Four-way induction active chilled beam

PremiAir

Description

The PremiAir active chilled beam is a four-way induction type air-conditioning unit that is designed for integrated installation, mounted directly in the ceiling. PremiAir is primarily designed to ventilate, cool and/or heat buildings, where a comfortable climate and individual room control is needed. PremiAir is designed to fit most type of suspended ceiling framework on the market with a standard width of 600 mm.

Air duct connection: From 100 mm, 125 mm, 160 mm to 200 mm, depending on the air volume.

Main features

- Energy efficient high performance operation
- Elegant, integrated exterior design
- Requires minimum installation space
- High flexibility with variable nozzles and AirFlex air deflectors
- Silent operation
- Easy accessible front panel
- ControlAir automatic control (optional)

Quick selection

Size (mm)	Airflow l/s [m³/h]	Pressure (Pa)	Cooling capacity*) (W)		
			Air	Water	Total
600	20 [72]	50	240	453	693
		100		521	761
1194	30 [108]	50	360	832	1192
		100		956	1316
1794	40 [144]	50	480	1102	1582
		100		1267	1747

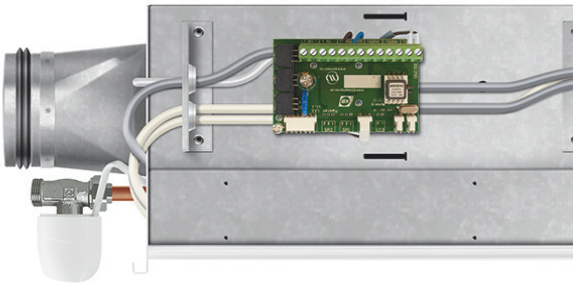
*) at ΔT = 10 °K

Function

The function is based on a well-known induction principle. The primary air from the air handling unit is injected into the plenum box within the unit, and distributed through specially shaped nozzles. As the air is discharged through the nozzles, the high velocity air jets above the coil create a low-pressure zone. This low-pressure zone draws ambient room air through the coil, and as it passes the coil fins it is conditioned (cooling - heating), according to the water temperature flowing through the coil. The conditioned air then mixes with the air jets (ventilation air, humidity control) before it is discharged back into the occupied space. The conditioned/mixed air distributed along the ceiling provides an optimal Coanda effect that is always the objective when the occupied zone requires low air velocities.

ControlAir

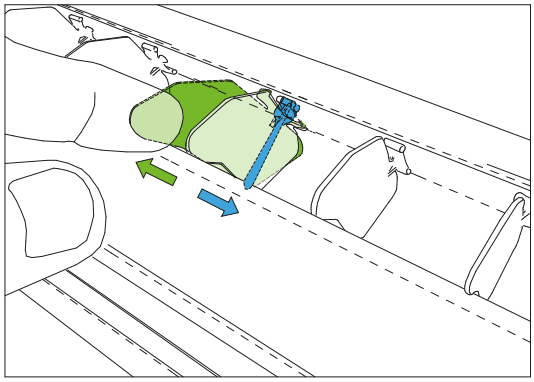
ControlAir is an energy saving digital control system, specifically designed to compliment our system products, such as chilled beams. All internal electrical wiring is factory connected and pre-configured before shipment. Due to its high integrity ControlAir requires minimum on-site installation work. After the power supply and signal lines have been connected, the system can be started immediately. The control system is factory pre-configured according to the customers' requests. No on-site configuration is required, thus significantly reducing installation and commissioning costs.



AirFlex- adjustable air deflectors

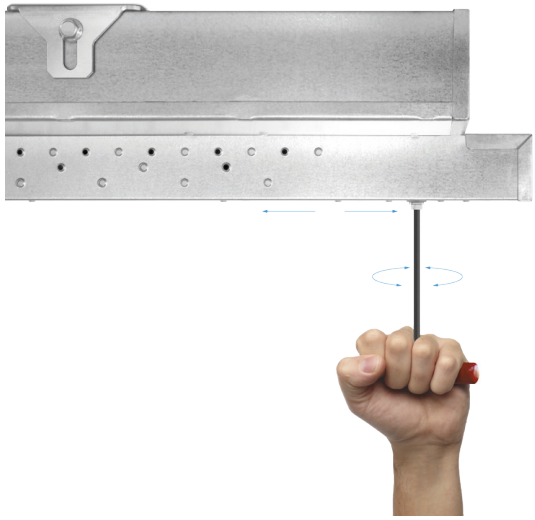
PremiAir is equipped with AirFlex air deflectors, which can be manually and individually adjusted on each side of the air slots, as a standard option. AirFlex allows the operator to easily adjust the direction and throw distance of the discharged conditioned air. With the fine-tuning capabilities of the AirFlex deflectors, in combination with the variable nozzles, a highly flexible, pleasant and draft-free indoor climate is easily achieved.

