AIR HANDLING UNITS

Product Catalog

MEKAR®

“ Life is in the Air ”

23MK-HP-W

Packaged heat pump units with an enthalpic rotary heat exchanger

The series 23MK-HP-W is a ventilation system dedicated to external air treatment which is able to supply autonomously purified primary air giving also the proper thermo-hygrometric treatment.
High efficiency is ensured by a double stage energy recovery, the unis in fact are equipped with enthalpy recovery wheel and integrated heat pump circuit.

The series 23MK-HP-W is designed for affording the main sensible thermal loads of the external air supplied to the ambient and can be successfully combined with the standard hydronic fan-coils systems and with refrigerant VRV systems.
It is adequate for plants where installation simplicity and high efficiency are needed without the addition of other integrative sources involving heat transfer fluids.
The operating range allows the unit working during the whole year, external air temperature limits from -10°C to +40°C.

FLEXIBILITY

HIGH CARE FOR INDOOR AIR QUALITY

PLUG & PLAY

SOFTWARE ENERGY ANALYSIS

Construction features

Structure composition

Supporting frame in anodized aluminum with thermal break profile and double gasket sealing.
60 mm thick thermal break sandwich panel with polyurethane insulation having density of 45 kg/m³ or with mineral wool to 90 kg / m³. T2 thermal transmittance class and thermal bridge factor TB2 (EN 1886); L1 (M) leakage.

Double stage heat recovery

High efficiency enthalpy wheel heat recovery with variable speed regulation and integrated purge sector. Thermodynamic recovery with heat pump refrigerant circuit using exhaust air as heat source.

Refrigerant circuit, gas R410A

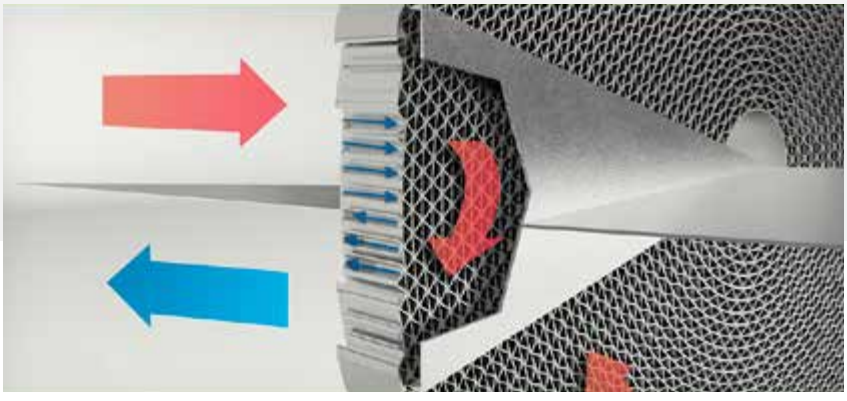
Hermetic rotary or scroll compressors with inverter driven DC-brushless motor ensuring continuous capacity modulation and high performance level in combination with the electronic expansion valve.

Control system

Plug&Play unit equipped with all the necessary sensors and control system: the micro-processor manages all the working parameters of the unit with possibility of additional elements control and supply of useful information to the plant manager.

-Temperature control with fixed supply air temperature set-point with automatic season change and dynamic set-point compensation
-Heat recovery management with capacity modulation (free-cooling and defrost management at low external temperatures)
-The regulation algorithms manage the thermodynamic recovery and the other sources involved in the primary air treatment with a cascade logic which maximizes the energy efficiency of the system as defined by the standard EN15232.

The software contains all the parameters for the operation and maintenance program according to the standard VDI 6022-1 giving to the user the activities request signaling.



Optional

The main design strategy in the development of these units, following Mekar manufacturing philosophy, is to obtain the maximum flexibility and the possibility to equip the machines with all the options available for the 23Mk standard series; as well as the possibility to choose among different material types depending on the final installation needs.
Some of the available configurations are the following:

"Sorption" thermal wheel

The Sorption type thermal wheel allows the reduction of the running costs connected to the summer air dehumidification and winter air humidification needs; moreover it ensures low levels of VOC contamination between exhaust air and supply air.

