

Cert. n° 0545

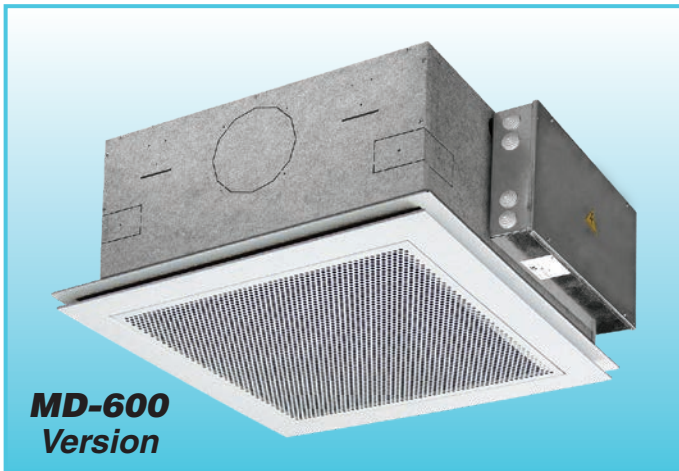
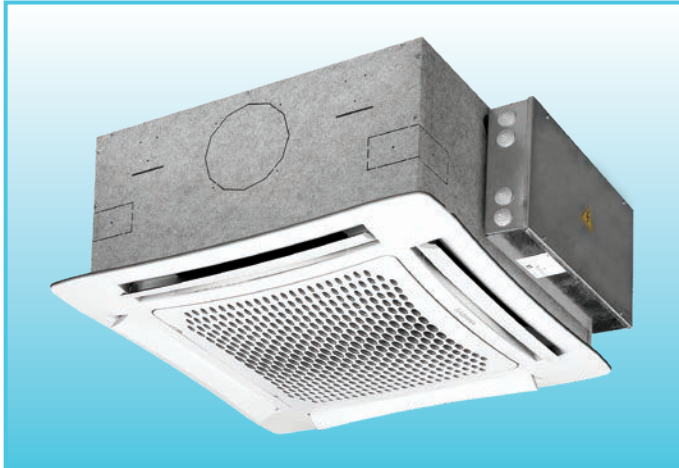


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# SkyStar SkyStar ECM Cassette Fan Coil Units

TECHNICAL GUIDE

# SkyStar / SkyStar ECM



## CONTENTS

### SkyStar

- **SkyStar**
  - Introduction Page 3
  - Main components Page 4
  - EUROVENT Certifications Page 5
  - Emissions Page 6
  - Water side pressure drop Page 9
  - Working conditions Page 9
  - Dimensions and weights Page 10
  - Air throw Page 12
  - Fresh air supply and Air distribution Page 13
  - Accessories Page 14
  - **CRYSTALL** electrostatic filter Page 20
  - Wall electronic controls Page 24
  - Controls for **SK-MB** versions Page 25
  - Electric heater **SK-E** Page 26

### SkyStar ECM

- **SkyStar ECM**
  - Introduction Page 28
  - Main components Page 29
  - EUROVENT Certifications Page 30
  - Emissions Page 32
  - Water side pressure drop Page 36
  - Working conditions Page 37
  - Dimensions and weights Page 38
  - Air throw Page 40
  - Accessories Page 41
  - **SK-ECM** configuration Page 43
  - Wall electronic controls Page 44
  - Controls for **SK-ECM-MB** versions Page 45
  - Electric heater **SK-ECM-E** Page 46

### SkyStar MCT

- **SkyStar MCT**
  - Introduction Page 47
  - Dimensions and weights Page 48
  - Assembly diagram Page 49
  - Components of the casing and Valve kit Page 50



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](http://www.eurovent-certification.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:
 

- Water temperature	+45°C E.W.T.	+40°C L.W.T.
- Entering air temperature	+20°C	
- 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	+65°C E.W.T.	+55°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.

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/MD-800 version:* metal diffuser painted in RAL 9003 white colour with 600x600 dimension to perfectly fit into the false ceiling standard modules without overlapping parts.

### **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 has 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

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°C E.W.T. +12°C L.W.T.

HEATING

Entering air temperature +20°C  
Water temperature +45°C E.W.T. +40°C L.W.T.

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	1,25	1,60	1,92	1,82	2,31	2,64	2,23	3,30	4,26	2,91	3,82	4,93	4,18	4,86	6,08	5,27	6,72	9,39	5,27	8,36	10,93
Cooling sensible emission (E)	kW	0,99	1,29	1,58	1,33	1,72	2,00	1,55	2,35	3,11	2,05	2,75	3,65	3,00	3,53	4,51	3,42	4,42	6,36	3,67	6,00	8,08
Heating (E)	kW	1,38	1,80	2,24	1,85	2,42	2,80	2,12	3,28	4,37	2,85	3,85	5,15	4,27	5,03	6,50	4,92	6,40	9,23	5,12	8,55	11,72
Dp Cooling (E)	kPa	4,5	7,0	10,0	4,9	7,6	9,7	6,4	13,0	20,9	7,5	12,4	19,7	10,9	14,3	21,6	9,4	14,7	26,9	9,4	21,8	35,6
Dp Heating (E)	kPa	4,4	7,2	10,7	4,3	6,9	9,0	2,8	6,1	10,2	6,2	10,6	17,8	7,0	9,4	15,0	7,1	11,4	22,0	7,6	19,2	33,8
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°C E.W.T. +12°C L.W.T.

HEATING

Entering air temperature +20°C  
Water temperature +65°C E.W.T. +55°C L.W.T.

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	310	500	710	320	500	710	430	610	880	430	610	880
Cooling total emission (E)	kW	1,49	1,93	2,27	1,83	2,33	2,66	1,83	2,61	3,27	2,07	3,02	3,86	2,33	2,96	3,72	2,69	3,47	4,44
Cooling sensible emission (E)	kW	1,13	1,52	1,84	1,32	1,68	1,94	1,32	1,94	2,49	1,47	2,20	2,88	1,72	2,23	2,88	1,94	2,56	3,37
Dp 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	1,72	2,23	2,66	2,13	2,66	3,04	2,13	3,04	3,86	1,73	2,71	2,91	2,61	3,33	4,19	2,14	2,66	3,29
Dp Heating (E)	kPa	5,2	8,3	11,4	4,6	6,8	8,7	4,6	8,7	13,3	2,6	4,6	6,7	6,4	9,9	15,0	3,9	5,7	8,4
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	1225	1730
Cooling total emission (E)	kW	4,11	4,98	6,26	4,48	5,60	7,59	4,95	6,27	8,65	4,48	6,84	8,72	4,95	7,75	9,69
Cooling sensible emission (E)	kW	2,93	3,60	4,61	3,21	4,09	5,71	3,49	4,49	6,37	3,21	5,09	6,67	3,49	5,64	7,26
Dp 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	5,21	6,33	8,02	5,69	7,15	9,66	4,59	5,63	7,50	5,69	8,80	11,16	4,59	6,78	9,48
Dp Heating (E)	kPa	7,9	11,2	17,2	9,3	14,0	24,0	4,9	7,0	11,8	9,3	20,3	31,2	4,9	9,9	15,0
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			1,0			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.

Mod.	Speed	Qv m³/h	WT: 5/10 °C				WT: 7/12 °C			WT: 9/14 °C			WT: 12/17 °C		
			Qw l/h	Pc kW	Ps kW	Qw l/h	Pc kW	Ps kW	Qw l/h	Pc kW	Ps kW	Qw l/h	Pc kW	Ps kW	
SK 02	MAX	610	421	2,39	1,77	340	1,92	1,58	254	1,41	1,39	199	1,10	1,10	
	MED	420	346	1,98	1,45	280	1,60	1,29	210	1,22	1,16	160	0,90	0,90	
	MIN	310	269	1,55	1,12	219	1,25	0,99	165	0,96	0,89	123	0,69	0,69	
SK 12	MAX	520	554	3,18	2,18	462	2,64	2,00	362	2,10	1,75	252	1,43	1,43	
	MED	420	482	2,77	1,88	403	2,31	1,72	317	1,84	1,50	220	1,25	1,25	
	MIN	310	417	2,40	1,62	317	1,82	1,30	276	1,61	1,29	188	1,07	1,07	
SK 22	MAX	710	926	5,31	3,57	745	4,26	3,11	617	3,59	2,87	420	2,37	2,37	
	MED	500	715	4,11	2,73	575	3,30	2,35	483	2,81	2,18	319	1,82	1,82	
	MIN	320	508	2,93	1,92	387	2,23	1,55	349	2,03	1,53	225	1,29	1,29	
SK 32	MAX	880	1049	6,01	4,08	863	4,93	3,65	694	4,03	3,29	479	2,70	2,70	
	MED	610	835	4,79	3,20	667	3,82	2,75	559	3,25	2,57	376	2,13	2,13	
	MIN	430	633	3,65	2,41	506	2,91	2,05	430	2,50	1,92	283	1,62	1,62	
SK 42	MAX	1140	1264	7,27	4,92	1060	6,08	4,40	840	4,88	3,95	573	3,25	3,25	
	MED	820	1003	5,78	3,87	845	4,86	3,45	674	3,92	3,09	453	2,58	2,58	
	MIN	630	858	4,96	3,29	722	4,18	2,94	580	3,37	2,62	384	2,20	2,20	
SK 52	MAX	1500	1943	11,18	7,47	1635	9,39	6,36	1301	7,57	5,99	880	5,00	5,00	
	MED	970	1374	7,93	5,21	1166	6,72	4,42	939	5,46	4,15	612	3,50	3,50	
	MIN	710	1070	6,18	4,02	913	5,27	3,42	740	4,30	3,20	434	2,48	2,48	
SK 62	MAX	1820	2277	13,07	8,84	1909	10,93	7,90	1511	8,78	7,11	1044	5,90	5,90	
	MED	1280	1722	9,92	6,59	1454	8,36	5,89	1162	6,75	5,27	775	4,42	4,42	
	MIN	710	1070	6,18	4,02	913	5,27	3,60	740	4,30	3,20	434	2,48	2,48	

**Heating emission of 1 battery units (2 pipe installation)**

Entering air temperature: +20°C

Mod.	Speed	Qv m³/h	WT: 45/40 °C		WT: 50/40 °C		WT: 60/50 °C		WT: 70/60 °C		WT: 80/70 °C	
			Qw l/h	Ph kW	Qw l/h	Ph kW	Qw l/h	Ph kW	Qw l/h	Ph kW	Qw l/h	Ph kW
SK 02	MAX	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
	MIN	310	237	1,38	126	1,46	183	2,13	240	2,80	298	3,47
SK 12	MAX	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
	MIN	310	356	2,07	198	2,31	279	3,25	360	4,19	441	5,12
SK 22	MAX	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
	MIN	320	412	2,39	235	2,73	326	3,79	415	4,83	505	5,87
SK 32	MAX	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
	MIN	430	520	3,02	294	3,42	410	4,77	524	6,10	639	7,43
SK 42	MAX	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
	MIN	630	734	4,27	415	4,82	578	6,72	741	8,61	903	10,50
SK 52	MAX	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
	MIN	710	876	5,09	505	5,87	694	8,07	882	10,25	1068	12,42
SK 62	MAX	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
	MIN	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.

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

Water (°C)	Air (°C)	TOTAL EMISSION			Air (°C)	SENSIBLE EMISSION		
		25 - 18	26 - 18.5	28 - 20		25 - 18	26 - 18.5	28 - 20
7/12	K	0,82	0,89	1,11	K	0,90	0,94	1,06
10/15	K	0,56	0,63	0,82	K	0,72	0,78	0,90
14/18	K	0,35	0,41	0,52	K	0,50	0,58	0,72

**LEGEND**

- WT = Water temperature
- Pc = Cooling total emission
- Ps = Cooling sens. emission
- Ph = Emission
- Qw = Water flow
- Speed = Fan speed
- MAX = High speed
- MED = Medium speed
- MIN = Low speed
- Qv = Air flow

Cooling emission of 2 battery units (4 pipe installation)

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

Mod.	Speed	WT: 5/10 °C				WT: 7/12 °C			WT: 9/14 °C			WT: 12/17 °C		
		Qv m³/h	Qw l/h	Pc kW	Ps kW	Qw l/h	Pc kW	Ps kW	Qw l/h	Pc kW	Ps kW	Qw l/h	Pc kW	Ps kW
SK 04	MAX	610	490	2,79	2,06	401	2,27	1,84	307	1,78	1,69	239	1,33	1,33
	MED	420	410	2,35	1,70	337	1,93	1,52	260	1,51	1,37	196	1,11	1,11
	MIN	310	314	1,80	1,27	260	1,49	1,13	201	1,17	1,02	148	0,84	0,84
SK 14	MAX	520	569	3,27	2,22	465	2,66	1,94	374	2,18	1,79	260	1,47	1,47
	MED	420	465	2,68	1,80	405	2,33	1,68	309	1,80	1,44	210	1,19	1,19
	MIN	310	398	2,29	1,53	318	1,83	1,32	267	1,55	1,22	177	1,01	1,01
SK 24	MAX	710	718	4,11	2,84	574	3,27	2,49	467	2,72	2,30	330	1,85	1,85
	MED	500	569	3,27	2,22	455	2,61	1,94	374	2,18	1,79	260	1,47	1,47
	MIN	320	398	2,29	1,53	318	1,83	1,32	267	1,55	1,22	177	1,01	1,01
SK 34	MAX	880	791	4,51	3,14	656	3,72	2,88	512	2,98	2,56	366	2,04	2,04
	MED	610	632	3,61	2,47	520	2,96	2,23	413	2,40	2,00	288	1,61	1,61
	MIN	430	510	2,94	1,98	405	2,33	1,72	337	1,96	1,59	231	1,32	1,32
SK 44	MAX	1140	1299	7,47	5,04	1090	6,26	4,50	864	5,02	4,04	586	3,33	3,33
	MED	820	1027	5,92	3,95	866	4,98	3,52	691	4,02	3,15	462	2,63	2,63
	MIN	630	842	4,86	3,21	713	4,11	2,87	572	3,33	2,56	374	2,14	2,14
SK 54	MAX	1500	1588	9,11	6,23	1327	7,59	5,57	1046	6,08	5,02	726	4,10	4,10
	MED	970	1158	6,67	4,47	974	5,60	4,00	775	4,50	3,57	524	2,99	2,99
	MIN	710	920	5,31	3,52	778	4,48	3,15	623	3,62	2,81	411	2,35	2,35
SK 64	MAX	1820	1836	10,50	7,26	1529	8,72	6,49	1199	6,97	5,98	849	4,77	4,77
	MED	1280	1423	8,18	5,55	1191	6,84	4,96	942	5,48	4,46	646	3,66	3,66
	MIN	710	920	5,31	3,52	778	4,48	3,15	623	3,62	2,81	411	2,35	2,35

Heating emission of 2 battery units (4 pipe installation)

Entering air temperature: +20°C

Mod.	Speed	WT: 45/40 °C			WT: 50/40 °C		WT: 60/50 °C		WT: 70/60 °C		WT: 80/70 °C	
		Qv m³/h	Qw l/h	Ph kW	Qw l/h	Ph kW	Qw l/h	Ph kW	Qw l/h	Ph kW	Qw l/h	Ph kW
SK 04	MAX	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
	MIN	310	166	0,96	87	1,01	128	1,49	169	1,96	210	2,44
SK 14	MAX	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
	MIN	310	196	1,14	103	1,20	151	1,76	209	2,43	247	2,87
SK 24	MAX	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
	MIN	320	196	1,14	103	1,20	151	1,76	209	2,43	247	2,87
SK 34	MAX	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
	MIN	430	247	1,44	130	1,51	191	2,22	267	3,10	312	3,63
SK 44	MAX	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
	MIN	630	501	2,91	267	3,11	388	4,51	508	5,91	629	7,31
SK 54	MAX	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
	MIN	710	547	3,18	291	3,39	423	4,92	555	6,45	686	7,98
SK 64	MAX	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
	MIN	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.

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

Water (°C)	Air (°C)	TOTAL EMISSION			SENSIBLE EMISSION			
		25-18	26-18.5	28-20	25-18	26-18.5	28-20	
7/12	K	0,82	0,89	1,11	K	0,90	0,94	1,06
10/15	K	0,56	0,63	0,82	K	0,72	0,78	0,90
14/18	K	0,35	0,41	0,52	K	0,50	0,58	0,72

LEGEND

- WT = Water temperature
- Pc = Cooling total emission
- Ps = Cooling sens. emission
- Ph = Emission
- Qw = Water flow
- Speed = Fan speed
- MAX = High speed
- MED = Medium speed
- MIN = Low speed
- Qv = Air flow

Cooling emission of 2 battery units (4 pipe installation)

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

Mod.	Speed	Qv m³/h	WT: 5/10 °C			WT: 7/12 °C			WT: 9/14 °C			WT: 12/17 °C		
			Qw l/h	Pc kW	Ps kW	Qw l/h	Pc kW	Ps kW	Qw l/h	Pc kW	Ps kW	Qw l/h	Pc kW	Ps kW
SK 26	MAX	710	812	4,65	3,22	664	3,86	2,88	528	3,00	2,53	378	2,13	2,13
	MED	500	629	3,62	2,47	519	3,02	2,20	415	2,37	1,93	288	1,63	1,63
	MIN	320	425	2,45	1,64	355	2,07	1,47	287	1,65	1,29	192	1,10	1,10
SK 36	MAX	880	940	5,37	3,77	764	4,44	3,37	606	3,43	2,96	442	2,48	2,48
	MED	610	729	4,18	2,87	597	3,47	2,56	477	2,71	2,25	337	1,90	1,90
	MIN	430	557	3,21	2,18	462	2,69	1,94	370	2,12	1,70	256	1,46	1,46
SK 56	MAX	1500	1804	10,37	7,13	1488	8,65	6,37	1189	6,79	5,60	836	4,74	4,74
	MED	970	1291	7,44	5,02	1078	6,27	4,49	867	4,98	3,94	587	3,35	3,35
	MIN	710	1012	5,85	3,90	851	4,95	3,49	689	3,96	3,06	459	2,63	2,63
SK 66	MAX	1820	2105	12,07	8,40	1725	10,03	7,51	1375	7,82	6,60	987	5,57	5,57
	MED	1280	1607	9,25	6,32	1332	7,75	5,64	1066	6,11	4,96	739	4,21	4,21
	MIN	710	1012	5,85	3,90	851	4,95	3,49	689	3,96	3,06	459	2,63	2,63

Heating emission of 2 battery units (4 pipe installation)

Entering air temperature: +20°C

Mod.	Speed	Qv m³/h	WT: 45/40 °C		WT: 50/40 °C		WT: 60/50 °C		WT: 70/60 °C		WT: 80/70 °C	
			Qw l/h	Ph kW	Qw l/h	Ph kW	Qw l/h	Ph kW	Qw l/h	Ph kW	Qw l/h	Ph kW
SK 26	MAX	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
	MIN	320	165	0,96	83	0,97	127	1,47	170	1,98	214	2,49
SK 36	MAX	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
	MIN	430	205	1,19	103	1,20	157	1,83	212	2,46	266	3,10
SK 56	MAX	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
	MIN	710	441	2,56	291	2,67	340	3,95	450	5,23	561	6,52
SK 66	MAX	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
	MIN	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.

