USER MANUAL

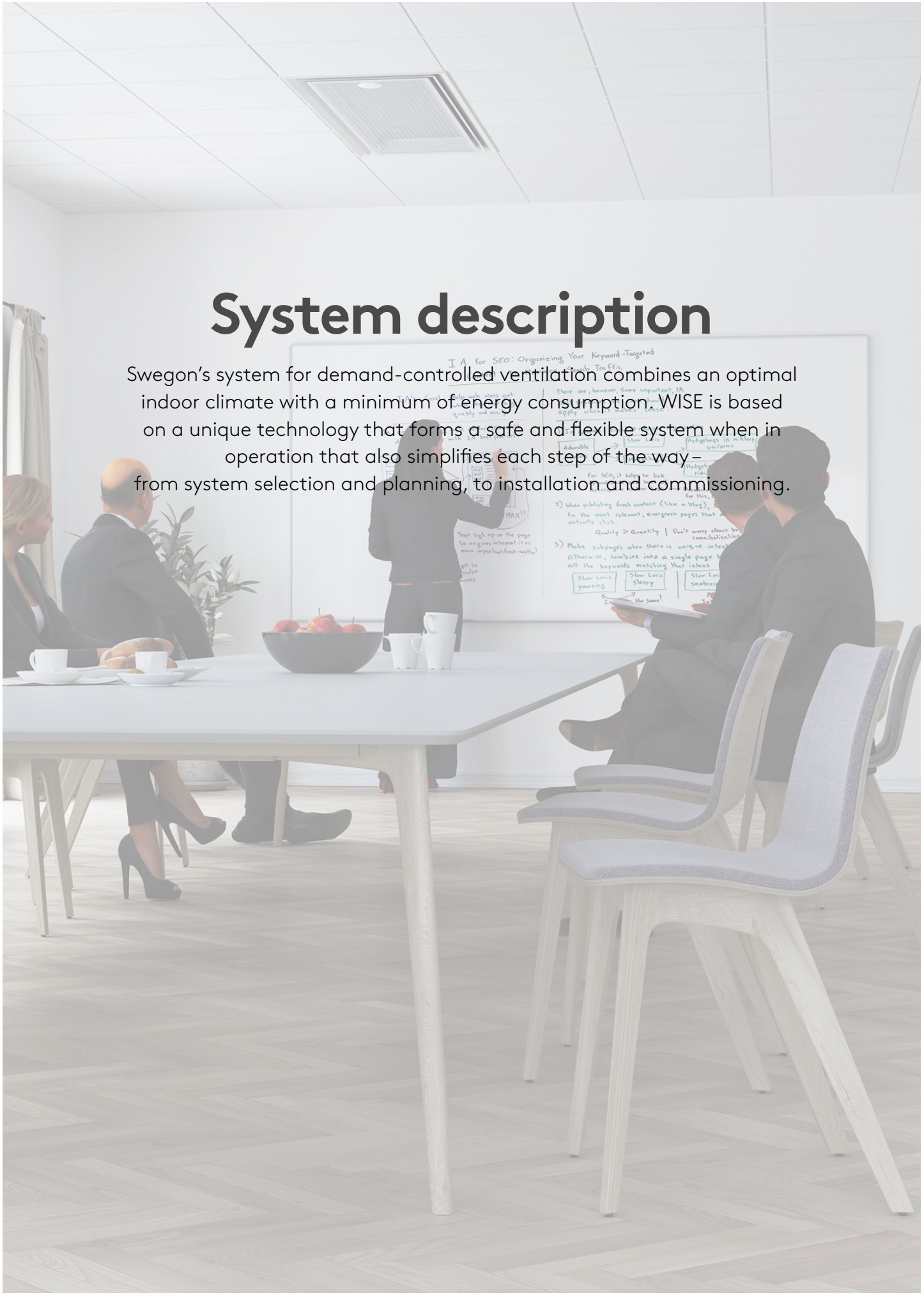
WISE

Demand-controlled indoor climate has never been easier

From software version 1.130

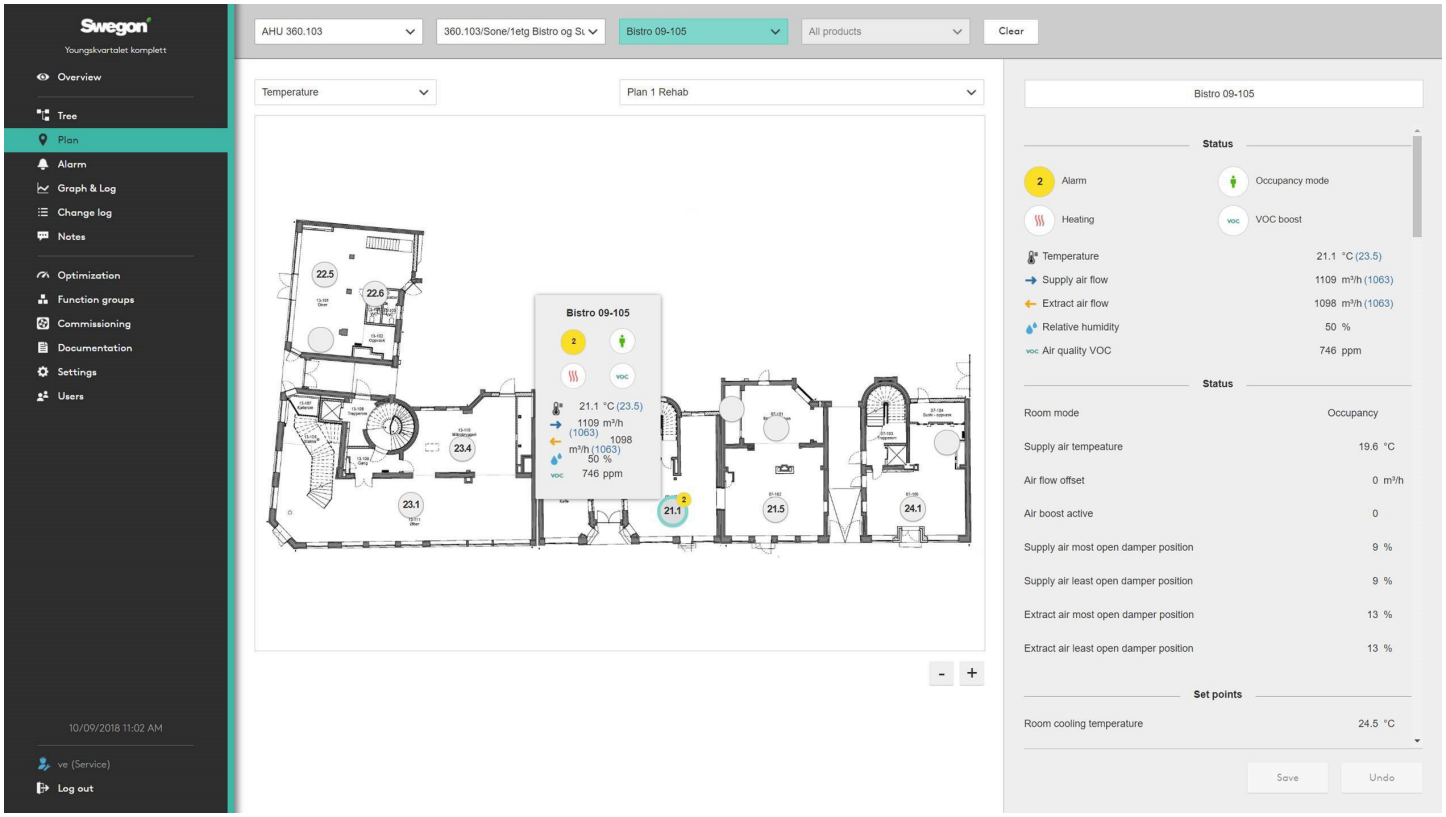
Swegon

Contents



System description

Swegon's system for demand-controlled ventilation combines an optimal indoor climate with a minimum of energy consumption. WISE is based on a unique technology that forms a safe and flexible system when in operation that also simplifies each step of the way – from system selection and planning, to installation and commissioning.



SuperWISE Interface view

WISE is a complete system with all the products you need for your indoor climate, including a smart control system and an easy-to-use user interface.

The basic purpose of WISE is to adjust the indoor climate to exactly the level required. It ventilates, cools and heats neither too much – which costs energy – nor too little – which adversely affects comfort, but only as much as is needed. With WISE you can combine high energy efficiency, the ideal indoor climate and a full overview of the whole system.

A large part of the functionality has been centralised and no longer lies on the product level. A project is configured by selecting functions and products for the unique project. When configuration is complete, a configuration file is produced which is read into SuperWISE during commissioning. When all products are loaded into the system, SuperWISE automatically sends the right configuration to the right product.

SuperWISE is the WISE system's interface with which the user integrates and communicates with the system and its products. Here you'll find all requisite information, without it being complicated or confusing. The common platform manages multiple air handling units and refrigerant units while there is considerable space for adaptation to each individual building. As SuperWISE is the system's single point of access, it's is easy to monitor and adjust the system, via computer or tablet, even remotely via Swegon Connect.

SuperWISE interface

SuperWISE graphical interface is an intuitive and user-friendly interface with which the user integrates and communicates with the system and its products. Commissioning, supervision, service and maintenance are significantly facilitated thanks to a good overview and clarity.

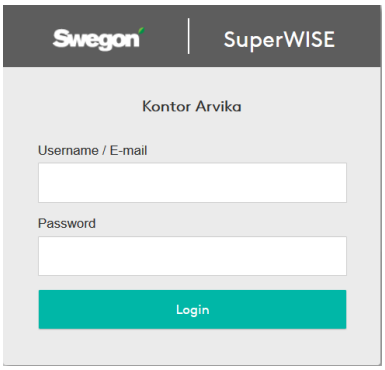
The common platform can manage multiple air handling units as well as cooling units and provides space for adaptation to each individual project.

Log in

Open your web browser* and enter the system's IP address in the address field.

Enter the password set at the factory the first time you log on. It is recommended that those using the system are assigned a user name and password for future logging in.

New users are added on the settings page. When a new user has been added, it is recommended that a standard user is activated.



Standard user

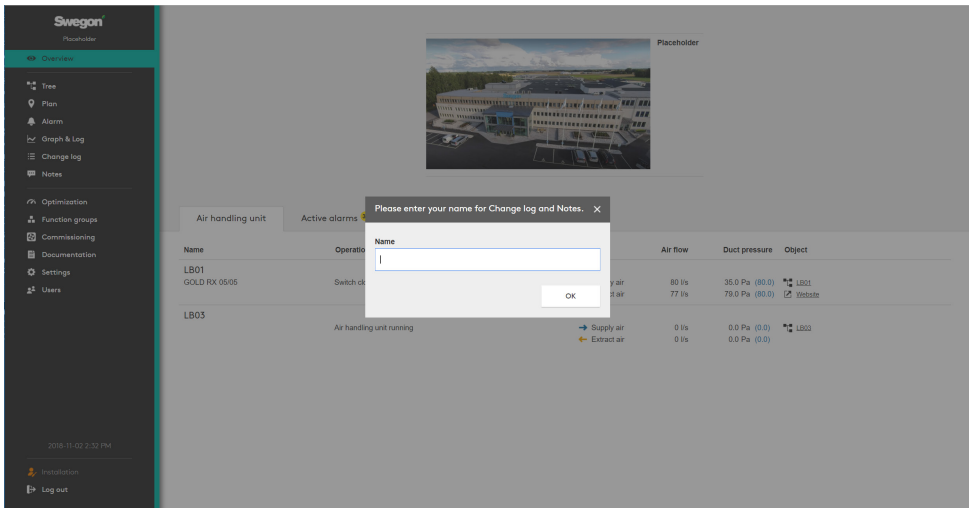
Authorisation	Username	Password
Local user	local	0000
Installation	installation	1111

*Recommended web browser: Google Chrome.

Identification

State name/signature in the dialog box shown once you have logged in. This information is important in order to see, among others, who made settings and adjustments to the system.

The identification dialog is only shown when the standard log in is used.



User interface

Symbol description

A number of symbols are used to visualize different modes in SuperWISE. These symbols are described below.

Room

	Occupancy mode Occupancy mode
	Unoccupancy mode Unoccupancy mode
	Heating Heating
	Cooling Cooling
	Lighting on Light on
	Lighting off Light off
	Temperature boost Temperature boost
	CO_2 boost CO_2 boost
	VOC boost VOC boost
	Manual boost Manual boost
	Air mix boost Air mix boost
	Duct flush boost Duct flush boost
	Condensation boost Condensation boost
	Relative humidity boost Relative humidity boost
	Relative humidity boost Moisture supply boost

	Commissioning mode Commissioning mode
	Open window mode Open window mode
	Emergency mode Emergency mode
	Summer night cooling Summer night cool
	Morning heating Morning boost
	Checked in mode Checked in mode
	Holiday mode Holiday mode
	Filter calibration Filter calibration
	Air handling unit stopped Air handling unit stopped
	A Alarm A Alarm
	B Alarm B Alarm
	Info Alarm Info Alarm

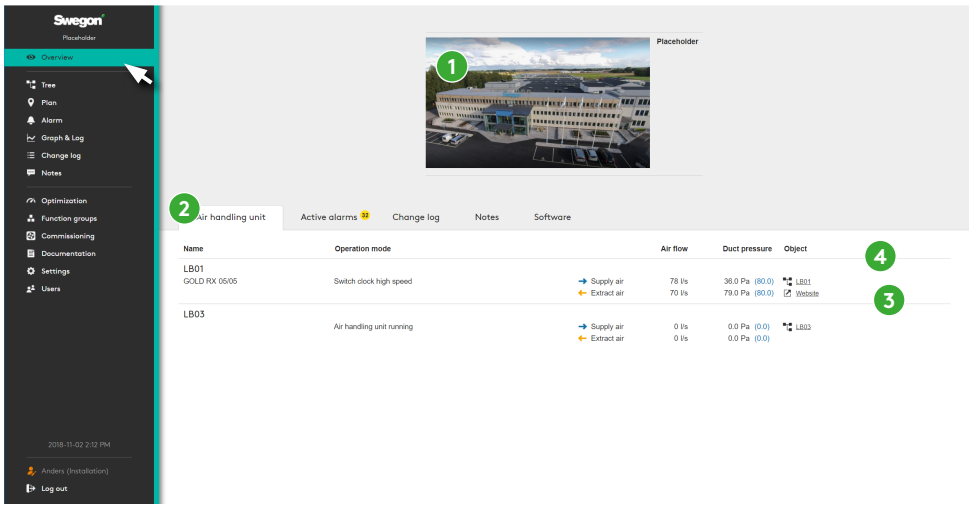
Product

	Untested Not tested
	Marked Marked
	Unpaired Unpaired

	Synchronization Synchronizing
	Service mode Service mode

Overview

The display you first see after logging in to the system.



Initially a picture of the site is shown, if this has been added. To add or change the picture, click on ***Please add site picture*** (1). This opens the same dialog reached via the main menu ***Settings*** and ***Site*** where you can enter basic information about the site.

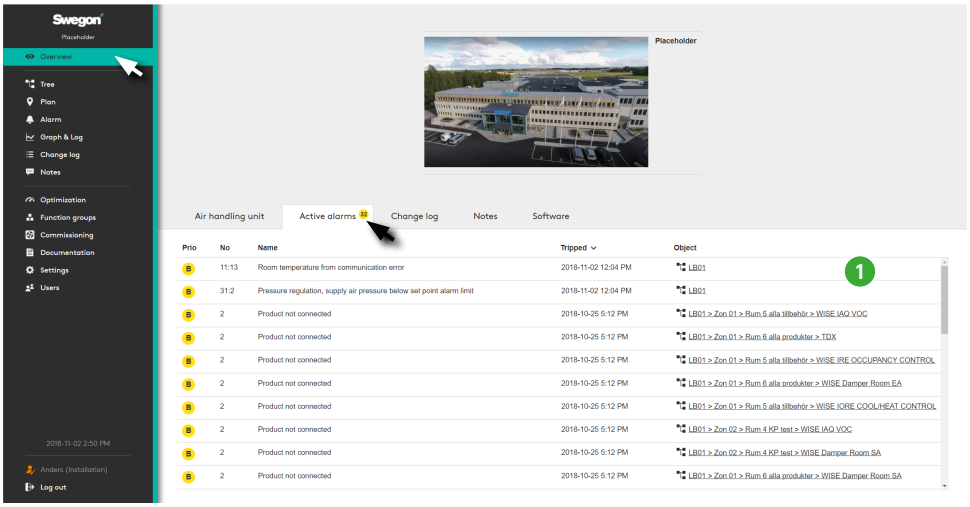
The overview consists of five tabs (2) - ***Air handling unit, Active alarm, Change log, Notes*** and ***Software***. As commissioning mode is enabled, an additional tab is displayed showing information about Commissioning. The same applies if there are products in the installation that have not been paired in the system during commissioning, a tab is then displayed with information about this.

Air handling unit

Overview of the system's air handling unit, with concise operating information and links to each air handling unit's web page (3), and its place in the tree view (4) with access to detailed information, settings, etc.

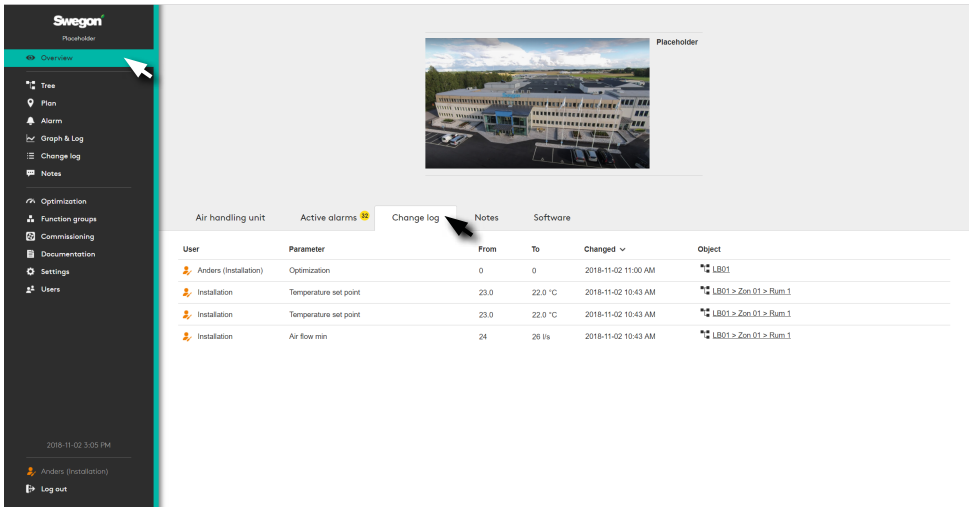
Active alarms

Shows active alarms and system messages from the WISE system and GOLD and COMPACT Air handling units.
Shows the link to the tree view (1) for additional information and management.



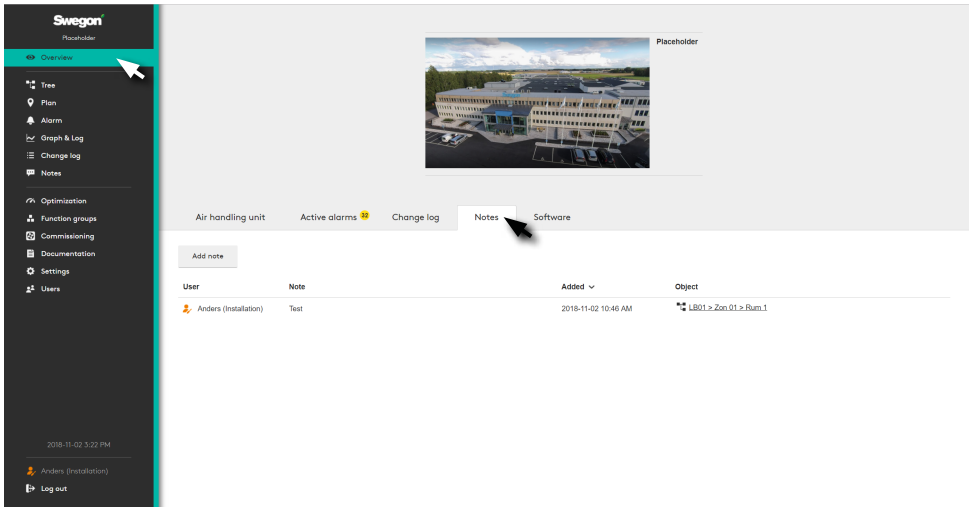
Change log

Summary of changes performed in the system, with information about what has been changed, who performed the change and when it was executed.



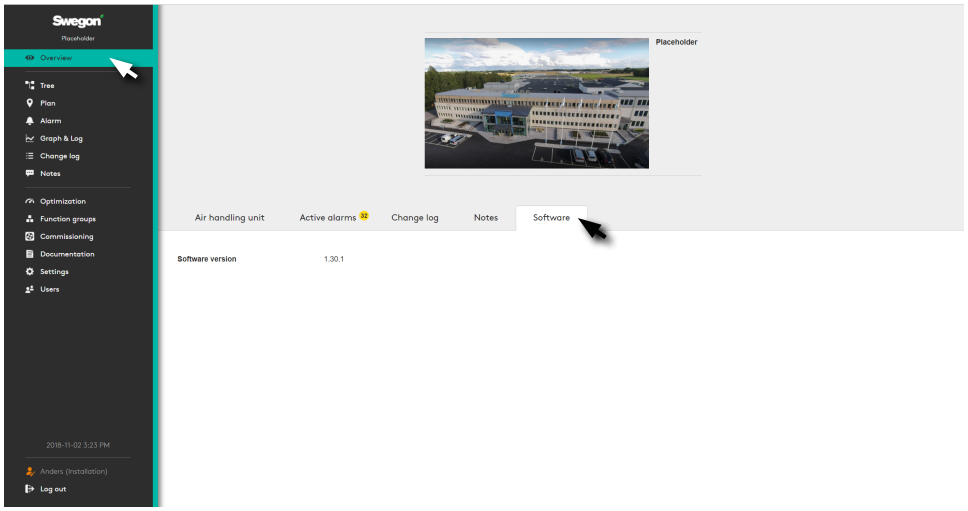
Notes

Users can with brief notes document and provide information about settings, adjustments and other relevant incidents. For additional clarity there is information about user, time and the object concerned.



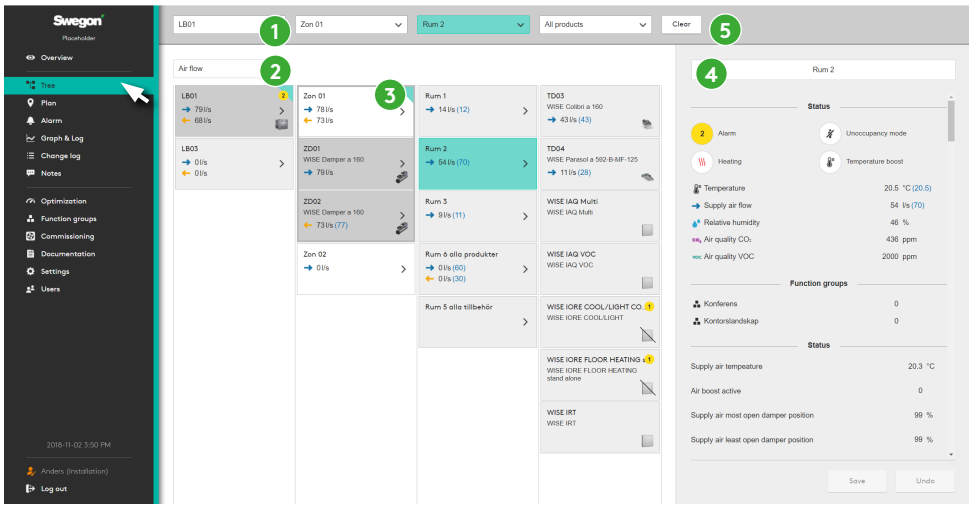
Software

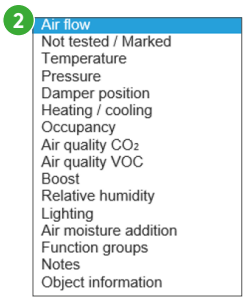
Current software version.



Tree

System overview with clear tree structure.





The tree structure (3) makes it possible to navigate through the system's products and functions, to see detailed information, change settings, etc.

Grey boxes indicates how the air flows. A whole turquoise box indicates a selected box. Boxes with turquoise corners indicate the path you clicked on to reach the selected box in the tree structure.

In the section menu (2), it is possible to select which values are to be displayed: ***Air flow, Not tested/marked, Temperature, Pressure, Damper position, Heating/cooling, Occupancy, Air quality CO_2, Air quality VOC, Boosted air flow, Relative humidity, Lighting, Additional moisture, Function groups, Notes*** or ***Object information***. Object information is used to identify the BACnet object. Not tested/marked means that the product is not marked as tested in TuneWISE, or that the product is "flagged" in TuneWISE

Navigating

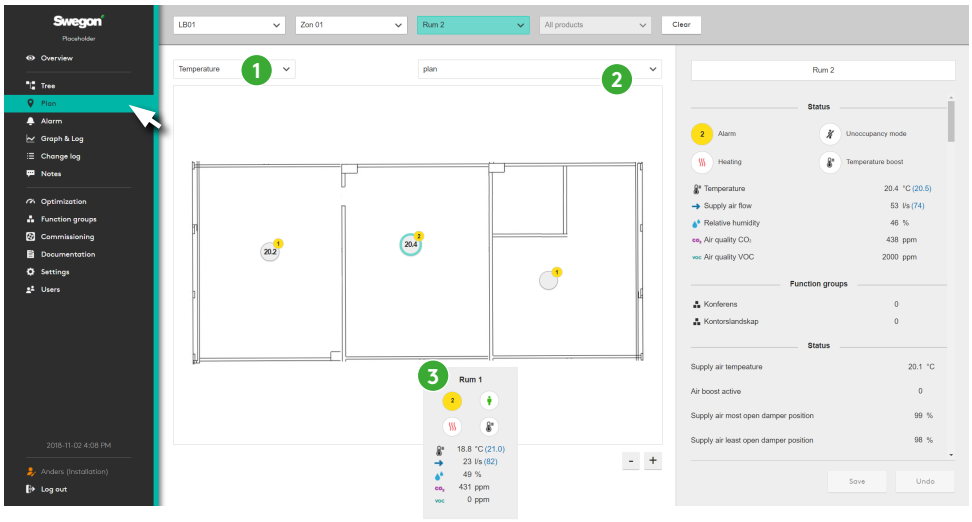
Applies to the views ***Tree, Plan, Alarms, Log, Change log*** and ***Notes***.