Air flow rate modulation

Possibility of air flow rate modulation based on Indoor Air Quality measure through CO_2 probe or VOC probe with the aim of reducing energy consumption giving only the necessary air supply; possibility of constant air supply regulation compensating automatically filters fouling and pressure drops increasing.

Sensors kit for air flow management

Air differential pressure transducers kit for supply and return fans, connected to the unit's microprocessor which allow the air flow rate measurement and is regulation in constant or variable mode.

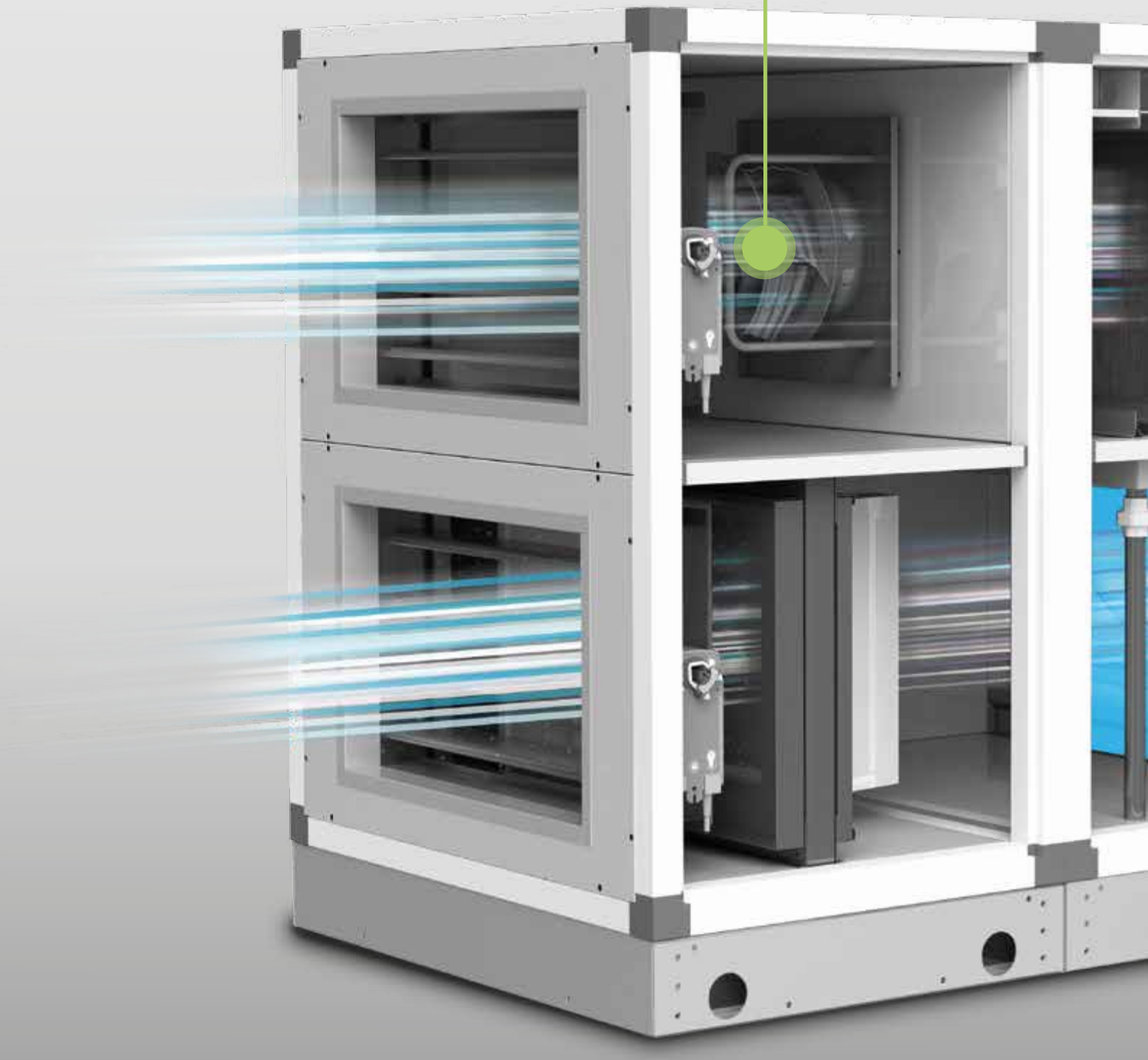
Indoor Air Quality

The increasing focus on IAQ parameters makes these units highly flexible in the possibilities of choice of air filtering and air purifying components:

- Bacteriostatic media filtration
- Third filtration stage HEPA class for supply air
- Electrostatic filtration
- Ionization systems
- Germicidal UV-C lamps, high intensity and long operating life
- Molecular filtration

Case Study

Plug Fans with permanent magnets EC Brushless motor.
Very high efficiency and integrated fans speed control.



High efficiency enthalpy wheel heat recovery with variable speed regulation and integrated purge sector.

Plug&Play unit with dedicated enclosure containing the refrigerant circuit components and electric panel with control system.

Software

Configuration Software

Dedicated simulation software based on a neural network algorithm which allows fast performance calculations with thermodynamic balance of heat pump system components in combination with thermal wheel performance calculation.
Thanks to this instrument Mekar is able to give complete support to Designers for precise simulations at specific design conditions and for seasonal simulations based on climatic profiles.
The energy analysis are very important for significant comparisons in terms of costs and benefits between the proposed solution and other system solutions commonly used.

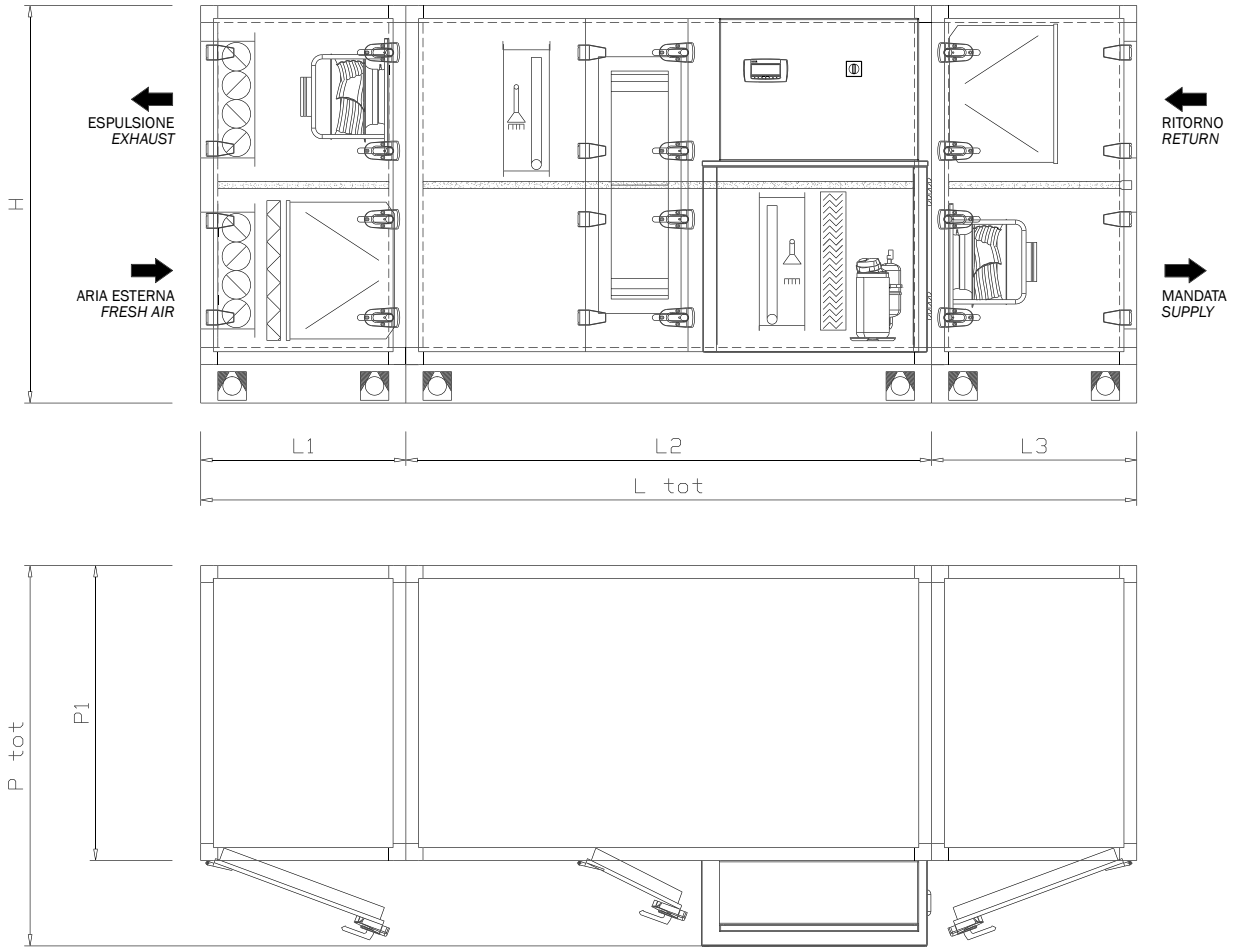
Services to the Installer and the User

The microprocessor with graphic display, also touch screen option, is equipped with built-in web interface and ethernet connectivity for an easy integration with the most common building automation protocols such as BACnet, Modbus and Lonworks for the connection with external monitoring systems.
