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Modular **Air Handling Units**

LKS Modular AIR HANDLING UNITS are designed by Lotus Research and Development team in order to meet the hygiene, comfort and industrial AIR HANDLING UNIT needs. The panel and frame structures of LKS Modular AIR HANDLING UNITS, which are designed based on energy efficiency at the basic point of their design, can provide low heat bridge values. In this way, heat bridges and heat leaks occurring from the housing of the AIR HANDLING UNIT can be prevented.

Thanks to its modular structure, it provides easy assembly and disassembly opportunities.



Standards

Modular AIR HANDLING UNITS offer a comfortable indoor atmosphere due to their high energy efficiency and their design that meets the standards.

During the designing process, the requirements and classifications contained in national and international standards and legal regulations were taken into considerations.

- EN 1886 Ventilation For Buildings AIR HANDLING UNITS Mechanical Performance
- **EN 13053** Classification of Air-Conditioning Power Units and Performance of Units, Equipment and Departments
- EN 13779 Ventilation in Non-Residential Buildings Performance Criteria for Ventilation and Local Air Conditioning Systems
- EN 308 Heat Exchangers; Heat Recovery From Air-To-Air And Waste Gases; Experimental Methods For Determining The Performance Of Their Units
- European Union Energy Commission (EU) No. 1253/2014 "ECO-DE- SIGN Requirements In Ventilation Units"
- EUROVENT

EN 1886

The identification and classification of the mechanical properties of AIR HANDLING UNITS should be carried out in parallel with the requirements of EN 1886 standard. The tests required for the classification are carried out in accord with the conditions established by this standard.

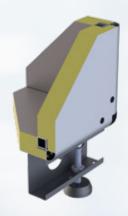
			BODT GEAGGI ISATISIVIII AGGGIIDANGE IIITI EN 1665								
			CRITERIA								
	Body Mechanical		Mechanical Strength Class D1			D	2	D3			
	Strength	D1	Maximum dependent strain mm x m²	Δ	1	1	0	10'un üzerinde			
	Gövde Hava Kaçağı		Air Leakage Class	L	1	L	2	L3			
	Negatif Basınç -400 Pa	L1	Maximum Leakage (1400) 1 x s 1x m²	0,	15	0,4	14	1,32			
	Gövde Hava Kaçağı Pozitif Basınç +700 Pa	L1	Air Leakage Class	L	1	L	2	L3			
			Maximum Leakage (1700) 1 x s 1x m²	0,2	22	0,6	63	1,90			
	Filtre Baypass	F9	Filter Leakage Class	F9	F8	F7	F6	G1-F5			
	Kaçağı		Filter Bypass Leakage Percentage	0,50	1	2	4	6			
	Termal	Т2	Thermal Conductivity Class	T1	T2	Т3	T4	T5			
	İletkenlik	12	Thermal Conductivity(U) Wxm² 7xK¹	U≤0,5	0,5 <u≤1< td=""><td>1<u≤1,4< td=""><td>1,4<u≤2< td=""><td>Standart Dışı</td><td></td></u≤2<></td></u≤1,4<></td></u≤1<>	1 <u≤1,4< td=""><td>1,4<u≤2< td=""><td>Standart Dışı</td><td></td></u≤2<></td></u≤1,4<>	1,4 <u≤2< td=""><td>Standart Dışı</td><td></td></u≤2<>	Standart Dışı			
	Termal	TB2	Thermal Bridging Class	TB1	TB2	TB3	TB4	TB5			
	Köprüleme		Thermal Bridging Factor (kb)	0.75 <kb≤1< td=""><td>0,6<kb≤0,75< td=""><td>0,45<kb≤0,6< td=""><td>0,3<kb≤0,45< td=""><td>Standart Dışı</td><td></td></kb≤0,45<></td></kb≤0,6<></td></kb≤0,75<></td></kb≤1<>	0,6 <kb≤0,75< td=""><td>0,45<kb≤0,6< td=""><td>0,3<kb≤0,45< td=""><td>Standart Dışı</td><td></td></kb≤0,45<></td></kb≤0,6<></td></kb≤0,75<>	0,45 <kb≤0,6< td=""><td>0,3<kb≤0,45< td=""><td>Standart Dışı</td><td></td></kb≤0,45<></td></kb≤0,6<>	0,3 <kb≤0,45< td=""><td>Standart Dışı</td><td></td></kb≤0,45<>	Standart Dışı			

BODY CLASSIFICATION IN ACCORDANCE WITH EN 1886

Housing

LKS Modular AIR HANDLING UNITS are manufactured with an anodized aluminium frame structure with values of D2, L2, T3, TB3 in parallel with EN 1886 standard. LKS Modular AIR HANDLING UNITS are manufactured modularly with reference to standard filter sizes. There is no metal contact between the inner part of the AIR HANDLING UNIT and the outer surface of the housing of the plant. In this way, high thermal bridging values can be achieved. A specially designed sealing system, which prevents the inner and outer sheets of the panel from contacting each other, is used.

No intermediary profiles are used while connecting the panels to the frame; instead, each panel is connected to another. In this way, uniform insulation is maintained on the entire surface of the AIR HANDLING UNIT; thus, thermal leaks can be kept to a minimum level.



Foot

The special structure of the foot used in LKS AIR HANDLING UNITS provides high benefits to the user during transportation and operation. Each cell of the AIR HANDLING UNIT has feet independent of other cells and allows access to the lower parts of the cells. In this way, convenience is ensured during transportation; plus, easy cleaning in the lower parts of the cells is ensured. As standard, all feet are manufactured as electrostatic oven-dyed 2,5 galvanized sheets. All feet have connection ports that allow cells to move both horizontally and vertically as standard.

Panel

LKS AIR HANDLING UNIT panels are manufactured as standard with rock wool insulation with a thickness of 50 mm and a density of 70 kg/m3. Thanks to the special design of the panels, a smooth structure is achieved on the inner and outer surfaces of the power plant. In this way, it is easy to clean and minimal internal pressure losses are experienced. Specially designed gaskets are used in order to prevent the inner and outer sheets of the panel from coming into contact with each other. In this way, high thermal bridging values and minimum thermal leakage can be ensured. As a standard for Panels, the inner sheets are made of 0.8 mm 275 gr/mm2 Galvanized Sheet, the outer sheets are made of 1.0 mm RAL 9002 painted sheet. The panels are connected to the AIR HANDLING UNIT frame with special design screws with increased corrosion resistance. The screws are hidden inside the panel and the outer parts are sealed with sealing stoppers made of plastic-based material. By this way, the formation of a heat bridge is prevented.

In LKS Modular AIR HANDLING UNITS, there are fans with front-bent frequently-placed blades, fans with back-bent sparsely-placed blades, Airfoil Plug Fans or EC Fans.

Under the roof of the criteria determined by the user, fans of all four types can be selected and optimization can be performed according to the efficiency of the fans, sound levels and engine power.

Fan outputs in the devices can be from the bottom, from the top or the front side in accord with the project. Fan outputs of the devices are manufactured together with flanges so that the connection with the air duct can be established. Just like the fact that flanges can be squarely shaped, there are also rectangular versions.







The fan/motor group is mounted on spring-structured insulators to prevent vibrations from being transmitted to the air duct. In the fan cells, there are service covers for engine service, belt control, replacement and fan cleaning.

