VOLCANO

Heating Unit

DESIGN AWARD 2017

ECO EC Motor Inside


JUNGHEINRICH


TAYLOR
AFR
CHEVROLET
MSD

VOLCANO

The Volcano air heaters are a new generation of devices by combining innovative technical solutions with a modern pattern design. Our precisely executed and light housing resembles the beautiful diamond shape; ideal in its simplicity.
The character of the device is emphasized by the composition of the selected materials and dynamically shaped air guide vane.

DESIGN AWARD 2017

EC

ENERGY-SAVING EC MOTORS

THREE-ROW WATER EXCHANGERS

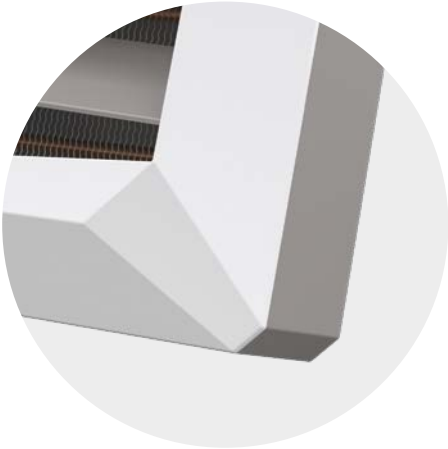
BIM COMPATIBLE
REVIT®FILES

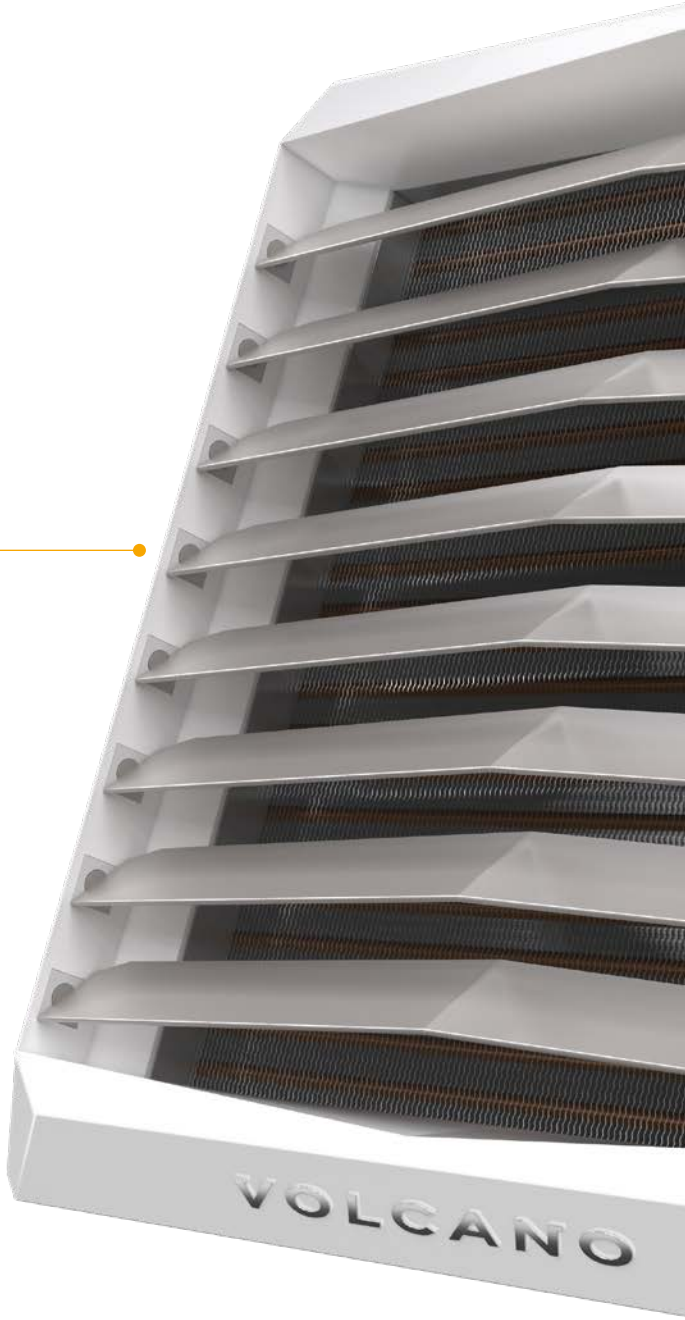
AVAILABLE ONLINE
24/7

Modernity

DESIGN

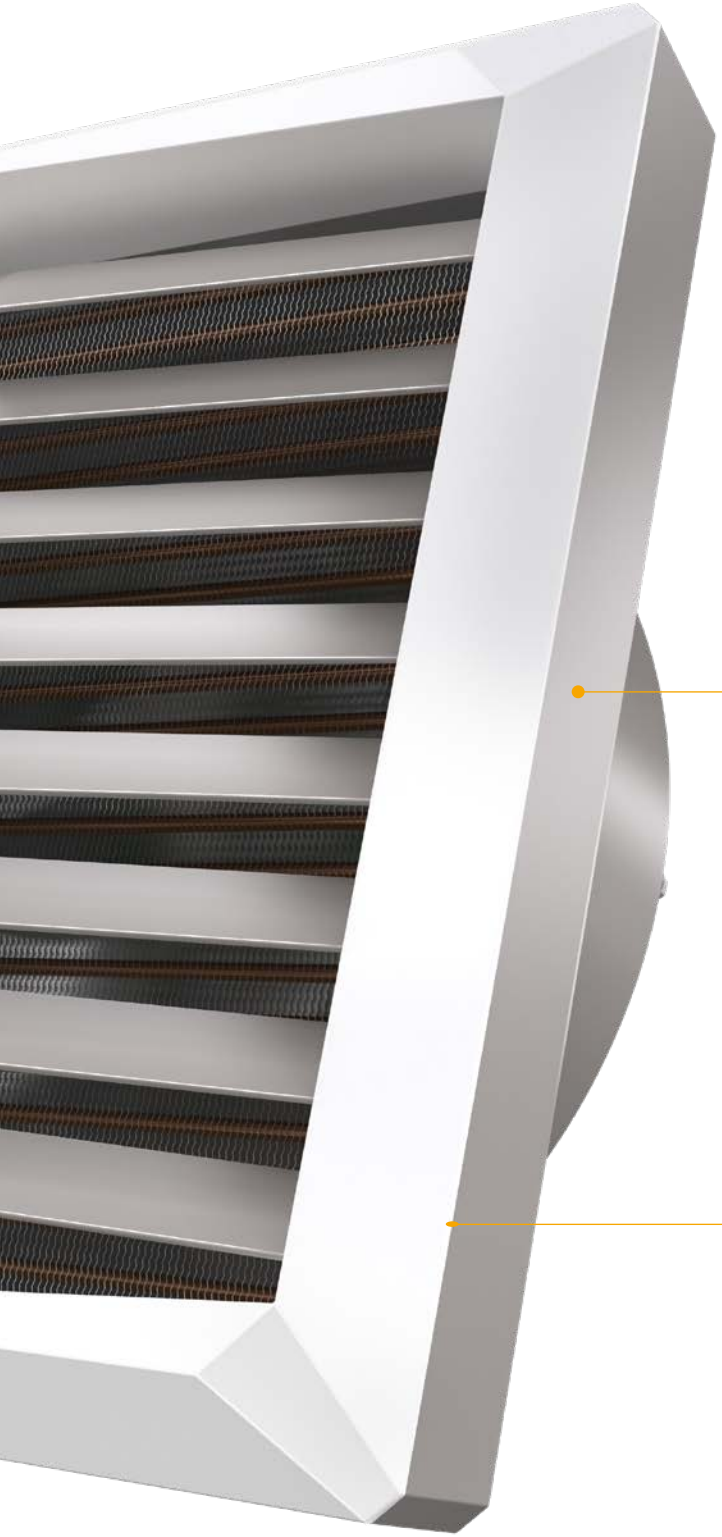
Highly developed casing form guarantees optimal exchanger surface exposure while hiding all structural elements.





