OPERATING AND INSTALLATION INSTRUCTIONS LG 1400(S) - LG 3200(S)

COMFORT VENTILATION

CERTIFIED COMPONENT
Passive House Institute
for residential buildings
for non-residential buildings

EN13141-7:2010

TÜV AUSTRIA
TYPE TESTED
TÜV AUSTRIA SERVICES GMBH

ErP 2018
EU Regulation 1253/2014

PICHLER

Systematic ventilation.

Contents

Introduction

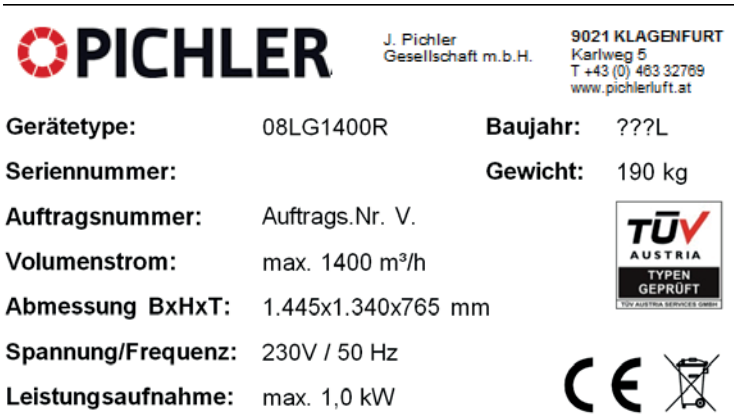
Dear Customer
Thank you very much for choosing a **ventilation unit of the series LG VENTECH System.**

Series LG ventilation units are state of the art. They prevail due to their high efficiency, operating convenience and operational reliability.

To operate your compact ventilation unit safely, properly and efficiently, please read and observe this operating guide carefully.

Only use the ventilation unit when it is in perfect condition, according to its intended purpose, with an awareness of safety and dangers, and also taking all the information in this guide into consideration.

The unit type and serial number (see type plate on unit) must always be provided for any questions or spare parts orders.



Illus.: type plate

Please contact the following if you have any other questions or if you lose the documentation:

PICHLER
J. Pichler Gesellschaft m.b.H.
9021 KLAGENFURT
Karlweg 5
T +43 (0)463 32769
F +43 (0)463 37548
office@pichlerluft.at
www.pichlerluft.at

1 General information

This chapter contains general information on the **series LG ventilation unit.**

READ THROUGH THIS GUIDE CAREFULLY BEFORE STARTING THE UNIT UP AND OBSERVE THE SAFETY INSTRUCTIONS.

This guide contains instructions and information for the safe operation, correct installation and operation and maintenance of the ventilation unit. It should be used as a reference for service work so that the work can be carried out in a responsible way. Keep this operating guide in a safe place where it can be accessed at any time.

Any necessary interventions and troubleshooting on the ventilation unit must be performed by an installation company (specialised company).

The unit is subject to constant improvement and ongoing development. Therefore it is possible that your unit differs slightly from this description.

Subject to changes: This guide was prepared with the utmost care. Nevertheless, no rights can be derived from it. We are constantly making an effort to provide technical improvements and optimisations to our products and reserve the right to change the designs of the units or technical data completely or in part without any prior notification. The current version of our "General Terms and Conditions" applies to the **LG series VENTECH System** ventilation units.

1.1 Usage in accordance with the intended purpose

Series LG ventilation units are designed to be installed in ventilation and air-conditioning systems for mechanical ventilation of living and recreation rooms and similar applications.

The purpose of mechanical ventilation of living and recreation rooms is to improve the quality of the air in the room and reduce the energy required for heating through the use of a highly efficient heat recovery system.

The area of application and proper use of the unit are limited to use in ventilation and air-conditioning systems for the extraction of room air and supply of fresh, temperature controlled outdoor air with maximum conveying temperatures of -16°C to +35°C. The conveyed air must be free of aggressive vapours and any substances that promote wear.

Any other application is considered to be for purposes other than the intended ones. The manufacturer declines any responsibility for ensuing damage or consequential damage. Compliance with the operating and installation guide stipulated by us is also part of proper use.

This unit, which is accessible to the general public, is intended to be installed in residential buildings or in commercially used buildings. The unit is used for mechanical ventilation of the room air and also for supplemental heating/cooling in connection with a heating and cooling battery.

This unit is not meant to be used by anyone, including children, with limited physical, sensory or mental abilities or with a lack of experience and/or lack of knowledge unless they are supervised by someone who is responsible for their safety or if they are given instructions by that person on how to use the unit. The unit is not suitable for installation outdoors and must only be installed in suitable and temperature controlled indoor rooms.

Series LG ventilation units are not ready-to-use products. They may only be put into operation after they have been properly built into and connected to the ventilation and air-conditioning system. Only qualified and appointed persons may work on the unit.

People who transport or work on the unit must have read and understood the operating guide, especially **chapter 2 "Safety".** The end user must be informed of possible dangers that may arise.

1.2 Liability

Series LG ventilation units were developed and manufactured for ventilation in living rooms and rooms with similar purposes such as offices and seminar rooms. **Proper use** is described **in section 1.1** of this guide.

Any other use is considered to be improper use and may lead to personal injury or damage to the ventilation unit for which the manufacturer cannot be made liable. The manufacturer is not liable for any damage in the event of:

- not observing the safety, operating and maintenance instructions given in this guide.
- installation of spare parts that were not supplied by the manufacturer
- normal wear

1.3 Warranty

The warranty starts when the unit is put into operation, or one month after delivery at the latest. The warranty exclusively covers simple material replacement and does not include claims for compensation for services.

It only applies if there is documentation of maintenance carried out in accordance with our regulations by a licensed, specialised installer company.

1.4 Warranty Terms

A warranty claim can be made within a maximum time period of 24 months after the installation of the ventilation unit, however, up to 30 months after the date of manufacture at most.

Warranty claims can be made exclusively for material and/or construction flaws that occur during the warranty period. In the event of a warranty claim, the ventilation unit may not be disassembled without the prior written consent of the manufacturer. The manufacturer then only grants a warranty on spare parts if they are installed by an installer recognised by the manufacturer.

The warranty becomes void automatically when the warranty period ends, in the event of improper operation such as, for example, operation without filters, if parts other than original parts supplied by the manufacturer are installed, and in the event of unapproved changes or modifications to the system.

Failure to comply with these operating and installation instructions will automatically void all warranties

2 Safety

Read this operating and installation guide carefully and observe the safety instructions during installation work, start-up, maintenance work or general work on the ventilation unit.

Keep the operating and installation guide close to the unit during its entire service life. Always follow the safety regulations, warning information, instructions and comments described in this operating guide.

The specifications mentioned in this document may not be changed.

Not observing these safety regulations, warning information, instructions and comments can lead to bodily harm or damage to the ventilation unit.

A service agreement is recommended to ensure that the unit is checked and serviced at regular intervals. Your supplier can give you the addresses of recognised installers in your area.

2.1 Symbols Used

The following safety symbols identify text passages in which there are warnings about dangers and sources of danger. Please familiarise yourself with these symbols.

Attention/Note!

Attention! Not observing this warning may lead to injury or danger to life and limb and/or damage to the equipment.

Attention, dangerous electrical voltage! Not observing this warning may lead to injury or danger to life and limb.

2.2 Safety regulations

2.2.1 General information

The installation, start-up, maintenance and repair must be carried out by an authorised specialist (heating/installation specialists).

Above and beyond this operating and installation guide, the national regulations and standards apply without restriction to the operation of the unit. Let the installer of the system instruct you on the unit and control unit after the installation. The ventilation unit may only be used in accordance with the **usage in accordance with the intended purpose** given in **section 1.1.**

All safety and danger information on the unit must be observed. In the event of malfunctions, the unit must be switched off immediately and secured against being switched back on. Malfunctions must be eliminated without delay.

After the repair work, the operational reliability of the unit must be restored by qualified persons.

Attaching or installing additional equipment is not permitted. Changes and modifications to the ventilation unit are not permitted and release the manufacturer of any warranty and liability. Only original spare parts may be used.

It must be ensured that no one, including children, with limited physical, sensory or mental abilities or with a lack of experience and/or lack of knowledge handle the unit.

2.2.2 Installation of the unit

All national and local regulations must be complied with for the assembly and installation. The unit may only be installed in compliance with national installation regulations. The assembly and installation must be carried out in accordance with the general, locally applicable building, safety and installation regulations of the respective municipality, or of the water and electricity services and other institutions.

The unit may only be installed in frost-free and dry rooms. The room temperature in the place of installation must constantly be between a minimum of +5°C and a maximum of +40°C.

The ventilation unit is designed for floor mounting and may only be installed if there is a suitable floor construction that is capable of bearing it. No vibrations must affect the unit. Suitable structure-borne sound insulation to the building must be provided by the customer.

When transporting the ventilation unit, the maximum permissible and reasonable lifting load for people and hoists must be observed.

A suitable drain with an effect odour trap (siphon) must be installed for continuous removal of the condensate that forms during operation of the ventilation unit. There must be sufficient distance between the bottom edge of the unit and the floor.

Installation of the unit, the electrical connection work as well as the installation and connection work for the water, heating and condensate connections must only be performed by a specialist. Adequate, professional execution of all connection work, in particular leak-free implementation of the connecting lines and the seal tightness of the condensate drain with an effective outflow and odour trap, must be ensured in order to exclude damage to the building. Before start-up and after each time the unit is serviced, the condensate drain must be checked in an on-site inspection to make sure it works.

System components of the ventilation system such as, for example, air lines with built-in components, optional heating batteries with accessories, which are possibly installed in unheated areas, must be designed to be suitably insulated in order to prevent heat loss or the formation of condensate (if the temperature drops below the dew point temperature). If there is a danger of frost for components, then suitable measures must be taken to ensure automatic, reliable, frost-free operation.

Structural, safety and fire protection regulations, provisions and standards that must be applied locally must be complied with. If applicable, suitable measures must be taken during the installation of the units on site, e.g. the installation of fire protection dampers in the air lines, etc.

2.2.3 Electrical connection work

- Warning: dangerous electrical voltages!
- Failure to observe this risk can lead to death, injury or damage to property.
- Before carrying out any work on live parts, the unit must always be disconnected completely from the power supply (all poles) and secured against being switched back on.

Electrical connections and work carried out on electrical components of the unit and its accessories may only be carried out by authorised electricians in compliance with the applicable laws, requirements, standards and directives.

The ventilation units are designed for a power supply (can be seen on the unit's type plate) of 230 V/50 Hz or 400 V/50 Hz. Refrain from any way of working that has an adverse effect on safety. For safe operation, safety equipment must not be disassembled or rendered inoperative.

The electrical equipment with the warning and protective devices of the unit must be checked regularly to make sure they work properly. In the event of malfunctions or deficiencies such as, for example, loose connections or scorched cables, the unit must be shut down immediately. Only original fuses with the specified amperage and dimensions may be used.

If the mains connection of the unit is damaged or defective, then it must be repaired without delay in order to avoid any resulting danger.

It is forbidden to operate the unit until restoration of safe system operation.

If electrical deficiencies and malfunctions arise, then only authorised electricians may determine the cause and resolve the problem without delay. After completion of electrical work, all protective measures on the unit must be checked (e.g. grounding resistance, etc.).

2.2.4 System operation

It is only permitted to operate the ventilation unit if all necessary connections related to planned external fittings and components such as, for example, a pre-heater battery with air filter, re-heater battery, sound suppressor, etc. have been established properly and are also operational and in working order.

If faults, deficiencies or damage occur that can endanger people or other components, then the ventilation unit must be shutdown immediately and all poles disconnected from the mains power supply. Any further use of the system must be effectively prevented until its repair. Measures must be taken to prevent the unit from being switched back on unintentionally.

When the front covers are open or the cover plates removed, make sure you proceed in a safety and danger conscious way. Refrain from any way of working that has an adverse effect on safety.

It is only permitted to operate the unit with a connected air line and attached system components such as a sound suppressor for example, with a minimum line length of 1000 mm in order to ensure that the fans, for example, cannot be touched by the hands.

The ventilation units may only be operated in accordance with the design documents. They must comply with the Equipment and Product Safety Act as well as the relevant regulations of the EU guidelines and standards.

Take environmental effects into consideration and do not install the ventilation unit close to combustible liquids and gasses, in swimming pools or in areas that are affected by chemicals or hazardous substances.

The ventilation unit must not be operated without the air filters in place under any circumstances. The air filters must be checked regularly for fouling and damage and replaced if necessary. There will be a related prompt on the control unit to replace the filters. Only original spare filters may be used. If the system is out of operation for an extended period of time (e.g. in the summer), then the air filters must be replaced for hygienic reasons before starting it up again.

3 Ventilation system functionality

3.1 System description

Centralised ventilation extracts air from rooms such as bedroom, lounge, bathroom, toilet and kitchen and replaces this air with filtered outside air.

Large savings in energy may be achieved in plants which are in constant operation, thanks to highly efficient heat exchangers recovering heat from the extract air and energy efficient fans with state of the art EC technology for controlled airflow.

This technology is particularly cost effective when buildings have air-tight shells and are effectively thermally insulated. Efficient heat exchangers will allow substantial energy savings. Demands for economical and energy efficient operation may be satisfied using variable volume air flow systems for comfort zone ambient air, especially through on-demand fan control in coordination with, for instance, electronic control of volume flow. The Pichler Air2 system will control these complex processes.

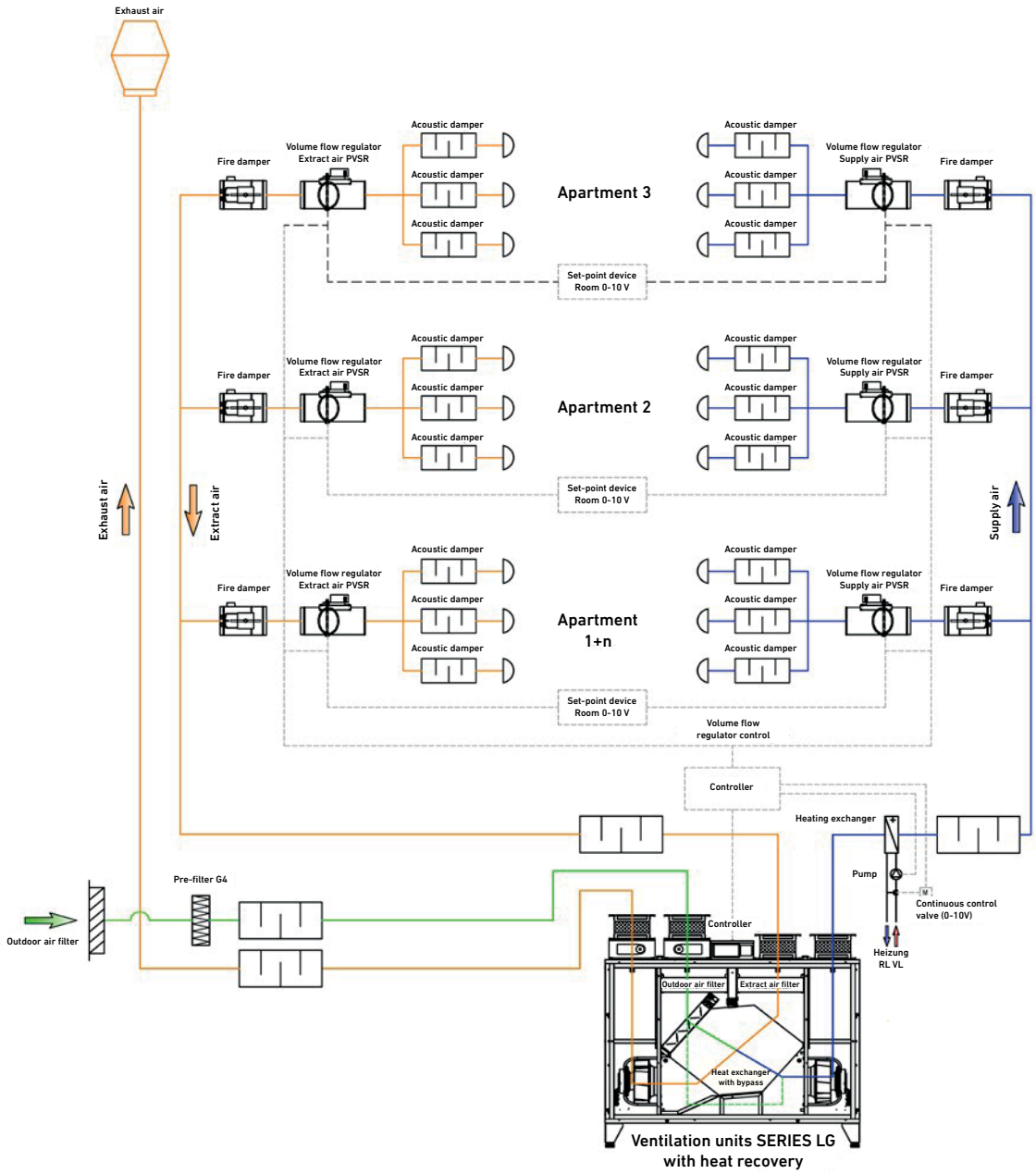


Fig.: The system diagram demonstrates the application of LG 1400 (S)/LG 3200 (S) System VENTECH compact ventilation units in a multi-storey residential building.

3.2 System extensions for heat exchanger frost protection

Depending on extract air temperature and humidity, a danger of freezing will exist at the heat exchanger exhaust air side, particularly under frost conditions in winter. The heat exchanger must be protected against ice formation during low outside air temperatures of ca. -3°C or less, using suitable measures.

Various strategies may be followed to protect the heat exchanger from freezing:

- Frost protection via heat exchanger bypass
- Frost protection by means of waterpreheater battery (glycol)
- Frost protection via pre-heater coils – electric version

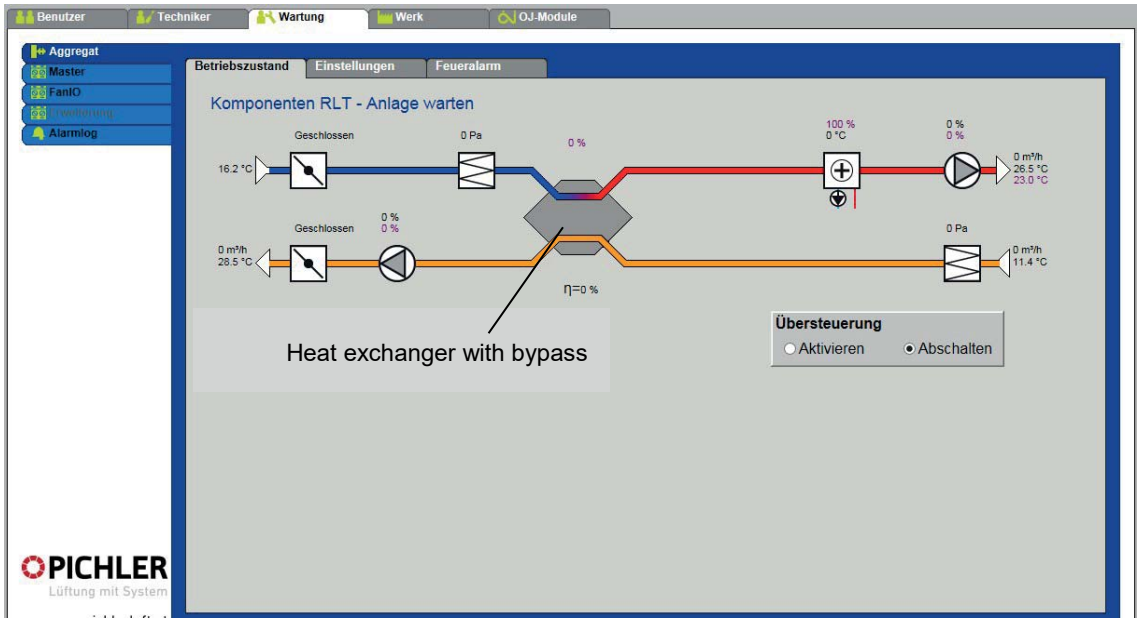
A frost protection alarm will trigger if none of these measures produce an effect after 5 minutes, i.e. if exhaust air temperature remains below minimum level despite fully open bypass damper and PWW pre-heating exchanger or electrical pre-heater on full power.

3.2.1 Frost protection via heat exchanger bypass

If the ventilation unit has no pre-heating exchanger, a bypass may be used to protect the heat exchanger from freezing. Cold outside air will in this case bypass the heat exchanger via a duct and the warm extract air will be used to protect the exchanger from freezing.

With this arrangement, a re-heater exchanger is recommended, in order to maintain a minimum supply air temperature.

Damper actuators are controlled via a 0-10 V signal.

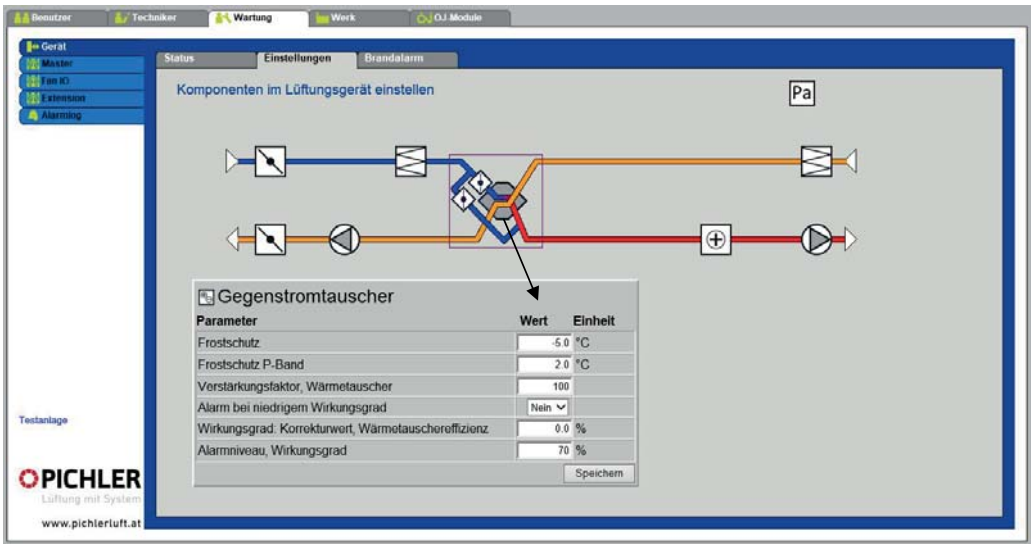


Description of the control system:

The bypass arrangement will protect the heat exchanger from freezing. The temperature sensor must be positioned in the exhaust air directly after the heat exchanger.

