PARASOL EX

Suspended comfort modules

QUICK FACTS

- Active, flexible, comfort modules for ventilation, cooling and heating
- 4-way air distribution with adjustable air volume and flexible direction of air discharge for highest comfort.
- Air diffusion for highest comfort regardless of where it is installed in the room
- There is even a connection casing that covers the water pipes and air duct to give a uniform design in the room
- Selectable colours for both the comfort modules and connection casing
- Selectable connection side
- Variable or constant flow regulation

Size					
PARASOL EX 690			PARASOL EX 1290		
Length	Width	Height	Length	Width	Height
690	690	250	1290	690	250

Primary air flow:	Up to 55 l/s
Pressure range:	50 to 150 Pa
Total cooling capacity:	Up to 1,930 W
Heating capacity – water:	Up to 2450 W

Content

Technical description

Comfort module PARASOL EX

PARASOL EX is the name of the product family PARASOL Classic comfort modules for suspended installation. The modules are designed to supplement one another and provide optimal room comfort.

See our demand-controlled suspended variant WISE PARASOL EX for integration in Swegon's WISE control platform.

Figure 1. Product image PARASOL EX 1290 with and without connection casing.

Modules & Installation

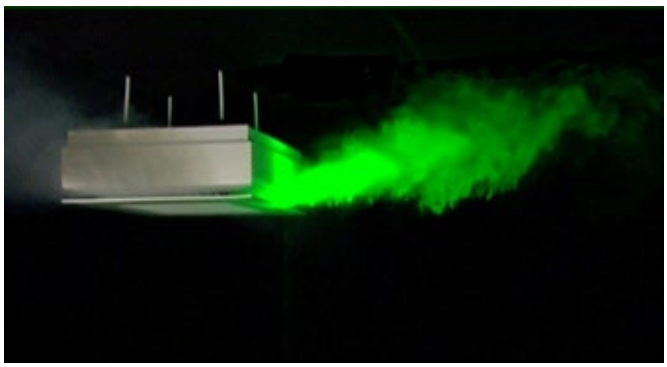
Modules:	Supply air Supply air and cooling Supply air, cooling and heating
Installation:	Suspended Ceiling surface mounted

Function

4-way air distribution in combination with Swegon's ADC^{II} (Anti Draught Control), creates a maximised mixing zone and minimises the risk of draught issues. The Parasol EX is also designed for distributing air slightly upward. This gives the chilled air more space to mix with the room air before it reaches the occupied zone and in doing so providing the occupants with a comfortable temperature.

Flexibility

The easily adjustable nozzles in combination with Swegon's ADC^{II} offer maximum flexibility if changes in the room layout become necessary. All the sides can be set independently of one another so that the comfort module can distribute more or less air and simultaneously discharge air in whatever direction desired in the room.



Design

By styling straight lines and sharp edges, Swegon architects have created a timeless design that fits in well in most room decor together with other installations in the room.

Draught-fee indoor climate

Utilising four directions for discharging chilled air into the room also maximises the size of the mixing zone. In practice, this effectively mixes the chilled primary air with the room air before the air reaches the occupied zone. When the mixed air reaches the occupied zone, it has attained a temperature that reduces the risk of draught. The special design of the outlet discharges the distributed air slightly upward which to a great extent contributes towards both reducing its velocity in the occupied zone and ensuring that the chilled air is mixed with room air before it reaches the occupied zone. This upward discharge also provides a distribution that is not dependent on nearby surfaces to create a coanda effect. In one simple operation, the ADC^{II}, included as standard, enables you to move the deflector groups to direct the air flow in whatever direction you desire.

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High capacity

The high performance and small overall dimensions of the PARASOL EX make them ideal for replacing awkwardly large products without sacrificing comfort.

Variants

PARASOL EX is available in three basic variants:

Variant A: Ventilation and water-based cooling from a coil

Variant B: Ventilation, waterborne cooling and heating from a coil

Variant C: Ventilation

Range of application

PARASOL EX is ideal for use as a standard application in such premises as:

- Offices
- Conference rooms
- Hotels
- Restaurants
- Hospitals
- Shops
- Shopping centres

Location

Since each side of the PARASOL EX is individually adjustable to provide the appropriate air flow, the comfort modules can be positioned anywhere in the room. Whether they are located at the front edge, centre, rear edge or symmetrically in the room is of no importance.
In rear edge solutions for separate office rooms, for instance, the unit can be installed directly against the corridor wall. The only operation that needs to be done is to reduce the volume of air distributed towards the corridor wall and to open on the three other sides more (see Figure 2). This is of benefit in comparison with other rear-edge solutions, because you can make use of the partition walls to increase the air mixing zone. This provides low air velocities and a healthy room climate.

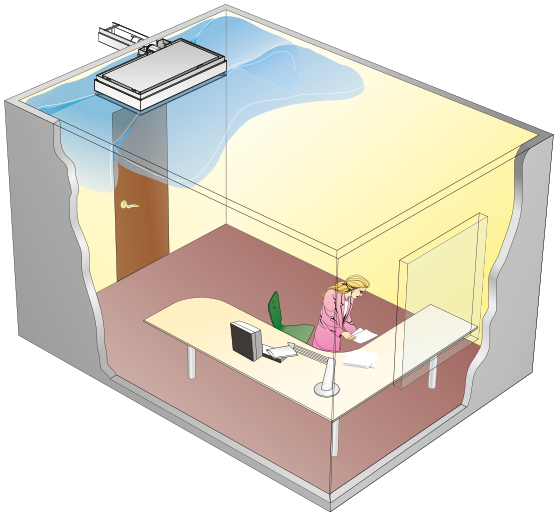


Figure 2. PARASOL EX as a rear edge solution

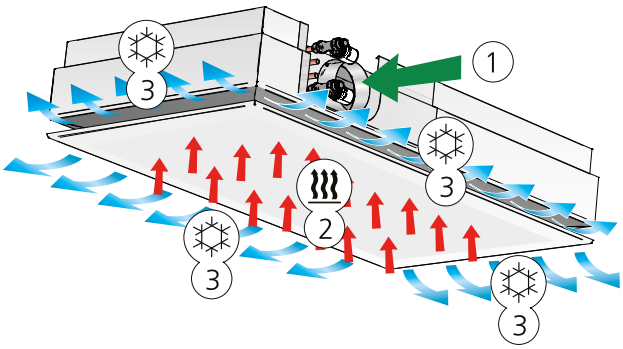


Figure 3. Variant A: Cooling function
1 = Primary air
2 = Induced room air
3 = Primary air mixed with cooled room air

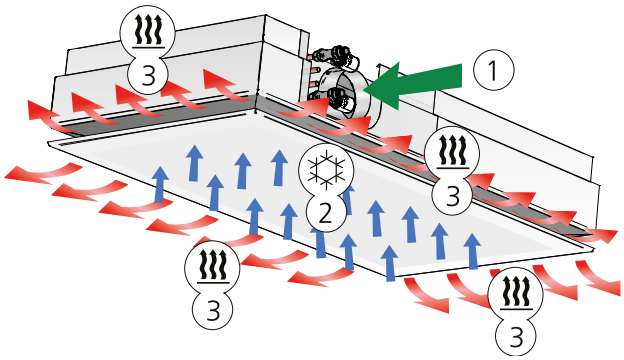


Figure 4. Variant B: Heating function (also includes cooling function)
1 = Primary air
2 = Induced room air
3 = Primary air mixed with heated room air

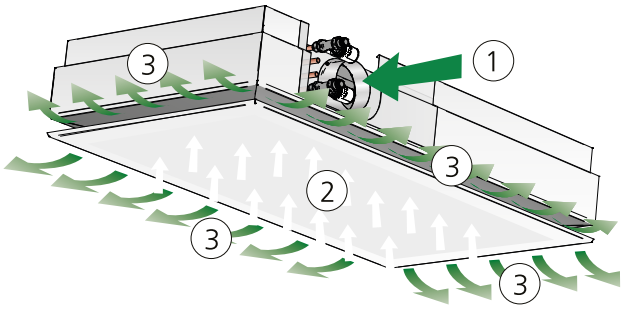


Figure 5. Variant C: Supply air function
1 = Primary air
2 = Induced room air
3 = Primary air mixed with room air

Supply air module

A comfort module for supply air only is available (variant C – without coil) to supplement certain types of rooms where the occupants need a great quantity of air, but only a smaller amount of water-based cooling energy. This applies, for instance, to certain conference rooms or the inner zones in large rooms. To avoid oversizing, it is common to combine units with cooling function and units with supply air function only. Since the supply air variant is also designed according to the induction principle, it is possible to discharge supply air substantially below room temperature and yet not need to think about possible reheating, which may be required in combined systems with chilled beams and air diffusers. The rate of induction varies depending on pressure and flow conditions but lies generally in the range of 3-5 which means that if you add 30 l/s, 3 to 5 times as much warm room air (90–150 l/s) will be induced. The mixed air then has a substantially higher temperature than the temperature of the supply air, which reduces the risk of draught in the occupied zone.

Another advantage of the supply air module is that it operates with the same duct pressure as the modules with coil. In other words, there is no need to throttle the pressure in any duct branch more than necessary. Instead of incorporating a coil into the supply air module, the module has an induction control with punched nozzles that is designed to provide the same rate of induction as the units with coil. This makes it possible to use Swegon's ProSelect sizing program for sizing throw lengths for supply air modules as well. If shorter throws lengths than standard are desirable, certain openings can be plugged to reduce the free area in the induction control to reduce the percentage of induced room air. The capacity of the primary air is never affected by an increase or decrease in the rate of induction.

Optional perforation patterns

The face plate of the unit is available with three different perforation patterns, so that it can be adapted to suit different kinds of ceiling components, e.g. light fittings and exhaust grilles. It can also be ordered in several colours.

Of course, other patterns and colours are available if required. For further details, get in touch with your nearest Swegon representative.

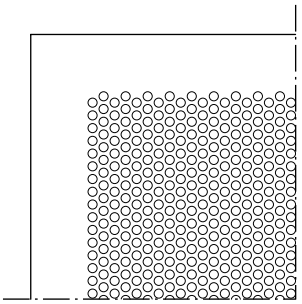


Figure 6. Standard face plate
Circular holes arranged in triangular pattern.

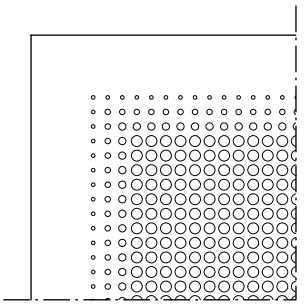


Figure 7. PD face plate
Circular holes arranged in a square pattern with a graduated border

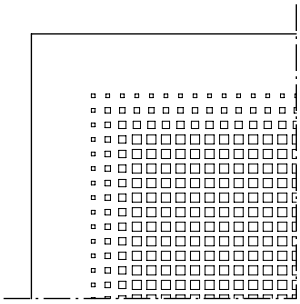


Figure 8. Face plate PE
Square holes arranged in a square pattern with a graduated border.

Commissioning

Simple to adjust

The built-in nozzle control makes PARASOL extremely versatile. The product can easily be adapted to current requirements by increasing or decreasing the air flow. A large room can be converted into separate office rooms without influencing the room climate. A partition wall can be installed in close proximity to any of the product's sides. The only measure required for preventing possible draught is to optimize the portion of air distributed from each side of the comfort module. The end result is a system that will provide excellent performance throughout its functional life.

