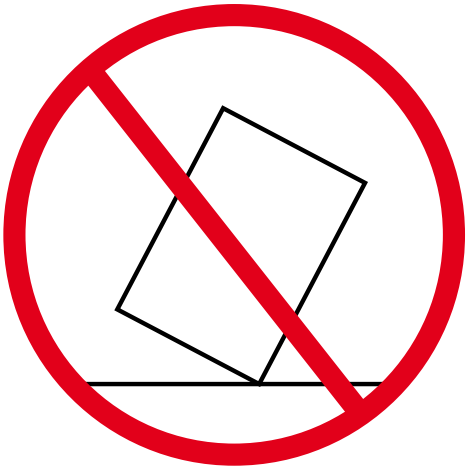


THE UNIT MUST NOT
BE TILTED MORE THAN 45°

enervent®

PRO greenair HP

Ventilation unit with heat recovery and integrated heat pump

Design, installation, and operation instructions

Please read this manual thoroughly before operating the unit, and retain it for further reference.

HP

Heat Pump

www.enervent.fi

TABLE OF CONTENTS

WARNINGS AND NOTICES

- The unit must not be tilted more than 45°.
- The unit must be switched off before the service hatch is opened. When the service door is opened, approx. two minutes must be left before maintenance work begins. The fans rotate by themselves for a while, and the compressor may be extremely hot even when the ventilation unit power supply is disconnected.
- There are no user-serviceable parts behind the control panel or the connection housing cover. These parts are to be serviced by a qualified technician only. Explore the cause of any fault before restarting the unit!
- Protective gloves should be used for handling of the components, because components may have sharp edges. In particular, the heat-pump unit should be handled extremely carefully, because the radiator plate edges are very sharp. The mass of the heat-pump unit, 35 kg, should be considered when one is moving the component. General electrical safety regulations must be considered in any maintenance or servicing of the unit.
- The unit must be disconnected from the electricity supply before any voltage tests, insulation resistance tests, and other work/tests are performed that could damage the sensitive electronic devices.

  The control equipment used in the ventilation unit may cause residual current. Because of this, a residual current circuit-breaker may not operate correctly with the unit. All applicable regulations, including local rules, must be observed when one is performing electrical installation work.
- The air flows must be adjusted. The ventilation unit's warranty is void if the air flows are not adjusted and/or an air-flow adjustment report is not made.
- The unit may have to be restarted in exceptional situations.

INSTRUCTIONS FOR THE USER

TYPE DESCRIPTION

Thank you for selecting an Enervent product.
The instructions cover the following models:

Enervent Pelican eco PRO greenair HP
Enervent Pegasos eco PRO greenair HP

The type designation plate is attached inside the ventilation unit. Please fill in the information here, so that the details are readily available when required – e.g., when you are purchasing new filters. Before you start reading the instructions, please check the unit's type marking.

EXPLANATIONS OF MARKINGS AND FIGURES

Enervent Pelican eco PRO greenair HP

Pelican / Pegasos	Ventilation unit frame
eco	Ventilation unit with DC fans
PRO greenair HP	Integrated heat pump

FOREWORD

All Enervent ventilation units are designed and manufactured for year-round operation. Enervent's units have been installed in Finnish offices and private homes for over 20 years. The popularity of our units has grown steadily year after year. Experience has enabled us to develop the user-friendliness of our units. The Enervent PRO greenair product range is a result of long-term product development. Its properties are extremely versatile and easily modified.

PRO greenair HP

WHAT is the PRO greenair HP?

The PRO greenair HP is a traditional ventilation unit combining regenerative heat recovery and a heat pump into a single compact unit. The extract air's heat energy is recovered during the winter, and supply air is cooled during the summer. Additionally, the room-air humidity and carbon dioxide levels can be controlled. The unit is easy to install, and no indoor unit is required.

HOW does the PRO greenair HP work?

Heat energy is recovered from the extracted air by the rotating heat exchanger. Its aluminium foils are continuously heated by the extract air, and when they rotate to the supply-air flow, they release the energy to the supply air with an efficiency of up to 80%.

The heat pump operates as a traditional refrigeration circuit; the refrigerant vaporises and stores energy (heat) from the extract air and releases it into the supply air when condensing. This is how the compressor 'pumps' energy from the warmer side to the cooler side. The refrigeration circuit can be operated in a transverse direction during warm seasons to cool down the supply-air temperature. In this case, the refrigerant stores energy from the outside air and releases it into the extract air.

What are the BENEFITS of the PRO greenair HP?

Because of its unique and compact design, the unit is ideally suited to installations in places where it is impossible to install an outdoor heat-pump unit. Because the heat pump is installed inside the unit, a ventilation installer can install it. Refrigeration system expertise is not required, because refrigeration circuit installations are not performed.

The combination of a regenerative heat exchanger and a heat pump heats or cools the supply air to the ideal temperature, regardless of the season. The heat exchanger and the heat pump operate side by side to create a constant and comfortable room temperature. The unit's efficiency is extremely high, and the energy and cost savings are significant because of the energy-saving fans, the inverter-controlled compressor, and the efficient heat exchanger. The PRO greenair HP cannot operate as a building's primary heating source.

ISSUES TO NOTE in the operation of the PRO greenair HP

Ventilation is the primary function of the unit. Cooling and heating are secondary functions.

Constant and uninterrupted operation of the unit ensures that the compressor is constantly running, which considerably lengthens its service life. To ensure constant operation of the PRO greenair HP unit, the unit is designed to be operated with extract-air or room-temperature control.

It is very important for the correct operation of the unit that the air ducts and air flows be designed to be great enough. The unit's automation keeps the fan power at 70% or more when the heating/cooling mode is selected. It is the ventilation designer and ventilation contractor's responsibility to design, construct, and adjust the air ducting such that sufficient air flows can be used.

GENERAL VENTILATION INFORMATION

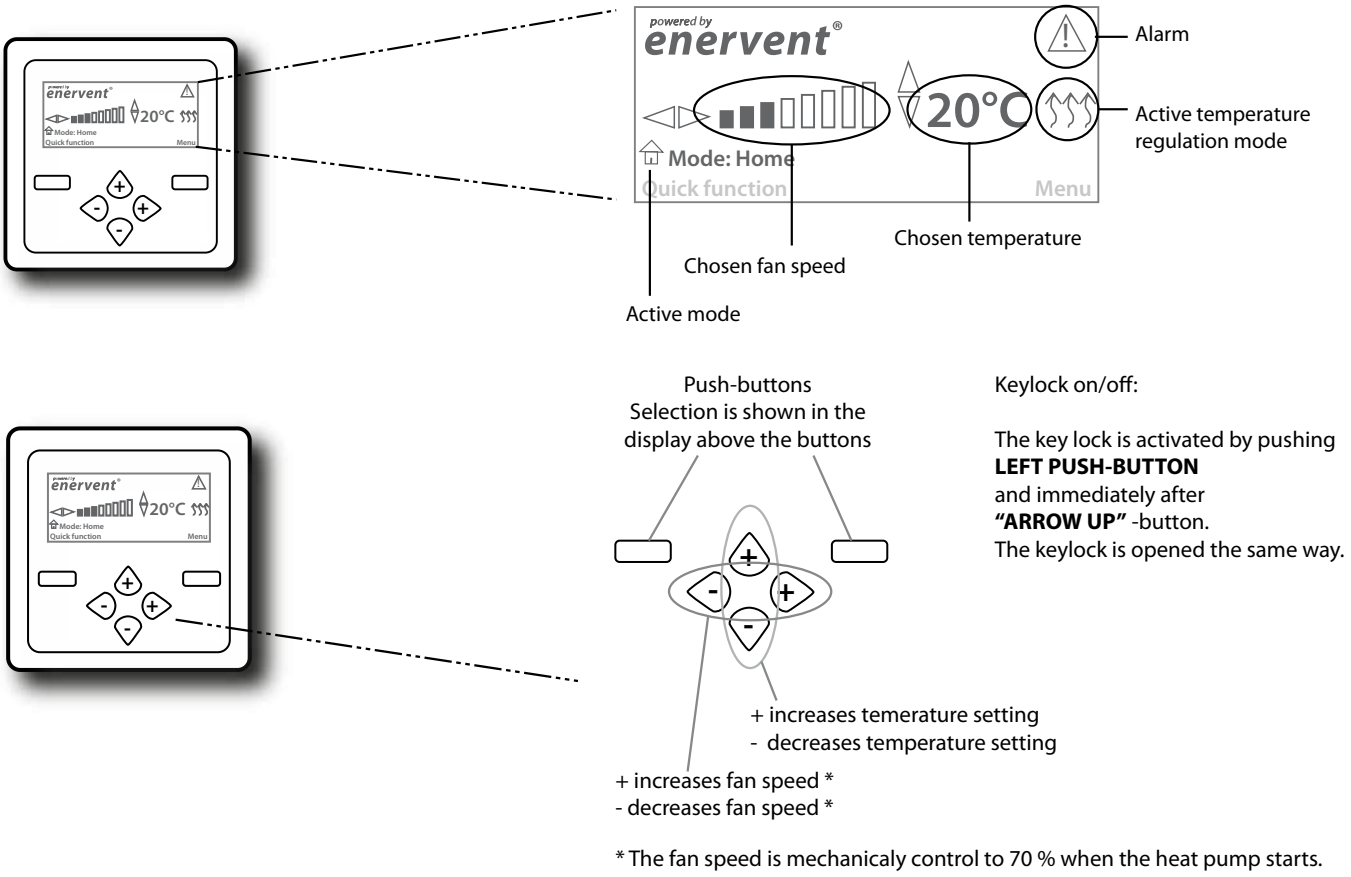
Always keep the ventilation power high enough! In other cases, humidity levels inside the rooms rise too high. In the winter, this causes condensation on cold window surfaces. The recommended relative room-air humidity is 35–45% (at a room temperature of 20–22 °C). This keeps the windows dry and the humidity levels healthy. Monitor the room-air humidity by using a humidity meter, and turn the ventilation to higher power when the humidity rises above 45%.

Change the filters at regular intervals! In the wintertime, the extract-air filter becomes dirty more quickly than the fresh-air filter does. This reduces the extract-air flow, which, in turn, increases the room-air humidity and lowers supply-air temperature. When changing the filters, always check that the heat exchanger rotates. The heat exchanger rotates when the HRC exhaust temperature is higher than the fresh-air temperature. The temperatures can be seen in the Measurements menu. If the ventilation unit is not used for a prolonged time, the fresh-air intake and exhaust-air exit vents are to be covered. This prevents moisture from condensing in, for example, the electric fan motors.

OPERATING THE VENTILATION UNIT

The PRO greenair HP unit has two switches behind the smaller right door. The unit is started by moving the green (main) switch to the ON position. The fans and the rotating heat exchanger operate in this mode. The heat-pump unit must not be switched on before the air flows have been adjusted. When the air flows have been adjusted and the heat pump is to be used for cooling or heating of the supply air, also the orange switch next to the main switch is moved to the ON position. The main switch switches the entire unit off, regardless of the position of the orange switch.

CONTROL PANEL



* The fan speed is mechanicaly control to 70 % when the heat pump starts.

The ventilation unit is operated from the control panel. Versatile functions of the automatic control system are accessed from the informative display and the quick-choice buttons. Our intention has been to make operation of the unit as simple as possible.

The ventilation installer specifies the normal running speed of the unit that is needed for meeting the requirements set in the ventilation design. The speed must be at least 70% during cooling or heating. The unit runs at this speed by default. Most situations in which a change of speed is required are taken into account in the unit's design. The control system has, for example, the following functions:

- **boost function**, intended for fairly brief airing
- automatic **humidity boosting**, which increases the fan speed when room-air humidity rises above the allowed limit (e.g., when a shower is being used)
- **carbon dioxide boosting** (associated transmitters are available as accessories), which increases the fan speed when the room-air carbon dioxide level rises above the allowed limit (such as when there are many people in the building)

The control panel displays either the extract-air temperature or the room temperature, depending on the settings. As the factory default, the PRO greenair HP displays the extract-air temperature. The temperature can be changed by means of the vertical '+' and '-' buttons.

The temperature control indicator on the control panel displays the active mode.

 The unit is in heating mode. The unit is not heating all the time, even when the control panel's heating indicator is lit. Power is regulated for reaching of the desired temperature.

 The unit is in cooling mode. The unit is not cooling all the time, even when the control panel's cooling indicator is lit. Power is regulated for reaching of the desired temperature.

 The unit uses heat recovery only for heating/cooling.

No indicator Fresh air is directly blown inside.

The ventilation mode is indicated at the left side of the display. The unit can be in any of the following modes: Home / Away / Long absence / Boost / Overpressure (fireplace switch) / Max. heat or cooling / Stove / Central vacuum cleaning / Night cooling.

Alarms have their own symbols on the display. The symbol appears on the display when a fault is detected in the unit or when it requires servicing.

QUICK CHOICES

'Quick choices' are displayed in the lower left corner of the display when standard mode is active. The quick-choice list is opened by pressing of the left multi-choice button. The following functions are available as quick-choice functions:

	Factory setting	Personal selections
Overpressure (i.e., fireplace switch)	√	
Boost (i.e., airing)	√	
Away	√	
Long absence	√	
Max. heat or cooling	√	
Night cooling	√	
Fan speed settings	√	
Temperature ctrl	√	
Min.–max.: 18–26 °C	√	

The ventilation installer can change the quick-choice list functions. To activate the quick-choice functions, press 'Change', the right multi-choice button.

FUNCTION DESCRIPTION

The ventilation unit can be used either in the HOME operation mode or in the OFFICE operation mode. Which functions are available depends on the operation mode. The operation mode desired is specified when the ventilation unit is ordered.

FANS

When the electricity supply is connected, the damper-control relay is energised and heat recovery is switched to maximum power. After a moment, the extract-air fan turns on; then, the supply-air fan turns on. After this, the ventilation unit is controlled on the basis of the settings made.

The fan speed control range is 20 –100%. The speed is set from the control panel's standard display or in the weekly/annual timer settings. Speed difference can be set for the supply- and extract-air fans. When the heat pump is running, the fan speeds are forced to at least 70%.

The following factors affect the fan speeds:
- Boost, overpressure (fireplace switch), and time extension
- The fan speeds – set to 1 if the supply-air temperature is too low
- The supply-air fan stopping and the extract-air fan speed being set to 1 if a fault is detected in heat exchanger operation
- Forced controls from the cooker hood and the central vacuum cleaner (constant-pressure control)
- Summer-night cooling

Fan overpressure control (fireplace switch)
Used only in the HOME operation mode
The overpressure control can be started directly from the control panel or via a separate switch. This makes lighting of the fire easier. Overpressure time and the supply/extract-air fan speeds can be set from the control panel. The overpressure control can be deactivated from the control panel.
The overpressure control reduces the extract-air fan speed and increases the supply-air fan speed for 10 minutes. This results in overpressure building up inside, which creates a good draught in the chimney.
Excessive use of the overpressure function may activate heat exchanger anti-freezing protection, which reduces the pressure inside the building. In this case, the smoke from the fireplace may come inside. If this happens, the front door should be opened for a moment.
NOTE: The ventilation unit does not supply combustion air for the fireplace. The overpressure function is used only in lighting of the fire, not during the entire burning process.

Fan carbon dioxide and humidity control
The power of the ventilation-unit fans is controlled on the basis of the actual need for ventilation as indicated by the humidity and/or carbon dioxide sensors. The function must be enabled from the Settings menu.
The carbon dioxide and/or humidity level inside the rooms is kept below the limits set by means of the control panel. If external humidity transmitters are not connected, the fans are controlled according to the readings from the unit's internal humidity sensor. It is possible to connect two carbon dioxide value transmitters and two humidity value transmitters to the ventilation unit. The transmitters are sold separately.

Fan boosting control
The boosting (i.e., airing) function is started directly from the control panel. Boosting increases the speed of both fans for a certain time (factory setting: fan speed 90%, time 30 min). The boosting can be terminated from the control panel.

Fan time extension control
Used only in the OFFICE operation mode
When the week timer programme has stopped the ventilation unit, it can be started for a 'time extension'. The extension period is specified from the control panel, and extension is started either from the control panel or by means of an external switch (available as an accessory). The time extension can be terminated from the control panel.

Room constant-pressure control
The pressure inside the rooms is maintained at a constant level regardless of the operation of the cooker hood and/or the central vacuum cleaner. The aims here include ensuring error-free fireplace operation.
Constant-pressure control requires an external control voltage (potential-free switch) from the cooker hood and central vacuum cleaner. The time extension can be terminated from the control panel.

Air ducting constant-pressure control
It is possible to connect two differential-pressure value transmitters 0–10 V / 24 V (available as an accessory) to the motherboard of the ventilation unit. They measure the pressures of the supply and extract ducts, and the pressures are kept at their set values through changing of the fan speeds.

Week and year timers
Timer programmes can be used to set a different fan speed for a certain time period. For example, when the house is empty, the fans can be operated at a lower speed by means of the week timer programmes. The week and year timer settings are made from the Timer programmes menu. The week timer has 20 timer blocks, which include the start and end time of the programme and the action that the unit is to perform during the specified time period. The year timer has five timer blocks, which include the start and end time of the programme and the action that the unit is to perform during the specified time period.

In the office operation mode, it is possible to stop the ventilation unit for the specified time period. In this case, the ducting must be equipped with dampers to block the entry of cold outside air into the ducting. The time extension button can be used to start the fans for a predetermined time. In this mode, the external forced controls are disabled. In the summer, it is not advised to shut the ventilation unit down when cooling is used, because the temperature of the rooms rises and it takes a lot of time and energy to cool the warm room spaces.

HEAT RECOVERY

Heat recovery is restricted during the summer period when the outside temperature exceeds the setpoint value 8 °C. During this time, the heat exchanger is stopped unless a heating request is received. When the temperature drops below

8 °C, heat recovery operates at 100% power. This may lead to contradictory situations, especially in the spring, because of the sun heating the rooms when the outside temperature is below 8 °C. During the shutdown period, the heat exchanger rotates for 10 seconds every two hours, to prevent accumulation of dust (shutdown-period cleaning function).

Cooling recovery
During the active time for the summertime power limit, the heat exchanger rotates continuously when the outside temperature is more than 2 °C higher than the extract-air temperature (i.e., room temperature). The heat exchanger stops when the outside-air temperature is 1 °C lower than the extract-air temperature.

Heat-recovery freeze prevention
The ventilation unit's EDA control system turns the supply fan on and off on the basis of the measured temperatures, to prevent freezing of the heat exchanger. The supply fan runs normally after the risk of freezing is over. The freeze-prevention function can be disabled from the control panel.

Heat-recovery efficiency
The supply- and extract-air heat-recovery efficiency is displayed in the control panel's Measurements menu as a percentage.

TEMPERATURES

Units equipped with cooling, such as the PRO greenair HP, must always be controlled on the basis of extract-air or room temperature.

Constant extract-air temperature
The ventilation unit's EDA control system controls the heat pump power on the basis of the reading from the extract-air temperature sensor, to keep the extract-air temperature at the value set from the control panel to an accuracy of ±2 °C (temperature setting: 15–30 °C). Heating is locked – i.e., enabled only when heat recovery is on and the control system requests heating. Cooling is enabled only when the control system requests cooling. Heating and cooling are not enabled simultaneously.
Heating and cooling are both disabled in the office operation mode during the shutdown period.

Maximum heating/cooling function
Momentary efficient heating/cooling is enabled by means of the 'Max. heat/cooling' functions from the control panel's Quick choices menu. The function can be enabled when the outside temperature is lower (max. heating) or higher (max. cooling) than the value set from the control panel. The function remains enabled until the temperature setting shown on the control panel's standard display is reached. This function is available also in the timer programmes.

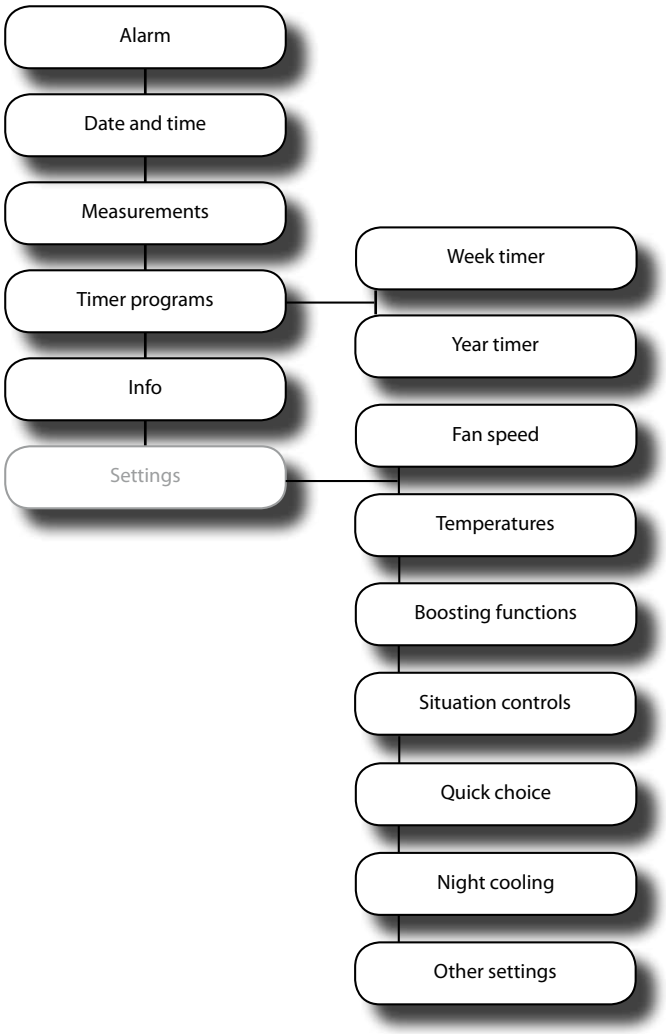
Night cooling
Room temperatures can be lowered on cool summer nights by means of the outside air.
Heating and cooling are disabled when night cooling is in operation. Fan speeds are selected on the basis of the selected control mode
Night cooling operates automatically when it is enabled in the Quick choices menu.

DAMPER ACTUATOR CONTROLS

Damper (accessory) actuators (accessory) are controlled in a parallel connection.
The dampers are open when the fans are running. The damper actuators have spring return, and the damper is closed when the actuator is de-energised.

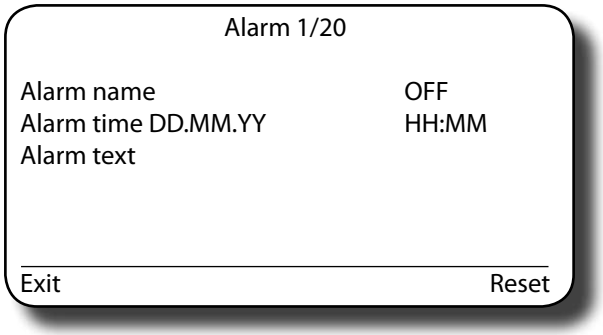
CONTROL SYSTEM'S MAIN MENU

It is not intended that the end user should use all the automatic control system functions. In general, the functions intended for the end user are collected under the main menu. Other menus may contain various settings that the installer should program as desired by the end user. The main menu contains the following submenus: Alarms, Date and time, Measurements, Timer programmes, and Info. The password for the Settings menu is 6143.



ALARMS

All alarms and error messages are displayed on the unit's alarm page. The alarm list displays the 20 latest events. Alarm status can be 'ON', 'OFF', or 'RES.'. The are two alarm classes, A and B. Class-A alarms stop the unit and initiate an external class-A alarm signal. Class-B alarms cause a class-B alarm signal but do not stop the unit. After certain alarms, the unit enters fault mode. In this mode, the extract fan operates at its lowest power and the supply fan is stopped.



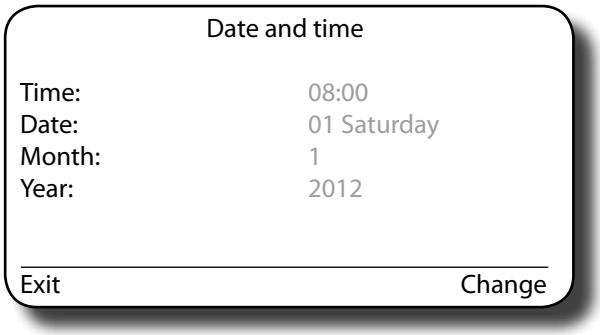
The newest alarm is displayed first in the list, and the last is removed when there are more than 20 alarms. The alarm window displays the alarm name and status on the first row and the alarm event's time on the second row. The third and fourth rows are reserved for text explaining the alarm. Alarm status can be 'on', 'off', or 'res.'. When the status is 'on', the alarm is active and the alarm output is energised. Also when the alarm status is 'on', the right multi-choice button acknowledges the alarm and its status changes from 'on' to 'res.', with the alarm output de-energised for the alarm in question. If the alarm is an A-class alarm, the unit does not operate before the alarm's cause has been corrected and the alarm acknowledged from the display. In 'off', status the alarm is no longer active, but it is still displayed in the list.