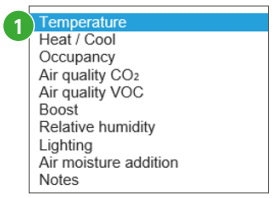
The object selector (1) at the top edge of the page has menus for ***Air handling unit, Zone, Room*** or ***Product***. This can be used for quick navigation to a specific part of the system.

Detailed information and possible settings, for the selected product or function, are shown and managed in the section to the right (4). The path to the selected product or function is maintained with new selections from the main menu. To clear the object selection, choose Clear to the far right of the upper menu (5).

Plan

Dynamic plan views with information and setting options for each room and space.





Contains the system's dynamic plan views. Click on the selected room to see detailed information, change settings, etc.

In the first section menu (1), you can select which values are to be shown: ***Temperature, Heating/cooling, Occupancy, Air quality CO_2, Air quality VOC, Boosted air flow, Relative humidity, Lighting, Additional moisture*** or ***Notes***. The choice made in the section menu (1) determines what is shown in the rings in the different rooms. The second menu (2) is used to select which plan view is to be shown.

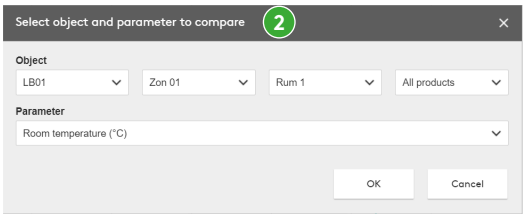
Hovering with the mouse over a room's position marker (3) displays a box with the information Temperature, Temperature-boost, Air quality, Occupancy, Relative humidity and Air flow. Click on the position marker for detailed information and settings.

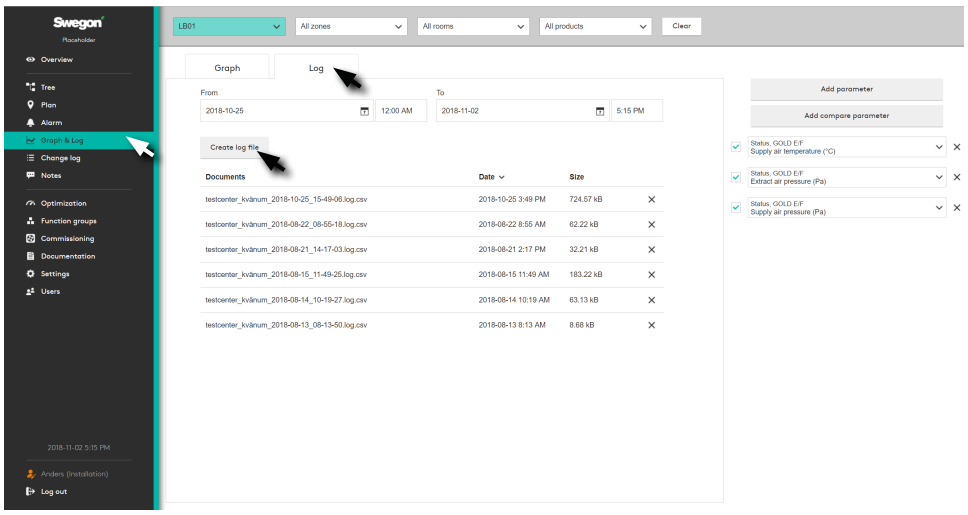
Graphs and logs

The logging function saves information from the system in SuperWISE.

It is possible to select a number of parameters to analyze in graph view directly in the SuperWISE interface.

Add parameters for the relevant object (1) or parameters and objects to compare (2). Select the time interval and generate a log file by clicking "***Create log file***".

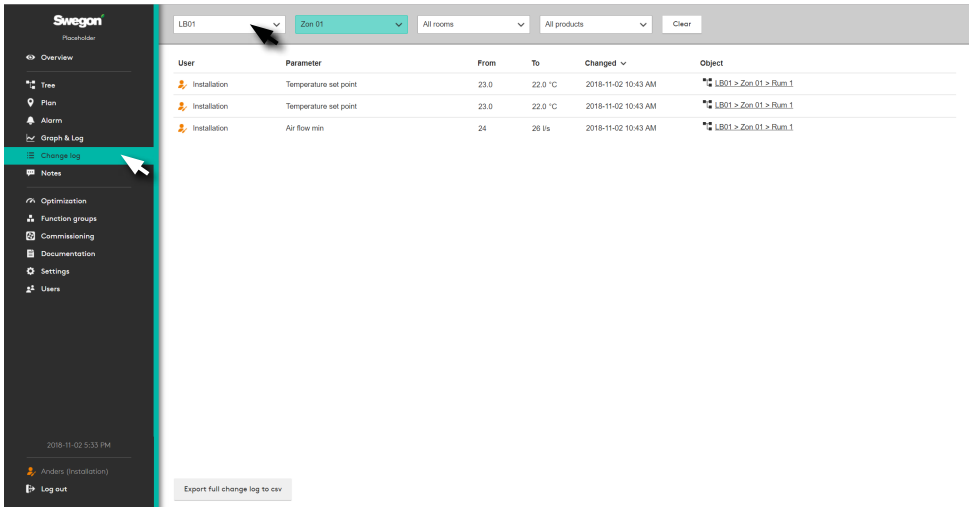




The log file is generated in .csv-format and is delimited using a semicolon. The log file can be opened using spreadsheet software such as: Microsoft Excel or a similar program.

Change log

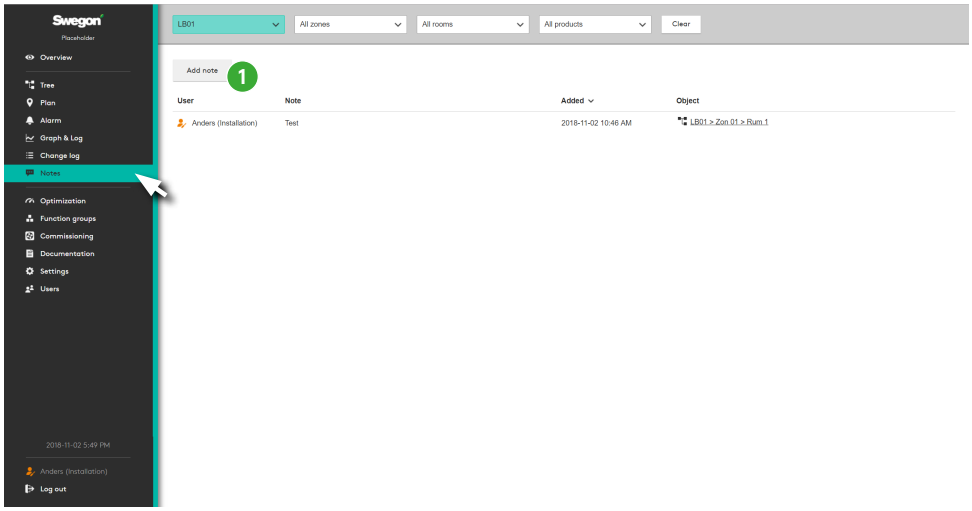
Summary of the changes implemented in the system.



Shows all changes made in the system for the selected object, with information about ***User, Parameter, Values, Time*** and the ***Object*** the change concerns.

Notes

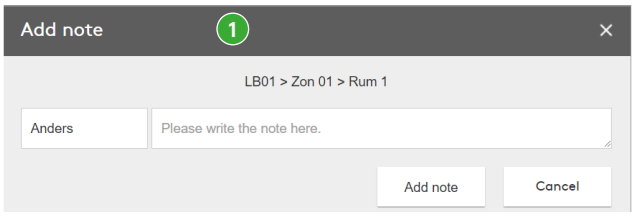
Summary of the system's notes.



Contains all the notes added to the system.

In order to place a note on the object in question, click "***add note***" (1).

It is possible to comment and delete existing notes.

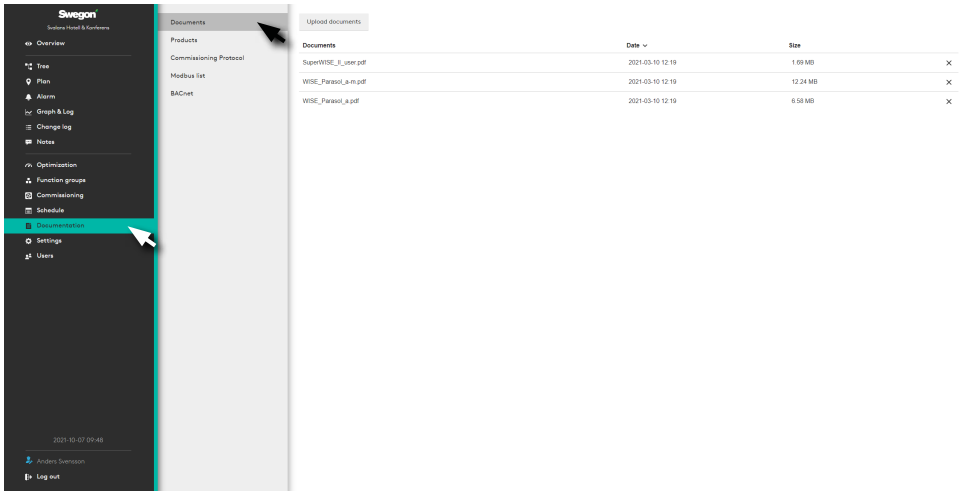


Documentation

There are four selections under documentation. ***Document***, ***Products***, ***Commissioning protocol***, ***Modbus list*** and ***BACnet***.

Documents

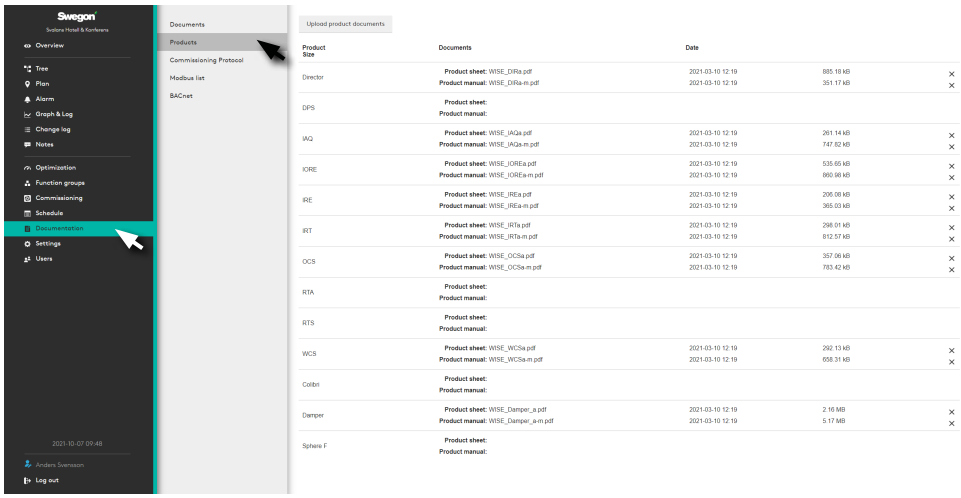
The documentation in the system is collected here.



On the document tab it is possible to upload new and updated documents of the type pdf, doc and docx.

Products

It is possible here to add Instructions for Use and product sheets downloaded from Swegon's website.

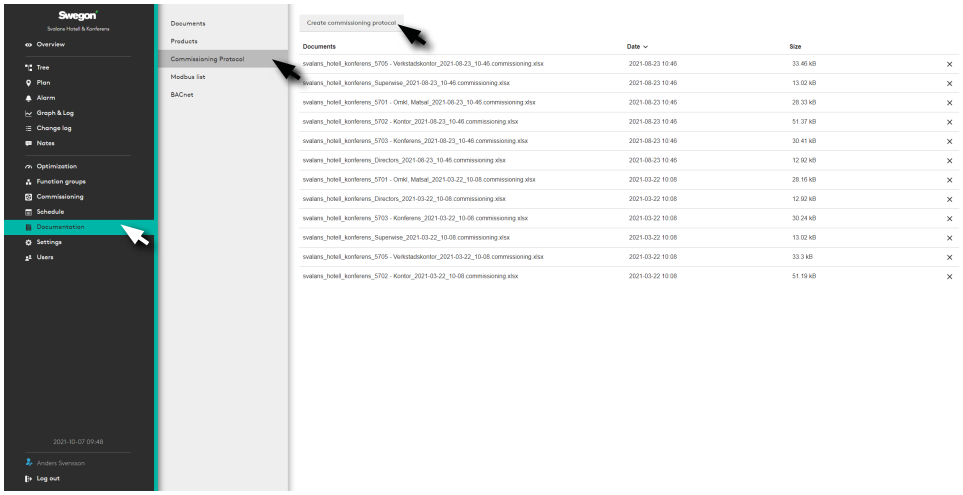


Product documents from the document tab are shown here. These documents are also available from the tree structure.

On the Product tab, it is possible to upload new and updated product documents.

Commissioning protocol

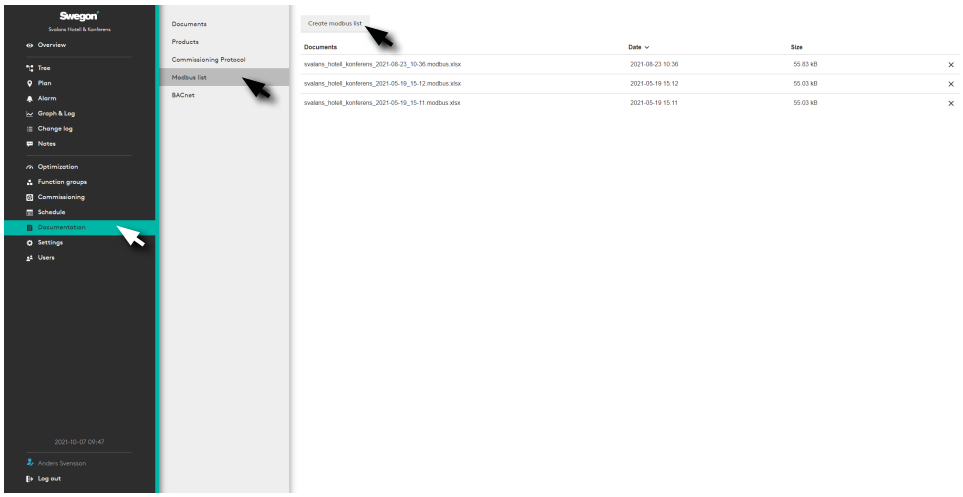
Generate a current commissioning protocol for the site.



The commissioning protocol is generated by clicking on the "***create commissioning protocol***" button. The file generated can be opened using spreadsheet software such as Excel.

Modbus list

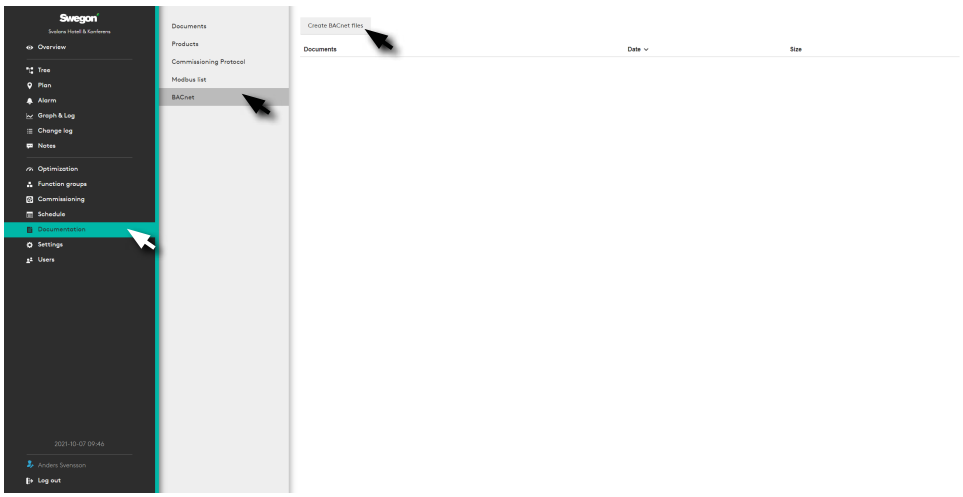
Generate the current Modbus list for the site.



Here you can generate a current Modbus list for the site, by clicking on the "***create Modbus List***" button. The file generated can be opened using spreadsheet software such as Excel. The Excel sheet is interactive and can be used to get all Modbus parameter addresses specific to the installation.

BACnet files

Generate the current BACnet files for the site.



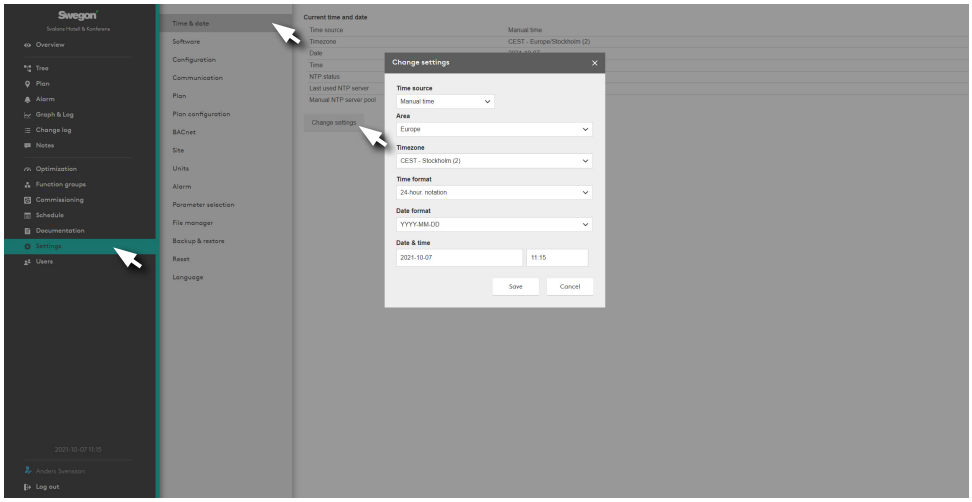
Here you can generate a current BACnet files for the site, by clicking on the "***Create BACnet files***" button.

Settings

Makes it possible to adjust SuperWISE to each specific project - via the menu options: ***Time and date***, ***Software***, ***Configuration***, ***Communication***, ***Plan***, ***Room position***, ***Site***, ***Units***, ***Alarm***, ***File manager***, ***Backup and restore***, ***Factory reset*** and ***Language***.

Time and date

Setting of the time and date.



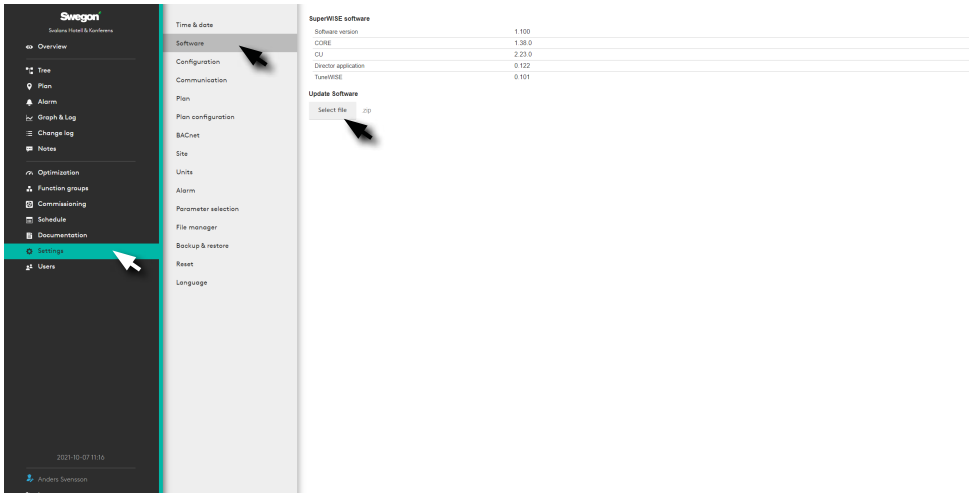
The current date and time can be set and adjusted if needed. The system clock automatically takes leap years into consideration.

The relevant region and city can be selected, summer time/winter time changeover will then be managed automatically.

Time source can be set to manual or via NTP (requires connection to network) and BACnet. The time format and date format can be set.

Software

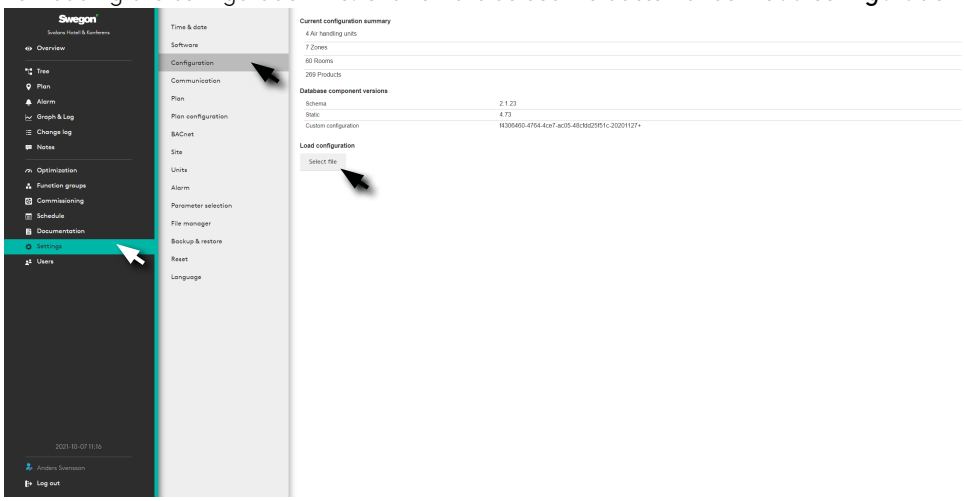
Shows information about the version of component software and the software update function. Click on the select file button under ***Update software*** and select the file to be imported.



The ongoing software update is performed in the background for minimum impact on the system during ongoing operations.

Configuration

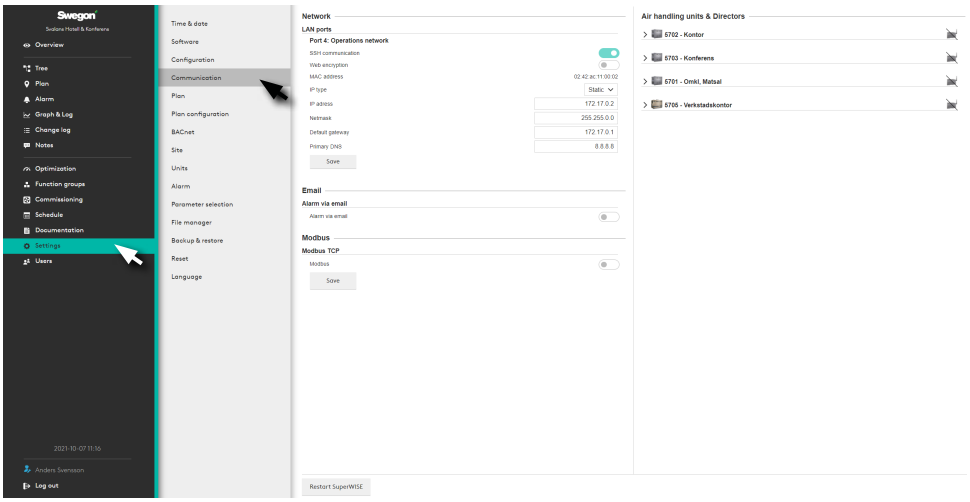
For reading the configuration file. Click on the ***Select file*** button under ***Load configuration*** and select the file to be imported.



When importing a new configuration file, an Audit log will be created, which helps the user to choose between parameters that have been changed manually in SuperWISE and parameters that are retrieved from the new configuration.

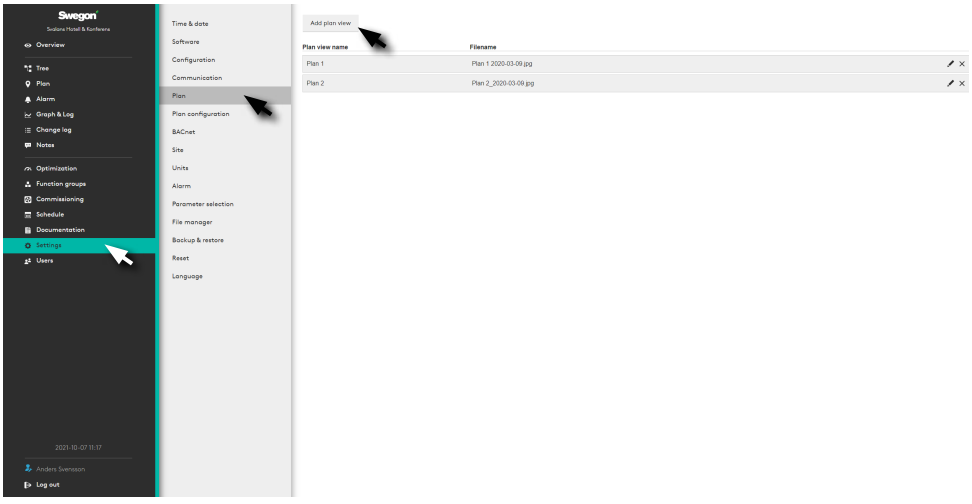
Communication

Network settings for the whole system and component products such as Air handling unit, WISE DIR, etc.



