ADAPT Parasol

Energy-saving comfort module for Swegon's WISE System for demand-controlled ventilation

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- Comfort modules for demand-controlled ventilation and Swegon's WISE system.
- Energy-efficient operation since the room is ventilated, heated and cooled exactly as called for by the load, neither more nor less.
- Highest possible comfort with provision for individual control on the product or at room level.
- Waterborne cooling energy and waterborne or electric heat
- Draught-free indoor climate, 4-way air distribution and Swegon's ADC (Anti Draught Control) provide maximum comfort and flexibility both today and for future needs.
- Simple installation, commissioning and maintenance. Complete product with all components and accessories installed from the factory.

Primary airflow:	Up to 85 l/s
Pressure range:	50 to 150 Pa
Total cooling capacity:	Up to 2055 W
Heating capacity:	Water: Up to 2700 W
	Electric: Up to 1000 W
Size:	600 and 1200 with adapters for a number of ceiling systems

ADAPT Parasol comfort module

The ADAPT Parasol is based on a standard Parasol but is equipped with functions for demand control of the indoor climate. Available as single and two-module units:

Sizes:	600x600; 600x1200
Modules:	Supply air and cooling Supply air, cooling and heating (water) Supply air, cooling and heating (electric)
Installation:	Flushed mounting for false ceiling constructions

Function

The essential function of the comfort modules is closely related to that of climate beams. The major difference is that comfort modules distribute air in four directions instead of two. This maximizes the area for the induction of room air with the supply air which enables the modules to deliver a high capacity without occupying more ceiling space than necessary. The comfort modules are also optimized to quickly mix the supplied air with the room which provides better comfort in the room. In heating applications, this technique also ensures heat is conveyed along the ceiling in a better way.

Demand-controlled indoor climate

Demand-controlled ventilation involves ventilating and conditioning the air in a room precisely to meet our needs – no more and no less. The potential for savings is substantial, especially in premises where there is considerable variation between low and high load conditions in rooms and during times when there are few or no occupants - which is the case in many premises. Offices for example have in many cases an occupancy rate of less than 50 %!

The ADAPT Parasol combines the best attributes from two worlds – demand-controlled ventilation with all its potential for savings combined with the comfort module's high capacity and performance for air conditioning rooms. All this packaged in one compact unit is simple to install.

Flexibility

The easily adjustable nozzles in combination with Swegon's ADC (Anti Draught Control) offer maximum flexibility for future changes in the room layout. All sides of the unit can be set independently of one another and this enables the comfort module to distribute more air or less air to each of the four sides and discharge the air in the preferred direction in the room.

Design

The face plate of the ADAPT Parasol is available in three different perforation patterns. As standard, the face plate has round perforations arranged in a triangular pattern however other optional patterns are available to special order.

Draught-fee indoor climate

The ADAPT Parasol distributes air in four directions at low air velocity. The low air velocity is created by distributing air cooler than room temperature over a large area. The special design of the outlet creates a turbulent flow enabling the supply air to be quickly mixed with the room air.

The ADAPT Parasol is available in the following coil/heat exchanger variants:

Variant A:	Supply air and waterborne cooling
Variant B:	Supply air, waterborne cooling and heating.
Variant X:	Supply air, waterborne cooling and electric heating.

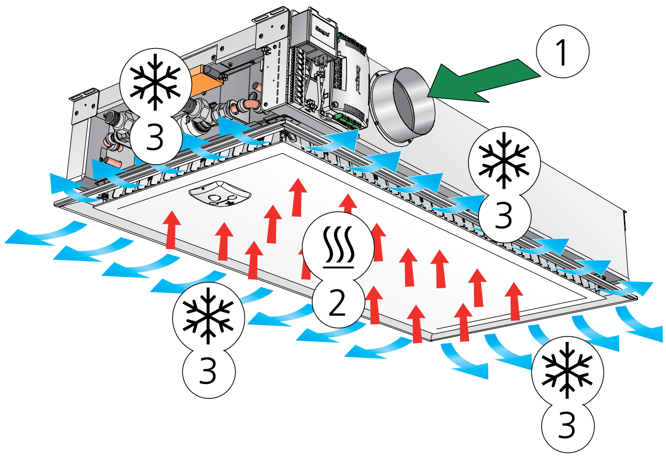


Figure 1. Variant A: Cooling and supply air operation
1 = Primary air
2 = Induced room air
3 = Primary air mixed with chilled room air

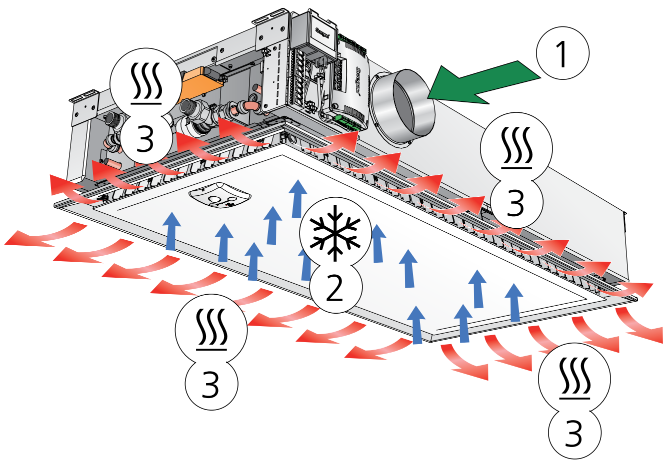


Figure 2. Variant B: Heating and supply air operation (also includes cooling operation)
1 = Primary air
2 = Induced room air
3 = Primary air mixed with heated room air

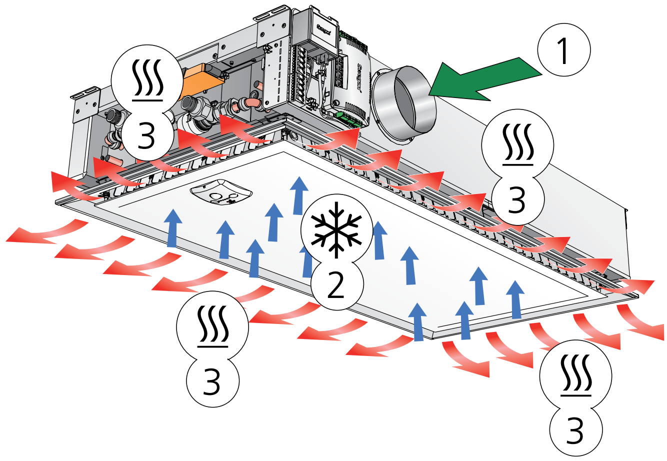


Figure 3. Variant X: Supply air and heating function with electric heating elements (also includes cooling function)

1 = Primary air
2 = Induced room air
3 = Primary air mixed with heated room air

ADAPT Parasol

Compact and intelligent unit

The ADAPT Parasol is supplied as a compact and intelligent unit in which the damper and control equipment is integrated into the product. Only the power supply and possible connection to a main control system need to be wired from the module.

The sensor module, which is a vital part of the product, is a combined presence detector and a temperature sensor. Its default location is within the face plate, however it can also be mounted on a wall.

The package together with its intelligent control system where numerous adaptations can be made, contribute to making the product very flexible and future proof.

As an example, it is noteworthy that all the units can operate as master or slave, simply adjustable by changing a parameter together with repositioning an RJ cable. This means that in the event an open-plan office, for example, is divided up into office cells, the extra work involved in adapting the product to the new operating conditions is minimized.

ADAPT Parasol PlusFlow

If you need both high cooling capacity and high airflows, then the ADAPT Parasol 600/1200 PF is the right choice. ADAPT Parasol PF installed in a conference room, for instance, can reduce the number of installed products by 50%.

The module can handle large airflows and at the same time has the same high cooling and heating capacity as a standard ADAPT Parasol, of course with maintained high level of comfort in the room.

High capacity

With its high capacity, the ADAPT Parasol utilizes 40-50% less ceiling area for handling the cooling energy demand in a normal office, compared with a traditional climate beam.

Simple to adjust

By means of built-in nozzle regulation with numerous possible settings, the ADAPT Parasol offers optimum comfort and can be easily adapted to meet a change in room size or operations conducted inside the premises. The comfort module can be set so that different air volumes are diffused on each side and can be set for both high and low airflows.

Range of Application

The ADAPT Parasol is ideal as a standard application in the following typical premises:

- Offices and conference rooms
- Classrooms
- Hotels
- Restaurants
- Hospitals
- Shops
- Shopping centres

With its numerous possible settings, the functions of the ADAPT Parasol can easily be adapted to new businesses or changes in the design of the premises.

Simple to install

The ADAPT Parasol's small compact units are designed to fit the most common modular ceiling dimensions and this makes them simple to install. The small dimensions offer benefits in handling, especially at the building site, with easier installation and reduced health and safety issues.

Market-standardised modular dimensions

The products available to order have modular dimensions to fit the standardised 600, 625 and 675 mm centre-to-centre ceiling dimensions. There are also mounting frames for gypsum board ceilings as well as solutions for clip-in type ceilings.

Always in stock

The ADAPT Parasol's standard variants with the most common functions are available from stock to keep delivery times short.

All components in the product can be installed directly from the factory

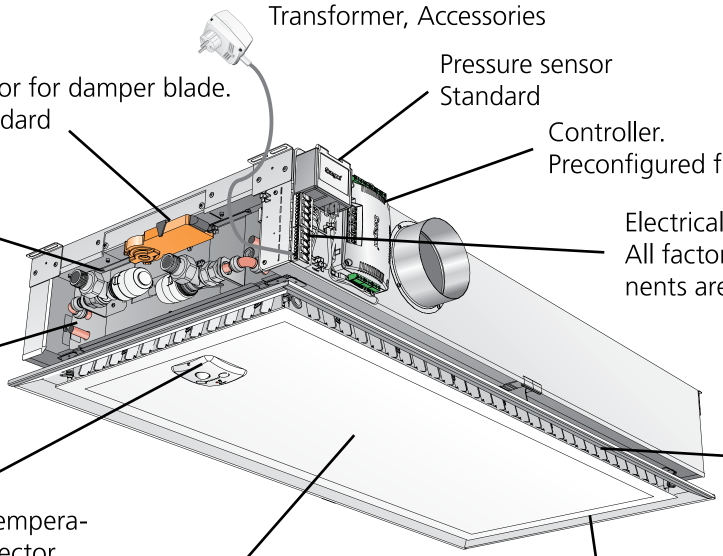


Figure 4. All components in the product can be installed directly from the factory

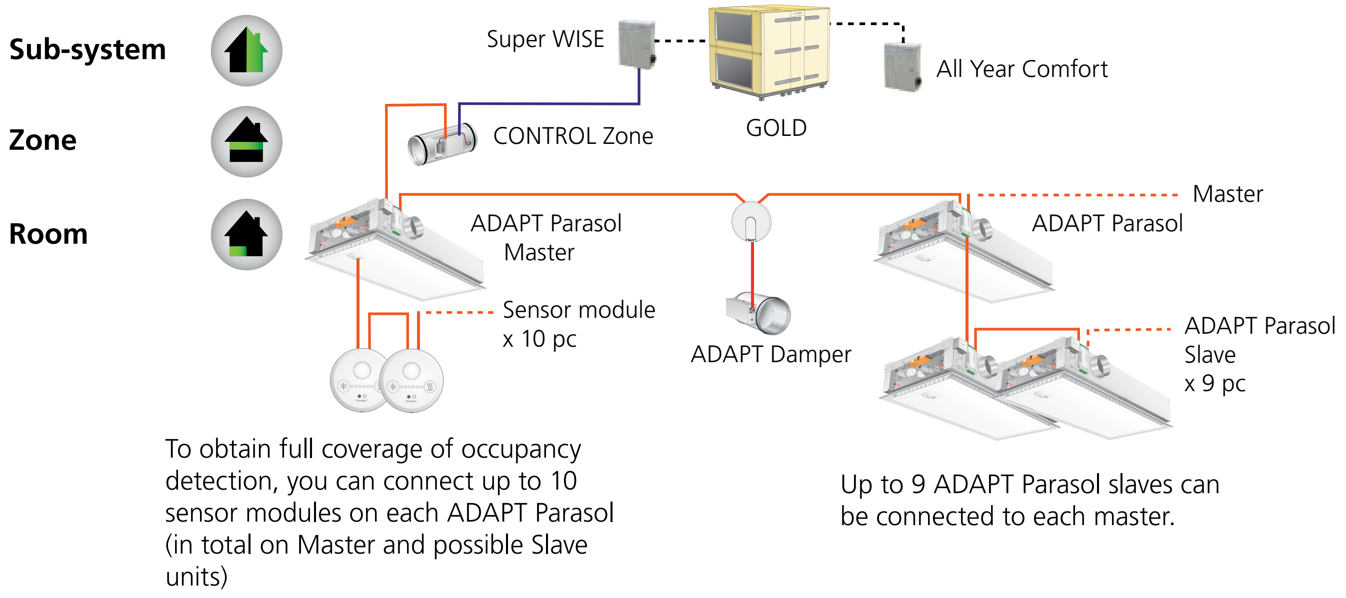


Figure 5. ADAPT Parasol, a component of the WISE system

Component of the WISE system

The ADAPT Parasol is a component of Swegon's WISE System for demand-controlled ventilation.

Via the SuperWISE, a communication unit, which, via Modbus RTU, ties all the components in the WISE system together, ADAPT Parasol communicates with other WISE products in the system and all the way up to the GOLD air handling unit.

