COMPACT VENTILATION UNIT LG 500 P





Product description

The LG 500 P compact ventilation unit comprises a compact, thermally insulated enclosure of galvanised sheet steel, RAL 9010 powder coated on the outside. It is designed as a self-standing or wall-mounted unit for frost-free rooms.

The ventilation unit includes a highly efficient heat recovery system with an air-to-air counterflow heat exchanger made of recyclable plastic, with up to

90% efficiency, automatic 100% bypass and energy-saving radial fans driven by EC motors. Also included are filters ODA ISO ePM2,5 65% for the outdoor air and filters ETA ISO Coarse 70% for the extract air, both easy to service via the inspection covers on the front of the apparatus.

An external 3.5" colour touch screen serves to program the integrated, wired controller.

As a standard, the LG 500 P comes with a volume flow constant control and three adjustable ventilation stages. The LG 500 P compact ventilation unit is optionally available with a constant pressure or a Pichler System Optimiser control. Optional $\mathrm{CO_2}$ or VOC sensors may be used to implement ventilation controlled for optimum comfort.

Area of application

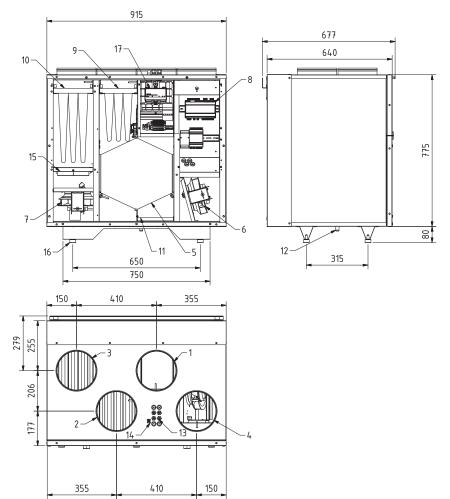
The compact ventilation unit LG 500 P is used for the controlled mechanical supply and extract air ventilation of larger residential houses, as a

centralized unit for up to 5 homes, schools, Doctor's practices, offices and similar applications.

The range of use extends fundamentally

to effective areas of 150 m^2 to approx. 400 m^2 that are designed as passive or low energy structures, with an adjustable air volume flow up to $550 \text{ m}^3/\text{h}$.

Layout sketch (standing or wall-mounted installation)



- 1 Supply air dia. 200 mm
- 2 Extract air dia. 200 mm
- 3 Outdoor air dia. 200 mm 4 Exhaust air dia. 200 mm
- 5 Counterflow heat exchanger
- 6 Exhaust air fan
- 7 Supply air fan
- 8 Control unit
- 9 Filter ETA ISO Coarse 70%
- 10 Filter ODA ISO ePM2,5 65%
- 11 Condensate trough
- 12 Condensate connector ø 16,5 mm
- 13 Cable entries 4 x M16 + 4 x reserves
- 14 Touch display connection
- 15 PTC electrical preheater battery (optional)
- 16 Height-adjustable feet
- 17 Pressure sensors

Illustration: LG 500 P-RV (right-hand version)

Versions

The compact ventilation unit LG 500 P is available in several different versions:

- right-hand or left-hand, depending on the location of the supply air connecting piece
- with or without an electrical PTC preheater battery integrated into the ventilation unit (Frost protection for the counterflow heat exchanger. Mounted in a grid frame. With a four-stage control for energy-efficient frost protection.)
- Version with standard or enthalpy exchanger for moisture recovery

ENTHALPY EXCHANGER

Humidity-transferring counterflow enthalpy exchanger with selective polymer membrane for heat and moisture recovery.

Advantages of the enthalpy exchanger:

- Enthalpy exchangers ensure optimal comfort within your rooms.
- During normal operation, the generation of condensate is prevented as far as possible. In contrast to a standard heat exchanger, the enthalpy exchanger only stops at low temperatures.
- The enthalpy exchanger prevents your rooms from drying out in winter.

Version	Left-hand version	Right-hand version
Item no. without an integrated electrical preheater battery	08LG500P-L	08LG500P-R
Item no. with an integrated electrical preheater battery	08LG500P-L-V	08LG500P-R-V
Item no. without an integrated electrical preheater battery and with an enthalpy exchanger	08LG500P-L-F	08LG500P-R-F
Item no. with an integrated electrical preheater battery and with an enthalpy exchanger	08LG500P-L-FV	08LG500P-R-FV
1 Supply air 2 Extract air 3 Outdoor air 4 Exhaust air		



Technical specifications

The technical specifications were measured by Lucerne Polytechnic – Engineering & Architecture, Centre for Integral Building Technology.