Plan

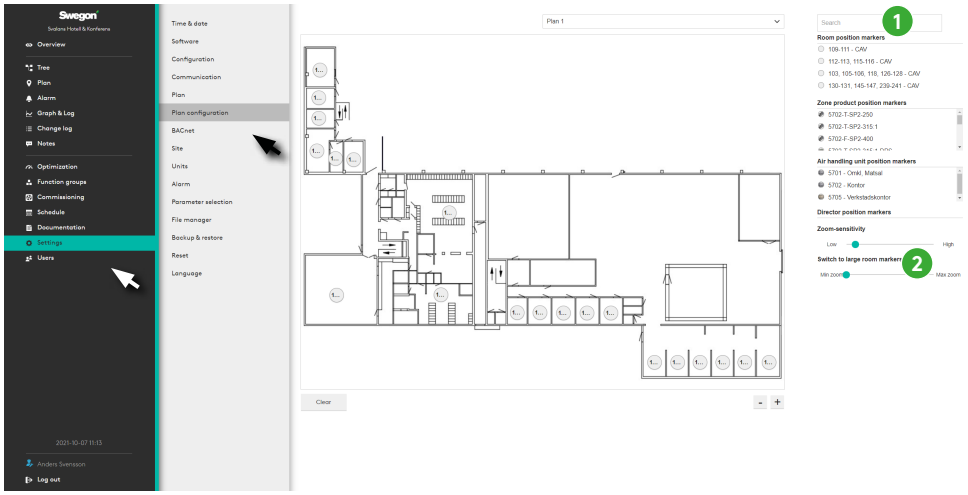
To add graphical files for plan views in one of the formats: ***.png***, ***.jpg***, ***.jpeg*** or ***.gif***. File size, max. 5Mb.



For loading plan view. Click on the button under ***Add plan view*** and select the file to be imported. Several plan views can be added for, e.g. different floors. It is possible to change the order in floor views by dragging and dropping them in the required order.

Room position

The function to select the room and space in the system's plan view(s), which results in it becoming dynamic with increased user options.

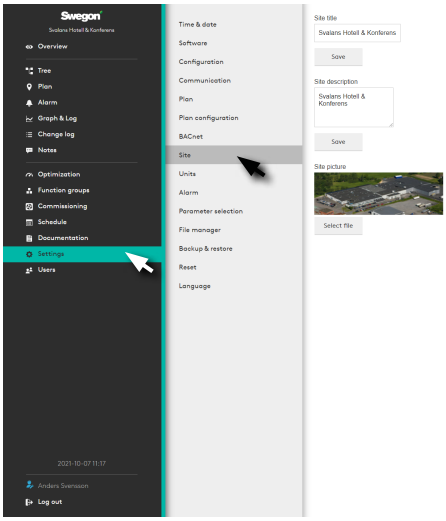


Drag and drop all Position markers for rooms, zone products, air handling units and Directors (1) to the right position on the plan view.

User the slider control to adjust the display (2).

Site

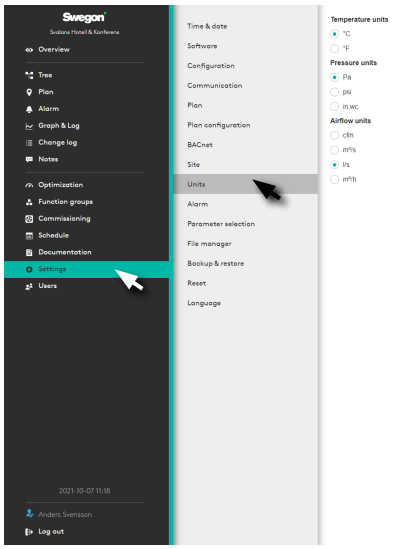
Name and describe the site. Here is a function to add a picture of the site, which is shown on the overview page.



To add graphical files for the page in one of the formats: ***.png***, ***.jpg***, ***.jpeg*** or ***.gif***. File size, max. 5Mb.

Units

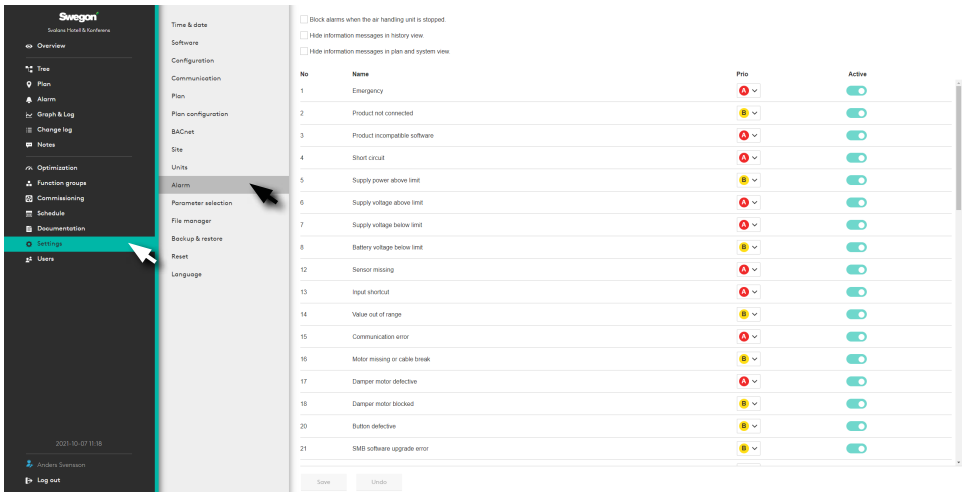
Unit settings for ***Temperature***, ***Pressure*** and ***Air flow***.



Note that unit settings take effect for all users of the site.

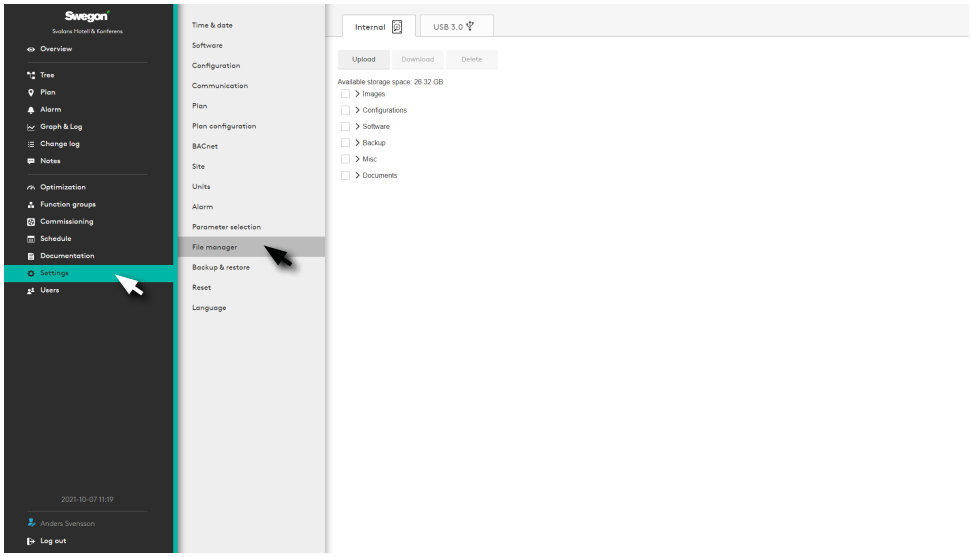
Alarm

Settings to categorize alarms and system information. Also gives the option to activate and deactivate alarms, and set alarm priority.



File manager

In order to Download, Upload, Erase and store files such as ***Pictures***, ***Configurations***, ***Software***, ***Backup copies***, and ***Documents***.

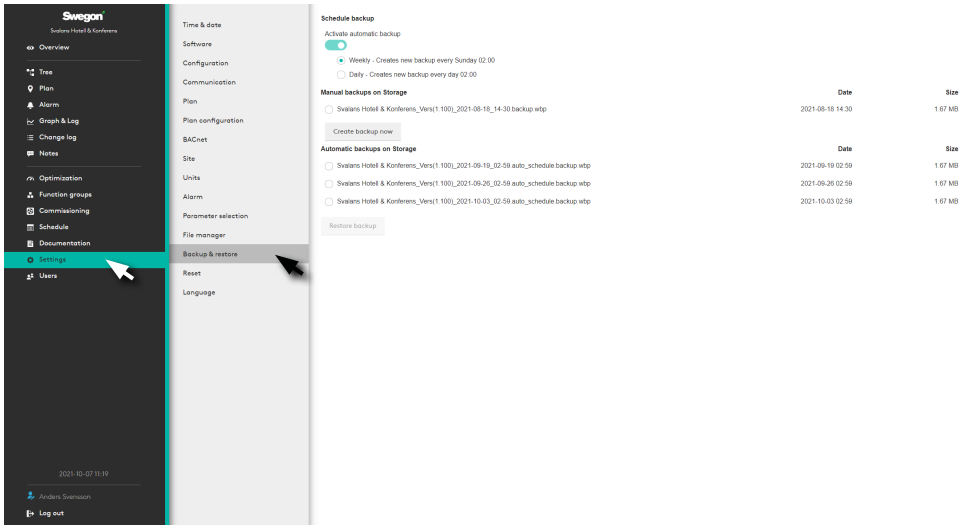


Backup and restore

The user can manually create a backup if necessary, under Manual backup. The backup is saved on a USB memory stick and can then be used to restore the system.

The user can also choose to let SuperWISE create a backup automatically, either daily or weekly, under Scheduled backup.

A backup is always created automatically when a new configuration file is loaded or if the software is updated. SuperWISE saves the three most recently created backups, and previous backups are deleted.



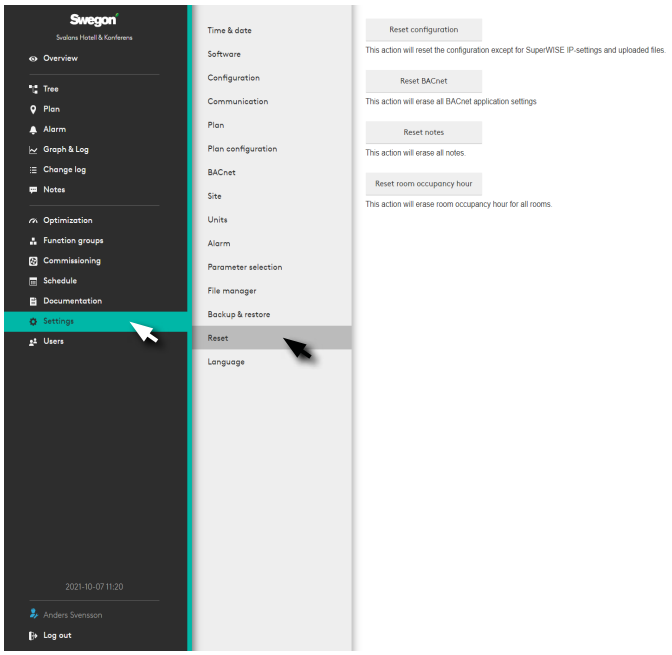
A backup made with a previous configuration or software version can be migrated to a more recent software version. Note that the USB-memory stick must be placed in SuperWISE.

The following parts are saved to the USB-memory stick during a backup:

- Configuration
- Users
- Project information and images
- Plan views and information
- Change log
- Time settings
- Language
- Configured values
- Unit settings
- Communication settings
- Alarm priorities

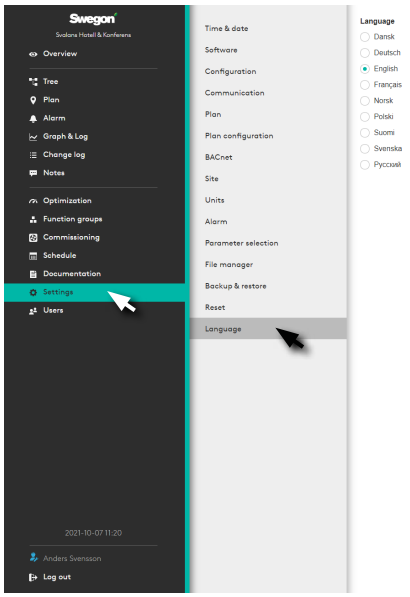
Restoring the factory settings

Change log and notes can be restored.



Language

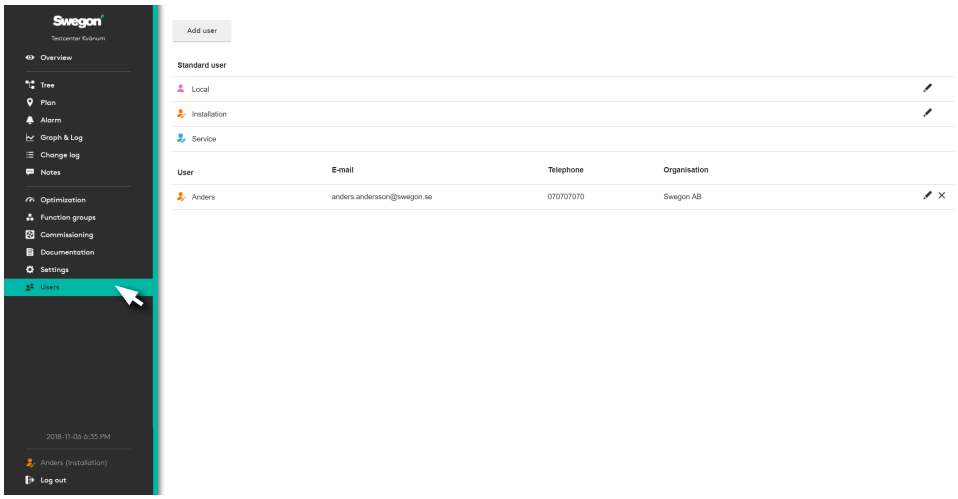
Set the language required for the SuperWISE interface. Available languages are ***Swedish, Danish, German, English, French, Norwegian, Polish, Finnish*** and ***Russian***.



Note! The language setting applies to individual users not just the entire installation.

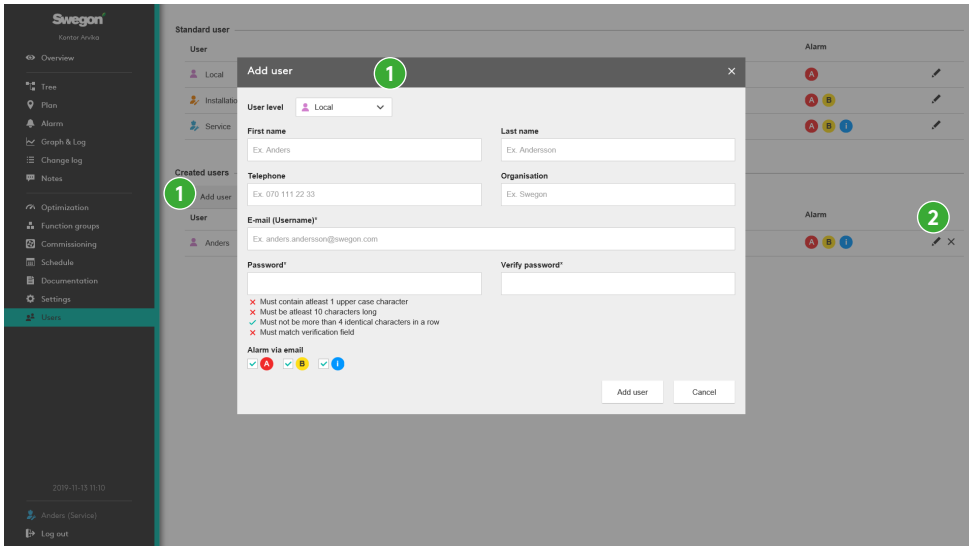
Users

Management of users for authorisation in the system.



The system has three user levels - ***Local, Installation*** and ***Service*** as standard. These levels control authorisation in the system where Local has the least authorisation and Service the highest.

Each user should be assigned their own log in, with their e-mail address and user name.



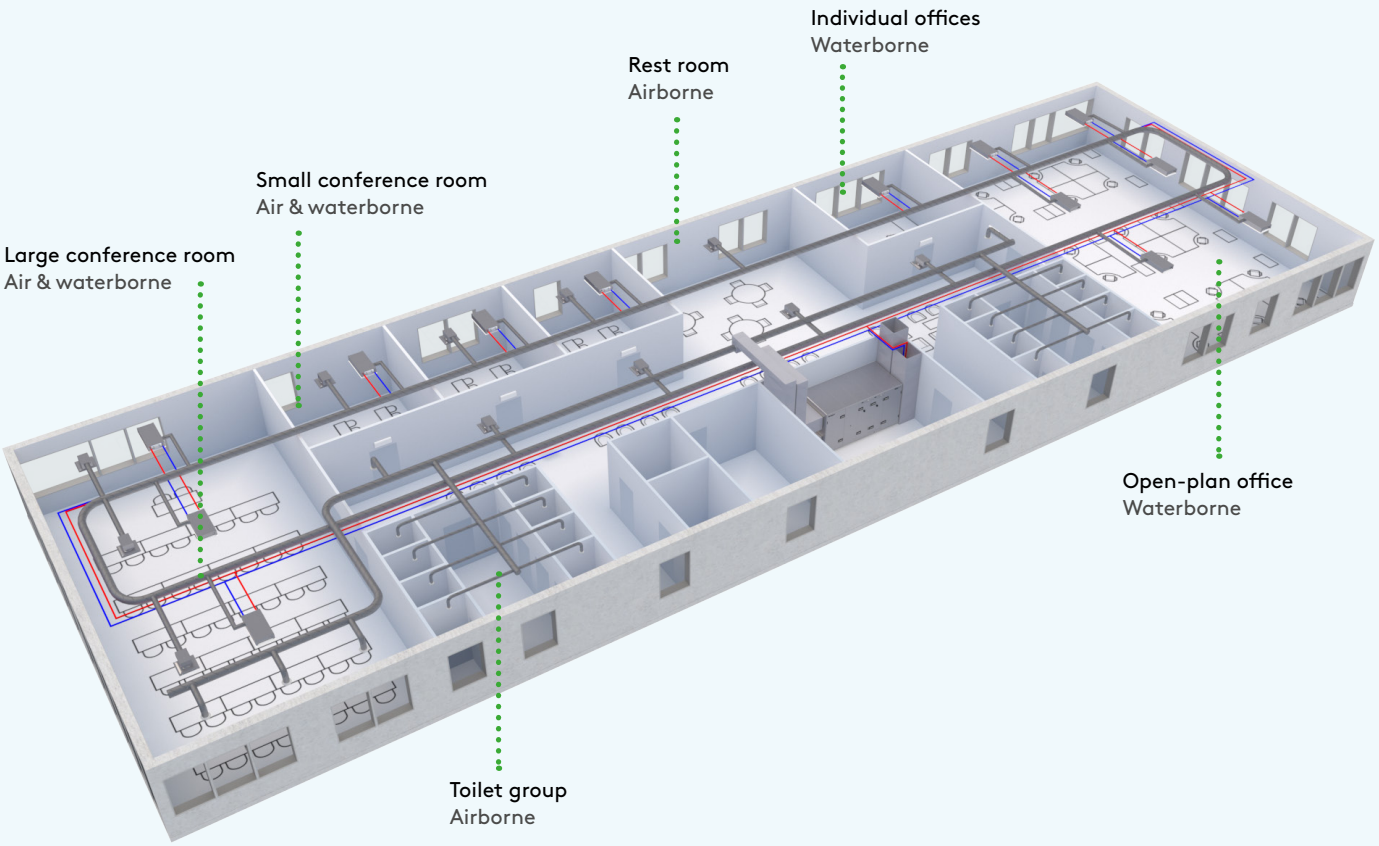
To add a new user:

Click on the Add user button (1). Select the required user level, state the user's details where E-mail and Password are the details used to log in to the system.

When a new user is added, it is also possible to set whether this user is to receive alarms via e-mail, and the type of alarms. This setting is made by checking A-, B- or information alarms under Alarm via e-mail. This setting can also be made at a later date by editing the relevant user. To edit a created user, click on the Edit user (2) button.

Room functions

Room functions are the functionality available on room level. Typically a room consists of a floor area surrounded by walls. However, a room can also be seen as a floor area where the same climate is required. Therefore it is also possible to divide a large building into several climate zones by creating virtual rooms. Virtual rooms act in the same way as real rooms, with the difference virtual rooms do not have walls. In the WISE system a room can consists of one or more room dampers (supply air and/or extract air), as well as one or more comfort modules or air diffusers in order to influence the room climate. The room can be supplemented with different types of sensors to measure the room climate and other properties that influence.



Air quality control

Why regulate air quality?

In order to promote a healthy indoor climate by influencing the surrounding environment and health. An indoor climate with impaired air quality can result, among others, in tiredness and headaches.

How is air quality regulated?

Air quality is measured with an RH, VOC or CO_2 sensor. These sensors are available both as system accessories and as optional integrated accessories in room products. VOC and CO_2 values present measurement values in ppm while the RH value is present as a percentage. Values are defined in the system for the upper and lower air quality limits, which form the basis of regulation in the system. Air quality is regulated based on the highest value in the room if there are several sensors, irrespective of sensor type.

If necessary, individual air quality sensors can, e.g. when they are improperly located and do not give a representative value, be excluded from the calculation of the room's average value. This is done under Settings for the relevant air quality sensor by setting the Mode to Reference.

Operating case

When the measured air quality value comes in between the lower and the upper limit values, i.e. within the regulation area, the function's regulation is enabled to increase the air flow requirement from 0-100%.

The air flow is controlled linearly between the end positions.

- 0% gives the room's minimum flow (different depending on the room mode).
- 50% gives the room flow in between min. and max.
- 100% gives the room's max. flow.

Comparison of VOC level in rooms and supply air

The aim of this function is to permit blocking of air flow boosting in each room due to a higher VOC supply than the VOC content in the room. The measured VOC content in the room is compared with the supply air, and if the VOC content in the supply air is higher than in the room air flow boosting is blocked due to a high VOC content in the room. This function requires a GOLD air handling unit with VOC measurement.

Adjustable room parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Air quality	Operating mode air quality VOC	On	Off	Only Occupancy	-	Installation/Installation	Enable or disable the function.
Air quality	VOC blocks poor supply air	Off	Off	On	-	Installation/Installation	Enable or disable the function.
Air quality	Upper VOC limit	1200	0	2000	ppm	Local/Installation	Upper limit for VOC regulation.
Air quality	Lower VOC limit	800	0	2000	ppm	Local/Installation	Lower limit for VOC regulation.
Air quality	VOC content, alarm limit	1200	0	2000	ppm	Installation/Installation	Limit for information alarm.
Air quality	Operating mode air quality CO_2	On	Off	Only Occupancy	-	Installation/Installation	Enable or disable the function.
Air quality	Upper limit CO_2	1200	0	2000	ppm	Local/Installation	Upper limit for CO_2 regulation.
Air quality	Lower CO_2 limit	800	0	2000	ppm	Local/Installation	Lower limit for CO_2 regulation.
Air quality	CO_2 content, alarm limit	1200	0	2000	ppm	Installation/Installation	Limit for information alarm.
Air quality	Relative humidity operation mode	On	Off	Only Occupancy	-	Installation/Installation	Enable or disable the function.
Air quality	Mode relative humidity	Average value	Lowest	Highest	-	Installation/Installation	Selection that determines how the measured humidity is to be presented when there are several humidity sensors.
Air quality	Relative humidity upper limit	90	0	100	%	Local/Installation	Upper limit for humidity regulation.
Air quality	Relative humidity lower limit	65	0	100	%	Local/Installation	Lower limit for humidity regulation.
Air quality	Relative humidity lower alarm limit	10	0	50	%	Installation/Installation	Limit for information alarm.
Air quality	Relative humidity upper alarm limit	80	50	100	%	Installation/Installation	Limit for information alarm.

Temperature control

Why regulate the temperature?

In order to reach and maintain the required temperature in a room, for good comfort and to avoid negative effects on health that an incorrect indoor temperature can result in.

How is temperature regulated?

In order to achieve the required temperature, the temperature is measured in the room with one or more temperature sensors and either regulates the room to an average value of several sensors' measured temperatures, or to the highest/lowest measured temperature. Note that the majority of Swegon's room sensors can provide a room temperature if required.

Individual temperature sensors can if required, e.g. when they are improperly located and do not give a representative value, be excluded from the calculation of the room's average value. This is made under Settings for the relevant temperature sensor by setting the Room temperature mode to Reference.

Operating case

If the temperature is outside of the limit values then heating or cooling needs to be supplied. Heating and cooling is supplied to a room by increasing the supply air flow of warm or cold air, or by enabling the heating or cooling circuits in different climate products. The heating/cooling signal can, e.g. result in increased air flow if there is a cooling requirement, or open a heating actuator if heating needs to be supplied.

It is even possible to control actuators in sequence, for example, if cooling is to be realized by first increasing the air flow before the cooling actuator is opened. Different sequences can be set by service personnel to obtain different sequence solutions.

In many cases the supply air temperature is measured to determine whether the increased flow will have the desired effect or not. If the supply air is warmer than the room temperature, when the temperature regulator needs to cool, the minimum flow will be obtained for a cooling requirement. Different minimum flows are supplied depending on the room's mode, e.g. minimum flow occupancy.

