of the heating coil.

In order to remove excess heat and thus avoid overheating of the heating coil, the fans continue to run in the set time (aftercooling time), after the heating coil has been disconnected.

- **Aftercooling:** Select whether aftercooling and thereby a possibility for set up of aftercooling time should be active. Yes/No.
- **Amplification factor heating 1:** Set the heating coil's gain factor. This factor strengthens the effect of the regulator, when it either increases or reduces the heat. When the value is 100, the factor is neutral.
- **Valve setpoint:** Displays the current valve position from 0 to 100%.
- **Test sequence:** Press **Start** to begin the test sequence of the valve motor. (Only applicable to the Belimo modbus valve motor).
- **Motor valve:** Set the motor valve's regulatory range. Always select 2-10V (VEX4000 standard)

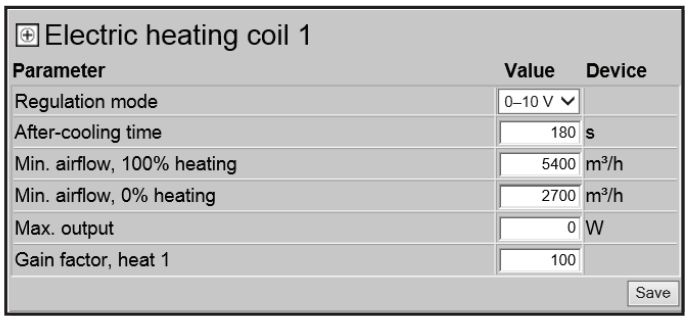
Press **Save** to save the settings.

Safety function

A return sensor is always connected to a water heating coil on the heating coil's outlet pipe in order to protect the heating coil from frost. When the temperature nears the set setpoint/minimum temperature for frost protection, the motorvalve opens so that the heat increases. If maximum heat input is not enough to maintain the minimum temperature for frost protection, a frost alarm is sounded on the heating coil and the valves stop.

Electric heating coil 1

The electric heating coil is used to increase the temperature of the supply air if the recovered heat does not supply enough.



- **Regulation mode:**
  - 0–10 V: Analogue heat regulation is connected to an analogue 0-10V output.
  - Single step: The electric heating coil is controlled with 1-step's On/Off (digital relay output)
  - Two step: The electric heating coil is controlled with 2-step's On/Off (digital relay output)
- **Aftercooling time:** Set the aftercooling time on the heating coil

When the airflow is reduced or stopped completely, there is a risk of overheating of the heating coil. During the aftercooling period, the heating coil is disconnected completely and the valves continue to run with regards to the set airflow setpoint. The set value indicates the time that is necessary to remove the excess heat from the heating coil.

- **Minimum airflow, 100% heating** Set the minimum airflow for 100% heating on the heating coil.
- **Minimum airflow, 0% heating:** Set the minimum airflow for 0% heating on the heating coil.
- **Max. output:** Set the maximum effect of the heating coil.
- **Amplification factor heating 1:** Set the heating coil's gain factor. This factor strengthens the effect of the regulator, when it either increases or reduces the heat. When the value is 100, the factor is neutral.

Press **Save** to save the settings.

Monitoring of the electric heating coil

The electric heating coil is protected against overheating using two overheating controls that are placed in the airflow between the heating elements.

External fire thermostat

The function is used in case of fire/smoke outside the building.

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Prerequisite for set-up

- EXcon Modules > Configure > Digital in/out: **External fire thermostat** must be configured.

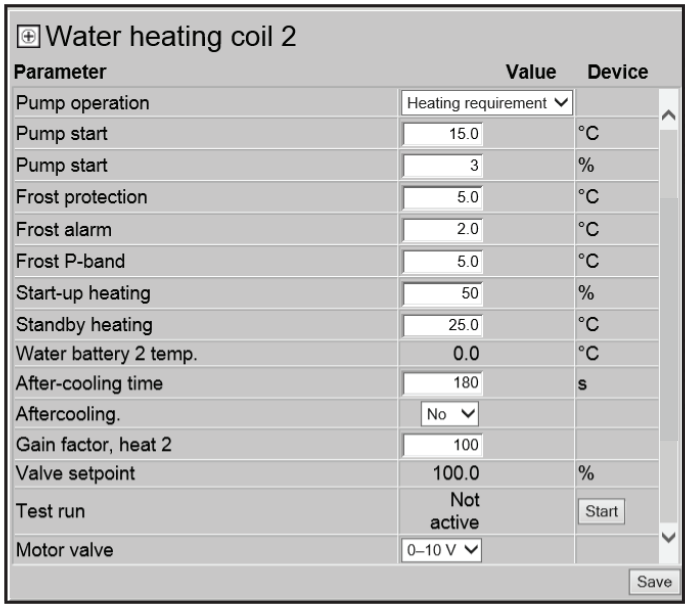
When the input is activated/opened:

- The VEX unit stops
- Damper to the outside air closes
- An alarm is triggered

When the input is closed again, the VEX unit will start up in normal operation.

Water heating coil 2

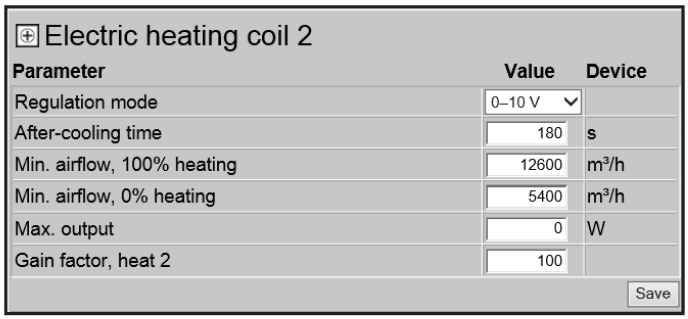
Only heating coil 2 is used during shop solution. The water heating coil is used to increase the temperature of the supply air if the heating coil does not supply enough.



To set **Water heating coil 2**: See settings for **Water heating coil 1**, which has the same possible settings.

Electric heating coil 2

Only heating coil 2 is used during shop solution. The electric heating coil is used to increase the temperature of the supply air if the heating coil does not supply enough.

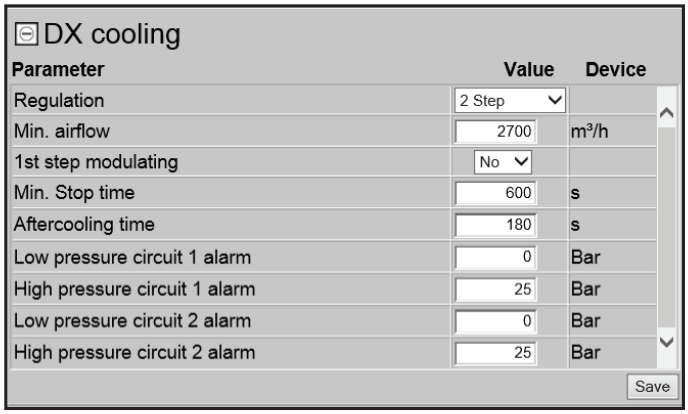


For setting **Electric heating coil 2**: See setting **Electric heating coil 1**, which has the same possible settings.

