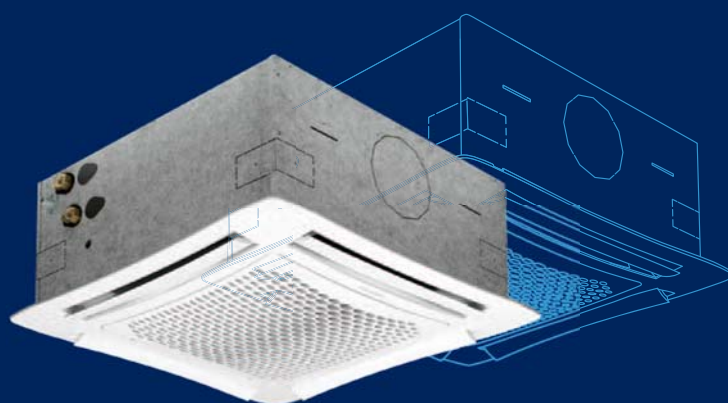




NEW
Control board
with **Modbus**
communication protocol



Air Conditioning
SkyStar
SkyStar ECM
Cassette Fan Coil Units



SABIANA
IL CLIMA AMICO

A leading brand of  **AFG**



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Sabiana take part to the Eurovent program of fan coil performance certification.

The official figures are published in the web site

www.eurovent-certification.com and in the web site www.certiflash.com.

The tested performances are:

- Cooling total emission at the following conditions:
 - Water temperature +7°C E.W.T. +12°C L.W.T.
 - Entering air temperature +27°C dry bulb +19°C wet bulb
- Heating emission (2 pipe units) at the following conditions:
 - Entering water temperature +50°C
 - Entering air temperature +20°C
 - Water flow rate as for the cooling conditions
- Cooling sensible emission at the following conditions:
 - Water temperature +7°C E.W.T. +12°C L.W.T.
 - Entering air temperature +27°C dry bulb +19°C wet bulb
- Heating emission (4 pipe units) at the following conditions:
 - Water temperature +70°C E.W.T. +60°C L.W.T.
 - Entering air temperature +20°C

• Fan absorption

• Water pressure drop

• Sound power

Innovating and beautiful design, seven different sizes, high control flexibility, easy maintenance: the new SkyStar chilled water cassette is the result of an extended technical and design development aimed at achieving the highest level in terms of performance, silent operation and control possibilities.

The air diffuser has an highly attractive aesthetical appearance, very innovative, and is also able to offer the best air distribution performance thanks to long computer studies and laboratory tests. The standard colour is RAL 9003, other colours available on request.

The 4 smaller sizes are designed to fit into 600x600 mm false ceiling standard modules. The 3 bigger sizes have a dimension of 800x800 mm which allows the best outcome in terms of quietness and of price/performance ratio for these high capacity models.

Every unit can be supplied with 1 battery (2 pipe system) and a possible electric heater or with 2 batteries (4 pipe system). Each model can have fresh air intake and a remote air diffuser can be connected to the unit.

The condensate pump is integral with the unit, is very quiet and has a maximum head of 650 mm.

In addition to temperature and speed standard controls, automatic speed selection is also available. More than one unit can be connected to a single control, and the unit control panel can be installed in a remote position that facilitates the maintenance operation. All the SkyStar units can be supplied in MB version. This version allows a wide range of controls, including the infra-red remote control, which can manage one single unit or several units by using the Modbus RTU - RS 485 communication protocol.

The units can be connected to the most common automatic building management systems.

It is also possible to use a completely wireless electronic control system based on radio communication called Free Sabiana, with great advantages in terms of installation flexibility and maximum precision in measuring room temperature.

Finally, each unit can be equipped with a low energy consumption electric motor that is controlled by an inverter card that makes possible continuous air flow variations.



INTAKE GRID AND DISTRIBUTION OF THE AIR

Intake grids, frame and adjustable air distribution louvers on each side, made from ABS.

HTA version : white ABS, RAL 9003

HTB version : with intake grid, frame and louvers, choice of one colour only

HTC version : with intake grid and louvers, choice of one colour, plus white ABS frame RAL 9003

HTD version : with louvers, choice of one colour, while the grid and frame are made from ABS, RAL 9003

MD-600 version : metal diffuser painted in RAL 9003 white colour with 600x600 dimension to perfectly fit into the false ceiling standard modules without overlapping parts (800x800 model is not available).

CASING

Is made from galvanized steel with internal thermal insulation with polyolefin (PO) foam (class M1) and external anti-condensate lining.

CONTROL PANEL

Made of an external box with the control electronic board with an easily accessible terminal board.

FAN ASSEMBLY

The fan assembly, which is mounted on anti-vibrating supports, is extremely silent.

The radial fan has been designed to optimise performance, using wing profile blades with a shape that reduces turbulence, increasing efficiency and reducing noise.

The single air inlet radial fan is connected to a 6 speed electric motor with single phase 230V/50Hz supply, class B insulation and integrated Klixon thermal contact for motor protection.

The units are supplied with 3 standard speeds connected and it is possible to change them on site if necessary.

COIL

Made of copper tubes with bonded aluminium fins for maximum transfer contact.

The coil have 1, 2 or 3 rows for 2 pipe models and 2+1 rows for 4 pipe models (the heating row is on the inside part of the coil).

For 4 pipe systems two versions are available:

SK 04, SK 14, SK 24, SK 34, SK 44, SK 54, SK 64 supply an higher heating emission;

SK 26, SK 36, SK 56, SK 66 supply an higher cooling emission.

The heat exchanger is not suitable for use in corrosive atmosphere or in environments where aluminium may be subject to corrosion.

CONDENSATE COLLECTION TRAY

High density ABS polystyrene foam condensate tray, shaped in order to optimize the air diffusion, fire retardant rating B1 to DIN 4102.

AIR FILTER

Synthetic washable filter, easily removable.

CONDENSATE PUMP

Float switch centrifugal pump with 650 mm of maximum head, integral to the unit and wired to the control panel on the outside of the casing.

VALVE SET

Two or three way valves for ON/OFF operation, with pipe mounting kit and thermostatic actuator.

Technical features

www.eurovent-certification.com
www.certiflash.com

2 pipe units. The following standard rating conditions are used:

COOLING

Entering air temperature: + 27°C d.b., + 19°C w.b.

Water temperature: + 7/12°C

HEATING

Entering air temperature: + 20°C

Water temperature: + 50°C

water flow rate as for the cooling conditions

MODEL		SK 02			SK 12			SK 22			SK 32			SK 42			SK 52			SK 62		
Speed		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Air flow	m³/h	310	420	610	310	420	520	320	500	710	430	610	880	630	820	1140	710	970	1500	710	1280	1820
Cooling total emission (E)	kW	1,27	1,63	1,98	1,84	2,34	2,68	2,25	3,34	4,33	2,94	3,88	5,02	4,21	4,91	6,16	5,31	6,78	9,51	5,31	8,45	11,10
Cooling sensible emission (E)	kW	1,01	1,32	1,64	1,35	1,75	2,04	1,57	2,39	3,18	2,08	2,81	3,74	3,03	3,58	4,59	3,46	4,48	6,48	3,71	6,09	8,25
Heating (E)	kW	1,62	2,12	2,64	2,22	2,90	3,35	2,56	3,93	5,23	3,43	4,63	6,17	5,12	6,03	7,77	5,61	7,34	10,71	6,13	10,30	14,00
Water flow	l/h	219	280	340	316	402	461	387	574	745	506	667	863	724	845	1060	913	1166	1636	913	1453	1909
ΔP Cooling (E)	kPa	4,5	7,0	10,0	4,9	7,6	9,7	4,6	9,4	15,1	7,5	12,4	19,7	10,9	14,3	21,6	9,4	14,7	26,9	9,4	21,8	35,6
ΔP Heating (E)	kPa	4,0	6,0	9,0	4,1	6,3	8,2	3,5	7,3	11,4	6,7	11,2	17,7	6,7	9,9	15,1	7,9	12,4	23,0	7,9	18,6	30,6
Sound power Lw (E)	dB(A)	33	40	49	33	40	45	33	45	53	41	49	59	33	40	48	34	40	53	34	48	58
Sound pressure Lp (*)	dB(A)	24	31	40	24	31	36	24	36	44	32	40	50	24	31	39	25	31	44	25	39	49
Fan (E)	W	25	32	57	25	32	44	25	44	68	32	57	90	33	48	77	42	63	120	42	95	170
	A	0,11	0,15	0,27	0,11	0,15	0,20	0,11	0,20	0,32	0,15	0,27	0,45	0,15	0,23	0,36	0,18	0,28	0,53	0,18	0,42	0,74
Water content	l	0,8			1,4			2,1			2,1			3,0			4,0			4,0		
Dimensions	mm	575 x 575 x 275												820 x 820 x 303								

4 pipe units. The following standard rating conditions are used:

COOLING

Entering air temperature: + 27°C d.b., + 19°C w.b.

Water temperature: + 7/12°C

HEATING

Entering air temperature: + 20°C

Water temperature: + 70/60°C

MODEL		SK 04			SK 14			SK 24			SK 26			SK 34			SK 36		
Speed		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Air flow	m³/h	310	420	610	310	420	520	320	500	710	320	500	710	430	610	880	430	610	880
Cooling total emission (E)	kW	1,51	1,96	2,33	1,85	2,36	2,70	1,85	2,65	3,34	2,09	3,06	3,93	2,36	3,02	3,81	2,72	3,53	4,53
Cooling sensible emission (E)	kW	1,15	1,55	1,90	1,34	1,71	1,98	1,34	1,98	2,56	1,49	2,24	2,95	1,75	2,29	2,97	1,97	2,62	3,46
Water flow	l/h	260	337	401	318	406	464	318	456	574	359	526	676	406	519	655	468	607	779
ΔP Cooling (E)	kPa	6,0	10,0	13,5	4,6	6,9	8,8	4,6	8,8	13,4	4,0	7,0	10,5	7,2	11,2	17,0	6,0	9,0	14,0
Heating (E)	kW	1,96	2,54	3,03	2,43	3,02	3,46	2,43	3,46	4,40	1,98	2,71	3,35	3,10	3,97	4,95	2,46	3,06	3,79
Water flow	l/h	169	219	261	209	260	298	209	298	378	170	233	288	267	341	426	212	263	326
ΔP Heating (E)	kPa	6,5	10,5	14,5	5,7	8,5	10,8	5,7	10,8	16,6	3,6	6,0	9,0	8,8	13,8	20,5	5,0	7,8	11,0
Sound power Lw (E)	dB(A)	33	40	49	33	40	45	33	45	53	33	45	53	41	49	59	41	49	59
Sound pressure Lp (★)	dB(A)	24	31	40	24	31	36	24	36	44	24	36	44	32	40	50	32	40	50
Fan (E)	W	25	32	57	25	32	44	25	44	68	25	44	68	32	57	90	32	57	90
	A	0,11	0,15	0,27	0,11	0,15	0,20	0,11	0,20	0,32	0,11	0,20	0,32	0,15	0,27	0,45	0,15	0,27	0,45
Cooling water content	l	1,0			1,4			1,4			1,7			1,4			1,7		
Heating water content	l	0,6			0,7			0,7			0,5			0,7			0,5		
Dimensions	mm	575 x 575 x 275																	

MODEL		SK 44			SK 54			SK 56			SK 64			SK 66		
Speed		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Air flow	m³/h	630	820	1140	710	970	1500	710	970	1500	710	1280	1820	710	1280	1820
Cooling total emission (E)	kW	4,14	5,03	6,34	4,52	5,66	7,71	4,99	6,33	8,77	4,52	6,93	8,89	4,99	7,84	10,20
Cooling sensible emission (E)	kW	2,96	3,65	4,69	3,25	4,15	5,83	3,53	4,55	6,49	3,25	5,18	6,84	3,53	5,73	7,68
Water flow	l/h	712	865	1090	777	974	1326	858	1089	1508	777	1192	1529	858	1348	1754
ΔP Cooling (E)	kPa	8,8	12,5	18,9	10,3	15,4	26,9	9,0	14,0	25,0	10,3	22,1	34,7	9,0	20,0	32,0
Heating (E)	kW	5,91	7,19	9,10	6,45	8,10	11,00	5,23	6,42	8,56	6,45	9,98	12,70	5,23	7,74	9,80
Water flow	l/h	508	618	783	555	697	946	450	552	736	555	858	1092	450	666	843
ΔP Heating (E)	kPa	9,8	14,0	21,4	11,5	17,4	29,9	6,5	9,2	15,3	11,5	25,3	38,8	6,5	13,0	19,5
Sound power Lw (E)	dB(A)	33	40	48	34	40	53	34	40	53	34	48	58	34	48	58
Sound pressure Lp (★)	dB(A)	24	31	39	25	31	44	25	31	44	25	39	49	25	39	49
Fan (E)	W	33	48	77	42	63	120	42	63	120	42	95	170	42	95	170
	A	0,15	0,23	0,36	0,18	0,28	0,53	0,18	0,28	0,53	0,18	0,42	0,74	0,18	0,42	0,74
Cooling water content	l	3,0			3,0			3,6			3,0			3,6		
Heating water content	l	1,4			1,4			1,1			1,4			1,1		
Dimensions	mm	820 x 820 x 303														

Condensate pump absorption: 10 W

(E) = Eurovent certified performance.

(*) = 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.

Cooling emission of 1 battery units (2 pipe installation)

Entering air temperature: +27°C d.b. +19°C w.b.

Model	Speed	Air flow	EWT 5 - LWT 10°C			EWT 7 - LWT 12°C			EWT 9 - LWT 14°C			EWT 12 - LWT 17°C		
			Water flow	Total emission	Sensible emission	Water flow	Total emission	Sensible emission	Water flow	Total emission	Sensible emission	Water flow	Total emission	Sensible emission
		m³/h	l/h	kW	kW	l/h	kW	kW	l/h	kW	kW	l/h	kW	kW
SK 02	High	610	421	2,45	1,83	340	1,98	1,64	254	1,47	1,45	199	1,16	1,16
	Med	420	346	2,01	1,48	280	1,63	1,32	210	1,22	1,16	160	0,93	0,93
	Low	310	269	1,57	1,14	219	1,27	1,01	165	0,96	0,89	123	0,71	0,71
SK 12	High	520	554	3,22	2,22	462	2,68	2,04	362	2,10	1,75	252	1,47	1,47
	Med	420	482	2,80	1,91	403	2,34	1,75	317	1,84	1,50	220	1,28	1,28
	Low	310	417	2,42	1,64	317	1,84	1,35	276	1,61	1,29	188	1,09	1,09
SK 22	High	710	926	5,38	3,64	745	4,33	3,18	617	3,59	2,87	420	2,44	2,44
	Med	500	715	4,15	2,77	575	3,34	2,39	483	2,81	2,18	319	1,86	1,86
	Low	320	508	2,95	1,94	387	2,25	1,57	349	2,03	1,53	225	1,31	1,31
SK 32	High	880	1049	6,10	4,17	863	5,02	3,74	694	4,03	3,29	479	2,79	2,79
	Med	610	835	4,85	3,26	667	3,88	2,81	559	3,25	2,57	376	2,19	2,19
	Low	430	633	3,68	2,44	506	2,94	2,08	430	2,50	1,92	283	1,65	1,65
SK 42	High	1140	1264	7,35	5,00	1060	6,16	4,59	840	4,88	3,95	573	3,33	3,33
	Med	820	1003	5,83	3,92	845	4,91	3,58	674	3,92	3,09	453	2,63	2,63
	Low	630	858	4,99	3,32	722	4,21	3,03	580	3,37	2,62	384	2,23	2,23
SK 52	High	1500	1943	11,30	7,59	1635	9,51	6,48	1301	7,57	5,99	880	5,12	5,12
	Med	970	1374	7,99	5,27	1166	6,78	4,48	939	5,46	4,15	612	3,56	3,56
	Low	710	1070	6,22	4,06	913	5,31	3,46	740	4,30	3,20	434	2,52	2,52
SK 62	High	1820	2277	13,24	9,01	1909	11,10	8,25	1511	8,78	7,11	1044	6,07	6,07
	Med	1280	1722	10,01	6,68	1454	8,45	6,09	1162	6,75	5,27	775	4,51	4,51
	Low	710	1070	6,22	4,06	913	5,31	3,71	740	4,30	3,20	434	2,52	2,52

Heating emission of 1 battery units (2 pipe installation)

Entering air temperature: +20°C

Model	Speed	Air flow	EWT 45 - LWT 40°C		EWT 50 - LWT 40°C		EWT 60 - LWT 50°C		EWT 70 - LWT 60°C		EWT 80 - LWT 70°C	
			Water flow	Emission	Water flow	Emission	Water flow	Emission	Water flow	Emission	Water flow	Emission
		m³/h	l/h	kW	l/h	kW	l/h	kW	l/h	kW	l/h	kW
SK 02	High	610	386	2,24	203	2,37	298	3,46	393	4,56	488	5,67
	Med	420	310	1,80	164	1,91	239	2,78	315	3,66	391	4,55
	Low	310	237	1,38	126	1,46	183	2,13	240	2,80	298	3,47
SK 12	High	520	482	2,80	266	3,10	377	4,39	488	5,68	599	6,97
	Med	420	417	2,42	232	2,69	327	3,80	422	4,91	513	5,96
	Low	310	356	2,07	198	2,31	279	3,25	360	4,19	441	5,12
SK 22	High	710	787	4,57	440	5,12	619	7,19	795	9,25	972	11,30
	Med	500	593	3,45	334	3,89	467	5,43	598	6,96	730	8,48
	Low	320	412	2,39	235	2,73	326	3,79	415	4,83	505	5,87
SK 32	High	880	903	5,25	504	5,86	709	8,25	914	10,63	1118	13,00
	Med	610	702	4,08	394	4,58	552	6,42	709	8,25	866	10,07
	Low	430	520	3,02	294	3,42	410	4,77	524	6,10	639	7,43
SK 42	High	1140	1118	6,50	624	7,26	878	10,21	1130	13,14	1383	16,08
	Med	820	865	5,03	486	5,65	681	7,92	874	10,16	1067	12,41
	Low	630	734	4,27	415	4,82	578	6,72	741	8,61	903	10,50
SK 52	High	1500	1683	9,78	951	11,06	1327	15,43	1699	19,76	2071	24,08
	Med	970	1146	6,67	655	7,62	906	10,54	1155	13,43	1403	16,32
	Low	710	876	5,09	505	5,87	694	8,07	882	10,25	1068	12,42
SK 62	High	1820	2015	11,72	1132	13,17	1586	18,45	2037	23,68	2486	28,91
	Med	1280	1471	8,55	834	9,70	1161	13,50	1484	17,26	1807	21,01
	Low	710	876	5,09	505	5,87	694	8,07	882	10,25	1068	12,42

Emission correction factors for different working conditions.

Multiply the factors by the emission figures in the 7-12°C table above.

Total emission				
Water (°C)	Air (°C)	25-18	26-18.5	28-20
7/12 °C	K	0,82	0,89	1,11
10/15 °C	K	0,56	0,63	0,82
14/18 °C	K	0,35	0,41	0,52

Sensible emission				
Water (°C)	Air (°C)	25-18	26-18.5	28-20
7/12 °C	K	0,9	0,94	1,06
10/15 °C	K	0,72	0,78	0,9
14/18 °C	K	0,5	0,58	0,72

Note:

the correction factors are indicative, as they are average values.

Emission of 4 pipe units with standard cooling battery

Cooling emission of 2 battery units (4 pipe installation)

Entering air temperature: +27°C d.b. +19°C w.b.

Model	Speed	Air flow	EWT 5 - LWT 10°C			EWT 7 - LWT 12°C			EWT 9 - LWT 14°C			EWT 12 - LWT 17°C		
			Water flow	Total emission	Sensible emission	Water flow	Total emission	Sensible emission	Water flow	Total emission	Sensible emission	Water flow	Total emission	Sensible emission
		m³/h	l/h	kW	kW	l/h	kW	kW	l/h	kW	kW	l/h	kW	kW
SK 04	High	610	490	2,85	2,12	401	2,33	1,90	307	1,78	1,69	239	1,39	1,39
	Med	420	410	2,38	1,73	337	1,96	1,55	260	1,51	1,37	196	1,14	1,14
	Low	310	314	1,82	1,29	260	1,51	1,15	201	1,17	1,02	148	0,86	0,86
SK 14	High	520	569	3,31	2,26	465	2,70	1,98	374	2,18	1,79	260	1,51	1,51
	Med	420	465	2,71	1,83	405	2,36	1,70	309	1,80	1,44	210	1,22	1,22
	Low	310	398	2,31	1,55	318	1,85	1,34	267	1,55	1,22	177	1,03	1,03
SK 24	High	710	718	4,18	2,91	574	3,34	2,56	467	2,72	2,30	330	1,92	1,92
	Med	500	569	3,31	2,26	455	2,65	1,98	374	2,18	1,79	260	1,51	1,51
	Low	320	398	2,31	1,55	318	1,85	1,34	267	1,55	1,22	177	1,03	1,03
SK 34	High	880	791	4,60	3,23	656	3,81	2,97	512	2,98	2,56	366	2,13	2,13
	Med	610	632	3,67	2,53	520	3,02	2,29	413	2,40	2,00	288	1,67	1,67
	Low	430	510	2,97	2,01	405	2,36	1,75	337	1,96	1,59	231	1,35	1,35
SK 44	High	1140	1299	7,55	5,12	1090	6,34	4,69	864	5,02	4,04	586	3,41	3,41
	Med	820	1027	5,97	4,00	866	5,03	3,65	691	4,02	3,15	462	2,68	2,68
	Low	630	842	4,89	3,24	713	4,14	2,96	572	3,33	2,56	374	2,17	2,17
SK 54	High	1500	1588	9,23	6,35	1327	7,71	5,83	1046	6,08	5,02	726	4,22	4,22
	Med	970	1158	6,73	4,53	974	5,66	4,15	775	4,50	3,57	524	3,05	3,05
	Low	710	920	5,35	3,56	778	4,52	3,25	623	3,62	2,81	411	2,39	2,39
SK 64	High	1820	1836	10,67	7,43	1529	8,89	6,84	1199	6,97	5,98	849	4,94	4,94
	Med	1280	1423	8,27	5,64	1191	6,93	5,18	942	5,48	4,46	646	3,75	3,75
	Low	710	920	5,35	3,56	778	4,52	3,25	623	3,62	2,81	411	2,39	2,39

Heating emission of 2 battery units (4 pipe installation)

Entering air temperature: +20°C

Model	Speed	Air flow	EWT 45 - LWT 40°C		EWT 50 - LWT 40°C		EWT 60 - LWT 50°C		EWT 70 - LWT 60°C		EWT 80 - LWT 70°C	
			Water flow	Emission	Water flow	Emission	Water flow	Emission	Water flow	Emission	Water flow	Emission
		m³/h	l/h	kW	l/h	kW	l/h	kW	l/h	kW	l/h	kW
SK 04	High	610	256	1,49	134	1,56	197	2,29	261	3,03	325	3,78
	Med	420	215	1,25	113	1,31	166	1,93	219	2,54	272	3,17
	Low	310	166	0,96	87	1,01	128	1,49	169	1,96	210	2,44
SK 14	High	520	283	1,65	149	1,73	218	2,54	298	3,46	358	4,17
	Med	420	247	1,44	130	1,51	191	2,22	260	3,02	312	3,63
	Low	310	196	1,14	103	1,20	151	1,76	209	2,43	247	2,87
SK 24	High	710	351	2,04	184	2,14	270	3,14	378	4,40	444	5,17
	Med	500	277	1,61	146	1,69	214	2,48	298	3,46	350	4,07
	Low	320	196	1,14	103	1,20	151	1,76	209	2,43	247	2,87
SK 34	High	880	402	2,34	211	2,45	310	3,60	426	4,95	510	5,93
	Med	610	317	1,84	166	1,94	244	2,84	341	3,97	401	4,67
	Low	430	247	1,44	130	1,51	191	2,22	267	3,10	312	3,63
SK 44	High	1140	771	4,48	410	4,76	596	6,93	783	9,10	970	11,28
	Med	820	609	3,54	324	3,77	471	5,48	618	7,19	766	8,90
	Low	630	501	2,91	267	3,11	388	4,51	508	5,91	629	7,31
SK 54	High	1500	929	5,40	493	5,73	718	8,34	946	11,00	1170	13,60
	Med	970	686	3,99	365	4,25	531	6,17	697	8,10	864	10,04
	Low	710	547	3,18	291	3,39	423	4,92	555	6,45	686	7,98
SK 64	High	1820	1074	6,24	569	6,61	829	9,64	1092	12,70	1353	15,74
	Med	1280	845	4,91	449	5,22	653	7,60	858	9,98	1064	12,37
	Low	710	547	3,18	291	3,39	423	4,92	555	6,45	686	7,98

Emission correction factors for different working conditions.

Multiply the factors by the emission figures in the 7-12°C table above.

Total emission				
Water (°C)	Air (°C)	25-18	26-18.5	28-20
7/12 °C	K	0,82	0,89	1,11
10/15 °C	K	0,56	0,63	0,82
14/18 °C	K	0,35	0,41	0,52

Sensible emission				
Water (°C)	Air (°C)	25-18	26-18.5	28-20
7/12 °C	K	0,9	0,94	1,06
10/15 °C	K	0,72	0,78	0,9
14/18 °C	K	0,5	0,58	0,72

Note:

the correction factors are indicative, as they are average values.

Cooling emission of 2 battery units (4 pipe installation)

Entering air temperature: +27°C d.b. +19°C w.b.