ALARM LIST

Alarm	Alarm class	Cause	Action
Service reminder	B	The control system issues a reminder for checking the ventilation unit's condition and changing the filters, every six months.	Service the ventilation unit and change the filters.
Filter alarm Supply-air filter	B	The supply-air differential-pressure transmitter (accessory) generates an alarm condition when the filter is clogged.	Change the supply-air filter.
Filter alarm Extract-air filter	B	The extract-air differential-pressure transmitter (accessory) issues an alarm when the filter is clogged.	Change the extract-air filter.
Supply air cold	B	See the troubleshooting table on page 22.	Service the ventilation unit, or have it serviced.
Risk of fire Supply air hot	A	See the troubleshooting table on page 22.	Contact an authorised service shop. Explore the cause of the fault before acknowledging the alarm.
Risk of fire Room air hot	A	If there is no fire, see the troubleshooting table on page 22.	Contact an authorised service shop. Explore the cause of the fault before acknowledging the alarm.
Extract air cold	B	See the troubleshooting table on page 22.	Service the ventilation unit, or have it serviced.
Risk of fire Extract air hot	A	If there is no fire, see the troubleshooting table on page 22.	Contact an authorised service shop. Explore the cause of the fault before acknowledging the alarm.
External Emergency stop	A	This alarm is enabled only for those units connected to a building automation system. If there is not an emergency, see the troubleshooting table on page 22.	Contact an authorised service shop. Explore the cause of the fault before acknowledging the alarm.
External Risk of fire	A	This alarm is enabled only for units connected to a building automation system. If there is no fire, see the troubleshooting table on page 22.	Contact an authorised service shop. Explore the cause of the fault before acknowledging the alarm.

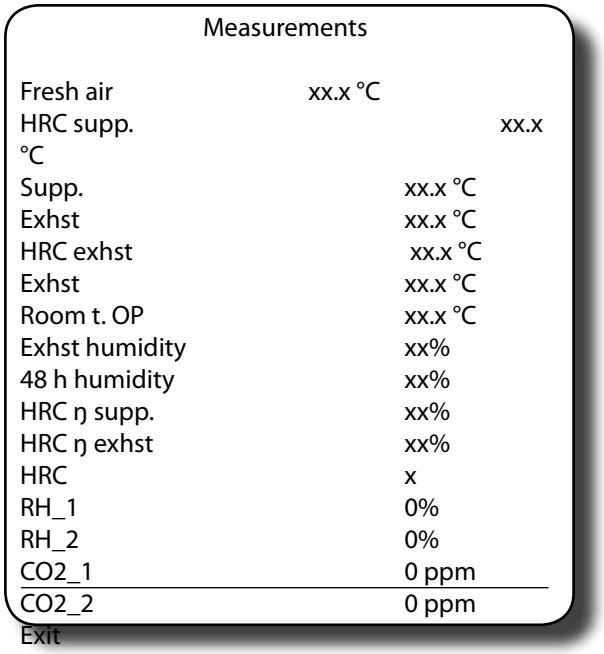
DATE AND TIME

This menu contains the settings for the time, date, month, and year. The day of the week is displayed automatically. For the week and year timers to operate correctly, it is important that the date and time be set correctly.



MEASUREMENTS

The Measurements menu is an interactive menu for displaying the measurement information. The information from the measurement accessories connected, such as carbon dioxide and humidity sensors, is displayed here.
Explanations of the measurements:



Fresh air	Outside-air temperature
HRC supp.	Supply-air temperature after heat recovery
Supp.	Supply-air temperature
Exhst	Extract-air temperature
HRC exhst	Extract-air temperature after the heat pump before the heat exchanger
Exhst	Exhaust-air temperature
Room t. OP	Room temperature, measured by the control panel (accessory)
Exhst humidity	Extract-air humidity
48 h humidity	The average extract-air humidity level over the last 48 hours
HRC ŋ supp.	Supply-air heat-recovery efficiency
HRC ŋ exhst	Extract-air heat-recovery efficiency
HRC	-100–0 the unit requests cooling 0–100 (only) heat recovery is used 100–200 the unit requests heating
RH_1	External humidity transmitter* measurement result
RH_2	External humidity transmitter* measurement result
CO2_1	Carbon dioxide transmitter* measurement result
CO2_2	Carbon dioxide transmitter* measurement result

* The transmitter is an accessory.

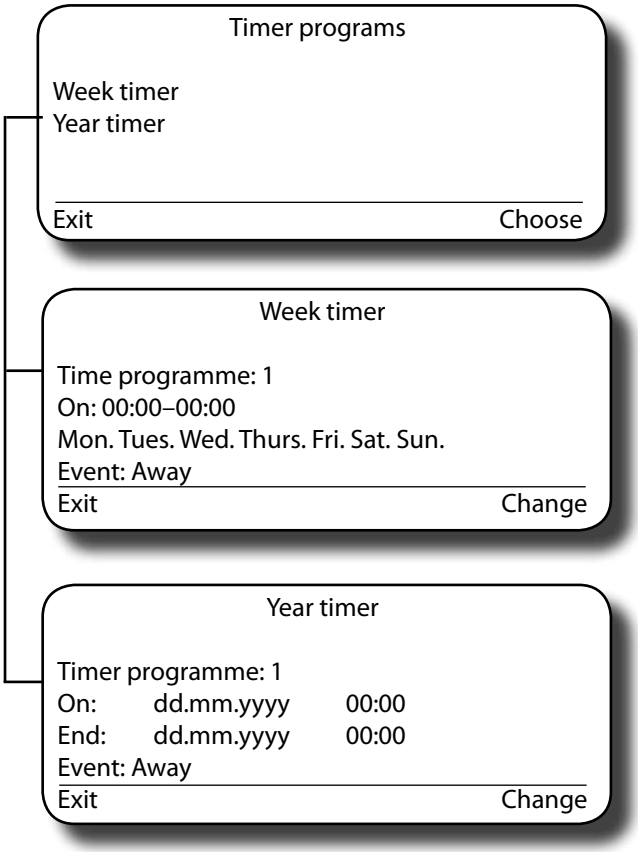
TIMER PROGRAMMES

The week and year timer settings are made in the Timer programmes menu. **The week timer has 20 timer blocks**, which include the start and end time of the programme and the action that the unit is to perform during the specified time period. **The week timer has five timer blocks**, which include the start and end time of the programme and the action that the unit is to perform during the specified time period.

A timer programme is programmed as follows:

1) Enter the Timer programmes menu, and select either the week or year timer. The week timer is used to pro gram events that occur often, such as those related to working hours. The year timer is used to program longer time cycles.
2) The timer programme number is selected.
3) The time period for an active programme is selected – e.g., 7:00–16:00 on all days of the week for the week timer or 1.7.2010–15.7.2010 for the year timer.
4) The event (i.e., function) is selected.

The timer programme events have certain factory-default values. The ventilation installer can change the values when this is necessary. The values given below are the factory-default values.



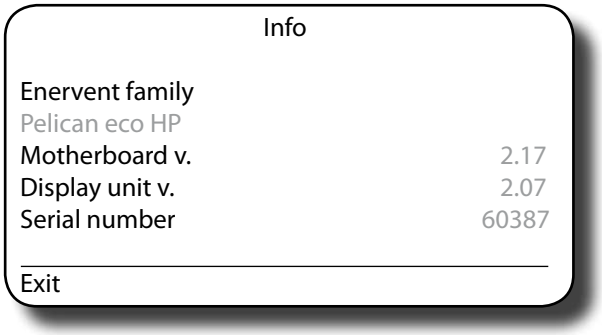
Timer programme events:

The functions 'Away' and 'Long absence' are not well suited to the PRO greenair HP, because the ventilation unit fan power is always at least 70% when the heat pump is operating and the extract-air temperature must be at least 20 °C for the unit to operate optimally. The 'Away' and 'Long absence' functions do not save energy with the PRO greenair HP.

Away	In this mode, the unit's fans operate at 30% power and the temperature is allowed to drop by 2.0 °C.
Long away	In this mode, the unit's fans operate at 20% power, the temperature is allowed to drop by 3.0 °C, and heating and cooling are disabled.
No heating	Heating using the heat pump is disabled.
No cooling	Cooling using the heat pump is disabled.
Temp. drop	The temperature setting value is decreased by 2 °C.
Max heat	Maximum heating power is used. This function remains on until the timer programme ends or the value set is reached.
Max cool	Maximum cooling power is used. This function remains on until the timer programme ends or the value set is reached.
Time rly	The time-controlled relay is set to be energised at a certain time.
IV %	The fan power is set to 20–100% for the timer programme period.

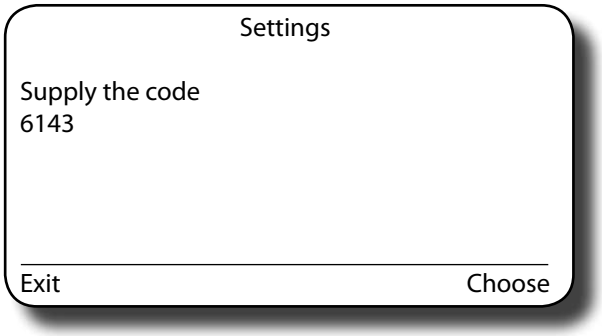
INFO

The Info menu is an interactive menu for displaying the unit's model, serial number, and control system version.



SETTINGS

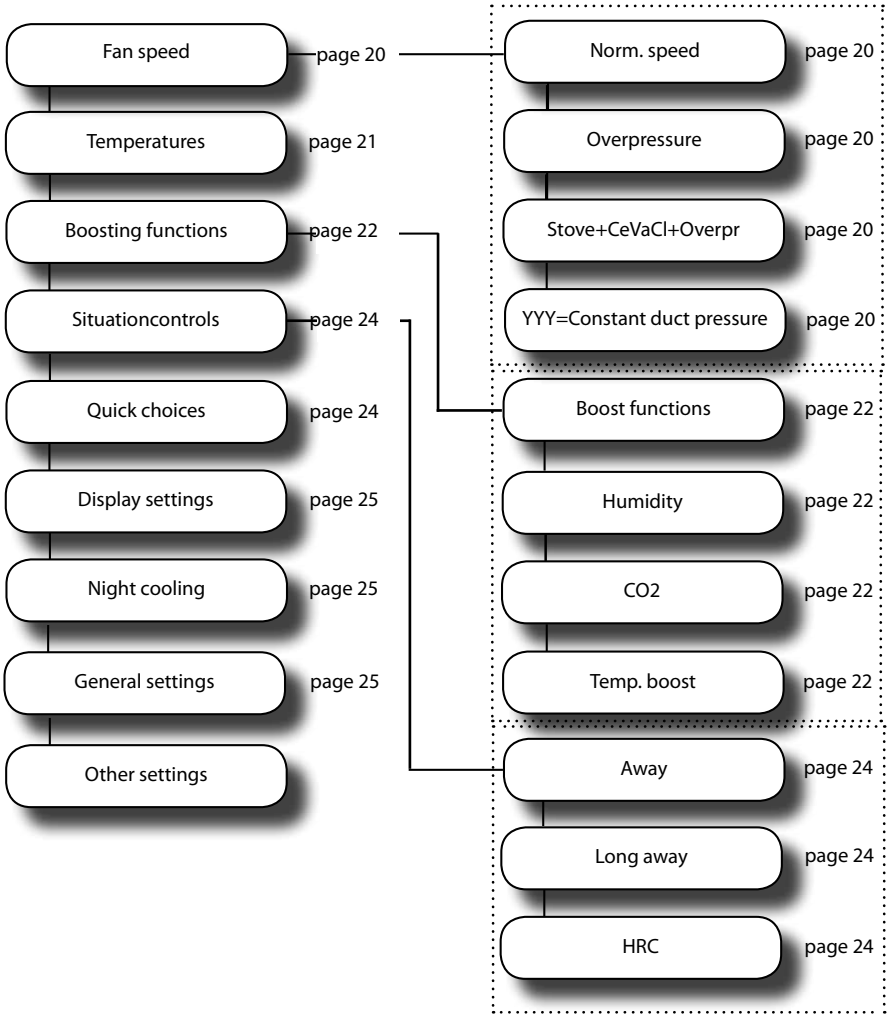
In the Settings menu, the ventilation installer specifies the fan speeds, temperatures, etc. If the installation work is performed well, the end user does not need this menu. Please see the 'Installation instructions' section for further information about the menu. The password for accessing this menu is 6143.



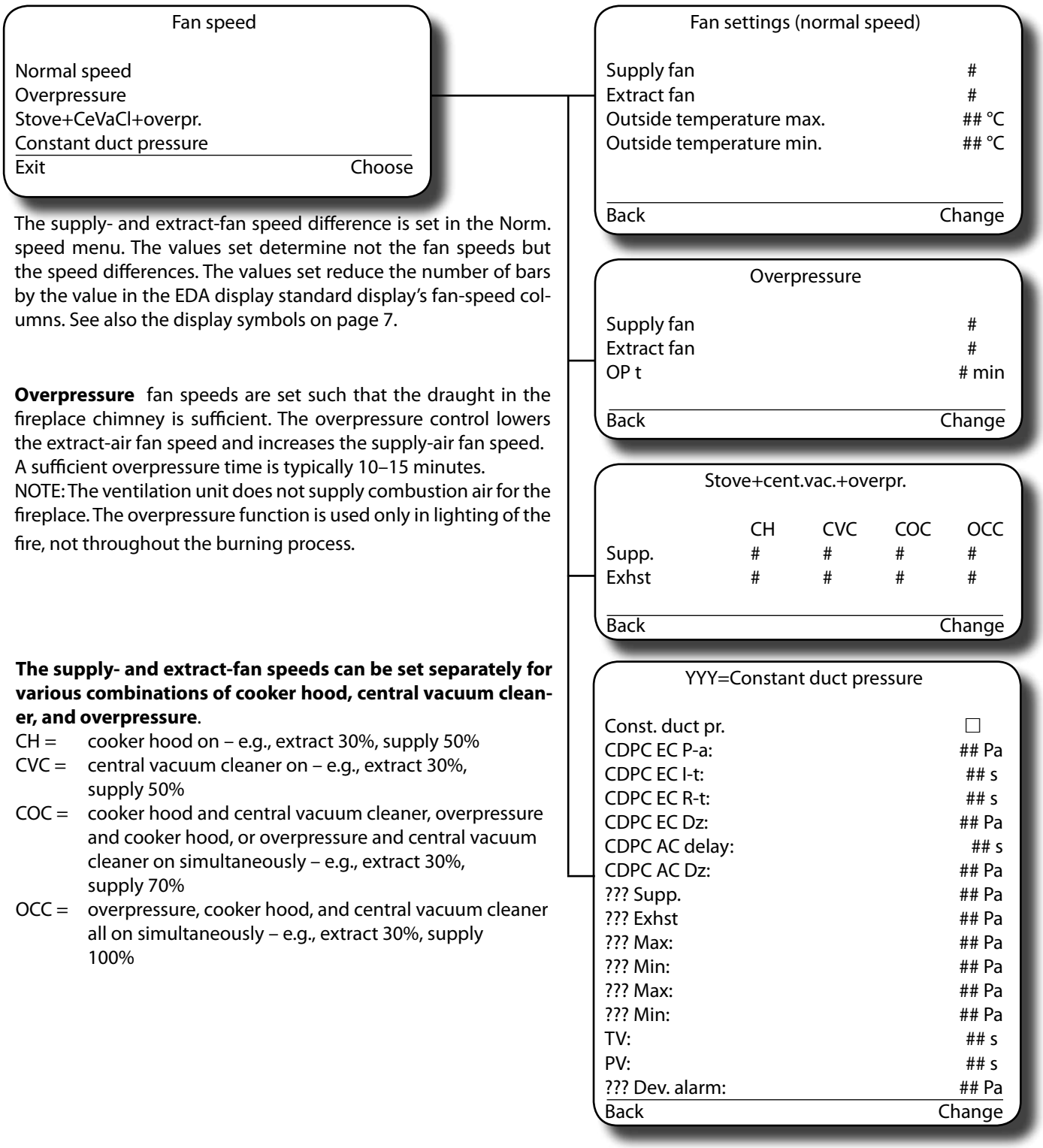
SETTINGS

All settings required in the commissioning of the unit are made from this menu. The menu's password is 6143.

Settings:



FAN SPEEDS



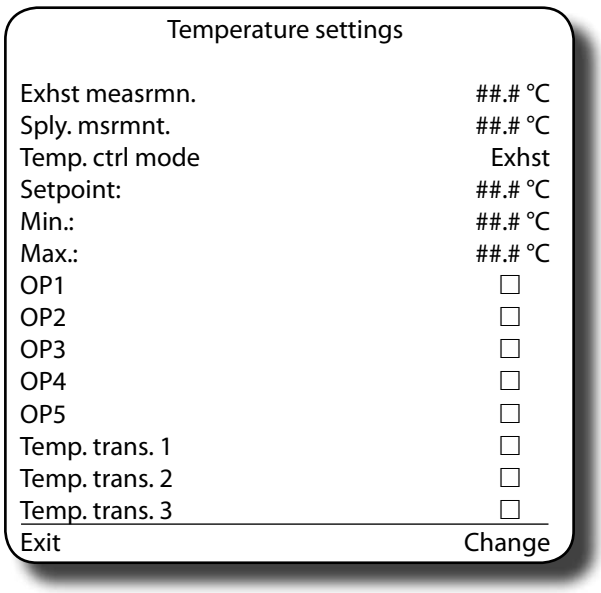
The supply- and extract-fan speed difference is set in the Norm. speed menu. The values set determine not the fan speeds but the speed differences. The values set reduce the number of bars by the value in the EDA display standard display's fan-speed columns. See also the display symbols on page 7.

Overpressure fan speeds are set such that the draught in the fireplace chimney is sufficient. The overpressure control lowers the extract-air fan speed and increases the supply-air fan speed. A sufficient overpressure time is typically 10–15 minutes.
NOTE: The ventilation unit does not supply combustion air for the fireplace. The overpressure function is used only in lighting of the fire, not throughout the burning process.

The supply- and extract-fan speeds can be set separately for various combinations of cooker hood, central vacuum cleaner, and overpressure.

CH = cooker hood on – e.g., extract 30%, supply 50%
CVC = central vacuum cleaner on – e.g., extract 30%, supply 50%
COC = cooker hood and central vacuum cleaner, overpressure and cooker hood, or overpressure and central vacuum cleaner on simultaneously – e.g., extract 30%, supply 70%
OCC = overpressure, cooker hood, and central vacuum cleaner all on simultaneously – e.g., extract 30%, supply 100%

TEMPERATURES



Exhst meas.: The more accurate extract-air temperature measurement value. This displays the room temperature if room-temperature control is selected as the temperature (LT) control method (not dis played if the unit is supply-air-temperature-controlled).

Supp. meas.: The more accurate supply-air temperature measurement value.

Temp. ctrl mode: Constant-extract-air-temperature or constant-room-temperature control.

Setpoint: Extract-air temperature or room-temperature setting value to 1/10-degree precision. Quick setting at one-degree intervals via the control panel's '+' and '-' buttons.

Min.: Minimum supply-air temperature.

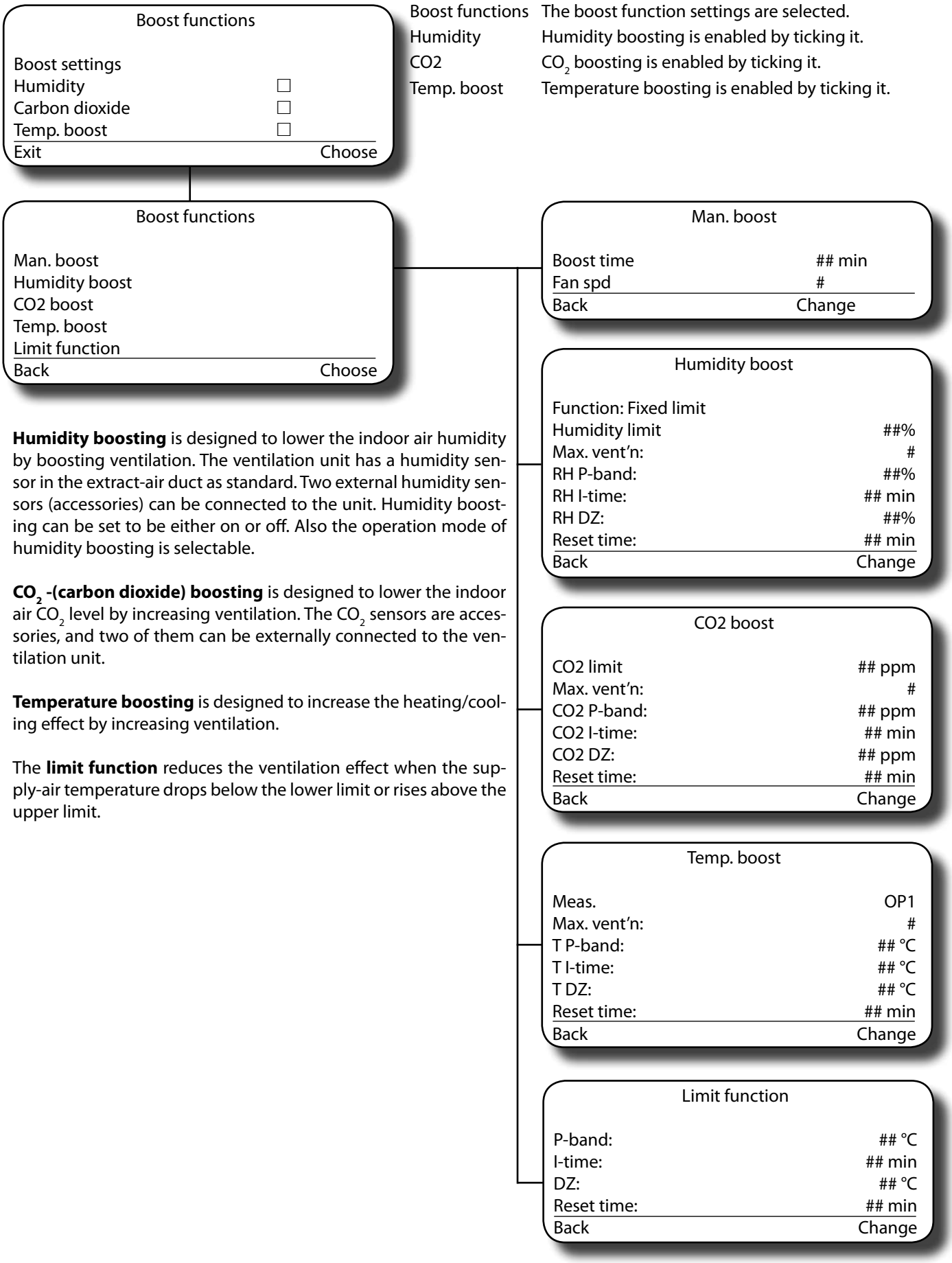
Max.: Maximum supply-air temperature.

OP1–OP5: These settings indicate which control panels are to participate in the control of room temperature. If several control panels (accessory) are selected, their mean temperature value is used for control.

Temp. trans. 1–3: These settings indicate which temperature trans mitters (accessory) are to participate in the temperature control. If several are selected, their mean temperature value is used for control.

BOOST FUNCTIONS

Boost functions	The boost function settings are selected.
Humidity	Humidity boosting is enabled by ticking it.
CO2	CO_2 boosting is enabled by ticking it.
Temp. boost	Temperature boosting is enabled by ticking it.