Optionally, a sight glass, cell lighting, a belt break signal or a constant flow kit (only for plug fans) shall be available. In applications, where plug fans are used and aggressive gases are present, devices with upper or lower shots can be used to remove the engine from the cell; and, by this way, the engine can be protected.

Panel Filter

Panel filters used for the purpose of pre-filter are manufactured as zigzags in cassettes to increase the air passage area in comfort applications. Filters, which can be G2, G3 and G4 class according to their dust holding capacity, can be cleaned with air; optionally, they can be produced in a washable type. They can also be manufactured as metal-containing oil containers to contain oil and similar materials. The dimensions of the filters used are standard, they are easy to service and replace. Carbon- impregnated types are also available to block the smell in the air.



Bag Filter

They are used for good-quality filtration of pre-filtered air; they have a high dust retention capacity and are classified as M5, M6, F7, F8 and F9 Class according to their dust retention capacities specified in the EN779 standard. In order to reduce the pressure losses on the filter, the standard pocket length of the filters produced in the pocket structure is 300 mm. Optionally, 535 and 600 mm long Filters can be used.



Compact Filter

They are used for good-quality filtration of pre-filtered air; they have a high dust retention capacity and are classified as M5, M6, F7, F8 and F9 Class according to their dust retention capacities specified in the EN779 standard. Due to their length of 292 mm, they are used as alternatives to bag filters, especially in applications, where a compact structure is preferred. Compact filters cannot be cleaned when they get dirty, as they lose their filtration ability; and, they need to be replaced with new ones.



Heater/Cooler Battery Section

Heating and Cooling Batteries are used in LKS Modular AIR HANDLING UNITS according to the designed heating and cooling needs. Refrigerant batteries can be of the Aqueous Type or Refrigerant Type, while heater batteries can also be of the Vapor Type. The batteries designed through a selection program according to the desired capacity, pressure drop and geometry are of Copper Tube type with Aluminium blades as standard, and can optionally be manufactured from copper tubes/copper blades or steel.

In aqueous type batteries, an Air Purger is available as standard. Airtightness is ensured by a by-pass sheet applied around the batteries. In case the charging speed of the refrigerant batteries is above 2.5 m/s, then the batteries must be manufactured together with droplet holders.



Electric Heater

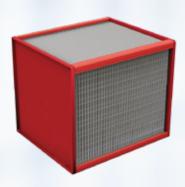
It is used in cases, where there are no heat sources for heating the air, or in order to prevent freezing. They are equipped with Operating Thermostats and Safety Limit Thermostats as standard. By connecting these thermostats to automation, increasing the cell temperature of electric heaters at undesirable values can be prevented. Electric heaters can be produced optionally with automation panels operating according to the desired temperature and the necessary safety equipment (differential pressure switches, flow-switches, safety thermostats).



Aluminium Plated, Cross-Flow Heat Recovery

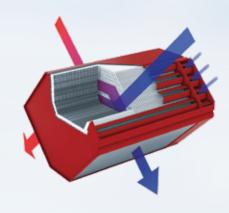
It is the type of heat recovery that is often used nowadays. They operate at up to 70% efficiency, depending on the temperature and humidity values of the air pushed out from the inside and the fresh air taken from the outside. Temperature efficiency increases with the latent heat released as a result of condensation of the expelled air in winter conditions. With this type of heat exchanger, high-temperature efficiency and low-pressure drop are achieved. Since the exhaust and fresh air flows occur in airflow ducts that are independent of each other, the odour, polluting gas and similar substances in the exhausted air are prevented from passing into the fresh air.

In AIR HANDLING UNITS using Cross Flow Heat Recovery, by-pass ventilation or free-cooling method can be applied optionally to cool the indoor environment during the transitional seasons. In this application, with a by-pass damper placed on the Heat Exchanger, it is ensured that the air is blown to the indoor environment, when desired, without passing over the heat exchanger, that is, without performing heat transfer. By-Pass ventilation is an optional feature; and, optionally, it can be supplied with damper motor and automation.



In standard applications, a condensation tray can be placed in the section, where the exhausted air exits the heat exchanger in the Cross-Flow Heat Recovery Sections, in order to collect possible condensation. In applications with very high outside humidity, optionally, condensation trays can be mounted against the condensation that may occur in other airflows. Cross Flow Heat Recovery Sections are designed in 4 different configurations as shown below.

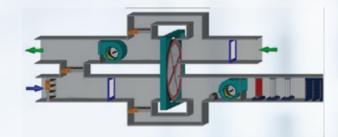




Rotor Type Heat Recovery

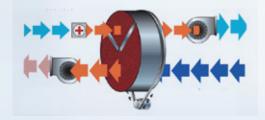
They are preferred in AIR HANDLING UNIT applications due to their high efficiency, humidity transfer capabilities and compact structures. The rotor consists of aluminium sheets wrapped around each other after they are given a sinusoidal waveform. Since the form that determines the distance between two sheets also determines the total heat transfer area; the efficiency and pressure drop of the Heat Exchanger also depend on the distance between the plates. As the rotor matrix passes through a flow of air, the Aluminium plates heat up or cool down; and, when the matrix is exposed to other air flows as a result of rotation, then the heat transfer takes place due to this stored energy.





According to the desired humidity transfer feature, the aluminium sheet can be coated with different materials. Regardless of the coating material, while the temperature efficiency of rotor type Heat Recovery Exchangers reaches 80%, depending on the blade spacing applied, on the other hand, the humidity transfer efficiencies vary.

While the humidity transfer efficiency is 40% in Condensing Type Rotors, the humidity transfer efficiency can reach 60% thanks to the silica-gel coating material used in enthalpy rotors. Nowadays, with the developing nanotechnology, the humidity transfer efficiency reaches 80% in Zeolite coated rotors.



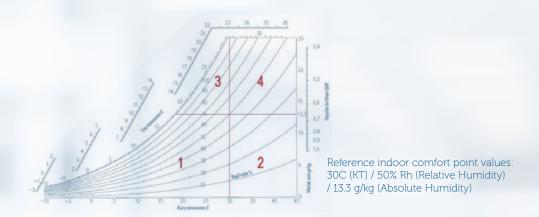
In the rotors, there is the possibility of mixing some of the air exhausted by the rotation effect to the fresh air. TKS Modular AIR HANDLING UNITS are supplied with a Sweeping Chamber as standard to reduce the above-mentioned mixt

During the rotation, the sweeping chamber provides the rotation air to be mixed with the fresh air to be transferred to the rotation duct. At the same time, thanks to this application, which ensures that the rotor surface is continuously clean, the service period is extended.

In the following 4 configurations, Rotor Type Heat Recovery Sections are designed with the counter flow principle.

Ideally, one of the C or A configurations is recommended to be used in applications, where the exhausted air is allowed to mix with the fresh air at a minimum rate.

Especially in applications with cold outside weather conditions and in applications, where fresh air is heated to the indoor environment, in order to increase the humidity of the air supplied to the indoor environment, the capacity and model of the humidifier in LKS Modular AIR HANDLING UNITS are determined according to the desired weather conditions.