One of the advantages with the ADAPT Parasol is that the pressure in the nozzles can be kept constant, and this means controlled throw lengths, high capacity and maintained Coanda effect of the air regardless of the operating conditions.

A CONTROL Zone damper is used for keeping the pressure constant in the zone and in each ADAPT Parasol module.

The ECOPulse function

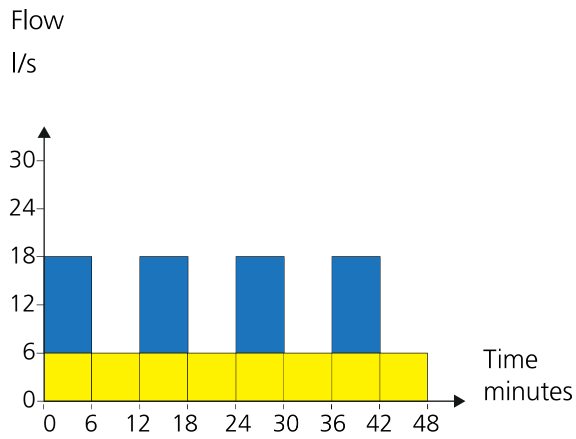
The ADAPT Parasol has 2 basic ventilation flows, min. & max. When the ECOPulse (standard) function has been selected, the controller calculates the amount of time the damper will be closed (min. flow) and open (max. flow), to obtain the required occupancy flow.

The ECOPulse function guarantees that the module always delivers highest possible capacity.

Example:
Max. airflow (18 l/s)
Required occupancy flow (12 l/s)
Min. flow (6 l/s)

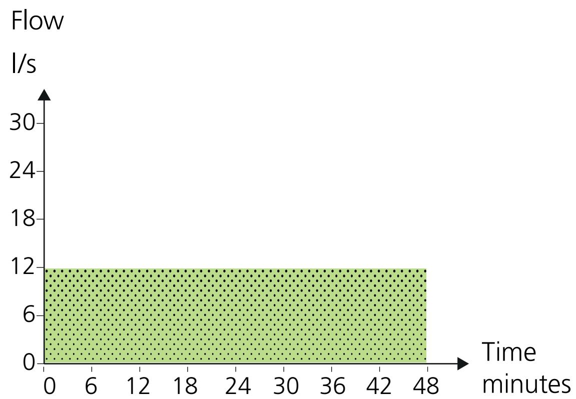
In this example, the allocation of time at closed (min. flow) and open (max. flow) will be approximately 50/50 as the required occupancy flow is halfway between the min. and max.

The sequence consists of periods (minimum of 6 minutes) that always begin with a period with max. flow, which is then followed by the right number of periods with min. flow to obtain the correct air volume over time.



When the system has operated for 48 minutes, it has therefore fulfilled a complete sequence. Then it begins a new sequence that lasts another 48 minutes provided no change in demand has occurred (temperature, CO_2, precense, etc).

If we now distribute the yellow and blue airflows as a mean value over time, we reach the required flow of 12 l/s.



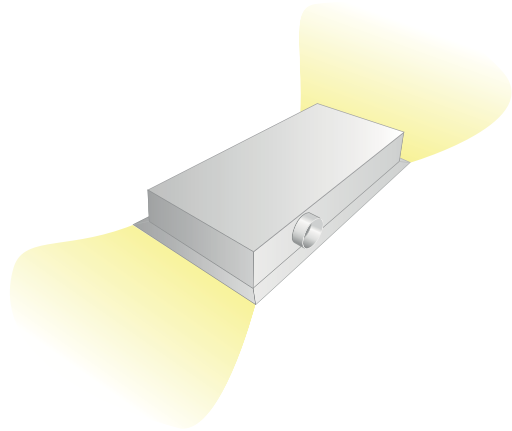


Figure 6. Min. flow, no occupancy in the room.

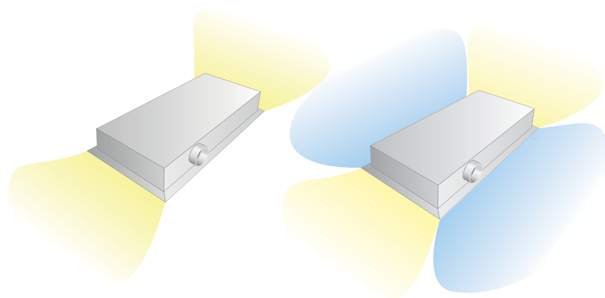


Figure 7. Presence detector, a combination of min. and max. flow.

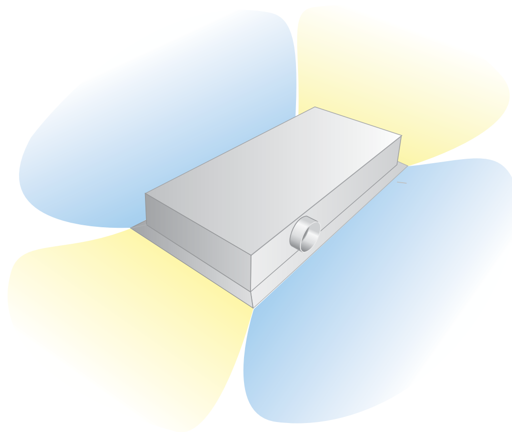


Figure 8. Max. flow when the temperature or CO_2 content is too high

Basic adjustment of nozzles

In the example above, the nozzles on the short side can be configured so that at a certain pressure they will deliver 6 l/s min. flow, which also is the unit's no occupancy flow.

The max. flow is obtainable by adjusting the nozzles on the long side so that the four sides together will deliver 18 l/s required max. flow.

You can test various variants and combinations of nozzle settings on the sides in ProSelect to save as much air as possible in the no occupancy mode combined with always obtaining a sufficiently good climate in the room in the occupancy mode.

Control functions

Regardless of which ADAPT Parasol model is ordered and how this module is configured from the beginning, you can simply choose between the following three operating modes by making a selection in the software:

ECOPulse

The ECOPulse function enables the ADAPT Parasol to alternate between min. and max. mode in order to obtain increased occupancy flow. See the more detailed description on page 7.

Variable

If the Variable function is selected, the nozzle configuration still sets the limits for min. and max. flows just as for the ECOPulse function, but in this case the integrated damper delivers the exact air quantity all the time.

On selecting the Variable function, all airflows between min. and max. will be delivered at lower capacity compared with the ECOPulse function.

Example: No occupancy flow approx. 5 l/s, required occupancy flow 20 l/s and max. flow 35 l/s.

In the occupancy case, the max. flow will be utilized only if the temperature or air quantity requires this, and when these requirements have been met, the flow will decrease back to the required occupancy flow again.

2Step

Here, the min. and max. flows are used just as before, but the max. flow is the same as the occupancy flow. So, if the same nozzle setting as the one in the Variable example above is used.

No occupancy = min. flow 5 l/s.

Occupancy = max. flow = 35 l/s.

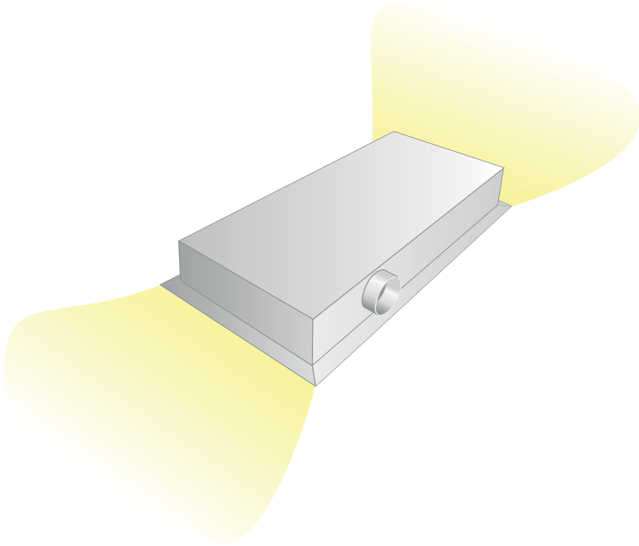


Figure 9. Vacancy/min. flow for all the control functions

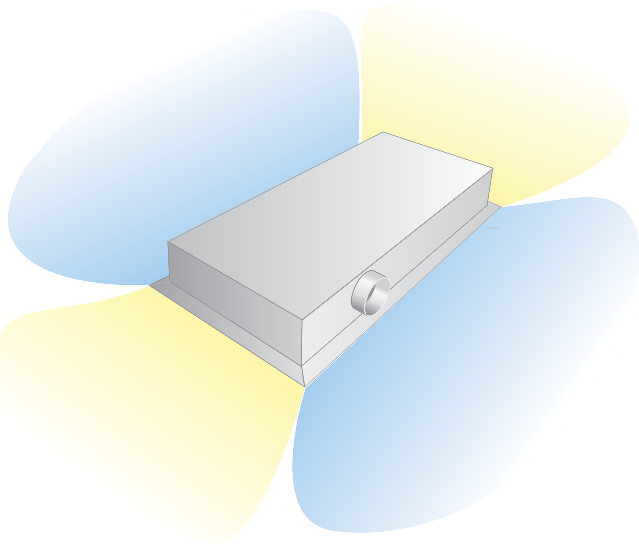


Figure 10. Occupancy/max. flow for 2Step. For the Variable control function, the long sides variably discharge air between the min., occupancy and max. ventilation flows.

Depending on the status of connected sensors, the controller adjusts the outputs from any of several possible operating conditions.

The operating conditions based on occupancy in the room, the status of the sensor in use or signals from a main control system are described below.

Operating modes

There are numerous functions in the ADAPT Parasol:

- Occupancy mode.
- No occupancy mode.
- Holiday.
- Stand-by, idle mode.
- Emergency mode.
- Commissioning.
- Summer night cooling.

Occupancy mode

When the ADAPT Parasol receives signals via presence detector that someone is in the room, the valve actuator for chilled water or heating water as the case may be is controlled according to the selected temperature setpoint for cooling or heating associated with this operating mode. The airflow is controlled to the preselected occupancy flow, but is influenced of course by sensors such as condensation sensors, temperature sensors, window contacts, air quality sensors, if required, etc.

No Occupancy mode

When the No occupancy mode function is active, the system automatically switches over to the energy-save mode. The system returns to the Occupancy mode and normal operation when occupancy is registered again. In the energy-save mode/No occupancy mode, the valve actuator is controlled to regulate the chilled water flow or hot water flow according to the status on other sensors in the room, but normally with a greater permissible deadband from the temperature setpoint for cooling or heating than in the occupancy mode, whilst the air is controlled to the min. flow setting.

Holiday.

When the Holiday operating mode is active, the system automatically switches over to the energy-save mode just as in the case of No occupancy, but with scope for allowing further greater temperature differential. Controlled from a main control system.

Stand-by, idle mode

When the control system registers that a window is open, the controller switches over to the Stand-by mode. When the window is closed, the controller switches over to the Occupancy mode. When the controller is in the Stand-by mode, the room temperature is kept above 10°C (frost protection).

Emergency mode

In the event of a fire alarm, the controller opens or closes the air damper in the extract air duct, depending on how the control system is set. In the Emergency mode, cooling and heating are switched off. Supply air is normally switched off.

The Emergency mode can only be managed in control systems that are connected to a main control system via Modbus RTU.

Commissioning level

The "First open" function involves having the water valves open while the installation work is in progress, which simplifies filling, pressure testing and venting the water system

The function will be automatically deactivated after approx. 6 minutes while the system is energised.

A clicking noise can be heard when the valves and dampers change over to the NC mode (normally closed) and the normal control function is activated.

Further particulars of the commissioning mode can be read in the description of the sensor module on page 12.

Summer night cooling

The function involves the use of cold air from outdoors for cooling the room at night to the predefined level.

The function can only be handled in the control system that is connected to a main control system via Modbus RTU.

Functions

Exercising of valves

The function involves exercising the water valves regularly by means of automatic control equipment to prevent them from seizing or becoming stuck. During the exercising process, all the valves wired to the controller open to the max. setting for 6 minutes and then close. The valves of the cooling system are exercised first; after that the valves of the heating system are exercised.

Frost protection

The function involves starting heating operation at 10°C to prevent the risk of damage that otherwise could occur due to freezing.

Change over

The function involves the use of only one valve actuator which should be wired to the cooling output terminal. This actuator then controls both the heating water and the chilled water, which is transported in the same pipe. An external temp. sensor should be used and this component should take measurements on the pipe through which water always circulates.

In winter, when heating is required, the valve opens if the water in the pipe is warmer than the temperature set point. If the water is colder, the valve does not open.

In summer, when cooling energy is required, the valve opens if the water in the pipe is colder than the temperature set point.

Specific nozzle settings

To specify nozzle settings, always begin from the side where the water pipes are located. From there, proceed in counter-clockwise direction and specify side after side, see Figures 11 and 12. Units can be ordered with nozzles factory-preset (this does not apply to units held in stock).