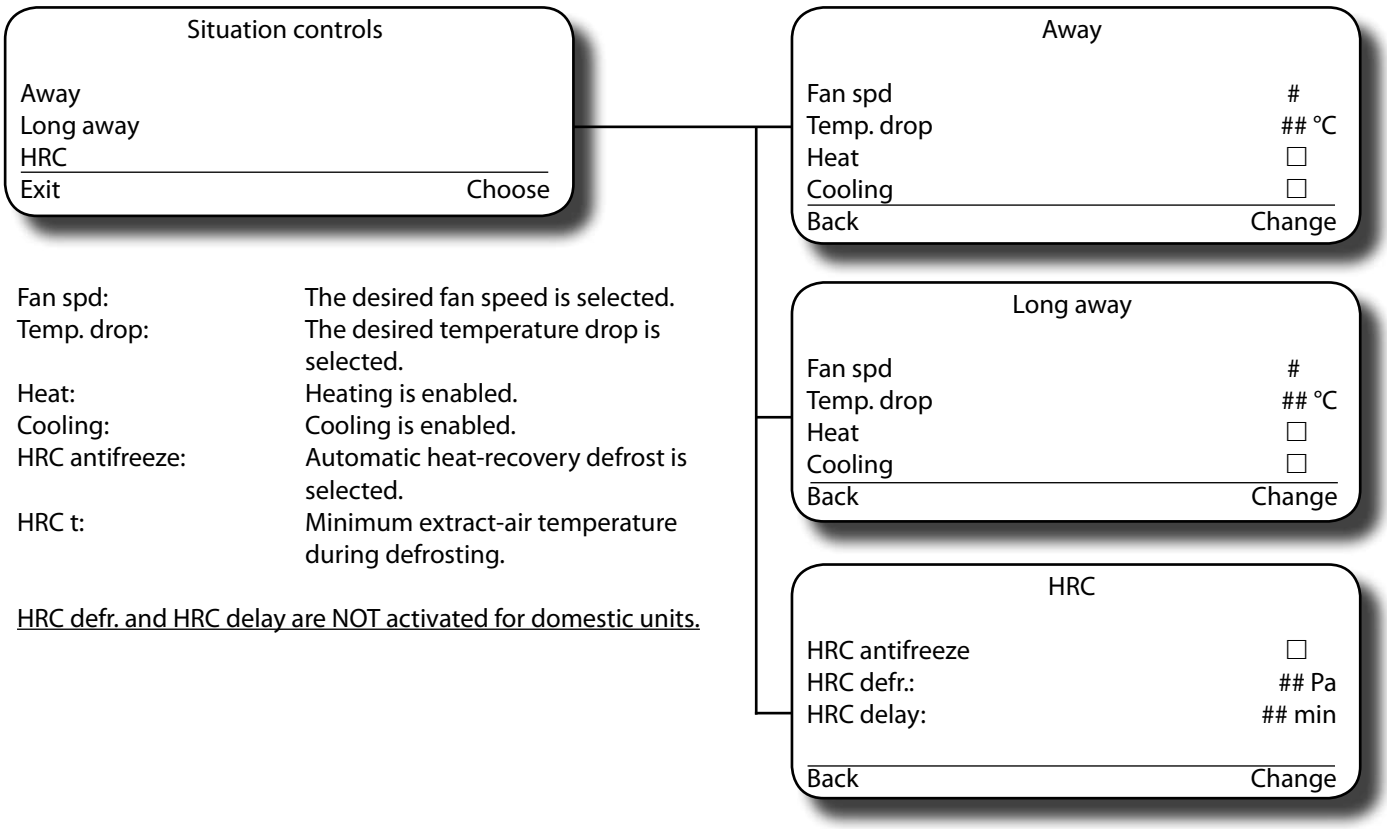
Humidity boosting is designed to lower the indoor air humidity by boosting ventilation. The ventilation unit has a humidity sensor in the extract-air duct as standard. Two external humidity sensors (accessories) can be connected to the unit. Humidity boosting can be set to be either on or off. Also the operation mode of humidity boosting is selectable.

CO_2 -(carbon dioxide) boosting is designed to lower the indoor air CO_2 level by increasing ventilation. The CO_2 sensors are accessories, and two of them can be externally connected to the ventilation unit.

Temperature boosting is designed to increase the heating/cooling effect by increasing ventilation.

The **limit function** reduces the ventilation effect when the supply-air temperature drops below the lower limit or rises above the upper limit.

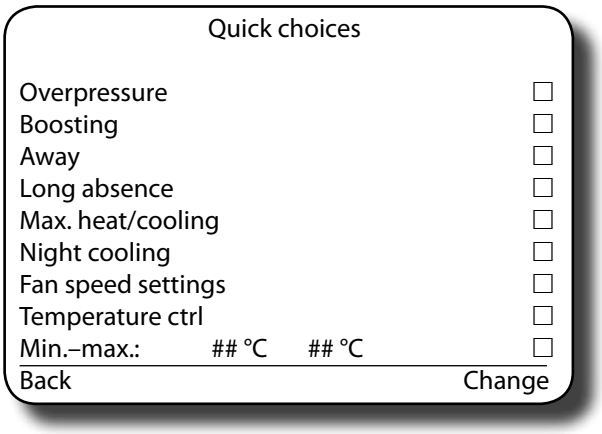
SITUATION CONTROLS



Fan spd:	The desired fan speed is selected.
Temp. drop:	The desired temperature drop is selected.
Heat:	Heating is enabled.
Cooling:	Cooling is enabled.
HRC antifreeze:	Automatic heat-recovery defrost is selected.
HRC t:	Minimum extract-air temperature during defrosting.

HRC defr. and HRC delay are NOT activated for domestic units.

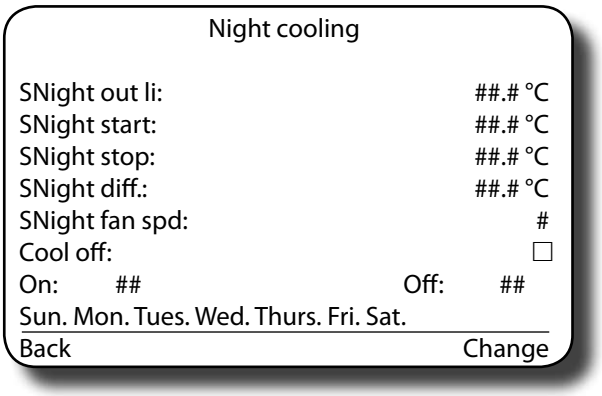
QUICK CHOICES



The desired quick-choice function for the control panel's left multi-choice button is selected from the list. The functions 'Away' and 'Long absence' are not displayed in the 'Quick choices' when they are configured as DI inputs (default). The fan speed and temperature control settings have an effect on the control panel's '+' and '-' buttons. Min.–max.: The control panel temperature control setpoint maximum and minimum values can be limited with this function.

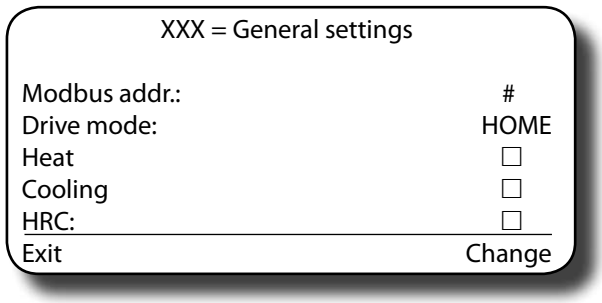
NIGHT COOLING

NOTE: Night cooling must be selected in the 'Quick choices' for it to be activated. In the PRO greenair HP, summer night cooling is available only when the heat pump is not running.



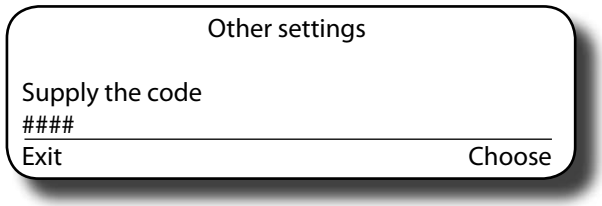
SNight out li:	Outside-air temperature limit above which summer night cooling is allowed.
SNight start:	Summer night cooling starts when the extract-air temperature or the room temperature is greater than the 'SNight start' value.
SNight stop:	Summer night cooling ends when the extract-air temperature or the room temperature falls below the 'SNight stop' value. SNight stop must always be 1 °C lower than SNight start.
SNight diff.:	Summer night cooling starts when the difference between the extract-air or room-air temperature and the outside temperature is greater than the 'SNight diff.' value.
SNight fan spd:	The fans run at this speed when summer night cooling is on.
Cool off:	Other modes of cooling are prevented during summer night cooling.
On:	Summer night cooling is allowed to start at this time.
Off:	Summer night cooling ends at this time.
Su Mo Tu We Th Fr Sa	The days of the week on which summer night cooling is available.

XXX GENERAL SETTINGS



Modbus addr.:	Motherboard Modbus address. Selectable between 1 and 10.
Drive mode:	Either HOME or OFFICE
Heat:	Heating is enabled or disabled. X = enabled.
Cooling:	Cooling is enabled or disabled. X = enabled.
HRC:	Heat recovery is enabled or disabled. X = enabled.

OTHER SETTINGS



This menu is not intended for the end user, and its functions are not required when the unit is commissioned. The parameters are pre-set at the factory. When required, please contact the unit's manufacturer.

MAINTENANCE

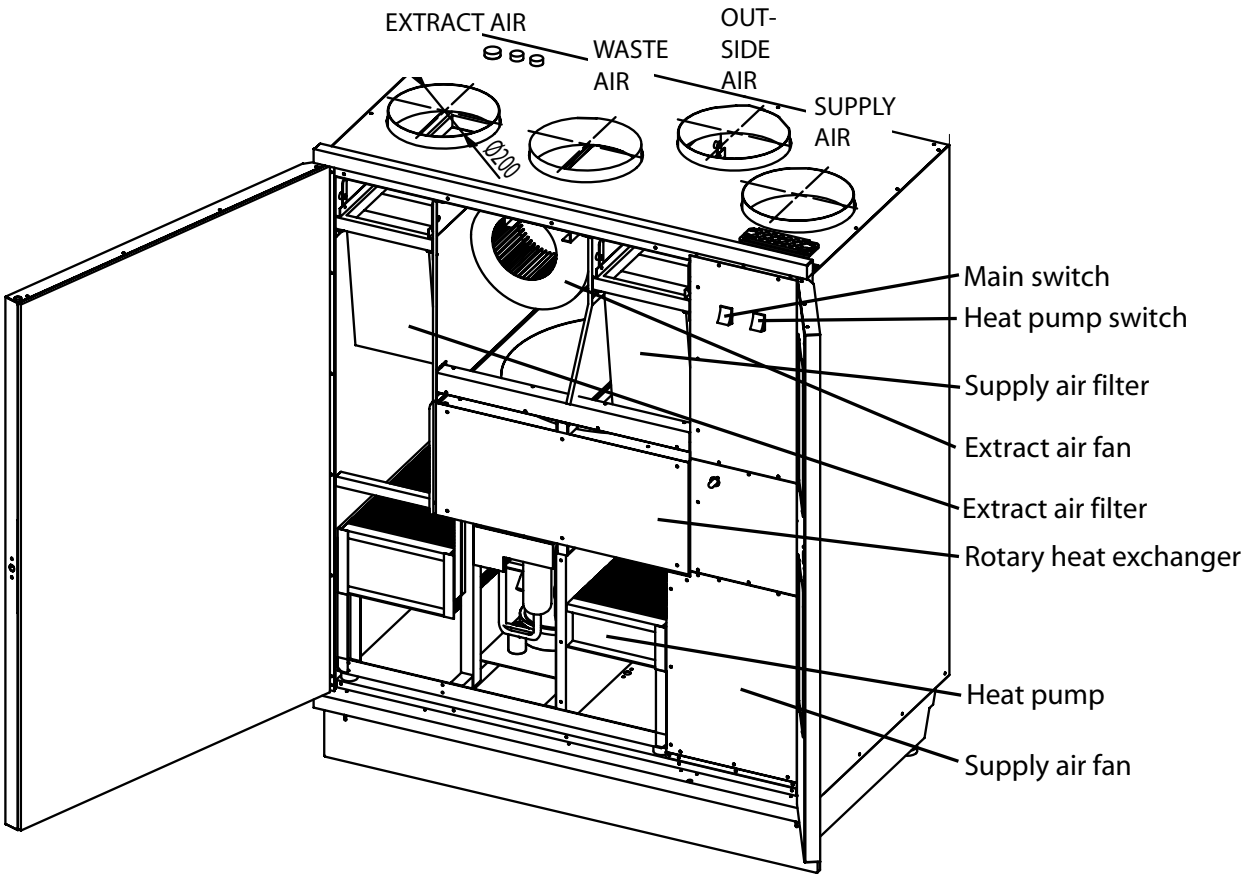
The ventilation unit does not require any regular maintenance, but the heat exchanger and the fans must be cleaned and the filters changed regularly. Disconnect the unit from the power supply before servicing it. Wait about two minutes before starting the servicing work, to allow the fans to stop and the compressor to cool down.

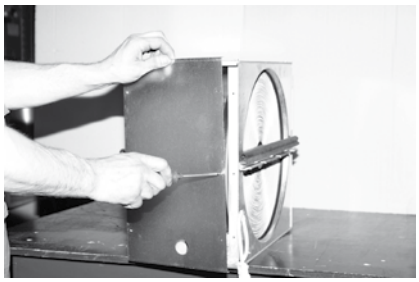
Cleaning the heat exchanger
Check the cleanness of the heat exchanger visually when changing the filters. If the heat exchanger is dirty, it is removed from the unit and washed under a shower with neutral detergent or pressurised air. The use of a pressure washer is strictly forbidden. The heat exchanger must not be submerged in water! There is an electric motor inside the exchanger body. It must not get wet. When the unit is started after cleaning, the rotation of the heat exchanger must be verified. Disconnect the heat pump when checking the heat exchanger. If the unit is operated with the heat pump on and the service door open, the heat-pump pressure switch will trip. You can switch the heat pump on once the service door has been closed.

Cleaning the fans
Check the cleanness of the fans visually when changing the filters. The fans are removed from the unit and cleaned with, for example, a toothbrush or pressurised air.

Changing the filters
The recommended change interval for bag filters is six months. The bag filters are changed by releasing the filter-locking levers, pulling the old filter out of the unit, and installing the new filter. Remember to engage the filter-locking levers. It is recommended to hoover the inside of the unit when changing the filters. NOTE: Make sure to close the service door properly!

Cleaning the supply- and extract-air radiators
Check the cleanness of the heat-pump unit's supply- and extract-air radiators visually when changing the filters. The unit stays clean when the filters are changed regularly. If the heat-pump unit's radiators are dirty, the heat-pump unit must be removed from the ventilation unit for cleaning. The rotating heat exchanger must be removed before removal of the heat-pump unit. Remember to disconnect the two heat-pump unit quick-connectors before removing the unit. The radiators are cleaned with pressurised air. Be careful not to damage the sheets of the radiators. After cleaning, the heat-pump unit is pushed back into the ventilation unit and the quick-connectors are connected.

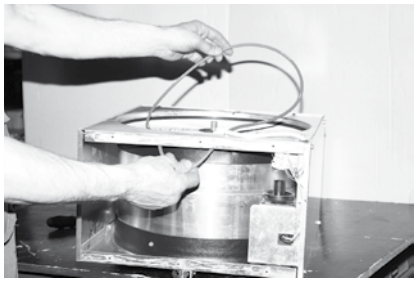




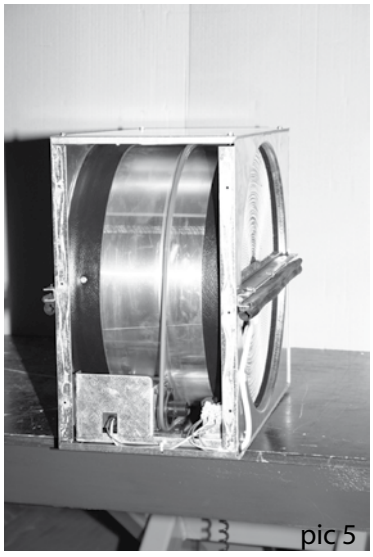
pic 1

pic 2

pic 3



pic 4



pic 5

There is a spare belt attached to all heat exchangers. In order to take use of the spare belt the heat exchager needs to be removed from the ventilation unit. Loosen the bayonet socket before removing the heat exchanger from the unit. Open the maintenance hatch (see below) and release the spare belt from the holders. Leave the holders on the heat exchanger. Pull the belt on to the belt wheel. Close the maintenance hatch. Place the heat exchanger back into the unit and connect the bayonet socket.

Follow the instructions below if there is no spare belt in the heat exchanger.

Turn of the ventilation unit by switching off the main power supply, removing the fuse or disconnecting the wall plug.

Open the maintenance hatch.

Unplug the heat exchanger.
Pull out the heat exchanger from the ventilation unit.

Remove the lid by detaching the screws (pic 1).

Turn the heat exchanger on to its side so that the axle is in a vertical position. Remove the sealing strip (pic 2).

Detach the hexagonal screw and the screws in the u-beam.

Remove the u-beam.

Remove the old belt.

Remove any possible dirt from the rotors surface and carefully place the new belt inside the heat exchanger through outer shell and the gasket (pic 3 and 4).

Carefully pull the belt past the gasket and rotate the rotor at the same time. Assemble the u-beam.

Attach the beams screws and the hexagonal screw of the axle.

Put the belt on to the belt wheel and rotate the rotor away from the motor a couple of times (pic 5).

Clean the inside of the heat exchanger.

Close the lid.

Re-assemble the heat exchanger in to the ventilation unit and plug it in.

Turn on the ventilation unit and check that the heat exchanger is rotating.

Close the maintenance hatch.

SUPPLY AIR IS COLD AFTER POST-HEATING (TE10 lower limit)

Possible cause	Action
The heat pump is not on.	Turn the heat pump on.
The heat exchanger belt is broken.	Change the belt.
The heat exchanger belt is greasy and slips.	Contact an authorised service shop.
The extract fan has stopped.	Contact an authorised service shop.
The extract-air filter is clogged.	Change filters.
The extract-air valves are adjusted for too low a flow.	Contact an authorised service shop.
The thermal insulation of the air ducts is not sufficient.	Check the insulation thickness of the supply- and extract-air ducts, and add insulation if required.
The TE 10 temperature sensor is faulty.	Contact an authorised service shop.

SUPPLY AIR IS HOT AFTER POST-HEATING (TE10 upper limit)

Possible cause	Action
Risk of fire.	A class-A alarm is activated. Explore the cause of the fault before acknowledging the alarm.
The TE 10 temperature sensor is faulty.	Contact an authorised service shop.

ROOM AIR IS HOT (TE20 upper limit)

Possible cause	Action
Risk of fire.	A class-A alarm is activated. Explore the cause of the fault before acknowledging the alarm.
The TE 20 temperature sensor is faulty.	Contact an authorised service shop.

Extract AIR IS COLD (TE30 lower limit)

Possible cause	Action
Insufficient duct insulation.	Increase the insulation thickness.
The unit's door is open.	Close the door.
Room temperature is low.	Increase the room temperature.
The TE 30 temperature sensor is faulty.	Contact an authorised service shop.

Extract AIR IS HOT (TE30 upper limit)

Possible cause	Action
Risk of fire.	A class-A alarm is activated. Explore the cause of the fault before acknowledging the alarm.
The TE 30 temperature sensor is faulty.	Contact an authorised service shop.

EXTERNAL EMERGENCY STOP (emergency stop)

Possible cause	Action
Ventilation has been stopped from the emergency stop button.	Explore the cause of the fault before acknowledging the alarm.

EXTERNAL FIRE RISK (risk of fire)

Possible cause	Action
Ventilation has been stopped from the external fire-risk control.	Explore the cause of the fault before acknowledging the alarm.

REDUCED AIR FLOWS

Possible cause	Action
The unit's filters are clogged.	Change the filters.
The fan speed selected is too low.	Select a higher speed.
The fans are operating according to a timer programme.	Check the timer programme.
The outside-air vent is clogged.	Clean the outside-air vent.
The fan blades are dirty.	Clean the fans.

INCREASED NOISE LEVEL OF THE UNIT

Possible cause	Action
The filters are clogged.	Change the filters.
The outside-air vent is clogged.	Clean the outside-air vent.
Fan bearings are faulty.	Change the bearings, or contact an authorised service shop.
The heat exchanger motor/gearbox is faulty.	Contact an authorised service shop.
The fan blades are dirty.	Clean the fans.

THE COMPRESSOR DOES NOT START

Possible cause	Action
The compressor has been starting too often.	Reset the ventilation unit by disconnecting the power supply for a couple of minutes, and then connect the power again.

INSTRUCTIONS FOR THE DESIGNER

PRO greenair HP

WHAT is the PRO greenair HP?

The PRO greenair HP is a traditional ventilation unit combining regenerative heat recovery and a heat pump into a single compact unit. Extract-air heat energy is recovered during the winter, and supply air is cooled during the summer. Additionally, the room-air humidity and carbon dioxide levels can be controlled. The unit is easy to install, and the procedure does not require indoor units or refrigeration expertise.

HOW does the PRO greenair HP work?

Heat energy is recovered from the extract air by the rotating heat exchanger. Its aluminium foils are continuously heated by the extract air, and when they rotate to the supply-air flow, they release the energy to the supply air with an efficiency of up to 80%.

The heat pump operates as a traditional refrigeration circuit, wherein the refrigerant vaporises and stores energy (heat) from the extract air and releases it into the supply air when condensing. This is how the compressor 'pumps' energy from the warmer side to the cooler side. The refrigeration circuit can be operated in a transverse direction during the warmer seasons to reduce the supply-air temperature. In this case, the refrigerant stores energy from the outside air and releases it into the extract air.

What are the BENEFITS of the PRO greenair HP?

Because of its unique and compact design, the unit is ideally suited to installations wherein it is impossible to install an outdoor heat-pump unit. Because the heat pump is installed inside the unit, a ventilation installer can install it. Refrigeration system expertise is not required, because refrigeration circuit installations are not performed.

The combination of a regenerative heat exchanger and a heat pump heats or cools the supply air to the ideal temperature, regardless of the season. The heat exchanger and the heat pump operate side by side to provide a constant and comfortable room temperature. The unit's efficiency is extremely high, and the energy and cost savings are significant because of the energy-saving fans, the inverter-controlled compressor, and the efficient heat exchanger. The PRO greenair HP cannot operate as a building's primary heating source.

ISSUES TO NOTE in the operation of the PRO greenair HP

Ventilation is the primary function of the unit. Cooling and heating are secondary functions. The unit cannot operate as a building's primary heating source.

Constant and uninterrupted operation of the unit ensures that the compressor is constantly running, which considerably lengthens its service life. To ensure constant operation of the PRO greenair HP unit, the unit is designed to be operated by means of extract-air or room-temperature control.

It is very important for the correct operation of the unit that the air ducts and air flows be designed to be large enough. The unit's automation keeps the fan power at 70% or more when the heating/cooling mode is selected. It is the ventilation designer and ventilation contractor's responsibility to design, construct, and adjust the air ducting such that sufficient air flows can be used.

PART LIST

THE UNIT DELIVERY INCLUDES:

1. The Enervent PRO greenair HP™ ventilation unit
2. Control panel
3. Control panel cable RJ4P4C, length 20 m (installation in a conduit with a minimum diameter of 16 mm)

THE FOLLOWING ARE AVAILABLE AS ACCESSORIES:

4. Additional control panels, max. four panels per unit
5. Control panel cable RJ4P4C, length 20 m
6. Fine filter F7 inside the unit
7. Fine cassette filter F7 in duct casing
8. Fireplace switch (button)
9. CO_2 value transmitter (up to two transmitters can be connected to the control system)
10. Relative-humidity value transmitter (up to two transmitters can be connected to the control system)
11. Room-temperature transmitter
12. Differential-pressure transmitter for the filters (filter guard)
13. Outside and extract-air dampers (recommended for EDW units)
14. Damper actuators (spring or electrical return)
15. Duct silencers
16. HRC differential-pressure transmitter (defrosting)
17. Carbon monoxide value transmitter (relay control)
18. Boosting switch (button)
19. Time extension switch LAP5 for office use
20. Presence detector LA14
21. KNX gateway
22. Freeway WEB
23. Silencer module

PRINCIPLE OF OPERATION

The PRO greenair HP ventilation unit is a combination of regenerative heat recovery and a heat pump. The system's core is an extract-air heat pump and a rotating heat exchanger, through which the supply and extract air flow in opposite directions. Heat is recovered from the extract air first with the heat pump and then with the rotating heat exchanger at high efficiency. The outside-air temperature rises first in the rotating heat exchanger and then in the heat pump supply-air radiator. The supply air needs no other method of heating. The regenerative heat exchanger has an extremely high capacity of recovery of heat energy. The combination of a rotating heat exchanger and a heat pump provides the heat pump with high efficiency (COP).

The PRO greenair HP helps to heat the building by means of heat-pump technology to produce warm air in the rooms at low cost. Additionally, it is an effective way to cool the rooms in the summer.

THE FOLLOWING ISSUES MUST BE TAKEN INTO ACCOUNT IN THE DESIGN OF A VENTILATION SYSTEM WITH COOLING:

- The air flow must be at least 1 l/s/m^2.
- The building air flow must be nearly equal to the ventilation unit maximum air flow if it is to reach reasonable cooling power.
- Room-specific ventilation cooling power is calculated as follows:
  HT = air flow x air heat energy content x air specific mass x temperature difference
  Example: A bedroom for two is supplied with air 6 °C cooler than the room air:
  2 x 6 l/s = 12 l/s of supply air -> HT = 12 x 1.2 x 1 x 6 = 86.4 W
  One person radiates heat at 70–140 W, depending on the conditions.
- The ducting must be dimensioned for an air speed of up to 3 m/s in order to prevent noise problems.
- Rooms with a lot of consumer electronics require a separate cooling device.

