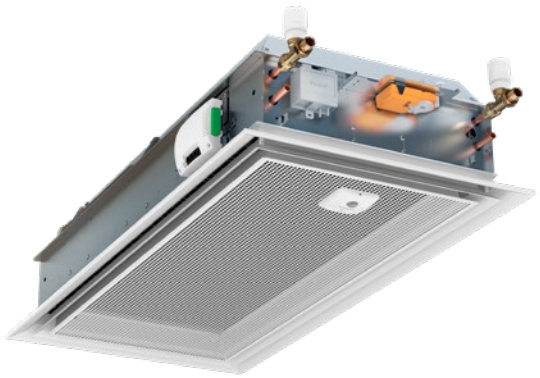
PARASOL Z VAV d

Technical manual

09/01/2023

Content



Swegon

Installation and safety

About this manual

This manual is intended for technicians or those with the equivalent knowledge who work in design, commissioning, maintenance or for some other reason need a more technical description of the product than offered by a product data sheet.

The manual contains information about:

Technical description.

Help during project design

Installation and start-up

Instruction about how the different settings are made

Changing the project

Swegon reserves the right to make changes to both the manual and to the product without prior notice.

Safety Instructions

Responsibility

It is the user's responsibility to:

- Make all relevant risk assessments of the activities that are related with this manual.
- Ensure that all necessary safety precautions have been taken before the activities related with this manual are started.

Function in the room

General

PARASOL Zenith VAV is a four-way blowing comfort module with built-in control equipment for demand-control not only of the air but also the entire indoor climate in the room.

The product can work as a stand-alone unit or connectable to BMS via ModBUS or connected in a system such as Swegon's WISE gen.1.

Function of the product is based on a constant duct pressure being provided either through a zone damper such as CONTROL Zone or in a smaller system with a unit that can maintain the duct pressure sufficiently constant.

In a room where the occupancy rate is low and/or uneven PARASOL Zenith VAV can, in the event being unoccupied, save air through the integrated damper and also allow the temperature to deviate more from the room's setpoint than with occupancy, all to save energy.

On occupancy the integrated control equipment quickly takes care of the indoor climate by opening the damper and the cooling or heating valves so that a comfortable indoor climate with high comfort is maintained - yet still with minimal energy input.

A sensor module with temperature and presence sensors registers what is happening in the room and act at the same time as setpoint selector and alarm indicator.

Functional description air

The product regulates the amount of air to the room according to three levels:

- Unoccupied
- Min. occupancy
- Max. occupancy

For **Unoccupied mode** a low air flow is supplied to save air. When someone enters the room the occupancy is detected by the presence sensor integrated in the sensor module and the air flow is increased to the **Min. occupancy** level.

In addition to an presence sensor there is also a temperature sensor in the sensor module that measures the temperature of the room air. When the temperature exceeds the desired setpoint in the room, the PARASOL Zenith VAV starts to cool, either with air first, or water depending which the chosen sequence selection. When the output demand becomes large enough, or air quality is poor enough, PARASOL Zenith VAV will variably open up to **Max occupancy** air flow.

Functional description water

Different temperature settings can be set for

- Unoccupied
- Occupancy
- Holiday mode, i.e. extended unoccupied mode
- In the case of **unoccupied mode** the temperature can be allowed to deviate more from the room's set-points than for occupancy. When someone enters the room and the sensor module indicates **occupancy** the PARASOL Zenith VAV is set to normal operation mode and then regulates the desired room temperature more accurately. **Holiday mode** works in the same way as unoccupied mode, but here the temperatures are permitted to deviate further from the room's set-point and a signal from a master system is required
- Heating and cooling are controlled in sequence to avoid simultaneous cooling and heating. However, there is a cold draught protection that can be activated and this then means that you allow a certain amount of heat simultaneously with cooling.

Adaptation as required

During a day different things occur that affect the room's climate, and PARASOL Zenith VAV uses both air and water to maintain a good climate:

- Night, no occupancy in the room
- The temperature is permitted to deviate slightly more from the setpoint than for occupancy
- Air flow "unoccupied"

- Morning, no occupancy
- Air flow "unoccupied"
- The temperature is still regulated according to the settings for unoccupied, but if a cooling demand occurs e.g. due to solar incident radiation PARASOL Zenith VAV will start to cool the room.

- Morning, the workday begins and someone enters into the room.
- The sensor module detects occupancy and the air flow rises to the set Min Occupancy flow, which is the minimum air flow in the room when someone is present.
- The temperature is now allowed to deviate less from the setpoint value than in unoccupied mode.

- Different things can happen during the day that change the room's climate, such as increased solar incident radiation or increased sensory pollution loads from occupants.
- PARASOL Zenith VAV can now manage this by opening the water valve in combination with variably regulating the air flow towards the Max Occupancy flow.

Distribution of the air flows

The principle is the same for a conference room or a landscape office.

When several PARASOL Zenith VAVs need to cooperate in a room the air flow is evenly distributed between them.

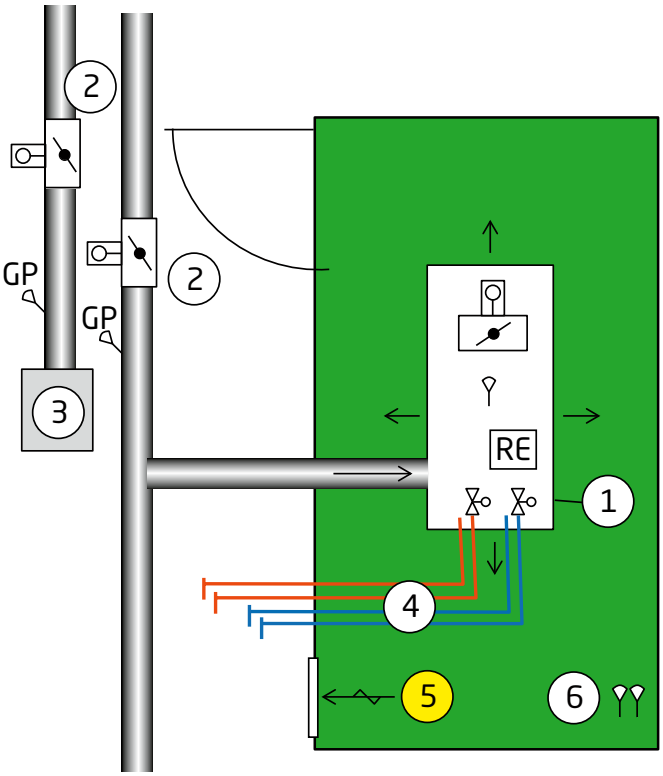
One product is then defined as the master while the others become slaves.

If the room is large and there is a great distance between products, it may be an alternative to allow all the units to be Masters, i.e. all are regulated independently of each other. Different parts of the room can then have different climates, which may be the intention, but you also risk supplying the room as a whole with both cooling and heating simultaneously.

Master and Slave(s) share the room's supply air flow proportionally. Proportionally as two different PARASOL Zenith VAVs, e.g. 600 and 1200 can have different maximum flows.

Example: If a 600 gives a maximum of 25 l/s and a 1200 max 40 l/s and the room's total supply air flow at one time is 30 l/s, the 600 will give approx. 12 l/s and the 1200 about 18 l/s. Had both been identical they would have given 15 l/s each.

The extract air constantly receives a signal from the master, a signal voltage of 2-8 V, which is converted from the master's flow.



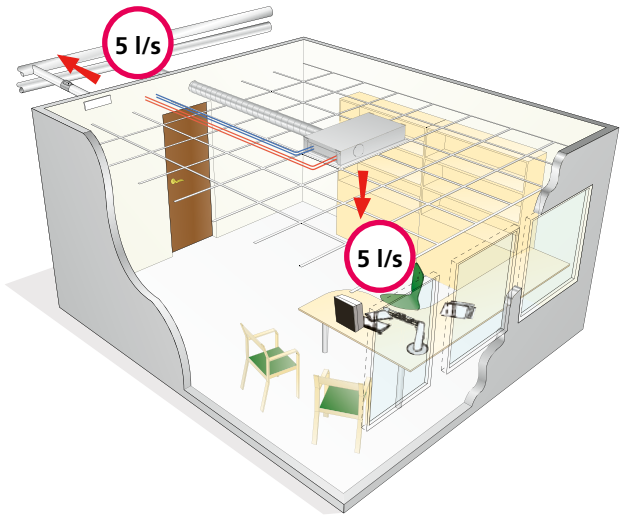
PARASOL Zenith VAV works perfectly as a standalone unit, i.e. without a connection to the master system. The simplest solution on offer is that shown in the picture, a room with PARASOL Zenith VAV and extract air via the air transfer unit. Air balancing occurs on a zone level and PARASOL Zenith VAV demand-controls the climate in the room.

1. Comfort module PARASOL Zenith VAV with supply air, cooling and heating Incl.
   - pressure sensor
   - communications unit/regulator
   - damper with motor.
2. Zone damper CONTROL Zone
3. Extract air diffuser
4. Cooling water and heating water
5. Extract air via transfer air to the corridor
6. External Sensor module (occupancy and temperature sensors)

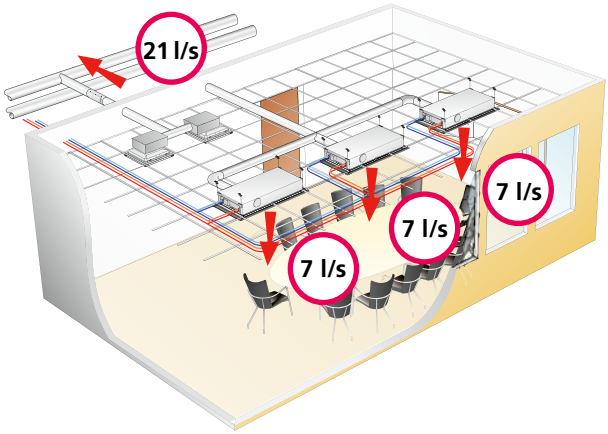
Since heating is provided from PARASOL Zenith VAV in the case above, the sensor module is positioned on the wall.

Distribution of the air flows

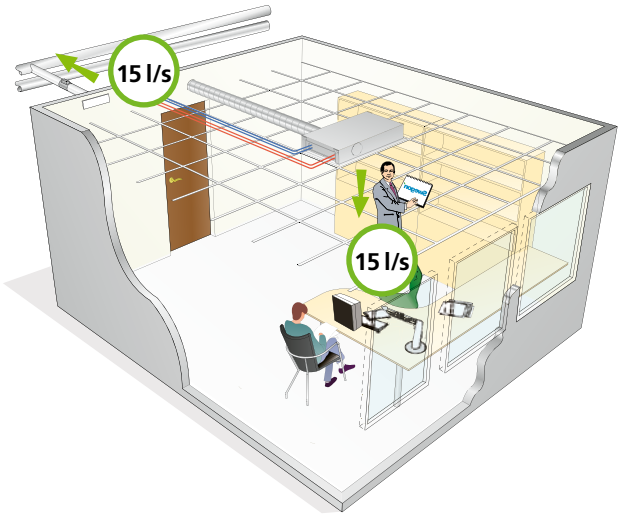
Office - Unoccupied



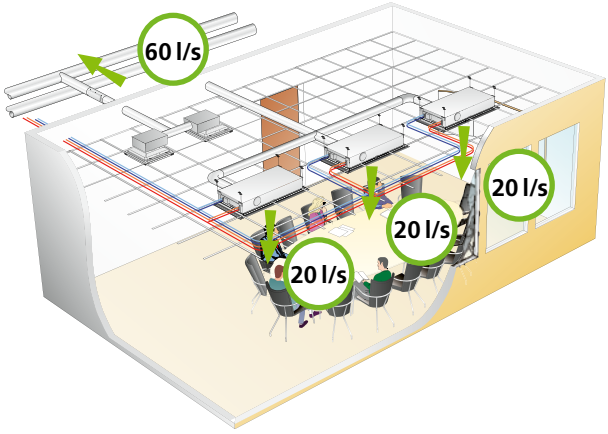
Conference room - Unoccupied



Office - Min. Occupancy

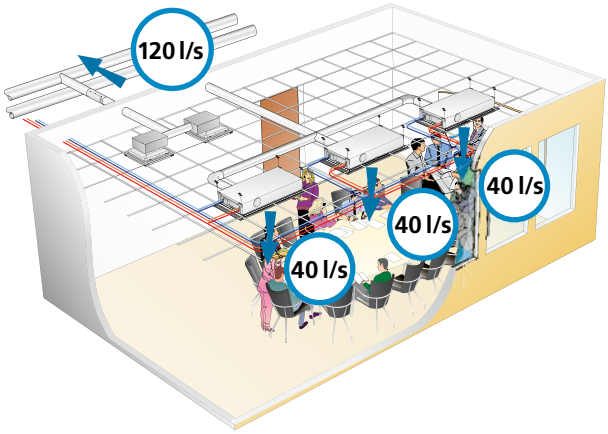


Conference room - Min. Occupancy



Office - Max. Occupancy

Conference room - Max. Occupancy

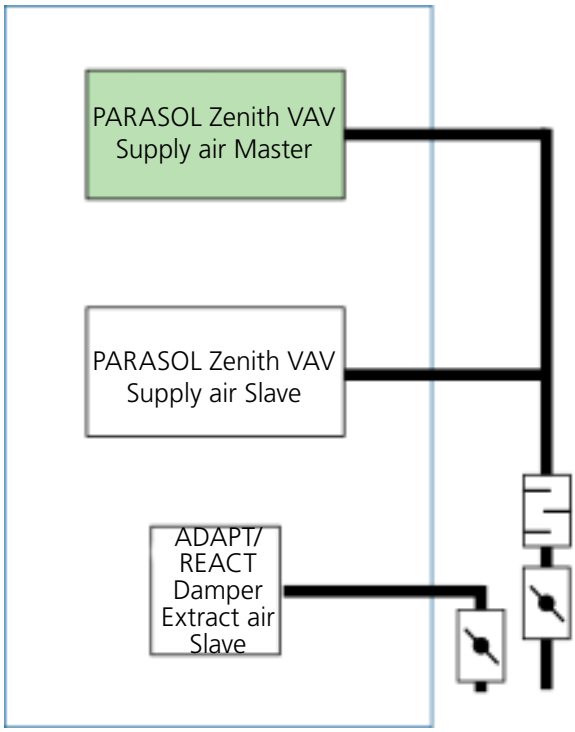


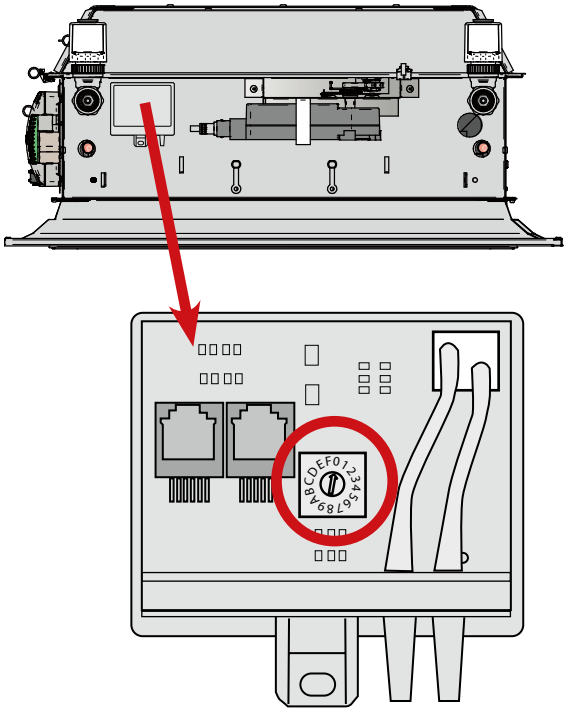
Configuration and settings

The following pages show a room with PARASOL Zenith VAV Master, PARASOL Zenith VAV Slave and ADAPT Damper slave/extract air and the settings you should remember to set on each unit to get the room to perform as intended.

Master: All settings for the room; temperature, air flow etc. are made here.