Nozzle setting

The unique built-in nozzle control in the PARASOL EX means that each of the four sides can be set individually. 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 air flow can be easily optimised using the Swegon ProSelect sizing program available at www.swegon.se.

All the units held in stock are preset to the same nozzle setting on all four sides. The air flow direction can be easily commissioned when installing the unit using the commissioning tools supplied with the unit. This provides logistic advantages since the fitter does not have to take specific room markings into account.

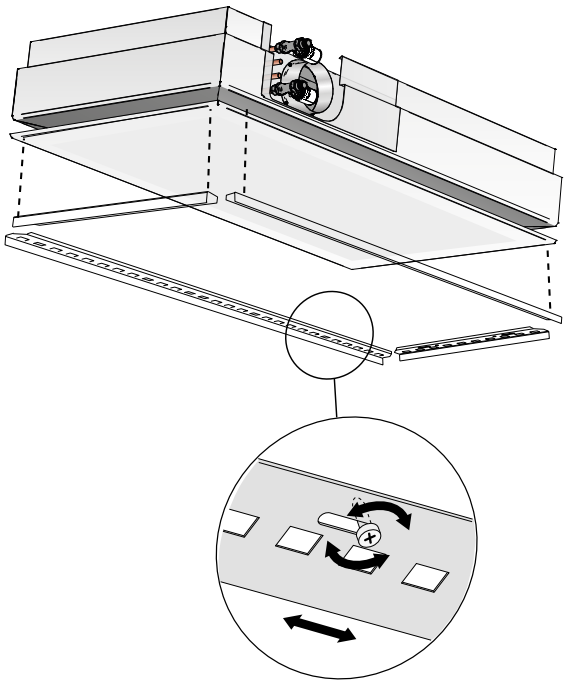


Figure 9. Nozzle adjustment

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.

Table 1. k-factor guide per side

PARASOL EX	Primary air volume	Side	Nozzle setting	k-factor
690 MF	Low	Any	L	0.253
	Average	Any	M	0.44
	High	Any	H	0.693
	None	Any	C	0
1290 MF	Low	Short side	L	0.176
	Average	Short side	M	0.253
	High	Short side	H	0.429
	None	Short side	C	0
	Low	Long side	L	0.464
	Average	Long side	M	0.667
	High	Long side	H	1.131
	None	Long side	C	0
1290 HF	Low	Short side	L	0.253
	Average	Short side	M	0.44
	High	Short side	H	0.693
	None	Short side	C	0
	Low	Long side	L	0.667
	Average	Long side	M	1.16
	High	Long side	H	1.827
	None	Long side	C	0
1290 PF	Low	Short side	L	0.85
	Average	Short side	M	0.99
	High	Short side	H	1.21
	None	Short side	C	0
	Low	Long side	L	2.22
	Average	Long side	M	2.62
	High	Long side	H	3.2
	None	Long side	C	0

Specific nozzle settings

To specify optimised nozzle settings, always begin from the side nearest to the left of the water connections. From there, specify side after side in anticlockwise order. See Figures 10-12. If you like, you can order the units preset from the factory.

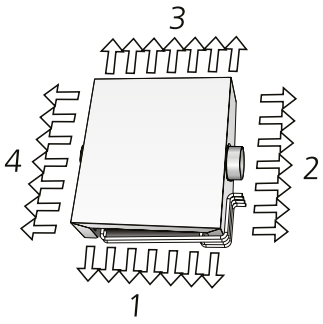


Figure 10. Top view, PARASOL EX 690, side 1-4

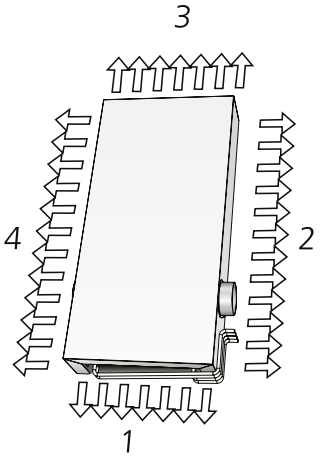


Figure 12. Top view, PARASOL EX 1290, side 1-4

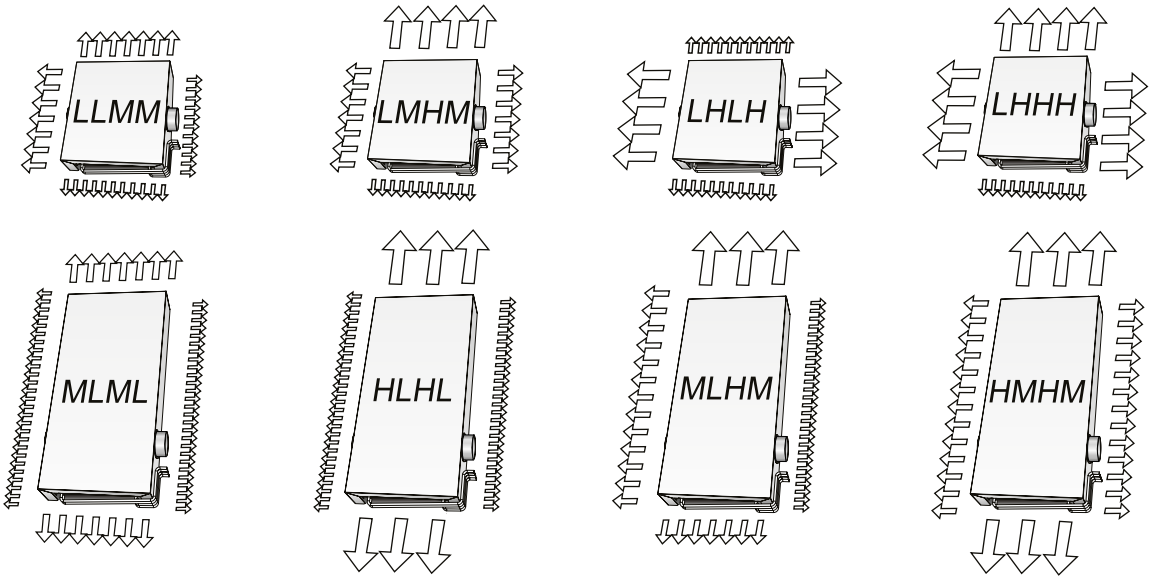


Figure 11. Examples of optimized nozzle setting.

ADC^{II}

All the comfort modules contain ADC^{II} as standard. 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^{II} 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° (see Figure 13). This provides great flexibility and can be easily adjusted without having to affect the system as a whole.

The sound level and the static pressure are not at all affected by the ADC^{II}. The water capacity is reduced by 5 - 10% if the ADC^{II} is adjusted to "fan shape".

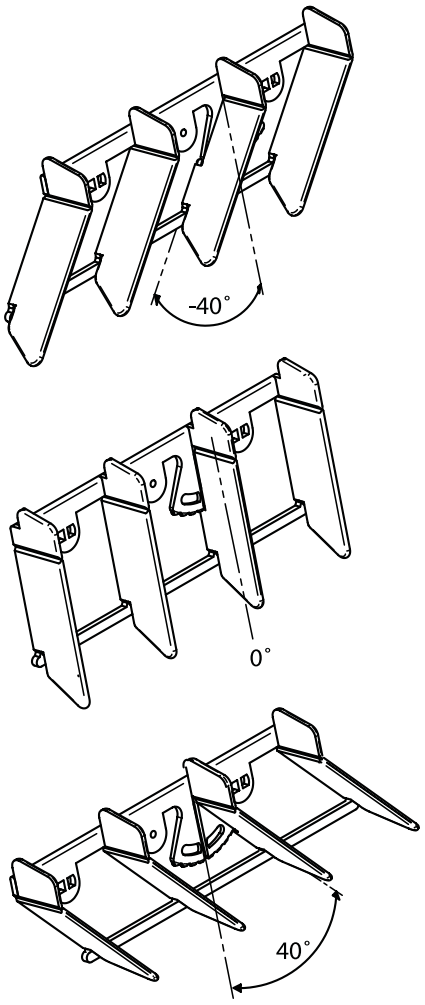


Figure 13. ADC^{II}, setting range from -40° to +40° in increments of 10°

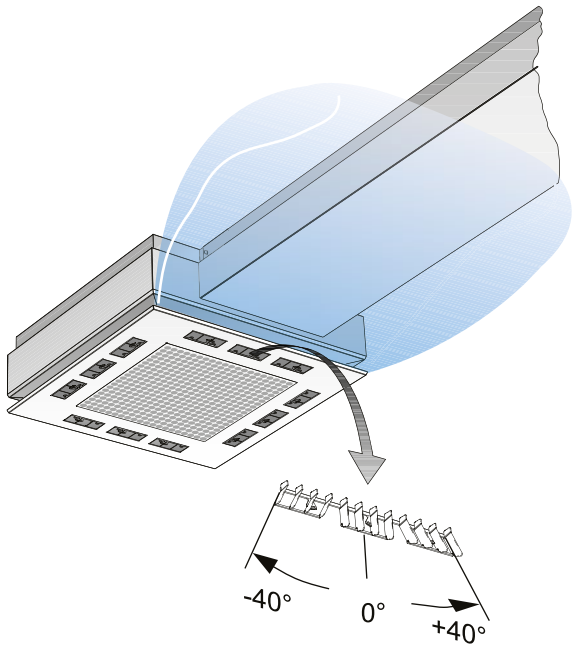


Figure 14. Possible settings for the ADC^{II}, Fan shape

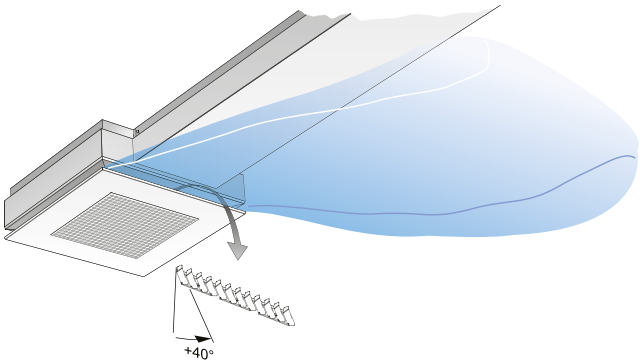


Figure 15. Possible settings for the ADC^{II}, X-shape

Room control

Constant flow ventilation and regulation of water valves

Reliable, well-performing control equipment is required for maintaining uniform room temperature and ensuring a healthy room climate.

Parasol EX can be supplemented with control equipment for CAV and water regulation in the form of Swegon's room control equipment, LUNA. LUNA controls the water actuators and makes it possible to quickly compensate possible sudden increases or decreases in heating loads in the room.

The digital processor is easy to reconfigure and this offers great flexibility. The operations conducted in the room can change after a given period, for instance, and this may require other settings than standard.

Demand-controlled ventilation

To easily integrate PARASOL EX in the WISE system, we recommend WISE IORE as a loose accessory.

As an option there is also our demand-controlled suspended variant WISE PARASOL EX for integration in Swegon's WiSE control platform.

For more information about room control equipment, see the separate product data sheet on www.swegon.se.