7.2.8 Cooling

DX cooling

DX cooling is with one or two compressors. Single step is always modulating and any two step fixed. Pressure transmitters must be fitted in the cooling circuit for measuring of high pressure and low pressure in the DX pressure circuit.



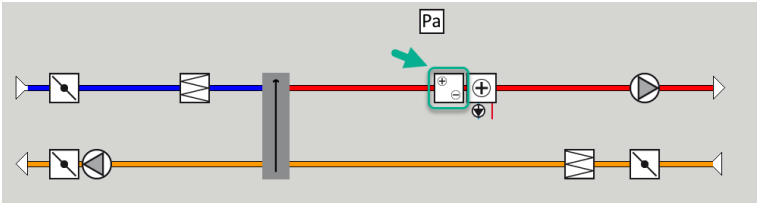
- **Regulation:** Select regulation mode
  - Single stage: The cooling coil is controlled by 1 step modulating. (VEX4010 - VEX4070)
  - 2 Step: The cooling coil is controlled by 2 step On/Off. (VEX4080 - VEX4100)
- **Minimum airflow:** Set minimum airflow. In the event of airflow **below** the set value, cooling is blocked.

  For more information about minimum airflow for DEX sizes, see the table below.

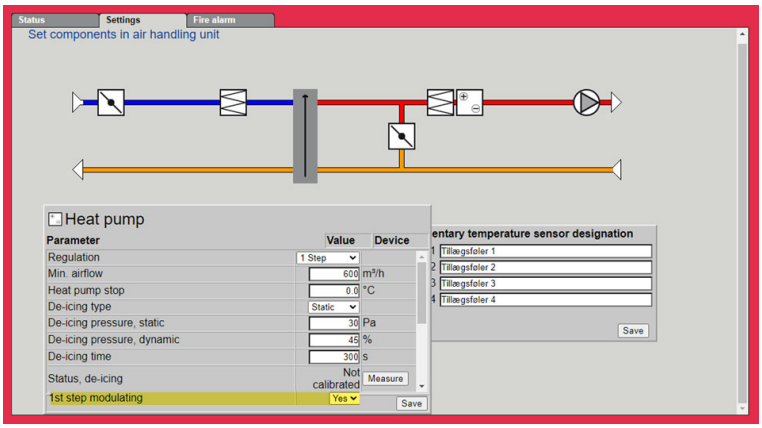
- **Single step modulation:** Select YES. Single step must always be modulating.
- **Min. stop time:** Set minimum stop time. Minimum period of time between two start-ups of the compressor.
- **Aftercooling time:** Set the aftercooling time of the cooling capacitor. When the airflow is reduced or stopped completely, there is a risk of overheating of the cooling capacitor. The set value indicates the time that the air extraction fan is in operation after the VEX unit has stopped.
- **Low pressure circuit 1 alarm:** Set the lowest value allowed for evaporation pressure in a cooling circuit. At lower pressures an alarm sounds.
- **High pressure circuit 1 alarm:** Set the highest value allowed for capacitor pressure in a cooling circuit. At higher pressures an alarm sounds.
- **Low pressure circuit 2 alarm:** Set the lowest value allowed for evaporation pressure in a cooling circuit. At lower pressures an alarm sounds. (Is not used in VEX4000)
- **High pressure circuit 2 alarm:** Set the highest value allowed for condenser pressure in a cooling circuit. At higher pressures an alarm sounds. (Is not used in VEX4000)

Press **Save** to save the settings.

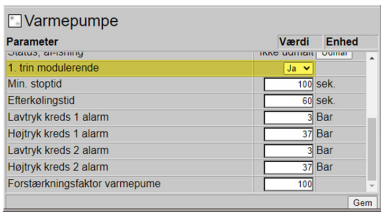
7.2.9 DX cooling and RHP heat pump



DX cooling and RHP heat pump (Reversible Heat Pump) come with one or two compressors. Single step is always modulating and any two step fixed. Pressure transmitters must be fitted in the cooling circuit for measuring of high pressure and low pressure in the DX pressure circuit.



- **Regulation:** Select regulation mode
  - Single stage: The cooling coil is controlled by 1 step modulating. (VEX4010 - VEX4070)
  - 2 Step: The cooling coil is controlled by 2 step On/Off. (VEX4080 - VEX4100)
- **Minimum airflow:** Set minimum airflow. In the event of airflow **below** the set value, DX cooling/RHP heat pump is blocked.
  For more information about minimum airflow for VEX sizes, see the table below. Minimum airflow during DX cooling.
- Heat pump stop: At a temperature lower than the one set, the heat pump is stopped due to bad COP.
- De-icing type: Select regulation mode Static or Dynamic.
  - **Static**: De-icing is started if the current pressure drop across the condenser exceeds the set-point set under “De-icing pressure static”.
  - **Dynamic**: De-icing is started if the current pressure drop across the condenser exceeds the calculated setpoint. The calculated setpoint is a calculation of the percentage increase in pressure drop across the condenser. De-icing starts if the pressure drop across the condenser exceeds the set value (De-icing pressure dynamically in %) in relation to an ice-free and clean condenser. In order for the function to be used, a measurement of the pressure drop above an ice-free and clean condensor must be conducted.
  - During de-icing, the hot-gas valve is opened for the set “De-icing time”.
- De-icing pressure, static: Set the static activation setpoint for pressure drop across the condenser. De-icing type must be set to 'Static' .
- De-icing pressure dynamic Set the alarm limit for how much (in %) the pressure drop may rise in relation to the pressure drop over a clean and ice-free condenser.
- **De-icing time:** When the current pressure drop across the condenser exceeds the set point (Static or dynamic), the hot gas valve opens.
- **Status, de-icing: If “De-icing pressure dynamic” is selected, the pressure drop across the condenser must be measured when the system is put into operation.** Press “Measure” to start this alignment.