- Output no. 19 is set to "ADAPT analogue extract air" to send the control signal to the extract air damper.
- Modbus address 4, 8, 12 etc. as per SuperWISE std.
- Pressure sensors and sensor module are addressed 0 with the dial.
- K-factor of master products





SWICCT

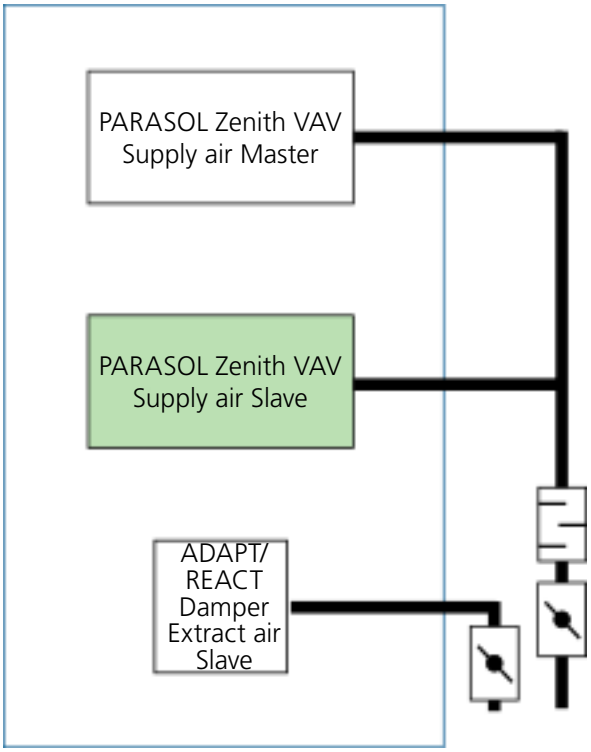
Airflow settings		
K-factor min flow	0	k*100
K-factor max flow	416	k*100
Zero cal. pressure sensor		
Airflow setpoint UNOCC.	50	l/s *10
Airflow setpoint OCC.	40	l/s *10
Airflow setpoint MAX	200	l/s *10
Airflow setpoint HOLIDAY	320	l/s *10
Min cooling Pressure	200	dpa
ADAPT EA analog min	200	l/s *10
ADAPT analog max	400	l/s *10
ADAPT EA offset	0	%* 100

K-factor of current product

Total air flow for the room

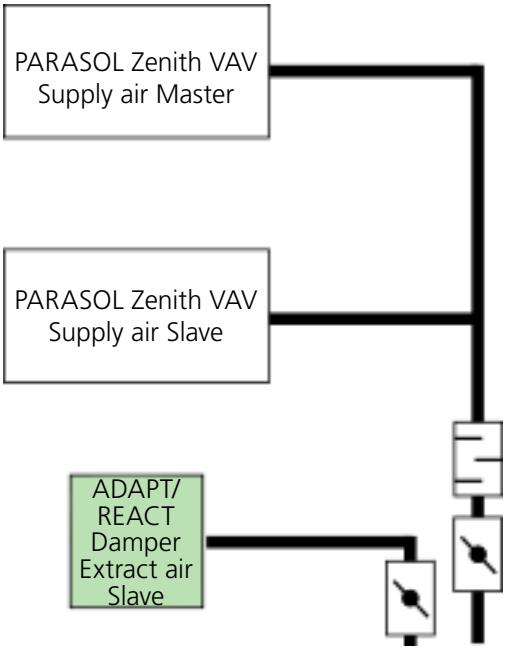
Working range for the extract air damper

Configuration and settings



Slave:

- Output no. 13 is set to "ADAPT slave supply air" to slave control the damper signal from the master.
- The Modbus ID is set between 1-9, not connection to SuperWISE.
- Addressing of the pressure sensors via the dial should always follow the slave unit's Modbus ID 1-9. Addressing of the sensor module
  ideally follows the same pattern, but is not required. Crucially, two sensor modules must not have the same address if they are connected on the same circuit as in this case with master/slave in the room.
  The regulator on the slave unit serves in this case as the connection point, all intelligence is used in the master unit.
  However, if the room in the future is fitted with a partition, the unit can be easily reconfigured as the master in its room.
  The sensor module connected to the slave unit reports occupancy and temperature to the master.
- K-factor for the PARASOL Zenith VAV slave must be fed into its regulator



Extract air:
Set to extract air, Temp Sensor Use = 1 med TUNE Adapt/ SuperWISE

Must be "slave" (Application type = 3), changed as necessary with the help TUNE Adapt/SuperWISE

Modbus address 5, 6, 7, 9, 10, 11, etc. as per SuperWISE std.

The damper is delivered in commissioning mode = fully open, must be set in "normal"/commissioning = "inactive".

The right size of damper for the extract air is selected using the product sheet for ADAPT Damper.

All dampers have default settings for unoccupied, min. occupancy and max. occupancy. These values (or new if they have been changed) must be specified in the software settings for PARASOL Zenith VAV master in the room, see the description of Master on page 8 and extract air page 10.

Configuration and settings

Continued, extract air

Example:

Assume that the room shown with PARASOL Zenith VAV master + slave + ADAPT Damper extract air slave must have the flows

Unoccupied = 12 l/s

Min. occupancy = 25 l/s

Max. occupancy = 60 l/s

By stating the extract air damper's Min. and Max. flow rate in the PARASOL Zenith VAV master (via SWICCT or SuperWISE) this knows what 2 V and 8 V represent for flows on the extract air damper.

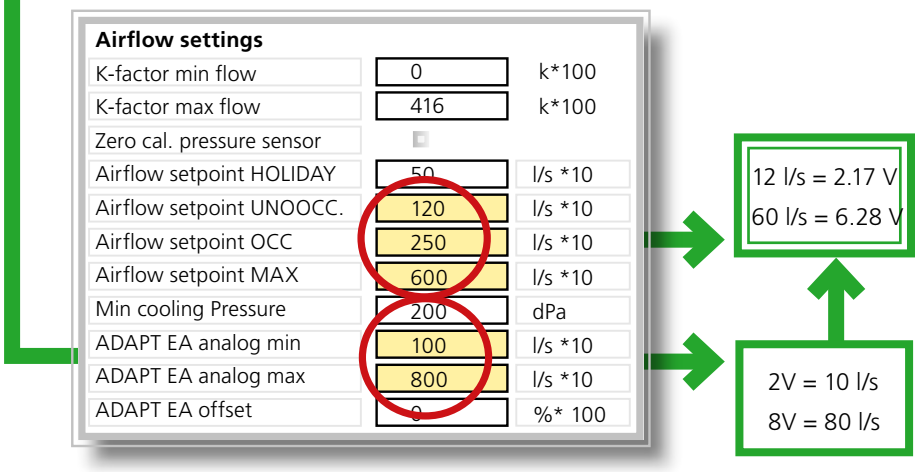
The master then converts the inputted room flows (12/60) to an analogue signal between 2-8 V which then slave control the extract air damper. The damper can by means of its flow measurement report back the flow.

ADAPT Damper product sheet:

Standard settings for default products

Air flows (l/s)	Unoccupied*	Min. air flow	Max. air flow
Size 125	0/4	8	35
Size 160	0/6	10	80
Size 200	0/10	15	125

SWICCT, input i PARASOL Zenith VAV master:



Note that the extract air damper's work range must be equal or greater than the room flow.

If the extract air flow must be shared by the two ADAPT Dampers, these must be of the same size and it is the total flow of the two dampers that should entered in the PARASOL Zenith VAV master regulator.

In the above the settings are described based on the ADAPT Damper's default values being used. **These values can be changed as usual with TUNE Adapt or SuperWISE, and then it is these new values that are to be entered in PARASOL Zenith VAV master.**

Sequences

Sequence selection, cooling with Air or Water first.

It is possible to prioritise cooling with water first or air first.

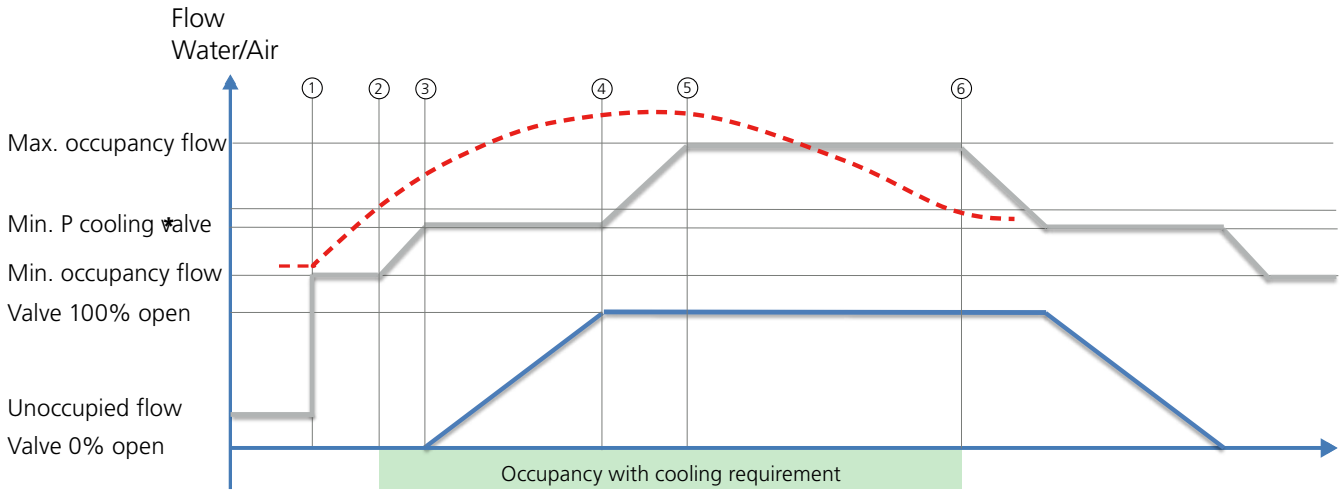
For the sequence selection water/air it applies that the cooling valve is not permitted to open before a given nozzle pressure is reached, this is to ensure that no cold air drops down into the occupancy zone.

The sequence selections are parameter selections in software, i.e. it is the same physical product being delivered from the factory.

The principle is the same irrespective of whether you have one product in the room or several Master/Slaves connected.

Sequence selections are described in the following graphs.

PARASOL Zenith VAV - Sequence Water/Air



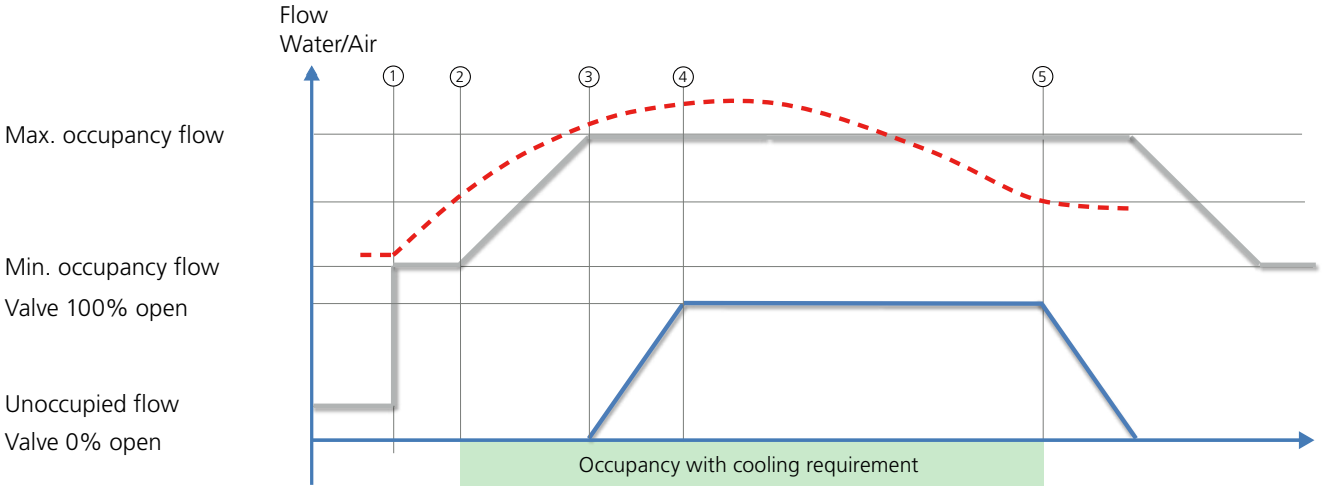
1. Occupancy - temperature rises
2. Room temperature reaches the level for the cooling demand - air opens to reach the minimum pressure that permits the cooling valve to open
3. The cooling valve is permitted to open
4. Cooling valve fully open, but there is still a cooling demand in the room - air damper opens to cool with more air
5. Cooling valve and air damper fully open
6. Temperature reaches the room's setpoint, damper and valve starts to close

Water
Air
Room temperature

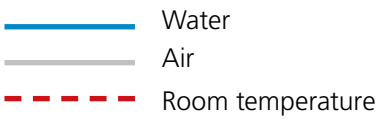
* Min P (Min cooling pressure): minimum permitted nozzle pressure to allow the cooling valve to open, this is to prevent cold draughts when the cold water circulates in the coil. In the event of a too low nozzle pressure and low temperature there is a risk the air drops too early from the ceiling.
20 Pa default but can be changed.

Sequences

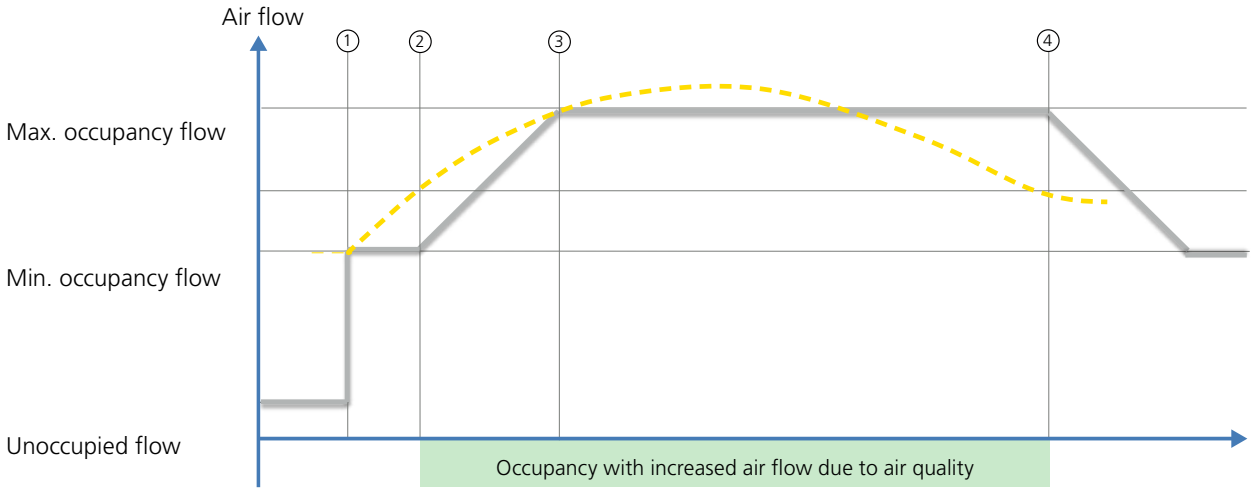
PARASOL Zenith VAV - Sequence Air / Water



1. Occupancy - temperature rises
2. Room temperature reaches the level for cooling demand - air opens
3. Air damper fully open, but there is still a cooling demand in the room - valve opens for cooling with water
4. Air damper and water valve fully open
5. Temperature reaches the room's setpoint, damper and valve starts to close



PARASOL Zenith VAV - Sequence Air quality



1. Occupancy – CO_2 / VOC content rises
2. CO_2 / VOC content reaches the permitted upper limit value - air damper opens variably
3. Air damper fully open
4. CO_2 / VOC content reaches the permitted lower limit value - air damper closes

Technical description

Sensor module overview

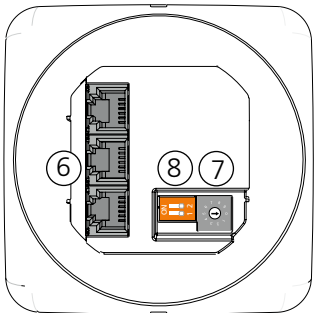
- Temperature and occupancy sensor
- Setpoint selector switch
- Installation on a wall or on the face plate
- Circular or rectangular
- Alarm indication
- Open/close the product's dampers and valves for e.g. function control/commissioning.
- Modbus connected
- Alternative connection point for the connection of a PC for software configuration

Sensor module occupancy

- Occupancy detector of the IR type, i.e. a heat-detecting sensor that quickly reacts to occupancy in the room
- Coverage area depending on the placement in the room, see figure.
- On and off delay adjustable via SWICCT default is 10 s, and 10 minutes respectively
- Several sensor modules can be used in the room, for example, in a conference room if you want the setpoint selector switch on the wall but the presence sensor on the ceiling.