Isothermal Humidifiers

In LKS Modular AIR HANDLING UNITS, External Steam Type Steam Humidifiers using ready-made steam, Electrode Type Steam Humidifiers, which generates steam by evaporating the softened water provided from water treatment systems thanks to the electrodes in its body, and Resistance Type Steam Humidifiers, which obtain steam using directly municipal water, can be designed and applied. External Steam Type Steam Humidifiers (FSH) -They are used when steam is supplied from steam sources in the enterprises.

In order for the water droplets that may occur due to condensation on the walls of the steam distributors, where the components are made of stainless material, to quickly turn into water vapour, they have a special design. Depending on the inlet humidity and the desired humidity values, steam penetration distances start from 300 mm.

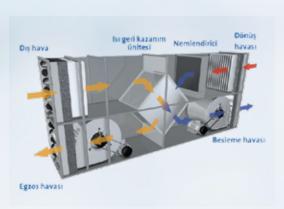
Steam Humidifier

It consists of a Microprocessor-Controlled Steam Generating Unit and a pipe set. Humidification is realized by delivering the steam taken from the humidifier into the power plant through steam distribution pipes. It produces steam from municipal water by using electrical energy. There are steam humidifiers with ON-OFF or proportional controls, operating at 230-400 Volts, with a capacity range of 5 kg/h up to 180 kg/h.

Pad/Filler Equipped Humidifiers

By quenching a cellulosic-based filling material that shall provide humidity transfer, the specific humidity of the air passing over it shall be increased. The system is fed by the circulation pump with the water coming from the water pool on itself and by the water provided from the municipal water. It is used with a droplet holder to prevent water droplets from passing into the air in applications, where airspeed is above 2.5 m/s. These types of humidifiers are also used for cooling purposes, especially in dry climates, thanks to their adiabatic cooling features.

Adiabatic Humidifiers



Adiabatic Humidifiers of the HEF2E Series are used for adiabatic cooling or humidification in LKS Modular AIR HANDLING UNITS. Humidifiers, which meet the needs for humidification with low energy consumption, are manufactured with VDI 6022 Hygiene Certificates. The system is applied with a humidifier pad made of glass fibre with flame retardant features and designed with high efficiency and low pressure drops, a circulation pump, flow balancing valves, droplet holders and level sensors. Optionally, a step control, simple or advanced automation, and a sterilization system with an ultraviolet lamp can also be provided together with the humidifier.

Condensation Tray

Condensation trays made of stainless steel shall be used as standard in order to remove the condensation, which shall occur in the cooling coils, from the system. Condensation trays are manufactured with double slopes by using Weld Containing Production Processes in order to accelerate the evacuation of the formed condensate water. A collective siphon is provided as standard with each device against the passage of odour and similar chemical particles from the condensation outlet to the AIR HANDLING UNIT.



Silencer

Since the housing of LKS Modular AIR HANDLING UNITS has high sound absorption capabilities, the ambient sound of the devices is low. In applications, where it is desired to reduce the sound caused by the movement of air, or in applications, where a very low sound level is required, sound levels can be reduced by using silencers of different lengths. 3 different lengths of silencer cells are designed as standard in the devices.

In applications, where lower noise is desired, these a few cells can be used. Sound absorption values of the silencer cells at different frequencies are given in the table below.



Control dampers with aluminium profile bodies and aluminium aerodynamic blades are used in the AIR HANDLING UNITS. The plastic gear mechanisms of the opposing blades are hidden between the aluminium edge profiles.

Thanks to the sealing gaskets and adjustment levers on the tips of the blades of the dampers; precise flow control becomes available. Dampers can optionally be hand-controlled or servo motor-controlled.

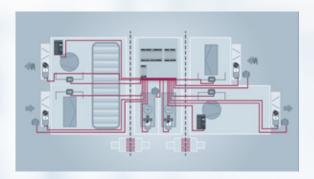




There are three different damper sections in the devices; suction cell with single damper, mixing cell with two (double) dampers and mixing cell with three dampers and they can be used according to the principles of the application. All dampers in the mixing cell dampers have been selected according to the velocities that will emerge when all the air is passed over them. Optionally, pre-filtering can be applied to damper cells.

Automation

LKS Modular Air Handling Units can optionally be supplied with an automatic control system to meet the project needs in order to meet the currently increasing energy saving requirements and the sensitive control needs of the air conditioning systems of the buildings. The automatic control system consists of a combination of electrical and electronic control panels of the device and since it is designed to work in harmony with the equipment used in AIR HANDLING UNITS, it prevents problems that may occur in the field.



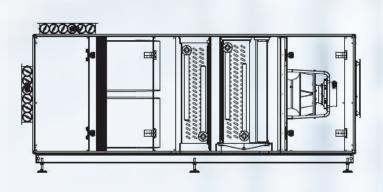
In line with the needs of the air conditioning system, basic components such as temperature/humidity/air quality sensors used in the device and in the duct, frequency inverters providing flow rate adjustment or EC motor automation, damper and mixed air control, heating/cooling capacity control, filter pollution control are applied to the devices and shipped to the field. In addition to being able to be controlled via a hand terminal, the automation panel provides flexibility to the user with the possibility of connecting to the building automation system and controlling it via a computer.

Automation panels are designed by our technical team in line with the project needs; in LKS Modular Air Handling Units, the following controls can be provided with automation application and appropriate component selection:

- Constant airflow
- Constant channel pressure
- Providing ventilation as much as necessary
- Variable flow control
- Electric heater control (gradual or non-staged control)
- Heating capacity control
- Cooling capacity control
- Heat recovery exchanger control (by-pass, REV control)
- Freezing control
- Fire Alarm
- Filter tracking
- Fault tracking and recording
- Weekly work schedule
- Damper control

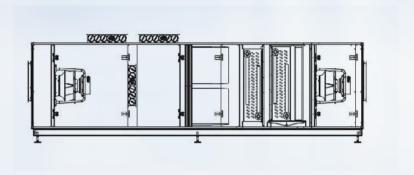
The Mixing Unit

In LKS Modular Air Handling Units, mixing cells are designed to mix the return air coming from the indoor environment with the fresh air and blow it into the indoor environment. Mixing cells are frequently used in order to positively pressurize the volume served by the air handling unit or to meet the fresh air requirement in applications where there are kitchen / toilet ventilation systems with a direct discharge without reuse.



In LKS Modular Air Handling Units, an economizer cell is designed to be used with a return fan in order to discharge the low-quality indoor air to the outside and to supply the determined amount of fresh air to the indoor environment. Through the economizer control system to be applied, it is possible to increase the fresh air ratio to provide optimum mixing air. With the economizer cell, the indoor environment can be kept at negative, neutral or positive pressure when desired.

For the airflow adjustment, resistance is created in the economizer dampers and the return air/fresh air ratio in the mixed air is adjusted according to the pressure drop created.



The principle of operation of AIR HANDLING UNITS

Feeding side

- 1- Pre-Filter Cell: Fresh air received through dampers is pre-filtered by G2, G3 and G4 filters
- 2 -FILTER Cell: F5, F6, F7 for filtration of small particles in the fresh air,

Bag (precision) filters are used in classes F8 and F9

- 3- Heat Recovery Cell: Energy recovery is achieved by transferring heat from the exhaust air
- 4- Heating Battery: It is used to heat the air taken from the external environment. Hygienic and comfort types are available.
- 5- Freeze Protection Cell: A specially designed frost protection cell with easy access to eliminate the risks that may occur with

freezing after the heating coil on the fresh air line.

