All Ventilation & Extraction Ltd
Unit 7 – Avocet Trading Estate
Victoria Gardens
Burgess Hill, West Sussex
RH15 9NH
Tel: 01444 230010
sales@ave-ltd.com | www.ave-ltd.com

15/12/2019

PROPOSED VENTILATION SYSTEM AT
38 Camden High Street, Camden Town, London, NW1 OJH

CONTENTS:

1.0 INTRODUCTION:

The information contained within this document should be used as supporting information when applying for Change of Use Planning Approval and is based on the '*DEFRA Annex B – Guidance on the control of odour and noise from Commercial* Kitchen *Exhaust system – Jan 05'*. This follows feedback from various Local Authorities who use Annex B as a guide when referring to the extract system as part of the application process.
Annex B advises that the aim of any ventilation/extraction is to ensure that no nuisance, disturbance or loss of amenity is caused by odour, fumes, food droplets or noise, to nearby properties.
Additionally, the visual appearance of the flue may be important and the flue itself may require a separate planning permission. Enquiries should be made to the Local Authority Planning Department regarding this matter.
A suitably qualified and experienced person with specialist knowledge of ventilation schemes should undertake the design and installation of a

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ventilation system.
Designing and installing appropriate ventilation systems may involve considerable expense.
In circumstances where the end user of the premises is unknown, or where the specific type of food to be cooked is unknown, the installation should be designed to achieve the highest level of odour control in order to cater for a worst case scenario.
There are many different types of odour abatement available (carbon filters, electrostatic precipitation, high dilution and high velocity extraction) however not all types are suitable for all cooking methods. In each case, grease filters must be installed.

2.0 PREAMBLE

All work is carried out in accordance with the latest relevant British (or Irish regulations where applicable) and European Standards, statutory Regulation and ByeLaws together with the following publications:

- CIBSE Codes and guides to current practice
- Water Authority Bye Laws
- HVCA – DW143 Practical Guide to Ductwork Leakage Testing
- HVCA DW144 Specification for Sheet Metal Ductwork
- HVCA DW172 Guide to Good Practice for Kitchen Ventilation Systems
- HVCA – RUAG70 Guide to Good Practice Refrigeration
- TR19 – Duct & Kitchen extract cleaning systems
- The Building Regulations
- Gas Safety (Installation and Use) Regulations 1998

All plant, ducts, pipe cables etc. shall be adequately protected against accidental damage corrosion and external environment and shall be capable of safe decontamination and removal in the future without disturbing other services. Pipes and ducts shall be adequately sized, kept as short as practicable, leak-proof with a minimum number of joints and have provision for routine maintenance. All facilities shall be designed to prevent the ingress or egress of rodents, vermin, and insects.
The duct will be fixed to the shell of the unit using anti-vibration fixing mounts and under no circumstances will flexible ductwork be used other than the fan connections
The HVAC contractor shall supply the client with system design drawings, prior to manufacture and installation
For projects in England and Wales, the HVAC contractor shall also demonstrate compliance with Building Regulations Approved documents L2A & L2B. This will include:
(a) Provision of details of the efficiency and controls of heating , cooling and ventilation systems in accordance with Non-Domestic Heating, Cooling and Ventilation compliance Guide (2006)
(b) Provision of commissioning certificates including air leakage tests on the ductwork
Fire/smoke dampers shall be installed in all fire compartment walls to Building Control requirements

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The HVAC contractor shall ensure that externally, the ductwork conforms to the supplied drawings in terms of its route, height and termination. These drawings will have formed part of the planning permission and must not be deviated from without prior consultation with the Project Manager / Architect.
Upon completion of the installation, all shall be fully tested and proved including airflows. The Contractor shall produce an Operating and Maintenance Manual which shall contain details of all equipment supplied; a record drawing of the complete mechanical services installation and copies of all Test Certificates. It shall contain a Maintenance Schedule based on the manufacturer's recommendations.

3.0 INFORMATION ON TYPE OF OPERATION

The proposed operation will produce approximately 100 meals on average per day.
The proposed hours of operation of the business and ventilation plant will be in accordance with the hours stated in the approved Change of Use

4.0 PLANS AND DRAWINGS

Please refer to drawing 11600-AEW-PJ003931-ZZ-DR-0013-[A]_Proposed RCP and HVAC and 11600-AEW-PJ003931-XX-DR-0015-[A]_Proposed Shopfront Elevations and 11600-AEW-PJ003931-RF-DR-0016-[A]_Existing and Proposed Roof Plan of the proposed premises which shows the indicative internal arrangement and location of the ventilation system.
A schematic drawing produced by the HVAC Designer will be provided at a later date.

5.0 DETAILED DESIGN OF VENTILATION SYSTEM

5.1 Pre-filters (fresh air system)

A copy of the manufacturer's product data sheet should be supplied clearly showing:
• Manufacturer's name: Ace Filtration
• Filter name and product code: Type 90 and VL2 Panel Filter
• Dimensions of the pre-filter: 45mm thick (rated airflow2.0m/s) see data sheets
• Nature of the filter media: Disposable glass fibre media
• Manufacturer's recommendations on the frequency and type of maintenance of the pre-filter having regard to the conditions that it will be used under: 3 monthly maintenance

5.2 Electrostatic precipitators

(NOT REQUIRED ON THIS SITE – REFER TO 5.9 CARBON FILTERS)

5.3 Odour counteracting or neutralising system

(NOT REQUIRED ON THIS SITE – REFER TO 5.9 CARBON FILTERS)

5.4 Cooker hood

The following information on the characteristics of the cooker hood should be

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supplied that clearly shows:
• The hood will made of: Stainless Steel construction with all visible joints to be welded, ground and polished and to incorporate a gutter around all edges with a plugged drain connection at lowest point.
• Length that the cooker hood overhangs the appliances: 300mm all round
• Face velocity at the cooker hood (metres per second): 0.25cu/m/s
• Dimensions of the opening of the cooker hood= 2m x 3m
The hood will include 6 no. baffle type grease filters, aluminium frame.
• Manufacturer's name: Ace Filtration
• Filter name and product code: Model AF111 450x450mm Baffle type filters
The extract system is predominantly removing heat and gas combustion fumes. Mesh filers are much more efficient at removing any fine particles which may be caught in the air flow.
There is not barrier to flame within the filter, and it is accepted that mesh filters cannot therefore be used on their own in applications where there is appreciable risk of fire. However this does not apply in this operation.

