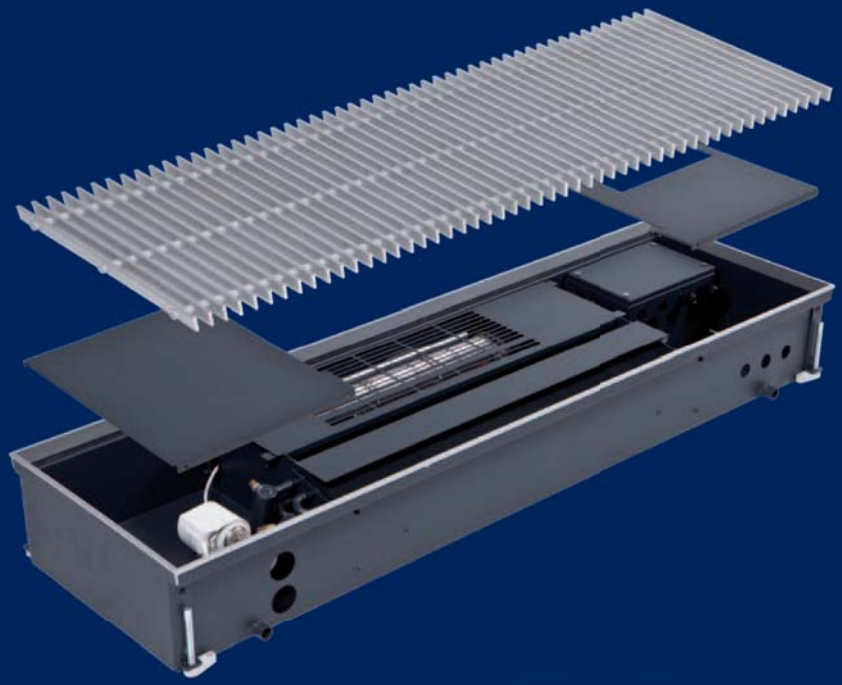
Cert. n° 0545

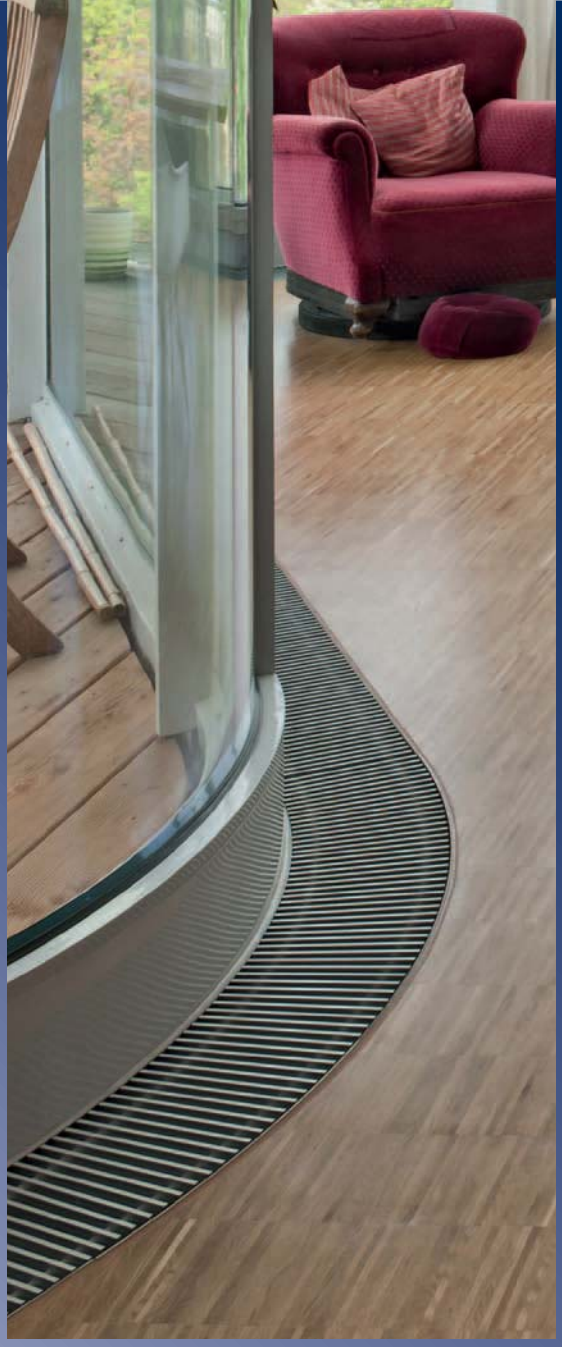


Heating / Air Conditioning

Carisma **Floor CCP–ECM** Trench Convectors

SABIANA
IL CLIMA AMICO

A leading brand of AFG



Carisma Floor CCP–ECM trench convectors represent a combination of innovative aesthetics and functionality in an air conditioning system.

They are designed to efficiently heat, cool and ventilate buildings with large windows or doors.

The wide range of models includes solutions which can be customised depending on architectural requirements with diffusion grids in a variety of materials and colours.

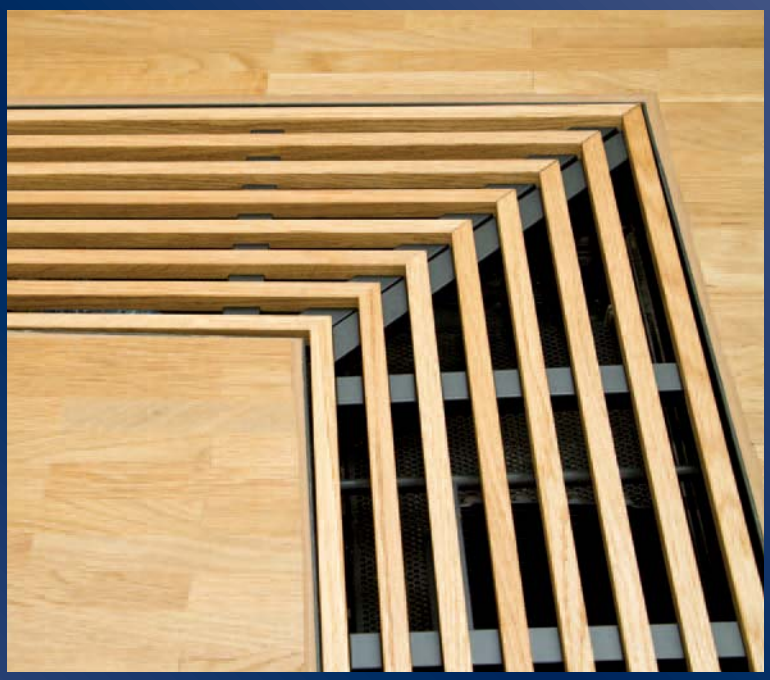
All the units are supplied with low energy consumption electronic motors.

A large variety of control and regulation accessories is available.

Floor trench convectors are used inside private homes, on verandas, in public offices and buildings and in exhibition and commercial areas.

The choice of **Carisma Floor** units has a lot of advantages:

- **Low energy consumption ECM motor**
- **Low noise**
- **Flexibility**
- **Advanced design**
- **Easy to install**



Gran Resort Bad Ragaz

A leading brand of AFG

CONTENTS

Construction features

CCP–ECM 2T version

Heating and cooling
2 pipe units

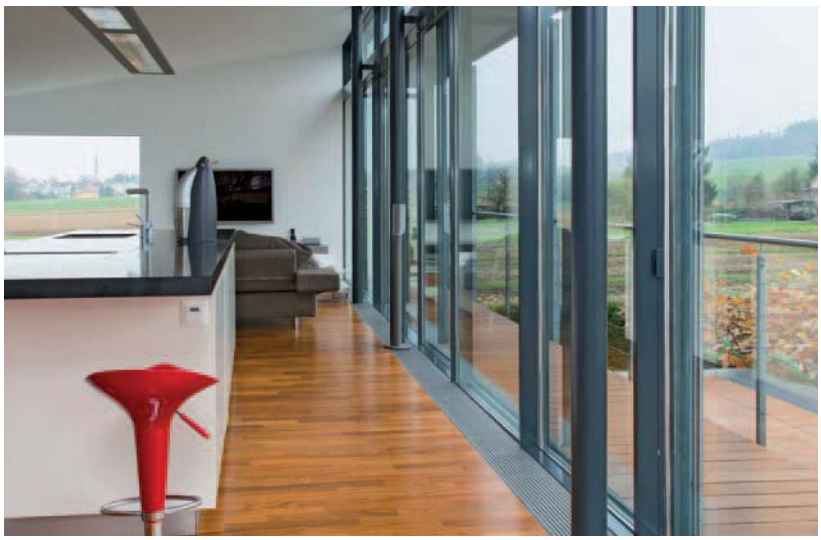
Walkable **floor casing,** in galvanised steel sheet, coated with Anthracite grey (RAL 7016) powder paint, with external height adjustable system preassembled with an antivibrating device. Condensate collection tray integrated in floor casing, including two side drain connections Ø 15 mm.

Coil consisting of copper pipes and aluminium fins, painted Anthracite grey (RAL 7016) and housed, with acoustic decoupling, in transversal galvanised and painted steel frame.
Euroconus connection, front or ambient side, with connection nut (int. thread ¾") and air venting.

Tangential fan, window side, with protective cover, 24V EC motors freely adjustable (0 – 10 V) pre-wired and ready for connection.

Aluminium roll-up grid consisting of stable profiles, anodised in natural colours, with 20 x 6 mm slats. Grid with overall height of 20 mm and free 70% transversal section, inserted in floor casing and acoustically insulated by rubber gaskets. Perimeter listel with finish of cover grid.

Mounting cover with a **protective profile** of the perimeter listels to protect the trench convectors during installation.



Villa

Construction features

Standard versions

2 Widths: 310 and 360 mm.
2 Heights: 130 and 155 mm.
3 Lengths: 1250, 2000 and 2750 mm.
Aluminium roll-up grid.

Identifications and Models

Dimensions			Model
Casing Length	Casing Height	Casing Width	
L (mm)	H (mm)	T (mm)	
1250	130	310	CCP–ECM 2T 1250-130-310
		360	CCP–ECM 2T 1250-130-360
	155	310	CCP–ECM 2T 1250-155-310
		360	CCP–ECM 2T 1250-155-360
2000	130	310	CCP–ECM 2T 2000-130-310
		360	CCP–ECM 2T 2000-130-360
	155	310	CCP–ECM 2T 2000-155-310
		360	CCP–ECM 2T 2000-155-360
2750	130	310	CCP–ECM 2T 2750-130-310
		360	CCP–ECM 2T 2750-130-360
	155	310	CCP–ECM 2T 2750-155-310
		360	CCP–ECM 2T 2750-155-360

Operating principle

Forced heating convection

The cold air which skims the windows is suctioned and heated by the coil. The heated air rises, creating a shield to cold air.

Forced cooling convection

Installation in front of the window surfaces efficiently contrasts the diffusion of heat due to solar radiation.

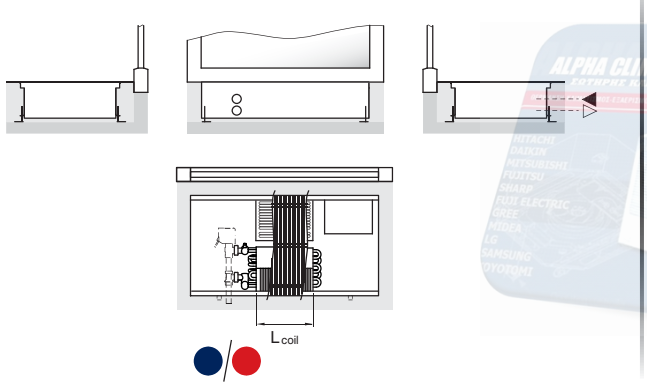
For further information, see the paragraph “Basic notions”.

Operating limits

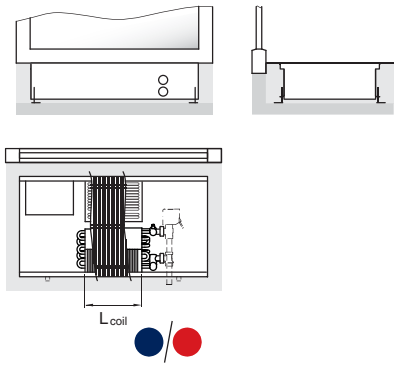
- Highest water inlet temperature: 90°C.
- Highest working pressure: 10 bars (high pressure optional model, 16 bars).
- Test pressure: 13 bars (high pressure optional model, 21 bars).

Front connections without integrated valve

A1 – Front left *connections with respect to environment side*



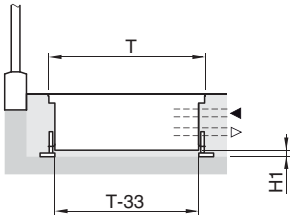
A2 – Front right *connections with respect to environment side*



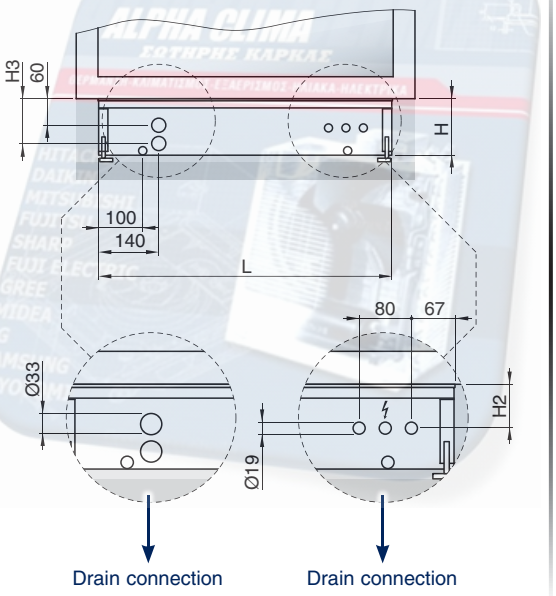
Coil connection measurement: *euroconus with connection nut (int. thread IG ¾")*

Dimensions – Front connections diagram *(Position A1)*

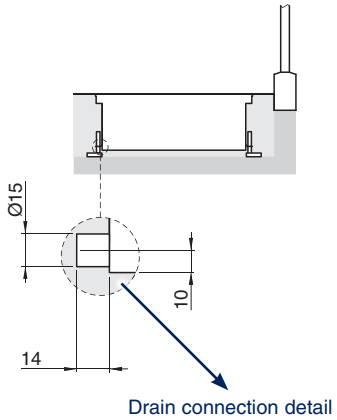
Left side view



Front view



Right side view



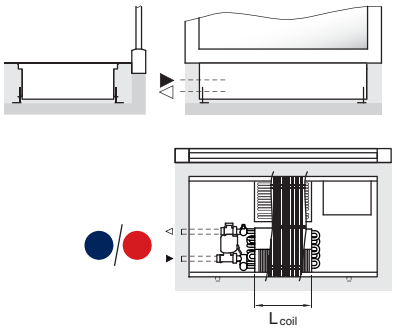
Position A2 specular with respect to Position A1

Dimensions

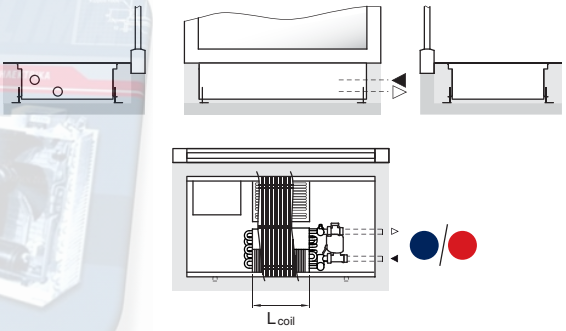
L *(mm)*	***Lcoil*** *(mm)*	***T*** *(mm)*	***H*** *(mm)*	***H1*** *(mm)*	***H2*** *(mm)*	***H3*** *(mm)*
up to 2750	L – 473	**310**	130	3 – 50	67	100
		360	155	3 – 85	92	105

Side connections without integrated valve

A3 – Side left *connections with respect to environment side*



A4 – Side right *connections with respect to environment side*

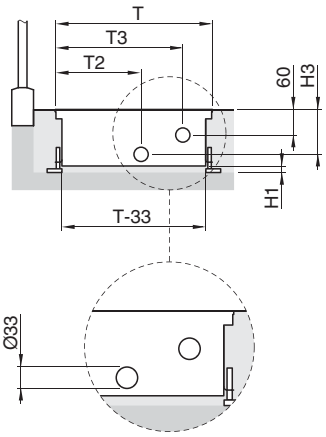


Coil connection measurement: *euroconus with connection nut (int. thread IG ¾")*

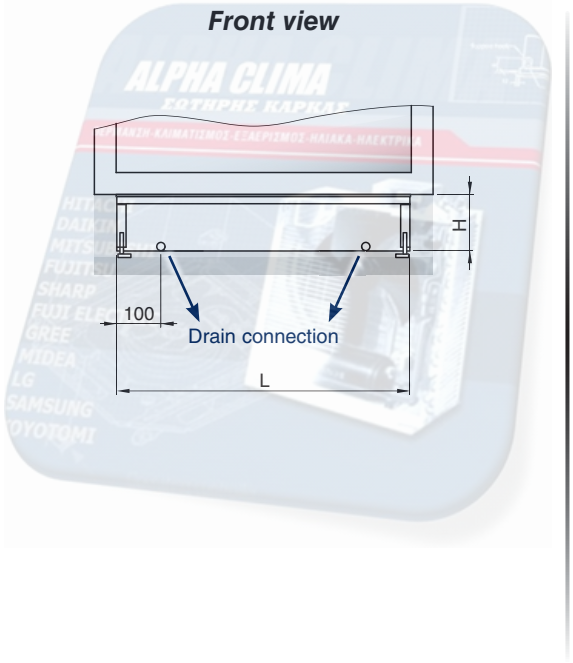
Dimensions – Side connections diagram *(Position A3)*

Left side view

(hydraulic connections side)

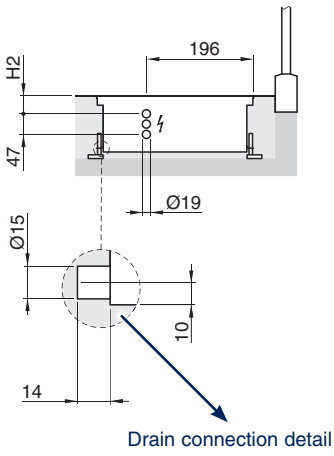


Front view



Right side view

(electric connections side)



Position A4 specular with respect to Position A3

Dimensions

L *(mm)*	L_{coil} *(mm)*	***T*** *(mm)*	***T2*** *(mm)*	***T3*** *(mm)*	***H*** *(mm)*	***H1*** *(mm)*	***H2*** *(mm)*	***H3*** *(mm)*
up to 2750	L – 473	**310**	183	243	130	3 – 50	43	100
		360	190	297	155	3 – 85	68	105

Fan specifications

Tangential fans technical data, 24 V DC valves included	L = 1250	L = 2000	L = 2750
Length	1250	2000	2750
Number of EC motors	1	2	3
Number of fans	2	4	6
Maximum absorbed power (W)	20	38	56
Maximum absorbed current (mA)	87	165	243
Maximum inrush current for 2 minutes (mA)	428	507	585
Maximum air flow rate (m^3/h)	414	828	1242

Control system on page 42.
For further information, see installation manual.

Grison Cantonal Bank

Oberwaid Kurhaus & Medical Centre

Technical data

Casing Length 1250 mm – Casing Height 130 mm

2 pipe units.

The following standard rating conditions are used:

COOLING (summer mode)

Entering air temperature + 27°C d.b.

Relative humidity 50%

Model			CCP-ECM 2T 1250-130-310				CCP-ECM 2T 1250-130-360			
Casing length **L**		mm	1250				1250			
Casing width **T**		mm	310				360			
Inverter Power		V	3	5	7	10	3	5	7	10
Air flow **QV**		m³/h	150	250	338	414	150	250	338	414
Cooling: ΔTm 17,5 K – 7/12°C	Total emission	W	412	769	865	1029	509	1073	1191	1189
	Sensible emission	W	275	517	592	729	339	722	815	842
Cooling: ΔTm 12,5 K – 12/17°C	Total emission	W	320	545	626	737	390	735	833	870
	Sensible emission	W	320	545	626	737	390	735	833	870
Cooling: ΔTm 10,0 K – 16/18°C	Total emission	W	273	441	513	600	330	582	668	717
	Sensible emission	W	273	441	513	600	330	582	668	717
Sound power L_w		dB(A)	27	37	45	51	27	37	45	51
Sound pressure L_p (*)		dB(A)	18	28	36	42	18	28	36	42
Exponent **n**		–	0,74	1,00	0,94	0,97	0,78	1,10	1,04	0,91
Weight **M**		kg	16,38				17,96			

HEATING (winter mode)

Entering air temperature + 20°C

Model		CCP-ECM 2T 1250-130-310					CCP-ECM 2T 1250-130-360				
Casing length **L**	mm	1250					1250				
Casing width **T**	mm	310					360				
Inverter Power	V	0	3	5	7	10	0	3	5	7	10
Air flow **QV**	m³/h	–	150	250	338	414	–	150	250	338	414
Heating: ΔTm 50,0 K – 75/65°C	W	195	1415	2481	2909	3500	217	1767	3056	3615	4200
Heating: ΔTm 30,0 K – 55/45°C	W	98	844	1480	1735	2087	107	1054	1823	2156	2505
Heating: ΔTm 22,5 K – 45/40°C	W	67	636	1116	1308	1574	73	795	1374	1625	1889
Sound power L_w	dB(A)	–	27	37	40	46	–	27	37	40	46
Sound pressure L_p (*)	dB(A)	–	18	28	31	37	–	18	28	31	37
Exponent **n**	–	1,33	1,00	1,00	1,00	1,00	1,36	1,00	1,00	1,00	1,00
Weight **M**	kg	16,38					17,96				

(*) = The sound pressure levels are 9 dB(A) lower than the sound power levels and apply to the reverberant field of a 100 m³ room and a reverberation time of 0.5 sec.

Technical data

Casing Length 1250 mm – Casing Height 155 mm

2 pipe units.

The following standard rating conditions are used:

COOLING (summer mode)

Entering air temperature + 27°C d.b.

Relative humidity 50%

Model			CCP–ECM 2T 1250-155-310				CCP–ECM 2T 1250-155-360			
Casing length **L**		mm	1250				1250			
Casing width **T**		mm	310				360			
Inverter Power		V	3	5	7	10	3	5	7	10
Air flow **QV**		m³/h	150	250	338	414	150	250	338	414
Cooling: ΔTm 17,5 K – 7/12°C	Total emission	W	454	882	1011	1068	531	1170	1320	1380
	Sensible emission	W	299	592	694	754	350	785	906	974
Cooling: ΔTm 12,5 K – 12/17°C	Total emission	W	359	617	717	771	400	797	905	963
	Sensible emission	W	359	617	717	771	400	797	905	963
Cooling: ΔTm 10,0 K – 16/18°C	Total emission	W	311	495	580	630	335	628	716	770
	Sensible emission	W	311	495	580	630	335	628	716	770
Sound power L_w		dB(A)	28	39	46	52	28	39	46	52
Sound pressure L_p (*)		dB(A)	19	30	37	43	19	30	37	43
Exponent **n**		–	0,68	1,04	1,00	0,95	0,83	1,12	1,10	1,05
Weight **M**		kg	17,62				19,23			

HEATING (winter mode)

Entering air temperature + 20°C

Model		CCP–ECM 2T 1250-155-310					CCP–ECM 2T 1250-155-360				
Casing length **L**	mm	1250					1250				
Casing width **T**	mm	310					360				
Inverter Power	V	0	3	5	7	10	0	3	5	7	10
Air flow **QV**	m³/h	–	150	250	338	414	–	150	250	338	414
Heating: ΔTm 50,0 K – 75/65°C	W	200	1573	2614	3192	3700	258	1920	3202	3827	4450
Heating: ΔTm 30,0 K – 55/45°C	W	99	938	1559	1904	2207	126	1145	1910	2283	2654
Heating: ΔTm 22,5 K – 45/40°C	W	67	707	1175	1435	1664	86	863	1440	1721	2001
Sound power L_w	dB(A)	–	28	39	46	52	–	28	39	46	52
Sound pressure L_p (*)	dB(A)	–	19	30	37	43	–	19	30	37	43
Exponent **n**	–	1,36	1,00	1,00	1,00	1,00	1,38	1,00	1,00	1,00	1,00
Weight **M**	kg	17,62					19,23				

(*) = The sound pressure levels are 9 dB(A) lower than the sound power levels and apply to the reverberant field of a 100 m³ room and a reverberation time of 0.5 sec.