- Less risk of draft
- Shorter throw length
- Individually adjustable



Variable nozzles

As standard, PremiAir is supplied with variable nozzles. This is a unique, elegant and flexible feature, which simplifies the adjustment of the airflow on either side of the chilled beam, without modifying the primary air pressure. PremiAir is supplied with pre-set airflows, according to the request of our customer. However, if needed, modifying the airflow on site can easily be done, even after the unit has been mounted. This is important when the conditions (occupancy, area) of the zone or room changes.
Instructions: Simply fold down the front cover plate, and use an Allen wrench to adjust the nozzle positions, to set the required airflow. By covering and uncovering the nozzles, it is possible to choose from three different airflow modes on each side of the product.



Mounting instructions and Maintenance

See separate Maintenance and Installation guide.

Materials

The connection and plenum air box are made of galvanized steel. The visible front plate and side panels are powder coated aluminium and sheet steel painted in standard white RAL 9003 colour. The heat exchanger consists of copper and aluminium. The AirFlex air deflectors are made of Polyamide plastic. The fronts are produced with circular perforation as standard.

Technical data

Sound power level / octave band L_W dB
Sound Pressure Level L_{PA} dB (A) (read from the power tables)
Corr: K_0 dB from Table 2 $_{LW} = L_{PA} + K_0$
Natural attenuation as shown in Table 2 apply to don incl. orifice damping.
The measurements have been performed in accordance with ISO 9614-2 and ISO 11691: 1995.

Dimensions

The sound pressure level L_{PA} dB(A) applies to an equivalent surface of 10 m², which corresponds to an attenuation of 4 dB in a 25 m³ room with normal atteunation.
Please see the chart to the right for correction examples of different room types.

Sound pressure level L_{PA}

Room volume capacity (m³)	Room type	Correction (dB)
25	hard	+ 2
25	attenuated	- 2
150	hard	- 3
150	normal	- 5
150	attenuated	- 7

Correction K_0 dB

Size (mm)	Medium frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
600	+ 1	- 11	+ 2	+ 1	0	- 5	- 13	- 23
1200	0	- 1	+ 1	0	0	- 4	- 13	- 24
1800	+2	- 1	+ 3	+ 1	- 1	- 4	- 11	- 24

Tol. ± 3 dB

Sound attenuation dB

Size (mm)	Medium frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
600	18	10	7	7	13	14	17	20
1200	17	7	4	5	10	11	16	21
1800	13	9	4	3	8	10	15	21