- **Single step modulation:** Select YES. Single step must always be modulating.
- **Min. stop time:** Set minimum stop time. Minimum period of time between two start-ups of the compressor.
- **Aftercooling time:** Set the aftercooling time of the cooling capacitor. When the airflow is reduced or stopped completely, there is a risk of overheating of the cooling capacitor. The set value indicates the time that the air extraction fan is in operation after the VEX unit has stopped.
- **Low pressure circuit 1 alarm:** Set the lowest value allowed for evaporation pressure in a cooling circuit. At lower pressures an alarm sounds.
- **High pressure circuit 1 alarm:** Set the highest value allowed for capacitor pressure in a cooling circuit. At higher pressures an alarm sounds.
- **Low pressure circuit 2 alarm:** Set the lowest value allowed for evaporation pressure in a cooling circuit. At lower pressures an alarm sounds. (Is not used in VEX4000)
- **High pressure circuit 2 alarm:** Set the highest value allowed for condenser pressure in a cooling circuit. At higher pressures an alarm sounds. (Is not used in VEX4000)

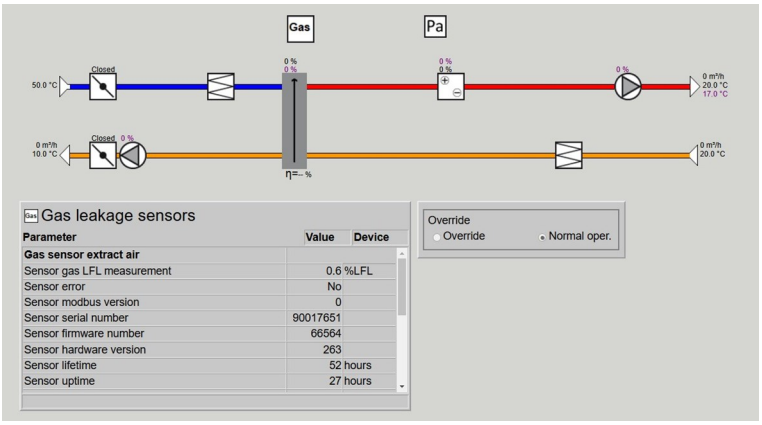
Press **Save** to save the settings.

Minimum airflow

VEX size	Min. airflow for IC/ICC (m3/h)	DEX size	Min. airflow for IC/ICC (m3/h)
4010	1500	4060	5000
4020	1500	4070	6000
4030	2000	4080	7000
4040	3000	4090	8500
4050	4000	4100	10000

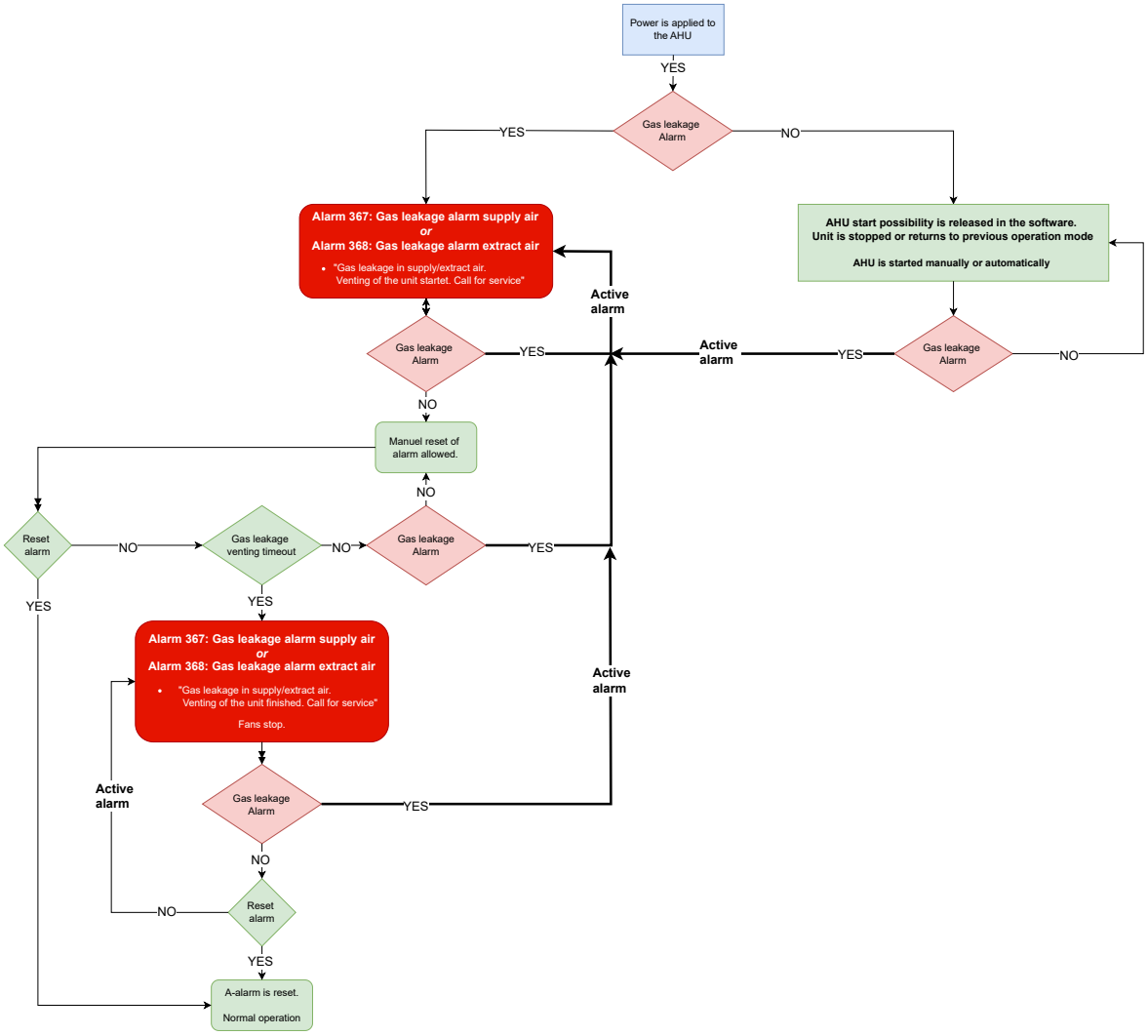
7.2.10 Gas Leak Detection for R454B Refrigerant

For units equipped with an integrated cooling system and R454B refrigerant, any potential gas leak is monitored via gas sensors. The unit is configured with these sensors when assembled during production. It is possible to view the status of these sensors by clicking the GAS icon in the web server. In the status box for the gas sensors, various data from the gas sensor can be read, such as the current LFL% (Lower Flammability Limit) measurement and software versions.



Parameter	Value	Device
Gas sensor extract air		
Sensor gas LFL measurement	0.6 %LFL	
Sensor error	No	
Sensor modbus version	0	
Sensor serial number	90017651	
Sensor firmware number	66564	
Sensor hardware version	263	
Sensor lifetime	52 hours	
Sensor uptime	27 hours	

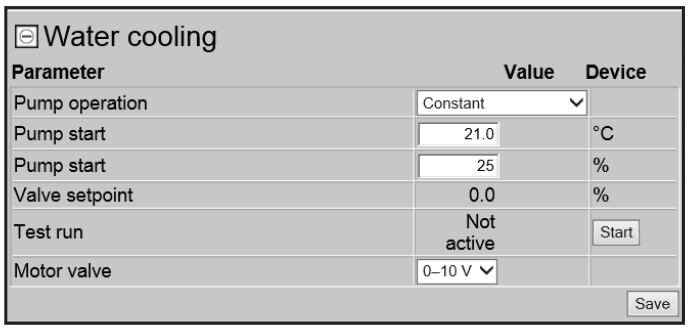
In the event that a gas leak is detected, the unit will trigger an alarm and begin to dilute the gas leak and follow this flowchart:



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Water cooling

Water cooling is configured to control an analogue valve in the water circuit via a 2-10V output that is configured. Start/Stop of a circulation pump in the cooling circuit via digital output. Alarm from a pump can be connected to ä digital input, **Cooling error** , which will trigger a pump alarm when the input is opened.