Model	Speed	Air flow	EWT 5 - LWT 10°C			EWT 7 - LWT 12°C			EWT 9 - LWT 14°C			EWT 12 - LWT 17°C		
			Water flow	Total emission	Sensible emission	Water flow	Total emission	Sensible emission	Water flow	Total emission	Sensible emission	Water flow	Total emission	Sensible emission
		m³/h	l/h	kW	kW	l/h	kW	kW	l/h	kW	kW	l/h	kW	kW
SK 26	High	710	812	4,72	3,29	676	3,93	2,95	528	3,07	2,60	378	2,20	2,20
	Med	500	629	3,66	2,51	526	3,06	2,24	415	2,41	1,97	288	1,67	1,67
	Low	320	425	2,47	1,66	359	2,09	1,49	287	1,67	1,31	192	1,12	1,12
SK 36	High	880	940	5,46	3,86	779	4,53	3,46	606	3,52	3,05	442	2,57	2,57
	Med	610	729	4,24	2,93	607	3,53	2,62	477	2,77	2,31	337	1,96	1,96
	Low	430	557	3,24	2,21	468	2,72	1,97	370	2,15	1,73	256	1,49	1,49
SK 56	High	1500	1804	10,49	7,25	1508	8,77	6,49	1189	6,91	5,72	836	4,86	4,86
	Med	970	1291	7,50	5,08	1089	6,33	4,55	867	5,04	4,00	587	3,41	3,41
	Low	710	1012	5,89	3,94	858	4,99	3,53	689	4,00	3,10	459	2,67	2,67
SK 66	High	1820	2105	12,24	8,57	1754	10,20	7,68	1375	7,99	6,77	987	5,74	5,74
	Med	1280	1607	9,34	6,41	1348	7,84	5,73	1066	6,20	5,05	739	4,30	4,30
	Low	710	1012	5,89	3,94	858	4,99	3,53	689	4,00	3,10	459	2,67	2,67

Heating emission of 2 battery units (4 pipe installation)

Entering air temperature: +20°C

Model	Speed	Air flow	EWT 45 - LWT 40°C		EWT 50 - LWT 40°C		EWT 60 - LWT 50°C		EWT 70 - LWT 60°C		EWT 80 - LWT 70°C	
			Water flow	Emission	Water flow	Emission	Water flow	Emission	Water flow	Emission	Water flow	Emission
		m³/h	l/h	kW	l/h	kW	l/h	kW	l/h	kW	l/h	kW
SK 26	High	710	279	1,62	139	1,61	213	2,48	288	3,35	363	4,22
	Med	500	226	1,32	113	1,32	173	2,01	233	2,71	294	3,42
	Low	320	165	0,96	83	0,97	127	1,47	170	1,98	214	2,49
SK 36	High	880	315	1,83	156	1,82	241	2,80	326	3,79	411	4,78
	Med	610	255	1,48	127	1,48	195	2,27	263	3,06	332	3,86
	Low	430	205	1,19	103	1,20	157	1,83	212	2,46	266	3,10
SK 56	High	1500	720	4,18	493	4,33	554	6,44	736	8,56	919	10,69
	Med	970	541	3,14	365	3,27	416	4,84	552	6,42	689	8,01
	Low	710	441	2,56	291	2,67	340	3,95	450	5,23	561	6,52
SK 66	High	1820	824	4,79	569	6,61	633	7,36	843	9,80	1053	12,24
	Med	1280	651	3,79	449	5,22	501	5,83	666	7,74	831	9,66
	Low	710	441	2,56	291	3,39	340	3,95	450	5,23	561	6,52

Emission correction factors for different working conditions.

Multiply the factors by the emission figures in the 7-12°C table above.

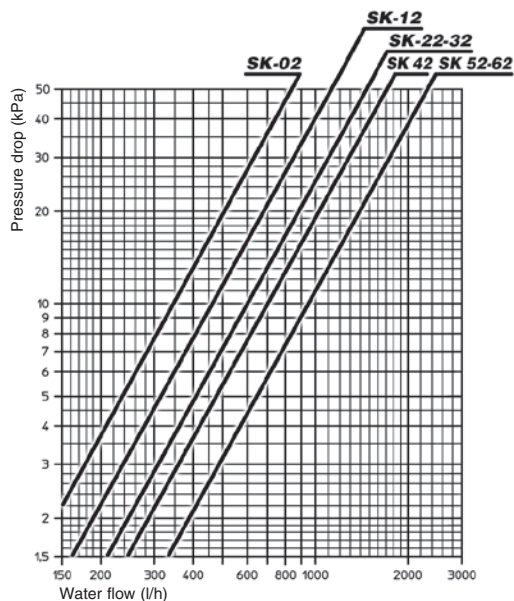
Total emission				
Water (°C)	Air (°C)	25-18	26-18.5	28-20
7/12 °C	K	0,82	0,89	1,11
10/15 °C	K	0,56	0,63	0,82
14/18 °C	K	0,35	0,41	0,52

Sensible emission				
Water (°C)	Air (°C)	25-18	26-18.5	28-20
7/12 °C	K	0,9	0,94	1,06
10/15 °C	K	0,72	0,78	0,9
14/18 °C	K	0,5	0,58	0,72

Note:

the correction factors are indicative, as they are average values.

2 pipe installation

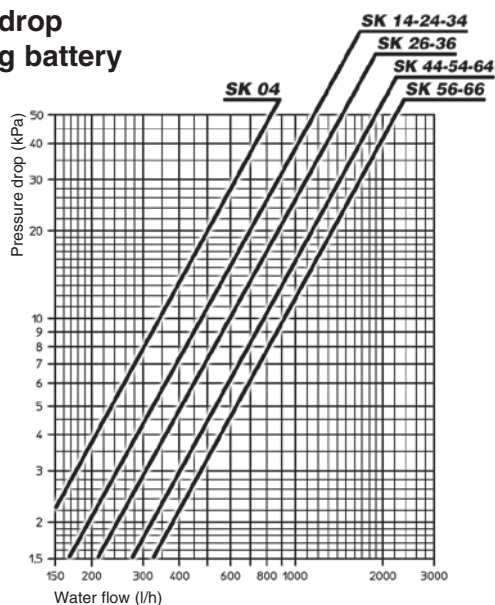


Pressure drop
for mean water temperature of 10°C,
for different temperatures multiply the pressure drop figure
by the K correction factors in the table.

°C	20	30	40	50	60	70	80
K	0,94	0,90	0,86	0,82	0,78	0,74	0,70

4 pipe installation

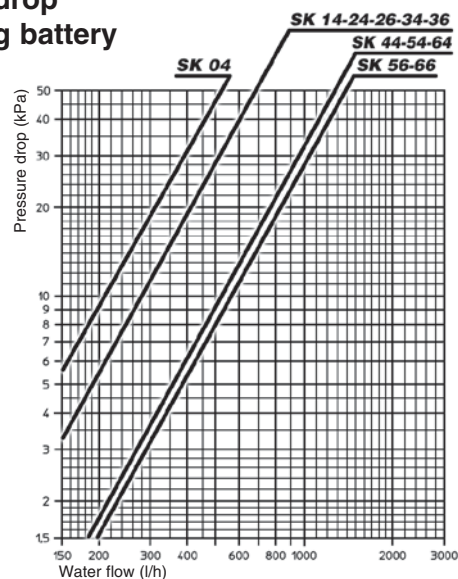
Pressure drop for cooling battery



Pressure drop
for mean water temperature of 10°C,
for different temperatures multiply the pressure drop figure
by the K correction factors in the table.

°C	20	30	40	50	60	70	80
K	0,94	0,90	0,86	0,82	0,78	0,74	0,70

Pressure drop for heating battery

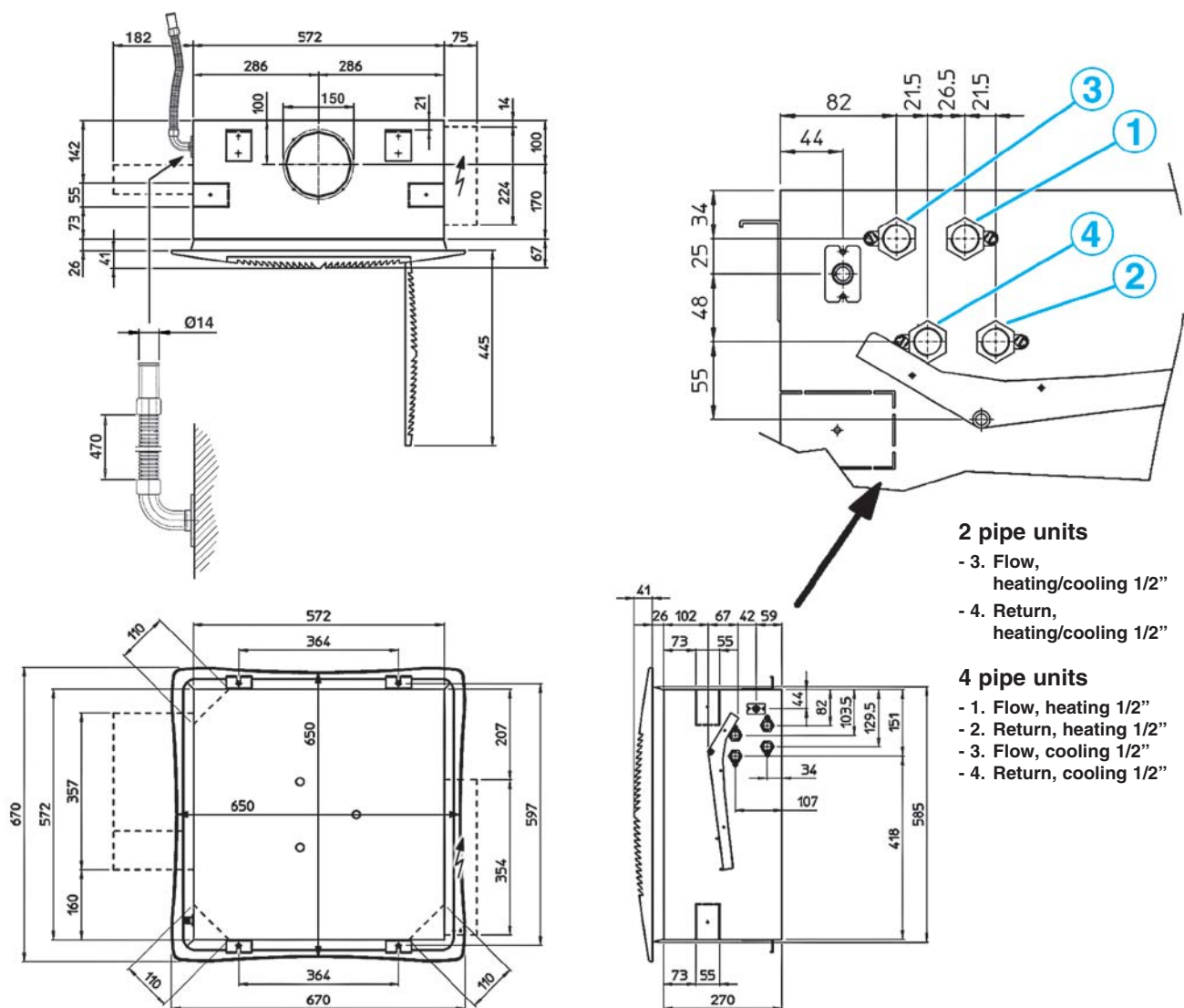


Pressure drop
for mean water temperature of 65°C,
for different temperatures multiply the pressure drop figure
by the K correction factors in the table.

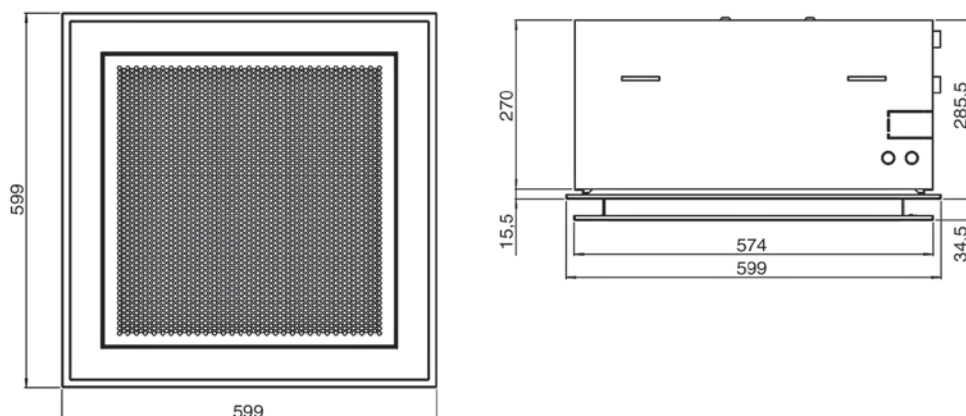
°C	40	50	60	70	80
K	1,14	1,08	1,02	0,96	0,90

Working conditions

Water flow	MAX. working pressure	MIN. entering water temperature: + 5°C
	8 bars	MAX. entering water temperature: + 80°C
Air flow	Suitable relative humidity	MIN. entering air temperature: 6°C
	15 - 75%	MAX. entering air temperature: 40°C
Supply	Single phase 230V 50Hz	
Installation	MAX. height: See table on page 12	

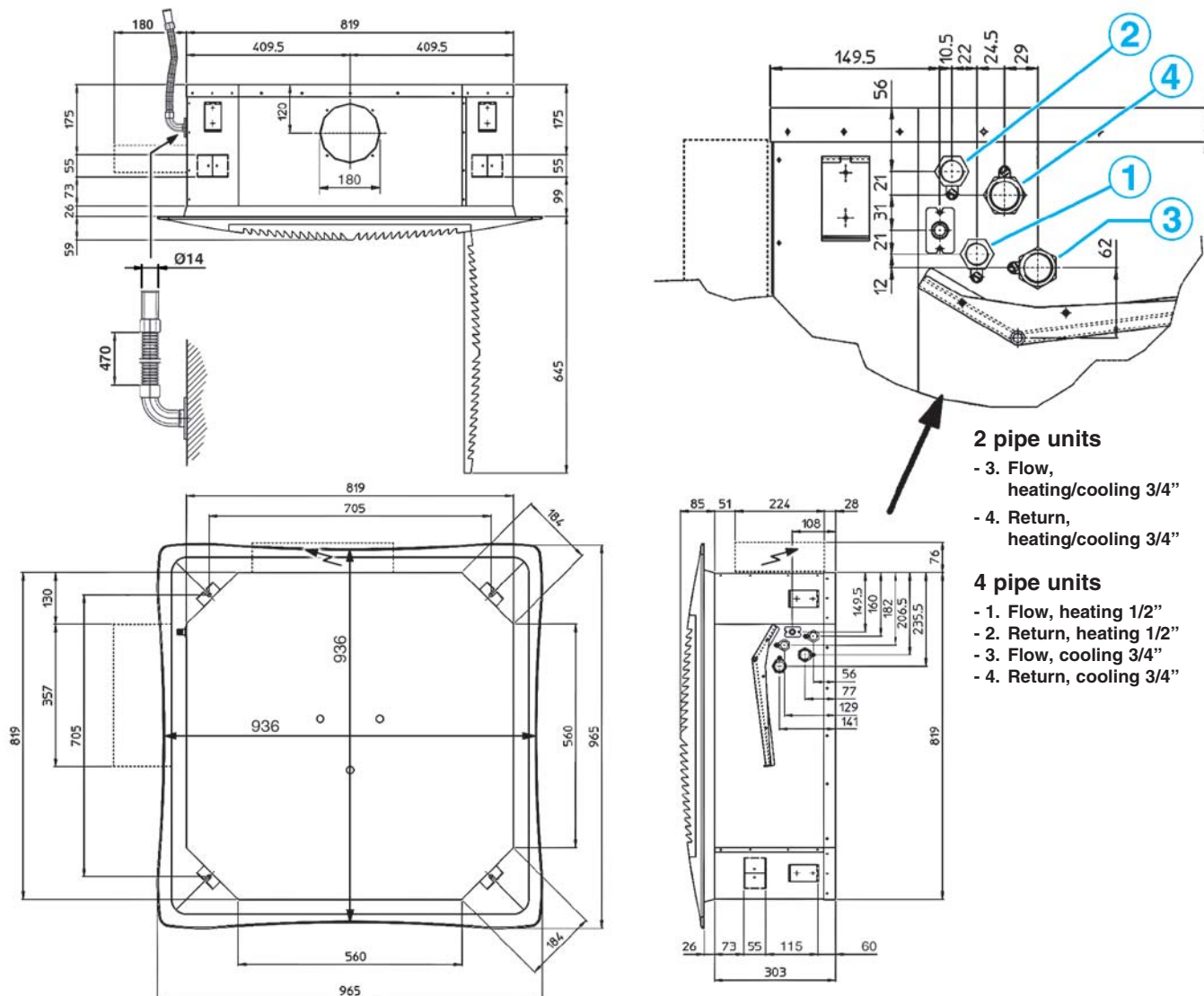
SK 02-04 / SK 12-14 / SK 22-24-26 / SK 32-34-36 (Version 600 x 600)

MD-600
METAL DIFFUSER

(RS receiver, Code 9066338,
for MD-600 metal diffuser
for MB units)

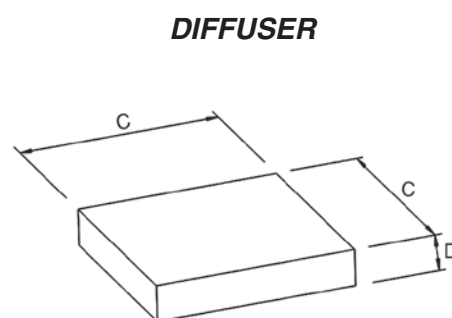
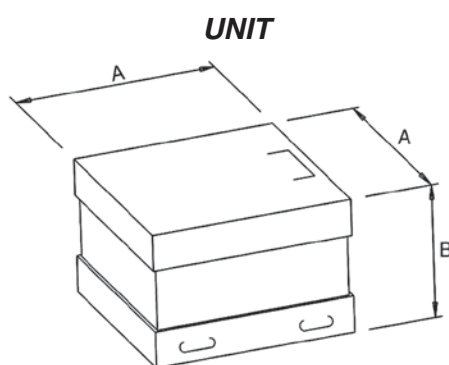


	UNIT		DIFFUSER		Packed unit Dimensions			
Model	Weights packed unit	Weights unpacked unit	Weights packed unit	Weights unpacked unit	A	B	C	D
	kg	kg	kg	kg	mm			
SK 02 - 12	28	22	6	3	790	350	750	150
SK 04 - 14	30	24						
SK 22 - 24 - 26								
SK 32 - 34 - 36								

SK 42-44 / SK 52-54-56 / SK 62-64-66 (Version 800 x 800)



PACKED UNIT

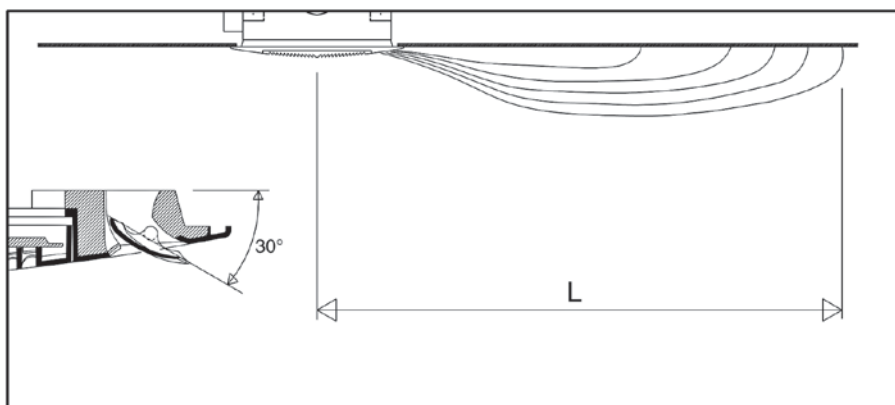


Model	UNIT		DIFFUSER		Packed unit Dimensions			
	Weights packed unit	Weights unpacked unit	Weights packed unit	Weights unpacked unit	A	B	C	D
	kg	kg	kg	kg	mm			
SK 42	44	36	10	6	1050	400	1000	200
SK 44								
SK 52 - 54 - 56	47	39						
SK 62 - 64 - 66								

The air throw indicated in the tables must only be considered the maximum value, as it may change significantly in relation to the dimensions of the room in which the appliance is installed and the positioning of the furniture in the room.

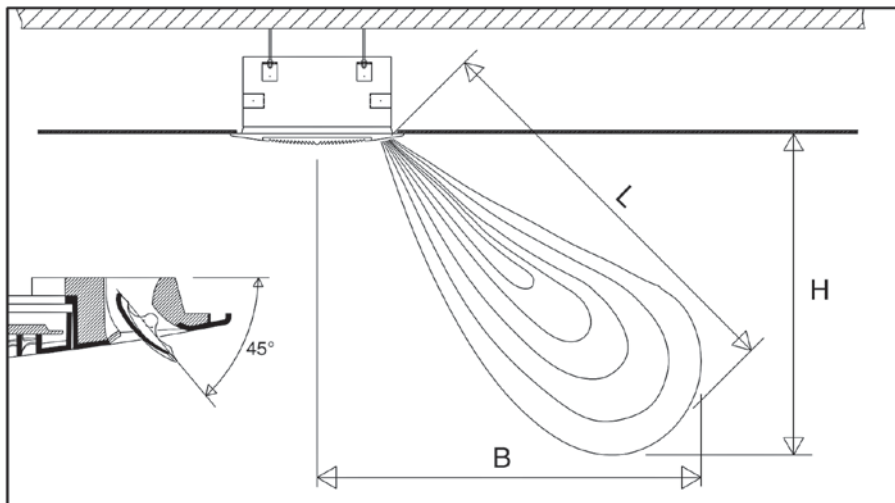
The useful throw **L** refers to the distance between the unit and the point where the air speed is 0.2 m/sec; if the louver has a gradient of 30° (recommended in cooling mode), the so-called “Coanda” effect will occur, illustrated in the first figure, while at a gradient of 45° (recommended in heating mode), there will be a downwards throw, as illustrated in the second figure.

With adjustable air diffusion louvers at 30°



Model		SK 02-04-12-14			SK 22-24-26			SK 32-34-36			SK 42-44			SK 52-54-56			SK 62-64-66		
Speed		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Air throw	L m	3,0	3,5	3,8	3,0	3,8	4,5	3,5	4,2	5,0	3,2	3,7	4,3	3,4	4,0	5,0	3,4	4,6	5,5

With adjustable air diffusion louvers at 45°



Model		SK 02-04-12-14			SK 22-24-26			SK 32-34-36			SK 42-44			SK 52-54-56			SK 62-64-66		
Speed		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Air throw	L m	3,3	3,9	4,2	3,3	4,2	4,8	3,9	4,5	5,2	3,5	4,1	4,8	3,8	4,6	5,4	3,8	5,1	5,8
Height	H m	2,2	2,6	2,8	2,2	2,8	3,2	2,6	3,0	3,4	2,2	2,6	3,0	2,4	2,8	3,4	2,4	3,1	3,6
Distance	B m	2,5	2,9	3,1	2,5	3,1	3,6	2,9	3,4	3,9	2,7	3,2	3,8	3,0	3,6	4,2	3,0	4,0	4,6

NOTE:

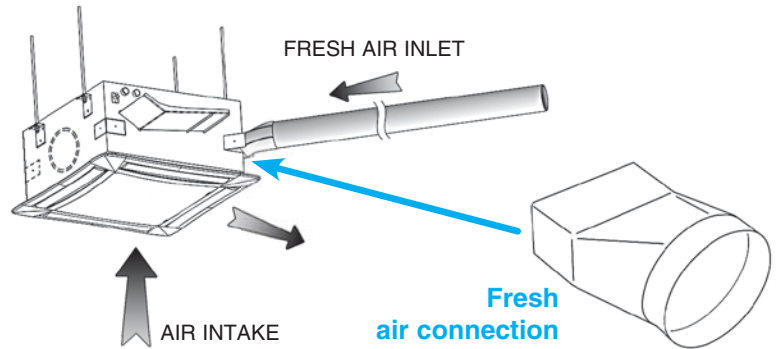
On heating it must be payed attention to rooms where the floor temperature is particularly low (for example less than 5°C).

In this situation the floor can cool the lower layer of air to a level that stop the uniform diffusion of the hot air coming from the unit, decreasing the throw figures shown in the table.

The cassette is fitted with inlets for fresh air to be mixed with return air inside the unit (Fig. 3).

The fresh air flow is limited to 20% of the total fan coil air flow at medium speed and 100 m³/h for each treated air inlet.

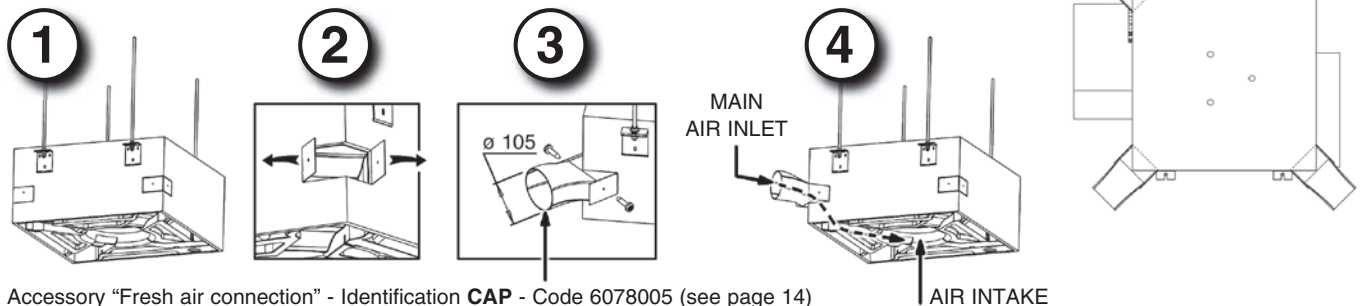
The units feature fresh air inlets on three corners (no inlets on the fourth corner because of the condensate pump inside the unit).



The fresh air inlets are designed for the insertion of standard 110 x 55 mm rectangular ducts.

The air duct is connected quickly and easily. After removing the blank and the insulation inside the unit, the mounting plate is rolled back and the air duct with its V-shaped section must be pushed into the unit (see Figures below). The duct is then fixed to the mounting plate.

Note: the fresh air must be filtered.