To protect the heat exchanger from freezing, the frost protection temperature (factory setting -5°C) and frost protection P-band (factory setting 2°C) parameters must be set. This means that the bypass damper will remain closed down to a frost protection temperature plus frost protection P-band. Starting from this temperature, the bypass damper will steadily open and will be fully open when the frost protection temperature is reached.

Primary parameters:



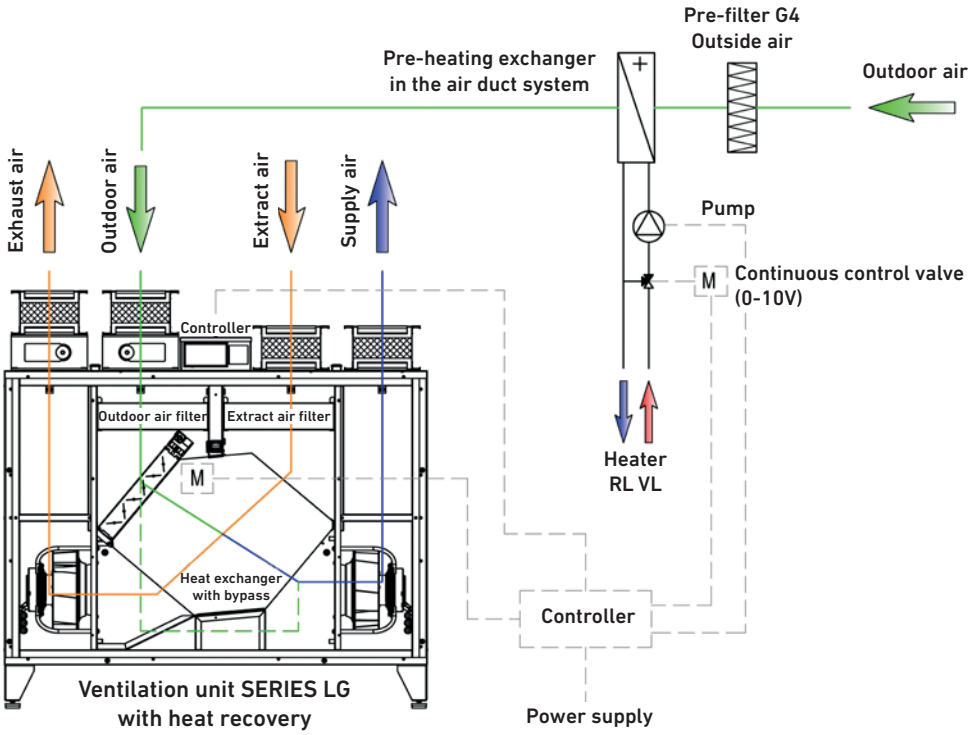
Primary parameters:	
Frost protection	✓ The bypass damper will open fully controlled at temperatures below the frost protection temperature and frost protection P-band. This means that the outside air will bypass the heat exchanger and the room extract air will continue passing through the heat exchanger.
Frost protection P-band	✓ At temperatures below the set frost protection P band plus the set frost protection, the bypass damper will be linearly controlled up to fully open.
Amplification factor, heat exchanger	✓ Set the heat exchanger's amplification factor.
Alarm at low efficiencies	✓ Determine whether an alarm will trigger when efficiency is too low.
Efficiency: Correction factor for efficiency calculation	✓ Set correction factor for efficiency calculation.
Efficiency alarm level	✓ Set low efficiency alarm limit. ✓ To trigger the alarm, the system must be ‘running’, the efficiency must be less than the set value and the "alarm at low efficiency" parameter must be set to "Yes".

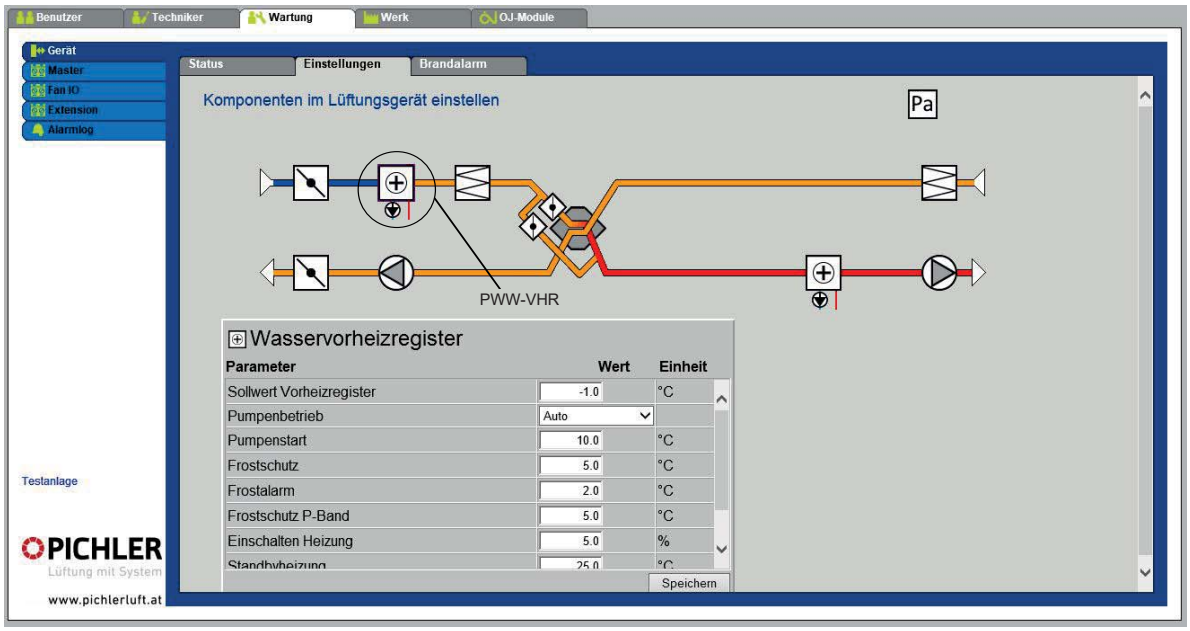
3.2.2 Frost protection via water pre-heating exchanger (optional)

The Series LG 1400 and LG 3200 ventilation unit may optionally be fitted with a water pre-heating exchanger to protect the heat exchanger from freezing. The cold outside air will to this end be pre-heated in an optional heating exchanger integrated in the air duct. The pre-heating exchanger will maintain the temperature before the heat exchanger above a set minimum to counter freezing of the heat exchanger.

The water-glycol mixture is regulated via a 0-10 V mixer controller with heating circuit, including a circulating pump.

The heating circuit **must** operate with antifreeze. (Glycol)





Description of the control systems:

The pre-heating exchanger will maintain the temperature before the heat exchanger at a set minimum. The sensor must be fitted directly after the pre-heating exchanger. Always operate the pre-heating exchanger with antifreeze.

Primary parameters:

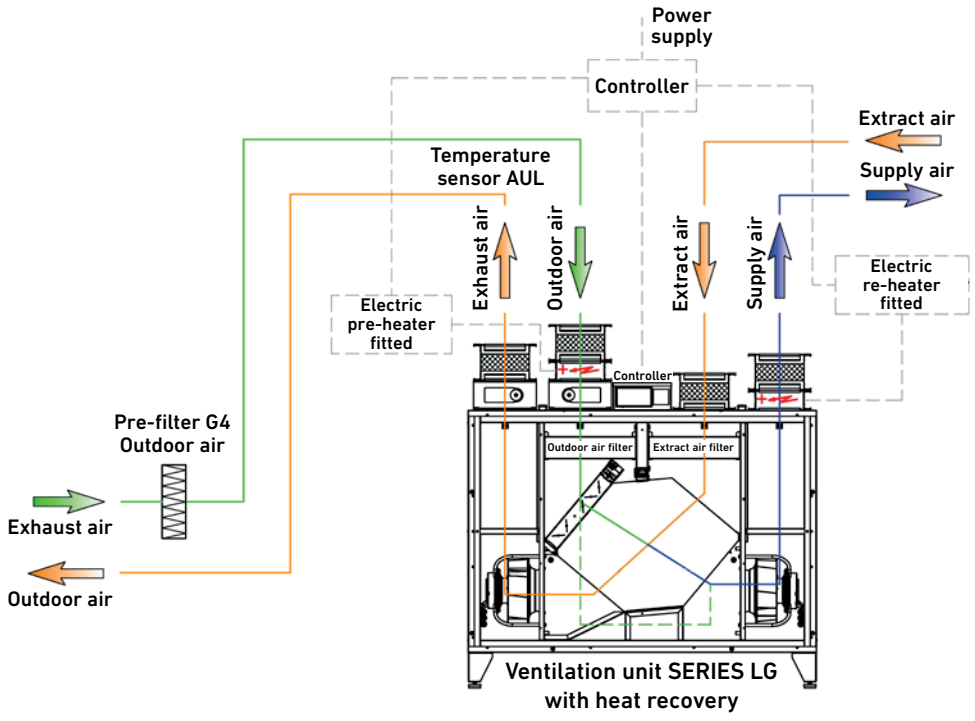
Primary parameters:	
Set-point, preheater	✓ Desired air-temperature set-point after pre-heating exchanger
Pump operation	✓ “Constant”. The circulating pump in the PWW heater will run continuously when power to the Air2Master is on. ✓ “Auto”. The circulating pump in the PWW heater will run when heating is required (valve setting >0.1%) ✓ “Outside temperature”. The circulating pump in the PWW heater will run when heat is required or when the outside temperature drops below the value set in the “Pump start” parameter.

Pump start	✓ The pump will start when the outside temperature falls below the set value. ✓ “Pump operation” must be set to “Outside temperature”.
Frost protection	✓ The set value gives the PWW heater return flow temperature at which the ventilator should be fully controlled. ✓ The heating valve control will be activated at set value plus “Frost-P-band” (see graphic)
Frost alarm	✓ The set value gives the PWW heater return flow temperature at which the compact ventilation unit will stop and a frost alarm will be triggered
Frost-P-band	✓ PWW heater frost protection sets in at the set value plus the “Frost protection” parameter value
Start-up heating	✓ Initial heating in %. Heating power when switching from standby to operation.
Stand-by heat	✓ When stopping the ventilation system, the heating valve will ensure that the return flow from the water battery does not get below the set value.
Water temperature	✓ Read actual return temperature.
P-Band	✓ P-band for the pre-heater PI controller
I-time	✓ I-time for the pre-heater PI controller
Motor-driven valve	✓ Set the control range of the motor-driven valve (0-10 V/2-10 V)

3.2.3 Frost protection via electric pre-heating exchanger (optional)

The Series LG 1400 and LG 3200 ventilating unit may optionally be fitted with an electric pre-heating exchanger to protect the heat exchanger from freezing. The cold outside air will to this end be pre-heated via a shell and tube heat exchanger mounted directly in the outside air duct to counter freezing of the heat exchanger.

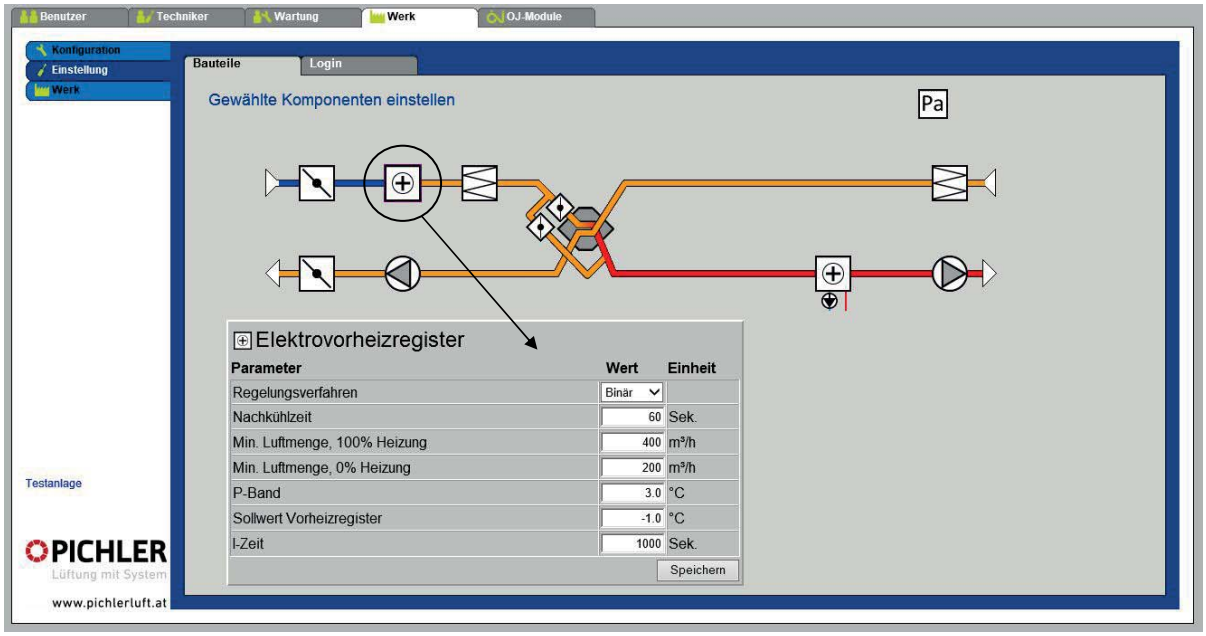
To reduce the consumption of primary energy, the frost protection strategies mentioned in Point 3.2.1 are recommended instead of the electrical versions.



Description of the control system:

The pre-heating exchanger will maintain a minimum required temperature before a heat exchanger. The temperature sensor must be fitted directly after the pre-heating exchanger.
A PI control algorithm is implemented here. The 0-10 V controller output signal regulates the pre-heating exchanger's power consumption via a Triac controller.

Primary parameters:



Primary parameters:	
Regulation form	✓ "0-10 V". Analogue heater control via a 0-10 V analogue output (e.g. EFS-9XXX) ✓ "single stage". Electric preheater is On/Off controlled ✓ "two-stage". Electric preheater is controlled in two stages (On/Off). As more heat is required, "Electric preheater relay 1" is first switched on, then "Electric preheater relay 2" and in reverse sequence switched off for less heat. ✓ "Binary". The electrical heater is digitally controlled in three stages (On/Off). The heating elements in the heating battery must be sized in 1/3 - 2/3. <u>By increasing heat requirements:</u> • Activate "Electric preheater relay 1" • Activate "Electric preheater relay 2" and disconnect "Electric preheater relay 1" • Activate "Electric preheater relay 1" and "Electric preheater relay 2" <u>By decreasing heat requirements:</u> • Disconnect "Electric preheater relay 1" • Disconnect "Electric preheater relay 2" and activate "Electric preheater relay 1" • Disconnect "Electric preheater relay 1" and "Electric preheater relay 2"

Post cooling time	✓ The electrical heater elements may overheat should air flow be reduced or stopped. The heating elements will be disconnected during post cooling and the ventilation units will continue to run as per the set air volume set-point. The set value defines the period required to ensure cooling of the electrical heating exchanger.
Min. flow, 100% heat	✓ Set value informs at which minimum volume (m^3/h) in the inlet, the heating should be 100% on.
Min. flow, 0% varme	✓ Set value informs at which minimum volume (m^3/h) in the inlet, the heating should be off (0%).
P-Band	✓ P-band for PI controller pre-heater
Set-point, preheating	✓ Desired air-temperature set-point after pre-heating exchanger P-band
I-time	✓ I-time for PI controller pre-heater

3.3 Optional: System extension for external auxiliary heating

The supply air exit temperature may be increased using one or two optional heating exchangers in the air duct system, operating using hot water or electrical power.

The integrated controller will control individual components such as the circulating pump, mixing valve etc.

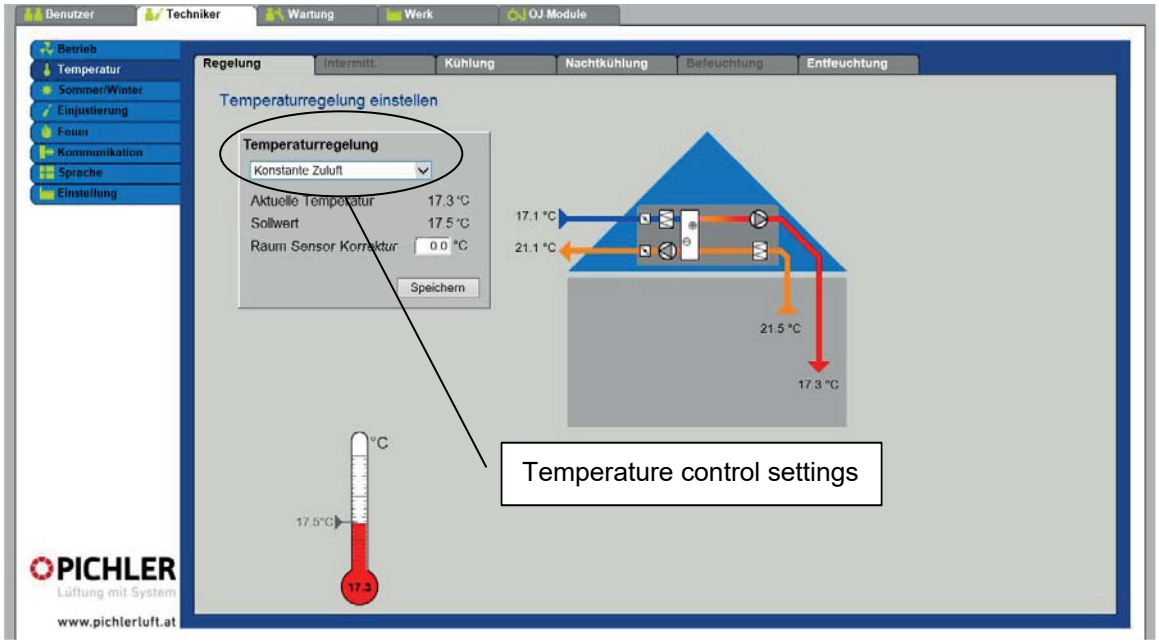
3.3.1 Post heating via pumped hot water re-heating exchanger (PWW-NHR)

The pumped hot water re-heating exchanger (PWW-NHR) mixer valves are controlled via 0-10 V signals (continuous). The circulating pumps will also be activated on demand.

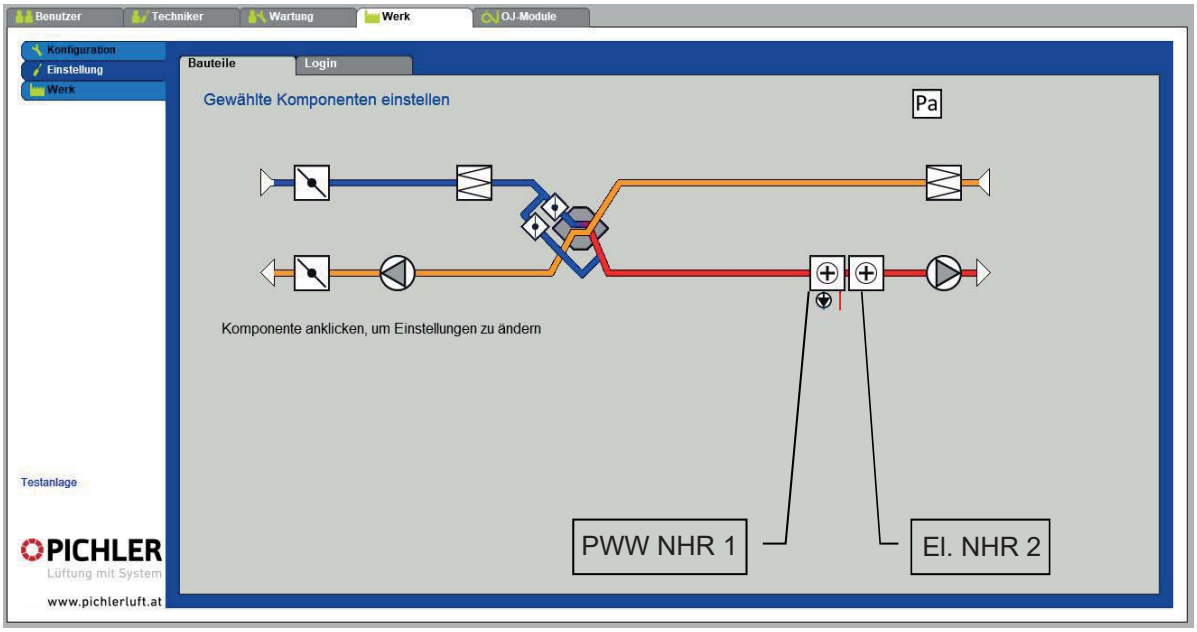
The following temperatures may be used as control parameters:

- Constant supply air temperature
- Constant extract air temperature
- Constant ambient air temperature
- Constant supply/extract air difference

The frost protection strategy for water-dependent heating/cooling batteries must always be checked against the local system requirements and on-site conditions , and modified if necessary It may sometimes be necessary to install an additional safety assembly (e.g. frost protection thermostat, heat exchanger). In case of risk of frost we recommend to always use a glycol filling. Outdoor heating circuits **must** always be operated with antifreeze (glycol)!