THE FOLLOWING ISSUES MUST BE TAKEN INTO ACCOUNT IN THE DESIGN OF A VENTILATION SYSTEM WITH AIR HEATING:

- The air flow must be at least 1 l/s / m^2.
- The building air flow must be nearly equal to the ventilation unit's maximum air flow if reasonable heating power is to be reached.
- Room-specific ventilation heating power is calculated as follows:
  HT = air flow x air heat energy content x air specific mass x temperature difference
  Example: A bedroom for two is supplied with air 14 °C warmer than the room air:
  2 x 6 l/s = 12 l/s of supply air -> HT = 12 x 1.2 x 1 x 14 = 201.6 W
- Heating power 1 l/s 7 m^2 x 1.2 x 1 x 14 = 16.8 W/m^2
- The ducting must be dimensioned for air speeds of up to 3 m/s so as to prevent noise problems.

DUCTING DESIGN

For saving energy, it is advisable to design the system such that it is capable of both cooling and performing the basic ventilation of the building. The basic ventilation air flows are specified in line with the Building Code's Part D2. The ventilation unit is selected to meet the basic ventilation requirements at a fan speed of 50–60% and cooling boost at fan speeds of 70–100%. The ducting is designed for larger cooling boost air flows without air speeds rising too high, which may cause noise problems. The valves used should be designed for operation at two operation points – standard ventilation and boosting. The ducts must be insulated properly. The importance of insulation is emphasised when the ventilation unit is equipped with cooling functionality. This results in a balanced and quiet system during boosting and standard ventilation alike.

The ducting sizes should be selected to be large enough to prevent excessive air speeds. The ventilation unit's duct connection size does not determine the ducting size used. Ducting size is selected on the basis of the required air flows. The duct pressure must be calculated, for assessment of whether the system can operate properly. The SFP value must be calculated for both the ducting and the ventilation unit. The smallest duct size is 125 mm. In particular, the outside-air and extract-air ducts should be dimensioned to be sufficiently large. The outside-air grating must not be equipped with an insect net, and the grating diameter must be at least as great as the ventilation unit's duct connection diameter values. Duct size must not change from the grating to the unit. Approved materials must be used in the ducting – e.g., galvanised steel air ducts or plastic ducts approved for ventilation use. All valves used must be approved for use with a ventilation unit. The minimum size for supply- and extract-air valves is 125 mm. NOTE: Rooms with swimming pools always require special design, and all appropriate recommendations must be followed.

The outside-air intake should always be placed on the north-facing wall of the building or in another shady location where the temperature variations are as small as possible. Extract air should be led outside close to the roof ridge, approx. 90 cm above the roof surface. Use a factory-made insulated roof penetration. A protective hood must be installed for the top of the extract-air duct, to prevent rainwater from entering the duct. The extract-air roof-penetration diameter must always be at least as great as the ventilation unit's duct connection size. There must be enough hatches in the ducting to facilitate cleaning of the ducting from inside. The locations of the hatches should be marked on, for example, roof trusses, to make them easier to find in the future.

There are extract valves in the following rooms: toilet, kitchen, washroom, bathroom, sauna, clothing closet, cleaning cupboard, and utility room. A standard cooker hood is installed above the cooker. The cooker hood blows the air directly outside. The cooker hood is used only during cooking. Additionally, a general extract-air valve is installed in the kitchen ceiling. Supply valves are found in the following rooms: bedroom, living room, dining room, separate sauna, hobby room, and changing room. They are recommended for installation in the ceiling area close to the window. In a sauna, the valve is installed and adjusted so as to direct the air stream above the stove. Door gaps or air grids are used to direct the air flow from clean rooms to dirtier ones. The minimum door gap height is 20 mm, in the sauna room 100 mm. Combustion air for wood-burning sauna stoves and fireplaces can be taken from outside with a separate fresh-air pipe, which can be closed when this is required. A gap must not be left under doors when rooms that are next to each other have different noise requirements. For example, the maximum noise level set for a utility room is 33 dB(A), but for rooms intended for living it is 28 dB(A). If door gaps must be omitted, the room must be equipped with both supply- and extract-air valves.

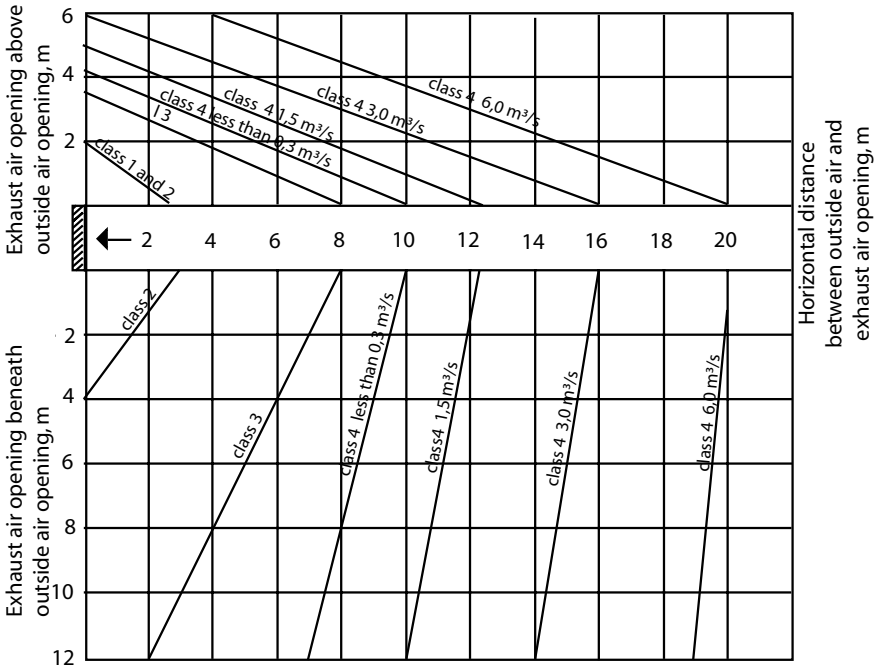
The ventilation of a garage must not be connected to the ventilation unit of the building. The garage must be ventilated by means of gravity-based ventilation, a roof ventilator, or a separate heat-recovery unit. Connection of a cooker hood to the ventilation unit is not recommended. A drying cabinet with a separate fan can be connected indirectly to the extract valve by means of the 'claws' delivered with the drying cabinet. In this case, some of the extract air is obtained from the drying cabinet and some from the room. The extract-air flow through a valve must be at least 12 l/s.

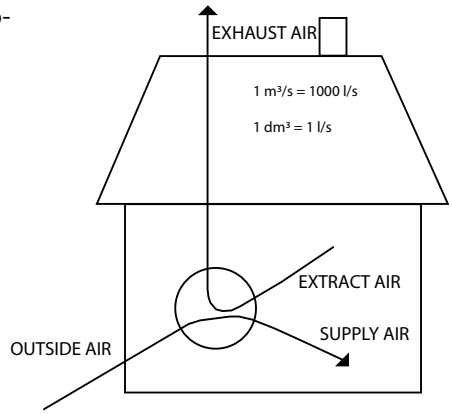
The supply- and extract-air ducts must be equipped with duct silencers. The duct silencers are dimensioned case-specifically. Silencer modules are available for PRO greenair HP units.

The SFP value and other design and dimensioning values can be calculated with the ***Enervent Energy Optimizer*** software, available via Enervent's Web site (www.enervent.fi).

DISTANCES FOR OUTSIDE AND EXHAUST-AIR VENTS

Normally, the outside-air intake vent is on the wall and the extract-air vent is located on the roof, but other locations may be used.





EXTRACT-AIR CLASSES OF ROOMS

Extract air leaving the building is classified as follows:

Class 1 Extract air containing only a small quantity of impurities. The sources of the impurities are mainly people and structures. The air is suitable for use as return or transfer air.
Class 2 Extract air containing some impurities. The air is not used as return air for other rooms, but it may be used as transfer air for toilets and washrooms.
Class 3 Extract air from rooms where humidity, processes, chemicals, and odours reduce the quality of the extract air. The air is not used as return or transfer air.
Class 4 Extract air containing impurities with bad odours or adverse health effects in significantly higher concentrations than allowed for inside air. The air is not used as return or transfer air.

Examples of extract-air classification of rooms

Class 1 Office rooms and the related storage rooms, customer service areas, education rooms, some meeting rooms, and business rooms without odour load.
Class 2 Rooms used for living, dining rooms, coffee shops, shop areas, storage facilities of office buildings, dressing rooms, and restaurant areas where smoking is prohibited.

Class 3 Toilets and washrooms, saunas, residential kitchens, teaching kitchens, and draughting rooms.
Class 4 Fume hoods in professional use, grilles and targeted extract in kitchens, garages and driving tunnels, paint- and chemical-processing areas, rooms for processing of dirty clothes at laundries, food-waste processing areas, chemical laboratories, smoking rooms, and hotel and restaurant areas where smoking is allowed.

GUIDING VALUES FOR AIR FLOWS

EXTRACT AIR

Kitchen	8.0 l/s
- use-time boosting	25 l/s
Bathroom	10 l/s
- use-time boosting	15 l/s
Toilet	7.0 l/s
- use-time boosting	10 l/s
Clothes closet	3.0 l/s
Hobby room	1.0 l/s/m²
Dressing room	2.0 l/s/m²
Washroom	3.0 l/s/m²
Utility room	8.0 l/s
- use-time boosting	15 l/s
Sauna	2.0 l/s/m²

SUPPLY AIR

Living room	0.5 l/s/m²
Bedroom	0.5 l/s/m², 6 l/s/person
Sauna	2.0 l/s/m²
Separate dining room	0.5 l/s/m²
Hobby room	1.0 l/s/m²
Dressing room	2.0 l/s/m²
Washroom	3.0 l/s/m²

With forced supply-air cooling, at least 1 l/s, m².

Fan overpressure control (fireplace switch)
The overpressure control lowers the extract-air fan speed and increases the supply-air fan speed for 10 minutes. NOTE: The ventilation unit does not supply combustion air for the fireplace. The overpressure function is used only in lighting of the fire, not throughout the burning process.

KITCHEN VENTILATION

A standard cooker hood is installed above the cooker. The cooker hood blows the air directly outside. The cooker hood is used only during cooking. Additionally, a general extract-air valve is installed in the kitchen ceiling.

The cooker hood must not be connected to the ventilation unit.

INSTALLATION LOCATION

The unit is located in a soundproofed technical room. The unit's noise level exceeds the maximum level (33/38 dB) specified in the Building Code for utility rooms etc. The PRO greenair HP is installed on an even floor surface or on a bed made for it. To prevent dirt and dust from entering the unit during construction, the door and the duct connections must be kept closed and be opened only when absolutely required.

Because the unit contains an extract-air heat pump, it must always be drained through a water lock. Two separate 32 mm threaded condensate connections are provided at the bottom of the unit, one for the extract-air side and one for supply-air side.

VENTILATION DUCT THERMAL INSULATION

Ventilation ducts must be thermally insulated to prevent water from condensing to the inner or external duct surfaces in any circumstances. Additionally, the air temperature must not decrease or increase excessively in the ducts because of external factors. The ventilation engineer calculates the insulation requirements depending on the placement of the ducts and the air temperatures. When the insulation materials are designed, it must be taken into account that the extract air temperature may decrease significantly below zero degrees. The Optimizer software, which is available from Ensto Enervent's website, can be used to calculate the extract air temperature with different outside air temperatures. Calculation software available from insulation material manufacturers can also be used when designing the insulation material thickness.

Table 1: Ventilation duct thermal insulation in **heating use**

Supply air duct from the ventilation unit to the supply valve	The insulation must be designed and implemented so that the maximum air temperature change in the duct is less than 1°C.
Extract air duct from the supply valve to the ventilation unit	The insulation must be designed and implemented so that the maximum air temperature change in the duct is less than 1°C.

Table 2: Ventilation duct thermal insulation in **cooling use**

Supply air duct from the ventilation unit to the supply valve	The insulation must be designed and implemented so that the maximum air temperature change in the duct is less than 1°C. At least 18 mm of cellular rubber insulation on the duct surface and sufficient additional insulation.
Extract air duct from the supply valve to the ventilation unit	The insulation must be designed and implemented so that the maximum air temperature change in the duct is less than 1°C.

Ventilation Duct Insulation Examples:

Outside air duct (fresh air duct)
Cold spaces: 100 mm of sheet, mat, or pipe-covering insulation (plus the blown wool, when used).
Warm/semi-warm spaces*:
Option 1: 80 mm insulation with vapour-proof external surface
Option 2: 20 mm of cellular rubber insulation on the duct surface and 50 mm insulation with vapour-proof external surface.
The insulation must prevent water vapour from condensing to the external duct surface and excessive air temperature rise during summer.

Supply air duct
Cold/semi-warm spaces*:
In standard ventilation the insulation must be designed and implemented so that the maximum air temperature change in the duct is less than 1°C. For example, 100 mm of sheet, mat, or pipe-covering insulation can be used (plus the blown wool, when used).
Warm spaces: Insulation is not required in standard ventilation.
In heating and cooling use see tables 1 and 2.

Extract air duct
Warm spaces: Insulation is not required in standard ventilation.
Cold/semi-warm spaces*:
In standard ventilation the insulation must be designed and implemented so that the maximum air temperature change in the duct is less than 1°C. For example, 100 mm of sheet, mat, or pipe-covering insulation can be used (plus the blown wool, when used).
In heating and cooling use see tables 1 and 2.

Exhaust air duct
Cold spaces: 100 mm of sheet, mat, or pipe-covering insulation
Warm/semi-warm spaces:
Option 1: 80 mm insulation with vapour-proof external surface
Option 2: 20 mm of cellular rubber insulation on the duct surface and 50 mm insulation with vapour-proof external surface.
The insulation must prevent water vapour from condensing to the external and internal duct surfaces.

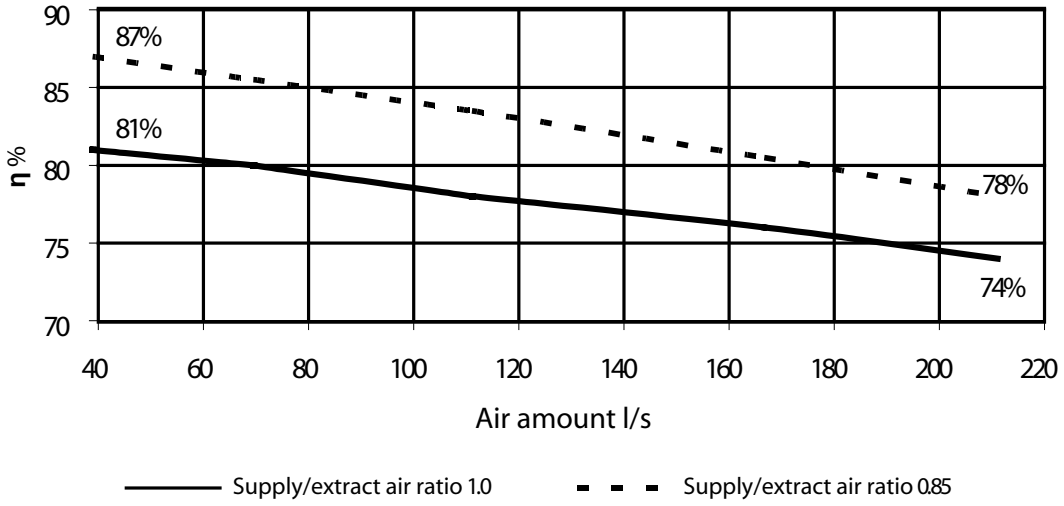
Circulation air duct
The insulation must be designed and implemented so that the maximum air temperature change in the duct is less than 1°C.**

*) A semi-warm space refers also to dropped ceilings, sub-floors, and casings.
**) When Kotilämpö systems are renewed, the recycling air duct can be left as it is.

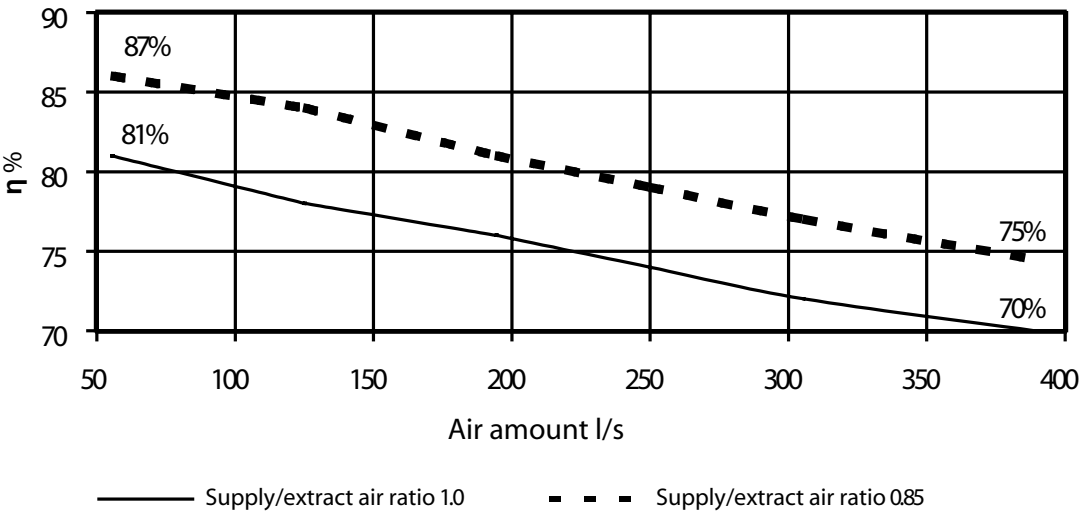
Sound insulation is not taken into account in these insulation instructions and examples.

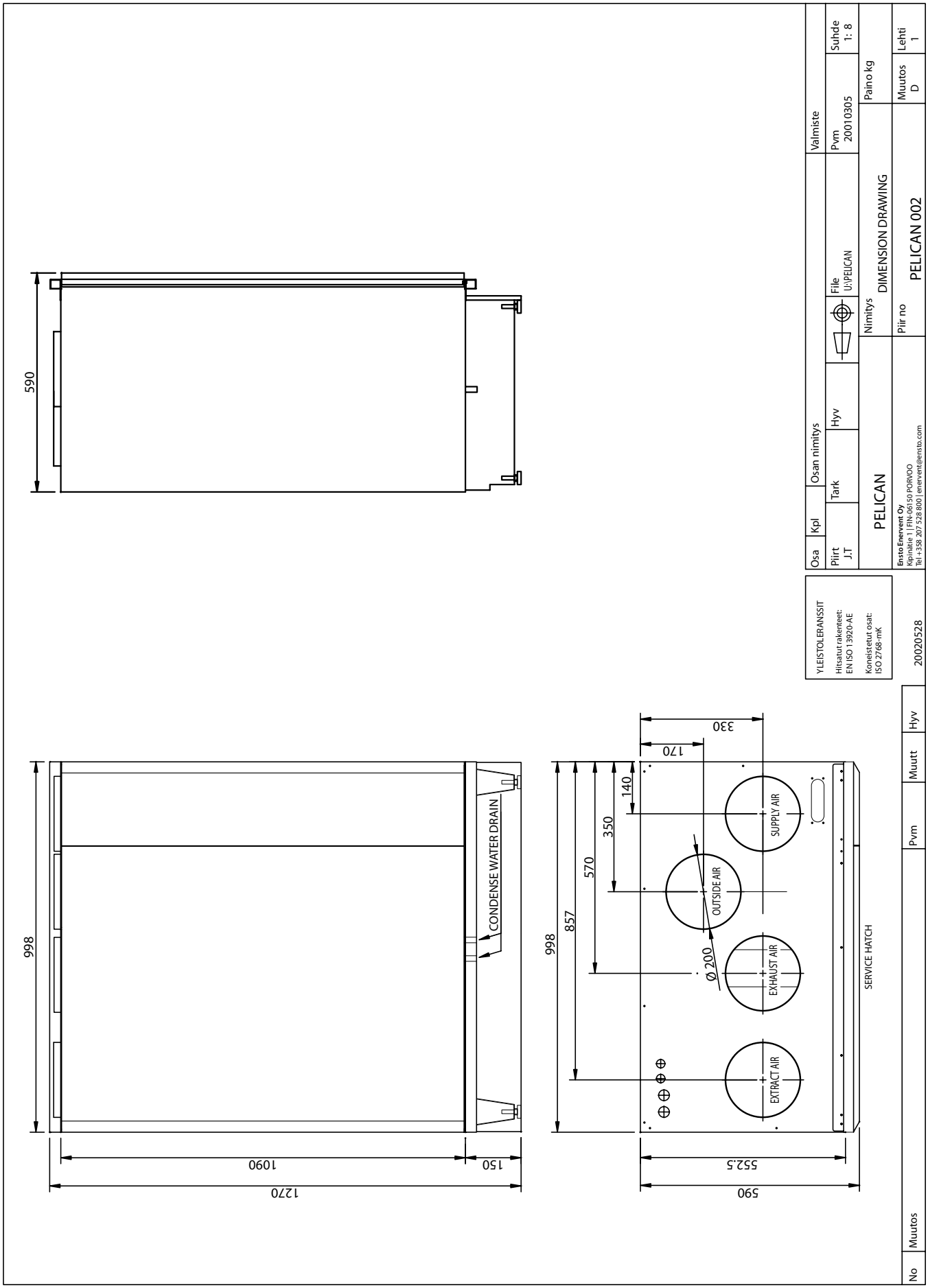
UNIT:	Pelican eco PRO greenair HP	Pegasos eco PRO greenair HP
Width Depth Height	998 mm 590 mm 1,270 mm	1,250 mm 677 mm 1,400 mm
Mass	150 kg	250 kg
Duct size	Ø 200 mm	Ø 250 m
DC fans, supply/extract	170 W, 1.22 A	565 W, 3.5 A
Voltage Fuse Control board: 5 x 20 mm glass tube fuse	230 V~, 50 Hz 16 A slow F1: T250 mA F2: T3.15 A F3: T160 mA	400 V 3~, 50 Hz 3 x 16 A slow F1: T250 mA F2: T8 A F3: T160 mA
Over-voltage protection	Built in	Built in
Heat exchanger motor	5 W, 0.04 A	5 W, 0.04 A
Communication bus	RS-485	RS-485
Standard protocol	Modbus RTU	Modbus RTU
Refrigerant	R410A, 1.5 kg	R410A, 1.5 kg
Compressor's nominal power	1.1 kW	2.6 kW