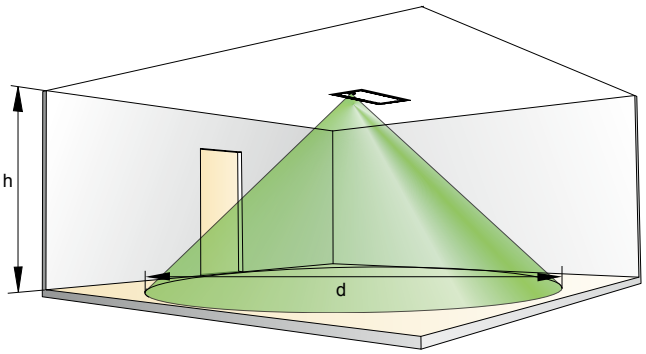
Sensor module front

Sensor module rear



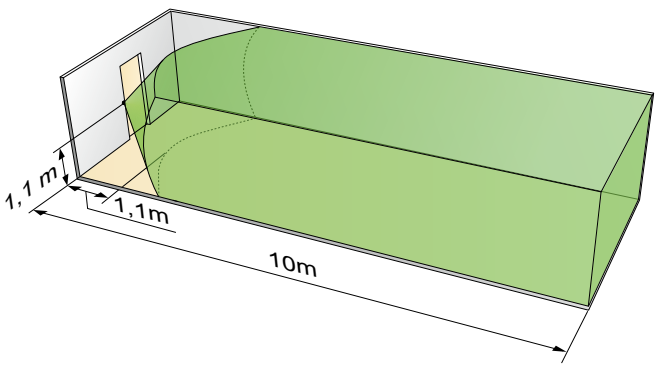
1. Presence sensor / IR sensor
2. LEDs for temperature, adjustment or alarm indication
3. Function keys
4. LED indicating function
   Green = OK
   Flashing green = Condensation alarm
   Yellow = alarm
   Green/yellow = Comfort alarm (not acute)
5. Temperature sensor
6. 3 parallel RJ12 ports (Modbus) for connections e.g. regulator, additional sensor module or PC.
7. Addressing the sensor module. A maximum of 10 sensor
   modules (possibly slaves included) can be connected to each master regulator. Each one must then have its own address 0-9.
8. Switch for termination resistance. Switch 1 is set to On on the last device in a circuit.

Ceiling mounted



h (m)	d (m)	A (m²)
2.5	5.2	21
2.7	5.6	24
2.9	6.0	28
3.1	6.4	32

Wall mounted



Sensor module temperature

Temperature settings

Room temperature sensor use

Mean value of sensor module (s)

- Mean value of sensor module (s)
- Sensor module id 0
- External temperature sensor
- Mean value of sensor module(s) and ext.temp.sens.

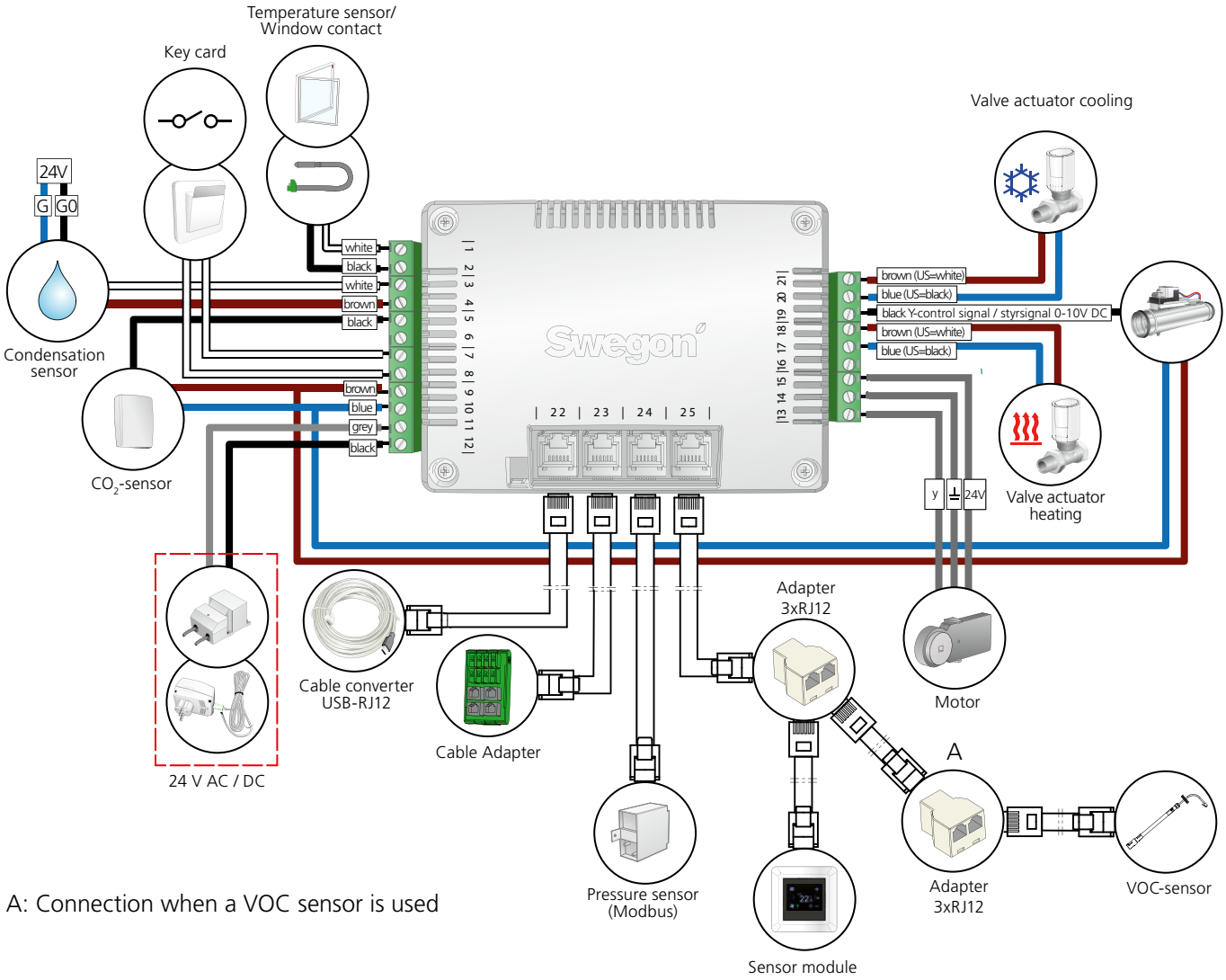
In SWICCT it is possible to state how you wish to measure the temperature in the room:

- **Mean value of sensor modules:** In cases where multiple sensor modules are connected to the master, for example, when using slave units as on page 24, the mean value of all sensor modules can then be used for temperature control in the room.
- **Sensor module id 0:** the selection means that only one sensor module (the one with id 0, master unit) is used for temperature control.
- **External temperature sensor:** here you state that an external temperature sensor is used, and regulation occurs only according to this sensor.
- **Mean value of sensor modules and ext. Temp. Sens:** signifies that the mean value of both sensor modules and external temperature sensors is used for temperature control.

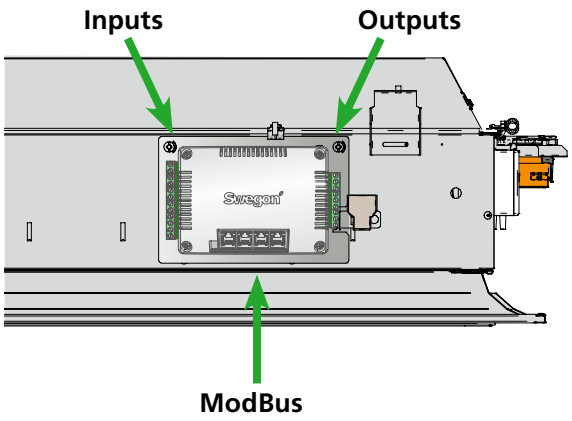
- The temperature in the room is set by pressing the function buttons (A)=cooling / (B)=heating.
- Both cooling and heating setpoints move, which means that the previously created neutral zone is maintained.
- For example, Cooling Setpoint = 24°C (call for cooling when the room temperature exceeds 24°C) Heating Setpoint 22°C (Start heating when the room temperature is below 22°C).
- Press the sensor module twice to make it warmer means the set values shift 2°C to 24 and 26°C respectively.
- If the desired temperature is not reached after a specific time a comfort alarm is generated, which is indicated by the alarm LED switching between yellow/ green.
- Ideally the sensor module can be mounted on a wall where it can be assumed that the room's setpoint needs to be changed often. Normally this need arises only in rooms used by different people with different needs.
- Wall mounting is also recommended when you heat with PARASOL Zenith VAV, usually this gives a fairer measurement of the room temperature.

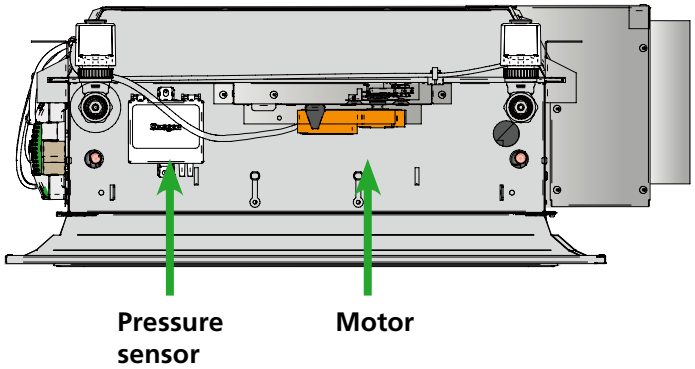
Wiring diagram

Wiring diagram for accessories



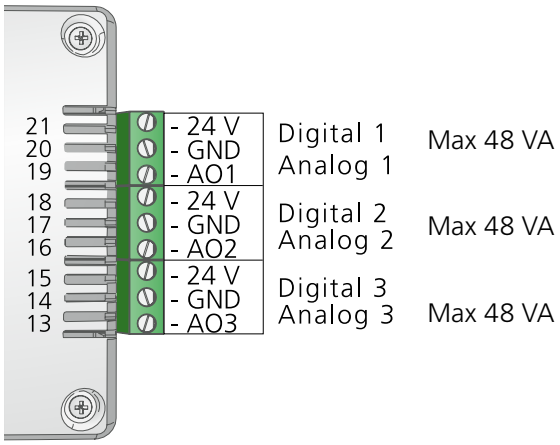
A: Connection when a VOC sensor is used





Regulator outputs

The outputs on the regulator



Outputs' standard settings

Output configuration

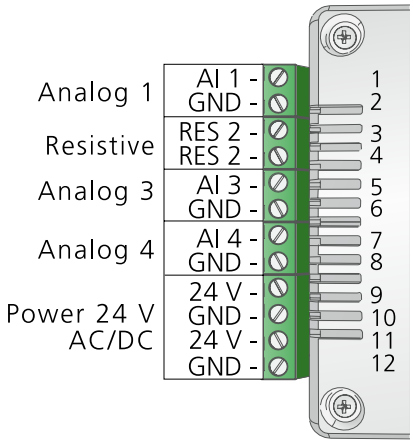
Digital output 1 (21)	Water cooling ▼	Normally closed ▼
Analog output 1 (19)	Not used ▼	Normally closed ▼
Digital output 2 (18)	Water heating ▼	Normally closed ▼
Analog output 2 (16)	Not used ▼	Normally closed ▼
Digital output 3 (15)	Power supply ▼	Normally closed ▼
Analog output 3 (13)	Variable ▼	Normally closed ▼

The outputs can be switched with SWICCT for alternative functions, for example, the use of a 0-10 V actuator for cooling/heating instead of 24V

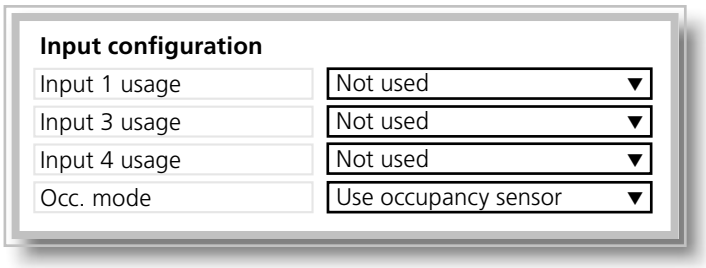
Digital output 1,2,3 (21,18,15)		**Description**
→	Not used	No signal on the output
→	Power supply	24V constant supply out from the output
→	Water cooling	24V when there is a cooling signal
→	Water heating	24V when there is a heating signal
→	Water change over 2 pipe	24V for cooling/heating demand
→	Water cooling primary sequence	Cooling sequence 0-50% 24V
→	Water cooling secondary sequence	Cooling sequence 50-100% 24V
→	Water heating primary sequence	Heating sequence 0-50% 24V
→	Water heating secondary sequence	Heating sequence 50-100% 24V
→	Light Control	Lighting output on/off signal
Analog output 1,2,3 (19,16,13)		**Description**
→	Not used	No signal on the output
→	Water cooling	0-10V for a cooling demand
→	Water heating	0-10V for a heating demand
→	Water change over 2 pipe	0-10V for cooling/heating demand
→	Water change over 4 pipe	For 6-way valve, 0-5V=cooling, 5-10V=heating
→	Water cooling primary sequence	Cooling sequence 0-50% 0-10V
→	Water cooling secondary sequence	Cooling sequence 50-100% 0-10V
→	Water heating primary sequence	Heating sequence 0-50% 0-10V
→	Water heating secondary sequence	Heating sequence 50-100% 0-10V
→	ECOPulse	Control signal for integrated damper at 3 different operating modes
→	2step	Control signal for integrated damper at 3 different operating modes
→	Variable	Control signal for integrated damper at 3 different operating modes
→	ADAPT analog extract air	Calculated 0-10V signal for extract air (ADAPT Damper)
→	ADAPT slave supply air	PARASOL Zenith VAV slave (control signal to internal damper)
→	Light Control	Lighting output control signal

Regulator inputs

The inputs on the regulator



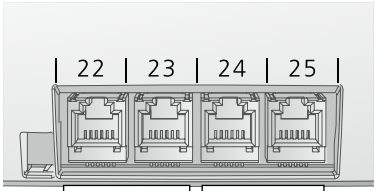
Inputs' standard settings



The inputs can be switched with SWICCT for alternative functions, for example, the use of keycard switches and window contacts

Input 1 usage		**Description**
→	Not used	Not used
→	Room Temperature	External temperature sensor is used
→	Change over temperature	Ext. Temp sensor for change-over is used
→	Temperature (read only)	Only temp. reading, no regulation
→	Window contact NO	Window contact normally open
→	Window contact NC	Window contact normally closed
Input 3 usage		
→	Not used	Not used
→	CO2 0-10V	CO2 sensor with 0-10 V control range
→	CO2 2-10V	CO2 sensor with 2-10 V control range
Input 4 usage		
→	Not used	Not used
→	Keycard switch NO	Keycard switch normally open
→	Keycard switch NC	Keycard switch normally closed
→	Window contact NO	Window contact normally open
→	Window contact NC	Window contact normally closed
→	Change-over contact NO	Change-over contact normally open
→	Change-over contact NC	Change-over contact normally closed
Occ mode		
	Use occupancy sensor	Detect occupancy/no occupany
	Always occupied	Force to occupancy mode
	Always unoccupied	Force on in unoccupied mode

Regulator's Modbus connections



RS 485 MB 1	RS 485 MB 2
SuperWISE bus **BMS bus**	**Sensor module** **Pressure sensor** **Slave controller**

The master circuit (22, 23) is used for communication between PARASOL Zenith VAV master units and communication from the master unit up to the superordinate system, for example, SuperWISE.

The slave circuit (24, 25) is used for communication between slave units PARASOL Zenith VAV and to connect the sensor module, pressure sensor, VOC sensor, etc.

Note that 22 and 23 are parallel (same function), and 24 and 25 are parallel. Important to distinguish between the pairs 22/23 and 24/25.

The order of the connected units on each circuit is not important, however it is more important to avoid so-called Stubs and build just one circuit instead.