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

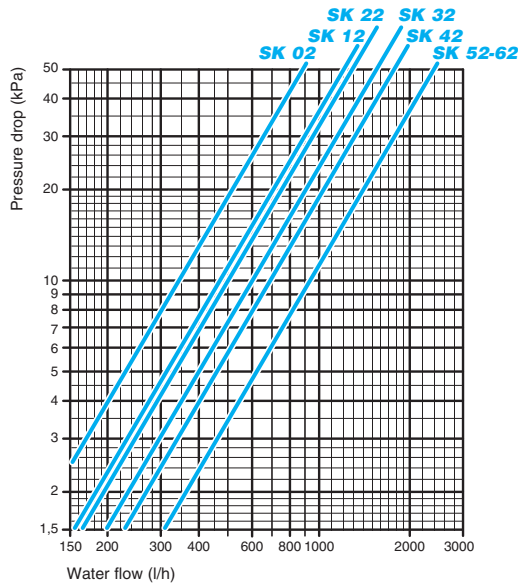
Water (°C)	Air (°C)	TOTAL EMISSION			Air (°C)	SENSIBLE EMISSION		
		25 - 18	26 - 18.5	28 - 20		25 - 18	26 - 18.5	28 - 20
7/12	K	0,82	0,89	1,11	K	0,90	0,94	1,06
10/15	K	0,56	0,63	0,82	K	0,72	0,78	0,90
14/18	K	0,35	0,41	0,52	K	0,50	0,58	0,72

LEGEND

- WT = Water temperature
- Pc = Cooling total emission
- Ps = Cooling sens. emission
- Ph = Emission
- Qw = Water flow
- Speed = Fan speed
- MAX = High speed
- MED = Medium speed
- MIN = Low speed
- Qv = Air flow



2 pipe installation

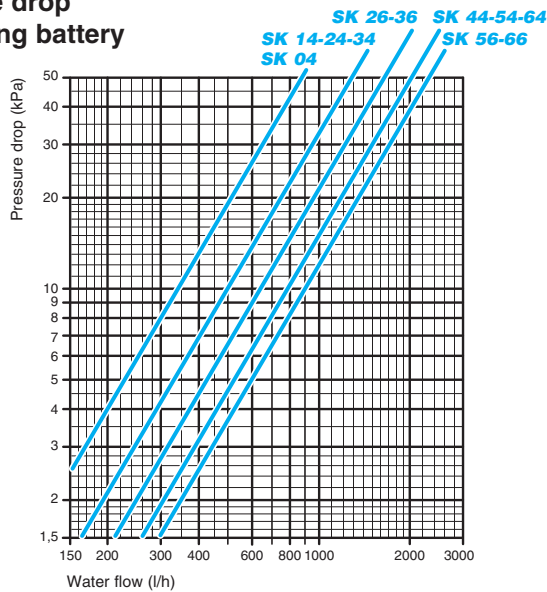


The water pressure drop figures refer to a mean water temperature of **10°C**; for different temperatures, multiply the pressure drop figures by the correction factors **K**.

°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

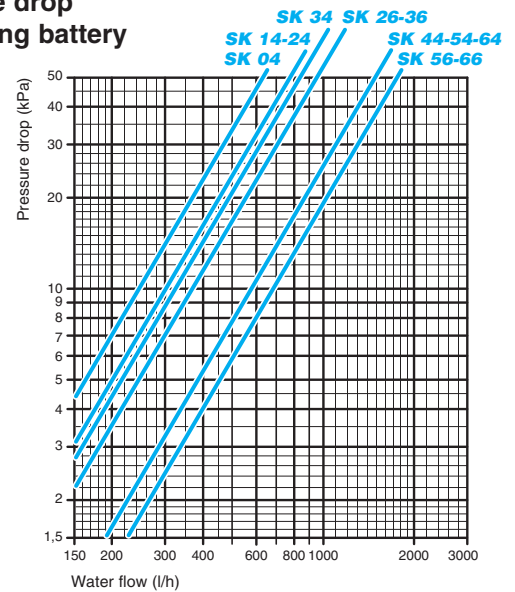
Pressure drop for cooling battery



The water pressure drop figures refer to a mean water temperature of **10°C**; for different temperatures, multiply the pressure drop figures by the correction factors **K**.

°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



The water pressure drop figures refer to a mean water temperature of **60°C**; for different temperatures, multiply the pressure drop figures by the correction factors **K**.

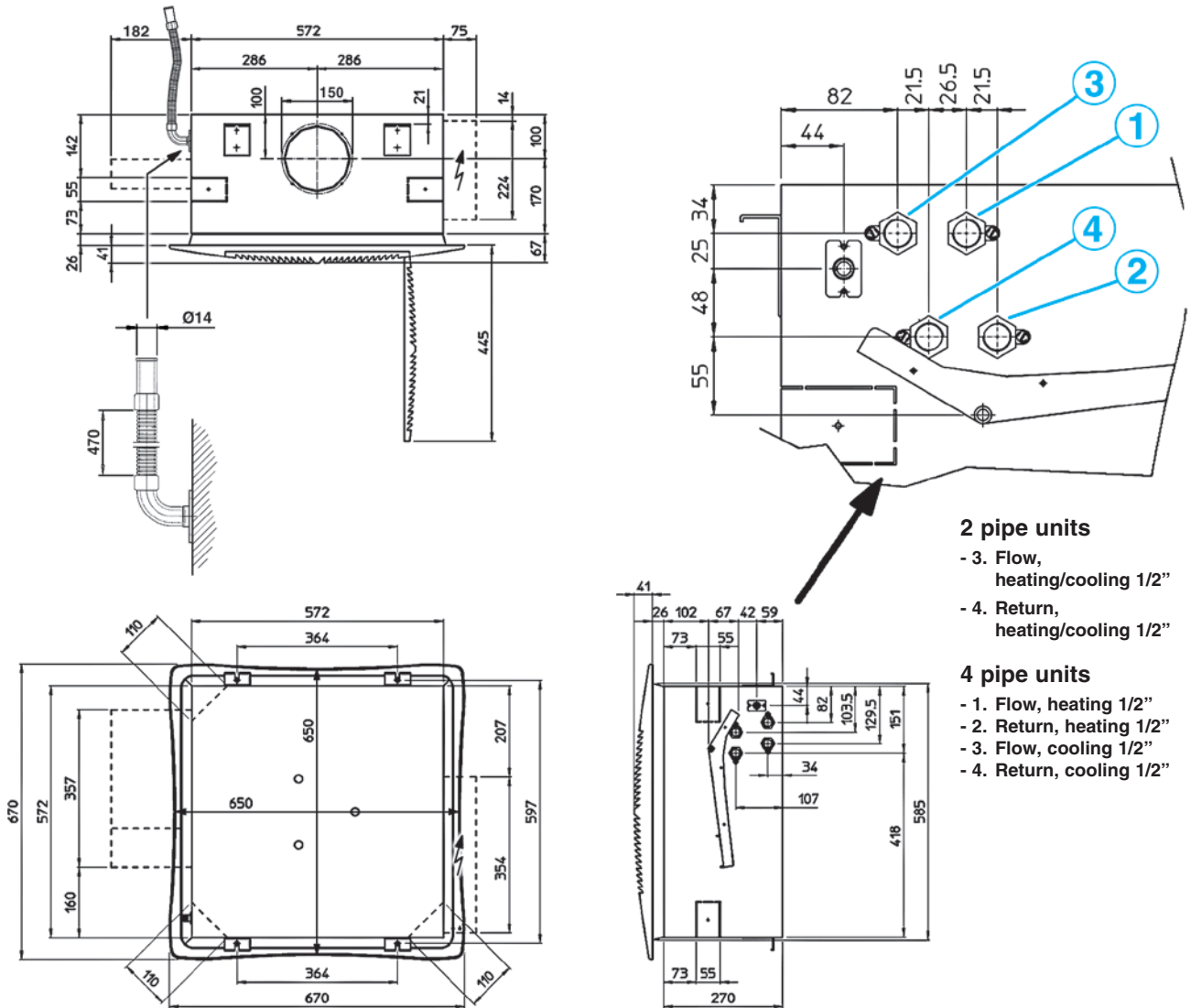
°C	40	50	70	80
K	1,12	1,06	0,94	0,88

Working conditions

<b>Water flow</b>	MAX. working pressure: 8 bars
<b>Air flow</b>	Suitable relative humidity: 15-75%
<b>Supply</b>	Single phase 230V / 50Hz
<b>Installation</b>	MAX. height: see table on page 12

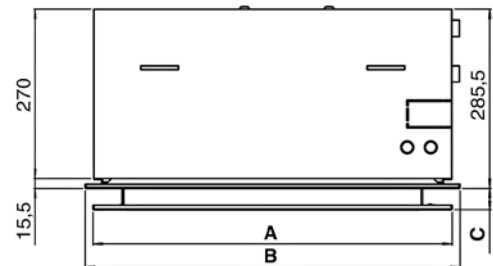
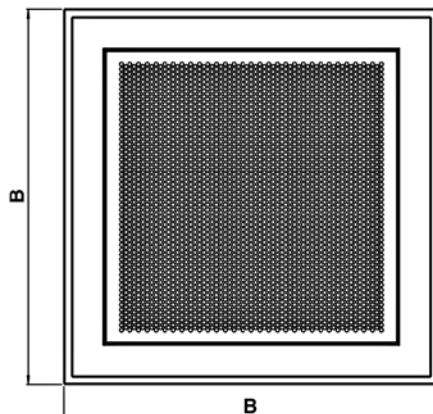
MIN. entering water temperature: +5°C
MAX. entering water temperature: +80°C
MIN. entering air temperature: +6°C
MAX. entering air temperature: +40°C

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



**MD-600/MD-800**  
**METAL DIFFUSER**

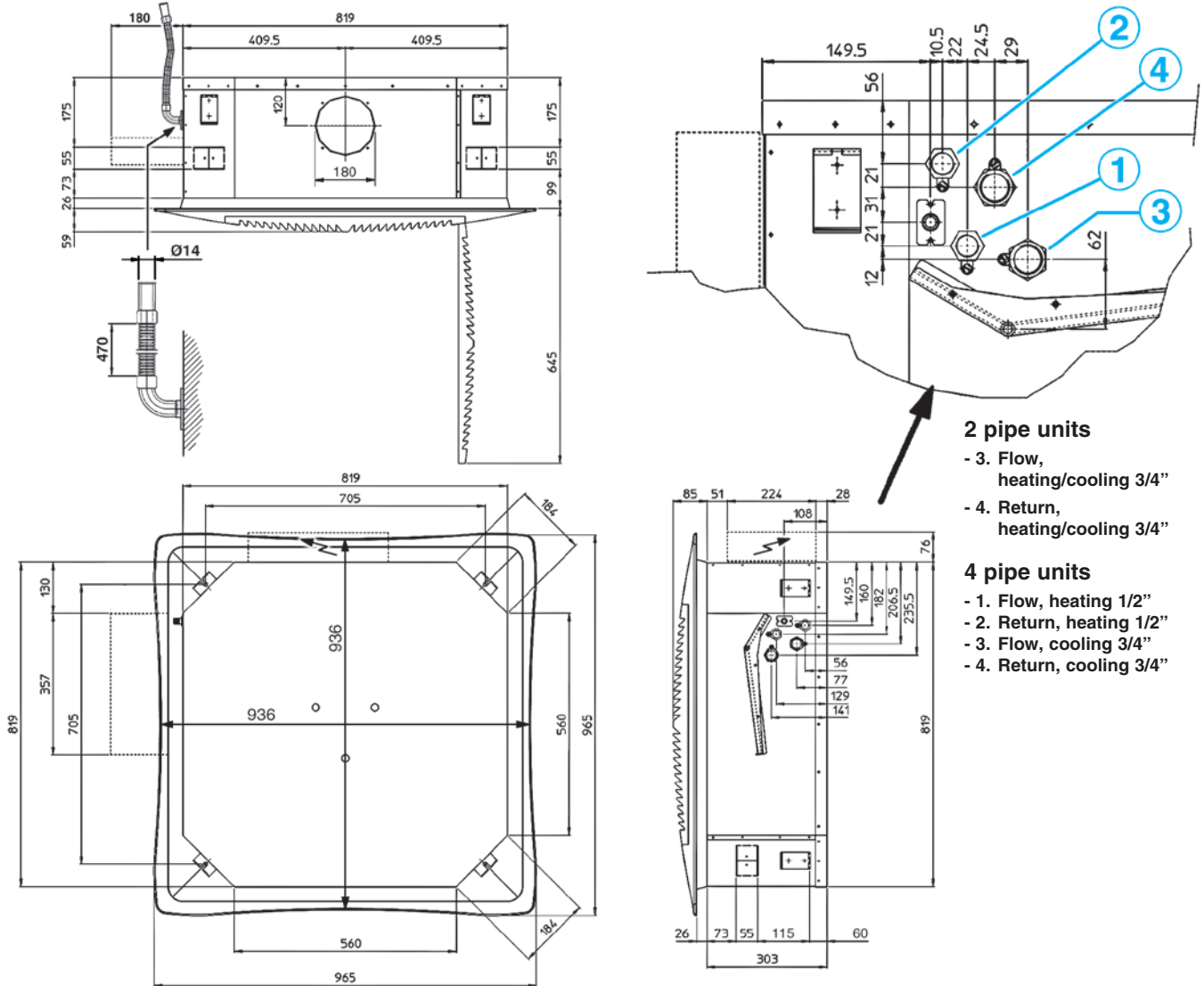
(RS receiver, Code 9066338, for metal diffuser for MB units)



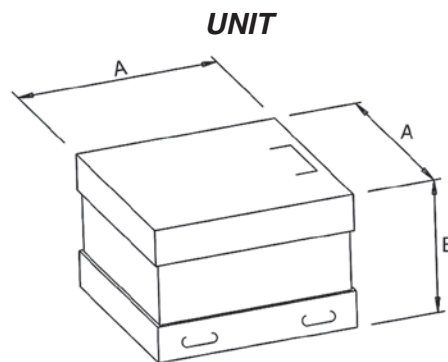
Size	A	B	C	Code
<b>MD-600</b>	574	599	34,5	9079420
<b>MD-800</b>	845	880	45,5	9079417

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			
<b>SK 02 - 12</b>	28	22	6	3	790	350	750	150
<b>SK 04 - 14</b>	30	24						
<b>SK 22 - 24 - 26</b>								
<b>SK 32 - 34 - 36</b>								

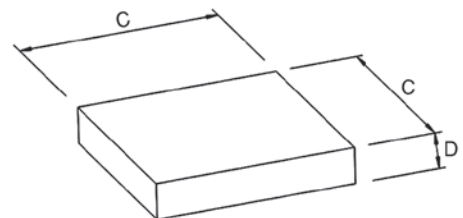
**SK 42-44 / SK 52-54-56 / SK 62-64-66** (Version 800 x 800)



**PACKED UNIT**



**DIFFUSER**

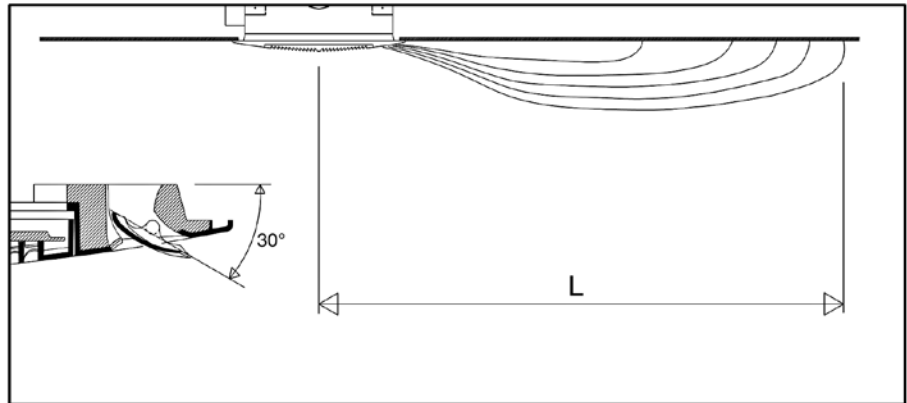


Model	UNIT		DIFFUSER		Packed unit Dimensions			
	Weights packed unit	Weights unpacked unit	Weights packed unit	Weights unpacked unit	A	B	C	D
	kg	kg	kg	kg	mm			
<b>SK 42</b>	44	36	10	6	1050	400	1000	200
<b>SK 44</b>	47	39						
<b>SK 52 - 54 - 56</b>								
<b>SK 62 - 64 - 66</b>								

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.