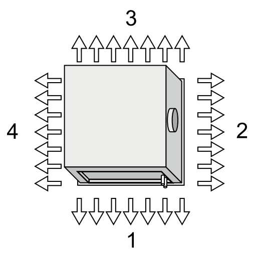


Figure 11. Top view, sides 1-4 ADAPT Parasol 600

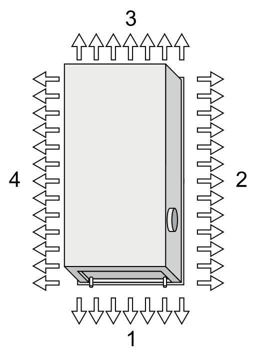


Figure 12. Top view, sides 1-4 ADAPT Parasol 1200

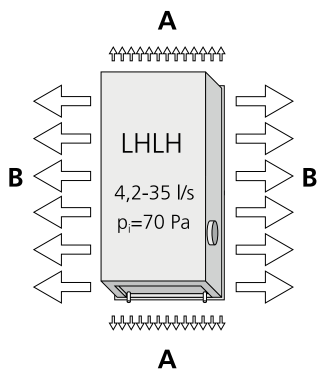


Figure 13. Example 1. A = 2.1 l/s, B = 15.4 l/s

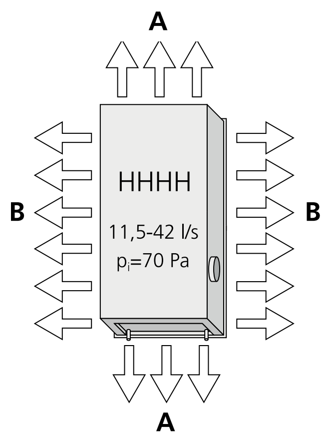


Figure 14. Example 2. A = 5.7 l/s, B = 15.25 l/s

Example 1:

Nozzle setting LHLH produces the lowest possible No Occupancy flow (sides 1 + 3 open). This produces a min. flow/No Occupancy flow of 4.2 l/s and a max. flow of 35 l/s at p_i= 70 pa

Example 2:

If it is instead more important to obtain the highest possible max. flow/capacity, the nozzles should be set to the HHHH position, i.e. fully open on all sides. A higher max. flow will then be obtained, however the No Occupancy flow will consequently also be slightly higher.

These adjustments are only different settings on the same physical product which makes the unit very flexible and adaptable, particularly together with the integrated software.

K-factors for each side can be obtained from Tables 2-5 or from the installation instructions on the Internet, however the easiest way to do this is in ProSelect where you can quickly test various variants.

Nozzle setting

The unique built-in nozzle control in the ADAPT Parasol makes it possible to individually set each one of the four sides. Depending on the unit's location and the room's primary air requirement, the primary air can be guided in all desired directions. The direction of the airflow can be easily optimized using the Swegon ProSelect sizing program that can be downloaded from www.swegon.com.

The required nozzle setting is preset from the factory, but if required it can be simply changed at the site.

K-factor

Each nozzle setting has a specific K-factor. A total K-factor for the unit can be determined by adding together the K-factors for the nozzle settings on each side. The relevant K-factor for optimized nozzle setting can also be obtained in ProSelect.

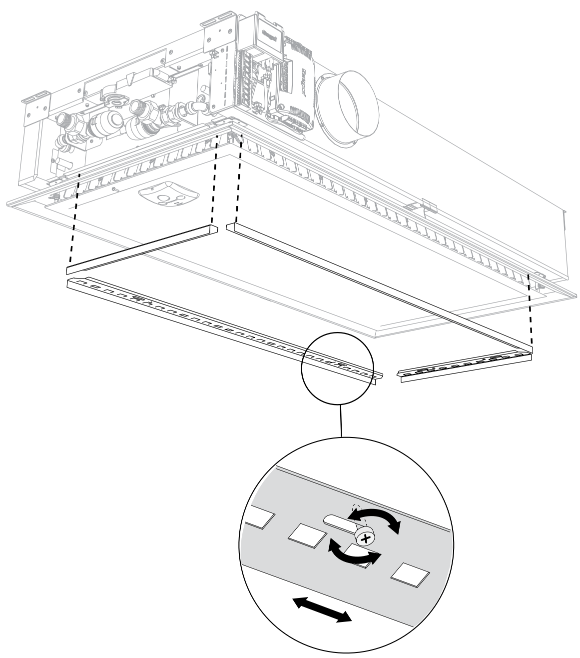


Figure 15. Nozzle setting

The sensor module

The sensor module consists of a presence detector and a temperature sensor in the same unit.

This component is mounted as standard in the face plate on the ADAPT Parasol but it can also be ordered as an accessory for wall mounting, and in that case either recessed in a standard electrical component box or surface-mounted on the wall.

By pressing the appropriate buttons on the sensor module, you can adjust the temperature in the room, set the ADAPT Parasol to the commissioning mode and read the alarm list.

6 light-emitting diodes indicate in the normal mode which temperature level has been selected. If an error occurs, the current alarm is shown as a series of flashes that are translatable using an alarm list.

Use an RJ12 cable to connect the sensor module to the controller.

The floor area covered by the presence detector is approx. 30 m^2 if it is mounted at a height of 2.7 metres above the floor and in parallel with the floor.

Basic setting for temperature adjustment

To lower the temperature setting, press down the left-hand button.

To raise the temperature setting, press down the right-hand button.

Each diode corresponds to a one degree increase or decrease of the set point.

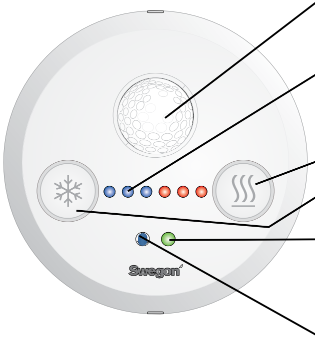


Figure 16. Sensor module viewed from the front

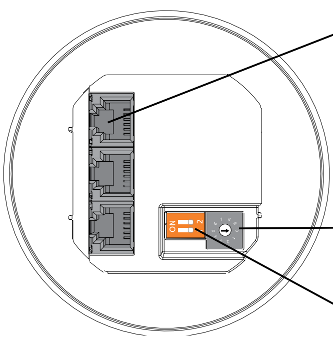


Figure 17. Sensor module viewed from rear

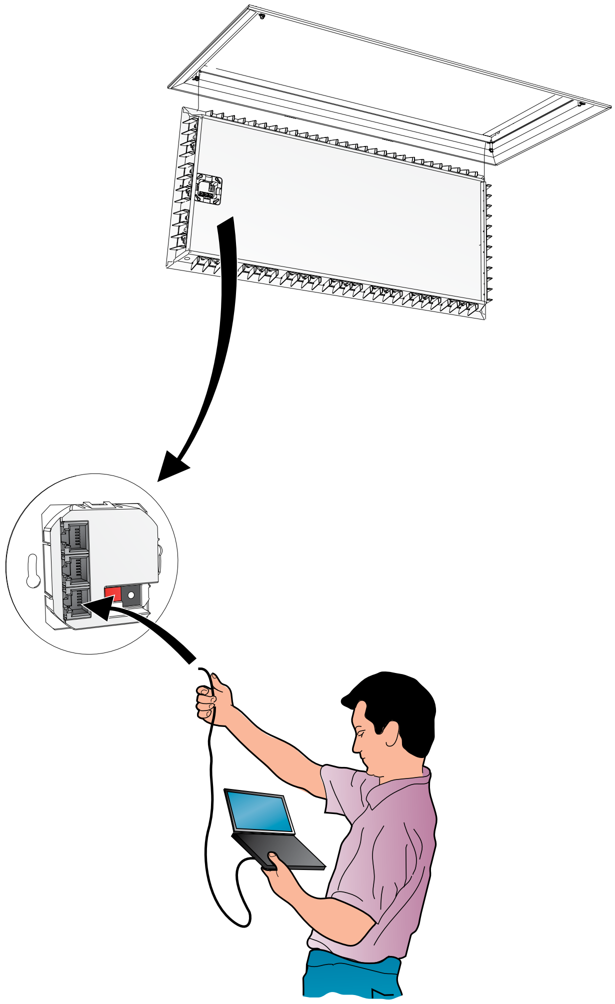


Figure 18. The CABLE CONVERTER USB-RJ12 (RS485) cable can be used for connecting a computer to the module for e.g. entering software settings.

Typical installations:

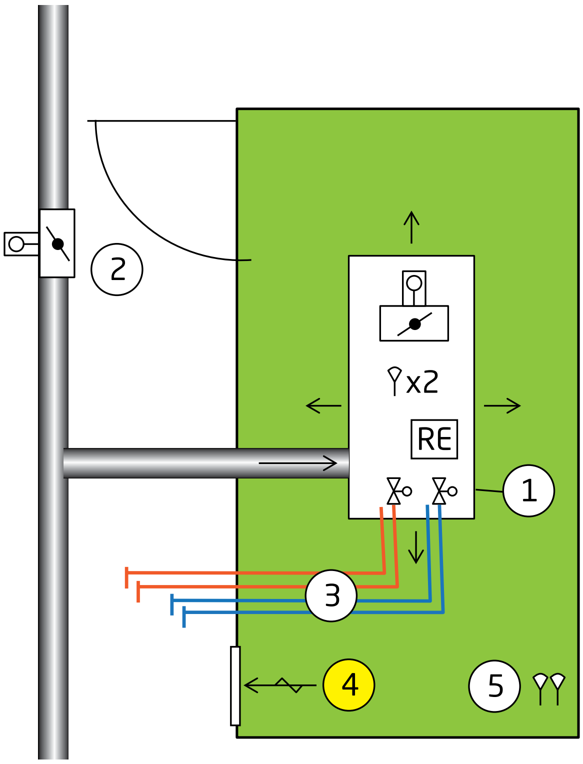


Figure 19. Typical room 1 shows ADAPT Parasol in an office room. Extract air leaves the room via a transfer air grille (balance at zone level)

1. ADAPT Parasol comfort module with supply air, cooling and heating.

- *Pressure sensor*
- *Condensation sensor*
- *Communication unit/controller*
- *Damper with motor.*

2. CONTROL Zone damper

3. Chilled water and heating water

4. Extract air via transfer air grille to the corridor

5. External sensor module (occupancy and temperature sensor)

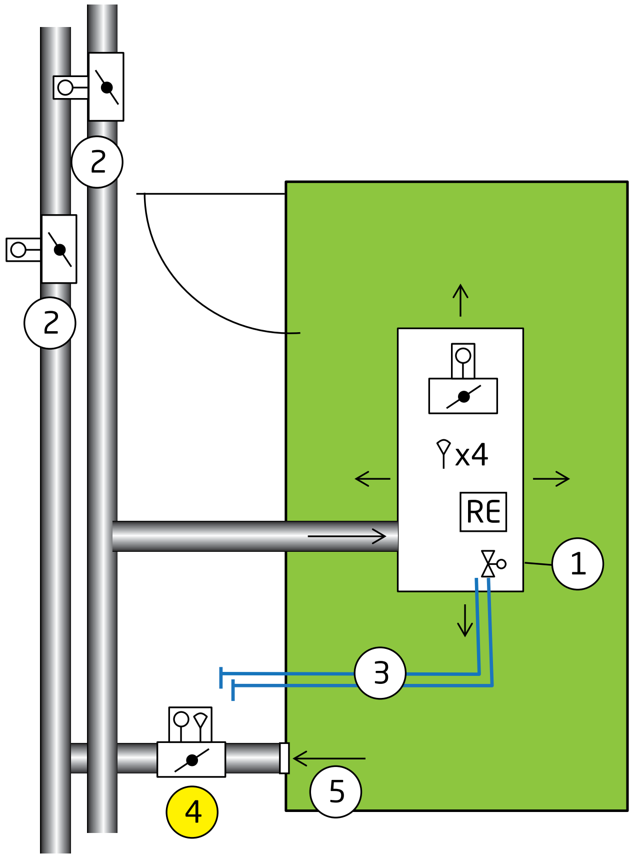


Figure 20. Type room 2 shows ADAPT Parasol in an office room. Supply and extract air in balance.

1. ADAPT Parasol comfort module with supply air and cooling.

- *Pressure sensor*
- *Presence detector*
- *Temperature sensor*
- *Condensation sensor*
- *Communication unit/controller*
- *Damper with motor.*

2. CONTROL Zone damper

3. Chilled water

4. Extract air via ADAPT Damper slave-controlled from ADAPT Parasol

5. Grille or fully open type EXC extract air register

Operating mode

ADC

All the comfort modules are supplied with ADC air deflectors.

ADC stands for Anti Draught Control, which enables you to set the diffusion pattern of the air being distributed to avoid risk of draught. A number of ADC sections with four air deflectors per section are arranged on each side of the unit. Each section is adjustable from a straight setting to 40° air deflection to the right or left in increments of 10°. This offers enormous flexibility and can be easily adjusted without affecting the sound level and the static pressure.