4x RS485, modular RJ12 6/6

22 & 23 parallel, master circuit

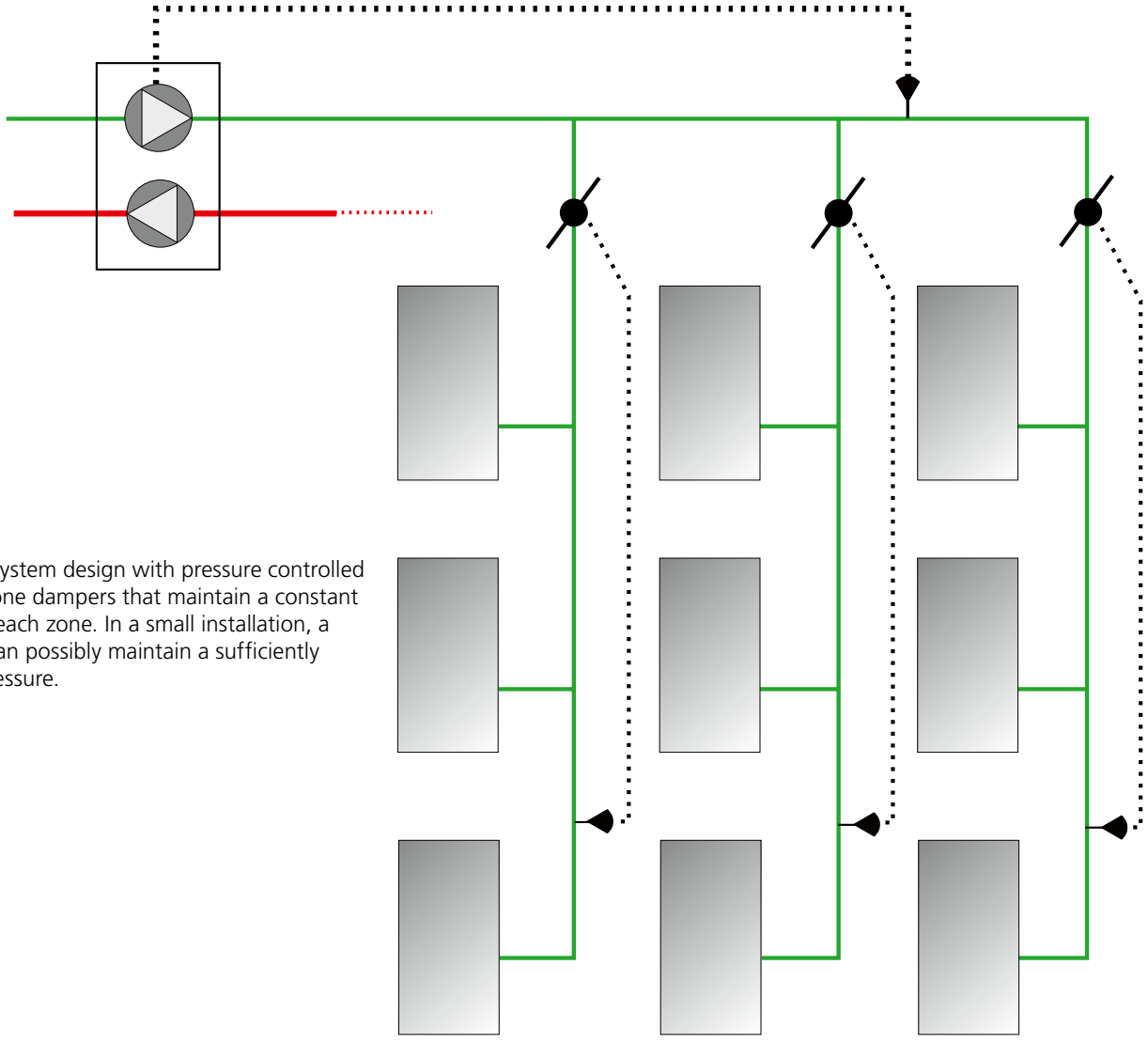
24 & 25 parallel, slave circuit

Systems Engineeering

Duct system

Remember:

- PARASOL Zenith VAV measures the pressure in each unit and can therefore manage the occupancy flow in a good way as long as there is sufficient duct pressure available, see figure
- The built-in damper generates very little noise compared with traditional commissioning damper and in many cases a sound attenuator in the room can therefore be excluded. However, beware of other sounds such as crosstalk and noise from e.g. zone dampers further back in the system.
- By selecting the unoccupied flow and maximum occupancy flow in a smart way in the software you also compensate for the duct pressure drop and control measurement is easier, see page 20-21.
- The software manages the flows, but beware of the noise and effects, see page 20-21.
- However, traditional commissioning dampers may be required for duct lengths and duct pressure drop outside the recommended ranges. This is easily checked by using IC Design by entering the actual duct pressure on the actual product.



Traditional system design with pressure controlled units and zone dampers that maintain a constant pressure in each zone. In a small installation, a good unit can possibly maintain a sufficiently constant pressure.

Duct system

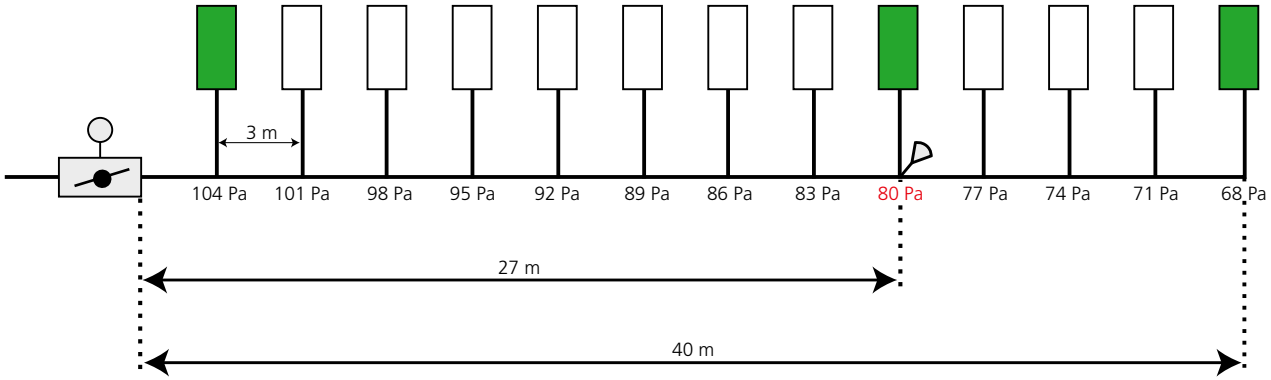
Minimum and maximum flows from IC Design limited by the available pressure and nozzle configuration selected for an PARASOL Zenith VAV 1200 HF LMLM.
Min. occupancy flow is selectable in IC Design and here is set to 15 l/s.
For an accepted pressure drop in the duct system of 1 Pa/m, the following can be used:

Duct pressure, Pa	104
Min. l/s	5
Occupancy l/s	15
Max. l/s	27.9

Design unit.

Duct pressure, Pa	80
Min. l/s	4.4
Occupancy l/s	15
Max. l/s	24.4

Duct pressure, Pa	68
Min. l/s	4
Occupancy l/s	15
Max. l/s	22.5



In SWICCT or by configuring PARASOL Zenith VAV in ProWISE limits can also be set for unoccupied and occupancy max flow (note the product's absolute min and max from the previous figure which are controlled by the selected nozzle setting!)

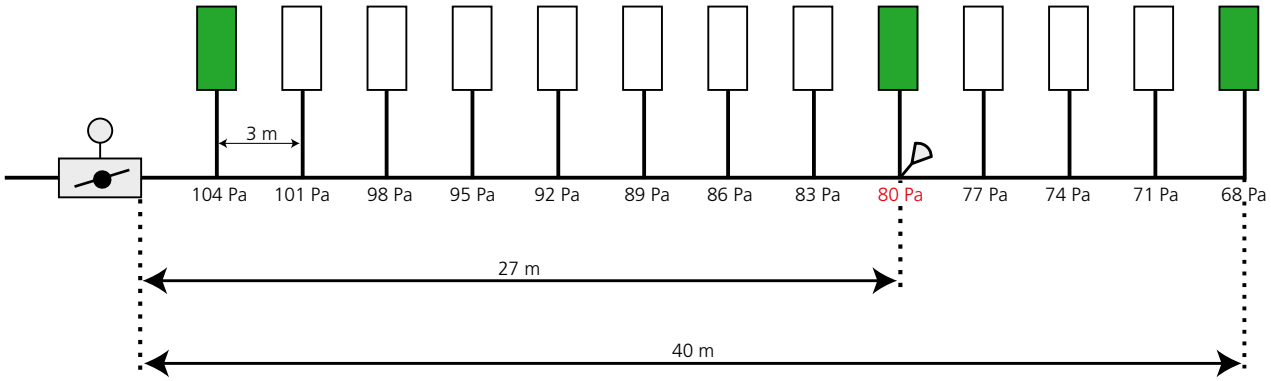
By letting the most exposed product in this way be the design unit for the current duct section and taking this into account at an early stage, you do not use a balancing damper before each product and can thus save both available pressure and money on unnecessary commissioning dampers, which in addition also risk creating noise.

Of course, the pressure fluctuations in a duct system can be so large that the traditional commissioning damper is still required, in all probability a damper in front of each product is not necessary as it should be enough to lower the pressure in some of the duct system and then apply the above.

Duct pressure, Pa	104
Min. l/s	5
Occupancy l/s	15
Max. l/s	22.5

Duct pressure, Pa	80
Min. l/s	5
Occupancy l/s	15
Max. l/s	22.5

Duct pressure, Pa	68
Min. l/s	5
Occupancy l/s	15
Max. l/s	22.5



Duct system

In the case above the design unit is of 110 Pa instead of as in the previous example, 80 Pa, and now we see that the first unit in the duct branch will have about 31 l/s and a pressure of 134 Pa. This flow gives a slightly louder noise from the nozzles, but as before lowering the maximum flow in software gives partly the same measured flow in each room, but also an improved noise level on the most exposed PARASOL Zenith VAV.

Setting the max air flow to 27 l/s gives 29 dB, as well as the maximum flow is the same for all units which may be desirable for commissioning/control measurement. Check, however, so that the cooling/heating output to the room is still OK.

1.

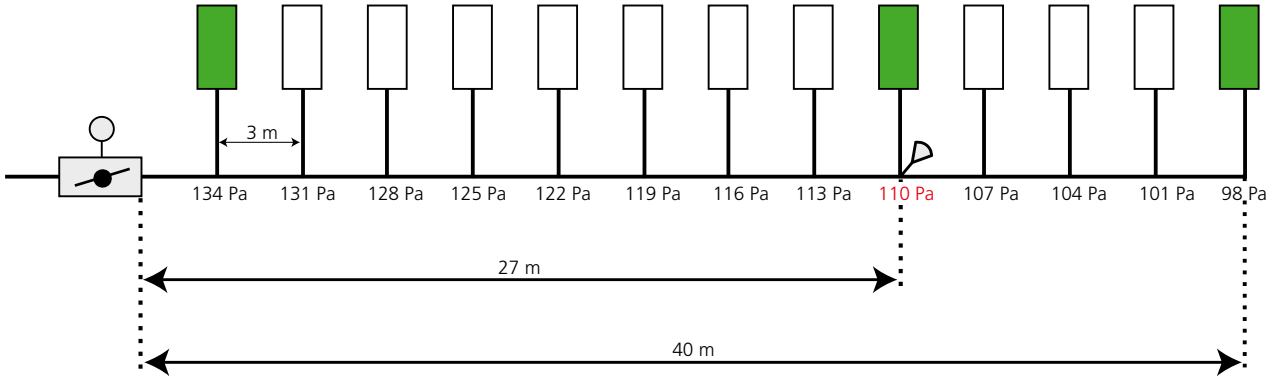
Duct pressure, Pa	134
Sound pressure level, Lp(A)	31
Min. l/s	5.7
Occupancy l/s	15
Max. l/s	31.6

Design unit.

Duct pressure, Pa	110
Sound pressure level, Lp(A)	28
Min. l/s	5.1
Occupancy l/s	15
Max. l/s	28.7

Duct pressure, Pa	98
Sound pressure level, Lp(A)	27
Min. l/s	4.8
Occupancy l/s	15
Max. l/s	27.0

Design instance 110 Pa gives 28 dBA and 28.7 l/s in the maximum position. The most vulnerable unit in this case will have 134 Pa, 31 dBA and 31.6 l/s.



2.

Duct pressure, Pa	134
Sound pressure level, Lp(A)	29
Min. l/s	5.7
Occupancy l/s	15
Max. l/s	**27**

Duct pressure, Pa	110
Sound pressure level, Lp(A)	27
Min. l/s	5.1
Occupancy l/s	15
Max. l/s	27

Duct pressure, Pa	98
Sound pressure level, Lp(A)	27
Min. l/s	4.8
Occupancy l/s	15
Max. l/s	27.0

By balancing the flows as before in software, in this case you can also rectify the rather high noise level. However, note the slightly lower effects produced.

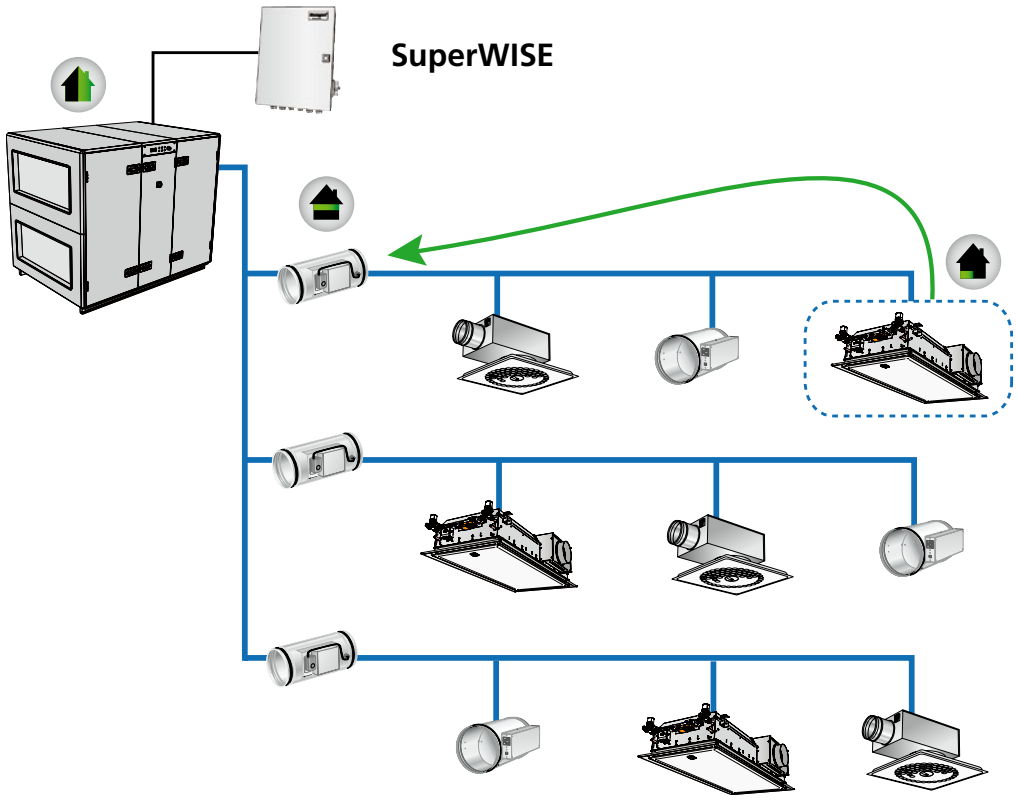
2-step optimisation in WISE gen.1

1. Zone and room optimisation

2-step optimisation is a further development of today's optimisation performed by SuperWISE. All zone dampers continuously check the damper position on products that are on the level below the zone damper and are connected via Modbus communications.

It is always the room damper with the greatest degree of opening that controls the zone damper for optimisation.

During normal operation, the most open room damper as standard should be between 70-90% open. If the most open room damper is open more than 90% the air flow in the zone is not sufficient. In this case, the zone damper will be opened until the most open room damper is open to less than 90%. If the most open room damper is open less than 70% the air flow in the zone is too high. In this case, the zone damper will be closed until the most open room damper is open to more than 70%.