5.5 System Operation
In addition to the specification of the components the following must be provided about the system:
• Proposed extract rate (expressed as m^3/second): 1.5 m^3/s
• Dwell time of the gases in the carbon filtration zone: 0.25s
• Volume of the kitchen: based on average prep area size of 100 - 150cu/m
• Efflux velocity: 11m/s
Note: The system performance is dependant upon the extract rate of the air. Where the rate can be adjusted by the use of dampers or a variable speed fan, then the conditions under which the extract rate can be achieved must be described.

5.6 Flue Design
The height and velocity of the final discharge are the two important factors. Generally, the greater the flue height, the better the dispersion and dilution of odours. The discharge of air should be at a minimum height of 1m above the roof ridge, especially if there are buildings nearby that may affect odour dispersion and dilution.
Where this is not possible (e.g. because of ownership or structural constraints), additional techniques will be required in order to reduce odours, such as an increase in efflux velocity and additional filters, etc. The final discharge should be vertically upwards, unimpeded by flue terminals. The number of bends in the ducting should be minimised and the ducting should have a smooth internal surface.
Details of proposal: Proposed new 500mm dia. galvanised oven extract duct to run internally above suspended ceiling onto carbon filter unit complete with 10 of site safe carbons and 3 of g4 panel filters
Extract system to be fitted with atmospheric side silencers with extract fan fixed

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to anti-vibration mounts to M&E specialist sub-contractor's design and detail. Extract system to be fitted with fine filtration and carbon filters.

5.7 Noise

Data on the noise produced by the system as a whole should be provided including:

• Sound power levels or sound pressure levels at given distances (the assumptions to this calculation must be clearly stated);
• An octave band analysis of the noise produced by the system should also be provided, where possible; and
• Hours of operation of the ventilation system (where this differs from the hours of opening).

This information is site dependent and can only be achieved once the system is designed and installed. Please refer to Appendix 1 for data sheets regarding the fans for more information.

5.8 Maintenance

A schedule of maintenance must be provided including details for:

• Cleaning of washable grease filters: Weekly
• Frequency of inspection and replacement of all filters (grease filters, prefilters carbon filters where proposed): Monthly
• Frequency of replacement of carbon filters where proposed): 6 Monthly
• Inspection and servicing of fans: Bi-annually

Please note that the HVAC contractor will provide 12 months spare filters at each new store.

5.9 Carbon Filters

Please refer to AVE Ltd risk assessment and specification document reference 11600_PJQ1430_PJ003931_XX_ME_Camden High Street_Annex B (Appendix 2) dated 15/12/2019. Please contact AVE Ltd directly for any additional information with regards to oven extract filtration details / specification. Contact details as follows:

Contact: Josh
Telephone: 01444 230010
Mobile: 07788 153364
Email: josh@ave-ltd.com

6.0 Additional notes for guidance

The air inlets must not permit pests to enter the kitchen. Fly screens are an example of how this can be achieved.

Sufficient air must be permitted into the premises to replace air extracted. The method for supplying this make-up air should be detailed. The route of the air into the kitchen must not result in its contamination, for example passage through a toilet. Separate provision must be made for ventilation of a toilet. There must be sufficient access points to permit adequate cleaning of all the ductwork.

Fresh air is introduced via a dedicated air handling unit to supply 80% of the extracted air, fresh air filtered to EU4 – tempered via a low pressure hot water

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coil - is introduced via ceiling mounted diffusers to the preparation / office and wash-up areas.

APPENDIX 1

COLDROOM AND AIR CONDITIONING COMPRESSORS

	AIR CONDITIONING	**COLD ROOM**
Model	Mitsubishi FDC125VNX	Coolmark SILAJ4517Z
Dimensions (WDH)(mm)	970 x 370 x 1300	1145 x 575 x 690
Weight (Net)	105kg	70kg
Airflow	100(m^3/min)	2700(m^3/hr)
Current (Inrush / Max)	5A / 29A	Refer to 'Coolmark Refrigeration Compressor' Pages 14 / 15
Refrigerant	Type/GWP – R410A	" "
Connections (Suction / Liquid)	5/8 inches / 3/8 inches	5/8 inches / 3/8 inches
Capacity (°C) Cooling Heating	-15~43 -20~20	Refer to 'Coolmark Refrigeration Compressor' Pages 14 / 15
Condenser Fan & Motor	Refer to FDC125VNX Technical Specification	" "
Noise (Cooling / Heating) Sound Power Level Sound Pressure Level	70 / 70 48 / 50	" "

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APPENDIX 2

PRODUCT DATA SHEETS

- G4 Panel (Extract pre filter) (3 of)
- Bag filter (Extract fine filter filter) (3 of)
- Site Safe Carbons (Extract Odour control) (9 of)
- System Air – Water heated air handling unit (Fresh Air Intake)
- System Air – Attenuator for fresh air intake (1 of)
- System Air – Attenuator for extract air intake (1 of)
- Ace Filtration – Model AF111 450x450mm Baffle type filters (Canopy Filters)
- Helios – GBD 500/4 EC Type B type acoustic box fan (Extract Fan)
- AVE Ltd – Square flexible anti vibe connections for both extract and Fresh air intake fans

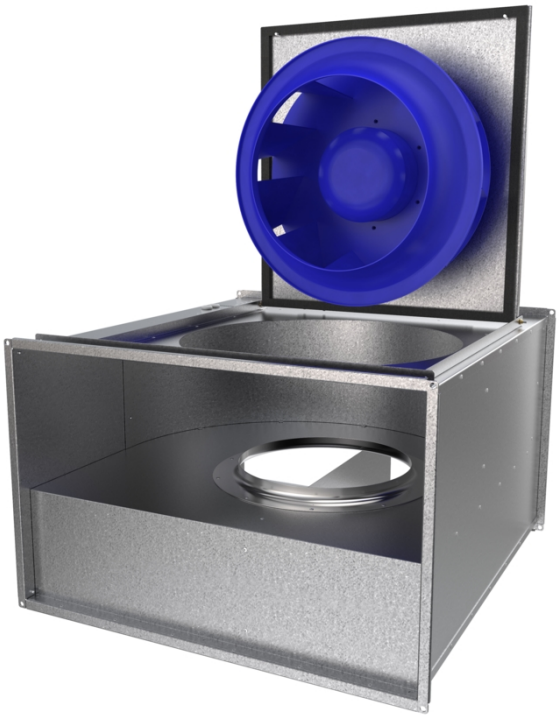
RS 70-40 EC SILEO

Item no. 92930

Document type: **Product card**
Document date: **2019-02-22**
Generated by: **Systemair Online Catalogue**