Tol. ± 3 dB

Sound diagrams

Diagram 1.
PremiAir 600

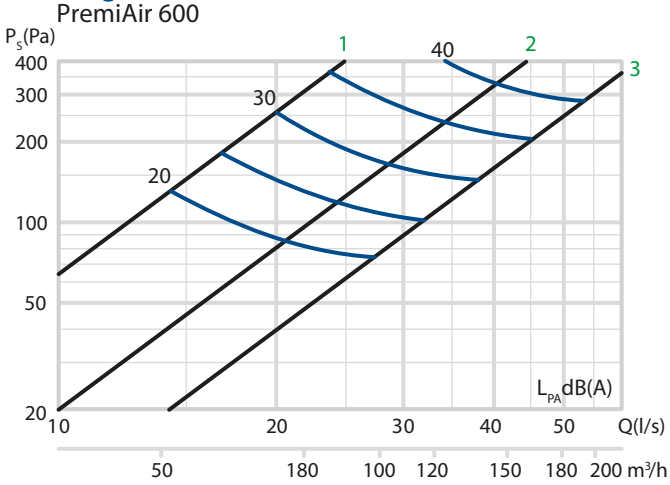


Diagram 2.
PremiAir 1200

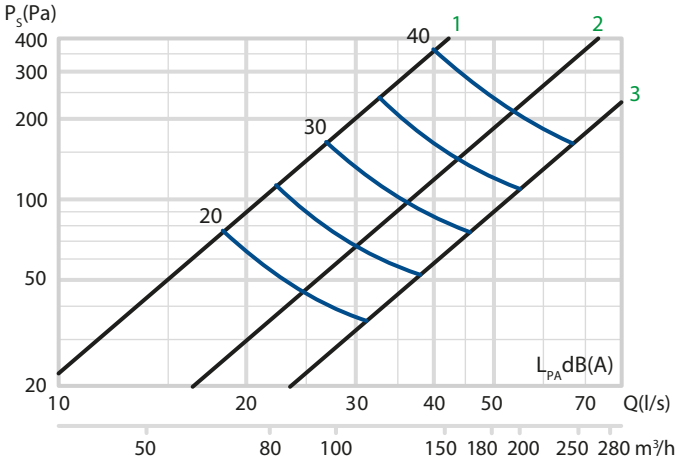
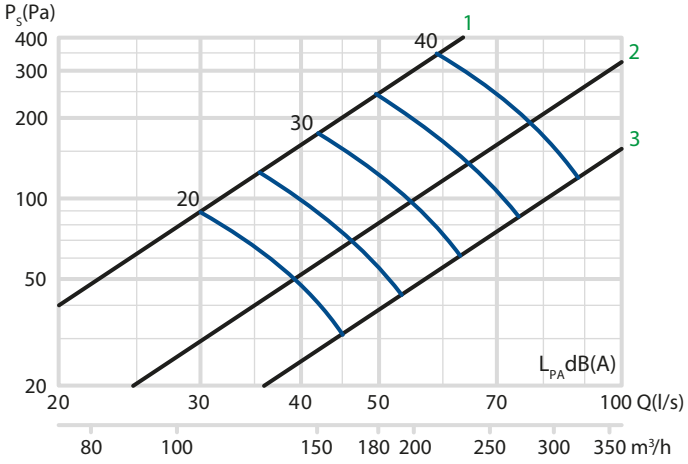


Diagram 3.
PremiAir 1800



Selection guide

Example for PremiAir cooling

Search the cooling capacity of water at the given air flow, pressure and cooling capacity of water ΔT.

Check the pressure drop in the water circuit.

Then adjust it by the turbulence intensity of cooling coil pipes in diagram 4. and add the cooling capacity of the air.

The water flow can be calculated, given the ΔT value of the current cooling water, with the following formula:
Water flow (qw) = Cooling capacity (w) /ΔT (return water-supply water) x 4200

Example:
The unit PremiAir 12 gives a cooling capacity of 670 W at ΔT 8,5°C. (631+710)/2=670 W, when the airflow is 20 l/s and the pressure is 100Pa.

The ΔT (return water-supply water) is 3°C.

Cooling water flow at 14-17°C: 670/(3x4200)=0.053 l/s.

Selection chart for cooling capacity with a standard coil

Size	Primary airflow		Cooling capacity of water (W) at given pressure (Pa) and ΔT (°C)														
			50 Pa					75 Pa					100 Pa				
(mm)	l/s	[m³/h]	6	7	8	9	10	6	7	8	9	10	6	7	8	9	10
1200	20	[72]	412	481	549	618	686	443	516	590	664	738	473	552	631	710	789
1200	25	[90]	458	534	610	687	763	492	574	656	738	820	526	614	702	789	877
1200	30	[108]	499	582	665	749	832	536	626	715	804	894	574	669	765	860	956
1800			614	716	818	921	1023	660	770	880	990	1100	706	823	941	1058	1176
1200	35	[126]	537	626	715	805	894	577	673	769	865	961	617	720	822	925	1028
1800			639	745	852	958	1065	687	801	916	1030	1144	734	857	979	1102	1224
1200	40	[144]						614	717	819	922	1024	657	767	876	986	1095
1800			661	772	882	992	1102	711	829	948	1066	1185	760	887	1014	1140	1267
1200	45	[162]						650	758	866	975	1083	695	811	926	1042	1158
1800			682	796	910	1023	1137	733	855	978	1100	1222	784	915	1046	1176	1307
1800	55	[198]	714	839	958	1078	1198	773	902	1030	1159	1288	826	964	1102	1239	1377
	65	[234]						807	942	1076	1211	1345	863	1007	1151	1295	1439
	72	[259]						829	967	1106	1244	1382					
	75	[270]											896	1045	1194	1344	1493
	85	[306]											926	1080	1234	1389	1543

*) Cooling capacity: at water flow of 0,066 l/s.