VENTILATION UNIT

Dimensions:

(W x H x D) 915 x 855 x 655 mm Thermally insulated housing made of galvanized sheet steel, coated in RAL 9010 – white

Air line connection:

4 x ø 200 mm

Condensate connection:

ø 16,5 mm at the bottom

Electrical connection:

230 V/50 Hz/ Fuse: 16 A

Protection class: IP 20

Permitted ambient temperature for the unit: +5 °C to +40 °C

Weight without accessories: approx. 75 kg

The characteristic curves shown are valid for the version of the unit with an outdoor air filter of filter class F7 (EN 779), extract air filter oof filter class G4 (EN 779) and the version with a PTC preheater battery in bypass mode.

CHARACTERISTIC CURVE OF THE EXTERNAL PRESSURE INCREASE – AIR VOLUME FLOW

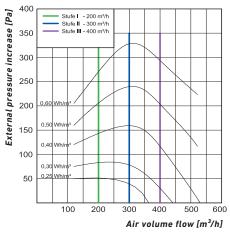
(for volume flow constant function)

The characteristic curve specifies the external pressure (p_{ext}) that is available for the ducting system.

TOTAL OUTPUT

The SFP values shown take into consideration the power consumption for in the supply air and exhaust air lines and the power consumption of the control unit.

PRESSURE-VOLUME FLOW CHARACTERISTIC CURVE FOR LG 500 P WITH A VOLUME FLOW CONSTANT CONTROL



FANS

(factory setting)

Air volume flow: Speed I: 200 m³/h Speed II: 300 m³/h Speed III: 400 m³/h Power consumption at an external 50 Pa/100 Pa:

Speed II: 80/100 W Speed III: 130/155 W

Air volume flow setting range:

150 to 550 m³/h

Power consumption mode: 7,1 W

PASSIVE HOUSE CERTIFIED IN ACCORDANCE WITH PHI CRITERIA

Housing seal-tightness: Externe Leckage 0,6 %, Interne Leckage 0,52 % Heat recovery rate: $\eta_{\rm eff,\,t,\,WRG}$ = 82 % (345 m³/h); 86 % (277 m³/h)

Comfort criterion: T_{SUP} = +16,5 °C bei T_{ODA} = -10 °C

Flow efficiency: $\eta_{\text{elek}} = 0.33 \text{ Wh/m}^3 (345 \text{m}^3/\text{h}); 0.26 \text{ Wh/m}^3 (277 \text{m}^3/\text{h})$



CERTIFIED ACCORDING TO EN13141-7:2010

Thermodynamic tests at air volume flow rates 121/304/446 m³/h (at outdoor-temp. +7 °C (+1 x Ref. +2 °C), at extract air temp. +20 °C): Extract air side = 76 %/76 %/70 % and supply air side = 88 %/84 %/82 %

Flow efficiency: $\eta_{\text{elek.}} = 0.26/0.20/0.36 \text{ Wh/m}^3$





Colour touch display PI-HMI

SOUND DATA

Measuring po	int		Housing emission		1	utdoor a necting p			Supply ai			xhaust a necting p			xtract ai	
Speed		I	II	III	ı	II	III	I	Ш	III	- 1	II	III	I	Ш	III
63 Hz		45	47	49	65	67	69	59	65	72	66	68	70	62	64	66
125 Hz		44	44	44	60	60	60	55	58	61	63	63	65	56	57	57
250 Hz		44	47	49	60	61	62	49	52	55	66	68	69	57	58	59
500 Hz	g c	35	37	40	45	50	55	37	43	48	48	55	62	44	49	54
1000 Hz	. ⊑ ^	31	32	33	31	35	39	25	31	37	37	42	47	30	35	39
2000 Hz	_	26	29	31	27	32	37	18	25	31	40	45	51	27	32	36
4000 Hz		24	28	31	21	26	32	14	20	26	37	42	47	16	21	26
8000 Hz		19	21	22	13	17	21	11	13	16	25	31	38	11	13	14
Total L _{wA} in dB (A))	39	41	44	53	55	57	44	48	53	53	53	58	50	51	55

(with an external pressure increase of 100 Pa)

Operation

BYPASS FOR HEAT EXCHANGER

The modulating bypass damper is controlled as a function of the outside air temperature and the set temperature control mode (supply air, extract air or room air). This allows continuous regulation of the heat exchanger output, via the air volumes. This will also protect the heat exchanger from frost damage. The heat exchanger may be bypassed in summer nights, for example, now blowing cool outdoor air into the room.