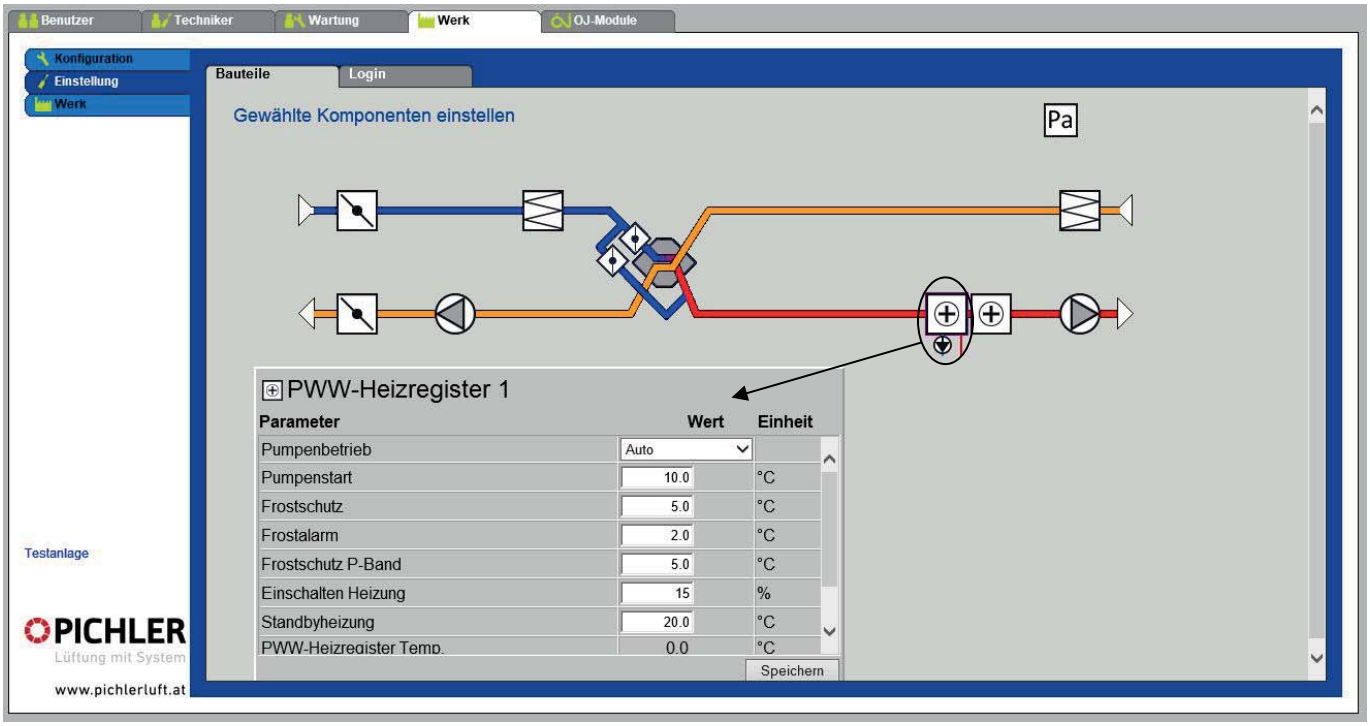
A return flow sensor (immersion sleeve or strap-on sensor) must be installed for frost protection of PWW-NHR. The heating circuit of the supply air re-heating exchanger may also be operated with antifreeze. The fans will stop when a frost alarm triggers.



A return flow sensor (immersion sleeve or strap-on sensor) must be installed for frost protection of PWW-NHR. The heating circuit of the supply air re-heating exchanger may also be operated with antifreeze. The fans will stop when a frost alarm triggers.

With room temperature control configured, the room temperature controller determines a set point supply air temperature based on the difference between set point temperature and actual temperature, which is then regulated by a downstream supply air temperature controller. With supply air temperature control configured, the higher level room temperature control falls away and the supply air temperature is regulated directly via a set point supply air temperature.

Primary parameters:



Primary parameters:	
Pump operation	✓ "Constant". The circulating pump in the PWW heater will run continuously when the Pichler Air2 Master is switched on. ✓ "Auto". The circulating pump in the PWW heater will run when heating is required (valve setting >0.1%) ✓ "Outside temperature". The circulating pump in the PWW heater will run when heat is required or when the outside temperature drops below the value set in the "Pump start" parameter.
Pump start	✓ The pump will start when the outside temperature falls below the set value. ✓ "Pump operation" must be set to "Outside temperature".
Frost protection	✓ The set value gives the PWW heater return flow temperature at which the ventilator should be fully controlled. ✓ The heating valve control will be activated at set value plus "Frost-P-band"
Frost alarm	✓ The set value gives the PWW heater return flow temperature at which the compact ventilation unit will stop and a frost alarm will be triggered
Frost-P-band	✓ PWW heater frost protection sets in at the set value plus the "Frost protection" parameter value (see graphic Page 12)
P-band	✓ P-band for PI controller heating
I-time	✓ I-time for PI controller heating
Start-up heating	✓ Initial heating in %. Heating power when switching from standby to operation.
Stand-by heat	✓ When stopping the ventilation system, the heating valve will ensure that the return flow from the water battery does not get below the set value.
Water temperature	✓ Read actual return temperature.
Gainfactor, heat 1	✓ Set gain factor for heating battery
Motor-driven valve	✓ Set the control range of the motor-driven valve (0-10 V/2-10 V)

3.3.2 Re-heating using electrical heating

The electrical heater may be controlled either via 0-10 V analogue signal or via digital relay outputs.

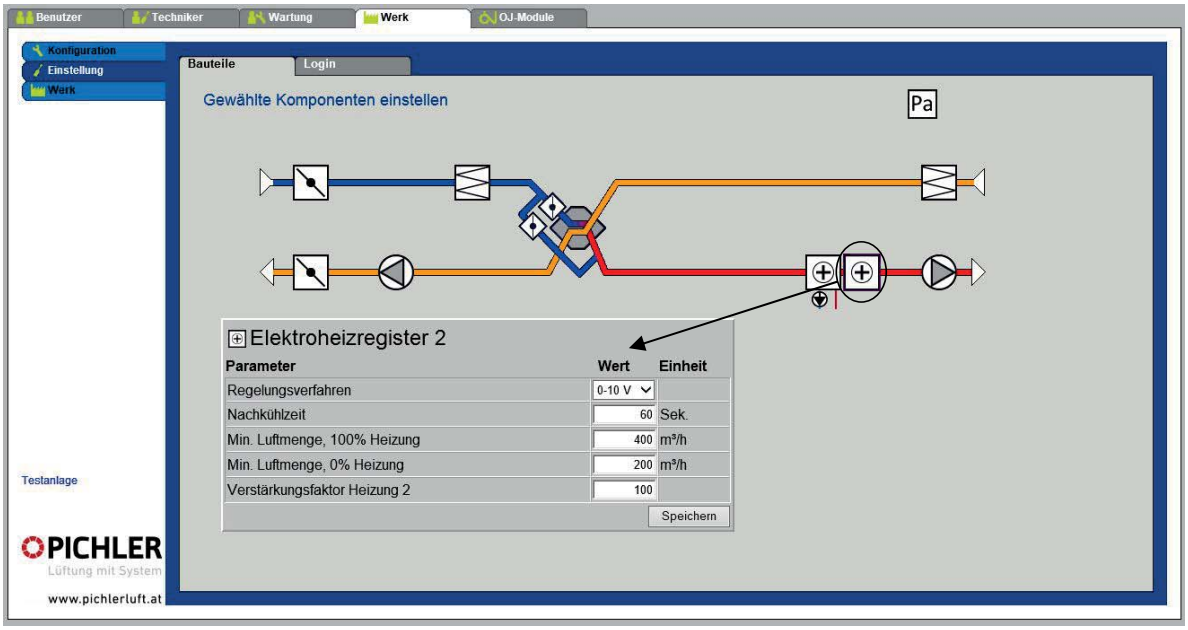
To maintain an adjustable set-point temperature, the electrical re-heating exchanger, optionally fitted to the connecting flange for supply air, is controlled via a 0 –10 V signal to a Triac controller.

When controlled via one or two digital outputs, the heater may be controlled as follows:

- Single stage
- Two-stage
- Binary via 2 relay outputs

The electrical re-heating exchanger will control the supply air set-point temperature with heating outputs of 0.4 kW to 2.0 kW (LG 1400) and 4.0 kW (LG 3200).

Primary parameters:



Primary parameters:	
Regulation form	✓ "0-10 V". Analogue heater control via a 0-10 V analogue output (e.g. EFS-9XXX) ✓ "single stage". Electric heating battery is On/Off controlled ✓ "two-stage". Electric heating batteryr is controlled in two stages (On/Off). As more heat is required, "Heating relay 1" is first switched on, then "Heating relay 2" and in reverse sequence switched off for less heat. ✓ "Binary". The electrical heater is digitally controlled in three stages (On/Off). The heating elements in the heating battery must be sized in 1/3 - 2/3. <u>By increasing heat requirements:</u> • Activate "Heating relay 1" • Activate "Heating relay 2" and disconnect "Heating relay 1" • Activate "Heating relay 1" and "Heating relay 2" <u>By decreasing heat requirements:</u> • Disconnect "Heating relay 1" • Disconnect "Heating relay 2" and activate "Heating relay 1" • Disconnect "Heating relay 1" and "Heating relay 2"
Post cooling time	✓ The electrical heater elements may overheat should air flow be reduced or stopped. The heating elements will be disconnected during post cooling and the ventilation units will continue to run as per the set air volume set-point. The set value defines the period required to ensure cooling of the electrical heating exchanger.
Min. flow, 100% heat	✓ Set value informs at which minimum volume (m^3/h) in the inlet, the heating should be 100% on.
Min. flow, 0% varme	✓ Set value informs at which minimum volume (m^3/h) in the inlet, the heating should be off (0%).
Gainfactor, heat 2	✓ Set gain factor for heating battery

3.4 Optional: System extension for cooling

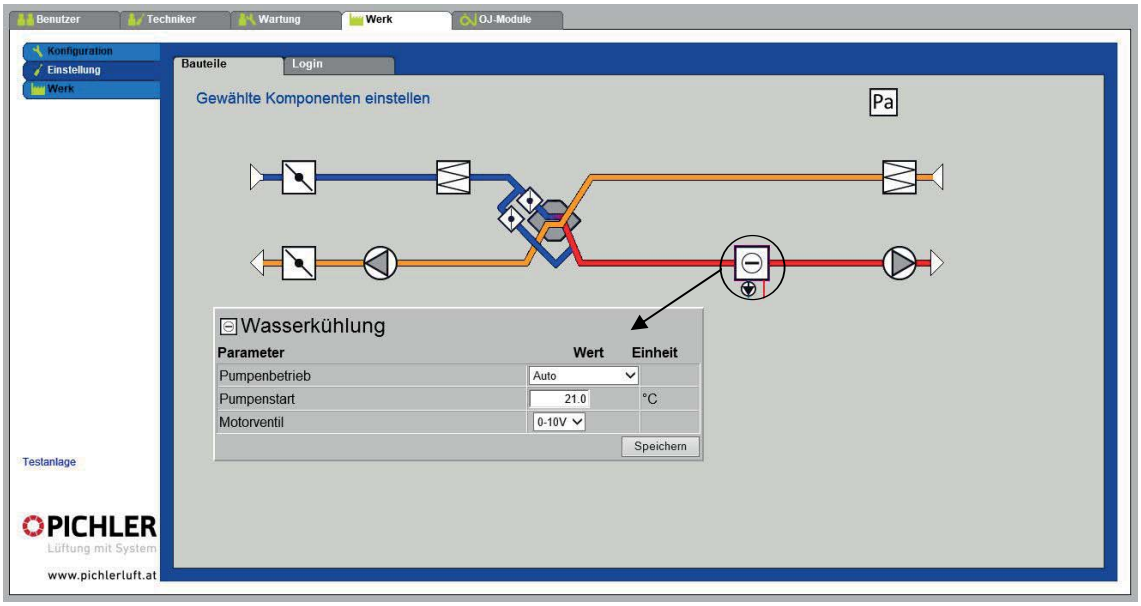
The supply air may be cooled using an optional cooling exchanger fitted in the supply air ducting. The integrated controller will control the individual components such as circulating pump, mixing valves etc..

3.4.1 Cooling with water cooling exchanger

A 0-10 V signal controls the cold water cooling valve. Start/Stop of the circulating pump in the cooling circuit via digital output. The alarm output of the pump may be connected to the “Cooling fault” digital input. This will trigger an alarm when the contact opens.

The heating circuit **must** operate with antifreeze. (Glycol) In water-based cooling batteries and cooling circuits no frost protection monitoring is carried out by the control system!
The glycol filling may only be dispensed with in exceptional cases, in indoor areas and if there is absolutely no risk of frost (e.g. if the cooling battery is installed downstream of a frost-monitored heater battery).

Primary parameters:



Primary parameters:	
Pump operation	✓ “Constant”. The circulating pump for the cooling exchanger will run continuously when the Pichler Air2 Master is switched on. ✓ “Auto”. The circulating pump for the cooling exchanger will run when cooling is needed (valve setting >0.1%). ✓ “Outside temperature”. The circulating pump for the cooling exchanger will run when cooling is required or when the outside temperature exceeds the “Pump start” parameter set value.
Pump start	✓ The pump will start when the outside temperature exceeds the set value. ✓ “Pump operation” must be set to “Outside temperature”
Motor-driven valve	✓ Set the control range of the motor-driven valve (0-10 V/2-10 V)
P-band cooling	✓ Controller parameter setting: P-band “Cooling”
I-time cooling	✓ Regulator parameter setting: I-time “Cooling”

3.4.2 DX cooling (cooling unit)

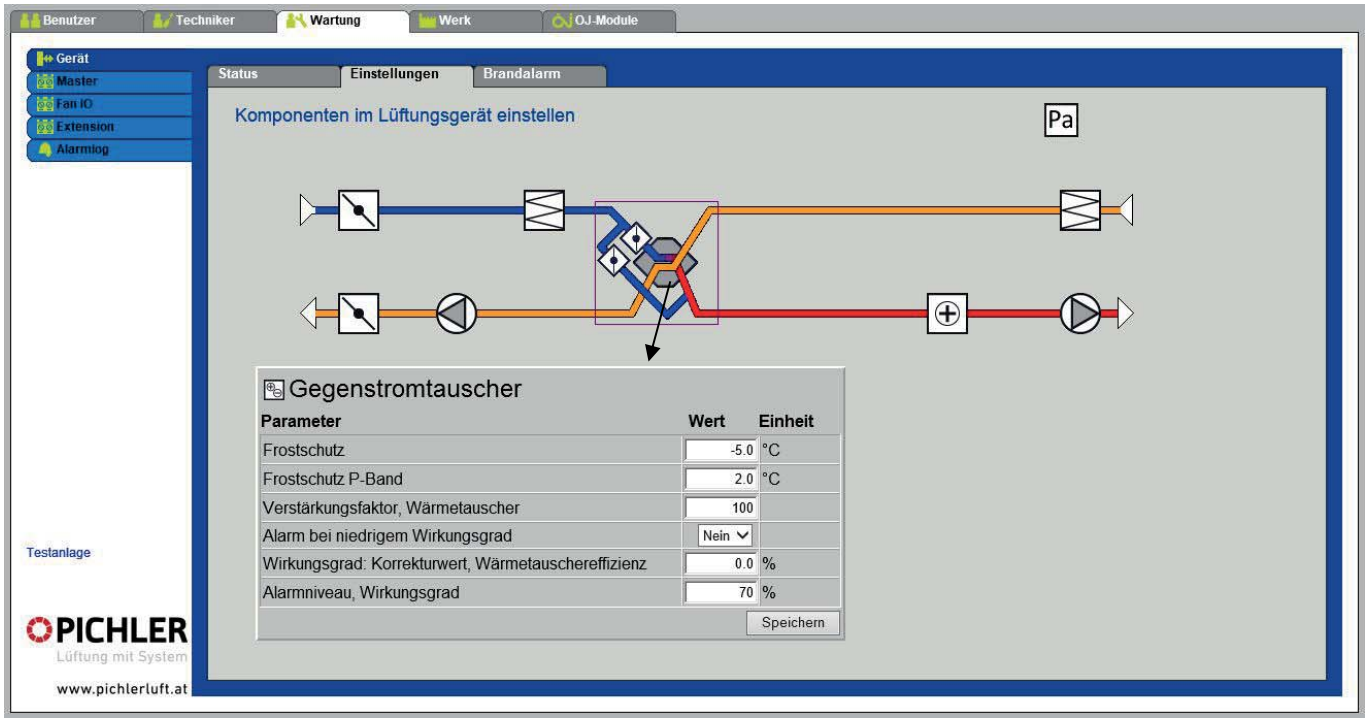
DX cooling may be configured for controlling compressors or cooling stages. The Air2 system will start and stop the compressors as required and will trigger alarm in case of errors in the cooling circuits. The compressors are started/stopped via 4 digital outputs.

3.5 Heat exchanger

The Air2 system may use various heat exchangers for heat recovery (WRG).

Bypass dampers in the heat exchangers will be controlled via a 0-10 V signal from the Air2 system. The exhaust air temperature is measured after the extract air has passed the heat exchanger to protect the heat exchanger from freezing up.

Primary parameters:



Primary parameters:	
Protection from frost and freezing	✓ At temperatures below the set value plus P-band, the bypass damper will be controlled up to 100% open. The warm extract air will in this way protect the heat exchanger from freezing.

3.6 Optional: Demand-driven plant operation

The Pichler Air2 system can offer several options for demand-driven air flow control:

- Constant CO_2/ RH value
- Fan optimiser
- GreenZone
- PI zone module / PI optimiser

3.6.1 Constant CO_2 value

- ✓ The plant must be configured with a CO_2 sensor.
- ✓ The CO_2 sensor may be fitted either as a room sensor or as a duct sensor in the extract air duct.

3.6.2 Fan optimiser

- ✓ Supply air and extract air fans are controlled by fan optimiser signals from the supply and extract air ducts.
- ✓ The fan optimiser signal (0-10 V) is connected to the analogue input.
- ✓ The plant must be fitted with 2 separate fan optimisers – one each in the supply and extract air ducts.

3.6.3 GreenZone/PI zone modules, PI optimisers

- ✓ GreenZone modules control demand-driven ventilation (CO_2, RH%, temperature) of the individual zones (rooms)
- ✓ GreenZone Master will optimise the air flow based on real time required air volumes in the individual zones
- ✓ Plug and Play system

PI zone modules (in rooms/zones) and PI optimisers together with flow regulators will adjust fan speeds as required to save energy. This will guarantee optimal plant operating points. Fan speeds may also be controlled depending on CO_2-/ RH content. This will require a relevant sensor in either the ambient or extract air ducts.

3.7 Optional: Building automation - networking

The Pichler Air2 system offers several options for networking into a higher level building automation system.

- Integrated Web server
- Modbus RTU
- Modbus TCP/IP
- BACnet
- LON

The corresponding bus connection will be activated/parameterised ex factory on customer request.

4 Ventilation Unit

4.1 Description

The energy-efficient, **VENTECH system compact ventilation units LG 1400 and LG 3200** are specially developed and optimised ventilation units each with an integrated regulation and control unit that is matched to the individual requirements. The compact ventilation units are used for controlled mechanical ventilation with heat recovery for multiple apartments in a multi-storey residential building, student residences and retirement homes, commercial, hotel and office buildings or similar applications.

With regard to freezing protection, the supplemental heating and cooling operation are optional additional components that are available, for example with or without a brine pre-heater, re-heater or cooling battery.

For ventilation units including an electric preheating battery, always a pre-filter (minimum quality category G4) has to be installed.

A pre-filter box with a G4 filter can be optionally obtained as an accessory item and can be mounted directly onto the heating battery.

Due to the sizes that are available, an air volume flow range of approx. 400 m³/h to approx. 3,400 m³/h is covered. The units are available in either a left or right design.

Unit's housing
The unit's housing is constructed using a compact, thermal bridge minimised and thermally insulated housing made of galvanised sheet metal in a self-supporting construction. The panels have a double-shell design constructed with galvanised sheet metal with an insulation thickness of 50 mm using mineral wool insulation.

Heat recovery
The energy-efficient heat recovery has a very high level of efficiency due to the adequately dimensioned air/air counter-current heat exchanger made of corrosion-resistant aluminium. The integrated 100% automatic bypass is used to bypass the heat exchanger (summer operation, frost bypass, etc.. It is equipped with an internal bypass for smooth regulation of the heat transfer capacity.

Fans
Energy-saving and low-noise high-performance fans with EC technology are used in the units . The energy savings potential is up to 60% compared to conventional drives, especially in partial load operation. The fans are maintenance-free.

Outdoor air/Extract air filter
The units are supplied with outdoor air filters of quality standard F7 and with extracted air filters of quality standard G4. If there are higher requirements of the air filter quality, then they can also be supplied with higher quality standards. After opening the maintenance doors, the air filters are easy to replace.

Integrated control and regulation
The VENTECH system LG 1400 and LG 3200 ventilation units are equipped with an integrated control and regulation system as a standard feature. Either an operator control unit or a Pichler handheld terminal is used to operate the unit, which can be optionally installed directly on the unit. Software is used to program the individual parameters for regulation and control. The possible settings and the procedure for operating or alternatively for adjusting the **different parameters** are given in **sections 5 and 6** of this guide. More detailed descriptions of controlling the unit and the parameters are available separately for specialists.

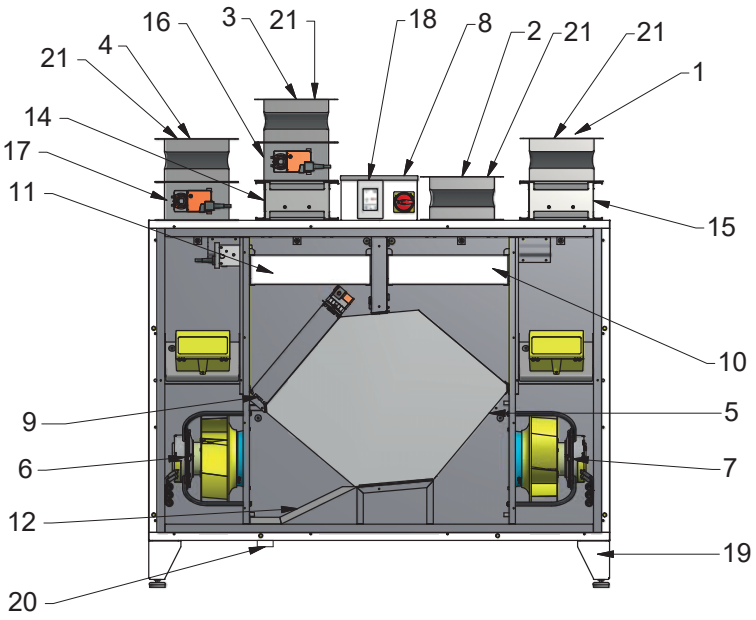
System operation can be programmed in accordance with the individual requirements using an integrated daily and weekly program. The volume flow is set using a 0 - 10 V control signal, which can also be used to incorporate external pressure control systems such as a fan optimiser, for example.

For protection against the counter-current heat exchanger freezing in the event of low outside temperatures, different frost strategies can be taken into consideration, for example by using bypass control with a re-heater battery.

The set system parameters and also the current values of temperature, volume flow or pressure that are currently in operation can be read on the Pichler handheld terminal or an other operator control unit. Fault messages are output on the control panel as a collective fault message or alternatively as a fault message.