Technical data

Casing Length 2000 mm – Casing Height 130 mm

2 pipe units.

The following standard rating conditions are used:

COOLING (summer mode)

Entering air temperature + 27°C d.b.

Relative humidity 50%

Model			CCP-ECM 2T 2000-130-310				CCP-ECM 2T 2000-130-360			
Casing length **L**		mm	2000				2000			
Casing width **T**		mm	310				360			
Inverter Power		V	3	5	7	10	3	5	7	10
Air flow **QV**		m³/h	300	500	676	828	300	500	676	828
Cooling: ΔTm 17,5 K – 7/12°C	Total emission	W	824	1538	1730	2057	1018	2145	2381	2378
	Sensible emission	W	548	1035	1184	1457	677	1444	1630	1684
Cooling: ΔTm 12,5 K – 12/17°C	Total emission	W	639	1091	1253	1475	779	1471	1667	1740
	Sensible emission	W	639	1091	1253	1475	779	1471	1667	1740
Cooling: ΔTm 10,0 K – 16/18°C	Total emission	W	546	882	1026	1200	660	1164	1336	1434
	Sensible emission	W	546	882	1026	1200	660	1164	1336	1434
Sound power L_w		dB(A)	28	39	47	53	28	39	47	53
Sound pressure L_p (*)		dB(A)	19	30	38	44	19	30	38	44
Exponent **n**		–	0,74	1,00	0,94	0,97	0,78	1,10	1,04	0,91
Weight **M**		kg	27,63				30,14			

HEATING (winter mode)

Entering air temperature + 20°C

Model		CCP-ECM 2T 2000-130-310					CCP-ECM 2T 2000-130-360				
Casing length **L**	mm	2000					2000				
Casing width **T**	mm	310					360				
Inverter Power	V	0	3	5	7	10	0	3	5	7	10
Air flow **QV**	m³/h	–	300	500	676	828	–	300	500	676	828
Heating: ΔTm 50,0 K – 75/65°C	W	390	2830	4962	5819	7000	434	3534	6112	7229	8400
Heating: ΔTm 30,0 K – 55/45°C	W	196	1688	2959	3470	4175	215	2108	3645	4311	5010
Heating: ΔTm 22,5 K – 45/40°C	W	135	1272	2231	2616	3148	146	1589	2748	3251	3777
Sound power L_w	dB(A)	–	28	39	47	53	–	28	39	47	53
Sound pressure L_p (*)	dB(A)	–	19	30	38	44	–	19	30	38	44
Exponent **n**	–	1,33	1,00	1,00	1,00	1,00	1,36	1,00	1,00	1,00	1,00
Weight **M**	kg	27,63					30,14				

(*) = The sound pressure levels are 9 dB(A) lower than the sound power levels and apply to the reverberant field of a 100 m³ room and a reverberation time of 0.5 sec.

Technical data

Casing Length 2000 mm – Casing Height 155 mm

2 pipe units.

The following standard rating conditions are used:

COOLING (summer mode)

Entering air temperature + 27°C d.b.

Relative humidity 50%

Model			CCP–ECM 2T 2000-155-310				CCP–ECM 2T 2000-155-360			
Casing length **L**		mm	2000				2000			
Casing width **T**		mm	310				360			
Inverter Power		V	3	5	7	10	3	5	7	10
Air flow **QV**		m³/h	300	500	676	828	300	500	676	828
Cooling: ΔTm 17,5 K – 7/12°C	Total emission	W	908	1765	2022	2136	1063	2341	2639	2760
	Sensible emission	W	598	1183	1387	1508	701	1569	1811	1948
Cooling: ΔTm 12,5 K – 12/17°C	Total emission	W	719	1235	1435	1542	799	1594	1809	1925
	Sensible emission	W	719	1235	1435	1542	799	1594	1809	1925
Cooling: ΔTm 10,0 K – 16/18°C	Total emission	W	622	990	1160	1260	670	1256	1431	1539
	Sensible emission	W	622	990	1160	1260	670	1256	1431	1539
Sound power L_w		dB(A)	30	41	48	54	30	41	48	54
Sound pressure L_p (*)		dB(A)	21	32	39	45	21	32	39	45
Exponent **n**		–	0,68	1,04	1,00	0,95	0,83	1,12	1,10	1,05
Weight **M**		kg	29,89				32,42			

HEATING (winter mode)

Entering air temperature + 20°C

Model		CCP–ECM 2T 2000-155-310					CCP–ECM 2T 2000-155-360				
Casing length **L**	mm	2000					2000				
Casing width **T**	mm	310					360				
Inverter Power	V	0	3	5	7	10	0	3	5	7	10
Air flow **QV**	m³/h	–	300	500	676	828	–	300	500	676	828
Heating: ΔTm 50,0 K – 75/65°C	W	400	3146	5228	6384	7400	516	3840	6404	7654	8900
Heating: ΔTm 30,0 K – 55/45°C	W	198	1876	3118	3807	4413	253	2290	3819	4565	5308
Heating: ΔTm 22,5 K – 45/40°C	W	135	1415	2351	2871	3327	171	1727	2880	3442	4002
Sound power L_w	dB(A)	–	30	41	48	54	–	30	41	48	54
Sound pressure L_p (*)	dB(A)	–	21	32	39	45	–	21	32	39	45
Exponent **n**	–	1,36	1,00	1,00	1,00	1,00	1,38	1,00	1,00	1,00	1,00
Weight **M**	kg	29,89					32,42				

(*) = The sound pressure levels are 9 dB(A) lower than the sound power levels and apply to the reverberant field of a 100 m³ room and a reverberation time of 0.5 sec.

Technical data

Casing Length 2750 mm – Casing Height 130 mm

2 pipe units.

The following standard rating conditions are used:

COOLING (summer mode)

Entering air temperature + 27°C d.b.

Relative humidity 50%

Model			CCP-ECM 2T 2750-130-310				CCP-ECM 2T 2750-130-360			
Casing length **L**		mm	2750				2750			
Casing width **T**		mm	310				360			
Inverter Power		V	3	5	7	10	3	5	7	10
Air flow **QV**		m³/h	450	750	1014	1242	450	750	1014	1242
Cooling: ΔTm 17,5 K – 7/12°C	Total emission	W	1236	2306	2595	3086	1527	3218	3572	3567
	Sensible emission	W	822	1552	1776	2186	1016	2166	2445	2526
Cooling: ΔTm 12,5 K – 12/17°C	Total emission	W	959	1636	1879	2212	1169	2206	2500	2610
	Sensible emission	W	959	1636	1879	2212	1169	2206	2500	2610
Cooling: ΔTm 10,0 K – 16/18°C	Total emission	W	819	1323	1539	1799	990	1745	2003	2150
	Sensible emission	W	819	1323	1539	1799	990	1745	2003	2150
Sound power L_w		dB(A)	29	41	48	54	29	41	48	54
Sound pressure L_p (*)		dB(A)	20	32	39	45	20	32	39	45
Exponent **n**		–	0,74	1,00	0,94	0,97	0,78	1,10	1,04	0,91
Weight **M**		kg	40,1				43,54			

HEATING (winter mode)

Entering air temperature + 20°C

Model		CCP-ECM 2T 2750-130-310					CCP-ECM 2T 2750-130-360				
Casing length **L**	mm	2750					2750				
Casing width **T**	mm	310					360				
Inverter Power	V	0	3	5	7	10	0	3	5	7	10
Air flow **QV**	m³/h	–	450	750	1014	1242	–	450	750	1014	1242
Heating: ΔTm 50,0 K – 75/65°C	W	585	4244	7443	8728	10500	651	5301	9168	10844	12600
Heating: ΔTm 30,0 K – 55/45°C	W	294	2531	4439	5206	6262	322	3161	5468	6467	7515
Heating: ΔTm 22,5 K – 45/40°C	W	202	1908	3347	3925	4721	220	2384	4122	4876	5666
Sound power L_w	dB(A)	–	29	41	48	54	–	29	41	48	54
Sound pressure L_p (*)	dB(A)	–	20	32	39	45	–	20	32	39	45
Exponent **n**	–	1,33	1,00	1,00	1,00	1,00	1,36	1,00	1,00	1,00	1,00
Weight **M**	kg	40,1					43,54				

(*) = The sound pressure levels are 9 dB(A) lower than the sound power levels and apply to the reverberant field of a 100 m³ room and a reverberation time of 0.5 sec.

Technical data

Casing Length 2750 mm – Casing Height 155 mm

2 pipe units.

The following standard rating conditions are used:

COOLING (summer mode)

Entering air temperature + 27°C d.b.

Relative humidity 50%

Model			CCP–ECM 2T 2750-155-310				CCP–ECM 2T 2750-155-360			
Casing length **L**		mm	2750				2750			
Casing width **T**		mm	310				360			
Inverter Power		V	3	5	7	10	3	5	7	10
Air flow **QV**		m³/h	450	750	1014	1242	450	750	1014	1242
Cooling: ΔTm 17,5 K – 7/12°C	Total emission	W	1361	2647	3033	3204	1594	3511	3959	4140
	Sensible emission	W	897	1775	2082	2261	1051	2354	2717	2922
Cooling: ΔTm 12,5 K – 12/17°C	Total emission	W	1078	1852	2152	2313	1199	2390	2714	2888
	Sensible emission	W	1078	1852	2152	2313	1199	2390	2714	2888
Cooling: ΔTm 10,0 K – 16/18°C	Total emission	W	933	1484	1739	1889	1005	1883	2147	2309
	Sensible emission	W	933	1484	1739	1889	1005	1883	2147	2309
Sound power L_w		dB(A)	31	42	49	55	31	42	49	55
Sound pressure L_p (*)		dB(A)	22	33	40	46	22	33	40	46
Exponent **n**		–	0,68	1,04	1,00	0,95	0,83	1,12	1,10	1,05
Weight **M**		kg	43,77				47,24			

HEATING (winter mode)

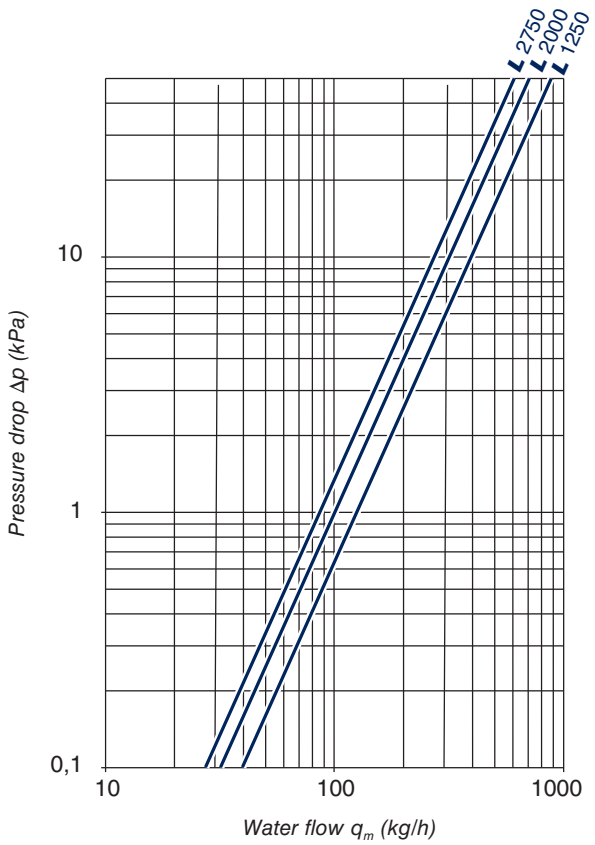
Entering air temperature + 20°C

Model		CCP–ECM 2T 2750-155-310					CCP–ECM 2T 2750-155-360				
Casing length **L**	mm	2750					2750				
Casing width **T**	mm	310					360				
Inverter Power	V	0	3	5	7	10	0	3	5	7	10
Air flow **QV**	m³/h	–	450	750	1014	1242	–	450	750	1014	1242
Heating: ΔTm 50,0 K – 75/65°C	W	600	4719	7842	9576	11100	774	5760	9606	11482	13350
Heating: ΔTm 30,0 K – 55/45°C	W	297	2814	4677	5711	6620	379	3435	5729	6848	7962
Heating: ΔTm 22,5 K – 45/40°C	W	202	2122	3526	4306	4991	257	2590	4319	5163	6003
Sound power L_w	dB(A)	–	31	42	49	55	–	31	42	49	55
Sound pressure L_p (*)	dB(A)	–	22	33	40	46	–	22	33	40	46
Exponent **n**	–	1,36	1,00	1,00	1,00	1,00	1,38	1,00	1,00	1,00	1,00
Weight **M**	kg	43,77					47,24				

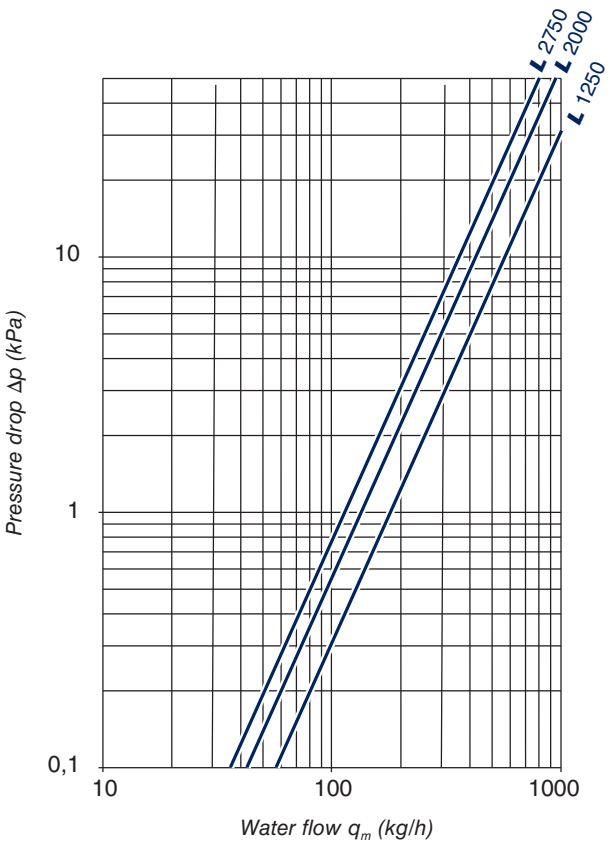
(*) = The sound pressure levels are 9 dB(A) lower than the sound power levels and apply to the reverberant field of a 100 m³ room and a reverberation time of 0.5 sec.

Pressure drop

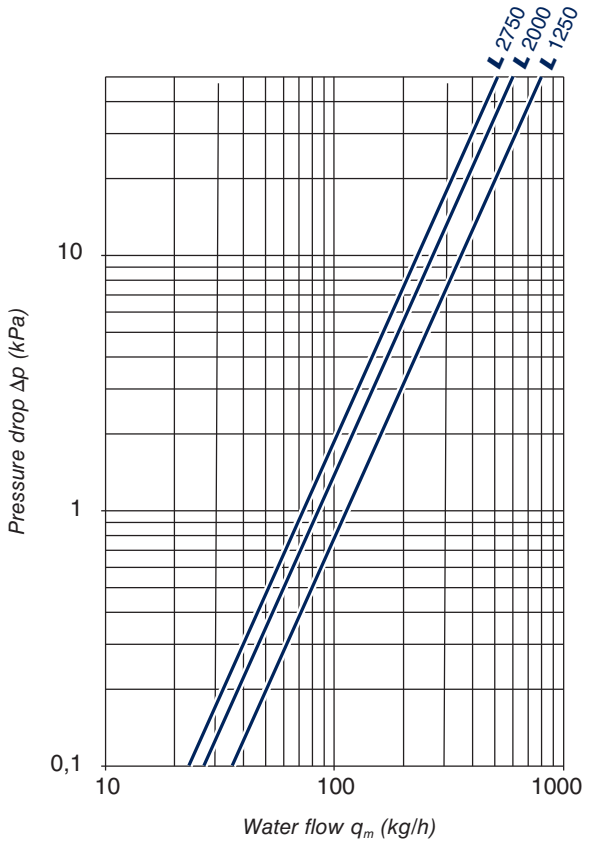
Height 130 mm — Width 310 mm



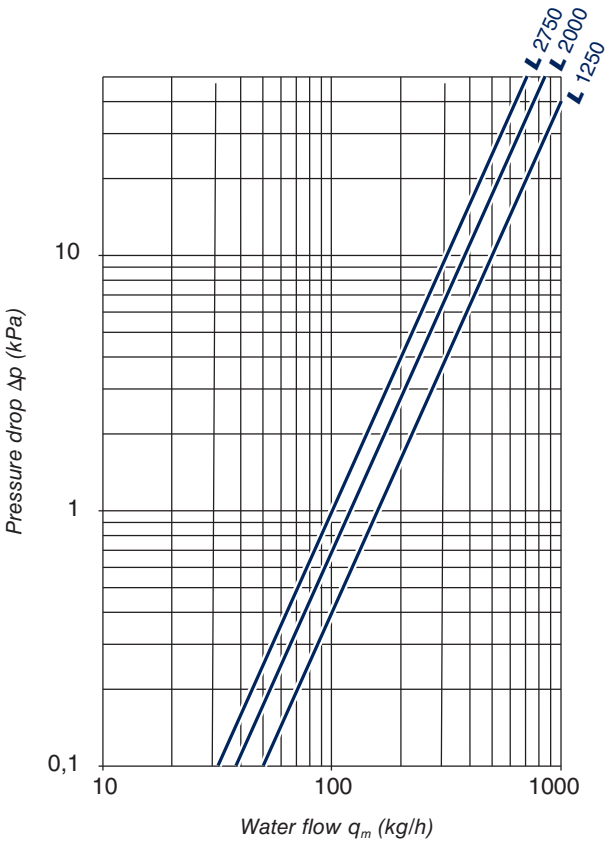
Height 155 mm — Width 310 mm



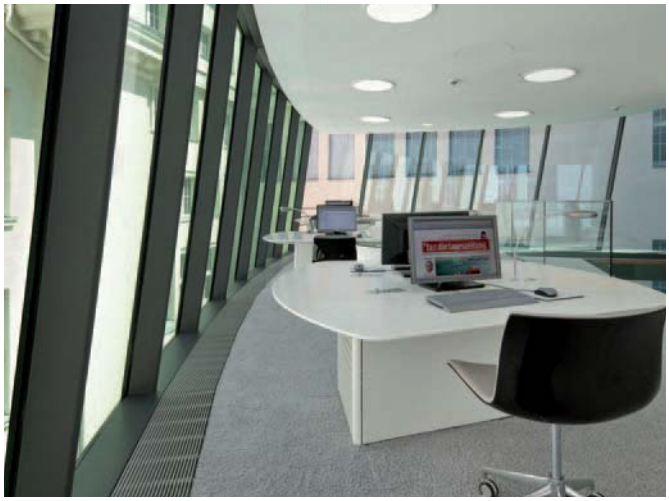
Height 130 mm — Width 360 mm



Height 155 mm — Width 360 mm



National Library of Leipzig



Construction features

CCP–ECM 4T version

Heating and cooling
4 pipe units

Walkable **floor casing,** in galvanised steel sheet, coated with Anthracite grey (RAL 7016) powder paint, with external height adjustable system preassembled with an antivibrating device. Condensate collection tray integrated in floor casing, including two side drain connections Ø 15 mm.

Coil consisting of copper pipes and aluminium fins, painted Anthracite grey (RAL 7016) and housed, with acoustic decoupling, in transversal galvanised and painted steel frame.
Euroconus connection, front or ambient side, with connection nut (int. thread ¾") and air venting.

Tangential fan, window side, with protective cover, 24V EC motors freely adjustable (0 – 10 V) pre-wired and ready for connection.

Aluminium roll-up grid consisting of stable profiles, anodised in natural colours, with 20 x 6 mm slats. Grid with overall height of 20 mm and free 70% transversal section, inserted in floor casing and acoustically insulated by rubber gaskets. Perimeter listel with finish of cover grid.

Mounting cover with a **protective profile** of the perimeter listels to protect the trench convectors during installation.

Residential complex Munich of Bavaria

Construction features

Standard versions

2 Widths: 330 and 360 mm.
2 Heights: 130 and 155 mm.
3 Lengths: 1250, 2000 and 2750 mm.
Aluminium roll-up grid.

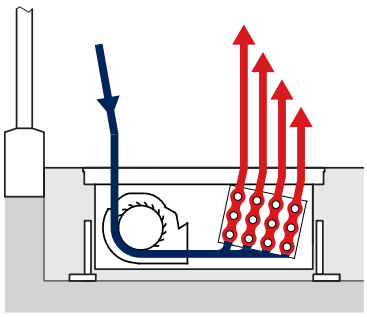
Identifications and Models

Dimensions			
Casing Length	Casing Height	Casing Width	Model
L (mm)	H (mm)	T (mm)	
1250	130	330	CCP–ECM 4T 1250-130-330
		360	CCP–ECM 4T 1250-130-360
	155	330	CCP–ECM 4T 1250-155-330
		360	CCP–ECM 4T 1250-155-360
2000	130	330	CCP–ECM 4T 2000-130-330
		360	CCP–ECM 4T 2000-130-360
	155	330	CCP–ECM 4T 2000-155-330
		360	CCP–ECM 4T 2000-155-360
2750	130	330	CCP–ECM 4T 2750-130-330
		360	CCP–ECM 4T 2750-130-360
	155	330	CCP–ECM 4T 2750-155-330
		360	CCP–ECM 4T 2750-155-360

Operating principle

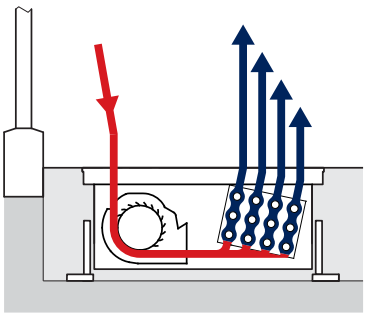
Forced heating convection

The cold air which skims the windows is suctioned and heated by the coil. The heated air rises, creating a shield to cold air.



Forced cooling convection

Installation in front of the window surfaces efficiently contrasts the diffusion of heat due to solar radiation.



For further information, see the paragraph “Basic notions”.

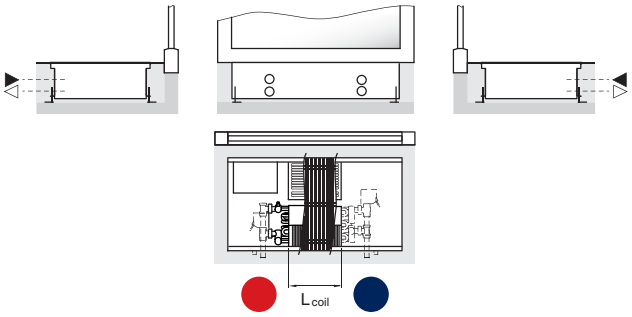
Operating limits

- Highest water inlet temperature: 90°C.
- Highest working pressure: 10 bars (high pressure optional model, 16 bars).
- Test pressure: 13 bars (high pressure optional model, 21 bars).