Selection chart for cooling capacity for the High Capacity coil*

Size	Primary airflow		Cooling capacity of water (W) at given pressure (Pa) and ΔT (°C)														
			50 Pa					75 Pa					100 Pa				
(mm)	l/s	[m³/h]	6	7	8	9	10	6	7	8	9	10	6	7	8	9	10
600	8	[29]	176	206	235	265	294										
	10	[36]						211	246	282	317	352					
	12	[43]											246	287	328	369	410
	15	[54]	238	277	317	356	396	255	298	340	383	425	273	319	364	410	455
600	20	[72]	272	317	363	408	453	292	341	390	438	487	313	365	417	469	521
1200			424	495	566	637	707	456	532	608	684	760	488	569	650	732	813
600	25	[90]						325	379	433	487	541	347	405	463	521	579
1200			483	564	644	725	806	519	606	693	779	866	556	648	741	833	926
600	30	[108]											379	442	505	568	631
1200			538	627	717	806	896	578	674	770	867	963	618	721	824	927	1030
1800			625	730	834	938	1042	672	784	896	1008	1120	719	839	958	1078	1198
1200	35	[126]	588	686	784	882	980	632	738	843	948	1054	676	789	902	1014	1127
1800			661	772	882	992	1102	711	829	948	1066	1185	760	887	1014	1140	1267
1200	40	[144]						683	797	911	1025	1139	731	853	975	1097	1219
1800			694	810	926	1041	1157	746	870	995	1119	1244	798	931	1064	1197	1330
1200	45	[162]						732	854	976	1098	1220	783	914	1044	1175	1305
1800			724	845	965	1086	1207	778	908	1037	1167	1297	832	971	1110	1248	1387
1800	55	[198]	779	909	1038	1168	1298	837	977	1116	1256	1395	895	1044	1194	1343	1492
	65	[234]						889	1037	1185	1333	1481	950	1109	1267	1426	1584
	72	[259]						922	1076	1230	1383	1537					
	75	[270]											1001	1168	1334	1501	1668
	85	[306]											1047	1222	1396	1571	1745

*)Cooling capacity: at water flow of 0,066 l/s.

Selection chart for heating capacity with a standard coil*

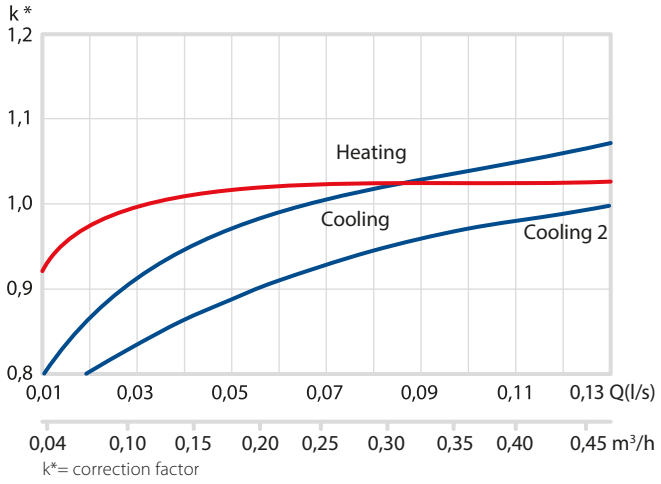
Size	Primary airflow		Heating capacity of water (W) at given pressure (Pa) and ΔT (°C)														
			50 Pa					75 Pa					100 Pa				
(mm)	l/s	[m³/h]	10	15	20	25	30	10	15	20	25	30	10	15	20	25	30
600	8	[29]	147	221	294	368	441										
	10	[36]						176	264	352	440	528					
	12	[43]											205	308	410	513	615
	15	[54]	198	297	396	495	594	213	320	426	533	639	228	342	456	570	684
600	20	[72]	227	341	454	568	681	244	366	488	610	732	261	392	522	653	783
1200			343	515	686	858	1029	369	554	738	923	1107	395	593	790	988	1185
600	25	[90]						271	407	542	678	813	290	435	580	725	870
1200			382	573	764	955	1146	410	615	820	1025	1230	439	659	878	1098	1317
600	30	[108]											316	474	632	790	948
1200			416	624	832	1040	1248	447	671	894	1118	1341	478	717	956	1195	1434
1800			512	768	1024	1280	1536	550	825	1100	1375	1650	588	882	1176	1470	1764
1200	35	[126]	447	671	894	1118	1341	481	722	962	1203	1443	514	771	1028	1285	1542
1800			533	800	1066	1333	1599	572	858	1144	1430	1716	612	918	1224	1530	1836
1200	40	[144]						512	768	1024	1280	1536	548	822	1096	1370	1644
1800			551	827	1102	1378	1653	593	890	1186	1438	1779	634	951	1268	1585	1902
1200	45	[162]						542	813	1084	1355	1626	579	869	1158	1448	1737
1800			596	854	1138	1423	1707	611	917	1222	1528	1833	654	981	1308	1635	1962
1800	55	[198]	599	899	1198	1498	1797	644	966	1288	1610	1932	689	1034	1378	1723	2067
	65	[234]						673	1010	1346	1683	2019	720	1080	1440	1800	2160
	72	[259]						691	1037	1382	1728	2073					
	75	[270]											747	1121	1494	1868	2241
	85	[306]											772	1158	1544	1930	2316