Accessory "Fresh air connection" - Identification **CAP** - Code 6078005 (see page 14)

Air distribution - Air distribution connection

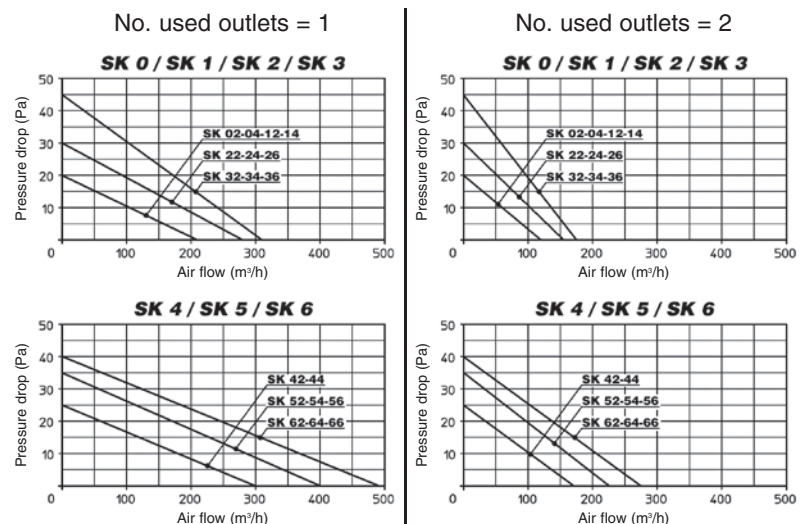
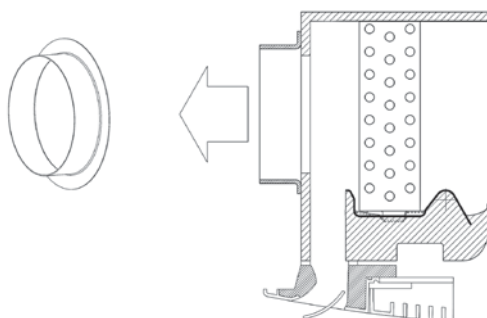
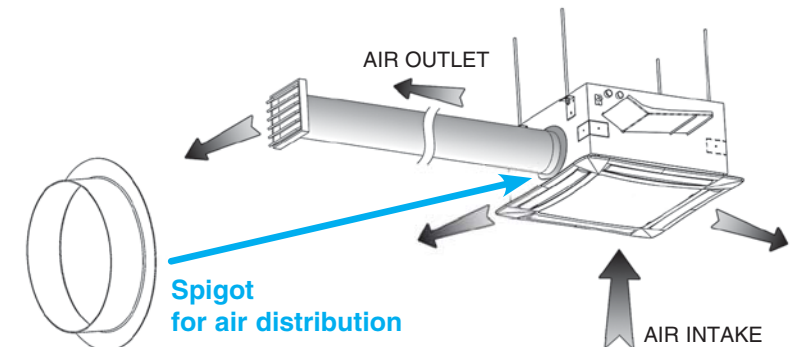
Two air outlets are provided on the side of the unit for connection to separate supply air outlets.

They can be used to supply air from the fan coil unit to distant areas of a room or even to a different room.

The total air flow does not change.

The air flow at high speed depending on the air duct pressure drop is shown in the tables below.

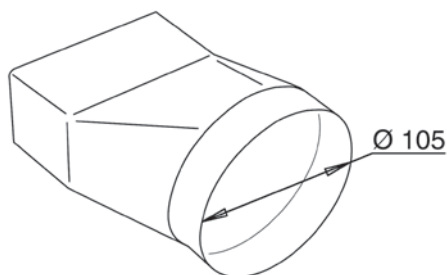
Note: all air ducts must be insulated in order to avoid condensation.



Fresh air connection

See page 13.

IDENTIFICATION	CODE
CAP	6078005

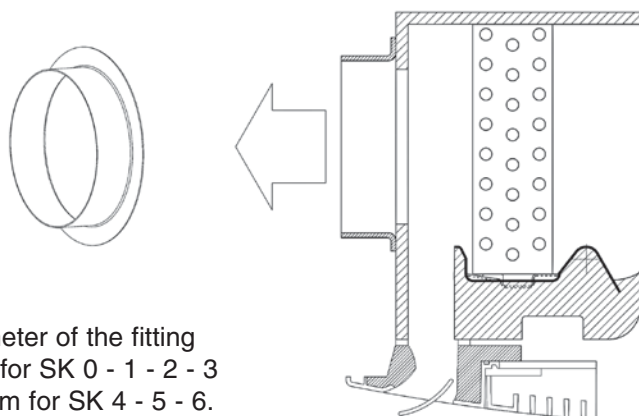


Air distribution connection

See page 13.

IDENTIFICATION	CODE
CDA 600	9079232
CDA 800	9079233

The diameter of the fitting is 150 mm for SK 0 - 1 - 2 - 3 and 180 mm for SK 4 - 5 - 6.



Fresh air kit

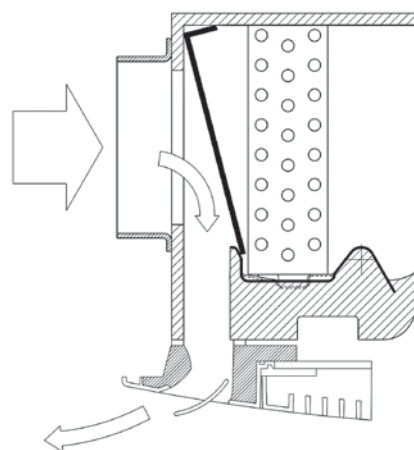
This is used to introduce fresh air into the environment directly through the diffuser. The kit includes a flow separator to be fitted inside the cassette, and a circular fitting for connection to the flexible system ducting. The flow of air is sent directly to just one of the outlet louvers, without passing through the coil. The air flow of fresh air introduced into the environment depends on the inlet static pressure.

MODEL	SK 0-1-2-3	SK 4-5-6
IDENTIFICATION	PRT 600	PRT 800
CODE	9079230	9079231

Correlation between flow-rate / static pressure

SK 0-1-2-3		SK 4-5-6	
m³/h	Pa	m³/h	Pa
80	3	160	3
120	8	200	8
160	15	300	15
200	25	400	25
240	36	500	36

The diameter of the fitting is 150 mm for SK 0 - 1 - 2 - 3 and 180 mm for SK 4 - 5 - 6.

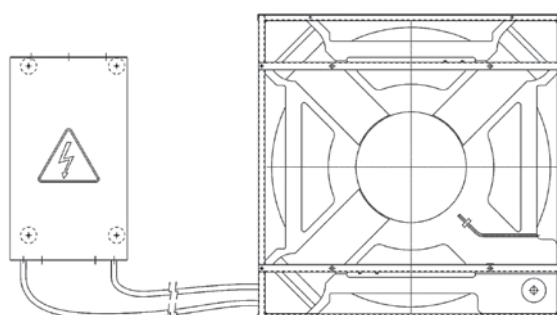


Units with remote electric board

On request the Skystar cassettes are available with electric control panel reachable from below and with the electric board that can be placed in a remote position. In this case the units are supplied with an electronic connecting control panel, fitted to the bottom side on the 4 smallest sizes and to the lateral side on the 3 biggest sizes.

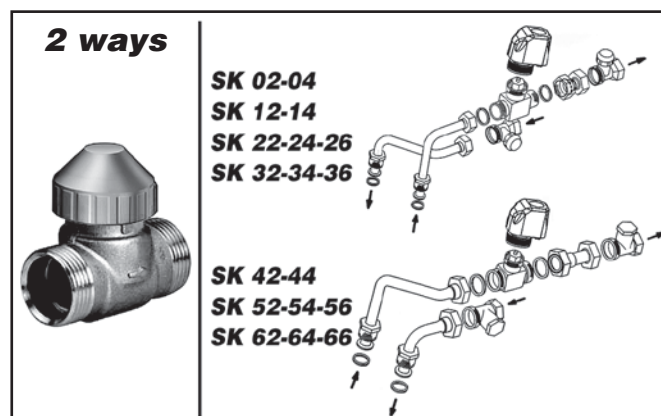
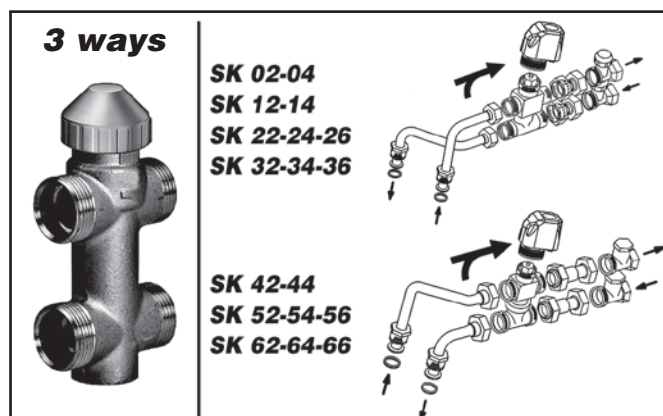
The electronic control panel is connected to the fan motor, to the condensate pump and to the condensate level control. A 6 m wire is also supplied with integral plug-in connections to connect the unit with the remote electric board that can be installed in a suitable and comfortable position, where the power and system connections can be made easily.

This feature is not available for units with electric heater or infra-red remote control.

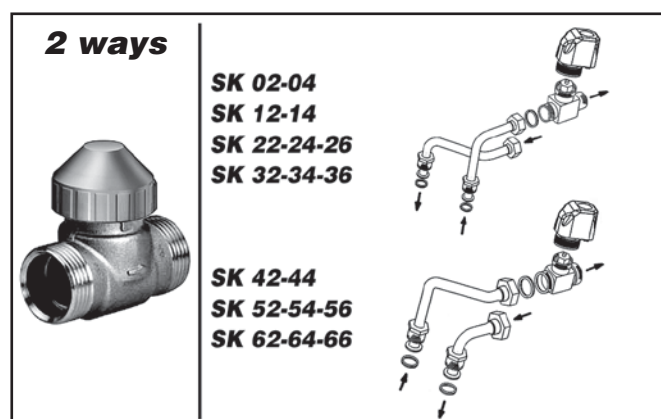
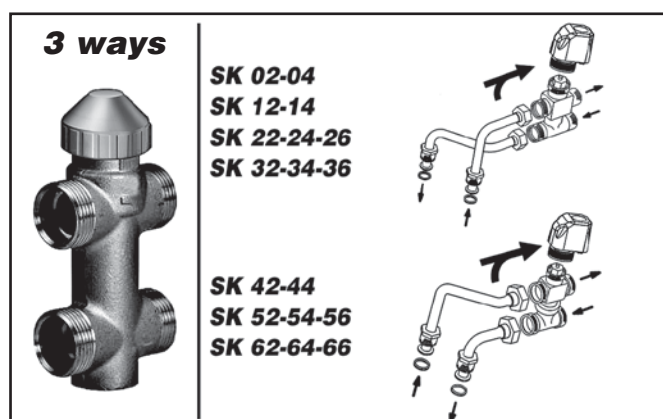


ON-OFF valves with thermoelectric actuator

VALVE WITH MICROMETRIC LOCKSHIELD VALVE



VALVE WITH SIMPLIFIED KIT



Technical data:

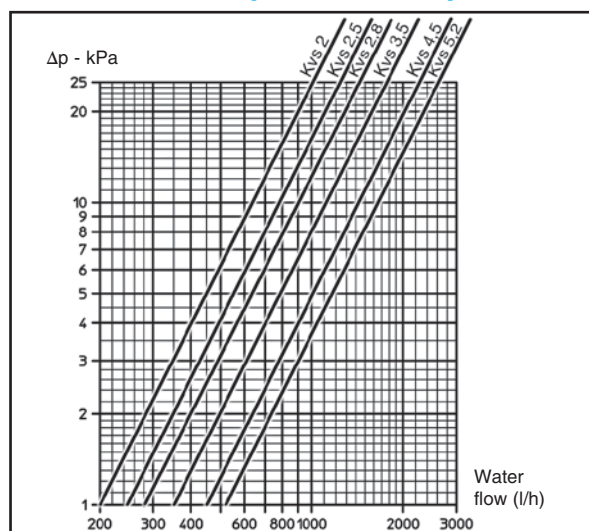
Rated pressure:	16 bar
Max. ambient temperature:	50 °C
Max. water flow temperature:	110 °C
Power:	230 V - 50/60 Hz
Rating:	3 VA
Protection:	IP 43
Travel time:	approx. 3 min.
Max. glycol content of water:	50%

Valves characteristics

Battery type	Model	2 way valves			3 way valves		
		K _{vs} m ³ /h	Δp _{max} kPa *	Valve ** connection	K _{vs} m ³ /h	Δp _{max} kPa *	Valve ** connection
Main	02-12-22-32	2,8	50	3/4"	2,5	50	3/4"
	04-14-24-26-34-36						
	42-52-62	5,2	60	1"	4,5	50	1"
	44-54-56-64-66						
Auxiliary	04-14-24-26-34-36	2,8	50	3/4"	2,5	50	3/4"
	44-54-56-64-66						

* maximum pressure difference for valve to close ** external thread, flat seal
 Note: 3 way valves with simplified kit and 1" connection have conical seal.

Valves pressure drop



Valve set, 2 or 3 ways, ON-OFF, with thermoelectric actuator. The set includes connection pipes.

Note: The main battery lockshield valve connection is 1/2" female (Kvs 2) for SK0 - SK1 - SK2 - SK3 sizes and 3/4" female (Kvs 3,5) for SK4 - SK5 - SK6 sizes, the auxiliary battery valve connection is 1/2" female (Kvs 2).

Note: The maximum pressure drop accross the fully open valve should not exceed 25 kPa for cooling operation and 15 kPa for heating operation.

Balancing valves independent from the system pressure

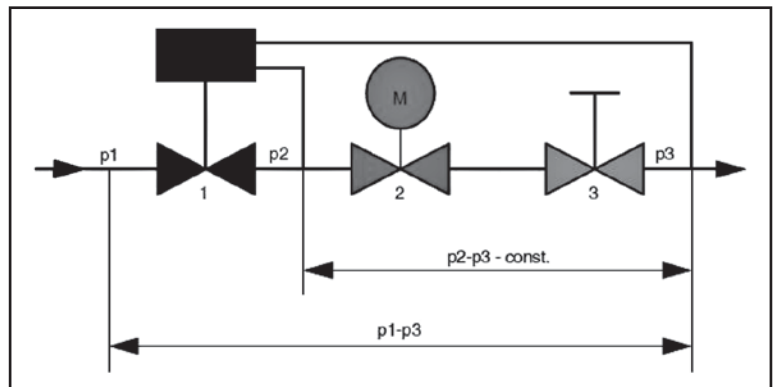
- The balancing valve and a combined 2 way valve allow the regulation of the water flow value autonomously, regardless of the system pressure, and the control of the flow by using an ON/OFF electro-thermal actuator.
- The balancing valve allows you to balance the hydraulic system by supplying the required water flow, for each fan- coil, and to maintain it even under partial load conditions.
- A graduated ring nut placed under the valve allows you to set the flow rate value and also allows direct reading of the set value.



Valve operation logic

- “p1” is the valve inlet pressure.
- “p3” is the outlet pressure.
- “p2” is the diaphragm activation pressure, which allows differential pressure “p2” – “p3” to be maintained at a constant value, in order to guarantee the water to flow at the set value.

The minimum differential pressure “p1” – “p3”, required to guarantee the correct value of the set water flow rate, is indicated in the diagrams on page 17. This is an essential factor to size the system pressure drop and pump pressure head. The flow rate is kept at a constant value only if the valve pressure drop is higher than the indicated value.



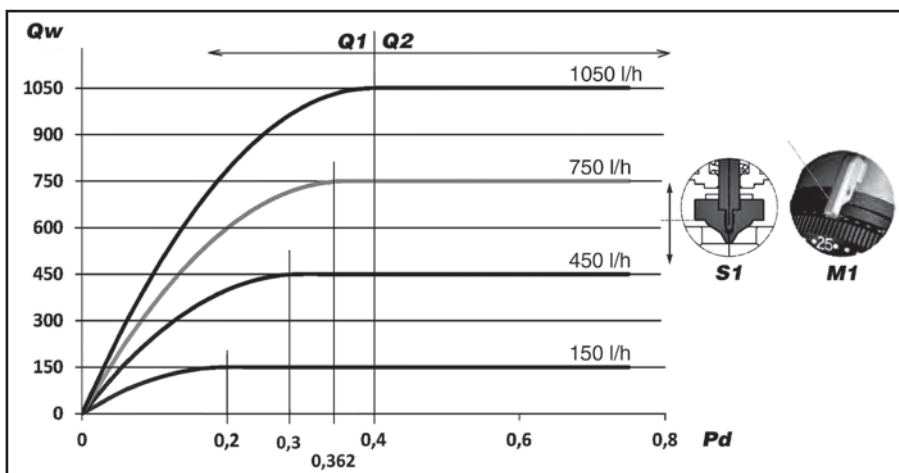
Minimum operating differential pressure

The minimum differential pressure and the balancing valve pressure drop must be considered to size the system pumps.

Flow rate is constant if the pressure drop is higher than that indicated in the diagrams on page 17.

The following diagram shows an example of the flow rate trend according to the pressure drop and calibration required.

Example DN 15 Model



LEGEND:

Qw = Water flow rate (l/h)

Pd = Min. differential pressure
“p1” – “p3” (bar)

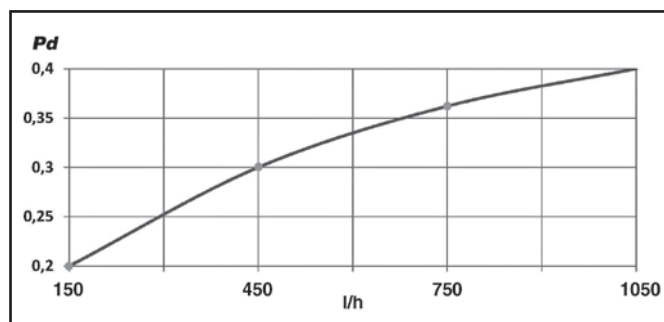
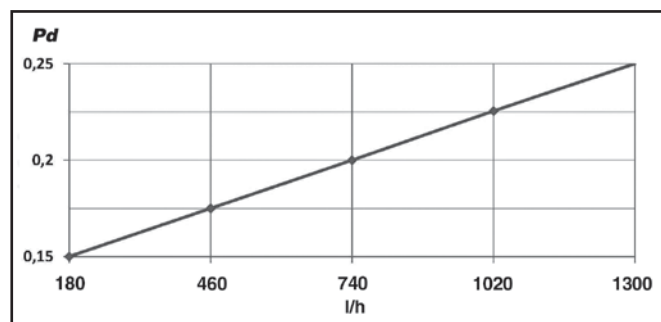
Q1 = Area with inconstant water flow

Q2 = Area with constant water flow

S1 = Position of the adjustment valve plunger

M1 = Position of the knob

The valve upstream-downstream minimum differential pressure (“p1” – “p3”), which depends on the valve calibration value, must be exceeded to access the constant flow rate field.

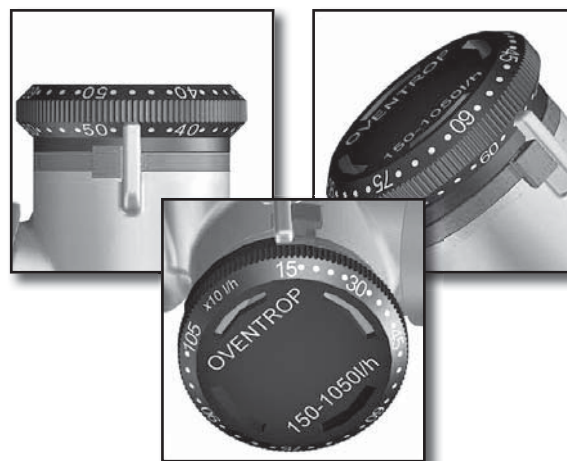
DN 15 Model**DN 20 Model****LEGEND:**

Pd = Min. differential pressure “p1” – “p3” (bar)

E.g., when sizing the system pump, in which the **DN 15** valves will be installed and in which 450 l/h are constantly required for each device, consider a useful pressure of 0.3 bar (to compensate the pressure drop of the valve) for each balancing valve. Therefore, the pressure drop values produced by the system balancing valves must be summed and the pump must be sized to produce a pressure equal to or greater than the value obtained previously.

Benefits

- Reduced dimensions.
- Easy installation on 2 or 4 pipe devices.
- Pre-regulation of the nominal value set even with installed actuator.
- Easy display of the nominal value set. Nominal values are indicated in 10 l/h without any conversion.
- Guarantee of constant flow rate set even with partial loads.
- Pre-regulation can be blocked and leaded with the locking ring.

**Technical features**

DN MODEL	FLOW RATE RANGE (l/h)	Kvs
DN 15	150 – 1050	1,8
DN 20	180 – 1300	2,5

Operation limits of the balancing valves

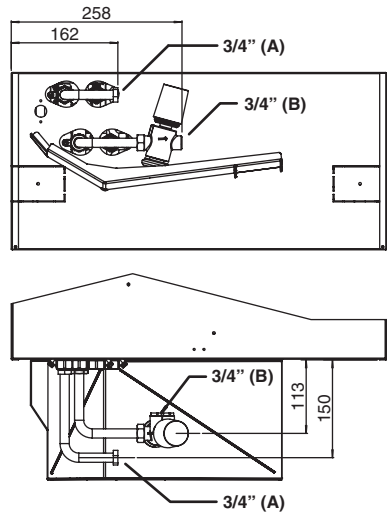
- Maximum operating temperature 120°C
- Maximum operating pressure 16 bar
- Maximum % of water/glycol mixture 50%
- Minimum operating temperature -10°C
- Maximum differential pressure 4 bar

Balancing valves for main coil

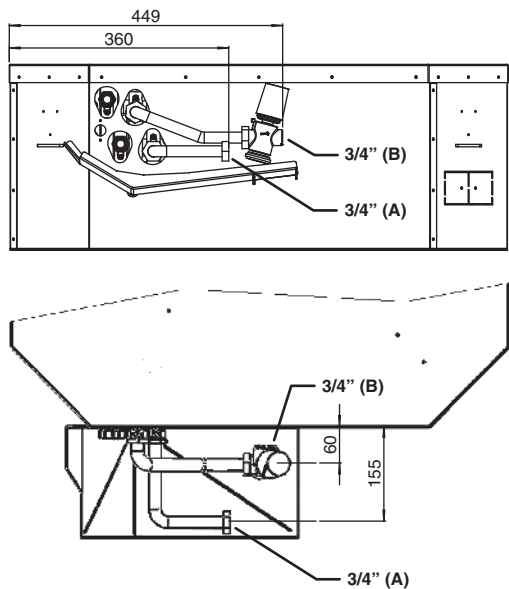
2 way valve for main coil and assembly kit.

The valve is supplied equipped with 230 Volt electro-thermal actuator for the ON/OFF control.

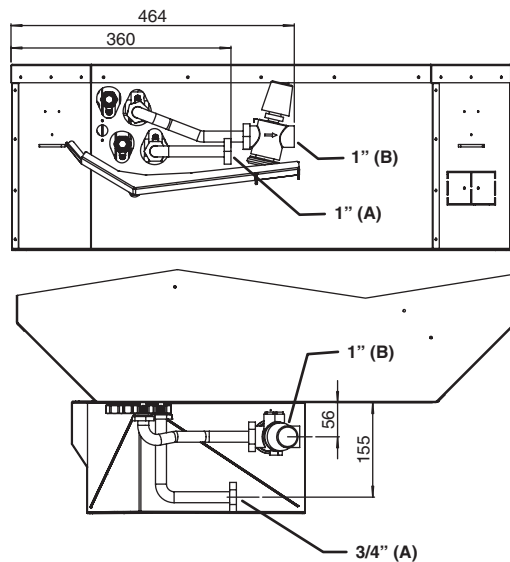
SK 0 - 1 - 2 - 3



SK 4



SK 5 - 6



LEGEND

A = Water inlet - Female connection
B = Water outlet - Male connection

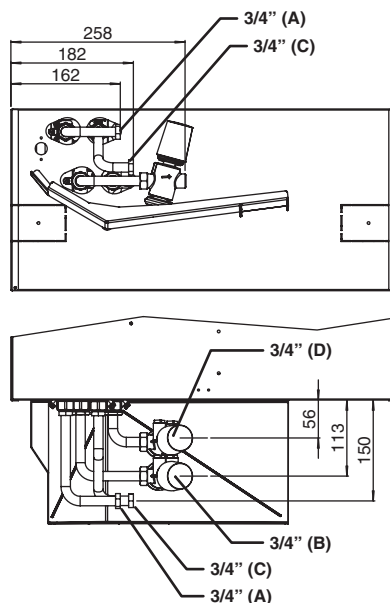
MODEL	VALVE			FITTED		NOT FITTED	
	DN	Ø	Flow Rate Range (l/h)	CODE	IDENTIFICATION	CODE	IDENTIFICATION
0 - 1 - 2 - 3	15	3/4"	150 – 1050	9079771	V2OVSK6BPM 150-1050	9079761	V2OVSK6BPS 150-1050
4	15	3/4"	150 – 1050	9079791	V2OVSK8BPM 150-1050	9079781	V2OVSK8BPS 150-1050
5 - 6	20	1"	180 – 1300	9079792	V2OVSK8BPM 180-1300	9079782	V2OVSK8BPS 180-1300

Balancing valves for main and additional coil

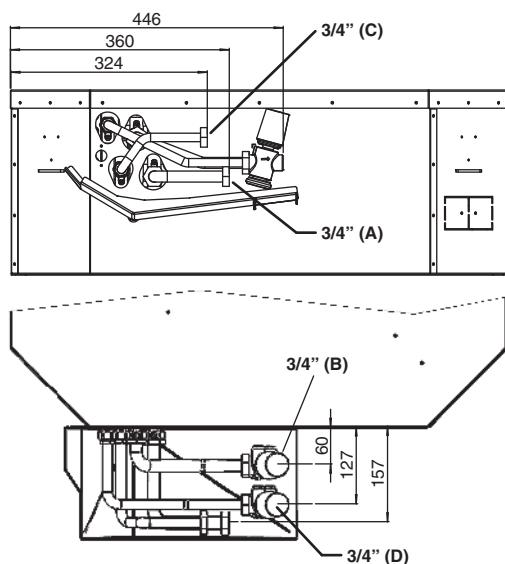
2 way valve for additional coil and assembly kit.