SHAPE AND COLOR

The light and clean casing lines, combined with a universal color palette, provide for harmonious adaptation to every room type.



MATERIAL

Made of the highest class ABS with an anti-UV pigment mixture. The casing is characterized by high mechanical strength, durability, and resistance to high temperatures. The material used guarantees unchangeable aesthetics, easy to clean surfaces and long-term durability certified by warranty for the casing.

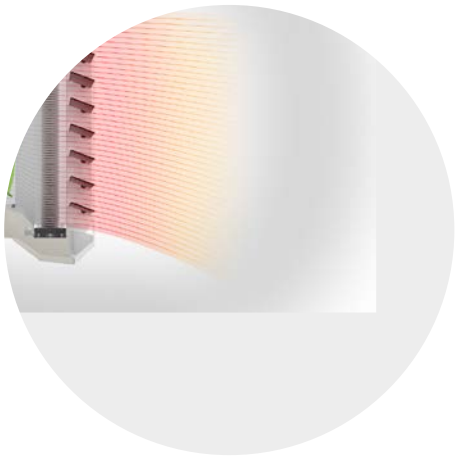
SMART LOCK

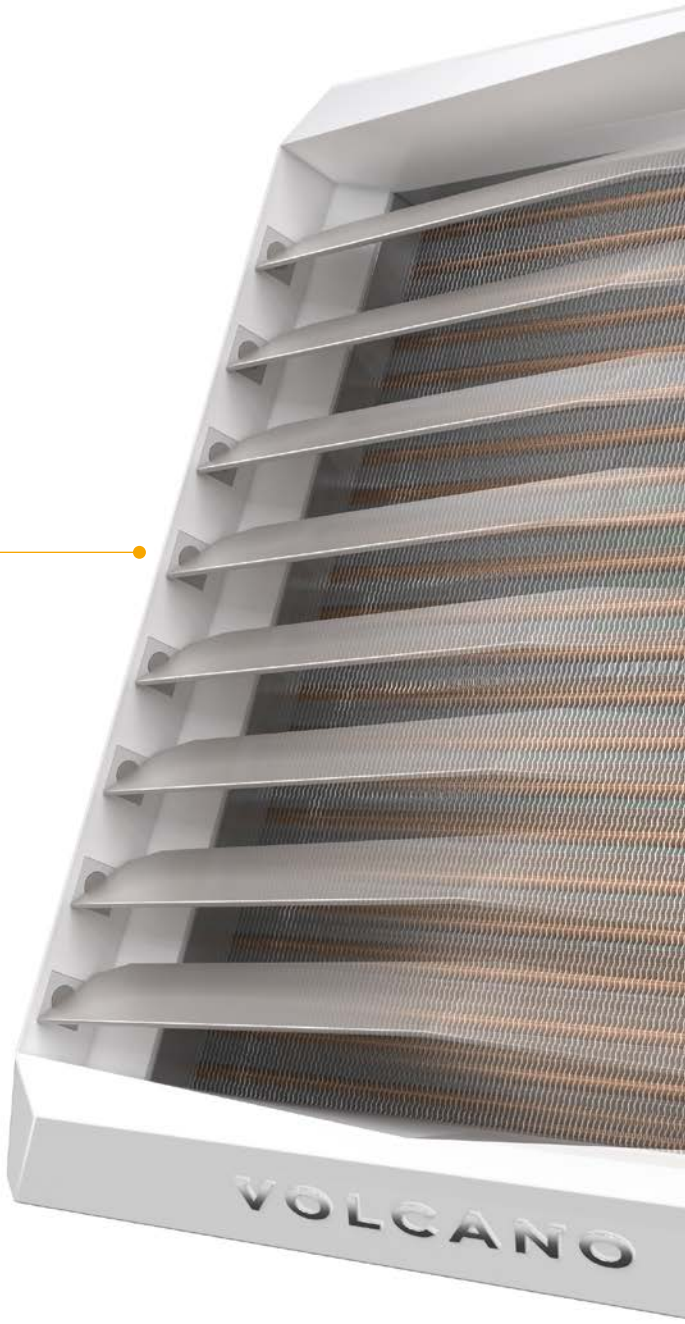
Our patented locking system guarantees a durable and precise fit for all casing elements.

Innovation

AIR GUIDE VANES

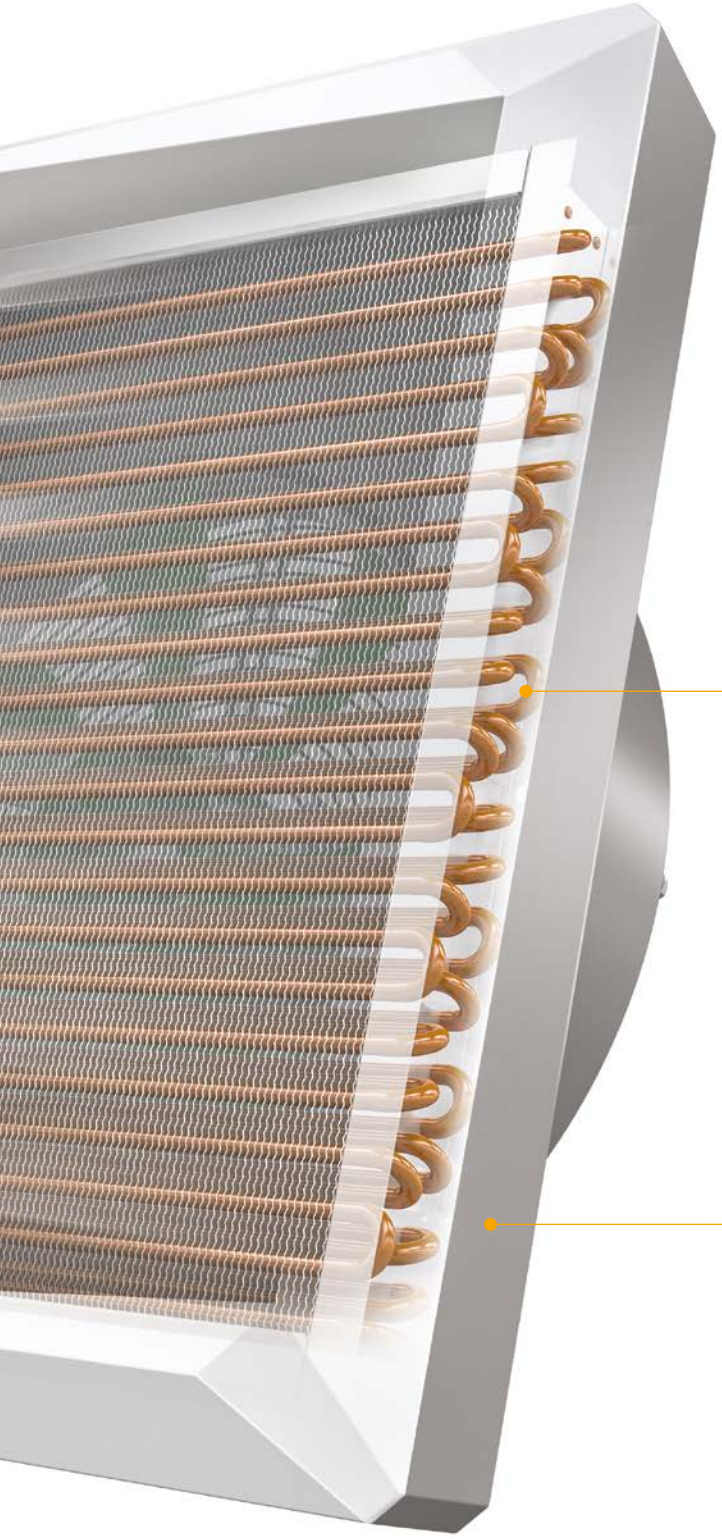
An innovative blade mount solution allows for their individual adjustment and stable positioning. The guide vane profile guarantees minimum air flow resistance rates.