Set point adjustment

WISE RTA or the Swegon Inside app can be used to allow those persons in the premises to influence the temperature setpoint. The temperature setpoint is adjusted with the help of the touch buttons when WISE RTA is in active mode, which is enabled by pressing one of the touch buttons. After a configurable number of seconds WISE RTA returns to deactivated mode. If the product is battery powered, the display dims in deactivated mode, while for the 24V-fed products it is possible to configure whether it should continue to be lit or be dimmed in deactivated mode.

In the Swegon Inside app, the user can set the temperature setpoint in the same way as via WISE RTA. The user can also activate Eco mode, which automatically controls the temperature setpoint based on the outdoor temperature within the permitted temperature setpoint range.

Adjustable room parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
*	Temperature setpoint value	22**	0	100	Celsius	Local/Local	Temperature setpoint value of the current operating case.
*	Temperature offset cooling mode	1**	0.5	10	Celsius	Local/Local	Number of degrees above the set "Temperature setpoint value" that is permitted before cooling of the room occurs.
*	Temperature offset heating instance	-1**	-10	-0.5	Celsius	Local/Local	Number of degrees below the set "Temperature setpoint value" that is permitted before heating of the room occurs.
Temperature	Temperature, operating mode	Average value	Lowest	Highest	-	Installation/ Installation	Selection that determines how the measured room temperature is to be presented when there are several room temperature sensors.
Occupancy sensor	Forced occupancy time RTA	0	0	1200	Minutes	Installation/ Installation	Timer that forces the room into occupancy during the set time after a setpoint offset has been made. After the set time, setpoint offset for non-occupancy is reset.
Temperature	Temperature offset time***	480	0	1200	Minutes	Local/Local	Timer for how long the setpoint offset shall apply before it is reset, regardless of whether there is occupancy or not. 0 = Never rest.
Temperature	Temperature offset***	0	-10	10	Celsius	Local/Installation	The number of degrees above/below the set setpoint value at which an offset should occur.
Temperature	Air temperature difference	1	0	10	Celsius	Installation/ Installation	Permitted supply air temperature to increase the flow in cooling mode respective heating instance. Consequently, a difference that is 1 means that the supply air temperature must be one degree lower than the room temperature so that a flow increase occurs for cooling mode.
Temperature	Temperature difference for alarm	2.0	1	20	Celsius	Installation/ Installation	Limit for activation of the comfort alarm for temperature deviations from the room set point value. The 2 °C setting means that the comfort alarm is given when the room temperature drops below the heating set point value by 2 °C or when the room temperature exceeds the cooling set point value by 2° C.
Changeover	Hysteresis	2.5	0	100	Celsius	Installation/ Installation	Minimum permitted difference between the water's supply flow temperature and the room's temperature to start heating and cooling sequences.
Changeover	Supply flow temperature	0	0	100	Celsius	Local/Installation	The temperature of the water for the changeover function when there is no measured value. Can be written via SuperWISE or the BMS system.

*Set separately for the sections Occupancy, Unoccupied, Holiday, Summer night cooling and Morning heating.
**Standard value applies for Occupancy.
***Only applies to Occupancy.

Additional moisture regulation

Why regulate based on additional moisture?

The amount of moisture produced in a room varies depending on the activity and the number of people in the room. Areas with sporadically high production of moisture can, for example, be a bathroom when the shower is on. This type of additional moisture is normally vented out.

How is additional moisture regulated?

Additional moisture is calculated for each room. By measuring and comparing the vapour content in the indoor air with the prevailing vapour content in supply air, we get the additional moisture (g/m^3). In order to accomplish this requires sensors to be installed to measure both the temperature and relative humidity (RH) in the room, as well as the temperature and relative humidity of the supply air in the air handling unit.

Values are defined in the system for the upper and lower additional moisture limits, which form the basis of regulation in the system.

Operating case

When the measured additional moisture comes in between the lower and the upper limit values, i.e. within the regulation range, the function's regulation is enabled to increase the air flow requirement from 0-100%.

The air flow is controlled linearly between the end positions.

- 0% gives the room's minimum flow (different depending on the room mode).
- 50% gives the room flow in between min. and max.
- 100% gives the room's max. flow.

In the event of rapid changes in weather, the supply air can temporarily contain more moisture than the indoor air. In these instances, the additional moisture value (FT) will be negative in the system. Usually, however, the relation is the opposite, which gives a positive value.

A comfort alarm is enabled if the additional moisture exceeds the alarm limit longer than an adjustable time.

Adjustable room parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Additional moisture	Operating mode	-	-	-	-	Local/Installation	Off, no additional moisture is calculated, group values are ignored and the room does not contribute to the group value. On, additional moisture is calculated and is utilized for regulation and alarms, if the room is a part of a group, the group value and room contribute towards the group value. Only measurement, additional moisture is calculated and contributes to the group value.
Additional moisture	Upper limit	-3	0	20	g/m^3	Local/Installation	Upper limit for regulation.
Additional moisture	Lower limit	-1	0	20	g/m^3	Local/Installation	Lower limit for regulation.
Additional moisture	Alarm limit	8	0	20	g/m^3	Local/Installation	Limit for alarms.
Additional moisture	Alarm delay	120	1	-	min.	Local/Installation	Time limit for alarms, the value must be above the defined alarm limit for this time before the alarm is activated.

Occupancy detection

Why regulate based on occupancy?

Occupancy detection gives the opportunity to save energy at the same time as a good indoor climate is guaranteed. Occupancy detection can also be used to trigger the lighting control.

How is occupancy detected?

The occupancy signal can come from products with an integrated sensor module (WISE SMB), presence sensor WISE OCS, external presence sensor linked to WISE IRE or via the BMS system.

For occupancy signals from WISE SMB or WISE OCS, a delay for switching off or on is configured in a configuration file or in SuperWISE. When the external presence sensor is used with WISE IRE, the delay for switching off or on is set in on the external occupancy sensor.

Occupancy detection through the BMS system

Occupancy detection through the BMS system works as an occupancy sensor in the room, but the occupancy sensor comes from a register on room level. The occupancy signal from a BMS system does not oversteer the room sensors, it adds a “virtual” room sensor.

Accumulated occupancy

In order to measure how much time a room is used, the total time that the room is in occupancy mode is calculated. Each room has an individual counter. The total occupancy time in hours is shown on a room level in tree view under Room information. All counters can be reset simultaneously under settings - Reset by clicking on “Reset occupancy hours, room”.

Operating case

When unoccupied a higher/lower temperature and lower air flows can be permitted than for occupied. Some functions can be deactivated in unoccupied mode, for example, cold draught protection or air quality control.

Adjustable room parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Occupancy sensor	Occupancy mode	Auto*	Unoccupied	Occupancy	-	Local/Installation	Function setting for occupancy.
Occupancy sensor	Switch-out delay	20	0	1440	Minutes	Local/Installation	Time after the most recent occupancy detection until the room changes to unoccupied.
Occupancy sensor	Switch-on delay	0	0	3600	Seconds	Local/Installation	Time after occupancy detection until the room is set to occupancy.
Occupancy sensor	External occupancy	OFF	OFF	ON	-	Installation/ Installation	Occupancy via BMS system.

*Depends on whether there are any occupancy sensors in the room.

Operating modes

Why are there different operating modes?

The purpose of the different operating modes is to save energy. What differentiates the different modes are the different settings for the minimum flow in the room and different limits for when the system starts heating respective cooling. In some operating modes, parts of the functionality are blocked while other functionality is forced.

What operating modes are there?

Occupancy

The room receives this mode when occupied. The temperature where the room does cool or heating during temperature regulation is less for increased comfort.

Unoccupied

The room is set to unoccupied mode to reduce energy consumption. The temperature where the room does cool or heating during temperature regulation is greater. When unoccupied a higher/lower temperature and lower air flows can be permitted than for occupied. Some functions can be deactivated in unoccupied mode, for example, cold draught protection or air quality control.

Checked-in

The room adopts this mode with an external signal from the master system, for example, a hotel booking system, or is activated from SuperWISE. The operating mode primarily works as Occupancy, but without occupancy in the room being a requirement. Air boost is available and is always activated when the mode is activated. The function is activated according to the time specified under Air flow boost, or until occupancy in the room is indicated. If occupancy in the room is indicated during this time the room adopts Occupancy, otherwise the room returns to Unoccupied.

Commissioning

The room adopts this mode through the active selection by the user on the SuperWISE interface's Commissioning tab. The function of the mode is to set the whole system, or parts of it, in different fixed modes in order to ensure the right air flows and functions in these. The air flows are determined by the user via the SuperWISE interface.

Holiday

The room adopts this mode through the active selection by the user on the SuperWISE interface for each room. The mode has its own parameters for temperature limits and minimum flow. Occupancy cannot be enabled with the help of an occupancy sensor.

Morning heating

The room adopts this mode with an external signal from the BMS system or from a GOLD air handling unit. The function of the mode is to heat the room with warm air from the air handling unit. The air flow is set to maximum and is maintained as long as the temperature is below the cooling setpoint value, or until the external signal stops. There are separate settings for temperature and minimum flow in this mode.

In a room where Morning heating is used for waterborne climate products, it is possible to adjust when heating will be performed with water or air respectively, with the aid of the parameters temperature setpoint value and temperature offset for cooling or heating respectively. The heating setpoint value, i.e. the temperature setpoint value with temperature offset heating, governs the temperature at which heating will be performed with water, and the cooling setpoint value, i.e. the temperature setpoint value with temperature offset cooling, governs the temperature at which heating will be performed with air. This means that higher negative temperature offset heating allows less heating with water, and vice versa.

For example, a temperature setpoint value of 23°C, temperature offset heating of -1°C and temperature offset cooling of 1°C means that when the Morning heating function is activated, the room will be heated with water up to 22°C and thereafter with air until the temperature reaches 24°C or the external signal stops.

Summer night cooling

The room adopts this mode with an external signal from the BMS system or from a GOLD air handling unit. The function of the mode is to cool with cool outdoor air from the air handling unit. The air flow is set to maximum and is maintained as long as the temperature is above the heating setpoint value, or until the external signal stops. There are separate settings for temperature and minimum flow in this mode.

Operating modes continued

Adjustable room parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Operating mode	Holiday	0	0	1	-	Local/Local	Set the room in holiday mode.
Operating mode	Checked-in	0	0	1	-	Local/Installation	Set the room in checked in mode.
*	Min. airflow	***	0	***	l/s	Local/Installation	Set minimum flow for each mode.
*	Temperature setpoint value	22**	0	100	Celsius	Local/Local	Temperature setpoint value of the current operating case.
*	Temperature offset cooling mode	1**	0.5	10	Celsius	Local/Local	Number of degrees above the set Temperature setpoint value that is permitted before cooling of the room occurs.
*	Temperature offset heating instance	-1**	-10	-0.5	Celsius	Local/Local	Number of degrees below the set Temperature setpoint value that is permitted before heating of the room occurs.
Commissioning	Mode water	Off			-	Installation/Installation	Select the mode for the required commissioning. The following modes are available: Cooling Heating Cooling and Heating
Commissioning	Mode air	Off			-	Installation/Installation	Select the mode for the required commissioning. The following modes are available: Unoccupied, min. flow Occupancy, min flow Max. flow rate Holiday, min flow Percentage of flow area, occupancy Percentage of maximum flow Example, when selecting 'Percentage of maximum flow' mode: if the maximum flow is 100 l/s and the user chooses commissioning mode Percentage of maximum flow to 50% the flow will be 50 l/s. Example, when selecting 'Percentage of flow range' mode: if the flow range is 20-100 l/s and the user chooses commissioning mode Percentage of flow range to 50% the flow will be 60 l/s.
Commissioning	Adapted air flow	80	0	100	%	Installation/Installation	Setting of the percentage when the you have selected per cent of the flow range, Occupancy in Mode air.
Commissioning	Max. time commissioning air	0	0		Hours	Installation/Installation	The room returns to normal regulation after the set time. 0 = No automatic shutdown of commissioning.
Commissioning	Max. time commissioning water	0	0		Hours	Installation/Installation	The room returns to normal regulation after the set time. 0 = No automatic shutdown of commissioning.
Commissioning	Electric mode	Off			-	Installation/Installation	Select the mode for the required commissioning. The following modes are available: Max. heating Heating Maximum heating gives 100% on the output Heating gives the percentage set on the parameter: Adapted electrical power.
Commissioning	Adapted electrical power	30	0	100	%	Installation/Installation	Setting the electrical power during electrical commissioning
Commissioning	Maximum time for electrical commissioning	0	0	5000	Hours	Installation/Installation	Specify the maximum time for electrical commissioning

*Set separately for the modes Occupancy, Unoccupied, Holiday, Summer night cooling and Morning heating.
**Standard value applies for Occupancy.
***Depending on the set min/max flow on the room products.

Flow balance

Why regulate the flow balance?

In order to avoid negative or positive pressure and the problems that these can cause such as noise and difficulties to open/close doors and windows.

How is flow balance regulated?

Within a room, the sum of the total supply air flow is always calculated minus the total extract air flow. The difference is the flow that needs to be created to create balance in the room. The flow balance is created with the help of one or more extract air dampers in the room. It is possible to add a positive or negative offset to the flow balance to create a little positive or negative pressure.

The flow balance is regulated through the extract air dampers that are not a constant flow damper that automatically becomes a balancing damper. However, the damper with constant flow is included in the balancing calculation.

The extract flow is distributed to balance the extract air dampers in proportion to their air flow capacity. Extract air dampers are used as balancing dampers. A damper's share of the total extract air flow is determined by its flow range (max-min). A damper's air flow cannot be lower than its minimum air flow setting.

Balance with external air flow (not controlled by WISE)

On a room level even external air flows can be balanced against the WISE system, for example, from fume hoods or kitchen hoods.

Balancing can be performed in two different ways, either via flow measurement with WISE Measure or via a digital indication to the WISE system. It is also possible to set whether the air flow is to be balanced by changing the supply air or extract air flows. As standard the system is set to balance with extract air flows, which means that the reported external air flow will be applied to the extract air in the balance calculations. If the user sets balancing to occur with supply air flow, the equivalent flows will be applied to the supply air instead. This mode is primarily intended for products in rooms where there are no extract air products.

For flow measurement using WISE Measure the measured air is balanced continuously against other extract air dampers in the room, if these are installed and balancing with extract air is selected. If balancing with supply air is chosen instead, the measured air flow will instead be continuously balanced through the supply air products increasing the flow corresponding to the measured flow.

For digital indication, the flow is balanced as a fixed offset against other extract air or supply air in the room, depending on which is selected.

The function for balancing external air flow is enabled from the Super WISE interface, where Offset balancing mode is also adjustable under Air flow to Extract air or Supply air.

Formulas to calculate the extract air flow to balance are:

"Extract air flow total" = "Sum Supply air flow" – "Non-balancing extract air flow" + "Offset"

"Extract air flow to balance" = "Extract air flow total" – "Sum min-air flow for balancing air flow"

Offset is specified in l/s or as a percentage.

Adjustable room parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Air flow	Offset*	0			l/s	Local/Installation	Settings for positive or negative offset to create a little positive or negative pressure.
Air flow	Offset*	0	-100	100	%	Local/Installation	Settings for positive or negative offset to create a little positive or negative pressure.
Air flow**	Offset boosted air flow*	0	-9999	9999	l/s	Local/Installation	Set offset flow.
Air flow	Air flow, max	-	0	9999	l/s	Local/Installation	Specify max flow for the room. The max flow is automatically distributed across the products in the room.

*Only works if there are extract air products in the room.
**On each product with an offset function.

Control of the lighting

Why control the lighting?

Used to switch on the lighting with occupancy, and prevents the need of an extra presence sensor and an additional system for lighting control. This saves the number of components, number of systems and installation costs.

How is lighting controlled?

All lighting outputs in the room are switched on when the lighting status for the room is in ON. The lighting can be switched on either with the lighting switch, presence sensor or group signal via SuperWISE or the BMS system. The lighting can also be controlled via a schedule.

A room can have an unlimited number of presence sensors, lighting switches and lighting outputs. Lighting switches must be monostable (momentary pushbutton).

Lighting mode

Lighting mode for a room is set in the SuperWISE interface or via the configuration file.

Lighting mode has the following options:

- Off
- On
- Light with the presence detector
- Light with the pushbutton

Off

Lighting in the room is switched off.

On

Lighting in the room is switched on.

Light with the presence detector

All presence sensors in the room are permitted to switch on the lighting. The lighting in the room is switched on directly when the occupancy sensors register occupancy, at the same time as switch-on delay starts to count down.

Observe that the room will not be set to Occupancy mode if the occupancy sensors do not detect new occupancy signal within 60 seconds after the switch-on delay. If no occupancy is detected the room will continue to be in Unoccupied mode. However, the lighting is switched on directly regardless of whether the room is occupied or not, but is then switched off after the set switch-on delay.

If the room goes to Occupancy mode, the lighting will be switch on until the room enters Unoccupied mode again, and the set time for the switch-off delay has passed.

The lighting can be switched off at any time with a lighting switch which is not included in the WISE system. The lighting will then be switched off until the lighting switch is activated again.

Light with the pushbutton

A lighting switch that is be included in the WISE system must be activated to light the lighting in this mode. When the lighting is switched on the functions are the same as for Lit with presence sensor. If the light is switched off because the room has entered Unoccupied mode there is a Relighting time during which the lighting may be switched on by the occupancy sensors. After this time the lighting switch must be activated again to switch the lighting on again.

Forced lighting

It is also possible to force the lighting via Modbus, BACnet and SuperWISE.

Emergency mode lighting

By configuring an output to "Emergency mode", the lighting connected to this output can be set to Off or Lit when Emergency mode is activated. This setting is made on the product whose output controls the lighting.

Adjustable room parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Lighting	Mode	OFF	-	-	-	Local/Installation	Choices that determine how the lighting is switched on. Possible choices are Off, Light with the push button, Light with occupancy or On.
Lighting	Switch-out delay	0	0	600	Minutes	Local/Installation	Time that determines how long the lighting should be switched on after the room has switched to Unoccupied mode.
Lighting	Relighting time*	0	0	120	Minutes	Local/Installation	The set time counts down after the delay time has elapsed and if the user returns within the set time the lighting is switched on again without the user needing to switch on a pushbutton.
Lighting	On by group signal	On	Off	On	-	Local/Installation	Controls whether the lighting should be switched on by a group signal.

*The function only works with a pushbutton.

Control of solar shading

Why control solar shading?

A good level of air quality and a thermal climate that maintains a certain level adapted to the activities in the premises are required for the indoor climate to be perceived as comfortable. The natural light that enters a room through windows is likely to provide much of the well-being factor. Large windows have been popular in recent decades, but a key factor in that context is that solar radiation can deliver a valuable volume of energy to an interior, especially in south-facing aspects over the spring and autumn.

With the WISE system it's not only the ventilation and indoor climate that is controlled, it's also possible to control interior sun shading as required in the premises. Solar shading can be used as part of temperature control, harnessing solar radiation to heat the room or, conversely, shutting it out to cool the room. Solar shading can be used as insulation, to prevent heat from escaping through windows during the night if it's cold outdoors. It can also be used as glare protection, to prevent those in the room being disturbed by the light. It's also possible to control the solar shading manually via push buttons. Each room is connected to a façade, and information about the sun's brightness is obtained from a weather station.

How does solar shading control work?

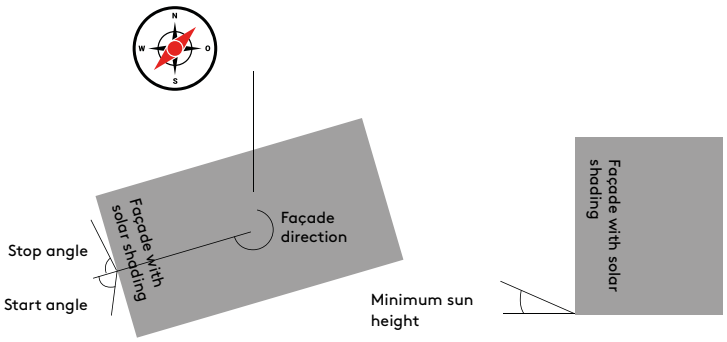
WISE supports control of internal solar shading with analogue controlled motors with two positions: open or closed.

Solar shading can be controlled to provide insulation from the cold, as a heat shield or to prevent those remaining in the building being dazzled by sunlight. In order to have a working system, a WISE Director must be connected to a WISE WS weather station to provide current values about the sun, such as direction, height and brightness. These are needed to figure out which façades have sun and which do not. Six façades can be configured, where each façade has a name, start and stop angles and height. If the position of the sun is within a façade and is above the configurable brightness limit, that façade is considered to have sun. When controlling solar shading, there are several operating modes that can be set as needed, including Schedule, glare protection and insulation. Solar shading can be controlled to two positions: open or closed.

WISE IORE is used together with two relays connected to the solar shading's motor. A momentary push button for overriding can be connected to WISE IORE or WISE IRE.

To configure a working system, the following must be set up:

- The brightness of the sun, which is the brightness at which the system judges that the sun is shining. In all probability this needs to be evaluated when operational to discover which setting works best with the local conditions for the project in question.
- Direction, which is the direction of the façade in degrees from north.
- Minimum height of the sun for the façade to be considered sunny.
- Start and stop angles, how many degrees from the direction of the façade the sun is considered to reach, i.e. which is not shaded. This must be set for each façade.



Façade settings

Operating modes

The different operating modes can overlap and interact. For example, glare protection can be used during occupancy while insulation is used only when unoccupied, combined with the user having the possibility to override via a push button.

Schedule and override button

Rooms can have their solar shading controlled up or down via a schedule. The schedule has the highest priority, overridden only by an override button. The override button shall be of the monostable type. When used, the shades close or open depending on where they were before the user pressed the button, and always run to the opposite position. The shades return to being controlled automatically by either: pressing the button once more or with a configurable timer elapsing. If the timer elapses while the room is still occupied, the shades will remain in override mode until the room becomes unoccupied.

Glare protection

It's possible to activate glare protection, which is used to prevent the occupants of the building being dazzled by sunlight. If glare protection is activated, the solar shading will be closed at all times when the sun is shining on the façade in question and the room is occupied. However, if glare protection is not activated, the solar shading will only close when the cooling load exceeds the set limit.

As insulation

Solar shading can be used for different types of insulation: ***On***, ***Off*** or ***Only unoccupied***.

When ***on***, the solar shading actively tries to help achieve the temperature setpoint for the room. This means that it closes as a heat field or to insulate depending on whether the sun is shining on the façade in question or not and whether there is a need of heating or cooling in the room. For example, the solar shading will open to let in sunlight if there is a need of heating in the room and, conversely, close if there is a need of cooling in the room.

When ***off***, the solar shading will ignore the temperature requirements of the room and will not open or close to affect the temperature of the room.

When set to ***Only unoccupied***, the solar shading will only act on the temperature requirement when the room is not in occupancy mode.

Room settings

Each room has three modes:

- Automatic: Solar shading is controlled automatically based on the temperature requirement. Schedule and override button can override.
- Only schedule: Only the schedule and override button can control solar shading.
- Off: All sun shades are open.

Each solar shading node in a room can be set to one of the six façades, but a node can only be assigned to one façade.

Even if a façade has sun, individual rooms on that façade may have different angles. In cases where solar shading has more limited sun, it's possible to set start/stop angles as well as sun height limits for this particular solar shading. If this solar shading does not have the sun, it will act as it would if the whole façade did not have the sun. Other solar shades on the same façade continue to work normally. Individual solar shades cannot be set to greater start/stop angles and height than its façade. These settings can be made under the WISE IORE, which controls the relevant solar shading.

The solar shading's node shows why it's down. Opening and closing of the solar shading take place with some delay, the length of this can be configured. This is to avoid the shade going up and down too often. There are also global delay system settings for sun and cloud. The façade will not be considered to have the sun until it has had the sun for a while. The same applies when the sun disappears. This delay is also adjustable.

Adjustable room parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Solar shading	Function activated	Automatic	-	-	-	Local/local	Automatic, Only schedule or Off
Solar shading	Glare protection	Off	-	-	-	Installation/Installation	Glare protection of or on
Solar shading	Insulation function, mode	On	-	-	-	Installation/Installation	On, Off, Only unoccupied

Cold draught protection

Why cold draught protection?

The protection against cold draughts is used to increase comfort and to prevent uncomfortable draught from occurring, for example, by windows and glazed sections.

How is cold draught protection regulated?

If there is a radiator in the room this can be used as cold draught protection. The function can be used for both Occupancy and Unoccupied modes in a room. When the cold draught protection is enabled, the radiator is turned on set to a preconfigured level that is not fallen below. The radiator turns off if the cooling requirement is higher than a configured level, or if a window is opened.

Adjustable room parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Cold draught protection	Heating level	20	1	100	%	Installation	Level of the output signal for radiator heating.
Cold draught protection	Cooling level limit	50	1	100	%	Installation	Level of the output signal for cooling when the cold draught function for radiator heating is to be switched off.
Cold draught protection	Mode cold draught protection	Off	-	-	-	Installation	Off = Cold draught protection disabled On = Always enabled Only for occupancy = Enabled for occupancy in the room

Frost protection

Why frost protection?

Frost protection ensures safety, it counteracts the freezing of water in pipes and it counteracts moisture from permeating the building.

How is frost protection regulated?

If there is a product in the room that can heat, the frost protection function will be enabled at the set limit. This function opens the heating valve or enables the electric heater to 100% when the room temperature is lower than the temperature limit. The protection's temperature limit is possible to set between +5°C to +15°C. The frost protection control is always used, irrespective of the operating mode. The frost protection is also enabled if there is an open window.

The factory setting is set to +5°C. A temperature sensor or product with integrated temperature measurement is needed in the room for this function. Heating can come from comfort modules or electric/water radiators.