LUNA components for installation with PARASOL EX

Valve kit:	SYST RK
Room controller:	LUNA RE-S
Transformer:	SYST TS-1

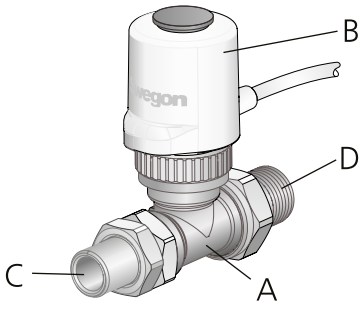


Figure 16. SYST RK
A = Valve

B = Actuator

C = Push-on ø12 mm

D = R male threads: ½'' B as per ISO 7/1

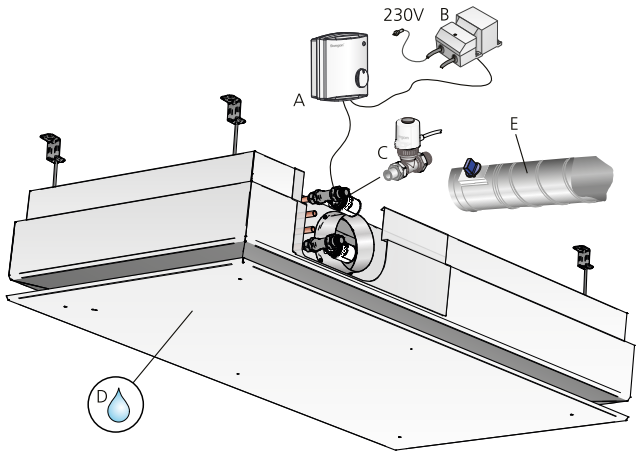


Figure 17. Installation with all components in the room
A = Room controller

B = Transformer

C = Valve kit with actuator

D = Condensation sensor

E = Damper, CRP 9-125

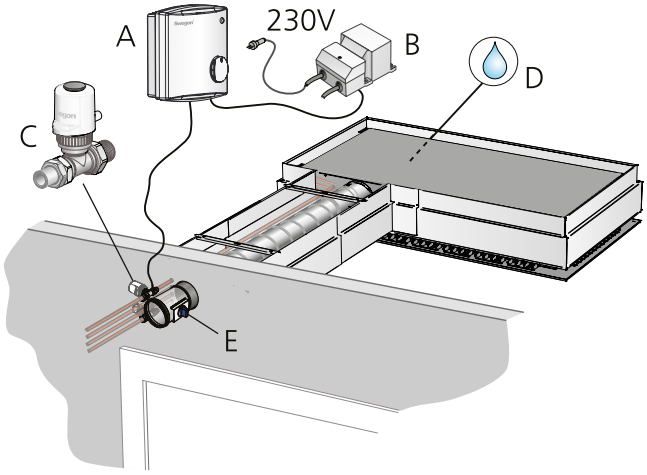


Figure 18. Installation with valve, actuator and damper in corridor
A = Room controller

B = Transformer

C = Valve kit with actuator

D = Condensation sensor

E = Damper, CRP 9-125

Commissioning of valves

On delivery, the valves are fully open (position N, k_v=0.89). The required k_v-value is set during commissioning. The flow rate is set by adjusting the valve cone. This is performed simply using the protective caps supplied, on which each k_v-value is marked by different length stripes. (see Table 2). The lift height is always the same, regardless of the setting.

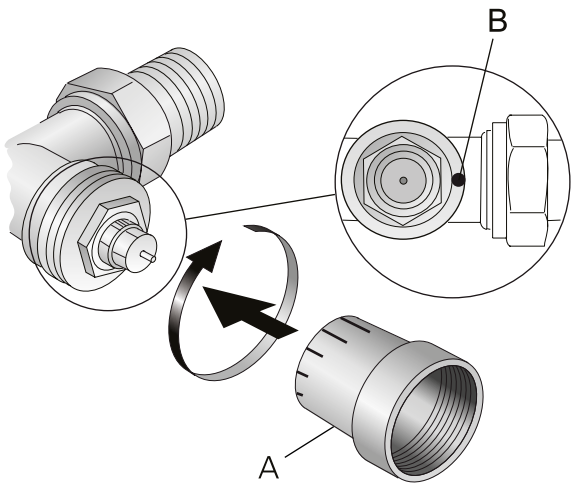
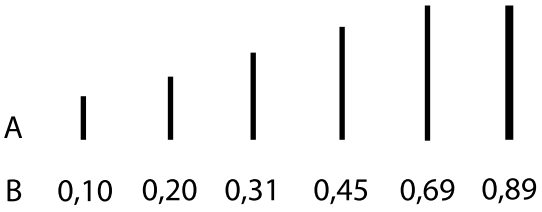


Figure 19. Commissioning of k_v value
A = Protective housing, rotatable through 180 °
B = Marking on the outlet side of the valve

Commissioning

1. Fit the protective housing A over the valve.
2. Turn the protective housing until the desired reference mark is centred with mark B on the valve.

Table 2. k_v value [m³/h] for different settings.



A = Reference mark
B = k_v-value

Valve maintenance

The valves do not normally require any maintenance at all.

If anything should damage the stuffing box, it can be replaced even while the system is under pressure. A special tool is required for this.

Technical Data, Valve

Functional data

PN Class:	PN 10
Permissible media:	Cold and hot water with anti-freeze agent Recommendation: Water treatment according to VDI 2035
Media temperature:	1…120°C
Permissible operating pressure:	1000 kPa (10 bar)
Closing pressure:	60 kPa (0.6 bar)
Pressure drop for fully open valve $\Delta p_{v\,100}$:	Recommended range: 5… 20 kPa (0.05… 0.2 bar)
Lifting height:	2 mm
Material	
Valve body:	Brass, mat, nickel plated
Connection nipple:	Brass, mat, nickel plated
Protective housing:	Polypropylene
O-ring:	EPDM
Connection	
R male threads:	½¨ B to ISO 7/1
Inlet/Outlet	
Rp female threads:	½" to ISO 7/1

Installation and suspension

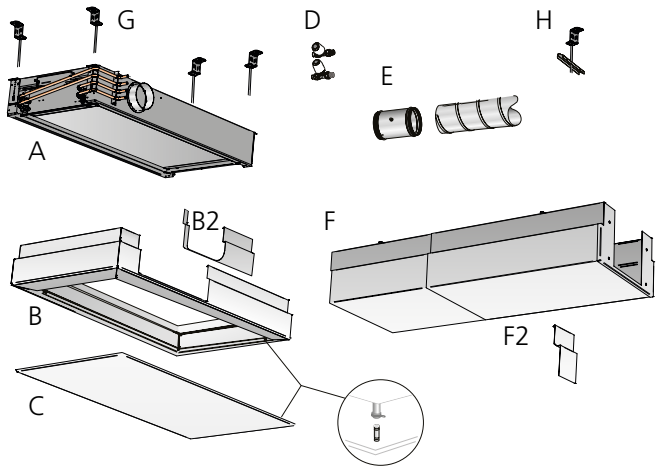


Figure 20. Diagrammatic sketch for suspending the PARASOL EX and housing
A = Base module
B = Design module with associated cover plate (B2)
C = Face plate
Optional accessories
D = Valve kit
E = Damper
F = Connection casing with associated cover plate (F2)
G = Assembly piece (see Figure 21)
H = Assembly piece for housing SYST MS. One kit is sufficient to mount a connection casing on two products.

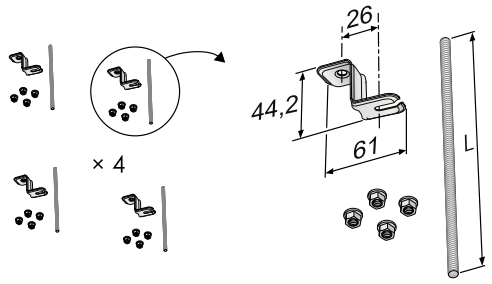


Figure 21. Assembly piece SYST MS M8-1, ceiling mount and threaded rod

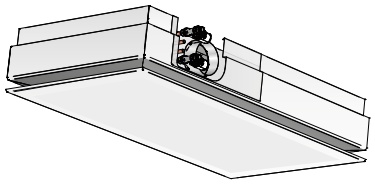


Figure 22. PARASOL EX in standard version and the valve kit.

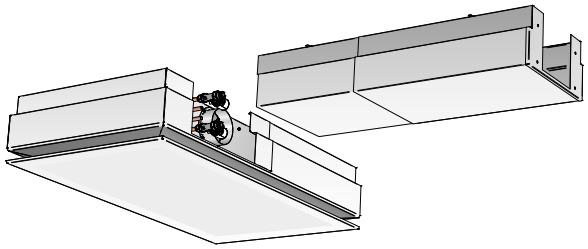


Figure 23. PARASOL EX with connection casing (ordered separately). Custom cover plate (included when ordering the connection casing).

Connection sizes

Water - cooling, plain pipe end (Cu)	Ø 12 x 1.0 mm
Water - heating, plain pipe end (Cu)	Ø 12 x 1.0 mm
Air, connecting sleeve MF/HF	Ø 125 mm
Air, connecting sleeve PF	Ø 160 mm

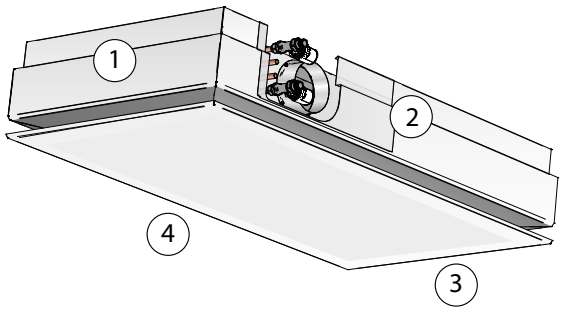


Figure 24. Air connection side. (The figure shows the standard connection on side 2).

Air connection

PARASOL EX is supplied with the connecting sleeve on the same side as the water connection. As standard the connections are on side 2, but can also be ordered the connecting sleeve and water connection mounted on side 4.

There is a cover on the opposite side, which can only be used as a cleaning cover. The design cover is dismantled to access the cleaning cover.

To connect the water

Connect the water pipes using push-on, compression ring couplings or sleeve nuts. Note that compression ring couplings require support sleeves inside the pipes.
Do not use soldered couplings for the connection of water pipes. High temperatures can damage the unit's existing soldered joints.

Flexible connection hoses for water may be ordered separately.

Condensation-free cooling

Since the comfort modules have to be dimensioned to operate without condensation, no drainage system is required.

Installation with or without connection casing

PARASOL EX is supplied as standard with a cover plate that covers a large part of the opening except for the water and air connections.

If you also wish to cover the pipes and air duct to give a uniform design, there is a connection casing available that is ordered as an extra accessory.

Technical data

Total cooling capacity, max.	1930 W
Heating capacity, water, max.	2450 W
Air flow:	
PARASOL EX 690	7-34 l/s
PARASOL EX 1290	9-55 l/s
Length:	
PARASOL EX 690	690 mm
PARASOL EX 1290	1290 mm
Width:	690 mm
Height:	250 mm

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

Table 3. Weight

Size	Type	Function	Dry weight	Water volume	
			(kg)	cooling (l)	heating (l)
690	MF	A	21.2	1.1	
690	MF	B	21.8	1.1	0.2
690	MF	C	18.5		
1290	MF/HF	A	31.8	1.4	
1290	MF/HF	B	35.8	1.4	0.9
1290	MF/HF	C	29.7		
1290	PF	A	35.0	1.4	
1290	PF	B	39.4	1.4	0.9

Recommended limit values

Pressure levels

Coil working pressure, max.	1000 kPa
Coil test pressure, max.	1300 kPa
Nozzle pressure	50-150 Pa
Recommended min. nozzle pressure if coil heating is used, p_l	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

Cooling water, temperature increase	2–5 K
Heating water, drop in temperature	4–10 K

Temperature differences are always expressed in Kelvin (K).