4.2 Unit Layout with fittings

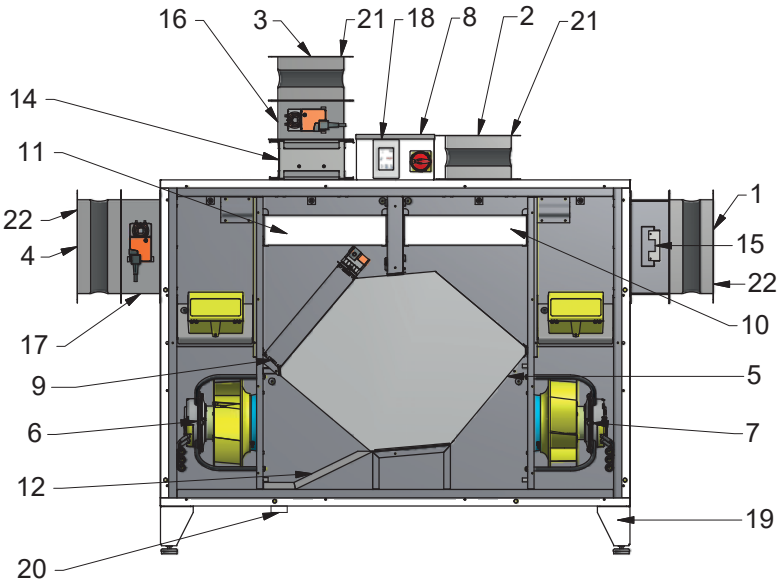
LG 1400 R (Illustration right-hand version)



1 Supply air 200 x 596 mm
2 Extract air 200 x 596 mm
3 Outdoor air 200 x 596 mm
4 Exhaust air 200 x 596 mm
5 Counterflow heat exchanger
6 Exhaust air fan
7 Supply air fan
8 Control system
9 Bypass damper with actuator
10 Extract air filter
11 Outdoor air filter
12 Condensate tray
13 Cable inlets 2 x M20, 8 x M16
14 Electric preheater battery (optional), with an optional heat insulation
15 Electric reheater battery (optional)
16 Outdoor air shut-off valve (optional)
17 Exhaust air shut-off valve (optional)
18 Control panel (optional)
19 Height adjustable feet
20 Condensate drain
21 Flexible connections top

Optional: Hot water preheater battery and hot water preheater battery for duct installation

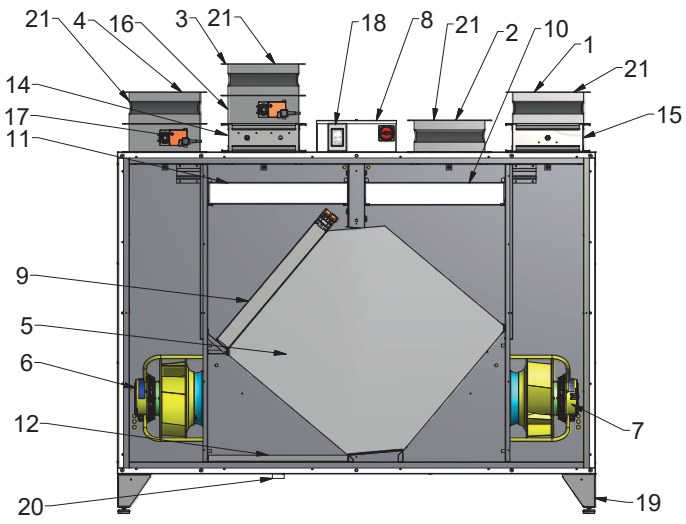
LG 1400 SR (Illustration right-hand side version)



1 Supply air 286 x 586 x mm
2 Extract air 200 x 596 mm
3 Outdoor air 200 x 596 mm
4 Exhaust air 286 x 586 mm
5 Counterflow heat exchanger
6 Exhaust air fan
7 Supply air fan
8 Control system
9 Bypass damper with actuator
10 Extract air filter
11 Outdoor air filter
12 Condensate pan
13 Cable inlets 2 x M20, 8 x M16
14 Electric preheater battery (optional) with an optional heat insulation
15 Electric reheater battery (optional)
16 Outdoor air shut-off valve (optional)
17 Exhaust air shut-off valve (optional)
18 Control panel (optional)
19 Height adjustable feet
20 Condensate drain
21 Flexible connections top
22 Flexible connections side

Optional: Hot water preheater battery and hot water reheater battery for duct installation

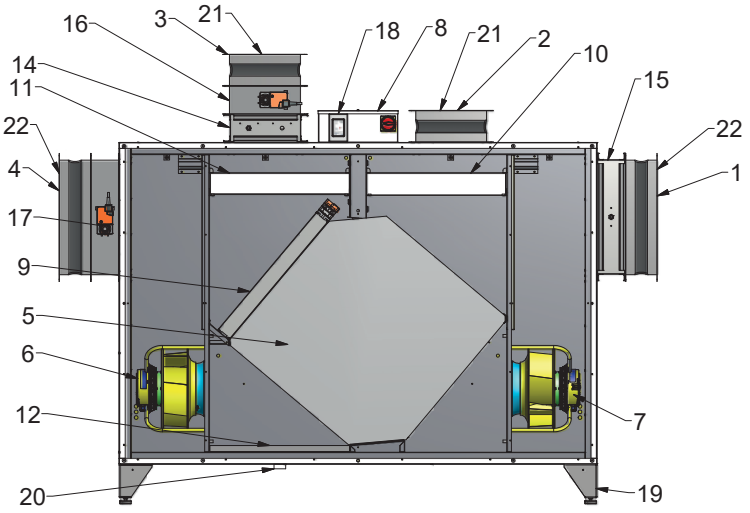
LG 3200 R (Illustration right-hand version)



1 Supply air 300 x 800 mm
2 Extract air 300 x 800 mm
3 Outdoor air 300 x 800 mm
4 Exhaust air 300 x 800 mm
5 Counterflow heat exchanger
6 Exhaust air fan
7 Supply air fan
8 Control system
9 Bypass damper with actuator
10 Extract air filter
11 Outdoor air filter
12 Condensate tray
13 Cable inlets 1 x M32, 2 x M20, 10 x M16
14 Electric preheater battery (optional), with an optional heat insulation
15 Electric reheater battery (optional)
16 Outdoor air shut-off valve (optional)
17 Exhaust air shut-off valve (optional)
18 Control panel (optional)
19 Height adjustable feet
20 Condensate drain
21 Flexible connections top

Optional: Hot water preheater battery and hot water reheater battery for duct installation

LG 3200 SR (Illustration right-hand side version)



1 Supply air 486 x 786 mm
2 Extract air 300 x 800 mm
3 Outdoor air 300 x 800 mm
4 Exhaust air 486 x 786 mm
5 Counterflow heat exchanger
6 Exhaust air fan
7 Supply air fan
8 Control system
9 Bypass damper with actuator
10 Extract air filter
11 Outdoor air filter
12 Condensate pan
13 Cable inlets 1 x M32, 2 x M20, 10 x M16
14 Electric preheater battery (optional), with an optional heat insulation
15 Electric reheater battery (optional)
16 Outdoor air shut-off valve (optional)
17 Exhaust air shut-off valve (optional)
18 Control panel (optional)
19 Height adjustable feet
20 Condensate drain
21 Flexible connections top
22 Flexible connections side

Optional: Hot water preheater battery and hot water reheater battery for duct installation

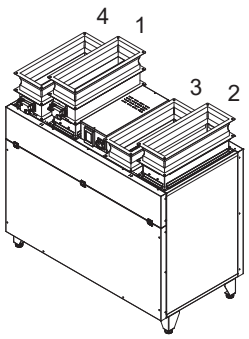
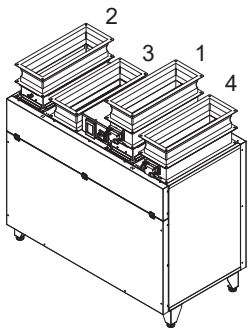
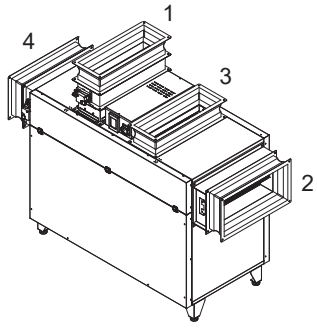
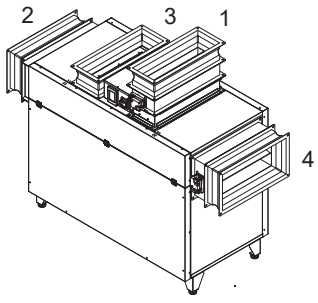
4.3 Configuration variations LG 1400 (S)

The VENTECH system LG 1400(S) compact ventilation unit is available in different configurations:

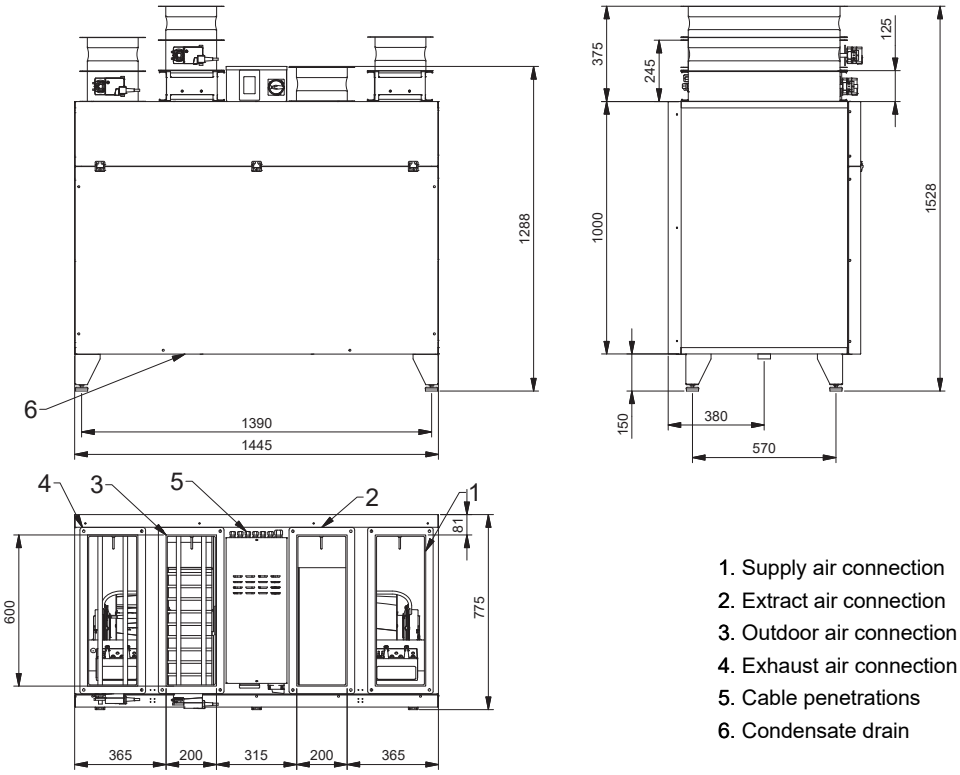
- right or left depending on the position of the supply air connecting pieces; position of all connection pieces directed upwards
- in a configuration with an electric pre-heater and re-heater battery mounted on the connecting pieces for frost protection of the heat exchanger and reheating the supply air.

It is optionally possible to equip the unit with the following additional functions:

- pressure sensors for constant volume flow or pressure function
- demand-based ventilation operation using a CO_2 and/or humidity sensor
- demand-optimised fan regulation with GreenZone/PI zone modules, PI optimisers
- re-heater battery for medium-hot water
- cooling battery for medium-hot water
- pre-heater battery

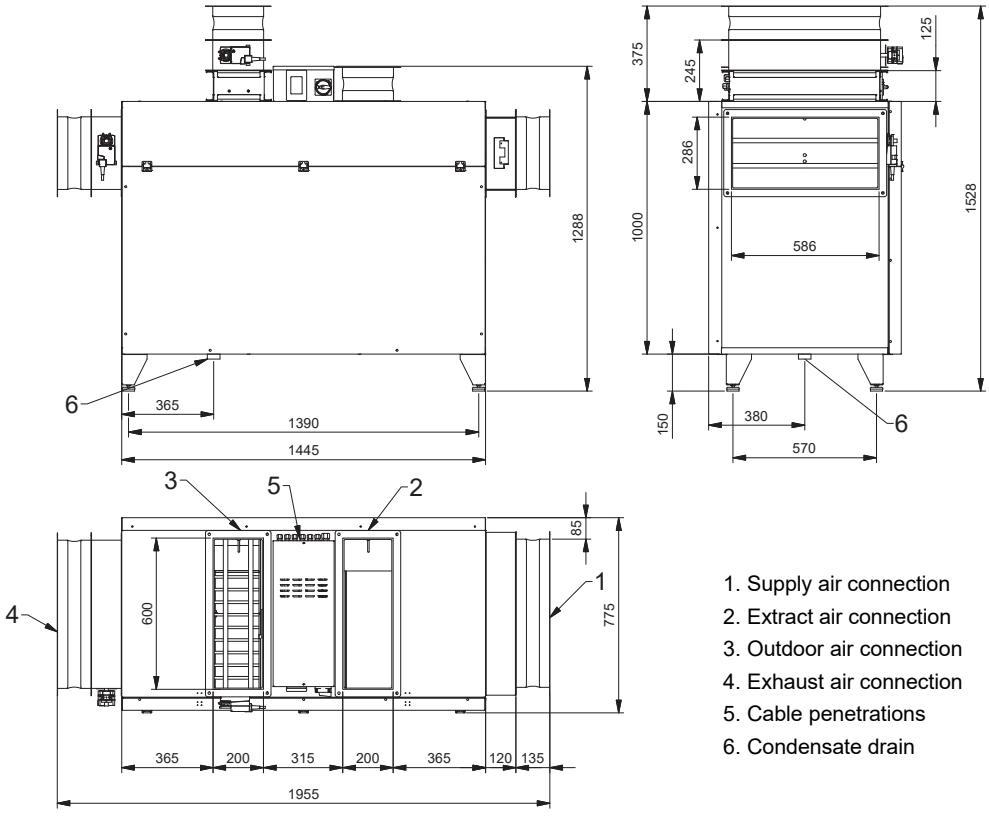
Configuration	Right configuration	Left configuration
Article no.	08LG1400R	08LG1400L
Article no. with optional electric pre-heater and re-heater battery	08LG1400RVN 08LG1400RV 08LG1400RN	08LG1400LVN 08LG1400LV 08LG1400LN
Optional delivery of exhaust air and extracted air shut-off flaps		
1 Outdoor air 2 Supply air 3 Extract air 4 Exhaust air		
Article no.	08LG400SR	08LG1400SL
Article no. with optional electric pre-heater and re-heater battery	08LG1400SRVN 08LG1400SRV 08LG1400SRN	08LG1400SLVN 08LG1400SLV 08LG1400SLN
Optional delivery of exhaust air and extracted air shut-off flap		
1 Outdoor air 2 Supply air 3 Extract air 4 Exhaust air		

4.3.1 LG 1400 Dimensions



1. Supply air connection	200 x 596 mm
2. Extract air connection	200 x 596 mm
3. Outdoor air connection	200 x 596 mm
4. Exhaust air connection	200 x 596 mm
5. Cable penetrations	2 x M20, 8 x M16
6. Condensate drain	DN40

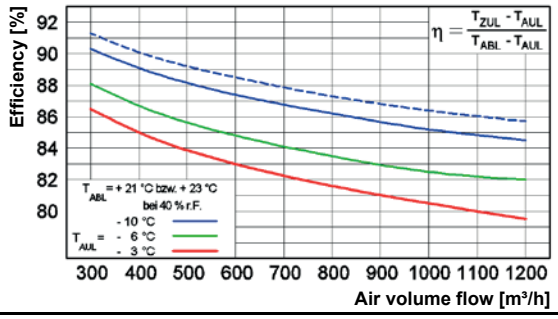
4.3.2 LG 1400 S Dimensions



1. Supply air connection	286 x 586 mm
2. Extract air connection	200 x 596 mm
3. Outdoor air connection	200 x 596 mm
4. Exhaust air connection	286 x 596 mm
5. Cable penetrations	2 x M20, 8 x M16
6. Condensate drain	DN40

4.3.3 LG 1400 (S) Technical data

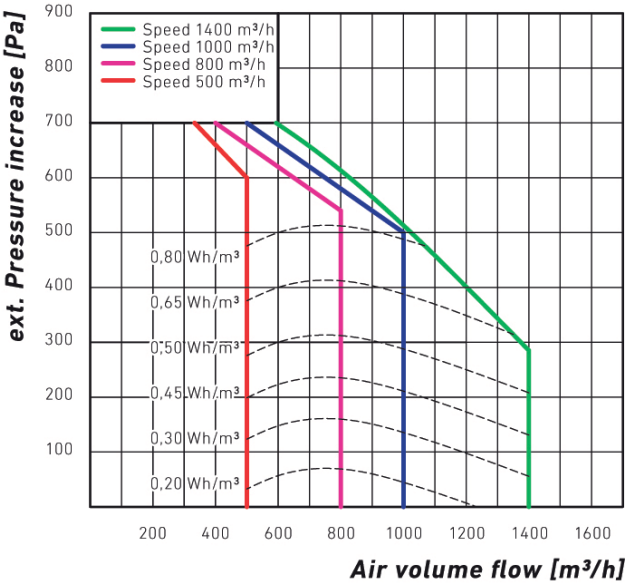
Technical data	Ventilation unit
Dimensions (W x H x D)	1445 x 1265 x 775 mm Housing in double-wall panel construction of galvanised sheet metal coated in RAL 9010 – white, insulation 50 mm
LG 1400 air line connection	connectors on top/with 30 mm flange Dimensions 200 x 596 mm
LG 1400(S) air line connection	2 connectors on top/with 30 mm flange Dimensions 200 x 596 mm 2 connectors on the side/with 30 mm flange Dimensions 286 x 586 mm
Condensate connector	DN 40 mm, bottom
Voltage/frequency/current	230V/50 Hz/20 A (400V/50Hz/25A electric pre- and/or re-heater battery)
Permissible unit temperature environment	+ 5 °C to + 40 °C
Permissible air temperatures	- 16 °C to + 35 °C
Weight (without accessories)	ca. 190 kg
Colour touch display „PI-HMI“:	attached directly to unit on front side
Dimensions (W x H x D)	80 x 121 x 42 mm
Connecting cable to the Pichler Air2 Master	MPFK6S cable or similar flat cable (telephone cable) with 6 wires, max. length < 50 m
Air filter	
Outdoor air/supply air filter	Cartridge filter, quality standard F7, optionally quality standard F9
Extract air filter	Cartridge filter, quality standard G4
Fans (factory setting)	
Fan speed Air volume flow [m³/h]	**low speed** **high speed** 800 1400
Adjustment range for air volume flow	350 to 1500 m³/h adjustable in increments of 1 m³/h
Electric power consumption as per PHI	0,38 Wh/m³ for residential building 0,39 Wh/m³ for non-residential building
Power consumption in stand-by mode	6,5 W
Heat exchanger	counter-current heat exchanger made of aluminium
Heat recovery rate as per PHI	82 % for residential building 83 % for non-residential building
Comfort criterion as per PHI	T_{ZUL}= + 16,5 °C for T_{AUL}= -10 °C

Recovery rate in compliance with EN 308 (for extract air 21 °C/ 40% relative humidity)	

Housing seal tightness (as per PHI with nominal air volume flow of 1100 m³/h)	**Residential building**	**Non-residential building**
External seal tightness	> 0,6 %	> 0,5 %
Internal seal tightness	> 0,4 %	> 0,4 %

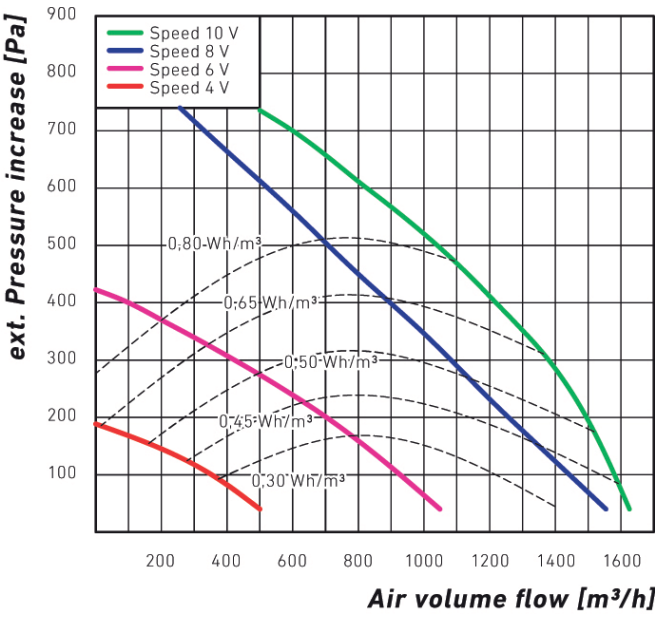
4.3.4 Air volume flow characteristic curve - external pressure increase

4.3.4.1 With constant volume flow function



The characteristic curves shown here apply to the unit configuration with pressure sensors for constant volume flow regulation, supply air filter of quality standard F7 and extracted air filter of quality standard G4.
The SFP values shown take into account power consumption for both fans for supply air and extracted air as well as the power consumption of the control unit.

4.3.4.2 Without constant volume flow function



The characteristic curves shown here apply to the unit configuration with a supply air filter of quality standard F7 and extracted air filter of quality standard G4.
The SFP values shown take into account power consumption for both fans for supply air and extracted air as well as the power consumption of the control unit.