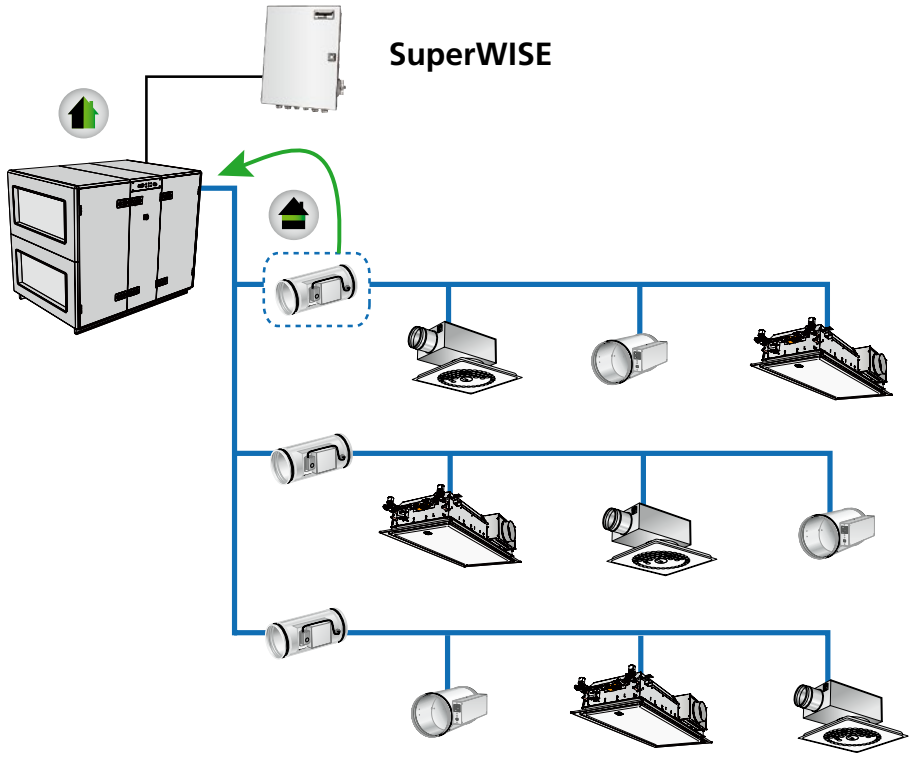
If a room damper is outside the limit 70-90% open, the zone damper is adjusted by being opened/closed.

2-step optimisation in WISE gen.1

2. Units and zone optimisation

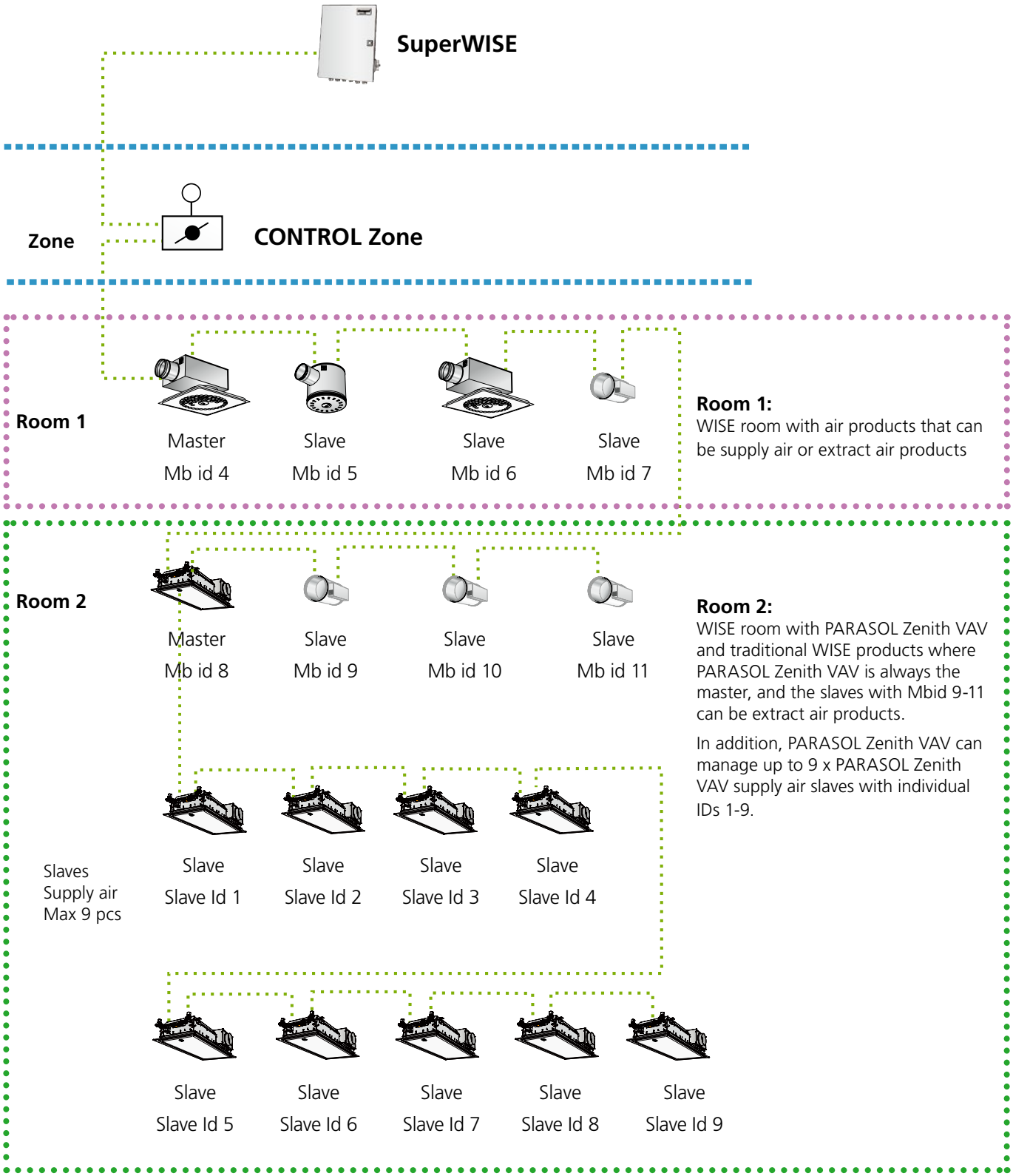
SuperWISE continuously controls the position of the zone damper, according to the same principle previously described for room dampers.

The unit's pressure setpoint is increased/decreased depending on the needs of the zones. The router simulates a zone damper and always shows the most open room product for supply air and extract air that is connected via Modbus to the router. If only the supply or extract air is used only this appears

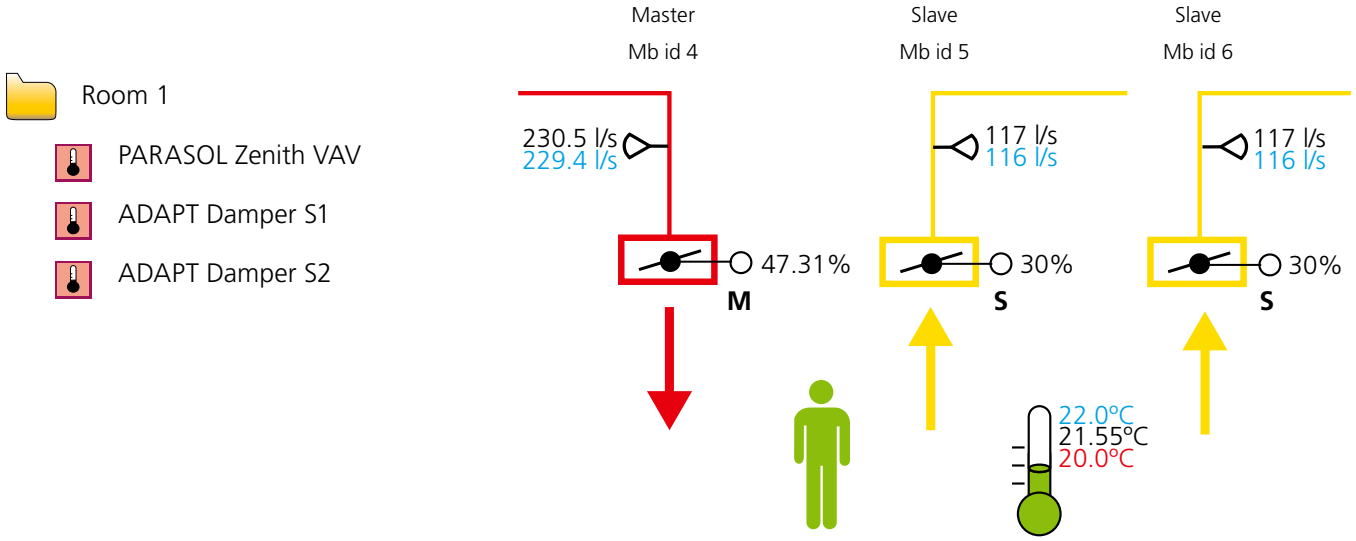


If a zone damper is outside the limit 70-90% open, the unit's pressure setpoint is increased/decreased until the zone damper is within the limits

Master/Slaves

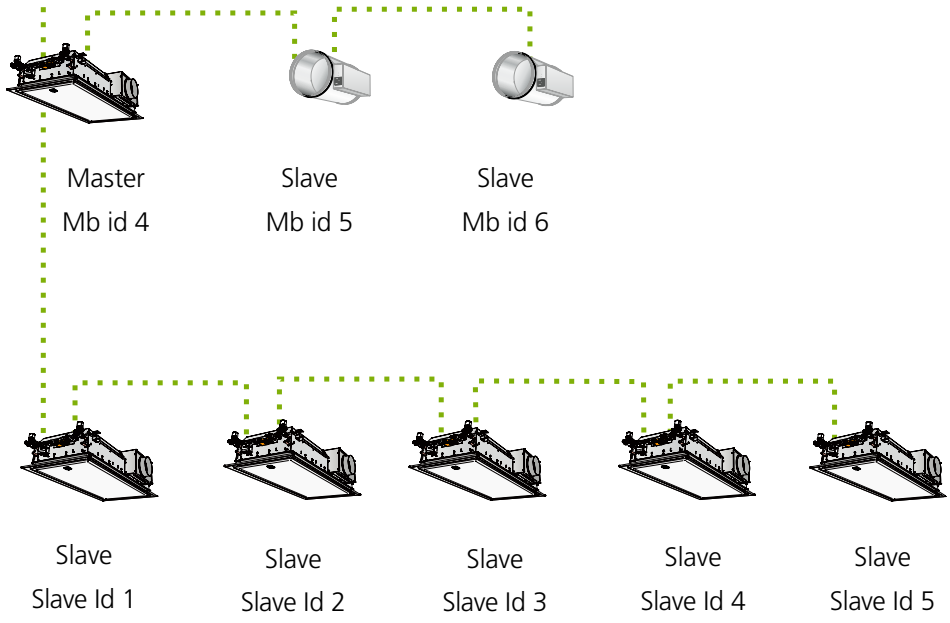


Display in Super Wise

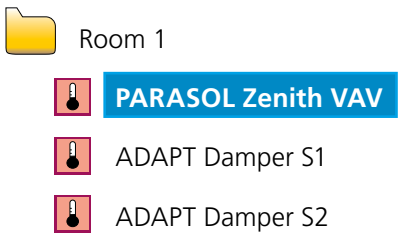


The SuperWISE display illustrates a room with 6 x PARASOL Zenith VAV for supply air and 2 x ADAPT Damper extract air.

The supply air is distributed on one master and five slaves, and as previously noted the slaves are not shown in this view, the master shows the room's supply air flow.



If you wish to see the supply air flow in more detail, highlight PARASOL Zenith VAV in the menu tree and the flow for all 5 underlying slaves will be shown.



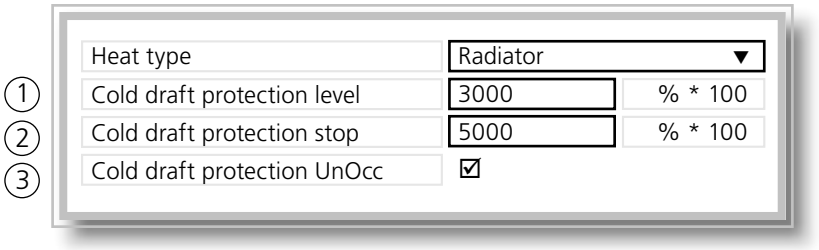
Air flow actual values	
Total supply air flow to the room	230.5 l/s
Calculated setpoint for the total supply air flow	229.4 l/s
Current pressure, Master	31.0 Pa
Supply air flow slave 1	46.4 l/s
Supply air flow slave 2	46.5 l/s
Supply air flow slave 3	45.8 l/s
Supply air flow slave 4	24.4 l/s
Supply air flow slave 5	22.9 l/s

IC Design

At the present time sizing and hardware configuration is performed in IC Design

Contact Helpdesk
Telephone: +46 512 - 78 24 44
Weekdays between 08:00-11:30, 12:30-15:00
E-mail: helpdesk.teknik@swegon.se

Heat with PARASOL Zenith VAV



Display from SWICCT and part of the "service mode" tab

1. **Protection level:** The amount the heating actuator is permitted to be open for cold draught protection. Default 30%, i.e. even if there is no heating load the 30% signal is sent out on the heat output.
2. **Protection stop:** At what cooling signal the cold draught protection should stop. Default 50%, i.e. when the cooling signal is 50% or more the cold draught protection is not permitted and no signal is sent out on the heating output.
3. **UnOcc:** Checked box means that the cold draught protection is active even when no one is in the room.

Heat type Radiator
In cases where the room is heated with PARASOL Zenith VAV, an increased air flow will result in an increased heat output being supplied to the room, the increased air volume "carries" out the water heat.

However, if the heat comes from an external radiator or a floor heating system, an increased air flow involves exactly the opposite effect, it only adds cold air to the room.

In order to avoid this you can choose radiator in the soft-ware as heat-type, which means that the boost function is blocked for a heating load.

Heat type Water actuator means the heat is controlled as usual with PARASOL Zenith VAVs heating coil and the actuator there.

Cold draught protection
Cold draught protection, allows the PARASOL Zenith VAV to send out heat signal even though there is a cooling load.

This is to be able to counteract cold draughts from such an inferior window with a radiator.

Cold draught protection is only run together with the choice Heat type radiator.

Note that the cold draught protection means that both cooling and heating actuators are energized at the same time, which increases the load on the output and transformer with 6 VA / actuator.

Sensor module
The sensor module is ideally placed on the wall for temperature measurement, if located in the faceplate there is a risk it measures a too high temperature.

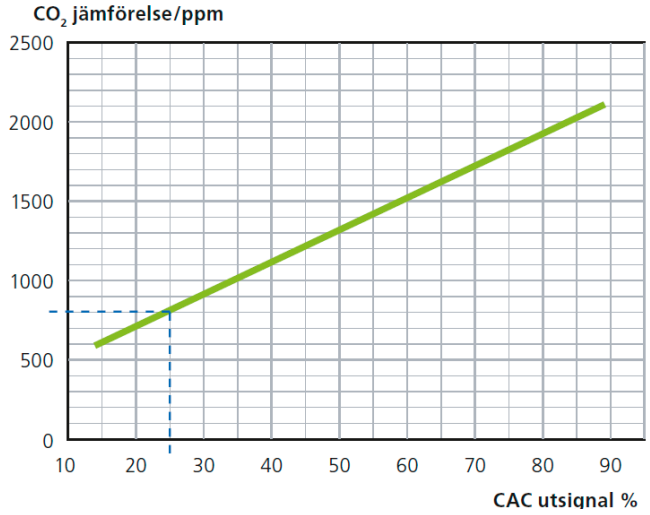
Alternatively, an external temperature sensor can be used.

In a conference room you can have sensor modules in all faceplates to indicate occupancy and an extra sensor module on the wall for temperature measurements and/ or setpoint setting.