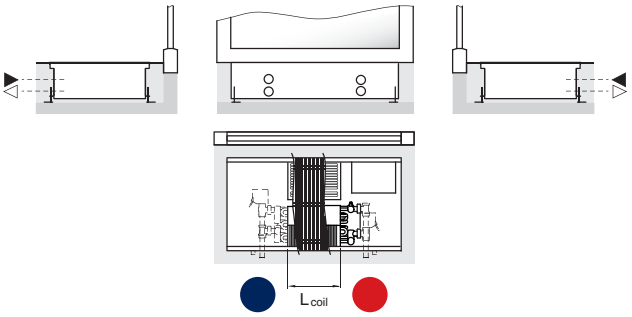
Front connections without integrated valve

Front *connections with respect to environment side*

A5 – *Heating coil:* ***left*** *connections. Cooling coil:* ***right*** *connections.*



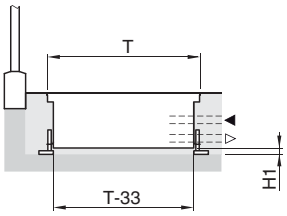
A6 – *Heating coil:* ***right*** *connections. Cooling coil:* ***left*** *connections.*



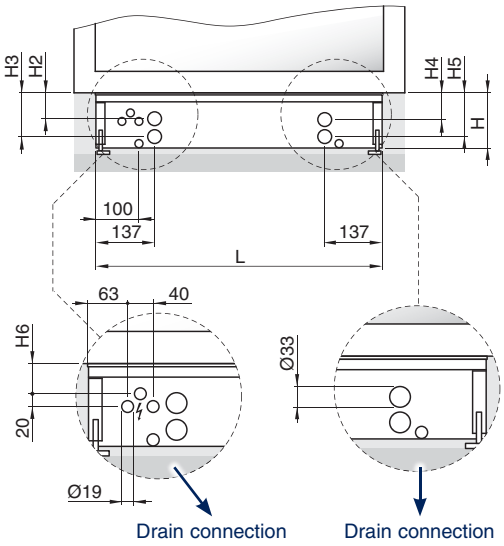
Coil connection measurement: *euroconus with connection nut (int. thread IG ¾")*

Dimensions – Front connections diagram *(Position A5)*

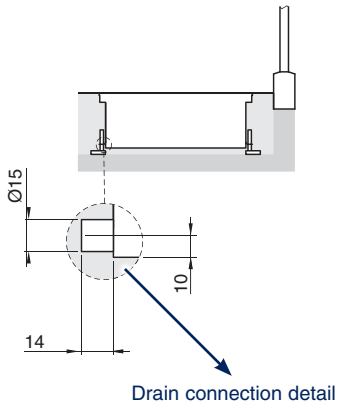
Left side view



Front view



Right side view



Position A6 specular with respect to Position A5

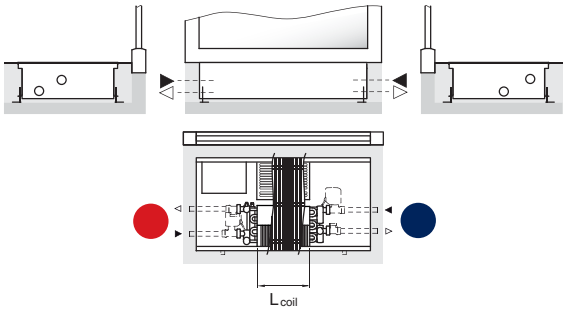
Dimensions

L *(mm)*	***Lcoil*** *(mm)*	***T*** *(mm)*	***H*** *(mm)*	***H1*** *(mm)*	***H2*** *(mm)*	***H3*** *(mm)*	***H4*** *(mm)*	***H5*** *(mm)*	***H6*** *(mm)*
up to 2750	L – 473	330	130	3 – 50	59	100	64	100	43
			155	3 – 85	60	106	65	101	68
		360	130	3 – 50	61	100	63	98	43
			155	3 – 85	61	105	64	98	68

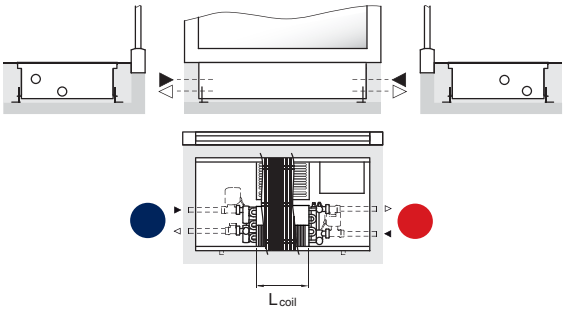
Side connections without integrated valve

Side *connections with respect to environment side*

A7 – *Heating coil:* ***left*** *connections. Cooling coil:* ***right*** *connections.*



A8 – *Heating coil:* ***right*** *connections. Cooling coil:* ***left*** *connections.*

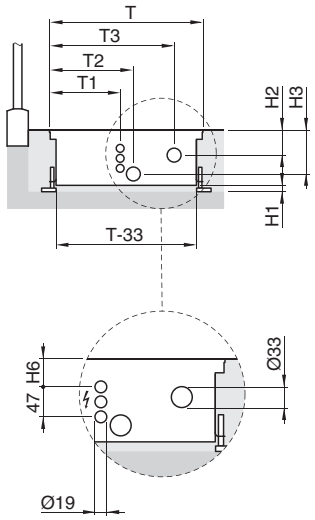


Coil connection measurement: *euroconus with connection nut (int. thread IG ¾")*

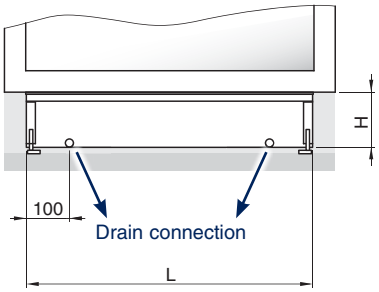
Dimensions – Side connections diagram *(Position A7)*

Left side view

(hydraulic connections side)

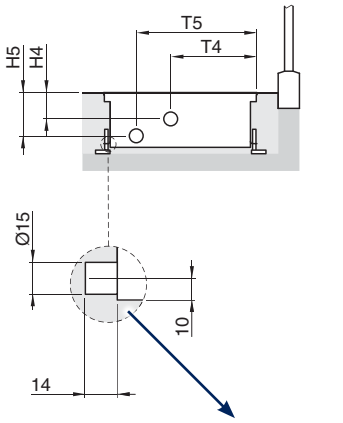


Front view



Right side view

(electric connections side)

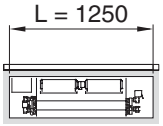
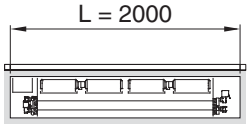
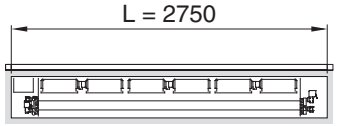


Position A8 specular with respect to Position A7

Dimensions

L *(mm)*	L_{coil} *(mm)*	***T*** *(mm)*	***T1*** *(mm)*	***T2*** *(mm)*	***T3*** *(mm)*	***T4*** *(mm)*	***T5*** *(mm)*	***H*** *(mm)*	***H1*** *(mm)*	***H2*** *(mm)*	***H3*** *(mm)*	***H4*** *(mm)*	***H5*** *(mm)*	***H6*** *(mm)*
up to 2750	L – 473	**330**	163	183	243	196	245	130	3 – 50	59	100	64	100	43
								155	3 – 85	60	106	65	101	68
		360	165	190	297	203	277	130	3 – 50	61	100	63	98	43
								155	3 – 85	61	105	64	98	68

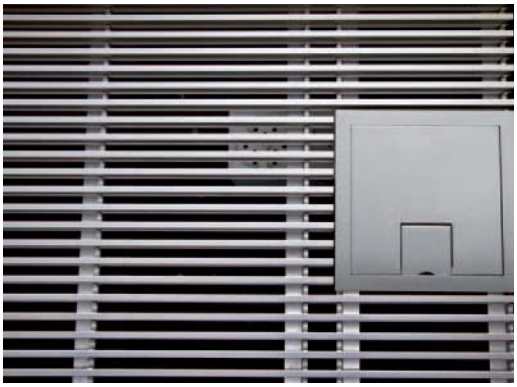
Fan specifications

Tangential fans technical data, 24 V DC valves included	L = 1250 	L = 2000 	L = 2750 
Length	1250	2000	2750
Number of EC motors	1	2	3
Number of fans	2	4	6
Maximum absorbed power (W)	20	38	56
Maximum absorbed current (mA)	87	165	243
Maximum inrush current for 2 minutes (mA)	428	507	585
Maximum air flow rate (m^3/h)	414	828	1242

Control system on page 42.
For further information, see installation manual.

Balainen school building

Belvedere restaurant



Technical data

Casing Length 1250 mm – Casing Height 130 mm

4 pipe units.

The following standard rating conditions are used:

COOLING (summer mode)

Entering air temperature + 27°C d.b.

Relative humidity 50%

Model			CCP-ECM 4T 1250-130-330				CCP-ECM 4T 1250-130-360			
Casing length **L**		mm	1250				1250			
Casing width **T**		mm	330				360			
Inverter Power		V	3	5	7	10	3	5	7	10
Air flow **QV**		m³/h	150	250	338	414	150	250	338	414
Cooling: ΔTm 17,5 K – 7/12°C	Total emission	W	394	668	773	936	444	908	1019	1160
	Sensible emission	W	266	471	563	724	299	640	742	897
Cooling: ΔTm 12,5 K – 12/17°C	Total emission	W	303	474	568	671	338	640	743	837
	Sensible emission	W	303	474	568	671	338	640	743	837
Cooling: ΔTm 10,0 K – 16/18°C	Total emission	W	258	383	469	546	286	515	611	684
	Sensible emission	W	258	383	469	546	286	515	611	684
Sound power L_w		dB(A)	27	37	45	51	27	37	45	51
Sound pressure L_p (*)		dB(A)	18	28	36	42	18	28	36	42
Exponent **n**		–	0,76	1,00	0,90	0,97	0,79	1,02	0,92	0,95
Weight **M**		kg	16,98				17,96			

HEATING (winter mode)

Entering air temperature + 20°C

Model		CCP-ECM 4T 1250-130-330					CCP-ECM 4T 1250-130-360				
Casing length **L**	mm	1250					1250				
Casing width **T**	mm	330					360				
Inverter Power	V	0	3	5	7	10	0	3	5	7	10
Air flow **QV**	m³/h	–	150	250	338	414	–	150	250	338	414
Heating: ΔTm 50,0 K – 75/65°C	W	154	1135	2001	2242	2578	169	1403	2493	2855	3261
Heating: ΔTm 30,0 K – 55/45°C	W	77	677	1193	1337	1538	83	837	1487	1703	1945
Heating: ΔTm 22,5 K – 45/40°C	W	52	510	900	1008	1159	56	631	1121	1284	1466
Sound power L_w	dB(A)	–	27	37	45	51	–	27	37	45	51
Sound pressure L_p (*)	dB(A)	–	18	28	36	42	–	18	28	36	42
Exponent **n**	–	1,35	1,00	1,00	1,00	1,00	1,39	1,00	1,00	1,00	1,00
Weight **M**	kg	16,98					17,96				

(*) = The sound pressure levels are 9 dB(A) lower than the sound power levels and apply to the reverberant field of a 100 m³ room and a reverberation time of 0.5 sec.

Technical data

Casing Length 1250 mm – Casing Height 155 mm

4 pipe units.

The following standard rating conditions are used:

COOLING (summer mode)

Entering air temperature + 27°C d.b.

Relative humidity 50%

Model			CCP–ECM 4T 1250-155-330				CCP–ECM 4T 1250-155-360			
Casing length **L**		mm	1250				1250			
Casing width **T**		mm	330				360			
Inverter Power		V	3	5	7	10	3	5	7	10
Air flow **QV**		m³/h	150	250	338	414	150	250	338	414
Cooling: ΔTm 17,5 K – 7/12°C	Total emission	W	407	815	778	1054	458	1040	1083	1180
	Sensible emission	W	281	594	596	876	316	757	830	981
Cooling: ΔTm 12,5 K – 12/17°C	Total emission	W	318	558	572	733	345	692	768	858
	Sensible emission	W	318	558	572	733	345	692	768	858
Cooling: ΔTm 10,0 K – 16/18°C	Total emission	W	273	442	472	585	289	537	621	704
	Sensible emission	W	273	442	472	585	289	537	621	704
Sound power L_w		dB(A)	28	39	46	52	28	39	46	52
Sound pressure L_p (*)		dB(A)	19	30	37	43	19	30	37	43
Exponent **n**		–	0,72	1,10	0,90	1,06	0,83	1,19	1,00	0,93
Weight **M**		kg	18,24				19,23			

HEATING (winter mode)

Entering air temperature + 20°C

Model		CCP–ECM 4T 1250-155-330					CCP–ECM 4T 1250-155-360				
Casing length **L**	mm	1250					1250				
Casing width **T**	mm	330					360				
Inverter Power	V	0	3	5	7	10	0	3	5	7	10
Air flow **QV**	m³/h	–	150	250	338	414	–	150	250	338	414
Heating: ΔTm 50,0 K – 75/65°C	W	158	1264	2130	2388	2727	191	1440	2542	2926	3294
Heating: ΔTm 30,0 K – 55/45°C	W	77	754	1270	1424	1626	93	859	1516	1745	1965
Heating: ΔTm 22,5 K – 45/40°C	W	52	568	958	1074	1226	62	647	1143	1316	1481
Sound power L_w	dB(A)	–	28	39	46	52	–	28	39	46	52
Sound pressure L_p (*)	dB(A)	–	19	30	37	43	–	19	30	37	43
Exponent **n**	–	1,38	1,00	1,00	1,00	1,00	1,40	1,00	1,00	1,00	1,00
Weight **M**	kg	18,24					19,23				

(*) = The sound pressure levels are 9 dB(A) lower than the sound power levels and apply to the reverberant field of a 100 m³ room and a reverberation time of 0.5 sec.

Technical data

Casing Length 2000 mm – Casing Height 130 mm

4 pipe units.

The following standard rating conditions are used:

COOLING (summer mode)

Entering air temperature + 27°C d.b.

Relative humidity 50%

Model			CCP-ECM 4T 2000-130-330				CCP-ECM 4T 2000-130-360			
Casing length **L**		mm	2000				2000			
Casing width **T**		mm	330				360			
Inverter Power		V	3	5	7	10	3	5	7	10
Air flow **QV**		m³/h	300	500	676	828	300	500	676	828
Cooling: ΔTm 17,5 K – 7/12°C	Total emission	W	787	1335	1547	1872	887	1816	2038	2319
	Sensible emission	W	530	940	1125	1448	597	1278	1482	1794
Cooling: ΔTm 12,5 K – 12/17°C	Total emission	W	606	947	1136	1342	677	1279	1486	1674
	Sensible emission	W	606	947	1136	1342	677	1279	1486	1674
Cooling: ΔTm 10,0 K – 16/18°C	Total emission	W	516	766	938	1092	572	1030	1222	1368
	Sensible emission	W	516	766	938	1092	572	1030	1222	1368
Sound power L_w		dB(A)	28	39	47	53	28	39	47	53
Sound pressure L_p (*)		dB(A)	19	30	38	44	19	30	38	44
Exponent **n**		–	0,76	1,00	0,90	0,97	0,79	1,02	0,92	0,95
Weight **M**		kg	28,55				30,14			

HEATING (winter mode)

Entering air temperature + 20°C

Model		CCP-ECM 4T 2000-130-330					CCP-ECM 4T 2000-130-360				
Casing length **L**	mm	2000					2000				
Casing width **T**	mm	330					360				
Inverter Power	V	0	3	5	7	10	0	3	5	7	10
Air flow **QV**	m³/h	–	300	500	676	828	–	300	500	676	828
Heating: ΔTm 50,0 K – 75/65°C	W	308	2269	4002	4484	5156	339	2806	4986	5710	6522
Heating: ΔTm 30,0 K – 55/45°C	W	153	1353	2387	2674	3075	165	1673	2974	3405	3890
Heating: ΔTm 22,5 K – 45/40°C	W	105	1020	1799	2016	2318	111	1262	2242	2567	2933
Sound power L_w	dB(A)	–	28	39	47	53	–	28	39	47	53
Sound pressure L_p (*)	dB(A)	–	19	30	38	44	–	19	30	38	44
Exponent **n**	–	1,35	1,00	1,00	1,00	1,00	1,39	1,00	1,00	1,00	1,00
Weight **M**	kg	28,55					30,14				

(*) = The sound pressure levels are 9 dB(A) lower than the sound power levels and apply to the reverberant field of a 100 m³ room and a reverberation time of 0.5 sec.

Technical data

Casing Length 2000 mm – Casing Height 155 mm

4 pipe units.

The following standard rating conditions are used:

COOLING (summer mode)

Entering air temperature + 27°C d.b.

Relative humidity 50%

Model			CCP–ECM 4T 2000-155-330				CCP–ECM 4T 2000-155-360			
Casing length **L**		mm	2000				2000			
Casing width **T**		mm	330				360			
Inverter Power		V	3	5	7	10	3	5	7	10
Air flow **QV**		m³/h	300	500	676	828	300	500	676	828
Cooling: ΔTm 17,5 K – 7/12°C	Total emission	W	815	1629	1557	2109	917	2081	2165	2361
	Sensible emission	W	562	1186	1193	1753	633	1515	1659	1963
Cooling: ΔTm 12,5 K – 12/17°C	Total emission	W	636	1117	1143	1466	690	1383	1536	1716
	Sensible emission	W	636	1117	1143	1466	690	1383	1536	1716
Cooling: ΔTm 10,0 K – 16/18°C	Total emission	W	546	884	944	1170	578	1074	1242	1408
	Sensible emission	W	546	884	944	1170	578	1074	1242	1408
Sound power L_w		dB(A)	30	41	48	54	30	41	48	54
Sound pressure L_p (*)		dB(A)	21	32	39	45	21	32	39	45
Exponent **n**		–	0,72	1,10	0,90	1,06	0,83	1,19	1,00	0,93
Weight **M**		kg	30,84				32,42			

HEATING (winter mode)

Entering air temperature + 20°C

Model		CCP–ECM 4T 2000-155-330					CCP–ECM 4T 2000-155-360				
Casing length **L**	mm	2000					2000				
Casing width **T**	mm	330					360				
Inverter Power	V	0	3	5	7	10	0	3	5	7	10
Air flow **QV**	m³/h	–	300	500	676	828	–	300	500	676	828
Heating: ΔTm 50,0 K – 75/65°C	W	316	2527	4260	4775	5454	382	2880	5084	5853	6588
Heating: ΔTm 30,0 K – 55/45°C	W	155	1507	2541	2848	3253	185	1718	3032	3491	3929
Heating: ΔTm 22,5 K – 45/40°C	W	105	1136	1915	2147	2452	125	1295	2286	2632	2962
Sound power L_w	dB(A)	–	30	41	48	54	–	30	41	48	54
Sound pressure L_p (*)	dB(A)	–	21	32	39	45	–	21	32	39	45
Exponent **n**	–	1,38	1,00	1,00	1,00	1,00	1,40	1,00	1,00	1,00	1,00
Weight **M**	kg	30,84					32,42				

(*) = The sound pressure levels are 9 dB(A) lower than the sound power levels and apply to the reverberant field of a 100 m³ room and a reverberation time of 0.5 sec.

Technical data

Casing Length 2750 mm – Casing Height 130 mm

4 pipe units.

The following standard rating conditions are used:

COOLING (summer mode)

Entering air temperature + 27°C d.b.

Relative humidity 50%

Model			CCP-ECM 4T 2750-130-330				CCP-ECM 4T 2750-130-360			
Casing length **L**		mm	2750				2750			
Casing width **T**		mm	330				360			
Inverter Power		V	3	5	7	10	3	5	7	10
Air flow **QV**		m³/h	450	750	1014	1242	450	750	1014	1242
Cooling: ΔTm 17,5 K – 7/12°C	Total emission	W	1181	2003	2320	2808	1331	2723	3056	3479
	Sensible emission	W	795	1411	1688	2172	897	1918	2223	2691
Cooling: ΔTm 12,5 K – 12/17°C	Total emission	W	910	1421	1704	2013	1015	1919	2229	2511
	Sensible emission	W	910	1421	1704	2013	1015	1919	2229	2511
Cooling: ΔTm 10,0 K – 16/18°C	Total emission	W	774	1149	1407	1637	858	1544	1832	2051
	Sensible emission	W	774	1149	1407	1637	858	1544	1832	2051
Sound power L_w		dB(A)	29	41	48	54	29	41	48	54
Sound pressure L_p (*)		dB(A)	20	32	39	45	20	32	39	45
Exponent **n**		–	0,76	1,00	0,90	0,97	0,79	1,02	0,92	0,95
Weight **M**		kg	41,34				43,54			

HEATING (winter mode)

Entering air temperature + 20°C

Model		CCP-ECM 4T 2750-130-330					CCP-ECM 4T 2750-130-360				
Casing length **L**	mm	2750					2750				
Casing width **T**	mm	330					360				
Inverter Power	V	0	3	5	7	10	0	3	5	7	10
Air flow **QV**	m³/h	–	450	750	1014	1242	–	450	750	1014	1242
Heating: ΔTm 50,0 K – 75/65°C	W	462	3404	6003	6726	7734	508	4209	7479	8565	9783
Heating: ΔTm 30,0 K – 55/45°C	W	230	2030	3580	4011	4613	248	2510	4460	5108	5835
Heating: ΔTm 22,5 K – 45/40°C	W	157	1531	2699	3024	3478	167	1893	3363	3851	4399
Sound power L_w	dB(A)	–	29	41	48	54	–	29	41	48	54
Sound pressure L_p (*)	dB(A)	–	20	32	39	45	–	20	32	39	45
Exponent **n**	–	1,35	1,00	1,00	1,00	1,00	1,39	1,00	1,00	1,00	1,00
Weight **M**	kg	41,34					43,54				

(*) = The sound pressure levels are 9 dB(A) lower than the sound power levels and apply to the reverberant field of a 100 m³ room and a reverberation time of 0.5 sec.

Technical data

Casing Length 2750 mm – Casing Height 155 mm

4 pipe units.

The following standard rating conditions are used:

COOLING (summer mode)

Entering air temperature + 27°C d.b.