ENERVENT PELICAN
HEAT RECOVERY TEMPERATURE EFFICIENCY



ENERVENT PEGASOS XL
HEAT RECOVERY TEMPERATURE EFFICIENCY




590
998
CONDENSE WATER DRAIN
1090
150
1270
330
170
140
350
570
857
998
SUPPLY AIR
OUTSIDE AIR
Ø 200
EXHAUST AIR
EXTRACT AIR
SERVICE HATCH
552.5
590
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Suhde 1: 8
Nimitys
DIMENSION DRAWING
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PELICAN
Piir no
PELICAN 002
Muutos D
Lehti 1
Ensto Enervent Oy
Kipinätie 1 | FIN-06150 PORVOO
Tel +358 207 528 800 | enervent@ensto.com
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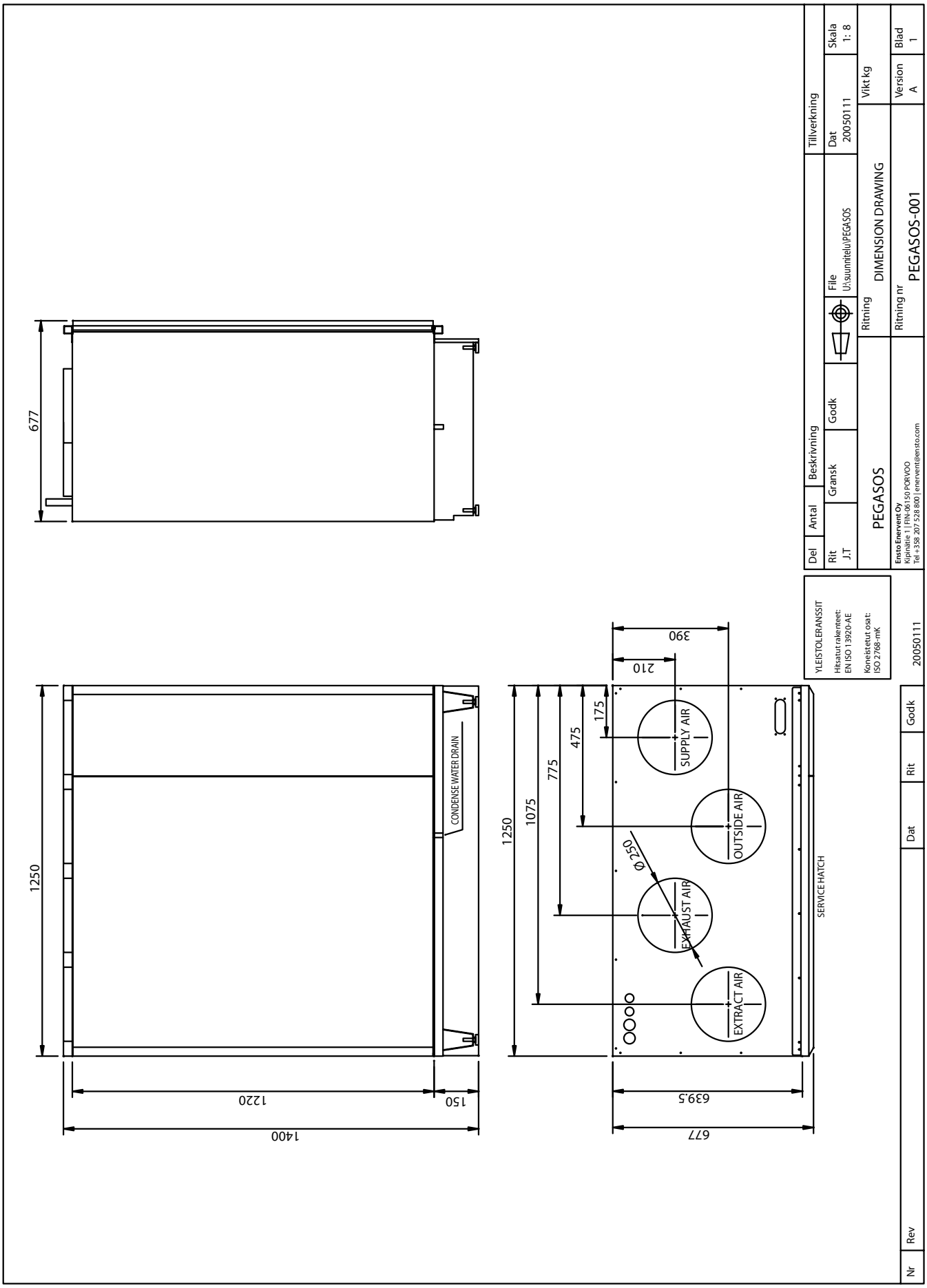
677
1250
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CONDENSE WATER DRAIN
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OUTSIDE AIR
EXHAUST AIR
EXTRACT AIR
Φ250
SERVICE HATCH
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YLEISTOLERANSSIT
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Vikt kg
Ritning nr
PEGASOS-001
Version
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Ensto Enervent Oy
Kipinätie 1 | FIN-06150 PORVOO
Tel +358 207 528 800 | enervent@ensto.com
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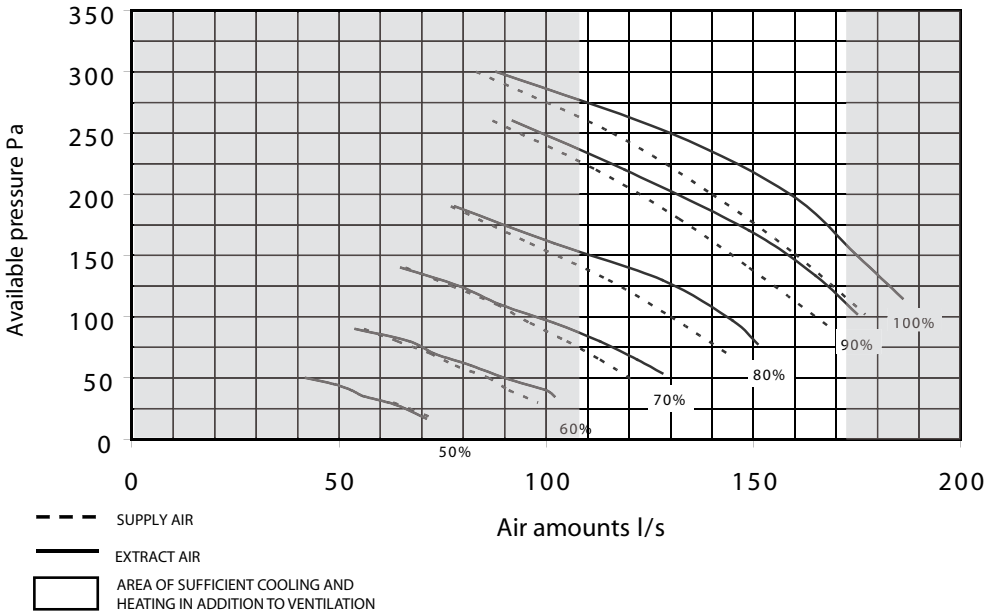
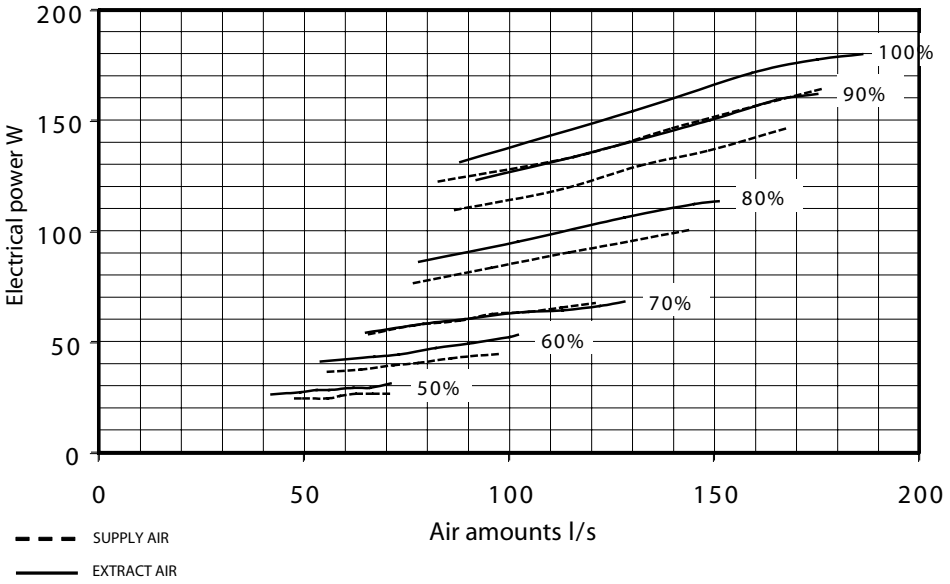
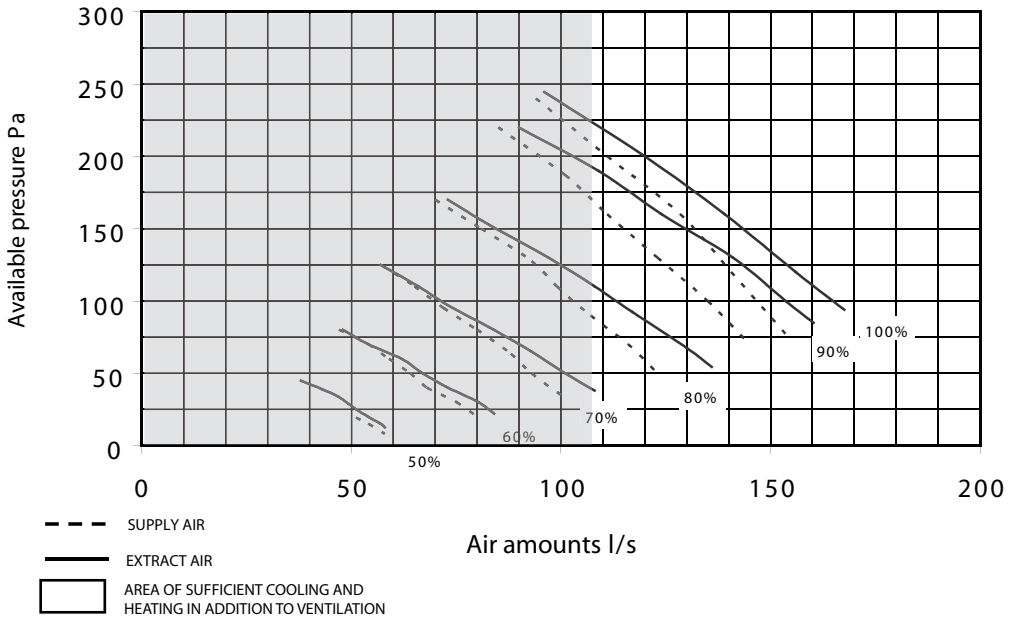
Pelican eco PRO greenair HP™ supply and extract air characteric curves with F5 filters



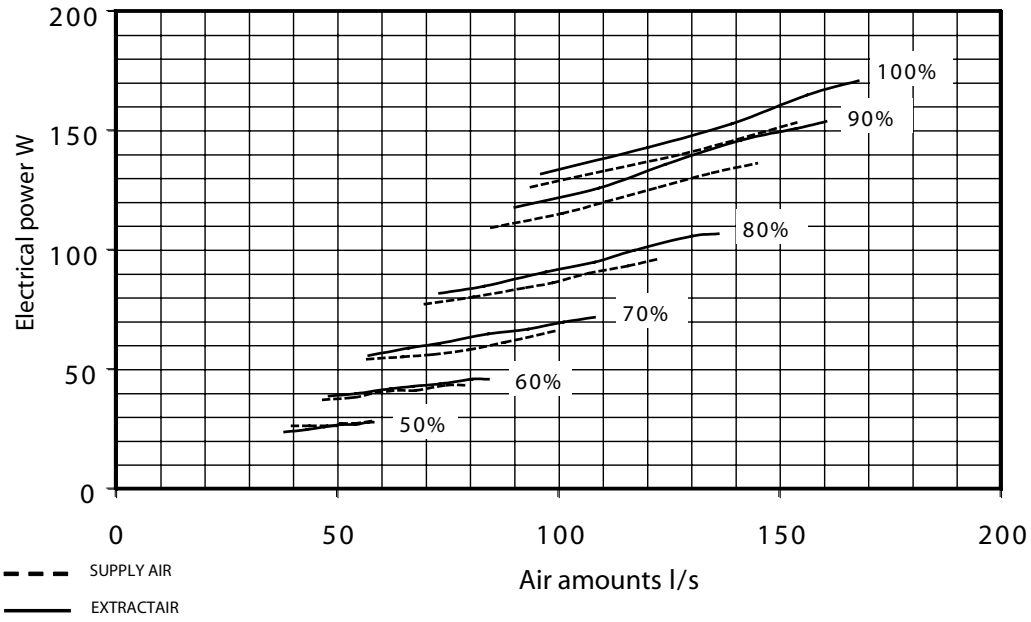
Pelican eco PRO greenair HP™ supply and extract air fans electrical power with F5 filters



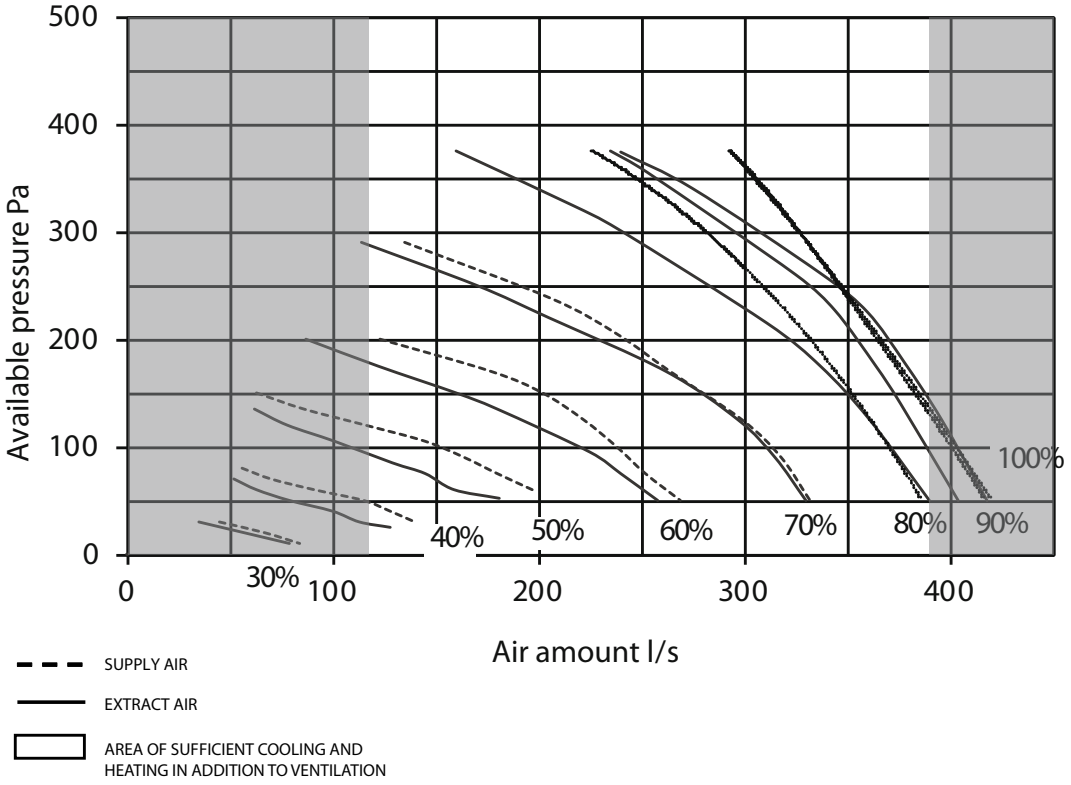
Pelican eco PRO greenair HP™ supply and extract air characteric curves with F7 filters



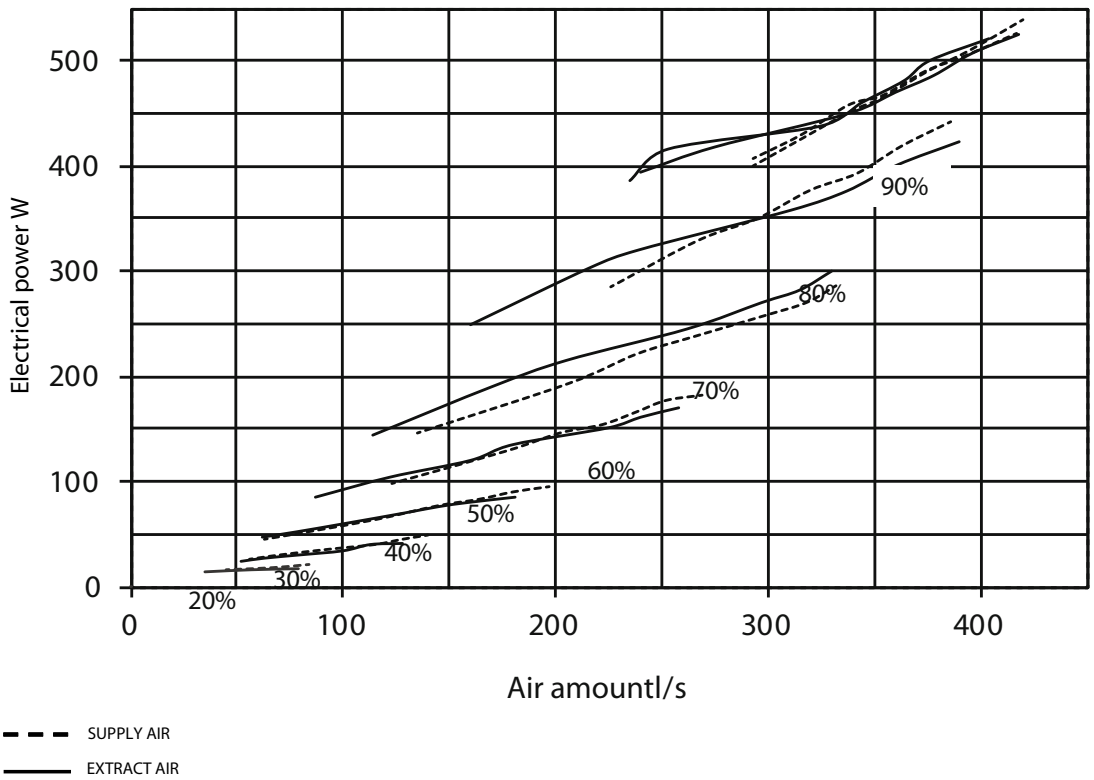
Pelican eco PRO greenair HP™ supply and extract air fans' electrical power with F7 filters



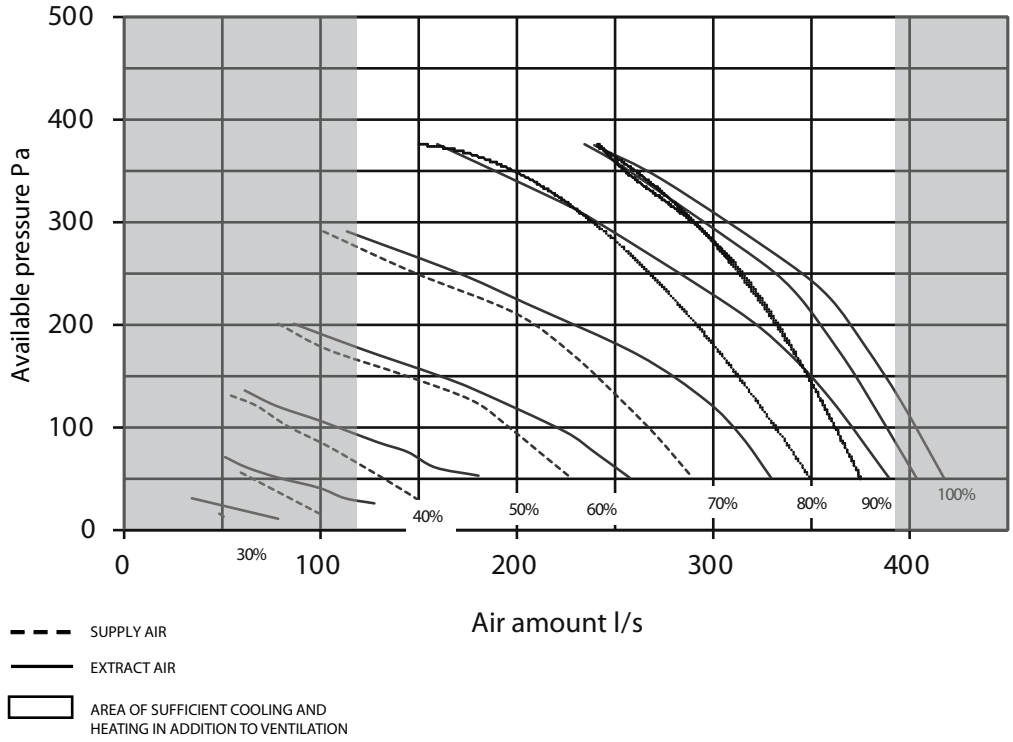
Pegasos eco PRO greenair HP™ supply and extract air characteric curves with F5 filters



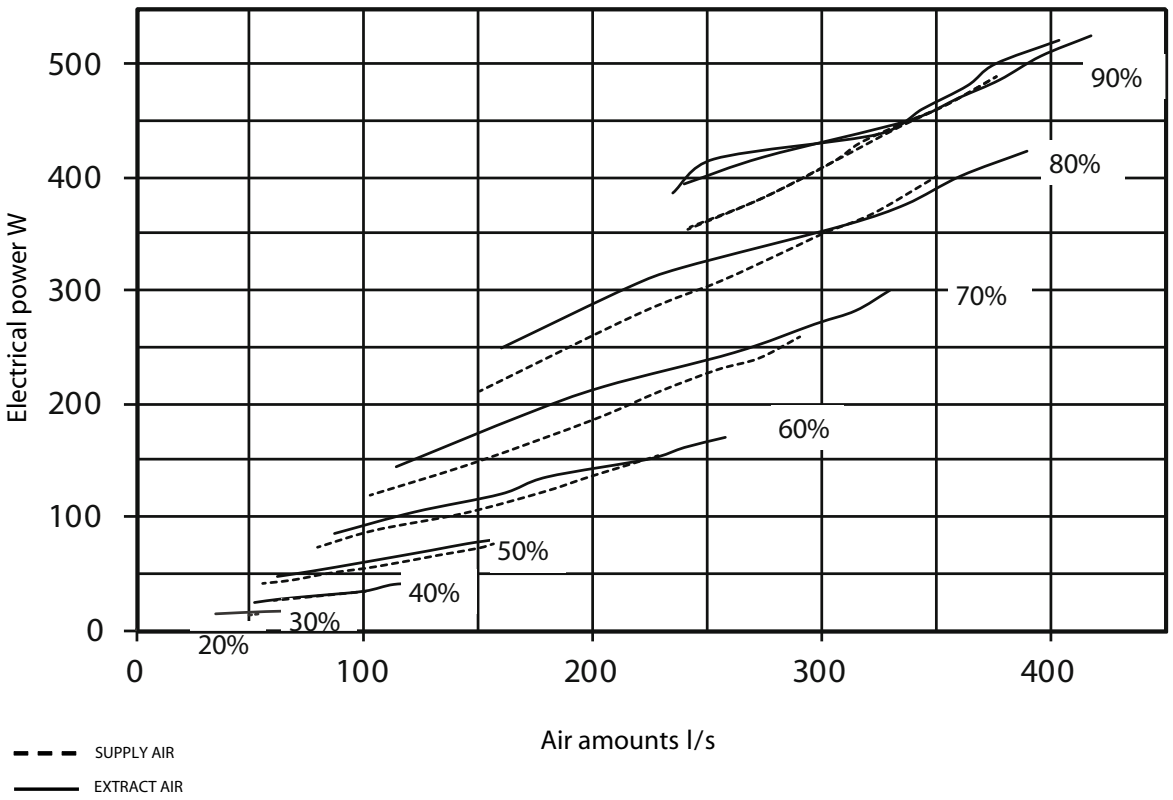
Pegasos eco PRO greenair HP™ supply and extract air fans electrical power with F5 filters



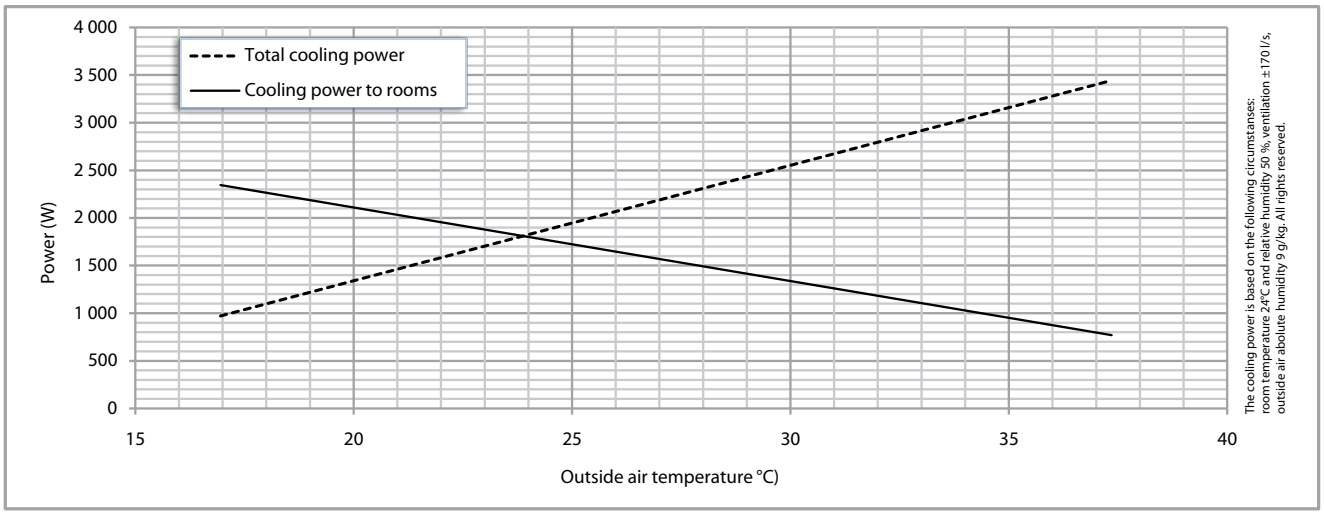
Pegasos eco PRO greenair HP™ supply and extract air characteric curves with F7/F5 filters