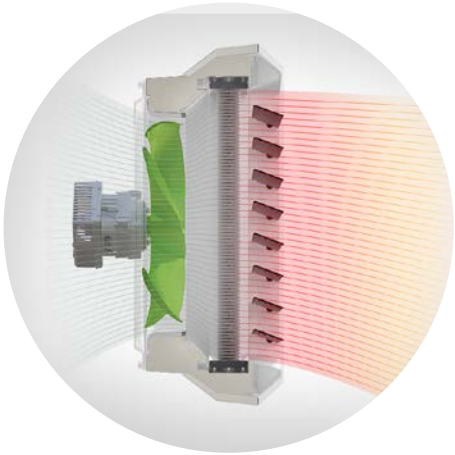
DIFFUSER

The design of the diffuser guarantees total integration with the rear section of the housing and the fan.



HEAT EXCHANGERS

- 1, 2 and 3-row heaters featuring increased heat exchange surfaces guarantee optimal match of heating power to the requirements of the facility;
- Enhanced heat transfer surface and ability to work with low temperatures agents;
- All exchangers are tested to guarantee 100% verification of tightness.



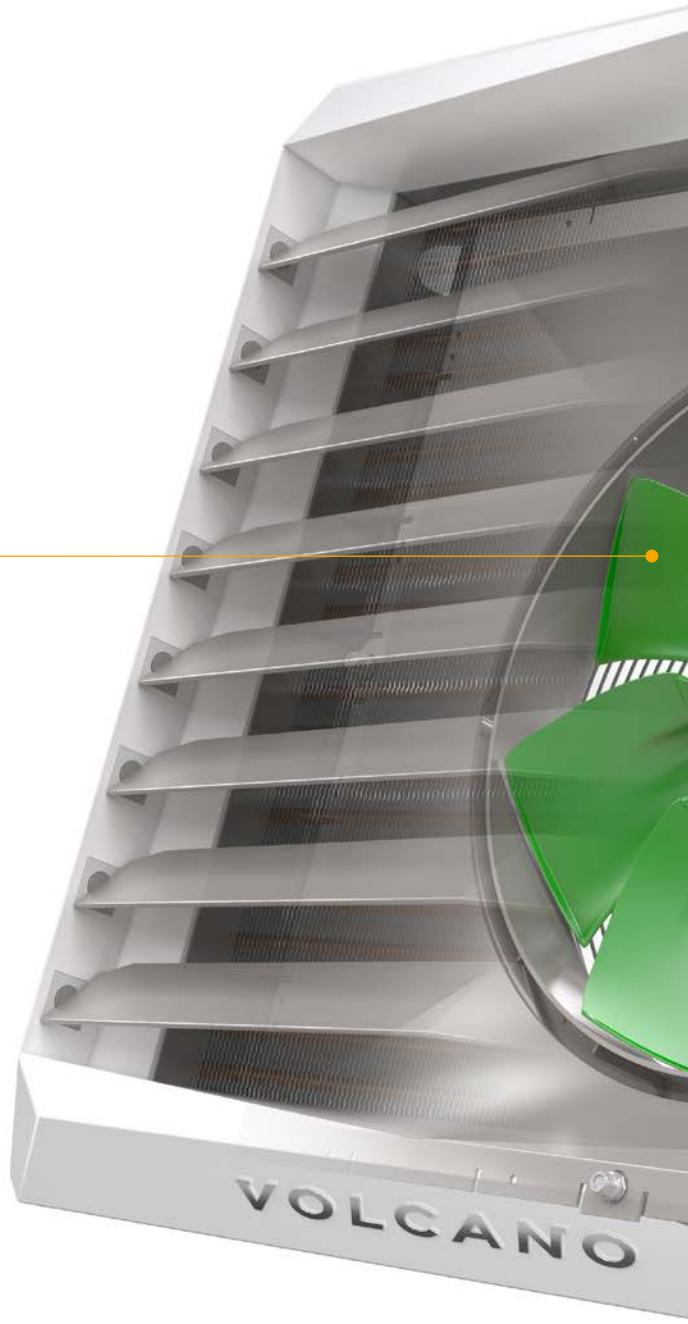
MAXIMUM AIR OUTPUT WITHOUT ANY POWER LOSS

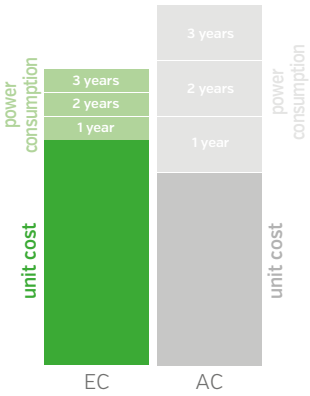
Our ideally matching fan casing and a dedicated diffuser provide for equal distribution of air speed in the exchanger, to guarantee small flow resistance rates and full use of the exchanger's power output.

Energy efficiency

EFFICIENT FANS

Optimized profile and increased blade surfaces guarantee low usage costs and quiet operation.





ELECTRICITY SAVINGS

Modern design of the engine and fan saves up to 40% of energy compared to conventional solutions.

FULL RECYCLING

The device is environmentally-friendly. 100% of materials used can be recycled.

ENERGY-SAVING REGULATION

EC motors guarantee maximum unit efficiency at reduced rotations. Stepless rotation regulation is now available for EC motors.

The Volcano air heater with EC motor

ENERGY EFFICIENCY

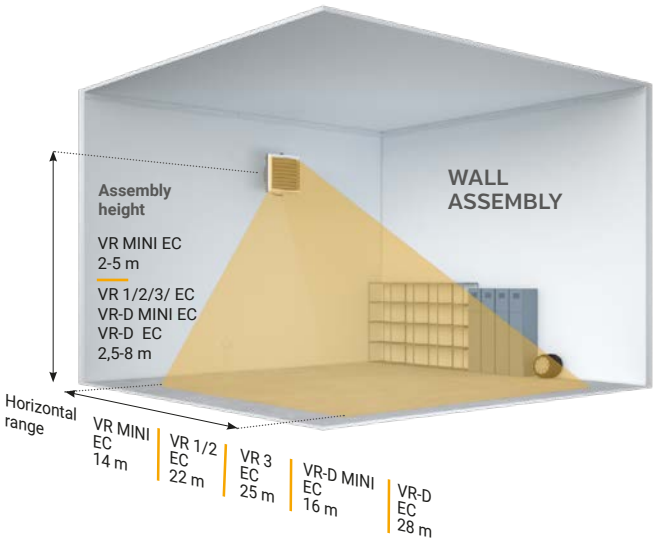
- Higher efficiency throughout the adjustment range in comparison to regular motors
- Excellent durability
- Low maintenance costs
- Possibility of connecting directly to BMS system
- Silent with considerable rates of rotation
- Adjustment of fan rates rotation with 0-10V DC signal