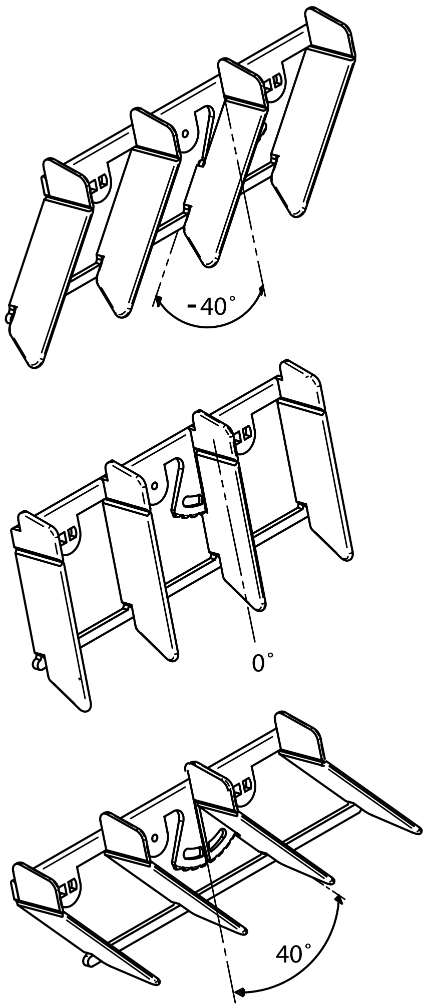


Figure 21. ADC, setting range from -40° to +40° in increments of 10°

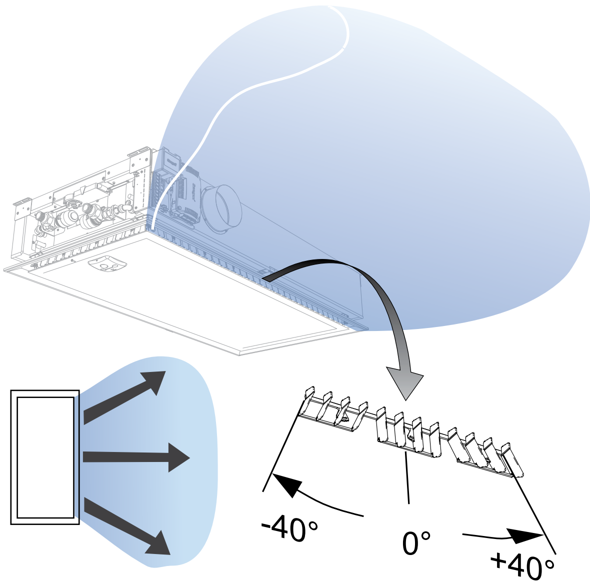


Figure 22. Possible settings for the ADC, Fan-shape

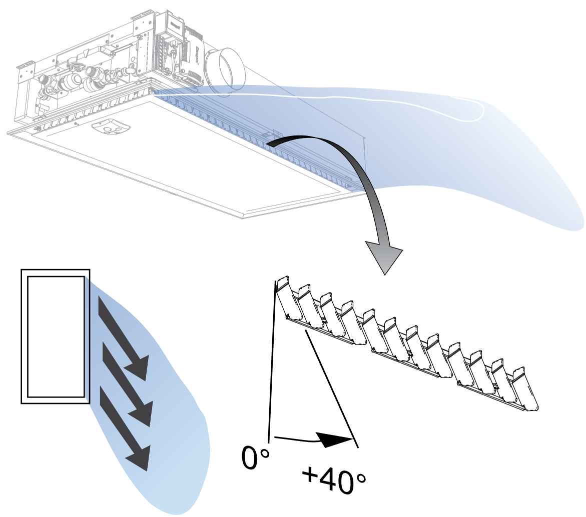


Figure 23. Possible settings for the ADC, X-shape

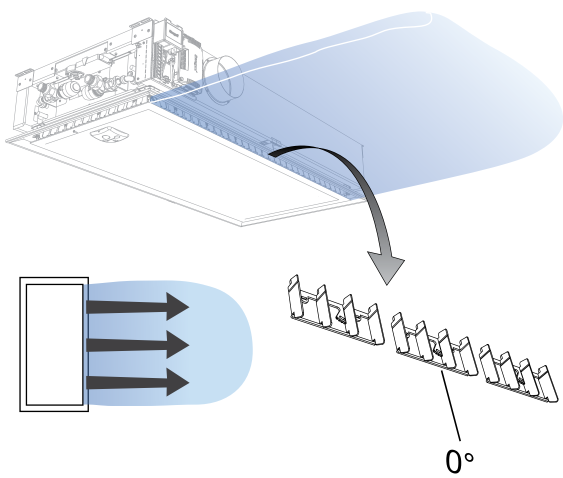


Figure 24. Possible settings for the ADC, Straight airflow setting

Installation

Recommended types of ceiling
The ADAPT Parasol is designed to fit in most T-Bar and Clip-in type ceiling systems in terms of length and width. To guarantee a quality finish in T-Bar ceiling system, we recommend T profiled sections with a width of 24 mm.

Suspension
The ADAPT Parasol has four mounting brackets for suspension, and are installed using a threaded rod in each mounting bracket (Figure 28). A double threaded rod with a thread lock should be used if there is substantial distance between the overhead slab and the unit.

The threaded rod, assembly piece SYST MS M6 (Figure 29), must be ordered separately.

Connection dimensions

Water	
Without valves:	
Cooling energy, plain end (Cu)	Ø 12 x 1.0 mm
Heating, plain end (Cu)	Ø 12 x 1.0 mm
With factory-fitted valves:	
Cooling	Male threads, DN15 (1/2”)
Heating	Male threads, DN15 (1/2”)
Air	
Air connection piece, standard variant	Ø 125 mm
Connection frame, variant PF	Ø 160 mm

To connect air
ADAPT Parasol is supplied as standard with an open air connection on the right-hand side (viewed from the end where the water is connected).

The air connection piece is mounted on delivery for connection ted to the primary air duct (see Figure 27). A cover is factory-fitted to the left-hand air connection, however handling can be easily reversed with the air connection piece fitted to the left if required.

To connect the water pipes
Connect the water pipes using push-on couplings or clamping ring couplings if the product is ordered without valves. Note that clamp ring couplings require support sleeves inside the pipes.

Do not use couplings that have to be brazed for connection of the water pipes. High temperatures could damage the unit’s existing brazed joints.

Flexible connection tubes for water are available for both plain pipe ends as well as valves and should be ordered separately.

Condensation-free cooling energy
Since the comfort modules have to be designed to operate without condensation, no drainage system is required.

To wire the electric heating elements
The wiring diagram is available from www.swegon.com.

Overheat protection
The ADAPT Parasol with electric heating is equipped with two thermal overheat protections. The protection, with automatic reset, switches out the heating elements (the zero conductor) when the temperature exceeds 60 °C. When the temperature has dropped to 50 °C the protection closes the circuit again and reenergizes the heating elements. If the temperature instead rises to 75 °C after the first overheat protection has tripped, the second manually resettable overheat protection will kick in and will also switch off the phase conductor to the heating element.

To reset the overheat portection the perforated face plate should first be removed. The red reset button is situated between the air heater and the end panel through which the cooling water pipes are installed. After the overheat protection has been reset, click the faceplate back into place.

CE marking
The ADAPT Parasol with electric heating is CE marked in accordance with applicable requirements. The CE Declaration of Conformity is available at our website: www.swegon.com.

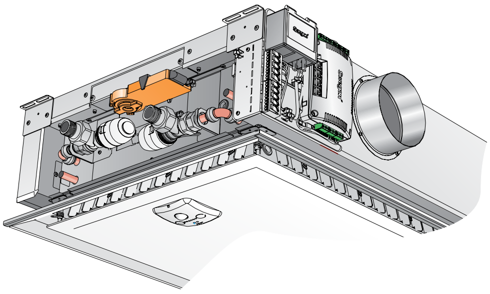


Figure 25. Water connection with factory-fitted valves (An ADAPT Parasol 1200 is shown in the example)

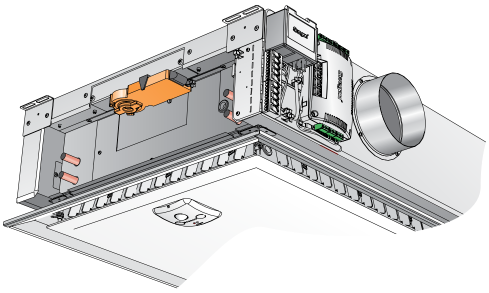


Figure 26. Water connections without factory-fitted valves (An ADAPT Parasol 1200 is shown in the example)

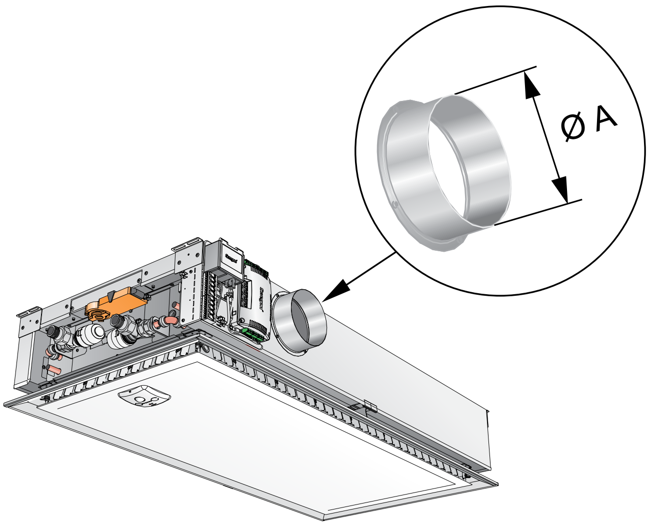


Figure 27. Air connection piece

Variant	
ADAPT Parasol 600	A = Ø 125 mm
ADAPT Parasol 600 PF	A = Ø 160 mm
ADAPT Parasol 1200	A = Ø 125 mm
ADAPT Parasol 1200 PF	A = Ø 160 mm

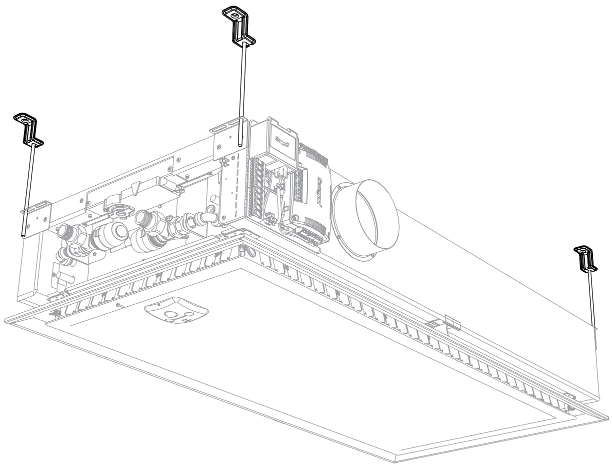


Figure 28. To suspend a two-module unit

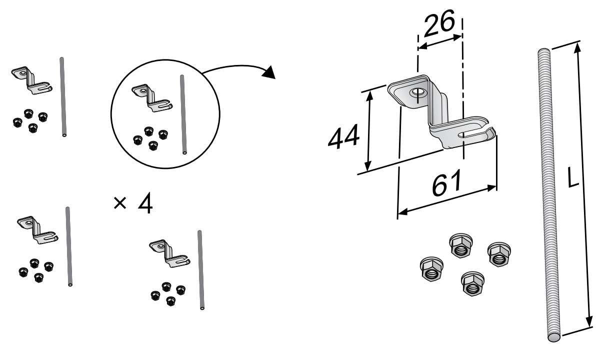


Figure 29. Assembly piece SYST MS M6-1, ceiling mount and threaded rod

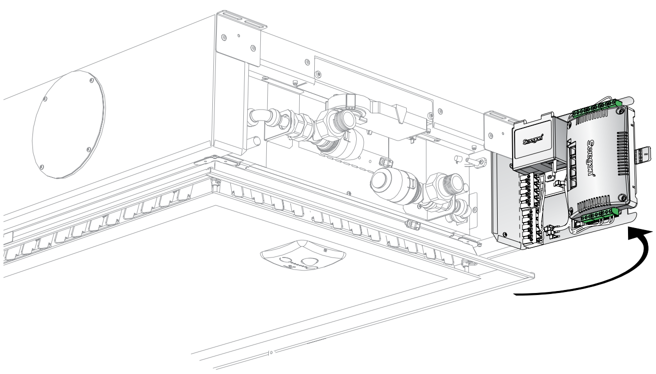


Figure 30. Controller, pressure sensor and wiring terminals are on a mounting plate which, if required, can be folded out for simpler access.

If the module is installed in a plasterboard ceiling, for example, an inspection cover must be arranged to enable access to the connection end of the ADAPT Parasol.

Technical data

Total cooling capacity, max. 2055 W

Heating capacity, water, max. 2700 W
Heating capacity, electric, max. 1000 W

Airflows
Single module unit 7-34 l/s
Two-module unit 7-85 l/s

Length
Single module unit 584; 592; 598; 617; 623; 642; 667 mm
Two-module unit 1184; 1192; 1198; 1242; 1248; 1292; 1342 mm

Width 584; 592; 598; 617; 623; 642; 667 mm

Height
ADAPT Parasol 600 220 mm
ADAPT Parasol 600 PF 250 mm
ADAPT Parasol 1200 220 mm
ADAPT Parasol 1200 PF 250 mm

Dimensions of the units have a tolerance of (±2) mm.

Power consumption

Power consumed for sizing 9.8 VA transformer with factory fitted actuator.

Table 1. Weight

ADAPT Parasol	Dry weight (l)	Chilled water volume (kg)	Heating water volume (kg)
1192-A	25.6	1.4	X
1192-B	29.7	1.4	0.9
1192-A-PF	28	1.4	X
1192-B-PF	32	1.4	0.9
1192-X1	27.4	1.4	X
1192-X2	27.7	1.4	X
592-A	15.8	1.1	X
592-B	16.3	1.1	0.2
592-A-PF	17.3	1.1	X
592-B-PF	17.8	1.1	0.2

These are examples of the most common sizes of the ADAPT Parasol. For other variants, please refer to our ProSelect program at www.swegon.com.
Excl. sensor module 0.1 kg.

Recommended limit values

Pressure levels

Working pressure, coil, max. 1600 kPa *

Test pressure, coil, max. 2400 kPa *
* Applies to module without installed control equipment

Nozzle pressure 50-150 Pa

Recommended lowest nozzle pressure if coil heat is used, p_i 70 Pa

Recommended lowest nozzle pressure with the face plate in the high capacity position, p_i 70 Pa

Water flow

Ensures evacuation of any air pockets in the system.

