

The Fan Coil unit with Electronic Motor and Inverter Board



Fan Coil Units Carisma CRT-ECM

TECHNICAL MANUAL



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CRT-ECM Controls

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Sabiana take part to the Eurovent program of fan coil performance certification. The official figures are published in the web site www.eurovent-certification.com. The tested performances are:

Total cooling emission at the following conditions:

• water temperature	+7 °C E.W.T.	+12 °C L.W.T.
• air temperature	+27 °C d.b.	+19 °C w.b.

Heating emission (2 pipe units) at the following conditions:

• water temperature	+45 °C E.W.T.	+40 °C L.W.T.
• air temperature	+20 °C	
Static pressure	Fan absorption	

Sensible cooling emission at the following conditions:

• water temperature	+7 °C E.W.T.	+12 °C L.W.T.
• air temperature	+27 °C d.b.	+19 °C w.b.

Heating emission (4 pipe units) at the following conditions:

• water temperature	+65 °C E.W.T.	+55 °C L.W.T.
• air temperature	+20 °C	
Water side pressure drop	Sound power	

INTRODUCTION

The **Carisma** fan coils combine a beautiful design with very interesting performances in terms of sound level and energy consumption.

They are available in five different versions, for wall and ceiling installation, with casing and concealed.

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

The **ECM** range makes use of the excellent experience gained with the Cassette fan coil units with inverter board, first in the world in production since 2009, and which have had great success on all markets.

The innovative brushless and sensorless type synchronous electronic motor with permanent magnets, is controlled by an inverter board designed and developed in Italy.

The board is mounted on the unit, closed to the motor, without the need to be cooled down by the air flow.

The air flow rate can be varied continuously by means of a 1-10 V signal generated by Sabiana controls or by independent control systems.

The continuous air flow control improves the acoustic comfort and allows a more punctual reply to the variation of the thermal loads and a greater stability of the requested ambient temperature.

The extreme efficiency, also at a low speed, makes possible a great reduction in electric consumption (more than 50% less in comparison to a motor of the standard range), with absorption values, under normal operating conditions, that are no greater than a 8 Watt for the **CRT-ECM** models.

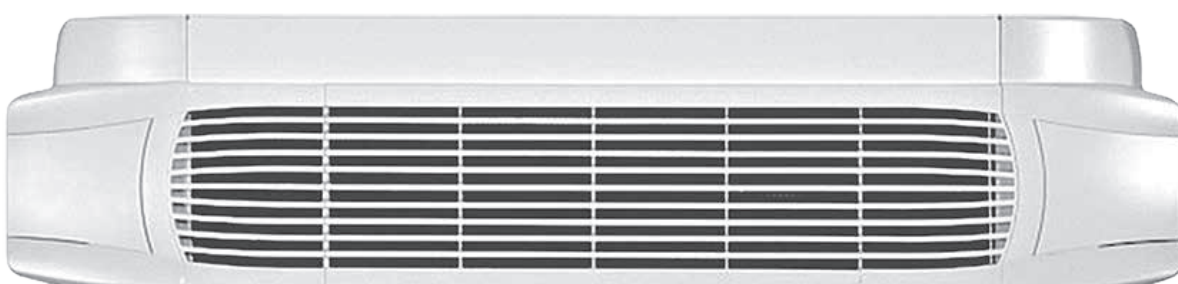
The excellent values of the **CRT-ECM** range in terms of sound levels have been maintained in all working conditions, without any resonance phenomenon at any frequency.

The full compliance with the Electromagnetic Compatibility Directive and with the other severe Standards in force is certified by an independent institute.



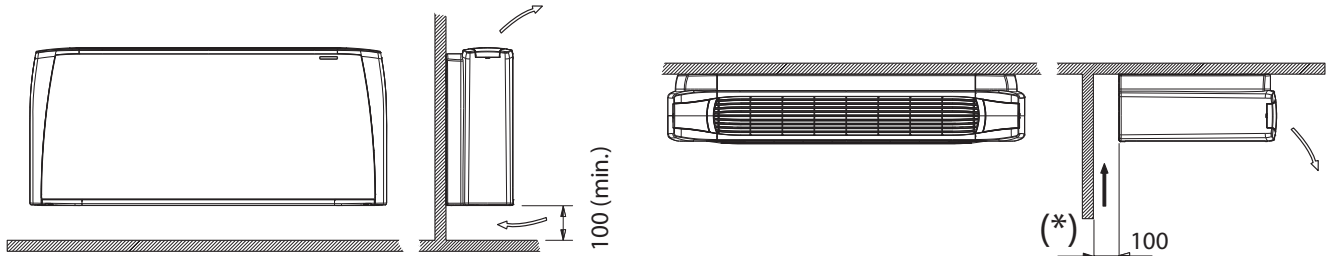
CRT-ECM range

Plastic outlet grid in one single piece of ABS : extraordinary design and strength



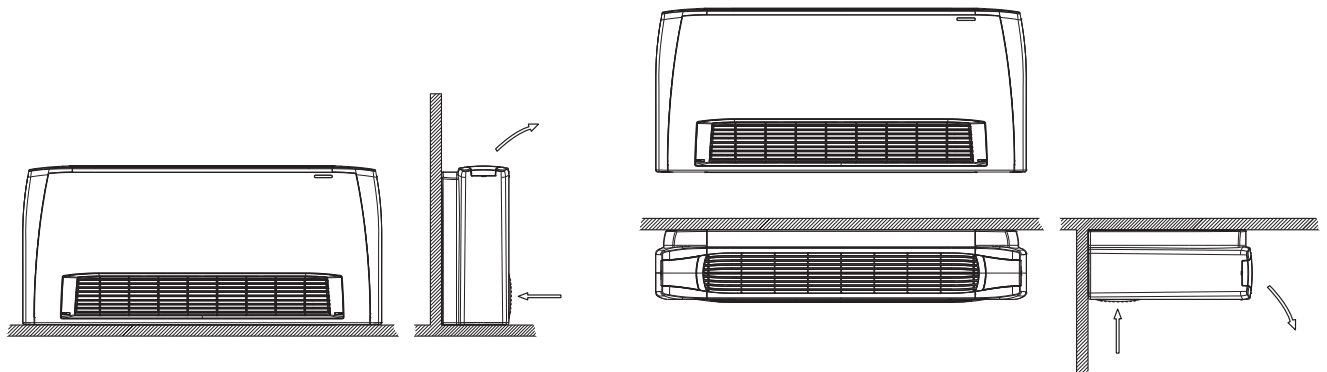
Versions

MV Vertical Casing - Wall and Ceiling Installation

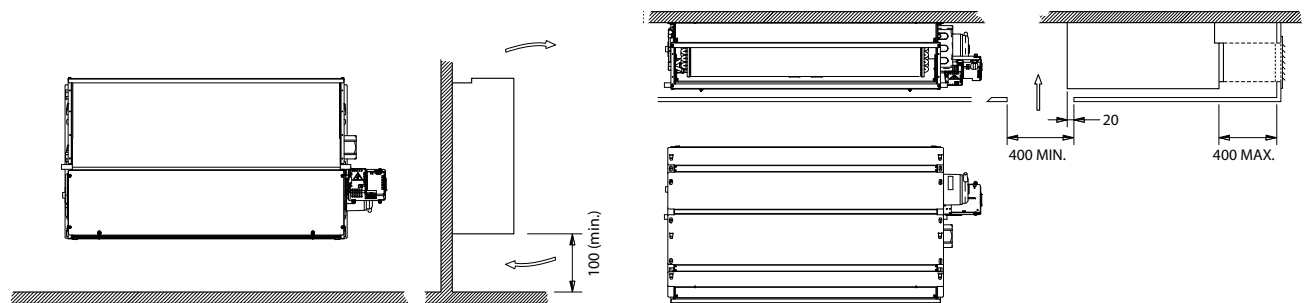


(*) the MV version can also be installed horizontally leaving behind a 100 mm gap for air intake.

MO-MVB Vertical Casing - Floor and Horizontal Installation



IV-IO - Vertical and Horizontal Concealed Installation

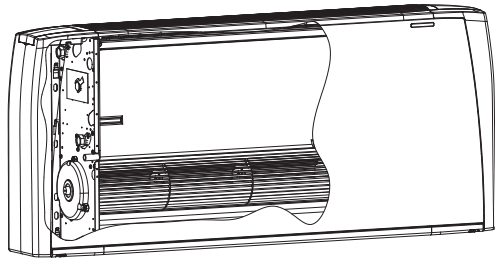


P.B.: For a correct **CRT-ECM** unit operation **IV-IO** version, don't connect any duct on the return side and respect the minimum suggested dimension of the air intake grid.

MAIN COMPONENTS

CRT-ECM range with tangential fan

The range includes 5 sizes (from 95 to 900 m³/h) and 5 versions (for wall and ceiling installation, with casing and concealed), each equipped with 3 row coils and with the possibility to add 1 row coil for 4 pipe systems. The range is perfect to meet all air-conditioning requirements of residential and work environments like offices, shops, restaurants and hotel rooms.



Outer casing

Made with strong synthetic lateral corners (ABS) and with a galvanized, pre-painted front steel panel. The plastic top grid has fixed louvres and is reversible in order to distribute the air in two different directions.

Standard colours :

- Lateral corners and top grid: **Pantone Cool Grey 1C (light grey)**
- Frontal panel : **RAL 9003 (white)**
- Other colours on request.

Inner casing

Made of 1 mm galvanized steel, a rear panel and two lateral sides insulated with 3 mm polyolefin (PO) foam B-s2-d0 EN 13501-1.

Fan assembly

The fan has an external diameter of 120 mm and is the length of the coil. The fins are concave and are positioned in a spiral shape along the whole length of the fan.

The tangential fan assembly is composed of two fan shrouds: an external one in ABS and an internal one of holed, shaped steel.

Electronic motor

Electronic motor with 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

It is manufactured from drawn copper tube and the aluminium fins are mechanically bonded onto the tube by an expansion process.

The coil has two Ø 1/2 inch BSP internal connections.

The coil has Ø 1/8" inch BSP air vent and drain.

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

The hydraulic connections are on the left side facing the unit.

On request we can deliver the unit with the connections on the right end side: this must be specified on the order as this operation can not be carried out on the construction site during installation.

Condensate collection tray

Made of plastic (ABS UL94 HB) with a "L"-shaped plastic fitted on the inner casing.

In the MO-MVB and IV-IO versions the tray is insulated with 3 mm polyolefin (PO) foam B-s2-d0 EN 13501-1.

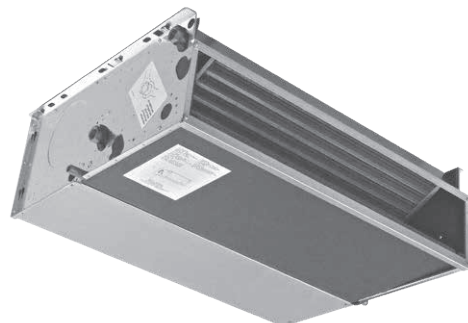
The outside diameter of the condensate discharge pipe is Ø 15 mm.

Filter

Polypropylene cellular fabric regenerating filter.

The filter frame of galvanized steel is inserted into special plastic sliding guides fastened to the internal structure for easy insertion and filter removal.

Filter presence is highlighted by a plastic front cover featuring the same colour as the top grid.



EUROVENT CERTIFICATION

3 row coil - 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		CRT-ECM 13			CRT-ECM 23			CRT-ECM 33		
Inverter power		1	5	10	1	5	10	1	5	10
		MIN	MED	MAX	MIN	MED	MAX	MIN	MED	MAX
Eurovent certified performances.		(E)	(E)	(E)	(E)	(E)	(E)	(E)	(E)	(E)
Air flow	m ³ /h	105	165	240	150	215	305	220	325	450
Cooling total emission (E)	kW	0,55	0,75	0,98	0,85	1,10	1,40	1,37	1,87	2,36
Cooling sensible emission (E)	kW	0,44	0,62	0,85	0,66	0,87	1,14	1,02	1,42	1,83
Heating emission (E)	kW	0,69	0,96	1,29	1,00	1,30	1,68	1,51	2,08	2,65
Dp Cooling (E)	kPa	0,8	1,4	2,2	2,1	3,4	5,2	7,4	12,9	19,7
Dp Heating (E)	kPa	1,0	1,7	2,9	2,4	3,8	5,9	7,2	12,7	19,8
Fan (E)	W	4,0	6,0	10,0	4,0	6,0	12,0	5,0	8,0	16,0
Sound power (Lw) (E)	dB(A)	33	39	48	36	43	49	33	42	49
Sound pressure (Lp) ⁽¹⁾	dB(A)	24	30	39	27	34	40	24	33	40

MODEL		CRT-ECM 53			CRT-ECM 73		
Inverter power		1	5	10	1	5	10
		MIN	MED	MAX	MIN	MED	MAX
Eurovent certified performances.		(E)	(E)	(E)	(E)	(E)	(E)
Air flow	m ³ /h	295	460	675	400	630	900
Cooling total emission (E)	kW	1,82	2,61	3,46	2,47	3,56	4,63
Cooling sensible emission (E)	kW	1,36	2,00	2,71	1,84	2,72	3,61
Heating emission (E)	kW	2,02	2,91	3,92	2,64	3,84	5,11
Dp Cooling (E)	kPa	4,8	9,1	15,0	9,6	18,2	29,1
Dp Heating (E)	kPa	4,8	9,1	15,4	8,9	17,3	28,5
Fan (E)	W	6,0	11,0	26,0	7,0	15,0	38,0
Sound power (Lw) (E)	dB(A)	35	46	53	37	48	56
Sound pressure (Lp) ⁽¹⁾	dB(A)	26	37	44	28	39	47

(E) Eurovent certified performance.

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

3+1 row coil - 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		CRT-ECM 13+1			CRT-ECM 23+1			CRT-ECM 33+1		
Inverter power		1	5	10	1	5	10	1	5	10
		MIN	MED	MAX	MIN	MED	MAX	MIN	MED	MAX
Eurovent certified performances.		(E)	(E)	(E)	(E)	(E)	(E)	(E)	(E)	(E)
Air flow	m ³ /h	95	150	225	135	195	285	200	295	415
Cooling total emission (E)	kW	0,51	0,71	0,94	0,78	1,01	1,33	1,25	1,70	2,20
Cooling sensible emission (E)	kW	0,40	0,59	0,80	0,60	0,80	1,08	0,93	1,29	1,71
Heating emission (E)	kW	0,54	0,95	0,95	0,83	1,07	1,37	1,37	1,78	2,21
Dp Cooling (E)	kPa	0,8	1,5	2,3	1,8	2,9	4,8	6,1	10,6	16,8
Dp Heating (E)	kPa	0,5	1,4	1,4	1,3	2,0	3,1	4,0	6,4	9,5
Fan (E)	W	4,0	6,0	10,0	4,0	6,0	12,0	5,0	8,0	16,0
Sound power (Lw) (E)	dB(A)	31	39	48	33	43	49	33	42	49
Sound pressure (Lp) ⁽¹⁾	dB(A)	22	30	39	24	34	40	24	33	40

MODEL		CRT-ECM 53+1			CRT-ECM 73+1		
Inverter power		1	5	10	1	5	10
		MIN	MED	MAX	MIN	MED	MAX
Eurovent certified performances.		(E)	(E)	(E)	(E)	(E)	(E)
Air flow	m ³ /h	270	420	640	355	565	820
Cooling total emission (E)	kW	1,68	2,43	3,32	2,25	3,28	4,31
Cooling sensible emission (E)	kW	1,25	1,84	2,59	1,67	2,49	3,33
Heating emission (E)	kW	1,79	2,42	3,21	2,34	3,23	4,14
Dp Cooling (E)	kPa	4,2	8,0	14,0	8,2	15,8	25,7
Dp Heating (E)	kPa	1,3	2,2	3,6	2,4	4,2	6,5
Fan (E)	W	6,0	11,0	26,0	7,0	15,0	38,0
Sound power (Lw) (E)	dB(A)	35	46	53	37	48	56
Sound pressure (Lp) ⁽¹⁾	dB(A)	26	37	44	28	39	47

(E) Eurovent certified performance.