- 6- Cooling Battery: It is used to cool down the air taken from the external environment. Hygienic and comfort types are available.
- 7 -Supply Air Fan: It is possible to choose between forward-curved, backwards-curved blades or plug fans.

Accessories such as inward opening type service door and discharge mouth flanges suitable for positive pressure can be added.



The rotating side

- 8- Return Air Filter: The return (exhaust) air taken with an adjustable damper is passed through G2-G3-G4 filters to prevent contamination and damage to the heat recovery cell.
- 9- Control Cell: It ensures that the device can work in accordance with the building automation and that the desired working conditions for the place can be easily adjusted. It saves energy according to the use case and comfort conditions.
- 10- Exhaust Fan Cell: Exhaust air fan and section plug, forward curved and backward curved blades and inward or outward opening type service door option suitable for positive or negative pressure, with discharge mouth flange.



Compact Air Handling Units

Compact air handling units with heat recovery, with their high efficiency and compact structure, are used for ventilating areas requiring air flow up to 15000 m3/h. Due to their modular construction, they can pass through tight spaces and are effortlessly reassembled.

Compact Air Handling Units have a double-walled profile housing structure. They are also used on the roofs of buildings due to their durability against natural factors such as rain, snow, sun and wind...

The internal structure of the Unit is designed in accord with the VDI 6022 Hygiene Standards and offers easy cleaning and service opportunities. LTS-C Models feature Counter Flow Plate-Integrated Heat Recovery Exchangers while, on the other side, LTS-R Models feature Rotor-Integrated Heat Recovery Exchangers. Moisture transfer is possible thanks to Zeolite, which is optionally provided in Rotor-Integrated Models. In this way, the need for humidification of the heated air during winter is aliminated.



Compact Air Handling Units

LOTUS-C: LOTUS-R:

Thermal Efficiency of up to 90% with a Counterflow Exchanger for Plate Type Heat Recovery

Thermal Efficiency of up to 90% with a Rotor-Integrated Heat Recovery Exchanger

Free-cooling option in spring with LTSC Bypass ventilation

Optional Moisture Transfer Option for LTS-R Units (featuring Zeolite-Coated Rotors)



High Efficiency, Proportionally Controlled EC Fans
50 mm Thick Double-Walled Structure Designed in parallel with Ecodesign Requirements
M5 Filter On The Exhaust Air Side, F7 Filter On The Fresh Air Side
Optional F9 Fresh Air Filter
Service Covers That Allow Easy Removal Of Components
Optional Heating - Cooling - Humidification and Silencer Modules
- 8 standard models in the range of 1500 m³/h 1500 m³/h airflow



Lotus Eco

Our changing lives, the increase in mixed life projects and the necessity of eliminating the air quality problems that came into question due to the above-mentioned mixed life projects make the use of these units more and more common day by day.

In mixed life projects, the release of exhaust wastes by present dining areas to the atmosphere is not tolerable. Similar problems are matters of fact even for restaurants located in open areas. For this reason, the use of units with advanced filtration features in kitchen exhaust systems of all enterprises providing catering services become important for the sake of the

environment. Therefore, serious restrictions have been imposed on this issue all over the world.



Alt is aimed by the European Council to replace the low energy-efficient products that are already present on the market with high-efficiency ones. And, prepared ECO-DE-SIGN Directives -together with mentioned dates-are considered as prerequisite terms for CE Certification and the entry of non-compliant units to EU Countries is restricted.



	REQUIREMENT FOR HEAT RECOVERY SYSTEMS	S FEATURE	YES	
	THERMAL EFFICIENCY (EN308) *1 n _t [%]	Plate-Integrated / Rot Heat Recovery	or-Integrated	73
	MAXIMUM SFP INTERNAL [W/(M /S) VALUE	Plate-Integrated / Rotor-Integrated	q<2m³/s	1.200 + E - 300 x q / 2 - F
	ALLOWED FOR THIS MODEL	Heat Recovery q≥2m³/s PLATE-INTEGRATED/ROTOR-INTEGRATED HEAT RECOVERY	900 + E -F	
	HEAT RECOVERY EFFICIENCY ADD-ON, E [W/(M³/S)]	PLATE-INTEGRATED/F INTEGRATED HEAT RE	OTOR- COVERY	(η _t -67) x 30
		MODEL UNIT		0
١	FILTER CORRECTION COEFFICIENT,	IF F5 FILTER IS NOT PI	RESENT	150
ı	F [W/M/S)]	IF F5 FILTER IS NOT PI	RESENT	190
		IF M5+F7 FILTERS ARE	NOT PRESENT	300
	REQUIREMENT FOR DRIVERS WITH VARIAB	Evet		
1	REQUIREMENT FOR MONITORING PRESSUR	Evet		

		INTENSIT	Y OF ODOR		OIL DENSITY				
	Low	Medium	High	Very High	Low	Medium	High	Very High	
Tea Houses/ Cafes	*	12.1913			*				
Pizza		*				*			
French Restaurants	N N	*			77 77 2	*		-	
Italian Restaurants	100	*				*			
Pubs / Bistros	1000	*				*			
Far Eastern Cuisine			*				*		
Kebab / Steak House	F. 150		*				*		
Traditional Turkish Cuisine			*				*		
Fast Food / Frying	Miller			*				*	

Lotus Eco Working Principles



By first passing the air sucked from the hood through a washable metal filter, it is ensured that large oil particles are captured. The Ionizer charges the pollutant particles in the air with a negative electrical charge. Then, as the airflow passes through the collector, negatively charged pollutants adhere to the positively charged plates while being repelled by the negatively charged plates. This collector should be cleaned at certain periods and can be used again. In order to solve the odour problem, active carbon filters are used in the unit. The issue to be considered in this regard is the length of the Contact Duration. Different carbon contact times should be taken into consideration for different kitchen types.

Ensuring Control on Oil and Odor

Low Intensity/Density

Standard kitchen exhaust fans are sufficient without the need for additional filters.

High Intensity/Density

Two-stage electrostatic separator followed by carbon filtration with a minimum Contact Duration of 0.2 seconds

Medium Intensity/Density

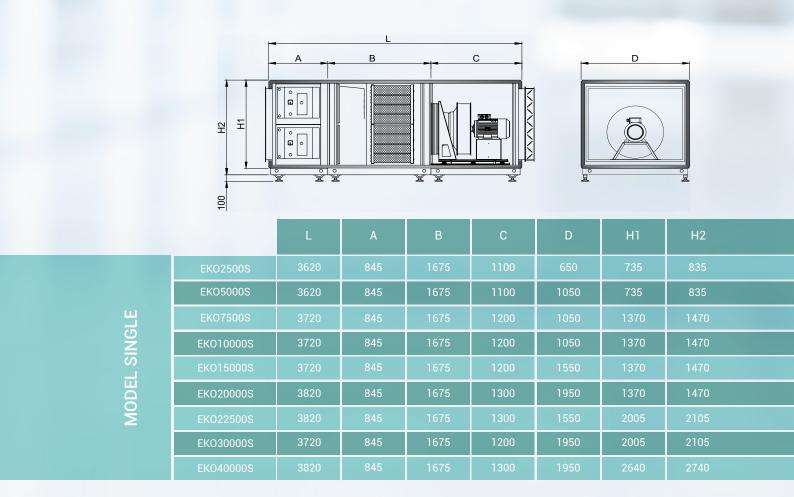
Carbon filtration with a Contact Duration of at least 0.1 seconds following the electrostatic separator.