Cooling water, min. 0.030 l/s

Heating water, min. 0.013 l/s

Temperature differentials

Chilled water, temperature increase 2–5 K

Heating water, drop in temperature 4-10 K

Temperature differences are always expressed in Kelvin (K).

Flow temperature

Cooling Water **

Heating water, max. 60°C

** Chilled water must always be kept at a level that ensures that no condensation will form.

Designations

P	Capacity (W)
t_l	Temperature of the primary air (°C)
t_r	Temperature of the room air (°C)
t_m	Mean water temperature (°C)
ΔT_m	Temperature differential t_r - t_m (K)
ΔT_l	Temperature differential t_l - t_r (K)
ΔT_k	Temperature differential between the cooling water inlet flow and return (K)
ΔT_v	Temperature differential between the heating water inlet flow and return (K)
v	Water velocity (m/s)
q	Flow (l/s)
p	Pressure (Pa)
Δp	Pressure drop (Pa)

Supplementary index: k = cooling energy, v = heat, l = air, i = commissioning, corr = correction

Nozzle pressure (commissioning pressure)

$$p_l = (q_l / k_{pl})^2$$

p_l	Nozzle pressure (Pa)
q_l	Primary airflow (l/s)
k_{pl}	Pressure drop constant for nozzle setting, see Tables 2-5

ADAPT Parasol

Cooling

Standard

The cooling capacities have been measured in conformance with EN 15116 Standard and have been recalculated for a constant water flow according to Diagram 2/3.

Calculating formulae – Cooling

Below are formulae that enable the user to calculate what comfort module is best suited for the application. The values for the calculations can be taken from the tables.

Pressure drop in cooling coil

$$\Delta p_k = (q_k / k_{pk})^2$$

Δp_k Pressure drop in cooling coil (kPa)

q_k Flow of cooling water (l/s), see Diagram 1

k_{pk} Pressure drop constant for cooling coil, see Tables 2-5

Cooling capacity of the air

$$P_l = 1.2 \cdot q_l \cdot \Delta T_l$$

P_l Primary air cooling capacity (W)

q_l Primary airflow (l/s)

ΔT_l Temperature differential between primary air (t_l) and room air (t_r) (K)

Cooling capacity of the water

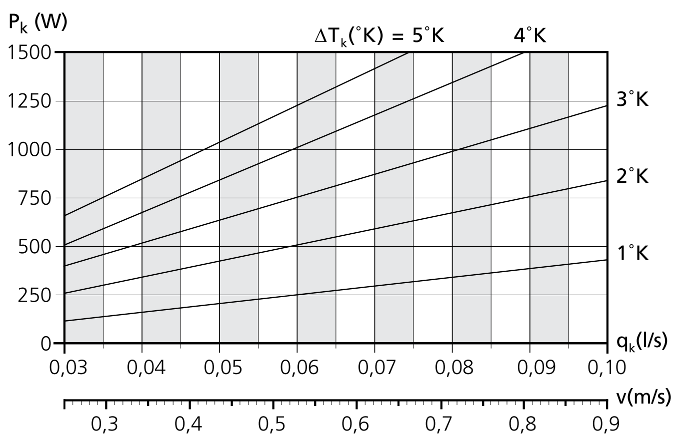
$$P_k = 4186 \cdot q_k \cdot \Delta T_k$$

P_k Cooling capacity of the water (W)

q_k Chilled water flow (l/s)

ΔT_k Temperature differential between the cooling water inlet flow and return (K)

Diagram 1. Water Flow – Cooling Capacity



Corrected capacity – water flow

Different water flow rates to some extent have effects on the capacity output. By checking calculated water flow against Diagrams 2 or 3, the capacity indicated in Tables 2-5 may need to be slightly adjusted up or down.

$$P_{corr} = k \cdot P_k$$

P_{corr} Corrected capacity (W)

k Correction factor

P_k Cooling capacity of the water

Diagram 2. Corrected capacity – Water flow, ADAPT Parasol 600

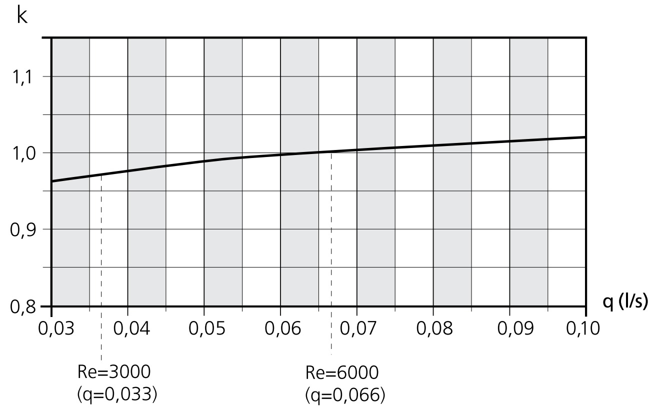


Diagram 3. Corrected capacity – Water flow, ADAPT Parasol 1200

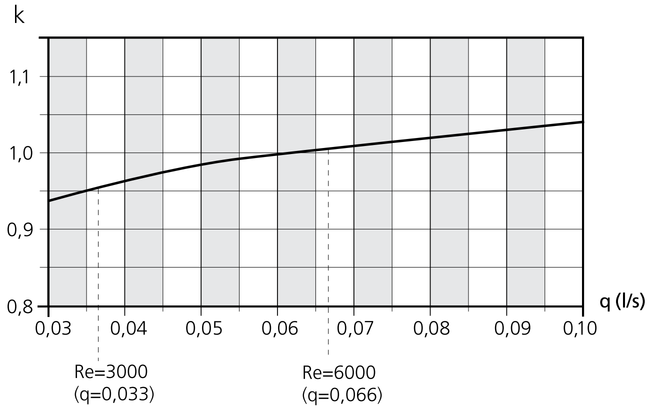


Diagram 4. Pressure drop – Chilled water flow

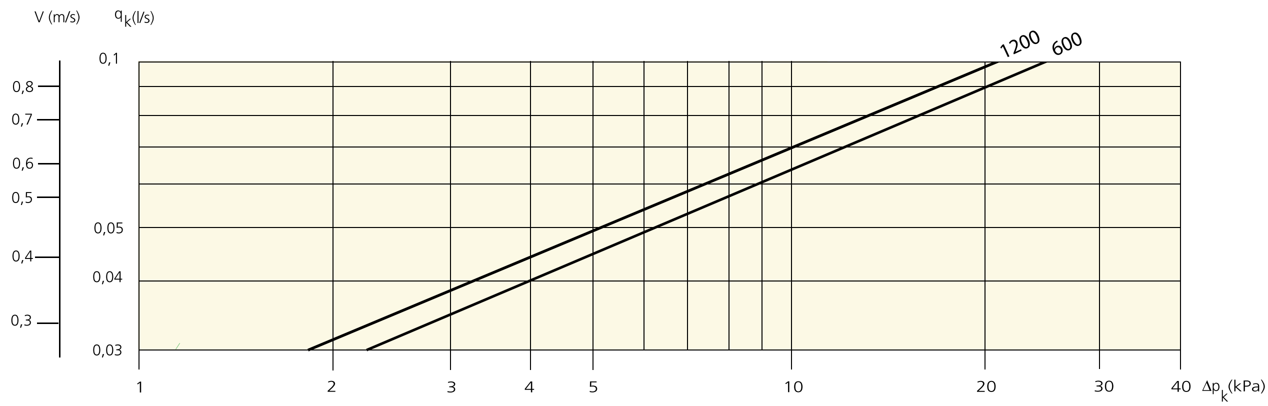


Table 2. Cooling capacity of the ADAPT Parasol 600

Nozzle pressure	Nozzle setting 1)	Primary airflow (l/s)	Sound level in dB(A) 2)	Cooling capacity of primary air (W) for ΔT_l				Cooling capacity of the water (W) for ΔT_{mk} 3)						Pressure drop constant, air/water	
				6	8	10	12	6	7	8	9	10	11	k_{pl}	k_{pk}
50 Pa	LLLL	7.2	<20	52	69	86	104	196	226	258	287	319	348	1.01	0.0200
	LHLH	13.4	<20	96	129	161	193	258	300	338	380	422	464	1.89	0.0200
	HHHH	19.6	20	141	188	235	282	278	324	370	415	461	502	2.77	0.0200
70 Pa	LLLL	8.5	<20	61	82	102	122	228	266	304	338	376	413	1.01	0.0200
	LHLH	15.9	24	114	153	191	229	303	352	396	444	492	540	1.89	0.0200
	HHHH	23.2	25	167	223	278	334	326	379	431	483	534	581	2.77	0.0200
90 pa	LLLL	9.6	20	69	92	115	138	255	297	335	377	418	460	1.01	0.0200
	LHLH	18.0	28	130	173	216	259	333	386	439	492	544	592	1.89	0.0200
	HHHH	26.3	29	189	252	316	379	363	420	477	534	590	636	2.77	0.0200

Table 3. Cooling capacity of the ADAPT Parasol 600 PF

Nozzle pressure	Nozzle setting 1)	Primary airflow (l/s)	Sound level in dB(A) 2)	Cooling capacity of primary air (W) for ΔT_l				Cooling capacity of the water (W) for ΔT_{mk} 3)						Pressure drop constant, air/water	
				6	8	10	12	6	7	8	9	10	11	k_{pl}	k_{pk}
50 Pa	LLLL	22.1	23	212	265	318	159	214	251	285	323	360	395	3.13	0.023
	LHLH	27.9	27	268	335	402	201	243	281	323	366	408	447	3.95	0.023
	HHHH	33.7	27	324	404	485	243	261	306	352	393	439	485	4.76	0.023
70 Pa	LLLL	26.2	28	252	314	377	189	263	308	352	392	437	481	3.13	0.023
	LHLH	33	31	317	396	475	238	288	337	386	436	485	534	3.95	0.023
	HHHH	39.8	32	382	478	573	287	310	362	415	467	520	573	4.76	0.023
90 pa	LLLL	29.7	31	285	356	428	214	301	351	395	445	494	543	3.13	0.023
	LHLH	37.5	35	360	450	540	270	325	380	434	488	543	597	3.95	0.023
	HHHH	45.2	36	434	542	651	325	342	400	462	520	578	636	4.76	0.023

1) For particulars on the sizing of alternative nozzle settings, use Swegon's ProSelect sizing program available at www.swegon.com

2) Room attenuation = 4 dB

3) The specified capacities are based on operation in the high capacity mode. Operation with the face plate set to the normal position reduces the water capacity of the ADAPT Parasol 600 by about 5% and that of the ADAPT Parasol 1200 by about 10 %.
The water capacity can vary depending on installation and how the airflow deflectors are set. The primary air capacity is not affected.
The water capacity is reduced by 5 -10% when the ADC is adjusted to "fan-shape".
N.B.! The total cooling capacity is the sum of the airborne and waterborne cooling capacities.

Table 4. Cooling capacity of the ADAPT Parasol 1200

Nozzle pressure	Nozzle setting 1)	Primary airflow (l/s)	Sound level in dB(A) 2)	Cooling capacity of primary air (W) for ΔT_l				Cooling capacity, water (W) for ΔT_{mk} 3)					Pressure drop constant, air/water	
				6	8	10	12	6	7	8	9	10	k_{pl}	k_{pk}
50 Pa	LLLL	13.0	<20	94	125	156	187	383	444	504	570	630	1.84	0.0220
	LHLH	29.4	22	212	282	353	423	499	580	653	733	806	4.16	0.0220
	HHHH	35.6	26	256	342	427	513	520	596	678	753	827	5.04	0.0220
70 Pa	LLLL	15.4	20	111	148	185	222	432	500	574	641	708	1.84	0.0220
	LHLH	34.8	26	251	334	418	501	557	646	733	813	899	4.16	0.0220
	HHHH	42.2	29	304	405	506	608	580	663	753	842	922	5.04	0.0220
90 pa	LLLL	17.5	<20	126	168	210	252	471	544	624	696	768	1.84	0.0220
	LHLH	39.5	29	284	379	474	569	603	697	790	875	966	4.16	0.0220
	HHHH	47.8	32	344	459	574	688	627	715	810	904	989	5.04	0.0220

Table 5. Cooling capacity of the ADAPT Parasol 1200 PF

Nozzle pressure	Nozzle setting 1)	Primary airflow (l/s)	Sound level in dB(A) 2)	Cooling capacity of primary air (W) for ΔT_l				Cooling capacity, water (W) for ΔT_{mk} 3)					Pressure drop constant, air/water	
				6	8	10	12	6	7	8	9	10	k_{pl}	k_{pk}
50 pa	LLLL	40.6	25	292	390	487	585	353	409	465	520	576	5.74	0.022
	LHLH	53.8	25	387	516	646	775	393	460	522	583	644	7.61	0.022
	HHHH	59.6	26	429	572	715	858	411	475	538	601	664	8.42	0.022
70 pa	LLLL	48.0	30	346	461	576	691	418	484	548	613	683	5.74	0.022
	LHLH	63.7	30	459	612	764	917	468	539	611	688	759	7.61	0.022
	HHHH	70.4	32	507	676	845	1014	481	554	634	707	787	8.42	0.022
90 pa	LLLL	54.5	33	392	523	654	785	469	541	612	690	760	5.74	0.022
	LHLH	72.2	34	520	693	866	1040	521	600	685	763	848	7.61	0.022
	HHHH	79.9	36	575	767	959	1151	535	615	703	791	870	8.42	0.022

1) For particulars on the sizing of alternative nozzle settings, use Swegon's ProSelect sizing program available at www.swegon.com

2) Room attenuation = 4 dB

3) The specified capacities are based on operation in the high capacity mode. Operation with the face plate set to the normal position reduces the water capacity of the ADAPT Parasol 600 by about 5% and that of the ADAPT Parasol 1200 by about 10 %.
The water capacity can vary depending on installation and how the airflow deflectors are set. The primary air capacity is not affected.
The water capacity is reduced by 5 -10% when the ADC is adjusted to "fan-shape".
N.B.! The total cooling capacity is the sum of the airborne and waterborne cooling capacities.