4.3.5 LG 1400 (S) Acoustic specifications

	Volume flow V [m³/h]	pt = 100 pa										pt = 200 pa									
		L_w [dB/Oct]								L_w [dB]	L_{wA} [dB(A)]	L_w [dB/Oct]								L_w [dB]	L_{wA} [dB(A)]
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz			63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz		
Supply air connecting pieces	500	52	51	65	49	47	45	36	24	66	**58**	58	57	71	55	53	51	42	30	72	**64**
	800	59	56	70	56	53	52	43	32	71	**63**	65	62	76	62	59	58	49	38	77	**69**
	1100	66	61	75	63	60	59	50	39	76	**69**	72	67	81	69	66	65	56	45	82	**75**
	1400	72	67	80	70	66	65	57	47	82	**75**	78	73	86	76	72	71	63	53	88	**81**
outdoor air connecting pieces	500	52	47	60	34	32	26	13	6	61	**52**	58	53	66	40	38	32	19	12	67	**58**
	800	56	50	61	41	38	31	20	11	63	**53**	62	56	67	47	44	38	26	17	69	**59**
	1100	61	54	63	48	44	37	27	16	65	**55**	67	60	69	54	50	43	33	22	71	**61**
	1400	65	58	64	55	50	43	34	21	68	**58**	71	64	70	61	56	49	40	27	74	**64**
Extract air connecting pieces	500	50	45	60	37	34	26	13	5	61	**52**	56	51	66	43	40	32	19	11	67	**58**
	800	55	50	62	44	40	32	20	11	63	**54**	61	56	68	50	46	38	26	17	69	**60**
	1100	60	55	64	51	46	39	27	16	66	**57**	66	61	70	57	52	45	33	22	72	**63**
	1400	65	60	66	58	52	45	35	22	69	**60**	71	66	72	64	58	51	41	28	75	**66**
Exhaust air connecting pieces	500	56	57	63	50	48	49	39	26	65	**57**	62	63	69	56	54	55	45	32	71	**63**
	800	60	59	68	56	54	54	45	33	70	**63**	66	65	75	62	60	60	51	39	76	**69**
	1100	65	62	74	63	60	60	51	40	75	**68**	71	68	80	69	66	66	57	46	82	**74**
	1400	70	65	80	69	66	65	58	47	81	**74**	76	71	86	75	72	71	64	53	87	**80**
Housing	500	46	45	41	31	33	32	22	21	50	**39**	52	51	47	37	39	38	28	27	56	**45**
	800	50	49	49	40	41	39	29	22	55	**46**	56	55	55	46	47	45	35	28	61	**52**
	1100	52	50	55	47	46	42	33	21	58	**51**	58	56	61	53	52	48	39	27	64	**57**
	1400	60	58	66	60	56	52	43	25	69	**62**	66	64	72	66	62	58	49	31	75	**68**

Acoustic data
(with an external pressure increase of 100/200 Pa)

Remark: Tolerances ± 2 dB for acoustic data

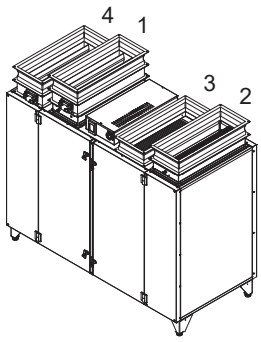
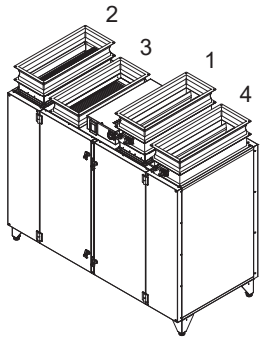
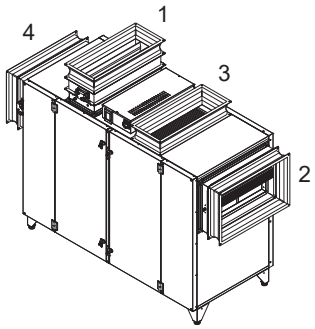
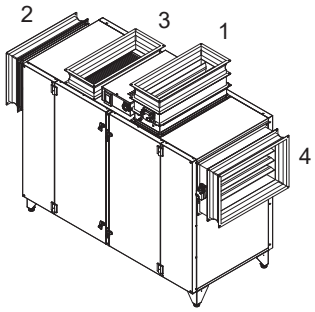
4.4 Configuration variations LG 3200 (S)

The VENTECH system LG 3200(S) compact ventilation unit is available in different configurations:

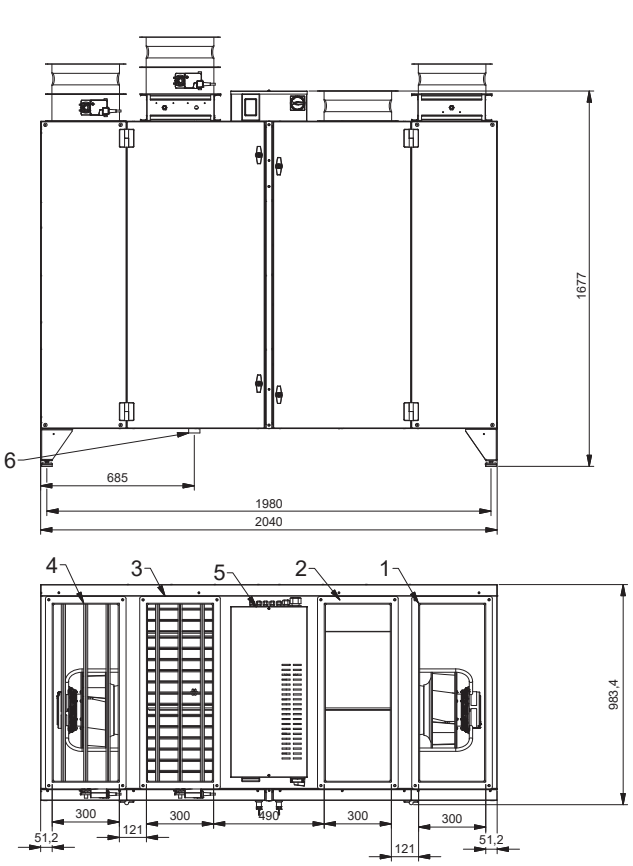
- right or left depending on the position of the supply air connecting pieces; position of all connecting pieces for outdoor air and extracted air upwards and for the supply air and exhaust air to the front in each case
- in a configuration with an electric pre-heater and re-heater battery mounted on the connecting pieces for frost protection of the heat exchanger and reheating the supply air.

It is optionally possible to equip the unit with the following additional functions:

- pressure sensors for constant volume flow or pressure function
- demand-based ventilation operation using a CO_2 and/or humidity sensor
- demand-optimised fan regulation with GreenZone/PI zone modules, PI optimisers
- re-heater battery for medium-hot water
- cooling battery for medium-hot water
- pre-heater battery

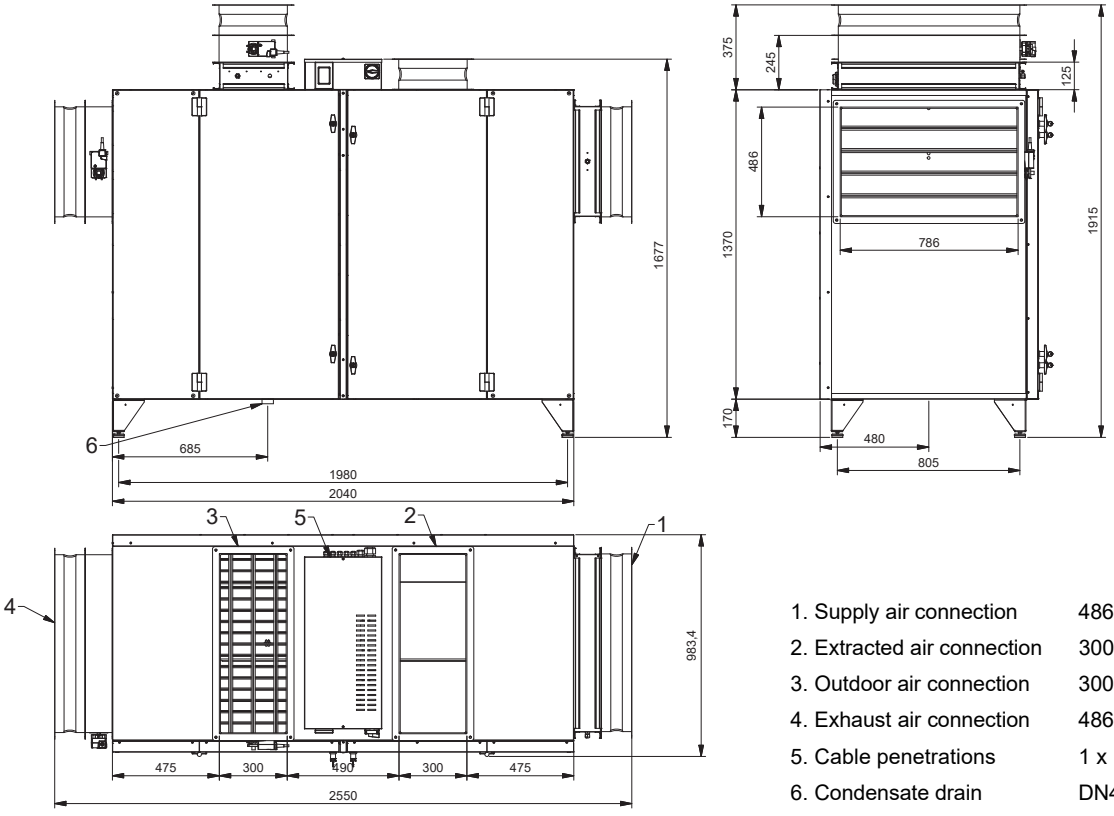
Configuration	Right configuration	Left configuration
Article no.	**08LG3200R**	**08LG3200L**
Article no. with optional electric pre-heater and re-heater battery	**08LG3200RVN** **08LG3200RV** **08LG3200RN**	**08LG3200LVN** **08LG3200LV** **08LG3200LN**
Optionally available with outgoing - outdoor air shut-off flap		
1 Outdoor air 2 Supply air 3 Extract air 4 Exhaust air		
Article no.	**08LG3200SR**	**08LG3200SL**
Article no. with optional electric pre-heater and re-heater battery	**08LG3200SRVN** **08LG3200SRV** **08LG3200SRN**	**08LG3200SLVN** **08LG3200SLV** **08LG3200SLN**
Optional delivery of exhaust air and extracted air shut-off flap		
1 Outdoor air 2 Supply air 3 Extract air 4 Exhaust air		

4.4.1 LG 3200 Dimensions



1. Supply air connection	300 x 800 mm
2. Extracted air connection	300 x 800 mm
3. Outdoor air connection	300 x 800 mm
4. Exhaust air connection	300 x 800 mm
5. Cable penetrations	1 x M32, 2 x M20, 10 x M16
6. Condensate drain	DN40

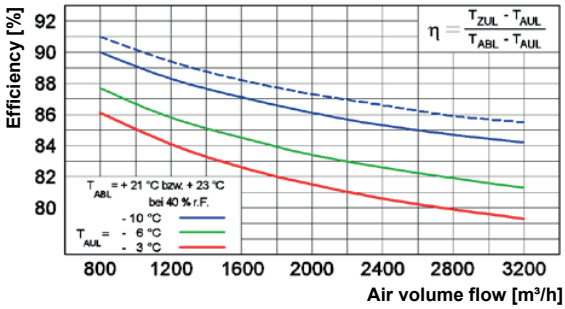
4.4.2 LG 3200 S Dimensions



1. Supply air connection	486 x 786 mm
2. Extracted air connection	300 x 800 mm
3. Outdoor air connection	300 x 800 mm
4. Exhaust air connection	486 x 786 mm
5. Cable penetrations	1 x M32, 2 x M20, 10 x M16
6. Condensate drain	DN40

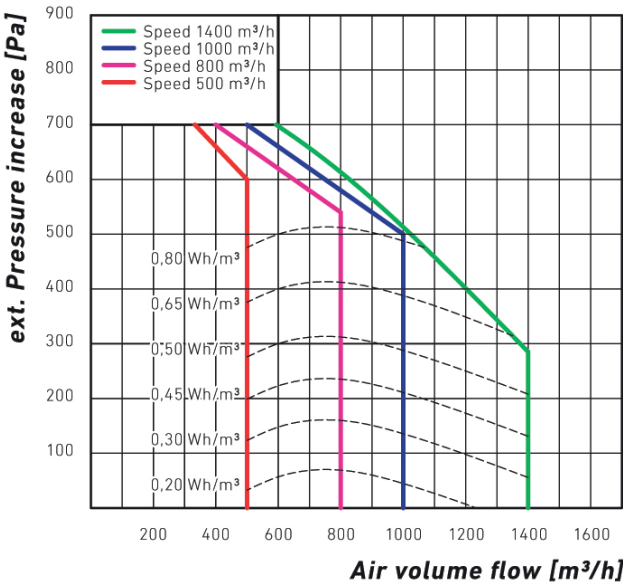
4.4.3 LG 3200 (S) Technical data

Technical data	Ventilation unit
Dimensions (W x H x D)	2040 x 1655 x 1000 mm Housing in double-wall panel construction of galvanised sheet metal coated in RAL 9010 – white, insulation 50 mm
LG 3200 air line connection	connectors on top/each with 30 mm flange Abmessung 300 x 800 mm
LG 3200(S) air line connection	2 connectors on top/each with 30 mm flange Dimensions 300 x 800 mm 2 connectors on the side/each with 30 mm flange Dimensions 486 x 786 mm
Condensate connector	DN 40 mm, bottom
Voltage/frequency/current	400V/50 Hz/20 A (400V/50Hz/25A electric pre- and/or re-heater battery)
Permissible unit temperature environment	+ 5 °C to + 40 °C
Permissible air temperatures	- 16 °C to + 35 °C
Weight (without accessories)	ca. 390 kg
Colour touch display „PI-HMI“:	attached directly to unit on front side
Dimensions (W x H x D)	80 x 121 x 42 mm
Connecting cable to the Pichler Air2 Master	MPFK6S cable or similar flat cable (telephone cable) with 6 wires, max. length < 50 m
Air filter	
Outdoor air/supply air filter	Cartridge filter, quality standard F7, optionally quality standard F9
Extract air filter	Cartridge filter, quality standard G4
Fans (factory setting)	
Fan speed Air volume flow [m³/h]	**low speed** **high speed** 1600 3000
Adjustment range for air volume flow	900 to 3400 m³/h adjustable in increments of 1 m³/h
Electric power consumption as per PHI	0,41 Wh/m³ for residential building and non-residential building
Power consumption in stand-by mode	6,5 W
Heat exchanger	counter-current heat exchanger made of aluminium
Heat recovery rate as per PHI	82 % for residential building 83 % for non-residential building
Comfort criterion as per PHI	T_{ZUL}= + 16,5 °C for T_{AUL}= -10 °C

Recovery rate in compliance with EN 308 (for extract air 21 °C/ 40% relative humidity)	
Housing seal tightness (as per PHI with nominal air volume flow of 1100 m³/h)	**Residential building and non-residential building**
External seal tightness	< 0,3 %
Internal seal tightness	< 0,9 %

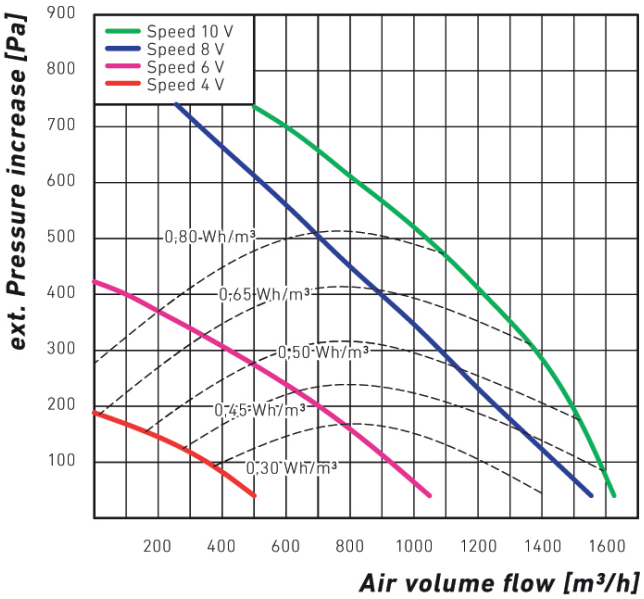
4.4.4 Air volume flow characteristic curve - external pressure increase

4.4.4.1 With constant volume flow function



The characteristic curves shown here apply to the unit configuration with pressure sensors for constant volume flow regulation, supply air filter of quality standard F7 and extracted air filter of quality standard G4.
The SFP values shown take into account power consumption for both fans for supply air and extracted air as well as the power consumption of the control unit.

4.4.4.2 Without constant volume flow function



The characteristic curves shown here apply to the unit configuration with a supply air filter of quality standard F7 and extracted air filter of quality standard G4.
The SFP values shown take into account power consumption for both fans for supply air and extracted air as well as the power consumption of the control unit.

4.4.5 LG 3200 (S) acoustic specifications

	Volume flow V [m³/h]	pt = 100 pa										pt = 200 pa									
		L_w [dB/Oct]								L_w [dB]	L_{WA} [dB(A)]	L_w [dB/Oct]								L_w [dB]	L_{WA} [dB(A)]
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz			63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz		
Supply air connecting pieces	1600	34	43	58	61	67	64	57	44	70	**70**	40	49	64	67	73	70	63	50	76	**76**
	2200	42	49	68	69	74	71	64	53	77	**77**	48	55	74	75	80	77	70	59	83	**83**
	2400	45	51	71	72	76	73	66	56	80	**79**	51	57	77	78	82	79	72	62	86	**85**
	3000	53	57	82	79	84	80	74	65	88	**87**	59	63	88	85	90	86	80	71	94	**93**
	3200	56	59	85	82	86	82	76	68	90	**89**	62	65	91	88	92	88	82	74	96	**95**
outdoor air connecting pieces	1600	25	37	49	46	44	38	22	11	52	**48**	31	43	55	52	50	44	28	17	58	**54**
	2200	30	42	55	52	50	44	30	19	58	**54**	36	48	61	58	56	50	36	25	64	**60**
	2400	32	44	57	54	52	46	33	21	60	**56**	38	50	63	60	58	52	39	27	66	**62**
	3000	37	49	63	60	58	52	40	25	66	**62**	43	55	69	66	64	58	46	31	72	**68**
	3200	39	51	65	62	60	54	43	27	68	**64**	45	57	71	68	66	60	49	33	74	**70**
Extract air connecting pieces	1600	24	40	57	48	43	37	22	15	57	**51**	30	46	63	54	49	43	28	21	63	**57**
	2200	31	45	62	54	49	43	27	14	63	**56**	37	51	68	60	55	49	33	20	69	**62**
	2400	33	47	64	56	51	45	29	14	65	**58**	39	53	70	62	57	51	35	20	71	**64**
	3000	40	52	69	62	57	51	34	13	70	**64**	46	58	75	68	63	57	40	19	76	**70**
	3200	42	54	71	64	59	53	36	13	72	**66**	48	60	77	70	65	59	42	19	78	**72**
Exhaust air connecting pieces	1600	34	43	71	60	67	65	56	47	73	**71**	40	49	77	66	73	71	62	53	79	**77**
	2200	42	49	76	68	74	71	62	54	79	**77**	48	55	82	74	80	77	68	60	85	**83**
	2400	45	51	78	71	76	73	64	56	81	**79**	51	57	84	77	82	79	70	62	87	**85**
	3000	52	57	83	79	83	79	70	63	88	**86**	58	63	89	85	89	85	76	69	94	**92**
	3200	55	59	85	82	85	81	72	65	90	**88**	61	65	91	88	91	87	78	71	96	**94**
Housing	1600	32	45	49	44	44	40	36	10	52	**48**	38	51	55	50	50	46	42	16	58	**54**
	2200	39	49	58	49	50	47	44	19	60	**55**	45	55	64	55	56	53	50	25	66	**61**
	2400	41	50	61	51	52	49	47	22	63	**58**	47	56	67	57	58	55	53	28	69	**64**
	3000	48	54	70	56	58	57	54	31	71	**65**	54	60	76	62	64	63	60	37	77	**71**
	3200	50	55	73	58	60	59	57	34	74	**68**	56	61	79	64	66	65	63	40	80	**74**

Acoustic data
(with an external pressure increase of 100/200 Pa)

Remark: Tolerances ± 2 dB for acoustic data

5 Control unit

5.1 General information

The settings on the ventilation unit are made using the operator control unit "PI-HMI" or "Pichler handheld terminal".

The control unit is usually installed near the ventilation unit.

5.2 Operator control unit PI-HMI

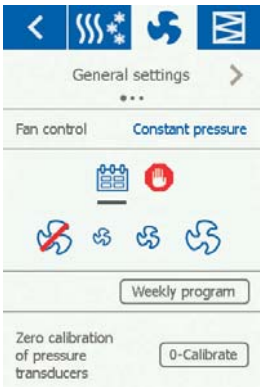
PI-HMI is a touchscreen panel with user-friendly graphical user interface specially developed for controlling ventilation systems. The panel communicates with the PI Air2 system via a Modbus interface, ensuring easy installation.

Product: PI-HMI
Type: 3,5“ touchscreen panel

5.2.1 Operation

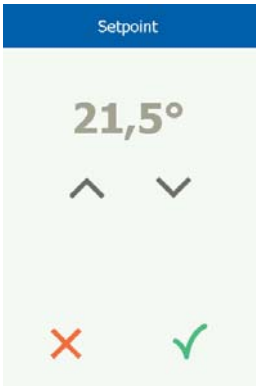
This quick start guide only de-scribes basic settings. If the screen saver is active, simply touch the screen once to open the home screen.
This screen provides access to elementary functions such as fan speed, temperature and setup. The time and day of the week are shown in the top line of the screen. Below these, an alarm bell is visible if an alarm has been activated. The house in the middle section of the screen provides access to a simple overview of temperatures, air volumes and filter pressures. The temperature shown to the right of the house is the temperature setpoint. The icons shown in the lower part of the screen can be changed and may therefore differ from those shown in these instructions.

5.2.2 Fan speed



To set fan speed, press the fan in the lower part of the home screen. You can choose between six predefined fan speeds. Off, Auto, Low, Medium, High and Service Stop. If you choose Auto, PI-HMI will follow a predefined program. If you choose Low, the predefined program is overridden and the fan operates at low speed. If you choose Medium, the predefined program is overridden and the fan operates at medium speed. If you choose High, the predefined program is overridden and the fan operates at high speed. If you choose Off, the fan comes to a complete standstill until fan speed is again changed. If you choose Service Stop, the system shuts down and can only be restarted locally from the control panel.

5.2.3 Temperature

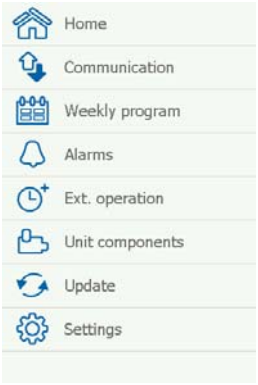


To change the temperature setpoint for the selected control mode, press the temperature on the panel's home screen. Change the temperature using the arrows and confirm with the green button.

5.2.4 Settings

PI-HMI is used together with an PI Air2 Master, and all communication is via the master. Some settings can be made via the menu icon in the upper right corner of the home screen. Begin by pressing the menu icon in the upper right corner of the home screen.

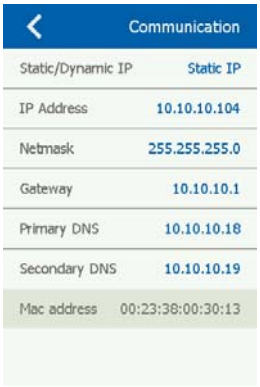
The following screen is then displayed:



Home

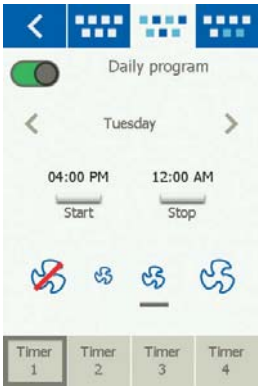
Press this icon to return to the home screen.