- **Pump operation:** Select parameter for pump operation
  - **Constant:** The pump runs constantly when there is tension on EXcon Master.
  - **Auto:** Pump operates with cooling requirement
  - **Outdoor air temperature:** The pump runs when the outside air temperature rises **above** the set value in **Pump start** or when there is a cooling requirement.
  - **Cooling requirement:** The pump starts when the motor valve is opened more than the set value.

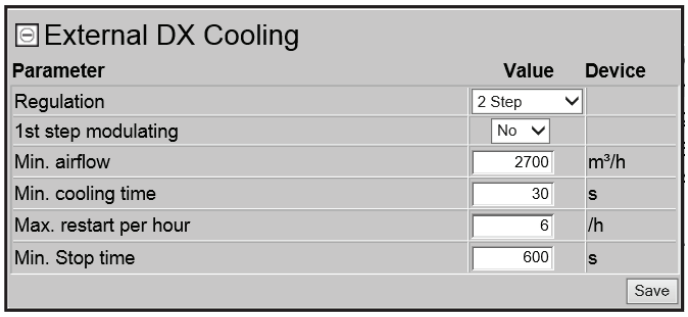
Pump motioning: If the pump has not been started for the last 24 hours, it will become motioned in 1 minute regardless of the cooling requirement. This is to combat the pump getting stuck.

- **Pump start:** Set temperature for the pump to start. The pump starts when the outdoor air temperature is above the set value. During pump operation, **Outdoor air temperature** must be selected.
- **Pump start:** Set values for the pump to start. The pump starts when the motor valve is opened more than the set percentage rate. During pump operation, **Cooling requirement** must be selected.
- **Valve setpoint:** Displays the current valve position
- **Test sequence:** Press Start to begin the test sequence of the valve motor. (Only applicable in case of Belimo modbus valve motor)
- **Motor valve:** Set the motor valve's regulatory range. Always select 2-10V

Press **Save** to save the settings.

External DX cooling

External DX cooling has one cooling step. The EXcon control system starts and stops the cooling as required. Start/stop of cooling step occurs with 1 digital output.



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- **Regulation:** Select regulation mode
  - Always select 1-step: The cooling coil is controlled by 1 step On/Off.
- **Single step modulation:** Always select **NO**. First step is always a fixed step On/Off.
- **Minimum airflow:** Set minimum airflow. In the event of airflow **below** the set value, cooling is blocked.

  For more information about minimum airflow for VEX sizes, see the table below.

- **Minimum cooling time:** Set minimum operating time for the individual compressor.
- **Max. restart/hour:** Set maximum number of restarts of the individual compressor per hour.
- **Min. stop time:** Set minimum stop time. Minimum period of time between two start-ups of the compressor

Press **Save** to save the settings.

Minimum airflow

VEX size	Min. airflow for IC/ICC (m3/h)	DEX size	Min. airflow for IC/ICC (m3/h)
4010	1500	4060	5000
4020	1500	4070	6000
4030	2000	4080	7000
4040	3000	4090	8500
4050	4000	4100	10000

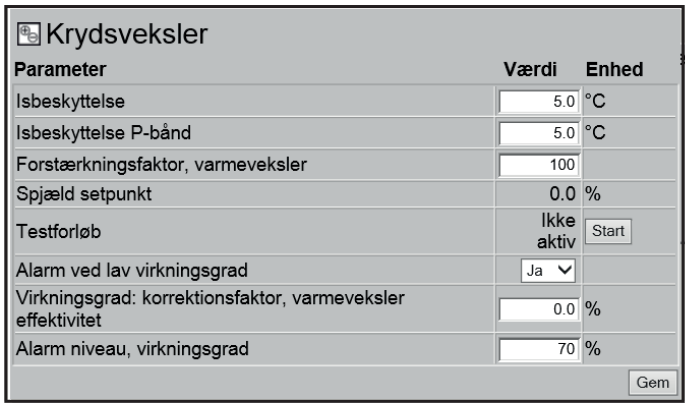
7.2.11 Heat recovery, Plate heat exchanger

Crossflow heat exchanger

The counterflow heat exchanger's bypass damper is controlled by a modulating damper actuator.

De-icing

If the exhaust air temperature drops below the set value (frost protection + frost protection P-band) the bypass damper will open with modulation up to 100%. The outdoor air will **bypass** the crossflow heat exchanger and the extract air will pass **through** the crossflow heat exchanger, and thereby ice formation on the heat exchanger will thaw.



- **Ice protection:** Set the exhaust air temperature for frost protection

  When the exhaust air temperature is **below** the set value, the bypass damper will be 100% open and there will be full frost protection
- **Ice protection P-band:** Set the frost protection P-band.
  At an exhaust air temperature **below** the set value + the set value in the parameter **Frost protection**, the bypass valve will open with modulation.
- **Amplification factor, heat exchanger** Set the amplification factor in the crossflow heat exchanger.
  This factor strengthens the effect of the regulator, when it either increases or reduces the heat. When the value is 100, the factor is neutral.
- **Damper setpoint** Shows the current setpoint for the bypass damper.
- **Test run:** Press **Start** to start the test sequence for the bypass damper. (Only applicable to the Belimo damper actuator)
- **Alarm in the event of low efficiency:** Select whether an alarm must be given in the event of low efficiency of heat recovery. **Yes/No**
- **Efficiency: correction factor, heat exchanger efficiency:** Set the correction factor for calculation of efficiency. (0-5%)

  The correction factor is added to the calculated efficiency and thus compensates for the heat that is measured in the emittance from the exhaust air/fan.

- **Alarm level, efficiency:** Set the alarm limit for **alarm in the event of low efficiency**. For the alarm to sound, it is a condition that:
  - **Alarm in the event of low efficiency** is set to **Yes**
  - The unit must be in operation.
  - The efficiency must be **below** the set value.

For further information concerning the calculation of efficiency, see the **Efficiency** section

Press **Save** to save the settings.

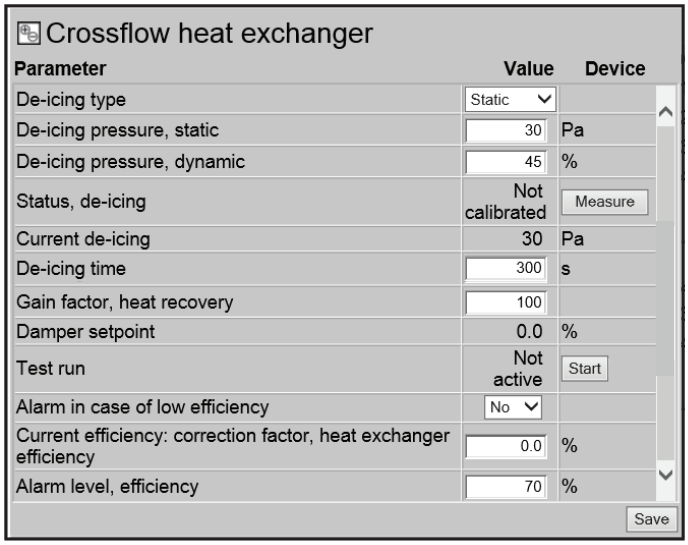
EXHAUSTO

Crossflow heat exchanger pressure

The crossflow heat exchanger's bypass damper is controlled by a modulating modbus damper actuator. If a pressure sensor is selected, the crossflow heat exchanger is protected against icing by measuring the pressure drop over the exchanger.