The valve is supplied equipped with 230 Volt electro-thermal actuator for the ON/OFF control.

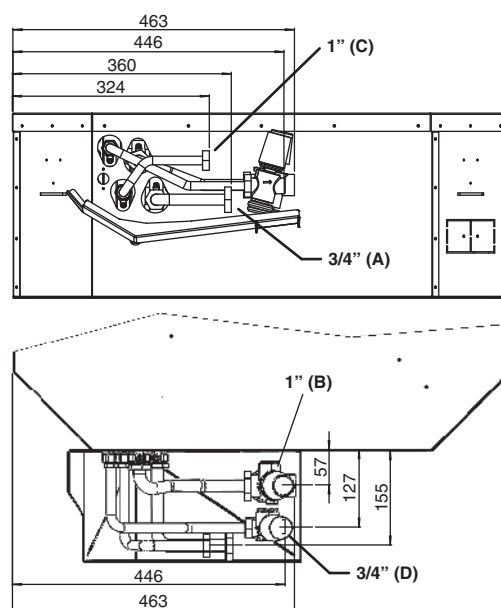
SK 0 - 1 - 2 - 3



SK 4



SK 5 - 6



LEGEND

A = Water inlet (main coil) - Female connection
B = Water outlet (main coil) - Male connection

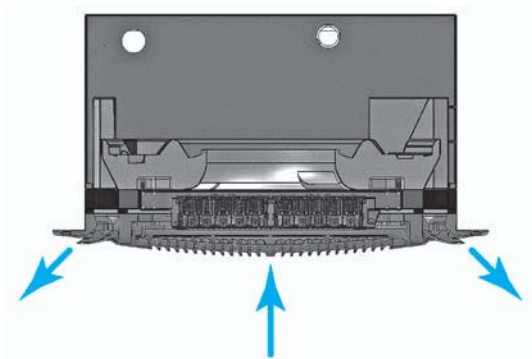
C = Water inlet (additional coil) - Female connection
D = Water outlet (additional coil) - Male connection

COIL	MODEL	VALVE			FITTED		NOT FITTED	
		DN	Ø	Flow Rate Range (l/h)	CODE	IDENTIFICATION	CODE	IDENTIFICATION
MAIN	0 - 1 - 2 - 3	15	3/4"	150 - 1050	9079771	V2OVSK6BPM 150-1050	9079761	V2OVSK6BPS 150-1050
	4	15	3/4"	150 - 1050	9079791	V2OVSK8BPM 150-1050	9079781	V2OVSK8BPS 150-1050
	5 - 6	20	1"	180 - 1300	9079792	V2OVSK8BPM 180-1300	9079782	V2OVSK8BPS 180-1300
ADDITIONAL	0 - 1 - 2 - 3	15	3/4"	150 - 1050	9079773	V2OVSK6BAM 150-1050	9079763	V2OVSK6BAS 150-1050
	4 - 5 - 6	15	3/4"	150 - 1050	9079793	V2OVSK8BAM 150-1050	9079783	V2OVSK8BAS 150-1050

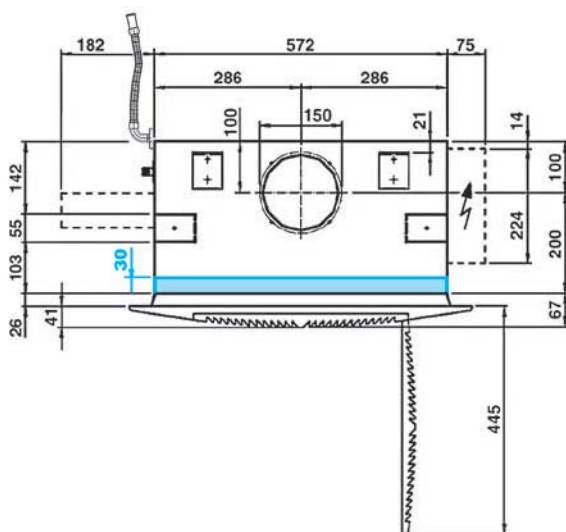
Introduction

Cassette SkyStar can be equipped with the innovative plate type electrostatic filter, **Crystall**, combining air treatment and purifying in a single product.

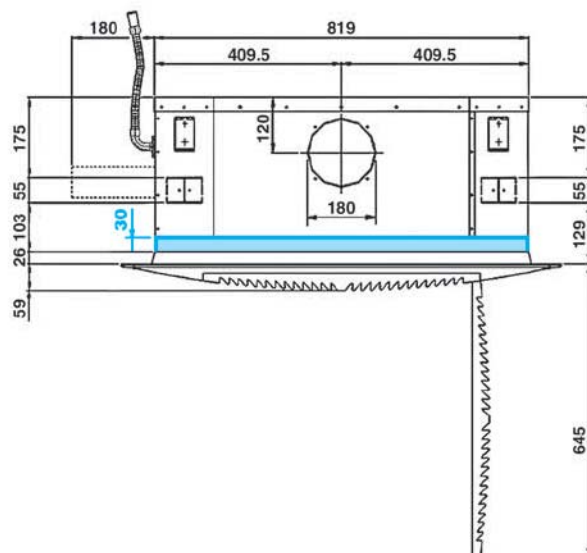
The electronic filter is patented and certified according to Standard UNI 11254.



Dimensions



SK 0 / 1 / 2 / 3
(Model 600 x 600)



SK 4 / 5 / 6
(Model 800 x 800)

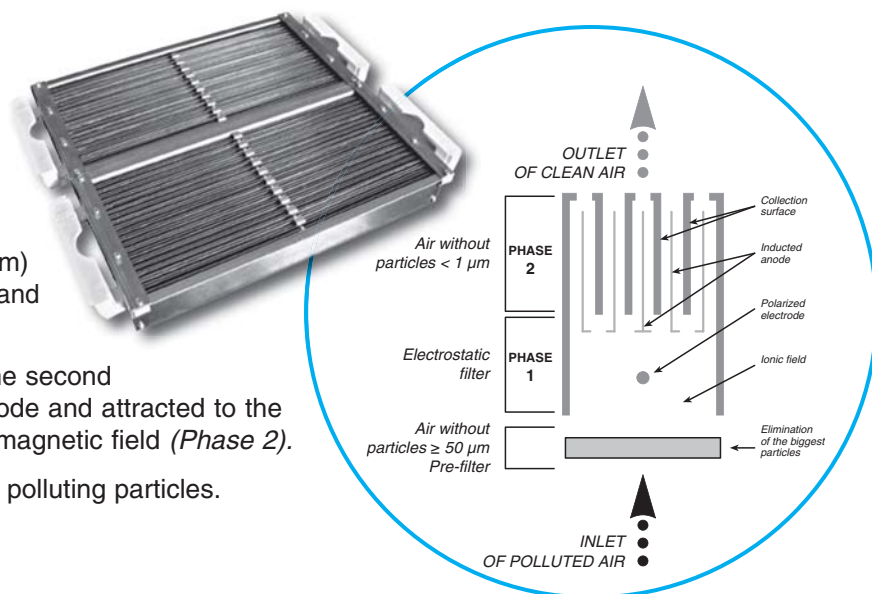
Operating principle of the electrostatic filter

When the polluted air goes through the mechanical pre-filter the particles $\geq 50 \mu$ are eliminated (powder, insects, etc).

Then the smallest particles ($50 \div 0.01 \mu\text{m}$) are exposed to an intensive ionizing field and are polarized (*Phase 1*).

The charged particles passing through the second filter section, are pushed back by the anode and attracted to the collection surfaces by a strong, induced magnetic field (*Phase 2*).

The air which leaves the unit is free from polluting particles.



Indoor air quality (IAQ)

The expression Indoor Air Quality (IAQ) covers all the procedures and methodologies used to **improve the quality of the air we breathe** in the places where we live and work, from all points of view, from temperature to cleanliness, to relative humidity, etc. (EN 15251 and EN 13779). Thanks to its new patented electronic filter, the **Crystall electrostatic filter totally eliminates the pollutants present in the air**, including tobacco smoke, dust (PM10, PM2.5), fibres, microbiological substances such as bacteria, fungi, etc., which are harmful to human health (source: OMS 2009). Purifying the air means not only greater well-being, but also energy saving, as the fresh air changes that are required to restore ideal climatic conditions and that entail greater consumption, are significantly reduced (it is sufficient to enter the quantity of air required to restore the optimum level of CO_2 - source: EN 1379:2008). Moreover, according to the UNI 10339rev, air recirculated by the **Crystall** appliance can be considered as fresh air, to be added to the minimum requirements (0,5 ls/m²). Purifying the air with the Sabiana **Crystall** appliance also **entails no reduction of living room space**, as the dimensions of the fan convector are practically unchanged (just 3 cm higher). The positioning of the electronic filter allows **simple and effective maintenance** and, as it is easy to wash, **its working life is practically unlimited**. The modularity of the filter components and their ease of mounting make the system extremely competitive in terms of cost compared with other types of filters present on the market. In spring and autumn, if air conditioning/heating is not required, the appliance acts simply as an **air purifier**.

Standards and legislation

THE AMBIENT CONDITION IS ACCEPTABLE WHEN:

- **Microclimatic parameters are normal**
- **80% of people are satisfied by the quality of air**
- **Specific internal contaminants are not in harmful concentrations**

*"Guidelines for the protection and promotion of health in confined areas O.G.
No. 276 dated 27 Nov 01 ordinary supplement no. 252"*

The method for obtaining the air quality required in confined areas and thus succeeding in ensuring that the contaminants present are in concentrations less than those considered dangerous to health are:

Prescriptive approach: ventilation of the internal area using only properly filtered fresh air, in the quantity and quality needed to dilute the internal contaminants in order to reach the required maximum acceptable concentration values (see WHO limits).

Performance approach: ventilation with fresh air and recirculated air from the same area, both properly filtered, in the quantity and quality needed to dilute the internal contaminants in order to reach the required maximum acceptable concentration values (see WHO limits).

The quantity and quality of recirculated air and outdoor air to be added is better specified in the prescriptive and performance approach in Standards UNI EN 13779:2008 and soon to be released UNI 10339rev according to the following simplified tables.

PRESCRIPTIVE METHOD	UNI EN 13779:2008			
	CATEGORY	UNIT	RATE OF FRESH AIR	
			TYPICAL RANGE	DEFAULT VALUE
	IDA 1	l.s. person	> 15	20
	IDA 2	l.s. person	10 – 15	12,5
	IDA 3	l.s. person	6 – 10	8
	IDA 4	l.s. person	< 6	5
	UNI EN 10339REV			
	CATEGORY	RATE OF FRESH AIR		
	High	(l.s. per person) + (l.s. per m²)		Total fresh air volume varies based on the intended use of the confined area
Medium	(l.s. per person) + (l.s. per m²)			
Low	(l.s. per person) + (l.s. per m²)			
not classified	not classified			

PERFORMANCE METHOD	UNI EN 13779:2008		
	IDENTIFICATION AND QUANTIFICATION OF THE REFERENCE POLLUTANT (PM OR GAS)		
	Concentration Limit	Minimum fresh air l.s. person	Quantity of recirculated air provided that it is filtered like fresh air
	WHO publicized values and legislative acts expressed in µg/m³, PPM, etc.	5 - 6	The volume of air to be considered is based on the internal production and the imposed concentration limits in the confined area
	UNI EN 10339REV		
	IDENTIFICATION AND QUANTIFICATION OF THE REFERENCE POLLUTANT (PM OR GAS)		
	Concentration Limit	Minimum fresh air l.s. person	Quantity of recirculated air provided that it is filtered like fresh air
	WHO publicized values and legislative acts expressed in µg/m³, PPM, etc.	The minimum volume of air input varies based on the intended use of the confined area	The volume of air to be considered is based on the internal production and the imposed concentration limits in the confined area

Fresh air flow rates according to the performance approach

UNI EN 13779:2008 and UNI 10339rev Standards

The example reproduced at the bottom of the page shows how, with adequate air filtering, it is possible to decrease considerably the quantity of fresh air to be brought into the environment (up to 3-4 times less); the thermal energy dissipated due to ventilation is in fact in direct proportion to the number of air changes, as indicated in the following equation:

$$Q_v = \Delta T \cdot \frac{R}{3600} \cdot D \cdot C \cdot Vol.$$

Q_v = Thermal energy lost for ventilation - Watt
ΔT = Indoor-Outdoor difference (T) - °C
R = A.C.H.
D = Air density - Kg/m³
C = Specific air heat - J/Kg-°C
Vol = Room size - m³

Construction features

The **Crystall** electrostatic filtering system consists of two parts: the first is a **plate type electronic active filter** and is fitted in the return air section of the cassette, while the second is an **electronic control and regulation board**, fixed on the structure.

All electrical connections are made during production. The installation of the SkyStar Sabiana cassette fan coil unit incorporating the **Crystall** electronic filter is therefore similar to that of a normal unit: the only difference is the installation height, for which the filter dimensions must be taken into account.

Crystall filters are not suitable for ECM and electric heater versions.

Active plate type electronic filter

The filtering element consists of two sections: the first consists of electrodes and insulating elements, forming a self-supporting ionising frame, while the second consists of special light aluminium fins (collector).

The two sections are installed above the return air grille to make the extraction and maintenance of the filter easier.

Accessibility to sections to be cleaned is ensured by easy-open plastic closures.

The collector can be cleaned by washing with water and ordinary detergents or steam jets (please consult the maintenance manual for further details).

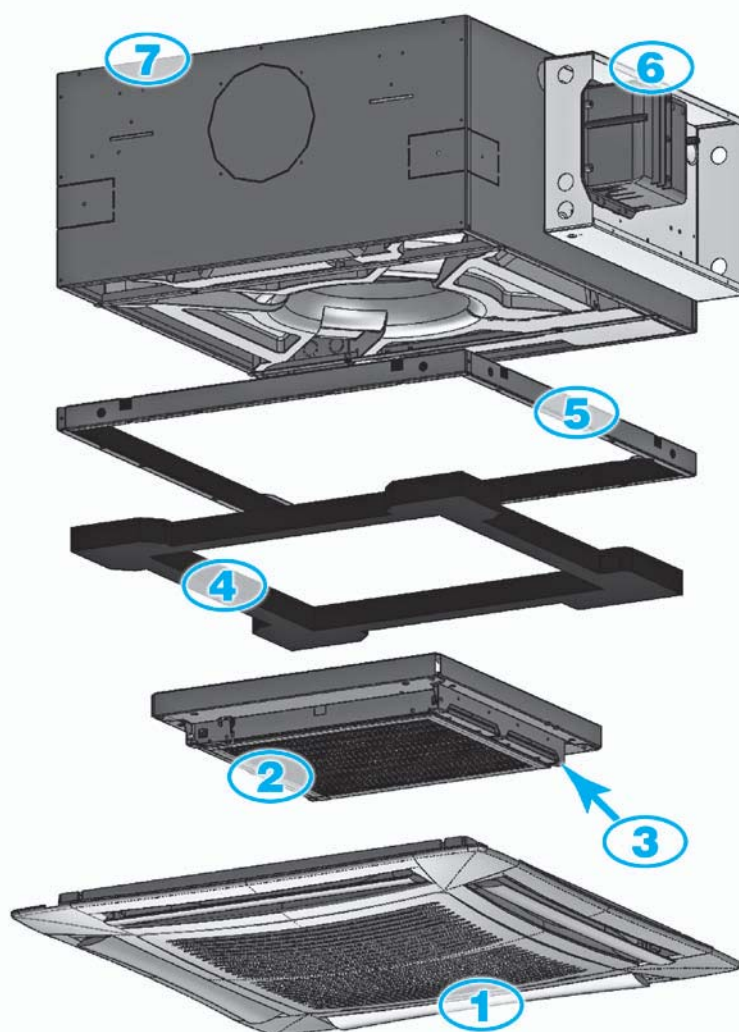
Electronic board

Controls and regulates all functions of the electrostatic filter.

It is appropriately protected against any operating defects of the electrostatic filter. It supplies a constant voltage to the electrodes when the mains supply voltage varies ($\pm 15\%$).

The supply transformer is constructed with its primary and secondary coils physically separated and wound onto separate cores.

The energy consumption of the filter group is 25 W (to which the electrical consumption of the Cassette must be added).



Control and regulation commands

Units with **Crystall** electrostatic filter can be controlled and regulated by the series of **IAQ** controls that are already provided for CRC Carisma fan coils.

- 1 - Diffuser with return air grid
- 2 - Active plate type electrostatic filter
- 3 - Plastic opening
- 4 - Insulation
- 5 - Filter containment frame
- 6 - Electronic board
- 7 - Cassette



If using the SkyStar Cassette fan coils with electronic controllers, the voltage values at the autotransformer terminals must be kept in consideration (transformer return voltages). These values may reach 500 Vac.

IDENTIFICATION	CODE
WM-3V	9066642



Dimensions: 75x75x30 mm

- Manual 3 speed switch.
- Without thermostatic control.
- It can not control the valves.

IDENTIFICATION	CODE
WM-T	9066630



Dimensions: 135x86x31 mm

- ON-OFF switch.
- Manual 3 speed switch.
- Manual Summer/Winter switch.
- Electronic room thermostat for fan control (ON-OFF).
- Electronic room thermostat for valve control (ON-OFF) (the fan keeps working).
- It allows to control the low temperature cut-out thermostat (TMM).
- It allows to control the chilled water valve (ON-OFF) and the electric heater in the SK-E version.

IDENTIFICATION	CODE
WM-TQR	9066631



Dimensions: 135x86x31 mm

- ON-OFF switch.
- Manual 3 speed switch.
- Manual Summer/Winter switch.
- Electric heater/IAQ filter activation button.
- Electronic room thermostat for fan control (ON-OFF).
- Electronic room thermostat for valve control (ON-OFF).
- Simultaneous thermostatic control of the valves and fan.
- It allows to control the low temperature cut-out thermostat (TME).
- It allows to control the chilled water valve (ON-OFF) and the electric heater in the SK-E version.
- It allows to control the summer/winter cycle with a centralized and remote switch or with an automatic change-over fitted on the water pipe (for 2-tube installations only).
- Energy saving function.

IDENTIFICATION	CODE
WM-AU	9066632



Dimensions: 135x86x24 mm

The control must always be connected with UPM-AU power unit (fitted on the unit) or with UP-AU power unit (not fitted on the unit).

- ON-OFF push button.
- Manual or automatic 3 speed progressive push button.
- Summer/Winter/Fan/Auto mode push button.
- Electric heater/IAQ filter activation button.
- Electronic room thermostat for fan control (ON-OFF).
- Electronic room thermostat for valve control (ON-OFF).
- Simultaneous thermostatic control of the valves and fan.
- It allows to control the low temperature cut-out thermostat (TME).
- It allows to control the chilled water valve (ON-OFF) and the electric heater in the SK-E version.
- It allows to control the summer/winter cycle with a centralized and remote switch or with an automatic change-over fitted on the water pipe (for 2-tube installations only).
- Energy saving push button.

N.B.: with 4 pipe installations and continuous chilled and hot water supply, it allows the automatic summer winter change-over in accordance to the room temperature (-1°C = Winter, +1°C = Summer, Neutral Zone 2°C).

IDENTIFICATION	CODE
T-MB	9066331E



Dimensions: 110x72x25 mm

The control must always be connected with UPM-AU power unit (fitted on the unit) or with UP-AU power unit (not fitted on the unit).

Wall control with display that allows controlling one or more units in Master/Slave mode. The control is equipped with internal sensor to detect the room temperature, which can be defined as a priority compared to the return air sensor on the fan coil.

The T-MB control features the following functions:

- Switch the unit ON and OFF.
- Temperature set.
- Manual, centralized or automatic Summer/Winter switch.
- Set the fan speed (low, medium, high or autofan).
- Set the operation mode (fan only, cooling, heating; auto for 4 pipe systems with mode selection depending on the air temperature).
- Time setting.
- Weekly ON/OFF program.

IDENTIFICATION	CODE
TMO-503-SV2	9060173



Dimensions: 118x87x8 mm

The TMO-503-SV2 control for fan coils with valves, is designed to be installed in a DIN 503 wall box. It is easy to use, it has a big and clear display, and a great precision. The control is supplied integral with the external frame, but it is possible to use frames of the most known brand on the market (BTicino, Vimar, AVE, Gewiss).

- Manual or automatic speed switch.
- Manual Summer/Winter switch.
- Electronic thermostat for valves control (ON-OFF).
- Simultaneous thermostatic control of the valves and fan.
- It allows to control the low temperature cut-out thermostat, included with the control.

N.B.: with 4 pipe installations and continuous chilled and hot water supply, it allows the automatic summer/winter change-over in accordance to the room temperature (-1°C = Winter, +1°C = Summer, Neutral Zone 2°C).

IDENTIFICATION	CODE
T2T	9060174

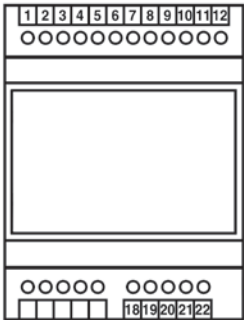


Dimensions: 128x75x25 mm

2 pipes units only.

- ON-OFF switch.
- 3 speed switch.
- Manual Summer/Winter switch.
- Thermostatic control on the fan.
- Thermostatic control on the valve and continuous fan operation.
- Simultaneous thermostatic control of the valve and fan.
- Cannot be used with speed switch (master-slave).

IDENTIFICATION	CODE
SEL-S	9079110



- Speed switch (Slave).
- It allows to control up to 8 units with only one centralized wall control (1 speed switch for each unit).
- For controls WM-T, WM-TQR, and TMO-503-SV2.

DESCRIPTION	IDENTIFICATION	CODE
Power unit for WM-AU and T-MB remote control (fitted on the unit)	UPM-AU	9066641
Power unit for WM-AU and T-MB remote control (not fitted on the unit)	UP-AU	9066640



Power unit to be installed on the fan coil (fan coil interface).

- It controls the fan and the valves of the fan coil.
- It is connected to the electric supply.
- It receives the information required from the control.

Control power absorption: 2,3 VA

TME low temperature cut-out thermostat

Suitable for wall controls only (not infra-red remote control). To be fitted between the coil fins; when connecting the control, the TME probe cable must be separated from the power supply wires.

To be used with the following controls: WM-TQR, WM-AU and T-MB.

It stops the fan when the water temperature is lower than 38°C and it starts the fan when is higher than 42°C.



IDENTIFICATION	CODE
TME	3021091

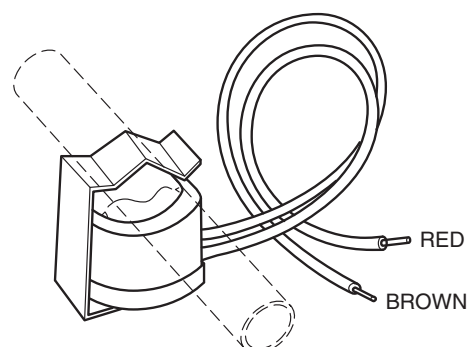
TMM low temperature cut-out thermostat

To be installed in contact with the hot water circuit.

To be used only with WM-T control.

For units working on heating only.

It stops the fan when the water temperature is lower than 30°C and it starts the fan when is higher than 38°C.



IDENTIFICATION	CODE
TMM	9053048

Change-Over CH 15-25

Suitable for wall controls only (not for infra-red remote control).

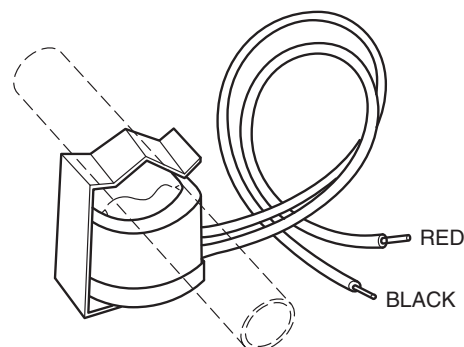
Automatic summer/winter switch

to be installed in contact with the water circuit.

For 2-tube installations only (not to be used with 2 way valve).

To be used with

the following controls: WM-TQR, WM-AU and T-MB.



IDENTIFICATION	CODE
CH 15-25	9053049


T2 sensor

T2 sensor to be placed on the water supply pipe upstream 3 way valves (not to be used with 2 way valve).

The T2 sensor must be used as described below:

- Change-Over for the automatic switch of the operating mode. If water temperature is lower than 20°C, cooling mode is set; on the other hand, if water temperature exceeds 30°C, heating mode is set.
- It can be used on units with electric heater and hot water supply. The T2 priority probe activates the electric heater or water valve, depending on the water temperature detected. If water temperature exceeds 34°C, the water valve ON-OFF control is activated; on the other hand, if water temperature is lower than 30°C, the electric heater is activated.

To be used with the following controls WM-AU and T-MB.

IDENTIFICATION	CODE	
T2	9025310	



FreeSabiana

Free Sabiana is an innovative, **fully wireless**, electronic system for use with fan coil units, based on radio communication.

This technology **provides installation flexibility and a more accurate measurement of the room temperature**. The probe can be moved until the most suitable position is found, without the worry of changes in the room layout and of its furniture and also without mounting it on a wall. If a new fan coil unit is added, no electrical wiring for the control system is required:

just define the control unit and the probe which regulates it. The improved measurement accuracy is a result of the possibility to position the probe near the user location: this enables to keep the temperature exactly at the required value with energy savings compared with a traditional measurement system.

Transmission is based on communication protocol IEE802.15.4, the most suitable way to transmit a relatively low amount of information with very low consumption and high reliability.