Supply flow temperature

Cooling Water *	
Heating water, max.	60 °C

** Cooling water must always be kept at a level that ensures that no condensation is formed.*

Designations

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

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

Pressure drop in nozzle

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

Δp_l	Pressure drop in nozzle (pa)
q_l	Flow of primary air (l/s)
k_{pl}	Pressure drop constant for nozzle setting, see Tables 4-7

Cooling

Standard

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

Calculating Formulae - Cooling

Below are some formulae that enable the user to calculate which comfort module selection 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 4-7

Air's cooling capacity

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

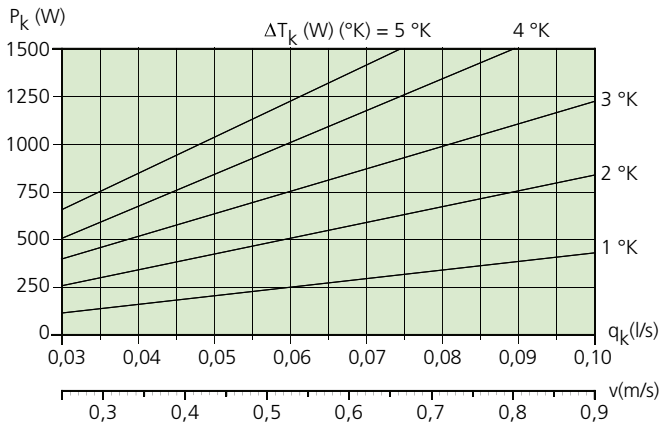
P_l	Primary air's cooling capacity (W)
q_l	Flow of primary air (l/s)
ΔT_l	Temperature difference between primary air (t_l) and room air (t_r) (K)

Water's cooling capacity

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

P_k	Cooling capacity of the water (W)
q_k	Cooling water flow (l/s)
ΔT_k	Temperature difference of cooling water 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 4-7 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, PARASOL EX 690

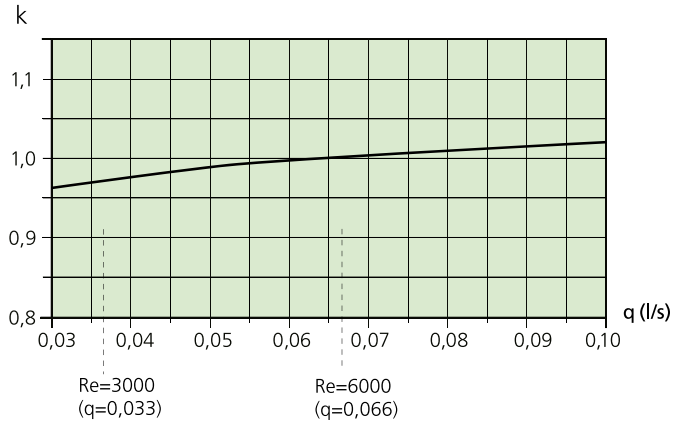


Diagram 3. Corrected capacity – water flow, PARASOL EX 1290

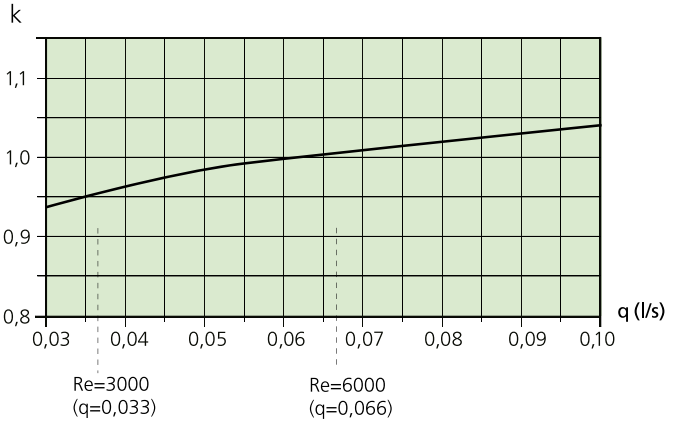


Diagram 4. Pressure drop – water flow, cooling.

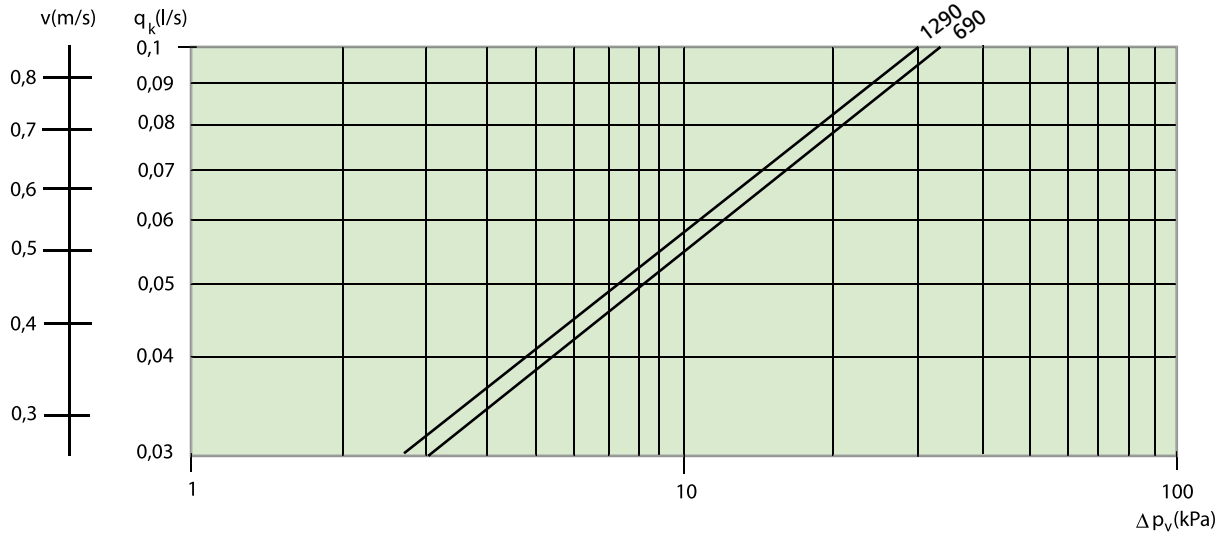


Table 4 – data – cooling. Sizing guide for PARASOL EX 690

Unit length (mm)	Nozzle setting 1)	Primary air flow (l/s)	Sound level dB(A) 2)	Nozzle pressure p_i (Pa)	Cooling capacity of primary air (W) at ΔT_i				Cooling capacity, water (W) at ΔT_{mk} 3)							Pressure drop constant air/water	
					6	8	10	12	6	7	8	9	10	11	12	k_{pl}	k_{pk}
690	LLLL	7	<20	48	50	67	84	101	172	199	226	252	279	306	333	1.01	0.0173
690	LLLL	8	<20	62	58	77	96	115	196	228	259	290	321	352	383	1.01	0.0173
690	LLLL	9	<20	79	65	86	108	130	218	252	288	323	357	393	427	1.01	0.0173
690	LLLL	10	22	98	72	96	120	144	237	276	314	352	390	428	467	1.01	0.0173
690	LLLL	12	27	140	86	115	144	173	271	315	359	402	446	491	534	1.01	0.0173
690	MMMM	12	<20	47	86	115	144	173	205	237	268	300	329	360	391	1.76	0.0173
690	MMMM	14	22	63	101	134	168	202	238	276	312	349	386	422	458	1.76	0.0173
690	MMMM	16	26	83	115	154	192	230	266	308	350	393	434	475	516	1.76	0.0173
690	MMMM	18	30	105	130	173	216	259	291	338	384	431	477	523	568	1.76	0.0173
690	MMMM	20	33	129	144	192	240	288	313	364	415	465	515	565	615	1.76	0.0173
690	HHHH	20	20	52	144	192	240	288	257	300	341	382	423	465	506	2.77	0.0173
690	HHHH	23	25	69	166	221	276	331	293	340	387	433	480	526	572	2.77	0.0173
690	HHHH	26	28	88	187	250	312	374	324	376	427	478	529	580	630	2.77	0.0173
690	HHHH	30	33	117	216	288	360	432	361	418	474	531	587	642	698	2.77	0.0173
690	HHHH	34	36	150	245	326	408	490	393	455	516	577	637	698	757	2.77	0.0173

Table 5 – data – cooling. Sizing guide for PARASOL EX 1290 MF

Unit length (mm)	Nozzle setting 1)	Primary air flow (l/s)	Sound level dB(A) 2)	Nozzle pressure p_i (Pa)	Cooling capacity of primary air (W) at ΔT_i				Cooling capacity, water (W) at ΔT_{mk} 3)							Pressure drop constant air/water	
					6	8	10	12	6	7	8	9	10	11	12	k_{pl}	k_{pk}
1290	LLLL	9	<20	49	65	86	108	130	271	315	360	405	450	494	540	1.28	0.0183
1290	LLLL	10	<20	61	72	96	120	144	298	348	397	446	496	546	595	1.28	0.0183
1290	LLLL	12	<20	88	86	115	144	173	346	403	462	519	577	635	693	1.28	0.0183
1290	LLLL	14	<20	120	101	134	168	202	386	450	516	580	645	710	775	1.28	0.0183
1290	LLLL	16	22	156	115	154	192	230	420	492	563	634	705	776	846	1.28	0.0183
1290	MMMM	13	<20	50	94	125	156	187	301	351	402	452	503	553	604	1.84	0.0183
1290	MMMM	15	<20	67	108	144	180	216	343	399	456	512	568	625	681	1.84	0.0183
1290	MMMM	17	<20	85	122	163	204	245	379	441	503	564	626	687	748	1.84	0.0183
1290	MMMM	20	23	118	144	192	240	288	426	495	564	632	700	768	835	1.84	0.0183
1290	MMMM	22	26	143	158	211	264	317	454	527	600	672	744	815	887	1.84	0.0183
1290	HHHH	22	<20	50	158	211	264	317	359	420	479	540	600	660	720	3.12	0.0183
1290	HHHH	25	<20	64	180	240	300	360	399	467	533	599	665	732	798	3.12	0.0183
1290	HHHH	28	22	81	202	269	336	403	436	508	580	652	723	795	867	3.12	0.0183
1290	HHHH	33	26	112	238	317	396	475	488	567	648	728	807	887	967	3.12	0.0183
1290	HHHH	38	30	148	274	365	456	547	532	619	707	793	879	967	1053	3.12	0.0183

1) For the sizing of alternative nozzle settings, use the Swegon ProSelect sizing program that is available for use at www.swegon.se

2) The specified sound level is applicable to connection without damper or with fully open damper. In other applications that call for throttling by means of a SYST CRP 9–125 commissioning damper fitted directly to the unit, the required data can be read using the Swegon ProSelect sizing program.

Room attenuation = 4 dB

3) The cooling water capacity is reduced by around 5% when the ADC[II] is set to the Fan-shape setting. The primary air capacity is not affected.

NOTE! The total cooling capacity is the sum of the air-based and water-based cooling capacities.