Table 6. Cooling Capacity for natural convection

Unit (mm)	Cooling capacity (W) for temperature differential, room - water ΔT_{mk} (K)						
	6	7	8	9	10	11	12
ADAPT Parasol 600	17	21	25	29	34	39	43
ADAPT Parasol 1200	41	51	61	72	83	95	107

Calculation example – cooling

A cellular office having dimensions w × d × h = 2.4 × 4 × 2.7 m is to be fitted with a comfort module. The total cooling demand is estimated to be 50 W/m^2 To meet this cooling load, an ADAPT Parasol that will generate 50 x 2.4 x 4 = 480 W is required.
Design room temperature (t_r) 24°C, cooling water temperature (inlet flow/return) 14/16°C and primary air temperature (t_l) 16°C produces:
ΔT_k= 2 K
ΔT_{mk}= 9 K
ΔT_l= 8 K
The required primary air flow to the room (q_l) has been determined to be 16 l/s. A zone damper ensures that the pressure in the duct should be kept at a constant 70 Pa. The sound from the unit must not exceed 30 dB(A).

Solution

Cooling

The cooling capacity of the primary air can be calculated using the following formula: $P_l = 1.2 \cdot \Delta T_l \cdot q_l$
$P_l = 1.2 \cdot 8 \cdot 16 = 154$ W
The ADAPT Parasol comfort module should therefore be able to generate 480 – 154 = 326 W in cooling capacity on the water side.
From Table 2 we can read that a 592 x 592 mm ADAPT Parasol with a nozzle setting of LHLH and a primary airflow of 16 l/s generates 444 W cooling capacity on the water side. This is thus sufficient for meeting the cooling energy demand in the room.

At the same time, this nozzle configuration makes it possible to save a large air volume when the module operates in the No Occupancy mode, which in this case involves 4.6 l/s.

As an alternative, the nozzles can be set to the HHHH settings. This then discharges more air when the room is vacant (less savings) but an over capacity of air volume and cooling energy to utilise if, for example, there are often visitors to the office.

Chilled water

With the cooling capacity requirement of 326 W for the cooling water, obtain in Diagram 1 the required water flow. With a temperature increase of ΔT_k= 2 K, the water flow will be 0.039 l/s.
In Diagram 2 we can read that a water flow of 0.039 l/s does not produce a fully turbulent outflow, but that the capacity must be corrected by a reduction factor of 0.97. The loss of capacity can be compensated by calculating the comfort module's required cooling capacity as follows: P_k = 326 / 0.97 = 336 W.
A new water flow can be obtained from Diagram 1, q_k = 0.040 l/s.
The pressure drop is calculated on the basis of a water flow of 0.040 l/s and pressure drop constant k_{pk} = 0.020, which is taken from Table 2.
The pressure drop can now be read to be 4.0 kPa from Diagram 4.

Heating

Heating function

The comfort module's capability of quickly mixing the primary air with the room air, makes the ADAPT Parasol ideally suited for managing both cooling and heating. Heating premises with air heated above room temperature discharged from the ceiling is, in other words, an excellent alternative to traditional radiator heating solutions. Some of the benefits achieved include lower installation costs, simpler installation and perimeter walls free from piping and radiators. When the ADAPT Parasol is set to maintain a high nozzle pressure, there will be a certain heating capacity, even with low airflow conditions or while the module is operating during weekends, for instance, when the flow is reduced for a longer period.

Regardless of the type of heating system installed, it is important to consider the operative temperature in a room. Most people are comfortable when the operative temperature in winter is in between 20–24°C. The optimum comfort requirements are normally met when the room temperature is 22°C. This means that in a room with a cold perimeter wall, the air temperature must be higher than 22°C to compensate for the radiant cooling energy. In new buildings with normal insulated perimeter walls and normal standards of window glazing, the difference between the room air temperature and the operative temperature is small. But for older buildings with worse windows, it may be necessary to raise the air temperature to compensate for the chilling effect. Different operating scenarios can be simulated easily using the Swegon ProClim Web software where both the room air temperature and operative temperature are specified.

Supplying heated air from the ceiling results in some stratification of the air. For a supply flow temperature of max. 40°C, the stratification is non-existent, while at 60°C it can be around 4 K in the occupied zone. This only applies during the warming-up phase, when the room is unused and there is no internal load. When the room is in use, the lighting is on, a computer is running and occupants are in the room, the stratification will decrease or disappear depending on the heating energy demand.

When heating with the ADAPT Parasol, it is advisable to use an external temperature sensor or an extra sensor module in the room.

Electric heating

The ADAPT Parasol variant with electric heating utilizes electric heating elements instead of heating water. The tubular heating elements, situated inside the heating water pipes of the coil, heat the circulated air that passes through the coil. Radiant heat constitutes only a small part of the total heating capacity

The ADAPT Parasol with electric heating is available in two capacity variants, see the table below.

Variant	P (W)	Imax(A)
X1	500	2.2
X2	1000	4.3

Calculation formulae - waterborne heating

Below are formulae that enable the user to calculate what comfort module is best suited for the application. The values for the calculations are in Tables 7-10.

The cooling or heating capacity of the air

$P_l = 1.2 \cdot q_l \cdot \Delta T_l$

P_l	The cooling or heating capacity of the air (W)
q_l	Primary airflow (l/s)
ΔT_l	Temperature differential between primary air (t_l) and room air (t_r) (K)

Pressure drop for heating circuit

$\Delta p_v = (q_v / k_{pv})^2$

Δp_v	Pressure drop in heating circuit (kPa)
q_v	Heating water flow (l/s), see Diagram 6
k_{pv}	Pressure drop constant for heating circuit, see Tables 7-10

Heating capacity of the water

$P_v = 4186 \cdot q_v \cdot \Delta T_v$

P_v	Heating capacity of the water (W)
q_k	Heating water flow (l/s)
ΔT_v	Temperature differential between the heating water inlet flow and return (K)

Diagram 5. Water Flow – Heating Capacity

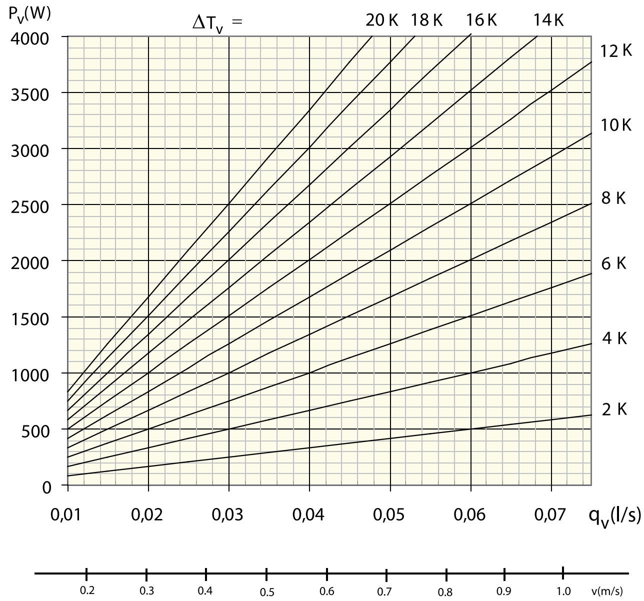


Diagram 6. Pressure drop – heating water flow

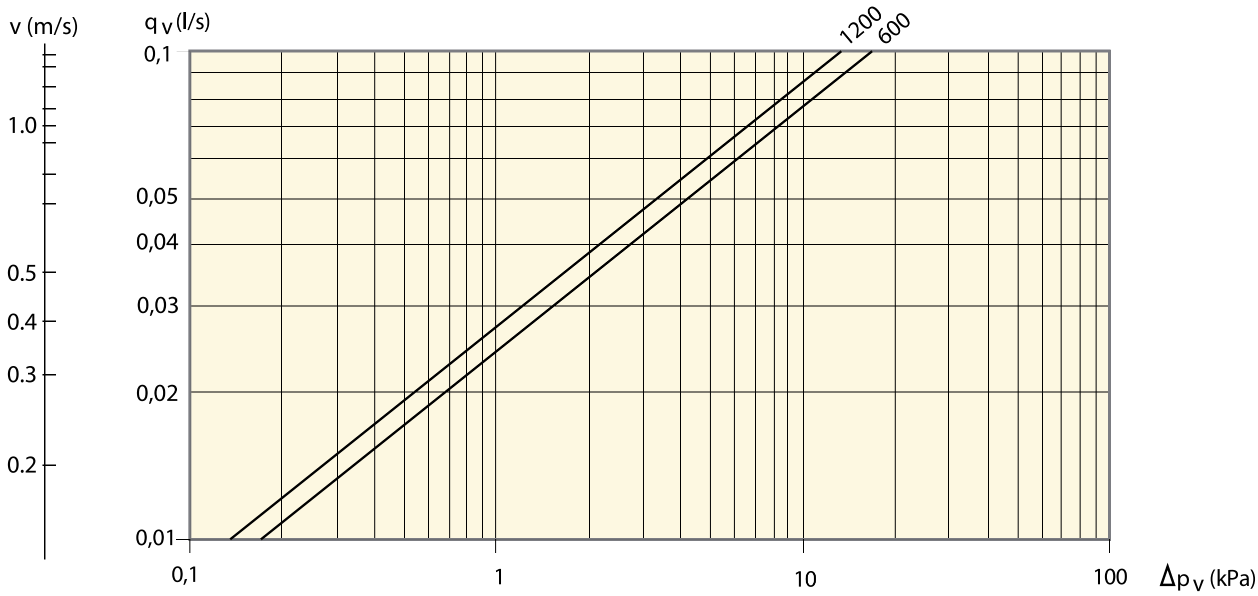


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Table 7 - Heating capacity, ADAPT Parasol 600

Nozzle pressure	Nozzle setting 1)	Primary air flow (l/s)	Sound level in dB(A) 2)	Heating capacity, water (W) for ΔT_{mv} 3)						Pressure drop constant, air/water	
				5	10	15	20	25	30	k_{pl}	k_{pv}
50 Pa	LLLL	7.2	<20	101	202	303	401	501	601	1.01	0.0241
	LHLH	13.4	<20	132	264	388	515	637	762	1.89	0.0241
	HHHH	19.6	20	142	285	420	556	688	819	2.77	0.0241
70 Pa	LLLL	8.5	<20	116	235	350	466	583	698	1.01	0.0241
	LHLH	15.9	24	148	297	439	585	726	867	1.89	0.0241
	HHHH	23.2	25	161	320	471	626	775	924	2.77	0.0241
90 pa	LLLL	9.6	20	130	257	386	514	641	769	1.01	0.0241
	LHLH	18.0	28	163	323	480	635	788	943	1.89	0.0241
	HHHH	26.3	29	173	347	513	677	841	1002	2.77	0.0241

Table 8 - Heating capacity, ADAPT Parasol 600 PF

Nozzle pressure	Nozzle setting 1)	Primary air flow (l/s)	Sound level	Heating capacity, water (W) for ΔT_{mv} 3)						Pressure drop constant, air/water	
			dB(A) 2)	5	10	15	20	25	30	k_{pl}	k_{pv}
50 Pa	LLLL	22.1	23	108	221	339	456	575	696	3.13	0.018
	LHLH	27.9	27	109	233	360	494	631	770	3.95	0.018
	HHHH	33.7	27	109	239	378	521	669	820	4.76	0.018
70 Pa	LLLL	26.2	28	126	255	390	527	665	804	3.13	0.018
	LHLH	33	31	129	269	414	562	713	867	3.95	0.018
	HHHH	39.8	32	131	277	429	588	747	911	4.76	0.018
90 pa	LLLL	29.7	31	137	282	429	581	731	882	3.13	0.018
	LHLH	37.5	35	142	294	453	611	775	939	3.95	0.018
	HHHH	45.2	36	146	306	468	635	805	977	4.76	0.018

1) For particulars on the sizing of alternative nozzle settings, use Swegon's ProSelect sizing program available at www.swegon.com

2) Room attenuation = 4 dB

3) The specified capacities are based on operation in the high capacity mode. Operation with the face plate set to the normal position reduces the water capacity of the ADAPT Parasol 600 by about 5% and that of the ADAPT Parasol 1200 by about 10%.
The water capacity can vary depending on installation and how the airflow deflectors are set. The primary air capacity is not affected. The water capacity is reduced by 5 -10% when the ADC is adjusted to "fan-shape".
N.B.! The total heating capacity is the sum of the airborne and waterborne heating capacities. If the primary air temperature is lower than the room temperature, it causes negative impact on the total heating capacity.