The unit is composed by multiple sections coupled through quick electric connections to ease the movements and the installation in places where the access is difficult; as an alternative the sections can be supplied mounted on a single base frame to reduce the installation time. The construction concept together with the high Company's flexibility give the possibility of assembling and installing on site especially in technical rooms with limited maneuvering space.

Dimensions

			020	035	055	085	115	145	180	200
Lunghezza / Lenght / Longueur / Länge / Longitud	L1	mm	720	810	810	810	810	900	990	1080
	L2	mm	1845	1845	1845	1845	1845	1845	1845	1845
	L3	mm	720	810	810	810	810	900	990	1080
	L tot	mm	3285	3465	3465	3465	3465	3645	3825	4005
Profondità / Depth / Profondeur / Tiefe / Profundidad	P1	mm	1035	1125	1350	1800	2025	2160	2295	2610
	P tot	mm	1335	1425	1650	2100	2325	2560	2695	3010
Altezza (basamento incluso) / Height (including base frame) / Hauteur (base incluse) / Höhe (Inklusive Basis) / Altura (base incluida)	H	mm	1395	1575	1845	1935	2205	2385	2655	2655
Massa di trasporto / Transport mass / Masse de transport / Transportmasse / Masa de transporte		kg	686	831	1045	1380	1641	1921	2255	2512

Dati riferiti a unità base, dati effettivi dipendono da accessori e configurazione esecutiva. Data referred to basic unit, final data depend on options an and final machine configuration.
Données se référant aux unités de base, les données réelles dépendent des accessoires et de la configuration exécutive. Daten für die Basiseinheiten, die tatsächlichen Daten hängen vom Zubehör und der angewendeten Konfiguration ab.
Los datos referidos a las unidades base, los datos reales dependen de los accesorios y la configuración ejecutiva.