*)Heating capacity: at water flow of 0,066 l/s.

Selection chart for cooling capacity of air

ΔT (°C)	Cooling capacity air (W) at primary airflow l/s [m³/h] for following sizes (mm)														
	8 [29]	10 [36]	12 [43]	15 [54]	20 [72]	25 [90]	30 [108]	35 [126]	40 [144]	45 [162]	55 [198]	65 [234]	72 [259]	75 [270]	85 [306]
2	19	24	29	36	48	60	72	84	96	108	132	156	173	180	204
3	29	36	43	54	72	90	108	126	144	162	198	234	259	270	306
4	39	48	57	72	96	120	144	168	192	216	264	312	346	360	408
5	48	60	72	90	120	150	180	210	240	270	330	390	432	450	510
6	58	72	86	108	144	180	216	252	288	324	396	468	518	540	612
7	67	84	101	126	168	210	252	294	336	378	462	546	605	630	714
8	77	96	115	144	192	240	288	336	384	432	528	624	691	720	816
9	86	108	130	162	216	270	324	378	432	486	594	702	778	810	918
10	96	120	144	180	240	300	360	420	480	540	660	780	864	900	1020

Diagram 4.
Correction for other water flows



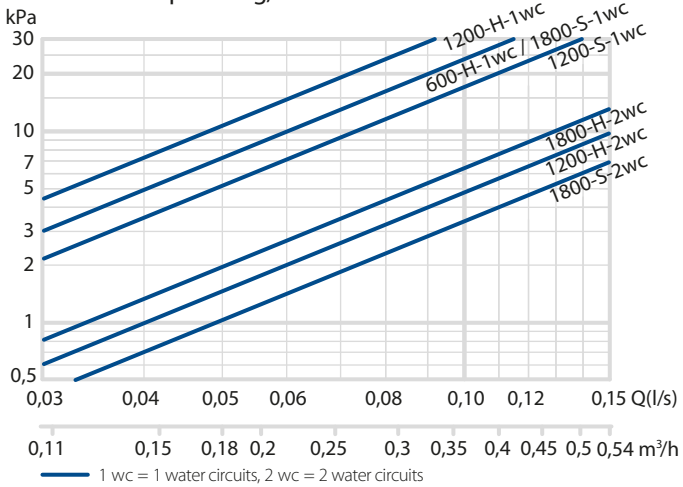
k*= correction factor

Correction Chart

The chart below applies:

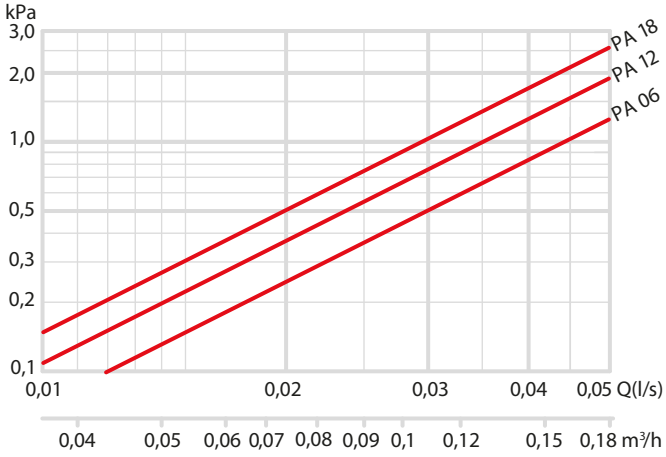
- Correction diagram for water flow refers to one water circuit, the two water circuits halve water flow.
- Blue curve = cold
- Red curve= heating
- k = correction factor
- 1wc / 2wc = number of water circuits

Diagram 5.
Pressure drop cooling, PremiAir



1 wc = 1 water circuits, 2 wc = 2 water circuits

Diagram 6.
Pressure drop heating, PremiAir



Nozzles setting diagrams

Diagram 7.

Size 600

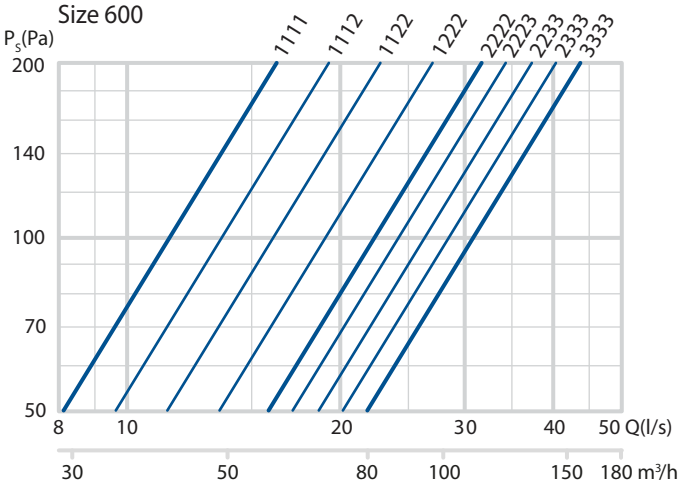


Diagram 8.

Long side for size 1200

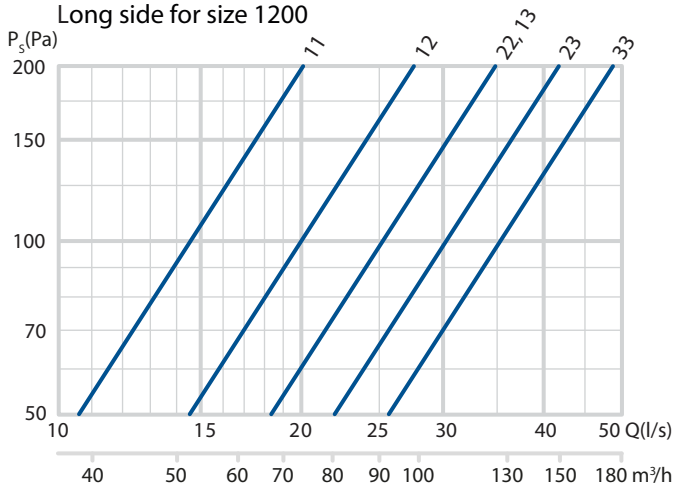


Diagram 9.