Adjustable room parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Temperature	Frost protection limit	5	5	15	Celsius	Installation/Installation	Frost protection limit where the heating function switches on in a room.

Open window

Why detect open windows?

Energy savings can be achieved by detecting open windows as unnecessary cooling and heating are prevented. In warm and moist weather conditions condensation problems can also occur in the rooms when cooling is installed and a window is open.

What happens when an open window is detected?

If a window is opened the heating/cooling valve closes to save energy and avoid problems with condensation. The frost protection function ensures that the products are not damaged by heating if the temperature is below a configurable value (standard value 5°C).

Operating case

If WISE WCS detects that a window is open, the supply air flow's setpoint value is set to min. It is possible to configure how the extract air should act in the event of an open window. The extract air flow is configurable between 0-100%.

It is also possible to set a switch-on delay to Open windows, which means the supply air and extract air flows are not adjusted until after the set time. For example, this can be useful if the Open window function is used for a door that is frequently opened and closed, where you do not want the air flows to be adjusted directly when the door is opened.

Adjustable room parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Air flow	Extract air	100	0	100	%	Installation/Installation	Extract air flow if there are open windows.

Control of the fan coil

Why control a fan coil?

To prevent two separate systems for heating and cooling counteracting each other.

How is a fan coil controlled?

WISE supports different types of fan coil integration with the help of WISE IORE, but this is limited to fan coils with the following functions:

- The fan speed must be possible to control with a 0-10 V signal
- Water valves according to one of the following options:
  1. Two water valves, heating and cooling, of the type 24 V on/off
  2. One water valve, heating or cooling, of the type 24 V on/off
  3. One water valve, only cooling, of the type 0-10 V
- Condensation monitoring with open/closed signal

WISE supports two variants of fan coil control:

1. Parallel control of the fan and water, without the possibility of the user controlling the fan speed
2. Separate control of the fan and water, with the possibility of the user controlling the fan speed

A description of how these two variants work is given below.

Parallel control of the fan and water

In this case WISE RTA can be used to let the user control the temperature set point in the room. Control of the fan coil occurs via WISE IORE. Two outputs are used to control the water valves (one for cooling and one for heating) and one output controls the fan speed. Air and water are regulated in parallel where the fan speed is proportional to the water valve's degree of opening. The fan speed increases/decreases to the same extent as the water valve's degree of opening. In order to attain the right fan speed, settings for voltage must be made to satisfy the lowest and highest possible fan speeds. When the speed signal is 0% the voltage signal is 0 V to stop the fan.

Operating case

In the cooling instance:

Cooling requirement > 0% = Fan starts and the cooling valve starts to open. The fan speed and the valve's degree of opening increases as the cooling requirement in the room increases. For a reduced need, the fan speed and degree of opening on the cooling valve decreases until the need = 0%. The fan then stops. The opposite occurs for a configured heating function.

Separate control of the fan and water

In this case WISE RTA can be used to let the user control both the temperature set point and the fan speed in the room. As standard the fan speed is set to AUTO, and the fan speed is then controlled in parallel with the water valve, as described under Parallel control of the fan and water. In addition to AUTO, there are four other manual settings that the user can set for the fan speed:

- Speed 0: the fan is turned off
- Speed 1: The fan speed is set to the configured speed 1, standard 30%
- Speed 2: The fan speed is set to the configured speed 2, standard 60%
- Speed 3: The fan speed is set to the configured speed 3, standard 90%

When the user sets the fan speed manually, it returns to AUTO after a specific time. This time can be configured and if it is set to 0 the function is disabled, which means the setting automatically switches to AUTO.

Operating case

In the cooling instance:

Cooling requirement > 0% = Cooling valve starts to open. The valve's degree of opening increases as the cooling requirement in the room increases. The fan speed and degree of opening on the cooling valve decreases with a reduced requirement until the requirement = 0%. The fan then stops. The fan speed is controlled according to the setting on WISE RTA. The opposite occurs for a configured heating function.

Fan coils often have a filter and it is possible to set a life expectancy for the filter. An alarm is activated when the active time reaches the life expectancy. Setting the alarm time to 0 disables this alarm function. The user can reset the active time, this should be done once the filter has been cleaned. The time when the fan speed is set to 0 is not included in the active time. The active time is saved and is not affected in the event of a restart.

Fan coils can also have condensation monitoring, an alarm is activated if the condensate reaches a high level in the inner container. All cold water is stopped when the alarm is active in an attempt to prevent more water from accumulating.

Control of chilled ceilings

Why control a chilled ceiling?

To prevent two separate systems for heating and cooling counteracting each other.

How is a chilled ceiling controlled?

WISE supports integration of different types of chilled ceilings, both for cooling and heating, with the help of WISE IORE:

- Chilled ceiling in two or four tube systems, with or without central change over
- Chilled ceiling with Swegon's CCO valves or third-party six-way valve

Underfloor heating

Why control the floor heating?

To maintain the required floor temperature and room temperature.

How is floor heating used?

WISE IRT is used to measure the surface temperature of the floor and the room temperature. An actuator for the floor heating circuit is controlled via a WISE IORE. The floor heating limits so that the floor does not exceed a set temperature. A value for the floor temperature between 15–30°C with an offset for switching on and off can be set. It is possible to hold a higher temperature on the floor compared with the room temperature.

There is a separate output signal to control the floor heating, adjustable as for radiators and comfort modules with a heating coil, 24 V NO/NC On/Off or PWM and 0-10 V Analogue.

Floor heating control is divided into different types. Either only the floor's surface temperature is regulated or the temperature of the whole room is regulated. It can also regulate the temperature as a separate zone in the room. In this instance the zone temperature is measured with a separate temperature sensor, see the table below.

When the room goes from no occupancy mode, it is possible to set so that the floor heating remains on as if the room was in occupancy mode for an adjustable number of minutes.

Flooding alarm

There is support to connect a sensor for water leakage, which can be used to detect water leakage in the floor heating installation. An alarm is generated when the sensor detects water leakage. This sensor can be connected to the same WISE IORE that is used to control the floor heating.

Operating case

If the temperature sensor for the zone temperature fails, the system switches to surface heating after an alarm has been tripped. If the surface temperature sensor fails the floor heating switches to the set fixed output, even then an alarm is tripped to inform the user.

Adjustable room parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Occupancy mode	Floor heating zone, set-point value	21	-	-	Celsius	Installation/Installation	Temperature setpoint value in occupancy for room zone regulation.
Unoccupancy mode	Floor heating zone, set-point value	19.5	-	-	Celsius	Installation/Installation	Temperature setpoint value in unoccupied for room zone regulation.
Underfloor heating	Comfort temperature	23	10	30	Celsius	Local/Installation	Comfort temperature = Setpoint value for surface regulation in occupancy and lowest limit in room regulation in occupancy.
Underfloor heating	Min. underfloor temperature	16	10	30	Celsius	Local/Installation	Min floor temperature = Setpoint value for occupancy.
Underfloor heating	Temperature mode	Average	Lowest	Highest	-	Local/Installation	The temperature to be used for regulation for more than one temperature sensor: Average = Average value of temperature sensor, Minimum = Lowest value of temperature sensor. Highest = Highest value of temperature sensor.
Underfloor heating	Cooling level limit	50	1	100	%	Local/Installation	Limit value for the size of the cooling requirement in the room that shuts off all floor heating.
Underfloor heating	Power factor	100	10	100	%	Installation/Installation	Can be used for the limitation of output on floor heating.
Underfloor heating	Fixed output	30	0	100	%	Installation/Installation	Fixed output, for output regulation of floor heating or for the loss of temperature sensors.
Underfloor heating	Post-running time comfort	0	0	1200	Minutes	Installation/Installation	Can be used so that the floor heating remains on as if the room was unoccupancy mode for an adjustable number of minutes.

Air boost

Why air boost?

Air boost is used, for example, such as the airing function through temporarily increasing the flow if a room has not been used for a long time.

How is air boosting regulated?

Air boost is a function that sets the air flow in a room to a specific given percentage of the max air flow during a predetermined time. Boost functionality in a room can be triggered automatically after a long period of non-occupancy when it becomes occupied or via the SuperWISE interface, master system or pushbutton. For a cooling requirement, boost is stopped if the temperature drops below the heating setpoint value for Unoccupied. For a heating requirement, boost is stopped if the temperature exceeds the cooling value for Unoccupied.

Operating case

In room modes Emergency mode, Commissioning and Holiday Boost is disabled.

Ventilation boost after long-term non-occupancy

When the room has been in a mode other than Unoccupied longer than the set delay time, an air flow boost starts when the room enters occupancy mode and continues during the set time or until the temperature limits as mentioned above are reached.

Ventilation boost for air mixture

When the air boost interval (since the last boosting) has elapsed and the room is in Occupancy boosting will be enabled during the set time to mix the air for a heating instance.

Manual boost via the SuperWISE interface

Manual boost is enabled in the room via the SuperWISE interface. The boost only starts if the room is in a mode where boost is permitted. If the room is in a mode where boost is not permitted, boost will occur first when the room permits this (only within 10 minutes). The room returns automatically to its normal operating mode after boost has been completed.

It is also possible to start air flow boost centrally per air handling unit when all rooms under the air handling unit start air flow boost. Air flow boost can also be started over Modbus, BACnet and schedule.

Checked-in

When a room is in Checked-in mode boost is started during the set time.

Manual boost

It's possible to enable air boost using a momentary or bistable pushbutton, connected e.g. to a WISE IRE. The pushbutton has its own parameters and does not use the room's parameters in respect of flow percentage and duration. The boost is enabled if the room is in a mode where boost is permitted. If the room is in a mode where boost is disabled, the selection is saved for 10 minutes.

If a momentary pushbutton is used, air boost remains active until the set time has elapsed. The time applies from the last time the button was pressed. In the case of a bistable pushbutton, air boost is enabled and disabled using the button.

Note that overriding via a button has a higher priority than e.g. air boost in a schedule, which means the schedule function only becomes active once the time for overriding via the button has elapsed. If air boost is in progress in the room and the user presses the button, the button's settings will apply and will override the room's settings.

Adjustable room parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Air flow boost	Delay	8	0	48	Hours	Installation/Installation	Boosted air flow starts if the room has been in another mode than occupancy during the set time. 0 = Boosted air flow when occupied.
Air flow boost	Flow percentage	100	0	100	%	Installation/Installation	Percent of max flow for boosting, but not lower than min flow in the mode the room is currently set to.
Air flow boost	Interval	0	0	48	Hours	Installation/Installation	Boosting for the set time to mix the air for a heating instance. 0 = Shut off.
Air flow boost	Duration	5	0	1440	Minutes	Local/Installation	Time how long boost shall be enabled.
Air flow boost	Manual boost	0	0	1	-	Local/Local	Enable boor manually.

Condensation

Why is condensation detected?

Condensation is detected to prevent precipitation of water droplets on pipes and cooling coils at low temperatures that can create problems in the property.

How is condensation detected?

In products

In products, condensation can be detected with a reactive sensor (CG IV) that is mounted on the supply pipe in the product. The sensor's temperature in relation to the room temperature and humidity gives a value to WISE CU/WISE IORE. Below the set lower limit the cooling function is shut off via the water valve until is value goes above the set upper limit, see the factory settings in the table below.

In rooms

A dewpoint function that is proactive is used in rooms. With The WISE system accessory the humidity of the air is measured in %RH, together with the measured room temperature which permits a dewpoint to be calculated. This is used to be compared against a temperature from a sensor (EXT PT-1000 connected to a WISE CU) which measures the surface temperature of the pipe and is placed on the supply pipe in the product.

There is an adjustable level to specify when the cooling function should be closed and a resetting level when cooling should be switched on. Factory settings is the cooling is switched off when the supply temperature is 2 degrees above the dewpoint and returns when the supply temperature is 3 degrees above the dewpoint. These are adjustable on room level via the SuperWISE interface.

The air flow required for the risk of condensation precipitation on products in the room can also be specified. A percentage of the room's maximum flow is set as a value for the risk of condensation, this is to air out moist air that may be in the room.

How is the dewpoint calculated?

When air of a specific temperature and relative humidity cools the relative humidity will increase. If you have a surface that is cold, the water vapour at a specific temperature will condense of the surface. The temperature when surface condensation forms is called the air's dewpoint, this is calculated by measuring the relative humidity in the room, room temperature and the temperature on the cold surface where there is a risk for condensation being precipitated.

Adjustable room parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Air flow	Supply air	100	0	100	%	Installation/Installation	Supply air flow for condensation

Duct heater/cooler

Why a duct heater/cooler?

Duct heater/cooler is used to heat/cool the air in a room. This function can be used when certain rooms have different temperatures compared to the rest of the building. For example, a conference room my need to be heated when it is not used while the rest of the building needs to be cooled due to a high temperature load caused by occupancy.

How do duct heaters/coolers work?

A duct heater and/or a duct cooler has the task of heating or cooling the supply air in a duct. A WISE IORE can control a duct heater and/or a duct cooler.

The principle is that a room temperature is desired with a setpoint value and the duct heater/cooler regulates the supply air temperature to achieve the desired room temperature.

In order not to exceed the adjustable temperature difference (max. permitted difference between room temperature and supply air temperature) the temperature load is converted (via sequence settings) to a supply air temperature setpoint value within the permitted limits.

It is possible to specify an air flow limit for when heating and cooling are to be permitted. That is say, for a heating/cooling requirement the air flow will first increase to the given limit before heating/cooling starts. This limit can then be used to prevent overheating/the development of condensation. The air flow limit is affected by a factor that is adjustable in the interval 0...100% where 0% means the factor is not used.

If the air handling unit is stopped heating and cooling are switched off.

It is possible to set the required supply air temperature when the room, zone or system is in the neutral zone (neither cooling or heating mode). It is set per air handling unit or zone as "Temperature at 0% requirement" or on room level as "Temperature in neutral zone".

Duct heater/cooler in a room

There can be more than one duct heater/cooler in the room. Each product has its own settings for heating and cooling sequences. It is possible to have two duct heaters in sequence independent of the heat source. The same applies to coolers. The permitted supply air temperature settings are used in the room for max. temperature difference. When the temperature load is zero, the set temperature in the neutral zone is used.

It is also possible to manage a mode when all the supply air products in the room are not connected to the duct heater/cooler. If this is the case, it is important that the setting is made correctly, as normally all supply air products contribute with supply air temperature after the duct heater/cooler and the combined supply air flow used for the overheating function. If no setting is made, it is assumed that all supply air products in the room are connected to the duct heater/cooler if installed in the room. In those exceptions when only one or two supply air products in the room are connected to the duct heater/cooler, these must point to the address of the right duct heater/cooler under settings for Duct heater/cooler on product level. The products in the room that are not assigned an address for a duct heater/cooler are then assumed to not be connected to one.

Air shut off rooms

Why shut off the air flow?

In properties housing several different businesses that utilise their premises at different times for example, it may be preferable to be able to shut off parts of the system at certain times, when the premises are not being used.

How does room shut off work?

The air flow to and from a room can be shut off with a mode called Air off for a desired time via SuperWISE, Modbus or BACnet. It's also possible to activate or deactivate closure via a push button of a locking type connected to WISE IRE. The position of the damper on all products belonging to the room is then set to 0%. When Air off is enabled for the room, the room temperature is then controlled according to No occupancy mode. All comfort alarms are blocked when air shut off in the room is enabled. Rooms can also be set to Air off via Schedule. However, a scheduled shut off can be overridden by switches, occupancy and for Emergency mode depending on how these are configured. For Air shut off, rooms come in balance by shutting off both supply and extract air.

Is it also possible to choose to override shut off on a room level in two different ways:

- Shut off can be overridden with a switch. This can be of the type momentary or non-momentary. If a non-momentary switch is used, Air shut off will be overridden until the switch is set in its normal position again. If a momentary switch is used, overriding will be active until the set time has elapsed. This applies irrespective of whether the room was shut off or will be shut off from elsewhere. The time applies from the last time the switch was actuated. Note that overriding via a switch has a higher priority than e.g. a schedule, which means the schedule function only becomes active once the time for overriding via switch has elapsed. However, the Emergency mode function always has highest priority.
- The shut off can be overridden by occupancy or using a switch.

In the event of Emergency mode, the dampers in the room will act according to the configuration set for Emergency mode. As Emergency mode has a higher priority than Air shut off, in some instances depending on the Emergency mode configuration, this may mean that the Air shut off function is overridden by the Emergency mode function.

A room damper cannot be shut off separately, but is shut off through Air off for the room or the zone damper. A damper in a shut off room will not be included in the calculation of pressure optimisation and/or damper optimisation. When the damper is shut-off the air flow value will be invalid and not shown.

When shutting off a large number of rooms, the easiest way to perform this is in Quick settings.

Note, in order for automatic functions in the event of a shut off to work, it is important that the installation is configured correctly and thus describes the structure set for the air flow in the format Air handling unit-Zone damper-Room-Room damper.

Shutting off the air handling unit

When a connected GOLD air handling unit is shut off, WISE will automatically detect this and prevent alarms from being set in the room. The damper will be set in 'default mode' to facilitate the restart of the air handling unit. If the air handling unit is of the type General AHU, the Modbus parameter for 'AHU Running' should be used to obtain equivalent functionality.

Adjustable room parameters in SuperWISE

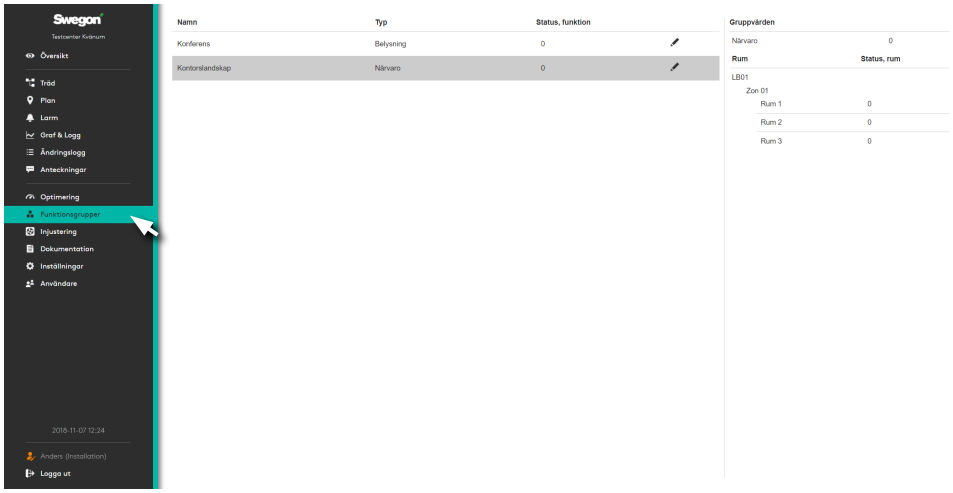
Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Air flow	Air off	Off	Off	On	-	Installation/Installation	Enable or disable the function
Air flow	Mode, air off	Standard	-	-	-	Installation/Installation	Standard, when the room remains shut off even with occupancy Occupancy blocks, when the room cancels shut off with occupancy, and then returns when it becomes unoccupied

Function groups

Function groups give the opportunity to share functions between room or products in the same room and get them to interact.

Function groups in SuperWISE

Summary of function groups in the system. These are created when configuring the system.



Contains information about the function groups available in the system. Detailed information is shown in the right-hand box by clicking on the relevant group.

To make settings for the group, click on the pen to the right.

Occupancy

Why occupancy groups?

In an occupancy group signals can be shared between several rooms. However, for occupancy in a room, all rooms in a group can receive the occupancy status. Occupancy can be indicated by WISE OCS and WISE SMB. The occupancy signal can also come from the main BMS system.

Adjustable group parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Function	Status, room	Contribute and follow				Local/Installation	States whether a room should use a function group value or only contribute to the function group value without using it. Contribute and follow Contribute only Follow only

Window contact

Why window contact groups?

Open windows make it difficult for the system to regulate the indoor climate in an energy efficient manner. The function means that all rooms in the group receive the status “Open window” if any of its sensors detect an open window. This can be managed by using wireless window contacts WISE WCS.

Air balancing

Why air balancing groups?

An air handling group groups several rooms to achieve air balance in the room. All supply air dampers, constant extract air dampers, fume hoods, etc. are included in the calculation of the total flow for the group.

Air quality

Why air quality groups?

In an air quality group it is possible for several rooms to share air quality sensors or regulate with the help of each other's sensors. It is also possible to compare the measured air quality of products and to regulate on an average value of several sensors' air quality or the highest/lowest measured air quality.

The air quality in the WISE system can be measured and regulated either by VOC or CO_2 or RH.

Adjustable group parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Function	Air quality mode VOC	Average value			-	Local/Installation	What value to use in the group Average value Lowest Highest
Function	Mode air quality CO_2	Average value			-	Local/Installation	What value to use in the group Average value Lowest Highest
Function	Air quality RH mode	Average value			-	Local/Installation	What value to use in the group Average value Lowest Highest
Function	Status, room	Contribute and follow			-	Local/Installation	States whether a room should use a function group value or only contribute to the function group value without using it. Contribute and follow Contribute only Follow only

Temperature

Why temperature groups?

In a temperature group it is possible for several rooms to share temperature sensors or regulate with the help of each other's sensors. It is also possible to compare the measured temperatures of products and to regulate on an average value of several sensors' temperatures or the highest/lowest measured temperature.

There are a number of different temperature sensors, with varying application areas, to use:

- WISE SMB
- WISE RTS
- WISE RTA
- WISE IAQ
- WISE IRT
- WISE OCS
- WISE RTS

See the WISE System guide or separate product documentation for further information.

Adjustable group parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Function	Mode temperature	Average value			-	Local/Installation	What value to use in the group. Average value Lowest Highest
Function	Status, room	Contribute and follow			-	Local/Installation	States whether a room should use a function group value or only contribute to the function group value without using it. Contribute and follow Contribute only Follow only

RTA group

Why RTA group?

In an RTA group, it is possible for several rooms to share the setpoints from a WISE RTA. A room with WISE RTA can send its information to other rooms in the group, and in this way several rooms can use the same setpoint selector switch.

The group also controls the rooms' occupancy mode, in the same way that a WISE RTA does for one room. This means that if the temperature setpoint has recently been changed via WISE RTA, the rooms in the group are set to occupancy mode. It is possible to set whether WISE RTA for the group is to control the temperature setpoint, the fan speed for the fan coil or both. This setting determines which values will be synched between the rooms in the group.

Adjustable group parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Group, RTA Settings	Step	0.5	0.1	10	Celsius	Installation/Installation	The defined step is the accuracy with which the user can set the temperature setpoint on WISE RTA.
Group, RTA Settings	Max. value	30	5	50	Celsius	Installation/Installation	The highest level at which the user can set the temperature setpoint on WISE RTA.
Group, RTA Settings	Min. value	15	5	50	Celsius	Installation/Installation	The lowest level at which the user can set the temperature setpoint on WISE RTA.
Group, RTA Settings	Temperature offset time	480	0	1200	Minutes	Local/Local	Timer for how long the setpoint offset will apply before it is reset, regardless of whether there is occupancy or not. 0 = Never reset
Group, RTA Settings	Forced occupancy time, RTA	0	0	1200	Minutes	Installation/Installation	Timer that forces the room into occupancy for the set time after a setpoint offset has been made. After the set time, the setpoint offset for non-occupancy is reset.
Group, RTA Settings	Fan speed, return time	480	0	1200	Minutes	Local/Installation	Timer for how long the fan speed change will apply before it is reset, regardless of whether there is occupancy or not. 0 = Never reset
Group, RTA Settings	Setpoint, mode	0	0	2	-	Local/Installation	Temperature Fan speed Temperature and Fan speed
Group, RTA Occupancy	Temperature offset, cooling	1	0.5	10	Celsius	Installation/Installation	Number of degrees above the set "Temperature setpoint" that is permitted before cooling of the room occurs.
Group, RTA Occupancy	Temperature offset, heating	-1	-10	-0.5	Celsius	Installation/Installation	Number of degrees below the set "Temperature setpoint" that is permitted before heating of the room occurs.
Group, RTA Occupancy	Temperature setpoint	22	15	30	Celsius	Installation/Installation	Temperature setpoint for the current operating case
Group, RTA Occupancy	Temperature setpoint, mode	1	0	1	-	Installation/Installation	One-point control or two-point control of the temperature.
Group, RTA Non-occupancy	Temperature offset, cooling	2.5	0.5	10	Celsius	Installation/Installation	Number of degrees above the set "Temperature setpoint" that is permitted before cooling of the room occurs.
Group, RTA Non-occupancy	Temperature offset, heating	-2.5	-10	-0.5	Celsius	Installation/Installation	Number of degrees below the set "Temperature setpoint" that is permitted before heating of the room occurs.
Group, RTA Non-occupancy	Temperature setpoint	22	15	30	Celsius	Installation/Installation	Temperature setpoint for the current operating case.
Group, RTA Non-occupancy	Temperature setpoint, mode	1	0	1	-	Installation/Installation	One-point control or two-point control of the temperature.
Group, RTA Holiday	Temperature offset, cooling	5	0.5	10	Celsius	Installation/Installation	Number of degrees above the set "Temperature setpoint" that is permitted before cooling of the room occurs.
Group, RTA Holiday	Temperature offset, heating	-5	-10	-0.5	Celsius	Installation/Installation	Number of degrees below the set "Temperature setpoint" that is permitted before heating of the room occurs.
Group, RTA Holiday	Temperature setpoint	20	15	30	Celsius	Installation/Installation	Temperature setpoint for the current operating case.
Group, RTA Morning heating	Temperature offset, cooling	3	0.5	10	Celsius	Installation/Installation	Number of degrees above the set "Temperature setpoint" that is permitted before cooling of the room occurs.
Group, RTA Morning heating	Temperature offset, heating	-3	-10	-0.5	Celsius	Installation/Installation	Number of degrees below the set "Temperature setpoint" that is permitted before heating of the room occurs.
Group, RTA Morning heating	Temperature setpoint	22	15	30	Celsius	Installation/Installation	Temperature setpoint for the current operating case.
Group, RTA Summer night cooling	Temperature offset, cooling	5	0.5	10	Celsius	Installation/Installation	Number of degrees above the set "Temperature setpoint" that is permitted before cooling of the room occurs.
Group, RTA Summer night cooling	Temperature offset, heating	-5	-10	-0.5	Celsius	Installation/Installation	Number of degrees below the set "Temperature setpoint" that is permitted before heating of the room occurs.
Group, RTA Summer night cooling	Temperature setpoint	20	15	30	Celsius	Installation/Installation	Temperature setpoint for the current operating case.