Relative humidity 50%

Model			CCP–ECM 4T 2750-155-330				CCP–ECM 4T 2750-155-360			
Casing length **L**		mm	2750				2750			
Casing width **T**		mm	330				360			
Inverter Power		V	3	5	7	10	3	5	7	10
Air flow **QV**		m³/h	450	750	1014	1242	450	750	1014	1242
Cooling: ΔTm 17,5 K – 7/12°C	Total emission	W	1222	2444	2335	3163	1375	3121	3248	3541
	Sensible emission	W	836	1640	1597	2239	941	2094	2222	2507
Cooling: ΔTm 12,5 K – 12/17°C	Total emission	W	954	1675	1715	2199	1034	2075	2304	2574
	Sensible emission	W	954	1675	1715	2199	1034	2075	2304	2574
Cooling: ΔTm 10,0 K – 16/18°C	Total emission	W	819	1325	1416	1754	867	1610	1862	2111
	Sensible emission	W	819	1325	1416	1754	867	1610	1862	2111
Sound power L_w		dB(A)	31	42	49	55	31	42	49	55
Sound pressure L_p (*)		dB(A)	22	33	40	46	22	33	40	46
Exponent **n**		–	0,72	1,10	0,90	1,06	0,83	1,19	1,00	0,93
Weight **M**		kg	45,05				47,24			

HEATING (winter mode)

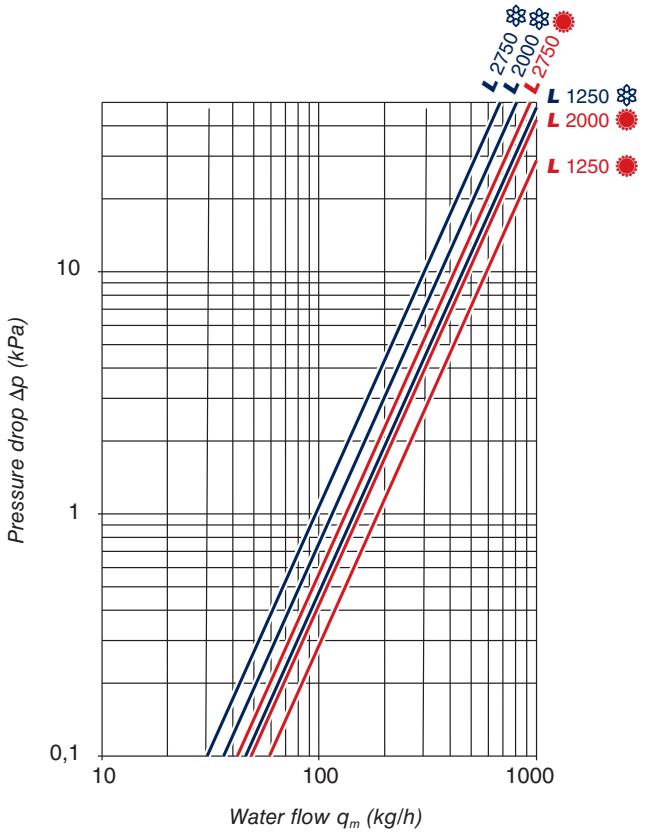
Entering air temperature + 20°C

Model		CCP–ECM 4T 2750-155-330					CCP–ECM 4T 2750-155-360				
Casing length **L**	mm	2750					2750				
Casing width **T**	mm	330					360				
Inverter Power	V	0	3	5	7	10	0	3	5	7	10
Air flow **QV**	m³/h	–	450	750	1014	1242	–	450	750	1014	1242
Heating: ΔTm 50,0 K – 75/65°C	W	474	3791	6390	7163	8181	573	4320	7626	8779	9882
Heating: ΔTm 30,0 K – 55/45°C	W	232	2261	3811	4272	4879	278	2576	4548	5236	5894
Heating: ΔTm 22,5 K – 45/40°C	W	157	1705	2873	3221	3679	187	1942	3429	3948	4443
Sound power L_w	dB(A)	–	31	42	49	55	–	31	42	49	55
Sound pressure L_p (*)	dB(A)	–	22	33	40	46	–	22	33	40	46
Exponent **n**	–	1,38	1,00	1,00	1,00	1,00	1,40	1,00	1,00	1,00	1,00
Weight **M**	kg	45,05					47,24				

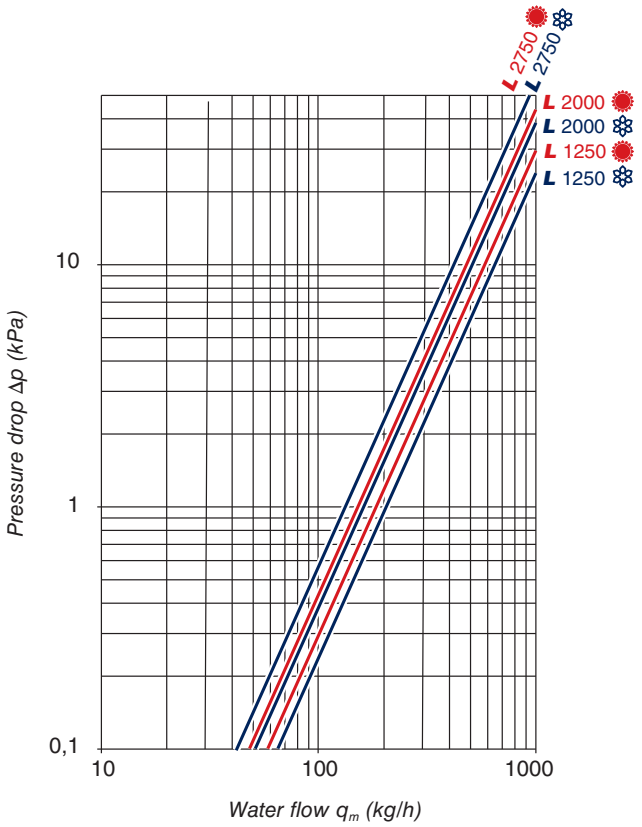
(*) = The sound pressure levels are 9 dB(A) lower than the sound power levels and apply to the reverberant field of a 100 m³ room and a reverberation time of 0.5 sec.

Pressure drop

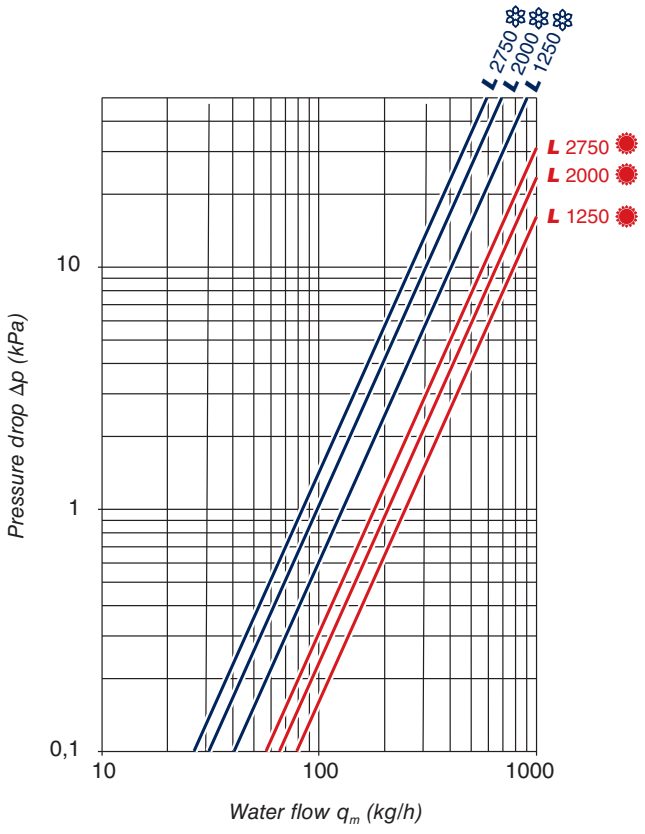
Height 130 mm — Width 330 mm



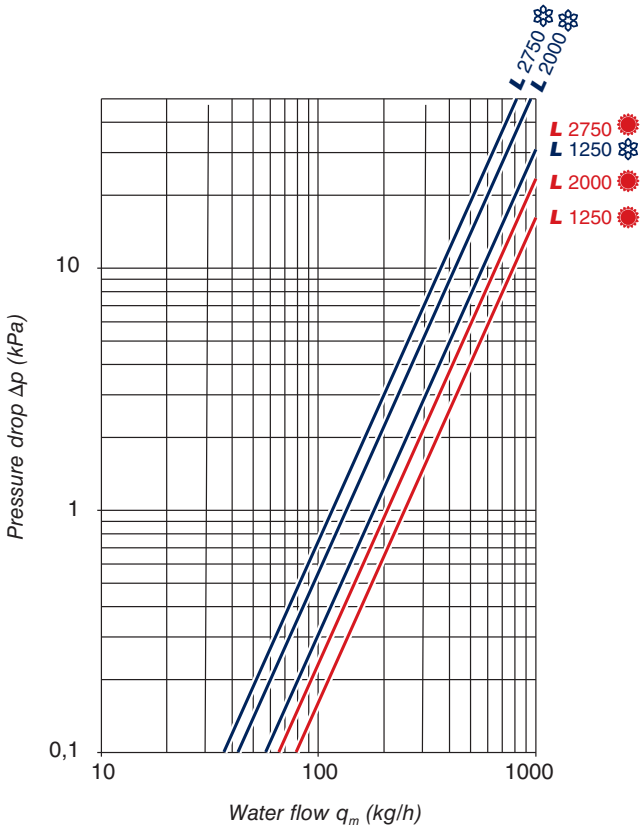
Height 155 mm — Width 330 mm



Height 130 mm — Width 360 mm



Height 155 mm — Width 360 mm



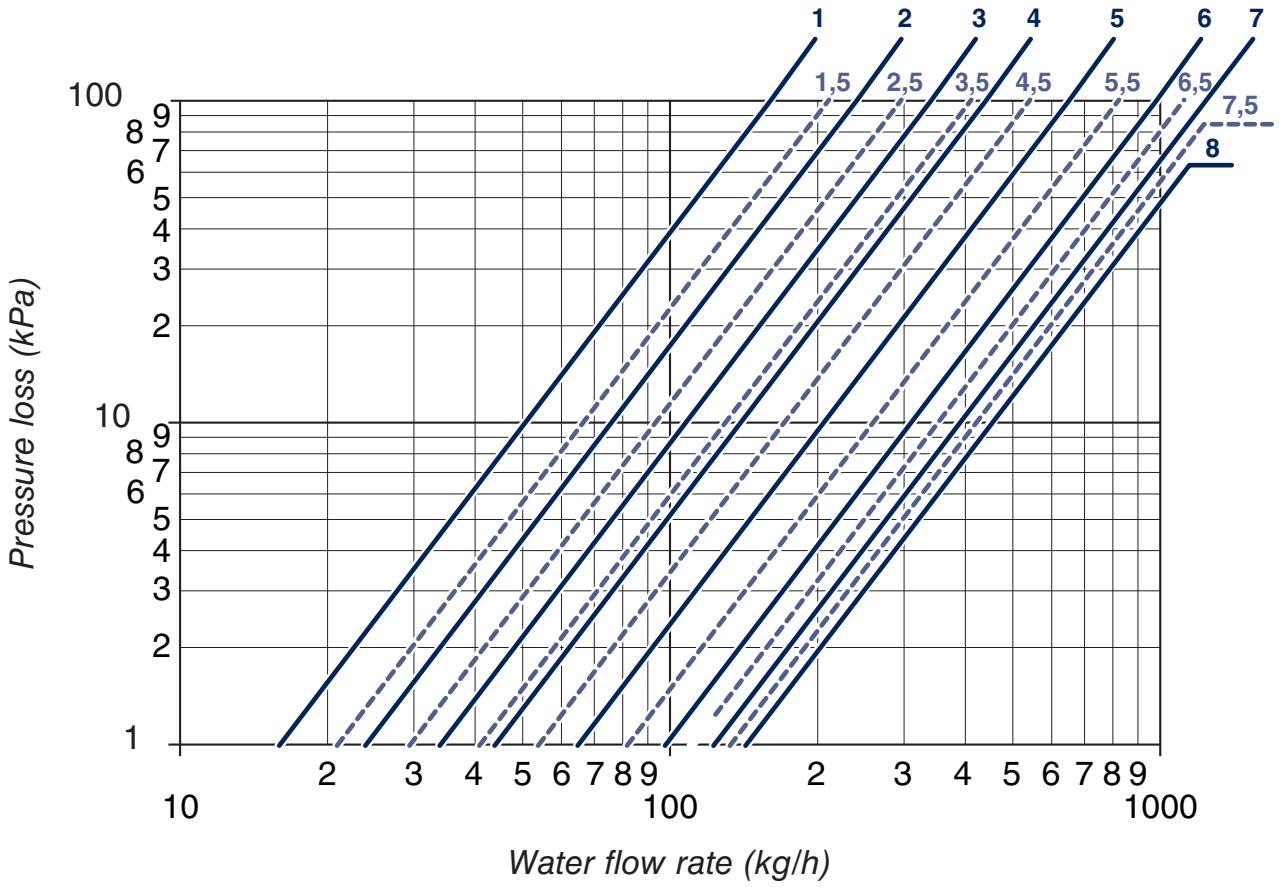
Morosani Schweizerhof Hotel

Sabiana trench convectors can be equipped with a regulating valve to perform precise calibration for small amounts of water. The following graph shows the setting values.

Adjustment curves for valve inserts

Standard valve insert

PRE-SETTING	1	1,5	2	2,5	3	3,5	4	4,5	5	5,5	6	6,5	7	7,56	8
k_{VS} VALUE UP TO	0,16	0,21	0,24	0,30	0,34	0,41	0,44	0,54	0,65	0,82	0,98	1,11	1,23	1,33	1,43



ATTENTION: *the valves must be calibrated during installation according to the designed water flow rates.*

Valve kit

Front connections valve kit

VE 8 (blue), k_{VS} value 1,43

Consisting of:

- Lower valve body with k_V factory preset:
  - DN 15 external thread with euroconus ¾"
  - M30 x 1,5
  - Galvanised, protective cap.
- Adjustable return lockshield:
  - DN 15 external thread with euroconus ¾"
  - Galvanised.

Version	Connection Type	FITTED		NOT FITTED	
		Identification	Code	Identification	Code
CCP-ECM 2T	A1 – A2	VM-1-2	9065090	VS-1-2	9065094
CCP-ECM 4T	A5 – A6	VM-5-6	9065092	VS-5-6	9065096

Side connections valve kit

VE 8 (blue), k_{VS} value 1,43

Consisting of:

- Lower valve body with k_V factory preset:
  - DN 15 external thread with euroconus ¾"
  - M30 x 1,5
  - Galvanised, protective cap.
- Adjustable return lockshield:
  - DN 15 external thread with euroconus ¾"
  - Galvanised.

Version	Connection Type	FITTED		NOT FITTED	
		Identification	Code	Identification	Code
CCP-ECM 2T	A3 – A4	VM-3-4	9065091	VS-3-4	9065095
CCP-ECM 4T	A7 – A8	VM-7-8	9065093	VS-7-8	9065097

Thermoelectric actuator

- Power supply: 24 V DC.
- Control signal: 0-10V DC.
- Absorption: 2 W.
- Absorbed current: 80 mA.
- Max inrush current: 350 mA (max. 2 min).
- Protection rating: IP 54.
- Adjustment stroke: 4mm.
- Including VA80 valve adaptor and 5m connection cable.
- Normally closed in absence of current.

Version	FITTED		NOT FITTED	
	Identification	Code	Identification	Code
CCP-ECM 2T / CCP-ECM 4T	ATT-24V-M	9065098	ATT-24V-S	9065099

Empty casing

The range and minimum and special lengths of the casings vary for the different models.

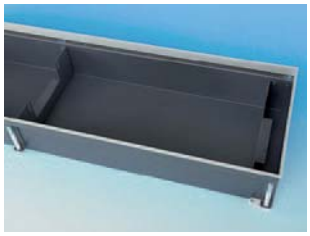
Dimensions:

- Heights: 130, 155 mm
- Widths: 310, 330, 360 mm
- Variable lengths: 200–3000 mm

Material:

- Galvanised steel painted Anthracite grey (RAL 7016 opaque) with natural anodised aluminium casing.

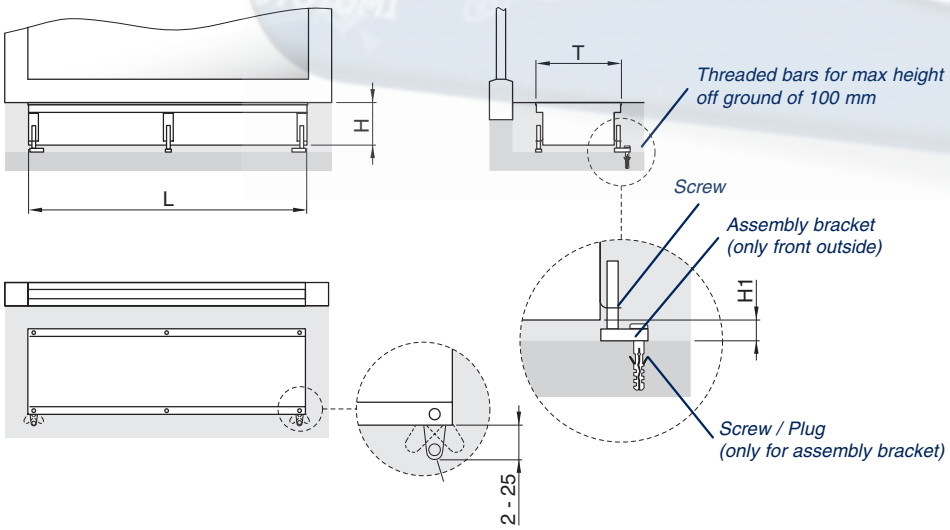
You must specify the length of the casing when placing the order.



Height H mm	Width T mm	Identification	Code
130	310	CVSG 13-31	9065100
	330	CVSG 13-33	9065101
	360	CVSG 13-36	9065102
155	310	CVSG 15-31	9065103
	330	CVSG 15-33	9065104
	360	CVSG 15-36	9065105

Casing fastening and installation

Fastening **with adjustable feet**



Model	Height H mm	H1 mm
CCP-ECM 2T	130	3 – 50
	155	3 – 85
CCP-ECM 4T	130	3 – 50
	155	3 – 85

Number of feet
depending on length

Length L mm	Number of assembly brackets
1000	3
1250	3
1500	3
1750	4
2000	4
2250	4
2500	5
2750	5
3000	5

Cover grid

Aluminium roll-up grid

Elegant, stable and sturdy, it can fit into the architectural design with great versatility.
You may choose from different profiles, materials, colours and finishes.
To facilitate maintenance, the grid is easy to remove and then to be put back in place.

Dimensions:

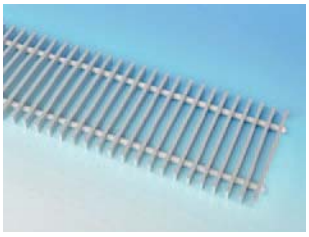
- Length up to 3000 mm
- Height: 20 mm
- Slat width: 6 mm
- Slat distance: 14 mm
  – other distances on demand
- Free section: 70%

Treatment:

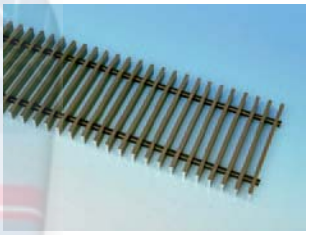
- Anodisation, natural or colour, powder painting in RAL colours.
- Colours for anodisation:
  – Natural
  – Bronze
  – Dark silver
  – Brass
  – Black
- Cutting surfaces in aluminium colour for grid in two sections.

Material:

- Aluminium profiles.

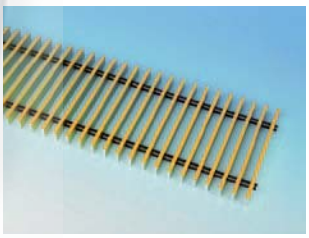


Natural anodised (standard)



Bronze

Dark silver



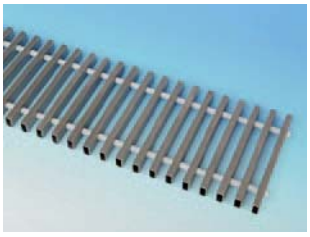
Brass

Black

Width T mm	Description	Identification	Code
310	Natural anodised - standard	GAA 31-NAT	9065010
	Bronze colour anodised	GAA 31-BRO	9065011
	Dark silver colour anodised	GAA 31-ARG	9065012
	Brass colour anodised	GAA 31-OTT	9065013
	Black colour anodised	GAA 31-NER	9065014
	optional colour anodised	GAA 31-COL	9065015
330	Natural anodised - standard	GAA 33-NAT	9065020
	Bronze colour anodised	GAA 33-BRO	9065021
	Dark silver colour anodised	GAA 33-ARG	9065022
	Brass colour anodised	GAA 33-OTT	9065023
	Black colour anodised	GAA 33-NER	9065024
	optional colour anodised	GAA 33-COL	9065025
360	Natural anodised - standard	GAA 36-NAT	9065030
	Bronze colour anodised	GAA 36-BRO	9065031
	Dark silver colour anodised	GAA 36-ARG	9065032
	Brass colour anodised	GAA 36-OTT	9065033
	Black colour anodised	GAA 36-NER	9065034
	optional colour anodised	GAA 36-COL	9065035

Cover grid

Stainless steel grid



Stainless steel

Elegant, stable and sturdy, it can fit into the architectural design with great versatility.
You may choose from different profiles, materials, colours and finishes.
To facilitate maintenance, the grid is easy to remove and then to be put back in place.

Dimensions:

- Length up to 3000 mm
- Height: 20 mm
- Slat width: 10 mm
- Slat distance: 16 mm
- Free section: 60%

Width T mm	Identification	Code
310	GAI 31	9065036
330	GAI 33	9065037
360	GAI 36	9065038

Wooden grid

Elegant, stable and sturdy, it can fit into the architectural design with great versatility.
You may choose from different profiles, materials, colours and finishes.
To facilitate maintenance, the grid is easy to remove and then to be put back in place.

Dimensions:

- Length up to 3000 mm
- Height: 20 mm
- Slat width: 12 mm
- Slat distance: 16 mm
- Free section: 55%

Width T mm	Colore	Identification	Code
310	oak	GLE 31-QUE	9065070
	ash	GLE 31-FRA	9065071
	beech	GLE 31-FAG	9065072
330	oak	GLE 33-QUE	9065073
	ash	GLE 33-FRA	9065074
	beech	GLE 33-FAG	9065075
360	oak	GLE 36-QUE	9065076
	ash	GLE 36-FRA	9065077
	beech	GLE 36-FAG	9065078

Cover grid

Aluminium linear grid

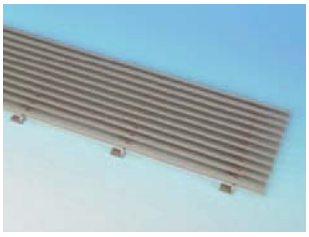
Elegant, stable and sturdy, it can fit into the architectural design with great versatility.
You may choose from different profiles, materials, colours and finishes.
To facilitate maintenance, the grid is easy to remove and then to be put back in place.

Dimensions:
- Length up to 3000 mm
- Height: 20 mm
- Slat width: 6 mm
- Slat distance: 10 mm
- Free section: 60%

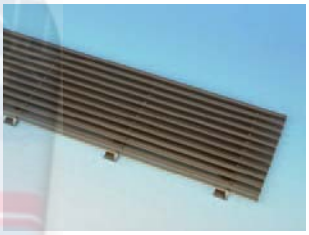
Treatment:
- Anodisation, natural or colour, powder painting in RAL colours.
- Colours for anodisation:
  – Natural
  – Bronze
  – Dark silver
  – Brass
  – Black
- Cutting surfaces in aluminium colour for grid in two sections.

Construction:
- Vertical profile slats, very rigid thanks to press-forming on angular aluminium profiles connected at a distance of 200-300 mm.

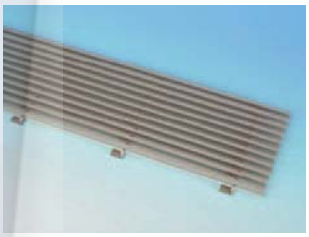
Material:
- Aluminium profiles.