Table 6 – data – cooling. Sizing guide for PARASOL EX 1290 HF

Unit length (mm)	Nozzle setting 1)	Primary air flow (l/s)	Sound level dB(A) 2)	Nozzle pressure p_i (Pa)	Cooling capacity, primary air (W) at ΔT_i				Cooling capacity, water (W) at ΔT_{mk} 3)							Pressure drop constant air/water	
					6	8	10	12	6	7	8	9	10	11	12	kpl	kpk
1290	LLLL	13	<20	50	94	125	156	187	331	384	438	491	542	595	647	1.84	0.0183
1290	LLLL	15	<20	67	108	144	180	216	367	426	485	543	602	660	718	1.84	0.0183
1290	LLLL	17	<20	85	122	163	204	245	398	463	526	589	653	716	780	1.84	0.0183
1290	LLLL	20	23	118	144	192	240	288	439	510	580	650	720	789	859	1.84	0.0183
1290	LLLL	22	26	143	158	211	264	317	463	538	612	685	759	832	905	1.84	0.0183
1290	MMMM	23	<20	52	166	221	276	331	390	452	514	575	636	697	757	3.2	0.0183
1290	MMMM	26	23	66	187	250	312	374	422	490	557	623	689	756	821	3.2	0.0183
1290	MMMM	30	27	88	216	288	360	432	461	535	608	680	752	824	895	3.2	0.0183
1290	MMMM	34	31	113	245	326	408	490	494	573	652	729	806	883	960	3.2	0.0183
1290	MMMM	39	35	149	281	374	468	562	532	616	700	783	866	948	1031	3.2	0.0183
1290	HHHH	36	26	51	259	346	432	518	450	519	588	655	722	789	854	5.04	0.0183
1290	HHHH	40	28	63	288	384	480	576	483	557	629	701	773	843	913	5.04	0.0183
1290	HHHH	45	31	80	324	432	540	648	519	598	676	753	828	903	978	5.04	0.0183
1290	HHHH	50	34	98	360	480	600	720	553	636	717	799	878	958	1037	5.04	0.0183
1290	HHHH	55	36	119	396	528	660	792	582	669	756	840	924	1007	1090	5.04	0.0183

Table 7 – data – cooling. Sizing guide for PARASOL EX 1290 PF

Unit length (mm)	Nozzle setting 1)	Primary air flow (l/s)	Sound level dB(A) 2)	Nozzle pressure p_i (Pa)	Cooling capacity, primary air (W) at ΔT_i				Cooling capacity, water (W) at ΔT_{mk} 3)					Pressure drop constant air/water	
					6	8	10	12	6	7	8	9	10	kpl	kpk
1290	LLLL	43.3	25	50	312	416	520	624	330	385	440	495	550	6.13	0.0183
1290	LLLL	51.3	30	70	369	492	616	739	394	460	525	591	657	6.13	0.0183
1290	LLLL	58.2	34	90	419	559	698	838	442	516	590	664	737	6.13	0.0183
1290	MMMM	51	26	50	367	490	612	734	363	424	485	545	606	7.21	0.0183
1290	MMMM	60.3	31	70	434	579	724	868	428	499	570	641	713	7.21	0.0183
1290	MMMM	68.4	35	90	492	657	821	985	477	556	636	715	794	7.21	0.0183
1290	HHHH	62.3	26	50	449	598	748	897	394	460	525	591	657	8.81	0.0183
1290	HHHH	73.7	32	70	531	708	884	1061	463	540	618	695	772	8.81	0.0183
1290	HHHH	83.6	36	90	602	803	1003	1204	516	602	688	774	860	8.81	0.0183

1) For the sizing of alternative nozzle settings, use the Swegon ProSelect sizing program that is available for use at www.swegon.se

2) The specified sound level is applicable to connection without damper or with fully open damper. In other applications that call for throttling by means of a SYST CRP 9–125 commissioning damper fitted directly to the unit, the required data can be read using the Swegon ProSelect sizing program.

Room attenuation = 4 dB

3) The cooling water capacity is reduced by around 5% when the ADC^{II} is set to the Fan-shape setting. The primary air capacity is not affected.

NOTE! The total cooling capacity is the sum of the air-based and water-based cooling capacities.

Table 8. Cooling capacity for natural convection

Unit (mm)	Cooling capacity (W) at temperature difference, room - water ΔT_{mk} (K)						
	6	7	8	9	10	11	12
PARASOL 690	17	21	25	29	34	39	43
PARASOL 1290	41	51	61	72	83	95	107

Calculation Example - Cooling

To make sizing comfort modules as simple as possible, the Swegon ProSelect sizing program is available at www.swegon.se. Another excellent way of sizing units is to use the catalogue data, an example of which is given below.

Conditions

A large room with dimensions (w x d x h) 8.0 x 20.0 x 3.0 m without suspended ceiling is to be ventilated and temperature-controlled with a PARASOL EX 1290 suspended comfort module. The total cooling requirement is estimated to 9.6 W/m2. Design room temperature (t_r) 24°C, cooling water temperature (flow/return) 14/18°C and the primary air temperature (t_l) 18 °C produces:

ΔT_k= 4K

ΔT_{mk}= 8K

ΔT_l= 6K

The desired primary supply air flow for the room (q_l) has been fixed at 432 l/s. The sound level from each comfort module must not exceed 27 dB(A).

Solution

Cooling

The cooling capacity of the primary air can be calculated using the following formula:

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

$P_l = 1.2 \times 6 \times 432 = 3110$ W

The remaining cooling capacity that must be provided by water-based cooling will then be 9600 – 3110 = 6490 W.

From Table 6 we find that a PARASOL EX 1290 in the high flow version with nozzle setting HHHH can distribute 36 l/s and generates 26 dB(A) at a nozzle pressure of 51 Pa. The cooling capacity of the water can be read from the same table: 588 W per unit.

The following is required to meet the 27 dB(A) per unit acoustic requirement: 432 / 36 = 12 x PARASOL EX 1290. The total cooling capacity on the water side will be 588 x 12 = 7056 W which is 566 W more than the cooling load.

Cooling water

With cooling capacity 588 W for cooling water, the necessary water flow can be obtained in Diagram 1. With the temperature increase ΔT_k= 4K the water flow obtained is 0.035 l/s.

In Diagram 3 we can read that a water flow of 0.035 l/s does not produce a fully turbulent outflow, but must be corrected by a capacity reduction factor of 0.95. The actual cooling capacity will then be 558 W per unit and a total of 6700 W for 12 units, i.e. close to the requirement.

The pressure drop is calculated on the basis of a water flow of 0.035 l/s and the pressure drop constant k_{pk} = 0.0183, which is taken from Table 6. The pressure drop will then be: $\Delta p_k = (q_k / k_{pk})^2 = (0.035 / 0.0183)^2 = 7$ kPa.

Sound level

In Table 6 we see that the noise level with a fully open damper (or without a damper) reaches 26 dB(A). To see the cut-off range and the current noise level after commissioning with separate type SYST CRPc 9-125 damper, Diagram 7 or the Swegon ProSelect sizing program can be used, which is available at www.swegon.se.

Result

The following products are needed in the sizing example described above:

Optimised solution:

10 x PARASOL EX 1290-A-HF with nozzle setting HHHH (cooling and ventilation)

2 x PARASOL EX 1290-C-HF with nozzle setting HHHH (ventilation only)

Alternative solution for maximum flexibility with regard to possible future room divisions:

12 x PARASOL EX 1290-A-HF with nozzle setting HHHH (cooling and ventilation)

Heating

Heating function

Heating spaces with air heated above room temperature discharged from the ceiling is a good alternative to conventional radiator heating solutions. The benefits achieved include lower installation costs, simpler installation and perimeter walls free from piping and radiators. 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, and for most quality requirements 22 °C is usually regarded as the optimum level. This means that for a room with a cold perimeter wall, the air temperature must be higher than 22°C to compensate for the chilling effect of the wall. 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 poor windows, it may be necessary to raise the air temperature to compensate for the chill from perimeter walls.

The PARASOL EX is optimised for distributing supply air without help from the coanda effect and can discharge air in a variable diffusion pattern thanks to the built-in ADC[II], that also further increases the mixture of supply air into the room air. The PARASOL EX therefore supplies heated air to the room with a turbulent jet that quickly mixes itself with the room air. This speeds up the process of cooling down the heated air so that it more easily can reach down to the occupied zone. Different operating scenarios can be simulated easily using the Swegon ProClim Web software to calculate the heat balance and determine the room air temperature and operative temperature. Supplying heated air from the ceiling results in some stratification of the air. With a maximum supply flow temperature of 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 being used and lighting, computers and people are present, the stratification is reduced or disappears depending on the heating load. Laboratory studies, computer simulations and reference projects all show that a good indoor climate will be achieved by means of the PARASOL EX comfort module whatever the time of year.

Calculating Formulae - Heating

Below are some formulae that enable the user to calculate which comfort module selection is best suited for the application. The values for the calculations are in Tables 9-12.

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	Flow of primary air (l/s)
ΔT_l	Temperature difference between primary air (t_l) and room air (t_r) (K)

Heating capacity of the water

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

P_v	Heating capacity of the water (W)
q_v	Flow of heating water (l/s)
ΔT_v	Temperature difference between the heating water's flow and return flow (K)

Pressure drop for heating coil

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

Δp_v	Pressure drop in cooling coil (kPa)
q_v	Flow of heating water (l/s), see Diagram 6
k_{pv}	Pressure drop constant for heating coil, see Tables 8-11