Performance technical data

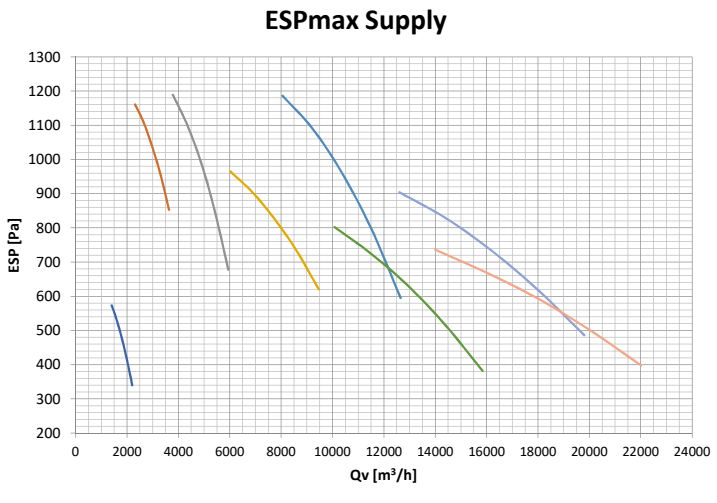
				020	035	055	085	115	145	180	200
External: 35 °C / 40% Internal: 26 °C / 50% — 20 °C	Potenza frigorifera totale Total cooling capacity Puissance frigorifique totale Kälteleistung gesamt Potencia frigorífica total		kW	13.1	20.6	34.8	54.9	74.5	92.7	116.9	128.7
	Potenza frigorifera sensibile Sensible cooling capacity Puissance frigorifique sensible Sensible Kälteleistung Potencia frigorífica total sensible		kW	10.2	16.6	27.7	43.9	59.1	73.7	92.3	101.9
	Potenza frigorifera recuperatore Recovery cooling capacity Récupérateur puissance frigorifique Kühlleistung Rekuperator Recuperación de energía del refrigerador		kW	6.4	10.3	16.6	26.9	36.0	44.1	55.8	61.4
	Potenza assorbita compressori Compressor absorbed power Puissance absorbée compresseurs Aufgenommene Leistung Kompressoren Compresores de potencia absorbida		kW	1.7	2.4	4.1	6.2	9.0	12.5	16.1	18.1
	Potenza ass. tot. alle cond. di progetto Tot. absorbed power at design cond. Puissance absorbée totale aux conditions de projet Gesamte aufgenommene Leistung bei Projektbedingungen Potencia absorbida total en condiciones de diseño	(1)	kW	2.6	4.1	6.9	10.8	15.0	20.2	25.8	28.5
	Efficienza Temperatura Recuperatore ηt Recuperator Temperature Efficiency ηt Efficacité Température Récupérateur ηt Temperatureffizienz Rekuperator ηt Eficiencia de temperatura Recuperador ηt		%	73.3%	72.0%	70.6%	71.9%	72.3%	70.7%	71.2%	71.1%
	Efficienza Umidità Recuperatore ηx Recuperator Humidity Efficiency ηx Efficacité Humidité Récupérateur ηx Feuchtigkeitseffizienz Rekuperator ηx Eficiencia Recuperador de humedad ηx		%	29.6%	28.5%	27.6%	28.5%	28.7%	27.6%	28.0%	27.9%
	E.E.R. (entalpico + termodinamico senza potenza ventilazione) E.E.R. (enthalpic + thermodynamic without ventilation power) E.E.R. (enthalpie+thermodynamique sans puissance de ventilation) E.E.R. (Enthalpie+Thermodynamik ohne Lüftungsleistung) E.E.R. (entálpico+termodinámico sin potencia de ventilación)			7.68	8.33	8.30	8.65	7.91	7.23	7.10	6.96
	E.E.R. (comp. con potenza ventilaz.) E.E.R. (total with ventilation power) E.E.R. (total avec puissance de ventilation) E.E.R. (umfassend mit Lüftungsleistung) E.E.R. (general con potencia de ventilación)	(1)		5.07	5.01	5.04	5.10	4.97	4.59	4.54	4.52
External: 5 °C / 90% Internal: 20 °C / 50% — 22 °C	Potenza termica totale Total heating capacity Puissance thermique totale Wärmeleistung gesamt Potencia térmica total		kW	13.0	21.4	34.9	56.1	75.0	92.1	116.4	129.2
	Potenza termica sensibile Sensible heating capacity Puissance thermique sensible Wärmeleistung empfindlich Potencia térmica sensible		kW	11.6	19.0	31.4	49.9	66.6	82.8	104.1	116.0
	Potenza termica recuperatore Recovery heating capacity Puissance thermique récupérateur Wärmeleistung Rekuperator Potencia de recuperación de calor		kW	8.9	14.8	23.4	38.5	51.8	62.4	79.2	87.4
	Potenza assorbita compressori Compressor absorbed power Puissance absorbée compresseurs Aufgenommene Leistung Kompressoren Compresores de potencia absorbida		kW	0.6	0.8	1.5	2.1	2.8	4.0	3.4	5.5
	Potenza ass. tot. alle cond. di progetto Tot. absorbed power at design cond. Puissance absorbée totale aux conditions de projet Gesamte aufgenommene Leistung bei Projektbedingungen Potencia absorbida total en condiciones de diseño	(1)	kW	1.5	2.5	4.3	6.7	8.7	11.8	13.0	15.9
	Efficienza Temperatura Recuperatore ηt Recuperator Temperature Efficiency ηt Efficacité Température Récupérateur ηt Temperatureffizienz Rekuperator ηt Eficiencia de temperatura Recuperador ηt		%	74.2%	74.3%	73.0%	74.3%	74.7%	73.0%	73.6%	73.4%
	Efficienza Umidità Recuperatore ηx Recuperator Humidity Efficiency ηx Efficacité Humidité Récupérateur ηx Feuchtigkeitseffizienz Rekuperator ηx Eficiencia Recuperador de humedad ηx		%	33.2%	32.4%	29.6%	32.3%	33.1%	29.7%	30.9%	30.5%
	C.O.P. (termodin. senza potenza ventil.) C.O.P. (thermodyn. without ventil. power) C.O.P. (thermodynamique sans puissance de ventilation) C.O.P. (thermodynamisch ohne Lüftungsleistung) C.O.P. (termodinámico sin potencia de ventilación)			21.12	25.92	22.08	24.12	23.87	20.97	31.24	21.96
	C.O.P. (comp. con potenza ventilaz.) C.O.P. (total with ventilation power) C.O.P. (total avec puissance de ventilation) C.O.P. (umfassend mit Lüftungsleistung) C.O.P. (general con potencia de ventilación)	(1)		8.72	8.67	8.13	8.31	8.61	7.82	8.94	8.15