CONTROLLER

All the ventilation unit settings are made via the external PI-HMI control unit. The current operational statuses and system values, e.g. operating mode, fan speed, temperature, etc. are shown on the 3,5" touchscreen display. Automatic or manual mode can be selected. In Automatic mode, the system is controlled by programmable timers and will operate fully automatically, whilst ventilation levels may, for instance, be individually increased in manual mode (boost ventilation).

DIMENSIONS

Item	Dimensions	Item Number
PI-HMI with Connecting cable, length 1 m and double-sided RJ12 connector	(W x H x D) 80 x 121 x 42 mm	included in the delivery

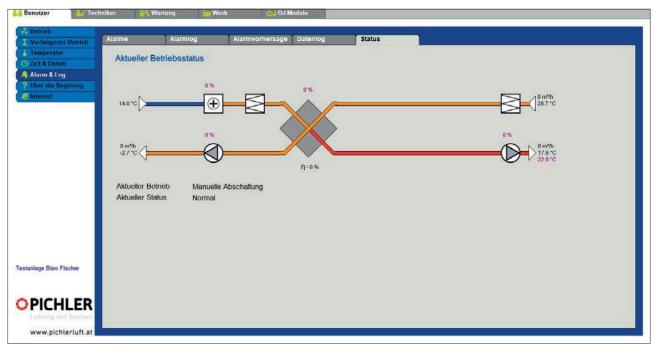
OPTIONAL: VISUALIZATION AND NETWORKING OPTIONS

The Pichler-Air2-System offers multiple networking options as integration into a higher level building automation system.

- Integratred webserver
- Modbus RTU
- Modbus TCP/IP
- BACnet
- KNX Gateway

The corresponding bus connection is activated/parameterized at the factory according to the customer's order.





Integrated webserver plant status

Functional overview

Function	Description	Standard	Optional*
Ventilation control	Constant volume flow control	•	
method:	Air quality control CO ₂	•	
	Air quality control VOC	•	
	External control signal 0-10 V		•
	Constant pressure control		•
	PICHLER System Optimiser		•
Temperature	Constant supply air temperature	•	
control method	Constant extract air temperature	•	
Ancillary functions	Outdoor air compensation	•	
	Summer nights cooling (only for weekly program)	•	
Possible heating and	Internal E-pre-heating battery, 4-level (Standard dependent on apparatus)	•	
cooling components	Control of an external E-re-heater battery		•
	DX cooler controller		•
	Control of a water pre-heater battery		•
	Control of a water re-heater battery		•
	Control of a water cooling battery		•
	Control of a water combi battery		•
Communication	Integrated web server		•
	Modbus TCP/IP		•
	Modbus RTU (not possible with System Optimiser!)		•
	BACnet		•
	KNX-Gateway		•
Signal exchange	Analog input for VOC/CO ₂ sensor (on terminal)	•	
hardware	Low rpm input	•	
	High rpm input	•	
	Shut-off valves 2x Belimo LM24A control (on terminal)	•	
	Error message Level A (floating max. 30V / 3A)	•	
	External start input (inverted)	•	
	External stop input (on terminal)		•
	External fire alarm input (on terminal)		•
	Operational (floating max. 30V / 3A)		•

^{*} The options must be specified in the order and will attract additional costs!



External control extension for external water registers



External PI-SYS-OPT control extension



Pressure sensors PI-Air2 incl. connection kit

External control extensions

EXTERNAL CONTROL EXTENSION FOR EXTERNAL WATER REGISTERS

External control extension for ventilation units with a PI-Air2 control system. Provides for controlling a maximum of two external water registers (pre-heater, postheater, water cooling battery and combi exchanger). Control system extension pre-assembled and wired in the surfacemounted housing.