Description

• EC-motors, high level of efficiency
• 100% speed controllable
• Integrated motor protection
• Can be installed in any position
• Potentiometer included for easy commissioning



The RSI models are thermally and acoustically insulated with 50mm mineral wool and perforated sheet steel on the inner surface. This gives a quiet running with many installation possibilities.
The RS/RSI EC series have impellers with backward-curved blades and are fitted to EC external rotor motors.These fans have a high capacity in relation to their compact design. The fans are delivered with a pre-wired potentiometer (0-10V) which allows you to easily find the desired working point.
EC fans are notable for their economical use of energy and excellent ease of control. They can be varied in speed to match the airflow demand, and operate at high efficiency levels. For the same air volume, they consume distinctly less energy than AC fan drives.
Motor protection is integrated in the electronics of the motor. The casing is manufactured from galvanized sheet steel.

Technical parameters

Nominal data		
Voltage	230	V
Frequency	50/60	Hz
Phase	1	~
Input power (P1)	653	W
Current	2,95	A
Max. airflow	1,45	m³/s
R.p.m.	1578	r.p.m.
Weight	33,4	kg

Temperature data		
Max. temperature of transported air	60	°C

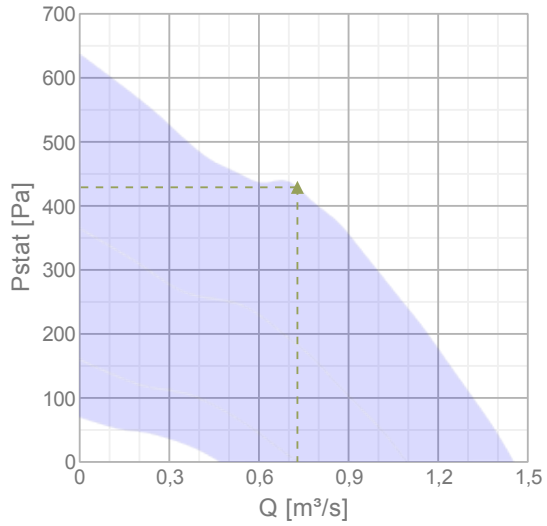
Sound data		
Sound pressure level at 3 m	57,8	dB(A)

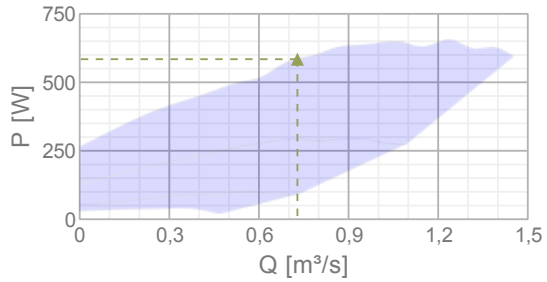
Protection / Classification	
Insulation class	F
Enclosure class, motor	IP54