Very High Intensity/Density

Two-stage electrostatic separator followed by a UV Ozone System with a minimum Contact Duration of 0.2 seconds; or, two-stage electrostatic separator followed by carbon filtration with a minimum Contact Duration of 0.4 seconds

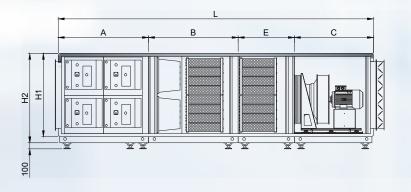
Single

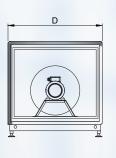
	Single 2500	Single 5000	Single 7500	Single 10000	Single 15000	Single 20000	Single 22500	Single 30000	Single 40000
AIR FLOW	2500 (m³/h)	5000 (m³/h)	7500 (m³/h)	10000 (m³/h)	15000 (m³/h)	20000 (m³/h)	22500 (m³/h)	30000 (m³/h)	40000 (m³/h)
BAG FILTER F7	*	*	*	*	*	*	*	*	*
CARBON FILTER	1 Sıralı	1 Sıralı	1 Sıralı	1 Sıralı	1 Sıralı	1 Sıralı	1 Sıralı	1 Sıralı	1 Sıralı
NUMBER OF CARTRIDGES IN CARBON FILTERS	12	24	40	48	72	96	108	144	192
DEPTH OF CARBON FILTERS	600	600	600	600	600	600	600	600	600
CARBON FILTER'S CONTACT DURATION	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
ESP CELL	1 Sıralı	1 Sıralı	1 Sıralı	1 Sıralı	1 Sıralı	1 Sıralı	1 Sıralı	1 Sıralı	1 Sıralı
ESP NUMBER	1	1	2	2	2	2	3	3	4
ESP POWER CONSUMPTION	20 Watt	30 Watt	60 Watt	60 Watt	80 Watt	100 Watt	120 Watt	150 Watt	200 Watt
FAN / MOTOR POWER	1.50 kW	3.00 kW	4.00 kW	5.50 kW	7.50 kW	7.50 kW	11.00 kW	15.00 kW	15.00kW
VOLTAGE / PHASE / FREQUENCY				4	.00V / 3Ph / 5	0 Hz			



Double

	Single 2500	Single 5000	Single 7500	Single 10000	Single 15000	Single 20000	Single 22500	Single 30000	Single 40000	
AIR FLOW	2500 (m³/h)	5000 (m³/h)	7500 (m³/h)	10000 (m³/h)	15000 (m³/h)	20000 (m³/h)	22500 (m³/h)	30000 (m³/h)	40000 (m³/h)	
BAG FILTER F7	*	*	*	*	*	*	*	*	*	
CARBON FILTER	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	
NUMBER OF CARTRIDGES IN CARBON FILTERS	24	48	80	96	144	192	216	288	384	
DEPTH OF CARBON FILTERS	600	600	600	600	600	600	600	600	600	
CARBON FILTER'S CONTACT DURATION	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	
ESP CELL	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	
ESP NUMBER	2	2	4	4	4	4	6	6	8	
ESP POWER CONSUMPTION	40 Watt	60 Watt	120 Watt	120 Watt	160 Watt	200 Watt	240 Watt	300 Watt	400 Watt	
FAN / MOTOR POWER	2.20 kW	3.00 kW	5.50 kW	7.50 kW	11.00 kW	11.00 kW	15.00 kW	22.00 kW	22.00kW	
VOLTAGE / PHASE / FREQUENCY		400V / 3Ph / 50 Hz								



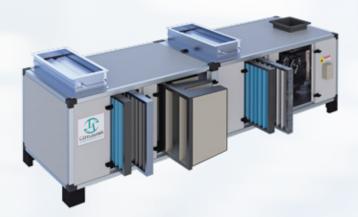


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	L	А	В	С	D	E	H1	H2
EKO2500S	5290	1590	1675	1100	650	925	735	835
EKO5000S	5290	1590	1675	1100	1050	925	735	835
EK07500S	5390	1590	1675	1200	1050	925	1370	1470
EK010000S	5390	1590	1675	1200	1050	925	1370	1470
EK015000S	5390	1590	1675	1200	1550	925	1370	1470
EKO20000S	5490	1590	1675	1300	1950	925	1370	1470
EKO22500S	5490	1590	1675	1300	1550	925	2005	2105
EK030000S	5390	1590	1675	1200	1950	925	2005	2105
							2640	



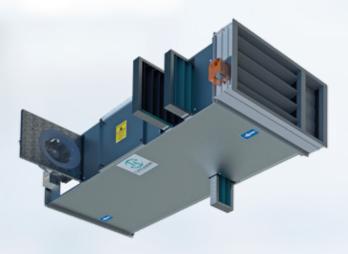
LSHS - Y Series



Shelter Units are manufactured with natural anodized aluminium profiles with cellular structure. Said Cells consist of Double-Walled, Electrostatic Powder-Coated Panels with 25 mm Glass Wool Insulation.

It consists of G4 Cassettes, Nuclear Type H13 Hepa Filters, Lead Separators and Activated Carbon Filters. Optionally, in order to protect against the harmful effects of X-RAYS, the intracellular walls are covered with 1.2 mm thick Lead Sheets.

LSHS - K Series



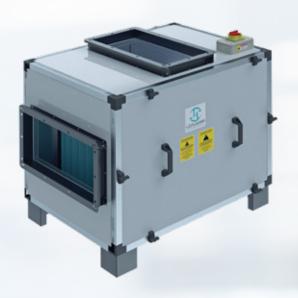
It consists of G4 Cassettes, Nuclear Type H13 Hepa Filters, Lead Separators and Activated Carbon Filters. Thanks to its compact structure, it provides the possibility of being connected to the air ducts in the ceiling and it saves space inside the Shelter.

Since our products are self-flanged, they offer the chance of being easily attached to the ducts.

The oppositely- positioned air dampers on the air suction side of the Shelter Ventilation Unit and also with the By-Pass structure inside the unit are controlled without interfering with each other with the direction of the air axis in emergency and normal situations.

Kitchen Exhaust Fans

Cell Type Kitchen Exhaust Fans offer you practical solutions, especially in industrial kitchen applications. The fact that the motor is excluded from the airflow and is directly coupled extends the periodic maintenance intervals, while it provides high performance and energy-saving thanks to its backwards-curved rotor structure.



Celled Aspirator

Cell Type Kitchen Exhaust Fans offer you practical solutions, especially in industrial kitchen applications. The fact that the motor is excluded from the airflow and is directly coupled extends the periodic maintenance intervals, while it provides high performance and energy-saving thanks to its backwards-curved rotor structure.



Heat Recovery Units

Ceiling type heat recovery units are designed to achieve high indoor air quality in addition to providing energy savings.