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

COOLING EMISSION

3 row coil units

Entering air temperature: 27 °C – R.H.: 50%

Model	Vdc	WT: 7 / 12 °C					WT: 8 / 13 °C				WT: 10 / 15 °C				WT: 12 / 17 °C			
		Qv m³/h	Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa
CRT-ECM 13	10	240	1,08	0,85	186	2,5	0,95	0,80	163	2,0	0,71	0,71	122	1,2	0,60	0,60	103	0,9
	5	165	0,82	0,62	141	1,6	0,73	0,59	126	1,3	0,52	0,51	89	0,7	0,44	0,44	76	0,5
	1	105	0,60	0,44	103	0,9	0,53	0,41	91	0,7	0,39	0,36	67	0,4	0,31	0,31	53	0,3
CRT-ECM 23	10	305	1,53	1,15	263	6,0	1,36	1,08	234	4,8	0,99	0,94	170	2,7	0,82	0,82	141	1,9
	5	215	1,20	0,88	206	3,9	1,07	0,83	184	3,2	0,79	0,72	136	1,8	0,63	0,63	108	1,2
	1	150	0,92	0,66	158	2,4	0,82	0,62	141	2,0	0,61	0,54	105	1,2	0,47	0,47	81	0,7
CRT-ECM 33	10	450	2,56	1,84	440	22,4	2,30	1,73	396	18,3	1,74	1,52	299	11,1	1,33	1,33	229	6,8
	5	325	2,02	1,42	347	14,7	1,81	1,34	311	12,1	1,38	1,17	237	7,3	1,03	1,03	177	4,3
	1	220	1,47	1,02	253	8,5	1,33	0,96	229	7,0	1,01	0,84	174	4,3	0,74	0,74	127	2,4
CRT-ECM 53	10	675	3,76	2,73	647	17,1	3,36	2,57	578	14,0	2,53	2,25	435	8,4	1,97	1,97	339	5,3
	5	460	2,82	2,00	485	10,3	2,53	1,88	435	8,5	1,92	1,64	330	5,1	1,44	1,44	248	3,1
	1	295	1,96	1,36	337	5,5	1,77	1,28	304	4,5	1,35	1,12	232	2,8	0,99	0,99	170	1,6
CRT-ECM 73	10	900	5,02	3,63	863	33,1	4,50	3,42	774	27,1	3,41	2,99	587	16,4	2,63	2,63	452	10,3
	5	630	3,84	2,71	660	20,7	3,45	2,55	593	17,0	2,63	2,23	452	10,4	1,96	1,96	337	6,1
	1	400	2,67	1,85	459	10,9	2,40	1,74	413	9,0	1,84	1,51	316	5,6	1,34	1,34	230	3,1

WT: Water temperature
Vdc: Inverter power
Qv: Air flow
Pc: Cooling total emission
Ps: Cooling sensible emission
Qw: Water flow rate
Dp(c): Dp Cooling

Entering air temperature 26 °C – R.H.: 50%

Model	Vdc	WT: 7 / 12 °C					WT: 8 / 13 °C				WT: 10 / 15 °C				WT: 12 / 17 °C			
		Qv m³/h	Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa
CRT-ECM 13	10	240	0,94	0,80	162	2,0	0,81	0,75	139	1,5	0,65	0,65	112	1,0	0,54	0,54	93	0,7
	5	165	0,72	0,59	124	1,3	0,63	0,55	108	1,0	0,48	0,48	83	0,6	0,40	0,40	69	0,4
	1	105	0,53	0,41	91	0,7	0,46	0,38	79	0,6	0,34	0,34	58	0,3	0,29	0,29	50	0,2
CRT-ECM 23	10	305	1,35	1,08	232	4,8	1,18	1,01	203	3,8	0,90	0,90	155	2,3	0,75	0,75	129	1,6
	5	215	1,06	0,83	182	3,2	0,93	0,77	160	2,5	0,69	0,69	119	1,4	0,57	0,57	98	1,0
	1	150	0,81	0,62	139	2,0	0,71	0,58	122	1,6	0,50	0,49	86	0,8	0,43	0,43	74	0,6
CRT-ECM 33	10	450	2,29	1,74	394	18,3	2,02	1,63	347	14,6	1,45	1,41	249	8,0	1,22	1,22	210	5,8
	5	325	1,80	1,34	310	12,0	1,59	1,26	273	9,6	1,15	1,08	198	5,3	0,94	0,94	162	3,7
	1	220	1,32	0,96	227	6,9	1,17	0,90	201	5,6	0,85	0,78	146	3,2	0,68	0,68	117	2,1
CRT-ECM 53	10	675	3,35	2,57	576	13,9	2,95	2,41	507	11,1	2,10	2,08	361	6,0	1,80	1,80	310	4,5
	5	460	2,52	1,89	433	8,4	2,23	1,77	384	6,8	1,60	1,52	275	3,7	1,32	1,32	227	2,6
	1	295	1,76	1,28	303	4,5	1,56	1,20	268	3,6	1,13	1,03	194	2,0	0,90	0,90	155	1,3
CRT-ECM 73	10	900	4,48	3,42	771	27,1	3,96	3,21	681	21,7	2,84	2,78	488	11,9	2,41	2,41	415	8,8
	5	630	3,43	2,56	590	17,0	3,04	2,40	523	13,6	2,20	2,07	378	7,6	1,80	1,80	310	5,3
	1	400	2,39	1,74	411	8,9	2,12	1,63	365	7,2	1,55	1,40	267	4,1	1,23	1,23	212	2,7

WT: Water temperature
Vdc: Inverter power
Qv: Air flow
Pc: Cooling total emission
Ps: Cooling sensible emission
Qw: Water flow rate
Dp(c): Dp Cooling

Entering air temperature: 25 °C – R.H.: 50%

Model	Vdc	Qv m³/h	WT: 7 / 12 °C				WT: 8 / 13 °C				WT: 10 / 15 °C				WT: 12 / 17 °C			
			Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa
CRT-ECM 13	10	240	0,82	0,75	141	1,6	0,71	0,71	122	1,2	0,60	0,60	103	0,9	0,49	0,49	84	0,6
	5	165	0,63	0,55	108	1,0	0,53	0,51	91	0,7	0,44	0,44	76	0,5	0,36	0,36	62	0,4
	1	105	0,46	0,38	79	0,6	0,39	0,36	67	0,4	0,31	0,31	53	0,3	0,26	0,26	45	0,2
CRT-ECM 23	10	305	1,18	1,01	203	3,8	1,01	0,94	174	2,8	0,82	0,82	141	2,0	0,67	0,67	115	1,4
	5	215	0,93	0,77	160	2,5	0,80	0,72	138	1,9	0,63	0,63	108	1,2	0,52	0,52	89	0,9
	1	150	0,71	0,58	122	1,6	0,61	0,54	105	1,2	0,47	0,47	81	0,7	0,39	0,39	67	0,5
CRT-ECM 33	10	450	2,02	1,63	347	14,7	1,75	1,52	301	11,3	1,34	1,34	230	7,0	1,10	1,10	189	4,9
	5	325	1,59	1,26	273	9,6	1,38	1,17	237	7,5	1,03	1,03	177	4,4	0,85	0,85	146	3,1
	1	220	1,17	0,90	201	5,6	1,02	0,84	175	4,4	0,74	0,74	127	2,5	0,61	0,61	105	1,8
CRT-ECM 53	10	675	2,95	2,42	507	11,1	2,55	2,26	439	8,6	1,98	1,98	341	5,4	1,63	1,63	280	3,8
	5	460	2,22	1,77	382	6,8	1,93	1,65	332	5,2	1,45	1,45	249	3,1	1,20	1,20	206	2,2
	1	295	1,55	1,20	267	3,6	1,35	1,12	232	2,8	0,99	0,99	170	1,6	0,82	0,82	141	1,1
CRT-ECM 73	10	900	3,95	3,22	679	21,8	3,43	3,01	590	16,8	2,64	2,64	454	10,5	2,18	2,18	375	7,4
	5	630	3,03	2,40	521	13,6	2,64	2,24	454	10,6	1,97	1,97	339	6,3	1,63	1,63	280	4,4
	1	400	2,11	1,63	363	7,2	1,84	1,52	316	5,6	1,34	1,34	230	3,2	1,11	1,11	191	2,3

WT: Water temperature
 Vdc: Inverter power
 Qv: Air flow
 Pc: Cooling total emission
 Ps: Cooling sensible emission
 Qw: Water flow rate
 Dp(c): Dp Cooling

3+1 row coil unit

Entering air temperature: 27 °C – R.H.: 50%

Model	Vdc	WT: 7 / 12 °C					WT: 8 / 13 °C				WT: 10 / 15 °C				WT: 12 / 17 °C			
		Qv m³/h	Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa
CRT-ECM 13+1	10	225	1,03	0,81	177	2,4	0,91	0,76	157	1,9	0,68	0,68	117	1,1	0,57	0,57	98	0,8
	5	150	0,78	0,59	134	1,5	0,69	0,56	119	1,2	0,50	0,48	86	0,6	0,42	0,42	72	0,5
	1	95	0,55	0,40	95	0,8	0,49	0,38	84	0,6	0,36	0,33	62	0,4	0,29	0,29	50	0,2
CRT-ECM 23+1	10	285	1,45	1,08	249	5,5	1,29	1,02	222	4,4	0,95	0,89	163	2,5	0,78	0,78	134	1,8
	5	195	1,10	0,80	189	3,4	0,98	0,75	169	2,7	0,73	0,66	126	1,6	0,58	0,58	100	1,0
	1	135	0,84	0,60	144	2,1	0,75	0,56	129	1,7	0,56	0,49	96	1,0	0,43	0,43	74	0,6
CRT-ECM 33+1	10	415	2,39	1,72	411	19,1	2,14	1,62	368	15,6	1,62	1,41	279	9,4	1,24	1,24	213	5,8
	5	295	1,84	1,29	316	12,0	1,65	1,22	284	9,9	1,25	1,06	215	6,0	0,93	0,93	160	3,5
	1	200	1,34	0,93	230	6,9	1,21	0,87	208	5,7	0,92	0,76	158	3,5	0,67	0,67	115	2,0
CRT-ECM 53+1	10	640	3,61	2,61	621	15,9	3,23	2,46	556	13,0	2,44	2,15	420	7,8	1,89	1,89	325	4,9
	5	420	2,62	1,85	451	9,1	2,35	1,74	404	7,4	1,78	1,52	306	4,5	1,33	1,33	229	2,7
	1	270	1,82	1,26	313	4,8	1,64	1,18	282	3,9	1,25	1,03	215	2,4	0,91	0,91	157	1,4
CRT-ECM 73+1	10	820	4,68	3,36	805	29,2	4,20	3,16	722	24,0	3,18	2,77	547	14,6	2,43	2,43	418	9,0
	5	565	3,54	2,49	609	17,9	3,18	2,34	547	14,7	2,43	2,04	418	9,0	1,80	1,80	310	5,3
	1	355	2,43	1,68	418	9,3	2,19	1,58	377	7,7	1,68	1,37	289	4,7	1,21	1,21	208	2,6

WT: Water temperature
Vdc: Inverter power
Qv: Air flow
Pc: Cooling total emission
Ps: Cooling sensible emission
Qw: Water flow rate
Dp(c): Dp Cooling

Entering air temperature 26 °C – R.H.: 50%

Model	Vdc	WT: 7 / 12 °C					WT: 8 / 13 °C				WT: 10 / 15 °C				WT: 12 / 17 °C			
		Qv m³/h	Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa
CRT-ECM 13+1	10	225	0,90	0,76	155	1,9	0,78	0,71	134	1,4	0,62	0,62	107	1,0	0,52	0,52	89	0,7
	5	150	0,69	0,56	119	1,2	0,60	0,52	103	0,9	0,46	0,46	79	0,6	0,38	0,38	65	0,4
	1	95	0,49	0,38	84	0,6	0,42	0,35	72	0,5	0,31	0,31	53	0,3	0,26	0,26	45	0,2
CRT-ECM 23+1	10	285	1,29	1,02	222	4,4	1,12	0,96	193	3,5	0,85	0,85	146	2,1	0,71	0,71	122	1,5
	5	195	0,98	0,75	169	2,7	0,86	0,71	148	2,2	0,63	0,63	108	1,2	0,52	0,52	89	0,9
	1	135	0,75	0,56	129	1,7	0,66	0,53	114	1,3	0,46	0,45	79	0,7	0,39	0,39	67	0,5
CRT-ECM 33+1	10	415	2,13	1,62	366	15,6	1,88	1,52	323	12,4	1,35	1,31	232	6,8	1,14	1,14	196	5,0
	5	295	1,64	1,22	282	9,8	1,45	1,14	249	7,9	1,05	0,98	181	4,4	0,85	0,85	146	3,0
	1	200	1,20	0,88	206	5,7	1,06	0,82	182	4,6	0,78	0,71	134	2,6	0,62	0,62	107	1,7
CRT-ECM 53+1	10	640	3,22	2,46	554	13,0	2,84	2,31	488	10,3	2,02	1,99	347	5,6	1,72	1,72	296	4,2
	5	420	2,34	1,74	402	7,4	2,07	1,63	356	5,9	1,49	1,40	256	3,3	1,22	1,22	210	2,3
	1	270	1,62	1,18	279	3,9	1,44	1,11	248	3,1	1,05	0,95	181	1,8	0,83	0,83	143	1,2
CRT-ECM 73+1	10	820	4,18	3,17	719	23,9	3,69	2,97	635	19,2	2,65	2,57	456	10,6	2,23	2,23	384	7,7
	5	565	3,16	2,35	544	14,7	2,80	2,20	482	11,8	2,03	1,89	349	6,6	1,65	1,65	284	4,5
	1	355	2,18	1,58	375	7,6	1,94	1,48	334	6,1	1,42	1,27	244	3,5	1,11	1,11	191	2,3

WT: Water temperature
Vdc: Inverter power
Qv: Air flow
Pc: Cooling total emission
Ps: Cooling sensible emission
Qw: Water flow rate
Dp(c): Dp Cooling

Entering air temperature: 25 °C – R.H.: 50%

Model	Vdc	Qv m³/h	WT: 7 / 12 °C				WT: 8 / 13 °C				WT: 10 / 15 °C				WT: 12 / 17 °C			
			Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa	Pc kW	Ps kW	Qw l/h	Dp(c) kPa
CRT-ECM 13+1	10	225	0,78	0,71	134	1,4	0,67	0,67	115	1,1	0,57	0,57	98	0,8	0,46	0,46	79	0,6
	5	150	0,60	0,52	103	0,9	0,51	0,48	88	0,7	0,42	0,42	72	0,5	0,34	0,34	58	0,3
	1	95	0,42	0,35	72	0,5	0,36	0,33	62	0,4	0,29	0,29	50	0,2	0,24	0,24	41	0,2
CRT-ECM 23+1	10	285	1,12	0,96	193	3,5	0,96	0,89	165	2,6	0,78	0,78	134	1,8	0,64	0,64	110	1,2
	5	195	0,86	0,71	148	2,2	0,74	0,66	127	1,6	0,58	0,58	100	1,0	0,47	0,47	81	0,7
	1	135	0,66	0,53	114	1,3	0,56	0,49	96	1,0	0,43	0,43	74	0,6	0,36	0,36	62	0,4
CRT-ECM 33+1	10	415	1,88	1,52	323	12,5	1,63	1,42	280	9,6	1,24	1,24	213	5,9	1,03	1,03	177	4,2
	5	295	1,45	1,14	249	7,9	1,26	1,07	217	6,1	0,94	0,94	162	3,6	0,77	0,77	132	2,5
	1	200	1,06	0,82	182	4,6	0,92	0,76	158	3,6	0,67	0,67	115	2,0	0,56	0,56	96	1,4
CRT-ECM 53+1	10	640	2,83	2,31	487	10,4	2,45	2,16	421	8,0	1,89	1,89	325	5,0	1,56	1,56	268	3,5
	5	420	2,06	1,63	354	5,9	1,79	1,52	308	4,6	1,34	1,34	230	2,7	1,11	1,11	191	1,9
	1	270	1,44	1,11	248	3,1	1,25	1,03	215	2,4	0,91	0,91	157	1,4	0,75	0,75	129	1,0
CRT-ECM 73+1	10	820	3,69	2,98	635	19,2	3,20	2,78	550	14,9	2,44	2,44	420	9,1	2,02	2,02	347	6,4
	5	565	2,80	2,20	482	11,8	2,43	2,05	418	9,2	1,80	1,80	310	5,4	1,49	1,49	256	3,8
	1	355	1,93	1,48	332	6,1	1,68	1,38	289	4,8	1,22	1,22	210	2,7	1,01	1,01	174	1,9

WT: Water temperature
 Vdc: Inverter power
 Qv: Air flow
 Pc: Cooling total emission
 Ps: Cooling sensible emission
 Qw: Water flow rate
 Dp(c): Dp Cooling

HEATING EMISSION

3 row coil units

Entering air temperature : 20 °C

Model	Vdc	Qv m³/h	WT: 70 / 60 °C			WT: 60 / 50 °C			WT: 50 / 40 °C			WT: 50 / 45 °C			WT: 45 / 40 °C		
			Ph kW	Qw l/h	Dp(h) kPa	Ph kW	Qw l/h	Dp(h) kPa	Ph kW	Qw l/h	Dp(h) kPa	Ph kW	Qw l/h	Dp(h) kPa	Ph kW	Qw l/h	Dp(h) kPa
CRT-ECM 13	10	240	2,63	226	2,8	1,99	171	1,8	1,35	116	0,9	1,61	277	4,2	1,29	222	2,9
	5	165	1,95	168	1,7	1,48	127	1,1	1,01	87	0,6	1,19	205	2,5	0,96	165	1,7
	1	105	1,39	120	0,9	1,06	91	0,6	0,73	63	0,3	0,85	146	1,4	0,69	119	1,0
CRT-ECM 23	10	305	3,41	293	5,6	2,59	223	3,6	1,78	153	1,9	2,08	358	8,4	1,68	289	5,9
	5	215	2,63	226	3,6	2,01	173	2,3	1,39	120	1,2	1,61	277	5,4	1,30	224	3,8
	1	150	2,01	173	2,2	1,54	132	1,4	1,07	92	0,8	1,23	212	3,4	1,00	172	2,4
CRT-ECM 33	10	450	5,32	458	18,6	4,08	351	12,0	2,84	244	6,6	3,25	559	27,9	2,64	454	19,6
	5	325	4,17	359	12,1	3,20	275	7,8	2,23	192	4,3	2,54	437	18,1	2,07	356	12,8
	1	220	3,05	262	7,0	2,34	201	4,5	1,64	141	2,5	1,86	320	10,5	1,51	260	7,4
CRT-ECM 53	10	675	7,92	681	14,6	6,07	522	9,4	4,21	362	5,1	4,83	831	21,9	3,92	674	15,4
	5	460	5,88	506	8,6	4,51	388	5,6	3,14	270	3,0	3,59	617	12,9	2,91	501	9,1
	1	295	4,07	350	4,5	3,13	269	2,9	2,19	188	1,6	2,49	428	6,8	2,02	347	4,8
CRT-ECM 73	10	900	10,31	887	27,0	7,91	680	17,4	5,51	474	9,6	6,29	1082	40,5	5,11	879	28,5
	5	630	7,74	666	16,3	5,95	512	10,6	4,15	357	5,8	4,73	814	24,5	3,84	660	17,3
	1	400	5,31	457	8,4	4,09	352	5,5	2,86	246	3,0	3,24	557	12,6	2,64	454	8,9