ErP	
ErP ready	ErP 2018

Diagrams

Diagrams



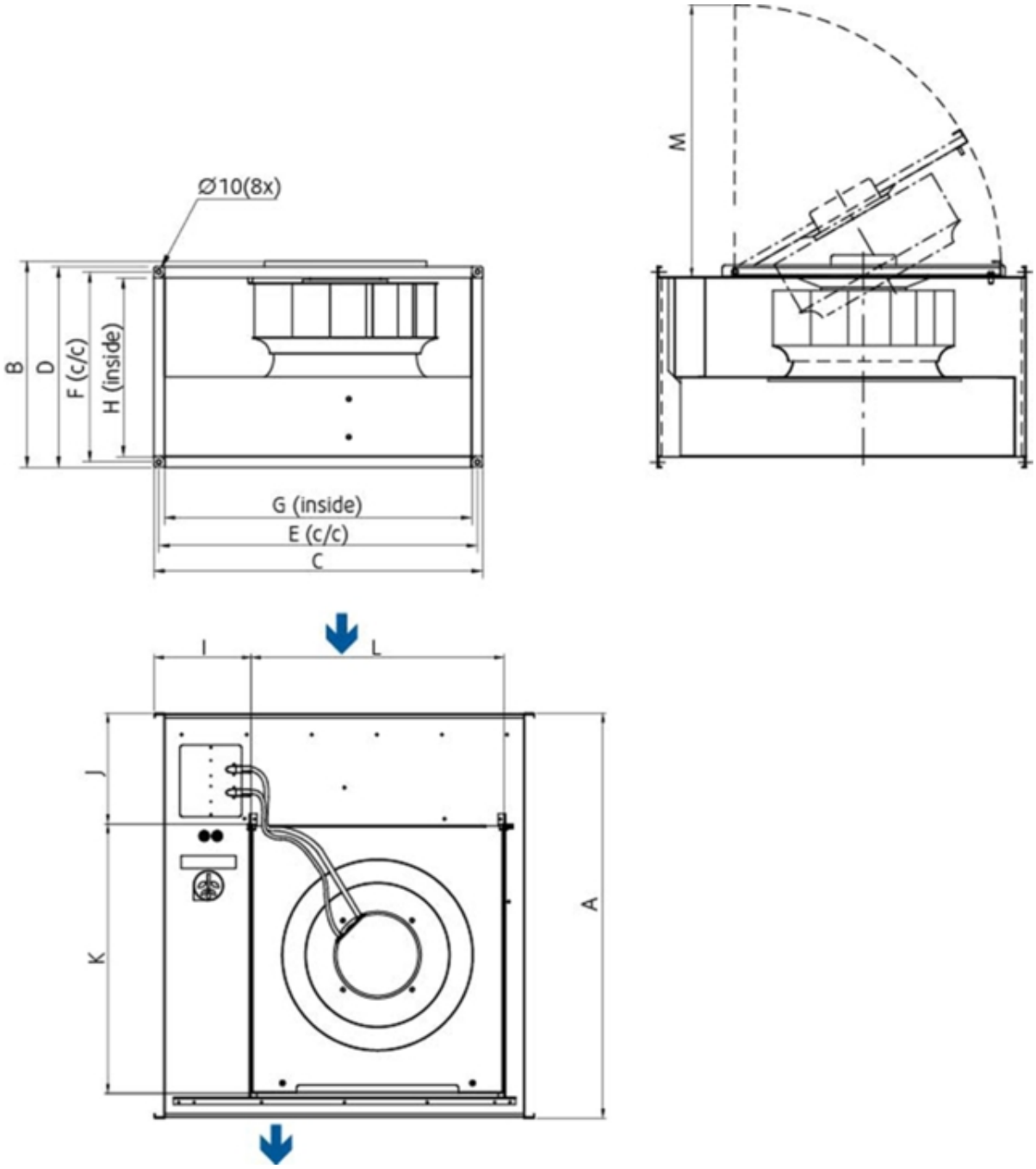


Max efficiency

Hydraulic data		
▲ Working air flow	0,729	m³/s
▲ Working static pressure	429	Pa
▲ Power	584	W
Speed	1579	r.p.m.
Current	2,66	A
SFP	0,802	W/(l/s)
Voltage	230	V

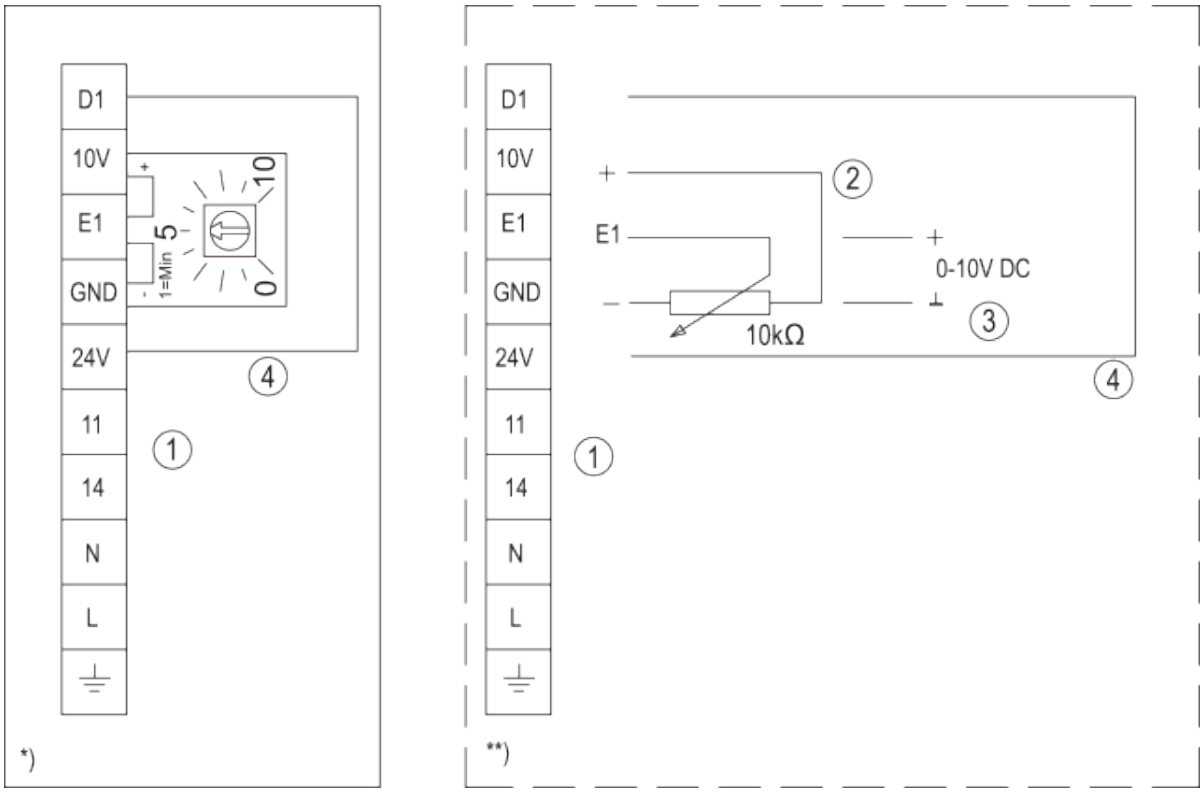
Sound power level		63	125	250	500	1k	2k	4k	8k	Tot
Inlet	dB(A)	58	69	70	70	70	69	64	56	77
Outlet	dB(A)	60	70	74	76	77	75	70	61	82
Surrounding	dB(A)	42	61	59	55	55	54	47	39	65

Dimensions



RS EC/AC	A	B	C	D	E	F	G	H	I	J	K	L	M
70-40	787	465	740	440	720	420	698	398	189	215	524	491	518
80-50	882	580	840	541	820	520	798	498	182,5	191	644	614	638
100-50	982	580	1040	540	1020	520	998	498	287	260	684	634	678

Wiring



*) = Internal potentiometer
**) = External speed control
1 11 & 14 = Alarm
For operation the relay is energized, connections “11” and “14” are bridged.
For fault the relay is de-energized (Diagnostics/faults).
Contact rating max. AC 250V 2A.
2 External potentiometer
3 External input DC 0...10V
4 External ON / OFF control via potential free contact

Accessories

Electric accessories

RT 0-30 Room Thermostat (5151)
CO2RT-R-D Transmitter (6993)
Presence detector/IR24-P (6995)
MTV-1/010 Controller 0..10V+ (30650)
MTP 10, 10K, Speed control (32731)
EC-Vent Room Unit (3018)
EC-Vent control board (3115)
REV-5POL/05 ON/OFF (33979)
MTP 20, on/off, 3-step (310220)
EC-Basic-H humidity (24807)
EC-Basic-T temperature (24805)
EC-Basic-U universal 0-10V (24806)
EC-Basic-CO2 and temperature (24808)
S-5EC/FRQ (76738)