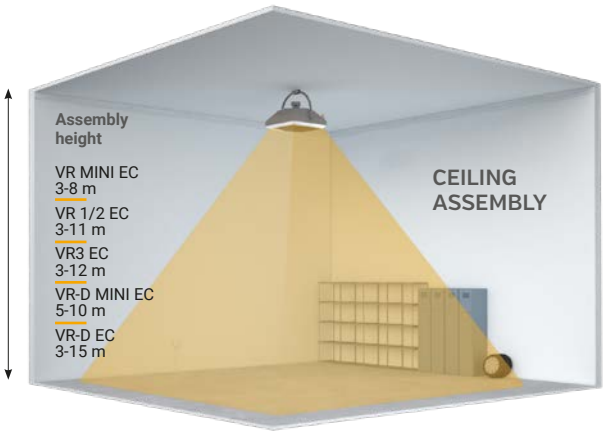
COMFORT AND FLEXIBILITY

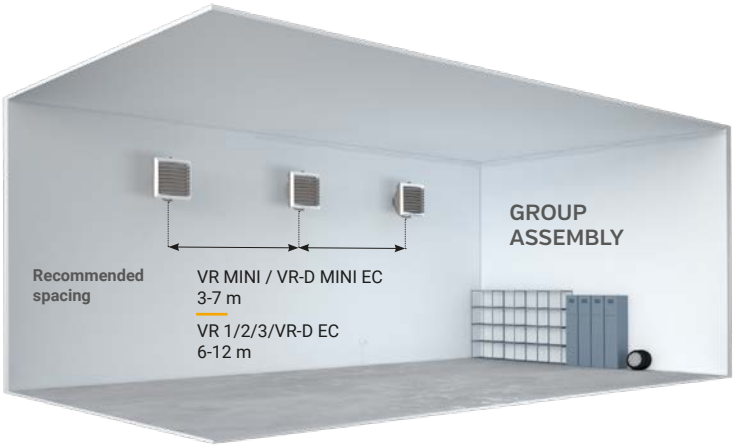
Microprocessor controller of EC Air Heater

- Cooperation with external temperature sensors.
- Heaters working time calendar for workdays and weekends.
- Working in BMS systems.
- Possibility of working in automatic and 3-level mode of speed control.
- Up to 8 heaters can be connected to one controller!

Assembly





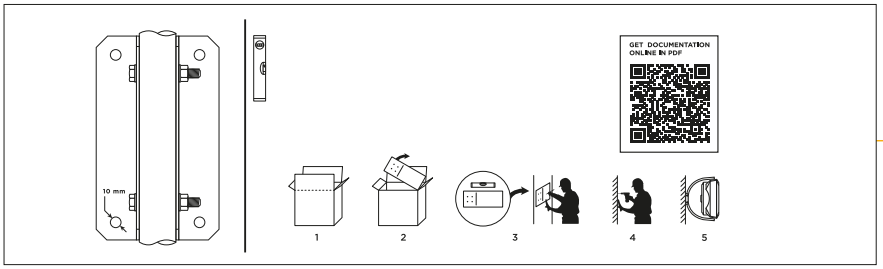


VOLCANO heaters are furnished with a standard assembly concole for wall and ceiling mounting of the device.

The maximum vertical range of the devices are 8-15 m, depending on the type of heater. The maximum horizontal range of the devices are 14-25 m.

Notice! If the minimum distance of 0.4m and 0.25m [VR Mini] is not maintained from the wall or ceiling during assembly, the device may operate incorrectly. The fan may be damaged or the entire device may work louder.

ASSEMBLY TEMPLATE



Each VOLCANO air heater package has a printed template representing the spacing of boreholes and a leveling line to facilitate the mount of the console to the wall. Simply cut the template out of the cardboard lid and proceed to assembly.

VOLCANO VR-D
Destratifier

Parameter	---	VOLCANO VR-D EC	VOLCANO VR-D MINI EC
Maximum air output	m^3/h	6500	2330
Maximum horizontal air range	m	28	16
Maximum vertical air range	m	15	10
Device weight (without water)	kg	15,5	8
Power supply voltage	V/Hz	1 ~ 230/50	1~230/50
Motor power EC	kW	0,37	0,095
Rated current EC	A	1,7	0,51
Rated motor rotational speed EC	rpm	1400	1200
Protection rating EC	IP	44	

Selection method in terms of room size:

Assembly height should be no less than 3/4 of the height of the room, measuring from the floor.

An example calculation of the minimal VOLCANO VR-D distratifier assembly height:

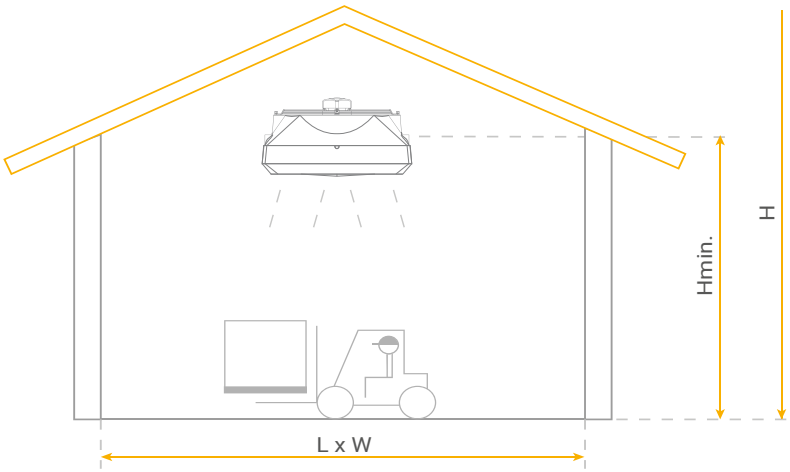
HMIN = ¾ x H

In a room of H=12m, the minimal VOLCANO VR-D destratifier assembly height will be:

HMIN = ¾ x 12 m = 9m

Description:

H - height
L - length
W - width



Automation

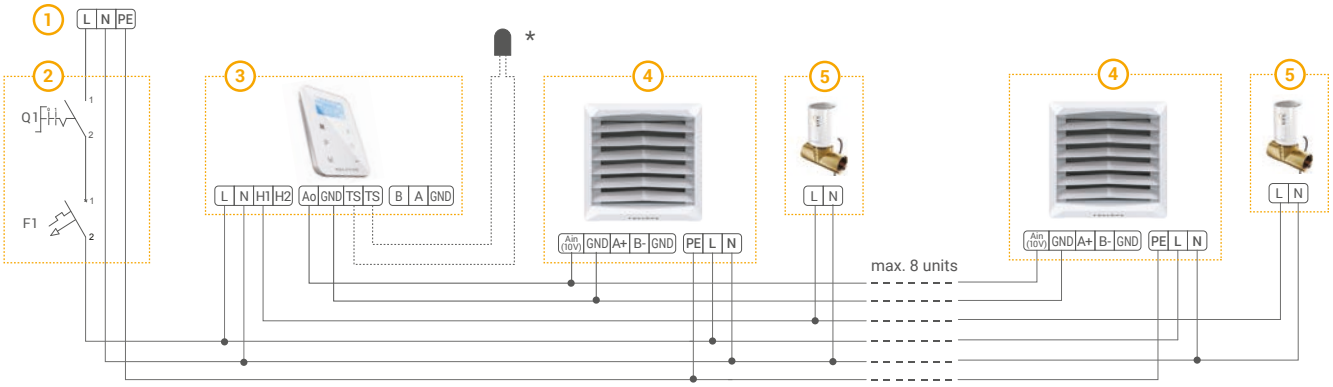
Parameters				
Model	-	Potentiometer VR EC (0-10 V)	Potentiometer with thermostat VR EC (0-10 V)	Controller Volcano EC
VTS product number	-	1-4-0101-0453	1-4-0101-0473	1-4-0101-0457
Motor support	-	EC		
Power supply voltage	V/ph/Hz	~230/1/50	~230/1/50	~230/1/50
Permissible load	A	0,02 A for 0-10V	0,02 A for 0-10V	1A for 230VAC 0,02A for 0-10V
Setting range	°C	-	5...40	5...40
Work mode	---	Manual		Manual / automatic
Hourly-weekly calendar	---	No	No	Yes
Clock	---	No	No	Yes
Temperature measurement	---	-	Integrated in the device	Integrated in the device
The possibility of connecting a separate temperature sensor	pcs.	No	1 or 4	1 or 4
Output signal	---	0-10V DC		
Protection rating	IP	30		