Short side for size 1200 and 1800

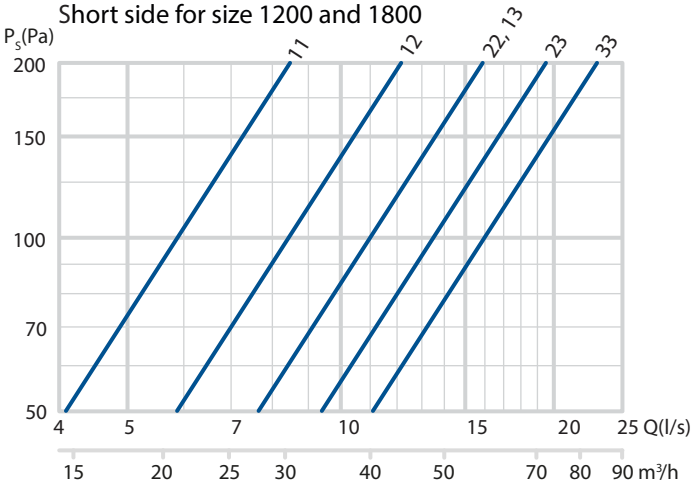
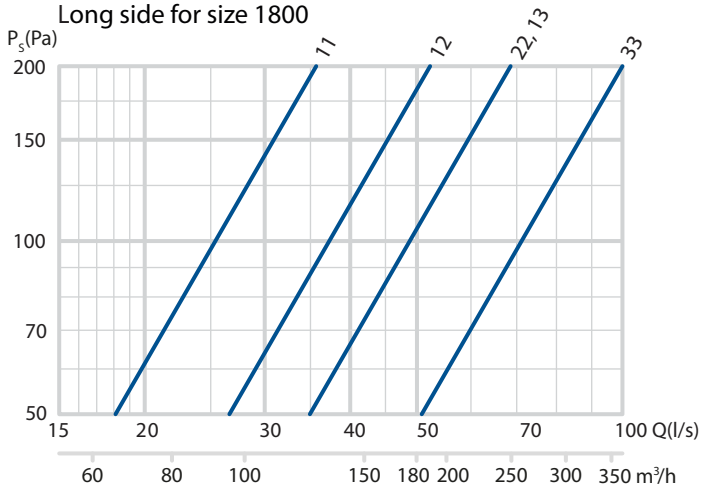
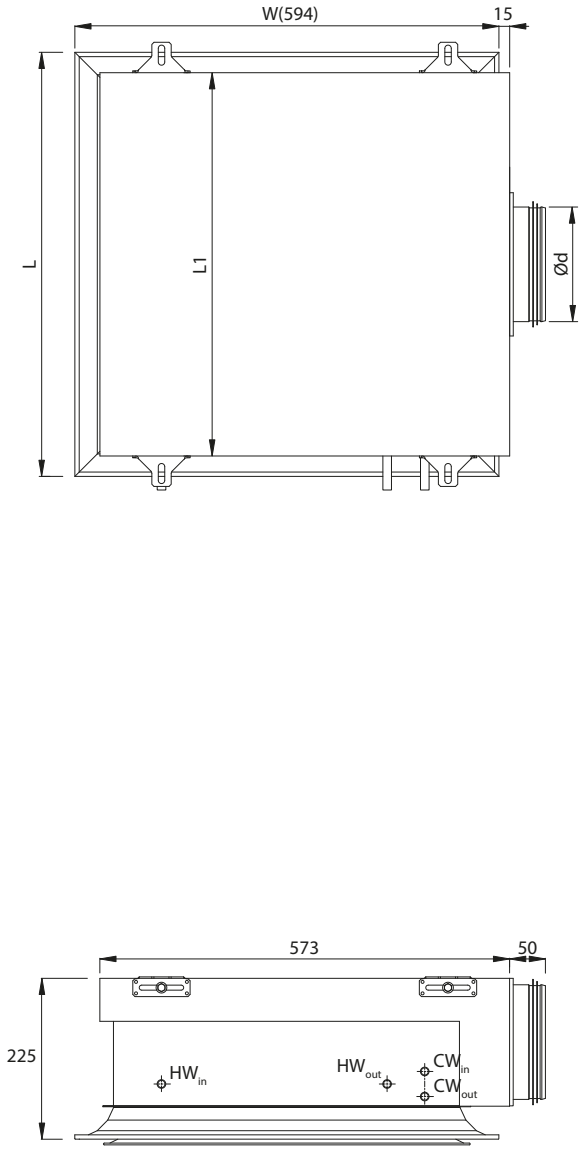


Diagram 10.