Accessories

RBM 70-40/27 400V/3 Duct heate (5455)
PGK 70-40-3-2,0 Duct cooler (6616)
VBR 70-40-2 Water heating batt (5468)
VBR 70-40-3 Water heating batt (5476)
LDR 70-40 Silencer (5074)
FFK 70-40 Filter cassette rect (1762)
DS 70-40 Flexible connection (1551)
GFL 70-40 Counter flange (2710)
VK-70-40 Louvre shutter (5652)
WSG 70-40 weather prot. guard (30594)
SRK 70-40 Class 3 Damper (7025)
DXRE 70-40-3-2,5 Duct cooler (7957)
RB 70-40/27-2 400V/3 Duct heat (9645)
RB 70-40/45-3 400V/3 Duct heat (9646)
RKT-SYS-700x400-S (43636)
RK-SYS-700x400-R (43648)
RK-SYS-700x400-S (43657)

Documentation

202341_Fans_Instructions_CE_A010.pdf (1,83MB)

EC-fans_Operation_and_maintenance_instr _206268_CE_(A022).pdf (2,88MB)

Specification text

Rectangular duct fan for easy and direct installation in ducts. For extract and supply air installations.
Galvanized sheet steel housing. Service cover. The fan unit is mounted on the service cover for easy cleaning and maintenance. Free-running, backward curved circular impeller made of composite PA6. Impeller acc. to VDI 2060, balancing quality G 6.3, dynamically balanced in two planes. EC-external rotor motor, maintenance-free, the motor is placed inside the air flow for cooling. Integrated, electronic motor protection. Integrated speed controller, the fan is equipped with a potentiometer (0-10V) to set the operating point directly. Integrated, electronic motor protection. Installation in any mounting position. For indoor installation.

LDR 70-40 Silencer

Item Number: 5074

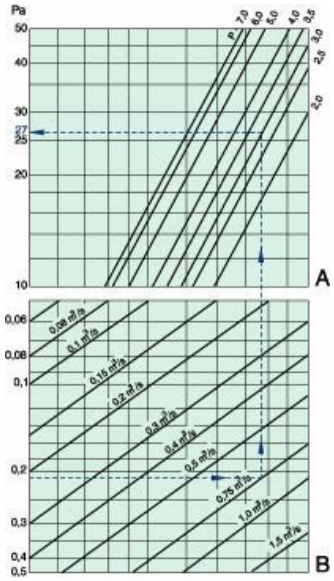
Silencer
Easily-fitted silencer immediately before or after the KE, KT, RS and RSI rectangular duct fans. Effectively suppresses noise transmitted to the duct. The silencer should be used together with an insulated fan where there is a requirement for noise suppression both in the duct and in the surroundings as a whole. All silencers are supplied with a universal flange suitable for PG flange or Metu profile.

Technical parameters

Dimensions and weights		
Rectangular, height, inlet	400 x 700	mm
Rectangular, width, inlet	400 x 700	mm
Rectangular, height, outlet	400 x 700	mm
Rectangular, width, outlet	400 x 700	mm
Weight	25.1	kg

Others	
Duct connection type	Rectangular

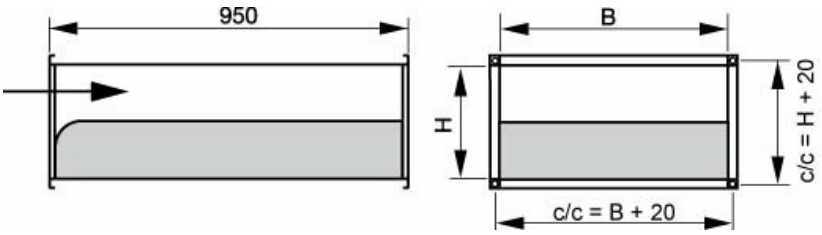
Performances



	Front area m2	P
LDR 30-15	0.045	3.5
LDR 40-20	0.08	3.6
LDR 50-25	0.125	3.7
LDR 50-30	0.15	3.3
LDR 60-30	0.18	3.3
LDR 60-35	0.21	3.0
LDR 70-40	0.28	3.1
LDR 80-50	0.40	3.6
LDR 100-50	0.50	3.6

Pressure drop calculation for rectangular silencers These calculations apply only if the silencer is connected to a duct at both ends. Example: Calculation of pressure drop for the LDR 60-35 (with dan model RSI 60-35 M3~) using the diagram to the right. 1. Start by defining the front area, see the table below. 2. Move horizontally to the right until you reach the designated air flow in diagram B. 3. Go up vertically to diagram A and the correct p value (see the table). 4. Then continue horizontally to the left and read off the pressure drop. In this example, the pressure drop is 27 Pa.

Dimension



	B	H	
LDR 30-15	300	150	10 kg
LDR 40-20	400	200	13 kg
LDR 50-25	500	250	17 kg
LDR 50-30	500	300	19 kg
LDR 60-30	600	300	21 kg
LDR 60-35	600	350	23 kg
LDR 70-40	700	400	27 kg
LDR 80-50	800	500	34 kg
LDR 100-50	1000	500	41 kg

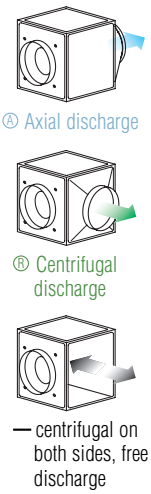
Acoustic

Noise suppression dB (mid-frequency Hz)

	125	250	500	1k	2k	4k	8k
LDR 30-15	7	15	18	25	25	19	19
LDR 40-20	5	9	15	23	16	12	10
LDR 50-25	10	15	25	25	20	15	12
LDR 50-30	8	15	20	31	17	14	11
LDR 60-30	8	15	20	31	17	14	11
LDR 60-35	7	13	17	18	13	10	8
LDR 70-40	7	11	14	14	10	8	6
LDR 80-50	6	8	10	11	8	6	3
LDR 100-50	6	8	10	11	8	6	3

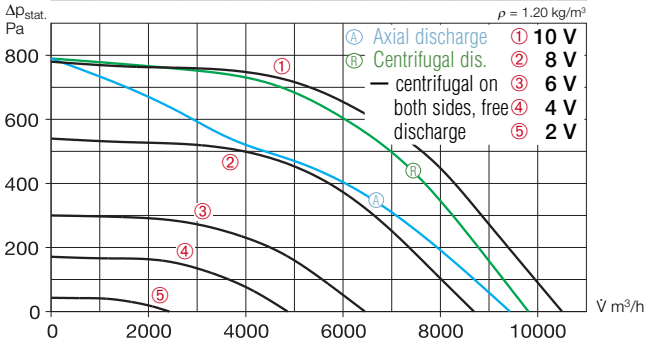
Models GB EC

Arbitrary installation position and assembly by five possible discharge directions.