Air quality sensor

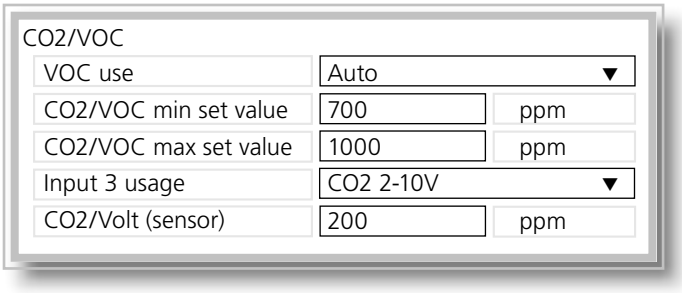
General

- The VOC sensor (Volatile Organic Compound), measures the content of emissions/impurities in the unit % VOC.
- When an occupant emits CO_2, this creates a proportional amount of emissions/impurities which are measurable by the VOC sensor.
- For an approximate translation of the % VOC to CO_2 content, see diagram.
- The sensors are concealed behind the faceplate on the PARASOL Zenith VAV and thus sit in the current of induced room air.
- The VOC sensor generally does not react to a specific substance but a variety of substances.
- The VOC sensor is Modbus connected and can be connected to PARASOL Zenith VAV master or slave.
- The CO_2 sensor is connected to an analogue input and must be connected to PARASOL Zenith VAV master.
- Both can be factory fitted behind the faceplate.



Data entry in SWICCT:

- The PPM values are similar as for a CO2 sensor, and are then recalculated to a correct output signal corresponding to the adjoining diagram.
- The values set in the adjoining figure signify that the PARASOL Zenith VAV has started to release more air at the equivalent of 600 ppm in the room, and continues variably up to 1200 ppm (max flow)
- VOC use Auto means that the control automatically detects whether the sensor is connected.
  OFF mode is used to disable already read sensors.
- Input 3 usage is only used for CO2 sensors and you specify here whether it is a 0-10 V or 2-10 V sensor.
- PPM CO2 / volt can also be set for the CO2 sensor in instances when sensors other than standard are used.
- See functional description air on page 17.
- More info about VOC and substances: Product sheet CAC on swegon.se.
- Regulation according to the air quality sensor also occurs in unoccupied mode (can be adjusted).



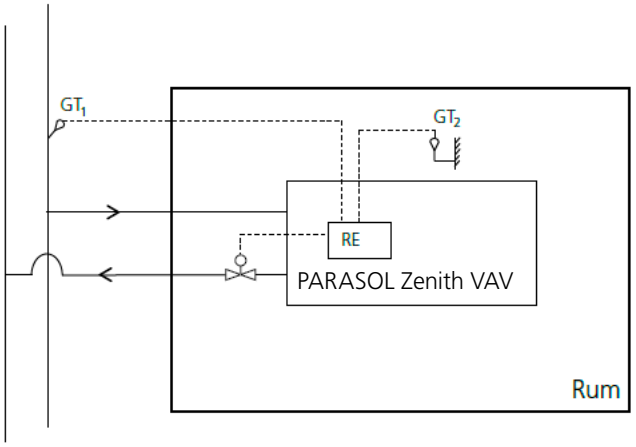
CO_2 or VOC?

Carbon dioxide CO_2 is in itself harmless, but is easy to measure and provides a good indication to the occupancy load in a building. However, a CO_2 sensor does not react to emissions from e.g. building materials or strong odours such as perfume, unlike a VOC sensor.

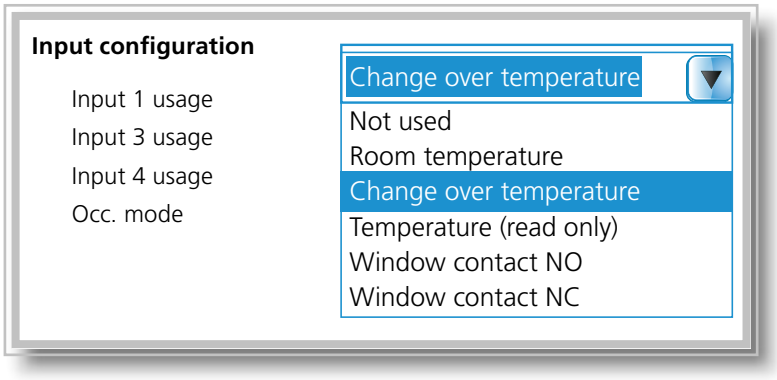
Change –over system

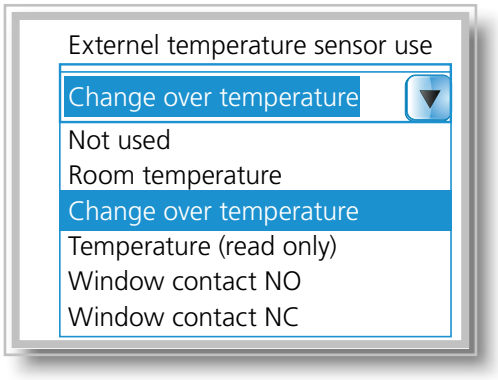
2-pipe system with cooling in the summer and heating in the winter

- 2-pipe system with cooling water in the summer and heating water in the winter
- GT_1 is placed where heating or cooling water always circulates
- Summer: If the room temperature T_2 is higher than the water temperature T_1, the valve opens when cooling is required.
- Winter: If the room temperature T_2 is lower than the water temperature T_1, the valve opens when heating is required.
- GT_1 is connected to the regulator as an external temperature sensor
- In SWICCT or SuperWISE (see below) you tell the regulator that the sensor is to be used for the Change-Over function.
- GT_2 is the temperature sensor which is located in the PARASOL Zenith VAV's sensor module
- Note: The valve actuator must be connected to the regulator's cooling output.

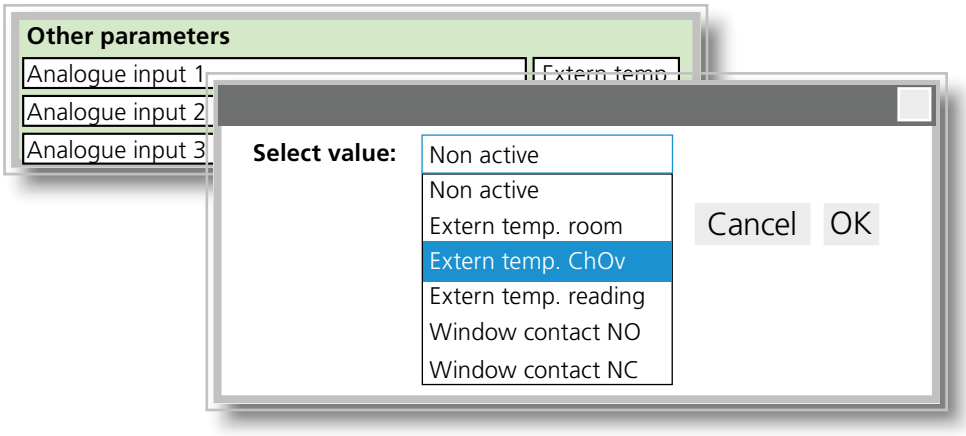


In SWICCT you make the change in one of these places, either under "Input configuration" or "External temperature sensor use". Irrespective of where you make the change, the other changes automatically.





The input's function can also be changed via SuperWISE:



Control of the lighting

Use of analogue output to switch an external relay

The regulator's analogue outputs no. 13 or 19 (see page xx) can be used to switch an external relay for lighting. The output is really intended to control actuators or internal dampers, but when 10V is fed on the output for occupancy (assuming that the output is configured 2-step, i.e. 0% output signal for unoccupied and 100% output for occupancy) lighting can also be managed for example by means of an external relay.

Note that this is an alternative use of the output, which means no own intelligence for just lighting control is connected to this.

For more information and assistance with connections contact the factory.

Start-up and Zero point calibration

During initial start-up after a power failure and for zero point calibration, the internal damper will open to fully open to read the current duct pressure in this position.

The damper is open for a few minutes and then closes and then start normal regulation of the air flow.

For zero point calibration, close the damper, the pressure sensor actual value is reset and then the start-up procedure is performed as above.

Calibration is activated via SuperWISE, SWICCT or via Modbus.

Two-stage cooling/two stage heating

The function two-step cooling means that both actuator outputs are used for cooling, this in order to supplement with extra cooling on output number two when the cooling on output no one is not sufficient.

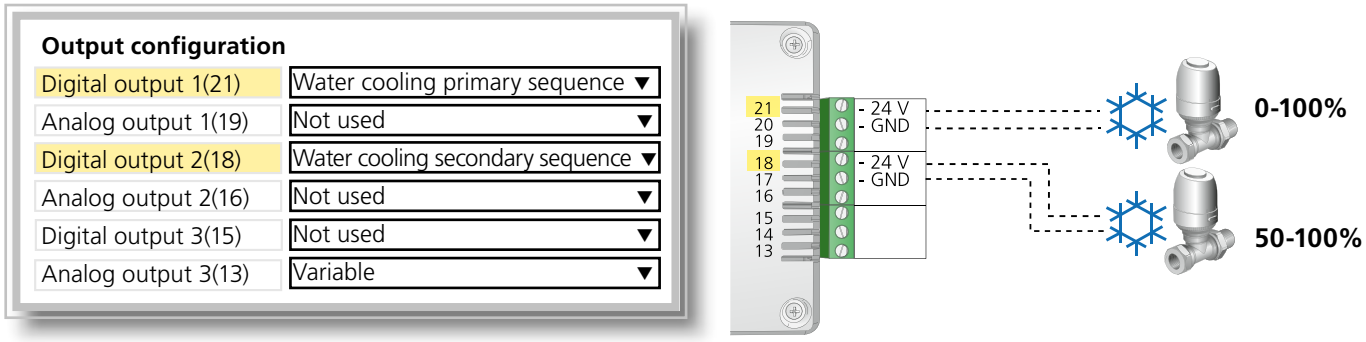
For 0-50% of the cooling load, 100% is put on one output and for a 50-100% cooling load 100% output signal is put on both outputs.

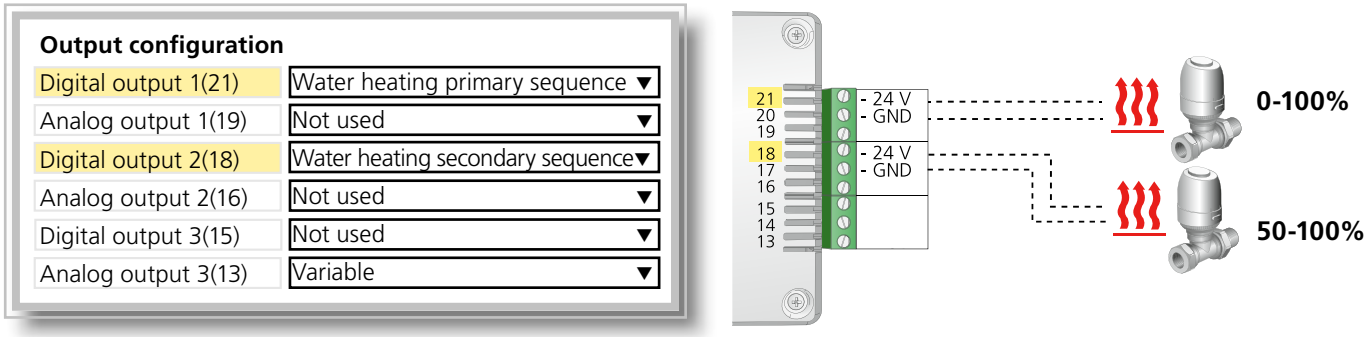
Note that in this case the voltage is on both outputs simultaneously, which can affect the choice of transformer.

The above applies in the same way in two-step heating.

Also note that only cooling or heating can be regulated according to the two-step principle when the same outputs are used.

The corresponding settings can be made on the analogue outputs for e.g. 0-10V actuators





Modbus register 1.57

Coil						
ID	**Name**	**Min**	**Max**	**Init**	**Settings**	**Description**
0x0001	Emergency	0	1	0		Emergency mode
0x0002	BOOT (first write parameters)	0	1	0		BOOT (first write parameters)
0x0003	Force parameter write	0	1	0		Force parameter write
0x0004	Clear all alarms	0	1	0		Clear all alarms
0x0005	Holiday	0	1	0		Holiday mode
0x0006	SNC	0	1	0		Summer night cooling mode
0x0007	Zero calibration demand to pressure sensor	0	1	0		Zero calibration
0x0008	Man valve test	0	1	0		Manual valve test
0x0009	Man vent boost	0	1	0		Manual ventilation boost
0x0010	Reset temperature offset.	0	1	0		Reset temperature offset
0x0011	Water actuator STOP	0	1	0		Water actuator STOP
0x0012	Air quality active UnOcc	0	1	0		Air quality regulation active in unoccupancy mode
0x0013	Group occupancy	0	1	0		Occupancy from group
0x0014	Cold draft protection active in unoccupancy	0	1	0		Cold draft protection active in unoccupancy mode
0x0015	Slave bus reset	0	1	0		Slave bus reset
0x0016	Reset VOC reset counter	0	1	0		Reset VOC reset counter
Input status						
ID	**Name**	**Min**	**Max**	**Init**	**Settings**	**Description**
1x0001	AC power supply.	0	1	0		AC power supply
1x0002	Discrete air hatch open (fixed)	0	1	0		Discrete air hatch open (fixed)
1x0003	Discrete air hatch open (pulsing)	0	1	0		Discrete air hatch open (pulsing)
1x0004	Discrete air hatch Parasol slave	0	1	0		Discrete air hatch Parasol slave
1x0005	Air flow forced	0	1	0		Air flow forced
1x0006	Vent boost active	0	1	0		Ventilation boost active
1x0007	Valve exercise active	0	1	0		Valve exercise active
1x0008	Condensation	0	1	0		Condensation state
1x0009	Digital in (IN4)	0	1	0		Digital in (IN4) state
1x0010	Window open	0	1	0		Window open
1x0011	Occupancy incl delays	0	1	0		Occupancy including delays
1x0012	Occupancy SM 1	0	1	0		Occupansy sensor module 1
1x0013	Occupancy SM 2	0	1	0		Occupansy sensor module 2
1x0014	Occupancy SM 3	0	1	0		Occupansy sensor module 3
1x0015	Occupancy SM 4	0	1	0		Occupansy sensor module 4
1x0016	Occupancy SM 5	0	1	0		Occupansy sensor module 5
1x0017	Occupancy SM 6	0	1	0		Occupansy sensor module 6
1x0018	Occupancy SM 7	0	1	0		Occupansy sensor module 7
1x0019	Occupancy SM 8	0	1	0		Occupansy sensor module 8
1x0020	Occupancy SM 9	0	1	0		Occupansy sensor module 9
1x0021	Occupancy SM 10	0	1	0		Occupansy sensor module 10
1x0022	Change over Heat present	0	1	0		Change over hot water present
1x0023	Change over Cool present	0	1	0		Change over cold water present
1x0024	Digital out 1 status	0	1	0		Digital out 1 status
1x0025	Digital out 2 status	0	1	0		Digital out 2 status
1x0026	Digital out 3 status	0	1	0		Digital out 3 status