De-icing

When the current pressure drop above the exchanger exceeds the setpoint (static or dynamic), the bypass damper is opened 100%. The outdoor air will **bypass** the crossflow heat exchanger and the extract air will pass **through** the crossflow heat exchanger, and thereby ice formation on the heat exchanger will thaw. The bypass damper will be open for the set time. During the de-icing period, where the bypass damper is 100% open, the supply air temperature will instead be maintained by a possible after heating coil.



- **De-icing type:** Select de-icing type.
  - **Static**: De-icing is started if the current pressure drop above the crossflow heat exchanger exceeds the setpoint that is set up under **De-icing pressure static.**
  - **Dynamic**: De-icing is started if the current pressure drop above the crossflow heat exchanger exceeds the calculated setpoint. The calculated setpoint is a percentile rise in the pressure drop above the exchanger. In order for the function to be used, a measurement of the pressure drop above an ice-free and clean crossflow heat exchanger must be taken. During de-icing, the bypass damper is opened 100% during the set **de-icing time**.
- **De-icing pressure, static:** Set static setpoint for pressure drop across the exchanger. De-icing type must be set to **Static**.
- **De-icing pressure, dynamic:** Set the dynamic setpoint for how high the pressure loss may be in relation to the pressure loss over a clean and ice-free crossflow heat exchanger. De-icing type must be set to **Dynamic**.
  See **Measurement dynamic de-icing** for further information.
- **Status, de-icing:**
  If **Dynamic de-icing** is selected, a measurement of the loss of pressure over the crossflow heat exchanger must be conducted when the unit is put into operation.
  See **Measurement dynamic de-icing** for further information.
- **Current de-icing pressure:** In the case of **Static** de-icing type, the set static pressure is displayed.
  In the case of **Dynamic** de-icing type, the calculated dynamic pressure is displayed..

- **De-icing time:** Setting the de-icing time. The set de-icing time is the period when the bypass damper is 100% open.
- **Amplification factor, heat exchanger** Set the amplification factor in the crossflow heat exchanger.
  This factor strengthens the effect of the regulator, when it either increases or reduces the heat. When the value is 100, the factor is neutral.
- **Damper setpoint** Shows the current setpoint for the bypass damper.
- **Test run:** Press **Start** to start the test sequence for the bypass damper. (Only applicable to the Belimo damper actuator)
- **Alarm in the event of low efficiency:** Select whether an alarm must be given in the event of low efficiency of heat recovery. **Yes/No**
- **Efficiency: correction factor, heat exchanger efficiency:** Set the correction factor for calculation of efficiency. (0-5%)

  The correction factor is added to the calculated efficiency and thus compensates for the heat that is measured in the emittance from the exhaust air/fan.

- **Alarm level, efficiency:** Set the alarm limit for **alarm in the event of low efficiency**. For the alarm to sound, it is a condition that:
  - **Alarm in the event of low efficiency** is set to **Yes**
  - The unit must be in operation.
  - The efficiency must be **below** the set value.

For further information concerning the calculation of efficiency, see the **Efficiency** section

Press **Save** to save the settings.

Measuring of dynamic de-icing

This function is used if the ice protection is conducted with pressure transmitters. The loss of pressure is measured over a clean and ice-free exchanger, and thus the EXcon control system knows the value of the exchanger's loss of pressure.

- **Status, de-icing:** Click on **Measure**

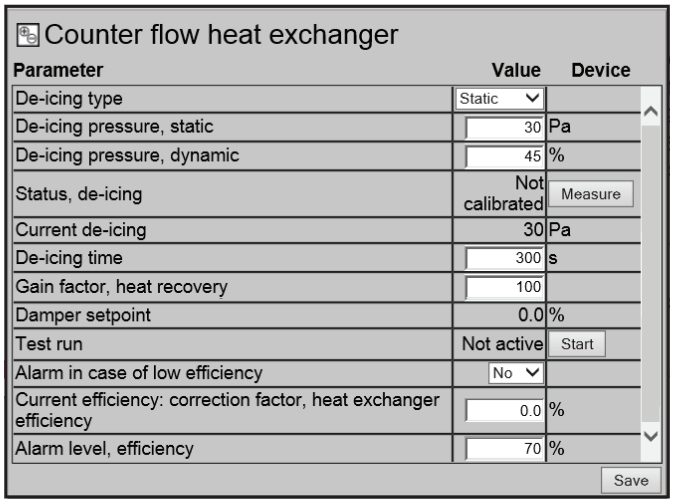
Clicking on **Measure** stops all fans. When all the fans have stopped, they are slowly started again from 0 to 100%. Simultaneously, during this start-up, the loss of pressure is registered over the exchanger.

De-icing pressure dynamic is thereafter set as a percentage higher value in relation to the loss of pressure over a clean and ice-free heat exchanger

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Counterflow heat exchanger (pressure)

The counterflow heat exchanger's bypass damper is controlled by a modulating damper actuator. The counterflow heat exchanger is protected against icing by measuring the pressure drop across the heat exchanger.



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- **De-icing type:** Select de-icing type.
  - **Static**: De-icing is started if the current pressure drop above the counterflow heat exchanger exceeds the setpoint that is set under **De-icing pressure static.**
  - **Dynamic**: De-icing is started if the current pressure drop above the counterflow heat exchanger exceeds the calculated setpoint. The calculated setpoint is a percentile rise in the pressure drop above the exchanger. For the function to be used, a measurement of the pressure drop above an ice-free and clean counterflow heat exchange must be performed. During de-icing, the bypass damper is opened 100% during the set **de-icing time**.
- **De-icing pressure, static:** Set static setpoint for pressure drop across the exchanger. De-icing type must be set to **Static**.
- **De-icing pressure, dynamic:** Set the dynamic setpoint for how high the pressure loss may be in relation to the pressure loss over a clean and ice-free counterflow heat exchanger. De-icing type must be set to **Dynamic**.
  See **Measurement dynamic de-icing** for further information.
- **Status, de-icing:**
  If **Dynamic de-icing** is selected, a measurement of the loss of pressure over the counterflow heat exchanger must be conducted when the unit is put into operation.
  See **Measurement dynamic de-icing** for further information.
- **Current de-icing pressure:** In the case of **Static** de-icing type, the set static pressure is displayed.
  In the case of **Dynamic** de-icing type, the calculated dynamic pressure is displayed..
- **De-icing time:** Setting the de-icing time. The set de-icing time is the period when the bypass damper is 100% open.
- **Amplification factor, heat exchanger** Set the counterflow heat exchanger's amplification factor. This factor strengthens the effect of the regulator, when it either increases or reduces the heat. When the value is 100, the factor is neutral.
- **Damper setpoint** Shows the current setpoint for the bypass damper.
- **Test sequence:** Press **Start** to start the test sequence for the bypass damper. (Only applicable to the Belimo damper actuator)
- **Alarm in the event of low efficiency:** Select whether an alarm must be given in the event of low efficiency of heat recovery. **Yes/No**
- **Efficiency: correction factor, heat exchanger efficiency:** Set the correction factor for calculation of efficiency. (0-5%)
  The correction factor is added to the calculated efficiency and thus compensates for the heat that is measured in the emittance from the exhaust air/fan.