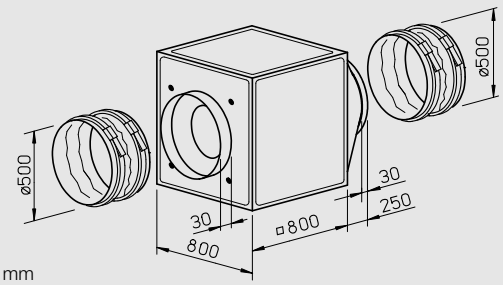


GBD EC 500

Frequency		Hz	Total	125	250	500	1k	2k	4k	8k
L_{WA}	Case breakout	dB(A)	66	56	65	58	57	53	50	43
L_{WA}	Intake	dB(A)	79	58	70	72	74	73	68	61
L_{WA}	Extract	dB(A)	82	62	73	76	77	75	71	64



	unimpeded					
Voltage V	**n** min⁻¹	**V̇** m³/h	**P** W	**I** A	**Lp** dB(A)	**SFP** kW/m³/s
10	1500	10500	1250	2.10	46	0.43
8	1250	8690	745	1.30	43	0.31
6	930	6450	300	0.60	38	0.17
4	710	4860	170	0.40	34	0.13



Dim. in mm

ECgreen Vent **65% saving*** * with speed control

■ Specification

■ Casing

Self-supporting frame construction from aluminium hollow profiles. Double-walled side panels from galvanised sheet steel, lined with 20 mm thick temperature insulating and flame-retardant mineral wool. Intake cone for ideal airflow, spigot and flexible connector for duct connection. With discharge adapter (from square to circular) on the pressure side for low-loss discharge and flexible sleeve to reduce vibration transmission. Simple positioning by standard crane hooks.

☐ Impeller

Smooth running backward curved centrifugal impeller out of aluminium, direct driven. Energy efficient with a low noise development. Dynamically balanced together with the motor to DIN ISO 1940 Pt.1 – class 2.5 .

☐ Motor

Energy saving, speed controllable EC-external rotor motors with highest efficiency, protection to IP 54. With ball bearings, maintenance-free and radio suppressed.

☐ Electrical connection

Standard terminal box (IP 54) is mounted with a permanently attached cable.

☐ Motor protection

Integrated electronic temperature monitoring for EC-motor and electronics.

☐ Speed control

Stepless speed control with potentiometer or stepless speed control with universal control system (see table). Duties at different speeds are exemplarily given in the performance curve.

☐ Assembly

Arbitrary installation position and flexible assembly by five possible discharge directions via the discharge adapter.
For wall mounting the wall bracket (accessories) has to be used. Outdoor installation is possible using outdoor cover hood and external weather louvers (accessories).

■ Sound levels

Total sound power levels and the spectrum figures in dB(A) are given for:
– sound level case breakout
– sound level intake
– sound level exhaust
In the table below as well as underneath the performance curve you can find additionally the case breakout level at 4 m (freefield conditions).

■ Accessories

Anti vibration mounts for installation indoors. Set of 4.
SDD-U Ref. No. 5627

Wall bracket for wall mounting.
GB-WK 500 Ref. No. 5626

External weather louvers to cover exhaust opening.
GB-WSG EC500 Ref. No. 5640

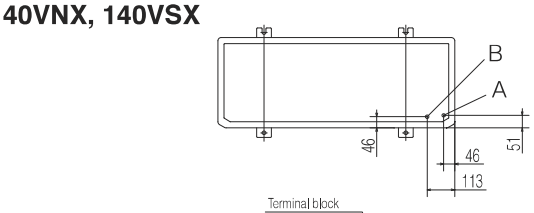
Outdoor cover hood for outdoor installation.
GB-WSD EC500 Ref. No. 5749

Condensate collector with condensate spigot (center) for pipe connection.
GB-KW EC500 Ref. No. 5645

☐ Accessory-Details	Page
Universal control system, speed potentiometer	78 on

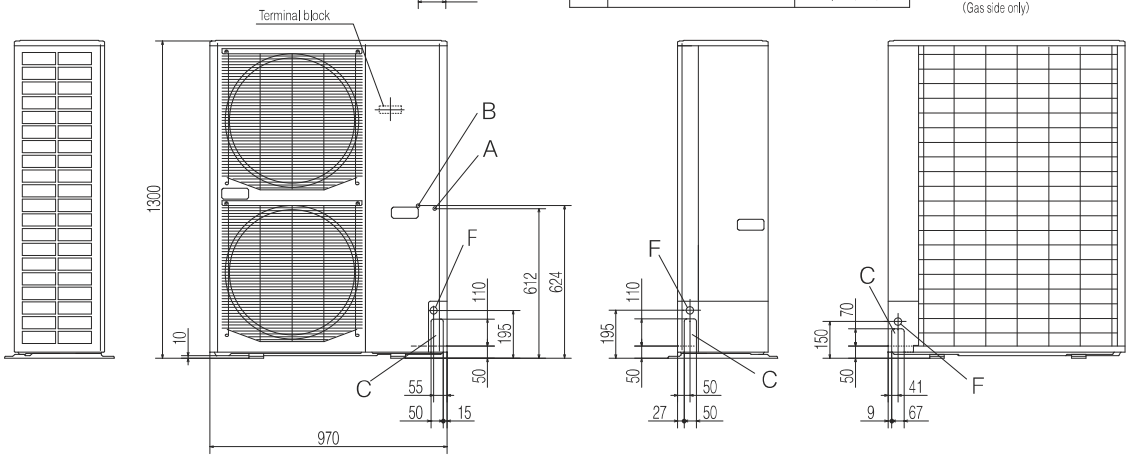
Type	Ref. No.	Connection Ø	Air flow volume (FID)	R.P.M.	Sound press. level case breakout	Motor power	Current	Wiring diagramm	max. air flow temperature	Nominal weight (net)	universal control system		Speed potentiometer flush mounted		surface mounted	
		mm	V̇ m³/h	min⁻¹	dB(A) in 4 m	kW	A	No.	+ °C	kg	**Type**	Ref. No.	**Type**	Ref. No.	**Type**	Ref. No.
3 phase motor, 400 V, 50 Hz, EC-motor, protection to IP 54																
GBD EC 500	5813	500	10500	1500	46	1.95	3.10	976	50	79.0	**EUR EC**	1347	**PU 24**	1736	**PA 24**	1737