Input status						
ID	**Name**	**Min**	**Max**	**Init**	**Settings**	**Description**
1x1000	Sum alarm for functional alarms	0	1	0		Sum alarm for functional alarms
1x1001	Sum alarm for comfort alarms	0	1	0		Sum alarm for comfort alarms
1x1002	Supply voltage low	0	1	0		Supply voltage low
1x1003	Supply voltage critical low	0	1	0		Supply voltage critical low
1x1004	Ext temp missing	0	1	0		External temperature missing
1x1005	Ext temp error	0	1	0		External temperature error
1x1006	Condensation sensor error	0	1	0		Condensation sensor error
1x1007	SM temp sensor error	0	1	0		Sensor module temperature error
1x1008	SM button error	0	1	0		Sensor module button error
1x1009	CO2 sensor missing	0	1	0		CO2 sensor missing
1x1010	VOC Error	0	1	0		VOC Error
1x1011	Low pressure	0	1	0		Low pressure
1x1012	-- Not used -- Alarm 11	0	1	0		-- Not used -- Alarm 11
1x1013	-- Not used -- Alarm 12	0	1	0		-- Not used -- Alarm 12
1x1014	-- Not used -- Alarm 13	0	1	0		-- Not used -- Alarm 13
1x1015	-- Not used -- Alarm 14	0	1	0		-- Not used -- Alarm 14
1x1016	-- Not used -- Alarm 15	0	1	0		-- Not used -- Alarm 15
1x1017	-- Not used -- Alarm 16	0	1	0		-- Not used -- Alarm 16
1x1018	SM comm error	0	1	0		Sensor module communication error
1x1019	Slave comm error	0	1	0		Slave communication error
1x1020	Pressure sensor comm error	0	1	0		Pressure sensor comm error
1x1021	VOC sensor comm error	0	1	0		VOC sensor communication error
1x1022	No master request (slave)	0	1	0		No master request (slave)
1x1023	Slave incompatible version	0	1	0		Slave incompatible version
1x1024	-- Not used -- Alarm 23	0	1	0		-- Not used -- Alarm 23
1x1025	-- Not used -- Alarm 24	0	1	0		-- Not used -- Alarm 24
1x1026	Heating comfort alarm	0	1	0		Heating comfort alarm
1x1027	Cooling comfort alarm	0	1	0		Cooling comfort alarm
1x1028	Temp. Set point overlap alarm	0	1	0		Temperature setpoint overlap alarm
1x1029	Air quality comfort alarm	0	1	0		Air quality comfort alarm
1x1030	Condensation	0	1	0		Condensation
1x1031	-- Not used -- Alarm 30	0	1	0		-- Not used -- Alarm 30
1x1032	-- Not used -- Alarm 31	0	1	0		-- Not used -- Alarm 31
1x1033	-- Not used -- Alarm 32	0	1	0		-- Not used -- Alarm 32
1x1034	24 V Out 1 overload error	0	1	0		24 V Output 1 overload error
1x1035	24 V Out 2 overload error	0	1	0		24 V Output 2 overload error
1x1036	24 V Out 3 overload error	0	1	0		24 V Output 3 overload error
1x1037	-- Not used -- Alarm 36	0	1	0		-- Not used -- Alarm 36
1x1038	-- Not used -- Alarm 37	0	1	0		-- Not used -- Alarm 37
1x1039	-- Not used -- Alarm 38	0	1	0		-- Not used -- Alarm 38
1x1038	-- Not used -- Alarm 37					-- Not used -- Alarm 37
1x1039	-- Not used -- Alarm 38					-- Not used -- Alarm 38
1x1040	-- Not used -- Alarm 39	0	1	0		-- Not used -- Alarm 39
1x1041	-- Not used -- Alarm 40	0	1	0		-- Not used -- Alarm 40
1x1042	Slave input sum alarm	0	1	0		Slave input sum alarm
1x1043	Slave output sum alarm	0	1	0		Slave output sum alarm
1x1044	-- Not used -- Alarm 43	0	1	0		-- Not used -- Alarm 43
1x1045	-- Not used -- Alarm 44	0	1	0		-- Not used -- Alarm 44
1x1046	-- Not used -- Alarm 45	0	1	0		-- Not used -- Alarm 45
1x1047	-- Not used -- Alarm 46	0	1	0		-- Not used -- Alarm 46
1x1048	-- Not used -- Alarm 47	0	1	0		-- Not used -- Alarm 47
1x1049	-- Not used -- Alarm 48	0	1	0		-- Not used -- Alarm 48

Input status						
ID	**Name**	**Min**	**Max**	**Init**	**Settings**	**Description**
1x1050	-- Not used -- Alarm 49	0	1	0		-- Not used -- Alarm 49
1x1051	-- Not used -- Alarm 50	0	1	0		-- Not used -- Alarm 50
1x1052	-- Not used -- Alarm 51	0	1	0		-- Not used -- Alarm 51
1x1053	-- Not used -- Alarm 52	0	1	0		-- Not used -- Alarm 52
1x1054	-- Not used -- Alarm 53	0	1	0		-- Not used -- Alarm 53
1x1055	-- Not used -- Alarm 54	0	1	0		-- Not used -- Alarm 54
1x1056	-- Not used -- Alarm 55	0	1	0		-- Not used -- Alarm 55
1x1057	-- Not used -- Alarm 56	0	1	0		-- Not used -- Alarm 56
1x1058	-- Not used -- Alarm 57	0	1	0		-- Not used -- Alarm 57
1x1059	-- Not used -- Alarm 58	0	1	0		-- Not used -- Alarm 58
1x1060	-- Not used -- Alarm 59	0	1	0		-- Not used -- Alarm 59
1x1061	-- Not used -- Alarm 60	0	1	0		-- Not used -- Alarm 60
1x1062	-- Not used -- Alarm 61	0	1	0		-- Not used -- Alarm 61
1x1063	-- Not used -- Alarm 62	0	1	0		-- Not used -- Alarm 62
1x1064	-- Not used -- Alarm 63	0	1	0		-- Not used -- Alarm 63
1x1065	-- Not used -- Alarm 64	0	1	0		-- Not used -- Alarm 64
Input register						
ID	**Name**	**Min**	**Max**	**Init**	**Settings**	**Description**
3x0001	Component Name ID	0	32767	19		Component name ID
3x0002	Bootloader revision	0	32767	0		Bootloader revision number
3x0003	SW revision	0	32767	157		Software revision number
3x0004	HW revision	0	15	0		Hardware revision number
3x0005	Serial number 1	-32768	32767	0		Serial number
3x0006	Serial number 2	-32768	32767	0		Serial number
3x0007	Serial number 3	-32768	32767	0		Serial number
3x0008	Serial number 4	-32768	32767	0		Serial number
3x0009	Serial number 5	-32768	32767	0		Serial number
3x0010	Serial number 6	-32768	32767	0		Serial number
3x0011	Serial number 7	-32768	32767	0		Serial number
3x0012	Serial number 8	-32768	32767	0		Serial number
3x0018	Application id	0	32767	15		Application ID
3x0020	Number of connected sensor modules.	0	10	0		Number of connected sensor modules.
3x0021	Number of connected slaves	0	9	0		Number of connected slaves
3x0022	Occupancy SM (bit code)	0	1023	0		Occupancy sensor module in bit code
3x0023	Output current	0	10000	0		Actual output current
3x0024	Pressure	-4000	25000	0		Actual pressure value
3x0025	CO2 ppm	0	2000	0		Actual CO2 ppm value
3x0026	VOC ppm	0	2000	0		Actual VOC ppm value
3x0027	RH %	0	10000	0		Actual Relative humidity value (%)
3x0028	Temperature from VOC sensor	-5000	8000	0		Actual temperature value from VOC sensor
3x0029	Input status mirror	-32768	32767	0		Input status mirror
3x0030	Input status mirror	-32768	32767	0		Input status mirror

Input register						
ID	**Name**	**Min**	**Max**	**Init**	**Settings**	**Description**
3x0032	Device state	0	11	0	"0=Not initiated yet, 1=Device is starting up, 2=Occupied, 3=Unoccupied, 4=Holiday, 5=Valve exercise, 6=Summer night cool, 7=Commissioning, 8=Slave, 9=Emergency, 10=Stop state (used when an alarm forces the regulator to stop), 11=Open Window"	Actual device state

Input register						
ID	**Name**	**Min**	**Max**	**Init**	**Settings**	**Description**
3x0033	Actual mean airflow.	0	32767	0		Actual mean airflow value
3x0034	Temp Ext	-5000	8000	0		Actual temperature value external
3x0035	Condensation	0	1	0		Condensation state
3x0036	Alarm 1-16	-32768	32767	0		Alarm 1-16
3x0037	Alarm 17-32	-32768	32767	0		Alarm 17-32
3x0038	Alarm 33-48	-32768	32767	0		Alarm 33-48
3x0039	Alarm 49-64	-32768	32767	0		Alarm 49-64
3x0040	Slave id for first Slave active alarm	0	10	0		Slave id for first Slave active alarm
3x0041	SM id for first SM active alarm	0	10	0		Sensor module id for first sensor module active alarm
3x0042	Alarm 1-16 history	-32768	32767	0		Alarm 1-16 history
3x0043	Alarm 17-32 history	-32768	32767	0		Alarm 17-32 history
3x0044	Alarm 33-48 history	-32768	32767	0		Alarm 33-48 history
3x0045	Alarm 49-64 history	-32768	32767	0		Alarm 49-64 history
3x0046	Analog input (IN3)	0	100	0		Actual value analog input (IN3)
3x0047	Digital output 1.	0	10000	0		Digital output 1 state
3x0048	Digital output 2.	0	10000	0		Digital output 2 state
3x0049	Digital output 3.	0	10000	0		Digital output 3 state
3x0050	Analogue output 1.	0	10000	0		Analog output 1 value
3x0051	Analogue output 2.	0	10000	0		Analog output 2 value
3x0052	Analogue output 3.	0	10000	0		Analog output 3 value
3x0053	Room temp	-5000	8000	2000		Actual room temperature
3x0054	Room temp set point	-5000	8000	2200		Actual room temperature setpoint
3x0055	Temp Low limit	0	10000	0		Temperature low limit
3x0056	Temp Hi limit	0	10000	0		Temperature high limit
3x0057	Temp load	-10000	10000	0		Actual temperature load
3x0058	Temp set point offset Occ	-1200	1200	0		Temperature setpoint offset occupancy mode
3x0059	Sensor module set point offset	-3	3	0		Actual temperature offset from sensor module
3x0060	Temp Slave controller 1	-5000	8000	0		Actual temperature slave controller 1
3x0061	Temp Slave controller 2	-5000	8000	0		Actual temperature slave controller 2
3x0062	Temp Slave controller 3	-5000	8000	0		Actual temperature slave controller 3
3x0063	Temp Slave controller 4	-5000	8000	0		Actual temperature slave controller 4
3x0064	Temp Slave controller 5	-5000	8000	0		Actual temperature slave controller 5
3x0065	Temp Slave controller 6	-5000	8000	0		Actual temperature slave controller 6
3x0066	Temp Slave controller 7	-5000	8000	0		Actual temperature slave controller 7
3x0067	Temp Slave controller 8	-5000	8000	0		Actual temperature slave controller 8
3x0068	Temp Slave controller 9	-5000	8000	0		Actual temperature slave controller 9
3x0069	Temp SM1	-5000	8000	0		Actual temperature sensor module 1
3x0070	Temp SM2	-5000	8000	0		Actual temperature sensor module 2
3x0071	Temp SM3	-5000	8000	0		Actual temperature sensor module 3
3x0072	Temp SM4	-5000	8000	0		Actual temperature sensor module 4
3x0073	Temp SM5	-5000	8000	0		Actual temperature sensor module 5
3x0074	Temp SM6	-5000	8000	0		Actual temperature sensor module 6
3x0075	Temp SM7	-5000	8000	0		Actual temperature sensor module 7
3x0076	Temp SM8	-5000	8000	0		Actual temperature sensor module 8
3x0077	Temp SM9	-5000	8000	0		Actual temperature sensor module 9
3x0078	Temp SM10	-5000	8000	0		Actual temperature sensor module 10
3x0079	Air flow load	0	10000	0		Actual airflow load signal
3x0080	Air flow set point	0	32767	0		Actual airflow setpoint
3x0081	Air flow moving average	0	32767	0		Air flow moving average
3x0082	Air quality load	0	10000	0		Actual air quality load signal
3x0083	Air quality	0	2000	0		Actual air quality
3x0084	Damper signal	0	10000	0		Damper signal
3x0085	Airflow control signal	0	10000	0		Airflow control signal

Input register						
ID	**Name**	**Min**	**Max**	**Init**	**Settings**	**Description**
3x0086	Air flow Slave controller 1	0	32767	0		Actual airflow slave controller 1
3x0087	Air flow Slave controller 2	0	32767	0		Actual airflow slave controller 2
3x0088	Air flow Slave controller 3	0	32767	0		Actual airflow slave controller 3
3x0089	Air flow Slave controller 4	0	32767	0		Actual airflow slave controller 4
3x0090	Air flow Slave controller 5	0	32767	0		Actual airflow slave controller 5
3x0091	Air flow Slave controller 6	0	32767	0		Actual airflow slave controller 6
3x0092	Air flow Slave controller 7	0	32767	0		Actual airflow slave controller 7
3x0093	Air flow Slave controller 8	0	32767	0		Actual airflow slave controller 8
3x0094	Air flow Slave controller 9	0	32767	0		Actual airflow slave controller 9
3x0095	Air flow modbus sensor, lps * 10.	0	32767	0		Actual airflow from modbus sensor, lps*10
3x0096	Water cooling regulator signal.	0	10000	0		Actual water cooling signal (%)
3x0097	Water heating regulator signal.	0	10000	0		Actual water heating signal (%)
3x0098	Airflow demand signal	0	10000	0		Actual airflow demand signal
3x0099	Air flow set point master regulator	0	32767	0		Actual airflow setpoint master controller
3x0100	Pressure slave 1	-4000	25000	0		Actual pressure from slave 1
3x0101	Pressure slave 2	-4000	25000	0		Actual pressure from slave 2
3x0102	Pressure slave 3	-4000	25000	0		Actual pressure from slave 3
3x0103	Pressure slave 4	-4000	25000	0		Actual pressure from slave 4
3x0104	Pressure slave 5	-4000	25000	0		Actual pressure from slave 5
3x0105	Pressure slave 6	-4000	25000	0		Actual pressure from slave 6
3x0106	Pressure slave 7	-4000	25000	0		Actual pressure from slave 7
3x0107	Pressure slave 8	-4000	25000	0		Actual pressure from slave 8
3x0108	Pressure slave 9	-4000	25000	0		Actual pressure from slave 9
3x0109	Pressure duct	-4000	25000	0		Actual duct pressure
3x0110	Master min airflow	0	32767	0		Min airflow master
3x0111	Master max airflow	0	32767	0		Max airflow master
3x0112	VOC error status	-32768	32767	0		VOC error status
3x0113	Condensation input value	0	1000	10000		Actual condensation sensor value
3x0160	Min airflow	0	32767	0		Min airflow
3x0161	Max airflow	0	32767	0		Max airflow
3x0162	Minutes since last calibration	0	32767	5000		Actual minutes since last calibration
3x0163	Room temp measured	-5000	8000	2000		Actual measured rom temperature
3x0198	Simulated motor feedback	0	32767	0		Actual simulated motor feedback signal
3x0200	Uptime year	0	32767	0		Actual uptime years
3x0201	Uptime hours	0	8760	0		Actual uptime hours
3x0202	Uptime minutes	0	60	0		Actual uptime minutes
3x0203	VOC reboot counter	0	32767	0		VOC reboot counter
3x0204	VOC fault pending counter	0	32767	0		VOC fault pending counter

Holding						
ID	**Name**	**Min**	**Max**	**Init**	**Settings**	**Description**
4x0001	Component Name ID	19	19	19		Component Name ID
4x0002	Component name	-32768	32767	30547		Component name
4x0003	Component name	-32768	32767	26469		Component name
4x0004	Component name	-32768	32767	28271		Component name
4x0005	Component name	-32768	32767	21792		Component name
4x0006	Component name	-32768	32767	26990		Component name
4x0007	Component name	-32768	32767	28518		Component name
4x0008	Component name	-32768	32767	28018		Component name
4x0009	Component name	-32768	32767	21024		Component name
4x0010	Component name	-32768	32767	28527		Component name
4x0011	Component name	-32768	32767	8301		Component name
4x0012	Component name	-32768	32767	28483		Component name
4x0013	Component name	-32768	32767	29806		Component name
4x0014	Component name	-32768	32767	28530		Component name
4x0015	Component name	-32768	32767	27756		Component name
4x0016	Component name	-32768	32767	29285		Component name
4x0017	Component name	-32768	32767	12576		Component name
4x0018	Application ID	0	999	15		Controller application
4x0019	Controller modbus address	1	247	1		Controller Modbus ID
4x0020	Baud rate	0	2	2	0=9600, 1=19200, 2=38400	Communication setting: Modbus Baud rate
4x0021	Parity	0	2	2	0=Odd, 1=Even, 2=None	Communication setting: Modbus Parity
4x0022	Stop bits	1	2	1	1=1 Stop Bit, 2=2 Stop Bits	Communication setting: Slave unit Modbus ID
4x0023	Slave id	1	9	1		Communication setting: Slave unit Modbus ID
4x0024	Identification number	0	32767	0		Identification number
4x0025	Controller type	0	1	0	0=Master controller, 1=Slave controller	Controller type