- **Alarm level, efficiency:** Set the alarm limit for **alarm in the event of low efficiency**. For the alarm to sound, it is a condition that:
  - **Alarm in the event of low efficiency** is set to **Yes**
  - The unit must be in operation.
  - The efficiency must be **below** the set value.

For further information concerning the calculation of efficiency, see the **Efficiency** section

Press **Save** to save the settings.

De-icing

When the current pressure drop above the exchanger exceeds the setpoint (static or dynamic), the bypass damper is opened 100%. The outdoor air will **bypass** the counterflow heat exchanger and the extract air will pass **through** the counterflow heat exchanger, and thereby ice formation on the heat exchanger will thaw. The bypass damper will be open for the set time. During the de-icing period, where the bypass damper is 100% open, the supply air temperature will instead be maintained by a possible after heating coil.

Measuring of dynamic de-icing

The loss of pressure is measured over a clean and ice-free exchanger, so that the control system knows the value of the exchanger's pressure loss.

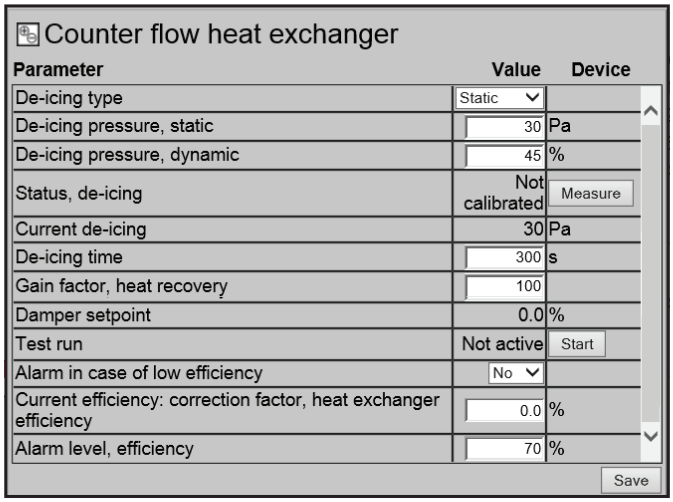
- **Status, de-icing:** Click on **Measure**

Clicking on **Measure** stops all fans. When all the fans have stopped, they are slowly started again from 0 to 100%. Simultaneously, during this start-up, the loss of pressure is registered over the exchanger.

De-icing pressure dynamic is thereafter set as a percentage higher value in relation to the loss of pressure over a clean and ice-free heat exchanger

Counterflow heat exchanger (pressure)

The counterflow heat exchanger's bypass damper is controlled by a modulating damper actuator. The counterflow heat exchanger is protected against icing by measuring the pressure drop across the heat exchanger.



- **De-icing type:** Select de-icing type.
  - **Static**: De-icing is started if the current pressure drop above the counterflow heat exchanger exceeds the setpoint that is set under **De-icing pressure static.**
  - **Dynamic**: De-icing is started if the current pressure drop above the counterflow heat exchanger exceeds the calculated setpoint. The calculated setpoint is a percentile rise in the pressure drop above the exchanger. For the function to be used, a measurement of the pressure drop above an ice-free and clean counterflow heat exchange must be performed. During de-icing, the bypass damper is opened 100% during the set **de-icing time**.
- **De-icing pressure, static:** Set static setpoint for pressure drop across the exchanger. De-icing type must be set to **Static**.
- **De-icing pressure, dynamic:** Set the dynamic setpoint for how high the pressure loss may be in relation to the pressure loss over a clean and ice-free counterflow heat exchanger. De-icing type must be set to **Dynamic**.
  See **Measurement dynamic de-icing** for further information.
- **Status, de-icing:**
  If **Dynamic de-icing** is selected, a measurement of the loss of pressure over the counterflow heat exchanger must be conducted when the unit is put into operation.
  See **Measurement dynamic de-icing** for further information.
- **Current de-icing pressure:** In the case of **Static** de-icing type, the set static pressure is displayed.
  In the case of **Dynamic** de-icing type, the calculated dynamic pressure is displayed..
- **De-icing time:** Setting the de-icing time. The set de-icing time is the period when the bypass damper is 100% open.
- **Amplification factor, heat exchanger** Set the counterflow heat exchanger's amplification factor. This factor strengthens the effect of the regulator, when it either increases or reduces the heat. When the value is 100, the factor is neutral.
- **Damper setpoint** Shows the current setpoint for the bypass damper.

- **Test sequence:** Press **Start** to start the test sequence for the bypass damper. (Only applicable to the Belimo damper actuator)
- **Alarm in the event of low efficiency:** Select whether an alarm must be given in the event of low efficiency of heat recovery. **Yes/No**
- **Efficiency: correction factor, heat exchanger efficiency:** Set the correction factor for calculation of efficiency. (0-5%)
  The correction factor is added to the calculated efficiency and thus compensates for the heat that is measured in the emittance from the exhaust air/fan.

- **Alarm level, efficiency:** Set the alarm limit for **alarm in the event of low efficiency**. For the alarm to sound, it is a condition that:
  - **Alarm in the event of low efficiency** is set to **Yes**
  - The unit must be in operation.
  - The efficiency must be **below** the set value.

For further information concerning the calculation of efficiency, see the **Efficiency** section

Press **Save** to save the settings.

De-icing

When the current pressure drop above the exchanger exceeds the setpoint (static or dynamic), the bypass damper is opened 100%. The outdoor air will **bypass** the counterflow heat exchanger and the extract air will pass **through** the counterflow heat exchanger, and thereby ice formation on the heat exchanger will thaw. The bypass damper will be open for the set time. During the de-icing period, where the bypass damper is 100% open, the supply air temperature will instead be maintained by a possible after heating coil.