Communication

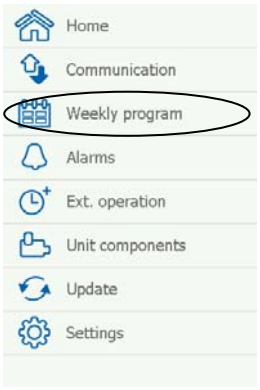


Here you can configure LAN settings such as static/dynamic IP and associated addresses.

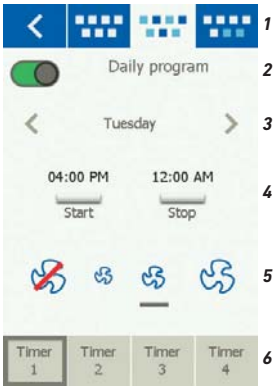
Weekly programm



Here you can enter times and modes for the built-in 7-day clock.



To set a weekly program for the ventilation unit, *weekly program* must be selected under *menu*.



Then you can choose among *three different modes:*

„Whole week“ – A ventilation setting for the whole week

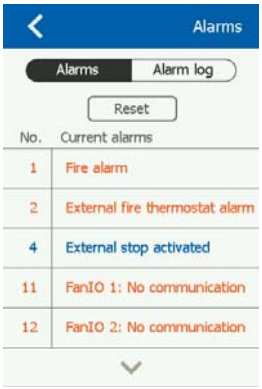
„Daily program“ – For each day different ventilation settings can be parameterized

„Weekday / weekend“ – Ventilation settings on weekdays and weekends are set

By pressing the button, the mode is turned on or off

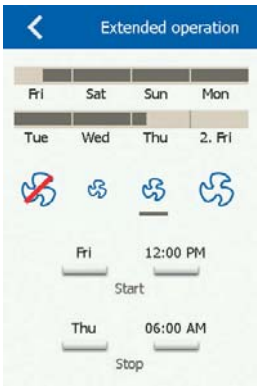
1 Switching between the different modes
2 Mode
3 Weekday
4 Time to start and stop the system
5 Fan speed
6 Timer: A fan speed can be selected for a certain period (e.g. in the morning). Up to four timers can be programmed.

Alarms



Here you can view active alarms and an alarm log. In case of an alarm, this screen can also be accessed via the bell icon on the home screen.

Extended operation

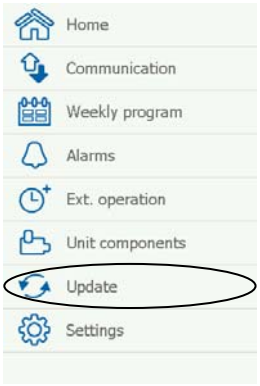


If a different pattern of operation is required for a short period of time, the weekly program can be overridden. The override period can last up to a week at most. Once the period has elapsed, the system returns to standard clock-controlled operation.

Unit components

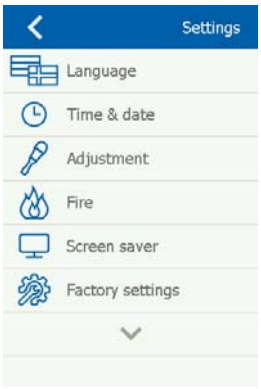
Here you can make general settings for the various components that are installed.

Software update



Here you can check if an SD card inserted into the PI Air2 Master contains a new software version.
Then select update in the settings and follow the instructions on the display.

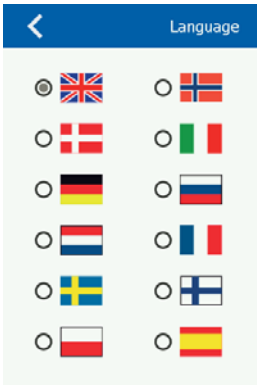
Settings



The following can be set/viewed:

- Language
- Time & date
- Locking of fan speed during adjust-ment.
- Setting of fan speed in case of fire/smoke extraction
- Setting of screen saver
- Restoration of factory settings
- Setting up the lower part of the screen
- Software version

Language



Here you can choose the language to be used on the screen.

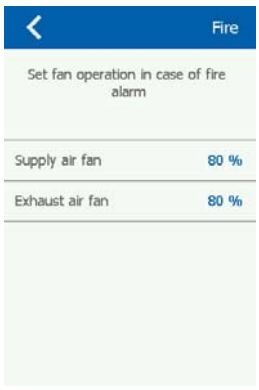
Time & date

Here you can set the time and date for the system.

Adjustment

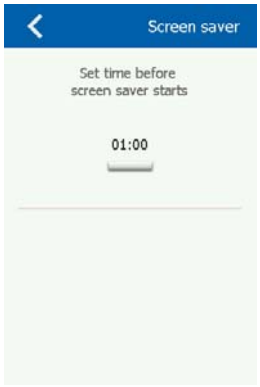
Here you can lock fan speed during system adjustment. Once the required air volume has been reached, the fan is locked at its current speed. This gives the installer the opportunity to adjust the system, ensuring the right amount of air in the individual rooms without interference from ventilation system regulation.

Fire



Here you can set the required fan speed in case of fire/smoke.

Screen saver

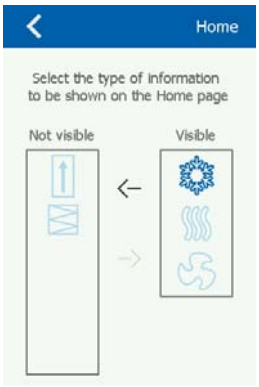


Here you can set the screen saver timeout period.

Factory reset (PIN required)

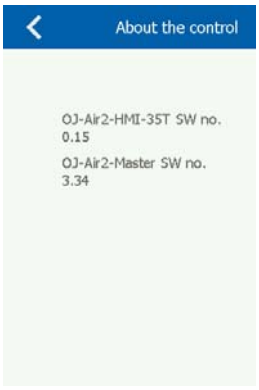
Here you can restore factory settings.

Home (PIN required)



Here you can configure the icons shown in the lower part of the home screen.

About the control



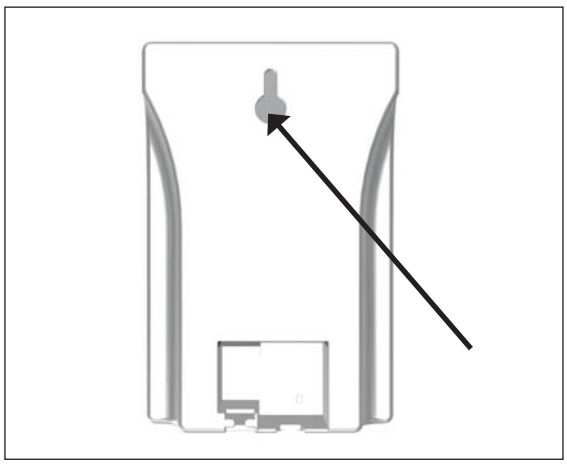
Here you can view information on software versions.

5.2.5 Installation on flat surface

PI-HMI can be installed in two ways: either in a wall box/panel front or directly on a flat surface.The back cover of the PI-HMI is equipped with a keyhole-shaped opening which can be used to hang the unit on a flat surface (see illus. 1). Use a screw that is max. 3.5 mm in diameter with a head no larger than 9 mm.

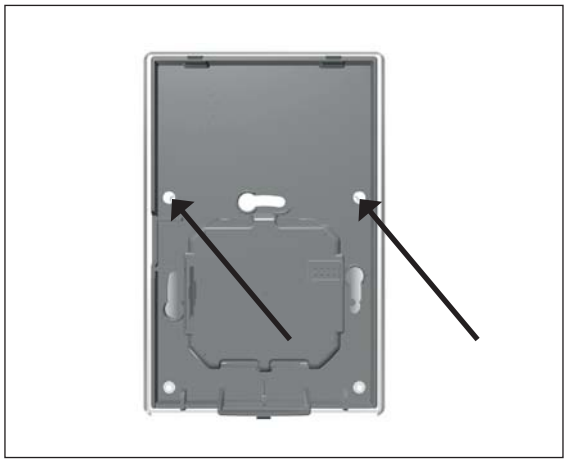
5.2.6 Installation in wall box/panel front

If PI-HMI is to be installed in a wall box or panel front, the back cover must be removed. Firstly, the front cover must be detached by gently releasing the catch on the bottom of the unit with a flat screwdriver and then tipping the cover outwards (see illus. 2).
Once the front cover has been detached, the two screws holding the back cover in place can be removed (see illus. 3). The back cover can now be detached and the front cover refitted. The baseplate is equipped with several screw holes. The dimensioned drawing (see illus. 4) can be used as a drilling template. The baseplate should be secured with at least two screws tightened to a torque of max. 0.8 Nm. Installation depth is 20 mm.

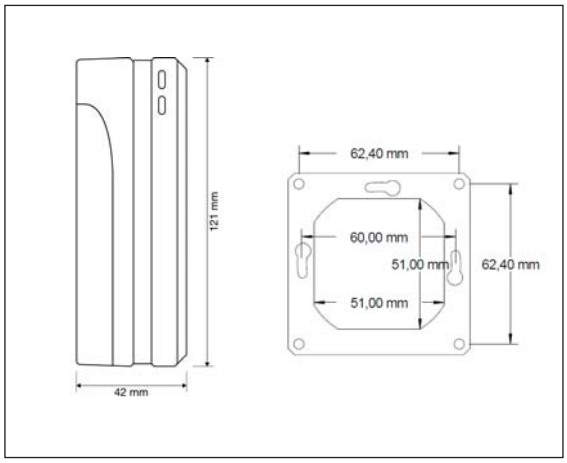


Illus. 1: Installation on flat surface

Illus. 2: Removing the front cover



Illus. 3: Removing the back cover

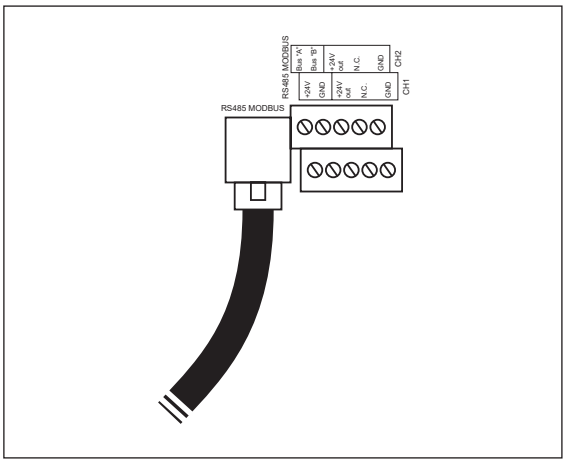


Illus. 4: Dimensioned drawing to facilitate installation in wall box or panel front

5.2.7 Modbus connection

PI-HMI is connected to the PI Air2 Master by means of a Modbus cable. The Modbus cable can be connected to the PI-HMI by means of the RJ12 6P4C port or four single-wire screw terminals. Whether the RJ12 6P4C port or screw terminals are used does not influence the available functions or operation.

5.2.8 Modbus RJ12 6P4C



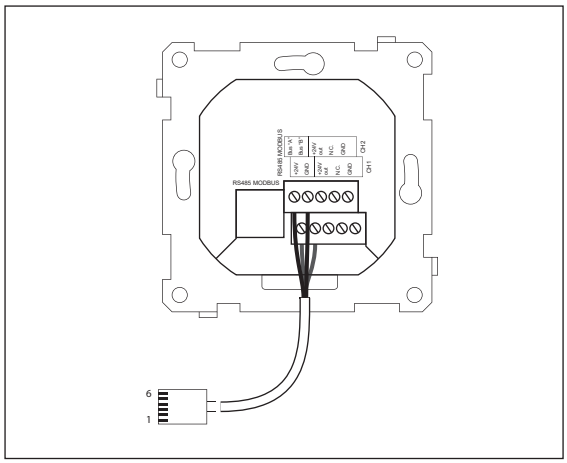
Illus. 5: Connecting Modbus via the RJ12 6P4C port

Connect the Modbus cable to the Modbus port for a hand terminal on the PI Air2 Master and to the RJ12 6P4C port on the PI-HMI (see illus. 5).

5.2.9 Modbus screw terminals

Connect the Modbus cable to the Modbus port for a hand terminal on the PI Air2 Master and to the corresponding screw terminals on the PI-HMI (see illus. 6).

RJ12	Screw terminals
1	+24 V
2	GND (earth)
3	Bus „B“
4	Bus „A“
5	+24 V
6	GND (earth)



Illus. 6: Connecting Modbus via the screw terminals

5.2.10 Technical data

Supply voltage ..... 24 V DC +/-10%
Cable dimensions ..... 10 x max. 0.75 mm²
Relative humidity ..... 0-95% (non-condensing)
Operating temperature .....-10/+40°C
Enclosure rating.....IP21 (EN 60529)
Port .....1 × RJ12 6P4C
.....10 x screw terminals
Dimensions ..... 80x121x42 mm (see illus. 4)
Installation depth ..... 22 mm
Max. power consumption ..... 900 mW
Standby power consumption ..... 600 mW

5.2.11 Service and maintenance

The PI-HMI touch panel is maintenance-free. Please contact us if you have any further queries.

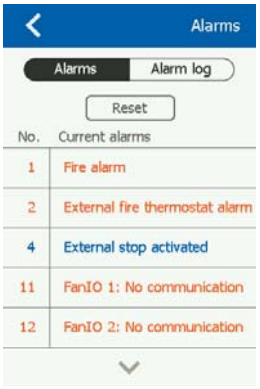
PICHLER
J. Pichler Gesellschaft m.b.H.

9021 KLAGENFURT
Karlweg 5, Postfach 32
T +43 (0)463 32769

6 Alarms/malfunctions

Pichler Air2 system malfunctions will be shown as alarms. This display may differ, depending on the control unit or internal Web server.

6.1 Operator control unit „PI-HMI“



Alarm display: The bell icon flashes on the home screen. The operator control unit „PI-HMI“ will display active alarms and an alarm log in the ALARM submenu. In case of an alarm, this screen can also be accessed via the bell icon on the home screen.

6.2 Optional: Alarm log in the web server

The log of the most recent 16 active alarms is shown in the user menu.

Zeit	Datum	Nr.	Alarmlog
10:18	1.08.2014	47	Frequenzumrichteralarm Abluftventilator
10:18	1.08.2014	37	Frequenzumrichteralarm Zuluftventilator
10:17	1.08.2014	26	Temperaturfühlerstörung: Wärmerückgewinnung
10:12	1.08.2014	93	Druckfühlerdefekt: Hochdruck 2. Kältemaschine
10:12	1.08.2014	92	Druckfühlerdefekt: Niederdruck 2. Kältemaschine
10:12	1.08.2014	91	Druckfühlerdefekt: Hochdruck 1. Kältemaschine
10:12	1.08.2014	90	Druckfühlerdefekt: Niederdruck 1. Kältemaschine
10:31	31.07.2014	26	Temperaturfühlerstörung: Wärmerückgewinnung
15:33	30.07.2014	93	Druckfühlerdefekt: Hochdruck 2. Kältemaschine
15:33	30.07.2014	92	Druckfühlerdefekt: Niederdruck 2. Kältemaschine
15:33	30.07.2014	91	Druckfühlerdefekt: Hochdruck 1. Kältemaschine
15:33	30.07.2014	90	Druckfühlerdefekt: Niederdruck 1. Kältemaschine
11:02	30.07.2014	25	Temperaturfühlerstörung: PWW-Erhitzer 1
10:57	30.07.2014	25	Temperaturfühlerstörung: PWW-Erhitzer 1
16:04	15.07.2014	47	Frequenzumrichteralarm Abluftventilator
16:04	15.07.2014	37	Frequenzumrichteralarm Zuluftventilator

7 Delivery contents, transport, storage and disposal

7.1 Delivery contents

- ventilation unit with the operator control unit "PI-HMI" or "Pichler-handheld terminal"
- operating and installation guide (enclosed with the ventilation unit)
- DN 40 mm siphon (enclosed in the ventilation unit)
- optional accessories such as, for example, the pre-heater or re-heater battery, shut-off

When the unit is delivered, check whether the types and serial numbers on the type plate match the information on the order and delivery documents, that the equipment with the optional accessories is complete, and that all parts have been delivered in perfect condition.

Note: In the event of any transport damage and/or if parts are missing, this must be reported to the freight forwarder immediately in writing.

7.2 Packaging

The safety markings applied to the packaging must be observed without fail.

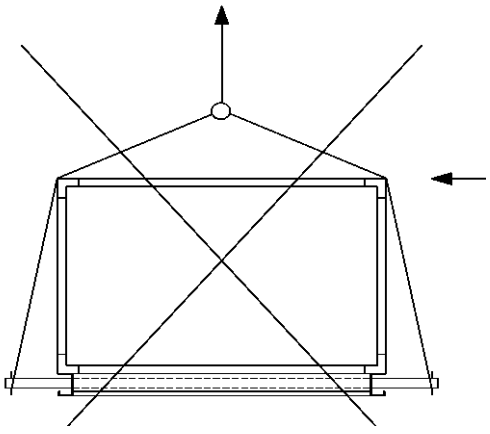
Unit type	LG 1400 (S)	LG 3200 (S)
Dimensions W x H x D	1445 x 1265 x 775 mm	2040 x 1655 x 1000 mm
Weight (without optional accessories)	approx. 190 kg	approx. 390 kg

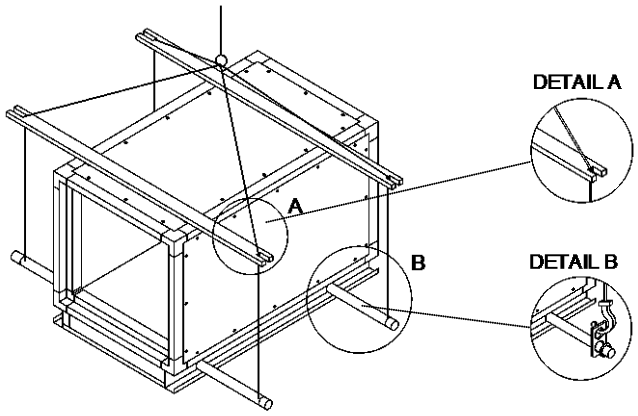
7.3 Transport

The ventilation unit is packed when it is delivered. The safety markings applied to the packaging must be observed and complied with when handling.

Make sure that the unit is not damaged by tipping or overturning under any circumstances. Avoid any blows or impact during transport. The unit can be lifted with a forklift or with the help of belts. Only lifting rods with sufficient load bearing capacity may be used. Secure the rods against slipping if at all possible (see illustration). Blows and impacts during transport as well as twisting the unit's frame and the housing components must be avoided.

The applicable safety and accident regulations must be complied with during transport. When transporting by hand, take reasonable human lifting and carrying strength into consideration.





7.4 Storage

The unit must be stored in the packaging in a suitable, dry and dust-free room. Storage times that are too long must be avoided.

7.5 Disposal

Help us to protect the environment through environmentally friendly disposal of packaging and used products.

The packaging material and protective packaging are to be disposed of in an environmentally compatible way.

The packing materials must be disposed of according to the local regulations, for example recycling of wooden pallets or cardboard.

Products with this label must not be disposed as normal domestic waste, but collected separately in accordance with the applicable local regulations. Units that no longer work must be disassembled by a specialised company and disposed of professionally using a suitable collection centre in accordance with the Waste Electrical and Electronic Equipment Ordinance (WEEE), which provides for the implementation of municipal law, guideline 202/95/EG (RoHS) and guideline 2002/96/EG (WEEE guideline).

8 Installation

8.1 Conditions for installation of the unig

The VENTECH system LG 1400/LG 3200 compact ventilation unit must be installed in accordance with the general and locally applicable safety and installation regulations and also in accordance with the regulations of this guide.

Installation and assembly work may only be performed by authorised specialists.

The ventilation unit may only be installed in a frost-free room, for example in the basement or in the attic with ambient temperatures of at least +5 °C and a maximum of +40 °C. Any condensate water that forms must be drained frost-free and reliably with a slope and using an effective odour trap (siphon).

The installation site of the unit must be selected in such a way that there is enough room to setup the air line connections, electrical connections, a condensate connection and to perform any maintenance and inspection work. At least 1 m of free space must be provided in front of the unit for operating and maintenance work.

A level and sufficiently hard installation surface must be provided for installing the ventilation unit.

The following connecting fixtures must be available in the installation room:

- air line connections for the supply air, extracted air and exhaust air
- electrical mains connection 230 v/50 Hz, 20A fuse for LG 1400 **without** an optional heating battery
- electrical mains connection 400 v/50Hz, 25A fuse for LG 1400 **with** an optional heating battery
- electrical mains connection 400 v/50Hz, 20A fuse for LG 3200 **without** an optional electric heating battery
- electrical mains connection 400 v/50Hz, 40A fuse for LG 3200 **with** an optional heating battery
- condensate drain line with effective odour trap (siphon)

Before installing the ventilation unit, all work that is to be done by the customer (drain, floor preparation, etc.) must be completed. After the air lines are connected to the ventilation unit, they are fixed in position and can no longer be moved. The outdoor air and exhaust air lines, e.g. between the ventilation unit and the roof opening, must be adequately insulated for energy reasons and to prevent the formation of condensate. There must not be any condensate formation on the air lines and in the roof sheathing. In the event of line routing outside the thermally insulated building shell, they must be adequately insulated in the cold area.

Suitable insulation, sound insulation and installation material such as, for example, adequately dimensioned noise suppressors, supply air and extracted air valves, overflow openings, etc. must be provided for proper and functional system operation taking into consideration the planning documents as well as technical data. Generally, sound suppressors must be taken into consideration on all the unit's connecting pieces to ensure a suitable noise level. Air line openings through walls or ceilings must be decoupled from vibrations to prevent structure borne noise.

To protect the system against coarse dirt such as greenery, leaves or insects, a fine-mesh wire screen must be provided as a pre-filter on the central outdoor air intake. The protective screen must be checked at regular intervals, especially in spring and autumn, and cleaned if necessary. Maintenance openings in the air line system must be taken into consideration if applicable to provide a way to clean and service the system.

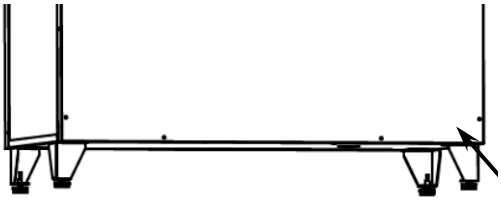
Seal: All sealing required during assembly must be performed using neutral-curing and non-corrosive sealants. For example: Sikaflex®-221, silicone-free (item no. 12DMAUSSEN).

8.2 Unit installation - floor mounting

The **safety instructions** given in **section 3.2** of this guide must be observed in all work.

The ventilation unit is delivered ready to use. Make sure that there is enough room to setup the air line connections, electrical connections, condensate connection and to perform any maintenance and inspection work.