Lighting

Why lighting groups?

Lighting can be controlled via the WISE system and several rooms can be included in a lighting group. It is therefore easy to manage the lighting in the rooms, regardless of the size, floor layout and any possible changes.

Rooms included in a group can give lighting information to the group, without being switched on by the group's lighting status. It is possible to configure what triggers the lighting in a room. See the section "Lighting control" in rooms under "Room functions" for more information.

A room can be a part of a lighting group and several rooms can be included one and the same group. A lighting group can extend over several Directors, rooms that are placed under different Directors can also be placed in the same lighting group. The lighting status for all rooms in the group give a lighting group status. If the lighting in any of the rooms is ON the status of the lighting group will be ON.

It is possible to specify a switch-off delay for the group. It is the time that the group signal is ON after all rooms in the group have returned to no occupancy mode.

If a room is included in a lighting group its lighting status is appraised to determine the lighting group's status. If an included room is to be illuminated with the help of the lighting group or not is individually adjustable for each room.

Adjustable group parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Lighting	Switch-out delay	0			Minutes	Local/Installation	Time the lighting is switched on after the room has been unoccupied.
Function	Status, room	Contribute and follow			-	Local/Installation	States whether a room should use a function group value or only contribute to the function group value without using it. Contribute and follow Contribute only Follow only

Duct heater/cooler

Why a duct heater/cooler?

Duct heater/cooler is used to heat/cool the air for a group. This function can be used when certain rooms have varying temperatures compared to the rest of the building. For example, a conference room my need to be heated when it is not used while the rest of the building needs to be cooled due to a high temperature load caused by occupancy.

How do duct heaters/coolers work in groups?

A duct heater/cooler can be placed in a duct branch that supplies a number of rooms with air. In this case a function group must be created to control the duct heater/cooler. A zone can have many function groups with duct heaters/coolers.

The function group calculates room temperature, supply air temperature and temperature load from rooms in the group. It is possible to enable one or more rooms in a calculation for the function group.
There are different ways to calculate these values, this is set in a calculation mode parameter. The different ways are:

- Average value
- Lowest
- Highest
- Average value weighted uses the room's maximal air flow to balance the effect from the room, a small room influences the average value less than a large room.

In the function group there are also different ways to set the required supply air temperature. If no optimization is enabled, a fixed temperature is used. For optimization, the setpoint value for the supply air can be calculated as a difference between supply air temperature and room temperature (Relative optimization) or as a fixed upper and lower temperature limit (absolute optimization). There is a fixed temperature setpoint value, which is used when there is no heating or cooling requirement in the group.

How temperature optimization works are described in detail under "Air optimization functions".

Additional moisture

Why additional moisture group?

In an additional moisture group, several rooms can share additional moisture values or regulate with the help of each other's values. It is also possible to compare the measured additional moisture of products and to regulate on an average value of several rooms or the highest/lowest calculated value.

Adjustable group parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Function	Additional moisture operating mode	Average value	-	-	-	Local/Installation	What value to use in the group Average value Lowest Highest

Change over

Why a change-over group?

A Change-over group can be used so rooms in the group can be controlled with either hot or cold water in the pipes. A Change-over system can then be used if you want to be able to cool and heat using the same pipes.

How does a change-over group work?

A Change-over group works by measuring the supply flow temperature of the water at one point and then sending this to the group. The supply flow temperature can also be acquired via BMS or from a configured value in SuperWISE.

It is also possible to choose whether cooling or heating is available, either in SuperWISE or via BMS.

- Heating: Sets the group's Change-over temperature to 50 °C.
- Cooling: Sets the group's Change-over temperature to 10 °C

A choice such as this overrides the measured Change-over temperature.

There are three different operating modes for each Change-over group:

1. Heating: The Change-over-group temperature is set to 50 °C.
2. Cooling: The Change-over-group temperature is set to 10 °C.
3. Measured temperature: The Change-over temperature will then be the measured supply flow temperature.

When there is no Change-over temperature in a Change-over group, the external Change-over temperature in the room will be used. This can be specified in SuperWISE, or communicated via BMS.

Air flow limitation

Why air flow limit groups?

It is common in renovation projects that the existing ventilation ducts or air handling unit set the limit for the maximum flow to a certain part of the building or group of rooms. It may then be desirable to permit a specific maximum flow in individual rooms and at the same time set a restriction on the total supply air flow to this group of rooms that for example utilise the same supply air duct, where the rooms can be permitted to have a specific supply air flow provided that the total flow to the group of rooms does not exceed a certain limit.

How does an air flow limit group work?

Rooms can be included in an air flow limit group. The group limits each room's maximum supply air flow. The group controls each room's requested air flow, and if the sum of the requested supply air for all included rooms is higher than the limit value for the group, the group restricts the supply air flow for all included rooms. If the limit value for the group is exceeded, the air flow to each room in the group is lowered proportionally.

For example: If the sum of the desired supply air flow for the group is 1200 l/s and the limit value for the group is 1000 l/s, i.e. 20% above the limit value, the set point for the supply air in each room is lowered by 20%.

Group for constant pressure regulation

Why a group for constant pressure regulation?

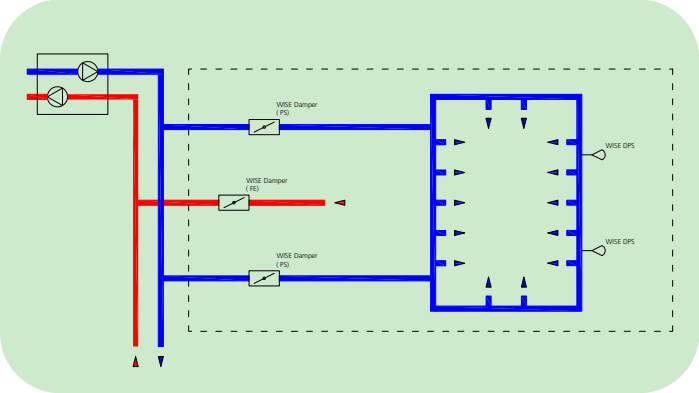
It's possible to create groups for constant pressure regulation on a zone level, which can be used for example in ring-fed duct systems. This type of group can consist of one or more WISE Dampers as well as one or more WISE DPS, both on pressure holding supply air (PS) and extract air dampers (PE).

How does a group work for constant pressure regulation?

The group uses a common pressure set point value that is specified for the whole group of pressure holding dampers. The measured pressure is given by the duct pressure sensor/sensors WISE DPS in the group. It is selectable whether the average value, minimum or maximum value for duct pressure should be used, where the average value is the default.

The WISE Dampers that belong to a group are controlled synchronously towards a damper position to achieve the required pressure, so that the system does not start to fluctuate or counteract itself. Accordingly, all WISE Dampers move simultaneously and towards the same pressure set point value.

For emergency mode, you can specify that another pressure set point value should apply for the group, rather than the one that applies for normal operations.

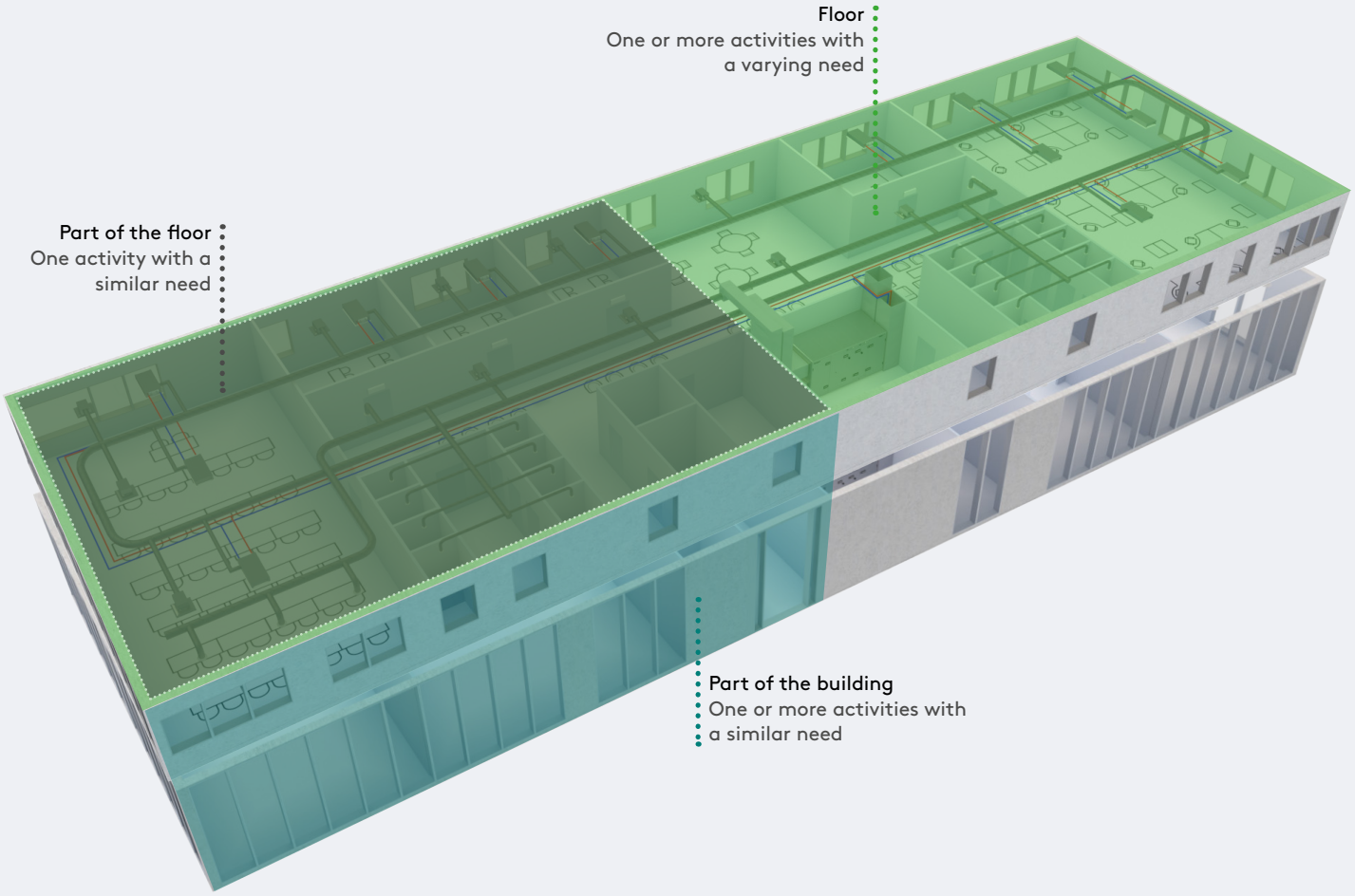


Basic circuit diagram, group for constant pressure regulation in ring-fed duct systems

Zone functions

Zone functions is the collective name for the functionality on the level above room level. Typically a zone is a part of the whole duct system. The zone can consist of one or more WISE Dampers.

All products within a specific zone are regulated by the same WISE Director. Underlying zone products, room products and sensors provide the system input to regulate. The products are designed based on the existing need and deliver the best possible indoor climate on each specific occasion.



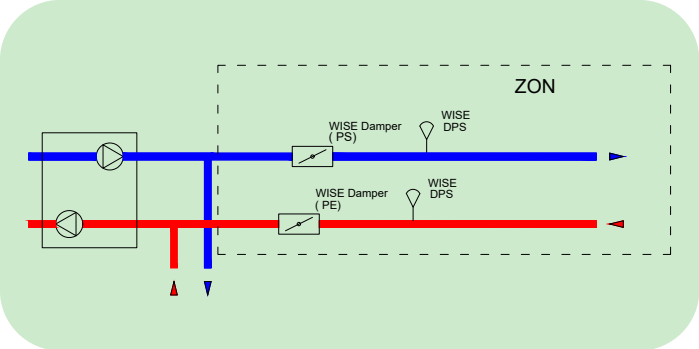
Constant pressure regulation

Why constant pressure regulation?

Constant pressure regulation is used to give the subsequent duct and room products optimal conditions. The pressure setpoint value is set so that all underlying rooms receive their max. flow. The most open room damper should, in this case, haver a degree of opening of approximately 80%. This ensures that all rooms receive air at the lowest possible energy consumption and the lowest possible sound generation in the ventilation system. In uniform smaller systems there is a possibility to pressure optimize directly from the air handling unit without pressure controlled zone dampers on the way.

For constant pressure regulation, a duct WISE Damper has the task to maintain a constant pressure independent of the flow that passes.

This is selectable if WISE Damper is to present a measured flow or whether it should present an added flow, based on the underlying rooms in SuperWISE.



Basic circuit diagram, Constant pressure regulation

How is constant pressure maintained?

This is achieved by measuring the duct pressure, with WISE DPS with the recommended placement two thirds out in the duct. WISE Damper adjusts the pressure by closing or opening the damper. In order to maintain a constant pressure, the flow is also measured to use in flow balance calculations. Constant pressure regulation can occur on the supply air (PS*) and extract air damper (PE*). When using a WISE Damper with pressure regulation, there is a possibility to set a maximum limit for the air flow.

If the measured flow exceeds the maximum flow limitation, the regulator starts and regulates according to the set maximum flow until the air flow drops below the set value, the damper will then return to pressure regulation again.

Group for constant pressure regulation

It's possible to create groups for constant pressure regulation on a zone level, which can be used for example in ring-fed duct systems. This type of group can consist of one or more WISE Dampers as well as one or more WISE DPS, both on the supply air (PS) and extract air dampers (PE). For more detailed description and adjustable group parameters, see the section Group for constant pressure regulation under Function groups.

Constant flow regulation

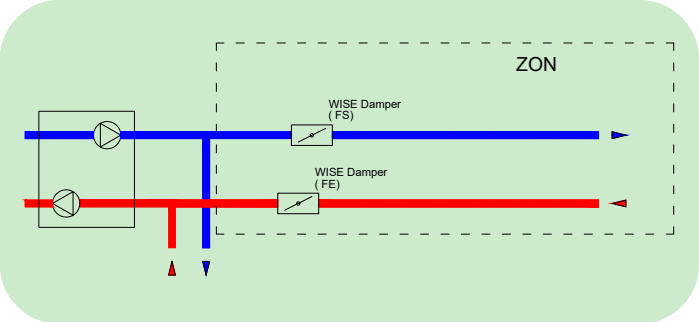
Why constant flow regulation?

Constant flow regulation is used when a constant flow is to be maintained in a duct.

How to establish constant flow?

The flow is measured at the damper where the flow is increased or decreased by closing or opening the damper. Constant flow regulation can occur on the supply air (FS*) and extract air damper (FE*).

Constant flow regulation is configured in IC Design, depending on whether it is a supply air damper (FS) or extract air damper (FE). Supply/extract air dampers (FS/FE) are configured by setting a setpoint value for the air flow.



Basic circuit diagram, Constant pressure regulation

Adjustable product parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Air flow	Constant air flow function	0	0	1	-	Local/Installation	Constant flow enabled or disabled on flow controlled products.
Air flow	Constant air flow	0			l/s	Local/Installation	Flow setpoint value for constant flow damper.

* PS = Pressure Supply, PE = Pressure Extract, PED = Pressure Extract Diverted,
FS = Flow Supply, FE = Flow Extract, OS = Optimize Supply, OE = Optimize Extract

Flow balance

Why regulate the flow balance?

In order to avoid negative or positive pressure and the problems that these can cause such as noise and difficulties to open/close doors and windows.

How is flow balance regulated?

Creating flow balance in a zone (consisting of several WISE Damper) is an important part of a WISE system that is solved with the help of so-called Ventilation groups. A zone is always a ventilation group. Within a ventilation group, the sum of the total supply air flow is calculated minus the total extract air flow. The difference is the flow that needs to be created so there is balance in the zone. Flow balance is created with the help of one or more extract air duct dampers (FE). It is possible to add a positive or negative offset to the flow balance to create a little positive or negative pressure.

The flow balance is regulated through the extract air dampers that are not a constant flow damper or constant pressure damper that automatically becomes balancing dampers. The flow offset is set on each product or on the zone.

The extract flow is distributed to balance the extract air dampers in proportion to their air flow capacity. Extract air dampers (FE) are used as balancing dampers. A damper's share of the total extract air flow is determined by its flow range (max-min). A damper's air flow cannot be lower than its minimum air flow setting.

Configuring the damper as a constant flow damper will not take any part of the balancing part of the extract air. However, the damper's flow is included in the balancing calculation.

A room can point out a specific zone damper to manage the selected room's extract air.

The zone damper's extract air setpoint value is then set based on the underlying room's supply air, before balancing in the zone is calculated with the help of the balancing function. These selected dampers are not used as balancing dampers for the balancing function.

Constant pressure damper for the extract air (PE), Optimization extract air (OE) and Reverse Pressure regulation damper extract air (PED*) are included in the sum of extract air, but cannot be used to balance the flow in the zone.

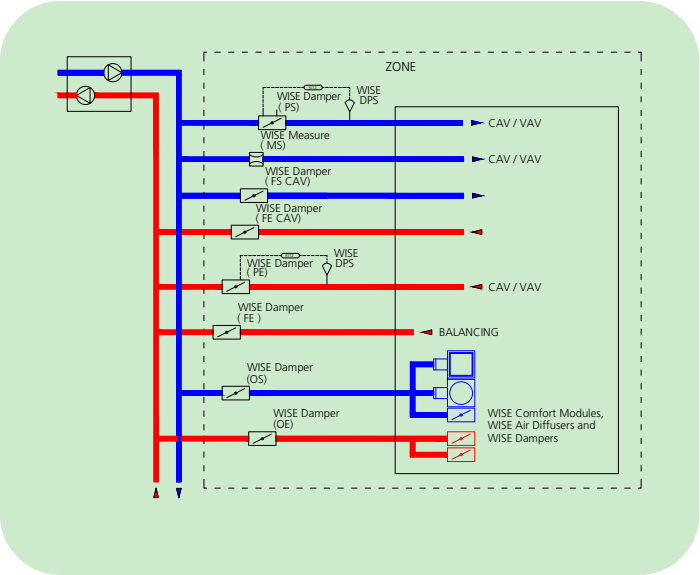
Formulas to calculate the extract air flow for balancing are:

"Extract air flow total" = "Sum Supply air flow" – "Non-balancing extract air flow" + "Offset"

"Extract air flow to balance" = "Extract air flow total" – "Sum min-air flow for balancing air flow"

Extract air to dedicated dampers are a part of the "Non balancing extra air flow".

Offset is specified in l/s and/or as a percentage.



Basic circuit diagram, Flow balancing

Adjustable product parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Air flow	Flow offset	0			l/s	Local/Installation	Settings for positive or negative offset to create a little positive or negative pressure.
Air flow	Flow offset	0	-100	100	%	Local/Installation	Settings for positive or negative offset to create a little positive or negative pressure.

Adjustable zone parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Airflow	Airflow from	Auto	-	-	-	Installation/Installation	Specifies the method with which the airflows should be added together for the zone. Auto adds together the airflows based on the values from the zone dampers and rooms that are directly connected to the air handling unit. Room adds together the airflows based on the values from the rooms. Zone adds together the airflows based on the values from the zone dampers. This relates to adding together flow-controlled extract air dampers (FE) in the zone.

Mode optimization

Why position optimize?

The purpose of the optimization functions are to reduce energy consumption and noise generation in the ventilation system.

How does position optimization zone work?

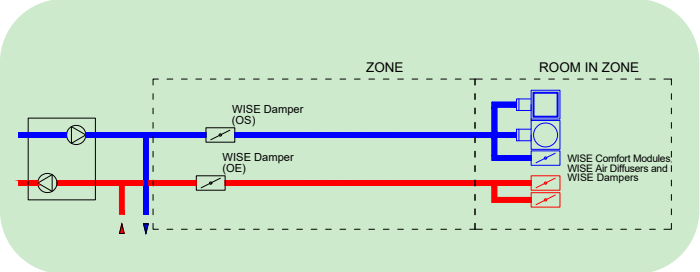
Position optimization is sometimes called two-step optimization. The reason it is called two-step optimization is that both damper position optimization on a zone and air handling unit are active simultaneously. The zone damper (OS/OE) optimizes its damper position depending on the damper positions on the room products that are linked to the zone product and are included in the optimization.

The zone damper position is changed by looking at the rooms' damper positions. There is a safety function that controls whether the zone damper's air flow is more than 10% below the underlying room product's setpoint values. The position will then not be reduced. If the most open room product has a damper position above the upper limit, the zone damper opens more to increase the air flow. If the most open damper is between the lower and upper limit the position of the zone damper is not changed. If the most open room product has a damper position below the lower limit, the zone damper closes to reduce the air flow.

This is selectable if WISE Damper is to present a measured flow or whether it should present an added flow, based on the underlying rooms in SuperWISE.

There is a configurable flag on each product that indicates whether the product should be included or excluded from the optimization.

- Time between the setting of the damper position and size of the step can be configured.
- It is also possible to use damper optimization without it optimizing on the air handing unit.
- Damper optimization can only be enabled via the SuperWISE configuration
- If damper optimization is enabled, the settings can be configured through the SuperWISE interface. The settings are in the zone.



Basic circuit diagram, Position optimization

Adjustable zone parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Optimization of the damper	Upper limit	90	0	100	%	Installation/Installation	Highest permitted damper position for the most open diffuser/room damper.
Optimization of the damper	Lower limit	70	0	100	%	Installation/Installation	Lowest permitted damper position for the most open diffuser/room damper.
Optimization of the damper	Interval	120	30	1200	Seconds	Installation/Installation	How often the zone damper may update its damper position.
Optimization of the damper	Step	3	1	20	%	Installation/Installation	How many percent the zone damper may be allowed to change between two updates.
Optimization of the damper	Minimum damper position	30	0	100	%	Installation/Installation	The percent that the zone damper does drop below in optimization.

Air shut off zone

Why shut off the air flow?

In properties housing several different businesses that utilise their premises at different times for example, it may be preferable to be able to shut off parts of the system at certain times, when the premises are not being used.

How does shut off of the zone damper work?

The air flow in a zone damper can be shut off with a mode called Air off for a desired time via SuperWISE, Modbus or BACnet. The position of the damper is then set to 0%. Zone damper can also be set to Air off via Schedule.

When zone dampers are closed, all underlying rooms are also shut off automatically, and similarly all comfort alarms are blocked. When Air off is enabled for the zone, the room temperature in underlying rooms is then controlled according to No occupancy mode and comfort alarms are blocked.

When closing supply air dampers on zone level, it is important to note how the extract air is configured and where applicable, shut off the extract air damper if appropriate.

Note, in order for automatic functions in the event of a shut off to work, it is important that the installation is configured correctly and thus describes the structure set for the air flow in the format Air handling unit-Zone damper-Room-Room damper.

When shutting off a large number of zone dampers, the easiest way to perform this is in Quick settings.

Shutting off the air handling unit

When a connected GOLD air handling unit is shut off, WISE will automatically detect this and prevent alarms from being set in the room. The damper will be set in 'default mode' to facilitate the restart of the air handling unit. If the air handling unit is of the type Generic AHU, the Modbus parameter for 'AHU Running' should be used to obtain equivalent functionality.

Adjustable zone parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Air flow	Air off	Off	Off	On	-	Installation/Installation	Enable or disable the function.

System functions

Interacting functions for the whole system that define the prerequisites in order to be able to create the optimal indoor climate in each individual project.

Schedule and calendar

Why schedule and calendar?

With the help of the schedule and calendar it is possible to control the system via weekdays and periods, by scheduling room functions. This, for example, can be Room mode, such as Occupancy or Holiday, Temperature offset or Air flow boost. Schedule and calendar can also be referred to as Time channels. It is also possible to create a schedule for GOLD air handling units in SuperWISE.

How do schedule and calendar work?

Schedule and calendar can be set either via BACnet or directly in the SuperWISE interface. The schedule can apply between specific dates or continue indefinitely. During the period that a schedule is active it will follow the basic settings except on times that have an event. An event is a time period during which a function other than the basic setting is performed. It is also possible to set exceptions from the schedule. The calendar can be used in those instances you wish to use exceptions on the same occasion for several schedules, as these schedules can be linked to a calendar.

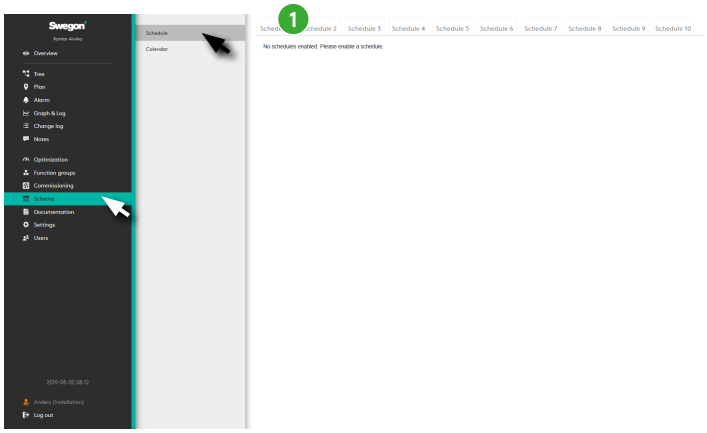
Overtime button and extended operation of the air handling unit (GOLD)

The overtime button is a momentary pushbutton with a configurable timer, and acts as a delay. Using the button, the air handling unit's previous schedule can be overridden and the system is started up again for the set time. It may be that the unit has been switched off according to the schedule, but the user wants it to run for longer.