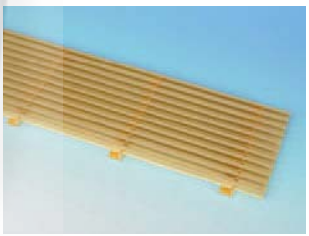
Natural anodised (standard)



Bronze



Dark silver



Brass

Black

Width T mm	Description	Identification	Code
310	Natural anodised - standard	GLA 31-NAT	9065040
	Bronze colour anodised	GLA 31-BRO	9065041
	Dark silver colour anodised	GLA 31-ARG	9065042
	Brass colour anodised	GLA 31-OTT	9065043
	Black colour anodised	GLA 31-NER	9065044
	optional colour anodised	GLA 31-COL	9065045
330	Natural anodised - standard	GLA 33-NAT	9065050
	Bronze colour anodised	GLA 33-BRO	9065051
	Dark silver colour anodised	GLA 33-ARG	9065052
	Brass colour anodised	GLA 33-OTT	9065053
	Black colour anodised	GLA 33-NER	9065054
	optional colour anodised	GLA 33-COL	9065055
360	Natural anodised - standard	GLA 36-NAT	9065060
	Bronze colour anodised	GLA 36-BRO	9065061
	Dark silver colour anodised	GLA 36-ARG	9065062
	Brass colour anodised	GLA 36-OTT	9065063
	Black colour anodised	GLA 36-NER	9065064
	optional colour anodised	GLA 36-COL	9065065

Accessories and auxiliary products for assembly

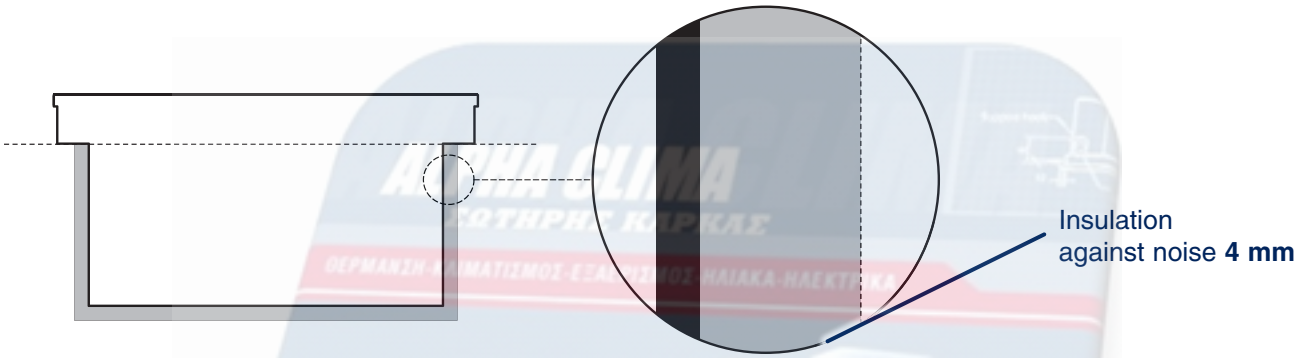
Air intake filter

Intake filter PPI 30 dark 140 x 3 mm.

VERSION	CCP-ECM 2T / CCP-ECM 4T
IDENTIFICATION	FVM
CODE	9065106

Casing sound absorbtion lining

4 mm sound absorbtion lining installed in the factory on the outer surface of the casing.



IDENTIFICATION	TS1
CODE	9065107

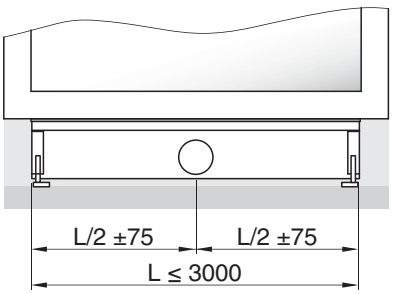
Air connections with dampers for flow rate adjustment

CONNECTION DIMENSIONS	IDENTIFICATION	CODE
63	LAG 63	9065108
80	LAG 80	9065109

One or more connections can be supplied for fresh air equipped with adjustment damper.
The connections can only be supplied on empty casings. Their position can be defined on demand.

(1) = *The positioning of air connections is only affected minimally by the position of the transversal ribs of the floor casing.*
For example: F connection (in the middle environment side) = "about halfway"
The exact position/dimension can be found on the drawing and must be approved by the customer.

Number and position of air connections



Control system

Sabiana control technology meets the ever growing demands regarding temperature control of individual environments and building management technology with KNX bus.

To develop this control technology, special attention was paid to guarantee simple mounting and installation. The control card is compatible with all Sabiana floor trench convectors with tangential fan ***(CCP–ECM 2T*** and ***CCP–ECM 4T)*** and is preassembled in the factory in an enclosure with a protective rating IP65. The integrated electric components are already fully wired and ready for connection. The system can be equipped at any time according to the customer's specific requirements, thanks to a series of different inlets/outlets (push-on contacts).

Electrical connection

The floor trench convector must be connected to the ambient thermostat and to the power line. This connection is made on two different lines and carried out as follows:

- the thermostat is connected to the circuit board of the unit by means of a 0.25 mm^2 cross-section twisted pair cable with a maximum allowed length of 30m;
- the circuit board must have a 220-240V AC power supply, by means of a conductor with a minimum cross-section of 1,5mm^2.

Furthermore, based on the configuration and supply of optional control components, it may be necessary to make the following external connections:

- internal bus line towards other trench convectors in an integrated control system (up to 6 trench convectors), min cable cross-section 0.25 mm^2, max line length 100 m;
- bus line connecting to a centralised home automation management system of the entire building (BMS), min cable cross-section 0.25 mm^2, max line length 700 m between Sabiana with KNX board and an IP router;
- connection cable with an outdoor temperature sensor;
- connection cable of a transmission receiver (for reception of input signals from contact detectors for windows and presence sensors).

The following optional control components are wired inside the floor duct.

They can be connected in the factory (according to the specific order) or at the worksite by the installer:

- thermoelectric actuator 24 V DC, control voltage 0-10 V DC;
- inlet temperature detection probe (in ***CCP–ECM 4T*** version, for heating and cooling circuit);
- dew point sensor ***(CCP–ECM 2T*** and ***CCP–ECM 4T);***
- KNX board.

For further information on the electrical connection, see the electric installation manual.

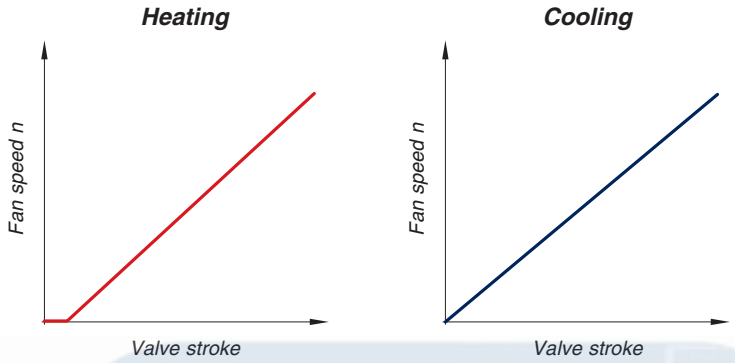
Commissioning

All Sabiana trench convectors are supplied with default control parameters.
According to the type of use (e.g. control with or without connection to a home automation management system of the building), to the trench convector model and to specific compartments of the user, upon commissioning, it could be necessary to set the parameters of the control system, using a Sabiana ambient thermostat (see accessory TAD - Code 9065080).

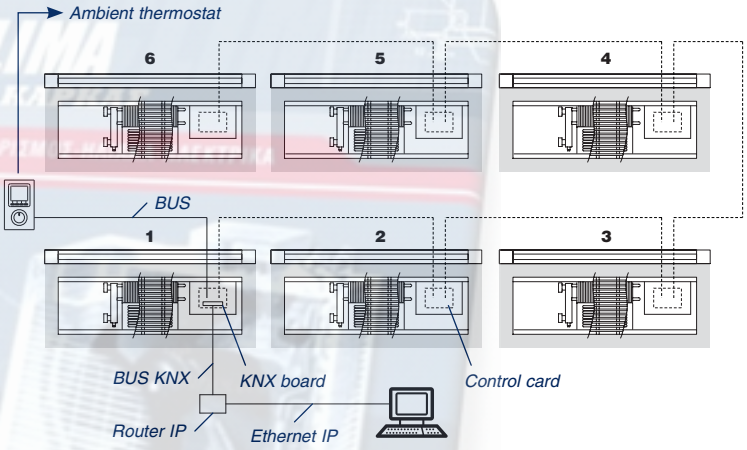
Control system

Features of the control system / Overview of the functions

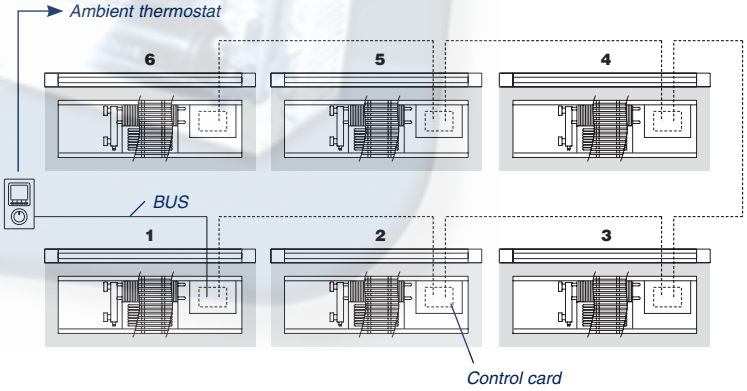
- Automatic fan speed control depending on the heating demand of the environment (difference between set temperature and actual temperature).
- Synchronous control of fan speed and valve stroke (water flow) for a balanced hydraulic network and high energy efficiency operation (respecting a minimum difference between supply and return temperature). According to a preliminary study conducted by Prof. Dr. Rainer Hirschberg, of the Technical University of Aachen (Hochscule Aachen), up to 8% thermal energy and beyond 80% electrical energy can be saved with respect to traditional systems without synchronous control.



- Quick automatic heating with outdoor temperature in the thermal comfort range (+/- 0.5°C of the nominal temperature) - can be deactivated with the parameter.
- Possibility of setting a maximum speed limit of the fan within the thermal comfort range.
- "Quiet heating" (without ventilation) for low power outputs.
- Antifreeze function with ambient temperature sensor.
- Possibility of connection to a central home automation management system of the building by means of an optional KNX board (a single board per integrated control group).



- Even if controlled by a central home automation system (BMS), control parameters can be adapted to individual requirements using a connected ambient thermostat (e.g. changing the nominal temperature for a limited time interval).
- Possibility of controlling up to 6 trench convectors (integrated group) with an ambient thermostat.

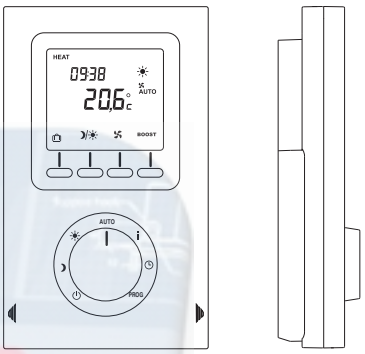


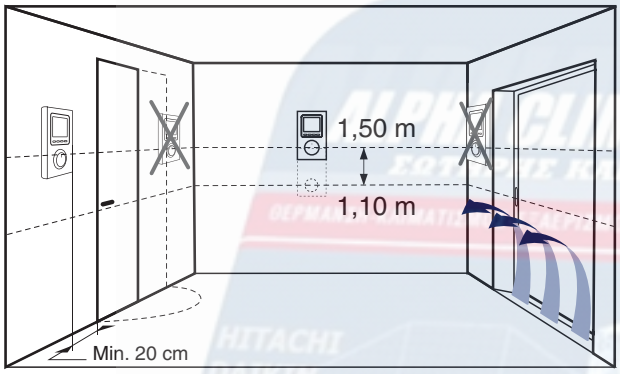
- Inside an integrated system, possibility of control with different ambient temperatures (detected by outdoor ambient temperature probes – optional accessory).
- For even greater energy efficiency, possibility of integrating further optional accessories in the control system, such as contact detectors for windows and presence sensors (both wireless).
- Automatic change-over in 2 pipe system by installing inlet water temperature sensors (accessories).

Control system

Programmable ambient thermostat

- The wall control of the Sabiana control system is equipped with a large multifunction display and functional input elements for the utmost practicality.



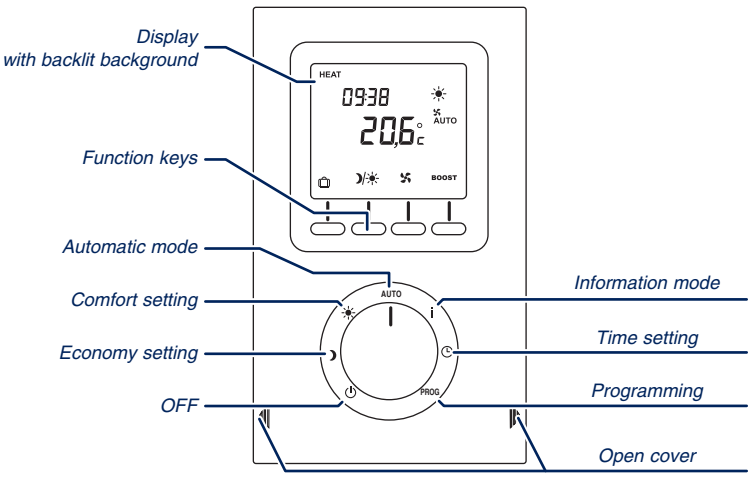


Product features

- Management by navigation knob and function keys
- Multifunction LCD display with automatic backlighting (light blue)
- Individually settable timing programs
- Integrated ambient temperature sensor
- Supply voltage by bus connection to control card
- Real time clock
- Customisable basic information
- BOOSTER function
- Holiday function
- Signalling by icons, possibility of international use
- Possibility of wall mounting
- Plastic case, colour similar to RAL 9010
- Technical data:
  - Supply voltage by bus connection to control card, 12-28V
  - Protection class II
  - Dimensions L x H x D = 81 x 135 x 33 mm
  - Protection rating IP 30
  - Timer data storage in case of power interruption: 2 hours
  - Operating temperature: from 0°C to + 40°C (10% - 90% relative humidity of air)
  - Suitable for wall mounting
  - Plastic case, colour similar to RAL 9010.

Icons key

HEAT Heating
COOL Cooling
Comfort mode
Economy mode
Antifreeze mode
OFF
Fan
Manual control
Absence
BOOST Quick heating/cooling
Error (see **i** mode)
Opening detection
C Cancel
BMS System
(central home automation management) connected



Control system

Functions

Command:	Control parameters input (for example nominal temperatures) Command by selection menu and function keys
Visualisation:	Visualisation of parameters and system status
Temperature measurement:	Ambient temperature detected by means of built-in temperature sensor
Timing programs:	Timing programs settable individually Possibility of setting various daytime switch-on values between economy mode and comfort mode
Error management:	Display of errors in INFO mode
Shortcut keys:	Quick access to manual control functions in AUTO mode by means of function keys
Manual fan management:	In 4 stages (0 - 1 - 2 - 3) with preset fan speed for time interval setting
Manual mode selection:	⇔ Switching from economy to comfort per time interval setting
BOOSTER (manual):	Quick heating for a certain time interval (15-30-60 min)
Holiday function:	Antifreeze mode for a freely settable number of days (1-365)
Integrated groups control:	Possibility of controlling an integrated group of up to 6 Sabiana trench convectors with an ambient thermostat
Customised settings:	of the control parameters of a BMS system (for example nominal temperatures, operating mode) for a limited time interval

Controls and Accessories

Digital ambient thermostat

- Programmable ambient thermostat, including fan control.
- Control for temperature adjustment, including fan control, with large LCD display to control up to 6 trench convectors.
- Automatic energy-saving light blue backlighting.
- Configurable timing program.
- Temperature range from 9°C to 32°C.
- Adjustment step 0,5°C.
- Antifreeze temperature 8°C.
- Adjustable thermal deviation +/5°C.
- Heating/cooling control.
- Power supply via BUS cable.
- 5A relay output.
- Protection rating/class: IP30 / II
- Plastic case 81x135x22 for wall mounting.
- Colour similar to RAL 9010.

VERSION	CCP-ECM 2T / CCP-ECM 4T
IDENTIFICATION	TAD
CODE	9065080

KNX board

To be integrated in a Sabiana control card for KNX network connection.
1 single board necessary for integrated group of trench convectors (up to 6).

VERSION	CCP-ECM 2T / CCP-ECM 4T	
	FITTED	NOT FITTED
IDENTIFICATION	KNX-M	KNX-S
CODE	9065081	9065082

Air temperature sensor

NTC 10 K ambient temperature sensor with plastic cap,
including 3 m cable + installation material.

VERSION	CCP-ECM 2T / CCP-ECM 4T
IDENTIFICATION	STAR
CODE	9065083

Minimum probe

IDENTIFICATION	STAC-2
CODE	9065084

- To detect supply temperature,
  including 2 m cable + installation material, for lengths up to 2000 mm.

IDENTIFICATION	STAC-5
CODE	9065085

- To detect supply temperature,
  including 4 m cable + installation material, for lengths up to 2000 mm.

Controls and Accessories

Dew point detector

- 24 V DC power supply.
- Max absorbed current 3 mA.
- Application range: from 10% to 100% R.H.
- Including cable gland and board connector.

Version	CCP-ECM 2T / CCP-ECM 4T
Identification	LPR
Code	9065086

Contact detector for windows

(must be coupled to transmission receiver)

- Power supply: 1 3 V lithium battery type CR2032, lasts up to 2 years.
- Transmission type: X2D protocol.
- Transmission frequency 868 MHz.
- Signal coverage up to 300 m (in open field).
- Protection rating IP 40.
- ABS/PC case.

Version	CCP-ECM 2T / CCP-ECM 4T
Identification	LCF
Code	9065087

Presence sensor

(must be coupled to transmission receiver)

- 230 V power supply with phase and neutral.
- Transmission frequency 868 MHz.
- 1 - 2 channels depending on function.
- 3 pre-installed cables to connect switches, ON/OFF buttons.
- 1 wired phase inlet for detector or button.
- Up to 16 two-way receivers and an optional number of one-way receivers.
- Operating temperature: from -5°C to 40°C.
- Dimensions: H 50 x W 47 x D 23 mm.

Version	CCP-ECM 2T / CCP-ECM 4T
Identification	SPR
Code	9065088

Transmission receiver

- For window contact detectors and presence sensors.
- Power supply by control card.
- Up to 2x20 recordable emitters.
- Signal coverage up to 100m (open field).
- Including 1m cable + installation material.

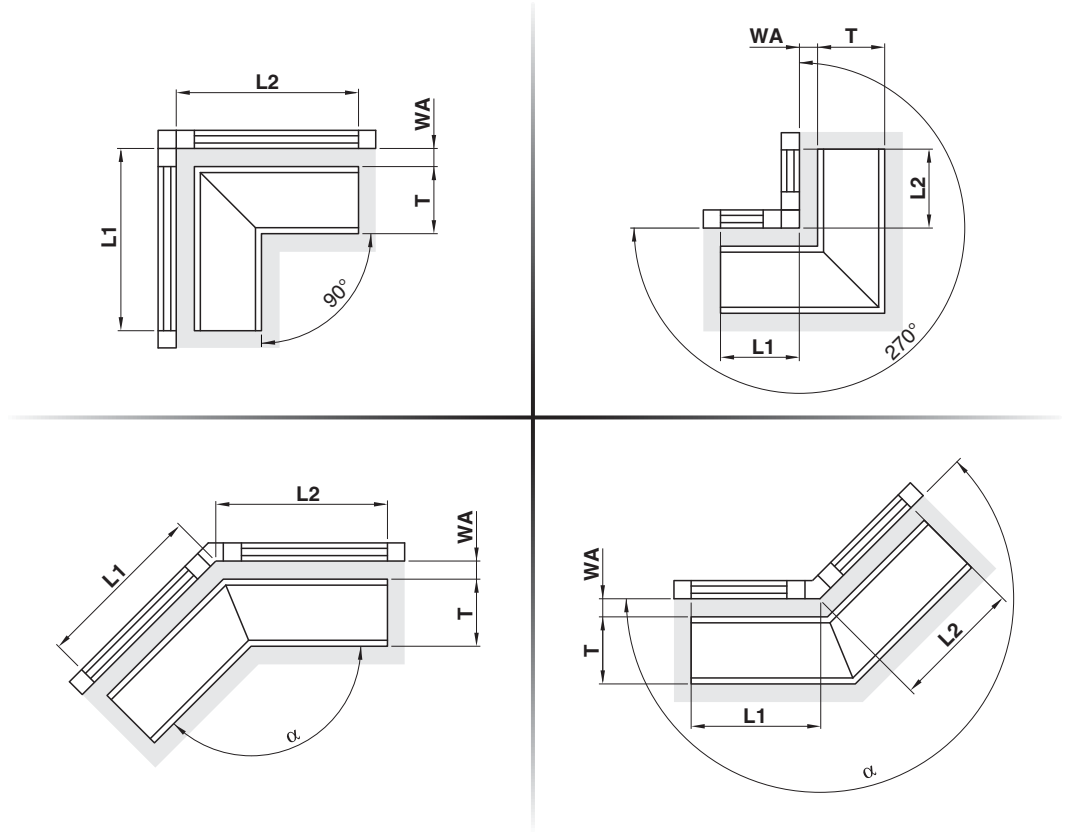
Version	CCP-ECM 2T / CCP-ECM 4T
Identification	RTR
Code	9065089

Angle models

- Available with all models and all casing sizes.
- The α angle can vary from 50° to 320°.
- When placing the order,
  you must supply a detailed drawing or a shape.
- Feasibility only after technical inspection.
- The trench convector must be transportable.

Drawing with dimensions

Cut



Item Number: 76 – *for oblique cut on both sides:* ***77***

LEGEND:

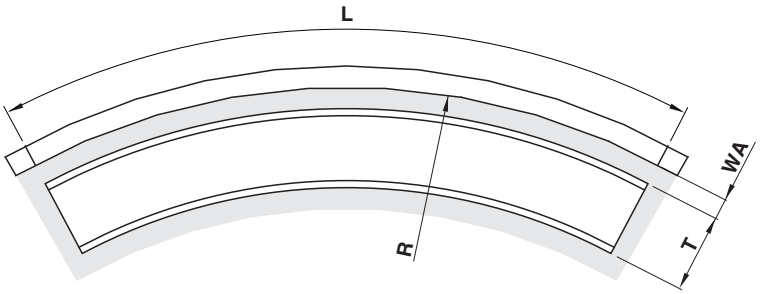
L1/L2 = Length of leg, measured on the wall α = Angle

T = Casing width **WA =** Distance from wall

Curved models

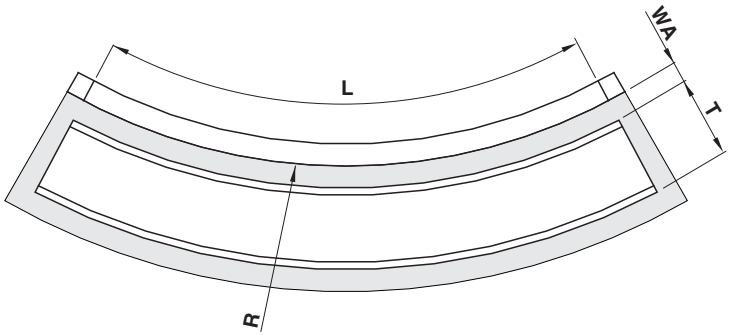
- Minimum curvature radius R: 1000 mm.
- When placing the order,
  you must supply a detailed drawing or a shape.
- Feasibility only after technical inspection.
- The trench convector must be transportable.

Drawing with dimensions



Inside radius

Outside radius



Item Number: 70

LEGEND:

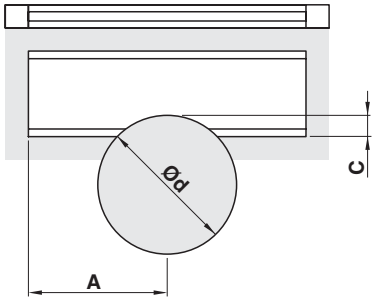
L = Extended length **R =** Wall curvature radius

T = Casing width **WA =** Distance from wall

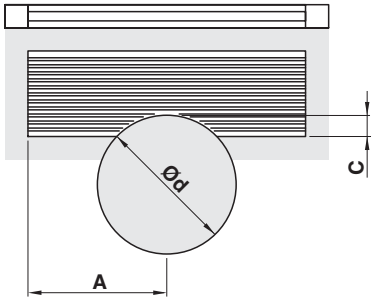
Models with column

- Available with all models and all casing sizes.
- When placing the order,
  you must supply a detailed drawing or a shape.
- Feasibility only after technical inspection.
- The trench convector must be transportable.