Diagram 5. Water flow - heating capacity

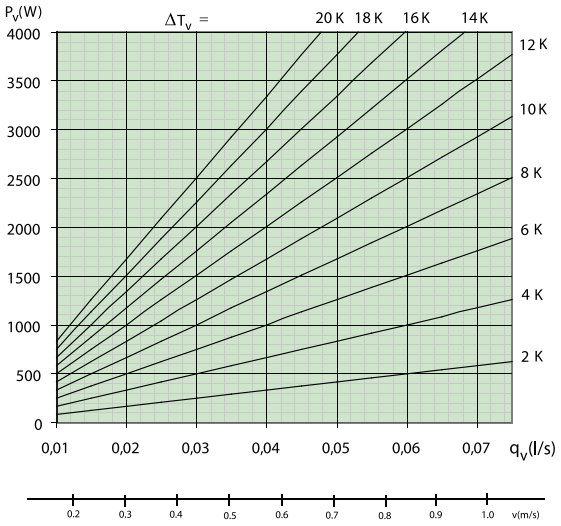


Diagram 6. Pressure drop – heating water flow

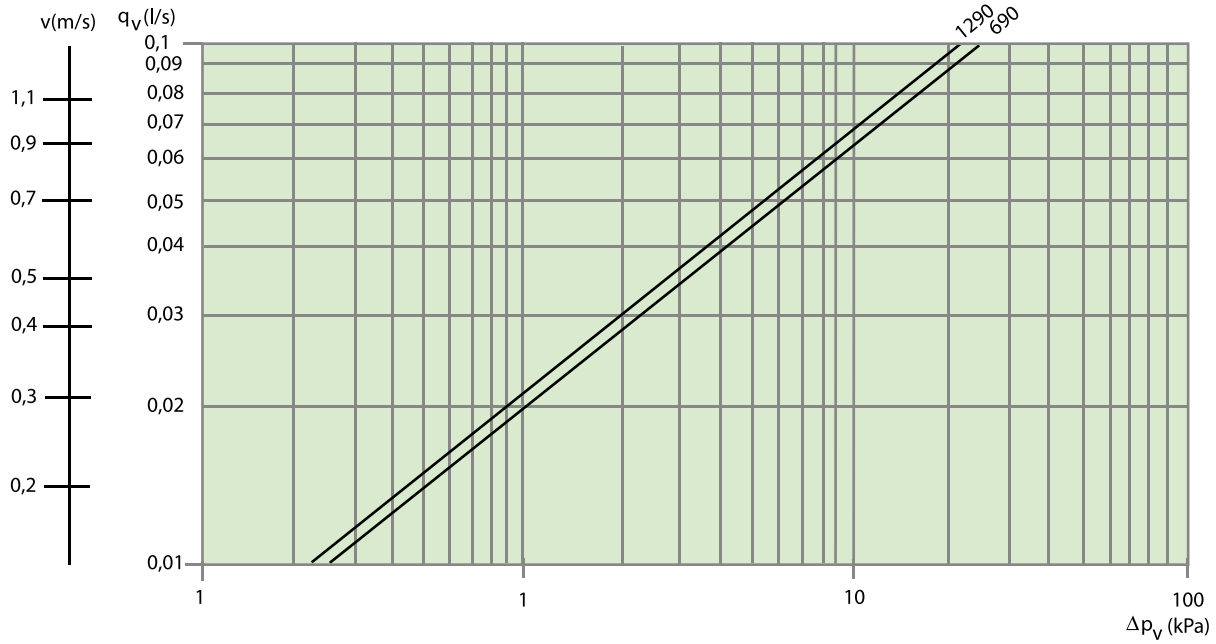


Table 9 – data – heating. Sizing guide for PARASOL EX 690

Unit length (mm)	Nozzle setting 1)	Primary air flow (l/s)	Sound level dB(A) 2)	Nozzle pressure p_i (Pa)	Heating capacity, water (W) at ΔT_{mv} 3)							Pressure drop constant air/water	
					5	10	15	20	25	30	35	k_{pl}	k_{pv}
690	LLLL	7	<20	48	93	187	280	372	465	557	649	1.01	0.02
690	LLLL	8	<20	62	106	212	317	422	526	631	735	1.01	0.02
690	LLLL	9	<20	79	117	233	349	465	581	696	812	1.01	0.02
690	LLLL	10	22	98	126	253	378	504	629	755	880	1.01	0.02
690	LLLL	12	27	140	143	287	429	571	714	856	998	1.01	0.02
690	MMMM	12	<20	47	123	247	359	472	581	690	796	1.76	0.02
690	MMMM	14	22	63	134	267	394	520	644	768	890	1.76	0.02
690	MMMM	16	26	83	143	285	424	562	699	835	971	1.76	0.02
690	MMMM	18	30	105	151	301	450	599	747	895	1043	1.76	0.02
690	MMMM	20	33	129	158	315	473	632	790	948	1107	1.76	0.02
690	HHHH	20	20	52	138	276	406	537	665	792	918	2.77	0.02
690	HHHH	23	25	69	152	303	448	592	734	876	1016	2.77	0.02
690	HHHH	26	28	88	164	327	484	641	795	949	1102	2.77	0.02
690	HHHH	30	33	117	178	356	527	698	866	1035	1201	2.77	0.02
690	HHHH	34	36	150	190	380	564	747	928	1109	1289	2.77	0.02

Table 10 – data – heating. Sizing guide for PARASOL EX 1290 MF with straight ADC[II]

Unit length (mm)	Nozzle setting 1)	Primary air flow (l/s)	Sound level in dB(A) 2)	Nozzle pressure p_i (Pa)	Heating capacity, water (W) at ΔT_{mv} 3)							Pressure drop constant air/water	
					5	10	15	20	25	30	35	k_{pl}	k_{pv}
1290	LLLL	9	<20	49	184	369	538	708	872	1036	1197	1.28	0.0213
1290	LLLL	10	<20	61	197	394	580	766	948	1130	1310	1.28	0.0213
1290	LLLL	12	<20	88	219	438	653	867	1081	1294	1506	1.28	0.0213
1290	LLLL	14	<20	120	238	475	714	953	1193	1432	1672	1.28	0.0213
1290	LLLL	16	22	156	254	508	767	1027	1289	1552	1815	1.28	0.0213
1290	MMMM	13	<20	50	177	353	543	732	926	1120	1318	1.84	0.0213
1290	MMMM	15	<20	67	206	412	625	838	1053	1269	1486	1.84	0.0213
1290	MMMM	17	<20	85	232	464	697	930	1165	1399	1633	1.84	0.0213
1290	MMMM	20	23	118	265	531	791	1051	1309	1567	1824	1.84	0.0213
1290	MMMM	22	26	143	285	570	846	1121	1394	1666	1936	1.84	0.0213
1290	HHHH	22	<20	50	227	454	677	901	1124	1346	1568	3.12	0.0213
1290	HHHH	25	<20	64	251	503	751	999	1246	1492	1738	3.12	0.0213
1290	HHHH	28	22	81	273	547	816	1086	1354	1622	1890	3.12	0.0213
1290	HHHH	33	26	112	305	610	911	1212	1511	1810	2109	3.12	0.0213
1290	HHHH	38	30	148	332	665	992	1320	1646	1972	2297	3.12	0.0213

1) For the sizing of alternative nozzle settings, use the Swegon ProSelect sizing program that is available for use at www.swegon.se

2) The specified sound level is applicable to connection without damper or with fully open damper. In other applications that call for throttling by means of a SYST CRP 9–125 commissioning damper fitted directly to the unit, the required data can be read using the Swegon ProSelect sizing program.

Room attenuation = 4 dB

3) The cooling water capacity is reduced by around 5% when the ADC[II] is set to the Fan-shape setting. The primary air capacity is not affected.

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 a negative impact on the total heating capacity.

Table 11 – data – heating. Sizing guide for PARASOL EX 1290 HF

Length of the unit (mm)	Nozzle setting 1)	Primary air flow (l/s)	Sound level dB(A) 2)	Nozzle pressure, p_i (Pa)	Heating capacity, water (W) at ΔT_{mv} 3)							Pressure drop constant air/water	
					5	10	15	20	25	30	35	k_{pl}	k_{pv}
1290	LLLL	13	<20	50	158	315	586	857	1015	1172	1441	1.84	0.0213
1290	LLLL	15	<20	67	175	349	650	951	1125	1299	1597	1.84	0.0213
1290	LLLL	17	<20	85	190	379	705	1032	1221	1410	1734	1.84	0.0213
1290	LLLL	20	23	118	209	418	778	1137	1346	1554	1911	1.84	0.0213
1290	LLLL	22	26	143	220	441	820	1199	1419	1639	2015	1.84	0.0213
1290	MMMM	23	<20	52	185	369	687	1005	1189	1373	1689	3.2	0.0213
1290	MMMM	26	23	66	200	400	745	1089	1289	1489	1830	3.2	0.0213
1290	MMMM	30	27	88	218	436	812	1188	1405	1623	1995	3.2	0.0213
1290	MMMM	34	31	113	234	468	871	1274	1507	1741	2140	3.2	0.0213
1290	MMMM	39	35	149	251	503	935	1368	1619	1870	2299	3.2	0.0213
1290	HHHH	36	26	51	210	419	780	1141	1350	1559	1917	5.04	0.0213
1290	HHHH	40	28	63	224	448	834	1220	1444	1667	2050	5.04	0.0213
1290	HHHH	45	31	80	240	481	895	1309	1549	1789	2199	5.04	0.0213
1290	HHHH	50	34	98	255	510	949	1388	1643	1897	2332	5.04	0.0213
1290	HHHH	55	36	119	268	536	998	1460	1728	1995	2453	5.04	0.0213

Table 12 – data – heating. Sizing guide for PARASOL EX 1290 PF

Length of the unit (mm)	Nozzle setting 1)	Primary air flow (l/s)	Sound level dB(A) 2)	Nozzle pressure, p_i (Pa)	Heating capacity, water (W) at ΔT_{mv} 3)						Pressure drop constant air/water	
					5	10	15	20	25	30	k_{pl}	k_{pv}
1290	LLLL	43.3	25	50	240	480	720	960	1201	1441	6.13	0.0213
1290	LLLL	51.3	30	70	283	566	849	1132	1416	1699	6.13	0.0213
1290	LLLL	58.2	34	90	315	630	945	1261	1576	1891	6.13	0.0213
1290	MMMM	51	26	50	266	532	799	1065	1331	1597	7.21	0.0213
1290	MMMM	60.3	31	70	308	617	925	1233	1541	1850	7.21	0.0213
1290	MMMM	68.4	35	90	340	680	1020	1360	1701	2041	7.21	0.0213
1290	HHHH	62.3	26	50	285	571	856	1142	1427	1713	8.81	0.0213
1290	HHHH	73.7	32	70	333	665	998	1331	1664	1996	8.81	0.0213
1290	HHHH	83.6	36	90	368	737	1105	1473	1842	2210	8.81	0.0213

1) For the sizing of alternative nozzle settings, use the Swegon ProSelect sizing program that is available for use at www.swegon.se

2) The specified sound level is applicable to connection without damper or with fully open damper. In other applications that call for throttling by means of a SYST CRP 9–125 commissioning damper fitted directly to the unit, the required data can be read using the Swegon ProSelect sizing program.

Room attenuation = 4 dB

3) The cooling water capacity is reduced by around 5% when the ADC[II] is set to the Fan-shape setting. The primary air capacity is not affected.

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 a negative impact on the total heating capacity.

Calculation Example - Heating

In the same room as in the example for cooling, there is also a heating load of 50 W/m^2. This produces a heating capacity load of 50 x 8.0 x 20.0 = 8.0 kW. The primary air flow must be the same as in the summer scenario, 432 l/s which gives 36 l/s and unit.

Design room temperature (t_r) 22 °C, heating water temperature (flow/return) 50/40 °C and the primary air temperature (t_l) 20 °C produces:

ΔT_v= 10 °K

ΔT_{mv}= 23 °K

ΔT_l= -2 °K

Solution

Heating

The primary airflow of 36 l/s in combination with the primary air temperature of 20°C produces a negative impact on the heating capacity: 1.2 x 432 x (-2) = -1037 W. The heating capacity requirement from the heating water is thus increased to 8000 + 1037 = 9037 W. Table 11 gives at ΔT_{mv}= 23 °K and primary air flow 36 l/s a heating capacity of P_v = 1266 W is obtained. To meet the total heating load we need 9037 / 1266 = 7.1 units which then can be rounded upward to 8 x PARASOL EX 1290 with a heating function.

Heating water

With a heating requirement of 9037 / 8 = 1130 W per unit and ΔT_v = 10K, we obtain the required water flow from Diagram 5: 0.027 l/s. The pressure drop for the heating water is calculated on the basis of a water flow of 0.027 l/s and pressure drop constant k_{pv} = 0.0213, which is taken from Table 11. The pressure drop will then be: $\Delta p_v = (q_v / k_{pv})^2 = (0.027 / 0.0213)^2$ = 1.6 kPa.

Result

Dimensioning case with ventilation, cooling and heating.

Optimised solution:

2 x PARASOL EX 1290-A-HF with nozzle setting HHHH (cooling and ventilation)

8 x PARASOL EX 1290-B-HF with nozzle setting HHHH (cooling, heating and ventilation)

2 x PARASOL EX 1290-C-HF with nozzle setting HHHH (ventilation only)

Alternative solution for maximum flexibility with regard to possible future room divisions:

12 x PARASOL EX 1290-B-HF with nozzle setting HHHH (cooling, heating and ventilation)

Acoustics

Diagram 7/8 shows the total generated sound power (L_{Wtot} dB), as a function of the air flow and pressure drop across the damper.
By correcting L_{Wtot} with the correction factors from Tables 13-15, the sound power levels for each octave band ($L_W = L_{wtot} + K_{ok}$) can be obtained.