- *Dimensions (WxHxD):* 255x180x110 m
- Material: polystyren
- Colour: light grey, similar to RAL 7035
- Degree of protection: IP54/6
- Suitable for indoor us
- Metric knockouts for screwed cable glands

Accessories included:

- Clamp-on temperature sensor PT1000 (2 pieces)
- Modbus flat cable (7 metres)
- RJ12 plug for press-fit applications (2 pieces)

EXTERNAL CONTROL EXTENSION WITH PICHLER-SYSTEM OPTIMIZER

External PI-SYS-OPT (Pichler system optimizer) control extension for ventilation units with a PI-Air2 control system. Provides for the demand-optimized control of the central ventilation unit within a range of up to 25 zones. The system can be extended to a maximum of 125 zones. Control system pre-assembled and wired in the surface-mounted housing.

- *Dimensions (WxHxD):* 255x180x110 mm
- Material: polystyren
- Colour: light grey, similar to RAL 7035
- Degree of protection: IP54/6
- Suitable for indoor us
- Metric knockouts for screwed cable glands

Advantages over constant pressure regulation: Significantly less energy consumption by the fans, less flow noise by regulated preliminary pressure in the duct system, optimised regulation by the central control of all volume flow regulators.

EXTERNAL CONTROL EXTENSION WITH PRESSURE SENSORS

Pressure sensors for external mounting including a connection kit. Serves to ensure the constant pressure control of ventilation units by means of a PI-Air2 control system.

Including:

- A double pressure sensor
- Air tube (1.5 metres)
- Connecting nozzles (2 pcs.)
- Modbus flat cable (5 metres)
- RJ12 plug for press-fit applications (2 pcs.)

Item	Item number
External control extension for external water registers	08LGREGWREG
External control extension with Pichler-system optimizer	08LGREGSYSOP
External control extension with pressure sensors	08LGREGDRUCK





CO₂ sensor

Accessories

SPARE FILTER

will ensure perfect hygiene and air quality given regular replacement, also proper functionality and efficient operation of the equipment.

Item	Item number
Filter ETA ISO Coarse 70% (extract air)	40LG050100 (standard)
Filter ODA ISO ePM2,5 65% (outdoor air)	40LG050090 (standard)
Filter ETA ISO Coarse 80% (extract air)	40LG050120
Filter ODA ISO ePM1 80% (outdoor air)	40LG050110

DEMAND-ORIENTED VENTILATION CONTROL

 ${\rm CO_2}$ or VOC sensors for demand-oriented ventilation control. The ventilation unit will automatically increase or reduce the air volumes depending on the quality of the air in the room. The sensor in the surface-mounted housing is suitable for wall

mounting. *Colour:* white

 $Dimensions: W \times H \times D = 85 \times 85 \times 35 mm$

Ambient temperature: 10-50°C Measuring range: 0-2000 ppm Sensor supply voltage: 24V AC/DC

Control signal: 0-10 V

Item	Item number
CO, sensor	07RC0248330

Needs-based operation via the ${\rm CO_2}$ or VOC sensor module only functions in automatic mode. The assignment of the fan speeds, the ppm and humidity values can be changed via the integrated web server.

BUTTERFLY VALVE

Ø 200 mm with mounted actuator LM24A-F.

Item	Item number
Butterfly valve	08AKR200LM24A

FLEXIBLE CONNECTION

Made of laminated and highly tear-resistant fabric and with double-sided sleeves made of galvanized sheet steel. With diameter: 200 mm, socket size, elongated length 150 mm.

Item	Item number
Flexible connection	01STR200

HOT WATER HEATER BATTERY, COLD WATER BATTERY

For pipe installation \emptyset 200 mm with accessories. Only in connection with an additional duct temperature sensor (item number 40LG0400011B) and a three-way motor control valve (item number 07R3..LR24ASR).

Item	Item number
Hot water heater battery for pipe installation ø 200 mm.	08PWW500200*
Cold water battery for pipe installation ø 200 mm.	01CWK200*
External control extension for external water registers	08LGREGWREG

^{*} For controlling the water register the external control extension 08LGREGWREG will be needed.







Direct evaporator

MODBUS/KNX-Gateway

EXTERNAL ELECTRIC RE-HEATER BATTERY

for pipe installation ø 200 mm.

Output: 1.200 W

An additional on-site mains supply and a corresponding contactor are required for the electric heater battery.

Controlling with O8LGREGEXENHR.

Only in connection with an additional duct temperature

sensor (item number 40LG0400011B).

Item	Item number
PTC electric reheater battery for pipe installation ø 200 mm	08CV20121MTXL

DIRECT EVAPORATOR

Duct cooler with DX coil. Controlling with 08LGREGDX. Only in connection with an additional duct temperature

sensor (item number 40LG0400011B).