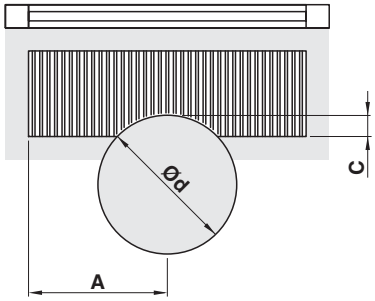
Drawing with dimensions



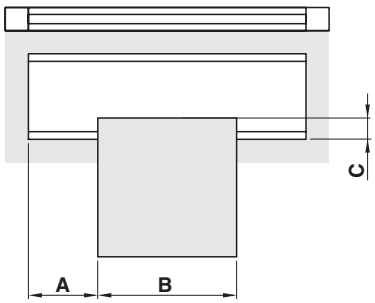
Duct column cut

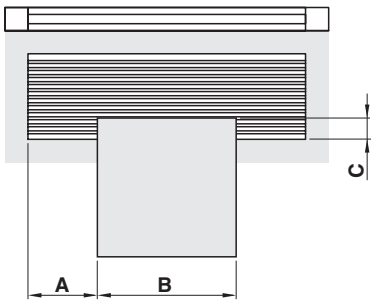


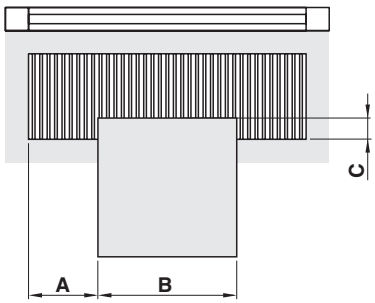
Linear grid column cut



Roll-up grid column cut







Item Number: 75

LEGEND:

d = Diameter **A** = Cut length

B = Cut width **C** = Cut depth

Further special models

Type	Description	Identification	Code
Special pressure	**High pressure** 16 bars (1600 kPa)	DRU	16
Special versions	**Special heating and cooling model lengths** [1] > 1250 mm possible	BES	SBL
	Lengths lower than minimum foreseen 850 mm - < 1250 mm possible (CCP–ECM 2T) 1050 mm - < 1250 mm possible (CCP–ECM 4T)	BES	SBL
	Special custom-designed lengths [2]	BES	SBT
	Special custom-designed heights [3]	BES	SBH
Fastening	Fastening with special brackets	–	–
Special painting	**Painting in different RAL colours** Linear grid / Roll-up aluminium grid Casing and thermal exchange coil	AUS FAR1	SF 99
	Painting in other RAL colours (RAL 7016 standard) Casing and thermal exchange coil	FAR1	SF

(1) = *specify the exact length.*
(2) = *specify the exact width.*
(3) = *specify the exact height.*

Availability on demand

Type Perimeter listel	Description	Identification	Code
Natural anodised	Natural anodised	RDL	ELO
Colour anodised	Bronze anodised	RDL	BRO
	Brass anodised	RDL	MES
	Dark silver anodised	RDL	DKS
	Black anodised	RDL	SWZ
	Steel anodised	RDL	EDS
Painting	Perimeter listel painted like floor duct/coil	RDL	FAR1
	Perimeter listel painted like cover grid	RDL	FAR2

Design advice

Noise emissions

Noise emissions depend on the construction geometry, dimensions and power output of the fan. Sound power levels are measured and detected in compliance with standard DIN 45635-1.

Pursuant to standard E DIN EN 16430-1 (Fan assisted radiators, convectors and trench convectors – Part 1: Technical specifications and requirements) the sound pressure level can be determined with an acoustic absorption of 8 dB(A), corresponding to a distance of 2 m from the sample, in ambient volume of 100 m^3 and reverberation time of 0.5 s.

The noise level degree is also determined by the acoustic features of the environment (absorption/reverberation). Therefore in practice values can be very different. For the design, we recommend considering Sabiana trench convectors based on medium speed.

Acoustics

Noise sources cause vibrations in the air which can either be thicker or rarer.

These pressure variations overlap the air pressure and propagate in sine waves. When these pressure variations reach our ear, the eardrum membrane transforms pressure waves into mechanical vibrations.

This starts the hearing process.

The mechanical ear only hears airborne-transmitted noise and its perception determines the two following quantities: **a:** acoustic pressure; **b:** frequency.

1. Acoustic pressure

Acoustic pressure is a variation of pressure in the air produced by a noise source. Similar pressure variations are measured in N/m^2 and are indicated with p.

Acoustic pressure represents a sound intensity measurement. It depends on the distance between the sound source and the point of measurement, as well as characteristics of the environment.

To calculate acoustic propagation in the environment, sound pressure is an inadequate quantity. In this case, you must detect the acoustic power level of a noise source.

2. Acoustic power

The energy transformed in sound by an element (sound source) is called acoustic power and is conducted in air in the form of pressure variations.

Sound power cannot be measured directly. It is determined by integrating sound pressure on a spherical or semi-spherical surface surrounding the sound source.

Sound power is therefore a quantity which does not depend on space or distance.

It is used for all further calculations.

Acoustic power is expressed in Watts (W).

For practical use, non-dimensional values were introduced by A. G. Bell.

3. Acoustic pressure level

The logarithmic ratio between an acoustic pressure p and an acoustic pressure of reference p_0 is defined acoustic pressure level L_P and expressed in decibels (dB).

$$L_P = 10 \lg \left(\frac{p}{p_0} \right)^2$$

p = effective acoustic pressure value in a determined point of the environment
p_0 = acoustic pressure of reference, set by international convention at 2×10^{-5} N/m^2

Design advice

4. Acoustic pressure level

The acoustic pressure level L_W is defined as:

$$L_W = 10 \lg \left(\frac{P}{P_0} \right) \text{ in dB}$$

P = acoustic power in Watts
P_0 = power of reference, set by international convention at 1×10^{-12} Watt

The acoustic power level is the noise produced by a sound source (namely the energy conducted in the environment). The acoustic pressure level equals the sound recorded at a certain distance from the sound source.

Therefore generally the acoustic power level is higher than the acoustic pressure level.

5. Frequency weighting

With different frequencies, the person perceives the same sound pressure levels as different. A sound pressure level at a lower frequency is normally perceived as lighter and less bothersome than a higher frequency.

To take this objective feeling into account, the sound pressure level measured objectively is filtered based on the sound intensity perception. Therefore we're speaking of sound pressure level weighting.

Weighting is performed by subtracting a certain factor from frequencies less perceivable by man and adding a certain factor to other frequencies.

Among the various types of weighting, A-weighting is almost exclusively set.

The result, expressed in the form of a single value, defined as the A-weighted sound pressure level or A-weighted sound power level.

The unit of measurement is the dB(A).

6. Addition to noise levels

If several sound sources are present, the various levels can be added to obtain the total noise level.

The same principles hold both for sound pressure levels and sound power levels.

With different sound sources with the same level, the following equation holds: $L_{ges} = L_1 + 10 \times \log n$ (dB)

Physical effects

Basic notions

Thermal comfort of heating and cooling systems substantially depends on air temperature and heat radiation. When the human body perceives these components as optimal, we can speak of thermal comfort.

During design, external walls and the surfaces of the windows take on a special value. The most significant differences between the temperature of the surface and the temperature of ambient air generally take place on these elements which delimit the living environment. Appropriate measures regarding thermal insulation are applied to external walls.

As far as windows are concerned, the use of insulated glass with thermal protection has become a standard. Nonetheless, due to the features of the materials used, the temperature of the internal surfaces is still lower than the temperature of the ambient air.

This generates the three following effects:

1. *Convective motion of cold air*
   Ambient air in contact with windows with a lower surface temperature cools off and tends to drop. The extent of this effect mainly depends on the height and size of the windows, the outdoor temperature and the thermal transmittance coefficient of the glass (U value). Cold air propagates even several meters inside the environment and causes the perception of air draughts.
2. *Radiation*
   The cold surface of the windows is an obstacle to thermal comfort. The comfort of persons near the cold surface of the windows is affected by their radiation, perceived as unpleasant, even though the ambient air temperature is within the comfort range (operating temperature).
3. *Condensation of the inside surface of the windows*
   If the temperature of the glass drops below the dew point temperature, aqueous vapour condensation occurs on the internal surface.

The objective is to avoid these three effects.

Different types of trench convectors are used depending on the architectural requirements of the context. Sabiana recessed floor trench convectors represent an excellent choice, because thanks to the many high design versions, adaptable to a wide variety of needs, maximum freedom is guaranteed in architectural design.

As far as heating is concerned, inserting recessed floor trench convectors in the project achieves the following results:

1. The formation of cold air draughts is eliminated completely. To do so, the trench convectors must be installed along the whole perimeter of the window and must have sufficient thermal capacity.
2. Radiation is contrasted as the forced convection of the trench convectors heats the cold surfaces of the windows.
3. Condensation on window surfaces can also be avoided. The warm air which rises, increases the inside surface temperature of the glass, keeping it from dropping below the dew point.

As far as cooling systems are concerned, the above-mentioned effects must be examined separately. In fact in this case, the objective is that of contrasting heat produced by rays of sunlight and to keep the ambient air temperature at the design temperature levels. Sabiana ***CCP-ECM*** trench convectors have been specifically designed for this purpose. Though their main function is cooling, they also allow the environments to be heated efficiently.

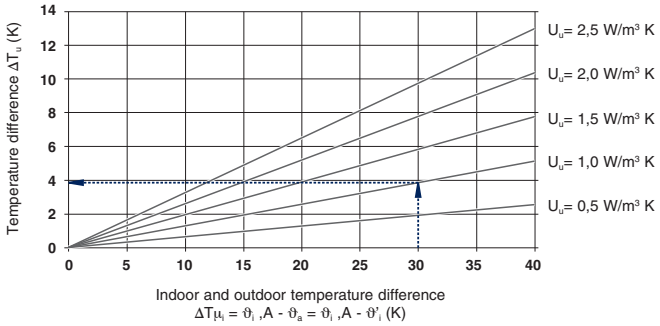
Inserting recessed floor trench convectors in the project achieves the following results during summer time:

1. The warm air generated by absorption of solar radiation through the glass, which tends to rise up along the glass, diffuses heat into the environment. This phenomenon is limited by the flow of cool air produced by the trench convector.
2. The temperature of the inside surface of the glass drops, thus generating a pleasant and comfortable ratio for the occupant between the temperature of the surfaces (especially of the windows) and the ambient air temperature.

Physical effects

Step 1

Calculation of the difference between the indoor temperature and the surface temperature of the window ΔT_u depending on the difference between indoor and outdoor temperature ΔT_i



ϑ_i ,A = Design indoor temperature in °C

ϑ_a = Outdoor temperature in °C

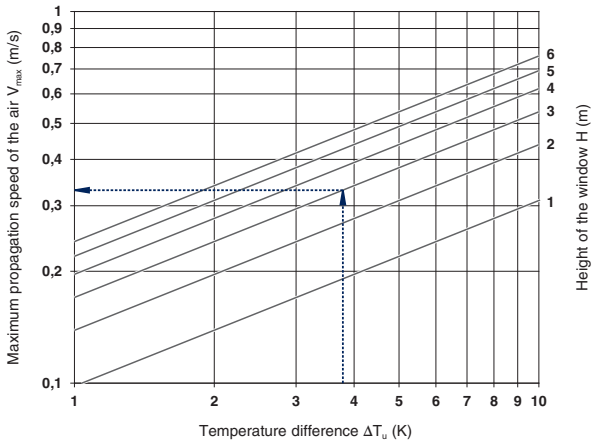
Uu = Thermal transmittance coefficient of transmission surface W/(m² K)

Example:

- Design indoor temperature: 20°C
- Outdoor temperature: - 10°C
- U value of window: 1 W/m² K
- Temperature difference ΔT_i: 30 K
- Temperature difference ΔT_u: 3,8 K

Step 2

Calculation of the maximum propagation speed of the air V_{max} depending on the temperature difference ΔT_u and the height of the window H



The Graph above can be represented by means of the following Table

Temperature difference ΔT_u	Propagation speed of the air V_{max} (m/s) — Window height (m)					
	1	2	3	4	5	6
1	0,0980	0,1386	0,1697	0,1960	0,2191	0,2400
2	0,1386	0,1960	0,2400	0,2772	0,3099	0,3395
3	0,1697	0,2400	0,2940	0,3395	0,3796	0,4158
4	0,1960	0,2772	0,3395	0,3920	0,4383	0,4801
5	0,2191	0,3099	0,3796	0,4383	0,4900	0,5368
6	0,2400	0,3395	0,4158	0,4801	0,5368	0,5880
7	0,2593	0,3667	0,4491	0,5186	0,5798	0,6351
8	0,2772	0,3920	0,4801	0,5544	0,6198	0,6790
9	0,2940	0,4158	0,5092	0,5880	0,6574	0,7201
10	0,3099	0,4383	0,5368	0,6198	0,6930	0,7591

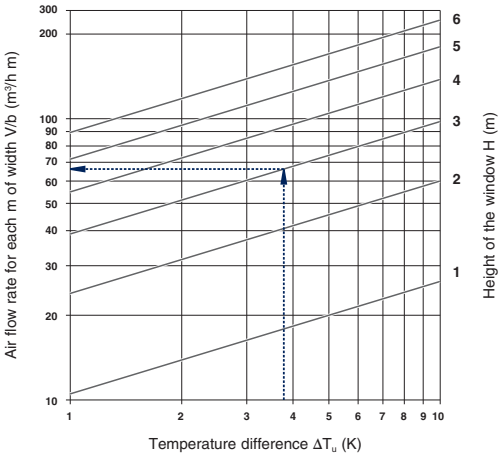
Example:

- Window height: 3 m
- Result: maximum propagation speed of air 0,34 m/s
- Reference value: speeds higher than 0.15 m/s are perceived as air draughts

Physical effects

Step 3

Calculation of air flow rate V/b for each m of width of the window depending on the temperature difference ΔT_u and the window height H



Result

Air flow rate for each m of width: 67 m³/m

The Graph above can be represented by means of the following Table

Temperature difference ΔT_u	***Air flow volume in width V/b (m³/h m) — Window height (m)***					
	1	**2**	**3**	**4**	**5**	**6**
1	10,400	23,893	38,867	54,892	71,746	89,292
2	13,723	31,527	51,285	72,430	94,669	117,822
3	16,139	37,078	60,315	85,183	111,339	138,568
4	18,107	41,600	67,671	95,572	124,917	155,467
5	19,798	45,484	73,989	104,494	136,579	169,982
6	21,296	48,925	79,586	112,400	146,912	182,842
7	22,650	52,037	84,648	119,549	156,256	194,471
8	23,893	54,892	89,292	126,108	164,829	205,140
9	25,046	57,540	93,600	132,191	172,780	215,036
10	26,124	60,016	97,629	137,881	180,218	224,293

Step 4

Calculation of the minimum power of the trench convector to avoid diffusion of cold air

$\dot{Q}_{\text{recessed trench convector}} > \dot{Q}_{\text{descending air}}$

Air flow rate	$\dot{V} = \dot{V}/b = 67$ m³/h *(see Graph of Step 3)*
Window width	L = 2 m
Density	$\rho = 1{,}2$ kg/m³
Specific heat	$C_S = 1{,}006$ KJ/kg K
Surface temperature	$\Delta Tm_u = 3{,}8$ K *(see Graph of Step 1)*

$$\dot{Q}_{\text{descending air}} = \dot{V} \times L \times \rho \times C_S \times \Delta Tm_u$$

$$\dot{Q}_{\text{descending air}} = \frac{67\ \text{m}^3/\text{h} \times 2\ \text{m} \times 1{,}2\ \text{kg/m}^3 \times 1{,}006\ \text{KJ/kg K} \times 3{,}8\ \text{K}}{3600}$$

$$\dot{Q}_{\text{descending air}} =$$

To avoid the diffusion of cold air, the trench convector must be at least 2 m long with a minimum power of 170 W.

Balainen school building

Design instructions – Heating

Calculation – General Information

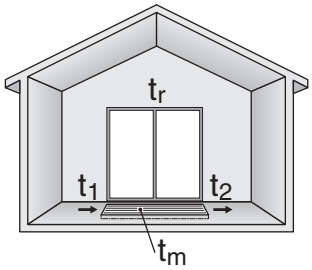
Calculating the thermal demand of buildings is performed in compliance with standard DIN EN 12831.

Thermal output – Fundamental principles

The thermal outputs of Sabiana recessed floor trench convectors are measured and detected pursuant to standard E DIN EN 16430 "Fan assisted radiators, convectors and trench convectors", part 1: "Technical specifications and requirements" and part 2: "Test method and rating for thermal output".

Standard heat output ΦS (ΔTm = 50 K)

The standard heat output ΦS in Watts of a heating body is the heat flow achieved in the following conditions:
- Supply temperature $t_1 = 75°C$
- Return temperature $t_2 = 65°C$
- Ambient air temperature $t_r = 20°C$
- Air pressure $p = 1013$ hPa



This results in an average temperature of the fluid t_m expressed in °C.

$$t_m = \frac{t_1 + t_2}{2} = \frac{75 + 65}{2} = 70°C$$

The difference between the temperature t_m and the ambient temperature t_2 is indicated by the symbol ΔTm and, in standard conditions, is equal to 50 K.

Calculation

Heat output Φ (with margin of ΔTm = 50 K)

With ΔTm other than 50 K, the heat output is calculated as follows: $\Phi = \Phi_S \times \left[\frac{\Delta Tm}{\Delta Tm_n}\right]^n$ namely $\Phi = \Phi_S \times C_K$

Where:
- n = exponent **n** (see ***CCP–ECM 2T*** tables from page 12 to 17 and ***CCP–ECM 4T*** tables from page 26 to 31);
- C_K = characteristic heat output correction factor (see technical data of trench convector).

Logarithmically, overtemperature ΔTm is calculated as follows: $\Delta Tm = \frac{(t_1 - t_r) - (t_2 - t_r)}{\ln\left[\frac{(t_1 - t_r)}{(t_2 - t_r)}\right]} = \frac{(t_1 - t_2)}{\ln\left[\frac{(t_1 - t_r)}{(t_2 - t_r)}\right]}$

Overtemperature ΔTm in standard conditions (75 / 65 / 20 °C) equals the logarithmic overtemperature: $\Delta Tm_n = \frac{75 - 65}{\ln\left[\frac{75 - 20}{65 - 20}\right]} = 49{,}83$ K

Calculation example: *CCP–ECM 2T* with L = 2000 mm; H = 155 mm; T = 310 mm

Standard heat output ΦS = 5228 Watt Esponent n = 1,00 Voltage V = 5

Operating conditions:
- Supply temperature $t_1 = 65°C$
- Return temperature $t_2 = 50°C$
- Ambient air temperature $t_r = 20°C$

$$\Delta Tm = \frac{65 - 50}{\ln\left[\frac{65 - 20}{50 - 20}\right]} = \frac{15}{\ln\left[\frac{45}{30}\right]} = \frac{15}{\ln 1{,}5} = \frac{15}{0{,}4055} = 36{,}99 \text{ K}$$

$$\Phi = \Phi_S \times C_K = 5228 \times \left[\frac{36{,}99}{49{,}83}\right]^{1{,}00} = 5228 \times 0{,}742 = 3879 \text{ W}$$

Design instructions – Heating

Water flow rate

Minimum flow rate

To guarantee uniform temperature distribution in heating bodies and correct heat emission, a minimum water flow rate must be guaranteed.

For each model, the power output data tables indicate the standard specific flow rate q_{ms}.

The water flow rate is calculated as follows: $q_m\ (kg/h) = \dfrac{\Phi}{1{,}16 \times (t_1 - t_2)}$

Calculation example: *CCP–ECM 2T* wih L = 2000 mm; H = 155 mm; T = 310 mm

Φ_S = 5228 W t_1 = 75°C t_2 = 65°C t_r = 20°C

$$q_m = \frac{5228\ W}{1{,}16 \times (75-65)} = 450{,}0\ kg/h$$

Φ = 3879 W t_1 = 65°C t_2 = 50°C t_r = 20°C

$$q_m = \frac{3879\ W}{1{,}16 \times (65-50)} = 222{,}9\ kg/h$$

Simplified project

Calculation:

1) Find the exponent from the table.
2) Determine the overtemperature ΔTm.
3) Determine the factor C_K according to the correction factor table.
4) Calculate the standard heat output as follows:

$$\Phi_S = \frac{\Phi_{\text{desired}}}{C_K}$$

5) Compare the value Φ_S calculated with the value Φ ΔTm 50 K in the table and choose the desired model.