Table 9 - Heating capacity, ADAPT Parasol 1200

Nozzle pressure	Nozzle set-ting 1)	Primary air flow (l/s)	Sound level in dB(A) 2)	Heating capacity, water (W) for ΔT_{mv} 3)						Pressure drop constant, air/water	
				5	10	15	20	25	30	k_{pl}	k_{pv}
50 Pa	LLLL	13.0	<20	173	348	643	944	1117	1291	1.84	0.0273
	LHLH	29.4	22	221	446	823	1207	1432	1653	4.16	0.0273
	HHHH	35.6	26	227	457	850	1243	1475	1706	5.04	0.0273
70 Pa	LLLL	15.4	20	197	391	729	1063	1260	1453	1.84	0.0273
	LHLH	34.8	26	247	494	919	1345	1592	1826	4.16	0.0273
	HHHH	42.2	29	253	507	948	1384	1642	1873	5.04	0.0273
90 pa	LLLL	17.5	<20	212	424	787	1156	1368	1580	1.84	0.0273
	LHLH	39.5	29	263	532	990	1448	1717	1947	4.16	0.0273
	HHHH	47.8	32	274	544	1019	1487	1762	1994	5.04	0.0273

Table 10. Heating capacity. ADAPT Parasol 1200 PF

Nozzle pressure	Nozzle set-ting 1)	Primary air flow (l/s)	Sound level in dB(A) 2)	Heating capacity. water (W) for ΔT_{mv} 3)						Pressure drop constant. air/water	
				5	10	15	20	25	30	k_{pl}	k_{pv}
50 Pa	LLLL	40.6	25	268	511	743	975	1200	1422	5.74	0.027
	LHLH	52.0	25	305	576	843	1100	1358	1608	7.61	0.027
	HHHH	59.6	26	315	599	874	1140	1406	1664	8.42	0.027
70 pa	LLLL	48.0	30	315	602	882	1157	1423	1691	5.74	0.027
	LHLH	63.7	30	354	677	992	1302	1607	1879	7.61	0.027
	HHHH	70.4	32	369	702	1026	1344	1659	1933	8.42	0.027
90 pa	LLLL	54.5	33	351	673	986	1294	1593	1868	5.74	0.027
	LHLH	72.2	34	392	758	1109	1450	1792	2063	7.61	0.027
	HHHH	79.9	36	402	778	1139	1501	1852	2119	8.42	0.027

1) For particulars on the sizing of alternative nozzle settings, use Swegon's ProSelect sizing program available at www.swegon.com

2) Room attenuation = 4 dB

3) The specified capacities are based on operation in the high capacity mode. If the face plate is set to the normal position, this will reduce the water capacity of the ADAPT Parasol 1200 PF by between 5 and 12%.
The water capacity can vary depending on the installation and how the air deflectors are set. The primary air capacity is not affected.
The water capacity is reduced by 5 -10% when the ADC is adjusted to "fan-shape".
N.B.! The total heating capacity is the sum of the airborne and waterborne heating capacities. If the primary air temperature is lower than the room temperature, it causes negative impact on the total heating capacity.

Calculation example - heating

In a cellular office with dimensions w × d × h = 2.4 × 4 × 2.7 m (the same room as in the example for cooling) there is also a heating demand of 450 W in the winter. The primary air flow should be the same as in the summer case, 16 l/s and the duct pressure is now kept constant..
Design room temperature (t_r) 22 °C, heating water temperature (supply/return) 45/39 °C and the primary air temperature (t_l) 20 °C produces:
ΔT_v= 6 K
ΔT_{mv}= 20 K
ΔT_l= -2 K

Solution

Heating

The primary airflow of 16 l/s in combination with the primary air temperature of 20 °C produces a negative impact on the heating capacity: 1.2 x 16 x (-2) = -38 W. The required heating capacity from the heating water thus increases to 450 + 38 = 488 W. From Table 7 we obtain from ΔT_{mv} = 20 K and the primary airflow 16 l/s a heating capacity of

P_v = 585 W from a single module unit with LHLH nozzle settings, which is sufficient for meeting the heat load.

Heating water

With a heating capacity requirement of 488 W and ΔT_v = 6 K the necessary water flow is obtained in Diagram 5: 0.019 l/s. The pressure drop for the heating water is calculated on the basis of a water flow of 0.019 l/s and pressure drop constant k_{pv} = 0.0241, which is taken from Table 7. The pressure drop will then be: $\Delta p_v = (q_v/k_{pv})^2$ = (0.019 / 0,0241)^2 = 0.62 kPa. As an alternative, the pressure drop can be read in Diagram 6.

Electric heating

The 488 W heating load can also be met with ADAPT Parasol electric heating variant X1, which generates 500 W heating capacity.

Table 11. Cross-talk

Typical R_w-values between office rooms with ADAPT Parasol where the partition wall extends with its top edge against the suspended ceiling (with excellent sealing properties). Assumes that the partition wall will have at least the same R_w-value as that given in the table.

Design	Suspended ceiling R_w(dB)	With ADAPT Parasol R_w(dB)
Light acoustic suspended ceiling. Mineral wool or perforated steel / aluminium coffers or screen.	28	28
Light acoustic suspended ceiling. Mineral wool or perforated steel / aluminium coffers or screen. The suspended ceiling is lined with 50 mm thick mineral wool*.	36	36
Light acoustic suspended ceiling. Mineral wool or perforated steel/aluminium coffers or screen. Vertical 100 mm thick mineral wool panel as sound insulation between the office cubicles*.	36	36
Perforated gypsum panels in T-section grid system. Acoustic insulation on the top side (25 mm thick).	36	36
Seal the gypsum board suspended ceiling with insulation on top side.	45	44
*Overview: Rockwool 70 kg/m, Gullfiber 50 kg/m.		

Natural attenuation and end reflection

natural attenuation ΔL (dB) including end reflection.

Table 12. natural attenuation ΔL (dB) ADAPT Parasol 600

	Octave band (Hz)							
Nozzle setting	63	125	250	500	1k	2k	4k	8k
LLLL	19	20	17	16	17	16	15	15
MMMM	17	18	15	14	15	14	13	13
HHHH	15	16	13	12	13	12	11	11

Table 13. Natural attenuation ΔL (dB) ADAPT Parasol 600 PF

	Octave band (Hz)							
Nozzle setting	63	125	250	500	1k	2k	4k	8k
LLLL	19	20	17	16	17	16	15	15
MMMM	17	18	15	14	15	14	13	13
HHHH	15	16	13	12	13	12	11	11

Table 14. natural attenuation ΔL (dB) ADAPT Parasol 1200

	Octave band (Hz)							
Nozzle setting	63	125	250	500	1k	2k	4k	8k
LLLL	18	19	16	15	16	15	14	14
MMMM	16	17	14	13	14	13	12	12
HHHH	14	15	12	11	12	11	10	10

Table 15. Natural attenuation ΔL (dB) ADAPT Parasol 1200 PF

	Octave band (Hz)							
Nozzle setting	63	125	250	500	1k	2k	4k	8k
LLLL	19	15	11	7	7	8	13	16
MMMM	19	15	11	7	7	8	13	16
HHHH	19	15	11	7	7	8	13	16

Dimensions, ADAPT Parasol 600

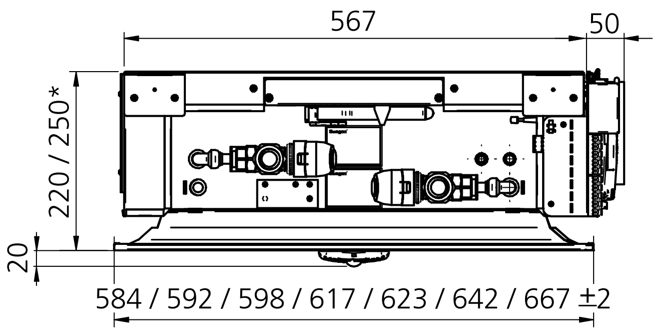


Figure 31. ADAPT Parasol 600, viewed from end wall
** = ADAPT Parasol 600 PF*

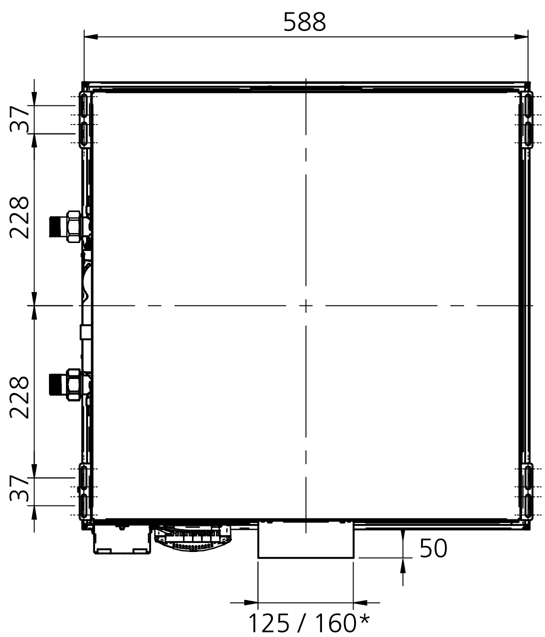


Figure 32. ADAPT Parasol 600, viewed from above
** = ADAPT Parasol 600 PF*

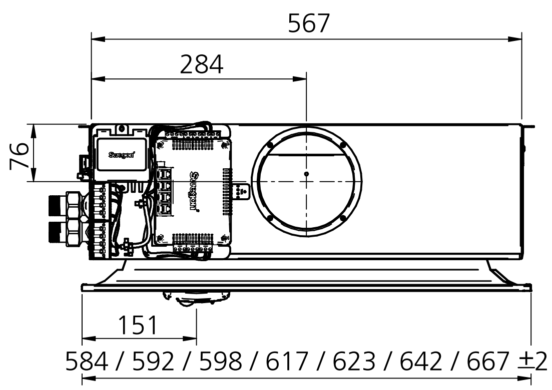


Figure 33. ADAPT Parasol 600, side view

Water connections, ADAPT Parasol 600

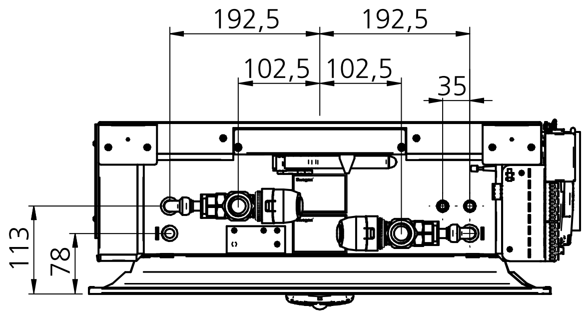


Figure 34. ADAPT Parasol 600, water connections

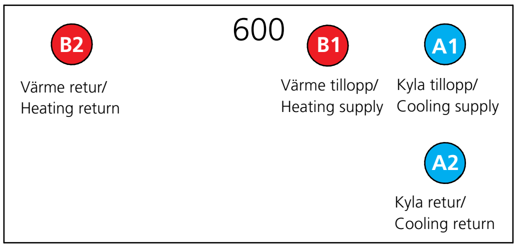


Figure 35. ADAPT Parasol 600 label
A1 = Chilled water inlet connection ø12x1.0 mm (Cu)
A2 = Chilled water return connection ø12x1.0 mm (Cu)
B1 = Heating water inlet connection ø12x1.0 mm (Cu)
B2 = Heating water return connection ø12x1.0 mm (Cu)

Observe the following:
For the single-module unit, it is important that the chilled water is connected to the correct pipe connection. The direction of water flow is necessary for obtaining full capacity. **The required direction of water flow is marked by arrows on the end wall of the unit.**