WT: Water temperature
Vdc: Inverter power
Qv: Air flow
Ph: Heating emission
Qw: Water flow rate
Dp(h): Dp Heating

3+1 row coil unit

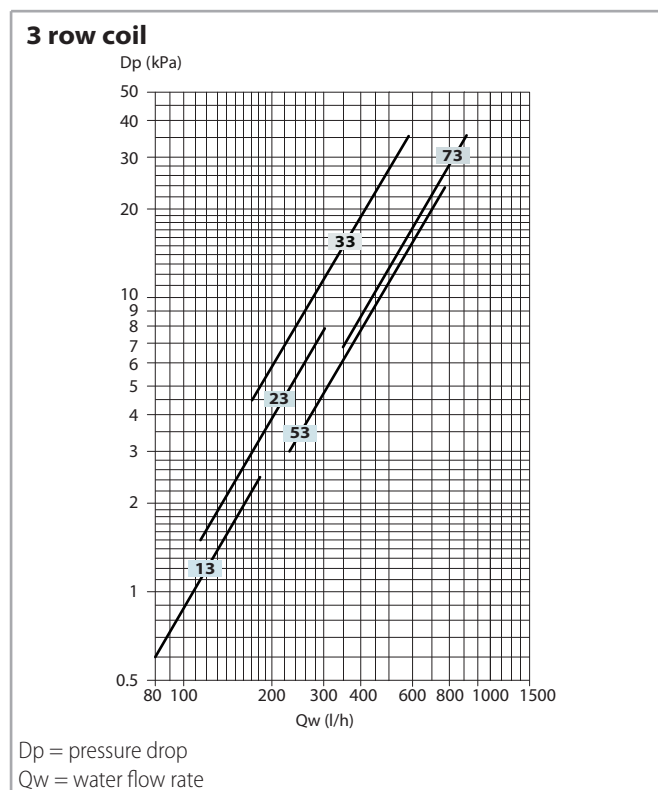
Entering air temperature : 20 °C

Model	Vdc	Qv m³/h	WT: 80 / 70 °C			WT: 75 / 65 °C			WT: 70 / 60 °C			WT: 65 / 55 °C			WT: 60 / 50 °C			WT: 55 / 45 °C		
			Ph kW	Qw l/h	Dp(h) kPa	Ph kW	Qw l/h	Dp(h) kPa	Ph kW	Qw l/h	Dp(h) kPa	Ph kW	Qw l/h	Dp(h) kPa	Ph kW	Qw l/h	Dp(h) kPa	Ph kW	Qw l/h	Dp(h) kPa
CRT-ECM 13+1	10	225	1,38	119	2,6	1,24	107	2,2	1,09	94	1,8	0,95	82	1,4	0,80	69	1,1	0,66	57	0,8
	5	150	1,07	92	1,7	0,96	83	1,4	0,85	73	1,1	0,74	64	0,9	0,63	54	0,7	0,52	45	0,5
	1	95	0,78	67	1,0	0,70	60	0,8	0,62	53	0,7	0,54	46	0,5	0,46	40	0,4	0,38	33	0,3
CRT-ECM 23+1	10	285	1,97	169	5,7	1,77	152	4,8	1,57	135	3,9	1,37	118	3,1	1,18	101	2,4	0,98	84	1,8
	5	195	1,54	132	3,7	1,38	119	3,1	1,23	106	2,5	1,07	92	2,0	0,92	79	1,6	0,77	66	1,2
	1	135	1,22	105	2,5	1,10	95	2,1	0,98	84	1,7	0,86	74	1,4	0,73	63	1,1	0,61	52	0,8
CRT-ECM 33+1	10	415	3,13	269	16,6	2,82	243	14,1	2,51	216	11,6	2,21	190	9,4	1,90	163	7,4	1,60	138	5,5
	5	295	2,49	214	11,1	2,24	193	9,4	2,00	172	7,8	1,76	151	6,3	1,52	131	4,9	1,27	109	3,7
	1	200	1,91	164	7,0	1,73	149	5,9	1,54	132	4,9	1,35	116	4,0	1,17	101	3,1	0,98	84	2,3
CRT-ECM 53+1	10	640	4,59	395	6,4	4,13	355	5,4	3,67	316	4,4	3,21	276	3,6	2,75	237	2,8	2,30	198	2,0
	5	420	3,45	297	3,9	3,11	267	3,3	2,76	237	2,7	2,42	208	2,2	2,08	179	1,7	1,73	149	1,2
	1	270	2,55	219	2,3	2,30	198	1,9	2,05	176	1,6	1,79	154	1,3	1,54	132	1,0	1,29	111	0,7
CRT-ECM 73+1	10	820	5,88	506	11,6	5,30	456	9,8	4,72	406	8,1	4,14	356	6,5	3,56	306	5,1	2,99	257	3,8
	5	565	4,58	394	7,5	4,13	355	6,3	3,68	316	5,2	3,23	278	4,2	2,78	239	3,3	2,33	200	2,5
	1	355	3,32	286	4,2	2,99	257	3,6	2,67	230	3,0	2,34	201	2,4	2,02	174	1,9	1,70	146	1,4

WT: Water temperature
Vdc: Inverter power
Qv: Air flow
Ph: Heating emission
Qw: Water flow rate
Dp(h): Dp Heating

WATER SIDE PRESSURE DROP

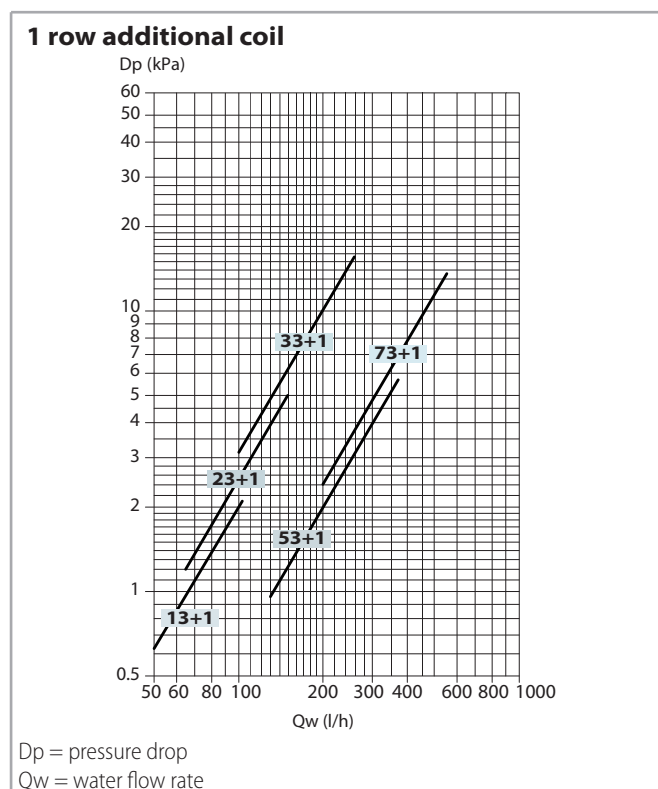
Main coil



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

K correction factor	Mean water temperature (°C)						
	20	30	40	50	60	70	80
	0,94	0,90	0,86	0,82	0,78	0,74	0,70

Additional coil



multiply the pressure drop figures by the correction factors **K**.

K correction factor	Mean water temperature (°C)			
	40	50	70	80
	1,12	1,06	0,94	0,88

The water pressure drop figures refer to a mean water temperature of **60 °C**; for different temperatures,

OPERATION LIMITS

Description		UoM	Value
Water flow	Coil maximum working pressure	bars	16
		kPa	1600
	Lowest water inlet temperature	°C	+6 (*)
	Highest water inlet temperature	°C	+85
Power supply	Single-phase rated operating voltage	V/Hz	230/50

(*) for entering water temperatures below +6 °C, contact the technical department

Attention: For the MO units the maximum installation height is 2,8 m. On heating it must be payed attention to rooms where the floor temperature is particularly low (for example less than 6 °C). In this situation the floor can cool the lower layer of air to a level that stops the uniform diffusion of the hot air coming from the unit.

Coils water flow limits

3 row coil

Model		CRT-ECM 13	CRT-ECM 23	CRT-ECM 33	CRT-ECM 53	CRT-ECM 73
Water flow rate Min.	l/h	100			150	
Water flow rate Max.	l/h	400	500	750	1000	1500

1 row additional coil

Model		CRT-ECM 13+1	CRT-ECM 23+1	CRT-ECM 33+1	CRT-ECM 53+1	CRT-ECM 73+1
Water flow rate Min.	l/h	50			100	
Water flow rate Max.	l/h	200	250	350	450	650

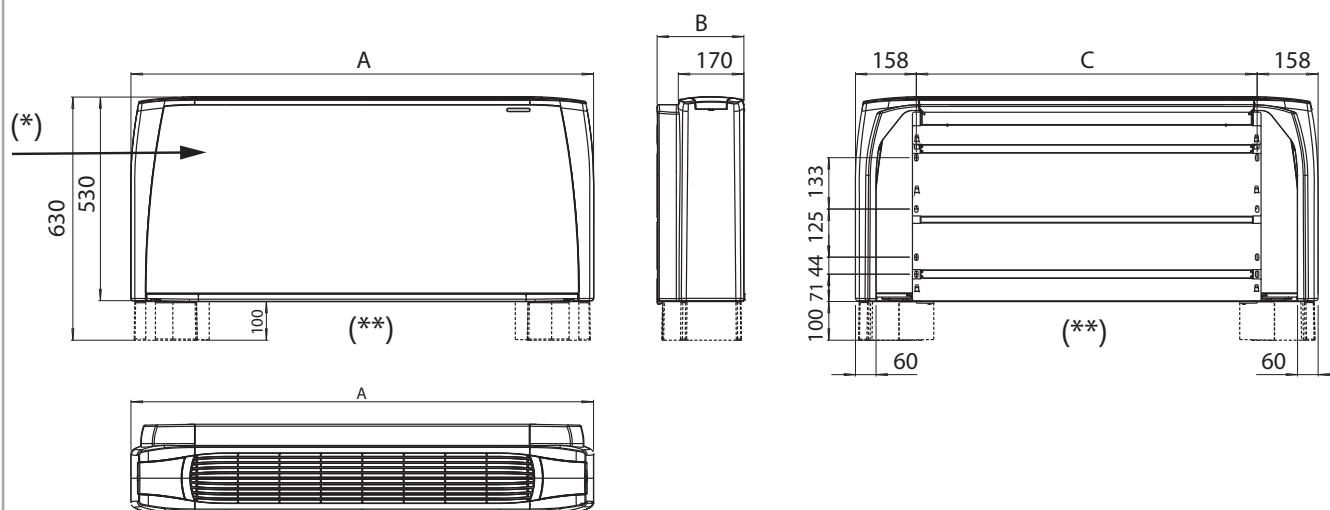
Motor electrical data - max. absorption

Model		CRT-ECM 1	CRT-ECM 2	CRT-ECM 3	CRT-ECM 5	CRT-ECM 7
Motor absorption	W	10,0	11,5	16,0	26,0	38,0
Current absorbed	A	0,094	0,106	0,138	0,222	0,305

DIMENSION, WEIGHT, WATER CONTENT - MV/MO-MVB VERSION

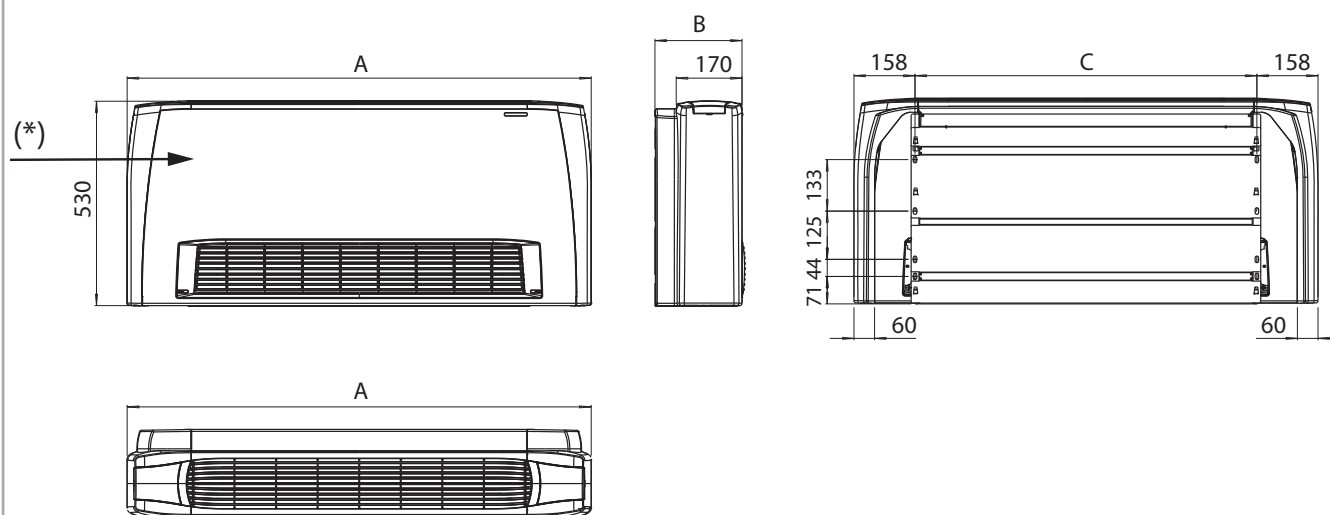
Dimensions

MV



(*) Coil connections on the left
(**) Feet (optional)

MO-MVB

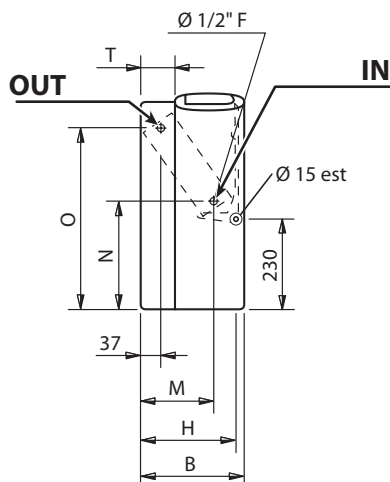


(*) Coil connections on the left

Model		CRT-ECM 1	CRT-ECM 2	CRT-ECM 3	CRT-ECM 5	CRT-ECM 7
A	mm	670	770	985	1200	1415
B	mm			225		
C	mm	354	454	669	884	1099

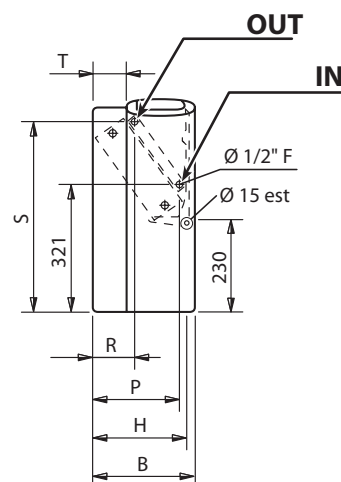
Coil connections

3 row coil



IN = Water inlet
OUT = Water outlet

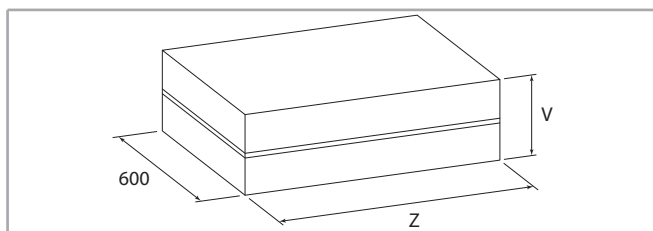
Heating additional coil (1 row)



IN = Water inlet
OUT = Water outlet

Model		CRT-ECM 1	CRT-ECM 2	CRT-ECM 3	CRT-ECM 5	CRT-ECM 7
B	mm			225		
H	mm			205		
M	mm			145		
N	mm			260		
O	mm			460		
P	mm			185		
R	mm			105		
S	mm			475		
T	mm			55		

Packed unit



Model		CRT-ECM 1	CRT-ECM 2	CRT-ECM 3	CRT-ECM 5	CRT-ECM 7
V	mm			260		
Z	mm	720	820	1035	1250	1465

Weight (kg)