Cooperation of controlers and regulators with water heaters				
Model		Potentiometer VR EC (0-10 V)	Potentiometer with thermostat VR EC (0-10 V)	Controller Volcano EC
VTS article No.		1-4-0101-0453	1-4-0101-0473	1-4-0101-0457
Cooperation with motors		EC		
VR Mini	pcs.	8	8	8
VR1	pcs.	8	8	8
VR2	pcs.	8	8	8
VR3	pcs.	8	8	8
VR-D Mini	pcs.	8	8	8
VR-D	pcs.	8	8	8

Parameters	
Valve with actuator (VA-VEH202TA)	
VTS product number	1-2-1204-2019
Power supply voltage	V/ph/Hz ~230/1/50
Power consumption	W 1
Connection	" 3/4
Kvs	m³/h 4,5
Opening/ closing time	min. 3/3
Protection rating	IP 54

Parameters	
Room NTC sensor (for the VOLCANO EC controller)	
VTS product number	1-2-1205-1007
Resistance measurement element	kΩ NTC 10K
Assembly	--- on-plaster
Maximum length of signal wire	m 100
Ambient temperature	°C -20...+70
Temperature measurement range	°C -20...+70
Protection rating	IP 66

EXAMPLE CONNECTION DIAGRAM OF VOLCANO EC

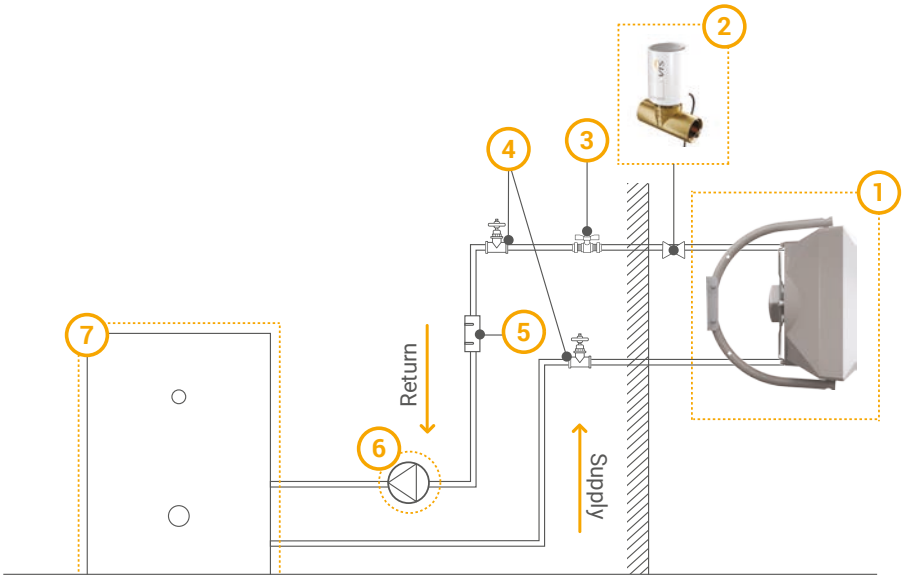


1. Power supply 230V/50 Hz
2. Main switch, fuses
3. Volcano EC controller
4. Volcano VR Mini, VR1, VR2, VR3, VR-D Mini, VR-D (possibility of connecting 8 units to one controller)
5. Valve with actuator

* Temperature sensor installed optionally

ALL EC HEATERS ARE CHARACTERIZED BY THEIR EASE AND SIMPLICITY OF CONNECTION

EXAMPLE OF A HYDRAULIC SYSTEM

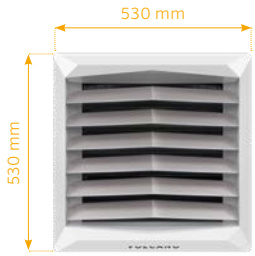


1. Unit heater
2. Valve with actuator
3. Vent valve
4. Cut-off valve
5. Filter
6. Circulation pump
7. Boiler

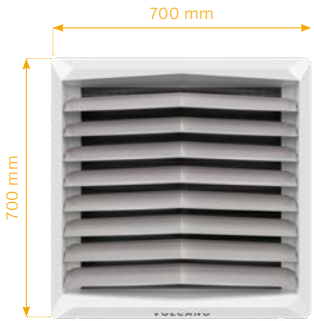
Device type series

VOLCANO	VR Mini EC	VR1 EC	VR2 EC	VR3 EC	VR-D Mini EC	VR-D EC
HEATING POWER RANGE	3-20 kW	5-30 kW	8-50 kW	13-75 kW	–	–
MAXIMUM AIR OUTPUT*	2100 m³/h	5300 m³/h	4850 m³/h	5700 m³/h	2330 m³/h	6500 m³/h
HORIZONTAL RANGE (MAX.)	14 m	23 m	22 m	25 m	16 m	28 m
VERTICAL RANGE (MAX.)	8 m	12 m	11 m	12 m	10 m	15 m