Note that the overtime button has a higher priority and can override e.g. a switch or schedule that is used to switch off a room damper (Air off). The schedule function becomes active once the time for the overtime button has elapsed. The time applies from the last time the overtime button was actuated.

Schedule in SuperWISE

The purpose of a schedule is to be able to arrange certain room functions. This can, for example, be Room mode, Temperature offset or Air flow boost.



The schedule can apply between specific dates or continue indefinitely. During the period that a schedule is active it will follow the basic settings except on times that have an event. An event is a time period during which a function other than the basic setting is performed.

A schedule allows you to select which room or rooms that are to follow the schedule. A room can follow several schedules but only one of each type.

Exceptions are exactly as the name suggests, exceptions from the regular day schedule. A schedule can have up to 10 exceptions. An exception can be a day, a period, day/week/month or linked to a calendar.

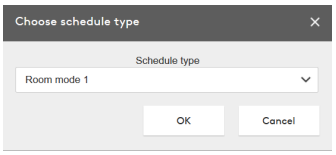
A base setting of the schedule must occur via the SuperWISE interface. The schedule can then be modified over BACnet.

Clicking on one of the tabs (1) displays a dialogue box for the user.

The dialogue box allows the user to select a schedule type for the schedule you click on.

Clicking on "***Cancel***" takes the user back to the previous view.

Clicking on "***OK***" takes the user to the tab for the selected schedule.



Enabling a schedule

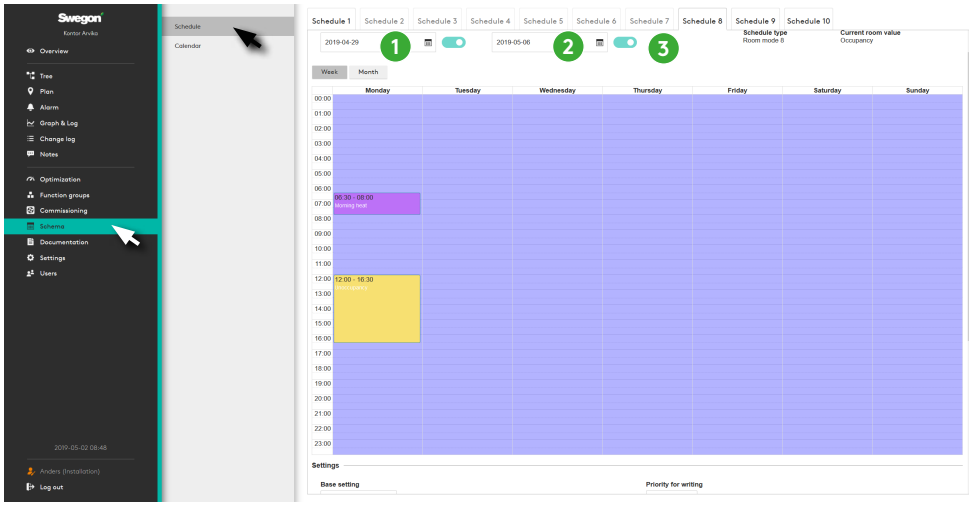
If the BACnet setting “BACnet” is set to “Off”, Schedule will show an empty page with the text:

“BACnet is not enabled. Please enable BACnet in Settings”.

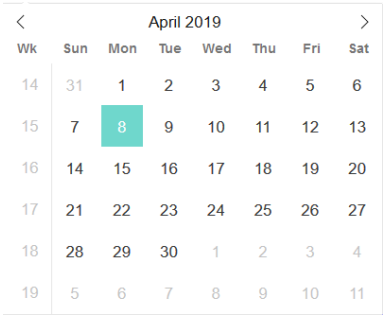
If any other setting on “BACnet” is set, the text: “No schedule enabled. Please activate a schedule” will be shown.

From and to dates

The schedule has a “***From***” and “***To***” date that describes between which dates a schedule should be enabled. This can either be a specific date or can be set to “***Always***”.

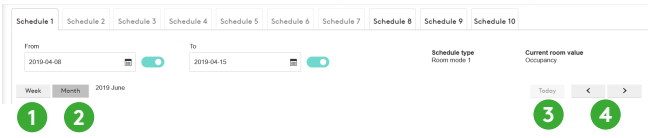


1. From date. Here the user chooses from which date the schedule should start to apply. The base setting is “Always”. This is chosen either by “enabling or disabling” a specific start date.
   Enabling a date and clicking on the date brings up a dialogue where it is possible to select a specific date.
2. To date. Works in the same way as the From date, but shows instead the date the schedule should apply to.
3. Schedule type. Shows the selected type for the schedule.



Week/month

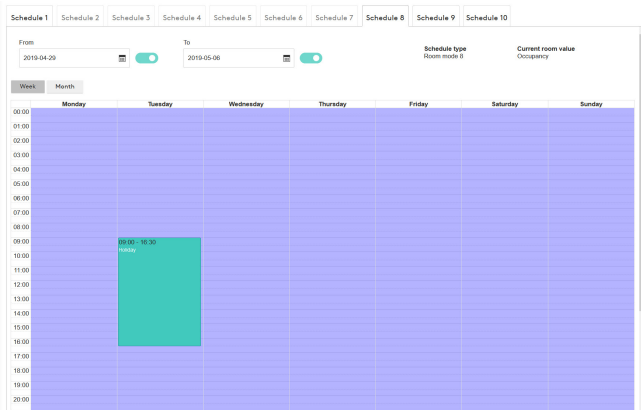
1. Week. This view is the default view when you open a Schedule. Events can only be created under this view.
2. Month. This view is a view where the month is shown instead of weeks. In this view it is not possible to create events, the view is only used to provide the user with an overview of events.
3. Today. A shortcut that takes the user to the current date if you have scrolled forwards or backwards along the time line with the help of the arrows (Item 4).
4. Forwards & backwards. The arrows can be used to scroll forwards or backwards along the time line.



Day schedule

Day schedule allows the user to set events that are to apply at specific times. An event is a start and end time where a specific function is performed by the schedule. The base settings apply at times where there is no event. All events continue for all weeks that the schedule is enabled.

Available functions, so-called day settings, that can be scheduled are: ***Disabled*** (Base settings), ***Holiday***, ***Occupancy***, ***Unoccupancy***, ***Morning heating***, ***Summer night cooling*** and ***Checked in***.

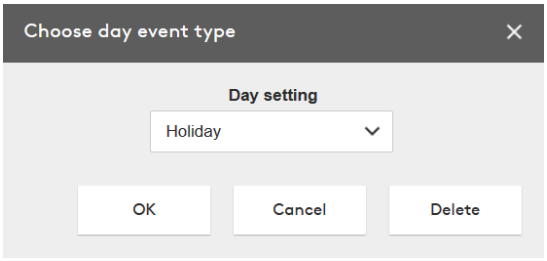


In order to create an event, the user highlights the time on the day you wish to have an event.

After highlighting the time, an empty event is created for this time.

Events can be moved around in week-view by clicking and dragging them to different days and times in the view.

If you wish to extend an event, you can extend the event by clicking and dragging the lower edge of an event. Each day in week view can have 5 events at most.

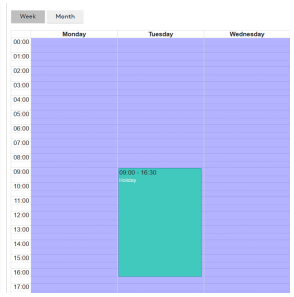


Clicking once on the event in the schedule brings up a dialogue box for this particular event

Here the user can set a Day setting. This setting is specific to the schedule type.

The dialogue box has three buttons.

OK – Sets the function that the day setting is set to as the selected event.



The event now has the function "***Holiday***" and is coloured based on the order in the scroll list. The room mode "***Holiday***" will now apply for this room type on all Tuesdays between 09:00 – 11:00 for those rooms that are linked to this schedule.

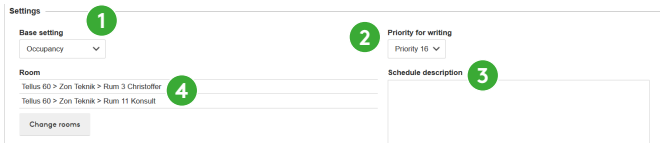
Cancel – Cancels and closes the dialogue box.

Delete – Removes the event you click on.

In order to change a function for an event, you can, in the same way as first time, click on the event and change the function type.

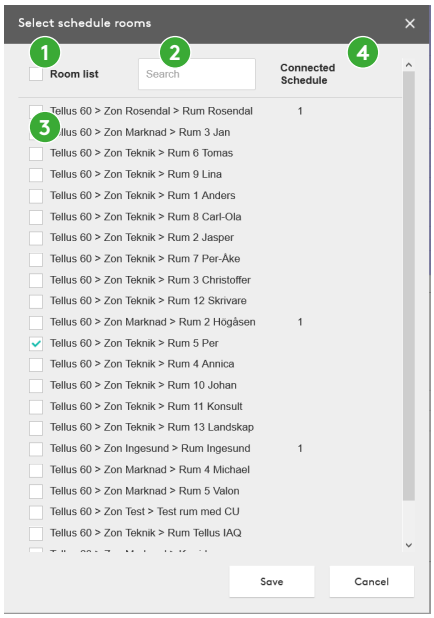
Settings

1. Base setting – The base setting is the setting that applies at all other times that do not have an event, but the schedule is still enabled. This is symbolised in the event view by a lilac background.
2. Priority for writing – The priority of the schedule where 1 is the highest priority and 16 is the lowest priority. The base setting is 16.
3. Schedule description – An optional description of the schedule.
4. Room – Lists the rooms that are linked to the schedule. The "***Change rooms***" button produces a dialogue box where you can add or remove the link between the room and the schedule.



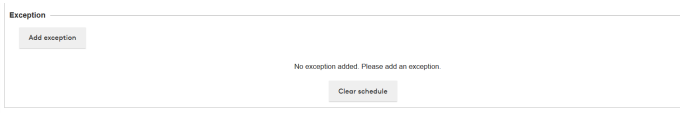
Change rooms

1. Room list – Checking this checkbox highlights all the rooms currently shown in list view.
2. Search – This field is a search field that checks for a matching name in the room list and only shows these.
3. The list shows all rooms at the site. The list can be filtered with the help of the search field and with the Room list checkbox only being checked for the rooms you searched for.
4. Connected schedule – Shows whether a room is linked to a schedule of the same type. This can be overwritten. An error message is then shown in the dialogue that warns for this.

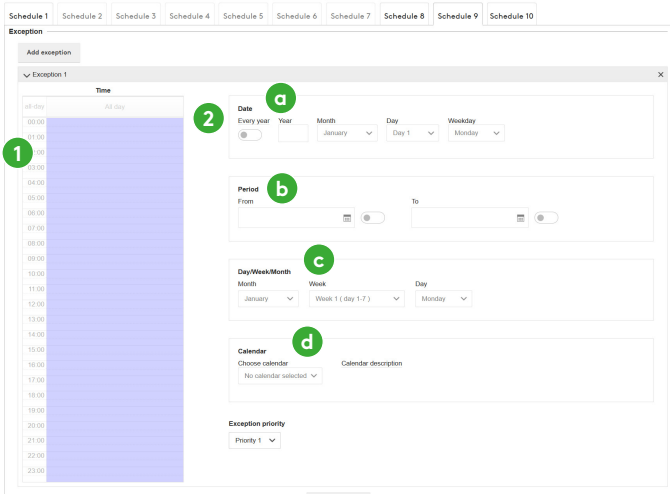


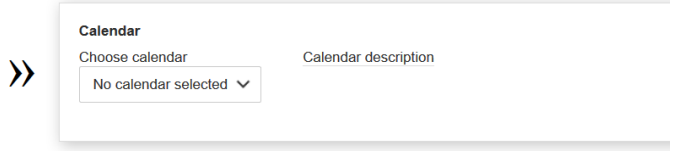
Exception

It is possible to select 10 exceptions from the scroll list. These exceptions permit one or more exception days to be chosen, which overwrite the regular schedule. For example, the room mode "***Holiday***" can be set between 16:00 and 23:00 all Tuesdays. However, on Tuesday April 23 the room mode "***Occupancy***" is required instead as there is to be an event on that evening.



1. Time – Works in the same way as "regular" events for a schedule. In addition, you can check the "***All day***" checkbox. This creates an event that extends over the whole day. Note that the whole box is "dimmed" so that it is not possible to set times in Time view before the user has selected the exception type.
2. Exception type – This is the type of day(s) you wish to use for the exception. This is selected by clicking on one of the checkboxes: Date, Period, Day/Week/Month or Calendar. An exception is not valid until the type has been selected. If you wish to delete an exception click on the cross in the top righthand corner.
   a. Date – A specific date where you set the Year, Month, Day, Weekday. There is also a possibility to select odd, even and all months or weeks.
   b. Period – From and To date for either a specific day or a period of days.
   c. Day/Week/Month – Here you can set specific months/weeks/days
   d. Calendar – A calendar if there is a calendar.



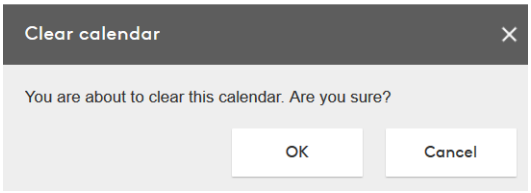


If there is a calendar and it has a description this is shown when you hold the cursor over the calendar.

Clear schedule

This dialogue box appears when you click on the “Clear schedule” button at the bottom of the schedule tab to ensure that the user is sure the current schedule should be deleted.

If the user clicks “OK” all values are cleared from the schedule and the schedule is disabled.



Colour description schedule

Events in schedules are presented in different colours depending on the function of the event. What functions the different colours correspond to are shown below.

Schedule

Room mode

1	Holiday Holiday
1	Occupancy Occupancy
1	Unoccupied Unoccupancy
1	Morning heating Morning heat
1	Summer night cooling Summer night cool
1	Checked in mode Checked in

Boosted air flow

1	Air boost on

Temperature offset

1	0
1	2.0 - 2.9 Celsius
1	3.0 - 3.9 Celsius
1	4.0 - 4.9 Celsius
1	5.0 - 5.9 Celsius
1	6.0 - 6.9 Celsius
1	7.0 - 7.9 Celsius
1	8.0 - 8.9 Celsius
1	9.0 - 9.9 Celsius
1	10 Celsius

Calendar in SuperWISE

The purpose of the calendar is to make it easy if you wish to use the same exception days for several schedules.

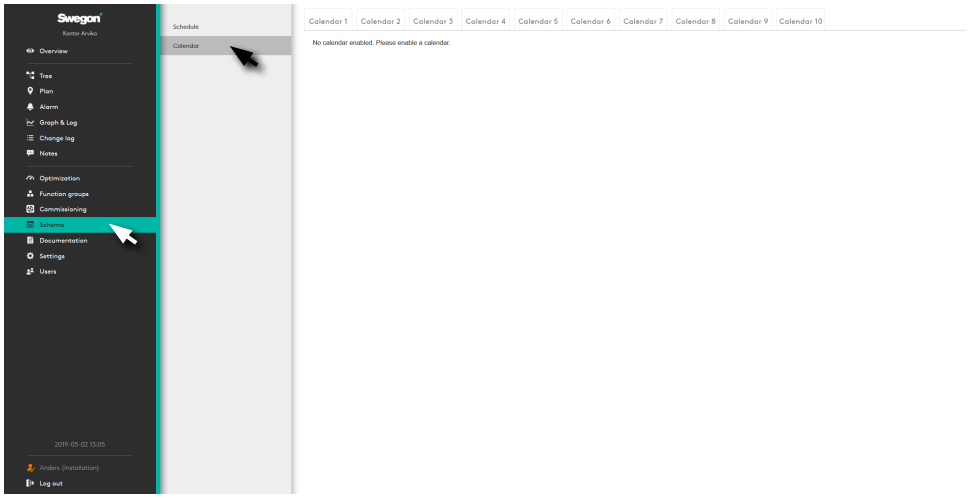
For example, you can create an exception for each holiday during the year. Instead of adding all the days to each schedule separately, you do it once in a calendar, which in turn is then linked to each schedule.

Enabling the calendar

If the BACnet setting “BACnet” is set to “***Off***”, the Calender will show an empty page with the text:

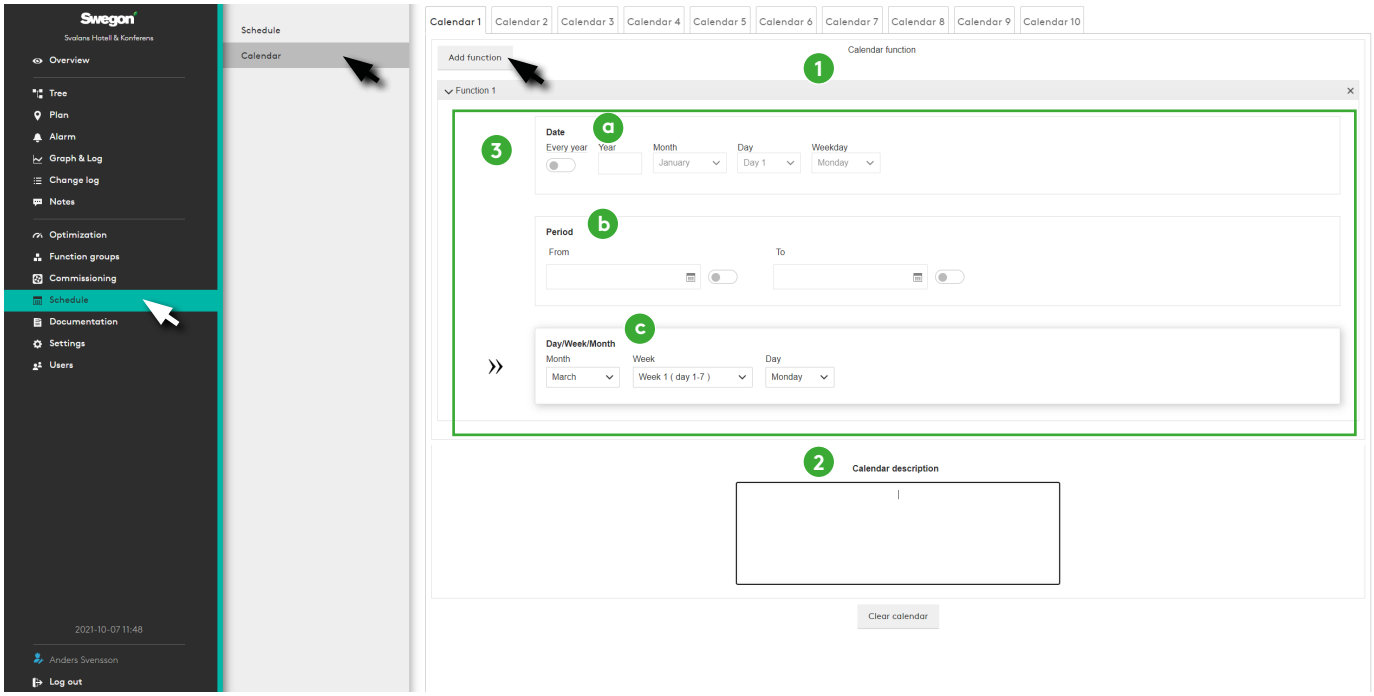
“BACnet is not enabled. Please enable BACnet in Settings”.

If any other setting on “BACnet” is set, this page will be shown.



Calendar

Clicking on one of the tabs displays a page for the calendar.



1. Calendar function – Each calendar can have 10 functions. In order for a calendar to be "enabled" at least one of these 10 needs to be set. Function is described in more detail in item 4.
2. Calendar description – Is a free text area for the user to describe the current calendar.
3. Shows a calendar function – Each function can have a function type. A function type can be a date, a period or a day/week/month.
4. This can be compared with the exception type that is created in a schedule.

This can be compared with the exception type that is created in a schedule.

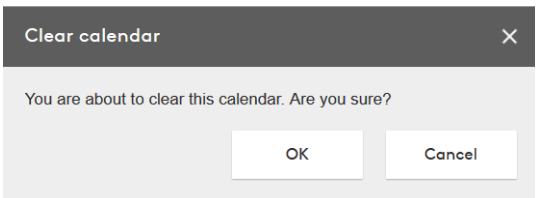
a. Date – Here you can describe only one year. Under this year you can choose a variant of "***Odd***", "***Even***" and "***Every***" month or week as well as a weekday or "***Every***".

b. Period – A period is similar to a schedule so you can choose a specific date or a period between two dates.

c. Day/Week/Month – Here you can choose "***Odd***", "***Even***" or "***Every***" month. Week in month and day in week.

Clear calendar

This dialogue box appears when you click on the "***Clear calendar***" button at the bottom of the calendar tab to ensure that the user is sure the current calendar should be deleted.



Commissioning

The user can set the whole of the system or parts of it in a specific operating mode via the SuperWISE interface Modbus or BACnet. Adjustment is divided into three parts, Commissioning air and Commissioning water and Electrical commissioning.

Selection for adjusting air:

- Unoccupied, min. flow
- Occupancy, min flow
- Max. flow rate
- Holiday, min flow
- Percentage of flow area, occupancy

Selection for adjusting water:

- Cooling
- Heating
- Cooling and Heating

Selections for electrical commissioning:

- Max. heating
- Heating

When Adjusting water, the air flow is set to the product's minimum flow. It is possible to use Adjusting air and Adjusting water simultaneously.

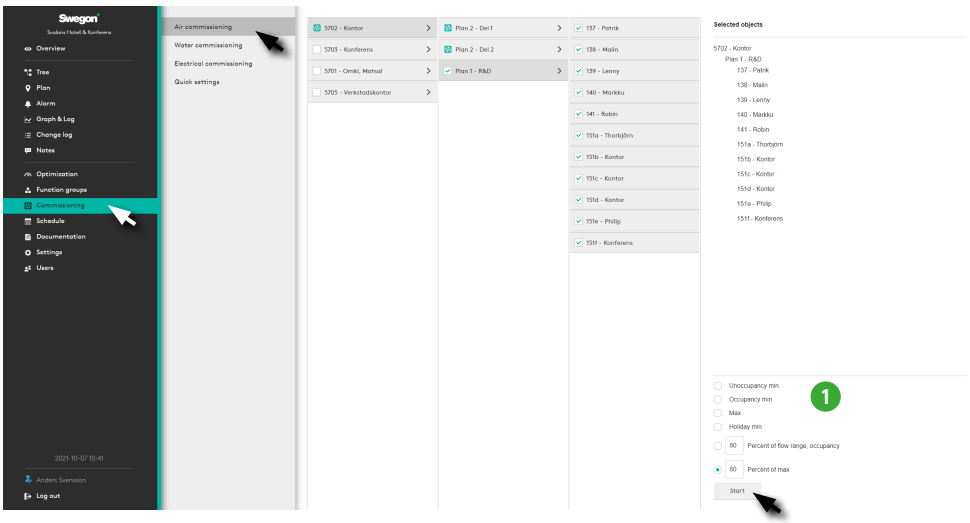
Adjustment is started and stopped on the Adjustment tab in the SuperWISE interface. It's possible to set how long the adjustment should apply. This setting can be made for each room.

See the table in "Operating mode" section.

Adjustment in SuperWISE

Air

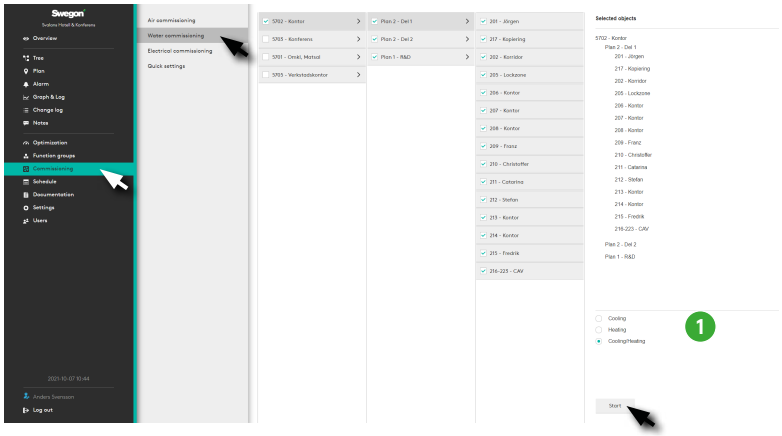
Used to adjust the air flow on a system already running.



Select the required object in the menu, select operating mode (1) – ***"Unoccupancy min. flow", "Occupancy, min. flow", "Maximum flow rate", "Holidays, min. flow", "Percentage of flow range, occupancy"*** or ***"Percentage of maximum flow rate"*** and click on the ***Start*** button. The selected part of the system is activated according to the selection made for control and adjustment. Once you have clicked on the ***Start*** button, the button changes to ***Stop***. Click on the ***Stop*** button after the performed control to return to normal operations.

Water

Used to adjust the water on a system already running.