The system has been certified by a leading independent body, officially recognized by the EU authorities and its sale has been authorized in all the EU and EFTA countries.

Main components

Free Sabiana includes 3 main components:

- A remote **control** which features a button panel and LCD display and can be wall mounted or positioned on a dedicated table support. It enables the control of all the operating variables of the fan coil units in different configurations. The control is battery powered. The temperature and the operating speed of the fan coil unit are set with two large buttons featuring user friendly graphics.

DESCRIPTION	IDENTIFICATION	CODE
Remote control	Free-Com	9060572



Control unit with support

- A **power unit** to be installed on the fan coil (fan coil interface). It controls the fan and the valves of the fan coil. The power unit is connected to the electric supply. The power unit receives the information required to control the fan coil both from the remote control and locally, such as the temperature of the coil.

DESCRIPTION	IDENTIFICATION	CODE
Power unit fitted on the unit	Free-Usm	9079107
Power unit not fitted on the unit	Free-Ups	9060570



Power unit

- A room **temperature probe**, which can be wall mounted or positioned on a dedicated table support. It is a battery powered device, able to measure the air temperature in the spot where it is positioned, generating temperature information which is communicated to the other devices.

DESCRIPTION	IDENTIFICATION	CODE
Temperature probe	Free-Sen	9060573



Probe with support

Main features of the remote control

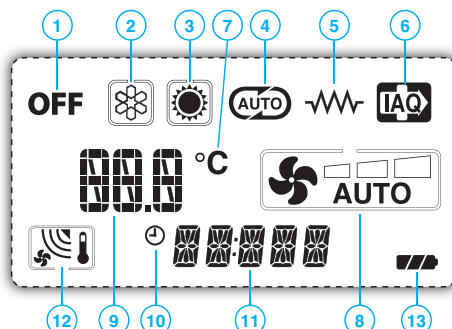
The control enables:

- Fan coil on/off switching
- Fan speed selection (high - medium - low - automatic)
- Summer/winter operation selection
- Valve on/off
- Real time clock setting
- Temperature setting
- Daily switch on/off setting (timer function)
- Enable/disable the timer function
- Activation of the (eventual) electrostatic filter
- Activation of the (eventual) electric heater



Main information displayed:

- ① On-off status
- ② Summer operation
- ③ Winter operation
- ④ Automatic season change
- ⑤ Electric heater
- ⑥ Crystall filter
- ⑦ Room temperature (with decimal accuracy)



- ⑧ Fan operating speed
- ⑨ Required/measured temperature
- ⑩ Timer
- ⑪ Clock
- ⑫ Transmission signal
- ⑬ Battery level

Main features of the power unit to be installed on the fan coil



The power unit controls the fan and the valves of the fan coil. The power unit receives the information required to control such units both from the remote control and locally.

It enables the following main actions:

- Fan on/off at a set speed
- Fan speed change (fan on/off)
- Water valve/s on/off (1 valve for 2 tube system - 2 valves for 4 tube system)
- Fan speed change operating the water valve/s
- Control of the electric heater as main heating unit or as integration to the battery supplied with hot water
- Control of the operation of the electrostatic filter (in parallel to the fan)
- Management of the dead zone function for 4-tube systems
- Available functional inputs:
 - Consent for remote on/off
 - Consent for remote Summer/Winter switch (centralized)
 - Consent for the activation of the Energy Saving function with setting change
 - Minimum probe
 - Probe for season change

Main features of the temperature probe



This device is able to measure the temperature of the air in the spot where it is positioned and to transmit it by means of radio communication to the other devices in the system. It is battery powered and can be freely positioned in the area to be air-conditioned.

Display:

- Measured environment temperature
- Transmission signal
- Clock
- Battery status

All the **SkyStar** units can be supplied in **MB version**. This version includes a wide range of controls, including the **infra-red remote control**, which allows managing one single unit or several units by using the Modbus RTU - RS 485 communication protocol.

Units can be managed according to the Master/Slave logic (up to 20 units) or by supervisory components.

The system consists in a **MB** board (*mounted on models SK-MB and SK-ECM-MB*) and a series of controls, such as the **T-MB** wall control, the **RT03** infra-red remote control, the **PSM-DI** multifunction control and the **Sabianet** supervisory program.



T-MB wall control



PSM-DI multifunction control



RT03 infra-red remote control

PC



Sabianet screenshot



Sabianet software

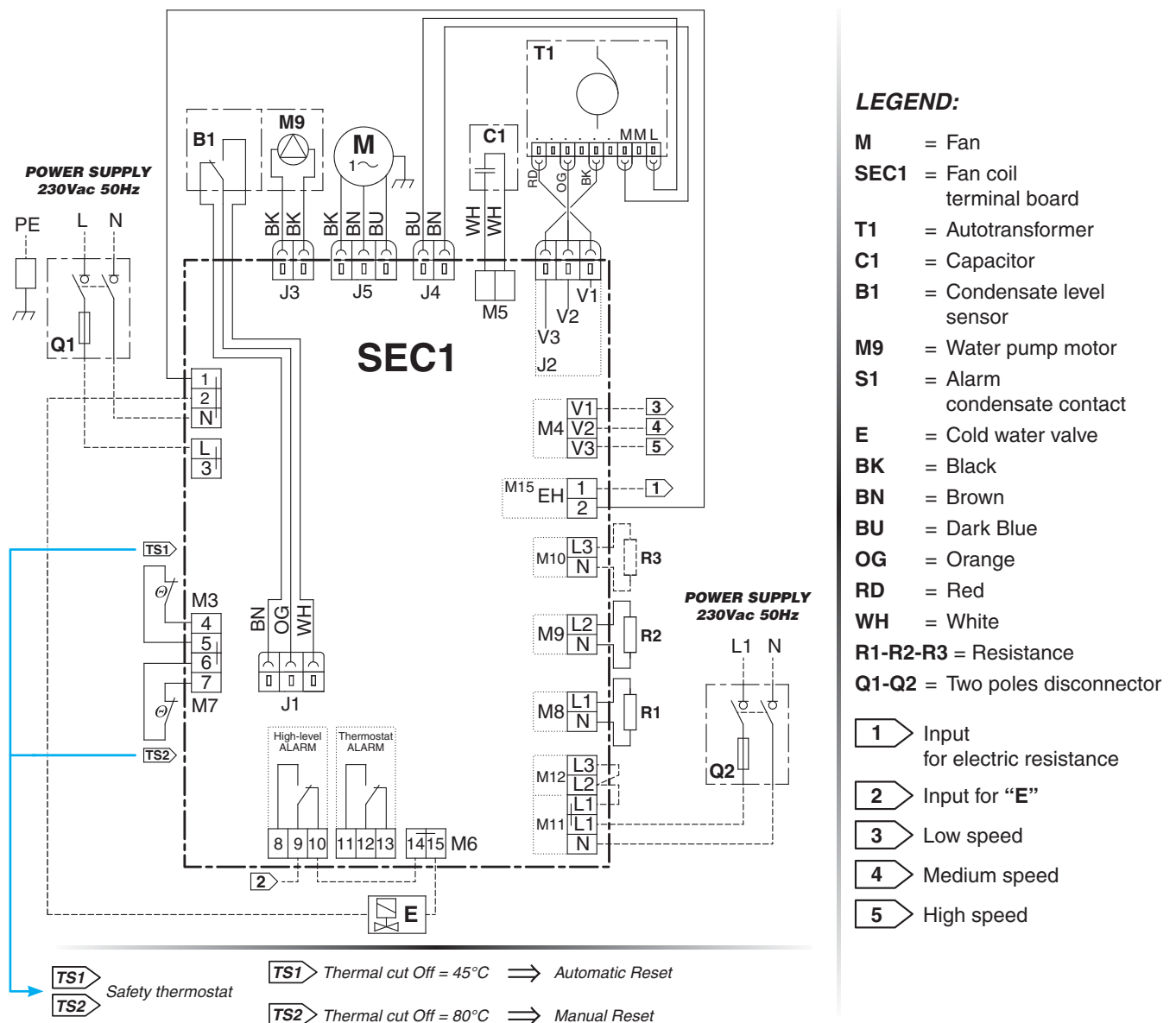
*All the controls for the **ECM** version and their functions are described in detail from Page 48.*

The Cassette 2 pipe models are available with electric resistance that is controlled in place of the heating battery valve. The electric resistance is controlled in place of the hot water valve and not as integration to it. The resistance is hermetically sealed and supplied inside the battery pipes and therefore can be only factory mounted. The electric resistances of the units are for single phase 230V supply. The Cassette includes no. 2 safety thermostats which intervene in case of internal over- heating, opening an auxiliary power relay (included in the shunt box) which stops the power supply to the resistances.

Model	SK 12-E	SK 22-E / SK 32-E	SK 42-E / SK 52-E / SK 62-E
Emission	1500 Watt	2500 Watt	3000 Watt
Supply	230V ~	230V ~	230V ~
Number and Dia. of connecting wires	3 x 1,5 mm ²	3 x 2,5 mm ²	3 x 2,5 mm ²

Note: the cooling emission of the units
is 95% of the emission in the tables of page 6.

Electric diagram



Cassette unit operating limits with electric coil

Max. ambient temperature for Cassette unit with electric coil in heating mode: 25°C

Introduction

The SkyStar ECM series uses an innovative brushless synchronous permanent magnet electric motor controlled by an inverter card that is directly installed on the unit.

The air flow can be varied **continuously** with a 1-10 V signal from Sabiana controls or by independent controllers (programmable controllers with a 1-10 V output).

The extreme efficiency, also at a low speed, makes possible a great reduction in electric consumption (**more than 75% less in comparison to a traditional motor**) with absorption values, under normal operating conditions, that are **no greater than 10 Watt** in the entire range.

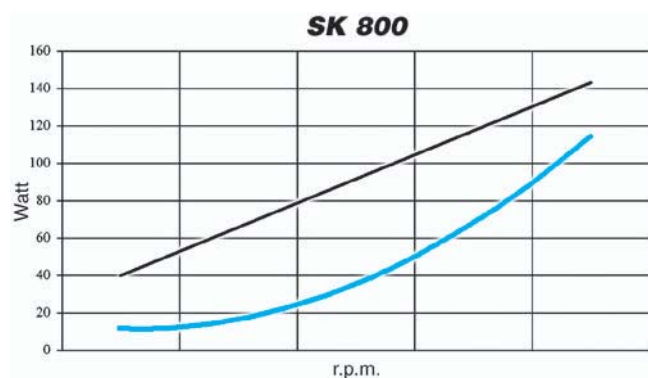
The brushless motor is characterised by a constant synchronous speed, independently of the applied load, that depends only on the motor power supply frequency, which is modulated by the inverter. It consumes less because:

- The motor always works at its point of maximum efficiency.
- In the brushless motor, the rotor's permanent magnets generate the magnetising power autonomously.
- The motor always operates at the synchronous speed, as a result there are no induced currents that reduce efficiency.

The main advantages are:

- Large reduction in energy consumption, thanks to an optimal response to the thermal load of the environment during every moment of the day.
- Operating silence at all rotation speeds.
- Ability to operate at any rotation speed.

MOTOR ABSORPTION



———— = SK ————— = SK-ECM

Main components

INTAKE GRID AND DISTRIBUTION OF THE AIR

Intake grids, frame and adjustable air distribution louvers on each side, made from ABS.

HTA version : white ABS, RAL 9003

HTB version : with intake grid, frame and louvers, choice of one colour only

HTC version : with intake grid and louvers, choice of one colour, plus white ABS frame RAL 9003

HTD version : with louvers, choice of one colour, while the grid and frame are made from ABS, RAL 9003

MD-600 version : metal diffuser painted in RAL 9003 white colour with 600x600 dimension to perfectly fit into the false ceiling standard modules without overlapping parts (800x800 model is not available).

CASING

Is made from galvanized steel with internal thermal insulation with polyolefin (PO) foam (class M1) and external anti-condensate lining.

CONTROL EQUIPMENT

SK-ECM version

It consists of the pump control circuit board and the inverter circuit board.

SK-ECM-MB version

It consists of the MB electronic board (that integrates pump control) and the inverter board.

FAN ASSEMBLY

The fan assembly, which is mounted on anti-vibrating supports, is extremely silent.

The radial fan has been designed to optimise performance, using wing profile blades with a shape that reduces turbulence, increasing efficiency and reducing noise.

The fans are connected to a three phase permanent magnet brushless electronic motor that is controlled with reconstructed current according to a BLAC sinusoidal wave.

The inverter board that controls the motor operation is powered by 230 Volt, single-phase and, with a switching system, it generates a three-phase frequency modulated, wave form power supply.

The electric power supply required for the machine is therefore single-phase with voltage of 230 - 240 V and frequency of 50 - 60 Hz.

COIL

Made of copper tubes with bonded aluminium fins for maximum transfer contact.

The coil have 2 or 3 rows for 2 pipe models and 2+1 rows for 4 pipe models (the heating row is on the inside part of the coil).

For 4 pipe systems two versions are available:

SK 14 and SK 44 supply an higher heating emission;

SK 26, SK 36, SK 56 supply an higher cooling emission.

The heat exchanger is not suitable for use in corrosive atmosphere or in environments where aluminium may be subject to corrosion.

CONDENSATE COLLECTION TRAY

High density ABS polystyrene foam condensate tray, shaped in order to optimize the air diffusion, fire retardant rating B1 to DIN 4102.

AIR FILTER

Synthetic washable filter, easily removable.

CONDENSATE PUMP

Float switch centrifugal pump with 650 mm of maximum head, integral to the unit and wired to the control panel on the outside of the casing.

VALVE SET

Two or three way valves for ON/OFF operation, with pipe mounting kit and thermostatic actuator.

EUROVENT Certification

www.eurovent-certification.com
www.certiflash.com

Technical features

2 pipe units. The following standard rating conditions are used:

COOLING

Entering air temperature: + 27°C d.b., + 19°C w.b.

Water temperature: + 7/12°C

HEATING

Entering air temperature: + 20°C

Water temperature: + 50°C

water flow rate as for the cooling conditions

MODEL		SK-ECM 12			SK-ECM 22			SK-ECM 32			SK-ECM 42			SK-ECM 52		
Inverter Power	Vdc	1	5	10	1	5	10	1	5	10	1	5	10	1	5	10
Speed		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Air flow	m³/h	310	380	535	310	445	710	360	610	880	630	870	1165	710	1130	1770
Cooling total emission (E)	kW	1,84	2,17	2,75	2,24	3,05	4,33	2,56	3,87	5,02	4,21	5,15	6,33	5,29	7,72	10,75
Cooling sensible emission (E)	kW	1,35	1,61	2,09	1,57	2,17	3,18	1,81	2,81	3,74	3,03	3,77	4,72	3,69	5,53	7,94
Heating (E)	kW	2,22	2,67	3,44	2,55	3,58	5,24	2,96	4,63	6,2	5,11	6,35	8,01	5,89	8,83	12,73
Water flow	l/h	317	373	473	385	524	744	441	666	864	723	885	1089	909	1328	1848
ΔP Cooling (E)	kPa	4,9	6,6	10,1	4,6	9,4	15,1	5,9	12,4	19,7	10,9	15,6	22,7	9,4	18,5	33,6
ΔP Heating (E)	kPa	4	5,5	8,7	3,6	6,6	13,1	4,7	10,5	17,7	8,7	12,8	19,5	7,2	14,9	28,8
Sound power Lw (E)	dB(A)	33	39	47	33	43	54	37	50	60	33	39	48	34	47	57
Sound pressure Lp (★)	dB(A)	24	30	38	24	34	45	28	41	51	24	30	39	25	38	48
Fan (E)	W	5	8	16	5	11	31	7	21	62	10	17	33	10	32	108
Water content	l	1,4			2,1			2,1			3,0			4,0		
Dimensions	mm	575 x 575 x 275									820 x 820 x 303					

4 pipe units. The following standard rating conditions are used:

COOLING

Entering air temperature: + 27°C d.b., + 19°C w.b.

Water temperature: + 7/12°C

HEATING

Entering air temperature: + 20°C

Water temperature: + 70/60°C

MODEL		SK-ECM 14			SK-ECM 26			SK-ECM 36			SK-ECM 44			SK-ECM 56		
Inverter Power	Vdc	1	5	10	1	5	10	1	5	10	1	5	10	1	5	10
Speed		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Air flow	m³/h	310	380	535	310	445	710	360	610	880	630	870	1165	710	1130	1770
Cooling total emission (E)	kW	1,85	2,18	2,77	2,09	2,81	3,93	2,38	3,53	4,53	4,3	5,28	6,51	4,98	7,17	9,87
Cooling sensible emission (E)	kW	1,34	1,6	2,08	1,49	2,04	2,95	1,71	2,62	3,46	3,08	3,84	4,83	3,52	5,2	7,4
Water flow	l/h	318	375	476	359	483	676	409	608	779	740	908	1120	856	1233	1697
ΔP Cooling (E)	kPa	4,6	6,2	9,5	3,5	5,7	10,5	4,1	8,4	13,1	9,4	13,6	19,8	8,8	17	30,1
Heating (E)	kW	2,43	2,85	3,62	1,98	2,53	3,35	2,2	3,06	3,79	6,14	7,54	9,36	5,22	7,16	9,51
Water flow	l/h	209	245	311	170	217	288	189	263	326	528	649	805	449	616	818
ΔP Heating (E)	kPa	5,7	7,6	11,7	3,5	5,5	9	4,5	7,5	11	10,5	15,5	22,5	6,5	11	18
Sound power Lw (E)	dB(A)	33	39	47	33	43	54	37	50	60	33	39	48	34	47	57
Sound pressure Lp (★)	dB(A)	24	30	38	24	34	45	28	41	51	24	30	39	25	38	48
Fan (E)	W	5	8	16	5	11	31	7	21	62	10	17	33	10	32	108
Cooling water content	l	1,4			1,7			1,7			3,0			3,6		
Heating water content	l	0,7			0,5			0,5			1,4			1,1		
Dimensions	mm	575 x 575 x 275									820 x 820 x 303					

Condensate pump absorption: 10 W

(E) = Eurovent certified performance.

* = 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.

Emission

Cooling emission of 1 battery units (2 pipe installation)

Entering air temperature: +27°C d.b. +19°C w.b.

ECM Mod.	Speed	Vdc	Air flow	EWT 5 - LWT 10°C			EWT 7 - LWT 12°C			EWT 9 - LWT 14°C			EWT 12 - LWT 17°C		
				Water flow	Total emission	Sensible emission	Water flow	Total emission	Sensible emission	Water flow	Total emission	Sensible emission	Water flow	Total emission	Sensible emission
				m³/h	l/h	kW	l/h	kW	kW	l/h	kW	kW	l/h	kW	kW
SK 12	High	10	535	570	3,32	2,33	473	2,75	2,09	368	2,14	1,84	266	1,54	1,54
	Med	5	380	448	2,60	1,80	373	2,17	1,61	293	1,70	1,42	207	1,21	1,21
	Low	1	310	379	2,2	1,51	317	1,84	1,35	250	1,45	1,18	174	1,01	1,01
SK 22	High	10	710	888	5,17	3,55	744	4,33	3,18	588	3,42	2,80	410	2,38	2,38
	Med	5	445	621	3,61	2,43	524	3,05	2,17	419	2,43	1,91	281	1,63	1,63
	Low	1	310	453	2,63	1,75	385	2,24	1,57	311	1,81	1,38	204	1,18	1,18
SK 32	High	10	880	1035	6,02	4,18	864	5,02	3,74	678	3,94	3,30	482	2,80	2,80
	Med	5	610	793	4,61	3,15	666	3,87	2,81	528	3,07	2,48	363	2,11	2,11
	Low	1	360	520	3,02	2,02	441	2,56	1,81	354	2,06	1,59	235	1,37	1,37
SK 42	High	10	1165	1304	7,58	5,27	1089	6,33	4,72	857	4,98	4,17	604	3,51	3,51
	Med	5	870	1055	6,13	4,21	885	5,15	3,77	701	4,07	3,32	483	2,81	2,81
	Low	1	630	859	4,99	3,39	723	4,21	3,03	576	3,35	2,67	392	2,28	2,28
SK 52	High	10	1770	2210	12,85	8,88	1848	10,75	7,94	1456	8,47	7,00	1031	5,99	5,99
	Med	5	1130	1574	9,15	6,18	1328	7,72	5,53	1059	6,16	4,86	718	4,18	4,18
	Low	1	710	1068	6,21	4,12	909	5,29	3,69	734	4,27	3,24	482	2,80	2,80

Heating emission of 1 battery units (2 pipe installation)

Entering air temperature: +20°C

ECM Mod.	Speed	Vdc	Air flow	EWT 45 - LWT 40°C		EWT 50 - LWT 40°C		EWT 55 - LWT 45°C		EWT 60 - LWT 50°C		EWT 70 - LWT 60°C	
				Water flow	Emission	Water flow	Emission	Water flow	Emission	Water flow	Emission	Water flow	Emission
			m³/h	l/h	kW	l/h	kW	l/h	kW	l/h	kW	l/h	kW
SK 12	High	10	535	493	2,87	272	3,17	330	3,83	387	4,49	500	5,82
	Med	5	380	383	2,22	213	2,48	257	2,99	300	3,49	387	4,51
	Low	1	310	318	1,85	178	2,07	214	2,49	250	2,91	322	3,75
SK 22	High	10	710	749	4,36	420	4,89	505	5,87	589	6,85	758	8,81
	Med	5	445	512	2,98	290	3,38	347	4,04	404	4,70	517	6,01
	Low	1	310	365	2,12	209	2,43	249	2,90	289	3,36	368	4,28
SK 32	High	10	880	886	5,15	494	5,75	595	6,92	696	8,09	896	10,42
	Med	5	610	663	3,85	373	4,34	448	5,20	522	6,07	670	7,79
	Low	1	360	423	2,46	241	2,81	288	3,35	335	3,89	427	4,96
SK 42	High	10	1165	1152	6,70	642	7,47	774	9,00	904	10,51	1165	13,54
	Med	5	870	912	5,30	512	5,95	615	7,15	717	8,34	922	10,72
	Low	1	630	734	4,27	415	4,82	497	5,78	578	6,72	741	8,61
SK 52	High	10	1770	1817	10,56	1015	11,81	1222	14,21	1428	16,60	1837	21,37
	Med	5	1130	1262	7,34	713	8,29	854	9,93	994	11,56	1274	14,82
	Low	1	710	842	4,90	481	5,60	574	6,67	666	7,74	849	9,87

Emission correction factors for different working conditions.

Multiply the factors by the emission figures in the 7-12°C table above.

Total emission				
Water (°C)	Air (°C)	25-18	26-18.5	28-20
7/12 °C	K	0,82	0,89	1,11
10/15 °C	K	0,56	0,63	0,82
14/18 °C	K	0,35	0,41	0,52

Sensible emission				
Water (°C)	Air (°C)	25-18	26-18.5	28-20
7/12 °C	K	0,9	0,94	1,06
10/15 °C	K	0,72	0,78	0,9
14/18 °C	K	0,5	0,58	0,72

Note:

the correction factors are indicative, as they are average values.

Emission of 4 pipe units with standard and enhanced cooling battery

Cooling emission of 2 battery units (4 pipe installation)

Entering air temperature: +27°C d.b. +19°C w.b.

ECM Mod.	Speed	Vdc	Air flow m³/h	EWT 5 - LWT 10°C			EWT 7 - LWT 12°C			EWT 9 - LWT 14°C			EWT 12 - LWT 17°C		
				Water flow	Total emission	Sensible emission	Water flow	Total emission	Sensible emission	Water flow	Total emission	Sensible emission	Water flow	Total emission	Sensible emission
				l/h	kW	kW	l/h	kW	kW	l/h	kW	kW	l/h	kW	kW
SK 14	High	10	535	572	3,32	2,32	476	2,77	2,08	372	2,17	1,83	264	1,54	1,54
	Med	5	380	448	2,61	1,79	375	2,18	1,60	296	1,72	1,41	206	1,20	1,20
	Low	1	310	378	2,20	1,50	318	1,85	1,34	252	1,46	1,18	172	1,00	1,00
SK 26	High	10	710	812	4,72	3,29	676	3,93	2,95	528	3,07	2,60	378	2,20	2,20
	Med	5	445	576	3,35	2,28	483	2,81	2,04	382	2,22	1,79	262	1,53	1,53
	Low	1	310	425	2,47	1,66	359	2,09	1,49	287	1,67	1,31	192	1,12	1,12
SK 36	High	10	880	940	5,46	3,86	779	4,53	3,46	606	3,52	3,05	442	2,57	2,57
	Med	5	610	729	4,24	2,93	608	3,53	2,62	477	2,77	2,31	337	1,96	1,96
	Low	1	360	486	2,82	1,91	409	2,38	1,71	325	1,89	1,50	221	1,29	1,29
SK 44	High	10	1165	1341	7,79	5,40	1120	6,51	4,83	882	5,13	4,26	619	3,6	3,6
	Med	5	870	1081	6,29	4,30	908	5,28	3,84	719	4,18	3,38	497	2,89	2,89
	Low	1	630	877	5,10	3,45	740	4,30	3,08	590	3,43	2,71	398	2,32	2,32
SK 56	High	10	1770	2035	11,83	8,26	1697	9,87	7,40	1332	7,74	6,53	951	5,53	5,53
	Med	5	1130	1467	8,53	5,82	1233	7,17	5,20	979	5,69	4,58	672	3,90	3,90
	Low	1	710	1010	5,87	3,93	856	4,98	3,52	687	3,99	3,09	457	2,66	2,66

Heating emission of 2 battery units (4 pipe installation)

Entering air temperature: +20°C

ECM Mod.	Speed	Vdc	Air flow m³/h	EWT 45 - LWT 40°C		EWT 50 - LWT 40°C		EWT 55 - LWT 45°C		EWT 60 - LWT 50°C		EWT 70 - LWT 60°C	
				Water flow	Emission	Water flow	Emission	Water flow	Emission	Water flow	Emission	Water flow	Emission
				l/h	kW	l/h	kW	l/h	kW	l/h	kW	l/h	kW
SK 14	High	10	535	305	1,78	161	1,87	198	2,30	236	2,74	311	3,62
	Med	5	380	241	1,40	127	1,48	156	1,82	186	2,16	245	2,85
	Low	1	310	205	1,19	108	1,26	133	1,55	158	1,84	209	2,43
SK 26	High	10	710	279	1,62	139	1,61	176	2,04	213	2,48	288	3,35
	Med	5	445	211	1,23	106	1,23	133	1,55	161	1,87	217	2,53
	Low	1	310	165	0,96	83	0,97	105	1,22	127	1,47	170	1,98
SK 36	High	10	880	315	1,83	156	1,82	198	2,31	241	2,80	326	3,79
	Med	5	610	255	1,48	127	1,48	161	1,87	195	2,27	263	3,06
	Low	1	360	184	1,07	93	1,08	117	1,36	141	1,64	189	2,20
SK 44	High	10	1165	793	4,61	421	4,90	517	6,01	613	7,13	805	9,36
	Med	5	870	639	3,72	340	3,96	417	4,85	494	5,75	649	7,54
	Low	1	630	521	3,03	278	3,23	340	3,96	403	4,68	528	6,14
SK 56	High	10	1770	800	4,65	413	4,80	514	5,97	615	7,15	818	9,51
	Med	5	1130	603	3,50	312	3,63	388	4,51	464	5,39	616	7,16
	Low	1	710	440	2,56	229	2,67	284	3,30	339	3,94	449	5,22

Emission correction factors for different working conditions.