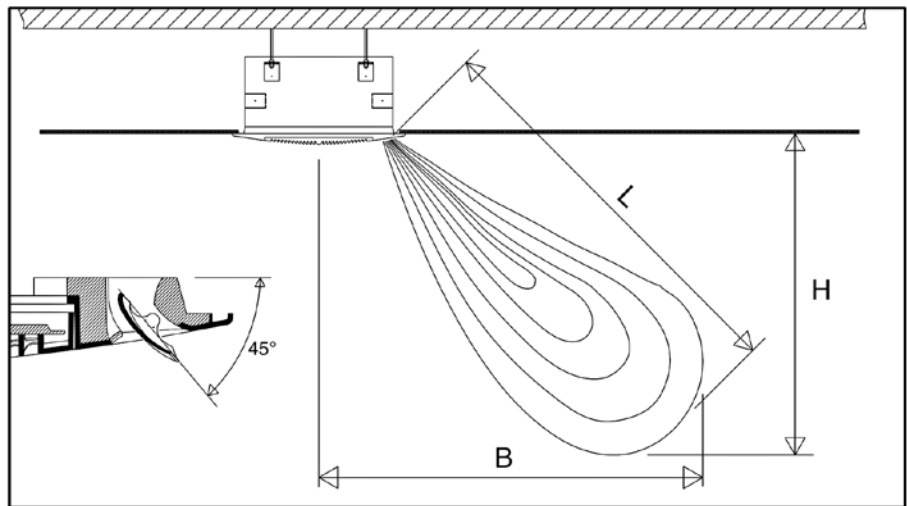
The useful throw **L** refers to the distance between the unit and the point where the air speed is 0.2 m/sec; if the louver has a gradient of 30° (recommended in cooling mode), the so-called “Coanda” effect will occur, illustrated in the first figure, while at a gradient of 45° (recommended in heating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

Fresh air connection, for SK 0-1-2-3 models only (not suitable for MTC models with outer casing).

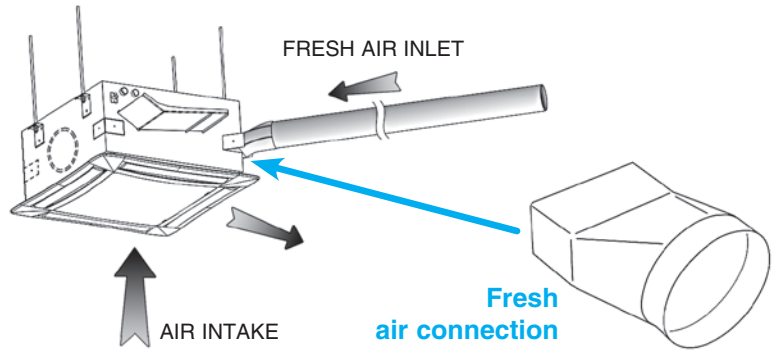
The cassette is fitted with inlets for fresh air to be mixed with return air inside the unit (Fig. 3).

The fresh air flow is limited to 20% of the total fan coil air flow at medium speed and 100 m<sup>3</sup>/h for each treated air inlet.

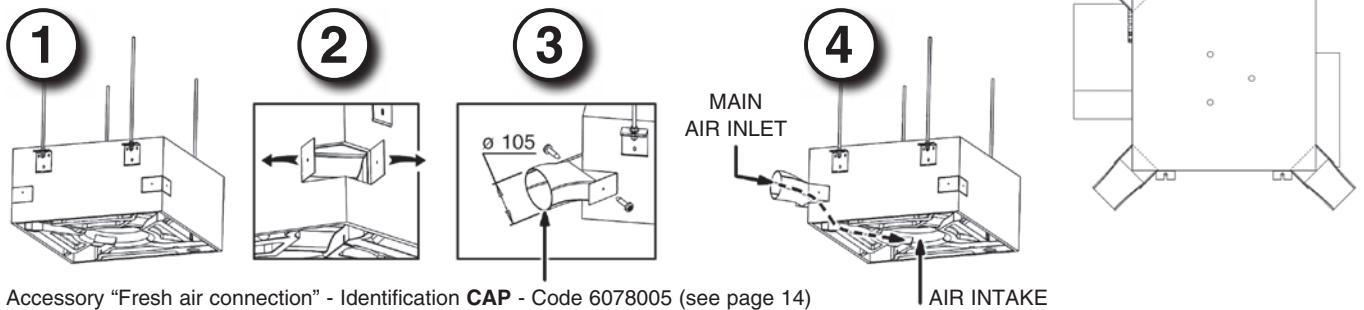
The units feature fresh air inlets on three corners (no inlets on the fourth corner because of the condensate pump inside the unit).

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)

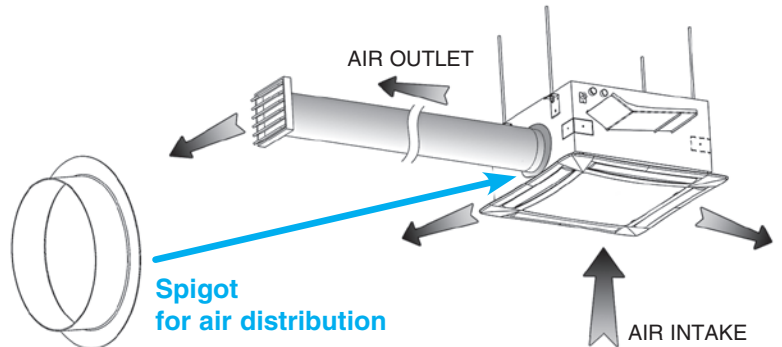
## Air distribution - Air distribution connection

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

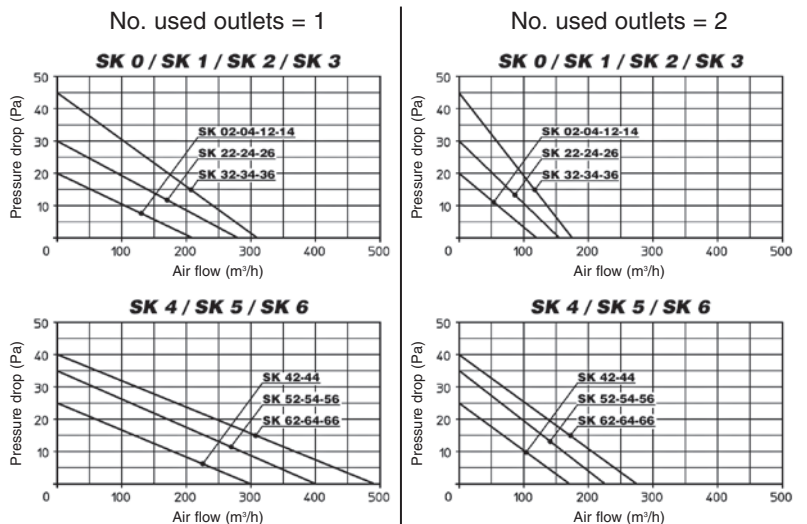
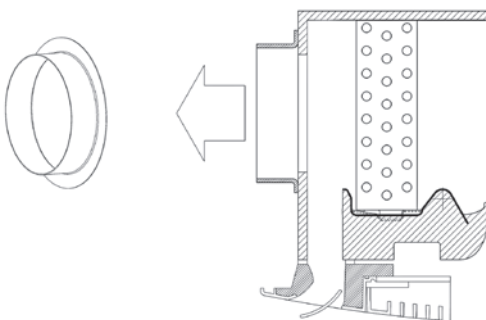
They can be used to supply air from the fan coil unit to distant areas of a room or even to a different room.

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.



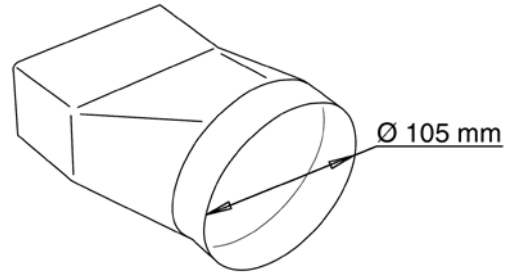
**Note:** all air ducts must be insulated in order to avoid condensation.



**Fresh air connection**

Only for SK 0-1-2-3 models  
(not suitable for MCT models with outer casing).

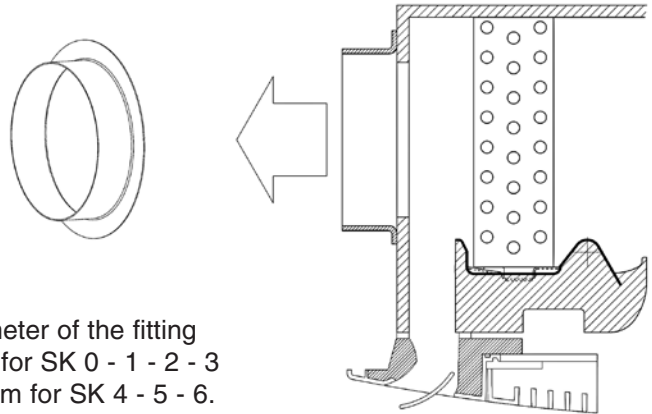
See page 13.



IDENTIFICATION	CODE
CAP	6078005

**Air distribution connection**

See page 13.



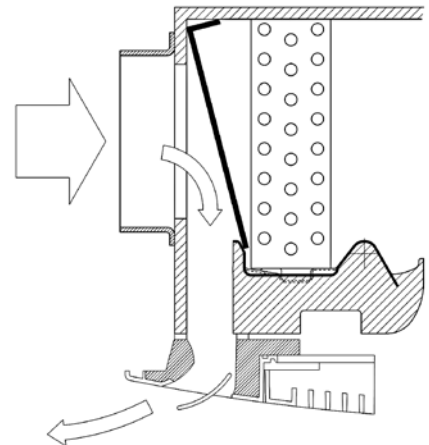
The diameter of the fitting is 150 mm for SK 0 - 1 - 2 - 3 and 180 mm for SK 4 - 5 - 6.

IDENTIFICATION	CODE
CDA 600	9079232
CDA 800	9079233

**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 depend on the inlet static pressure.

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



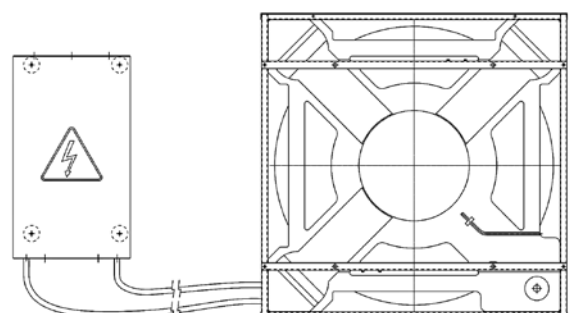
The diameter of the fitting is 150 mm for SK 0 - 1 - 2 - 3 and 180 mm for SK 4 - 5 - 6.

**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

**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 infrared remote control.



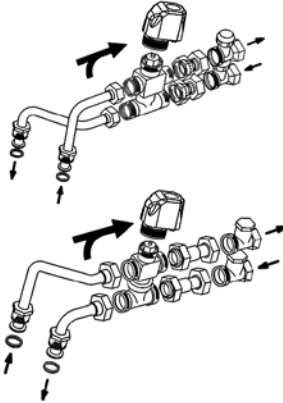
ON-OFF valves with thermoelectric actuator

VALVE WITH MICROMETRIC LOCKSHIELD VALVE

**3 ways**




**SK 02-04**  
**SK 12-14**  
**SK 22-24-26**  
**SK 32-34-36**

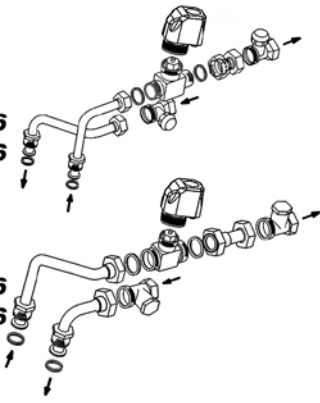


**SK 42-44**  
**SK 52-54-56**  
**SK 62-64-66**

**2 ways**




**SK 02-04**  
**SK 12-14**  
**SK 22-24-26**  
**SK 32-34-36**



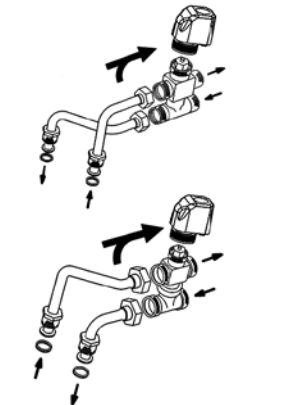
**SK 42-44**  
**SK 52-54-56**  
**SK 62-64-66**

VALVE WITH SIMPLIFIED KIT

**3 ways**




**SK 02-04**  
**SK 12-14**  
**SK 22-24-26**  
**SK 32-34-36**

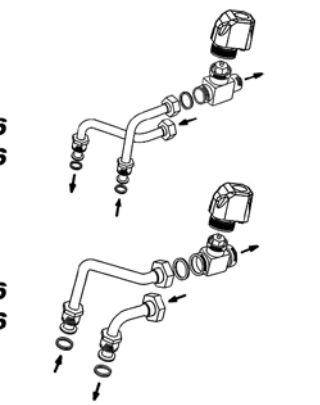


**SK 42-44**  
**SK 52-54-56**  
**SK 62-64-66**

**2 ways**



**SK 02-04**  
**SK 12-14**  
**SK 22-24-26**  
**SK 32-34-36**



**SK 42-44**  
**SK 52-54-56**  
**SK 62-64-66**

Technical data:

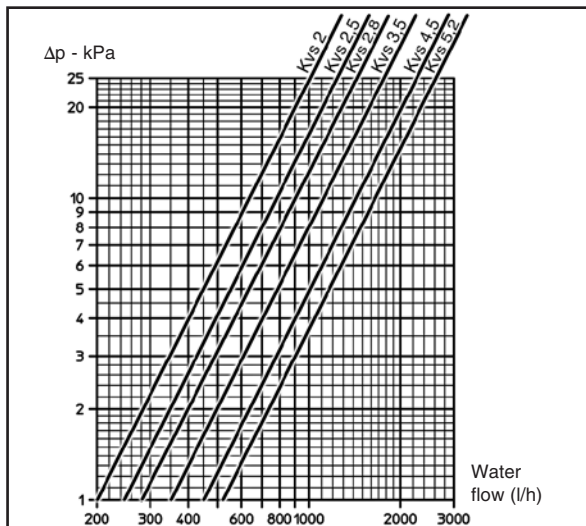
Rated pressure:	16 bar
Max. ambient temperature:	50 °C
Max. water flow temperature:	110 °C
Power:	230 V - 50/60 Hz
Rating:	3 VA
Protection:	IP 43
Travel time:	approx. 3 min.
Max. glycol content of water:	50%

Valves characteristics

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

\* 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 across the fully open valve should not exceed 25 kPa for cooling operation and 15 kPa for heating operation.

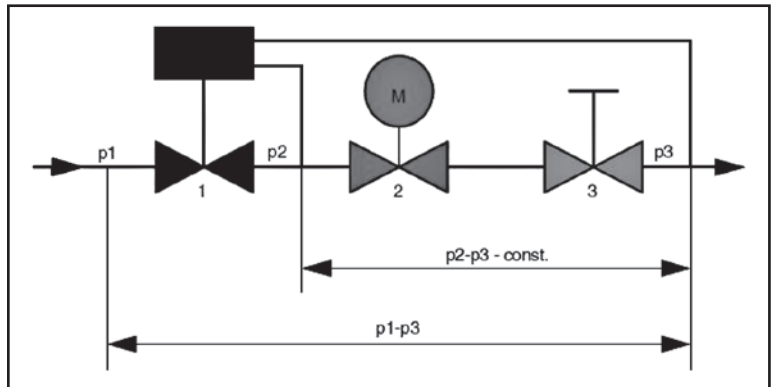
### Balancing valves independent from the system pressure

- 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.

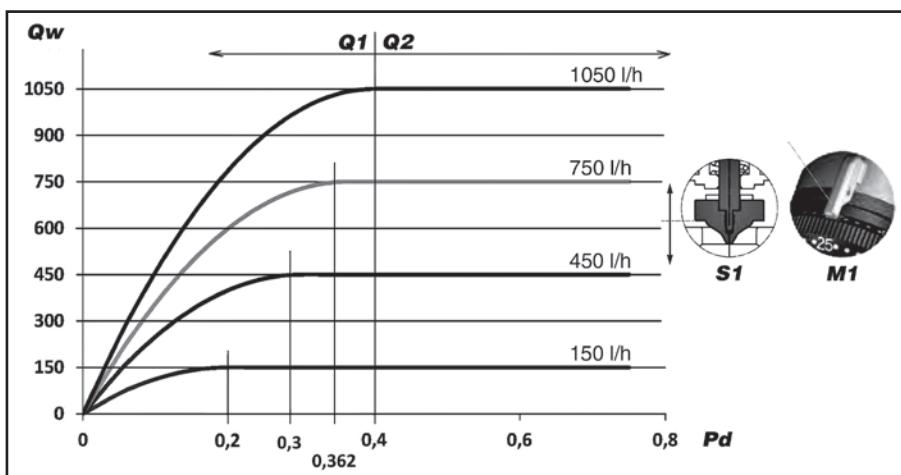
### Minimum operating differential pressure

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

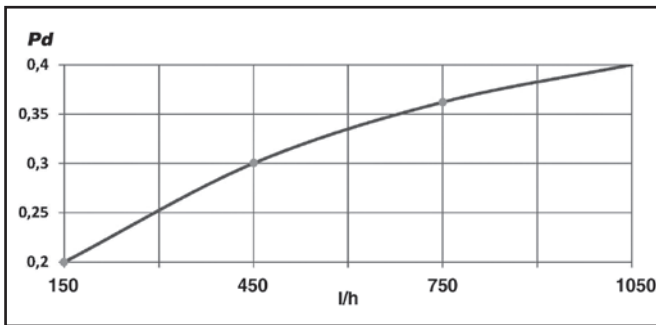
**S1** = Position of the adjustment valve plunger

**M1** = Position of the knob

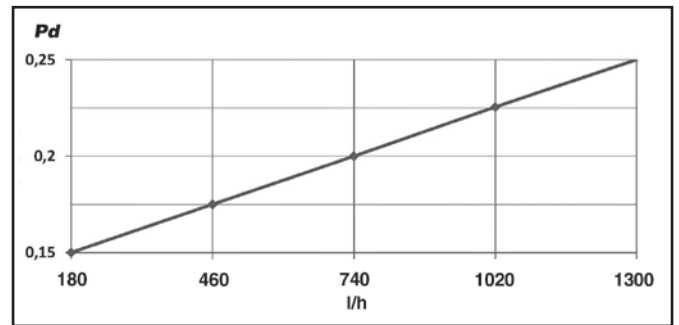


The valve upstream-downstream minimum differential pressure (“p1” – “p3”), which depends on the valve calibration value, must be exceeded to access the constant flow rate field.