Initial Commissioning Range

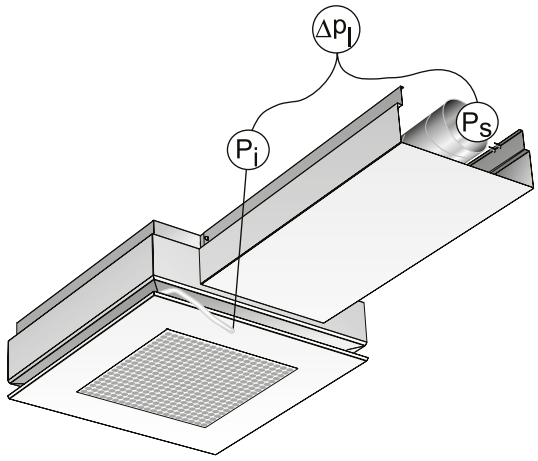


Figure 25. Pressure Conditions - Air

$\Delta p_l = p_s - p_i$

Δp_l	Commissioning range of fitted damper p_s - p_i, see Diagrams 7-8
$p_{i\,4}$	Nozzle pressure (easily measured with a pressure gauge connected to measurement hoses)
p_s	Static pressure upstream of unit and damper

Diagram 7. Commissioning range, CRPc 9-125 damper

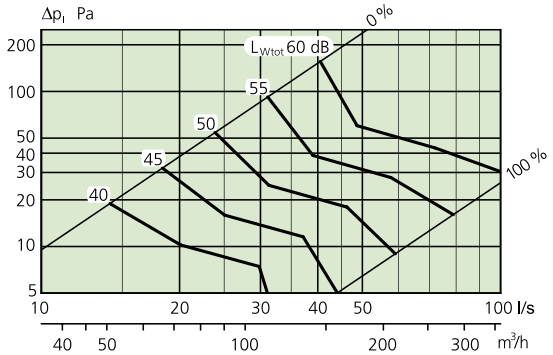


Diagram 8. Commissioning range, CRPc 9-160 damper

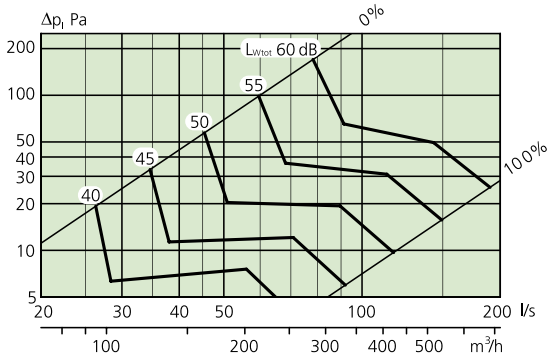


Table 13. Natural attenuation ΔL (dB) PARASOL

Nozzle setting	Octave band (Hz)							
	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) PARASOL

Nozzle setting	Octave band (Hz)							
	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) PARASOL EX 1290 HF/PF

Nozzle setting	Octave band (Hz)							
	63	125	250	500	1k	2k	4k	8k
LLLL	16	17	14	13	14	13	12	12
MMMM	14	15	12	11	12	11	10	10
HHHH	12	13	10	9	10	9	8	8

Table 16. Sound power level for damper CRPc 9-125, Correction factor, K_{ok}

Size	Mid-frequency (octave band) Hz							
CRPc 9	63	125	250	500	1000	2000	4000	8000
125	0	-2	-9	-15	-20	-25	-29	-35
Tol. ±	2	2	2	2	2	2	2	2

Table 17. Sound power level for damper CRPc 9-160, Correction factor, K_{ok}

Size	Mid-frequency (octave band) Hz							
CRPc 9	63	125	250	500	1000	2000	4000	8000
160	0	-2	-12	-16	-18	-21	-26	-36
Tol. ±	2	2	2	2	2	2	2	2

Dimensions

PARASOL EX 690

Table 18. Dimensions 690, base module

Variant	Length (mm) *	Width (mm) *	Height (mm)
690	567 (+ 41)	567 (+ 72)	178
690 PF	567 (+ 41)	567 (+ 72)	208

* Dimensions (in brackets) refer to protruding pipes

Table 19. Dimensions 690 incl. design module

Length (mm)	Width (mm)	Height (mm)
690	690	250

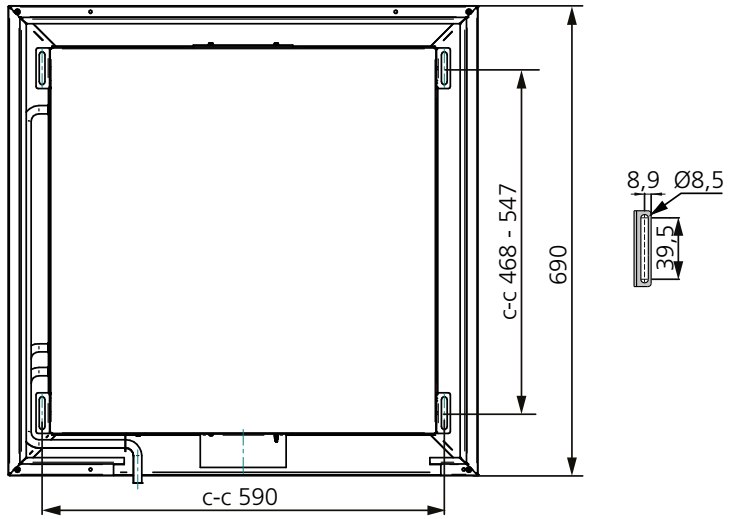


Figure 26. PARASOL EX 690 top view with air connection on side 2.

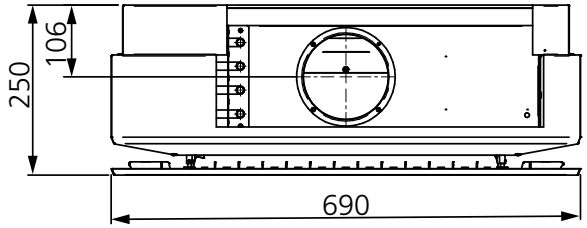


Figure 27. PARASOL EX 690, side view

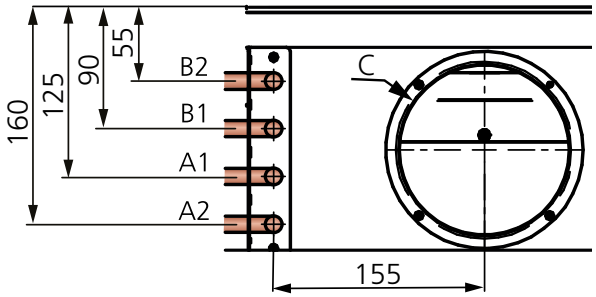


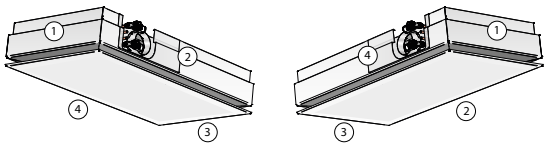
Figure 28. Air and water connections

C = Connecting sleeve air Ø125 mm

B1 = Inlet heating water Ø12 x 1.0 mm B2 = Return heating water Ø12 x 1.0 mm

A1 = Inlet, cooling water Ø12 x 1.0 mm A2 = Return cooling water Ø12 x 1.0 mm

PARASOL EX 1290



Connection side 2 Connection side 4

Table 20. Dimensions 1290, base module

Variant	Length (mm) *	Width (mm) *	Height (mm)
1290 MF/HF	1167 (+ 41)	567 (+ 72)	178
1290 PF	1167 (+ 41)	567 (+ 72)	208

** Dimensions (in brackets) refer to protruding pipes*

Table 21. Dimensions 1290 incl. design module

Length (mm)	Width (mm)	Height (mm)
1290	690	250

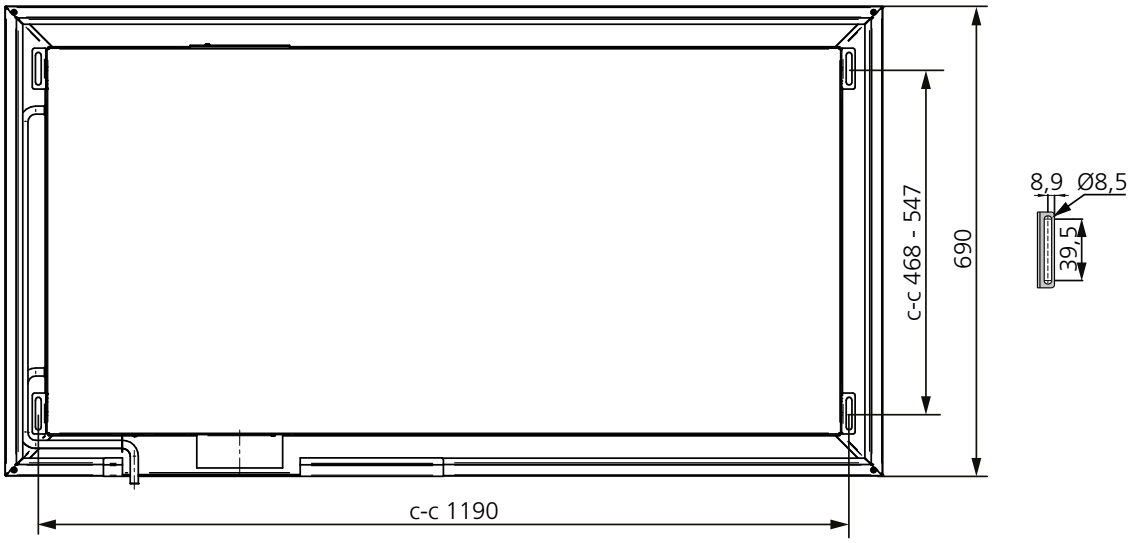
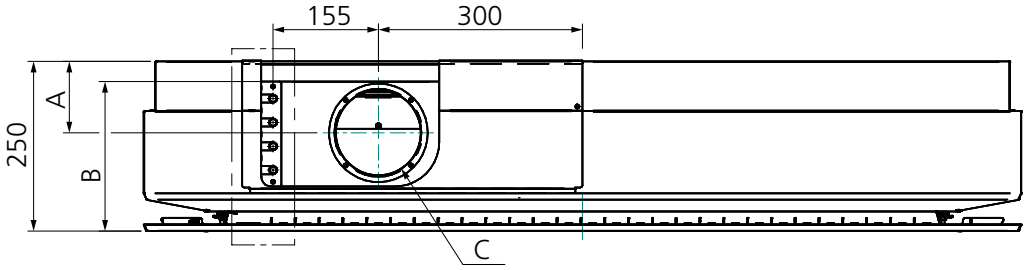


Figure 29. PARASOL EX 1290, top view (example with connection on side 2).