Weight with packaging

Model	CRT-ECM 1	CRT-ECM 2	CRT-ECM 3	CRT-ECM 5	CRT-ECM 7
3 rows	14,8	16,2	19,6	24,2	28,7
3+1 rows	15,5	17,0	20,8	25,7	30,5

Weight without packaging

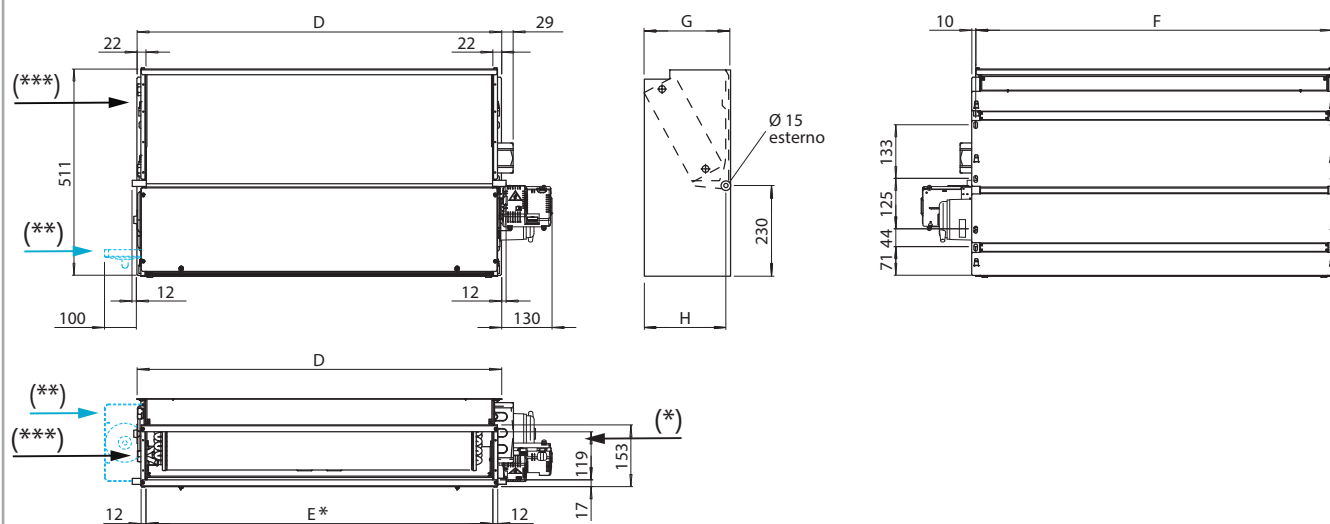
Model	CRT-ECM 1	CRT-ECM 2	CRT-ECM 3	CRT-ECM 5	CRT-ECM 7
3 rows	13,2	14,4	17,3	21,4	25,4
3+1 rows	13,9	15,2	18,5	22,9	27,2

Water content (litres)

Model	CRT-ECM 1	CRT-ECM 2	CRT-ECM 3	CRT-ECM 5	CRT-ECM 7
3 rows	0,5	0,6	0,9	1,3	1,7
3+1 rows	0,2	0,2	0,3	0,4	0,5

DIMENSION, WEIGHT AND WATER CONTENT IV-IO VERSION

IV-IO - Vertical Concealed Installation

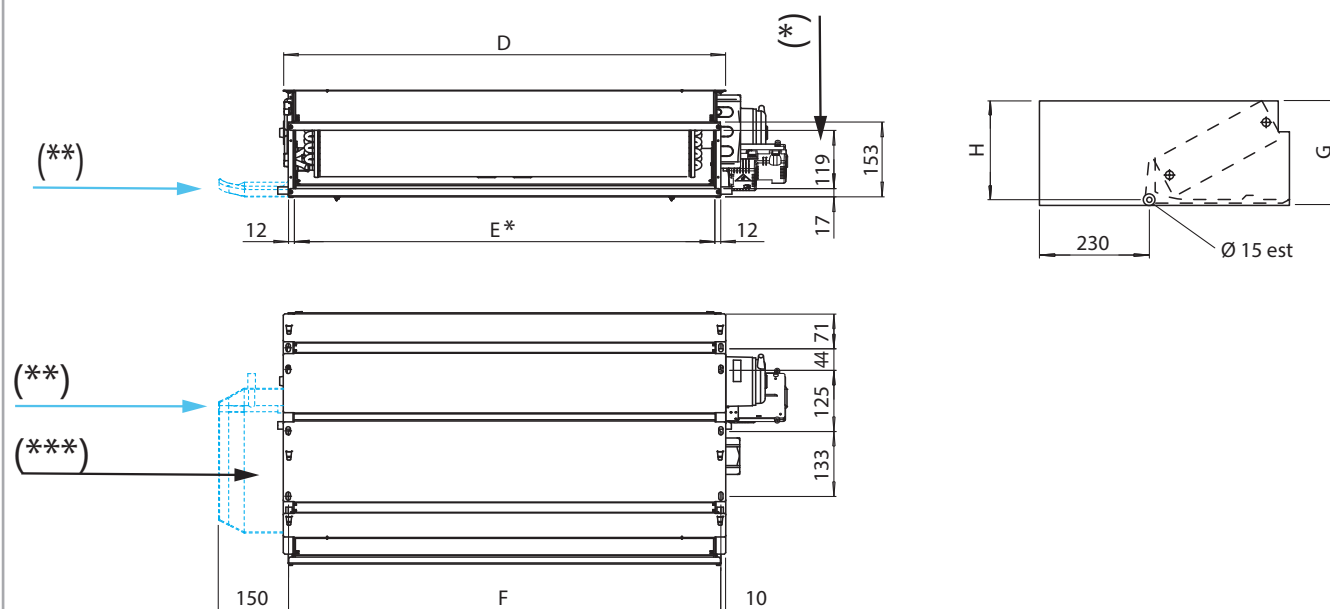


(*) = Supply frame dimension E x 119 mm

(**) = Auxiliary condensate tray (optional)

(***) = Coil connections on the left

IV-IO - Horizontal Concealed Installation



(*) = Supply frame dimension E x 119 mm

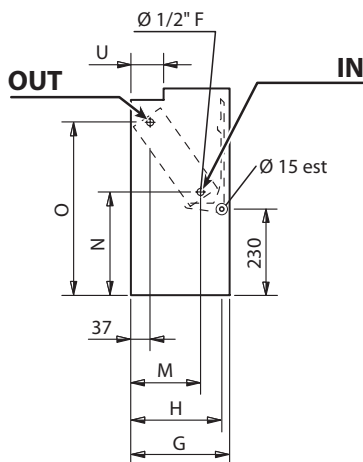
(**) = Auxiliary condensate tray (optional)

(***) = Coil connections on the left

Model		CRT-ECM 1	CRT-ECM 2	CRT-ECM 3	CRT-ECM 5	CRT-ECM 7
D	mm	374	474	689	904	1119
E	mm	330	430	645	860	1075
F	mm	354	454	669	884	1099

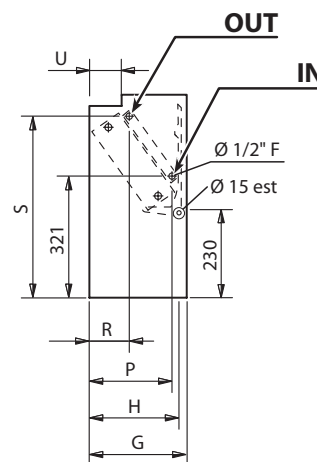
Coil connections

3 row coil



IN = Water inlet
OUT = Water outlet

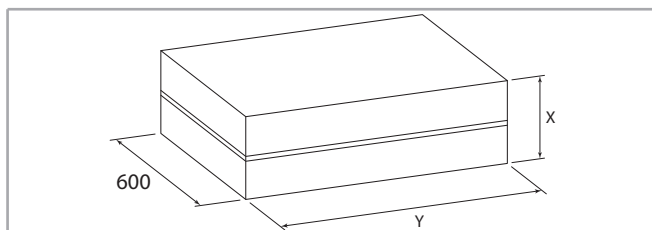
Heating additional coil (1 row)



IN = Water inlet
OUT = Water outlet

Model		CRT-ECM 1	CRT-ECM 2	CRT-ECM 3	CRT-ECM 5	CRT-ECM 7
G	mm			218		
H	mm			205		
M	mm			145		
N	mm			260		
O	mm			460		
P	mm			185		
R	mm			105		
S	mm			475		
U	mm			65		

Packed unit



Model		CRT-ECM 1	CRT-ECM 2	CRT-ECM 3	CRT-ECM 5	CRT-ECM 7
X	mm			260		
Y	mm	720	820		1035	1250

Weight (kg)

Weight with packaging

Model	CRT-ECM 1	CRT-ECM 2	CRT-ECM 3	CRT-ECM 5	CRT-ECM 7
3 rows	11,5	12,6	15,3	19,2	23,6
3+1 rows	12,2	13,4	16,5	20,7	25,4

Weight without packaging

Model	CRT-ECM 1	CRT-ECM 2	CRT-ECM 3	CRT-ECM 5	CRT-ECM 7
3 rows	9,9	10,8	13,5	16,9	20,8
3+1 rows	10,6	11,6	14,7	18,4	22,6

Water content (litres)

Model	CRT-ECM 1	CRT-ECM 2	CRT-ECM 3	CRT-ECM 5	CRT-ECM 7
3 rows	0,5	0,6	0,9	1,3	1,7
3+1 rows	0,2	0,2	0,3	0,4	0,5

CONTROLS FITTED ON THE UNIT

All the **Carisma CRT-ECM** units can be supplied with electronic controls to be fitted that allows managing one single unit.

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

The electronic thermostats of the **-ECM** range let the speed control, regulate the room temperature precisely and are suitable when the user wants to set the fan speed.

The most evolved **CB-T-ECM** version allows the manual and the automatic speed switch or the continuous variation of the fan speed.

Note: all the controls are described in detail in the "Fan Coil Control Range literature".

Controls

CB-T-ECM control



CB-TOUCH CONTROL FITTED ON THE UNIT

Controls

All the **CRT-ECM** units can be supplied and managed with the **CB-Touch** fitted control with Bluetooth e WiFi technology (only version with casing; available mounted in the factory or supplied separately)

The **CB-Touch** control fitted on the unit offers moreover the possibility of management via **"Sabiana WiFi"** and **"Sabiana BLE"** APP. This makes this fan coil unit the ideal solution for the air-conditioning of all residential ambients.

The **CB-Touch** control is equipped with a microprocessor with BLE / WiFi feature, that allows to control at distance or remotely all the units installed in your home.

With the BLE / WiFi technology it is possible to manage all the fan coil operation modes.

It is moreover possible to manage each single unit or to create some groups; a weekly program can be created by setting, for each day of the week, until four different operation modes.



Sabiana WiFi

Sabiana WiFi is the App for the control at a distance of your Sabiana system of climatisation.

Free and easy to use, it needs only a wireless network and a smartphone with internet connection. Using the "Cloud" it allows to manage, program and supervise the status of Your air conditioners wherever You are.

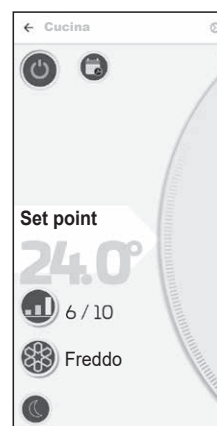


Sabiana BLE

Sabiana BLE is the new App for Android™ and iOS® systems to set, manage and control Your climatisation system via Bluetooth Low Energy (BLE)® transmission.

Free and easy to configure and use, it needs only a smartphone with a Bluetooth® connection (version 4.0 or later versions).

Our APP **"Sabiana WiFi"** and **"Sabiana BLE"** are compatible with iOS® e Android™ systems.



The **CB-Touch** controls fitted on the unit, whose characteristics are described on the next pages, can be supplied either fitted on the unit or with separate packaging; those controls fitted on the unit that are separately bought can be used only with UP power unit to buy separately.

The Sabiana electronic thermostats regulate the room temperature precisely and are suitable when the user wants to set the fan speed.

CB-Touch control fitted on the unit features



The CB-Touch control allows to control and adjust the room temperature in a simple and intuitive way by means of a probe positioned in the lower part of the unit.

CB-Touch allows to select the desired operation mode, heat, cool or just ventilate the room, set a desired temperature set and adjust the fan operating speed according to your needs.

The maximum operation speed will be set to reach quickly the comfort temperature. Otherwise the minimum operation speed will be set when a noiseless operation is required, or the auto mode to optimise thermal and sound comfort.

With the low temperature cut-out thermostat (T3 sensor collocated between the coil fins; already wired for the units with fitted control, included together with the power unit and to wire for the versions without control) and according to the selected operation there will be as follows:

- winter cycle - the fan will only start operating if the water temperature is above 30 °C, thus preventing cold air from flowing out from the unit.
- summer cycle - the fan will only start operating if the water temperature is below 21 °C, thus preventing hot air from flowing out from the unit.

To improve comfort, it is also possible to select the night mode which minimises the fan speed and smartly changes the set temperature independently.

The control has a memory, so all settings will not be lost either in the event of switching off or power failure.

After a period of 3 minutes since the last action the brightness of the panel is reduced (SLEEPING mode) in order to increase the energy saving and the comfort during the night; only the symbol  is shown on the display.

By pressing the same button twice, the brightness is restored.

The control is designed to be managed at distance with the smart features of one's own telephone by using the bluetooth wireless connection or wifi via APP downloadable from the Web.

IMPORTANT!: the device supports WiFi networks (IEEE 802.11) of b, g and n type (WiFi 4) with the following security methods :

- WEP
- WPA-PSK
- WPA2-PSK
- WPA2-enterprise

CB-Touch control fitted on the unit

Fitted		Not Fitted	
ID	Code	ID	Code
CB-Touch-M	9066905	CB-Touch-S	9066903



The control must always be connected with the UP-Touch-M / UP-Touch-S power unit (to be ordered separately).

The main characteristics are:

- Set the unit ON or stand-by
- Operation mode (Summer/Winter/Ventilation)
- Set the fan speed
- Set the automatic fan speed
- Possibility to use the T1 sensor as return air probe (mounted on the power unit)
- Possibility to use the T3 sensor as low temperature cut-out thermostat (mounted on the power unit)
- It allows to use the T2 sensor as Change-over (mounted on the power unit).
- Night mode
- Alarm messages
- OFFSET regulation
- Button lock controller
- Regulation of LED brightness
- To be controlled by APP Sabiana, both locally (BLE)[®], and locally or at a distance via Cloud (WiFi)

Control power absorption: see the UP-Touch power unit



POWER UNITS AND PROBES

UP-Touch power unit

Fitted		Not Fitted	
ID	Code	ID	Code
UP-Touch-M	9066906	UP-Touch-S	9066904



Power unit for CB-Touch-M and CB-Touch-S controls

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

- It controls the motor/the fan and the fan coil valve.
- It is connected to the electric supply.
- It receives the information required to manage such parts from the CB-Touch control
- Possibility to use the T1 sensor (included) for the T1 function which allows the return air control.
- Possibility to use the T3 sensor (included) for the T3 function as water coil low temperature cut-out thermostat (summer and winter operation)
- Possibility to use the T2 probe (included) for the T2 function which controls the summer/winter switch (change-over).
- It allows to control up to 10 units (1 master and 9 slaves).
- Max. network length: 100 meters.
- Max cable length between control and first connected power unit: 20 meters.

Power unit absorption: 11 VA (6 W)

T2 probe

ID	Code
T2	9025310



NTC probe type, to be placed on the water supply pipe upstream of the valves (not to be used with 2 way valves).

The T2 probe is to be used as Change-Over for 2 pipe systems, for the automatic switch of the operation mode. If water temperature is lower than 20 °C, cooling mode is set; on the other hand, if water temperature exceeds 30 °C, heating mode is set.

CONFIGURATION AND ELECTRONIC WALL CONTROLS

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

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

The **WM-AU**, **T-MB2**, **WM-503-AC-EC** and **WM-S-ECM** electronic thermostats regulate the room temperature precisely and are suitable when the user wants to set the fan speed.

Note: all the controls are described in detail in the "Fan Coil Control Range literature".

Configuration

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

Fan coil control signal

- Fan OFF = 0 Vdc
- Fan ON > 1 Vdc
- Max. speed = 10 Vdc

ECM Blac inverter board

- 0÷10 Vdc Circuit Input Impedance Value = 68 kOhm

Controls

WM-AU control (*)



230 V 50-60 Hz

WM-S-ECM control



230 V 50 Hz

T-MB2 control (*)



230 V 50-60 Hz

WM-503-AC-EC control (**)



230 V 50 Hz

(*) To be used with UPM-AU or UP-AU only

(**) To be used with UP-503-AC-EC power unit only.

CONTROLS AND UNITS MB VERSION

All the **Carisma CRT-ECM** units can be supplied with a wide range of controls, which allows managing one single unit or several units by using the Modbus RTU - RS 485.

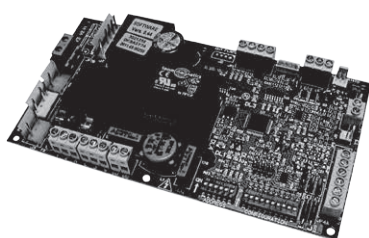
Units can be managed according to the Master/Slave logic (up to 20 units) or by supervisory components.