Example:

- Supply temperature t_1 = 65°C
- Return temperature t_2 = 50°C
- Ambient air temperature t_r = 20°C
- Desired heat output F = 1800 W
- Maximum dimensions L = 2000 mm
  H = 155 mm
  T = 310 m

1) n = 1,00
2) Overtemperature at 65/50/20°C = 36,99 K
3) Factor C_K 65/50/20 = 0,7420
4) $\Phi_S = \dfrac{\Phi_{\text{desired}}}{C_K} = \dfrac{1800\ W}{0{,}7420} = 2425\ W$
5) ***CCP–ECM 2T*** with: L = 1250 mm, H = 155 mm, T = 310 mm,
   Φ_S = 2614 W ≥ 2425 W

or

CCP–ECM 2T with: L = 2000 mm, H = 155 mm, T = 310 mm,
Φ_S = 2871 W ≥ 2425 W

Design instructions – Heating

ΔTm (logarithmical calculation)

Inlet temperature t_1 (°C)	Ambient air temperature t_r (°C)	Outlet temperature t_2 °C									
		30	35	40	45	50	55	60	65	70	75
90	24	–	30,7	35,3	39,3	42,9	46,3	49,5	52,5	55,4	58,2
	22	–	33,2	37,6	41,5	45,1	48,4	51,6	54,5	57,4	60,2
	20	30,8	35,7	39,9	43,7	47,2	50,5	53,6	56,6	59,4	62,2
	18	33,5	38,1	42,2	45,9	49,3	52,6	55,7	58,6	61,5	64,2
	15	37,3	41,6	45,5	49,1	52,5	55,7	58,7	61,7	64,5	67,2
85	24	–	29,2	33,6	37,5	41,0	44,3	47,4	50,3	53,1	55,9
	22	–	31,7	35,9	39,7	43,2	46,4	49,5	52,4	55,2	57,9
	20	29,4	34,1	38,2	41,9	45,3	48,5	51,5	54,4	57,2	59,9
	18	32,0	36,5	40,4	44,0	47,4	50,5	53,5	56,4	59,2	61,9
	15	35,7	39,9	43,7	47,2	50,5	53,6	56,6	59,4	62,2	64,9
80	24	–	27,7	31,9	35,7	39,1	42,3	45,3	48,1	50,8	53,5
	22	–	30,1	34,2	37,8	41,2	44,3	47,3	50,1	52,8	55,5
	20	27,9	32,5	36,4	40,0	43,3	46,4	49,3	52,1	54,8	57,5
	18	30,4	34,8	38,6	42,1	45,4	48,4	51,4	54,2	56,9	59,5
	15	34,1	38,2	41,9	45,3	48,5	51,5	54,4	57,2	59,9	62,5
75	24	–	26,1	30,2	33,8	37,1	40,2	43,1	45,8	48,5	–
	22	–	28,5	32,4	35,9	39,2	42,2	45,1	47,8	50,5	–
	20	26,4	30,8	34,6	38,0	41,2	44,2	47,1	49,8	52,5	–
	18	28,9	33,1	36,8	40,1	43,3	46,3	49,1	51,8	54,5	–
	15	32,5	36,4	40,0	43,3	46,4	49,3	52,1	54,8	57,5	–
70	24	–	24,5	28,4	31,9	35,1	38,0	40,8	43,5	–	–
	22	–	26,8	30,6	34,0	37,1	40,0	42,8	45,5	–	–
	20	24,9	29,1	32,7	36,1	39,2	42,1	44,8	47,5	–	–
	18	27,3	31,3	34,9	38,1	41,2	44,1	46,8	49,5	–	–
	15	30,8	34,6	38,0	41,2	44,2	47,1	49,8	52,5	–	–
65	24	–	22,8	26,6	29,9	32,9	35,8	38,4	–	–	–
	22	–	25,1	28,7	32,0	35,0	37,8	40,4	–	–	–
	20	23,3	27,3	30,8	34,0	37,0	39,8	42,5	–	–	–
	18	25,6	29,5	32,9	36,1	39,0	41,8	44,5	–	–	–
	15	29,1	32,7	36,1	39,2	42,1	44,8	47,5	–	–	–
60	24	–	21,1	24,7	27,8	30,7	33,4	–	–	–	–
	22	–	23,3	26,8	29,9	32,7	35,4	–	–	–	–
	20	21,6	25,5	28,9	31,9	34,8	37,4	–	–	–	–
	18	23,9	27,6	30,9	33,9	36,8	39,4	–	–	–	–
	15	27,3	30,8	34,0	37,0	39,8	42,5	–	–	–	–
55	24	–	19,3	22,7	25,7	28,4	–	–	–	–	–
	22	–	21,5	24,7	27,7	30,4	–	–	–	–	–
	20	20,0	23,6	26,8	29,7	32,4	–	–	–	–	–
	18	22,2	25,7	28,9	31,7	34,4	–	–	–	–	–
	15	25,5	28,9	31,9	34,8	37,4	–	–	–	–	–
50	24	–	17,4	20,6	23,4	–	–	–	–	–	–
	22	–	19,6	22,6	25,4	–	–	–	–	–	–
	20	18,2	21,6	24,7	27,4	–	–	–	–	–	–
	18	20,4	23,7	26,7	29,4	–	–	–	–	–	–
	15	23,6	26,8	29,7	32,4	–	–	–	–	–	–
45	24	–	15,5	18,4	–	–	–	–	–	–	–
	22	–	17,5	20,4	–	–	–	–	–	–	–
	20	16,4	19,6	22,4	–	–	–	–	–	–	–
	18	18,5	21,6	24,4	–	–	–	–	–	–	–
	15	21,6	24,7	27,4	–	–	–	–	–	–	–

Design, assembly and installation instructions
Heating capacity correction factor

Correction factor C_K (logarithmical calculation)

ΔTm (K)	Exponent n												
	1,00	1,28	1,29	1,30	1,31	1,32	1,33	1,34	1,35	1,36	1,37	1,38	1,39
10	0,2007	0,1280	0,1260	0,1239	0,1220	0,1200	0,1181	0,1162	0,1144	0,1126	0,1108	0,1090	0,1073
11	0,2207	0,1446	0,1424	0,1403	0,1382	0,1361	0,1341	0,1321	0,1301	0,1281	0,1262	0,1243	0,1225
12	0,2408	0,1616	0,1593	0,1571	0,1549	0,1527	0,1505	0,1484	0,1463	0,1442	0,1422	0,1402	0,1382
13	0,2609	0,1791	0,1767	0,1743	0,1720	0,1697	0,1674	0,1652	0,1630	0,1608	0,1587	0,1566	0,1545
14	0,2809	0,1969	0,1944	0,1920	0,1895	0,1871	0,1848	0,1824	0,1801	0,1779	0,1756	0,1734	0,1712
15	0,3010	0,2151	0,2125	0,2100	0,2075	0,2050	0,2025	0,2001	0,1977	0,1954	0,1930	0,1907	0,1885
16	0,3211	0,2336	0,2310	0,2283	0,2258	0,2232	0,2207	0,2182	0,2157	0,2133	0,2109	0,2085	0,2061
17	0,3411	0,2524	0,2497	0,2471	0,2444	0,2418	0,2392	0,2367	0,2341	0,2316	0,2291	0,2267	0,2243
18	0,3612	0,2716	0,2688	0,2661	0,2634	0,2608	0,2581	0,2555	0,2529	0,2504	0,2478	0,2453	0,2428
19	0,3813	0,2911	0,2883	0,2855	0,2828	0,2800	0,2774	0,2747	0,2721	0,2695	0,2669	0,2643	0,2618
20	0,4013	0,3108	0,3080	0,3052	0,3024	0,2997	0,2969	0,2942	0,2916	0,2889	0,2863	0,2837	0,2811
21	0,4214	0,3308	0,3280	0,3252	0,3224	0,3196	0,3169	0,3141	0,3114	0,3087	0,3061	0,3035	0,3008
22	0,4415	0,3511	0,3483	0,3454	0,3426	0,3398	0,3371	0,3343	0,3316	0,3289	0,3262	0,3236	0,3209
23	0,4615	0,3717	0,3688	0,3660	0,3632	0,3604	0,3576	0,3548	0,3521	0,3494	0,3467	0,3440	0,3414
24	0,4816	0,3925	0,3897	0,3868	0,3840	0,3812	0,3784	0,3757	0,3729	0,3702	0,3675	0,3649	0,3622
25	0,5017	0,4136	0,4107	0,4079	0,4051	0,4023	0,3995	0,3968	0,3941	0,3914	0,3887	0,3860	0,3833
26	0,5217	0,4349	0,4320	0,4292	0,4265	0,4237	0,4209	0,4182	0,4155	0,4128	0,4101	0,4075	0,4048
27	0,5418	0,4564	0,4536	0,4508	0,4481	0,4453	0,4426	0,4399	0,4372	0,4345	0,4319	0,4292	0,4266
28	0,5619	0,4781	0,4754	0,4726	0,4699	0,4672	0,4645	0,4619	0,4592	0,4566	0,4540	0,4513	0,4487
29	0,5819	0,5001	0,4974	0,4947	0,4920	0,4894	0,4867	0,4841	0,4815	0,4789	0,4763	0,4737	0,4712
30	0,6020	0,5223	0,5196	0,5170	0,5144	0,5118	0,5092	0,5066	0,5040	0,5015	0,4990	0,4964	0,4939
31	0,6221	0,5447	0,5421	0,5395	0,5370	0,5344	0,5319	0,5294	0,5269	0,5244	0,5219	0,5194	0,5169
32	0,6421	0,5672	0,5647	0,5622	0,5598	0,5573	0,5548	0,5524	0,5499	0,5475	0,5451	0,5427	0,5403
33	0,6622	0,5900	0,5876	0,5852	0,5828	0,5804	0,5780	0,5756	0,5733	0,5709	0,5685	0,5662	0,5639
34	0,6823	0,6130	0,6107	0,6083	0,6060	0,6037	0,6014	0,5991	0,5968	0,5946	0,5923	0,5900	0,5878
35	0,7023	0,6362	0,6339	0,6317	0,6295	0,6273	0,6250	0,6228	0,6206	0,6185	0,6163	0,6141	0,6119
36	0,7224	0,6595	0,6574	0,6553	0,6531	0,6510	0,6489	0,6468	0,6447	0,6426	0,6405	0,6384	0,6364
37	0,7425	0,6831	0,6811	0,6790	0,6770	0,6750	0,6730	0,6710	0,6690	0,6670	0,6650	0,6630	0,6611
38	0,7625	0,7068	0,7049	0,7030	0,7011	0,6992	0,6973	0,6954	0,6935	0,6916	0,6898	0,6879	0,6860
39	0,7826	0,7307	0,7289	0,7271	0,7254	0,7236	0,7218	0,7200	0,7183	0,7165	0,7148	0,7130	0,7113
40	0,8027	0,7548	0,7531	0,7515	0,7498	0,7482	0,7465	0,7449	0,7432	0,7416	0,7400	0,7384	0,7367
41	0,8227	0,7790	0,7775	0,7760	0,7745	0,7730	0,7714	0,7699	0,7684	0,7669	0,7655	0,7640	0,7625
42	0,8428	0,8034	0,8020	0,8007	0,7993	0,7979	0,7966	0,7952	0,7939	0,7925	0,7911	0,7898	0,7884
43	0,8629	0,8280	0,8268	0,8255	0,8243	0,8231	0,8219	0,8207	0,8195	0,8183	0,8171	0,8159	0,8147
44	0,8830	0,8527	0,8516	0,8506	0,8495	0,8485	0,8474	0,8464	0,8453	0,8443	0,8432	0,8422	0,8411
45	0,9030	0,8776	0,8767	0,8758	0,8749	0,8740	0,8731	0,8722	0,8713	0,8705	0,8696	0,8687	0,8678
46	0,9231	0,9026	0,9019	0,9012	0,9005	0,8997	0,8990	0,8983	0,8976	0,8969	0,8962	0,8954	0,8947
47	0,9432	0,9278	0,9273	0,9267	0,9262	0,9257	0,9251	0,9246	0,9240	0,9235	0,9229	0,9224	0,9219
48	0,9632	0,9532	0,9528	0,9525	0,9521	0,9517	0,9514	0,9510	0,9507	0,9503	0,9500	0,9496	0,9492
49	0,9833	0,9787	0,9785	0,9783	0,9782	0,9780	0,9778	0,9777	0,9775	0,9773	0,9772	0,9770	0,9768
50	1,0034	1,0043	1,0043	1,0044	1,0044	1,0044	1,0045	1,0045	1,0045	1,0046	1,0046	1,0046	1,0047
51	1,0234	1,0301	1,0303	1,0306	1,0308	1,0310	1,0313	1,0315	1,0317	1,0320	1,0322	1,0325	1,0327
52	1,0435	1,0560	1,0564	1,0569	1,0573	1,0578	1,0582	1,0587	1,0592	1,0596	1,0601	1,0605	1,0610
53	1,0636	1,0821	1,0827	1,0834	1,0841	1,0847	1,0854	1,0861	1,0867	1,0874	1,0881	1,0888	1,0894
54	1,0836	1,1083	1,1092	1,1100	1,1109	1,1118	1,1127	1,1136	1,1145	1,1154	1,1163	1,1172	1,1181
55	1,1037	1,1346	1,1357	1,1368	1,1380	1,1391	1,1402	1,1413	1,1425	1,1436	1,1447	1,1459	1,1470
56	1,1238	1,1611	1,1624	1,1638	1,1651	1,1665	1,1679	1,1692	1,1706	1,1720	1,1733	1,1747	1,1761
57	1,1438	1,1877	1,1893	1,1909	1,1925	1,1941	1,1957	1,1973	1,1989	1,2005	1,2021	1,2037	1,2054
58	1,1639	1,2144	1,2163	1,2181	1,2200	1,2218	1,2237	1,2255	1,2274	1,2293	1,2311	1,2330	1,2349
59	1,1840	1,2413	1,2434	1,2455	1,2476	1,2497	1,2518	1,2539	1,2560	1,2582	1,2603	1,2624	1,2646
60	1,2040	1,2683	1,2706	1,2730	1,2754	1,2777	1,2801	1,2825	1,2849	1,2873	1,2896	1,2920	1,2944
61	1,2241	1,2954	1,2980	1,3006	1,3033	1,3059	1,3086	1,3112	1,3139	1,3165	1,3192	1,3219	1,3245
62	1,2442	1,3226	1,3255	1,3284	1,3313	1,3342	1,3372	1,3401	1,3430	1,3460	1,3489	1,3518	1,3548
63	1,2642	1,3500	1,3532	1,3564	1,3595	1,3627	1,3659	1,3691	1,3723	1,3756	1,3788	1,3820	1,3853
64	1,2843	1,3775	1,3809	1,3844	1,3879	1,3913	1,3948	1,3983	1,4018	1,4053	1,4089	1,4124	1,4159
65	1,3044	1,4051	1,4088	1,4126	1,4163	1,4201	1,4239	1,4277	1,4315	1,4353	1,4391	1,4429	1,4468
66	1,3244	1,4328	1,4369	1,4409	1,4450	1,4490	1,4531	1,4572	1,4613	1,4654	1,4695	1,4737	1,4778
67	1,3445	1,4607	1,4650	1,4694	1,4737	1,4781	1,4825	1,4869	1,4913	1,4957	1,5001	1,5046	1,5090
68	1,3646	1,4886	1,4933	1,4979	1,5026	1,5073	1,5120	1,5167	1,5214	1,5261	1,5309	1,5356	1,5404
69	1,3846	1,5167	1,5217	1,5266	1,5316	1,5366	1,5416	1,5466	1,5517	1,5567	1,5618	1,5669	1,5720

Design, assembly and installation instructions
Heating capacity correction factor

Correction factor C_K (logarithmical calculation)

ΔTm (K)	Exponent n												
	1,40	1,41	1,42	1,43	1,44	1,45	1,47	1,48	1,49	1,65	1,70	1,72	1,93
10	0,1056	0,1039	0,1022	0,1006	0,0990	0,0974	0,0943	0,0928	0,0913	0,0706	0,0652	0,0631	0,0451
11	0,1206	0,1188	0,1170	0,1153	0,1135	0,1118	0,1085	0,1069	0,1053	0,0827	0,0767	0,0744	0,0542
12	0,1362	0,1343	0,1324	0,1306	0,1287	0,1269	0,1233	0,1216	0,1199	0,0954	0,0889	0,0864	0,0641
13	0,1524	0,1504	0,1484	0,1464	0,1444	0,1425	0,1387	0,1369	0,1350	0,1089	0,1018	0,0991	0,0748
14	0,1691	0,1669	0,1648	0,1627	0,1607	0,1587	0,1547	0,1527	0,1508	0,1231	0,1155	0,1126	0,0863
15	0,1862	0,1840	0,1818	0,1796	0,1775	0,1754	0,1712	0,1692	0,1671	0,1379	0,1299	0,1268	0,0985
16	0,2038	0,2015	0,1992	0,1970	0,1948	0,1926	0,1882	0,1861	0,1840	0,1534	0,1450	0,1417	0,1116
17	0,2219	0,2195	0,2172	0,2148	0,2125	0,2103	0,2058	0,2036	0,2014	0,1696	0,1607	0,1573	0,1255
18	0,2404	0,2379	0,2355	0,2331	0,2308	0,2284	0,2238	0,2216	0,2193	0,1863	0,1771	0,1735	0,1401
19	0,2593	0,2568	0,2543	0,2519	0,2494	0,2471	0,2423	0,2400	0,2377	0,2037	0,1941	0,1904	0,1555
20	0,2786	0,2760	0,2735	0,2710	0,2686	0,2661	0,2613	0,2589	0,2566	0,2217	0,2118	0,2080	0,1717
21	0,2983	0,2957	0,2931	0,2906	0,2881	0,2856	0,2807	0,2783	0,2759	0,2403	0,2301	0,2262	0,1887
22	0,3183	0,3157	0,3132	0,3106	0,3081	0,3056	0,3006	0,2982	0,2957	0,2595	0,2491	0,2450	0,2064
23	0,3388	0,3362	0,3336	0,3310	0,3284	0,3259	0,3209	0,3184	0,3160	0,2792	0,2686	0,2645	0,2249
24	0,3596	0,3569	0,3543	0,3518	0,3492	0,3467	0,3416	0,3391	0,3367	0,2995	0,2888	0,2846	0,2441
25	0,3807	0,3781	0,3755	0,3729	0,3703	0,3678	0,3628	0,3603	0,3578	0,3204	0,3095	0,3053	0,2641
26	0,4022	0,3996	0,3970	0,3944	0,3919	0,3893	0,3843	0,3818	0,3793	0,3418	0,3309	0,3266	0,2849
27	0,4240	0,4214	0,4189	0,4163	0,4138	0,4112	0,4062	0,4037	0,4013	0,3638	0,3528	0,3485	0,3064
28	0,4462	0,4436	0,4411	0,4385	0,4360	0,4335	0,4285	0,4261	0,4236	0,3863	0,3753	0,3710	0,3287
29	0,4686	0,4661	0,4636	0,4611	0,4586	0,4561	0,4512	0,4488	0,4463	0,4093	0,3984	0,3941	0,3517
30	0,4914	0,4889	0,4865	0,4840	0,4815	0,4791	0,4743	0,4719	0,4695	0,4329	0,4220	0,4178	0,3755
31	0,5145	0,5121	0,5096	0,5072	0,5048	0,5024	0,4977	0,4953	0,4930	0,4569	0,4462	0,4420	0,4001
32	0,5379	0,5355	0,5331	0,5308	0,5284	0,5261	0,5215	0,5192	0,5169	0,4815	0,4710	0,4668	0,4253
33	0,5616	0,5593	0,5570	0,5547	0,5524	0,5501	0,5456	0,5433	0,5411	0,5066	0,4962	0,4922	0,4514
34	0,5855	0,5833	0,5811	0,5789	0,5766	0,5744	0,5701	0,5679	0,5657	0,5322	0,5221	0,5181	0,4781
35	0,6098	0,6076	0,6055	0,6034	0,6012	0,5991	0,5949	0,5928	0,5907	0,5582	0,5485	0,5446	0,5056
36	0,6343	0,6323	0,6302	0,6282	0,6261	0,6241	0,6200	0,6180	0,6160	0,5848	0,5754	0,5716	0,5339
37	0,6591	0,6572	0,6552	0,6533	0,6513	0,6494	0,6455	0,6436	0,6417	0,6118	0,6028	0,5992	0,5629
38	0,6842	0,6823	0,6805	0,6786	0,6768	0,6750	0,6713	0,6695	0,6677	0,6394	0,6307	0,6273	0,5926
39	0,7095	0,7078	0,7061	0,7043	0,7026	0,7009	0,6975	0,6957	0,6940	0,6674	0,6592	0,6560	0,6231
40	0,7351	0,7335	0,7319	0,7303	0,7287	0,7271	0,7239	0,7223	0,7207	0,6958	0,6882	0,6852	0,6543
41	0,7610	0,7595	0,7580	0,7565	0,7551	0,7536	0,7507	0,7492	0,7477	0,7248	0,7177	0,7149	0,6862
42	0,7871	0,7857	0,7844	0,7831	0,7817	0,7804	0,7777	0,7764	0,7751	0,7542	0,7477	0,7452	0,7189
43	0,8135	0,8123	0,8111	0,8099	0,8087	0,8075	0,8051	0,8039	0,8027	0,7840	0,7782	0,7760	0,7523
44	0,8401	0,8390	0,8380	0,8369	0,8359	0,8348	0,8328	0,8317	0,8307	0,8143	0,8093	0,8073	0,7864
45	0,8669	0,8660	0,8651	0,8643	0,8634	0,8625	0,8607	0,8599	0,8590	0,8451	0,8408	0,8391	0,8213
46	0,8940	0,8933	0,8926	0,8919	0,8911	0,8904	0,8890	0,8883	0,8876	0,8763	0,8728	0,8714	0,8569
47	0,9213	0,9208	0,9203	0,9197	0,9192	0,9186	0,9176	0,9170	0,9165	0,9079	0,9053	0,9042	0,8932
48	0,9489	0,9485	0,9482	0,9478	0,9475	0,9471	0,9464	0,9460	0,9457	0,9400	0,9383	0,9376	0,9302
49	0,9767	0,9765	0,9764	0,9762	0,9760	0,9759	0,9755	0,9754	0,9752	0,9726	0,9718	0,9714	0,9680
50	1,0047	1,0047	1,0048	1,0048	1,0048	1,0049	1,0049	1,0050	1,0050	1,0055	1,0057	1,0058	1,0065
51	1,0329	1,0332	1,0334	1,0337	1,0339	1,0341	1,0346	1,0349	1,0351	1,0389	1,0401	1,0406	1,0457
52	1,0614	1,0619	1,0623	1,0628	1,0632	1,0637	1,0646	1,0650	1,0655	1,0728	1,0750	1,0760	1,0856
53	1,0901	1,0908	1,0914	1,0921	1,0928	1,0935	1,0948	1,0955	1,0962	1,1070	1,1104	1,1118	1,1263
54	1,1190	1,1199	1,1208	1,1217	1,1226	1,1235	1,1253	1,1262	1,1271	1,1417	1,1463	1,1481	1,1677
55	1,1481	1,1492	1,1504	1,1515	1,1527	1,1538	1,1561	1,1572	1,1584	1,1768	1,1826	1,1849	1,2097
56	1,1774	1,1788	1,1802	1,1816	1,1830	1,1843	1,1871	1,1885	1,1899	1,2123	1,2194	1,2222	1,2526
57	1,2070	1,2086	1,2102	1,2119	1,2135	1,2151	1,2184	1,2200	1,2217	1,2482	1,2566	1,2600	1,2961
58	1,2367	1,2386	1,2405	1,2424	1,2443	1,2462	1,2499	1,2518	1,2537	1,2846	1,2943	1,2983	1,3403
59	1,2667	1,2688	1,2710	1,2731	1,2753	1,2774	1,2818	1,2839	1,2861	1,3213	1,3325	1,3370	1,3853
60	1,2968	1,2993	1,3017	1,3041	1,3065	1,3089	1,3138	1,3163	1,3187	1,3585	1,3711	1,3762	1,4310
61	1,3272	1,3299	1,3326	1,3353	1,3380	1,3407	1,3461	1,3489	1,3516	1,3960	1,4102	1,4159	1,4773
62	1,3578	1,3607	1,3637	1,3667	1,3697	1,3727	1,3787	1,3817	1,3847	1,4340	1,4497	1,4561	1,5244
63	1,3885	1,3918	1,3951	1,3983	1,4016	1,4049	1,4115	1,4148	1,4181	1,4723	1,4897	1,4967	1,5722
64	1,4195	1,4230	1,4266	1,4302	1,4338	1,4374	1,4446	1,4482	1,4518	1,5111	1,5301	1,5378	1,6208
65	1,4506	1,4545	1,4584	1,4622	1,4661	1,4700	1,4779	1,4818	1,4857	1,5503	1,5710	1,5794	1,6700
66	1,4820	1,4861	1,4903	1,4945	1,4987	1,5029	1,5114	1,5157	1,5199	1,5898	1,6123	1,6214	1,7199
67	1,5135	1,5180	1,5225	1,5270	1,5315	1,5361	1,5452	1,5498	1,5544	1,6298	1,6541	1,6639	1,7706
68	1,5452	1,5500	1,5549	1,5597	1,5646	1,5694	1,5792	1,5841	1,5891	1,6701	1,6962	1,7068	1,8219
69	1,5771	1,5823	1,5874	1,5926	1,5978	1,6030	1,6135	1,6187	1,6240	1,7108	1,7389	1,7502	1,8740

Design instructions – Cooling

Calculation – General Information

Calculating the cooling demand of buildings is performed in compliance with standard VDI 2078.

Cooling capacity – General principles

The cooling capacity of Sabiana recessed floor trench convectors are measured and detected pursuant to standard E DIN EN 16430 "Fan assisted radiators, convectors and trench convectors", part 1: "Technical specifications and requirements" and part 3: "Test method and rating for cooling capacity".