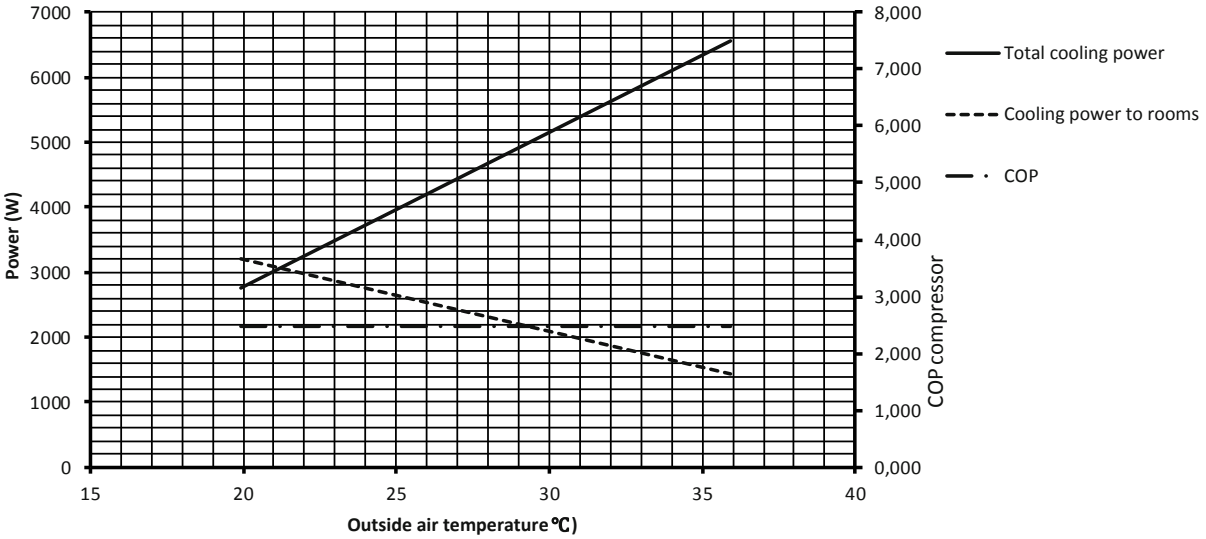
Pegasos eco PRO greenair HP™ supply and extract air fans electrical power with F7/F5 filters



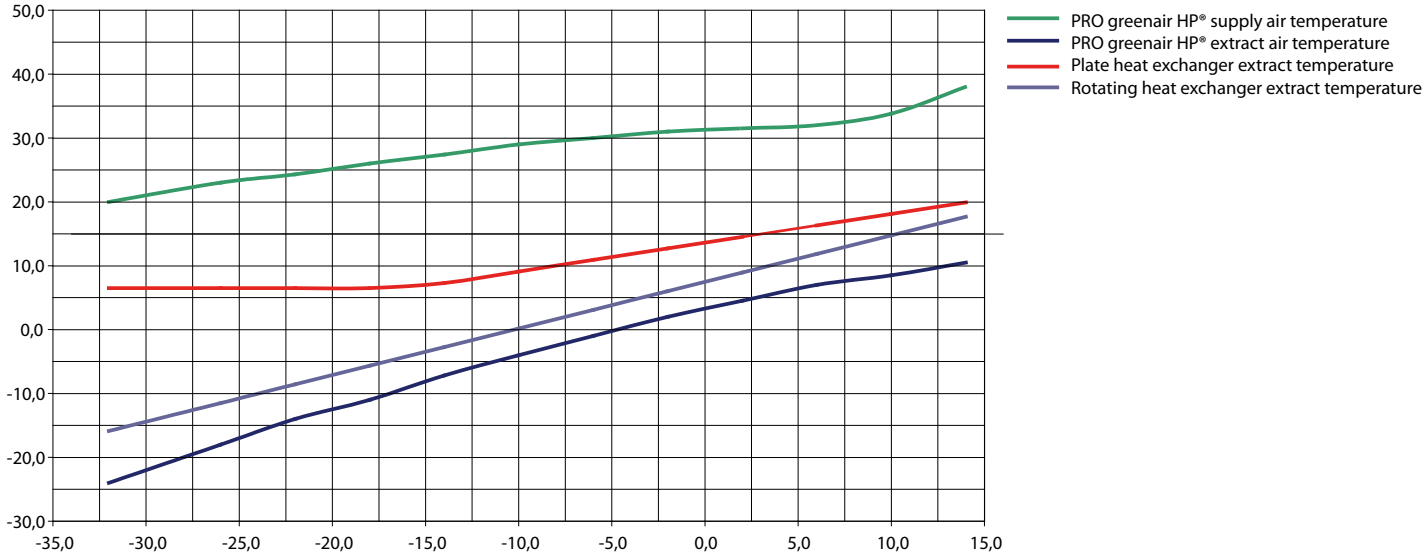
Pelican PRO greenair HP

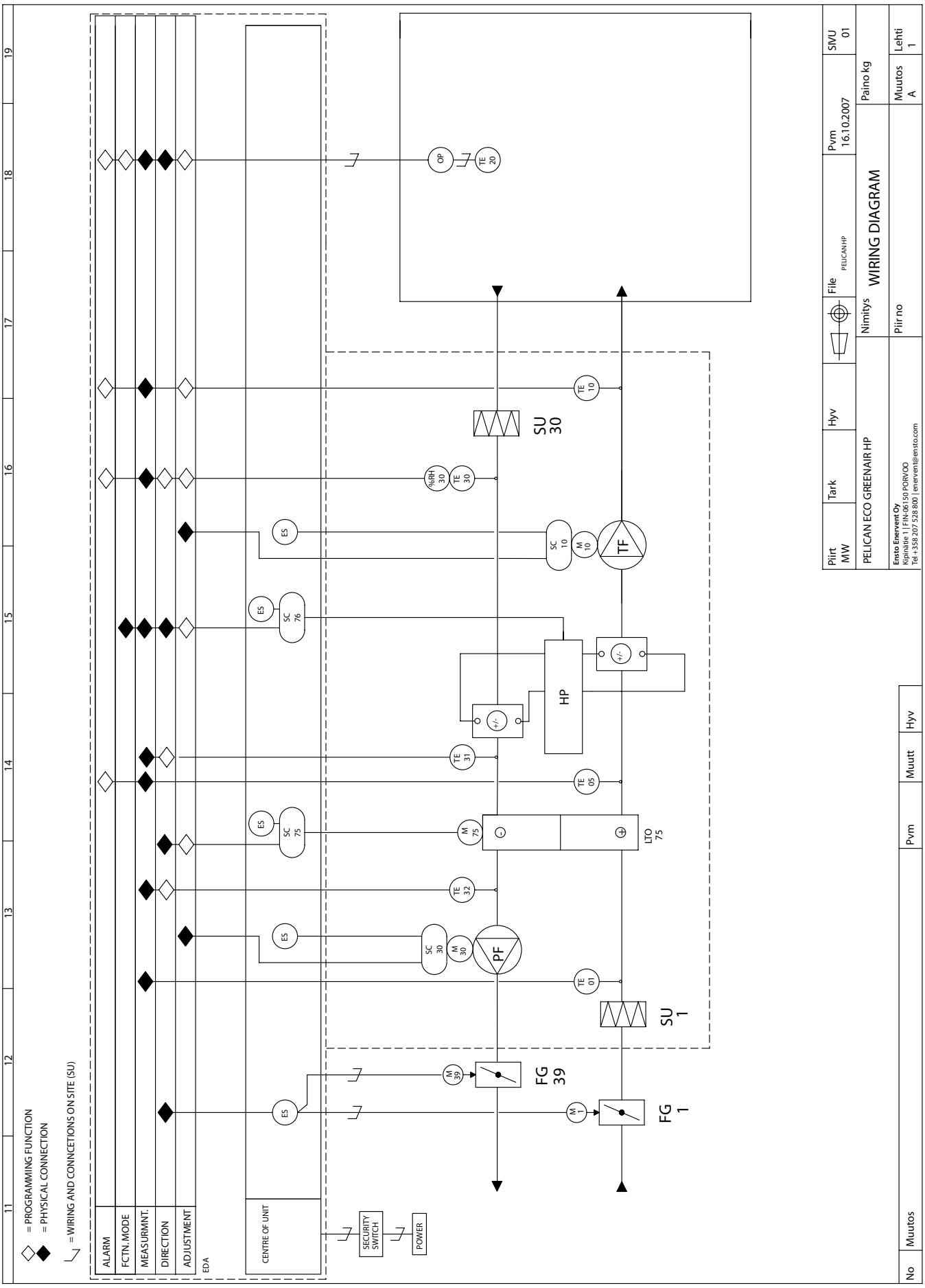


Pegasos PRO greenair HP

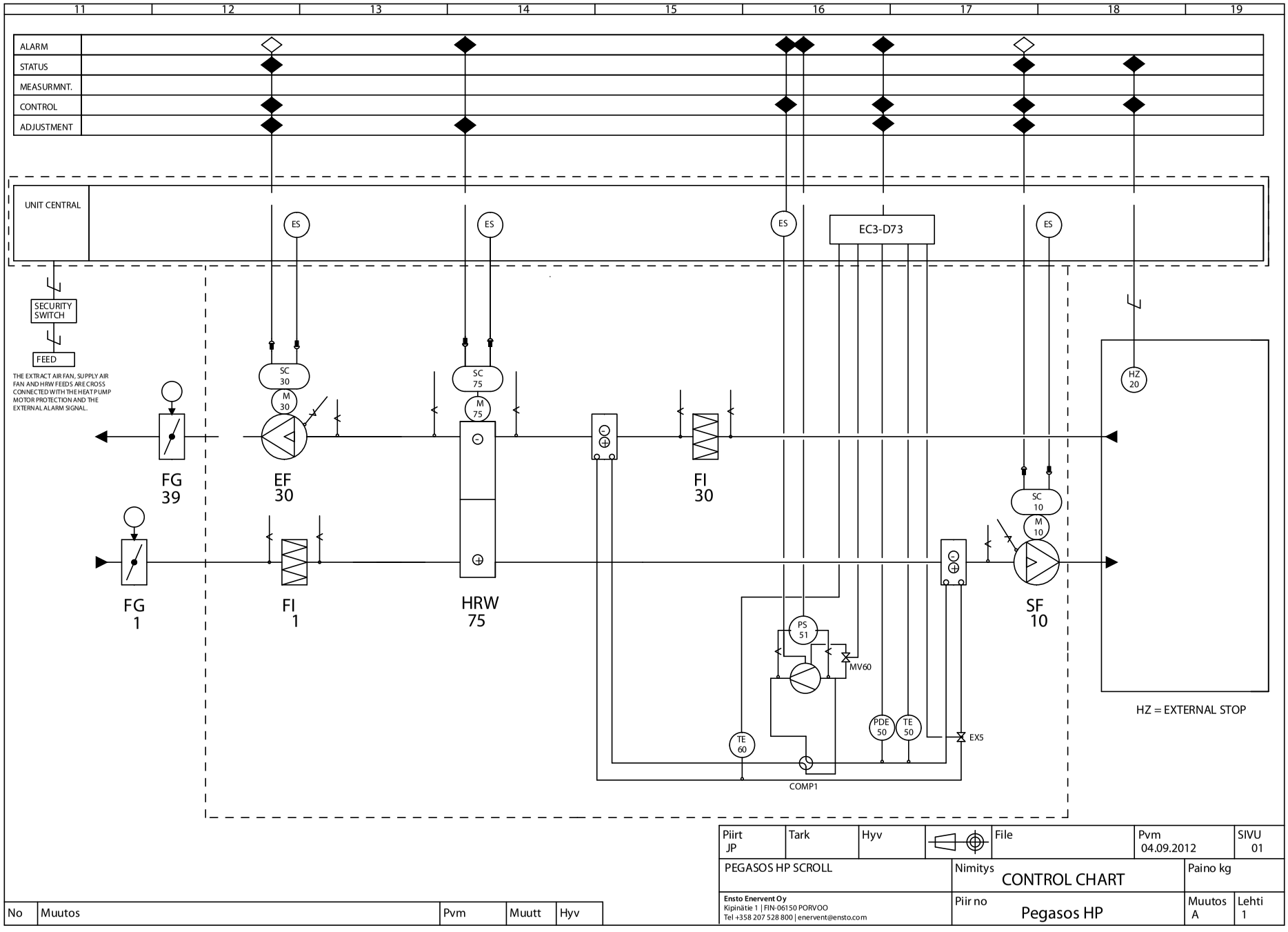


Supply- and extract air temperatures





INSTRUCTIONS FOR THE DESIGNER


11
12
13
14
15
16
17
18
19
ALARM
STATUS
MEASURMNT.
CONTROL
ADJUSTMENT
UNIT CENTRAL
ES
EC3-D73
SECURITY SWITCH
FEED
THE EXTRACT AIR FAN, SUPPLY AIR FAN AND HRW FEEDS ARE CROSS CONNECTED WITH THE HEAT PUMP MOTOR PROTECTION AND THE EXTERNAL ALARM SIGNAL.
SC 30
M 30
SC 75
M 75
HZ 20
FG 39
EF 30
FI 30
SC 10
M 10
FG 1
FI 1
HRW 75
SF 10
PS 51
MV60
PDE 50
TE 50
TE 60
EX5
COMP1
HZ = EXTERNAL STOP
Piirt JP
Tark
Hyv
File
Pvm 04.09.2012
SIVU 01
PEGASOS HP SCROLL
Nimitys CONTROL CHART
Paino kg
Ensto Enervent Oy
Kipinätie 1 | FIN-06150 PORVOO
Tel +358 207 528 800 | enervent@ensto.com
Piir no Pegasos HP
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Pvm
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11	12	13	14	15	16	17	18	19

PF= EXHAUST AIR FAN

TF= SUPPLY AIR FAN

SU1= SUPPLY AIR FILTER

SU30= EXHAUST AIR FILTER

LTO75= HRC

HP= HEAT PUMP UNIT

FG1= OUTSIDE AIR'S SHEET METAL

FG39= WASTE AIR'S SHEET METAL

SC75= HRC CONTROL CARD

SC76= HP CONTROL CARD

SC10= TF CONTROL CARD

SC30= PF CONTROL CARD

OP= CONTROL PANEL

TE01= OUTSIDE AIR DETECTOR

TE05= AFTER HRC SUPPLY AIR DETECTOR

TE10= SUPPLY AIR DETETCTOR

TE20= ROOM DETECTOR

TE30 & %RH30= EXHAUST- AND HUMIDITY DETECTOR

TE31= AFTER EXHAUST AIR COIL'S DETECTOR

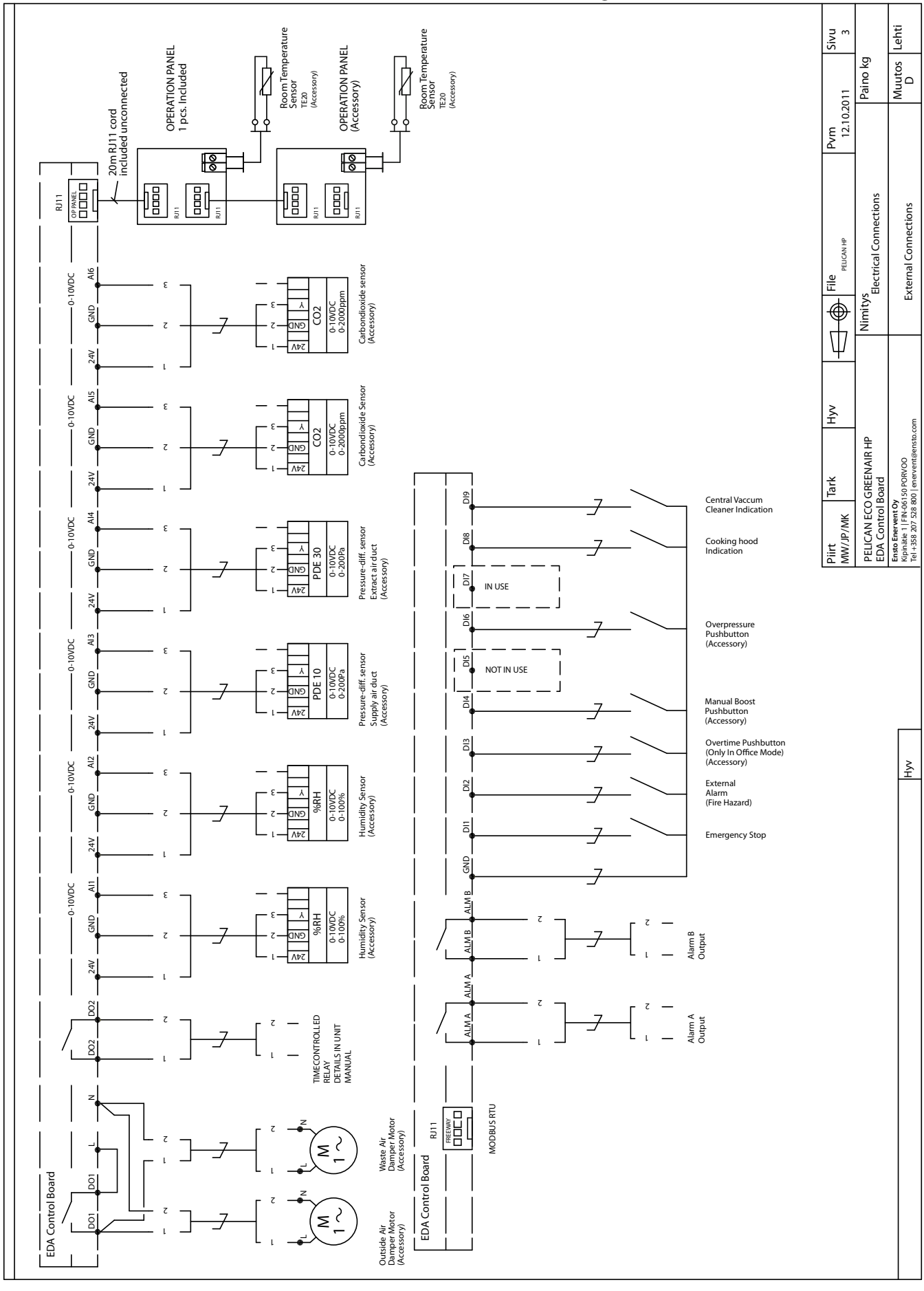
TE32= WASTE AIR DETECTOR

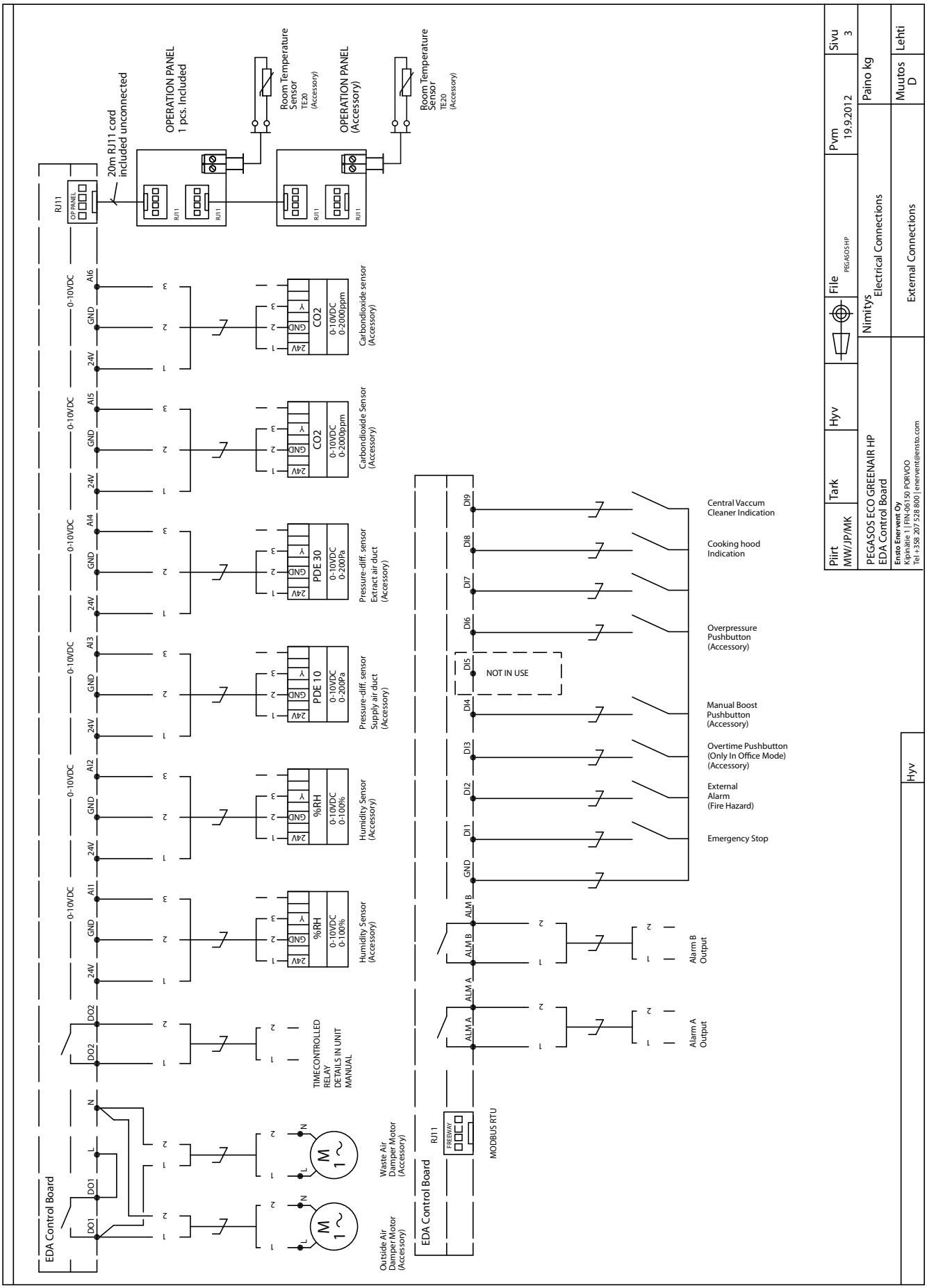
No	Muutos	Pvm	Muutt	Hyv

Piirt	Tark	Hyv		File	Pvm	SIVU
MW					16.10.2007	02
ECO GREENAIR HP			Nimitys	ABBREVIATIONS		Paino kg
Ensto Enervent Oy Kipinätie 1 | FIN-06150 PORVOO Tel +358 207 528 800 | enervent@ensto.com			Piir no			Muutos A / Lehti 1

INSTRUCTIONS FOR THE DESIGNER

SCHEMATICS, UNIT'S EXTERNAL CONNECTIONS PELICAN eco PRO greenair HP




EDA Control Board
RJ11
OP PANEL
20m RJ11 cord
included unconnected
OPERATION PANEL
1 pcs. Included
OPERATION PANEL
(Accessory)
Room Temperature
Sensor
TE20
(Accessory)
Room Temperature
Sensor
TE20
(Accessory)
0-10VDC
AI6
AI5
AI4
AI3
AI2
AI1
GND
24V
CO2
0-10VDC
0-2000ppm
Carbondioxide sensor
(Accessory)
PDE 30
0-10VDC
0-200Pa
Pressure-diff. sensor
Extract air duct
(Accessory)
PDE 10
Pressure-diff. sensor
Supply air duct
(Accessory)
%RH
0-10VDC
0-100%
Humidity Sensor
(Accessory)
DO1
DO2
N
L
TIMECONTROLLED
RELAY
DETAILS IN UNIT
MANUAL
M
1~
Waste Air
Damper Motor
(Accessory)
Outside Air
Damper Motor
(Accessory)
FREEWAY
MODBUS RTU
DI9
DI8
DI7
DI6
DI5
DI4
DI3
DI2
DI1
GND
NOT IN USE
Central Vaccum
Cleaner Indication
Cooking hood
Indication
Overpressure
Pushbutton
(Accessory)
Manual Boost
Pushbutton
(Accessory)
Overtime Pushbutton
(Only In Office Mode)
(Accessory)
External
Alarm
(Fire Hazard)
Emergency Stop
ALM A
ALM B
Alarm A
Output
Alarm B
Output
Piirt
MW/JP/MK
Tark
Hyv
File
PEGASOS HP
Pvm
19.9.2012
Sivu
3
PEGASOS ECO GREENAIR HP
EDA Control Board
Nimitys
Electrical Connections
Paino kg
Ensto Enervent Oy
Kipinätie 1 | FIN-06150 PORVOO
Tel +358 207 528 800 | enervent@ensto.com
External Connections
Muutos
D
Lehti

EXTERNAL WIRING

Point	Explanation	Delivery	Voltage	Cable example
OP panel 1	Control panel	1 pc. in standard delivery	RS-485 / Modbus RTU bus	20 m RJ4P4C cable included in the delivery
OP panel 2	Control panel	Accessory (max. of 2 can be connected)	RS-485 / Modbus RTU bus	20 m RJ4P4C cable included in the delivery
TE20	TE 20 room-temperature sensor (connected to the control panel)	Accessory	max. 2 V	KLM, 2 x 0.8
DO1	Outside-air damper, damper actuator	Accessory	max. 250 VAC, 1 A	MMJ, 3 x 1.5
DO1	Exhaust-air damper, damper actuator	Accessory	max. 250 VAC, 1 A	MMJ, 3 x 1.5
DO2	Time-controller relay output	Standard	max. 250 VAC, 1 A	MMJ, 3 x 1.5
AI1, AI2	% RH value transmitter (max. of 2 can be connected)	Accessory	0–10 V / 24 V	KLM, 4 x 0.8
AI5, AI6	CO_2 value transmitter (max. of 2 can be connected)	Accessory	0–10 V / 24 V	KLM, 4 x 0.8
ALM A	Class-A alarm output	Must be cabled	max. 24 V, 1 A	KLM, 2 x 0.8
ALM B	Class-B alarm output	Must be cabled	max. 24 V, 1 A	KLM, 2 x 0.8
DI1	Emergency stop	Must be cabled	potential-free switch point	KLM, 2 x 0.8
DI2	External alarm information (fire risk)	Must be cabled	potential-free switch point	KLM, 2 x 0.8
DI3	Time extension on/off switch (only in the OFFICE operation mode)	Accessory	potential-free switch point	KLM, 2 x 0.8
DI4	Boost button	Accessory	potential-free switch point	KLM, 2 x 0.8
DI6	Fireplace button (overpressure)	Accessory	potential-free switch point	KLM, 2 x 0.8

The low-voltage control cables must be separated from the high-voltage supply cable!