The system consists of a MB board and a series of controls, such as the **T-MB2** wall control, the **RT03 / RR03 infra-red remote control**, the **PSM-DI** multifunction control panel, the **Sabianet** supervisory program, the **T-DI** Touch screen multifunction panel and the Web Gateway for **Sabiana Cloud SabWeb**.

Note: all the controls are described in detail in the "Fan Coil Control Range literature".

Controls

MB electronic board



T-MB2 control



RT03 / RR03 remote control



PC and Sabianet screenshot



T-DI Touch screen multifunction control panel

The T-DI multifunction control panel lets supervise and control more units with MB or SIOS boards; the panel is equipped with a 7 inches touch screen display and a serie of graphical pages that allows an easy reading of the data sent by the fan coils and the management of up to 60 units (max. 60 units: SIOS + MB).

With the T-DI multifunction control panel it is also possible to control the units at a distance with the specific Sabiana Cloud App for Android and iOS.

The Sabiana Cloud application is simple to use and lets have complete control of all the connected units.

T-DI Touch screen multifunction control panel



Web gateway for Cloud

With the Web gateway for "Sabiana Cloud" it is possible to control at a distance up to 60 units, equipped with MB or SIOS boards (max. 60 units: SIOS + MB), with the specific APP for Android and iOS.

The "Sabiana Cloud" APP is simple to use and lets have complete control of all the connected units.

SabWeb gateway for Sabiana Cloud



PSM-DI Multifunction control panel

With the PSM-DI multifunction control panel it is possible to control remotely up to 60 units, equipped with MB or SIOS boards (max. 60 units: SIOS + MB).

The PSM-DI multifunction control panel supervises via Bus network all the connected units.

The remote connection (stand-alone) is not possible.

PSM-DI multifunction control panel



KNX BUS SYSTEM

The KNX bus system is a building automation standard for controlling, managing and monitoring a wide range of products for:

- Heating, cooling, ventilation.
- Lighting.
- Alarm systems.
- Audio and video systems.
- Electricity and gas.

Since 2016, Sabiana is a certified member of the KNX association and the certified products can be added to this system in compliance with the tests carried out at KNX laboratories.



KNX devices

The Sabiana **WM-KNX** room thermostat controls and adjusts the temperature of a room or area in a building. In combination with one or several **UP-KNX** power units, the thermostat is able to control the operation of terminal units such as fan coils. The appliance consists

of an LCD display with adjustable backlight and a sensor for measuring the room temperature.

WM-KNX is suitable for installation in a wall recessed box (to be used with UP-KNX and with PL mounting plate only).

Note: all the controls are described in detail in the "Fan Coil Control Range literature".

Recessed thermostat WM-KNX



Power unit UP-KNX



WM-KNX with rectangular plate



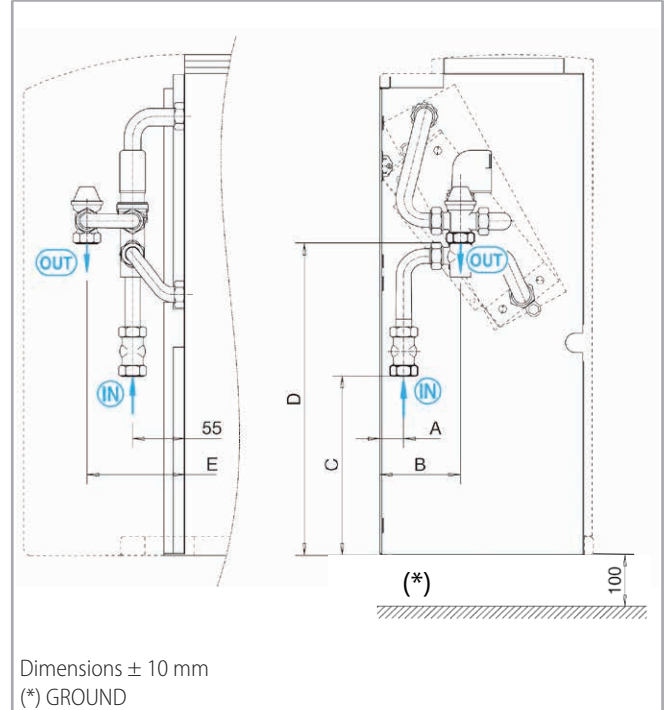
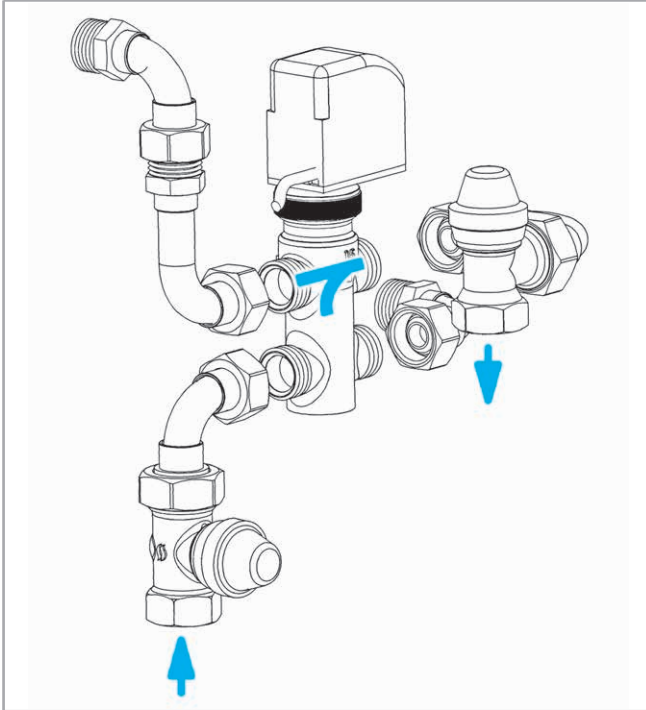
WM-KNX with square plate



ACCESSORIES

VBP main coil 3 way valve

Control valve kit: 3 way valve, ON-OFF 230 V, with electric motor and mounting kit with micrometric lockshield valve.



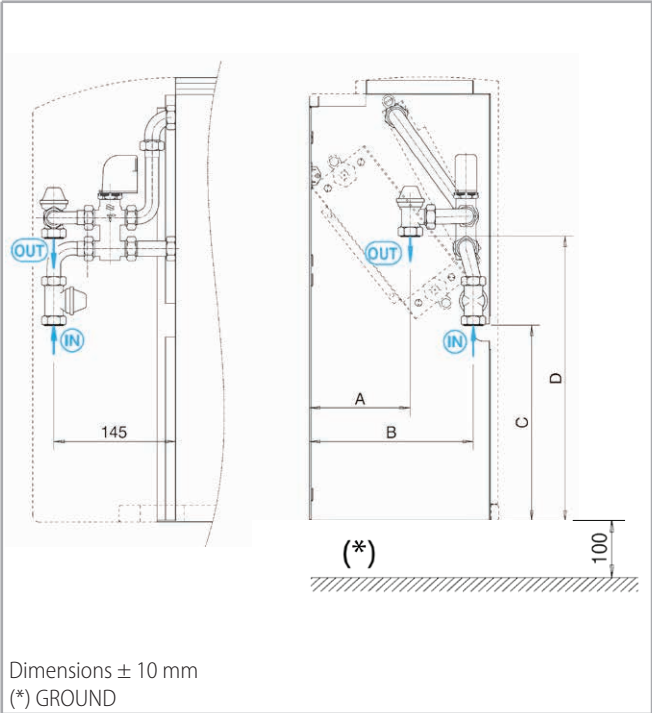
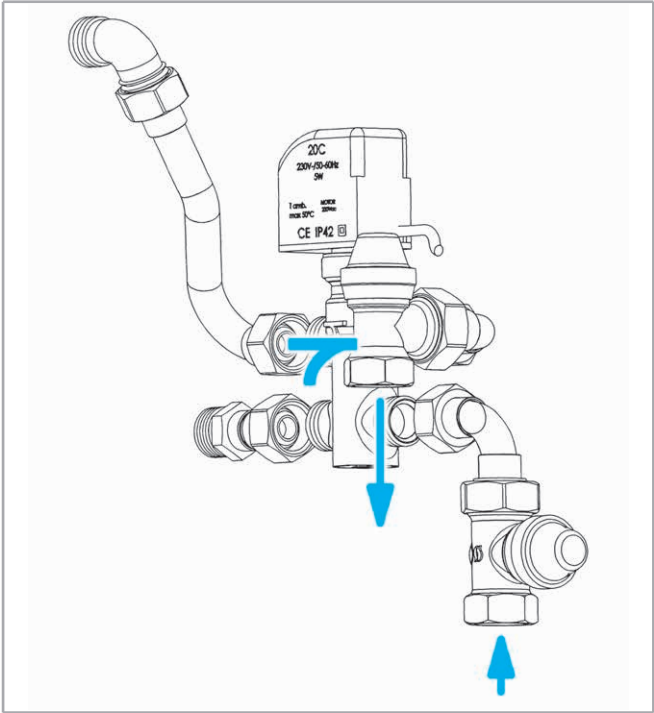
Model	FITTED		NOT FITTED		Valve			Micrometric lockshield valve		
	ID	Code	ID	Code	DN	(Ø)	Kvs	DN	(Ø)	Kvs
1 ÷ 5	VBPM-C G1-5	9066561	VBPS-C G1-5	9066560	15	1/2"	1,6	15	1/2" F	2
7	VBPM-C G6-9	9060471	VBPS-C G6-9	9060474	20	3/4"	2,5	15	1/2" F	2

Model	Dimensions (mm)				
	A	B	C	D	E
1 ÷ 5	25	85	190	290	105
7	25	85	190	290	105

Water side pressure drop (Kvs) diagrams to p. 33

VBA additional coil 3 way valve

Control valve kit: 3 way valve, ON-OFF 230 V, with electric motor and mounting kit with micrometric lockshield valve.



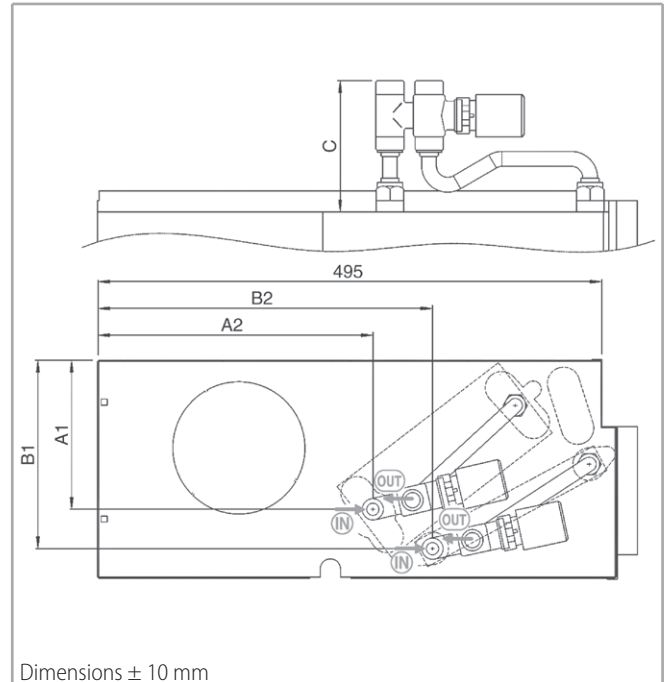
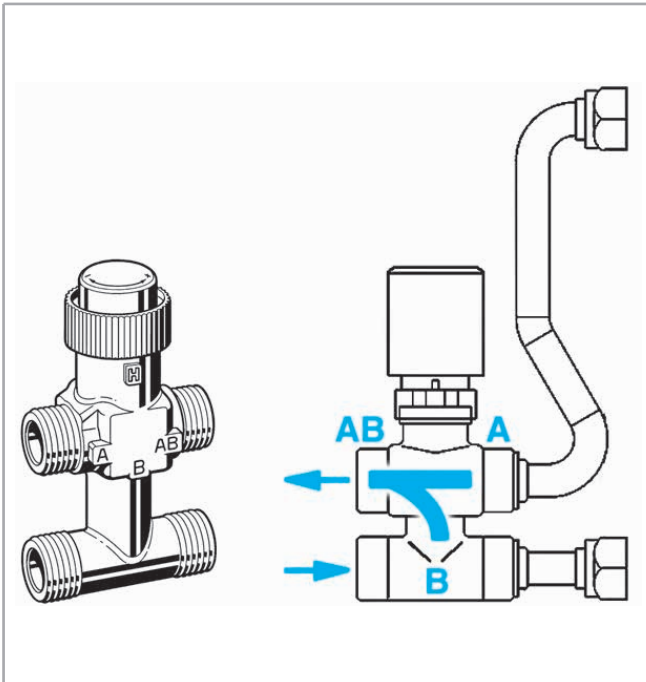
Model	FITTED		NOT FITTED		Valve			Micrometric lockshield valve		
	ID	Code	ID	Code	DN	(Ø)	Kvs	DN	(Ø)	Kvs
1 ÷ 7	VBAM-C G1-9	9060472	VBAS-C G1-9	9060475	15	1/2"	1,6	15	1/2" F	2

Model	Dimensions (mm)			
	A	B	C	D
1 ÷ 7	120	195	240	340

Water side pressure drop (Kvs) diagrams to p. 33

VS simplified kit for 3 way valve for main and additional coil (concealed models only)

3 way valve, ON-OFF 230 V with electric motor and mounting kit without micrometric lockshield valve.
Valve with flat connection.



Dimensions ± 10 mm

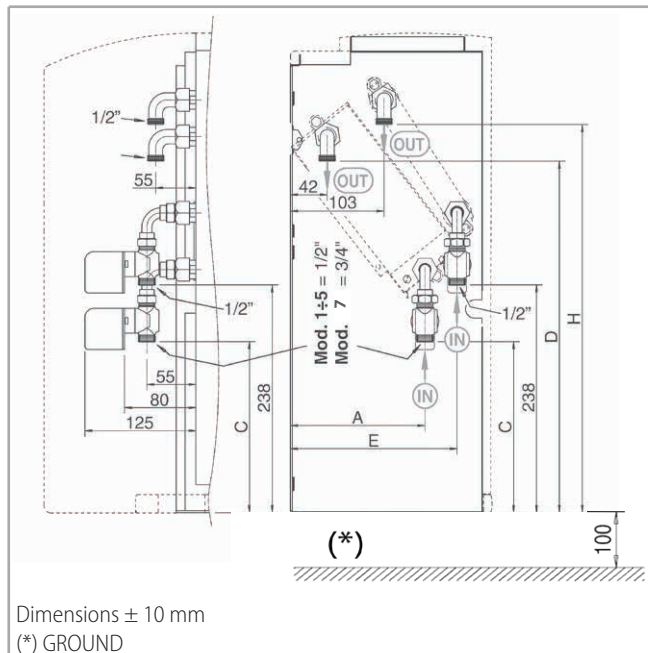
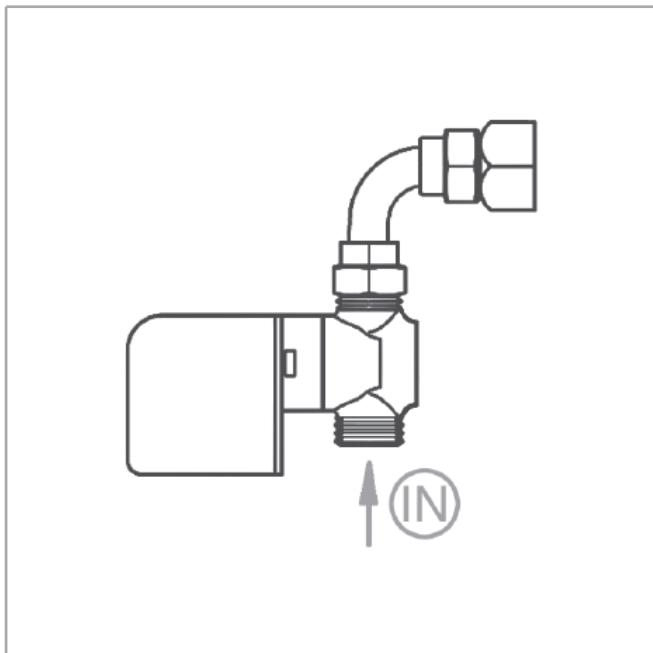
Model	MAIN COIL				DN	(Ø)	Kvs
	FITTED		NOT FITTED				
	ID	Code	ID	Code			
1 ÷ 5	VSPM-C G1-5	9066571	VSPS-C G1-5	9066570	15	1/2"	1,6
7	VSPM-C G6-9	9060484	VSPS-C G6-9	9060481	20	3/4"	2,5
	ADDITIONAL COIL						
1 ÷ 7	VSAM-C G1-9	9060483	VSAS-C G1-9	9060480	15	1/2"	1,6

Model	Dimensions (mm)				
	Main		Additional		
	A1	A2	B1	B2	C
1 ÷ 5	152	270	185	330	116
7	152	268	185	330	124