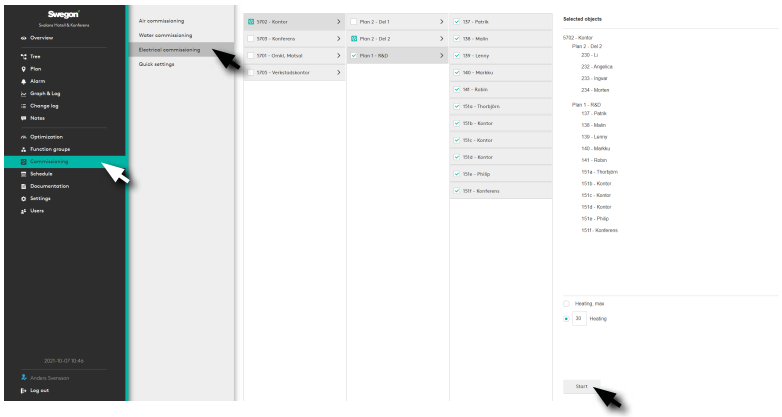


Select the required object in the menu, select operating mode (1) – ***Cooling***, ***Heating***, ***Cooling and Heating*** and click on ***Start***. The selected part of the system is activated according to the selection made for control and adjustment.

Click on the ***Stop*** button after the performed control to return to normal operations.

Electric

Used to adjust the electricity on a system already running.

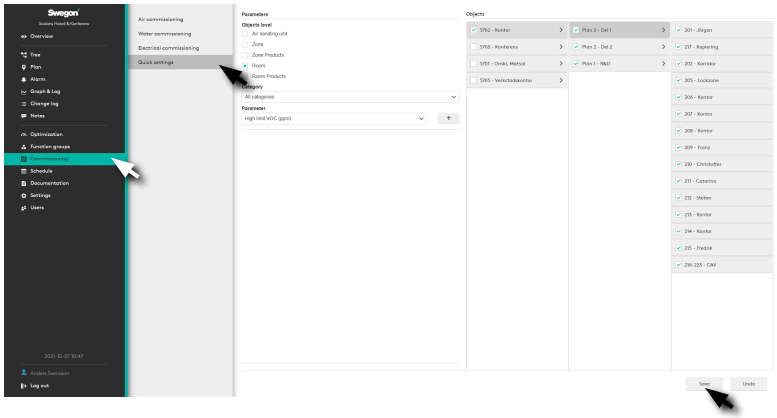


Select the required object in the menu, select operating mode (1) – ***Max, Heating*** or ***Heating*** and click on the ***Start*** button. The selected part of the system is activated according to the selection made for control and adjustment.

Click on the ***Stop*** button after the performed control to return to normal operations.

Quick settings

Used for simplified adjustment of parameters for Air handling units, Zone, Room and Products. Quick settings allow you to adjust the same parameter for large parts of the building at the same time. For example, it is possible to adjust Temperature setpoint for Occupancy in all rooms in the building with just a pair clicks, instead of having to update each room separately.



Select the relevant object level, state the parameter and its desired value. Select the object for the required value and click save. The setting is applied to all selected objects.

Interacting functions with the air handling unit

Room temperature for communication

The aim of this function is to provide a representative temperature for all selected rooms under the air handling unit. The temperature mirrors the current room temperature better than e.g. an individual sensor in the extract air. The function can be used by GOLD or the BMS system to better improve the supply air temperature by knowing the room temperature.

How does room temperature work for communications?

The function calculates a common room temperature for all rooms under an air handling unit. It is possible to select whether a room is to be included in the calculation or not. There are four different methods to calculate the common room temperature:

- Average value
- Lowest
- Highest
- Average value weighted

The difference between Average value and Average value weighted is that Average value weighted uses the room's maximum air flow as the weighting factor.

The function works both with GOLD and other air treatment units.

In order to use another air handling unit than GOLD, the calculated temperature can be retrieved via the external protocol.

For use of GOLD, if the temperature is OK and room temperature for communication is enabled on GOLD, the calculated room temperature will be automatically written to GOLD.

Forwarding of operating information from the air handling unit

The operating information from the air handling unit is communicated to the WISE system, which results in several common benefits. Signals that are transferred are Summer night cooling, Morning heating, Filter calibration and Stop.

When the air handling unit has stopped, SuperWISE blocks all comfort alarms, this function requires the BMS system or GOLD/COMPACT air handling unit to forward the operating status to the WISE system.

If the GOLD or COMPACT air handling unit is linked to the WISE system, all alarms are transferred from the air handling unit to SuperWISE for a complete alarm overview.

Note that GOLD air handling unit must have software version 1.21 or newer installed to be compatible with SuperWISE.

How do the various modes work?

Morning heating

The room adopts this mode after an external signal from the BMS system or from a GOLD air handling unit. There are separate temperature/min. flow settings for the mode. The function of the mode is to heat with warm air from the air handling unit and/or water from waterborne climate products. The air flow is set to maximum and is maintained as long as the temperature is below the cooling setpoint value, i.e. the temperature setpoint value with temperature offset cooling, or until the external signal stops. See the table in the "Operating mode" section. The function is based on the supply air not being below room temperature.

In a room where Morning heating is used for waterborne climate products, it is possible to adjust when heating will be performed with water or air respectively, with the aid of the parameters temperature setpoint value and temperature offset for cooling or heating respectively. The heating setpoint value, i.e. the temperature setpoint value with temperature offset heating, governs the temperature at which heating will be performed with water, and the cooling setpoint value, i.e. the temperature setpoint value with temperature offset cooling, governs the temperature at which heating will be performed with air. This means that higher negative temperature offset heating allows less heating with water, and vice versa.

For example, a temperature setpoint value of 23°C, temperature offset heating of -1°C and temperature offset cooling of 1°C means that when the Morning heating function is activated, the room will be heated with water up to 22°C and thereafter with air until the temperature reaches 24°C or the external signal stops.

Summer night cooling

The room adopts this mode with an external signal from the BMS system or from a GOLD air handling unit. There are separate temperature/min. flow settings for this mode. The function of the mode is to cool with cold air from the air handling unit. The air flow is set to maximum and is maintained as long as the temperature is above the heating setpoint value, or until the external signal stops. See the table in "Operating mode" section.

Filter calibration

Filter calibration is a function used by a connected air handling unit when the air handling unit calibrates the pressure drop across an air filter. During filter calibration the air handling unit delivers a high air flow to give a correct pressure drop reading from the air handling unit filter.

- The WISE system opens all dampers on zone and room levels during the filter calibration cycle.
- Filter calibration is not a separate mode. The rooms continue to be in their ordinary operating mode during filter calibration, but with a fully open damper.
- The alarm is suppressed during filter calibration.

Stop

The room adopts this mode with an external signal from the BMS system or from a GOLD or COMPACT air handling unit. The stop symbol is shown on room level to indicate that the air handling unit is switched off. Alarms as a consequence of the air handling unit being switched off are ignored. All dampers switch to a specific given mode, preset to 50% degree of opening, and stop temporarily to regulate the flow.

Outdoor temperature via communication (GOLD)

The aim of this function is to use one or more outdoor temperature sensors for several air handling units. All GOLD units with the function activated are included in this function. An average outdoor temperature is calculated from all existing outdoor temperature sensors, this temperature is then written to GOLD.

Adjustable unit parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Air handling unit	Air handling unit, authorisation mode	Read and write	None	Read	-	Installation/Installation	Rights for write/read.

Air optimization functions

Why optimize the air handling unit?

The main purpose of the air optimization functions is to reduce energy consumption, but the functions also reduce the risks of experiencing problems with disturbing noise from the ventilation system.

There are different types of optimization:

- Duct pressure optimization
- Supply air temperature optimization

How does pressure optimization of the supply air temperature work?

Optimization reduces/increases the fan speed by analysing the damper positions on the products that lie directly under the air handling unit. There is a configurable flag on each product that indicates whether the product should be included or excluded from the optimization.

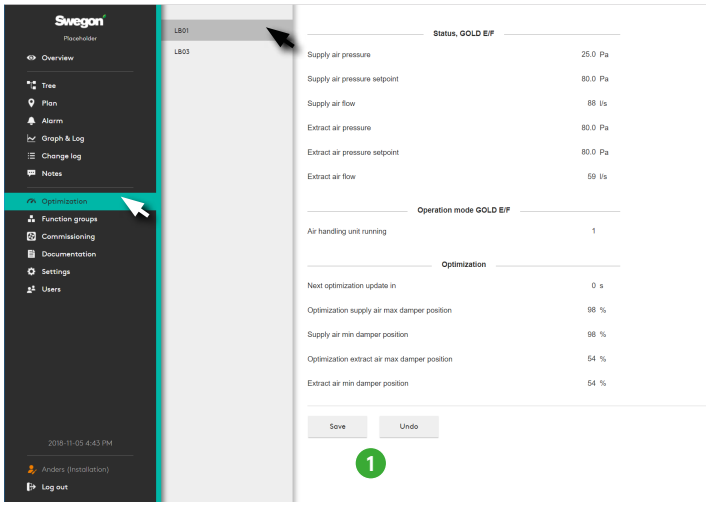
GOLD

SuperWISE has support for communication with the GOLD and COMPACT air handling unit. For other air handling units (referred to as “Generic air handling unit” in the SuperWISE interface), a BMS system is required to read and write the optimization parameters.

The parameters can be found on the “Documentation” tab in the SuperWISE interface where it’s possible to create a list.

Optimization in SuperWISE

Optimization settings for the system’s air handling unit.



Settings to optimize the system’s air handling unit. Select the air handling unit to be optimized.

The function is activated with a slider at the top of the page, which establishes direct contact between the relevant air handling unit and SuperWISE. GOLD version E/F as well as Compact Unit, Top and LP communicate with SuperWISE, other air handling units via Modbus/BACnet.

The ***Reading*** section shows the air handling unit’s current operating information while settings for optimization are found under ***Optimization***.

Any settings are executed by clicking on ***Save***, or ***Undo*** to return to the existing settings (1). Implemented changes are saved in the Change log.

How does pressure optimization of the supply air temperature work?

The supply air temperature from the air handling unit is optimized to reduce the need of heating/cooling in the rooms.

There is a fixed temperature setpoint value, which is used when there is no heating or cooling requirement in the installation. It is possible to set which rooms in the installation are to contribute with their need of optimization.

Interacting functions with the cooling/heating producer

Water optimization functions

Why optimize the cooling/heating producer?

The main purpose of the optimization functions is to reduce energy consumption, but the functions also help to increase comfort, reduce the risk of condensation and make it easier to avoid oversizing.

The following types of optimization are available:

- Optimization of the supply flow temperature

Optimization of the supply flow temperature

Why optimization of the supply flow temperature?

The demand for cooling and heating capacity varies greatly and the maximum design demand occurs only during a very few hours of the year. This allows for energy savings. The COP and EER value for a heat pump or water chiller compare how much capacity these produce, against the power they consume. The higher COP and EER, the more efficient the equipment.

The amount of cooling or heating a liquid chiller or heat pump can produce depends largely on the size of the temperature difference between the hot and cold side. This means that electrical energy can be saved if the liquid chiller produces as warm cooling medium as possible to meet the cooling requirements of the installation. Similarly, you don't want to produce warmer heating media than necessary. As a rule of thumb, for every degree that the temperature of the cooling medium can be raised or the temperature of the heating medium can be lowered, 2-3% of electrical energy is saved.

Another advantage of the system not requesting colder cooling media than needed in the cooling case is that the number of hours when free cooling can be used on the liquid side is increased.

In addition to saving energy, optimizing the supply temperature can lead to improved thermal comfort. When the cooling demand in the room is low, a low supply temperature combined with simple on/off control of the water flow risks leading to impaired thermal comfort due to fluctuating room temperature and draughts.

How does optimization of the supply flow temperature work?

WISE regulates the temperature in each room. If there are waterborne climate products, the valves will be opened or closed according to the cooling or heating needs of the room. The demand for cooling or heating is calculated by a controller that compares the measured temperature with the current temperature setpoint, see section Temperature control.

The controller calculates a degree of opening of each valve. If the valve is far from fully open (degree of opening << 100%), this means that the room would cope with a lower supply temperature in the heating case and a higher supply temperature in the cooling case. Conversely, an opening rate close to 100% indicates that the system is struggling to maintain the correct temperature in the room and needs a lower or higher supply temperature.

The system allows an upper and a lower limit on the opening degree of the valve to be set when the room requests a new water temperature. As long as the room is between these two valve opening settings, the room will not request a new water temperature, even if there is a cooling or heating demand.

Operating case

If a room with cooling demand reaches a room temperature within the limits, the cooling demand will disappear. The room will therefore require a higher water temperature. This increase of the requested water temperature is valid until the room either has a cooling demand or reaches the maximum selected cooling medium temperature in the installation. How quickly the room's required supply temperature changes can be set by adjusting how many steps the optimization should take and how often the supply temperature is to be updated.

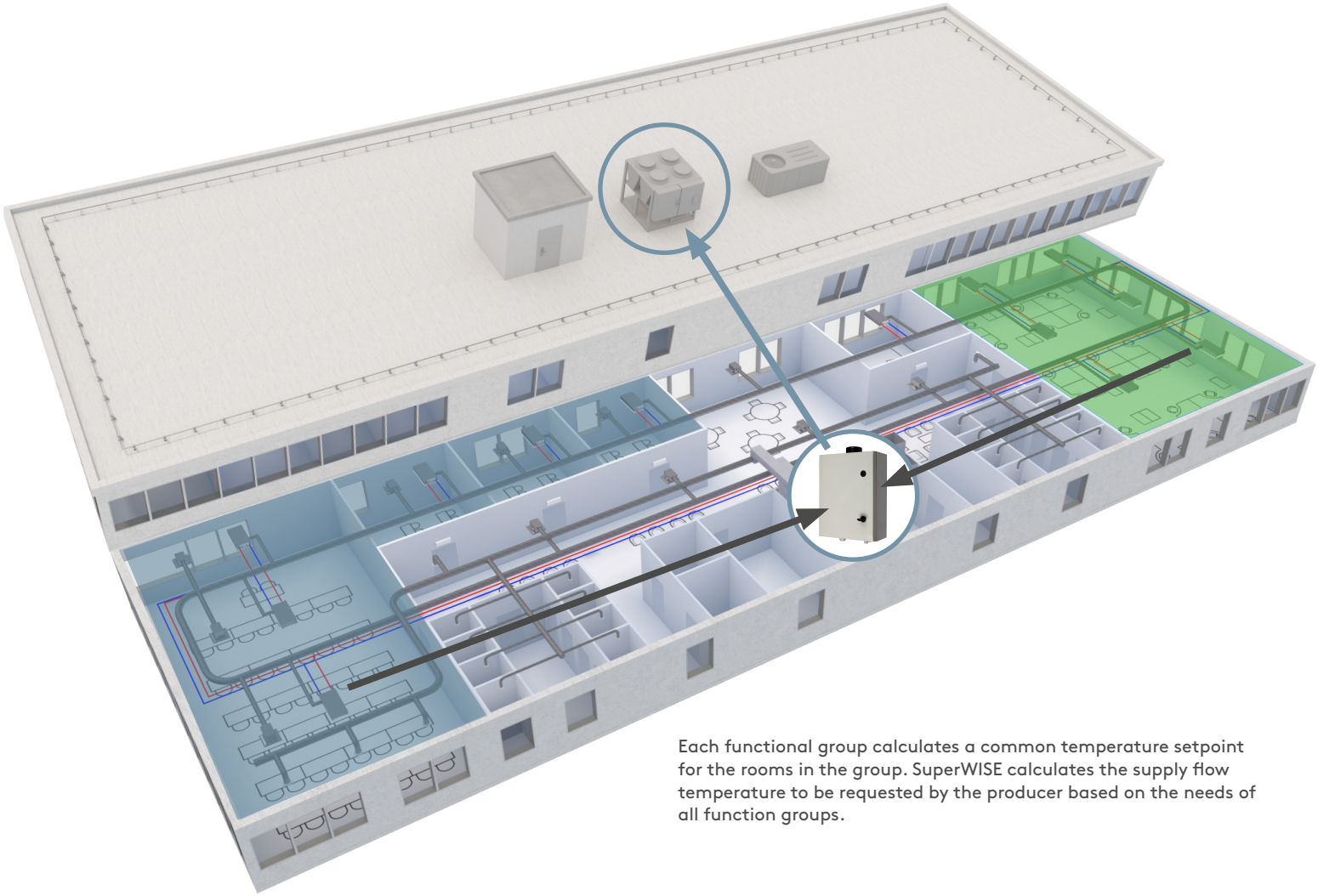
Function group settings

Each room cannot have its own individual supply temperature, but the system compares the needs of the different rooms in a functional group, and then calculates which supply temperature to use as a common setpoint. Each room with waterborne products is connected to a function group for cooling and a function group for heating. SuperWISE optimizes each function group individually by looking at the needs of all the rooms that make up the function group. It's possible to create up to 20 function groups for optimization of the supply temperature, which is done by Swegon technicians.

The calculated demand is connected to one of two circuits for cooling or heating media, A or B. SuperWISE then looks at all the optimization groups connected to the each circuit A or B and lets the function group with the highest demand determine what temperature the system should request from each cooling or heating producer.

The following choices are possible for the function group:

- It is possible to exclude certain rooms from the temperature optimization. These rooms then risk not reaching their temperature setpoint.
- It's possible to choose whether the room with the greatest or lowest need should set each function group's setpoint value or whether it must be the average value of all the rooms in the group. It's also possible to choose a weighted average value of all rooms in the group, where rooms with a higher air flow are weighted more heavily in the average value.
- It's possible to divide an installation into several cooling and heating circuits and create a function group for each circuit. This makes it possible to obtain different optimized supply flow temperatures in different parts of a building. It's then possible to use shunt groups to control the temperature required in each circuit.
- It is possible to set within which ranges the supply flow temperature is allowed to vary.



Each functional group calculates a common temperature setpoint for the rooms in the group. SuperWISE calculates the supply flow temperature to be requested by the producer based on the needs of all function groups.

Communication to the shunt group

The calculated demand for each function group can be read from SuperWISE to be used by a shunt group controller to deliver the most optimal temperature possible to the each function group.

If a shunt group controller from Swegon is used, SuperWISE will send the setpoint for each function group to the appropriate shunt group via Modbus TCP/IP. For this to work, the IP address of each shunt group is linked to the correct function group, which is done by Swegon's technicians. In addition to the temperature setpoint, SuperWISE sends information about possible cooling and heating needs, which allows the shunt group controller to switch off the pump if the function group does not have a need.

If a shunt group controller from another supplier is used, the temperature setpoints calculated by SuperWISE can be made available via Modbus/BACnet to the master system.

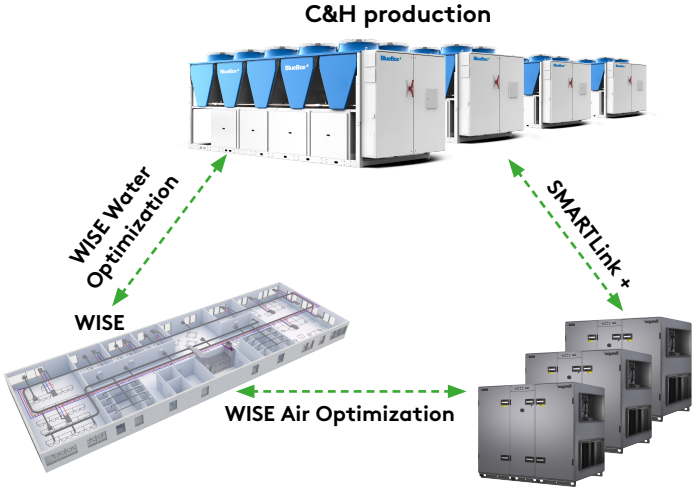
Communication to the cooling/heating producer

The communication between SuperWISE and the cooling/heating producer from BlueBox is performed via ModBus TCP/IP. The communication is activated by Swegon's technicians and then happens automatically.

Combine with SMART Link+

When a BlueBox liquid chiller or heat pump is used in a system together with SuperWISE and the SMART Link+ function, the SuperWISE calculated requirements of cooling media (for circuits A and B) and the calculated requirements of heating media (for circuits A and B) as consumers of cooling or heating are linked in SMART Link+. The liquid chiller/heat pump takes into account all connected heating and/or cooling consumers, e.g. two air handling units and a WISE system, and optimises the production of cooling and/or heating to satisfy the needs of the consumer with the highest demand.

Up to two liquid chillers and two heat pumps can be interconnected in the BlueBox control unit. Multilogic or Hyzer increases the number of producers that can be connected to a total of 32. These in turn can handle up to ten consumers (SuperWISE or air handling units).



Combine water optimization with SMART Link+ for optimal energy performance. Water optimization functions, air optimization functions and SMART Link+ can be used independently or combined.

If a cooling/heating producer from another supplier is used, the temperature setpoints and the need of cooling and/or heating calculated by SuperWISE can be made available via Modbus/BACnet to the master system.

What components are used?

System accessories

Shunt group controller from Swegon

System occupancy

Why use system occupancy?

The system occupancy signal indicates whether the system is in occupancy mode, and is used for communication to the BMS system or air handling unit. System occupancy can be used to automatically communicate with and start the GOLD air handling unit.

How does system occupancy work?

The WISE system knows the total number of rooms. The System occupancy signal is set to 1, if the number of rooms in Occupancy mode reaches or exceeds a configurable number of rooms. Otherwise the signal is 0. Three other parameters are also presented:

- Number of rooms with occupancy detection
- Number of rooms that detect occupancy
- Percentage of rooms in occupancy

Emergency mode

How does emergency mode work?

When an emergency signal is written from the air handling unit or the BMS system, all products follow the configured emergency mode function for each output.

The emergency mode function can be found under each output setting on the product.

Emergency mode actions

- Ignore emergency mode - Same functionality without emergency mode.
- Emergency mode flow - Regulates towards the set air flow setpoint value for emergency mode*.
- Emergency mode pressure - Regulates towards the set pressure setpoint value for emergency mode**.
- 0% - The output/damper is fully closed.
- 100% - Output/damper is fully open.
- Disable - The voltage on the output is disabled. This measure may be suitable in combination with spring return type motor.

* Only flow controlled products.
** Only pressure controlled products.

There is also a possibility to configure whether lighting shall be switched on or switched off in emergency mode, see the Lighting control section.

Adjustable product parameters in SuperWISE

Section	Description	Standard value	Min.	Max.	Unit	Lowest user level (read/write)	Function
Output X, settings	Output X, emergency mode	-	-	-	-	Installation/Installation	Select the mode for the required emergency mode actions. The following modes are available: Ignore emergency mode Emergency mode flow* Emergency mode pressure** 0% 100% Disable

*Only works on flow controlled products.
**Only works on pressure controlled products.

Periodic valve operation

Why periodic valve operation?

In order to ensure that valves do not jam when they are not used for long periods, for example, heating valves during the summer, they are regularly operated.

How does periodic valve operation work?

Periodic valve operation occurs automatically and does not need to be activated manually by the user. Periodic valve operation occurs on all outputs that are configured to control water valves. The sequence is as follows: 0% on outputs for cooling for 3 minutes, then 100% for 3 minutes. The same sequence is then performed on the heating output.

Periodic valve operation starts automatically for the first time in unoccupancy mode every Friday after 00:01, if the room is in occupancy mode, periodic valve operation is carried out regardless of occupancy or unoccupancy on Monday at 00:01.

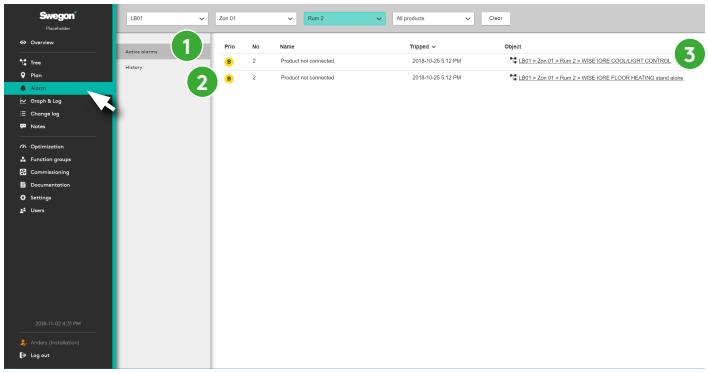
LED operating status

How does LED operating status work?

The product's LED normally shows its operating status. There is a setting to switch off the LED for normal operations if it is perceived as disturbing.

Alarms in SuperWISE

Shows all active and historical alarms and system messages.



The two sections here show active alarms and system message (1) as well as history (2). Both with links to the relevant object (3).

When an active alarm is triggered, there is a possibility to make a setting so that an e-mail is sent to selected users. Seethe Users section.

The system's alarms are categorized in the categories A, B and information.

Alarms in Category A are of such a character that the cause can have a major effect on the WISE system's function and on the indoor climate.

Alarms in Category B are of such a character that may have a long-term or temporarily effect on the function and on the indoor climate.

Alarms in the Category information are of such a character information and the cause are judged to have no or little effect on the function or the indoor climate.

It is possible to make you own category group and change the category of the alarms based on individual wishes or requirements under Settings - Alarms.

Summary alarms can be communicated via Modbus or BACnet, and indicate whether there is any active alarm in category A or B under an air handling unit in the WISE system.

When an active alarm is triggered, an e-mail is sent to all users who have registered their e-mail address and requested notification for the alarm type. The setting is made under Users in SuperWISE, and works for created unique users only. Swegon Connect can be used as a mail server if it is a gateway in its own WISE network. This setting is made under Settings -> Communications -> E-mail.

Generic alarms from third-party products

Why generic alarms from third-party products?

In projects where SuperWISE is the only interface used to monitor the property, it may be desirable to collect all products which can generate alarms under the same interface.

How do generic alarms from third-party products work?

It's possible to read a generic alarm from a third-party product via a digital input signal to WISE IRE. An alarm is generated in the SuperWISE interface when the input signal is active. The alarm will be deactivated when the input signal becomes inactive. The alarm is managed exactly as other alarms from the WISE system, for example, group alarms and communication to the BMS-system.

Notes

Feel good **inside**

Swegon