By using Heat Recovery Ventilation Units, it is aimed to both save energy and increase indoor air quality by performing heat transfer between fresh air and exhaust air through plate-integrated heat exchangers.

In workplaces, banks, offices, hotels, houses, cinemas, fair-exhibition areas, hospitals, multi-purpose halls, restaurants, coffee halls and places where such high-density exhaust is required, besides their energy-saving advantages, these types of units are used to meet the need for fresh air



LOTUS - HRD



- Thermal Efficiency of up to 90% with a Counter Flow Plate-Integrated Heat Recovery Exchanger
- High Efficiency, Proportionally Controlled EC Fans
- Sound and heat insulation with 25 mm thick double-walled structure Designed in parallel with Ecodesign Requirements
- Free-cooling option in spring with bypass ventilation
- M5 Filter On The Exhaust Air Side, F7 Filter
 On The Fresh Air Side Optional F9 Fresh Air Filter
- Service Covers That Allow Easy Removal Of Components
- Optional Heating-Cooling Module
- 5 standard models in the range of 500 m^3/h 3000 m^3/h airflow

Ceiling type heat recovery devices are designed to achieve high indoor air quality in addition to providing energy savings.

With heat recovery ventilation devices, it is aimed to both save energy and increase indoor air quality by performing heat transfer between fresh air and exhaust air through a plate heat exchanger.

In workplaces, banks, offices, hotels, houses, cinemas, fair-exhibition areas, hospitals, multi-purpose halls, restaurants, coffee halls and places where such high-density exhaust is required, these types of devices are used to meet the need for fresh air in addition to its energy-saving advantage.

The devices are designed as 8 models between 800 m3/h and 6000 m3/h airflow. It transfers most of the energy of the polluted air, which is exhausted from the interior, to the fresh air taken from outside and gives it to the living space.

Components with the most up-to-date technology are used in the devices, and electrical and thermal energy efficiency is prioritized. Plate heat recovery exchangers with Eurovent certificate and directly coupled plug fans with AC motor, which provides high efficiency, low noise level and energy consumption, are used in the devices. Fans have backwards curved sparse blade type with blades and have blade structure to increase aerodynamic efficiency.

Functions

LOTUS - HRS devices are used to provide the following functions;

- Providing fresh air to the indoor environment,
 Removal of dirty air from the indoor environment,
- Filtration of air taken from the external environment,
 - Transfer of energy of the indoor air to fresh air.

Advantages

- Thermal efficiency with cross-flow plate heat recovery exchanger
 Easy-to-maintain, silent-running AC plug fans
 - Standard G4 filter for both exhaust and fresh air lines
 - 10mm PU sponge providing sound and heat insulation
 - Optional channel connections
 - Service covers that allow easy removal of components
 Optional heating-cooling module
- 8 standard models in the range of 800 m3/h 6000 m3/h airflow

LOTUS - HRS

- High thermal efficiency with Eurovent certified heat recovery exchangers All of the heat recovery exchangers used in LOTUS-HRS devices have Eurovent certificates and their performance has been approved by independent test institutions.
- High efficiency and low noise level with plug type fans which have backwards-curved blades Direct-coupled plug fans with AC motors used in LOTUS-HRS devices provide high-efficiency values with their aerodynamic blade structures. At the same time, they can operate at a high performance at low noise levels.
- Flexible assembly solution with alternative channel connections LOTUS-HRS devices have 2 extrachannel connections to adapt to different channel connection options. The connection directions of the device can be changed by using one of these outputs or both when necessary.

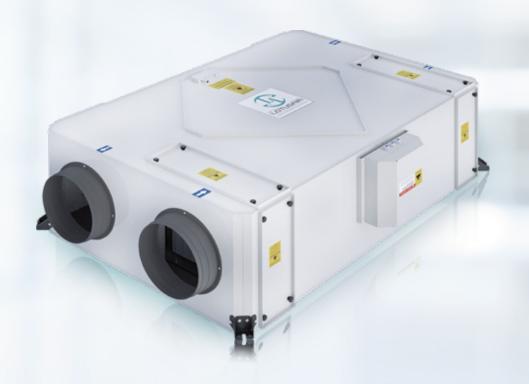


 Easy service which does not require disassembly of all components all components in LOTUS-HRS devices are removable without the need for disassembly of the device. The fans, filters and heat recovery exchanger of the device are designed in such a way that they can be easily removed and serviced with the help of service covers inside the suspended ceiling.

• In LOTUS-HRS devices, polyurethane sound andthermal insulation with a flame retarding feature is used.

Thanks to the flame retarding feature, the flame conductivity of the device is minimized and it has been made in accordance with international standards.

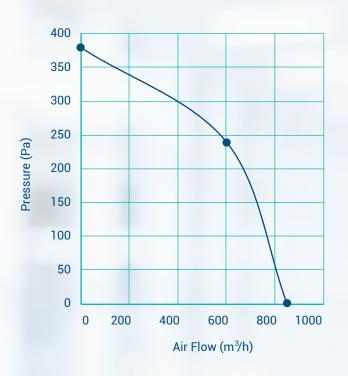
- Thermal Efficiency of up to 60% with a Cross-Flow Plate-Integrated Heat
- Recovery Exchangers
- Easy-To-Maintain, Silent-Running AC Plug Fans
- Standard G4 Filter For Both Exhaust And Fresh Air Lines
- Optional F7 Filter in Fresh Air Line
- 10mm PU Sponge Providing Sound and Heat Insulation
- Optional Duct Connection Ports
- Service Covers That Allow Easy Removal Of Components
- Optional Heating-Cooling Module
- 8 standard models in the range of 800 m³/h 6000 m³/h airflow



	LOTUS-HRS									
	Unit	800	1200	1500	2000	3000	4000	5000	6000	
Network Connection	1~230 V 50 Hz									
Performance Character	Performance Characteristics									
Air Flow (1)		850	1300	1500	2100	3100	4200	5100	6100	
Sound Level (2)	dB(A)	44	45	46	48	49	50	52	53	
Electrical Properties										
Fan Motor Power (3)	W	240	310	420	450	750	960	1360	1840	
Maximum Current	(A)	0,9	1,36	1,8	2	3,5	4,8	6	3,8	

- It is the airflow measured when the external static pressure is 0 Pa.
- Sound levels are the values measured at 250 Hz, 1.5 m below the device at a nominal flow rate.
- The value of the consumed power.