Multiply the factors by the emission figures in the 7-12°C table above.

Total emission				
Water (°C)	Air (°C)	25-18	26-18.5	28-20
7/12 °C	K	0,82	0,89	1,11
10/15 °C	K	0,56	0,63	0,82
14/18 °C	K	0,35	0,41	0,52

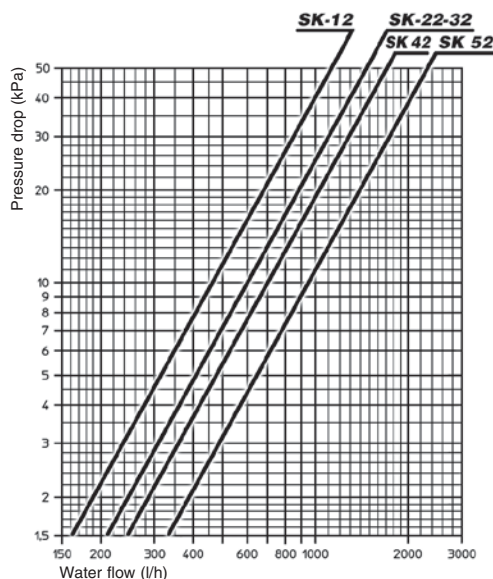
Sensible emission				
Water (°C)	Air (°C)	25-18	26-18.5	28-20
7/12 °C	K	0,9	0,94	1,06
10/15 °C	K	0,72	0,78	0,9
14/18 °C	K	0,5	0,58	0,72

Note:

the correction factors are indicative, as they are average values.

Water side pressure drop

2 pipe installation

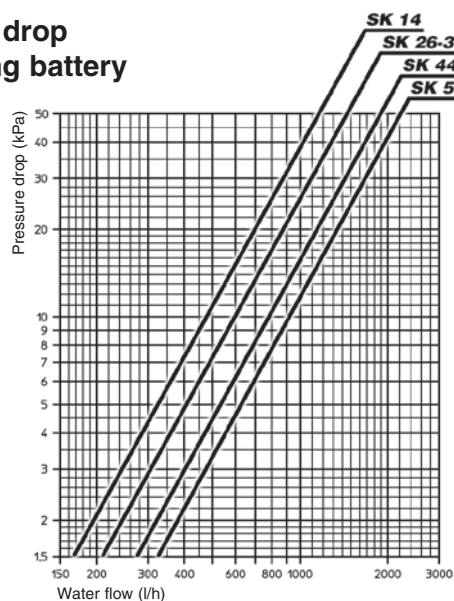


Pressure drop
for mean water temperature of 10°C,
for different temperatures multiply the pressure drop figure
by the K correction factors in the table.

°C	20	30	40	50	60	70	80
K	0,94	0,90	0,86	0,82	0,78	0,74	0,70

4 pipe installation

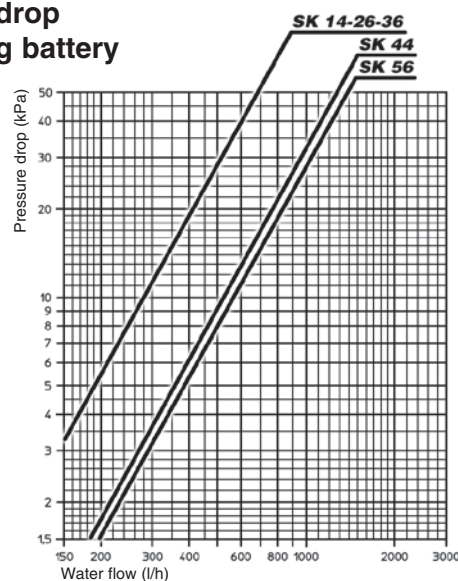
Pressure drop for cooling battery



Pressure drop
for mean water temperature of 10°C,
for different temperatures multiply the pressure drop figure
by the K correction factors in the table.

°C	20	30	40	50	60	70	80
K	0,94	0,90	0,86	0,82	0,78	0,74	0,70

Pressure drop for heating battery



Pressure drop
for mean water temperature of 65°C,
for different temperatures multiply the pressure drop figure
by the K correction factors in the table.

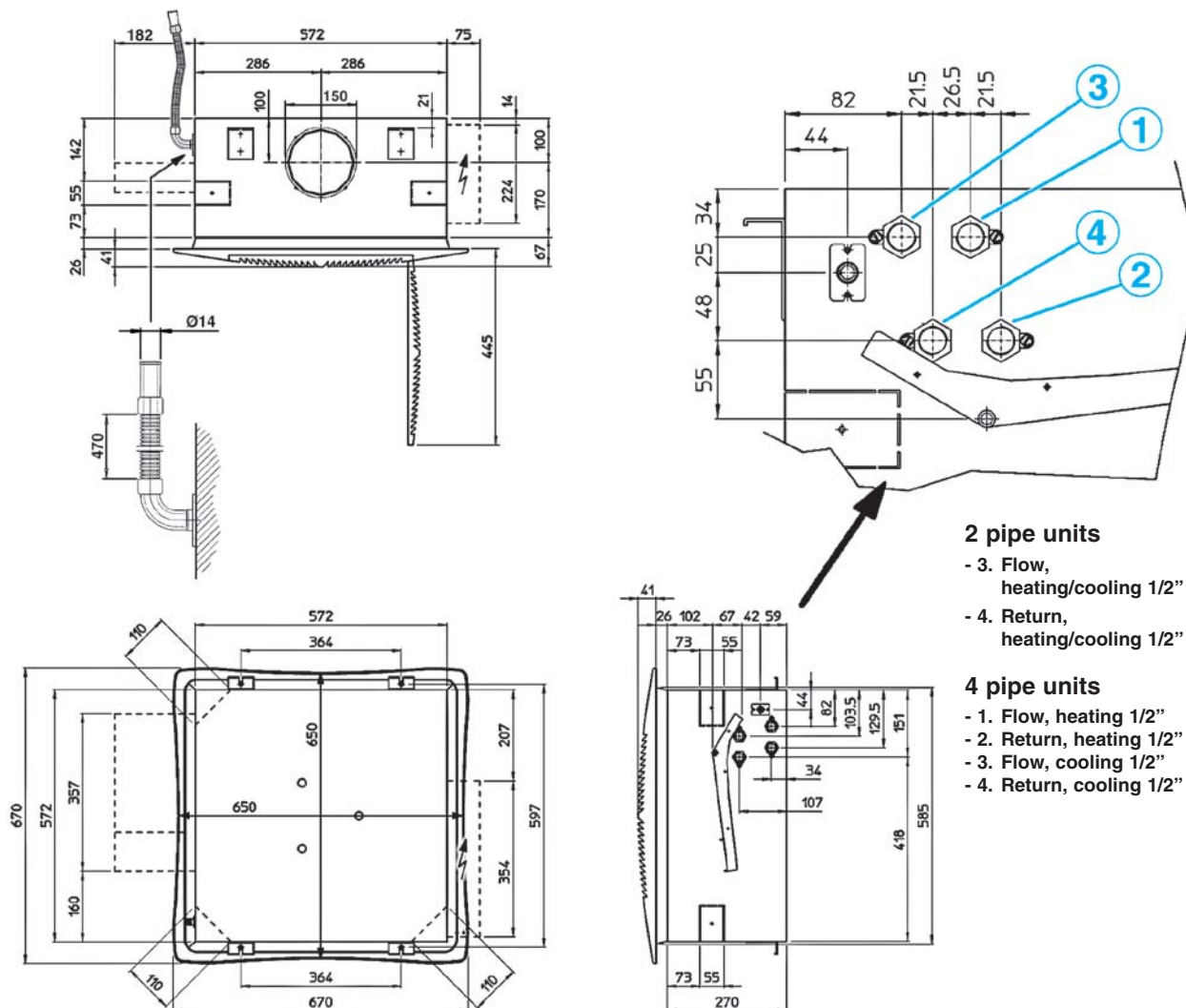
°C	40	50	60	70	80
K	1,14	1,08	1,02	0,96	0,90

Working conditions

Water flow	MAX. working pressure 8 bars	MIN. entering water temperature: + 5°C
		MAX. entering water temperature: + 80°C
Air flow	Suitable relative humidity 15 - 75%	MIN. entering air temperature: 6°C
		MAX. entering air temperature: 40°C
Supply	Single phase 230V 50Hz	
Installation	MAX. height: See table on page 12	

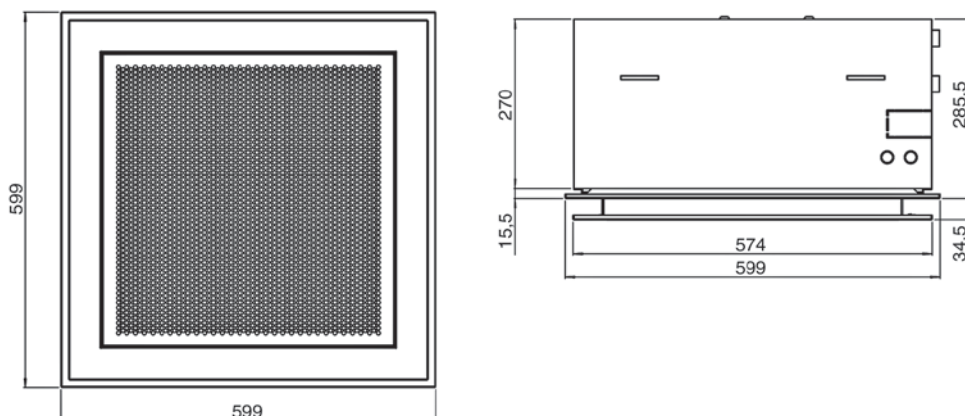
Dimensions and weights

SK 12-14 / SK 22-26 / SK 32-36 (Version 600 x 600)



MD-600 **METAL DIFFUSER**

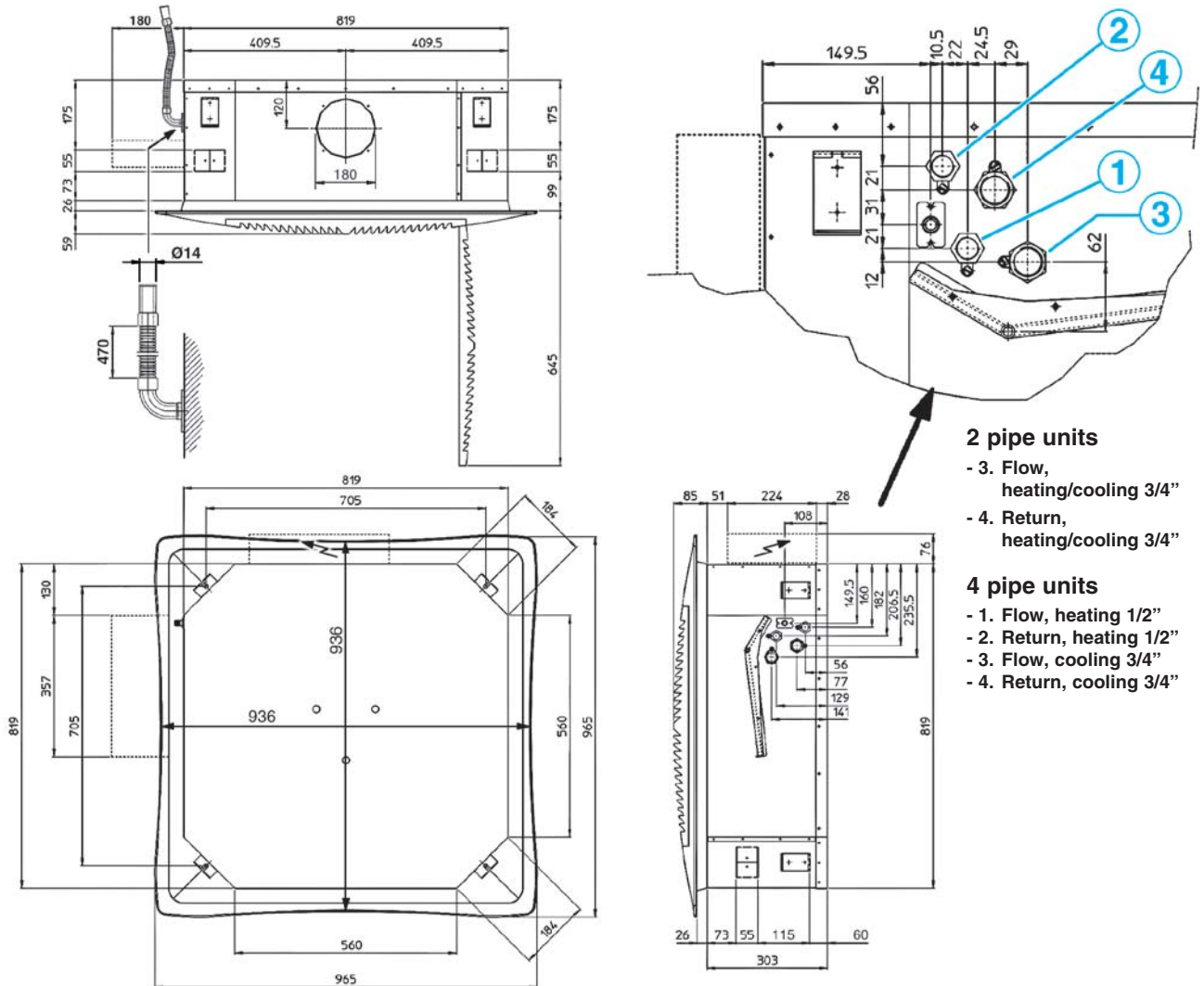
(RS receiver, Code 9066338,
for MD-600 metal diffuser
for MB units)



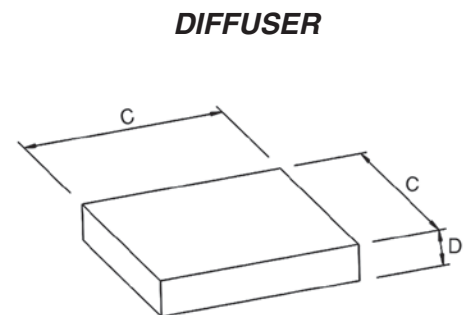
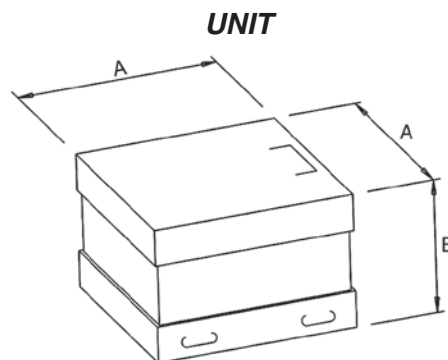
	UNIT		DIFFUSER		Packed unit Dimensions			
ECM Model	Weights packed unit	Weights unpacked unit	Weights packed unit	Weights unpacked unit	A	B	C	D
	kg	kg	kg	kg	mm			
SK 12	28	22	6	3	790	350	750	150
SK 14								
SK 22 - 26								
SK 32 - 36								
	30	24						

Dimensions and weights

SK 42-44 / SK 52-56 (Version 800 x 800)



PACKED UNIT



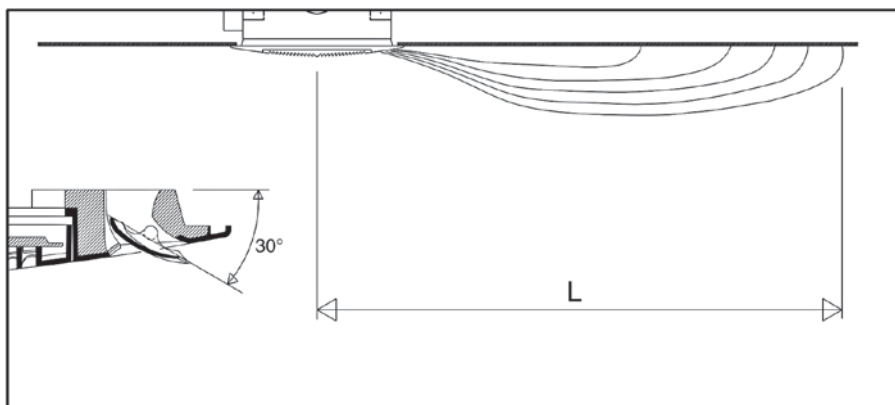
ECM Model	UNIT		DIFFUSER		Packed unit Dimensions			
	Weights packed unit	Weights unpacked unit	Weights packed unit	Weights unpacked unit	A	B	C	D
	kg	kg	kg	kg	mm			
SK 42	44	36	10	6	1050	400	1000	200
SK 44	47	39						
SK 52 - 56								

Air throw

The air throw indicated in the tables must only be considered the maximum value, as it may change significantly in relation to the dimensions of the room in which the appliance is installed and the positioning of the furniture in the room.

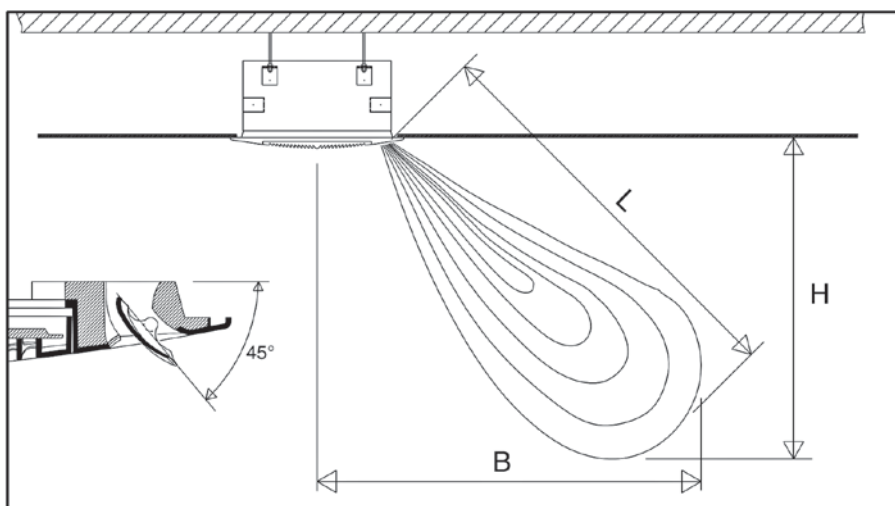
The useful throw **L** refers to the distance between the unit and the point where the air speed is 0.2 m/sec; if the louver has a gradient of 30° (recommended in cooling mode), the so-called “Coanda” effect will occur, illustrated in the first figure, while at a gradient of 45° (recommended in heating mode), there will be a downwards throw, as illustrated in the second figure.

With adjustable air diffusion louvers at 30°



ECM Model		SK 12-14			SK 22-26			SK 32-36			SK 42-44			SK 52-56		
Speed		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Air throw	L m	3,0	3,5	3,8	3,0	3,8	4,5	3,5	4,2	5,0	3,2	3,7	4,3	3,4	4,0	5,0

With adjustable air diffusion louvers at 45°



ECM Model		SK 12-14			SK 22-26			SK 32-36			SK 42-44			SK 52-56		
Speed		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Air throw	L m	3,3	3,9	4,2	3,3	4,2	4,8	3,9	4,5	5,2	3,5	4,1	4,8	3,8	4,6	5,4
Height	H m	2,2	2,6	2,8	2,2	2,8	3,2	2,6	3,0	3,4	2,2	2,6	3,0	2,4	2,8	3,4
Distance	B m	2,5	2,9	3,1	2,5	3,1	3,6	2,9	3,4	3,9	2,7	3,2	3,8	3,0	3,6	4,2

NOTE: On heating it must be payed attention to rooms where the floor temperature is particularly low (for example less than 5°C).

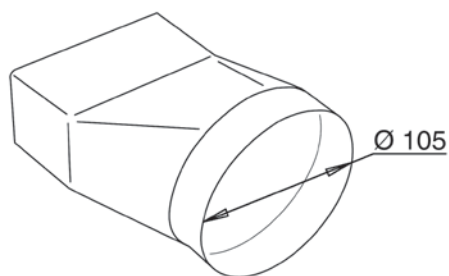
In this situation the floor can cool the lower layer of air to a level that stop the uniform diffusion of the hot air coming from the unit, decreasing the throw figures shown in the table.

Accessories

Fresh air connection

See page 13.

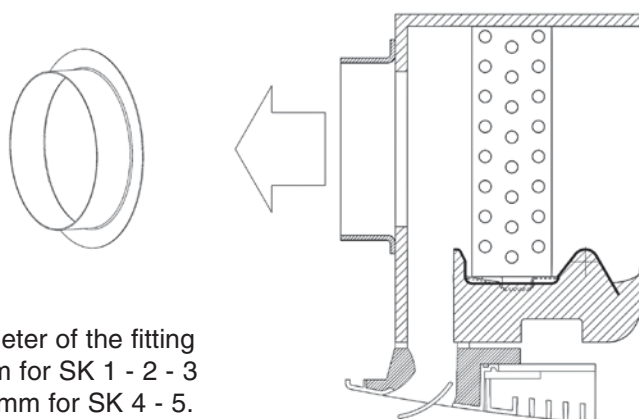
IDENTIFICATION	CODE
CAP	6078005



Air distribution connection

See page 13.

IDENTIFICATION	CODE
CDA 600	9079232
CDA 800	9079233



The diameter of the fitting is 150 mm for SK 1 - 2 - 3 and 180 mm for SK 4 - 5.

Fresh air kit

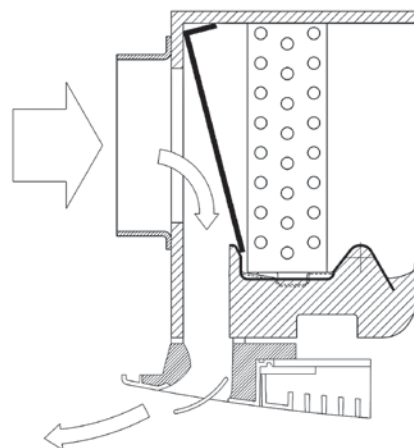
This is used to introduce fresh air into the environment directly through the diffuser. The kit includes a flow separator to be fitted inside the cassette, and a circular fitting for connection to the flexible system ducting. The flow of air is sent directly to just one of the outlet louvers, without passing through the coil. The air flow of fresh air introduced into the environment depends on the inlet static pressure.

MODEL	SK 1-2-3	SK 4-5
IDENTIFICATION	PRT 600	PRT 800
CODE	9079230	9079231

Correlation between flow-rate / static pressure

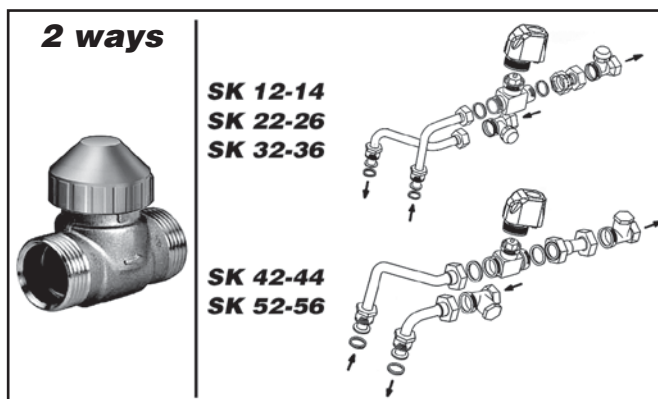
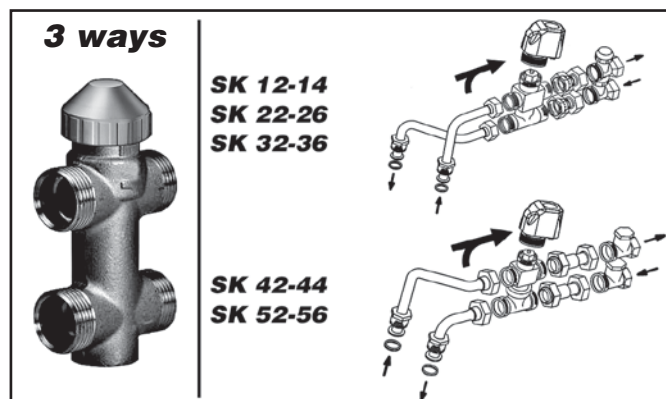
SK 1-2-3		SK 4-5	
m³/h	Pa	m³/h	Pa
80	3	160	3
120	8	200	8
160	15	300	15
200	25	400	25
240	36	500	36

The diameter of the fitting is 150 mm for SK 1 - 2 - 3 and 180 mm for SK 4 - 5.