Measuring of dynamic de-icing

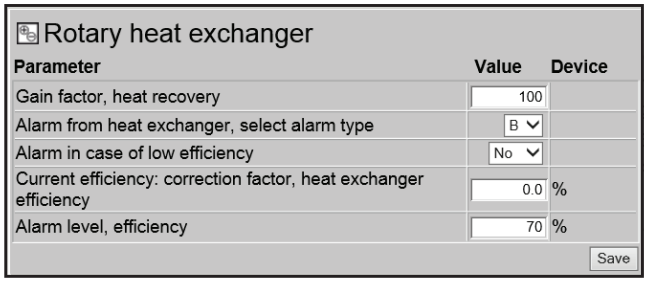
The loss of pressure is measured over a clean and ice-free exchanger, so that the control system knows the value of the exchanger's pressure loss.

- **Status, de-icing:** Click on **Measure**

Clicking on **Measure** stops all fans. When all the fans have stopped, they are slowly started again from 0 to 100%. Simultaneously, during this start-up, the loss of pressure is registered over the exchanger.

De-icing pressure dynamic is thereafter set as a percentage higher value in relation to the loss of pressure over a clean and ice-free heat exchanger

Rotary heat exchanger



- **Amplification factor, heat exchanger:** Set the rotary heat exchanger's gain factor.
  This factor strengthens the effect of the regulator, when it either increases or reduces the heat.
  When the value is 100, the factor is neutral.
- **Alarm from heat exchanger, select alarm type:** Select alarm type
  - **A alarm**: The unit stops when an alarm is given.
  - **B alarm**: The unit continues to run during sounding of alarm.
- **Alarm in the event of low efficiency:** Select whether an alarm must be given in the event of low efficiency of heat recovery. **Yes/No**
- **Efficiency: correction factor, heat exchanger efficiency** Set the correction factor for calculation of efficiency. (0-5%)

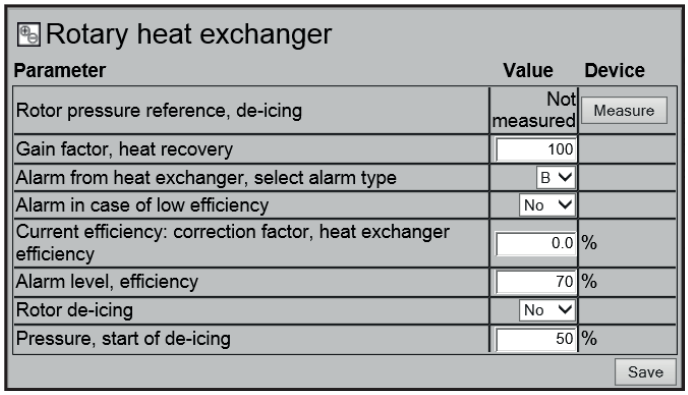
  The correction factor is added to the calculated efficiency and thus compensates for the heat that is measured in the emittance from the exhaust air/fan.
- **Alarm level, efficiency:** Set the alarm limit for **alarm in the event of low efficiency**. For the alarm to sound, it is a condition that:
  - **Alarm in the event of low efficiency** is set to **Yes**
  - The unit is in operation.
  - The efficiency is **below** the set value.

- **#Reduce Rotor RPM to prevent leakage **** [Picture]:
  - Select whether automatic reduction of rotor RPM must be active (Yes/No).

- **#Min. Flow supply air/extract air, at Max. Motor RPM****
  - Set min. Airflow at Max- Motor RPM.

#** only visible if Automatic Leakage Control (ALC) is configured.
Press **Save** to save the settings.

Rotary heat exchanger (with pressure de-icing)



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- **Rotor pressure reference, de-icing:** A measurement of the loss of pressure over the rotary heat exchanger must be conducted when the unit is put into operation.
  See **Measurement of pressure reference, de-icing** for further information.
- **Amplification factor, heat exchanger:** Set the rotary heat exchanger's gain factor.
  This factor strengthens the effect of the regulator, when it either increases or reduces the heat. When the value is 100, the factor is neutral.
- **Alarm from heat exchanger, select alarm type:** Select alarm type
  - **A alarm**: The unit stops when an alarm is given.
  - **B alarm**: The unit continues to run during sounding of alarm.
- **Alarm in the event of low efficiency:** Select whether an alarm must be given in the event of low efficiency of heat recovery. **Yes/No**
- **Efficiency: correction factor, heat exchanger efficiency** Set the correction factor for calculation of efficiency. (0-5%)

  The correction factor is added to the calculated efficiency and thus compensates for the heat that is measured in the emittance from the exhaust air/fan.
- **Alarm level, efficiency:** Set the alarm limit for **alarm in the event of low efficiency**. For the alarm to sound, it is a condition that:
  - **Alarm in the event of low efficiency** is set to **Yes**
  - The unit is in operation.
  - The efficiency is **below** the set value.
- **Rotor de-icing:** Select Yes to activate the de-icing function. An outdoor air temperature sensor MUST be mounted, as the de-icing function is only active at outdoor temperatures below 0°C.
- **Pressure, start of de-icing:** Set the maximum value which the pressure drop may rise to as a percentage of the measured pressure reference. If the pressure drop exceeds the value, the de-icing function will start.

Press **Save** to save the settings.

Measurement of pressure reference, de-icing

This function is used if the ice protection is conducted with pressure transmitters. The loss of pressure is measured over a clean and ice-free exchanger, and thus the EXcon control system knows the value of the exchanger's loss of pressure.

- **Rotor pressure reference, de-icing:** Click on **Measure**

Clicking on **Measure** stops all fans. When all the fans have stopped, they are slowly started again from 0 to 100%. Simultaneously, during this start-up, the loss of pressure is registered over the exchanger.

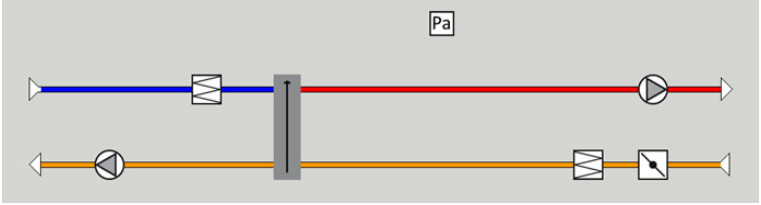
Pressure, start of de-icing is thereafter set up as a percentage-wise higher value in relation to the loss of pressure over a clean and ice-free heat exchanger.

7.2.12 Automatic Leakage Control (ALC) accessory on purchasing device

Application



Automatic Leakage Control (ALC) is a function that prevents leakage in units (AHU) with rotary heat exchangers. ALC continuously measures and controls the pressure difference between supply airflow and extract airflow to ensure that no contaminated air is recirculated to the cleansupply airflow air in the air handling unit's supply.
NB! If ALC is purchased, all components are fully mounted in the unit and configured in the HMI from the factory.



Prerequisites

ALC can be configured and activated in applications with:

- Rotary heat exchanger
- Modbus-controlled damper in extract air.
- Pressure transmitter mounted between supply air and extract air in rotor section.
- Purging zone
- EXcon Software version 6.31 or later.