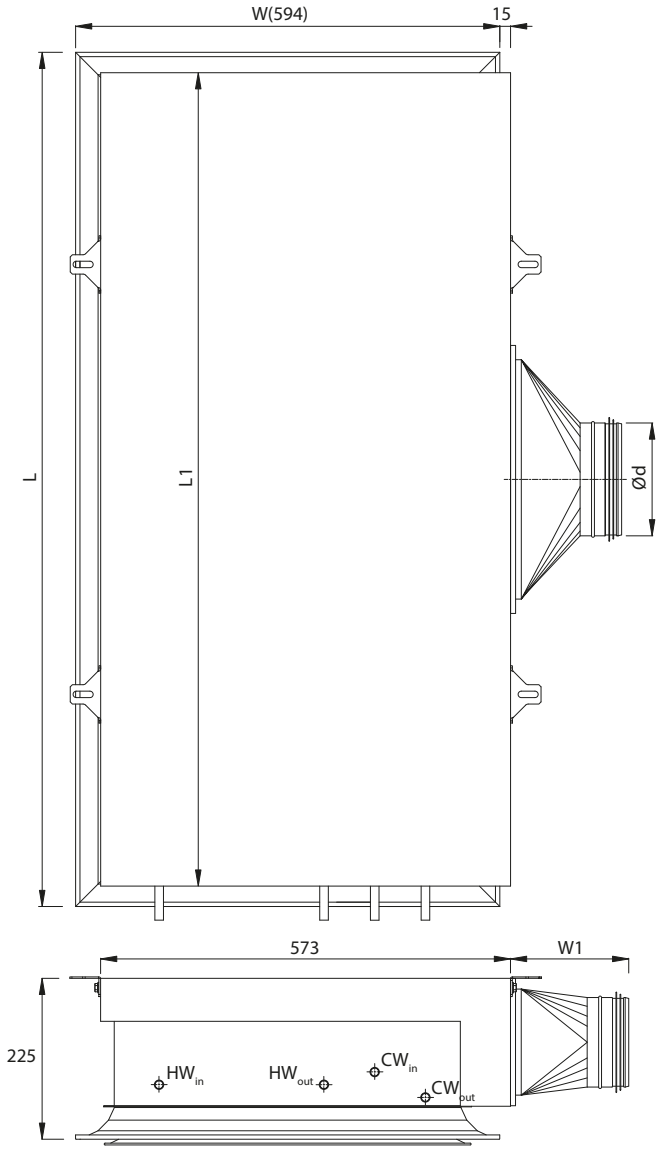
Long side for size 1800



Dimensions



PremiAir 600



PremiAir 1200 / 1800

Dimensions

Size	Dimensions (mm)										
	L	V				W	L1	W1			
		Ø100	Ø125	Ø160	Ø200			Ø100	Ø125	Ø160	Ø200
600	594	36	36	-	-	594	534,5	36*	36*	-	-
1200	1194	-	40	37	-		1134,5	-	165	133	-
1800	1794	-	-	37	37		1734,5	-	-	133	168

* W1 size tolerance (size 600) +4/-2.

Water connection

Size	Number of circuits	Water connection (mm)			
		Water for cooling		Water for heating	
		In [Ci]	Out [Co]	In [Hi]	Out [Ho]
600*)	1-circuit	Ø 12		Ø 12	
1200*)	1-circuit				
1800	1-circuit				
	2-circuits	Ø 15			

The indicated sizes in mm.
*) Size 600 and 1200 can only be ordered with one water circuit.

Duct dimensions

Size	Duct dimensions, ØD*			
	Ø100	Ø125	Ø160	Ø200
600	98	123	-	-
1200	-	123	158	-
1800	-	-	158	198

The indicated sizes in mm.

Water volume and weights

Size	Type of coil/type of effect	Weight (kg)	Water flow (l)
600	High (v2)	14	–
			1,0
1200	Standard (v1)	25	1,25
	High (v2)	27	2,5
1800	Standard (v1)	43	2,0
	High (v2)	46	4,0

Specification

Ordering code:	XX	-X	-XXX	-XX	-XX	-X	-XxXXX
Product type:	PA						
Coil size:	standard capacity	-					
	high capacity	H					
Coil type*:	1-circuit cooling		C1				
	2-circuit cooling		C2				
	1-circuit cooling and heating		C1H				
	2-circuit cooling and heating		C2H				
	1-circuit changeover		C1O				
	2-circuit changeover		C2O				
Size (mm):			600	06			
			1200	12			
			1800	18			
Nozzle position:				side A	C1		
					C2		
					C3		
					C4		
					C5		
				side B	B1		
					B2		
					B3		
					B4		
					B5		
				side C	C1		
					C2		
					C3		
					C4		
					C5		
				side D	D1		
					D2		
					D3		
					D4		
					D5		
Orientation of water connection:					left	L	
					right	R	
Duct size (s):							1x100
							2x100
							1x125
							1x160
Example:	PA-H-C1H-06-A2B1C2D1-L-1x100						

* The number of water circuits depends on the size and capacity you require, so please use the Airvent Selection Program for calculation.