Water side pressure drop (Kvs) diagrams to p. 33

V2 2 way valve for main and additional coil

2 way valve ON-OFF 230 V

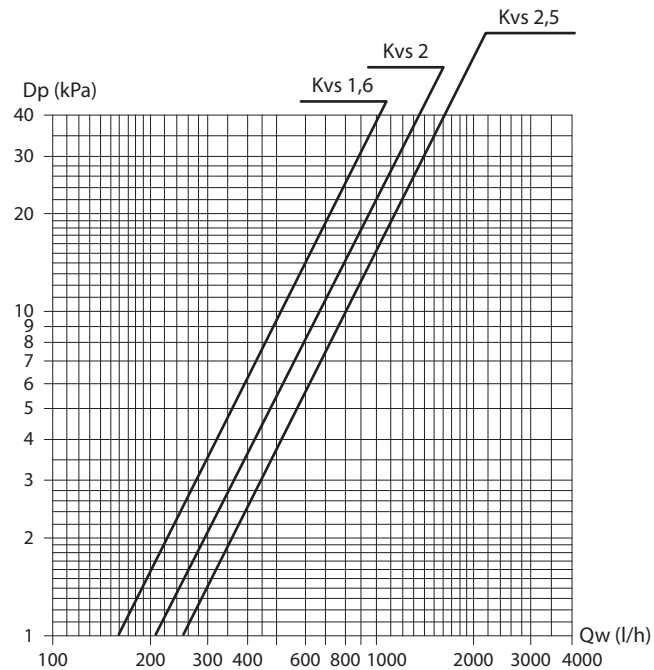


Model	MAIN COIL				DN	(Ø)	Kvs
	FITTED		NOT FITTED				
	ID	Code	ID	Code			
1 ÷ 5	V2M-C G1-5	9060476	V2S-C G1-5	9060478	15	1/2"	1,7
7	V2M-C G6-9	9060477	V2S-C G6-9	9060479	20	3/4"	2,8
	ADDITIONAL COIL						
1 ÷ 7	V2M-C G1-5	9060476	V2S-C G1-5	9060478	15	1/2"	1,7

Model	Dimensions (mm)				
	A	Main	D	Additional	H
1 ÷ 5	149	180	438	186	456
7	150	181	438	186	456

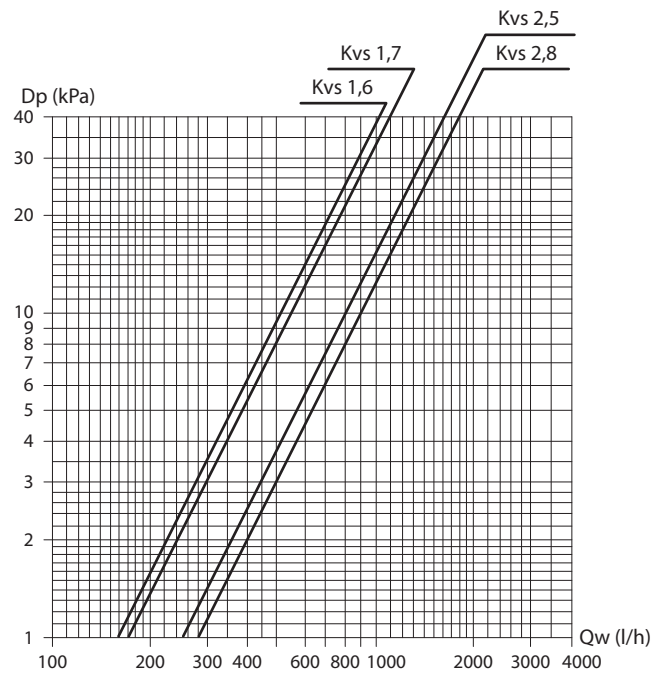
Water side pressure drop (Kvs) diagrams to p. 33

Water side pressure drop VBP - VBA



Dp = pressure drop
Qw = water flow rate

Water side pressure drop VS - V2



Dp = pressure drop
Qw = water flow rate

3 way double valve kit for 4 tube installation and single coil

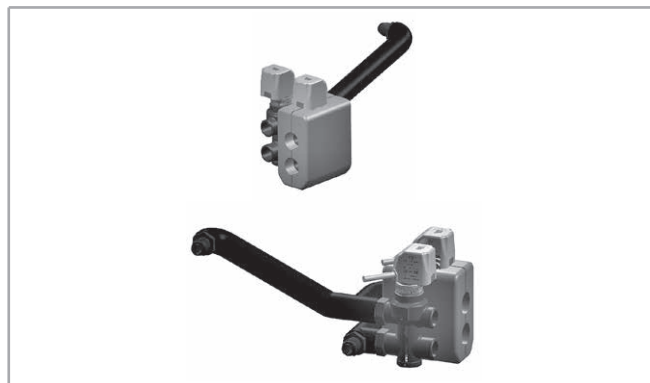
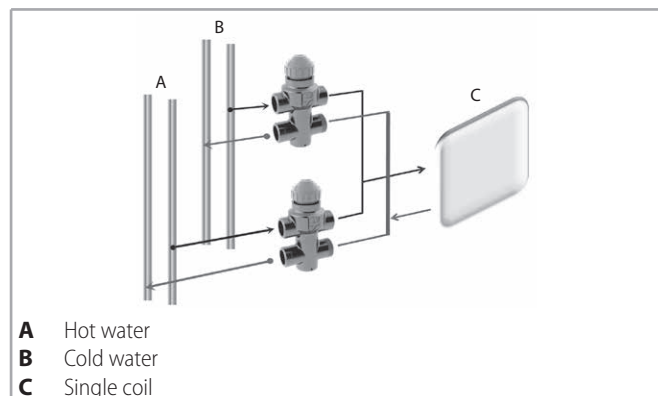
The kit consists of:

- Nr 2 special 3 way valves.
- Nr 2 actuators, 230 Volt ON-OFF, with internal safety micro switch.
- Insulated pipe kit.
- External valve insulation sleeve.

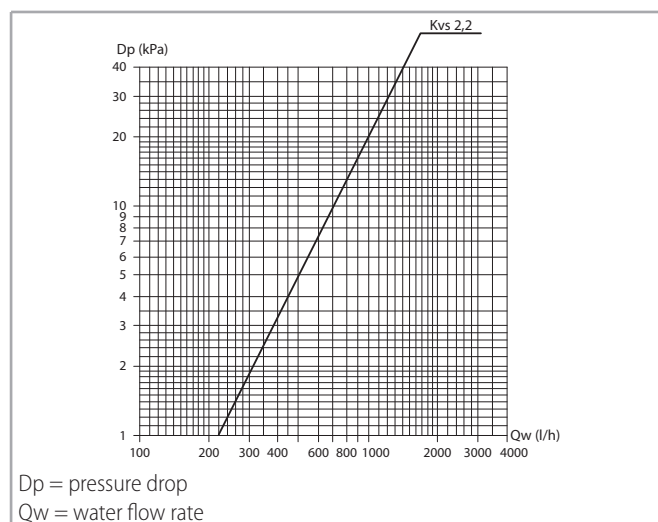
The kit uses a special 3 way valve which allows the transformation of the fan coil, equipped with one single coil, into a 4 tube installation.

The new **4x2**, valve has been designed to keep the water flow between flow and return perfectly separated, allowing its use in parallel.

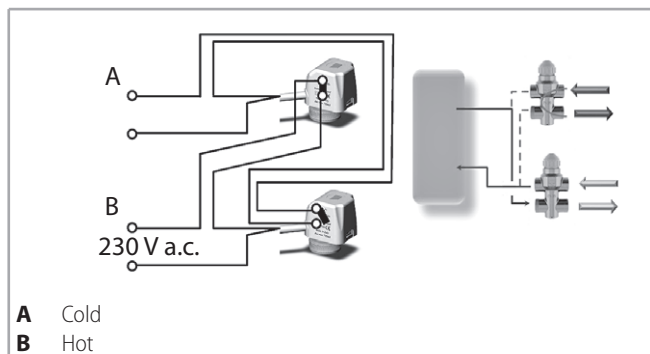
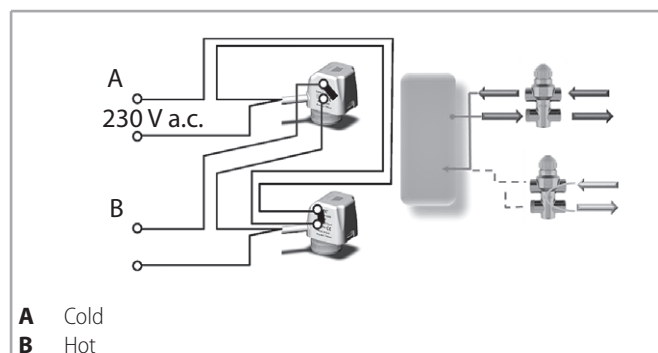
Therefore, it can be used on 4 pipe fan coil systems with one single heat-exchange coil on board the fan coil.



Model	FITTED		NOT FITTED		(Ø)	Kvs
	ID	Code	ID	Code		
1 ÷ 7	V3M4X2	9066572W	V3S4X2	9066562W	3/4"	2,2



Double actuator electrical connections

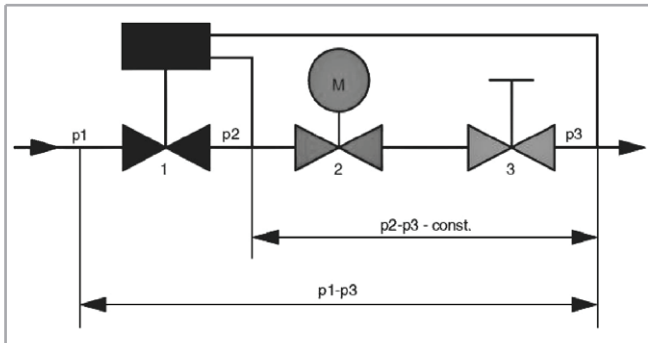


Balancing valves independent from the system pressure

- 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.

Valve operation logic

- "p1" the valve inlet pressure.
- "p3" the outlet pressure.
- "p2" 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 and in the related tables. 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.

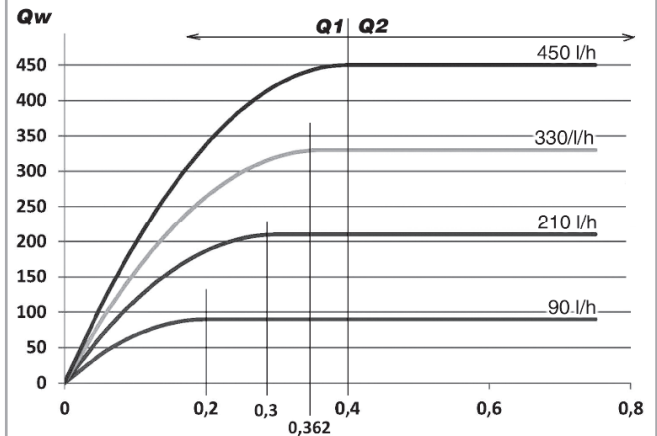
Minimum operating differential pressure

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 and into the related tables.

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

Example



Qw = Water flow rate

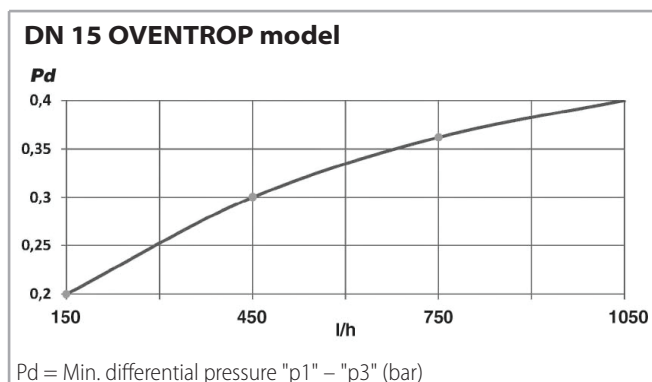
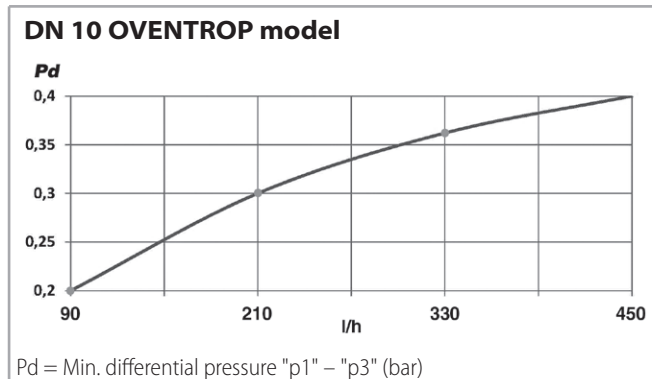
Pd = Min. differential pressure "p1" - "p3" (bar)

Q1 = Area with inconstant water flow

Q2 = Area with constant water flow

Kit with OVENTROP valve

In case of Oventrop valves, 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.



E.g., when sizing the system pump, in which the DN 10 valves will be installed and in which 210 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.

OVENTROP technical characteristics

Model	DN 10	DN 15
Flow rate range (l/h)	90 - 450	150 - 1050
Kvs	1,1	1,8

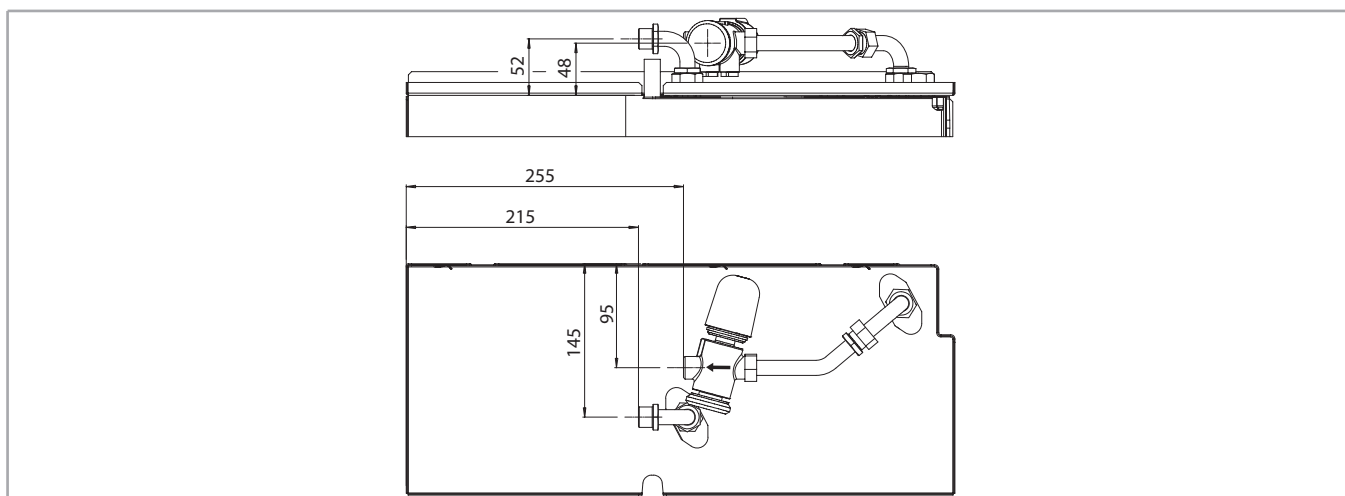
Operation limits of the balancing valves

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

Balancing valves for OVENTROP 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.

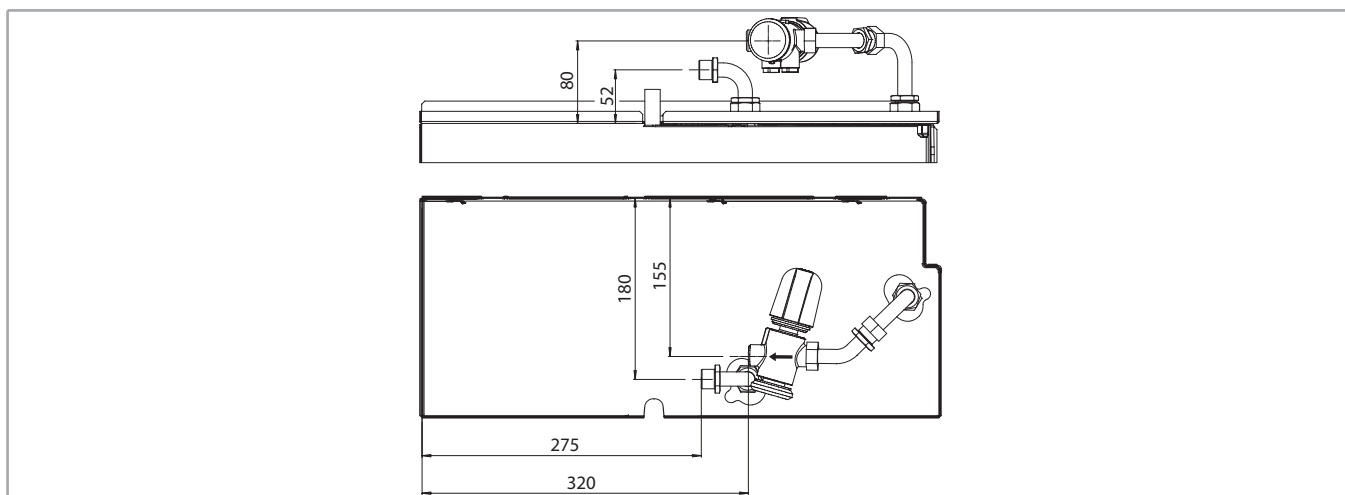


Model	FITTED		NOT FITTED		DN	(Ø)	Range (l/h)
	ID	Code	ID	Code			
1 ÷ 3	V20VBPM 90-450	9066660	V20VBPS 90-450	9066650	10	1/2"	90-450
5 ÷ 7	V20VBPM 150-1050	9066661	V20VBPS 150-1050	9066651	15	3/4"	150-1050

Balancing valves for OVENTROP 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.