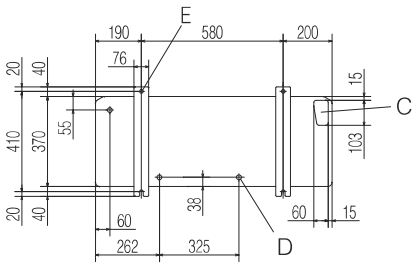
FDC100VNX, 100VSX, 125VNX, 125VSX, 140VNX, 140VSX

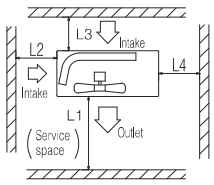


Symbol	Content	
A	Service valve connection of the attached connecting pipe (gas side)	ϕ15.88 (5/8") (Flare)
B	Service valve connection (liquid side)	ϕ9.52 (3/8") (Flare)
C	Pipe / cable draw-out hole	
D	Drain discharge hole	ϕ20 × 3places
E	Anchor bolt hole	M10 × 4places
F	Cable draw-out hole	ϕ30 (front) ϕ45 (side) ϕ50 (back)

Notes
(1) It must not be surrounded by walls on the four sides.
(2) The unit must be fixed with anchor bolts. An anchor bolt must not protrude more than 15mm.
(3) Where the unit is subject to strong winds, lay it in such a direction that the blower outlet faces perpendicularly to the dominant wind direction.
(4) Leave 1m or more space above the unit.
(5) A wall in front of the blower outlet must not exceed the units height.
(6) The model name label is attached on the lower right corner of the front panel.
(7) Connect the Service valve with local pipe by using the pipe of the attachment. (Gas side only)







Minimum installation space

Examples of installation / Dimensions	I	II	III
L1	Open	Open	500
L2	300	5	Open
L3	150	300	150
L4	5	5	5

FDC100VNA, 125VNA, 140VNA 100VSA, 125VSA, 140VSA

Symbol	Content	
A	Service valve connection (gas side)	ϕ15.88 (5/8") (Flare)
B	Service valve connection (liquid side)	ϕ9.52 (3/8") (Flare)
C	Pipe/cable draw-out hole	
D	Drain discharge hole	ϕ20×3places
E	Anchor bolt hole	M10×4places
F	Cable draw-out hole	ϕ30×3places

Notes
(1) It must not be surrounded by walls on the four sides.
(2) The unit must be fixed with anchor bolts. An anchor bolt must not protrude more the 15mm.
(3) Where the unit is subject to strong winds, lay it in such a direction that the blower outlet faces perpendicularly to the dominant wind direction.
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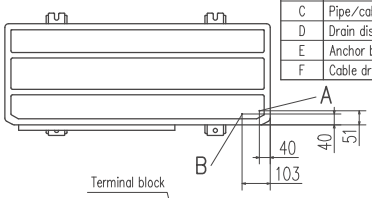

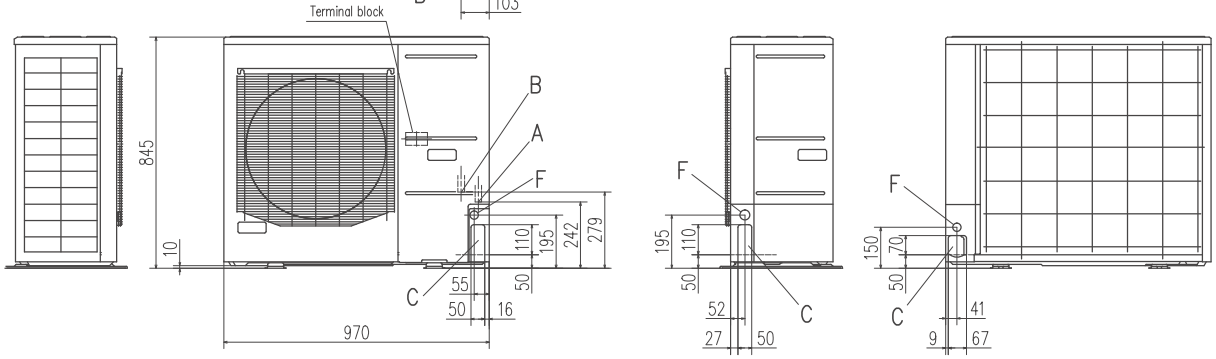

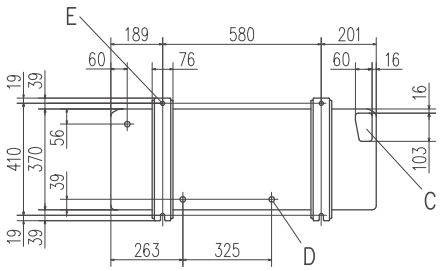

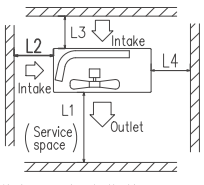

Minimum installation space

Examples of installation / Dimensions	I	II	III
L1	Open	Open	500
L2	300	5	Open
L3	150	300	150
L4	150	150	150