**DN 15 Model**



**DN 20 Model**



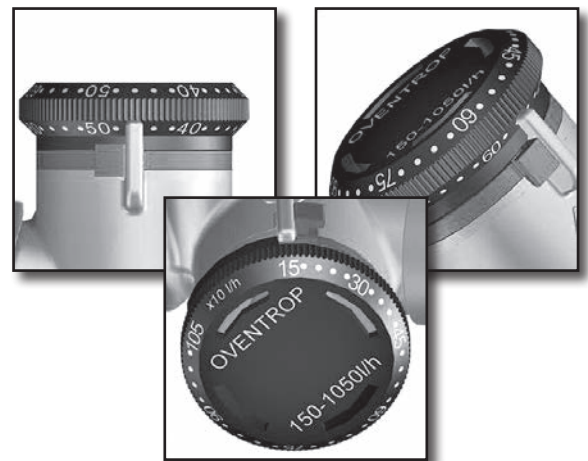
**LEGEND:**

**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
<b>DN 15</b>	150 – 1050	1,8
<b>DN 20</b>	180 – 1300	2,5

**Operation limits of the balancing valves**

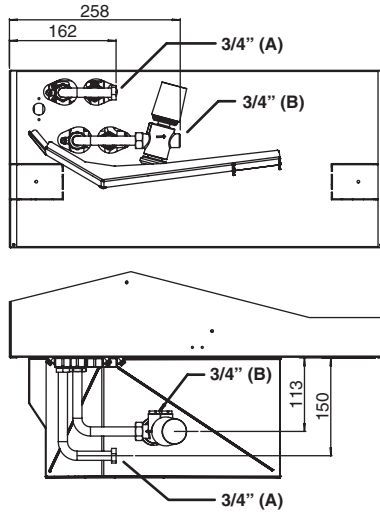
- Maximum operating temperature 120°C
- Maximum operating pressure 16 bar
- Maximum % of water/glycol mixture 50%
- Minimum operating temperature -10°C
- Maximum differential pressure 4 bar

### Balancing valves for main coil

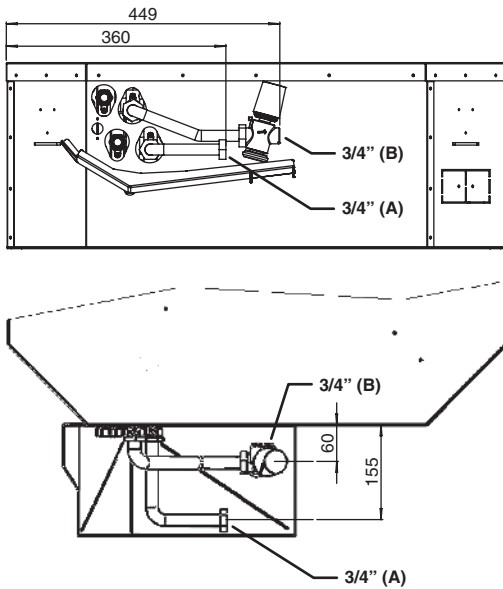
2 way valve for main coil and assembly kit.

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

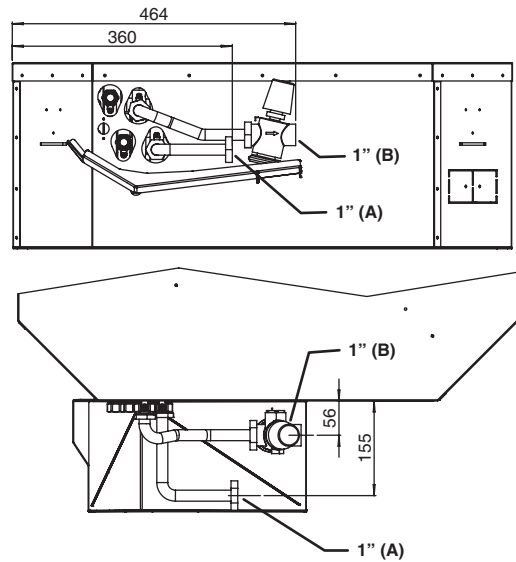
#### SK 0 - 1 - 2 - 3



#### SK 4



#### SK 5 - 6



#### LEGEND

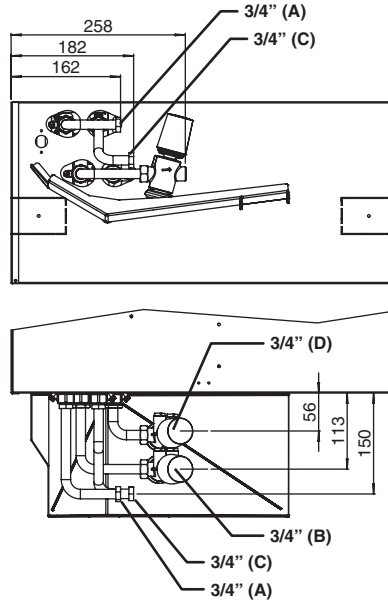
A = Water inlet - Female connection  
B = Water outlet - Male connection

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

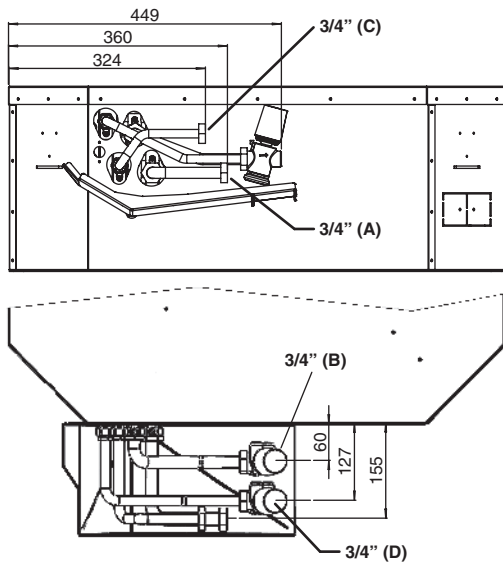
### Balancing valves for main and additional coil

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.

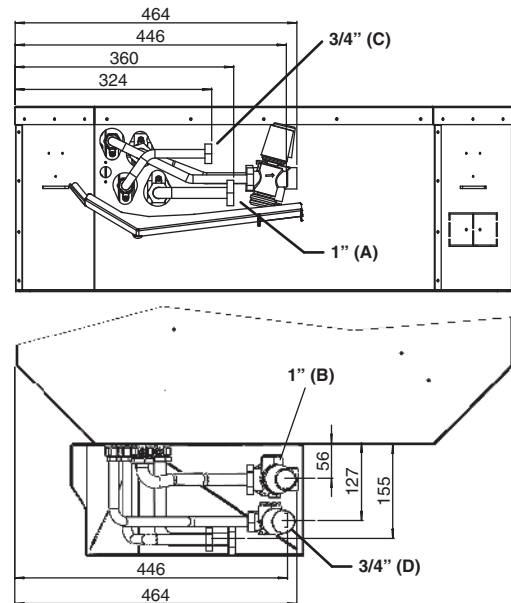
#### SK 0 - 1 - 2 - 3



#### SK 4



#### SK 5 - 6



#### LEGEND

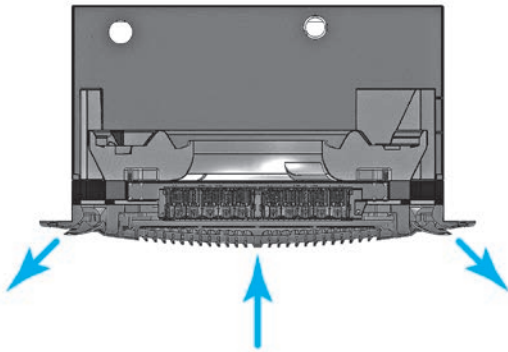
A = Water inlet (main coil) - Female connection  
B = Water outlet (main coil) - Male connection

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

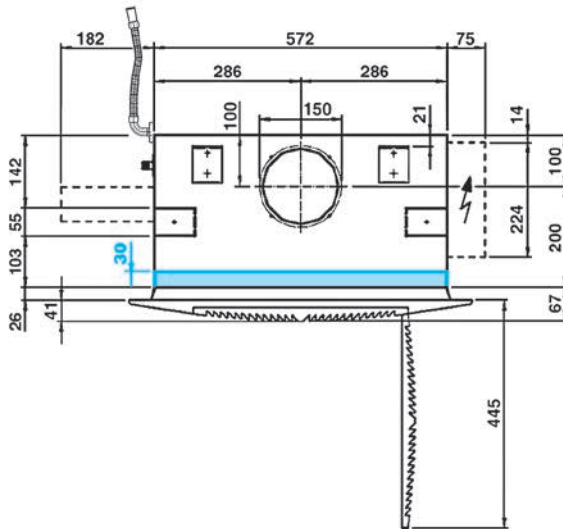
COIL	MODEL	VALVE			FITTED		NOT FITTED	
		DN	Ø	Flow Rate Range (l/h)	CODE	IDENTIFICATION	CODE	IDENTIFICATION
MAIN	0 - 1 - 2 - 3	15	3/4"	150 - 1050	9079771	V2OVSK6BPM 150-1050	9079761	V2OVSK6BPS 150-1050
	4	15	3/4"	150 - 1050	9079791	V2OVSK8BPM 150-1050	9079781	V2OVSK8BPS 150-1050
	5 - 6	20	1"	180 - 1300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

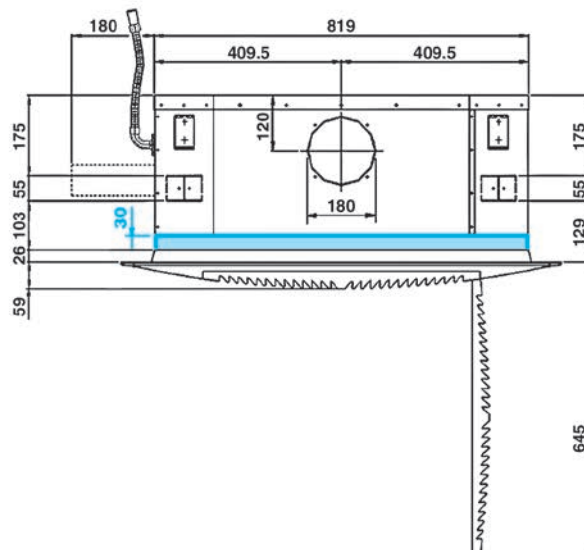
**Cassette SkyStar** can be equipped with the innovative plate type electrostatic filter, **Crystall**, combining air treatment and purifying in a single product. The electronic filter is patented and certified according to Standard UNI 11254.



**Dimensions**



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



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

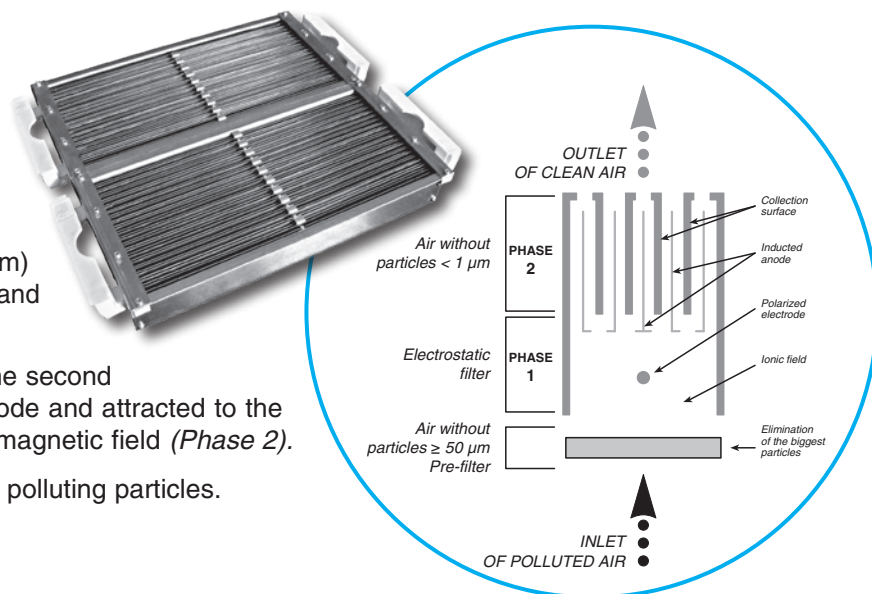
## Operating principle of the electrostatic filter

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  $\text{CO}_2$  - 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/m<sup>2</sup>). 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	<b>UNI EN 13779:2008</b>			
	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	
<b>UNI EN 10339REV</b>				
CATEGORY	RATE OF FRESH AIR			
High	(l.s. per person) + (l.s. per m <sup>2</sup> )		Total fresh air volume varies based on the intended use of the confined area	
Medium	(l.s. per person) + (l.s. per m <sup>2</sup> )			
Low	(l.s. per person) + (l.s. per m <sup>2</sup> )			
not classified	not classified			

PERFORMANCE METHOD	<b>UNI EN 13779:2008</b>		
	<b>IDENTIFICATION AND QUANTIFICATION OF THE REFERENCE POLLUTANT (PM OR GAS)</b>		
	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/m <sup>3</sup> , 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
	<b>UNI EN 10339REV</b>		
<b>IDENTIFICATION AND QUANTIFICATION OF THE REFERENCE POLLUTANT (PM OR GAS)</b>			
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/m <sup>3</sup> , 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<sub>v</sub>** = Thermal energy lost for ventilation - Watt
- ΔT** = Indoor-Outdoor difference (T) - °C
- R** = A.C.H.
- D** = Air density - Kg/m<sup>3</sup>
- C** = Specific air heat - J/Kg-°C
- Vol** = Room size - m<sup>3</sup>

## 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 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).

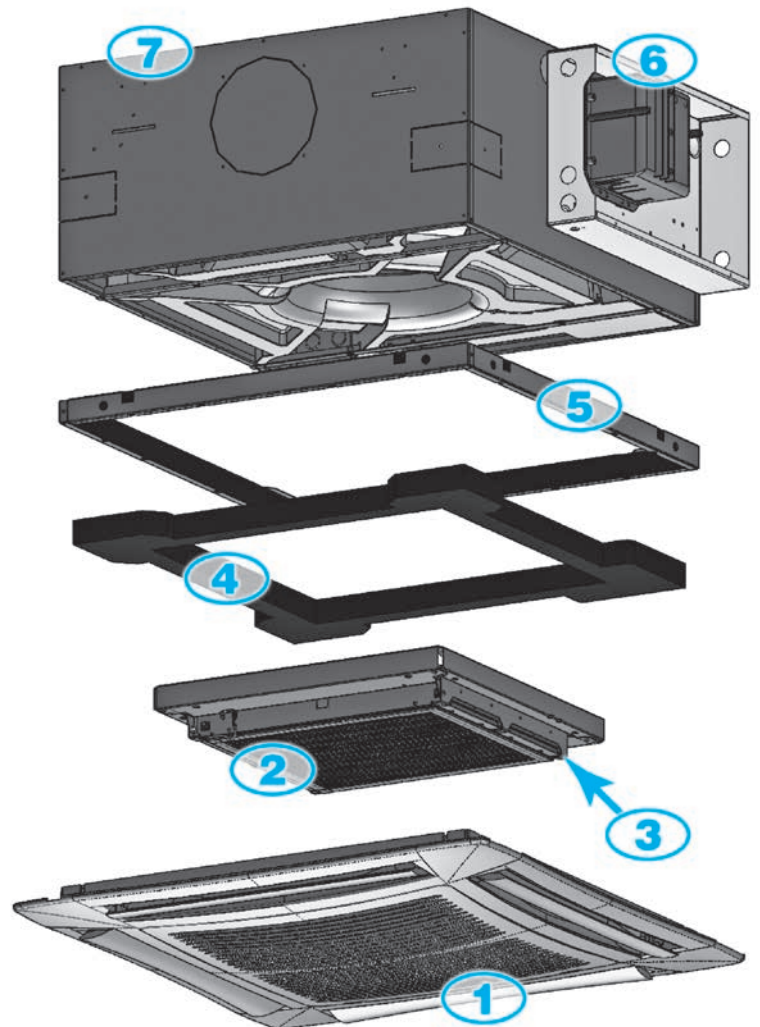
### Electronic board

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

All the **SkyStar** units can be supplied with a wide range of controls that allows managing one single unit or several units (by using speed switches or the power unit).

The room temperature can be controlled through electronic room thermostats, with different solutions according to every ambient conditions.

The options range from the basic 3 speed control **WM-3V** to the highly sophisticated **WM-T** and **WM-TQR** electronic room thermostats that regulate the room temperature and are suitable when the user wants to set the fan speed. The most evolved **WM-AU**, **T-MB** and **WM-503** versions allow both the manual and the automatic speed switch.



**WM-3V**



**WM-T**



**WM-TQR**



**WM-AU**



**T-MB**



**WM-503**



**T2T**

*All the controls are described in detail in the "Fan Coil Control Range" literature.*



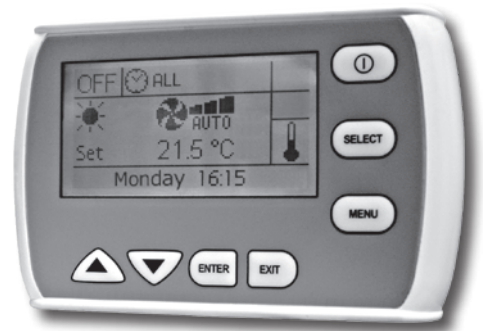
All the **SkyStar** units can be supplied in **MB version**. This version includes a wide range of controls, including the **infra-red remote control**, which allows managing one single unit or several units by using the Modbus RTU - RS 485 communication protocol.