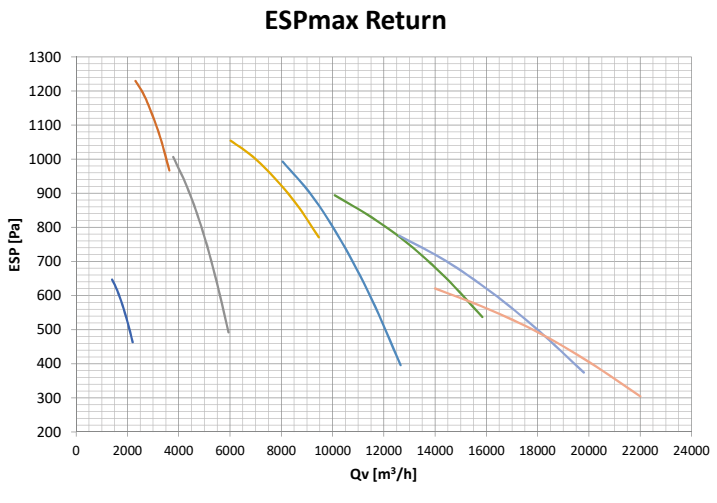
set point temperatura mandata - supply set point temperature - point de consigne température alimentation - Sollwert Temperatur Zufuhr - punto de ajuste de la temperatura de suministro