LOTUS-HRS 800 / AIR PERFORMANCE



TECHNICAL INFORMATION Air Flow (m3/h) 850 Maximum Power (kW) 0,24 Maximum Current (A) 0,9 Supply Voltage 230V, 1~, 50 Hz The Sound Emitted to the Environment at a distance of 1m. (dBA) Air Filter ePM10 50% (M5) Weight (kg) 65

855

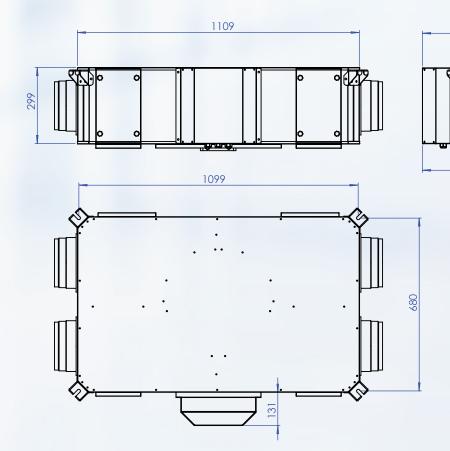
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Ø 200

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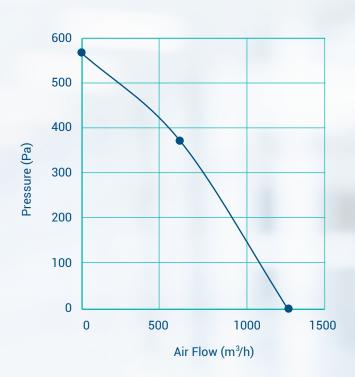
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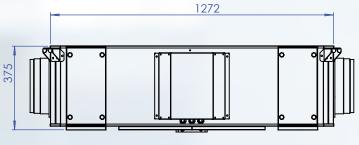
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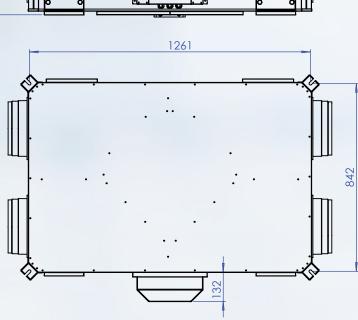


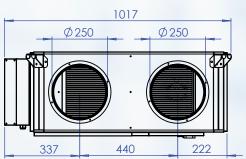
LOTUS-HRS 1200 / AIR PERFORMANCE

Air Flow (m3/h)	1300
Maximum Power (kW)	0,31
Maximum Current (A)	1,36
Supply Voltage	230V, 1~, 50 Hz
The Sound Emitted to the Environment at a distance of 1m. (dBA)	59
Air Filter	ePM10 50% (M5)
Weight (kg)	75

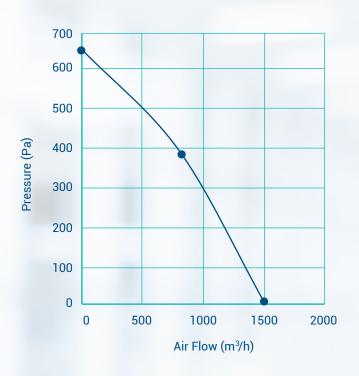




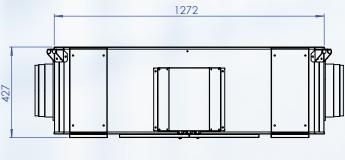


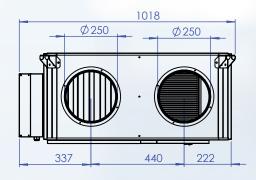


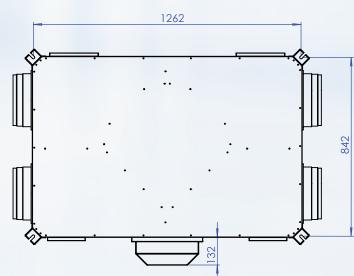
LOTUS-HRS 1500 / AIR PERFORMANCE



Air Flow (m3/h)	1500
Maximum Power (kW)	0,42
Maximum Current (A)	1,86
Supply Voltage	230V, 1~, 50 Hz
The Sound Emitted to the Environment at a distance of 1m. (dBA)	62
Air Filter	ePM10 50% (M5)
Weight (kg)	90

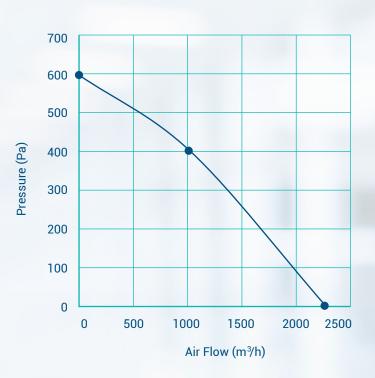


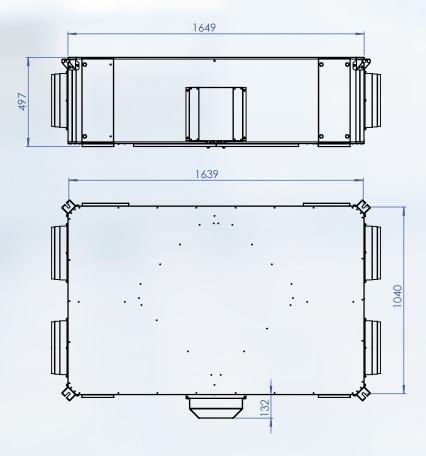


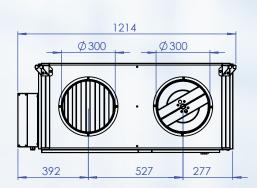


LOTUS-HRS 2000 / AIR PERFORMANCE

Air Flow (m3/h)	2100
Maximum Power (kW)	0,45
Maximum Current (A)	2
Supply Voltage	230V, 1~, 50 Hz
The Sound Emitted to the Environment at a distance of 1m. (dBA)	55
Air Filter	ePM10 50% (M5)
Weight (kg)	125



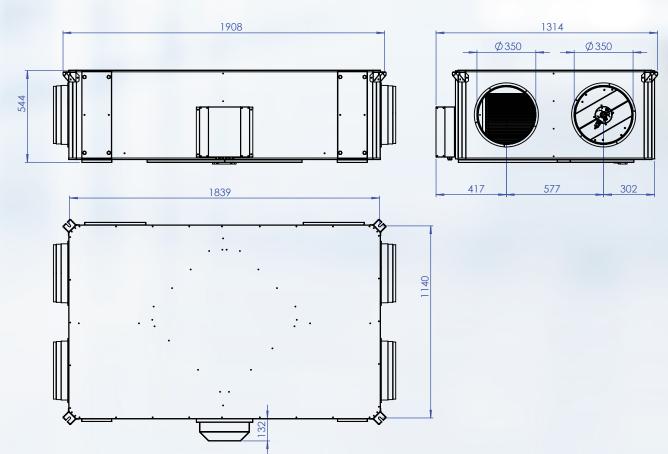




LOTUS-HRS 3000 / AIR PERFORMANCE

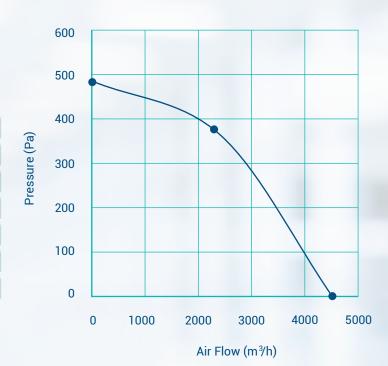


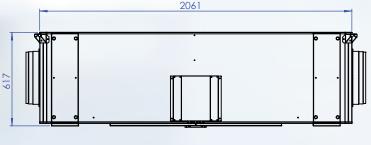
TECHNICAL INFORMATION			
Air Flow (m3/h)	3100		
Maximum Power (kW)	0,75		
Maximum Current (A)	3,5		
Supply Voltage	230V, 1~, 50 Hz		
The Sound Emitted to the Environment at a distance of 1m. (dBA)	55		
Air Filter	ePM10 50% (M5)		
Weight (kg)	145		