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**



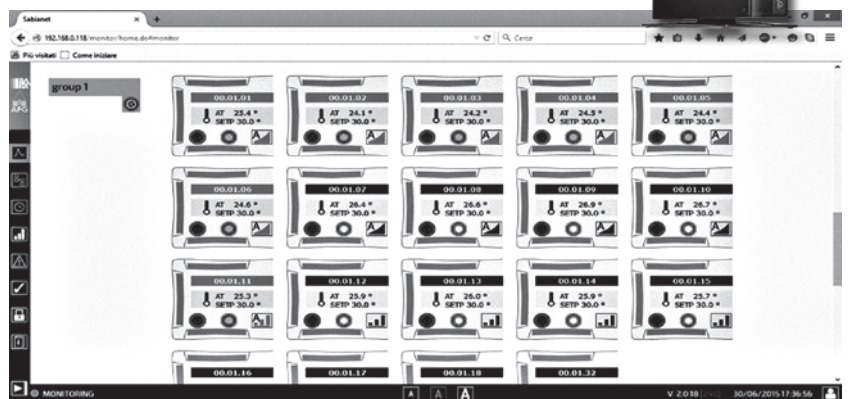
**PSM-DI multifunction control**



**RT03 infra-red remote control**

**PC**

**Sabianet screenshot**



**Sabianet software**

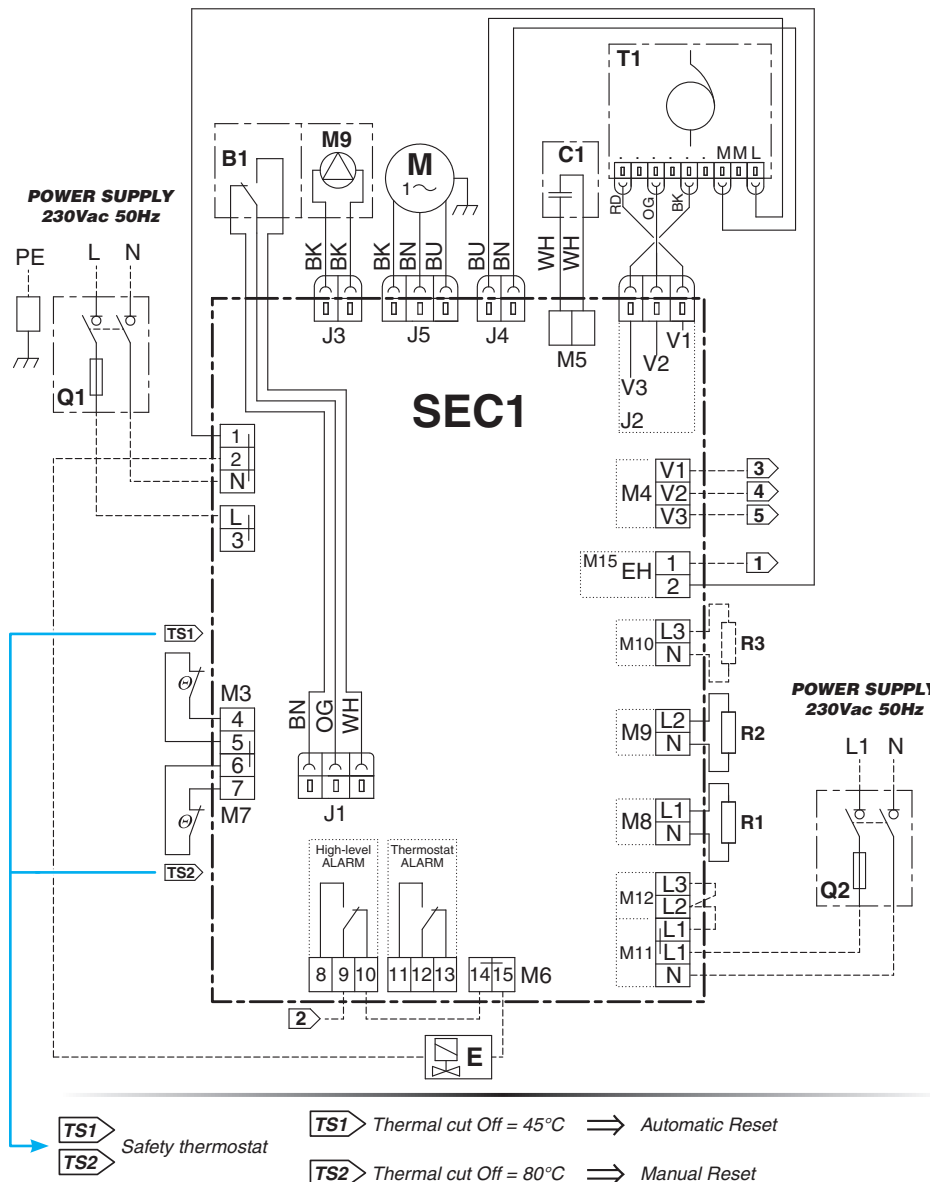
**All the controls are described in detail in the “Fan Coil Control Range” literature.**

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 <sup>2</sup>	3 x 2,5 mm <sup>2</sup>	3 x 2,5 mm <sup>2</sup>

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

Electric diagram



LEGEND:

- M = Fan
  - SEC1 = Fan coil terminal board
  - T1 = Autotransformer
  - C1 = Capacitor
  - B1 = Condensate level sensor
  - M9 = Water pump motor
  - S1 = Alarm condensate contact
  - E = Cold water valve
  - BK = Black
  - BN = Brown
  - BU = Dark Blue
  - OG = Orange
  - RD = Red
  - WH = White
  - R1-R2-R3 = Resistance
  - Q1-Q2 = Two poles disconnector
- 1 Input for electric resistance
  - 2 Input for "E"
  - 3 Low speed
  - 4 Medium speed
  - 5 High speed

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.

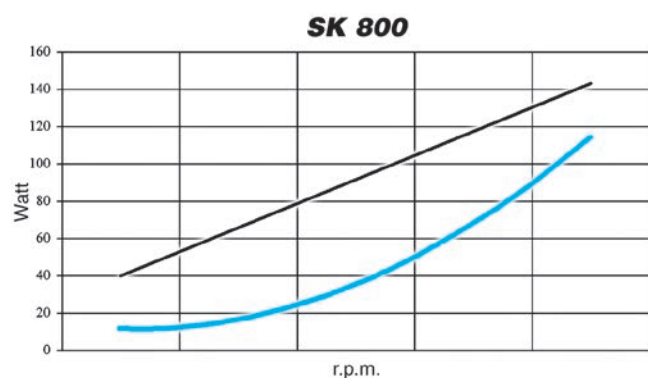
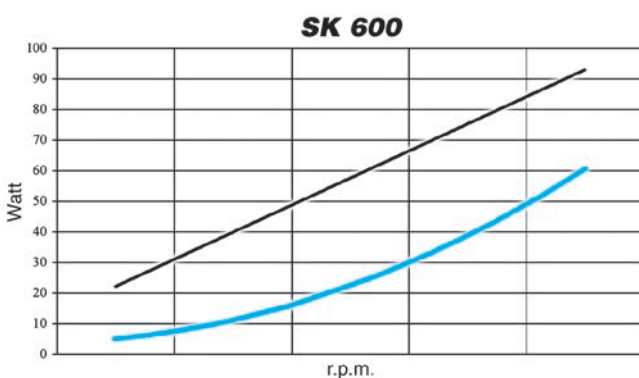
The brushless motor is characterised by a constant synchronous speed, independently of the applied load, that depends only on the motor power supply frequency, which is modulated by the inverter. It consumes less because:

- 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/MD-800 version:* metal diffuser painted in RAL 9003 white colour with 600x600 dimension to perfectly fit into the false ceiling standard modules without overlapping parts.

### 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 has 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

**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°C E.W.T. +12°C L.W.T.

**HEATING**

Entering air temperature +20°C  
Water temperature +45°C E.W.T. +40°C L.W.T.

MODEL		SK-ECM 12					SK-ECM 22					SK-ECM 32				
		1	3	5	7,5	10	1	3	5	7,5	10	1	3	5	7,5	10
Speed		LOW		MED		HIGH	LOW		MED		HIGH	LOW		MED		HIGH
Air flow	m <sup>3</sup> /h	310	345	380	457	535	310	377	445	577	710	360	485	610	745	880
Cooling total emission (E)	kW	1,84	2,01	2,16	2,47	2,73	2,24	2,65	3,04	3,71	4,30	2,55	3,25	3,85	4,45	4,96
Cooling sensible emission (E)	kW	1,35	1,47	1,60	1,84	2,07	1,57	1,87	2,16	2,67	3,15	1,80	2,31	2,79	3,25	3,68
Heating (E)	kW	1,85	2,04	2,22	2,55	2,87	2,12	2,56	2,98	3,68	4,36	2,46	3,17	3,85	4,52	5,15
Dp Cooling (E)	kPa	4,9	5,8	6,6	8,4	10,1	4,6	6,3	11,0	11,6	15,1	5,9	9,1	12,4	16,2	19,7
Dp Heating (E)	kPa	4,3	5,1	5,9	7,6	9,4	3,6	5,1	6,6	9,7	13,2	4,7	7,5	10,6	14,1	17,8
Fan (E)	W	5	6,5	8	12	16	5	8	11	21	31	7	14	21	41,5	62
Sound power Lw (E)	dB(A)	33	36	39	43	47	33	38	43	48,5	54	37	43,5	50	55	60
Sound pressure Lp (*)	dB(A)	24	27	30	34	38	24	29	34	39,5	45	28	34,5	41	46	51
Water content	l	1,4					2,1					2,1				
Dimensions	mm	575 x 575 x 275														

MODEL		SK-ECM 42					SK-ECM 52				
		1	3	5	7,5	10	1	3	5	7,5	10
Speed		LOW		MED		HIGH	LOW		MED		HIGH
Air flow	m <sup>3</sup> /h	630	750	870	1017	1165	710	920	1130	1450	1770
Cooling total emission (E)	kW	4,20	4,70	5,13	5,76	6,30	5,28	6,54	7,69	9,28	10,69
Cooling sensible emission (E)	kW	3,02	3,39	3,75	4,23	4,69	3,68	4,62	5,50	6,71	7,83
Heating (E)	kW	4,27	4,78	5,30	6,02	6,70	4,90	6,18	7,34	9,00	10,56
Dp Cooling (E)	kPa	10,9	13,3	15,6	19,3	22,7	9,4	13,8	18,5	26,1	33,0
Dp Heating (E)	kPa	9,6	11,8	14,2	17,9	21,6	7,0	10,7	14,6	21,1	28,1
Fan (E)	W	10	13,5	17	25	33	10	21	32	70	108
Sound power Lw (E)	dB(A)	33	36	39	43,5	48	34	40,5	47	52	57
Sound pressure Lp (*)	dB(A)	24	27	30	34,5	39	25	31,5	38	43	48
Water content	l	3,0					4,0				
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 m<sup>3</sup> room and a reverberation time of 0.5 sec.

**EUROVENT Certification**

**Technical features**

**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°C E.W.T. +12°C L.W.T.

**HEATING**

Entering air temperature +20°C  
Water temperature +65°C E.W.T. +55°C L.W.T.

MODEL		SK-ECM 14					SK-ECM 26					SK-ECM 36				
		1	3	5	7,5	10	1	3	5	7,5	10	1	3	5	7,5	10
Speed		LOW		MED		HIGH	LOW		MED		HIGH	LOW		MED		HIGH
Air flow	m³/h	310	345	380	457	535	310	377	445	577	710	360	485	610	745	880
Cooling total emission (E)	kW	1,85	2,02	2,17	2,48	2,75	2,09	2,46	2,81	3,39	3,90	2,37	2,99	3,51	4,03	4,47
Cooling sensible emission (E)	kW	1,34	1,47	1,59	1,83	2,06	1,49	1,76	2,03	2,49	2,92	1,70	2,17	2,60	3,01	3,40
Heating (E)	kW	2,13	2,32	2,51	2,85	3,18	1,73	1,97	2,20	2,57	2,91	1,92	2,31	2,66	2,99	3,29
Dp Cooling (E)	kPa	4,6	5,4	6,2	7,9	9,5	3,3	4,4	5,6	7,9	10,3	4,1	6,3	8,4	10,9	13,1
Dp Heating (E)	kPa	4,6	5,3	6,1	7,7	9,4	2,6	3,3	4,1	5,4	6,7	3,2	4,4	5,7	7,1	8,4
Fan (E)	W	5	6,5	8	12	16	5	8	11	21	31	7	14	21	41,5	62
Sound power Lw (E)	dB(A)	33	36	39	43	47	33	38	43	48,5	54	37	43,5	50	55	60
Sound pressure Lp (*)	dB(A)	24	27	30	34	38	24	29	34	39,5	45	28	34,5	41	46	51
Cooling water content	l	1,4					1,7					1,7				
Heating water content	l	0,7					0,5					0,5				
Dimensions	mm	575 x 575 x 275														

MODEL		SK-ECM 44					SK-ECM 56				
		1	3	5	7,5	10	1	3	5	7,5	10
Speed		LOW		MED		HIGH	LOW		MED		HIGH
Air flow	m³/h	630	750	870	1017	1165	710	920	1130	1450	1770
Cooling total emission (E)	kW	4,29	4,81	5,29	5,92	6,48	4,97	6,13	7,14	8,56	9,76
Cooling sensible emission (E)	kW	3,07	3,46	3,82	4,32	4,80	3,51	4,37	5,17	6,27	7,29
Heating (E)	kW	5,41	6,04	6,65	7,46	8,24	4,58	5,47	6,27	7,36	8,33
Dp Cooling (E)	kPa	9,4	11,6	13,6	16,8	19,8	8,8	12,9	17,0	23,7	30,1
Dp Heating (E)	kPa	8,5	10,3	12,3	15,1	18,1	4,9	6,7	8,6	11,4	14,3
Fan (E)	W	10	13,5	17	25	33	10	21	32	70	108
Sound power Lw (E)	dB(A)	33	36	39	43,5	48	34	40,5	47	52	57
Sound pressure Lp (*)	dB(A)	24	27	30	34,5	39	25	31,5	38	43	48
Cooling water content	l	3,0					3,6				
Heating water content	l	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.

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	Qv m³/h	WT: 7/12 °C			WT: 8/13 °C			WT: 10/15 °C			WT: 12/17 °C		
				Qw l/h	Pc kW	Ps kW	Qw l/h	Pc kW	Ps kW	Qw l/h	Pc kW	Ps kW	Qw l/h	Pc kW	Ps kW
SK 12	MAX	10	535	506	2,94	2,06	455	2,64	1,94	307	1,78	1,78	263	1,53	1,53
		7,5	457	455	2,64	1,84	409	2,38	1,73	323	1,88	1,52	234	1,36	1,36
	MED	5	380	399	2,32	1,60	360	2,09	1,50	284	1,65	1,32	206	1,20	1,20
		3	345	370	2,15	1,47	334	1,94	1,38	264	1,54	1,22	190	1,10	1,10
SK 22	MAX	10	710	792	4,61	3,14	716	4,16	2,95	566	3,29	2,60	404	2,35	2,35
		7,5	577	681	3,96	2,67	617	3,59	2,51	490	2,85	2,20	379	2,20	1,93
	MED	5	445	559	3,25	2,16	508	2,95	2,03	403	2,35	1,78	312	1,81	1,56
		3	377	487	2,83	1,87	442	2,57	1,76	354	2,06	1,54	274	1,59	1,35
SK 32	MAX	10	880	916	5,32	3,67	825	4,80	3,45	653	3,80	3,04	471	2,74	2,74
		7,5	745	817	4,75	3,24	738	4,29	3,05	585	3,40	2,69	417	2,43	2,43
	MED	5	610	710	4,13	2,79	643	3,74	2,62	510	2,97	2,31	394	2,29	2,02
		3	485	596	3,46	2,31	541	3,14	2,17	429	2,49	1,91	332	1,93	1,67
SK 42	MAX	10	1165	1162	6,76	4,67	1049	6,10	4,40	826	4,80	3,88	599	3,48	3,48
		7,5	1017	1057	6,15	4,22	955	5,55	3,97	755	4,39	3,49	541	3,14	3,14
	MED	5	870	945	5,50	3,74	856	4,97	3,52	675	3,93	3,10	480	2,79	2,79
		3	750	861	5,01	3,39	780	4,54	3,19	619	3,60	2,80	438	2,55	2,55
SK 52	MAX	10	1770	1962	11,41	7,81	1772	10,30	7,35	1410	8,20	6,48	1012	5,89	5,89
		7,5	1450	1702	9,90	6,70	1541	8,96	6,29	1227	7,14	5,55	951	5,53	4,87
	MED	5	1130	1415	8,22	5,49	1281	7,45	5,17	1026	5,96	4,54	791	4,60	3,98
		3	920	1200	6,98	4,61	1090	6,34	4,34	875	5,09	3,81	675	3,92	3,33
	MIN	1	710	968	5,63	3,68	881	5,12	3,46	710	4,13	3,04	550	3,20	2,66

Emission correction factors for different working conditions

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

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

Water (°C)	Air (°C)	TOTAL EMISSION			Air (°C)	SENSIBLE EMISSION		
		25 - 18	26 - 18.5	28 - 20		25 - 18	26 - 18.5	28 - 20
7/12	K	0,82	0,89	1,11	K	0,90	0,94	1,06
10/15	K	0,56	0,63	0,82	K	0,72	0,78	0,90
14/18	K	0,35	0,41	0,52	K	0,50	0,58	0,72

LEGEND

- WT = Water temperature
- Pc = Cooling total emission
- Ps = Cooling sensible emission
- Qw = Water flow
- Speed = Fan speed
- MAX = High speed
- MED = Medium speed
- MIN = Low speed
- Vdc = Inverter Power
- Qv = Air flow



Emission

Heating emission of 1 battery units (2 pipe installation)