		020	035	055	085	115	145	180	200
PORTATE D'ARIA MANDATA / RIPRESA - SUPPLY / RETURN AIR VOLUME - DÉBITS D'AIR DÉPART/ REFOULEMENT - LUFTSTROM VORLAUF / RÜCKGEWINNUNG - FLUJOS DE AIRE ENVÍO / REANUDACIÓN									
Flusso aria di progetto Design air flow Débit d'air de projet Luftstrom Projekt Flujo de aire de proyecto	m^3/h	2000	3300	5400	8600	11500	14400	18000	20000
Flusso aria minimo Minimum air flow Débit d'air minimum Luftstrom minimal Flujo de aire mínimo	m^3/h	1400	2310	3780	6020	8050	10080	12600	14000
Flusso aria massimo Maximum air flow Débit d'air maximum Luftstrom maximal Flujo máximo de aire	m^3/h	2200	3630	5940	9460	12650	15840	19800	22000
DATI SONORI - ACOUSTIC DATA - DATI SONORI - DATI SONORI - DATI SONORI (2)									
Livello di potenza sonora Sound power level Niveau de puissance sonore Schall-Leistungpegel Nivel de potencia acústica	dB(A)	69	70	77	78	85	86	86	87
Pressione sonora a 1m campo libero lato pannello Sound pressure at 1m distance in free field condition Pression acoustique calculée à 1 m de champ libre côté panneau Schalldruck berechnet an der Seite der Platte mit 1 m Abstand Presión acústica calculada a 1 m campo libre lado del panel	dB(A)	57	58	64	64	70	71	71	72
DATI ELETTRICI TOTALI - TOTAL ELECTRIC DATA - DONNÉES ÉLECTRIQUES TOTALES - ELEKTRISCHE DATEN GESAMT - DATOS ELÉCTRICOS TOTALES (3)									
Tensione di alimentazione Power supply Tension d'alimentation Stromversorgung Tensión de alimentación		230V/ 1ph+N+PE /50Hz	400V/3ph+N+PE/50Hz						
Massima potenza assorbita Maximum absorbed power Puissance maximale Maximale Leistungsaufnahme Potencia máxima absorbida	kW	5.7	15.7	16.7	24.7	33.6	35.6	41.3	41.1
Massima corrente assorbita Maximum absorbed current Courant maximal admissible maximale Stromaufnahme Corriente máxima absorbida	A	25.2	30.8	32.8	46.8	55.5	58.3	67.7	67.3

(1) Potenze ventilatori calcolate a portata aria nominale, prevalenza utile 200Pa mandata, 150 Pa ripresa, filtri mandata G4+F7 / ripresa M5. - Fans absorbed power calculated at nominal airflow, external static pressure supply 200Pa return 150Pa, filters supply G4+F7 / exhaust M5. - Puissances ventilateurs calculées au débit d'air nominal, prévalence utile 200 Pa alimentation, 150 Pa refoulement, filtres alimentation G4+F7 / reprise M5. - Lüftungsleistungen berechnet bei Nennluftdurchsatz, nützliche Prävalenz 200 Pa Zufuhr, 150 Pa Rückgewinnung, Filter Zufuhr G4+F7 / Rückgewinnung M5. - Potencias del ventilador calculadas al flujo de aire nominal, prevalencia útil del flujo de 200 Pa, recuperación de 150 Pa, filtros de salida G4+F7 / M5 recuperación.
(2) Calcolato a portata aria nominale, compressore 80% di rps max, prevalenza utile 250Pa, filtri mandata G4+F7 / ripresa M5. - Calculated at nominal airflow, compressor 80% of rps max, external static pressure 250Pa, filters supply G4+F7 / exhaust M5. - Calculé au débit d'air nominal, compresseur 80% de la vitesse de rotation max, prévalence utile 250Pa, filtres alimentation G4+F7 / refoulement M5. - Berechnet bei Nennluftdurchsatz, Kompressor 80 % der rps max, Nutzprävalenz 250 Pa, Filter Zufuhr G4+F7 / Rückgewinnung M5. - Calculado en flujo nominal de aire, compresor 80% rps máx, prevalencia útil 250Pa,filtros de salida G4+F7 / recuperación M5.
(3) Dati riferiti a unità base, dati effettivi dipendono da accessori e configurazione esecutiva. - Data referred to basic unit, final data depend on options an and final machine configuration. - Données se référant aux unités de base, les données réelles dépendent des accessoires et de la configuration exécutive. - Daten für die Basiseinheiten, die tatsächlichen Daten hängen vom Zubehör und der angewendeten Konfiguration ab. - Los datos referidos a las unidades base, los datos reales dependen de los accesorios y la configuración ejecutiva.

PREVALENZE UTILI VENTILATORE MANDATA / RIPRESA - EXTERNAL STATIC PRESSURE - PRÉVALENCES UTILES VENTILATEUR DÉPART / REFOULEMENT - ERFORDERLICHE PRÄVALENZ VORLAUF / RÜCKGEWINNUNG - PREVALENCIAS ÚTILES DEL VENTILADOR DE ENVÍO / REANUDACIÓN





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