* maximum speed 0.5 m/s

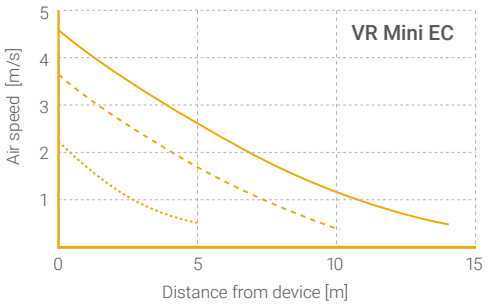


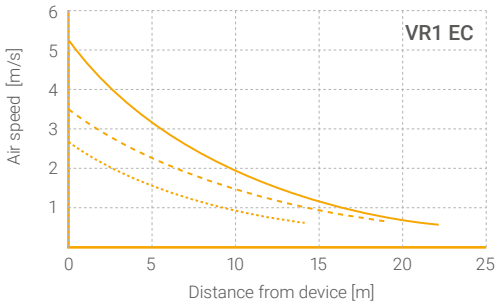
VR MINI EC
VR-D MINI EC

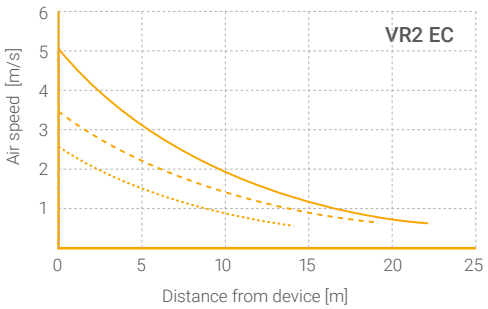


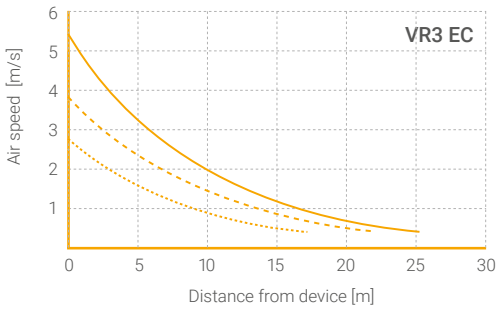
VR1 EC, VR2 EC, VR3 EC, VR-D EC

Air speed in the distance function









Technical parameters

Parameter	Unit	VOLCANO VR MINI	VOLCANO VR1	VOLCANO VR2	VOLCANO VR3	VOLCANO VR-D MINI	VOLCANO VR-D
		EC	EC	EC	EC	EC	EC
VTS product number		1-4-0101-0455	1-4-0101-0442	1-4-0101-0443	1-4-0101-0444	1-4-0101-0498	1-4-0101-0450
Number of heater rows	-	2	1	2	3	---	---
Maximum air output	m^3/h	2100	5300	4850	5700	2330	6500
Heating power range	kW	3-20	5-30	8-50	13-75	---	---
Maximum temperature of heating medium	°C	130				---	---
Maximum working pressure	MPa	1,6				---	---
Maximum horizontal air range	m	14	23	22	25	16	28
Maximum vertical air rage	m	8	12	11	12	10	15
Water capacity	dm^3	1,12	1,25	2,16	3,1	---	---
Connection stub pipe diameter	"	3/4				---	---
Device weight (without water) EC	kg	14	21	21,5	24,5	8	15,5
Power supply voltage	V/Hz	1 ~ 230/50					
EC motor power	kW	0,095	0,25		0,37	0,095	0,37
EC motor rated current	A	0,51	1,3		1,7	0,51	1,7
EC motor rotations	rpm	1200	1430		1400	1200	1400
EC motor protection rating	IP	44					
Casing color palette		Front: RAL 9016 Traffic White, rear + console: RAL 7036 Platinum Gray, fan (EC): RAL 6038 Green					

PIPELINE DIAMETERS*

Number of heaters connected to the main line**	VR Mini		VR1		VR2		VR3	
	Max water flow [m^3/h]	Pipeline diameter [”]	Max water flow [m^3/h]	Pipeline diameter [”]	Max water flow [m^3/h]	Pipeline diameter [”]	Max water flow [m^3/h]	Pipeline diameter [”]
1	0,9	¾	1,3	¾	2,2	¾	3,3	¾
2	1,8	¾	2,6	¾	4,4	1	6,6	1 ¼
3	2,7	1	3,9	1	6,6	1 ¼	9,9	1 ½
4	3,6	1	5,2	1	8,8	1 ¼	13,2	1 ½
5	4,5	1	6,5	1 ¼	11	1 ½	16,5	2
6	5,4	1 ¼	7,8	1 ¼	13,2	1 ½	19,8	2
7	6,3	1 ¼	9,1	1 ¼	15,4	2	23,1	2 ½
8	7,2	1 ¼	10,4	1 ½	17,6	2	26,4	2 ½
9	8,1	1 ¼	11,7	1 ½	19,8	2	29,7	2 ½
10	9,0	1 ¼	13	1 ½	22	2 ½	33	3

* Pipeline diameters selected for maximum water flow rate up to 2.5 m / s
** Heaters connected successively to one main line

VOLCANO VR MINI EC

FAN SPEED		III	II	I
Fan output	m³/h	2100	1650	1100
Noise level for heaters with EC motors*	dB(A)	50	40	27
EC motor power**	W	95	56	39
electricity consumption***	W	91	32	13
Horizontal range	m	14	8	5
Vertical range	m	8	5	3

VOLCANO VR1 EC

FAN SPEED		III	II	I
Fan output	m³/h	5300	3900	2800
Noise level for heaters with EC motors*	dB(A)	54	49	38
EC motor power**	W	250	190	162
electricity consumption***	W	202	75	41
Horizontal range	m	23	20	15
Vertical range	m	12	9	7

VOLCANO VR2 EC

FAN SPEED		III	II	I
Fan output	m³/h	4850	3600	2400
Noise level for heaters with EC motors*	dB(A)	54	49	38
EC motor power**	W	250	190	162
electricity consumption***	W	226	89	45
Horizontal range	m	22	19	14
Vertical range	m	11	8	6

VOLCANO VR3 EC

FAN SPEED		III	II	I
Fan output	m³/h	5700	4100	3000
Noise level for heaters with EC motors*	dB(A)	55	49	43
EC motor power**	W	370	285	218
electricity consumption***	W	355	123	55
Horizontal range	m	25	22	17
Vertical range	m	12	9	7

VOLCANO VR-D MINI EC

FAN SPEED		III	II	I
Fan output	m³/h	2330	1830	1220
Noise level for heaters with EC motors*	dB(A)	50	40	27
EC motor power**	W	95	56	39
Horizontal range	m	16	10	7
Vertical range	m	10	7	5

VOLCANO VR-D EC

FAN SPEED		III	II	I
Fan output	m³/h	6500	4600	3400
Noise level for heaters with EC motors*	dB(A)	56	50	43
EC motor power**	W	370	285	218
Horizontal range	m	28	24	19
Vertical range	m	15	11	9

* reference conditions: 1500m³ room volume, measurement performed at 5m
** EC motor power for the above specified fan outputs
*** Standard laboratory conditions

VOLCANO VR MINI EC

Tz / Tp parameters [°C]																	
		90/70				80/60				70/50				50/30			
Tp1 [°C]	Qp [m³/h]	Pg [kW]	Tp2 [°C]	Qw [m³/h]	Δp [kPa]	Pg [kW]	Tp2 [°C]	Qw [m³/h]	Δp [kPa]	Pg [kW]	Tp2 [°C]	Qw [m³/h]	Δp [kPa]	Pg [kW]	Tp2 [°C]	Qw [m³/h]	Δp [kPa]
0	2100	20,7	29,5	0,92	13,9	17,9	25,4	0,79	10,7	15,1	21,4	0,66	7,9	9,2	13,1	0,4	3,4
	1650	18,1	32,6	0,8	10,7	15,6	28,2	0,69	8,3	13,1	23,7	0,58	6,1	8	14,6	0,35	2,6
	1100	14,1	38,3	0,63	6,8	12,2	33,2	0,54	5,3	10,3	27,9	0,45	3,9	6,3	17,2	0,28	1,7
5	2100	19,4	32,6	0,86	12,3	16,6	28,6	0,73	9,3	13,7	24,5	0,6	6,6	7,6	16,1	0,34	2,5
	1650	16,9	35,6	0,75	9,5	14,5	31,1	0,64	7,2	12	26,6	0,53	5,2	6,8	17,4	0,3	2
	1100	13,3	40,9	0,59	6	11,3	35,8	0,5	4,6	9,4	30,5	0,41	3,3	5,4	19,6	0,23	1,3
10	2100	18,1	35,7	0,8	10,8	15,3	31,7	0,67	8	12,4	27,6	0,54	5,5	6,4	19,1	0,28	1,7
	1650	15,8	35,5	0,7	8,4	13,3	34,1	0,59	6,2	10,8	29,5	0,47	4,3	5,6	20,1	0,24	1,4
	1100	12,4	43,5	0,55	5,3	10,4	38,3	0,46	3,9	8,5	33	0,37	2,8	4,4	21,9	0,19	0,9
15	2100	16,8	38,8	0,74	9,4	13,9	34,8	0,61	6,7	11	30,7	0,48	4,4	4,9	22	0,22	1,1
	1650	14,6	41,4	0,65	7,3	12,1	37	0,54	5,2	9,6	32,4	0,42	3,5	4,3	22,8	0,19	0,9
	1100	11,5	46,1	0,51	4,6	9,5	40,9	0,42	3,3	7,6	35,5	0,33	2,2	3,3	24,1	0,15	0,5
20	2100	15,5	41,9	0,69	8	12,6	37,9	0,56	5,6	9,7	33,7	0,42	3,5	3,3	24,7	0,14	0,5
	1650	13,5	44,3	0,6	6,2	11	39,8	0,48	4,3	8,4	35,2	0,37	2,7	2,8	25,1	0,12	0,4
	1100	10,6	48,6	0,47	4	8,6	43,4	0,38	2,8	6,6	38	0,29	1,8	1,9	25,2	0,08	0,2