Air volume: 500 m³/h *Medium:* R410A *Te:* +32°C / 40% r.F.

Ta: +18°C Power: 3,0 kW Pressure loss: 24 Pa

Dimensions: W x H = 400 x 200 mm

Item	Item number
Direct evaporator DXRE-40-20	01DXRE4020
Droplet separator DE 40-20	01DE4020

THREE-WAY MOTOR CONTROL VALVE

Three-way control ball valve for the continuous closed-loop control of cold and warm water with a mounted closed-loop control actuator.

Belimo drive: LR 24ASR Drive voltage: 24V AC/DC Control signal: 0-10V DC Control ball valve: R3015 Mounting position: optional

KVS value	Item number
0,63 m ³ /h	07R3015P6LR24ASR
1,0 m³/h	07R30151SLR24ASR
1,6 m³/h	07R30151PLR24ASR
2,5 m ³ /h	07R30152PLR24ASR

EXTERNAL SUPPLY AIR TEMPERATURE SENSOR

Item	Item number
Duct temperature sensor – PT1000 sensor with flange, cable length 3 m	40LG0400011B

MODBUS/KNX GATEWAY

The Modbus/KNX gateway allows for the connection of the compact ventilation unit LG 500 P to a KNX bus system. In this process, the gateway serves as a connective link between the two bus systems. It is provided with a Modbus RTU and TCP interface and is always the master on the Modbus. On the KNX side, however, it responds like a common KNX TP-1 unit. This makes it possible to centrally control and monitor the ventilation unit by a KNX system. The configuration is implemented via the IP or USB interface.

Dimensions: W x H x L = 88 x 56 x 90 mm

Mounting: Top hat rail or wall

Permissible ambient temperature: $0-60~^{\circ}\text{C}$ Permissible humidity: 5-95% non-condensing

Protection class: IP20 Voltage: 24V AC/DC

Interfaces: Ethernet, EIA-485, KNX-TP1

Item	Item number
MODBUS/KNX-Gateway	08KNXGA5006000A

COMPLETE PROGRAM FOR AIR DISTRIBUTION SYSTEMS

We offer a complete program of air distribution systems, such as Komflex (round or oval). Details of our air distribution program can be found in the technical documentation.



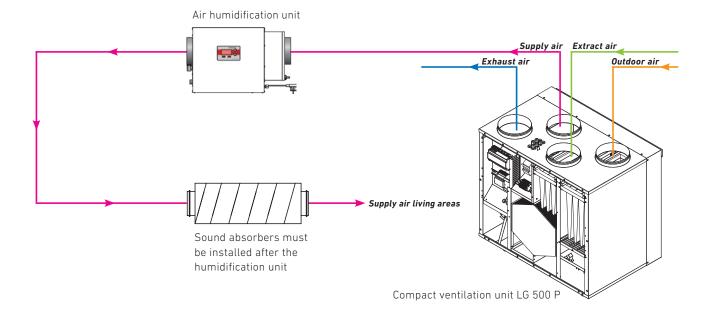


LBE 500 with warm water heater battery (right-hand version)

COMFORT THROUGH AIR HUMIDIFICATION WITH THE LBE 500 UNIT

- Constant, optimal indoor air humidity for the entire living area
- Active humidification of the indoor air
- By means of natural evaporation no over-humidification is possible
- Compact automatic humidifier
- Easy to operate
- Hygienic and safe operation, evidenced by a hygiene expertise
- Installation in the central ventilation system, also suitable for retrofitting
- Low maintenance costs

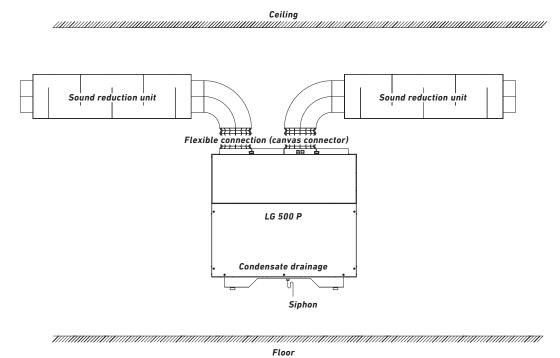
Standing or wall- mounted installation		Air connection [mm]	Water connection [inches]	Flow [m³/h]	Flow [m³/h] Weight [kg]	
08 LBE500 LW	Left-hand version incl. PWW Hot water preheater battery	250	3/4	500	46,0	610 x 560 x 510
08 LBE500 RW	Right-hand version incl. PWW Hot water preheater battery	250	3/4	500	46,0	610 x 560 x 510





Mounting examples

WALL-MOUNTED INSTALLATION IN THE BASEMENT





Data in accordance with EU Regulations 1253/1254-2014

The Pichler ventilation unit meets the requirements of the Eco-design Directive, in accordance with the EU Regulations 1253/1254-2014, and is based on the current state of knowledge (07/07/2014).