Standard cooling capacity P_{KN} (ΔTm = 10 K)

The standard total cooling capacity P_{KN} in Watts of a Sabiana trench convector is the cooling flow determined in the following conditions:

t_1 (°C) = Inlet cold water	t_1 = 16°C
t_2 (°C) = Outlet cold water	t_2 = 18°C
t_r (°C) = Ambient temperature	t_r = 27°C
Air pressure	p = 1013 hPa
Relative humidity	φ = 50%

This results in the average temperature of the cold water t_m in °C.

$$t_m = \frac{t_1 + t_2}{2} = \frac{16 + 18}{2} = 17°C$$

Calculation

Cooling capacity P_K (with margin of ΔTm = 10 K)

With ΔTm other than 10 K,
the cooling capacity is calculated as follows: $P_K = P_{KN} \times \left[\frac{\Delta Tm}{\Delta Tm_n}\right]^n$ namely $P_K = P_{KN} \times C_K$

where n = exponent
and C_K = characteristic heat output correction factor (see technical data).
Logarithmically,
overtemperature ΔTm is calculated as follows: $\Delta Tm = \frac{(t_1 - t_r) - (t_2 - t_r)}{\ln\left[\frac{(t_1 - t_r)}{(t_2 - t_r)}\right]} = \frac{(t_1 - t_2)}{\ln\left[\frac{(t_1 - t_r)}{(t_2 - t_r)}\right]}$

Undertemperature ΔTm in standard conditions
(16 / 18 / 27 °C) equals the logarithmic undertemperature: $\Delta Tm_n = \frac{16 - 18}{\ln\left[\frac{16 - 27}{18 - 27}\right]} = 9{,}97$ K

Calculation example: *CCP–ECM 2T* with L = 2000 mm; H = 130 mm; T = 310 mm

- Total standard cooling capacity P_{KN} = 882 Watt
- Exponent n = 1,00
- Control voltage 5 V

Operating conditions:
- Supply temperature t_1 = 17°C
- Return temperature t_2 = 19°C
- Ambient air temperature t_r = 26°C

$$\Delta Tm = \frac{17 - 19}{\ln\left[\frac{17 - 26}{19 - 26}\right]} = \frac{2}{\ln\left[\frac{9}{7}\right]} = \frac{2}{\ln 1{,}29} = \frac{2}{0{,}2513} = 7{,}96 \text{ K}$$

$$P_K = P_{KN} \times C_K = 882 \times \left[\frac{7{,}96}{9{,}97}\right]^{1{,}00} = 882 \times 0{,}7984 = 704 \text{ W}$$

Design instructions – Cooling

Water flow rate

Water flow rate

Formula for calculating water flow rate $q_m\ (kg/h) = \dfrac{P_K\ (W)}{1{,}16 \times (t_2 - t_1)}$

For each model, the power output data tables indicate the standard specific flow rate q_{ms}.

Calculation example: *CCP–ECM 2T* with L = 2000 mm; H = 130 mm; T = 310 mm

P_{KN} = 882 W t_1 = 16°C t_2 = 18°C t_r = 27°C

$$q_m = \frac{882\ W}{1{,}16 \times (18\text{-}16)} = 380\ kg/h$$

P_K = 704 W t_1 = 17°C t_2 = 19°C t_r = 26°C

$$q_m = \frac{704\ W}{1{,}16 \times (19\text{-}17)} = 303{,}45\ kg/h$$

Simplified project

Calculation:

1) Find the exponent from the table. For approximate calculations n = 1,00.
2) Determine the undertemperature ΔTm.
3) Determine the factor C_K according to the correction factor table.
4) Calculate the standard cooling capacity as follows:

$$P_{KN} = \frac{P_{desired}}{C_K}$$

5) Compare the value P_{KN} calculated with the value in the table and choose the desired model.

Example:

- Supply temperature t_1 = 17°C
- Return temperature t_2 = 19°C
- Ambient air temperature t_r = 26°C
- Desired cooling capacity $P_{desired}$ = 1000 W
- Desired model CCP–ECM 2T
- Maximum dimensions L = 2000 mm
  H = 155 mm
  T = 360 m

1) n = 1,00
2) Undertemperature at 17/19/26°C = 7,96 K ~ 8 K
3) Factor C_K 17/19/26 = 0,8024
4) $P_{KN} = \dfrac{P_{desired}}{C_K} = \dfrac{1000\ W}{0{,}8024} = 1246\ W$
5) ***CCP–ECM 2T*** with: L = 2000 mm, H = 155 mm, T = 360 mm,
   Design with control voltage 5 V: P_{KN} = 1256 W ≥ 1246 W

or

CCP–ECM 2T with: L = 2000 mm, H = 130 mm, T = 310 mm,
Design with control voltage 7 V: P_{KN} = 1336 W ≥ 1246 W

Note to paragraph "Cooling capacity – General principles":
The calculations indicated above refer to a project with sensitive cooling. If during the design phase, temperatures are chosen deliberately entailing dehumidification, aside from the total cooling capacity, you must also consider the sensitive cooling capacity. In that case, the sensitive cooling capacity will be decisive to determine the cooling load.

Design instructions – Cooling

Dew point table

To safely design a cooling system without producing condensation, you must consider the supply temperature of the cold water. The supply temperature of the water can be considered as the possible minimum surface temperature of a fin. In standard conditions (ambient air temperature = 27°C, relative humidity of the air = 50%) the dew point is equal to 15.8°C. This means that, if the supply temperature of the cold water is less than 15.8°C, you can expect condensation to form. The favourable effects produced by the presence of the fan are not considered, because they mainly depend on fan speed.

Table with TEMPERATURES IN °C of dew point depending on relative humidity

Air temperature (°C)	RELATIVE HUMIDITY									
	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
5	-24,0	-15,9	-11,2	-7,6	-4,6	-2,2	-0,1	+1,8	+3,5	+5,0
6	-23,1	-15,0	-10,3	-6,6	-3,7	-1,3	+0,8	+2,8	+4,5	+6,0
7	-22,3	-14,2	-9,4	-5,7	-2,8	-0,4	+1,8	+3,8	+5,5	+7,0
8	-21,6	-13,5	-8,5	-4,8	-1,8	+0,6	+2,8	+4,8	+6,5	+8,0
9	-21,0	-12,8	-7,6	-3,8	-0,8	+1,6	+3,8	+5,8	+7,4	+9,0
10	-20,2	-12,0	-6,7	-2,9	+0,1	+2,5	+4,8	+6,8	+8,4	+10,0
11	-19,5	-11,1	-5,9	-2,0	+0,9	+3,5	+5,7	+7,8	+9,4	+11,0
12	-18,7	-10,2	-5,0	-1,2	+1,7	+4,4	+6,6	+8,7	+10,4	+12,0
13	-17,9	-9,4	-4,2	-0,3	+2,6	+5,3	+7,5	+9,7	+11,4	+13,0
14	-17,2	-8,6	-3,3	+0,6	+3,5	+6,2	+8,5	+10,6	+12,3	+14,0
15	-16,5	-7,8	-2,4	+1,5	+4,5	+7,2	+9,5	+11,6	+13,3	+15,0
16	-15,7	-6,9	-1,5	+2,4	+5,5	+8,1	+10,5	+12,6	+14,3	+16,0
17	-14,9	-6,0	-0,7	+3,3	+6,5	+9,1	+11,5	+13,5	+15,3	+17,0
18	-14,1	-5,2	+0,2	+4,2	+7,4	+10,1	+12,4	+14,5	+16,3	+18,0
19	-13,2	-4,5	+1,0	+5,1	+8,3	+11,0	+13,4	+15,4	+17,3	+19,0
20	-12,5	-3,6	+1,9	+6,0	+9,3	+12,0	+14,3	+16,4	+18,3	+20,0
21	-11,7	-2,8	+2,7	+6,8	+10,2	+12,9	+15,3	+17,4	+19,3	+21,0
22	-11,0	-2,0	+3,6	+7,7	+11,1	+13,9	+16,3	+18,3	+20,3	+22,0
23	-10,3	-1,2	+4,5	+8,6	+12,1	+14,7	+17,2	+19,3	+21,2	+23,0
24	-9,6	-0,3	+5,4	+9,5	+12,9	+15,7	+18,2	+20,3	+22,2	+24,0
25	-8,8	+0,5	+6,3	+10,4	+13,8	+16,7	+19,2	+21,3	+23,2	+25,0
26	-8,0	+1,3	+7,1	+11,3	+14,8	+17,7	+20,2	+22,3	+24,2	+26,0
27	-7,3	+2,1	+7,9	+12,2	**+15,8**	+18,5	+21,0	+23,2	+25,2	+27,0
28	-6,5	+3,0	+8,7	+13,1	+16,7	+19,5	+22,0	+24,2	+26,2	+28,0
29	-5,7	+3,8	+9,6	+14,0	+17,5	+20,4	+23,0	+25,2	+27,2	+29,0
30	-5,0	+4,6	+10,5	+14,9	+18,4	+21,4	+24,0	+26,2	+28,2	+30,0

Example to design a system in standard conditions

Design, assembly and installation instructions
Cooling capacity correction factor

Correction factor C_K (logarithmical calculation)

ΔTm (K)	Exponent n										
	0,68	0,72	0,74	0,76	0,78	0,79	0,83	0,90	0,91	0,92	0,93
8	0,8610	0,8534	0,8497	0,8459	0,8422	0,8404	0,8330	0,8203	0,8185	0,8167	0,8149
9	0,9328	0,9290	0,9271	0,9252	0,9233	0,9223	0,9186	0,9120	0,9111	0,9101	0,9092
10	1,0020	1,0022	1,0022	1,0023	1,0023	1,0024	1,0025	1,0027	1,0027	1,0028	1,0028
11	1,0691	1,0734	1,0755	1,0776	1,0797	1,0808	1,0850	1,0925	1,0936	1,0947	1,0957
12	1,1343	1,1427	1,1470	1,1512	1,1555	1,1577	1,1663	1,1815	1,1837	1,1859	1,1881
13	1,1978	1,2105	1,2170	1,2235	1,2300	1,2332	1,2464	1,2698	1,2731	1,2765	1,2799
14	1,2597	1,2769	1,2856	1,2943	1,3032	1,3076	1,3255	1,3573	1,3620	1,3666	1,3712
15	1,3202	1,3419	1,3529	1,3640	1,3752	1,3808	1,4036	1,4443	1,4502	1,4561	1,4621
16	1,3794	1,4057	1,4191	1,4326	1,4462	1,4531	1,4808	1,5307	1,5379	1,5452	1,5525
17	1,4374	1,4685	1,4842	1,5001	1,5162	1,5244	1,5572	1,6165	1,6252	1,6339	1,6426
18	1,4944	1,5302	1,5483	1,5667	1,5854	1,5948	1,6329	1,7018	1,7119	1,7221	1,7323
19	1,5504	1,5909	1,6115	1,6325	1,6537	1,6644	1,7078	1,7867	1,7983	1,8099	1,8216
20	1,6054	1,6507	1,6739	1,6974	1,7212	1,7332	1,7821	1,8711	1,8842	1,8974	1,9106
21	1,6596	1,7098	1,7354	1,7615	1,7879	1,8013	1,8558	1,9551	1,9697	1,9845	1,9993
22	1,7129	1,7680	1,7962	1,8249	1,8540	1,8687	1,9288	2,0387	2,0549	2,0712	2,0877
23	1,7655	1,8255	1,8563	1,8876	1,9194	1,9355	2,0013	2,1219	2,1397	2,1577	2,1758
24	1,8173	1,8823	1,9157	1,9496	1,9842	2,0017	2,0733	2,2048	2,2242	2,2439	2,2637
25	1,8685	1,9385	1,9744	2,0111	2,0484	2,0673	2,1447	2,2873	2,3084	2,3297	2,3512
26	1,9190	1,9940	2,0326	2,0719	2,1120	2,1324	2,2157	2,3695	2,3923	2,4153	2,4386
27	1,9689	2,0489	2,0901	2,1322	2,1751	2,1969	2,2862	2,4513	2,4759	2,5007	2,5257

ΔTm (K)	Exponent n										
	0,94	0,95	0,97	1,00	1,02	1,04	1,05	1,06	1,10	1,12	1,19
8	0,8131	0,8113	0,8077	0,8024	0,7989	0,7954	0,7936	0,7919	0,7849	0,7815	0,7695
9	0,9083	0,9073	0,9055	0,9027	0,9009	0,8990	0,8981	0,8972	0,8935	0,8917	0,8853
10	1,0028	1,0029	1,0029	1,0030	1,0031	1,0031	1,0032	1,0032	1,0033	1,0034	1,0036
11	1,0968	1,0979	1,1001	1,1033	1,1055	1,1077	1,1087	1,1098	1,1142	1,1164	1,1241
12	1,1903	1,1925	1,1969	1,2036	1,2081	1,2126	1,2148	1,2171	1,2261	1,2307	1,2467
13	1,2833	1,2867	1,2936	1,3039	1,3109	1,3178	1,3213	1,3248	1,3390	1,3461	1,3713
14	1,3759	1,3806	1,3900	1,4042	1,4138	1,4234	1,4283	1,4331	1,4527	1,4626	1,4978
15	1,4681	1,4741	1,4862	1,5045	1,5169	1,5293	1,5356	1,5418	1,5672	1,5801	1,6259
16	1,5599	1,5673	1,5822	1,6048	1,6201	1,6355	1,6432	1,6510	1,6825	1,6985	1,7557
17	1,6514	1,6602	1,6780	1,7051	1,7234	1,7419	1,7512	1,7606	1,7986	1,8179	1,8871
18	1,7425	1,7529	1,7737	1,8054	1,8269	1,8486	1,8595	1,8706	1,9153	1,9381	2,0199
19	1,8334	1,8453	1,8692	1,9057	1,9305	1,9555	1,9682	1,9809	2,0327	2,0590	2,1541
20	1,9240	1,9374	1,9646	2,0060	2,0341	2,0627	2,0771	2,0916	2,1506	2,1808	2,2897
21	2,0142	2,0293	2,0598	2,1063	2,1379	2,1700	2,1863	2,2026	2,2692	2,3033	2,4266
22	2,1043	2,1210	2,1548	2,2066	2,2418	2,2776	2,2957	2,3139	2,3884	2,4265	2,5647
23	2,1941	2,2125	2,2498	2,3069	2,3458	2,3854	2,4054	2,4256	2,5080	2,5503	2,7040
24	2,2836	2,3038	2,3446	2,4072	2,4499	2,4933	2,5153	2,5375	2,6283	2,6748	2,8445
25	2,3730	2,3949	2,4393	2,5075	2,5541	2,6014	2,6255	2,6497	2,7490	2,8000	2,9861
26	2,4621	2,4858	2,5339	2,6078	2,6583	2,7098	2,7358	2,7622	2,8702	2,9257	3,1288
27	2,5510	2,5765	2,6284	2,7081	2,7626	2,8182	2,8464	2,8749	2,9918	3,0520	3,2725

Sizes and units of measurement

Description	Symbol	Unit of measurement
Metre	–	[m]
Millimetre	–	[mm]
Kilogram	–	[kg]
Degrees Celsius	–	[°C]
Kelvin	–	[K]
Joule	–	[J]
Second	–	[s]
Hour	–	[h]
Pascal, Kilopascal	–	[Pa, kPa]
Length, Height, Width	L, H, T	[mm]
Casing length	L_{Casing}	[mm]
Finned pack length	L_{Coil}	[mm]
Casing height	H_{Casing}	[mm]
Coil height	H_{Coil}	[mm]
Casing width	T_{Casing}	[mm]
Coil width	T_{Coil}	[mm]
Weight	M	[kg]
Inlet temperature - Outlet temperature	t_1, t_2	[°C]
Ambient air temperature	tr	[°C]
Average water temperature	t_m	[°C]
Flow rate	V	[m^3/h]
Speed	v	[m/s]
Pressure drop	Δp	[mbar]
Valve pressure drop	K_V	–
Adjustable valve pressure drop	K_{VS}	–
Operating, test pressure, air pressure	p	[bar/Pa]
Sound pressure	L_p	[dB(A)]
Sound power	L_W	[dB(A)]
Female thread	IG	–
Male thread	AG	–

Sizes and units of measurement relative to heating

Description	Symbol	Unit of measurement
Average temperature according to EN 442	$t_m = \frac{t_1 + t_2}{2}$	[°C]
DeltaTm	ΔT	[K]
DeltaTm normalised	ΔT_n = 49,83 K	[K]
Emission (Phi)	Φ	[W]
Nominal emission with 75 / 65 / 20°C (ΔT 50K) according to EN 442	Φ_S	[W]
Specific nominal emission	Φ_L	[W/m]
Specific thermal emission	c_p	[J/kgK]
Exponent	n	–
Correction coefficient	C_K	–
Water flow rate, nominal water flow rate according to EN 442	q_m	[kg/h]
Specific nominal water flow rate according to EN 442	q_{ms}	[kg/h m]

Sizes and units of measurement relative to cooling

Description	Symbol	Unit of measurement
Average temperature	$t_m = \frac{t_1 + t_2}{2}$	[°C]
DeltaTm	ΔT	[K]
Nominal DeltaTm	ΔT_n = 9,97 K	[K]
Total emission	P_K	[W]
Nominal total emission	P_{KN}	[W]
Sensible emission	P_S	[W]
Nominal sensible emission	P_{SN}	[W]
Specific thermal capacity	c_p	[J/kgK]
Exponent	n	–
Correction coefficient	C_K	–
Water flow rate, nominal water flow rate according to EN 442	q_m	[kg/h]
Specific nominal water flow rate according to EN 442	q_{ms}	[kg/h m]
Relative humidity	φ	[%]

Assembly and installation advice

Preliminary warnings

Technical information

The technical information refers to the standard version of the products, with the reservation of usual variations and tolerances for the sector.

Operating conditions

- Suitable for use in heating systems with hot water according to standards DIN 18380 and water quality pursuant to directive VDI 2035.
- Sabiana recessed floor trench convectors are not suitable to be used in steam heating systems.

CCP-ECM 2T / CCP-ECM 4T		
Operating features	**Standard version**	**High pressure version**
Operating pressure [bar (kPa)]	10,0 (1000)	16,0 (1600)
Test pressure [bar (kPa)]	13,0 (1300)	20,8 (2080)
Maximum temperature [°C]	90	90

If there is no indication regarding operating pressure, the standard version is supplied.

Water quality

The operational requirements of the directive VDI 2035 regarding water quality and the assembly directives in use in the industry must be complied with.

Warranty obligations, agreed based on our General Sales, Supply and Payment Terms and Conditions, become null and void in case of:

- emptying the plant periodically or for long periods;
- operating with steam;
- introducing additives to the water of the heating system (e.g. chemical substances, antifreeze) with aggressive action on copper and gaskets;
- excess sedimentation inside the trench convectors;
- periodical or constant infiltration of oxygen into the system (e.g. through non-hermetic pipes);
- non-hermetic heating system.
- system not protected against freezing.

Special versions with drawing

If necessary, the customer is presented with a drawing with the dimensions of the special version, to be checked and approved. The order will be fulfilled when the approved drawings are returned. Should the order be cancelled, the customer must reimburse any expenses sustained and services provided up until that moment.

Painting

Powder painting (complete) in all RAL tones according to the customer's specifications, possibility making chromatic changes normally accepted in the industry.

Only use original RAL samples to make sure the colour is compatible.

For technical production purposes, slight chromatic variations between the coats can be detected, even based on different lighting conditions. Deformities can also be detected by comparing the painting of surfaces and ceramic products. For technical printing purposes, the colours represented could be slightly different than the real colours.

Floor ducts and aluminium grids are painted in compliance with standard DIN 55900. Therefore they must be transported with the utmost caution and protected from any risk of damage in the worksite.

Assembly and installation instructions

Supply features

- Height adjustable, external and acoustically decoupled (pre-assembled) devices.
- For ***CCP–ECM 2T*** and ***CCP–ECM 4T*** aluminium roll-up grid (on demand, it also be supplied at the end of the installation phase).
- Rubber elements for acoustic decoupling.
- Assembly cover and perimeter listel protection (come such as protections during installation).

Design indications

- To compensate the diffusion of cold air through windows with large surfaces, the trench convectors must be installed in the floor along the entire length of the windows.
- Due to thermal conditions, the screed and floor could compress the casing of the recessed floor trench convectors. Appropriate expansion joints must be provided to avoid this problem.
- A duct must be installed when using electric lines or thermostatic head with a remote sensor.
- The assembly cover supplied is to protect the trench convectors while being installed and must be replaced with the linear or roll-up grid when assembly has finished. The assembly cover can bear limited loads and must not be used to support scaffolding, cables, etc.
- The trench convector must always be easily accessible to be able to perform maintenance.

Assembly indications

Positioning and alignment

- Before starting assembly, remove the film and packaging of the trench convector. If a cover grid has also been supplied, keep it in a safe place until the assembly operations are over.
- Bring the trench convector in place and align it using external adjustment devices. They can be positioned correctly using a screwdriver.
- Fasten the casing to the floor with the assembly wedges.
- If needed, apply insulating material underneath and to the sides of the duct.

Connecting the trench convector to the floor

- The water connection must normally be made on the front or ambient side, through the specific openings for passage of the pipes (on demand, possibility of different connection solutions).
- Fasten with screws and connect the pipes.
- To keep floor material from invading the casing, seal the openings with suitable material (e.g. membrane from Accessories catalogue).
- Bleed air from the coil through the specific vents.
- Perform a pressurised test.
- Cover the trench convector with the supplied assembly cover.
- If using components of other manufacturers (e.g. connection kit, actuators etc.) not included in the Sabiana accessories catalogue, pay attention to the overall dimensions.

Intended use

CCP–ECM 2T and ***CCP–ECM 4T*** trench convectors are only intended for indoor use (e.g. verandas, residential rooms, exhibition halls, etc.). The trench convectors cannot be used in swimming pools, moist rooms or outdoors. If in doubt, consult the manufacturer. Any other use is considered nonconforming to the intended use.

Safety warnings

- Electrical interventions can only be carried out by an authorised electrician. The electrical connections must be made respecting VDE requirements and EVU directives in force.
- To install the ***CCP–ECM 2T*** and ***CCP–ECM 4T*** trench convectors, an appropriate residual current device (RCD) / circuit breaker switch FI (less than 30 mA) must be used.
- It is recommended to implement an electric line exclusively for the trench convectors.
- Failure to comply with the requirements and directives can lead to functional failures with relative harmful consequences and place personal safety in danger. RISK OF DEATH in case of accidental exchange of cables or incorrect electrical connection!
- Carefully read the safety warnings in the installation manual as well.

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CERTIFICATO n. 0545/6
CERTIFICATE No.

SI CERTIFICA CHE IL SISTEMA DI GESTIONE PER LA QUALITA' DI
WE HEREBY CERTIFY THAT THE QUALITY MANAGEMENT SYSTEM OPERATED BY

SABIANA S.p.A.

Sede e Unità Operativa
Via Piave, 53 - 20011 Corbetta (MI)
Direzione e uffici amministrativi, progettazione, assistenza, produzione di apparecchiature per il riscaldamento e il condizionamento dell'aria (aerotermi, termostrisce radianti, unità trattamento aria) e canne fumarie
Unità Operativa
Via Virgilio, 2 - 20013 Magenta (MI)
Produzione di ventilconvettori, magazzino e logistica
Italia

E' CONFORME ALLA NORMA
IS IN COMPLIANCE WITH THE STANDARD

UNI EN ISO 9001:2008

PER LE SEGUENTI ATTIVITA'
FOR THE FOLLOWING ACTIVITIES

EA: 18

Progettazione, produzione e assistenza di apparecchiature per il riscaldamento e il condizionamento dell'aria (aerotermi, termostrisce radianti, ventilconvettori e unità trattamento aria) e canne fumarie.

Design, production and service of heating and air conditioning equipment (unit heaters, radiant panels, fan coil units and air handling units) and chimneys.

Riferirsi al Manuale della Qualità per l'applicabilità dei requisiti della norma di riferimento.
Refer to Quality Manual for details of application to reference standard requirements.

Il presente certificato è soggetto al rispetto del regolamento per la certificazione dei sistemi di gestione per la qualità delle aziende.
The use and the validity of this certificate shall satisfy the requirements of the rules for the certification of company quality management systems.

Data emissione	Emissione corrente	Data di scadenza
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Heating / Air Conditioning

Carisma **Floor CCP–ECM** Trench Convectors

CCP-ECM - 09/15 B/09/15
Cod. A4650100

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