R-404A COMMERCIAL HIGH TEMPERATURE REFRIGERATION

PISTON

		VOL-TAGE CODE	Cooling capacity (Watts) EN13215 Return suction gas 20 °C								EN13215 Super heating 10K		Sound pressure 10 m	Sound pressure 5 m
		FZ TZ KZ	Ambient temperature	-20 °C	-15 °C	-10 °C	-5 °C	0 °C	5 °C	10 °C	15 °C	Cool. cap. (W) -10 °C	Power input (W)	Acoustic* [dB(A)]	
	SILAE9450Z	FZ	25	631	788	974	1188	1431	1703	2003	2333	833	448		
			32	539	678	843	1034	1251	1494	1764	2059	756	469	30	36
			43	395	506	638	792	968	1166	1387	1629	559	502		
	SILAE9460Z	FZ	25	744	923	1130	1365	1631	1929	2262	2633	1022	636		
			32	643	804	987	1194	1427	1688	1979	2304	881	627	30	36
			43	484	615	760	922	1102	1303	1528	1782	660	615		
	SILAJ9480Z	FZ/TZ	25	1037	1280	1556	1866	2208	2580	2980	3404	1409	695		
			32	917	1140	1391	1671	1979	2312	2671	3051	1247	724	29	35
			43	724	918	1132	1366	1620	1894	2189	2502	993	770		
	SILAJ9510Z	FZ/TZ	25	1284	1574	1904	2271	2674	3108	3570	4056	1722	845		
			32	1137	1405	1704	2035	2396	2785	3199	3634	1524	879	29	35
			43	900	1131	1384	1659	1956	2274	2613	2971	1210	932		
	SILAJ9513Z	FZ/TZ	25	1572	1948	2361	2809	3291	3801	4338	4898	2131	1003		
			32	1361	1710	2087	2491	2918	3368	3837	4324	1864	1022	29	35
			43	1022	1329	1649	1982	2326	2680	3045	3419	1441	1053		
	SILAJ4517Z	FZ/ TZ/KZ	25	1725	2142	2608	3118	3668	4254	4870	5510	2348	1180		
			32	1501	1896	2326	2791	3286	3807	4350	4910	2072	1223	36	42
			43	1143	1498	1871	2262	2668	3086	3515	3951	1629	1291		
	SILAJ4519Z	FZ/ TZ/KZ	25	2231	2767	3362	4016	4729	5497	6321	7198	3020	1582		
			32	1993	2489	3030	3615	4243	4912	5622	6369	2693	1634	36	42
			43	1608	2039	2492	2966	3459	3971	4501	5048	2168	1716		
	SILFH4524Z	FZ/ TZ/KZ	25	2445	3097	3820	4610	5464	6380	7351	8376	3433	1766		
			32	2096	2706	3370	4086	4853	5668	6530	7436	2995	1790	37	43
			43	1530	2070	2639	3238	3866	4525	5216	5941	2291	1826		
	SILFH4531Z	FZ/ TZ/KZ	25	3248	4098	4968	5859	6772	7706	8663	9641	4456	2322		
			32	2676	3539	4393	5245	6098	6956	7820	8697	3898	2309	37	43
			43	1714	2606	3447	4248	5017	5763	6496	7231	2992	2287		
	SILFH4540Z	FZ/ TZ/KZ	25	3841	4765	5753	6776	7801	8794	9722	10550	5140	2941		
			32	3396	4262	5173	6105	7031	7921	8747	9483	4567	2974	37	43
			43	2603	3388	4190	4990	5770	6511	7195	7818	3609	3025		

Preliminary data.

** Sound level at maximum speed ventilation*
*** In: nominal current - Im: maximal current*

Sound power	Technical data				FZ Voltage code			TZ Voltage code			KZ Voltage code			Weight	
	Air flow (m³/h)	Liquid receiver volume (L)	For tubing O.D.		220V - 240V 50 Hz 1~			400V 50 Hz / 440V 60 Hz 3~			220V 50 Hz / 220V 60 Hz 3~			Gross (kg)	Net (kg)
			Suction	Liquid line	Power input (W)	In (A)**	Im (A)	Power input (W)	In (A)	Im (A)	Power input (W)	In (A)	Im (A)		
61	1 650	0,75	3/8	1/4	551	3,0	4,4	-	-	-	-	-	-	79	59
61	1 650	0,75	3/8	1/4	743	3,2	6,0	-	-	-	-	-	-	79	59
60	1 650	1,5	1/2	3/8	891	4,1	7,2	902	2,0	3,4	-	-	-	88	68
60	1 650	1,5	5/8	3/8	1 112	5,2	8,5	1 138	2,3	3,5	-	-	-	89	69
60	1 650	1,5	5/8	3/8	1 354	6,5	10,7	1 287	2,7	4,2	-	-	-	91	71
67	2 700	2,35	5/8	3/8	1 663	7,5	13,8	1 651	3,6	5,1	1 536	5,9	7,9	92	70
67	2700	2,35	5/8	3/8	2 174	10	16,3	2 167	4,7	5,9	2 207	7,9	12,3	93	71
68	2700	2,35	5/8	1/2	2 463	11	20,7	2 458	4,9	8,8	2 459	8	11,1	106	83
68	2700	3,9	7/8	1/2	3 215	14,2	23,5	3 068	5,8	10,1	3 136	9,8	14,5	109	87
68	2700	3,9	7/8	1/2	4 188	19,3	28,1	4 107	8,4	10,3	4 269	14,8	21,7	109	87

More models next page →

Old letter code	New letter code	Designation
F	**FZ**	220-240V~50Hz
/	**XC**	220-240V~50Hz
K	**KZ**	220V 3~50Hz 220V 3~60Hz
T	**TZ**	400V 3~50Hz 440V 3~60Hz
/	**XG**	380-420V 3~50Hz 460V 3~60Hz

Cooling capacity according EN 13215 conditions: suction gas 20 °C, sub cooling 3K, Ambient T° 32 °C.
Cooling performances are listed for single phase groups.
For three-phase groups in some cases they may be different.
Presentation of acoustic values of maximum fan speed in a straight line and according EN 13215.
In a constant effort to reconcile reported and actual acoustic values, Tecumseh Europe meets the acoustic standard EN ISO 3743-1.
Silensys® is designed to operate in high ambient temperatures (Ambient T° 46 °C).