Variant	A	B	C
	(mm)	(mm)	Ø
MF/HF	105	220	125
PF	101	250	160

Figure 30. PARASOL EX 1290, side view (example with connection on side 2)

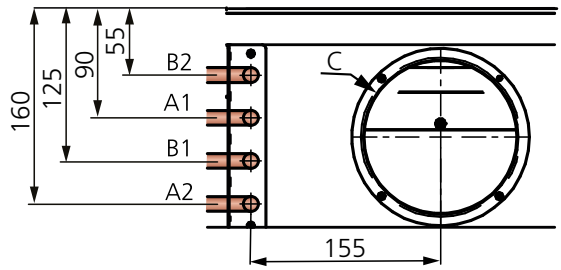


Figure 31. Air and water connection on side 2.
C = Connecting sleeve air ø125 mm
B2 = Return heating water ø12 x 1.0 mm
A1 = Inlet cooling water ø12 x 1.0 mm
B1 = Inlet heating water ø12 x 1.0 mm
A2 = Return cooling water ø12 x 1.0 mm

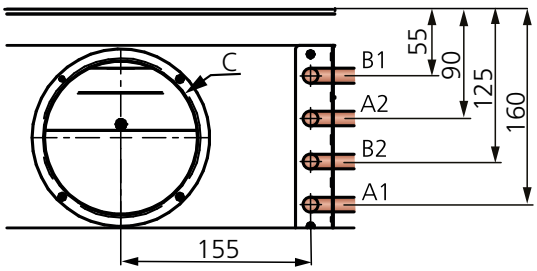


Figure 32. Air and water connection on side 4.
C = Connecting sleeve air ø125 mm
B1 = Inlet heating water ø12 x 1.0 mm
A2 = Return cooling water ø12 x 1.0 mm
B2 = Return heating water ø12 x 1.0 mm
A1 = Inlet cooling water ø12 x 1.0 mm

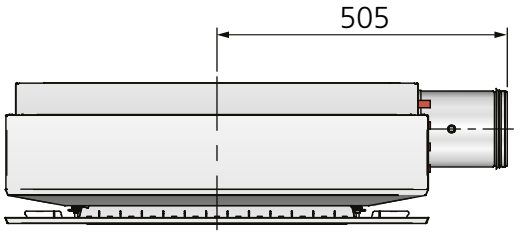


Figure 33. Connection with damper, end view

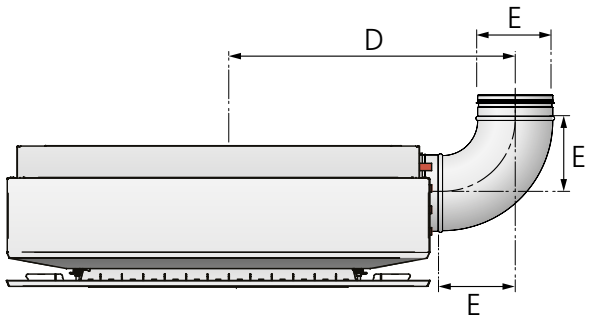


Figure 34. Connection with duct bend, end view
Mounted connection fittings SYST CA xxx-90
PARASOL EX 690 MF/HF: D = 460; E = 125
PARASOL EX 1290 MF/HF: D = 460; E = 125
PARASOL EX 1290 PF: D = 495; E = 160

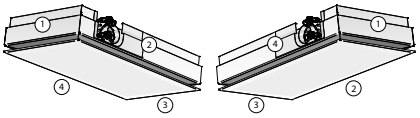
Specification

Contractor demarcation

Swegon's delivery ends at the connection points for water and air (see Figures 27-28 and 30-34).

- The pipe contractor connects the connections points for water to the plain pipe ends and fills the system, bleeds it and tests the pressure.
- The ventilation contractor connects ducting to the air connecting piece.

Ordering range, PARASOL EX

Size	PARASOL EX 690: 690 x 690 mm
	PARASOL EX 1290: 1290 x 690 mm
	The tolerance is ±2 mm
Function	The units can be ordered in three different functional versions:
	A = Cooling and supply air
	B = Cooling, heating and supply air
	C = Supply air only
Connection side	PARASOL EX 690:
	2: Water and air connection on side 2
	PARASOL EX 1290:
	2: Water and air connection on side 2 (standard), *see the diagram below.*
	4: Water and air connection on side 4, *see the diagram below.*
	
ADC[II]	Factory-fitted ADC[II]
	supplied as standard
Air flow variant	690 MF = Medium flow variant
	1290 MF = Medium flow variant
	1290 HF = High flow variant
	1290 PF = Plus flow variant (Ø160)
Nozzle setting	Each side can be set in four different ways:
	L = Low air flow
	M = Medium air flow
	H = High air flow
	C = No airflow
Colour	Optional colour on the design module, face plate and connection casing
RAL 9003	Standard colour, white, gloss ratio 30 ± 6%
RAL 7037	Grey (Grey Dusty shade), gloss ratio 30-40%)
RAL 9010	White (White), gloss ratio 30-40%)
RAL 9005	Black (Black Jet), gloss ratio 30-40%)
RAL 9006	White (White Aluminium), gloss ratio 70-80%)
RAL 9007	Grey (Grey Aluminium), gloss ratio 70-80%)

Ordering key, PARASOL EX 690

PARASOL EXc 690	a-	2	MF-	bcde	RAL ffff

Function:

A = Cooling and supply air
B = Cooling, heating and supply air
C = Supply air only

Connection side: 2

Airflow variant: MF

Nozzle setting:

Side 1: L; M; H; C
Side 2: L; M; H; C
Side 3: L; M; H; C
Side 4: L; M; H; C

Colour, RAL:

9003 Standard colour, gloss ratio 30 ± 6%
7037 (Grey Dusty shade, gloss ratio 30-40%)
9010 (White, gloss ratio 30-40%)
9005 (Black Jet, gloss ratio 30-40%)
9006 (White Aluminium, gloss ratio 70-80%)
9007 (Grey Aluminium, gloss ratio 70-80%)

Ordering key, PARASOL EX 1290

PARASOL EXc 1290	a-	b-	cc-	defg	RAL HHHH

Function:

A = Cooling and supply air
B = Cooling, heating and supply air
C = Supply air only

Connection side:

2 = Connection on side 2, standard
4 = Connection on side 4

Airflow variant:

MF = Medium flow
HF = High flow
PF = Plus flow (Ø160)

Nozzle setting:

Side 1: L; M; H; C
Side 2: L; M; H; C
Side 3: L; M; H; C
Side 4: L; M; H; C

Colour, RAL:

9003 Standard colour, gloss ratio 30 ± 6%
7037 (Grey Dusty shade, gloss ratio 30-40%)
9010 (White, gloss ratio 30-40%)
9005 (Black Jet, gloss ratio 30-40%)
9006 (White Aluminium, gloss ratio 70-80%)
9007 (Grey Aluminium, gloss ratio 70-80%)

Available to order, Accessories

Perforation pattern	The face plate can be ordered with a perforation pattern in three different variants and in several colours: Standard: Circular holes arranged in a triangular pattern. PD: Circular holes arranged in a square pattern PE: Square holes arranged in a square pattern *Contact support for more information regarding perforation patterns and special colours*
Connection casing	Telescopic casing for concealing ducts and pipes. The casing can also be ordered in several colours. Width: 380 mm Length interval: 175 - 250 mm 250 - 400 mm 400 - 700 mm 700 - 1200 mm 1200 - 2000 mm *Assembly piece SYST MS is required for suspended installation from hangers (ordered separately). One kit is sufficient to mount a casing on two products.*
Room control kit	Plug-and-play kit with valve, actuator and push-on coupling for quick connection (supplied separately)
Flexible connection hose	Connection hose supplied with compression ring coupling, push-on coupling with a diameter of 12 mm or sleeve nuts
Assembly piece	Ceiling mount, threaded rod and plastic sleeve for covering the threaded rod Supplied in galvanised finish or RAL 9003
Connection piece (90° bend), air	90° duct bend, Ø125; Ø160
Commissioning damper	Damper for adjusting the air volume Ø125; Ø160
Tool for nozzle adjustment	One tool for nozzle adjustment is supplied with each order free of charge. If several tools are required, they must be specified separately.
Venting nipple	Venting nipple with push-on coupling for connection to return pipe for water.
Control equipment	WISE IORE (for integration in the WISE system) LUNAd (for CAV and water regulation) *See IC Design and ProSelect for further control accessory options*

Ordering Key, Accessories

Perforation pattern	PARASOL EX c T- PP-	a-	bb	RAL-bbbb
Type: 1 = PARASOL EX 690 2 = PARASOL EX 1290				
Perforation variant: PD PE				
Colour, RAL: 9003 Standard, gloss ratio 30 ± 6% 7037 (Grey Dusty shade, gloss ratio 30-40%) 9010 (White, gloss ratio 30-40%) 9005 (Black Jet, gloss ratio 30-40%) 9006 (White Aluminium, gloss ratio 70-80%) 9007 (Grey Aluminium, gloss ratio 70-80%)				

Connection casing	PARASOL EXc T- CC-	aaaa-	RAL-bbbb
Max. length (mm): 250; 400; 700; 1200; 2000			
Colour, RAL: 9003 Standard, gloss ratio 30 ± 6% 7037 (Grey Dusty shade, gloss ratio 30-40%) 9010 (White, gloss ratio 30-40%) 9005 (Black Jet, gloss ratio 30-40%) 9006 (White Aluminium, gloss ratio 70-80%) 9007 (Grey Aluminium, gloss ratio 70-80%)			

Room control kit (Supplied separately)	SYST RK	aa
Variant: C = Cooling CH = Cooling and heating		

Assembly piece	SYST MS-M8	aaaa-	b-	c
Length of threaded rod (mm) 200; 500; 1000				
Type: 1 = One threaded rod 2=Two threaded rods and one thread lock				
1 = Galvanised finish 2 = Painted in RAL 9003				

Flexible connection hose, (x1) Compression ring coupling (12 mm dia.) against pipe on both ends (x1)	SYST FH F1-	aaa-	12
Length (mm): 300, 500 or 700			

Flexible connection hose, (x1) Quick-connector (push-on, Ø12 mm) against pipe on both ends (x1)	SYST FH F20-	aaa-	12
Length (mm): 275, 475 or 675			

Flexible connection hose, (x1) Quick-fit coupling (push-on, 12 mm dia.) against pipe on one end, G20ID sleeve nut on the other end	SYST FH F30-	aaa-	12
Length (mm): 200, 400 or 600			

Connection fitting (90° bend), air	SYST CA	aaa-	90
125 = Ø125			
160 = Ø160			

Commissioning damper	SYST CRPc-9	aaa
125 = Ø125		
160 = Ø160		

Tool for nozzle adjustment	SYST TORX 6-200
Venting nipple	SYST AR-12
Control equipment for integration into the WISE system	WISE IORE
Control equipment for CAV and water regulation	LUNAd RE
Hand-held terminal for LUNA	LUNAd T-CU
Condensation sensor	CG-IV WCD2

Specification text

Example of a specification text according to VVS AMA.

KB XX

Swegon PARASOL EX comfort module for suspended installation, with the following functions:

- Cooling (optional)
- Heating (optional)
- Ventilation
- Adjustable air direction
- Comfort guarantee ADC[II]
- Upward directed air distribution without need of any coanda effect.
- Integrated circulating air opening in face plate
- Enclosed version for circulating air
- Cleanable air duct
- Fixed measurement tapping with hose
- Painted in standard shade of white RAL 9003
- Contractor demarcation at connection point for water and air as in outline drawing.
- At connection points the pipe contractor connects to 12 mm plain pipe end (cooling) or to 12 mm dia. plain pipe end (heating).
- The pipe contractor fills. vents, tests the pressure and assumes responsibility for the design water flows reaching each branch of the system and the index unit
- The ventilation contractor conducts initial commissioning of the air flows

Accessories:

Control equipment, see IC Design and ProSelect as well as separate documentation on Swegon's website www.swegon.se