VOLCANO VR2 EC

Tz / Tp parameters [°C]																	
		90/70				80/60				70/50				50/30			
Tp1 [°C]	Qp [m³/h]	Pg [kW]	Tp2 [°C]	Qw [m³/h]	Δp [kPa]	Pg [kW]	Tp2 [°C]	Qw [m³/h]	Δp [kPa]	Pg [kW]	Tp2 [°C]	Qw [m³/h]	Δp [kPa]	Pg [kW]	Tp2 [°C]	Qw [m³/h]	Δp [kPa]
0	4850	50,0	30,7	2,21	23,8	43,1	26,5	1,9	18,3	36,2	22,3	1,59	13,5	22,3	13,7	0,97	5,7
	3600	41,9	34,7	1,86	17,2	36,5	30	1,6	13,3	30,5	25,3	1,34	9,8	18,8	15,6	0,82	4,2
	2400	32,7	40,6	1,45	10,8	28,3	35,2	1,25	8,4	23,9	29,7	1,05	6,2	14,8	18,4	0,64	2,7
5	4850	46,7	33,7	2,07	21,1	39,9	29,5	1,76	15,9	33,1	25,3	1,45	11,4	19	16,7	0,83	4,3
	3600	39,3	37,5	1,74	15,2	33,6	32,8	1,48	11,5	27,9	28,1	1,22	8,3	16,1	18,3	0,7	3,1
	2400	30,6	43,1	1,36	9,6	26,2	37,6	1,16	7,3	21,8	32,1	0,96	5,3	12,6	20,7	0,55	2
10	4850	43,6	36,8	1,93	18,5	36,7	32,6	1,62	13,6	29,8	28,4	1,31	9,4	15,6	19,6	0,68	3
	3600	36,6	40,4	1,62	13,4	30,9	35,6	1,36	9,9	25,2	30,9	1,11	6,8	13,2	21	0,58	2,2
	2400	28,6	45,5	1,27	8,4	24,2	40	1,07	6,3	19,7	34,5	0,87	4,4	10,4	22,9	0,45	1,4
15	4850	40,4	39,8	1,79	16	33,5	35,6	1,48	11,5	26,6	31,3	1,17	7,6	12,2	22,5	0,53	1,9
	3600	34	43,1	1,51	11,6	28,2	38,4	1,25	8,3	22,4	33,6	0,99	5,5	10,3	23,5	0,45	1,4
	2400	26,5	48	1,18	7,3	22,1	42,5	0,98	5,3	17,6	36,9	0,77	3,5	8	25	0,35	0,9
20	4850	37,2	42,8	1,65	13,7	30,3	38,6	1,34	9,5	23,3	34,3	1,02	5,9	8,4	25,2	0,37	1
	3600	31,3	45,9	1,39	10	25,5	41,1	1,13	6,9	19,7	36,3	0,86	4,3	7	25,8	0,31	0,7
	2400	24,5	50,4	1,09	6,3	20	44,8	0,88	4,4	15,5	39,2	0,68	2,8	5,3	26,6	0,23	0,4

Legend:

T_z - device feed water temperature
T_p - device return water temperature
T_{p1} - device feed air temperature
T_{p2} - device outlet air temperature

P_g - device heating power
Q_p - air output
Q_w - water flow
Δp - heat exchanger pressure loss

VOLCANO VR1 EC

Tz / Tp parameters [°C]																	
		90/70				80/60				70/50				50/30			
Tp1 [°C]	Qp [m³/h]	Pg [kW]	Tp2 [°C]	Qw [m³/h]	Δp [kPa]	Pg [kW]	Tp2 [°C]	Qw [m³/h]	Δp [kPa]	Pg [kW]	Tp2 [°C]	Qw [m³/h]	Δp [kPa]	Pg [kW]	Tp2 [°C]	Qw [m³/h]	Δp [kPa]
0	5300	29,9	16,8	1,33	26	25,8	14,5	1,14	20	21,7	12,2	0,95	14,6	13,2	7,5	0,58	6,2
	3900	25,4	19,4	1,12	19,1	21,9	16,7	0,97	14,7	18,4	14,1	0,81	10,8	11,3	8,6	0,49	4,6
	2800	21,2	22,6	0,94	13,6	18,3	19,5	0,81	10,5	15,4	16,4	0,68	7,8	9,4	10,1	0,41	3,3
5	5300	28	20,8	1,24	23	23,9	18,4	1,05	17,3	19,7	16,1	0,87	12,3	11,3	11,3	0,49	4,6
	3900	23,8	23,2	1,05	16,9	20,3	20,5	0,9	12,8	16,8	17,8	0,74	9,1	9,6	12,3	0,42	3,4
	2800	19,9	26,2	0,88	12,1	16,9	23,1	0,75	9,1	14	19,9	0,62	6,6	8	13,6	0,35	2,5
10	5300	26,1	24,7	1,16	20,2	22	22,4	0,97	14,8	17,8	20	0,78	10,2	9,2	15,2	0,4	3,2
	3900	22,2	27	0,98	14,9	18,7	24,3	0,82	10,9	15,1	21,6	0,66	7,6	7,9	16	0,34	2,4
	2800	18,5	29,7	0,82	10,6	15,6	26,6	0,69	7,8	12,7	23,5	0,56	5,4	6,6	17	0,29	1,8
15	5300	24,2	28,6	1,07	17,5	20	26,3	0,88	12,5	15,8	23,9	0,7	8,2	7,2	19	0,31	2
	3900	20,5	30,7	0,91	12,9	17	28	0,75	9,2	13,5	25,3	0,59	6,1	6,1	19,7	0,27	1,5
	2800	17,2	33,3	0,76	9,2	14,2	30,2	0,63	6,6	11,3	27	0,5	4,4	5,1	20,4	0,22	1,1
20	5300	22,2	32,5	0,99	15	18,1	30,2	0,8	10,3	13,8	27,8	0,61	6,4	5	22,8	0,22	1,1
	3900	18,9	34,5	0,84	11,1	15,4	31,8	0,68	7,6	11,8	29	0,52	4,8	4,2	23,2	0,18	0,8
	2800	15,8	36,8	0,7	7,9	12,9	33,7	0,57	5,5	9,9	30,5	0,43	3,5	3,5	23,7	0,15	0,6