The control panel is supplied separately with all unit models. The control panel (IP20) is installed in a dry space.

MODBUS INFORMATION

- Modbus address 1 as default
- Communication format: RS485
- Modbus traffic through the control board's Freeway connector

Freeway connector pin out:
1 = +5 V
2 = L1 RxD receive
3 = L2 TxD transmit
4 = GND

- Speed: 19,200 bps
- 8 bits
- No parity

INSTRUCTIONS FOR THE INSTALLER

PRO greenair HP

WHAT is the PRO greenair HP?

The PRO greenair HP is a traditional ventilation unit combining regenerative heat recovery and a heat pump into a single compact unit. Extract-air heat energy is recovered during the winter, and supply air is cooled during the summer. Additionally, the room-air humidity and carbon dioxide levels can be controlled. The unit is easy to install, in a procedure that does not require any indoor units or refrigeration expertise.

HOW does the PRO greenair HP work?

Heat energy is recovered from the extract air by the rotating heat exchanger. Its aluminium foils are continuously heated by the extract air, and when they rotate to the supply-air flow, they release the energy to the supply air with an efficiency of up to 80%.

The heat pump operates as a traditional refrigeration circuit, wherein the refrigerant vaporises and stores energy (heat) from the extract air and releases it into the supply air when condensing. This is how the compressor 'pumps' energy from the warmer side to the cooler side. The refrigeration circuit can be operated in a transverse direction during the warmer seasons to lower the supply-air temperature. In this case, the refrigerant stores energy from the outside air and releases it into the extract air.

What are the BENEFITS of the PRO greenair HP?

Because of its unique and compact design, the unit is ideally suited to installations wherein it is impossible to install an outdoor heat-pump unit. Because the heat pump is installed inside the unit, a ventilation installer can install it. Refrigeration system expertise is not required, because refrigeration circuit installations are not performed.

The combination of a regenerative heat exchanger and a heat pump heats or cools the supply air to the ideal temperature, regardless of the season. The heat exchanger and the heat pump operate side by side to provide a constant and comfortable room temperature. The unit's efficiency is extremely high, and the energy and cost savings are significant because of the energy-saving fans, the inverter-controlled compressor, and the efficient heat exchanger. The PRO greenair HP cannot operate as a building's primary heating source.

ISSUES TO NOTE in the operation of the PRO greenair HP

Ventilation is the primary function of the unit. Cooling and heating are secondary functions.

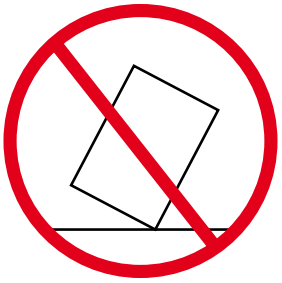
Constant and uninterrupted operation of the unit ensures that the compressor is constantly running, which considerably lengthens its service life. To ensure constant operation of the PRO greenair HP unit, the unit is designed to be operated by means of extract-air or room-temperature control.

It is very important for the correct operation of the unit that the air ducts and air flows be designed to be large enough. The unit's automation keeps the fan power at 70% or more when the heating/cooling mode is selected. It is the ventilation designer and ventilation contractor's responsibility to design, construct, and adjust the air ducting such that sufficient air flows can be used.

PART LIST

THE UNIT DELIVERY INCLUDES:

1. The Enervent PRO greenair HP ventilation unit
2. Control panel
3. Control panel cable RJ4P4C, length 20 m
   (installed in a conduit with a minimum diameter of 16 mm)



THE UNIT MUST NOT
BE TILTED MORE THAN 45°

THE FOLLOWING ARE AVAILABLE AS ACCESSORIES:

4. Additional control panels, max. 4 panels per unit
5. Control panel cable RJ4P4C, length 20 m
6. Fine filter F7 inside the unit
7. Fine cassette filter F7 in duct casing
8. Fireplace switch (button)
9. CO_2 transmitter (no more than two transmitters can be connected to the control system)
10. % RH value transmitter (no more than two transmitters can be connected to the control system)
11. Room-temperature transmitter
12. Differential-pressure transmitter for the filters (filter guard)
13. Outside- and extract-air dampers (recommended for EDW units)
14. Damper actuators (spring or electrical return)
15. Duct silencers
16. HRC differential-pressure transmitter (defrosting)
17. Carbon monoxide transmitter (relay control)
18. Boost switch (button)
19. Time extension switch LAP5 for office use
20. Presence detector LA14
21. KNX gateway
22. Freeway WEB
23. Silencer module

WARNING

The unit must be switched off before the service door is opened. Wait about two minutes after opening the service door before starting maintenance work. The fans rotate by themselves for a while, and the compressor may be extremely hot even when the ventilation unit's power supply is disconnected.

Protective gloves should be used when one is handling the components, because components may have sharp edges. In particular, the heat-pump unit should be handled extremely carefully, because the radiator plate edges are very sharp. The heat-pump unit's mass, 35 kg, should be considered when one is moving the component. Electrical safety regulations must be considered in any maintenance of the unit.

DUCTING DESIGN

For saving energy, it is advisable to design the system such that it is capable of both cooling and handling the basic ventilation of the building. The basic ventilation air flows are specified in accordance with the Building Code's Part D2. The ventilation unit is selected to meet the basic ventilation requirements at a fan speed of 50–60% and cooling boost at fan speeds of 70–100%. The ducting is designed for larger cooling boost air flows without air speeds rising too high, which may cause noise problems. The valves used should be designed to operate at two operation points – standard ventilation and boosting. The ducts must be insulated properly. The importance of insulation is emphasised when the ventilation unit is equipped with cooling functionality. This results in a balanced and quiet system during both boosting and standard ventilation.

The ducting sizes should be selected to be large enough to prevent excessive air speeds. The ventilation unit duct connection size does not determine the ducting size used. Ducting size is selected on the basis of the required air flows. The duct pressure must be calculated, for assessment of whether the system can operate properly. The SFP value must be calculated for both the ducting and the ventilation unit. The smallest duct size is 125 mm. In particular, the outside-air and extract-air ducts should be dimensioned to be sufficiently large. The outside-air grating must not be equipped with an insect net, and the grating diameter must be at least as great as that of the ventilation unit's duct connections. Duct size must not change from the grating to the unit. Approved materials must be used in the ducting – e.g., galvanised steel air ducts or plastic ducts approved for ventilation use. All valves used must be approved for use with a ventilation unit. The minimum size for supply- and extract-air valves is 125 mm. NOTE: Rooms with swimming pools always require special design, and the appropriate recommendations must be followed.

The outside-air intake should always be placed on the north-facing wall of the building or in another shady location where the temperature variations are as small as possible. Extract air should be led outside close to the roof ridge, approx. 90 cm above the roof surface. Use a factory-made insulated roof penetration. A protective hood must be installed at the top of the extract-air duct to prevent rainwater from entering the duct. The extract-air roof-penetration diameter must always be at least as great as the ventilation unit's duct connection diameter. There must be enough hatches in the ducting to facilitate cleaning of the ducting from inside. The locations of the hatches should be marked on, for example, roof trusses, to make them easier to find in the future.

There are extract valves in the following rooms: toilet, kitchen, washroom, bathroom, sauna, clothes closet, cleaning cupboard, and utility room. A standard cooker hood is installed above the cooker. The cooker hood blows the air directly outside. The cooker hood is used only during cooking. Additionally, a general extract-air valve is installed in the kitchen ceiling. There are supply valves in the following rooms: bedroom, living room, dining room, separate sauna, hobby room, and changing room. They are recommended for installation in the ceiling area close to the window. In a sauna, the valve is installed and adjusted so as to direct the air stream above the stove. Door gaps or air grids are used to direct the air flow from clean rooms to dirtier ones. The minimum door gap height is 20 mm, in the sauna room 100 mm. Combustion air for wood-burning sauna stoves and fireplaces can be taken from outside with a separate fresh-air pipe, which can be closed when this is required. A gap must not be left under doors when rooms located next to each other have different noise requirements. For example, the maximum noise level allowed for a utility room is 33 dB(A), but in rooms intended for living it is 28 dB(A). If door gaps must be omitted, the room must be equipped with both supply- and extract-air valves.

The ventilation of a garage must not be connected to the ventilation unit of the building; the garage must be ventilated by means of gravity-based ventilation, a roof ventilator, or a separate heat-recovery unit. Connection of a cooker hood to the ventilation unit is not recommended. A drying cabinet with a separate fan can be connected indirectly to the extract valve by means of the 'claws' delivered with the drying cabinet. In this case, some of the extract air is obtained from the drying cabinet and some from the room. The extract-air flow through a valve must be at least 12 l/s.

The supply- and extract-air ducts must be equipped with duct silencers. The duct silencers are to be dimensioned case-specifically. Silencer modules are available for all PRO greenair HP units.

The SFP value and other design and dimensioning values can be calculated with the ***Enervent Energy Optimizer*** software, available from Enervent's Web site, at www.enervent.fi.

VENTILATION DUCT THERMAL INSULATION

Ventilation ducts must be thermally insulated to prevent water from condensing to the inner or external duct surfaces in any circumstances. Additionally, the air temperature must not decrease or increase excessively in the ducts because of external factors. The ventilation engineer calculates the insulation requirements depending on the placement of the ducts and the air temperatures. When the insulation materials are designed, it must be taken into account that the extract air temperature may decrease significantly below zero degrees. The Optimizer software, which is available from Ensto Enervent's website, can be used to calculate the extract air temperature with different outside air temperatures. Calculation software available from insulation material manufacturers can also be used when designing the insulation material thickness.

Table 1: Ventilation duct thermal insulation in **heating use**

Supply air duct from the ventilation unit to the supply valve	The insulation must be designed and implemented so that the maximum air temperature change in the duct is less than 1°C.
Extract air duct from the supply valve to the ventilation unit	The insulation must be designed and implemented so that the maximum air temperature change in the duct is less than 1°C.

Table 2: Ventilation duct thermal insulation in **cooling use**

Supply air duct from the ventilation unit to the supply valve	The insulation must be designed and implemented so that the maximum air temperature change in the duct is less than 1°C. At least 18 mm of cellular rubber insulation on the duct surface and sufficient additional insulation.
Extract air duct from the supply valve to the ventilation unit	The insulation must be designed and implemented so that the maximum air temperature change in the duct is less than 1°C.

Ventilation Duct Insulation Examples:

Outside air duct (fresh air duct)
Cold spaces: 100 mm of sheet, mat, or pipe-covering insulation (plus the blown wool, when used).
Warm/semi-warm spaces*:
Option 1: 80 mm insulation with vapour-proof external surface
Option 2: 20 mm of cellular rubber insulation on the duct surface and 50 mm insulation with vapour-proof external surface.
The insulation must prevent water vapour from condensing to the external duct surface and excessive air temperature rise during summer.

Supply air duct
Cold/semi-warm spaces*:
In standard ventilation the insulation must be designed and implemented so that the maximum air temperature change in the duct is less than 1°C. For example, 100 mm of sheet, mat, or pipe-covering insulation can be used (plus the blown wool, when used).
Warm spaces: Insulation is not required in standard ventilation.
In heating and cooling use see tables 1 and 2.

Extract air duct
Warm spaces: Insulation is not required in standard ventilation.
Cold/semi-warm spaces*:
In standard ventilation the insulation must be designed and implemented so that the maximum air temperature change in the duct is less than 1°C. For example, 100 mm of sheet, mat, or pipe-covering insulation can be used (plus the blown wool, when used).
In heating and cooling use see tables 1 and 2.

Exhaust air duct
Cold spaces: 100 mm of sheet, mat, or pipe-covering insulation
Warm/semi-warm spaces:
Option 1: 80 mm insulation with vapour-proof external surface
Option 2: 20 mm of cellular rubber insulation on the duct surface and 50 mm insulation with vapour-proof external surface.
The insulation must prevent water vapour from condensing to the external and internal duct surfaces.

Circulation air duct
The insulation must be designed and implemented so that the maximum air temperature change in the duct is less than 1°C.**

*) A semi-warm space refers also to dropped ceilings, sub-floors, and casings.
**) When Kotilämpö systems are renewed, the recycling air duct can be left as it is.

Sound insulation is not taken into account in these insulation instructions and examples.

The unit is located in a soundproofed technical room. The unit's noise level exceeds the maximum (33/38 dB) specified in the Building Code for utility rooms etc. The PRO greenair HP is installed on an even floor surface or on a bed made for it. To prevent dirt and dust from entering the unit during construction, the door and the duct connections must be kept closed and be opened only when absolutely required.

Because the unit contains an extract-air heat pump, it must always be drained through a water lock. Two separate R1/4" internal thread (13.5 mm) condensate connections are provided at the bottom of the unit, one for the extract-air side and the other for the supply-air side.

INSTALLATION STAGES:

NOTE: The rotating heat exchanger can be removed from the unit, making it lighter and easier to install.

1. Install the unit horizontally on the floor or on a bed, resting on its own rubber feet. Leave a 10 mm air gap between the unit and to the sides. If the unit is installed with its side against the wall, a 15 mm air gap is left to the side. Note the space required for the condensate draining under the unit.

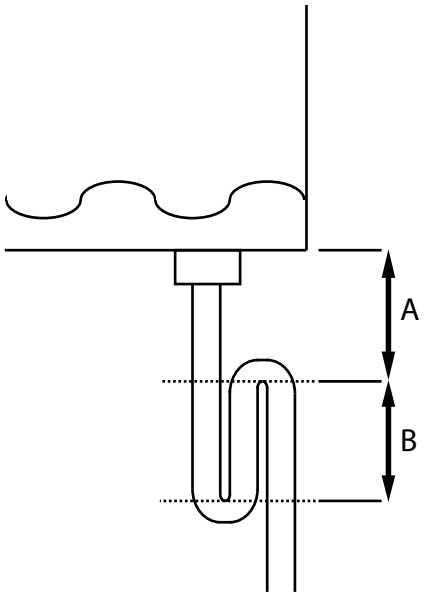
2. Ensure that at least 75 mm of free space is left in front of the unit and that the electricity through-holes are easy to access. The unit has a plug connection (230 VAC, 50 Hz, 16 A). The connection cable is found in the front corner of the unit, above the smaller door. The connection cable length is 120 cm.

3. Connect the unit to the ducting, using flexible connection pieces. It is recommended to use duct silencers in both the supply and the extract ducts.

4. Drain the unit in accordance with the instructions below.

DRAINING THE VENTILATION UNIT

It is recommended that all Enervent-family ventilation units be equipped with condensate draining. When the air cools, water condenses; i.e., condensate water is produced. This occurs especially in the winter, when the humid room air comes in contact with the rotor cooled by the outside air or when the ventilation unit is equipped with a cooling radiator. The condensate water pipe must not be connected directly to the sewer system! The condensate water is led, in a descending pipe with a diameter greater than Ø 15 mm, through a water lock to a floor drain or similar. The pipe must be installed below the ventilation unit bottom, it must not have long horizontal parts, and it must contain only one water lock. If the unit has more than one condensate outlet, each must have its own water lock.



There is a vacuum inside the unit, and the recommended condensate water outlet and water lock distance (A) is 75 mm; however, the minimum is the vacuum divided by 10 in millimetres (e.g., vacuum of 500 Pa -> 50 mm). The recommended water water-lock water column height is 50 mm; however, the minimum is the vacuum divided by 20 in millimetres (e.g., vacuum of 500 Pa -> water column height of 25 mm). If a duct radiator is installed, the radiator has overpressure inside it and the recommended condensate water outlet and water lock distance (A) is 25 mm. The recommended water-lock water column height (B) is 75 mm; however, the minimum in millimetres is the vacuum divided by 10 (e.g., vacuum of 500 Pa -> water column height of 50 mm). The water lock must be filled with water before starting of the unit. The water lock may dry out with time if no water accumulates in it. In this case, air may start flowing in the pipe and prevent water from entering the water lock, which causes a disturbing 'bubbling' sound.

COMMISSIONING

The Enervent PRO greenair HP ventilation unit may be commissioned after the following issues are taken into account:

- The unit is installed on an even surface (check this, using a spirit level; it is important if the condensate removal is to operate correctly)!
- Both condensate outlets and their separate water locks are connected to the sewer.
- The ducts and the duct silencers are attached to the unit's duct connections.
- The valves are installed for the ducting.
- The outside-air grating is attached to the outside-air intake (note that the outside-air grating must not have an insect net, because these are difficult to clean).
- The exhaust-air roof penetration has been installed. We recommend the use of factory-made insulated roof penetrations with a duct diameter of 200 mm.
- The ducts are insulated in line with the instructions.
- The unit has an appropriate electricity supply (an earthed outlet, 230 VAC, 16 A).
- The control panel is connected to the unit (to motherboard connector OP1) with the supplied RJ4P4C cable.
- The unit must be operated only by means of extract-air or room-temperature control. Any room-temperature transmitter (an accessory) must be connected to the control panel connector before commissioning.
- The room temperature is at least 16 °C. The control system prevents starting of the unit if the extract-air temperature is below 15 °C.

When the above-mentioned installation work has been completed, open the unit's door with the supplied key and ensure that the unit is clean inside (and that there are no extra items inside the unit) and that the filters are correctly in place. Close the door carefully. The unit must not be operated or started when the door is open! The heat-pump pressure switch trips if the unit is operated with the door open.

The PRO greenair HP is started by pushing the (green) main switch into the ON position. The fans and the rotating heat exchanger operate in this mode. The heat-pump unit must not be switched on before the air flows have been adjusted. When the air flows have been adjusted and the heat pump is to be used for cooling or heating of the supply air, also the orange switch next to the main switch is to be moved to the ON position. The main switch turns the entire unit off, regardless of the position of the orange switch.

The unit must be disconnected from the electric network if voltage tests, insulation resistance measuring or other measurings/electrical work, which can harm sensitive electronic equipment are done.

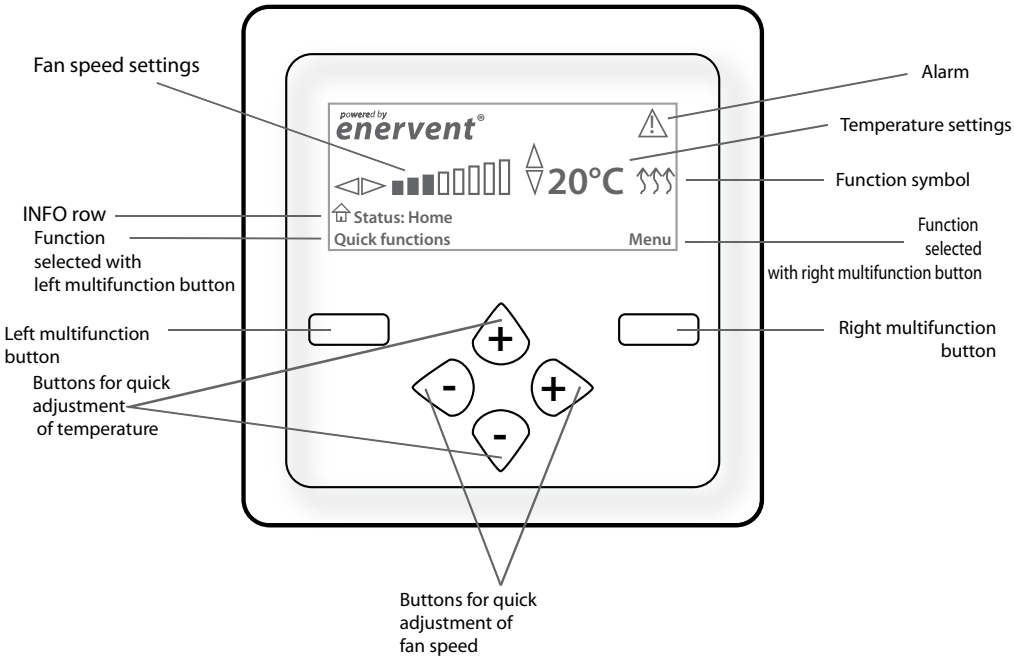
The regulation and control equipment of the unit can cause leakage current. Therefore the fault current protection doesn't always work correctly with the unit. The electrical connections must be made according to prevailing local directives.

ADJUSTING THE SUPPLY- AND EXTRACT-AIR RATIO (AFTER COMMISSIONING)

After commissioning, the air flows must be adjusted to their design values. The required fan speed settings are made from the Settings menu. The extract-air flow should be approx. 5–10% greater than the supply-air flow. The adjustment is made by measuring the air flows of each air valve with appropriate measurement devices (e.g., a thermo-anemometer) and adjusting them to the design values. A well-adjusted unit has good heat-recovery efficiency and keeps the building's inside pressure correct, slightly underpressurised. This keeps the heating costs low and moisture out of the structures.

Please see the air-flow adjustment instructions on page 61.

The air flows must be adjusted. The ventilation unit warranty is void if the air flows are not adjusted and/or an air-flow adjustment report is not made.



CONTROL PANEL BUTTONS

Fan speed 'Quick choice' buttons
Push the right-arrow button when you want to increase the fan speeds manually.
Push the left-arrow button when you want to decrease the fan speeds manually.

Temperature setting 'Quick choice' buttons
Push the up-arrow button when you want to increase the temperature setting.
Push the down-arrow button when you want to decrease the temperature setting.

Left multi-choice button
The 'Quick choices' list is opened by pushing the left multi-choice button of the standard display. This list contains functions that can be started immediately. The functions in the list can be selected from the Settings > Quick choices menu. Quick functions include overpressure (i.e., fireplace switch), boost, max. heat or cooling, and night cooling being allowed or prevented.

Right multi-choice button
The 'main menu' is opened by pushing of the right multi-choice button from the standard display. The main menu contains the following functions: listing and resetting alarms, setting the date and time (NOTE: the year must also be set), displaying the measured temperatures and humidity levels, programming week and year timer programmes, seeing ventilation-unit information, and entering the Settings menu with a password (not intended for the end user).

Keypad lock
The keypad lock is activated by pushing the left multi-choice button ('Quick choices') and after that the arrow-up button (for temperature increase). The keypad lock is released with the same key combination.

DISPLAY SYMBOLS:

Fan speed settings in units with DC fans

The bars of the column indicate which ventilation power range is used: 1 = 20–29%, 2 = 30–39%, 3 = 40–49%, 4 = 50–59%, 5 = 60–69%, 6 = 70–79%, 7 = 80–89%, 8 = 90–100%. When the fan speed button '-' or '+' is pushed, the precise setting to an accuracy of one per cent is displayed for a moment. if the fans are in boost mode, the boosting ventilation power is displayed. In other cases, the standard power is displayed. The number of bars indicates how many power ranges are available. If a speed difference has been specified for the supply and extract fans, the amount of ventilation power available is decreased by the speed difference. The maximum number of bars is eight when there is no speed difference specified for the fans. For example, the standard extract-fan speed is 50% and the supply fan standard speed is 40%. The speeds differ from each other by one power range, so 8-1=7 bars are displayed.

Temperature setting

The selected temperature setting is displayed here. It is the supply-air, extract-air, or room temperature, if the room temperature transmitter is connected to the control panel.

Operation symbol

The symbol indicates the temperature control mode:

 The unit is cooling

 The unit uses heat recovery only for heating/cooling:

 The unit is heating

INFO row

This row indicates the operation mode of the ventilation unit. The unit can be in one of the following modes: Home / Away / Long absence / Boosting (°C or % RH or CO_2) / Overpressure / Max. heat or cooling / Stove / Central vacuum cleaner / Night cooling / Defrosting.