After setting the ventilation unit down on the installation site, then it must be positioned correctly.



Feet of the unit

The ventilation unit must be setup so that it is horizontal and stable. It is easy to align the unit by using the adjustable feet of the unit.

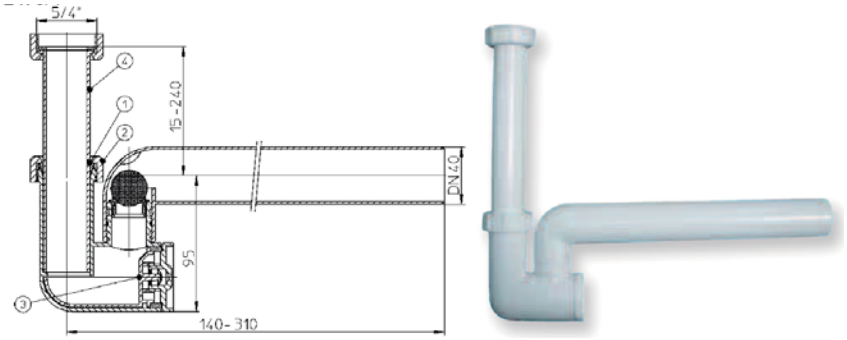
Make sure that there is enough clearance between the floor and bottom edge of the unit in order to ensure flawless operation of the condensate drain.

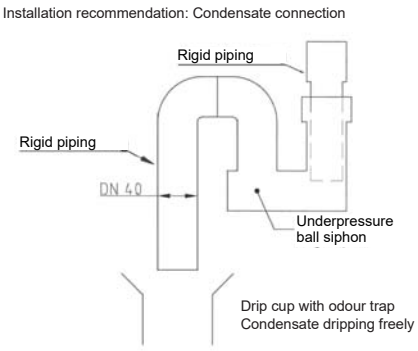
8.2.1 Preparing the condensate water connection

The front doors of the unit must be opened to prepare the condensate drain.

The siphon included in the delivery must be shortened to the respective length and screwed onto the condensate tray on the bottom of the housing with the valve connector.

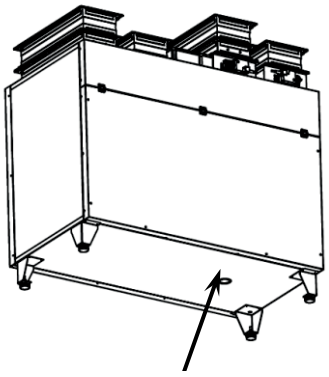
There must be sufficient slope (at least 5%) for reliable drainage of the water. The siphon must be filled with water for effective odour control and to prevent leakage.



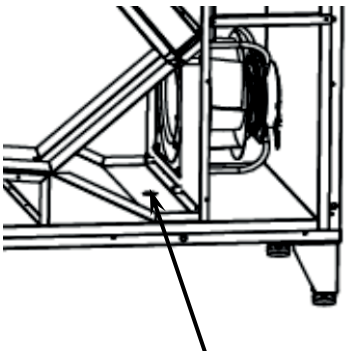


After completion of the work, all tools and installation materials must be removed from the unit. Make sure that not tools or installation materials are left in the unit, because they may damage or destroy the unit when it starts up.

When closing the front doors, make sure there is an adequate and reliable seal to the unit's housing to ensure sealing that is air and condensate water tight.



Condensate connection ø 5/4“



Condensate tray with drain

8.2.2 Connection of air lines and components

When connecting the air line, make sure that it is air-tight and suitably decoupled from vibrations.
The air lines and attachments such as the sound suppressor, for example, may only be fastened to the ventilation unit on suitable solid wall or ceiling structural elements of the building using suitably dimensioned fastening elements.
Avoid using flexible hoses to setup the connections to the unit.
When setting up the line connections, pay particular attention to ensure that no tools or installation material fall into the connections to the unit or on the unit. This could result in damage to components, for example to the fan blades.
In accordance with the project specifications, suitable and adequate insulation must be prepared for the air line components and fittings.

8.3 Electrical connection

- Warning: dangerous electrical voltages!
- Failure to observe this risk can lead to death, injury or damage to property.
- Before carrying out any work on live parts, the unit must always be disconnected completely from the power supply (all poles) and secured against being switched back on.

Electrical connection work and work on the system's electrical components may only be carried out by authorised electricians, in compliance with national and local regulations. Final responsibility for the electrical installation, cabling, etc. lies with the electrical contractor which performed them. Under normal power supply conditions, the terminals and connections of the EC fans are constantly live!
The Safety notes under Section **2.2.3 – Electrical connections** must be heeded when performing any electrical work.

- The electrical connection must accord with the electrical switching plan!
- The cable cross-sections indicated are minimum cross-sections for copper lines and do not take cable length or site conditions into account.
- Cable type, cable cross-section and laying must be determined by an authorised electrician.
- Low-voltage cables must be laid separately from mains cables; alternatively, screened cables must be used.
- The inlet fuse on the power supply line must be an isolation type!
- The cable glands are only suitable for rounded cable and lines. The permissible clamping areas can be found in the electrical switching plan.
- A separate cable inlet must be used for each cable!
- Unused cable inlets must be hermetically sealed!
- All cable entries must be strain-relieved!
- Potential equalisation must be put in place between the unit and the air duct system!
- All safety measures must be tested following electrical connection! (Earth resistance, etc.)

8.3.1 Control lines

All lines for sensors, actuators, pumps, etc. must be connected in accordance with the wiring plan.
Lines must be dimensioned by an electrician. Low-voltage cables must be laid separately from mains cables; alternatively, screened cables must be used. Refer to the electrical switching plan for the max. permissible load from potential-free outputs.

8.3.2 Circulating pumps

Pumps connected to the control system must be intrinsically safe and stallproof. Electrical connection with U = 230 VAC and Imax = 2A.

8.3.3 Internal control fuse: 2 x glass tube fuses, 2.5 A ø 5 x 20 mm, slow-blow.

Only original fuses with the prescribed amperage and dimensions may be used.

8.3.4 Mains connection

The ventilation unit is not supplied ready to plug in. The mains connection is provided by the customer and – depending on unit size and sub-assemblies – must comply with the rated voltage specified on the nameplate. Before working on the electrical power unit, the equipment must be isolated from mains and protected against renewed switch-on.

The power connection must be connected in accordance with the specifications in the electrical diagram. The cross-section of the power supply line must be determined by authorised specialist personnel based on the nominal output of the equipment, the supply line fuse, the length of the cable from the distributor to the unit and the installation type, taking into account the regulatory requirements. An appropriate inlet fuse with an isolation function must be provided in accordance with the provisions of the electrical switching plan.

Only AC/DC sensitive earth leakage circuit breakers (type B) are permitted. As with frequency converters, earth leakage circuit breakers will not protect persons when the unit operates. To ensure as high as possible operating safety, we recommend earth leakage circuit breakers with a 300 mA trigger level.

8.3.5 Connecting the operating unit

The operating unit is connected to the ventilation unit control system by means of the supplied Modbus cable. To this end, the control unit has a corresponding RJ-12 jack directly at the “PI-Air2 Master” (see graphic) provided for connecting the operating unit. On the control unit itself, the Modbus cable is plugged into the rear of the unit, in the RJ12 port. Alternatively, the screw glands on the control unit can also be used to connect a Modbus cable. Please refer t o the appropriate connection images and diagrams in sections 5.2.7 - 5.2.9.

An adequately long RJ-12 Modbus cable (max. 50 m.) must be supplied for separate installation of the operating unit. We recommend using an LIYY 6x0,14 mm² electric cable or a flat ribbon cable AWG28/6C (e.g.: MFK6SW, MPFK6S. The required RJ-12 plugs are supplied together with the ventilation unit. Suitable crimping pliers are required to crimp on the plugs!

8.3.6 Connection to Web server (Optional!)

The control component of the ventilation unit contains a relevant RJ-45 jack (see graphic) directly at the “PI-Air2 Master” which is used to communicate with a TCP/IP network.

9 Start-up

ATTENTION! Note the following before commissioning the plant:

1. All connections must comply with the local EVU *[electricity board]* provisions.
2. Check that all connecting and contact screws and free connections are tight (may loosen in transport).
3. Compare the mains voltage with the plant's nameplate voltage. **The nominal mains voltage is 400 V/50 Hz (three phase) or 230 V/50 Hz (single phase, LG 1400 without electrical heating battery).**

Before starting up the ventilation unit, the entire ventilation system must be completed, connected electrically, hydraulically and to the air and it must be operational. Only when all work on the system has been completed is a start-up or system setup possible.

The factory settings on the control unit may only be changed by the specialised installer. An incorrect setting can result in the unit malfunctioning.

Factory setting of the fan speeds for LG 1400 (S):

Fan speed	Mode of operation	Description	Volumetric flow rate
low speed	Normal ventilation	Fan speed that is active if no other fan speed has been selected manually or via the automatic system	800 m³/h
high speed	Intensive ventilation	Operation with increased volume flow, rush airing for short, intensive ventilation of the occupied area	1400 m³/h

Factory setting of the fan speeds for LG 3200 (S):

Fan speed	Mode of operation	Description	Volumetric flow rate
low speed	Normal ventilation	Fan speed that is active if no other fan speed has been selected manually or via the automatic system	1600 m³/h
high speed	Intensive ventilation	Operation with increased volume flow, rush airing for short, intensive ventilation of the occupied area	3000 m³/h

9.1 General procedure for start-up by a specialist:

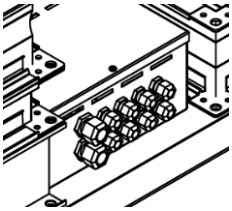
9.1.1 Checks before start-up

- Are all air lines and fittings completely installed?
- Are all system components installed and electrically connected?
- Is the electrical cabling finished and the control unit installed?
- Is an operational condensate connection setup?
- Are the air passages, inlet and outlet valves (grating) installed correctly and open?
- Are the air filters in the ventilation unit installed correctly and in a clean condition?
- Are the air filters in the geothermal heat exchanger etc. installed correctly and in a clean condition?
- Are the fire protection flaps in an open position if applicable?

9.1.2 Setting the system parameters

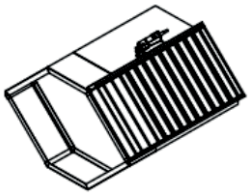
- Check the system components and correct the setting if applicable.
- Set the system parameters, for example adjust the air volume flow/fan speed.
- Set the system time.
- Program the time of day program in accordance with requirements.

9.1.3 Cable penetrations



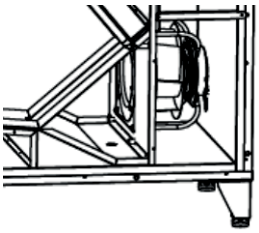
To connect the power mains cable, optional system components or external sensors, the cables must be inserted into the ventilation unit through the PG penetrations provided on the top of the unit.

9.1.4 Counter-current plate heat exchanger



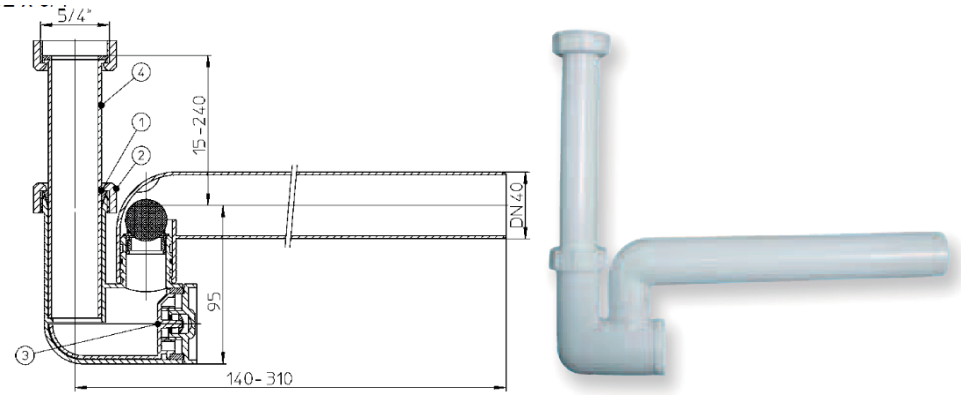
If there is a servo motor for the bypass flap, check to see whether it turns in the right direction.

9.1.5 Condensate tray

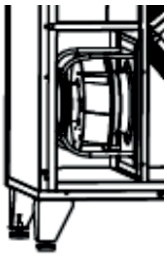


The siphon included with the delivery must be installed properly. There must be sufficient slope (at least 5%) for reliable drainage of the water.

Check that the water drains reliably and that all connections are leak-proof during the start-up.



9.1.6 Ventilator



The fans must run quietly without any grinding noises.

9.1.7 Housing front/door

The housing front/door must be closed tightly after start-up and secured against being opened by unauthorised persons with the key that is included with the delivery.

9.2 Connection of air lines and components

When connecting the air lines, make sure that it is air-tight and suitably decoupled from vibrations.

The air lines and attachments such as the sound suppressor, for example, may only be fastened to the ventilation unit on suitable solid wall or ceiling structural elements of the building using suitably dimensioned fastening elements.

When setting up the line connections, pay particular attention to ensure that no tools or installation material fall into the connections to the unit or on the unit. This could result in damage to components, for example to the fan blades.

In accordance with the project specifications, suitable and adequate insulation must be prepared for the air line components and fittings.

After completion of the work, all tools and installation materials must be removed from the unit. Make sure that no tools or installation materials are left in the unit, because they may damage or destroy the unit when it starts up.

When closing the front doors, make sure there is an adequate and reliable seal to the unit's housing to ensure sealing that is air and condensate water tight.

10 Shutdown/Maintenance/Cleaning

During cleaning or maintenance work on the ventilation unit, always pull the power plug or separate all poles of the ventilation unit from the power mains. Otherwise there is possible danger from the rotating components if the unit is switched on unintentionally.

All fans and rotating parts must come to a complete stop before opening the door. Due to the underpressure in the unit, loose parts can be drawn in, which can lead to damaging the fan or danger to life and limb.

Any other existing system components and system parts such as, for example, a geothermal heat exchanger, pre- and re-heater battery, sound suppressor etc. must be maintained and cleaned in accordance with the regulations and instructions.

A vacuum cleaner should be used if possible to remove dirt and dust. Cleaning by exerting a great deal of force or with compressed air can lead to damage to the components and surfaces.

It is not permitted to use aggressive cleaning agents or solvents.

The electrical components must not come into contact with moisture or wetness.
The safety instructions in **section 2.2** must be observed for all electrical work, especially **section 2.2.3 Electrical Connection Work**.

10.1 Factory customer service

For all questions connected to the delivered **VENTECH system LG 1400(S)/ LG 3200(S) compact ventilation unit,** please contact the installer of the ventilation and air-conditioning system or contact us directly.

10.2 Maintenance instructions for the specialised company

The work on the ventilation unit given in the following may only be performed by qualified personnel. If deficiencies are discovered during the course of the maintenance work, then they must be eliminated immediately for safe operation of the system.

Original spare parts may be used exclusively for replacements and repairs.

10.2.1 Outdoor and extracted air compact filters

The condition of the air filters must be checked regularly. If they are very dirty, then the filters must be replaced immediately. Otherwise the filters are replaced at intervals of at least half a year depending of the pollution of the outdoor air.

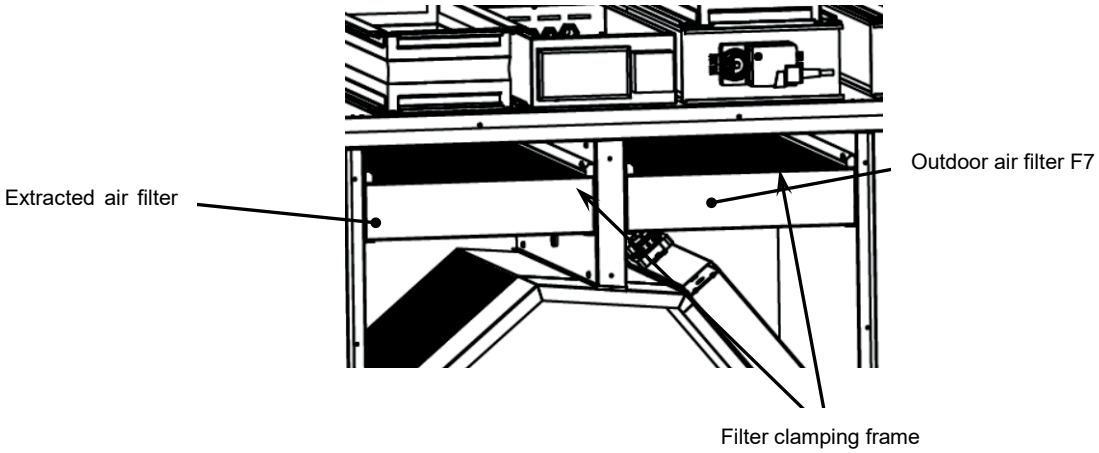
Original replacement filters are to be used exclusively to replace the filters, taking the designated filter quality standard into consideration.

The ventilation unit must never be operated without the air filters for outdoor and extracted air in place.

If ventilation units are put out of operation for an extended period of time, then it is necessary to replace the air filters for hygienic reasons before the unit is switched back on.

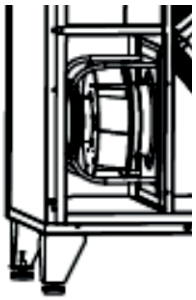
Before pulling the air filters out of the unit, the filter's clamping frame must be released by pulling it forward. Only then can the air filters be pulled out easily and replaced.

When inserting a new filter, make sure there is a good seal and adequate clamping between the air filter and filter clamping frame in order to avoid too much filter bypass leakage.



Note the indication of proper air flow direction on the filter.
When replacing the air filters, make sure that the unit and system parts do not get dirty. Dirty air filters must be disposed of professionally without delay. It has proven to be beneficial to pack the air filters air-tight after pulling them out of the unit in order to avoid dirtying the ventilation system and the unit.

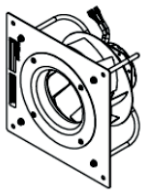
10.2.2 Fans



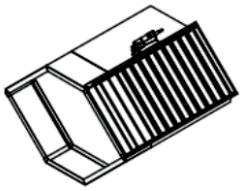
A soft brush must be used to clean the fan blades and fan housing. The dust deposits under the fan are to be removed with a vacuum cleaner.

Damage to the blades must be avoided. Any existing balancing weights must not be removed or damaged. Otherwise imbalance of the impeller will occur and as a result an increased noise level and vibrations may occur.

In the event of that kind of fault of the fan, it must be replaced by a new original fan.



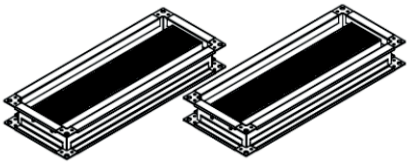
10.2.3 Counter-current plate heat exchanger with bypass flap



Yearly cleaning at least is recommended depending on how dirty the heat exchanger is.

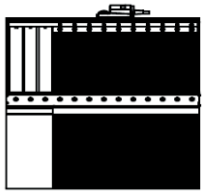
Rinse the heat exchanger with warm water and a conventional cleaning agent. Under no circumstances clean the heat exchanger with compressed air, steam jets or high-pressure cleaners. That could destroy it.

10.2.4 Pre- and re-heater battery

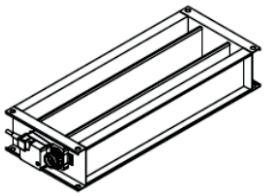


Yearly cleaning at least is recommended depending on how dirty the unit is. During the course of cleaning, the fins on the battery must not be damaged. A vacuum cleaner or soft brush must be used to remove dust. If the pre- or alternatively re-heater battery becomes damaged that way, is must be replaced by an original heater battery.

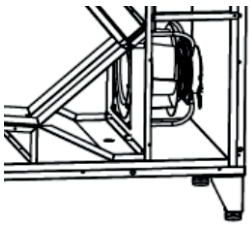
10.2.5 Bypass flap, exhaust air flap, outdoor air flaps



The flaps must be checked to ensure they move easily. A soft brush and soapy water must be used to clean the flaps. The flaps must not be oiled, because the plastic that is used may be destroyed and the flaps will no longer work.

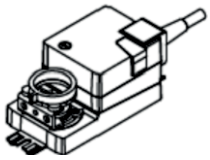


10.2.6 Condensate tray



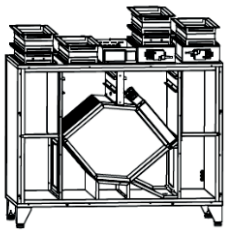
The condensate tray must be checked regularly for dirtying. Depending of how dirty it is and the temperatures, at least yearly cleaning of the condensate drain, drain line and odour trap (siphon) is recommended. Before switching the system on again, the odour trap (siphon) must be filled with water.

10.2.7 Servo motors



Check the connection between the servo motor and the flap drive regularly to make sure it is firm. Otherwise the motors are maintenance-free.

10.2.8 Unit's housing - cleaning the inside



Depending of how dirty it is, at least yearly cleaning of the inside of the unit's housing is recommended.

Make sure the surfaces of the housing are treated with care during cleaning. A vacuum cleaner must be used to remove dust. Electrical components must not come into contact with moisture or wetness. In particular, make sure to avoid any possible damage to the temperature sensors and electrical connection line.

11 Maintenance table

This table must be completed (for documentation) after completion of the maintenance work on the system.