Holding						
ID	**Name**	**Min**	**Max**	**Init**	**Settings**	**Description**
4x0026	App AO1	0	19	0	"0=Output not used, 1=Water cooling, 2=Water heating, 3=Water change over 2 pipe, 4=Water change over 4 pipe, 5=Water cooling primary sequence, 6=Water cooling secondary sequence, 7=Water heating primary sequence, 8=Water heating secondary sequence, 9=Discrete supply air, pulsed, 10=Discrete extract air, pulsed, 11=Discrete supply air, fixed on/off, 12=Discrete extract air, fixed on/off, 13=Power supply, 14=Continues supply air, 15=Continues extract air, 16=Flow demand supply air (for analogue outputs with no feedback), 17=Flow demand extract air (for analogue outputs with no feedback), 18=Supply air for Parasol adapt slaves, 19=Light control"	Operating Mode
4x0027	App AO2	0	19	0	"0=Output not used, 1=Water cooling, 2=Water heating, 3=Water change over 2 pipe, 4=Water change over 4 pipe, 5=Water cooling primary sequence, 6=Water cooling secondary sequence, 7=Water heating primary sequence, 8=Water heating secondary sequence, 9=Discrete supply air, pulsed, 10=Discrete extract air, pulsed, 11=Discrete supply air, fixed on/off, 12=Discrete extract air, fixed on/off, 13=Power supply, 14=Continues supply air, 15=Continues extract air, 16=Flow demand supply air (for analogue outputs with no feedback), 17=Flow demand extract air (for analogue outputs with no feedback), 18=Supply air for Parasol adapt slaves, 19=Light control"	Operating Mode
4x0028	App AO3	0	19	0	"0=Output not used, 1=Water cooling, 2=Water heating, 3=Water change over 2 pipe, 4=Water change over 4 pipe, 5=Water cooling primary sequence, 6=Water cooling secondary sequence, 7=Water heating primary sequence, 8=Water heating secondary sequence, 9=Discrete supply air, pulsed, 10=Discrete extract air, pulsed, 11=Discrete supply air, fixed on/off, 12=Discrete extract air, fixed on/off, 13=Power supply, 14=Continues supply air, 15=Continues extract air, 16=Flow demand supply air (for analogue outputs with no feedback), 17=Flow demand extract air (for analogue outputs with no feedback), 18=Supply air for Parasol adapt slaves, 19=Light control"	Operating Mode
4x0029	App DO1	0	19	0	"0=Output not used, 1=Water cooling, 2=Water heating, 3=Water change over 2 pipe, 4=Water change over 4 pipe, 5=Water cooling primary sequence, 6=Water cooling secondary sequence, 7=Water heating primary sequence, 8=Water heating secondary sequence, 9=Discrete supply air, pulsed, 10=Discrete extract air, pulsed, 11=Discrete supply air, fixed on/off, 12=Discrete extract air, fixed on/off, 13=Power supply, 14=Continues supply air, 15=Continues extract air, 16=Flow demand supply air (for analogue outputs with no feedback), 17=Flow demand extract air (for analogue outputs with no feedback), 18=Supply air for Parasol adapt slaves, 19=Light control"	Operating Mode

Holding						
ID	**Name**	**Min**	**Max**	**Init**	**Settings**	**Description**
4x0030	App DO2	0	19	0	"0=Output not used, 1=Water cooling, 2=Water heating, 3=Water change over 2 pipe, 4=Water change over 4 pipe, 5=Water cooling primary sequence, 6=Water cooling secondary sequence, 7=Water heating primary sequence, 8=Water heating secondary sequence, 9=Discrete supply air, pulsed, 10=Discrete extract air, pulsed, 11=Discrete supply air, fixed on/off, 12=Discrete extract air, fixed on/off, 13=Power supply, 14=Continues supply air, 15=Continues extract air, 16=Flow demand supply air (for analogue outputs with no feedback), 17=Flow demand extract air (for analogue outputs with no feedback), 18=Supply air for Parasol adapt slaves, 19=Light control"	Operating Mode
4x0031	App DO3	0	19	0	"0=Output not used, 1=Water cooling, 2=Water heating, 3=Water change over 2 pipe, 4=Water change over 4 pipe, 5=Water cooling primary sequence, 6=Water cooling secondary sequence, 7=Water heating primary sequence, 8=Water heating secondary sequence, 9=Discrete supply air, pulsed, 10=Discrete extract air, pulsed, 11=Discrete supply air, fixed on/off, 12=Discrete extract air, fixed on/off, 13=Power supply, 14=Continues supply air, 15=Continues extract air, 16=Flow demand supply air (for analogue outputs with no feedback), 17=Flow demand extract air (for analogue outputs with no feedback), 18=Supply air for Parasol adapt slaves, 19=Light control"	Operating Mode
4x0032	Input 1 usage	0	5	0	"0=Don't use external temperature sensor, 1=Use external temperature input for room temperature, 2=Use external temperature input for change over, 3=Use external temperature input for reading, no function, 4=Use input for window contact, normal open, 5=Use input for window contact, normal closed"	Input 1 configuration. Room temp, Change over temp, Read only temp or Window contact
4x0033	Input 3 usage	0	2	0	0=Not used, 1=CO2 sensor 0-10V, 2=CO2 sensor 2-10V	Input 3 configuration, Used for CO2 input
4x0034	Input 4 usage	0	6	0	0=Not used, 1=Keycard, normal open, 2=Keycard, normal closed, 3=Window contact, normal open, 4=Window contact, normal closed, 5=Change over, normal open, 6=Change over, normal closed	Input 4 configuration. Keycard switch, Window contact or Change over switch
4x0035	Room temperature sensor use.	0	3	0	"0=Use mean value of sensor module(s), 1=Use sensor module with ID 1, 2=Use external temperature input, 3=Use mean value of SM(s) and external sensor"	Defines witch temperature to use. Mean value from SM, SM ID0, External Temp, Mean of SM and Ext temp.
4x0036	Occ mode	0	2	0	0=Use occupancy sensor, 1=Always occupied, 2=Always unoccupied	Defines occupancy mode. Auto, Forced OCC or Forced UNOCC
4x0037	Occ off delay	60	3600	600		Occupancy off delay in s
4x0038	Occ on delay	1	600	30		Occupancy on delay in s
4x0039	Occupancy trig level	0	32767	20		Occupancy trig level

Holding						
ID	**Name**	**Min**	**Max**	**Init**	**Settings**	**Description**
4x0040	Commissioning mode.	0	516	0	0=Commissioning not active, 1=Min air flow unoccupied, 2=Min air flow occupied, 3=Max air flow, 4=Min air flow holiday, 256=Open cooling valve, 512=Open heating valve	Commisioning mode selection.
4x0041	Commissioning max time	0	5000	0		Max comissioning time in hours
4x0042	Set point Cool Occ	500	8000	2300		Cooling setpoint in occupancy mode (degrees celsius*100)
4x0043	Set point Heat Occ	500	8000	2100		Heating setpoint in occupancy mode (degrees celsius*100)
4x0044	Set point Cool UnOcc	500	8000	2400		Cooling setpoint in unoccupancy mode (degrees celsius*100)
4x0045	Set point Heat UnOcc	500	8000	2000		Heating setpoint in unoccupancy mode (degrees celsius*100)
4x0046	Set point Cool SNC	500	8000	2400		Cooling setpoint summer night cooling (degrees celsius*100)
4x0047	Set point Heat SNC	500	8000	1500		Heating setpoint summer night cooling (degrees celsius*100)

Holding						
ID	**Name**	**Min**	**Max**	**Init**	**Settings**	**Description**
4x0048	Set point Cool Holiday	500	8000	2500		Cooling setpoint in holiday mode (degrees celsius*100)
4x0049	Set point Heat Holiday	500	8000	1800		Heating setpoint in holiday mode (degrees celsius*100)
4x0050	Room temperature offset	-1000	1000	0		Room temp offset (Degrees celsius*100)
4x0051	SM SP offset step size	0	300	100		"Sensor module Offset step size (degrees celsius*100) Default 100 = 1 degree"
4x0052	Cooling boost delay	0	60	10		Two step cooling delay in minutes
4x0053	Heating boost delay	0	60	10		Two step heating delay in minutes
4x0054	Change over 2 act temp	0	8000	0		Actual Change over temp (degrees celsius*100)
4x0055	Heat type	0	1	0	0=Normal (water actuator), 1=Radiator	Defines heat type Water actuator or Radiator
4x0056	Air flow max	0	32767	2000		Configured max airflow in l/s*10
4x0057	Air flow min Occ	0	32767	150		Configured min occupancy airflow in l/s*10
4x0058	Air flow min UnOcc	0	32767	50		Configured min unoccupancy airflow in l/s*10
4x0059	Air flow min Holliday	0	32767	50		Configured min holiday airflow in l/s*10
4x0061	Air flow moving average time (hours).	0	24	1		Air flow moving average time (hours).
4x0062	Low pressure alarm limit	0	10000	0		Configured low pressure alarm limit in dpa
4x0063	Vent boost delay	0	200	72		Configured ventilation boost delay time in hours
4x0064	Vent boost time	0	60	5		Configured ventilation boost time in minutes
4x0065	Valve exercise interval	0	96	48		Configured valve exercise interval in hours
4x0066	Min pressure for cooling	0	30000	250		Configured minimum pressure to allow cooling in dpa
4x0067	Air cooling sequence	0	2	1	"0=Control temperature in three steps, air, water then air again, 1=Control temperature with air before water"	Defines cooling sequence Water-Air or Air-Water
4x0068	K-factor on damper short side	-32768	32767	0		K-factor short side ' 100
4x0069	K-factor on damper long side	-32768	32767	0		K-factor long side ' 100
4x0070	Heating P-band	0	1500	300		Regulator setting P-band heating (degrees*100)
4x0071	Cooling P-band	0	1500	300		Regulator setting P-band cooling (degrees*100)
4x0072	Heating I-time	0	1200	20		Regulator setting Heating I-time (minutes)
4x0073	Cooling I-time	0	1200	20		Regulator setting Cooling I-time (minutes)
4x0076	P-band airflow regulator	0	32767	800		Regulator setting Airflow P-band (l/s*10)
4x0077	I-time airflow regulator	0	32767	45		Regulator setting Airflow I-time (seconds)
4x0079	Change over 2 hyst temp	0	1000	500		Change over temperature hysteresis (Degrees*100)
4x0080	Change over 4 low limit	0	1000	550		CCO valve deadzone low limit (V*100)
4x0081	Change over 4 hi limit	0	1000	650		CCO valve deadzone high limit (V*100)
4x0082	Internal LED mode	0	1	1		Internal LED operation mode
4x0083	SM offset LED mode	0	2	2		Sensor module offset LED operation mode
4x0084	SM offset LED active	1	999	20		Sensor module offset LED activation
4x0085	SM LED brightness active	0	10000	10000		Configured led brightness on SM active state (%*100)
4x0086	SM LED brightness inactive	0	10000	2000		Configured led brightness on SM inactive state (%*100)
4x0088	Damper action emergency	0	1	0	0=Close damper, 1=Open damper	Damper emergency action mode
4x0089	Air quality low limit ppm	0	2000	600		CO2/VOC low limit ppm

Holding						
ID	**Name**	**Min**	**Max**	**Init**	**Settings**	**Description**
4x0090	Air quality high limit ppm	0	2000	1200		CO2/VOC high limit ppm
4x0091	PPM/V for CO2 or VOC analog sensor	0	1000	200		Configured ppm/v value from analog Co2/ VOC sensor
4x0092	VOC sensor use	0	1	1	0=VOC sensor not used, 1=VOC value used if sensor is present	VOC sensor mode. Off/Auto
4x0093	Low lim AO1	0	1000	200		Analog output 1 low limit (v*100)
4x0094	Hi lim AO1	0	1000	800		Analog output 1 high limit (v*100)
4x0095	Low lim AO2	0	1000	200		Analog output 2 low limit (v*100)
4x0096	Hi lim AO2	0	1000	1000		Analog output 2 high limit (v*100)
4x0097	Low lim AO3	0	1000	200		Analog output 3 low limit (v*100)
4x0098	Hi lim AO3	0	1000	700		Analog output 3 high limit (v*100)
4x0099	Coil mirror	-32768	32767	0		Coil mirror
4x0100	Modbus master delay time	1	500	1		Modbus master delay time
4x0101	Restore settings (write 1111)	0	32767	0		Restore settings (write 1111)
4x0102	Save settings (write 2222)	0	32767	0		Save settings (write 2222)
4x0103	Airflow demand min	0	32767	0		Configured min value airflow demand
4x0104	Airflow demand max	0	32767	0		Configured max value airflow demand
4x0105	EA offset	-10000	10000	0		Configured Extract air offset (%*100)
4x0106	Digital out 1 option	0	1	0	0=Output is normally open (default), 1=Output is normally closed. (Means inverted)	Used to configure function on Digital output 1
4x0107	Digital out 2 option	0	1	0	0=Output is normally open (default), 1=Output is normally closed. (Means inverted)	Used to configure function on Configuration output 2
4x0108	Digital out 3 option	0	1	0	0=Output is normally open (default), 1=Output is normally closed. (Means inverted)	Used to configure function on Digital output 3
4x0109	Analog out 1 option	0	1	0	0=Output is normally open (default), 1=Output is normally closed. (Means inverted)	Used to configure function on Analog output 1
4x0110	Analog out 2 option	0	1	0	0=Output is normally open (default), 1=Output is normally closed. (Means inverted)	Used to configure function on Analog output 2
4x0111	Analog out 3 option	0	1	0	0=Output is normally open (default), 1=Output is normally closed. (Means inverted)	Used to configure function on Analog output 3
4x0112	Ignore Occupancy SM (bit code)	0	1023	0		Ignore Occupancy sensor module (bit code)
4x0113	Slave air function	0	1	0	0=Slave is variable, 1=Slave is on/off	Slave air function
4x0114	Air-water-air break-point A	0	10000	3000		Cooling/Heating sequence breakpoint A (%*100)
4x0115	Air-water-air break-point B	0	10000	8000		Cooling/Heating sequence breakpoint B (%*100)
4x0116	Cold draft protection level	0	10000	3000		Cold draft protection level (%*100)
4x0117	Cold draft protection limit to turn off	0	10000	5000		Cold draft protection limit to stop (%*100)
4x0118	Actuator period time	60	1800	600		Defines Actuator PWM period time in seconds
4x0119	Condensation low trig level	0	1000	500		Condensation trig level (kOhm)
4x0120	Condensation hi trig level	0	1000	900		Condensation release level (kOhm)
4x0121	Room temp central	-5000	8000	0		Room temp central
4x0122	Reset timer tempera-ture offset	0	24	0		Temperature offset reset time (h)
4x0123	Continuous airflow type	0	2	0		Airflow regualtion mode
4x0124	Motor stroke time	1	1000	100		Defines motor stroke time (s)

Trouble shooting

Alarm List

Alarm no.	Type of alarm	Probable cause
Alarm no.	Type of alarm	Comment
Alarm 1	Supply voltage low	Low supply voltage, undersized transformer, voltage drop in long cables. Risk of reduced function
Alarm 2	Supply voltage critical low	See above, large risk of reduced function
Alarm 3	Ext temp missing	Temp. sensor not connected
Alarm 4	Ext temp error	Temp. sensor defective
Alarm 5	Condensation sensor error	Condensation sensor defective
Alarm 6	SM temp sensor error	SM temp sensor defective
Alarm 7	SM button error	SM temp button defective
Alarm 8	CO2 sensor missing	CO2 sensor not connected
Alarm 9	VOC Error	VOC sensors, incorrect value
Alarm 10	Low pressure	One of the pressure sensors measure a pressure below the permitted
Alarm 17	SM comm error	Communication error sensor module, check addressing
Alarm 18	Slave comm error	Slave unit not connected
Alarm 19	Pressure sensor comm error	Communication error pressure sensor, check addressing of the pressure sensor
Alarm 20	VOC sensor comm error	VOC sensor not connected
Alarm 21	No master request (slave)	The slave unit cannot find a Master to relate to.
Alarm 22	Slave incompatible version	Software version in slave unit is different to the one in the master unit
Alarm 25	Heating comfort alarm	Room setpoint cannot be reached, even though the output to the heating actuator has been 100% for x minutes
Alarm 26	Cooling comfort alarm	Room setpoint cannot be reached, even though the output to the cooling actuator has been 100% for x minutes
Alarm 27	Temp. Setpoint overlap alarm	Overlapping set values for temperature
Alarm 28	Air quality comfort alarm	Permitted PPM value exceeded during x minutes
Alarm 29	Condensation	The condensation sensor has made the circuit, condensate water or short circuit
Alarm 33	24 V Out 1 overload error	Overloaded output
Alarm 34	24 V Out 2 overload error	Overloaded output
Alarm 35	24 V Out 3 overload error	Overloaded output
Alarm 41	Slave input sum alarm	Input alarm from slave unit
Alarm 42	Slave output sum alarm	Output alarm from slave unit