Model	FITTED		NOT FITTED		DN	(Ø)	Range (l/h)
	ID	Code	ID	Code			
1 ÷ 3	V20VBAM 90-450	9066663	V20VBAS 90-450	9066653	10	1/2"	90-450
5 ÷ 7	V20VBAM 150-1050	9066664	V20VBAS 150-1050	9066654	15	3/4"	150-1050

Kit with DANFOSS valve

The flow rate can be calculated without any special tools. In order to modify the presetting (the factory value is 100%), go ahead as follow :

1. Remove the blue protective cover or the actuator fitted on the unit
2. Lift up the indicator (DN 25-32)
3. Turn (clockwise to decrease) on the new value
4. Set off the grey indicator again into the closed position (DN 25-32)

The presetting range shows flow rate values between 10-0 (DN 15). The clockwise rotation reduces the requested flow rate value whereas the counterclockwise rotation increases it.



DANFOSS technical characteristics

Nominal diameter		DN	15	15HF
Type		-	90-450	150-1050
Flow rate range		l/h	650	1200
Adjustment range		%	10-100	
Differential pressure	Dp min.	kPa	16	25
	Dp max.		600	
Nominal pressure		PN	25	

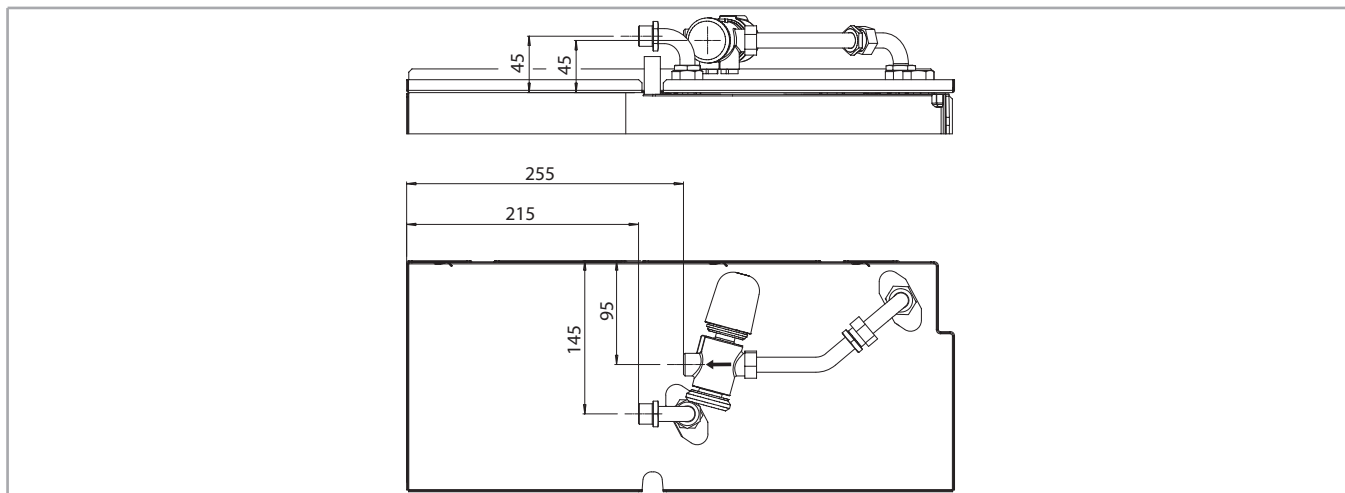
Operation limits of the DANFOSS balancing valves

- Maximum operating temperature: 120 °C
- Maximum % of water/glycol mixture: 50%
- Minimum operating temperature: -10 °C

Balancing valves for DANFOSS 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.



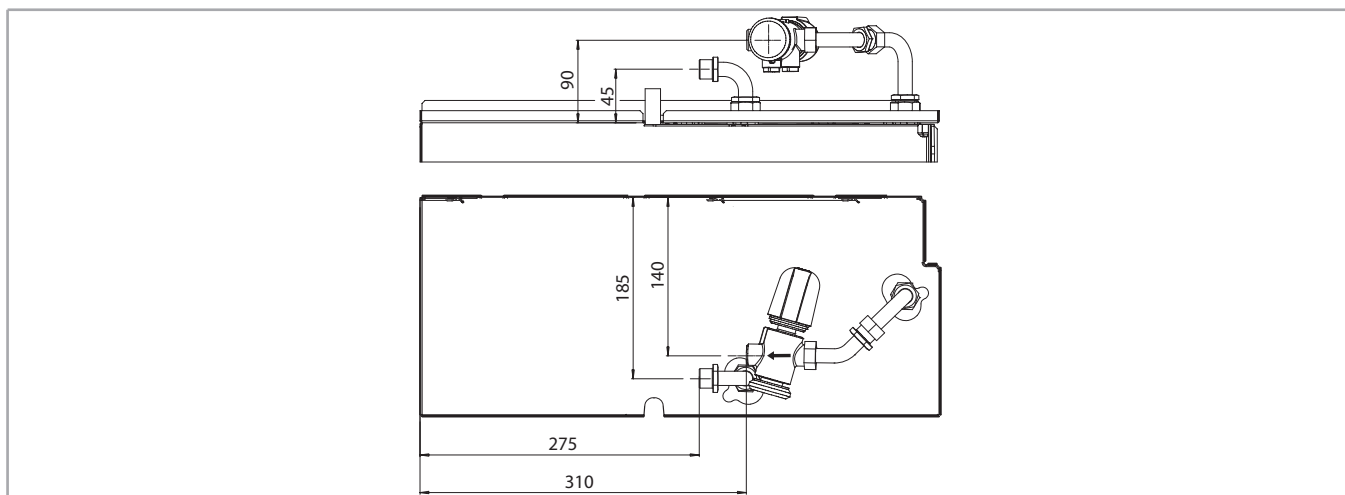
Model	FITTED		NOT FITTED		DN	(Ø)	Range (l/h)
	ID	Code	ID	Code			
1 ÷ 3	V2DFBPM 90-450	9066665	V2DFBPS 90-450	9066655	15	3/4"	90-450
5 ÷ 7	V2DFBPM 150-1050	9066666	V2DFBPS 150-1050	9066656	15	3/4"	150-1050

Attention: the DN 15 valve diameter, unlike the Oventrop model, is of 3/4

Balancing valves for DANFOSS 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.



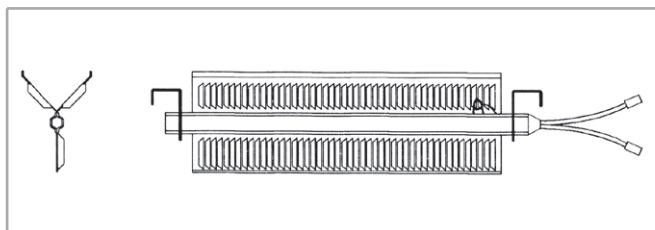
Model	FITTED		NOT FITTED		DN	(Ø)	Range (l/h)
	ID	Code	ID	Code			
1 ÷ 5	V2DFBAM 90-450	9066668	V2DFBAS 90-450	9066658	15	3/4"	90-450
7	V2DFBAM 150-1050	9066669	V2DFBAS 150-1050	9066659	15	3/4"	150-1050

BEL electric heater

1 PHASE 230 V.

Safety thermostat and relay control integrated.

The electric heater must be fitted in the factory during the production of the fan coil and cannot be added later.



MV-MO-MVB Version

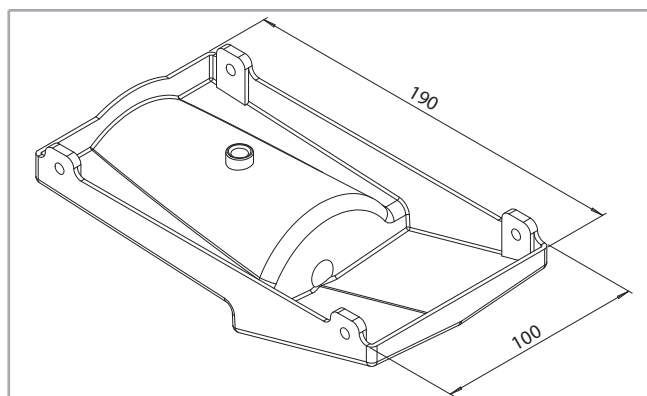
Model	ID	Code	Watt (W)
1	BEL-C G1 / 07	9066491	650
2	BEL-C G2 / 10	9066492	1000
	BEL-C G2 / 06	9066482	600
	BEL-C G2 / 04	9066472	400
3	BEL-C G3-4 / 15	9066493	1500
	BEL-C G3-4 / 09	9066483	900
	BEL-C G3-4 / 06	9066473	600
5	BEL-C G5-6 / 20	9066495	2000
	BEL-C G5-6 / 12	9066485	1250
	BEL-C G5-6 / 07	9066475	750
7	BEL-C G7-9 / 25	9066497	2500
	BEL-C G7-9 / 15	9066487	1500
	BEL-C G7-9 / 10	9066477	1000

IV-IO version

Model	ID	Code	Watt (W)
1	BEL-I G1 / 07	9066611	650
2	BEL-I G2 / 10	9066612	1000
	BEL-I G2 / 06	9066602	600
	BEL-I G2 / 04	9066592	400
3	BEL-I G3-4 / 15	9066613	1500
	BEL-I G3-4 / 09	9066603	900
	BEL-I G3-4 / 06	9066593	600
5	BEL-I G5-6 / 20	9066615	2000
	BEL-I G5-6 / 12	9066605	1250
	BEL-I G5-6 / 07	9066595	750
7	BEL-I G7-9 / 25	9066617	2500
	BEL-I G7-9 / 15	9066607	1500
	BEL-I G7-9 / 10	9066597	1000

BSV extension condensate collection tray to cover valve assembly

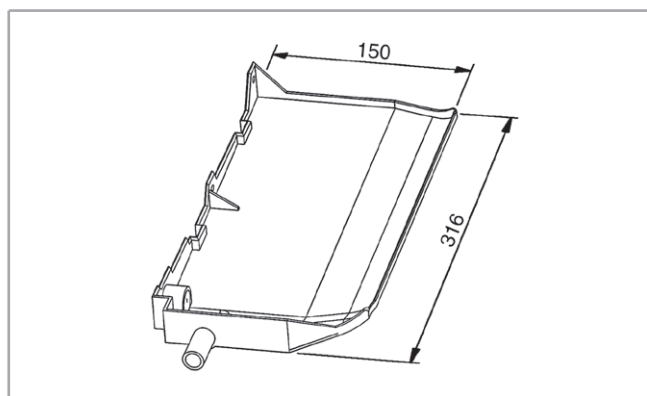
for vertical versions **MV-MVB-IV.**



Model	ID	Code
1 ÷ 7	BSV-C	6060400

BSO-C extension condensate collection tray to cover valve assembly

For **MO** horizontal versions with casing.

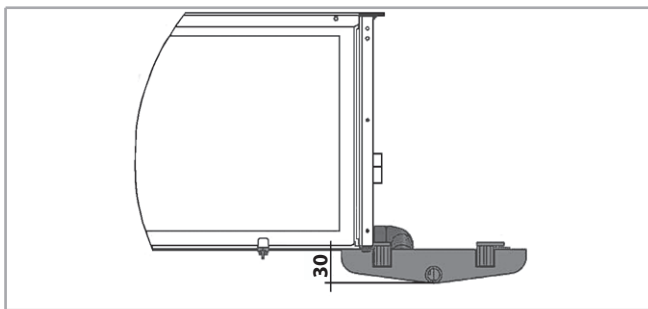
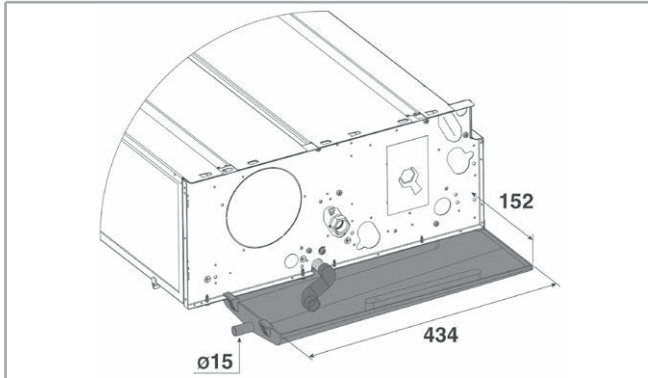


Model	LEFT		RIGHT	
	ID	Code	ID	Code
1 ÷ 7	BSO-C-SX	6060402	BSO-C-DX	6060403

BSI-C extension condensate collection tray to cover valve assembly

For **IO** horizontal versions without casing.

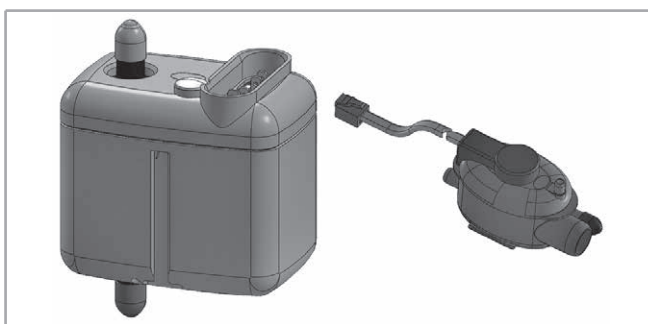
Not be used with KAF accessory.



Model	ID	Code
1 ÷ 7	BSI-C	6066039

DRPV-C condensate pump

for vertical versions **MV-MVB-IV**.

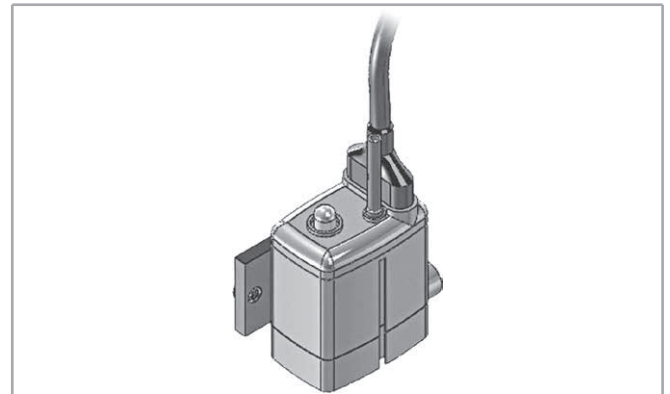


Model	FITTED		NOT FITTED	
	ID	Code	ID	Code
1 ÷ 7	DRPV-C-M	9066297	DRPV-C-S	9066296

Height for vertical flow (m)	Water flow (l/h) depending on the length of horizontal flow	
	5 m	10 m
1	7,6	7,2
2	5,6	5,2
3	4,0	3,7
4	3,2	2,9

DRPO-C condensate pump

For **MO** horizontal versions.

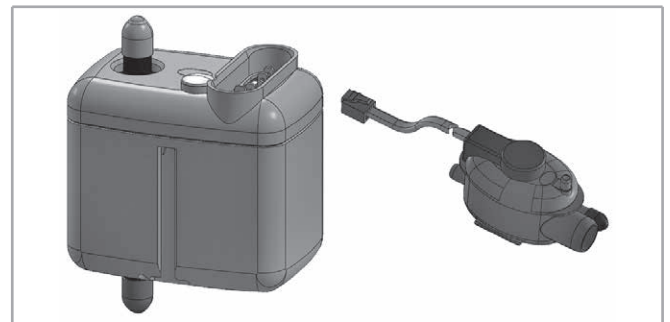


Model	FITTED		NOT FITTED	
	ID	Code	ID	Code
1 ÷ 7	DRPO-C-M	9066295	DRPO-C-S	9066294

Height for vertical flow (m)	Water flow (l/h) depending on the length of horizontal flow	
	5 m	10 m
1	7,6	7,2
2	5,6	5,2
3	4,0	3,7
4	3,2	2,9

DRPI-C condensate pump

For **IO** horizontal versions.



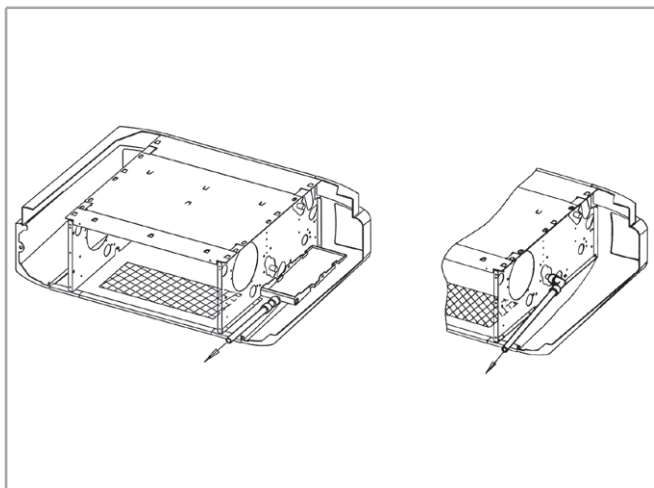
Model	FITTED		NOT FITTED	
	ID	Code	ID	Code
1 ÷ 7	DRPI-C-M	9066298	DRPI-C-S	9066180

Height for vertical flow (m)	Water flow (l/h) depending on the length of horizontal flow	
	5 m	10 m
1	7,6	7,2
2	5,6	5,2
3	4,0	3,7
4	3,2	2,9

SCR plastic condensate drain pipe with fast connection

For **MO-IO** versions.