Proviso:

ALC **cannot** be used in applications controlled by:

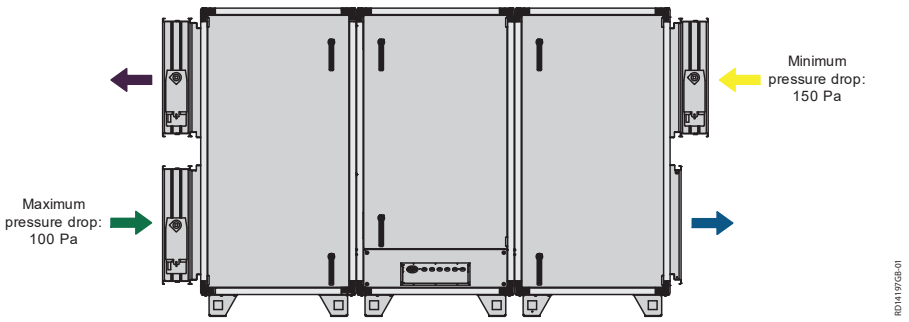
- Cross, double crossflow, counterflow, liquid connected heat exchangers.
- Recirc./recirc. damper (On/Off, 0-10V).
- CO2 / VOC / Fan Optimiser regulation.
- For third-party control systems

Function

The principle of the function is to keep a minimum negative pressure in the extract air side (exhaust side) of the rotary heat exchanger in relation to the supply air side (fresh air side) of 20 Pa.
If the differential pressure due to dynamic pressure changes moves towards a value lower than 20 Pa, the extract air damper will gradually close towards the minimum to maintain the positive differential pressure.

Operational prereq-uisites

- Maximum duct pressure drop on outdoor air: 100 Pa at maximum ERP airflow.
- Minimum duct pressure drop on extract air: 150 Pa at maximum ERP airflow.
- Maximum permitted imbalance in airflow between supply air and extract air: 50%
- Maximum +/- 20% offset on slave regulation.

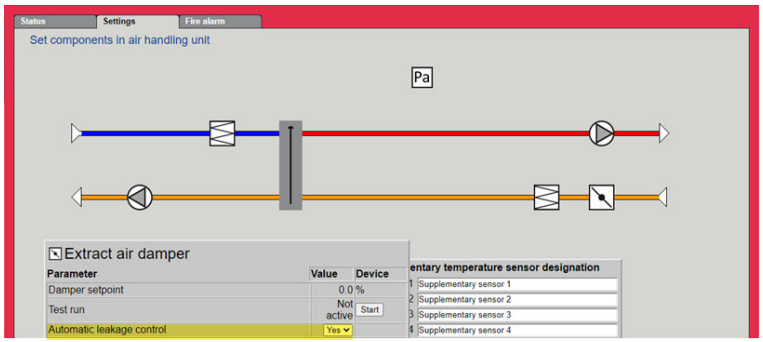


Please note!

If the operational prerequisites are not met, there may be instability and/or leakage from extract air to supply air.

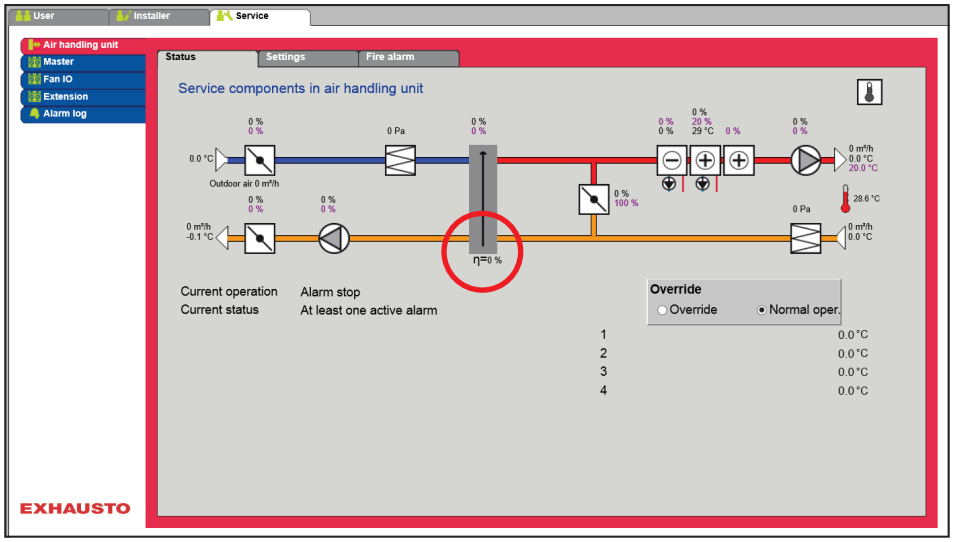
Stopping ALC

IMPORTANT! It is recommended **that the system is only switched off during service and maintenance** , as leakage may occur briefly during start-up.
Under: **Service >Unit > Settings**, you can click on the extract air damper and the extract air damper menu will appear. ALC can now be switched on and off.



7.2.13 Efficiency

EXcon control system automatically calculates the level of efficiency for the heat exchangers that are fitted and configured in the VEX unit. The level of efficiency (η) can be seen in connection with the heat exchanger on the status image under: **User > Alarm & Log > Status** or **Service > Unit > Status.**



Under certain circumstances the calculation will display large deviations:

- When the control signal for the recovery is lower than 5%, or the outside air temperature is higher than 10°C, the level of efficiency displays 0%.
- When the level of efficiency assumes values below the set level, and the control signal for heat recovery is 100%, an alarm will sound for: **Too low recovery**.

Calculation

The level of efficiency is calculated using the current measured temperatures. In order for the level of efficiency calculation to provide as accurate a picture as possible of the current level of efficiency, it is important that the sensors are placed correctly in the airflow. During calculation of the heat exchangers' level of efficiency, sensors are used that measure:

- Extract air temperature
- Exhaust air temperature
- Outdoor air temperature

The level of efficiency is calculated using the formula:

- Level of efficiency[%] = ((Extract air - Exhaust air) / (Extract air - Outdoor air)) * 100 + **Y**.

Y is a correction factor which indicates the heat that the exhaust fan emits into the air. **Y** can be set to values between 0 og 5%.

7.3 Master, Fan IO and Extension

EXcon modules terminal overview

In the menus Master, Fan IO and Extension, it is possible to see the inputs and outputs of the different modules. Hold the mouse/marker over the texts to see help texts.

7.4 Alarm log

The parameters in the menu **Alarm log** are used to log alarms and operating data which have occurred since the last startup of the VEX unit. A log is kept of which alarms have occurred, which alarms are nearing their limit values and operating data history. The logged alarms can be reviewed via the web user interface or the HMI Touch control panel/manual terminal. Apart from current alarms, the online user interface also shows impending alarms and the logged operating data.
For a more detailed description of the parameters, see under: **User > Alarm & log**

NB:

If an alarm repeatedly triggers, contact a service technician.

7.5 Zones

Reference

For further information on setting the zones, refer to the accompanying guidelines **EXcon zone control**

Scan code and go to addresses at
www.exhausto.com

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