VOLCANO VR3 EC

Tz / Tp parameters [°C]																	
		90/70				80/60				70/50				50/30			
Tp1 [°C]	Qp [m³/h]	Pg [kW]	Tp2 [°C]	Qw [m³/h]	Δp [kPa]	Pg [kW]	Tp2 [°C]	Qw [m³/h]	Δp [kPa]	Pg [kW]	Tp2 [°C]	Qw [m³/h]	Δp [kPa]	Pg [kW]	Tp2 [°C]	Qw [m³/h]	Δp [kPa]
0	5700	75,0	39	3,31	32,6	64,5	33,8	2,85	25,1	54,3	28,4	2,39	18,4	33,6	17,6	1,46	7,8
	4100	60,6	44,1	2,69	22	52,5	38,2	2,32	17	44,3	32,2	1,95	12,5	27,5	20	1,2	5,4
	3000	49,5	49,2	2,19	15	42,9	42,7	1,89	11,6	36,3	36,1	1,59	8,6	22,6	22,5	0,98	3,7
5	5700	69,9	41,6	3,1	28,9	59,8	36,3	2,64	21,7	49,6	31	2,18	15,5	28,7	20	1,25	5,8
	4100	56,8	46,3	2,52	19,5	48,7	40,4	2,15	14,8	40,5	34,4	1,78	10,6	23,5	22,1	1,02	4
	3000	46,4	51,1	2,06	13,3	39,8	44,6	1,76	10,1	33,1	37,9	1,46	7,3	19,3	24,2	0,84	2,8
10	5700	65,2	44,1	2,89	25,3	55	38,8	2,43	18,6	44,8	33,4	1,97	12,8	23,7	22,4	1,03	4,1
	4100	53	48,6	2,35	17,1	44,9	42,6	1,98	12,7	36,6	36,6	1,61	8,8	19,4	24,1	0,84	2,8
	3000	43,3	53,1	1,92	11,7	36,7	46,5	1,62	8,7	30	39,8	1,32	6,1	15,9	25,8	0,69	2
15	5700	60,4	46,6	2,68	21,9	50,2	41,3	2,22	15,7	40	35,9	1,76	10,3	18,4	24,6	0,8	2,6
	4100	49,2	50,8	2,18	14,9	41	44,8	1,81	10,7	32,7	38,8	1,44	7,1	15,1	26	0,66	1,8
	3000	40,2	55	1,78	10,2	33,6	48,4	1,48	7,4	26,8	41,6	1,18	4,9	12,4	27,3	0,54	1,2
20	5700	55,6	49,1	2,47	18,8	45,4	43,8	2	13	35	38,3	15,4	8,1	12,8	26,7	0,56	1,3
	4100	45,3	53	2,01	12,8	37,1	47	1,64	8,9	28,7	40,9	1,26	5,6	10,4	27,5	0,45	0,9
	3000	37,1	56,9	1,64	8,8	30,4	50,2	1,34	6,1	23,6	43,4	1,04	3,9	8,3	28,2	0,36	0,6

Legend:

T_z - device feed water temperature
T_p - device return water temperature
T_{p1} - device feed air temperature
T_{p2} - device outlet air temperature

P_g - device heating power
Q_p - air output
Q_w - water flow
Δp - heat exchanger pressure loss

FAQ
DEVICES

1. HOW DO I CORRECTLY SELECT A VOLCANO HEATER?

Step one: determine the temperature inside the target room and its heat demand for heating purposes. Air heating is one of the most dynamic methods of heating rooms, allowing for the application of temporary (e.g. overnight) temperature lowering in the heating room and its fast heating right before use. This allows for significant reductions in heat consumption, but does not require any heating power surpluses to be added to the devices for quick heating.

Step two: determine the location of heaters and the necessary air stream range to guarantee the achievement of suitable temperatures in the areas of the room you are interested in. Notice that the air speed should not exceed the permissible values in human occupancy zones or on any other sensitive areas, e.g. in the vicinity of industrial processes.

Step three: obtain information on the temperature of the heating medium and access to the building.

Step four: Having all of the aforementioned data, take the VOLCANO catalogue and look for devices which fulfill the criteria of the required air stream and required heating power, considering the possibility of work at varying outputs (first, second or third speed). Use the charts presenting air speeds in the distance function to determine the range for each device size. Alternatively, use the chart on page 19, presenting the range for limit speed of 0.5 m/s. Determine the heating power for each device speed and for various heating medium temperatures using the tables on pages 22-23.

Easy selection "shortcut": To make your work easier, use a selection program available at: ehcad.vtsgroup.com.

2. KEY ADVANTAGES OF EC MOTORS.

EC motor is an electronically commutated brushless direct current motor. Compared to standard motors, the efficiency of the EC motor is higher throughout their entire control range, which gives significant reduction in energy costs. Units equipped with these motors are charcterized by excellent durability with minimal costs associated with their operation. Low noise level even with considerable rates of rotation, which has a favourable influence on acustics of devices in which these motors are installed. Possibility of connection with the BMS system allow to control all units from one place.

3. HOW DOES EC MOTORS REGULATION WORKS?

The speed of a fan equipped with an EC motor is regulated using the 0-10 V signal. Optionally, use a simple wall-mounted potentiometer allowing for step-less efficiency change or an advanced microprocessor controller, which can carry out a series of other functions (regulation of temperature in the room, weekly program ON/OFF and working parameter settings, anti-freeze functions, etc.), apart from the 3 saved efficiency thresholds.

4. HOW SHOULD I GRADE THE DIAMETERS OF THE MAIN FEED PIPELINES WHEN CONNECTING A LARGE NUMBER OF HEATERS?

The diameter of the main pipeline should be adapted in such a manner that the water flow speed does not exceed 2.5 m/s. This is caused by a compromise between investment costs related to the size of the pipes used and usage costs related to the resistance of water flow in pipelines. We recommend the following minimum pipeline diameters, depending on the number of devices and type of heaters connected to the main, according to the table on page 20.

In the case of extensive installations, i.e. when heaters are situated at least 10 m from the heat source, the diameters of pipelines should be corrected by considering lower water flow speeds.

5. HOW DO I CONNECT THE VALVE WITH ACTUATOR TO HAVE THE FAN SWITCH OFF WHEN THE VALVE IS CLOSED?

Connection of the valve with actuator to the Volcano EC controller is possible through dedicated input. This input on controller is marked as H1. On H1 input, 230 V AC voltage appears when the controller changes modes for worked mode. It transfers the 0-10V DC voltage to the fan and 230V AC voltage to actuator of the valve, which opens it.

6. CAN I CONNECT A FEED PIPELINE TO THE UPPER HEAT EXCHANGER MANIFOLD?

Yes, you can, although a heat exchanger powered by an upper manifold will be more difficult to vent. Remember to leave sufficient space for mounting a valve actuator, which should be installed on the return stub pipe.

7. CAN I FEED VOLCANO VR MINI / VR1 / VR2/ VR3 HEATERS WITH A NON-FREEZE MEDIUM?

Yes, you can. The most frequently used non-freeze medium is a water solution of ethylene glycol. The heaters mounted in VOLCANO can support up to 50% mixtures. Make sure to check, however, if other elements of the technological heat installation (valves, pump, etc.) are adapted to work on glycol mix. To do this, check the recommendations of the manufacturers of particular components used.

Remember that the use of glycol mixes, which are usually characterized by higher viscosity and lower thermal capacity, compared to water, increases the resistance of heating medium flow and reduces the heating power of the device.

8. CAN THE VOLCANO VR MINI/VR1 / VR2/ VR3 HEATER BE USED TO COOL DOWN AIR AS WELL?

Yes, but only when the temperature of the working medium is higher than the dew point of the cooled air, since VOLCANO devices are not equipped with drip trays and we shouldn't lead to the condensation of humidity. To switch a VOLCANO device to the cooling function, connect an ice water installation. When there is the risk that the temperature of the working medium could fall below the dew point of the cooled air, make sure to build a drip tray and install it under the device. In this case, the VOLCANO device will be able to work with the horizontal air outlet only. The use of a VOLCANO device with vertical air outlet can result in flooding the fan motor or the space under the device, since mounting a drip tray in this position of the device is impossible.

VOLCANO is not equipped with a liquid trap, which is why you should always reduce its work efficiency in the cooling mode, in order to eliminate the phenomenon of drip-trapping by the air flowing through the heat exchanger.

9. CAN VOLCANO VR MINI / VR1 / VR2 / VR3 HEATERS SUPPORT HEAT PUMPS?

Yes, VOLCANO water heaters can cooperate with heat pumps. However, when selecting the size of the device, take the low temperature of the heating medium into account. We recommend the use of heaters with large heat exchange surfaces. For this type of installation, we recommend the VR3 heater equipped with a three-row heat exchanger. Make sure to check VR Mini and VR2 with two-row heat exchangers as well.