Entering air temperature: +20°C

				WT: 45/40 °C			WT: 50/40 °C		WT: 55/45 °C		WT: 60/50 °C		WT: 70/60 °C	
ECM MOD.	Speed	Vdc	Qv	Qw	Ph	Qw	Ph	Qw	Ph	Qw	Ph	Qw	Ph	
			m³/h	l/h	kW	l/h	kW	l/h	kW	l/h	kW	l/h	kW	
SK 12	MAX	10	535	247	2,87	272	3,17	330	3,83	387	4,49	500	5,82	
		7,5	457	219	2,55	243	2,82	293	3,41	343	3,99	444	5,16	
	MED	5	380	191	2,22	213	2,48	257	2,99	300	3,49	387	4,51	
		3	345	176	2,04	196	2,28	236	2,74	276	3,21	355	4,13	
	MIN	1	310	159	1,85	178	2,07	214	2,49	250	2,91	322	3,75	
SK 22	MAX	10	710	375	4,36	420	4,89	505	5,87	589	6,85	758	8,81	
		7,5	577	317	3,68	357	4,15	428	4,97	499	5,80	640	7,44	
	MED	5	445	256	2,98	290	3,38	347	4,04	404	4,70	517	6,01	
		3	377	220	2,56	251	2,92	300	3,48	348	4,05	444	5,16	
	MIN	1	310	183	2,12	209	2,43	249	2,90	289	3,36	368	4,28	
SK 32	MAX	10	880	443	5,15	494	5,75	595	6,92	696	8,09	896	10,42	
		7,5	745	389	4,52	435	5,06	524	6,09	611	7,11	786	9,14	
	MED	5	610	331	3,85	373	4,34	448	5,20	522	6,07	670	7,79	
		3	485	273	3,17	309	3,59	370	4,30	430	5,01	551	6,41	
	MIN	1	360	212	2,46	241	2,81	288	3,35	335	3,89	427	4,96	
SK 42	MAX	10	1165	576	6,70	642	7,47	774	9,00	904	10,51	1165	13,54	
		7,5	1017	517	6,02	579	6,73	696	8,10	813	9,46	1046	12,16	
	MED	5	870	456	5,30	512	5,95	615	7,15	717	8,34	922	10,72	
		3	750	411	4,78	463	5,38	555	6,45	647	7,52	830	9,65	
	MIN	1	630	367	4,27	415	4,82	497	5,78	578	6,72	741	8,61	
SK 52	MAX	10	1770	908	10,56	1015	11,81	1222	14,21	1428	16,60	1837	21,37	
		7,5	1450	774	9,00	870	10,11	1045	12,15	1219	14,17	1565	18,20	
	MED	5	1130	631	7,34	713	8,29	854	9,93	994	11,56	1274	14,82	
		3	920	532	6,18	604	7,02	722	8,40	839	9,76	1073	12,47	
	MIN	1	710	421	4,90	481	5,60	574	6,67	666	7,74	849	9,87	

LEGEND

- WT = Water temperature
- Ph = Emission
- Qw = Water flow
- Speed = Fan speed
- MAX = High speed
- MED = Medium speed
- MIN = Low speed
- Vdc = Inverter Power
- Qv = Air flow

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	Qv m³/h	WT: 7/12 °C			WT: 8/13 °C			WT: 10/15 °C			WT: 12/17 °C		
				Qw l/h	Pc kW	Ps kW	Qw l/h	Pc kW	Ps kW	Qw l/h	Pc kW	Ps kW	Qw l/h	Pc kW	Ps kW
SK 14	MAX	10	535	508	2,95	2,05	458	2,66	1,93	305	1,77	1,77	261	1,52	1,52
		7,5	457	456	2,65	1,83	412	2,39	1,72	325	1,89	1,52	235	1,37	1,37
	MED	5	380	401	2,33	1,59	362	2,10	1,50	286	1,66	1,32	204	1,19	1,19
		3	345	371	2,16	1,47	336	1,95	1,38	265	1,54	1,21	188	1,09	1,09
	MIN	1	310	340	1,98	1,33	308	1,79	1,26	242	1,41	1,10	171	0,99	0,99
SK 26	MAX	10	710	720	4,19	2,91	648	3,77	2,73	513	2,98	2,41	372	2,16	2,16
		7,5	577	623	3,62	2,49	562	3,27	2,34	446	2,59	2,06	319	1,85	1,85
	MED	5	445	516	3,00	2,03	467	2,71	1,91	369	2,15	1,68	261	1,52	1,52
		3	377	452	2,63	1,76	409	2,38	1,66	326	1,90	1,46	251	1,46	1,28
	MIN	1	310	383	2,23	1,48	347	2,02	1,39	277	1,61	1,22	214	1,24	1,07
SK 36	MAX	10	880	826	4,80	3,38	742	4,31	3,18	586	3,41	2,81	431	2,51	2,51
		7,5	745	742	4,31	3,00	667	3,88	2,82	527	3,06	2,49	384	2,23	2,23
	MED	5	610	649	3,77	2,60	585	3,40	2,44	462	2,69	2,15	333	1,94	1,94
		3	485	548	3,19	2,17	496	2,88	2,04	393	2,28	1,79	278	1,62	1,62
	MIN	1	360	436	2,54	1,70	395	2,30	1,60	314	1,83	1,40	243	1,41	1,23
SK 44	MAX	10	1165	1196	6,95	4,79	1080	6,28	4,50	851	4,95	3,96	613	3,56	3,56
		7,5	1017	1086	6,31	4,31	982	5,71	4,06	775	4,51	3,57	553	3,21	3,21
	MED	5	870	969	5,64	3,82	878	5,10	3,59	697	4,05	3,16	495	2,88	2,88
		3	750	882	5,13	3,45	800	4,65	3,25	634	3,69	2,86	447	2,60	2,60
	MIN	1	630	790	4,59	3,07	717	4,17	2,89	567	3,30	2,54	439	2,55	2,22
SK 56	MAX	10	1770	1801	10,47	7,26	1623	9,44	6,83	1286	7,48	6,03	933	5,42	5,42
		7,5	1450	1571	9,14	6,25	1419	8,25	5,88	1123	6,53	5,18	805	4,68	4,68
	MED	5	1130	1315	7,65	5,17	1191	6,93	4,86	942	5,48	4,27	731	4,25	3,74
		3	920	1123	6,53	4,36	1019	5,93	4,10	810	4,71	3,60	625	3,63	3,16
	MIN	1	710	913	5,31	3,51	831	4,83	3,30	664	3,86	2,90	514	2,99	2,53

Emission correction factors for different working conditions

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

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

Water (°C)	Air (°C)	TOTAL EMISSION			Air (°C)	SENSIBLE EMISSION		
		25 - 18	26 - 18.5	28 - 20		25 - 18	26 - 18.5	28 - 20
7/12	K	0,82	0,89	1,11	K	0,90	0,94	1,06
10/15	K	0,56	0,63	0,82	K	0,72	0,78	0,90
14/18	K	0,35	0,41	0,52	K	0,50	0,58	0,72

LEGEND

- WT = Water temperature
- Pc = Cooling total emission
- Ps = Cooling sensible emission
- Qw = Water flow
- Speed = Fan speed
- MAX = High speed
- MED = Medium speed
- MIN = Low speed
- Vdc = Inverter Power
- Qv = Air flow

Emission of 4 pipe units  
with standard and enhanced cooling battery

Heating emission of 2 battery units (4 pipe installation)

Entering air temperature: +20°C

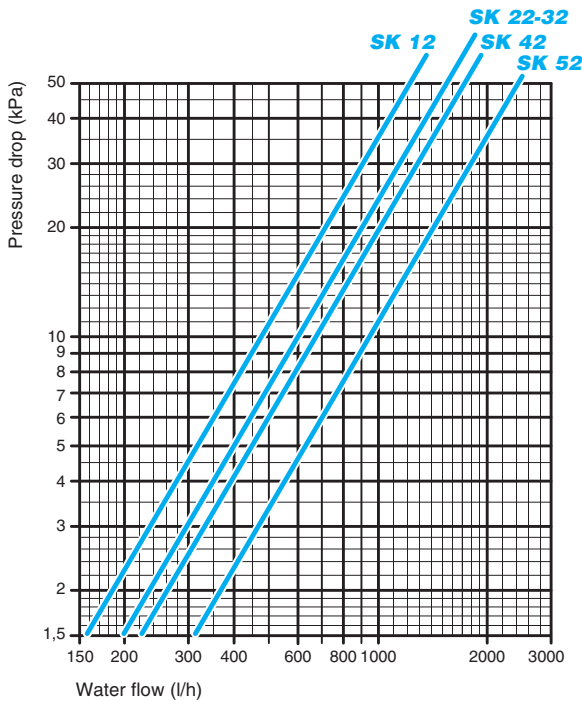
ECM MOD.	Speed	Vdc	Qv m³/h	WT: 45/40 °C		WT: 50/40 °C		WT: 55/45 °C		WT: 60/50 °C		WT: 70/60 °C	
				Qw l/h	Ph kW	Qw l/h	Ph kW	Qw l/h	Ph kW	Qw l/h	Ph kW	Qw l/h	Ph kW
SK 14	MAX	10	535	153	1,78	161	1,87	198	2,30	236	2,74	311	3,62
		7,5	457	137	1,59	144	1,68	178	2,07	212	2,46	279	3,24
	MED	5	380	120	1,40	127	1,48	156	1,82	186	2,16	245	2,85
		3	345	112	1,30	118	1,37	145	1,69	172	2,01	227	2,64
	MIN	1	310	103	1,19	108	1,26	133	1,55	158	1,84	209	2,43
SK 26	MAX	10	710	139	1,62	139	1,61	176	2,04	213	2,48	288	3,35
		7,5	577	123	1,43	123	1,43	156	1,81	189	2,19	254	2,96
	MED	5	445	105	1,23	106	1,23	133	1,55	161	1,87	217	2,53
		3	377	95	1,10	95	1,11	120	1,39	145	1,68	195	2,27
	MIN	1	310	83	0,96	83	0,97	105	1,22	127	1,47	170	1,98
SK 36	MAX	10	880	158	1,83	156	1,82	198	2,31	241	2,80	326	3,79
		7,5	745	143	1,67	142	1,66	181	2,10	219	2,54	296	3,44
	MED	5	610	127	1,48	127	1,48	161	1,87	195	2,27	263	3,06
		3	485	111	1,29	111	1,29	140	1,63	170	1,97	229	2,66
	MIN	1	360	92	1,07	93	1,08	117	1,36	141	1,64	189	2,20
SK 44	MAX	10	1165	396	4,61	421	4,90	517	6,01	613	7,13	805	9,36
		7,5	1017	359	4,17	382	4,44	468	5,45	555	6,46	729	8,48
	MED	5	870	320	3,72	340	3,96	417	4,85	494	5,75	649	7,54
		3	750	291	3,38	310	3,60	380	4,41	450	5,23	590	6,86
	MIN	1	630	260	3,03	278	3,23	340	3,96	403	4,68	528	6,14
SK 56	MAX	10	1770	400	4,65	413	4,80	514	5,97	615	7,15	818	9,51
		7,5	1450	353	4,11	365	4,25	454	5,28	543	6,32	722	8,40
	MED	5	1130	301	3,50	312	3,63	388	4,51	464	5,39	616	7,16
		3	920	263	3,06	273	3,18	339	3,94	405	4,70	537	6,24
	MIN	1	710	220	2,56	229	2,67	284	3,30	339	3,94	449	5,22

**LEGEND**

- WT = Water temperature
- Ph = Emission
- Qw = Water flow
- Speed = Fan speed
- MAX = High speed
- MED = Medium speed
- MIN = Low speed
- Vdc = Inverter Power
- Qv = Air flow

## Water side pressure drop

### 2 pipe installation

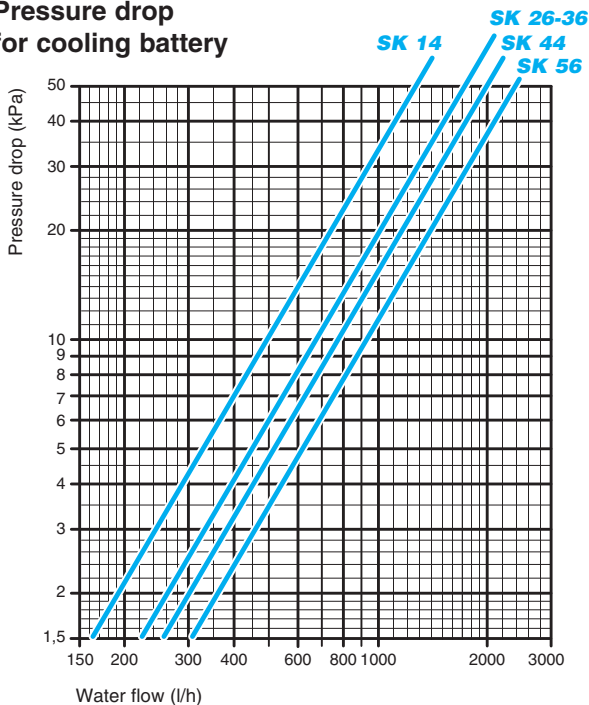


The water pressure drop figures refer to a mean water temperature of **10°C**; for different temperatures, multiply the pressure drop figures by the correction factors **K**.

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

### 4 pipe installation

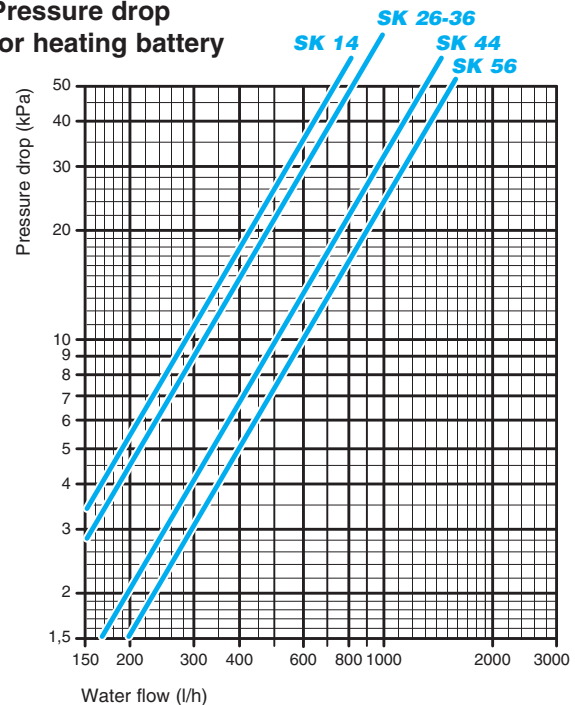
#### Pressure drop for cooling battery



The water pressure drop figures refer to a mean water temperature of **10°C**; for different temperatures, multiply the pressure drop figures by the correction factors **K**.

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

#### Pressure drop for heating battery



The water pressure drop figures refer to a mean water temperature of **60°C**; for different temperatures, multiply the pressure drop figures by the correction factors **K**.