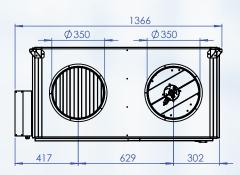


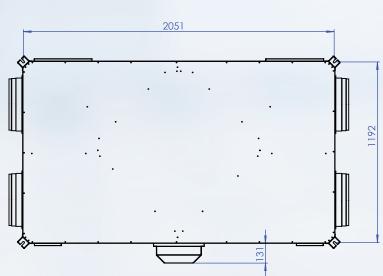
LOTUS-HRS 4000 / AIR PERFORMANCE

Air Flow (m3/h)	4200		
Maximum Power (kW)	0,96		
Maximum Current (A)	4,8		
Supply Voltage	230V, 1~, 50 Hz		
The Sound Emitted to the Environment at a distance of 1m. (dBA)	58		
Air Filter	ePM10 50% (M5)		
Weight (kg)	180		

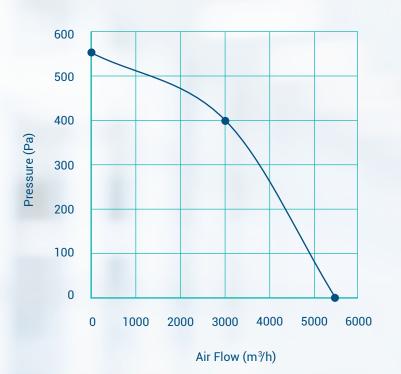




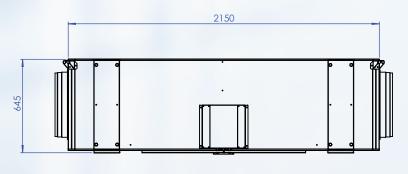


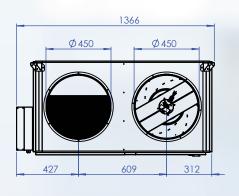


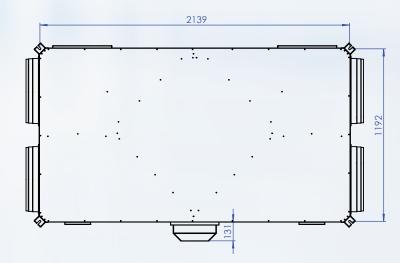
LOTUS-HRS 5000 / AIR PERFORMANCE



TECHNICAL INFORMATION Air Flow (m3/h) 5100 Maximum Power (kW) 1,36 Maximum Current (A) 6 Supply Voltage 230V, 1~, 50 Hz The Sound Emitted to the Environment at a distance of 1m. (dBA) Air Filter ePM10 50% (M5) Weight (kg) 225

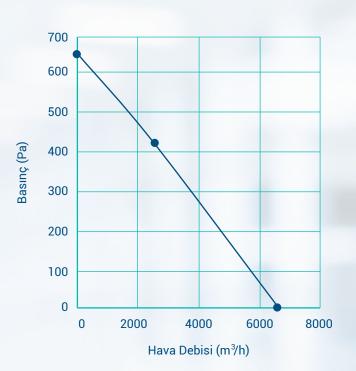


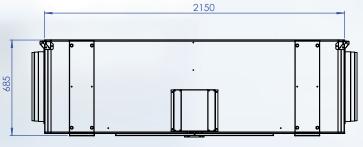


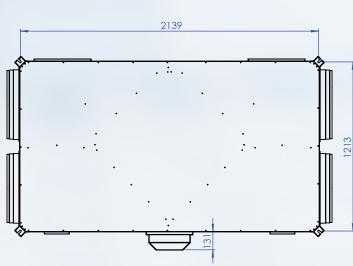


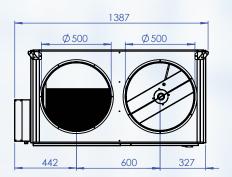
LOTUS-HRS 6000 / AIR PERFORMANCE

Air Flow (m3/h)	6100
Maximum Power (kW)	1,84
Maximum Current (A)	3,8
Supply Voltage	3800V, 3~, 50 Hz
The Sound Emitted to the Environment at a distance of 1m. (dBA)	56
Air Filter	ePM10 50% (M5)
Weight (kg)	245









Accessories

Optional Duct Type Electrical Heater

Duct Type Electrical Heaters are used to protect Heat Recovery Units against freezing in very cold climates or in environments, where high blowing temperature is necessary. Depending on the need, it is manufactured as rounded duct or rectangular duct types





Optional Duct Type Hydro Coil

Heat exchangers are used by being mounted on the fresh air outlet part of LOTUS HR devices or on the fresh air duct. The heat exchangers are made of copper pipes, aluminum fins and brass collectors. There is a control output for on/off control of the batteries via the LOTUS HR automation panel, and hot water is activated and exited according to the temperature set on the room control panel.



Optional Duct Type Circular Silencer

It is designed to reduce in-duct noise.

* All models are 1 m long.



Rounded Duct Type Radial Fan

In the housings and blades of Rounded Duct Type Radial Fans in models from 100 to 160, the blades are manufactured from plastic injection while the other parts are manufactured from high quality galvanized steel. Fans have backwards-tilted blades and fan housings have high corrosion resistance. Under the roof of the Series, there are 13 different models that offer flow rates from 290 to 3.380 m³/h and connection diameter options from Ø100 to 400 mm.

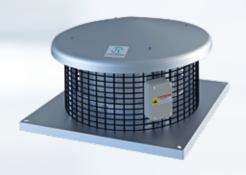


Rectangular Duct Fans



Rectangular Duct Type Fans with sparse blades are designed to meet medium and high volume ventilation needs in duct systems, where rectangular duct fans are applied.

Horizontally Launched Radial Roof Fan



Roof-Type Fans are ventilation accessories designed in such a way that they shall not be affected by external factors. This type of Fan, which are placed on the roofs of the buildings and are not affected by negative conditions, absorb the odours and allow the odours to be released into the atmosphere. As standard, they are manufactured in the range of 1000 m³/h – 20000 m³/h Air Flow.

Rounded Duct Type Fans



Models from 160 to 800 of TD Series Rounded Duct Type Mixed Flow Fans are manufactured from plastic materials, and models from 1000 to 6000 are manufactured from epoxy-polyester painted steel sheets. Under the roof of the Fans, there are 9 different models that offer flow rates from 180 to 5.500 m³/h and connection diameter options from Ø100 to 400 mm.

Rounded Duct Type Fans

Models from 160 to 800 of TD Series Rounded Duct Type Mixed Flow Fans are manufactured from plastic materials, and models from 1000 to 6000 are manufactured from epoxy-polyester painted steel sheets. Under the roof of the Fans, there are 9 different models that offer flow rates from 180 to 5.500 m³/h and connection diameter options from Ø100 to 400 mm.



Smoke Extraction Fans

It is hygienic that the gases emitted from the house in the kitchens of large buildings such as hotels, hospitals and factories, which are made especially by firing, are sent to the head by the smoke evacuation aspirator. Not only in the large kitchens, but also in the modest kitchens of the residences, the smoke evacuator is used and the ingestion of food smell is prevented.























www.lotusairventilation.com







LOTUSAIR VENTILATION

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