System installed by			**Date**
No.	**Maintenance work** (e.g. replace filter)	**Performed by signature**	**Date**
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			

12 Overview of PI-Air-2 functions

Function	Description	Standard	Optional	Accessories necessary
Filter monitoring	Filter timer monitors filter runtime		●	
	Pressure switch for monitoring static pressure loss		●	●
	Continuous pressure sensors for monitoring static pressure loss	●		●
	Continuous pressure sensors for monitoring dynamic pressure loss		●	●
Temperature control	Regulation of constant supply air temperature		●	
	Regulation of constant extract air temperature	●		
	Regulation of constant room air temperature		●	● (room air temperature sensor)
	Regulation of constant supply air/extract air temperature differential		●	
	Temperature compensation guided by outside air temperature setpoint value		●	
Summer/winter changeover	Changes temperature control type for winter and summer modes.		●	
Night time cooling	If the temperature conditions are approved during the summer, the cooler outside air is used to cool down rooms at night. This can be controlled over a period of time or within a temperature window.		●	
Active cooling	Cooling performance can be managed continuously by installing a cooler battery.		●	● (PWW cooler)
	DX cooling battery – digital or continuous refrigerating machine power control		●	● (DX cooler)
Active heating/cooling	By using a combination battery, the user can control heating and cooling via a continuous 0-10 V and a 230 V pump outlet.		●	● (Combi battery)
	Requirement for heating or cooling demand		●	● (Signal relay)
Approve cooling	Digital input when using a combi battery. Facility for external control of whether coolant is provided in the event of demand for cooling		●	
Approve heating	Digital input when using a combi battery. Facility for external control of whether heating medium is provided in the event of demand for heating		●	
Preheating	Control signal for an electrical pre-heater battery or digital switch output		●	● (electric heater)
	Control signal for a PWW/glycol/brine pre-heater battery 0 – 10 V mixer valve and 230 V pump control		●	● (PWW heater)
	Heat requirement in the event of heating demand		●	● (Signal relay)
Reheating	Control signal for an electrical re-heater battery or digital switch output		●	● (electric heater)
	Control signal for a PWW reheater battery 0-10 V mixer valve and 230 V pump control		●	● (PWW heater)
	Heat requirement in the event of heating demand		●	● (Signal relay)
Temperature sensor	Outside air temperature sensor	●		
	Supply air temperature sensor	●		
	Exhaust air temperature sensor	●		
	Room temperature sensor		●	● (room air temperature sensor)
	Extract air temperature sensor	●		
Heat recovery bypass per- formance control	Continuous bypass control for optimal energy recovery	●		
Bypass frost protection	Protection of the heat exchanger by opening the bypass duct.	●		
Fan protection	In the event of a fault in the fans, an alarm is triggered and the unit is shut down.	●		
Fire alarm system	Alarm signal from central fire alarm system can be connected (digital input).An active alarm stops the unit.		●	
Smoke alarm	An active smoke alarm (digital input) triggers a smoke detector alarm in the unit and a defined, adjustable fan speed.		●	
Web operation	Integration into a LAN network. Unit operation and remove control via integrated web server		●	

Function	Description	Standard	Optional	Accessories necessary
Communication	Connection to a building´s automation system via Modbus RTU interface		●	
	Connection to a building´s automation system via Modbus TCP/IP interface		●	
	Connection to a building´s automation system via BACnet interface		●	
	Connection to a building´s automation system via LON interface		●	● (LON module)
Shut-off valve	Outside air valve closes automatically when the unit stops.		●	● (valve with actuator)
	Exhaust air valve closes automatically when the unit stops.		●	● (valve with actuator)
Cold recovery	When extract air is cool and outside air is too warm, the warm outside air is used to cool down the outside air.	●		
Weekly programme	Time-controlled ventilation regulation. Up to 4 start and stop times may be defined per 24 hour period.	●		
Shock ventilation (party function)	By activating a digital input, the unit is operated at a high ventilation level. The unit can run for a definable period of time after the contact is opened.		●	
External start/stop	The unit is started or stopped by activating a digital input.		●	
A alarm	Fault message resulting in unit shutdown. (potential-free output)	●		
B alarm	Warning message requiring maintenance e. g. filter change (potential-free output)		●	
Ventilation control	Constant ducting pressure control		●	● (pressure sensors)
	Constant air volume control	●		
	Constant supply air duct pressure control		●	● (pressure sensors)
	Constant extract air duct pressure control		●	● (pressure sensors)
	VOC/CO_2 bedarfsgeführte Regelung		●	● (CO_2/VOC sensor)
	0-10 V demand-controlled supply air and extract air separated		●	● (e. g. Belimo Fan-optimiser)
	GreenZone/PI Optimizer – demand optimised control		●	● (Pi-optimiser/zone module)
	Constant fan speed		●	
Dehumidification	Dehumidification of extract room air (only possible in combination with cooling and heater batteries)		●	● humidity sensor, cooling/heater battery)
Humifidication	0-10 V signal and switch output to control an external humidification unit for supply air		●	● (External humidifier, humidity sensor)
Control unit	Pichler 3,5‘‘ colour touch screen control unit	●		
Language package	The following languages are currently available: German, English, Italian, French, Danish, Finnish, Swedish, Norwegian, Spanish, Polish, Russian, Dutch	●		
Heater battery protection	An alarm is triggered in the event of a heater battery fault.	●		
Combi battery protection	An alarm is triggered in the event of a combi battery fault.		●	
Summer operation	Signalling of summer operation		●	
Operating message	Signalling of system operation status		●	

13 Spare parts and accessories

Exclusively original spare parts may be installed and used for replacements and repairs. Reliable system operation is only ensured if original spare parts are used.

13.1 System components LG 1400 (S)

Description	Article number	Dimensions
Outdoor air filter, quality standard F7 for LG 1400(S)	40LG050130	375 x 660 x 92 mm
Optional outdoor air filter, quality standard F9 for LG 1400(S)	40LG050150	375 x 660 x 92 mm
Extract air filter, quality standard G4 for LG 1400 and LG 1400(S)	40LG050140	375 x 660 x 92 mm
Optional extracted air filter, quality standard F5 for LG 1400(S)	40LG050160	375 x 660 x 92 mm
Electrical pre-heater battery 400V/6kW for LG 1400(S)	40LG080170	260 x 654 x 121 mm
Electrical re-heater battery for LG 1400 230V/2kW	40LG080160	260 x 654 x121mm
Electrical re-heater battery for LG 1400(S) 400V/2kW	40LG080150	346 x 646 x121 mm
Canvas supports for LG 1400	08STELG1400	200 x 596 x 121 mm P30
Canvas supports for side outlet LG 1400(S)	08STELG1400S	286 x 586 x 121 mm P30
Installation accessories set for canvas supports LG 1400/LG 3200	08STEMONTZB	
Condensate siphon	40LG030620	DN 40 mm

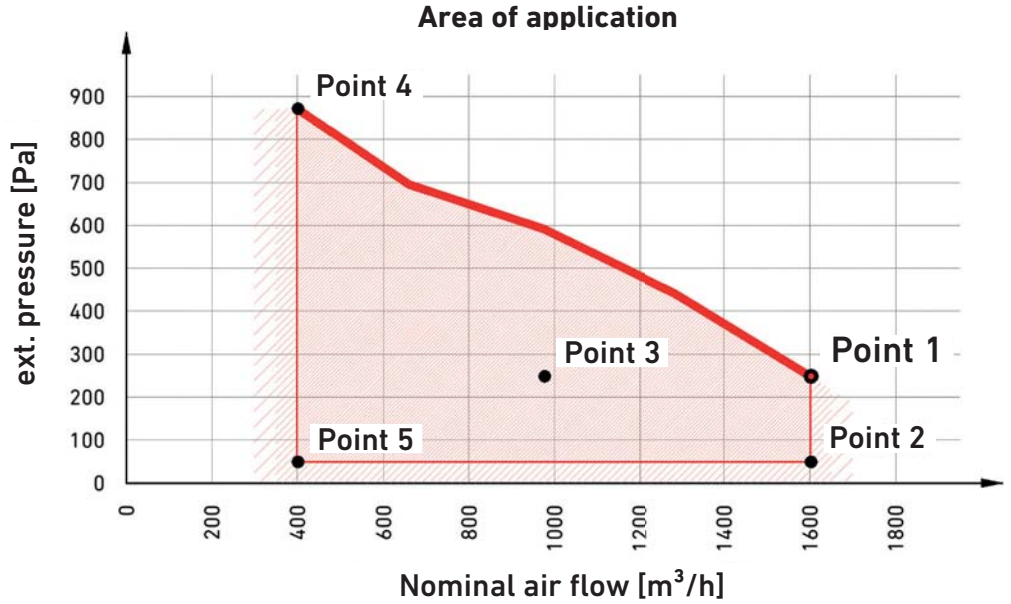
13.2 System components LG 3200 (S)

Description	Article number	Dimensions
Outdoor air filter, quality standard F7 for LG 3200(S)	40LG050170	592 x 860 x 92 mm
Optional outdoor air filter, quality standard F9 for LG 3200(S)	40LG050190	592 x 860 x 92 mm
Extract air filter, quality standard G4 for LG 3200(S)	40LG050180	592 x 860 x92 mm
Optional extracted air filter, quality standard F5 for LG 3200(S)	40LG050200	592 x 860 x92 mm
Electrical pre-heater battery 400V/12kW for LG 3200(S)	40LG080240	360 x 860 x121 mm
Electrical re-heater battery for LG 3200 400V/4kW	40LG080220	360 x 860 x121 mm
Electrical re-heater battery for LG 3200(S) 400V/4kW	40LG080230	546 x 846 x 121 mm
Canvas supports for LG 3200	08STELG3200	300x 800 x 121 mm P30
Canvas supports for side outlet LG 3200(S)	08STELG3200S	486 x 786 x 121 mm P30
Installation accessories set for canvas supports LG 1400/LG 3200	08STEMONTZB	
Condensate siphon	40LG030620	DN 40 mm

14. Product fiches

14.1 Product fiche LG 1400 (S)

Model ID	PICHLER System Ventech LG 1400 (S)
Type	Two-way ventilation plant for non-residential use
Drive type	Speed control
Type of heat recovery *	Other heat recovery system counterflow heat exchanger



The apparatus complies with the Eco-design Directive inside the cross-hatched area.
The diagram applies to the reference configuration (fans, filters, heat exchangers) without assemblies not for ventilation (e.g. heating coils, louvre flaps, etc.). Additional loss of pressure must be taken into account when installing assemblies not for ventilation.

Point 1			
Internal specific fan power	SVL_{int}	1060	[W/(m³/s)]
Thermal transmission	η_{t_nwla}	80,50%	[-]
Enclosure sound power level	L_{WA}	75	[dB(A)]
Nominal airflow	q_{nom}	0,444	[m³/s]
		1600	[m³/h]
actual electrical input power	$P_{el,ges}$	0,94	[kW]
Airflow speed	v_{nom}	1,80	[m/s]
Nominal outside pressure ZUL	$\Delta p_{s,ext\ ZUL}$	250	[Pa]
Nominal outside pressure ABL	$\Delta p_{s,ext\ ABL}$	250	[Pa]
Internal pressure drop across ventilation components, ZUL	$\Delta p_{s,int\ ZUL}$	329	[Pa]
Internal pressure drop across ventilation components, ABL	$\Delta p_{s,int\ ABL}$	272	[Pa]
Internal pressure drop across non-ventilation components, ZUL	$\Delta p_{s,add\ ZUL}$	0	[Pa]
Internal pressure drop across non-ventilation components, ABL	$\Delta p_{s,add\ ABL}$	0	[Pa]
Fan efficiency, ZUL, at nominal external pressure loss and internal pressure loss across ventilation components	$\eta_{fan\ ZUL}$	56,55	[%]
Fan efficiency, ABL, at nominal external pressure loss and internal pressure loss across ventilation components	$\eta_{fan\ ABL}$	56,92	[%]
External air leakage (at ±400 Pa)		< 1	[%]
Internal air leakage (at 250 Pa)		< 1	[%]
Energy class, ZUL-filter (F7) **		960,4	[kWh]
Energy class, ABL-filter (G4) **		588,2	[kWh]

ZUL = supply air
ABL = extract air

Point 2			
Internal specific fan power	SVL_{int}	1070	[W/(m³/s)]
Thermal transmission	η_{t_nwla}	80,50%	[-]
Enclosure sound power level	L_{WA}	65	[dB(A)]
Nominal airflow	q_{nom}	0,444	[m³/s]
		1600	[m³/h]
Nominal external pressure, ZUL	$\Delta p_{s,ext\ ZUL}$	50	[Pa]
Nominal external pressure, ABL	$\Delta p_{s,ext\ ABL}$	50	[Pa]
Point 3			
Internal specific fan power	SVL_{int}	568	[W/(m³/s)]
Thermal transmission	η_{t_nwla}	83,00%	[-]
Enclosure sound power level	L_{WA}	59	[dB(A)]
Nominal airflow	q_{nom}	0,271	[m³/s]
		975	[m³/h]
Nominal external pressure, ZUL	$\Delta p_{s,ext\ ZUL}$	250	[Pa]
Nominal external pressure, ABL	$\Delta p_{s,ext\ ABL}$	250	[Pa]
Point 4			
Internal specific fan power	SVL_{int}	324	[W/(m³/s)]
Thermal transmission	η_{t_nwla}	88,50%	[-]
Enclosure sound power level	L_{WA}	55	[dB(A)]
Nominal airflow	q_{nom}	0,097	[m³/s]
		350	[m³/h]
Nominal external pressure, ZUL	$\Delta p_{s,ext\ ZUL}$	875	[Pa]
Nominal external pressure, ABL	$\Delta p_{s,ext\ ABL}$	875	[Pa]
Point 5			
Internal specific fan power	SVL_{int}	265	[W/(m³/s)]
Thermal transmission	η_{t_nwla}	88,50%	[-]
Enclosure sound power level	L_{WA}	52	[dB(A)]
Nominal airflow	q_{nom}	0,097	[m³/s]
		350	[m³/h]
Nominal outside pressure ZUL	$\Delta p_{s,ext\ ZUL}$	50	[Pa]
Nominal outside pressure ABL	$\Delta p_{s,ext\ ABL}$	50	[Pa]

The ventilation unit complies with Eco-design Directive (EU Regulation 1253/2014) as required for 2018.

Visual filter warning

The ventilation unit has a visual warning to replace the filter. An error message will be displayed on the control panel when the set pressure difference is exceeded.

WARNING: The plant will not work efficiently unless the filter is replaced regularly, causing power consumption to increase.

Disposal

Equipment that is no longer functional must be uninstalled by a specialist firm and properly disposed of at a suitable facility. The Electrical and Electronic Equipment Act (EAG-VO), implementing Community law Directives 202/95/EC (RoHS) and 2002/96/EC (WEEE Directive) applies.

* Types of heat recovery:	none
	Fluid circulation heat exchanger
	other heat recovery system

** The energy class is calculated based on the annual operating hours (8760 h) and average pressure loss (see table below for final pressure loss pursuant to ÖNORM EN 13053).

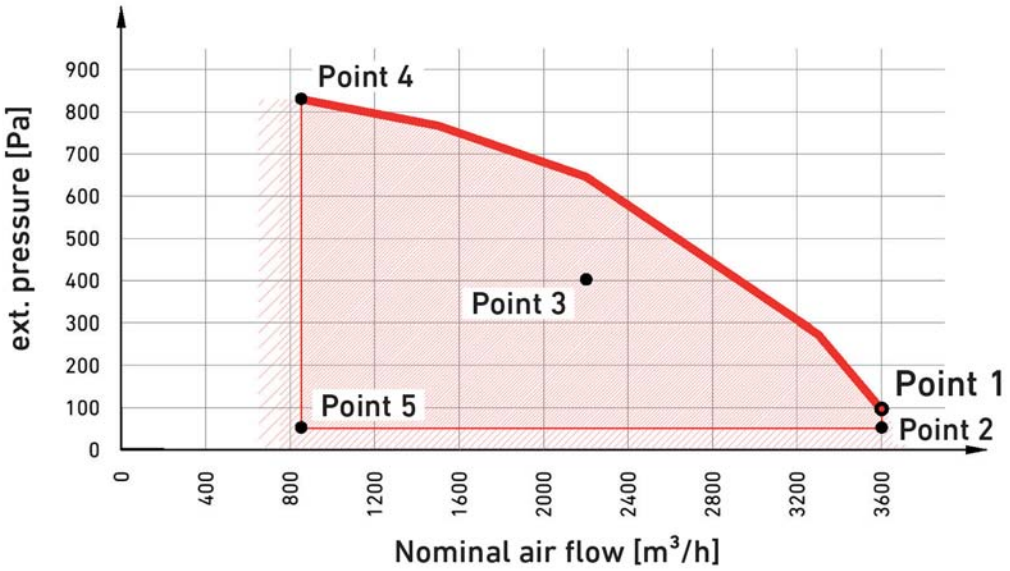
	Filter class	Final pressure di˜erence
Max. pressure drop across filter pursuant to ÖNORM EN 13053:	G1-G4	150 Pa
	M5-F7	200 Pa
	F8 - F9	300 Pa

Information based on the current state of knowledge of EU Regulation 1253/2014

14.2 Product fiche LG 3200 (S)

Model ID	PICHLER System Ventech LG 3200 (S)
Type	Two-way ventilation plant for non-residential use
Drive type	Speed control
Type of heat recovery *	Other heat recovery system counterflow heat exchanger

Area of application



The apparatus complies with the Eco-design Directive inside the cross-hatched area.
The diagram applies to the reference configuration (fans, filters, heat exchangers) without assemblies not for ventilation (e.g. heating coils, louvre flaps, etc.). Additional loss of pressure must be taken into account when installing assemblies not for ventilation.

Point 1			
Internal specific fan power	SVL_{int}	1153	[W/(m³/s)]
Thermal transmission	η_{t_nwla}	86,00%	[-]
Enclosure sound power level	L_{WA}	72	[dB(A)]
Nominal airflow	q_{nom}	1	[m³/s]
		3600	[m³/h]
actual electrical input power	$P_{el,ges}$	1,69	[kW]
Airflow speed	v_{nom}	1,96	[m/s]
Nominal outside pressure ZUL	$\Delta p_{s,ext\ ZUL}$	94	[Pa]
Nominal outside pressure ABL	$\Delta p_{s,ext\ ABL}$	94	[Pa]
Internal pressure drop across ventilation components, ZUL	$\Delta p_{s,int\ ZUL}$	380	[Pa]
Internal pressure drop across ventilation components, ABL	$\Delta p_{s,int\ ABL}$	313	[Pa]
Internal pressure drop across non-ventilation components, ZUL	$\Delta p_{s,add\ ZUL}$	0	[Pa]
Internal pressure drop across non-ventilation components, ABL	$\Delta p_{s,add\ ABL}$	0	[Pa]
Fan efficiency, ZUL, at nominal external pressure loss and internal pressure loss across ventilation components	$\eta_{fan\ ZUL}$	60,89	[%]
Fan efficiency, ABL, at nominal external pressure loss and internal pressure loss across ventilation components	$\eta_{fan\ ABL}$	59,23	[%]
External air leakage (at ±400 Pa)		< 1	[%]
Internal air leakage (at 250 Pa)		< 1	[%]
Energy class, ZUL-filter (F7) **		2100,4	[kWh]
Energy class, ABL-filter (G4) **		1294,1	[kWh]

ZUL = supply air
ABL = extract air

Point 2			
Internal specific fan power	SVL_{int}	1177	[W/(m³/s)]
Thermal transmission	η_{t_nwla}	86,00%	[-]
Enclosure sound power level	L_{WA}	68	[dB(A)]
Nominal airflow	q_{nom}	1	[m³/s]
		3600	[m³/h]
Nominal external pressure, ZUL	$\Delta p_{s,ext\ ZUL}$	50	[Pa]
Nominal external pressure, ABL	$\Delta p_{s,ext\ ABL}$	50	[Pa]
Point 3			
Internal specific fan power	SVL_{int}	972	[W/(m³/s)]
Thermal transmission	η_{t_nwla}	86,50%	[-]
Enclosure sound power level	L_{WA}	73	[dB(A)]
Nominal airflow	q_{nom}	0,917	[m³/s]
		2200	[m³/h]
Nominal external pressure, ZUL	$\Delta p_{s,ext\ ZUL}$	272	[Pa]
Nominal external pressure, ABL	$\Delta p_{s,ext\ ABL}$	272	[Pa]
Point 4			
Internal specific fan power	SVL_{int}	291	[W/(m³/s)]
Thermal transmission	η_{t_nwla}	92,00%	[-]
Enclosure sound power level	L_{WA}	74	[dB(A)]
Nominal airflow	q_{nom}	0,236	[m³/s]
		850	[m³/h]
Nominal external pressure, ZUL	$\Delta p_{s,ext\ ZUL}$	829	[Pa]
Nominal external pressure, ABL	$\Delta p_{s,ext\ ABL}$	829	[Pa]
Point 5			
Internal specific fan power	SVL_{int}	267	[W/(m³/s)]
Thermal transmission	η_{t_nwla}	92,00%	[-]
Enclosure sound power level	L_{WA}	65	[dB(A)]
Nominal airflow	q_{nom}	0,236	[m³/s]
		850	[m³/h]
Nominal outside pressure ZUL	$\Delta p_{s,ext\ ZUL}$	50	[Pa]
Nominal outside pressure ABL	$\Delta p_{s,ext\ ABL}$	50	[Pa]

The ventilation unit complies with Eco-design Directive (EU Regulation 1253/2014) as required for 2018.

Visual filter warning

The ventilation unit has a visual warning to replace the filter. An error message will be displayed on the control panel when the set pressure difference is exceeded.

WARNING: The plant will not work efficiently unless the filter is replaced regularly, causing power consumption to increase.

Disposal

Equipment that is no longer functional must be uninstalled by a specialist firm and properly disposed of at a suitable facility. The Electrical and Electronic Equipment Act (EAG-VO), implementing Community law Directives 202/95/EC (RoHS) and 2002/96/EC (WEEE Directive) applies.

* Types of heat recovery:	none
	Fluid circulation heat exchanger
	other heat recovery system

** The energy class is calculated based on the annual operating hours (8760 h) and average pressure loss (see table below for final pressure loss pursuant to ÖNORM EN 13053).

	Filter class	Final pressure difference
Max. pressure drop across filter pursuant to ÖNORM EN 13053:	G1-G4	150 Pa
	M5-F7	200 Pa
	F8 - F9	300 Pa

Information based on the current state of knowledge of EU Regulation 1253/2014

15 Subject to changes.

We are constantly making an effort to provide technical improvements and optimisations to our products and reserve the right to change the designs of the units or technical data without any prior notification.

ErP 2018

ErP 2018
Fulfils the requirements of the Ecodesign Directive,
in accordance with EU Regulation 1253/2014.

Your partner/installer:

klimaaktiv Partner | PASSIVHAUS Austria | NETZWERK PASSIVHAUS www.passivhaus.at

Responsible for the content: J. Pichler Gesellschaft m.b.H.
Photos: Ferdinand Neumüller, Archiv J. Pichler Gesellschaft m.b.H. | ***Text:*** J. Pichler Gesellschaft m.b.H. All rights reserved | All photos are symbolic photos | Subject to change without notice | ***Version:*** 10/2017 db/kp

PICHLER
Systematic ventilation.

J. PICHLER
Gesellschaft m.b.H.

office@pichlerluft.at
www.pichlerluft.at

ÖSTERREICH
9021 KLAGENFURT AM WÖRTHERSEE
Karlweg 5
T +43 (0)463 32769
F +43 (0)463 37548

ÖSTERREICH
1100 WIEN
Doerenkampgasse 5
T +43 (0)1 6880988
F +43 (0)1 6880988-13

Sales offices in Slovenia and Serbia.
Sales partners in Germany, Switzerland and Italy.