°C	40	50	70	80
<b>K</b>	1,12	1,06	0,94	0,88

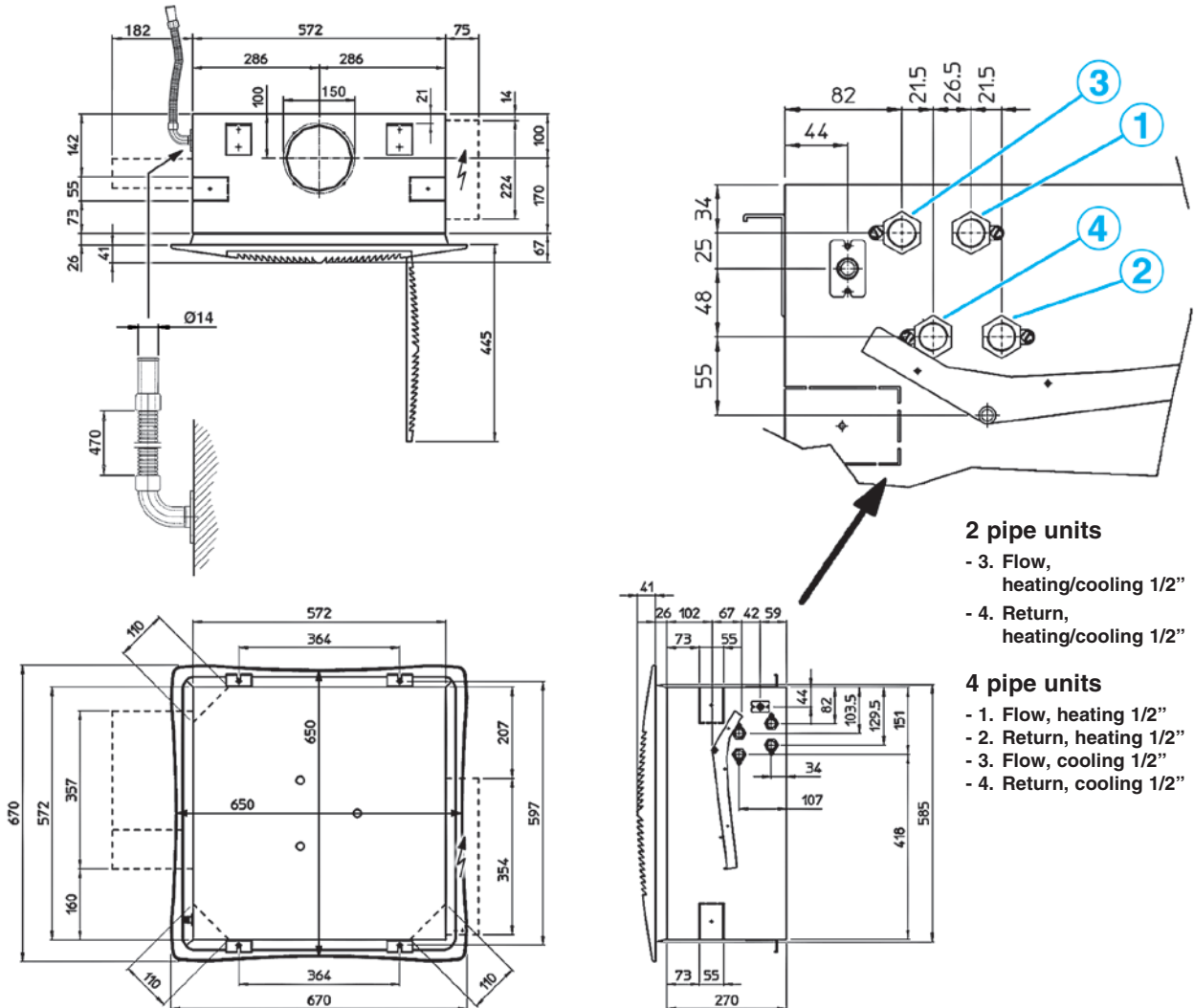
## Working conditions

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



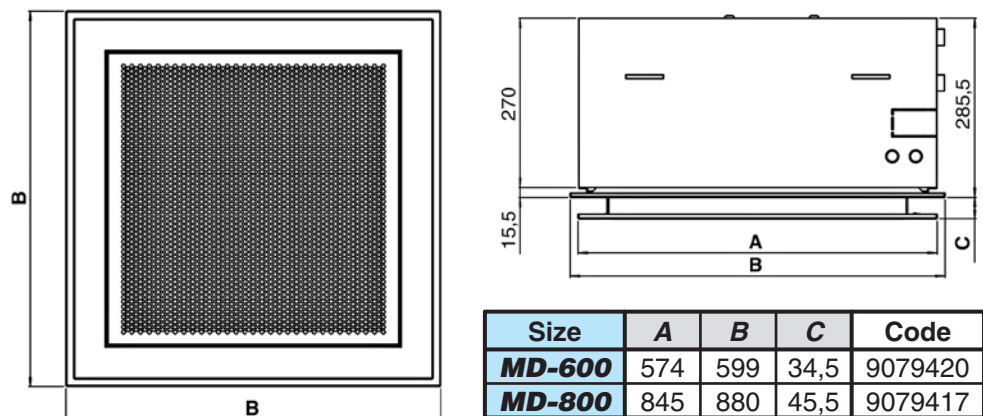
**Dimensions and weights**

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



**MD-600/MD-800  
METAL DIFFUSER**

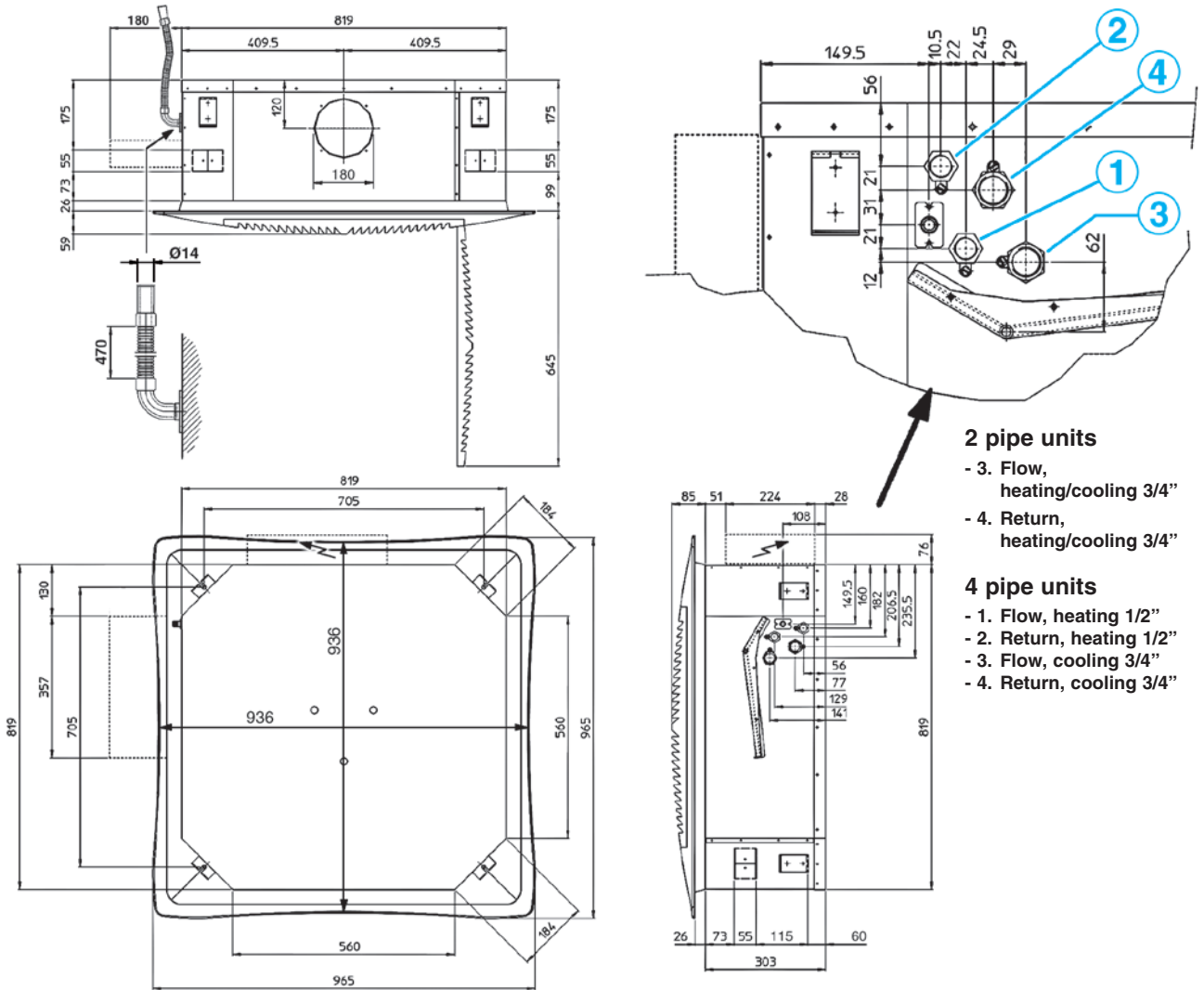
(RS receiver, Code 9066338, for metal diffuser for MB units)



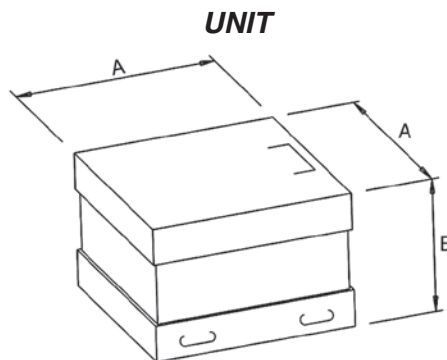
ECM Model	UNIT		DIFFUSER		Packed unit Dimensions			
	Weights packed unit	Weights unpacked unit	Weights packed unit	Weights unpacked unit	A	B	C	D
	kg	kg	kg	kg	mm			
<b>SK 12</b>	28	22	6	3	790	350	750	150
<b>SK 14</b>	30	24						
<b>SK 22 - 26</b>								
<b>SK 32 - 36</b>								

Dimensions and weights

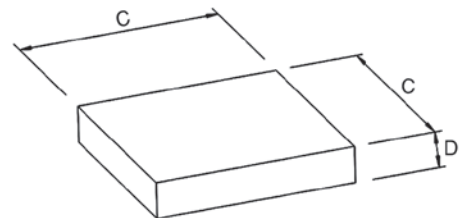
**SK-ECM 42-44 / SK-ECM 52-56** (Version 800 x 800)



**PACKED UNIT**



**DIFFUSER**



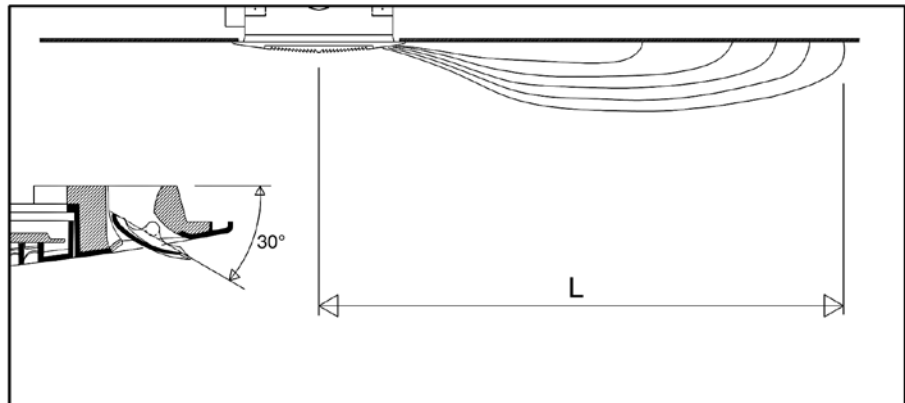
ECM Model	UNIT		DIFFUSER		Packed unit Dimensions			
	Weights packed unit	Weights unpacked unit	Weights packed unit	Weights unpacked unit	A	B	C	D
					mm			
<b>SK 42</b>	kg	kg	kg	kg	1050	400	1000	200
<b>SK 44</b>	44	36	10	6				
<b>SK 52 - 56</b>	47	39						

## 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.

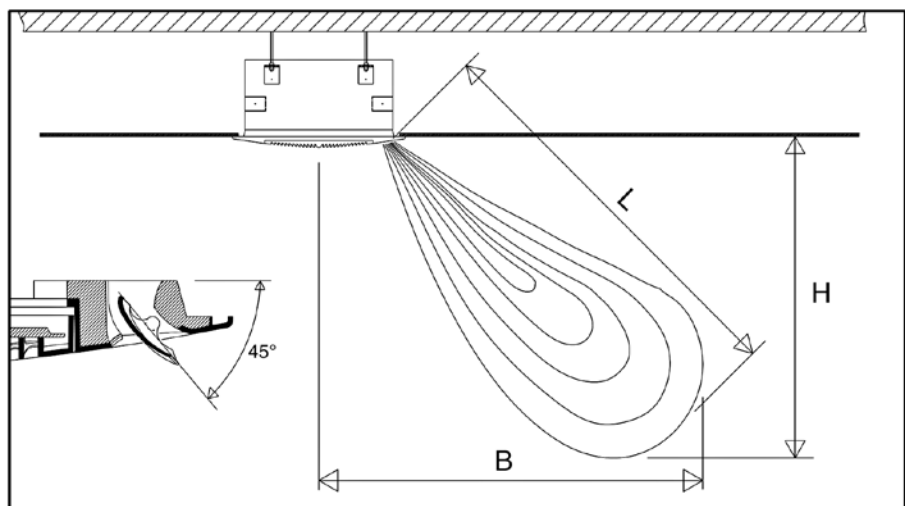
The useful throw **L** refers to the distance between the unit and the point where the air speed is 0.2 m/sec; if the louver has a gradient of 30° (recommended in cooling mode), the so-called “Coanda” effect will occur, illustrated in the first figure, while at a gradient of 45° (recommended in heating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

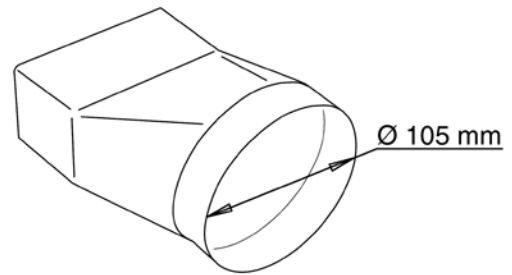


## Accessories

### Fresh air connection

Only for SK 1-2-3 models  
(not suitable for MCT models with outer casing).

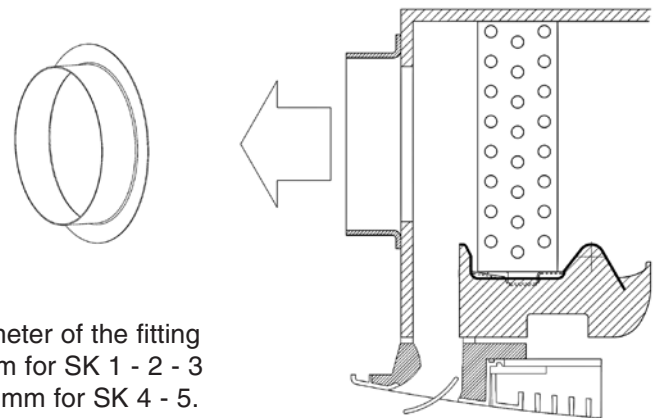
See page 13.



IDENTIFICATION	CODE
CAP	6078005

### Air distribution connection

See page 13.



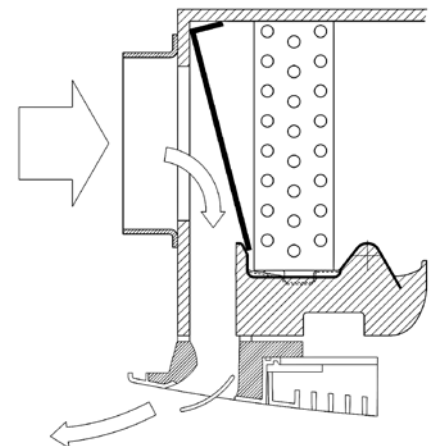
The diameter of the fitting is 150 mm for SK 1 - 2 - 3 and 180 mm for SK 4 - 5.

IDENTIFICATION	CODE
CDA 600	9079232
CDA 800	9079233

### 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 depend on the inlet static pressure.

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



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


### 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

ON-OFF valves with thermoelectric actuator

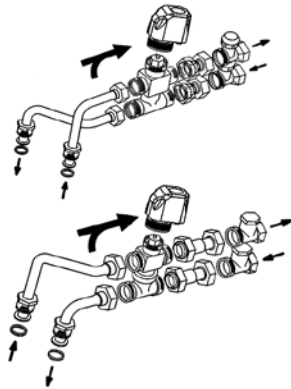
VALVE WITH MICROMETRIC LOCKSHIELD VALVE

**3 ways**




SK 12-14  
SK 22-26  
SK 32-36

SK 42-44  
SK 52-56

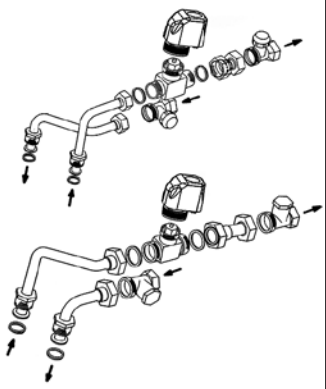


**2 ways**




SK 12-14  
SK 22-26  
SK 32-36

SK 42-44  
SK 52-56



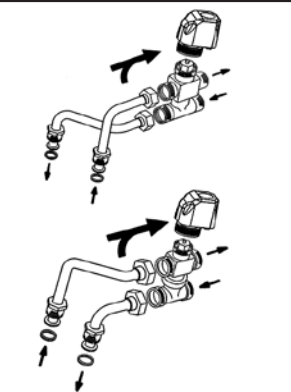
VALVE WITH SIMPLIFIED KIT

**3 ways**




SK 12-14  
SK 22-26  
SK 32-36

SK 42-44  
SK 52-56

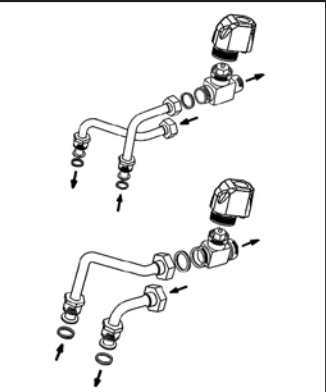


**2 ways**



SK 12-14  
SK 22-26  
SK 32-36

SK 42-44  
SK 52-56



Technical data:

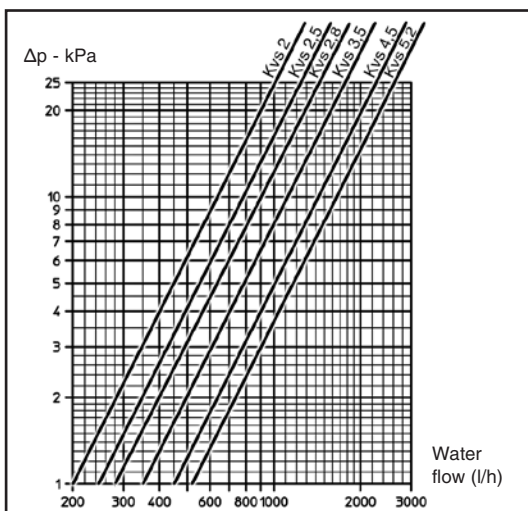
Rated pressure:	16 bar
Max. ambient temperature:	50 °C
Max. water flow temperature:	110 °C
Power:	230 V - 50/60 Hz
Rating:	3 VA
Protection:	IP 43
Travel time:	approx. 3 min.
Max. glycol content of water:	50%

Valves characteristics

Battery type	ECM Model	2 way valves			3 way valves		
		Kvs m <sup>3</sup> /h	Δp <sub>max</sub> kPa *	Valve ** connection	Kvs m <sup>3</sup> /h	Δp <sub>max</sub> kPa *	Valve ** connection
Main	12 - 22 - 32	2,8	50	3/4"	2,5	50	3/4"
	14 - 26 - 36						
	42 - 52 44 - 56	5,2	60	1"	4,5	50	1"
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.