Dimensions, ADAPT Parasol 1200

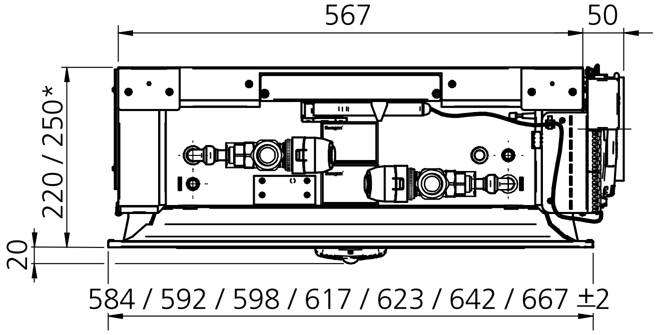


Figure 36. ADAPT Parasol 1200, viewed from end wall
** = ADAPT Parasol 1200 PF*

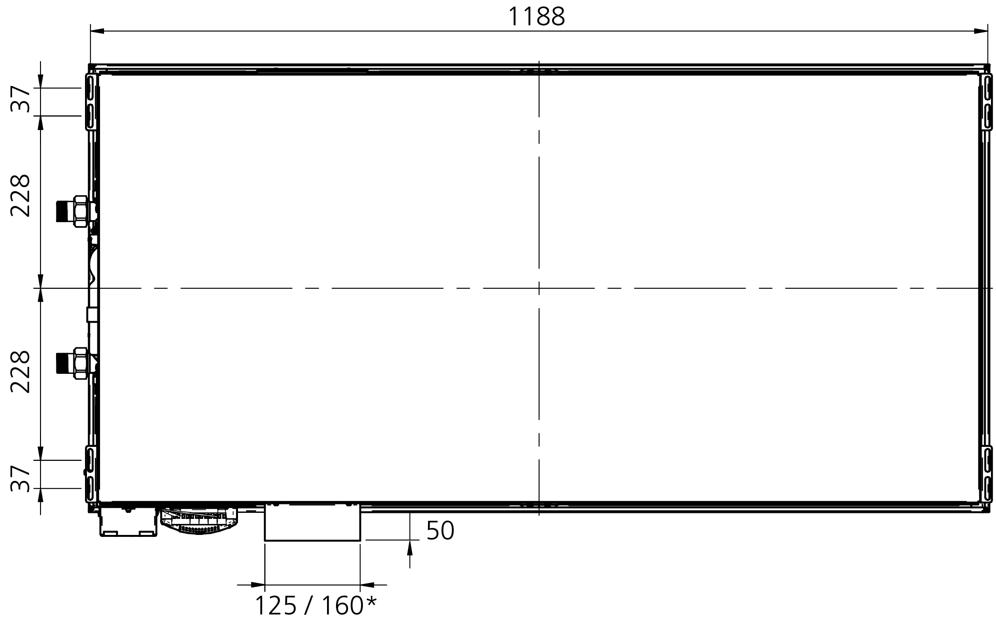


Figure 37. ADAPT Parasol 1200, viewed from above
** = ADAPT Parasol 1200 PF*

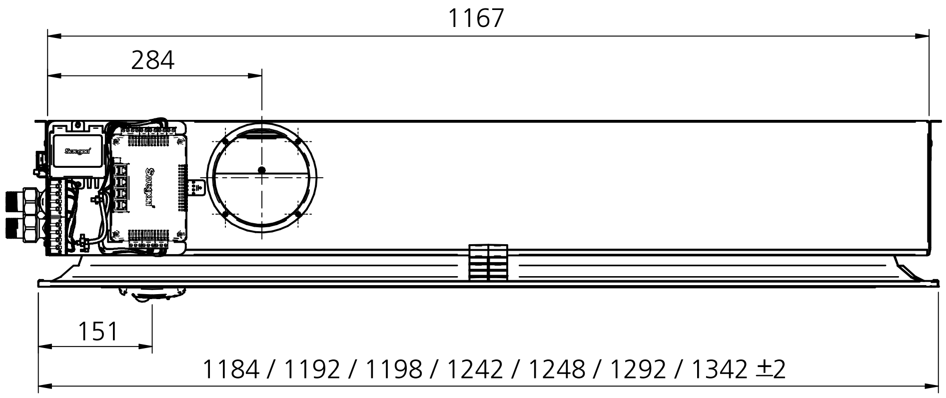


Figure 38. ADAPT Parasol 1200, side view

Water connections, ADAPT Parasol 1200

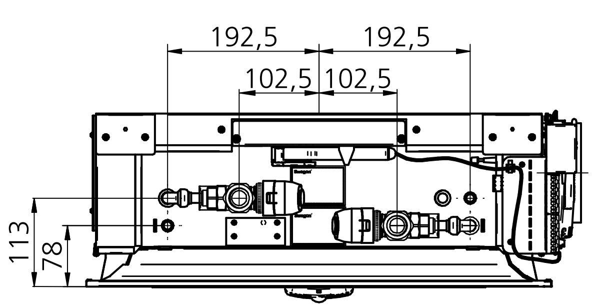


Figure 39. ADAPT Parasol 1200, water connections

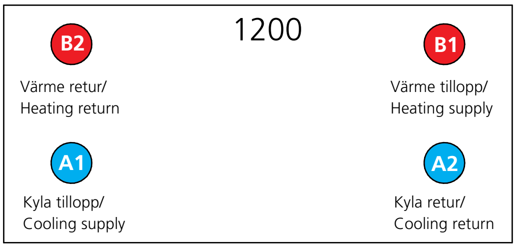


Figure 40. ADAPT Parasol 1200 label
A1 = Chilled water inlet conn. ø12x1.0 mm (Cu)
A2 = Chilled water return conn. ø12x1.0 mm (Cu)
B1 = Heating water inlet conn. ø12x1.0 mm (Cu)
B2 = Heating water return conn. ø12x1.0 mm (Cu)

Air connection, ADAPT Parasol 600/1200

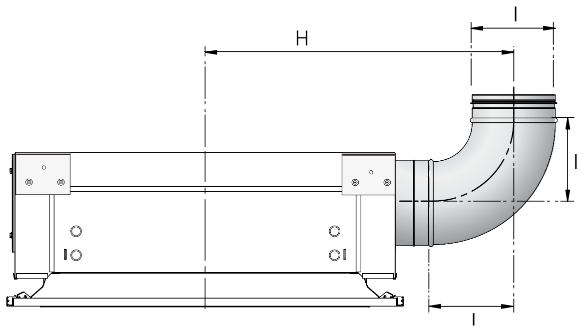
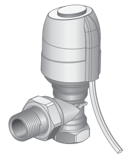


Figure 41. Connection with bend, viewed from end wall
Mounted SYST CA xxx-90 connection piece

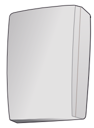
ADAPT Parasol 600	*H = 460 I = 125*
ADAPT Parasol 600 PF	*H = 495 I = 160*
ADAPT Parasol 1200	*H = 460 I = 125*
ADAPT Parasol 1200 PF	*H = 495 I = 160*

Accessories, factory-fitted

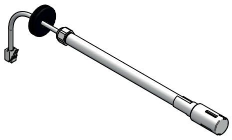
Valve with actuator, SYST VEN115 with **LUNA AT** for cooling energy and heat.
Fitted and wired to the controller. See separate product datasheet at www.swegon.com.



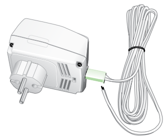
Detect Qa Co_2 sensor
Analogue carbon dioxide sensor to be fitted concealed from view above the face plate. See separate product datasheet at www.swegon.com.



Detect VOC sensor
Modbus-connected air quality sensor to be fitted concealed from view above the face plate.



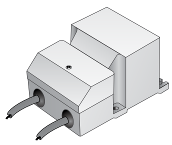
POWER Adapt 20 VA transformer
230 V 50-60 Hz input voltage
24 V AC output voltage
20 VA capacity
IP33 rated enclosure



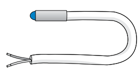
The factory-fitted accessories above can also be ordered as individual items of equipment.

Accessories

SYST TS-1 72 VA Transformer
Double-insulated protective transformer, 230V AC/24 V AC
See separate product datasheet at www.swegon.com.



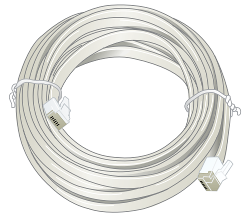
CONDUCTOR T-TG temperature sensor
External temperature sensor. Used for example if the room temperature is to be measured at a location other than by the sensor module or for measuring the temperature on the main pipe in a change-over system.



External sensor module
Sensor module with temperature sensor and presence detector for wall mounting when an extra sensor module is required in the room (1 pc is always supplied with the ADAPT Parasol)

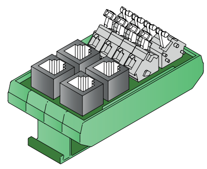
Available in a circular or rectangular model and is always supplied with both mounting frame for the most common existing electrical connection boxes as well as a protruding frame for surface mounting.

Cable, SYST CABLE RJ12 6-LED.
Cable for connection of an external sensor module to the controller or between sensor modules. Available in various lengths.

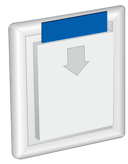


Cable, CABLE CONVERTER USB-RJ12 (RS485)
Cable with built-in modem for connecting a PC to the controller. Needed for running SWICCT or ModbusPoll, for instance.

ADAPTER RJ12-WIRE
Adapter for connecting the cable together with a RJ12 connector and cable with multi-pin cable ends.
Can also be used as an RJ12 splitter.



Card circuit breaker, SYST SENSO
Key card holder for hotel rooms.

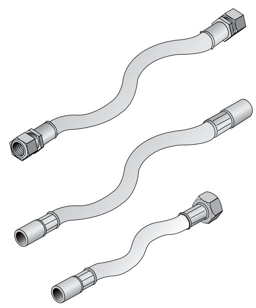


SYST MS M6 Assembly piece
The assembly piece is used for installation and consists of threaded rods, ceiling mounts as well as nuts for all four suspension mounts.

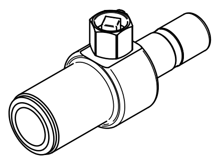
Flexible connection hoses, SYST FH
Flexible hoses are available with quick-fit, push-on couplings as well as clamping ring couplings for quick and simply connection. The hoses are also available in various lengths. Note that clamp ring couplings require support sleeves inside the pipes.

F1 = Flexible hose with clamp ring couplings
F20 = Flexible hose with quick-fit push-on couplings
F30 = Flexible hose with quick-fit push-on couplings on one end and G20ID sleeve nuts on the other end.

F1
F20
F30



SYST AR-12 push-on venting nipple
A venting nipple is available as a complement to the flexible hoses with push-on couplings. The nipple fits directly in the push-on hose coupling and can be fitted in an instant.

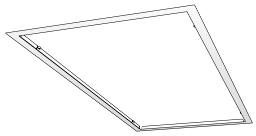


Connection piece, air – insertion joint, SYST AD1
SYST AD1 is used as an insertion joint between the ADAPT Parasol and the duct system. Available in two dimensions: Ø125 and Ø160 mm.

Connection piece, air, SYST CA
duct bend, 90°

Available in two dimensions: Ø125 and Ø160 mm.

Plasterboard frame, Parasol b T-FPB
Frame for creating an attractive interface between the ADAPT Parasol and the opening in the plasterboard ceiling.



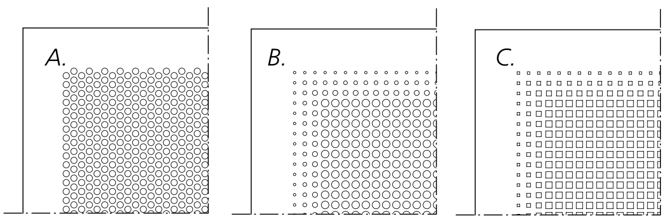
Tool for nozzle adjustment, SYST TORX
Tool designed for easy adjustment of the nozzle plates.

Optional perforation patterns
The face plate of the unit is available with three different perforation patterns that make it easily adaptable to suit different types of ceiling components, e.g. light fittings and exhaust grilles that share the surface of a suspended ceiling. Other patterns are of course available on special order. For further details, contact your nearest Swegon representative.

A. Face plate, standard PB
Circular holes arranged in a triangular pattern.

B. Face plate, PD
Circular holes arranged in a square pattern with a graduated border.

C. Face plate, PE
Square holes arranged in a square pattern with a graduated border.



Ordering key

Type of ceiling	Dimensions of the face plate (mm)	
Lay-in T-Bar system	600 module	1200 module
c-c 600	592x592	1192x592
c-c 600 SAS130/15	584x584	1184x584
c-c 625	617x617	1242x617
c-c 650	642x642	1292x642
c-c 675	667x667	1342x667

Clip-in / metal tile	600 module	1200 module
c-c 600	598x598	1198x598
c-c 625	623x623	1248x623

The tolerance is ±±2 mm

Function	The units can be ordered in various functional versions: A = Cooling and supply air B = Cooling, heating and supply air X = Cooling, electric heating and supply air
ADC	Factory-fitted ADC supplied as standard
Airflow variant	Single module unit: ADAPT Parasol 600 ADAPT Parasol 600 PF Two-module unit: ADAPT Parasol 1200 ADAPT Parasol 1200 PF (PF = PlusFlow, extra high airflow)
Software configuration	The product can be supplied with certain software settings preconfigured from the factory. For example: Occupancy flow and temperature set point.
Nozzle setting	Each side can be set in three different ways: L, M or H L = Low airflow M = Medium airflow H = High airflow
Colour	The units are supplied painted in Swegon's standard shade of white, RAL 9010, gloss level 30 ±6%
Communication	Modbus RTU

Ordering key

Contractor demarcation

Swegon's supply demarcation is at the connection points for water and air as well as for wiring the room control equipment (see Figures 31, 32, 33, 34, 35 and 36, 37, 38, 39, 40, 41).

- The pipework contractor connects the connections points for water to the plain pipe ends and fills the system, vents it and tests the pressure. If the room control equipment is installed from the factory, connect the return pipe for chilled water and heating water respectively to the valve. (DN ½" male threads).
- The ventilation contractor connects ducting to the air connection spigot.
- The electrical installation contractor connects the power (24 V) and the signal cables to the wiring terminals equipped with spring-loaded pressure connections. The maximum permissible cable cross-sectional area is 2.5 mm². For reliable operation we recommend the use of cable ends with multi-pin connectors.

Summary of accessories

Sensor module	
Valve actuator	LUNA AT
Valve	SYST VEN115
CO_2 sensor	DETECT Qa
Temperature sensor	CONDUCTOR T-TG
VOC sensor	DETECT VOC
Tool for nozzle adjustment	SYST TORX
Transformer	SYST TS-1, 72 VA
Transformer	POWER Aa, 20 VA
Connection piece, air – insertion joint	SYST AD1
Connection piece, air – 90°	SYST CA
Assembly piece	SYST MS M6
Flexible connection hose, with clamp ring couplings.	SYST FH F1
Flexible connection hose with quick-fit couplings (push-on)	SYST FH F20
Flexible connection hose with quick-fit coupling (push-on) in one end and G20ID sleeve nut in the other end.	SYST FH F30
Venting nipple, push-on	SYST AR-12
Plasterboard ceiling frame	Parasol b T-FPB
Cable (2xRJ12)	SYST CABLE RJ12 6-LED.
Cable (USB+RJ12)	CABLE CONVERTER USB-RJ12 (RS485)
Adapter	ADAPTER RJ12-WIRE
Key-Card circuit breaker	SYST SENSO
Perforated face plate, (in addition to PB standard perforations)	PD PE