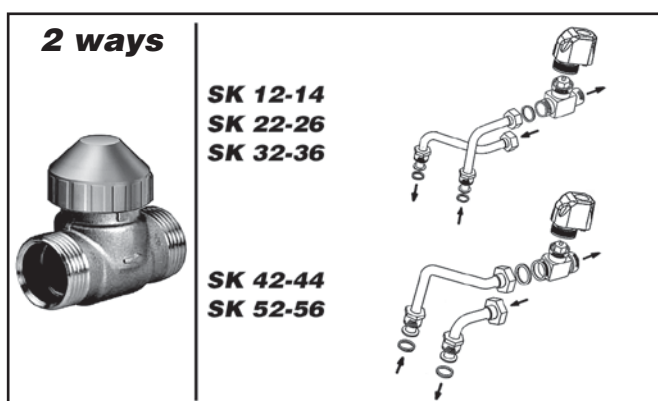
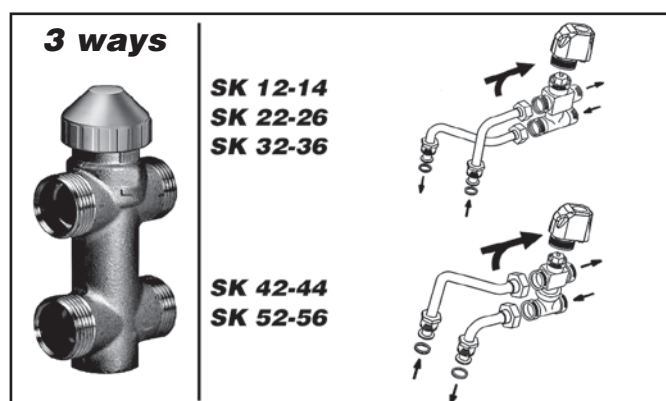


ON-OFF valves with thermoelectric actuator

VALVE WITH MICROMETRIC LOCKSHIELD VALVE



VALVE WITH SIMPLIFIED KIT



Technical data:

Rated pressure:	16 bar
Max. ambient temperature:	50 °C
Max. water flow temperature:	110 °C
Power:	230 V - 50/60 Hz
Rating:	3 VA
Protection:	IP 43
Travel time:	approx. 3 min.
Max. glycol content of water:	50%

Valves characteristics

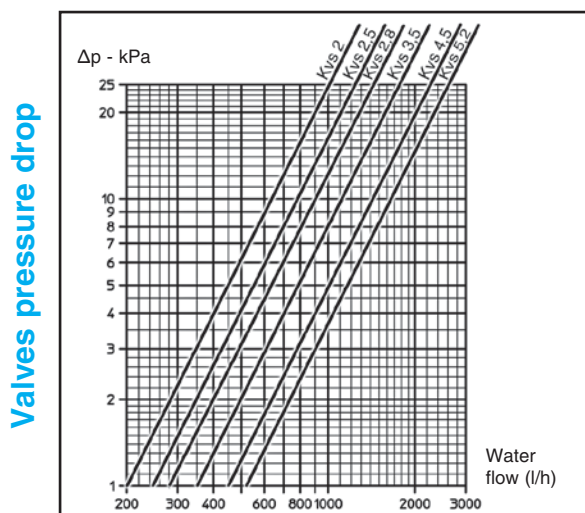
Battery type	ECM Model	2 way valves			3 way valves		
		K _{vs} m ³ /h	Δp _{max} kPa *	Valve ** connection	K _{vs} m ³ /h	Δp _{max} kPa *	Valve ** connection
Main	12 - 22 - 32	2,8	50	3/4"	2,5	50	3/4"
	14 - 26 - 36						
	42 - 52	5,2	60	1"	4,5	50	1"
	44 - 56						
Auxiliary	14 - 26 - 36	2,8	50	3/4"	2,5	50	3/4"
	44 - 56						

* maximum pressure difference for valve to close ** external thread, flat seal
Note: 3 way valves with simplified kit and 1" connection have conical seal.

Valve set, 2 or 3 ways, ON-OFF, with thermoelectric actuator.
The set includes connection pipes.

Note: The main battery lockshield valve connection is 1/2" female (K_{vs} 2) for SK1 - SK2 - SK3 sizes and 3/4" female (K_{vs} 3,5) for SK4 - SK5 sizes, the auxiliary battery valve connection is 1/2" female (K_{vs} 2).

Note: The maximum pressure drop across the fully open valve should not exceed 25 kPa for cooling operation and 15 kPa for heating operation.



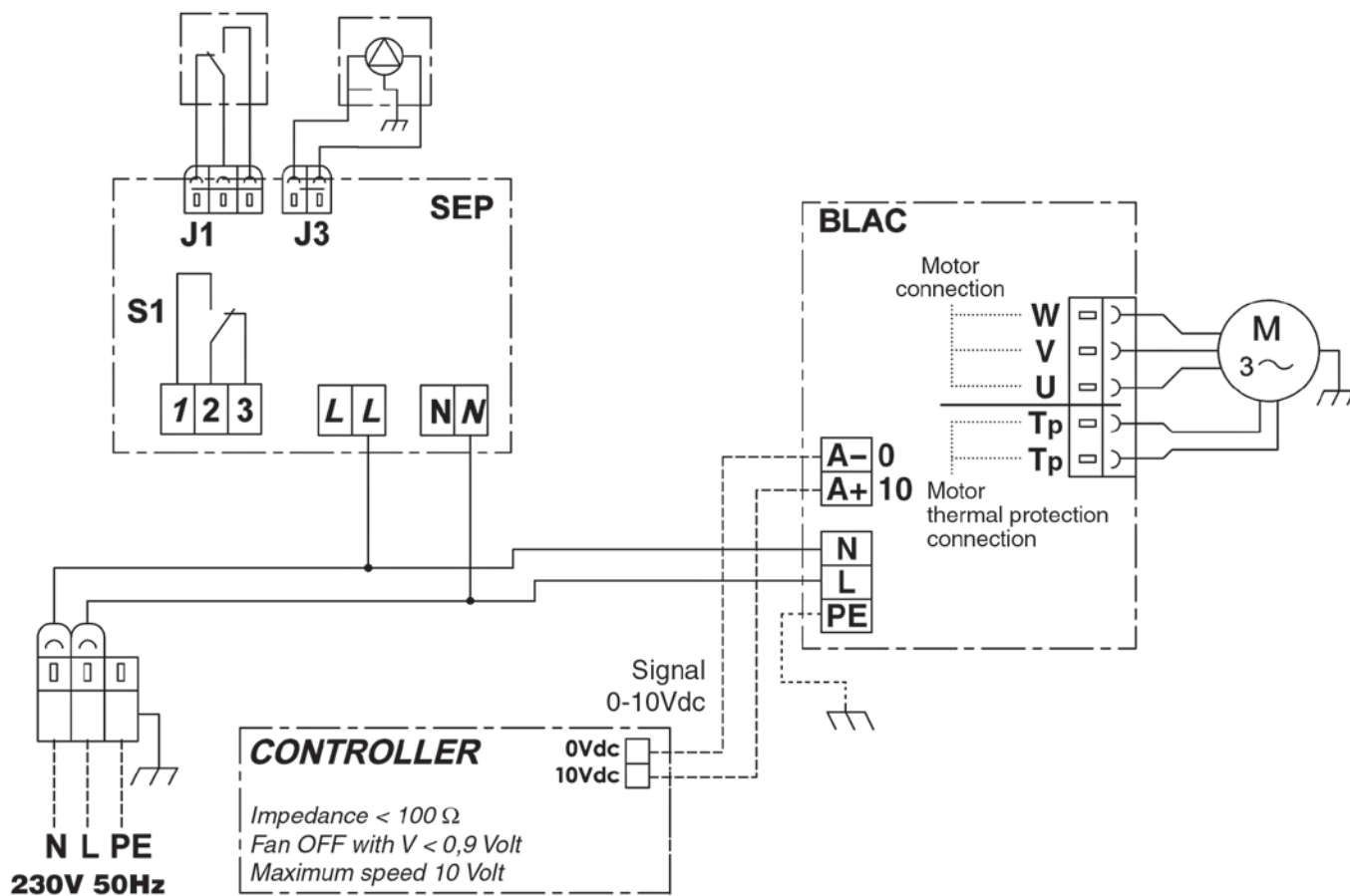
For 2 way balance valve, refer to page 16.

SK-ECM configuration

For this cassette configuration, the 1-10 Vdc signal, which controls the inverter, must be supplied by a controller with the following signal specifications:

- Impedance < 100 Ω ;
- Maximum speed 10Vdc;
- Fan OFF with V < 0.9Vdc.

SK-ECM electric diagram



LEGEND

SEP = Pump control board **M** = Electronic motor
BLAC = Inverter board **CONTROLLER** = Controller

Wall electronic controls

IDENTIFICATION	CODE
CR-T-ECM	9066342



Dimensions: 133x93x37 mm

The control must always be connected with UPM-ECM power unit (fitted on the unit) or with UPS-ECM power unit (not fitted on the unit).

- It allows to control up to 16 units (one power unit for each unit).
- ON-OFF switch.
- Manual 3 speed switch or automatic continuous speed control.
- Manual Summer/Winter switch.
- Continuous speed control based on the difference between ambient temperature and Set temperature (speed switch in Auto position).
- Electronic room thermostat for fan or valve control (ON-OFF).
- Simultaneous thermostatic control of the valves and fan.
- It allows to control low temperature cut-out thermostat (NTC).
- It allows to control summer/winter cycle with a centralized and remote switch or with an automatic change-over fitted on the water pipe (for 2-tube installations only).

IDENTIFICATION	CODE
CR-DI-ECM	9066316



Dimensions: 135x88x25 mm

The control must always be connected with UPM-ECM power unit (fitted on the unit) or with UPS-ECM power unit (not fitted on the unit).

- It allows to control up to 16 units (one power unit for each unit).
- ON-OFF switch.
- Manual 3 speed switch or automatic continuous speed control.
- Manual Summer/Winter switch.
- Continuous speed control based on the difference between ambient temperature and Set temperature (speed switch in Auto position).
- Electronic room thermostat for fan or valve control (ON-OFF).
- Simultaneous thermostatic control of the valves and fan.
- It allows to control low temperature cut-out thermostat (NTC).
- It allows to control summer/winter cycle with a centralized and remote switch or with an automatic change-over fitted on the water pipe (for 2-tube installations only).
- Time setting.
- Weekly ON/OFF program.

IDENTIFICATION	CODE
WM-AU	9066632



Dimensions: 135x86x24 mm

The control must always be connected with UPM-AU power unit (fitted on the unit) or with UP-AU power unit (not fitted on the unit).

- ON-OFF push button.
- Manual or automatic 3 speed progressive push button.
- Summer/Winter/Fan/Auto mode push button.
- Electric heater/IAQ filter activation button.
- Electronic room thermostat for fan control (ON-OFF) and for valve control (ON-OFF).
- Simultaneous thermostatic control of the valves and fan.
- It allows to control the low temperature cut-out thermostat (TME).
- It allows to control the chilled water valve (ON-OFF) and the electric heater in the SK-E version.
- It allows to control the summer/winter cycle with a centralized and remote switch or with an automatic change-over fitted on the water pipe (for 2-tube installations only).
- Energy saving push button.

N.B.: with 4 pipe installations and continuous chilled and hot water supply, it allows the automatic summer winter change-over in accordance to the room temperature (-1°C = Winter, +1°C = Summer, Neutral Zone 2°C).

IDENTIFICATION	CODE
T-MB	9066331E



Dimensions: 110x72x25 mm

The control must always be connected with UPM-AU power unit (fitted on the unit) or with UP-AU power unit (not fitted on the unit).

Wall control with display that allows controlling one or more units in Master/Slave mode. The control is equipped with internal sensor to detect the room temperature, which can be defined as a priority compared to the return air sensor on the fan coil.

The T-MB control features the following functions:

- Switch the unit ON and OFF.
- Temperature set.
- Manual, centralized or automatic Summer/Winter switch.
- Set the fan speed (low, medium, high or autofan).
- Set the operation mode (fan only, cooling, heating; auto for 4 pipe systems with mode selection depending on the air temperature).
- Time setting.
- Weekly ON/OFF program.

Wall electronic control accessories

DESCRIPTION	IDENTIFICATION	CODE
Power unit for CR-T-ECM and CR-DI-ECM remote control (fitted on the unit)	UPM-ECM	9066341
Power unit for CR-T-ECM and CR-DI-ECM remote control (not fitted on the unit)	UPS-ECM	9066340
Power unit for WM-AU and T-MB remote control (fitted on the unit)	UPM-AU	9066641
Power unit for WM-AU and T-MB remote control (not fitted on the unit)	UP-AU	9066640



Power unit to be installed on the fan coil (fan coil interface).

- It controls the fan and the valves of the fan coil.
- It is connected to the electric supply.
- It receives the information required from the control.

Control power absorption UPM-ECM and UPS-ECM: 1,5 VA

Control power absorption UPM-AU and UP-AU: 2,3 VA

NTC low temperature cut-out thermostat

To be fitted between the coil fins. When connecting the control, the NTC probe cable must be separated from the power supply wires.

To be used with CR-T-ECM and CR-DI-ECM controls.

It stops the fan when the water temperature is lower than 28°C and it starts the fan when is higher than 33°C.

IDENTIFICATION	CODE
NTC	3021090



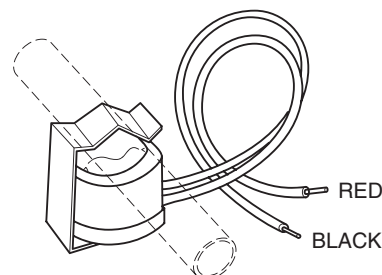
Change-Over CH 15-25

Automatic summer/winter switch to be installed in contact with the water circuit.

For 2-tube installations only (not to be used with 2 way valve).

To be used with CR-T-ECM, CR-DI-ECM, WM-AU and T-MB controls.

IDENTIFICATION	CODE
CH 15-25	9053049



TME low temperature cut-out thermostat

Suitable for wall controls only (not infra-red remote control). To be fitted between the coil fins; when connecting the control, the TME probe cable must be separated from the power supply wires.

To be used with WM-AU and T-MB controls.

It stops the fan when the water temperature is lower than 38°C and it starts the fan when is higher than 42°C.

IDENTIFICATION	CODE
TME	3021091



T2 sensor

T2 sensor to be placed on the water supply pipe upstream 3 way valves (not to be used with 2 way valve).

The T2 sensor must be used as described below:

- Change-Over for the automatic switch of the operating mode. If water temperature is lower than 20°C, cooling mode is set; on the other hand, if water temperature exceeds 30°C, heating mode is set.
- It can be used on units with electric heater and hot water supply. The T2 priority probe activates the electric heater or water valve, depending on the water temperature detected. If water temperature exceeds 34°C, the water valve ON-OFF control is activated; on the other hand, if water temperature is lower than 30°C, the electric heater is activated.

To be used with WM-AU and T-MB controls.

IDENTIFICATION	CODE
T2	9025310



Controls for **SK-ECM-MB** versions

All the **SkyStar ECM** units can be supplied in **MB version**. This version includes a wide range of controls, including the **infra-red remote control**, which allows managing one single unit or several units by using the **Modbus RTU - RS 485** communication protocol.

Units can be managed according to the Master/Slave logic (up to 20 units) or by supervisory components.

The system consists in a **MB board** (mounted on models **SK-MB** and **SK-ECM-MB**) and a series of controls, such as the **T-MB** wall control, the **RT03** infra-red remote control, the **PSM-DI** multifunction control and the **Sabianet** supervisory program.



T-MB wall control



PSM-DI multifunction control



RT03 infra-red remote control

PC



Sabianet screenshot



Sabianet software

All the controls and their functions are described in detail from Page 48.

Electric heater **SK-ECM-E**

The Cassette 2 pipe models are available with electric resistance that is controlled in place of the heating battery valve. The electric resistance is controlled in place of the hot water valve and not as integration to it.

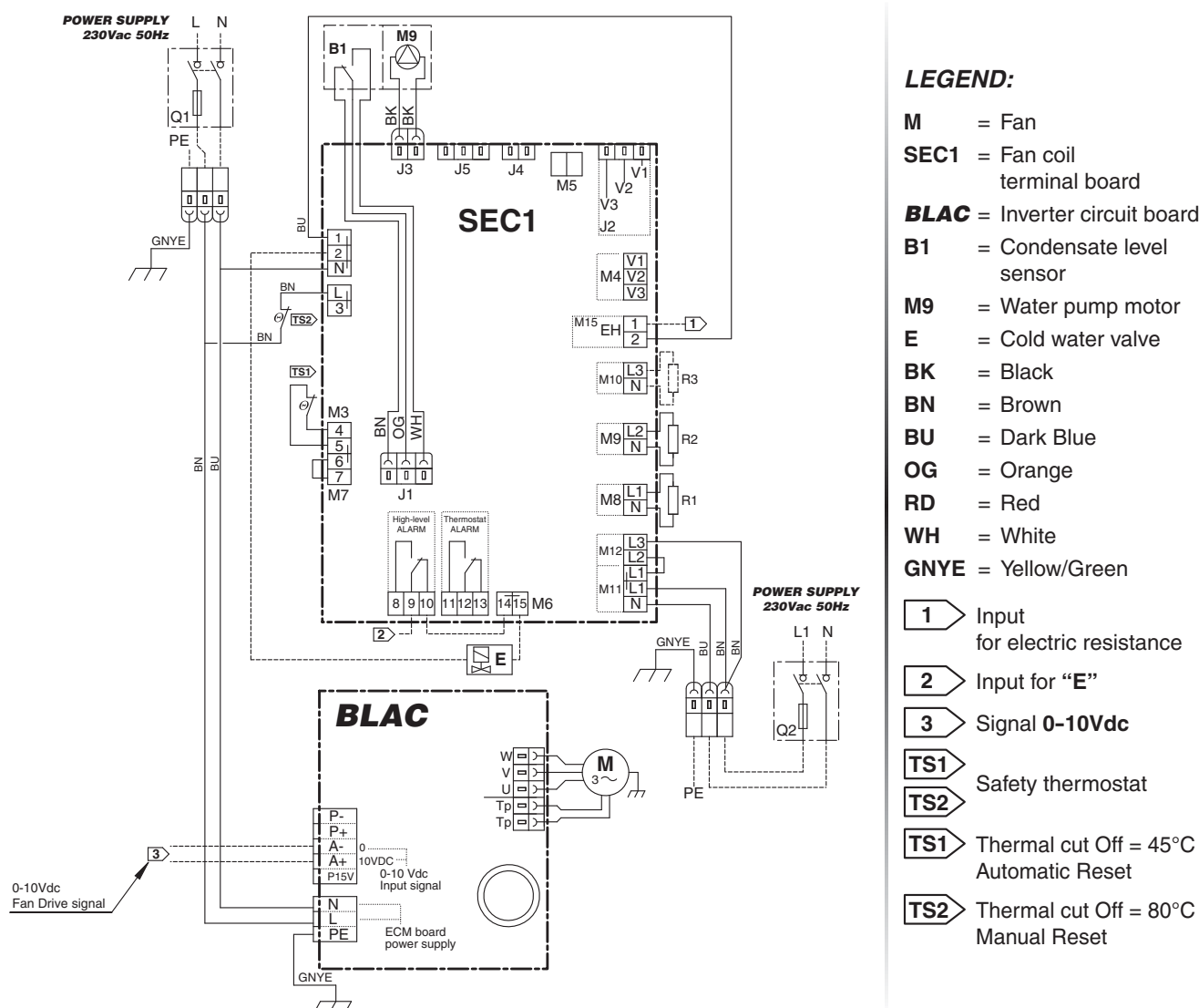
The resistance is hermetically sealed and supplied inside the battery pipes and therefore can be only factory mounted. The electric resistances of the units are for single phase 230V supply.

The Cassette includes no. 2 safety thermostats which intervene in case of internal over- heating, opening an auxiliary power relay (included in the shunt box) which stops the power supply to the resistances.

ECM Model	SK 12-E	SK 22-E / SK 32-E	SK 42-E / SK 52-E / SK 62-E
Emission	1500 Watt	2500 Watt	3000 Watt
Supply	230V ~	230V ~	230V ~
Number and Dia. of connecting wires	3 x 1,5 mm ²	3 x 2,5 mm ²	3 x 2,5 mm ²

Note: the cooling emission of the units
is 95% of the emission in the tables of page 6.

Electric diagram



Cassette unit operating limits with electric coil

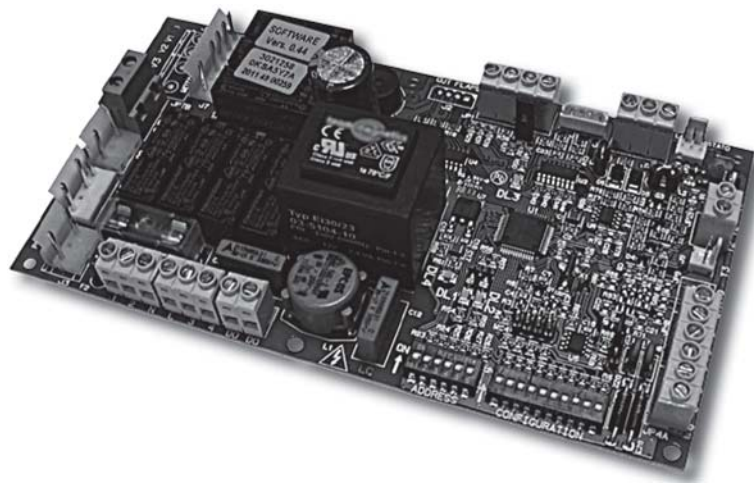
Max. ambient temperature for Cassette unit with electric coil in heating mode: 25°C

MB controls

MB electronic board

The **MB** electronic board, mounted as per standard on the SK-MB and SK-ECM-MB versions, is set to carry out different functions and adjustment modes, in order to meet the installation requirements.

These modes are selected by setting the configuration dip switches on the board.



- 2/4 pipe system.
- Fan ON/OFF thermostatic control.
- Valve ON/OFF thermostatic control and continuous ventilation.
- Valve and simultaneous ventilation ON/OFF thermostatic control.
- Fan operation control depending on the coil temperature (cut-out T3 probe fitted), which can be activated only in heating mode or heating and cooling mode.
- Automatic switch of the operating mode by means of T2 water probe (optional) applied on the 2 pipe system.
- Seasonal switch by means of remote contact.
- ON/OFF of the fan coil by means of the remote contact (window or clock contact).
- Electric heater control.

By activating the cut-out T3 probe function, the fan is stopped in winter when the coil temperature is lower than 32°C and started when the temperature reaches 36°C. In summer mode, the fan stops when the temperature inside the coil exceeds 22°C and starts when it drops below 18°C.

The following connections are located on the power board:

- Receiver for infra-red remote control.
- T-MB wall control.
- RS 485 serial connection to manage several fan coils in Master/Slave configuration or to create a supervisory network.

MB controls

T-MB wall control

DESCRIPTION	IDENTIFICATION	CODE
Wall control (to be used with SK-MB and SK-ECM-MB version only)	T-MB	9066331E

Wall control with display that allows controlling one or more units in Master/Slave mode. The control is equipped with internal sensor to detect the room temperature, which can be defined as a priority compared to the return air sensor on the fan coil.

The **T-MB** control features the following functions:

- Switch the appliance ON and OFF.
- Temperature set.
- Modify the set point (when used as a +/- 3° variation of the set point configured from Sabianet supervisory program or PSM-DI).
- Set the fan speed (low, medium, high or autofan).
- Set the operation mode (fan only, cooling, heating; auto for 4 pipe systems with mode selection depending on the air temperature).
- Time setting.
- Weekly ON/OFF program.
- Display and change of the fan coil operation parameters.



Dimensions: 110x72x25 mm

MB controls

RT03 infra-red remote control

DESCRIPTION	IDENTIFICATION	CODE
RT03 infra-red remote control with receiver supplied with separate packaging (to be used with SK-MB and SK-ECM-MB version only)	RCS-RT03	9079117
Receiver for RT03 infra-red remote control supplied with separate packaging (to be used with SK-MB and SK-ECM-MB version only)	RCS	9079116
Receiver for RT03 infra-red remote control and MD-600 metal diffuser supplied with separate packaging (to be used with SK-MB and SK-ECM-MB version only)	RS	9066338
RT03 infra-red remote control supplied with separate packaging (to be used with SK-MB and SK-ECM-MB version only)	RT03	3021203

The infra-red remote control allows setting by a remote position the fan coil operation parameters.

The **RT03** infra-red remote control features the following functions:

- Switch the appliance ON and OFF.
- Temperature set.
- Set the fan speed (low, medium, high or autofan).
- Set the operation mode (fan only, cooling, heating; auto for 4 pipe systems with mode selection depending on the air temperature).
- Time setting.
- 24 hours ON/OFF program.

**INSTALLATION EXAMPLE
WITH INFRA-RED REMOTE CONTROL**



IDENTIFICATION	CODE
RT03	3021203



IDENTIFICATION	CODE
RCS-RT03	9079117



IDENTIFICATION	CODE
RCS	9079116

MB controls

A group of **SkyStar MB** can be connected via a serial link and can consequently be managed at the same time by just one **T-MB** wall control or **RT03** infra-red remote control. Using the special jumper present on the **MB** board, one unit must be configured as the master, and all the others as slaves. It is clear that the remote control must be pointed at the receiver on the master unit. To avoid problems, it is recommended to install and connect the receiver only on the master unit.