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

#### Fan Drive Signal

0 Vdc = Fan OFF

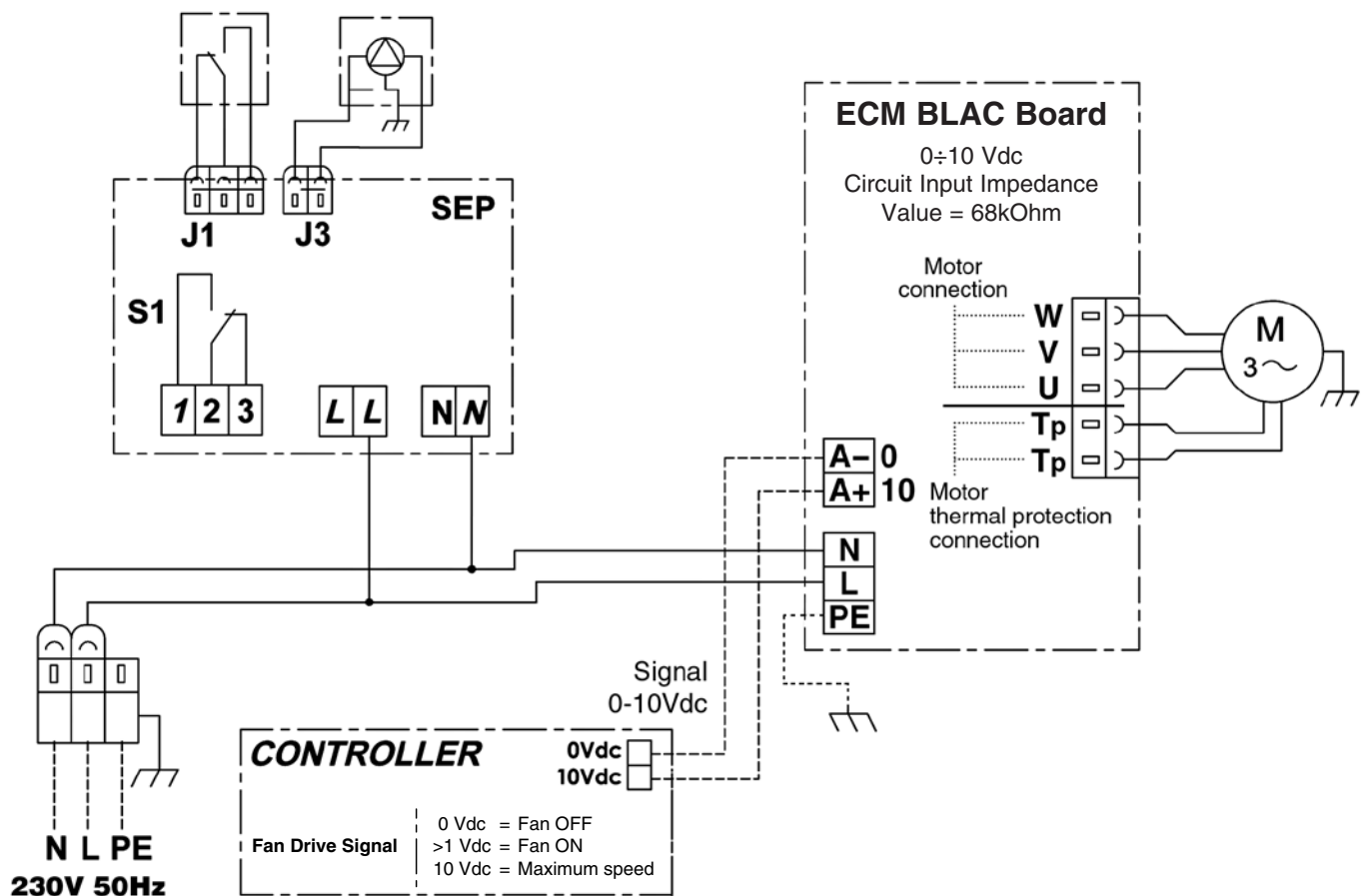
>1 Vdc = Fan ON

10 Vdc = Maximum speed

#### ECM BLAC Board

0÷10 Vdc Circuit Input Impedance Value = 68kOhm

### SK-ECM electric diagram



#### LEGEND

SEP = Pump control board

BLAC = Inverter board

M = Electronic motor

CONTROLLER = Controller

## Wall electronic controls

All the **SkyStar** units can be supplied with a wide range of controls that allows managing one single unit or several units (by using the power unit).

The room temperature can be controlled through electronic room thermostats, with different solutions according to every ambient conditions.

The electronic thermostats **WM-AU**, **T-MB** and **WM-S-ECM** rule the room temperature precisely and are suitable for each of those situations, into which it is the user to decide between the manual or the automatic fan speed.



**WM-AU**



**T-MB**



**WM-S-ECM**

*All the controls are described in detail in the "Fan Coil Control Range" literature.*

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

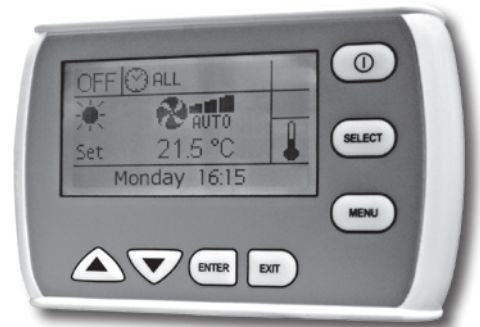
All the **SkyStar ECM** units can be supplied in **MB version**. This version includes a wide range of controls, including the **infra-red remote control**, which allows managing one single unit or several units by using the Modbus RTU - RS 485 communication protocol.

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**



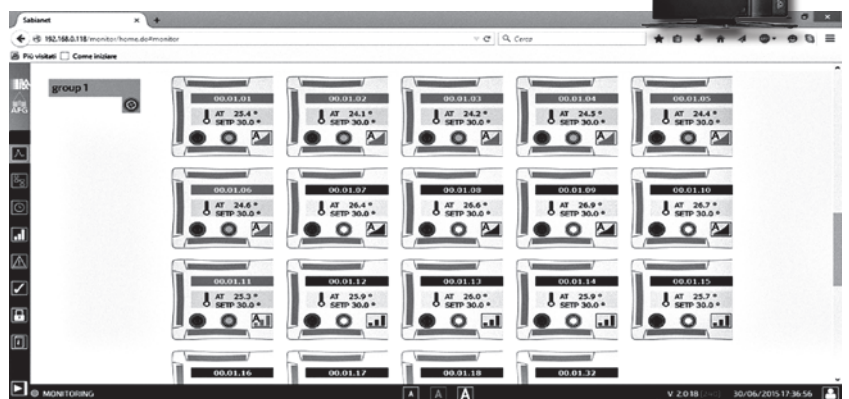
**PSM-DI multifunction control**



**RT03 infra-red remote control**

**PC**

**Sabianet screenshot**



**Sabianet software**

**All the controls are described in detail in the “Fan Coil Control Range” literature.**

## 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.

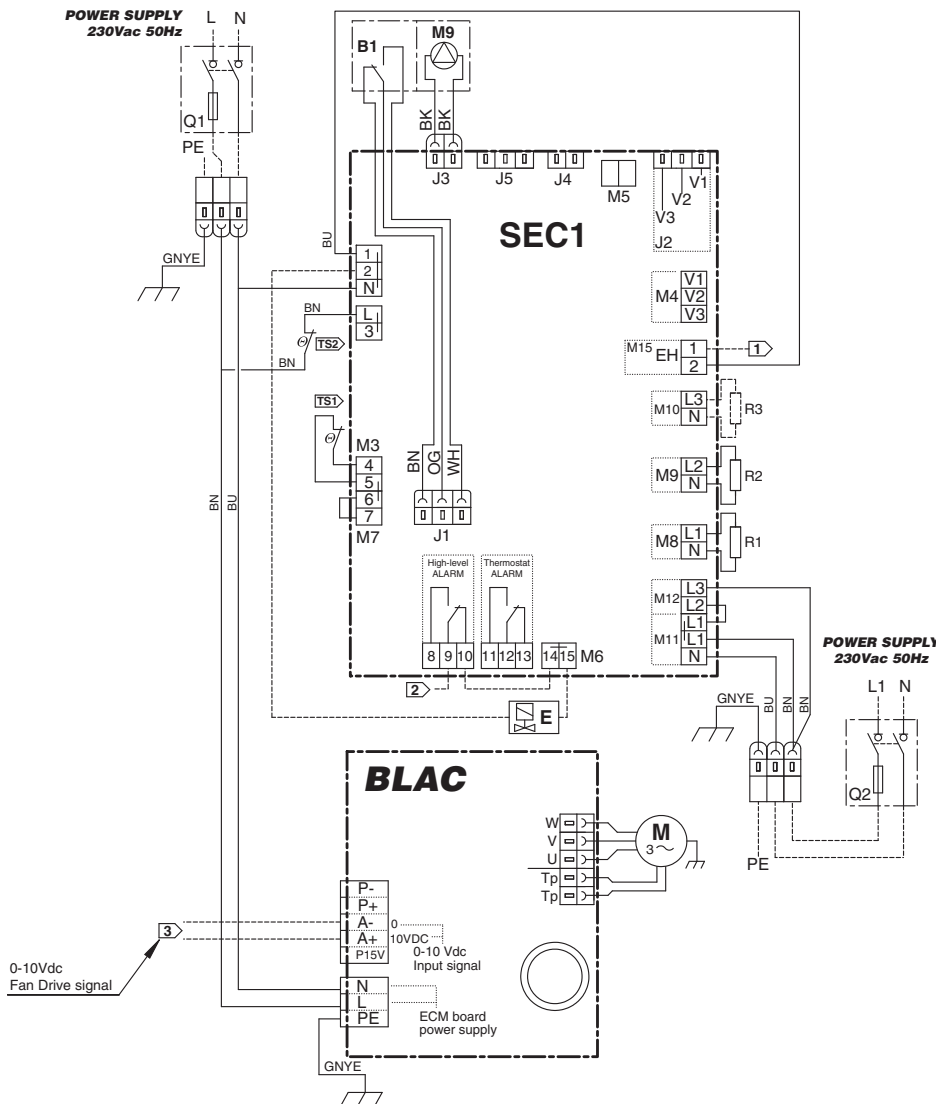
The resistance is hermetically sealed and supplied inside the battery pipes and therefore can be only factory mounted. The electric resistances of the units are for single phase 230V supply.

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 <sup>2</sup>	3 x 2,5 mm <sup>2</sup>	3 x 2,5 mm <sup>2</sup>

**Note:** the cooling emission of the units is 95% of the emission in the tables of page 35.

## Electric diagram



### LEGEND:

- M** = Fan
- SEC1** = Fan coil terminal board
- BLAC** = Inverter circuit board
- B1** = Condensate level sensor
- M9** = Water pump motor
- E** = Cold water valve
- BK** = Black
- BN** = Brown
- BU** = Dark Blue
- OG** = Orange
- RD** = Red
- WH** = White
- GNYE** = Yellow/Green
- 1** Input for electric resistance
- 2** Input for "E"
- 3** Signal 0-10Vdc
- TS1** Safety thermostat
- TS2** Safety thermostat
- TS1** Thermal cut Off = 45°C Automatic Reset
- TS2** Thermal cut Off = 80°C Manual Reset

## Cassette unit operating limits with electric coil

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

## 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, in COOL GREY 1C colour, delivered in separate packaging; this must only be fitted after having installed the SkyStar unit and completed the water and electrical connections.

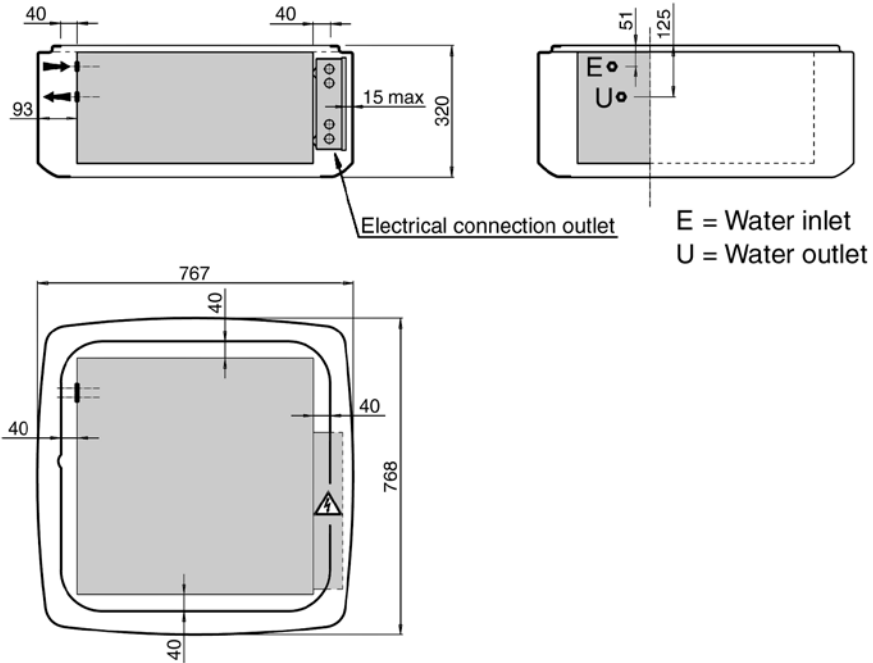


## Dimensions and Weights

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

Casing code: 9079240

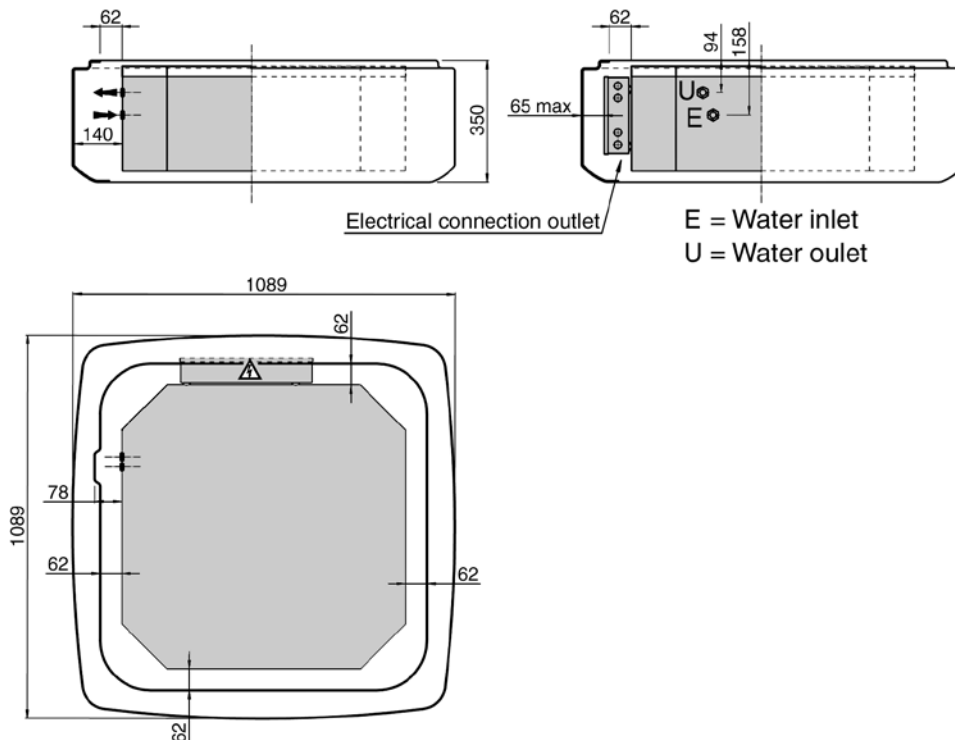
Casing weight: 5 kg (7,5 kg with the packaging)



### 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**

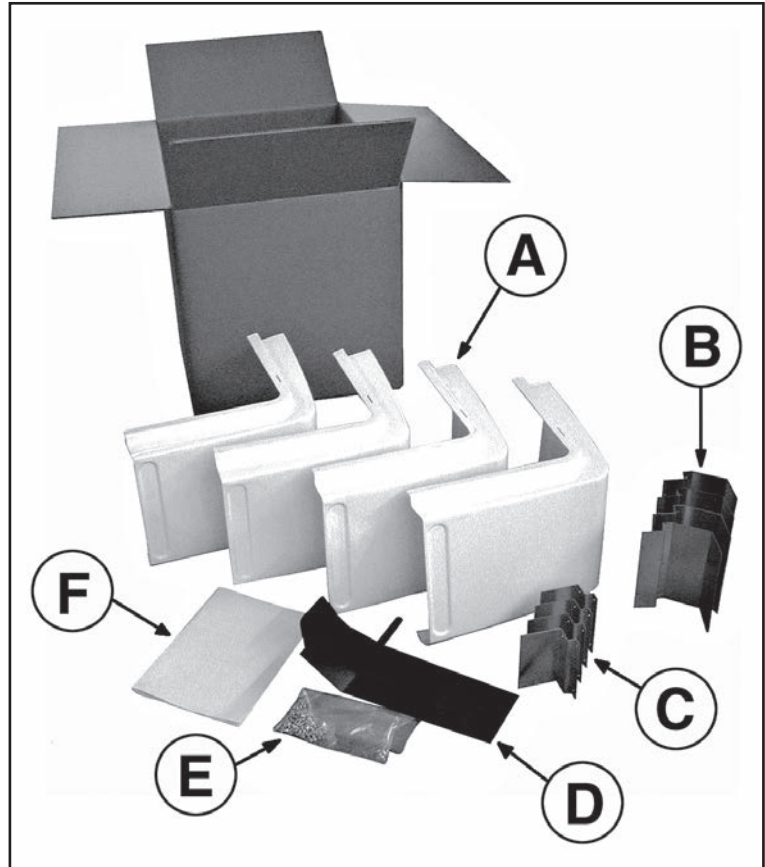
**SK 42-MCT  
SK 52-MCT / SK 62-MCT**



### Components of the casing:

The casing includes:

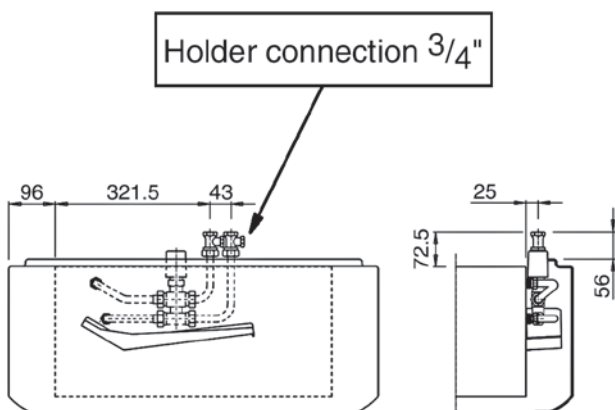
- A** – 4 corner covers
- B** – 4 bottom brackets
- C** – 4 top brackets
- D** – Condensate collection tray
- E** – Hardware  
(45 3.9x9.5mm TCX screws)
- F** – Instruction sheet



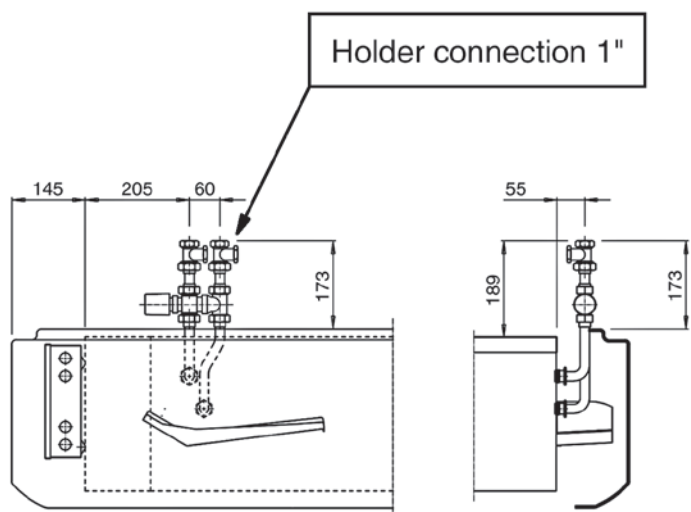
### Valve kit

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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