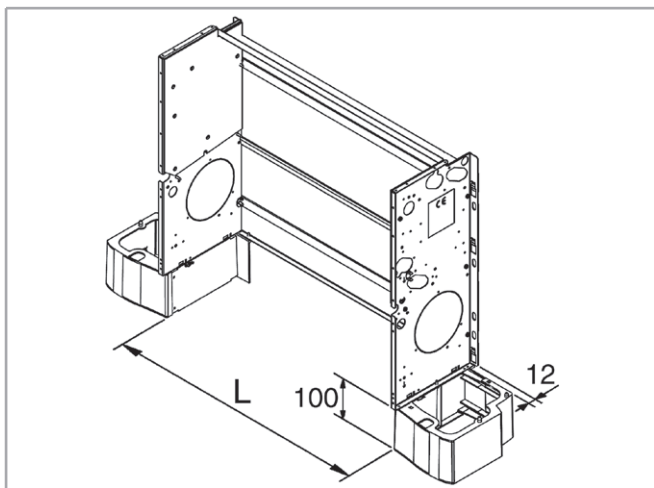
It helps regular drainage of condensate thereby preventing the formation of bends.



Model	ID	Code
1 ÷ 7	SCR-C	6060420

PAP feet

For **MV** versions.



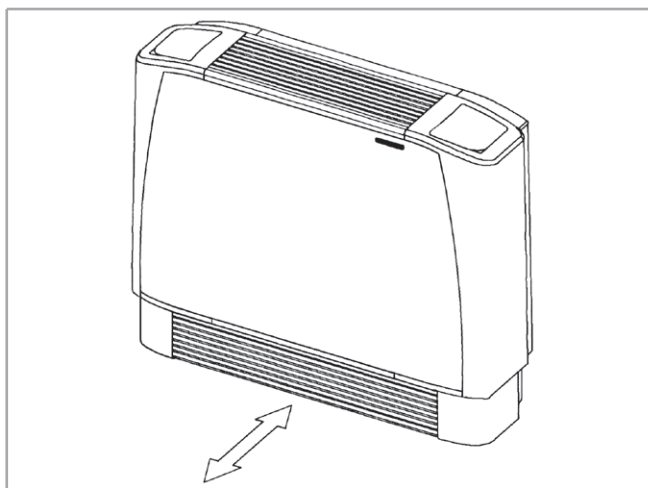
Model	ID	Code	L mm
1	PAP-C G1-7	9066351	330
2	PAP-C G1-7	9066351	430
3	PAP-C G1-7	9066351	645
5	PAP-C G1-7	9066351	860
7	PAP-C G1-7	9066351	1119

GAP Aluminium low intake grid

For **MV** versions.

Removable, made of aluminium, to be installed with PAP feet.

Not be used with accessory BSI-C.

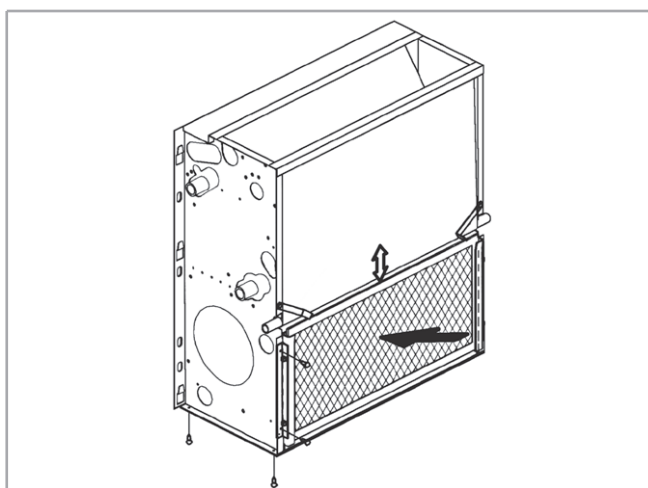


Model	ID	Code
1	GAP-C G1	9066541
2	GAP-C G2	9066542
3	GAP-C G3-4	9066543
5	GAP-C G5-6	9066545
7	GAP-C G7-9	9066547

KAF frontal intake kit

For **IV-IO** versions. Bottom closing panel and sliding guides.

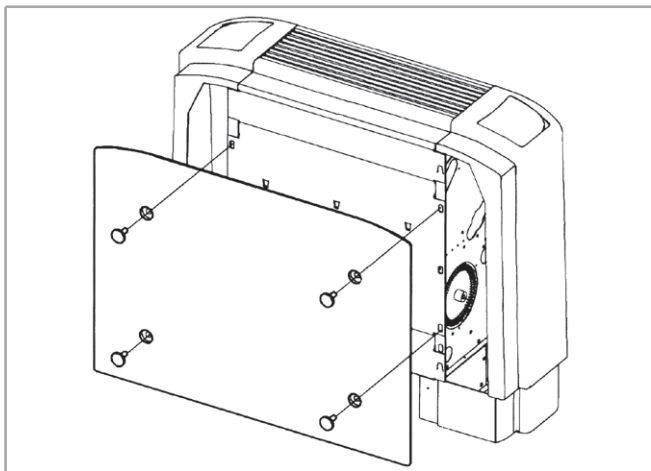
Not be used with accessory BSI-C.



Model	ID	Code
1	KAF-C G1	9066501
2	KAF-C G2	9066502
3	KAF-C G3-4	9066503
5	KAF-C G5-6	9066505
7	KAF-C G7	9066507

PCV rear closing panel

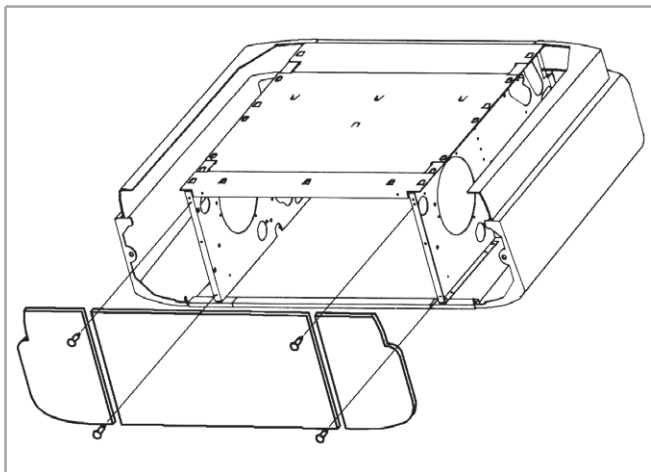
for vertical versions **MV-MVB**.



Model	ID	Code
1	PCV-C G1	9066511
2	PCV-C G2	9066512
3	PCV-C G3-4	9066513
5	PCV-C G5-6	9066515
7	PCV-C G7-9	9066517

PCO bottom closing panel

for **MO** horizontal versions.

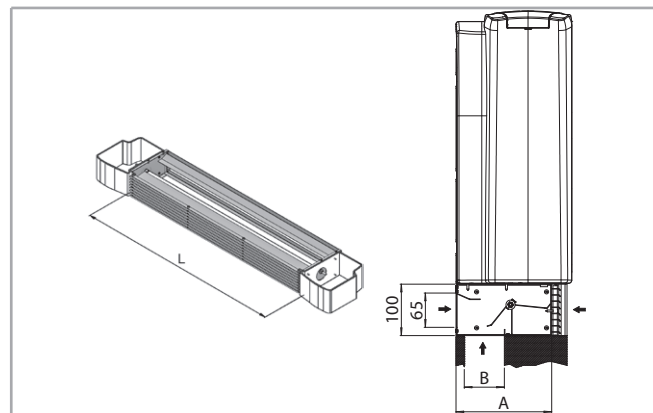


Model	ID	Code
1	PCO-C G1	9066521
2	PCO-C G2	9066522
3	PCO-C G3-4	9066523
5	PCO-C G5-6	9066525
7	PCO-C G7	9066527

SAEM fresh air mixing damper

For **MV** versions.

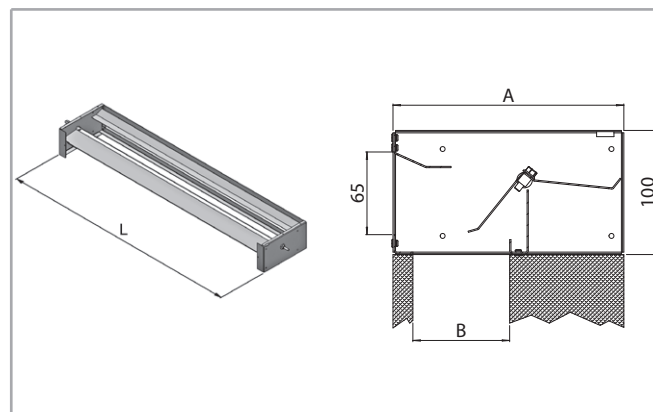
Factory mounted with feet and intake grid included



Model	ID	Code	A mm	B mm	L mm
1	SAEM-C G1	9066621	186	78	354
2	SAEM-C G2	9066622	186	78	454
3	SAEM-C G3-4	9066623	186	78	669
5	SAEM-C G5-6	9066625	186	78	884
7	SAEM-C G7	9066627	186	78	1099

SAE fresh air mixing damper

for versions **IV-IO**, not fitted.

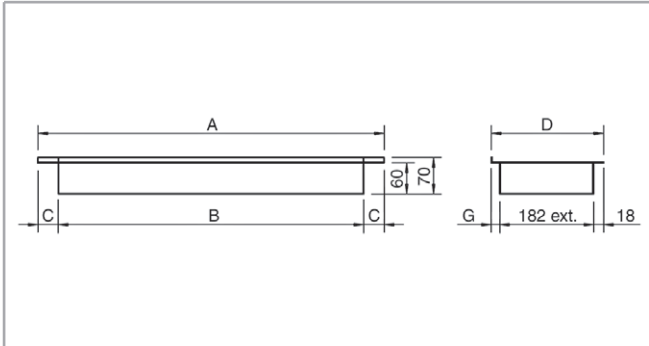


Model	ID	Code	A mm	B mm	L mm
1	SAE-C G1	9066531	186	78	354
2	SAE-C G2	9066532	186	78	454
3	SAE-C G3-4	9066533	186	78	669
5	SAE-C G5-6	9066535	186	78	884
7	SAE-C G7	9066537	186	78	1099

FRD straight inlet flange

For versions **IV-IO**. Can be used together with GRAG air inlet grid.

Made of galvanized steel.

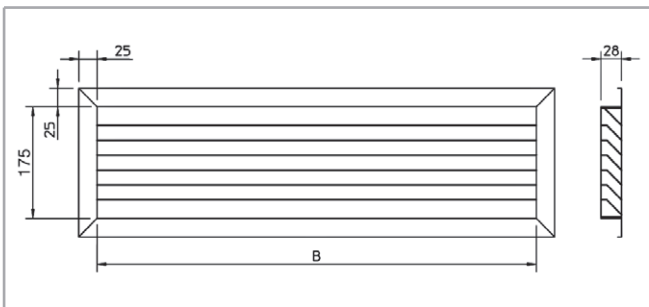


Model	ID	Code	A mm	B mm	C mm	D mm	G mm
1	FRD-C-1	9066451	354	290	32	216	16
2	FRD-C-2	9060720	454	390	32	216	16
3	FRD-C-3-4	9060721	669	590	40	216	16
5	FRD-C-5-6	9060722	884	790	47	216	16
7	FRD-C-7	9060723	1099	990	54	216	16

GRAG air inlet grid

For versions **IV-IO**. To be used with FRD straight inlet flange.

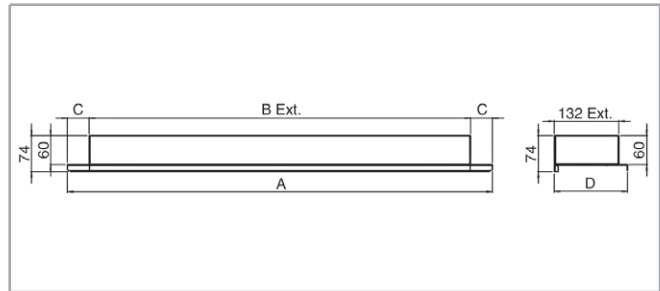
Made of anodized aluminium.



Model	ID	Code	B mm
1	GRAG-C-1	9066431	275
2	GRAG-C-2	9060764	375
3	GRAG-C-3-4	9060765	575
5	GRAG-C-5-6	9060766	775
7	GRAG-C-7-9	9060767	975

FMD straight outlet flange

Made of galvanized steel for versions **IV-IO**.

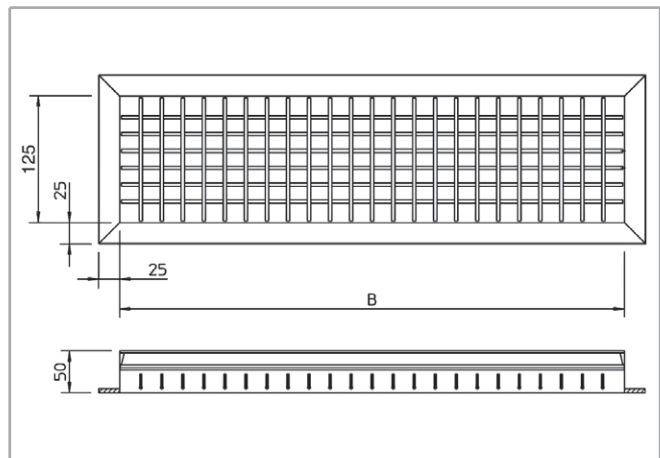


Model	ID	Code	A mm	B mm	C mm	D mm
1	FMD-C-1	9066371	352	290	31	152
2	FMD-C-2	9066372	452	390	31	152
3	FMD-C-3-4	9066373	667	590	38	152
5	FMD-C-5-6	9066375	882	790	46	152
7	FMD-C-7	9066377	1097	990	54	152

BMA air outlet grid

For versions **IV-IO**. Double louvre grid to be fitted to the FMD straight outlet flange.

Made of anodized aluminium.



Model	ID	Code	B mm
1	BMA-C-1	9066411	275
2	BMA-C-2	9060750	375
3	BMA-C-3-4	9060751	575
5	BMA-C-5-6	9060752	775
7	BMA-C-7-9	9060753	975





THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

CISQ/ICIM SPA has issued an IQNet recognized certificate that the organization:

SABIANA S.p.A.

Head Office and Operative Unit
Via Piave, 53 - I-20011 Corbetta (MI)
Operative Unit
Via Virgilio, 2 - I-20013 Magenta (MI)

has implemented and maintains a
Quality Management System

for the following scope:

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

which fulfils the requirements of the following standard:

ISO 9001:2015

Issued on: **2021-04-10**
First issued on: **1996-06-10**
Expires on: **2024-04-09**

*This attestation is directly linked to the IQNet Partner's original
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Registration Number: **IT-4000**




Alex Stoichitoiu
President of IQNET




Ing. Mario Romersi
President of CISQ

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Il presente documento annulla e sostituisce il certificato di pari numero emesso in data 06/05/2022.



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CERTIFICATO N. 0545/8
CERTIFICATE No.

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

SABIANA S.P.A.

Sede e Unità Operativa

Via Piave, 53 - 20011 Corbetta (MI) - Italia

Processi direzionali, primari e di supporto relativamente a Progettazione, produzione e assistenza di apparecchiature per il riscaldamento e il condizionamento dell'aria (aerotermini, termostrisce radianti, ventilconvettori e unità trattamento aria) e canne fumarie.

Unità Operative

Via Virgilio, 2 - 20013 Magenta (MI) - Italia

Produzione di ventilconvettori. Magazzino Logistica.

(Presente solo reparto produttivo, magazzino componenti e logistica: Magazzino P.F. e spedizione).

Via Zanella, 27 - 20011 Corbetta (MI) - Italia

Assemblaggio unità trattamento aria, lavorazioni meccaniche, saldatura, magazzino, assemblaggio recuperatori.

È CONFORME ALLA NORMA / IS IN COMPLIANCE WITH THE STANDARD

UNI EN ISO 9001:2015

Sistema di Gestione per la Qualità / Quality Management System

PER LE SEGUENTI ATTIVITÀ / FOR THE FOLLOWING ACTIVITIES

EA: 18

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

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

Riferirsi alla documentazione del Sistema di Gestione per la Qualità aziendale per l'applicabilità dei requisiti della norma di riferimento.

Refer to the documentation of the Quality Management System for details of application to reference standard requirements.

Il presente certificato è soggetto al rispetto del documento ICIM "Regolamento per la certificazione dei sistemi di gestione" e al relativo Schema specifico.

The use and the validity of this certificate shall satisfy the requirements of the ICIM document "Rules for the certification of company management systems" and specific Scheme.

Per informazioni puntuali e aggiornate circa eventuali variazioni intervenute nello stato della certificazione di cui al presente certificato,

si prega di contattare il n° telefonico +39 02 725341 o indirizzo e-mail info@icim.it.

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www.icim.it



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Cert. n. 0545



Cert. n. 050153

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