With T-MB wall control

One control for each cassette
(MAXIMUM LENGTH OF THE CONNECTION CABLE = 20 m)



One control for more cassettes (20 units max.)
(MAXIMUM TOTAL LENGTH OF THE CONNECTION CABLE = 800 m)

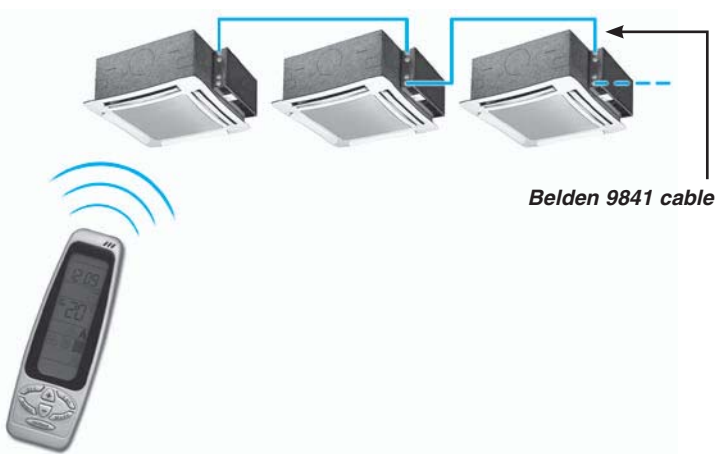


With RT03 infra-red remote control

One control for each cassette



One control for more cassettes (20 units max.)
(MAXIMUM TOTAL LENGTH OF THE CONNECTION CABLE = 800 m)



T2 accessory for units with MB electronic board

IDENTIFICATION	CODE
T2	9025310



The T2 sensor can be combined with MB boards to be placed on the water supply pipe upstream 3 way valves (not to be used with 2 way valve).

The T2 sensor must be used as described below:

- Change-Over for 2-pipe system for the automatic switch of the operating mode.
If water temperature is lower than 20°C, cooling mode is set; on the other hand, if water temperature exceeds 30°C, heating mode is set.
- It can be used on units with electric heater and hot water supply. The T2 priority probe activates the electric heater or water valve, depending on the water temperature detected. If water temperature exceeds 34°C, the water valve ON-OFF control is activated; on the other hand, if water temperature is lower than 30°C, the electric heater is activated.

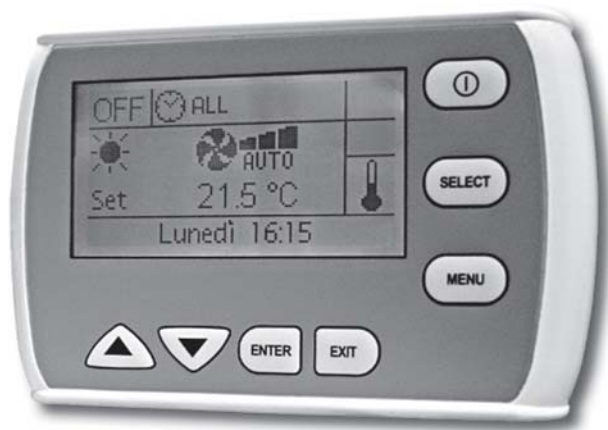
MB controls

PSM-DI multifunction control panel

DESCRIPTION	IDENTIFICATION	CODE
Multifunction control (to be used with SK-MB and SK-ECM-MB version only)	PSM-DI	3021293

Another option available for the serial communication between the units is the possibility to connect up to 60 **Cassette** units in series and manage them with just one wall mounted **PSM-DI** controller. The wall mounted controller can be used to set the operating mode for each individual unit connected, display the operating conditions of each individual unit, and set the ON/OFF time sets for each day of the week (the program can be set for all the units and for a maximum of two groups of units).

If more than 60 units need to be connected, two or more controllers must be used. Each unit must have a MB board. The **PSM-DI** control is used to manage a series of fan coils, up to a maximum of 60 units (the maximum length of the RS 485 connection cable must not exceed 800 m), from one single control point.



The **PSM-DI** control communicates via a serial line with all the units connected, with the possibility of controlling them all together or individually. In fact, the unique address of each individual fan coil means that all the units can be called at the same time, or the individual unit called, to perform the following functions:

- display the current operating mode, the fan speed, the set point;
- display the room temperature measured on the individual unit;
- turn all the units ON and OFF at the same time or alternatively each unit individually;
- change the operating mode (fan only, heating, cooling, automatic changeover);
- change the set point;
- modify the values and operation parameters of the fan speed.

Each function can then be sent to all the units connected, or alternatively to each individual unit.

Different set points or operating modes can be set for each individual unit.

The **PSM-DI** panel can also be used for the time management of the units over the week. Four ON times and four OFF times can be set on the units for each day of the week. A different Temperature set that will be considered as Operation set for all connected appliances, can be set for each event. If the Temperature set is not entered for the individual event, it must be set during programming for each individual unit or for the entire network.

Units without receiver or with receiver can be connected within the network: the former can receive instructions only from the **PSM-DI** wall mounted panel; while the latter can receive information from both the wall mounted panel (**PSM-DI**) and infra-red remote control. Use the infra-red remote control to force ON mode of the individual unit, if ON/OFF daily time programming has been set. The unit will regain the settings from the **PSM-DI** panel during execution of successive start-up program.

The PSM-DI panel cannot be used together with the Sabianet management program (see next page).

Note: set the configuration Dip Switches of each fan coil as illustrated in the remote control use manual, based on the required solutions.

Note: the RS 485 network's overall length must not exceed 700/800 metres.

Management system for a network of fan coils

Sabianet program for managing a network of Sabiana MB fan coils

DESCRIPTION	IDENTIFICATION	CODE
Hardware/software supervisory system (to be used with SK-MB and SK-ECM-MB version only)	Sabianet	9079118

Sabianet is a centralised control system for networks of Sabiana MB fan coils, based on software that runs on LINUX™ operating system (the program is provided pre-installed on a PC). The **Sabianet** software offers a practical and economical solution for managing the units, with the simple click of the mouse.

The main characteristics include:

- simplicity of use;
- an extremely complete and functional weekly program;
- possibility to access the historical operating data for each individual unit connected.

The program exploits all the potential of our units with remote controls, representing an addition to the latter.

The **Sabianet** program is a control tool that can be used as a replacement for the remote control, or in parallel, however the settings made using **Sabianet** can have priority over those made using the remote control.

The program can be used to:

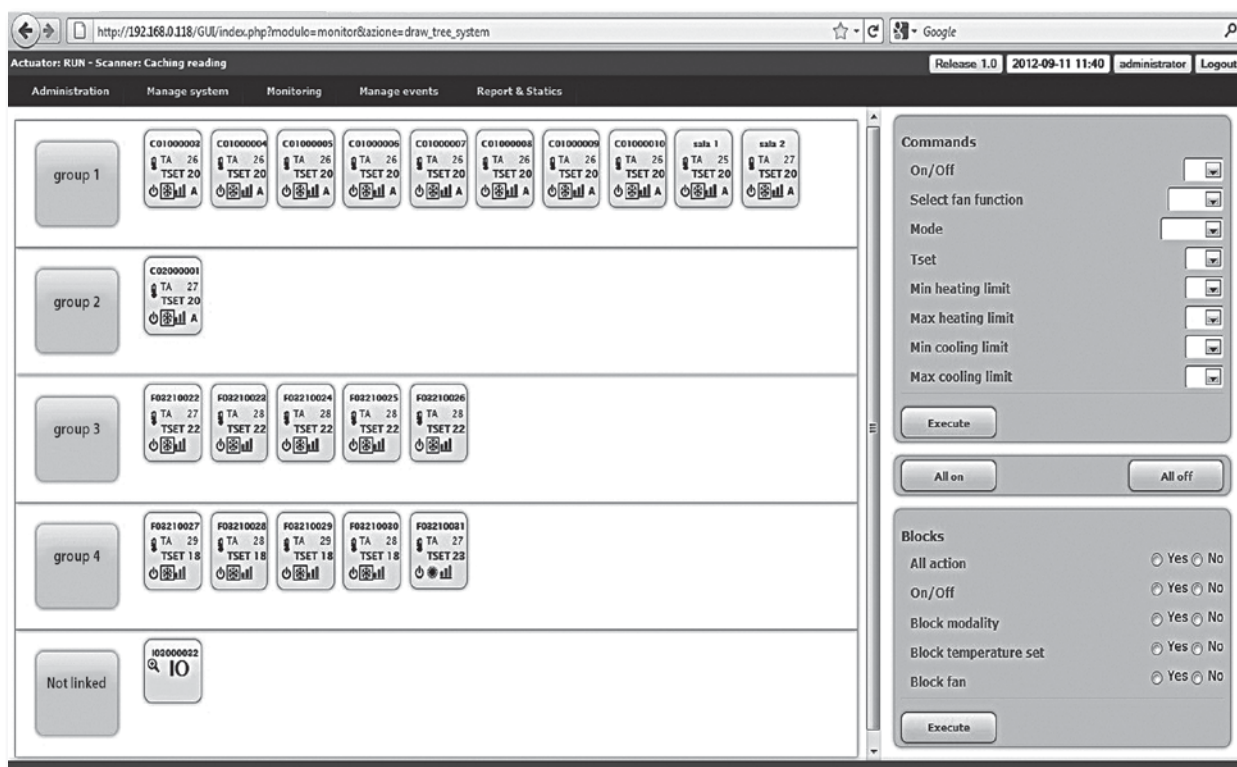
- Create uniform groups (groups of units on individual floors, in offices or rooms).
- Save weekly programs configured for different types of operation (summer, winter, mid seasons, closing periods etc.); these can then be recalled and activated with a simple click of the mouse. Weekly on/off cycles can be set for individual units or groups of units.
- Set the operating conditions for each individual unit or groups of units (operating mode, fan speed, temperature setting).
- Set the set point limits for each individual unit or groups of units.
- Switch each individual unit or groups of units ON or OFF.



Management system for a network of fan coils

The main program screen can display and interact with the entire network of units. An individual unit, a group of units or the entire network can be called so as to make modifications to the operating mode and the set point. The user can then check the operating status of each individual unit, read the room temperature, the coil temperature and the operating status of the condensate drain pump or any alarms.

“MONITORING” SCREEN



Displaying a unit

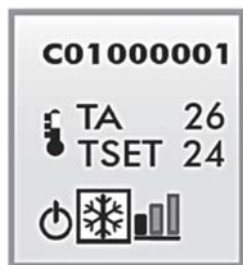
The “MONITORING” SCREEN shows the units that are connected to the network and scanned by the program.

The icon of the terminal unit provides the following information:

- Unit name (**C01000001**)
- Set temperature (TSET)
- Room temperature (TA)

- Unit status: ON or OFF

- Mode:
 - Summer
 - Winter
 - Auto
 - Fan only
- Fan speed:
 - Low
 - Medium
 - High
 - AutoFan



Management system for a network of fan coils

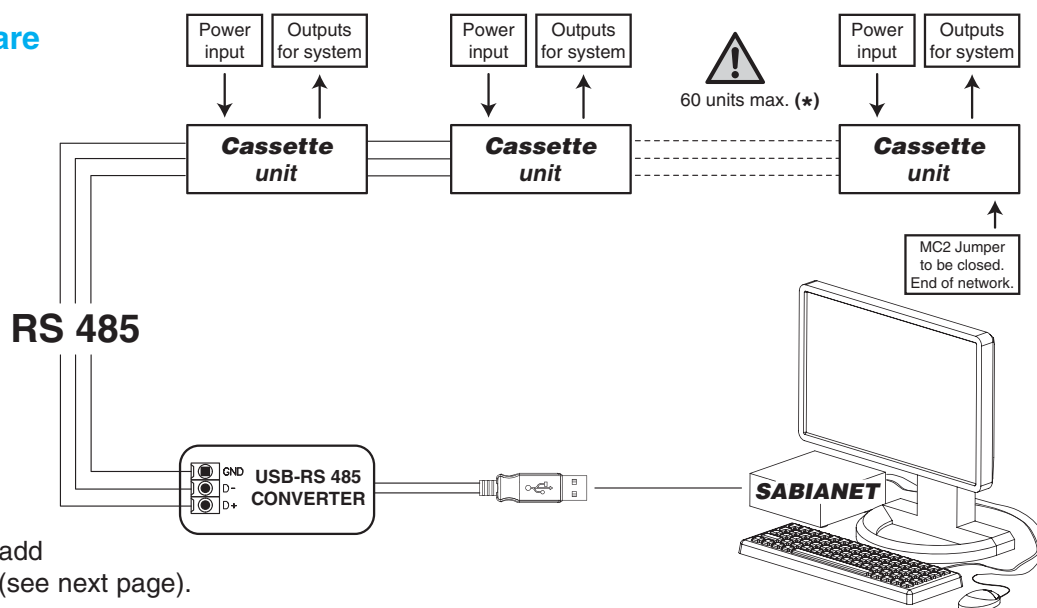
The “Weekly Program” can be used to set the unit operating parameters for each day of the week. Up to 20 different weekly programs can be set.

“EVENT MANAGEMENT” SCREEN

Time bands are available for each day of the week. The time and the type of operation to be performed by the unit can be set for each band. The time and the operating parameters can then be displayed before being sent to the unit and implemented.

PC Sabianet Software

Connection
of a **Cassette**
SkyStar SK-MB or
SK-ECM-MB network

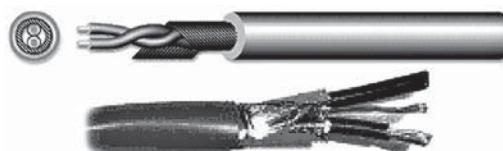


(*) In the event
of more than 60 units, add
one or more Router-S (see next page).

RS 485 serial connection cable

Shielded cable to be used:

Belden 9841, RS-485, 1x2x24 AWG SFTP, 120 Ohm



PSM-DI and Sabianet accessories

IDENTIFICATION	CODE
SIOS	3021292

SIOS is a board equipped with 8 relays with potential free contact to control the activation or deactivation of remote electric utilities. Moreover, the board has 8 digital inlets to display the actuators or external consents, such as motor or other.

The SIOS boards can be connected:

- inside a network managed by Sabianet;
- to a PSM-DI panel (one SIOS for each PSM-DI panel).



IDENTIFICATION	CODE
Router-S	3021290

The Router-S is an electronic board that:

- allows creating networks with more than 60 units (minimum 2 Router-S are required) or to divide the network (per floor, building, etc.);
- it allows creating a Master/Slave sub-network to be controlled as an independent group.

The Router-S can be used only inside a network managed by Sabianet.

The number of Router-S to be used is:

- up to 60 units: no Router-S
- from 61 to 120 units: 2 Router-S
- every 60 subsequent units: 1 additional Router-S



Introduction

The MCT version has been designed for all environments where false ceilings are not featured or cannot be constructed.

The cover cabinet fits perfectly to the air intake and outlet diffuser, maintaining the appealing design that defines the SkyStar series. The water fittings can be turned to point upwards.

The MCT series includes 7 models, with an installation height of up to 5 m, thanks to the highly flexible adjustment of the air distribution louvers.

All the technical specifications described on the previous pages remain the same, while keeping in mind that:

- the MCT series features one coil only (two pipe systems)
- there is no possibility of fresh air intake
- there is no possibility of additional electric heater

The MCT version features a special casing delivered in separate packaging; this must only be fitted after having installed the SkyStar unit and completed the water and electrical connections.

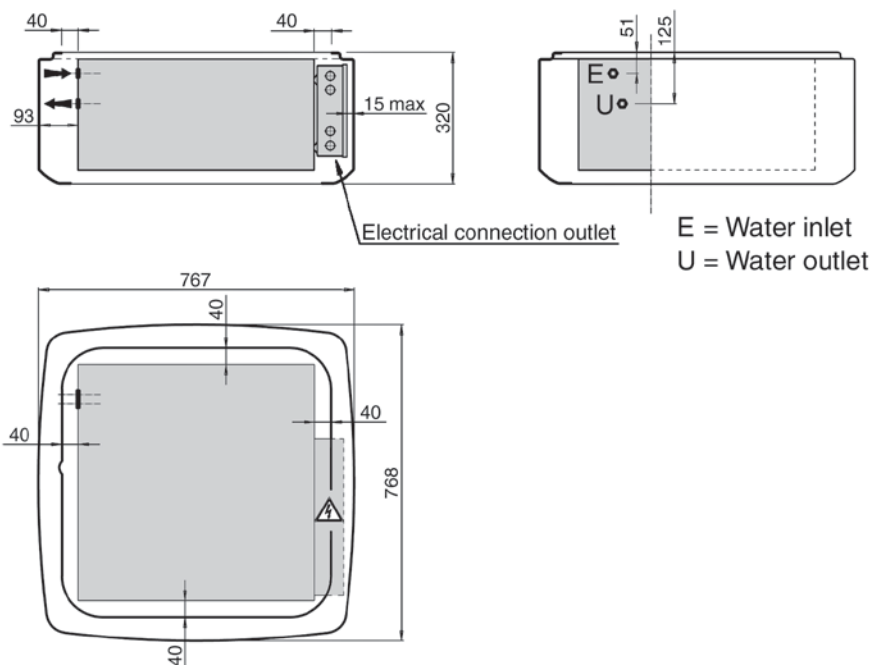


Dimensions and Weights

SK 02-MCT / SK 12-MCT / SK 22-MCT / SK 32-MCT

Casing code: 9079240

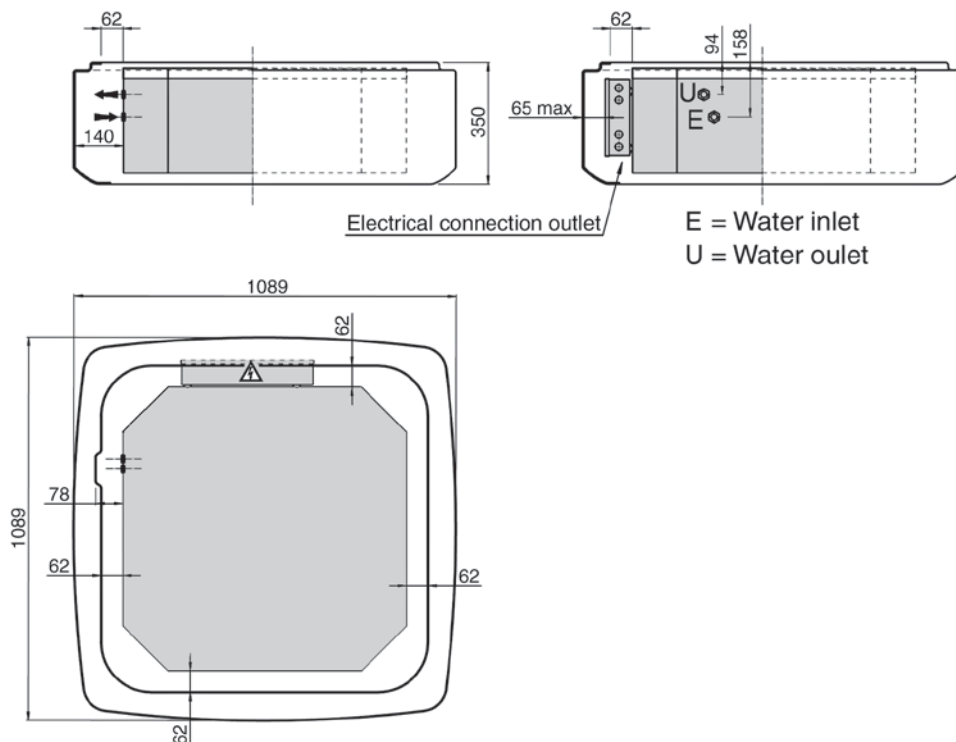
Casing weight: 5 kg (7,5 kg with the packaging)



SK 42-MCT / SK 52-MCT / SK 62-MCT

Casing code: 9079250

Casing weight: 10,5 kg (13,5 kg with the packaging)

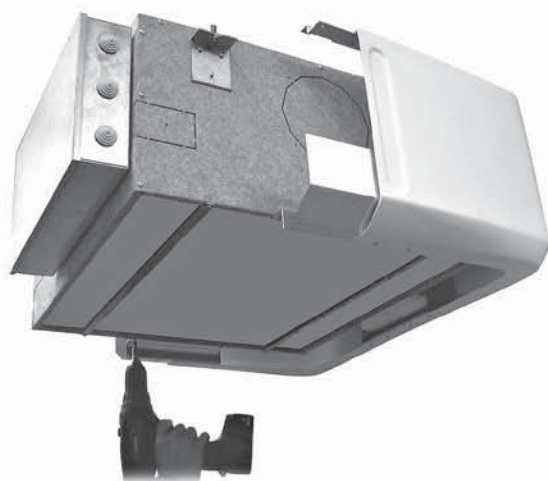


Warning: the electrical and water connections must enter the unit from above and must not interfere with the casing.

Assembly diagram



SK 02-MCT / SK 12-MCT
SK 22-MCT / SK 32-MCT



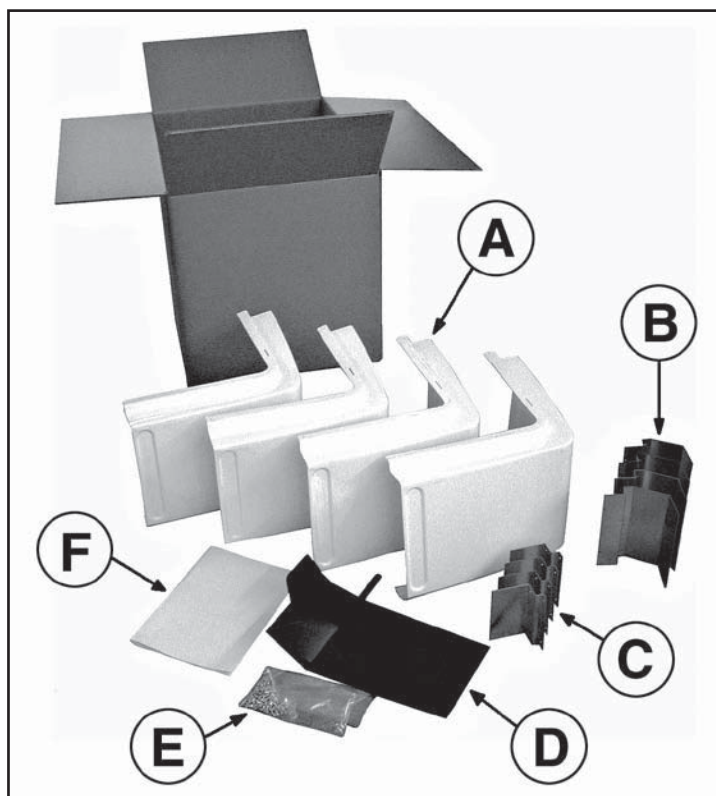
SK 42-MCT
SK 52-MCT / SK 62-MCT



Components of the casing:

The casing includes:

- A** – 4 corner covers
- B** – 4 bottom brackets
- C** – 4 top brackets
- D** – Condensate collection tray
- E** – Hardware (45 3.9x9.5mm TCX screws)
- F** – Instruction sheet

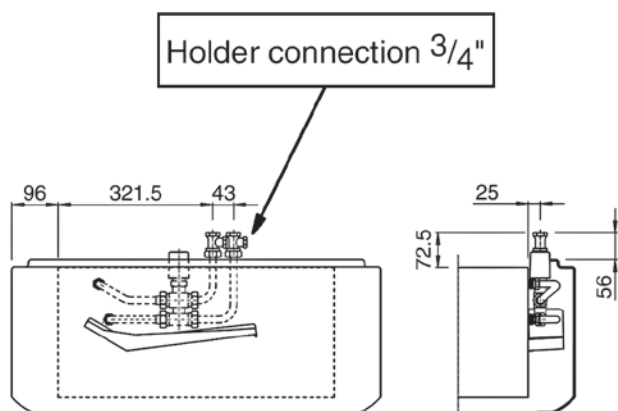


Valve kit

The valve fittings allow the water pipes to be connected from above.

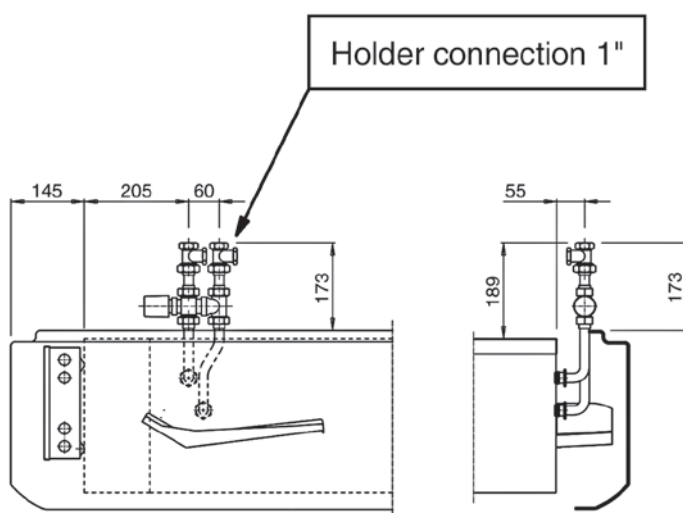
SK 02-MCT / SK 12-MCT **SK 22-MCT / SK 32-MCT**

Code 9079155



SK 42-MCT **SK 52-MCT / SK 62-MCT**

Code 9079156



For the specifications of the valves, see page 15.

The descriptions and illustrations provided in this publication are not binding: Sabiana reserves the right, whilst maintaining the essential characteristics of the types described and illustrated, to make, at any time, without the requirement to promptly update this piece of literature, any changes that it considers useful for the purpose of improvement or for any other manufacturing or commercial requirements.



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CERTIFICATE

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SABIANA S.p.A.

Head Office and Operative Unit: Via Piave, 53 - I-20011 Corbetta (MI)

Operative Unit: Via Virgilio, 2 - I-20013 Magenta (MI)

for the following field of activities

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

has implemented and maintains a

Quality Management System

which fulfills the requirements of the following standard

ISO 9001:2008

Issued on: **2012-04-10**

Validity date: **2015-04-09**

Registration Number: **IT-4000**



Michael Drechsel

President of IQNET



Gianrenzo Prati

President of CISQ

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OPERATIVE UNITS

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Unità Operativa

Via Virgilio, 2 - 20013 Magenta (MI)
Italia

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PER LE SEGUENTI ATTIVITÀ
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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.

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SGA N° 005D
SCR N° 006F
SSI N° 006G
PRD N° 004B
ISP N° 046E

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Air Conditioning
SkyStar - SkyStar ECM Cassette Fan Coil Units



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