LG 500 P

Specific energy consumption:

 A+ is applicable when controlled to local requirements and is valid up to the specified maximum airflow volume A is applicable when controlled with a manual control, a clock control or a central demand control and is valid up to the specified maximum airflow volume

LG 500 PF

Specific energy consumption:

- A is applicable when controlled with a clock control, a central demand control or a local demand control
- B is applicable when controlled with a manual control

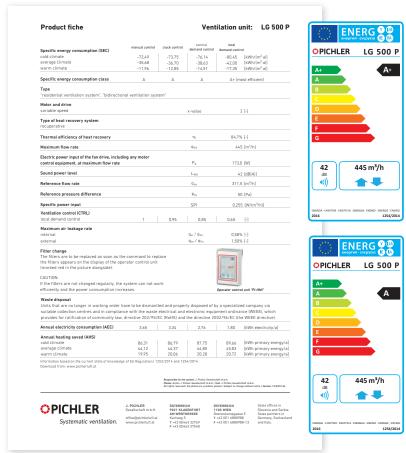
Maximum air volume flow: 445 m³/h The specified energy efficiency is applicable when controlled to local requirements and is valid up to the specified maximum air volume flow.

Sound power level LWA indoors: 42 db(A)

Overview energy efficiency classes

Air control options	manual control		clock control		central demand control		local demand control	
Ventilation unit	LG 500 P	LG 500 PF	LG 500 P	LG 500 PF	LG 500 P	LG 500 PF	LG 500 P	LG 500 PF
LG + operator control PI-HMI	Α	В	Α	Α	-	-	-	-
LG + operator control PI-HMI + 1 x CO ₂ sensor (08LGC02FUEHLER)	-	-	-	-	Α	Α	A+	Α

^{*}see page 8, optional accessories for needs-based operation



Download from: www.pichlerluft.at



The LG 500 P at a glance!

Fans:

energy-saving radial fans with EC motor technology and optional constant pressure control

Counterflow heat exchanger:

highly efficient heat recovery system with an air/air counterflow heat exchanger made of recyclable plastic with an automatic 100% bypass

Air volume flow:

of 150 to 550 $\mathrm{m^3/h}$ with an external pressure of 50 to 250 Pa

Filter:

Filter ODA ISO ePM2,5 65% Filter ETA ISO Coarse 70%

PTC-electric preheater battery module:

can be integrated into the comfort ventilation device. Compact electrical pre-heater module for outdoor air with automatic bypass function as anti-freeze protection for the counterflow heat exchanger

Housing:

made of galvanized sheet steel, powdercoated in RAL 9010 with thermal insulation

Air connections:

left and right-hand versions of the unit. ODA/EHA/ETA/SUP: each 200 mm in diameter with a double lip seal

Installation position:

standing or wall-mounted device

Summer changeover:

integrated 100% bypass flap with seal

Optional: building automation – networking options:

- Integratred webserver
- Modbus RTU
- Modbus TCP/IP
- BACnet
- KNX-Gateway

The corresponding bus connection is activated/parameterized at the factory according to the customer's order.

Electrical connection:

delivered ready to plug in, 230V/16A

Service – maintenance – initial startup Suitable in conjunction with the air humidifier LBE 500.

OUR COMPACT VENTILATION UNIT LG 500 P HAS BEEN EXTERNALLY INSPECTED BY

• Lucerne Polytechnic – Engineering & Architecture

OUR COMPACT VENTILATION UNIT LG 500 P HAS BEEN CERTIFIED BY

• Passivhausinstitut (Passive House Institute) Darmstadt

Notice:

Our product range includes units with a size up to 10,000 m³/h as well as comprehensive accessories.



Notes



Notes





ErP 2018

Fulfils the requirements of the Ecodesign Directive, in accordance with EU Regulation 1253/2014.



Your partner/installer:







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Systematic ventilation.

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