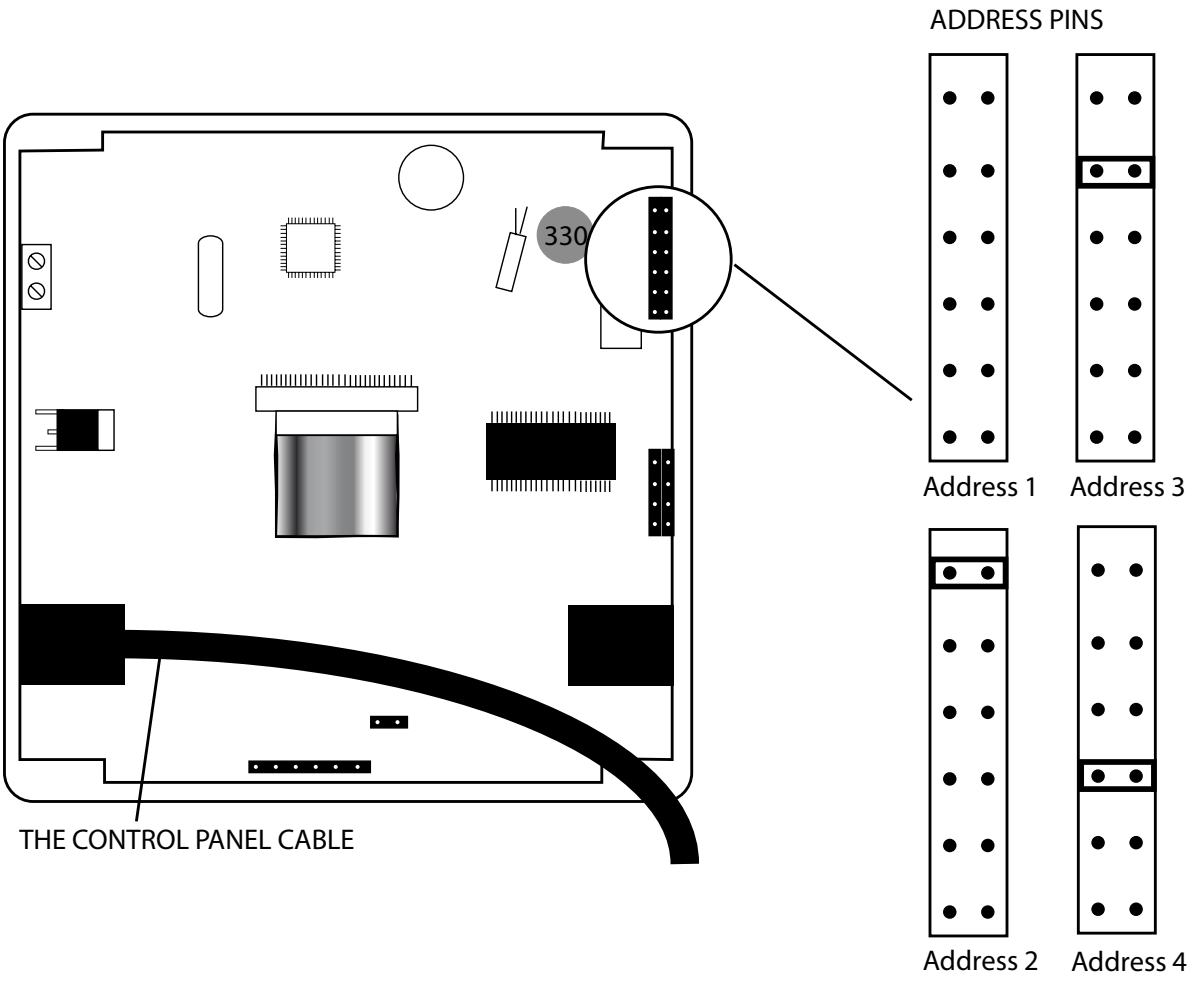
Fault / service notification

The symbol appears on the display when a fault is detected in the unit or when it requires servicing.

SPECIFYING THE CONTROL PANEL ADDRESS

Four control panels can be connected to the ventilation unit equipped with the EDA control system. The Modbus addresses of the control panels must be specified when several panels are used in parallel to control the unit. The address is selected by placing the supplied jumpers in the correct locations.

1. Remove the cover plate from the back of the panel.
2. Disconnect the control panel if it is connected, or turn off the ventilation unit if it is in operation.
3. Select a unique address for each panel by placing the jumper on the pins as shown below.

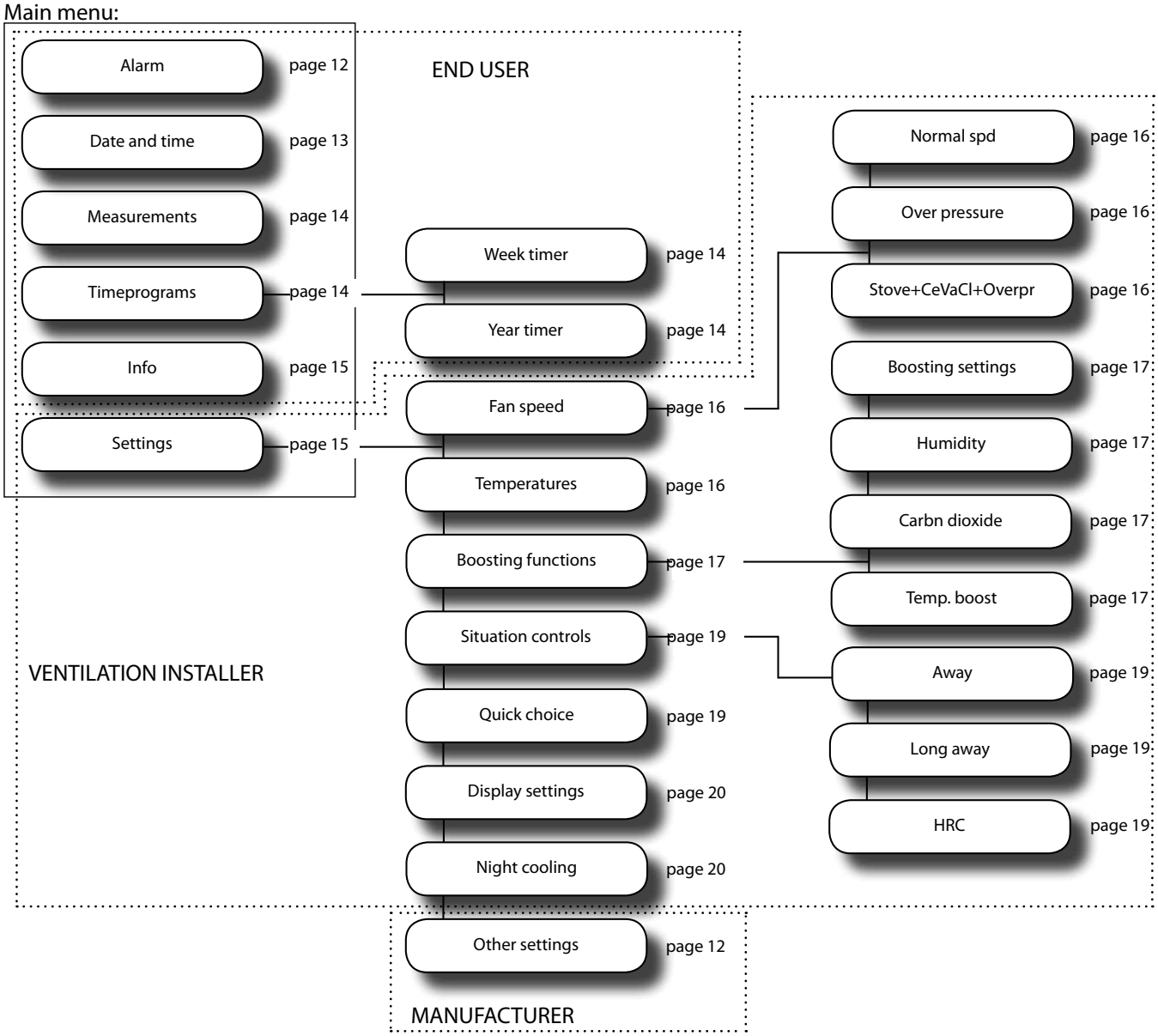


CONTROL SYSTEM

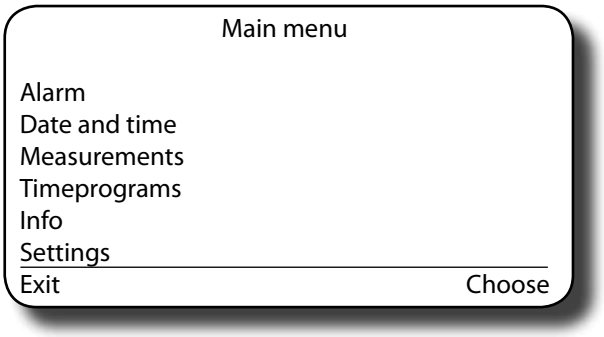
The control panel menu is accessed by pressing of the right multi-choice button. Menus are navigated with the up- and down-arrow buttons. When a menu is open, the alternatives, such as 'Exit', 'Choose', 'Reset', and 'Change', are displayed at the bottom of the display. These alternatives are selected by pushing the corresponding multi-choice button.

MENU STRUCTURE

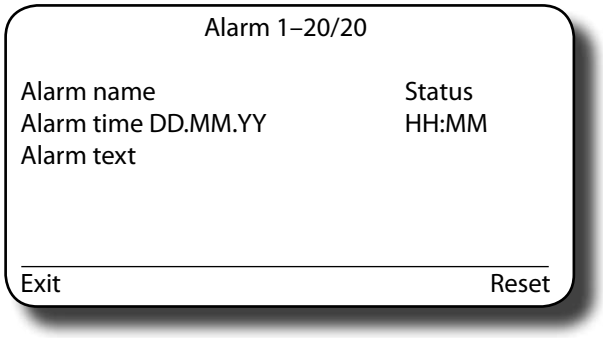
Main menu:



MAIN MENU



ALARMS



All alarms and error messages are displayed on the unit's alarm page. The alarm list displays the 20 latest events. One alarm can have three associated events. The alarm is issued (ON), the alarm is reset but still active, the alarm is not active (OFF). For example, if the extract-air temperature has dropped below the lower alarm threshold, the result is an ON alarm. When the alarm is reset but the alarm condition is still active, a reset is done. Further, when the temperature rises above the lower threshold (+ hysteresis range), the result is an OFF alarm state.
There are two alarm classes: A and B. Class-A alarms stop the unit and issue an external class-A alarm signal. A class-B alarm issues a class-B alarm signal but does not stop the unit. Depending on the alarm, the unit may enter failsafe mode: extract fan speed to minimum and supply fan off. Times and dates for controlling when the class-B alarm output operates can be set for alarm output B. If the alarm occurs outside the specified time, the alarm output is activated only when the specified time starts.

The alarm menu title indicates the alarm number and the total number of alarms. The newest alarm is displayed first in the list, and the last is removed when there are more than 20 alarms. The alarm window displays the alarm name and status on the first row and the alarm event time on the second row. The third and fourth rows are reserved for text explaining the alarm. The alarm status can be 'on', 'off', or 'res.'. When the status is 'on', the alarm is active and the alarm output is energised. When the alarm status is 'on', the right multi-choice button resets the alarm and its status changes from 'on' to 'res.'; also, the alarm output is de-energised for the alarm in question. If the alarm is an A-class alarm, the unit does not operate before the alarm's cause has been corrected and the alarm reset from the display. In 'off' status, the alarm is no longer active, but it is still displayed in the list.

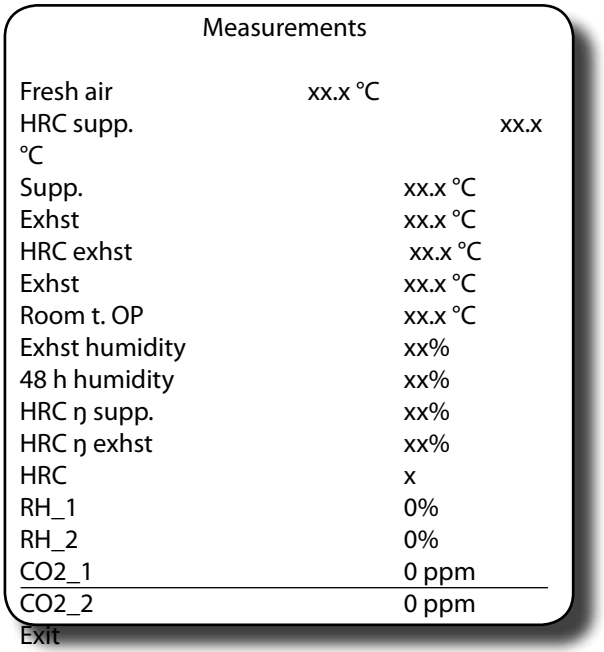
Alarm	Alarm class	Cause	Action
Service reminder	B	The control system issues a reminder for checking the ventilation unit's condition and changing the filters, every six months.	Service the ventilation unit and change the filters.
Filter alarm Supply-air filter	B	The supply-air differential-pressure transmitter (accessory) generates an alarm condition when the filter is clogged.	Change the supply-air filter.
Filter alarm Extract-air filter	B	The extract-air differential-pressure transmitter (accessory) issues an alarm when the filter is clogged.	Change the extract-air filter.
Supply air cold	B	See the troubleshooting table on page 22.	Service the ventilation unit, or have it serviced.
Risk of fire Supply air hot	A	See the troubleshooting table on page 22.	Contact an authorised service shop. Explore the cause of the fault before acknowledging the alarm.
Risk of fire Room air hot	A	If there is no fire, see the troubleshooting table on page 22.	Contact an authorised service shop. Explore the cause of the fault before acknowledging the alarm.
Extract air cold	B	See the troubleshooting table on page 22.	Service the ventilation unit, or have it serviced.
Risk of fire Extract air hot	A	If there is no fire, see the troubleshooting table on page 22.	Contact an authorised service shop. Explore the cause of the fault before acknowledging the alarm.
External Emergency stop	A	This alarm is enabled only for those units connected to a building automation system. If there is not an emergency, see the troubleshooting table on page 22.	Contact an authorised service shop. Explore the cause of the fault before acknowledging the alarm.
External Risk of fire	A	This alarm is enabled only for units connected to a building automation system. If there is no fire, see the troubleshooting table on page 22.	Contact an authorised service shop. Explore the cause of the fault before acknowledging the alarm.

DATE AND TIME

This menu contains the settings for the time, date, month, and year. The day of the week is displayed automatically.

MEASUREMENTS

The Measurements menu is an interactive menu for displaying the measurement information. The information from the measurement accessories connected, such as carbon dioxide and humidity sensors, is displayed here.
Explanations of the measurements:



Fresh air	Outside-air temperature
HRC supp.	Supply-air temperature after heat recovery
Supp.	Supply-air temperature
Exhst	Extract-air temperature
HRC exhst	Extract-air temperature after the heat pump before the heat exchanger
Exhst	Exhaust-air temperature
Room t. OP	Room temperature, measured by the control panel (accessory)
Exhst humidity	Extract-air humidity
48 h humidity	The average extract-air humidity level over the last 48 hours
HRC ŋ supp.	Supply-air heat-recovery efficiency
HRC ŋ exhst	Extract-air heat-recovery efficiency
HRC	-100–0 the unit requests cooling 0–100 (only) heat recovery is used 100–200 the unit requests heating
RH_1	External humidity transmitter* measurement result
RH_2	External humidity transmitter* measurement result
CO2_1	Carbon dioxide transmitter* measurement result
CO2_2	Carbon dioxide transmitter* measurement result

* The transmitter is an accessory.

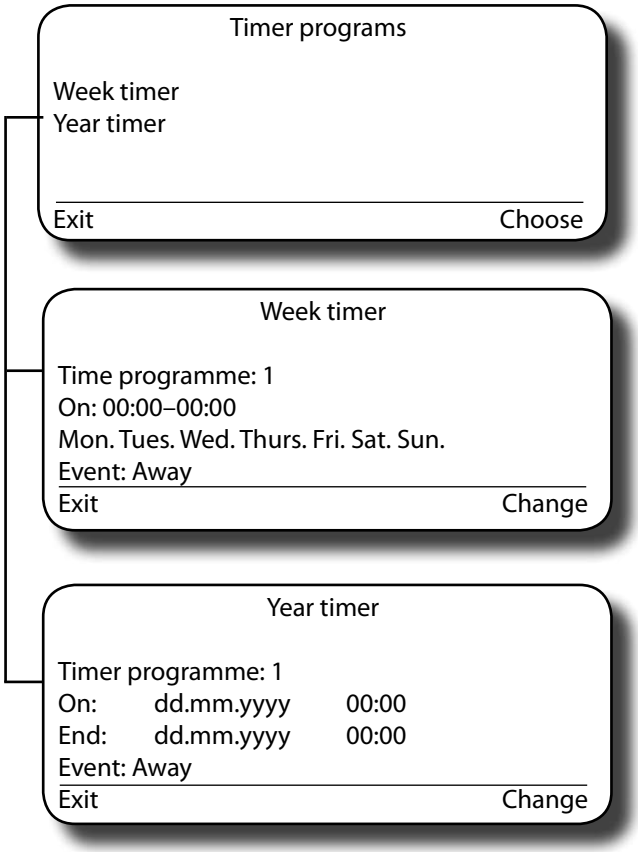
TIMER PROGRAMMES

The week and year timer settings are made in the Timer programmes menu. **The week timer has 20 timer blocks**, which include the start and end time of the programme and the action that the unit is to perform during the specified time period. **The week timer has five timer blocks**, which include the start and end time of the programme and the action that the unit is to perform during the specified time period.

A timer programme is programmed as follows:

1) Enter the Timer programmes menu, and select either the week or year timer. The week timer is used to pro gram events that occur often, such as those related to working hours. The year timer is used to program longer time cycles.
2) The timer programme number is selected.
3) The time period for an active programme is selected – e.g., 7:00–16:00 on all days of the week for the week timer or 1.7.2010–15.7.2010 for the year timer.
4) The event (i.e., function) is selected.

The timer programme events have certain factory-default values. The ventilation installer can change the values when this is necessary. The values given below are the factory-default values.



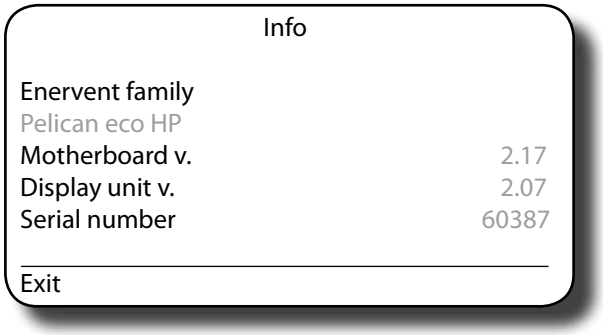
Timer programme events:

The functions 'Away' and 'Long absence' are not well suited to the PRO greenair HP, because the ventilation unit fan power is always at least 70% when the heat pump is operating and the extract-air temperature must be at least 20 °C for the unit to operate optimally. The 'Away' and 'Long absence' functions do not save energy with the PRO greenair HP.

Away	In this mode, the unit's fans operate at 30% power and the temperature is allowed to drop by 2.0 °C.
Long away	In this mode, the unit's fans operate at 20% power, the temperature is allowed to drop by 3.0 °C, and heating and cooling are disabled.
No heating	Heating using the heat pump is disabled.
No cooling	Cooling using the heat pump is disabled.
Temp. drop	The temperature setting value is decreased by 2 °C.
Max heat	Maximum heating power is used. This function remains on until the timer programme ends or the value set is reached.
Max cool	Maximum cooling power is used. This function remains on until the timer programme ends or the value set is reached.
Time rly	The time-controlled relay is set to be energised at a certain time.
IV %	The fan power is set to 20–100% for the timer programme period.

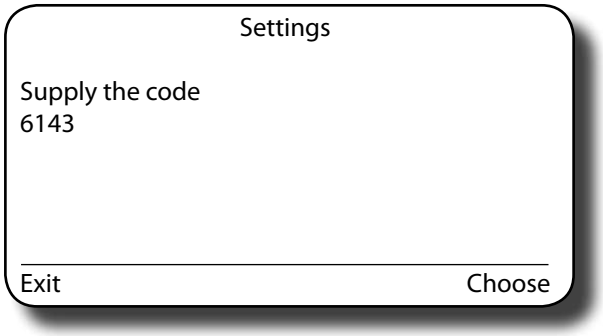
INFO

The Info menu is an interactive menu for displaying the unit's model, serial number, and control system version.



SETTINGS

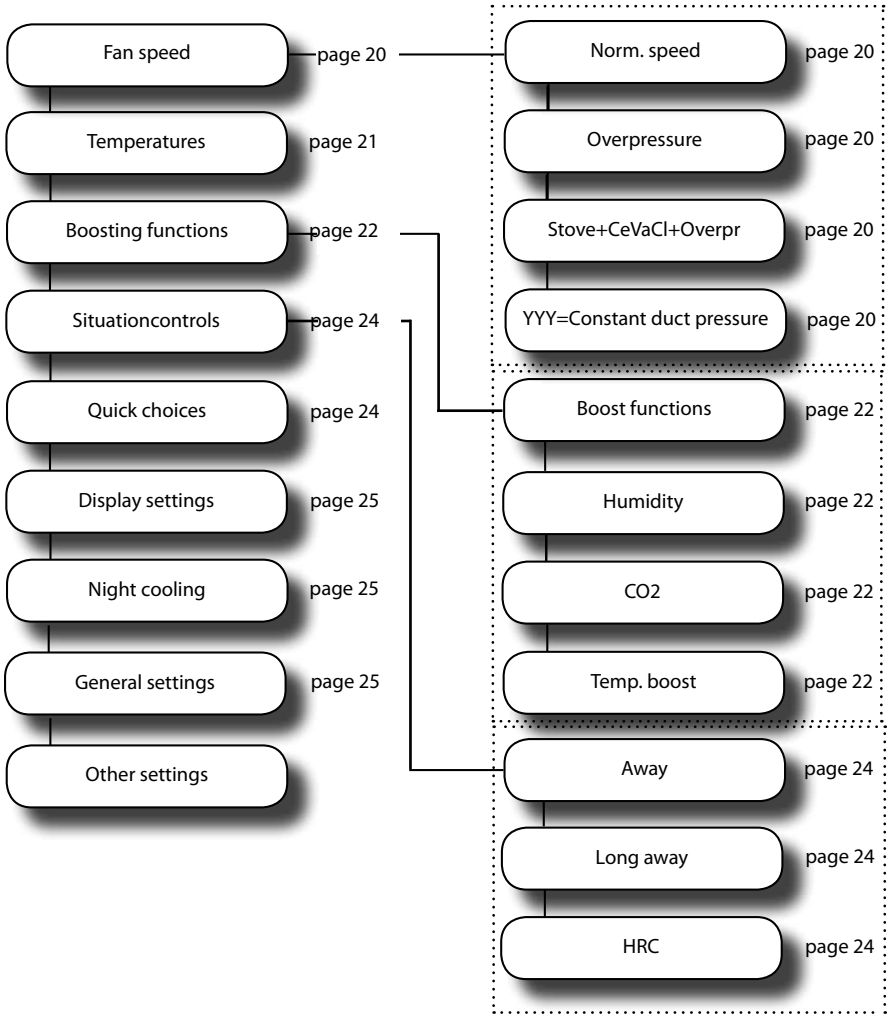
In the Settings menu, the ventilation installer specifies the fan speeds, temperatures, etc. If the installation work is performed well, the end user does not need this menu. Please see the 'Installation instructions' section for further information about the menu. The password for accessing this menu is 6143.



SETTINGS

All settings required in the commissioning of the unit are made from this menu. The menu's password is 6143.

Settings:



The following procedure is followed when one adjusts air flows for a unit equipped with the EDA control system:

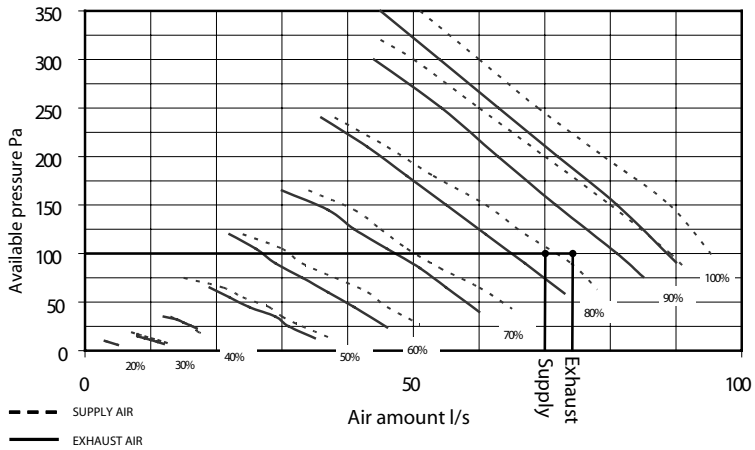
1) Check the air flow and duct pressure values specified by the ventilation engineer.

2) Pre-adjust the valves in accordance with the installation instructions.

3) The specific curves for each model of unit are included in this manual. Select the fan speeds according to the graphs or by using the Energy Optimizer software, available on our Web site, www.enervent.fi.
Example:

LTR-3 eco EC ventilation unit with F7 bag filter
supply-air flow 70 l/s, 100 Pa = 79% fan speed
extract-air flow 75 l/s, 100 Pa = 86% fan speed

LTR-3 eco EDA supply and exhaust air charactersistic curves with F7 filters



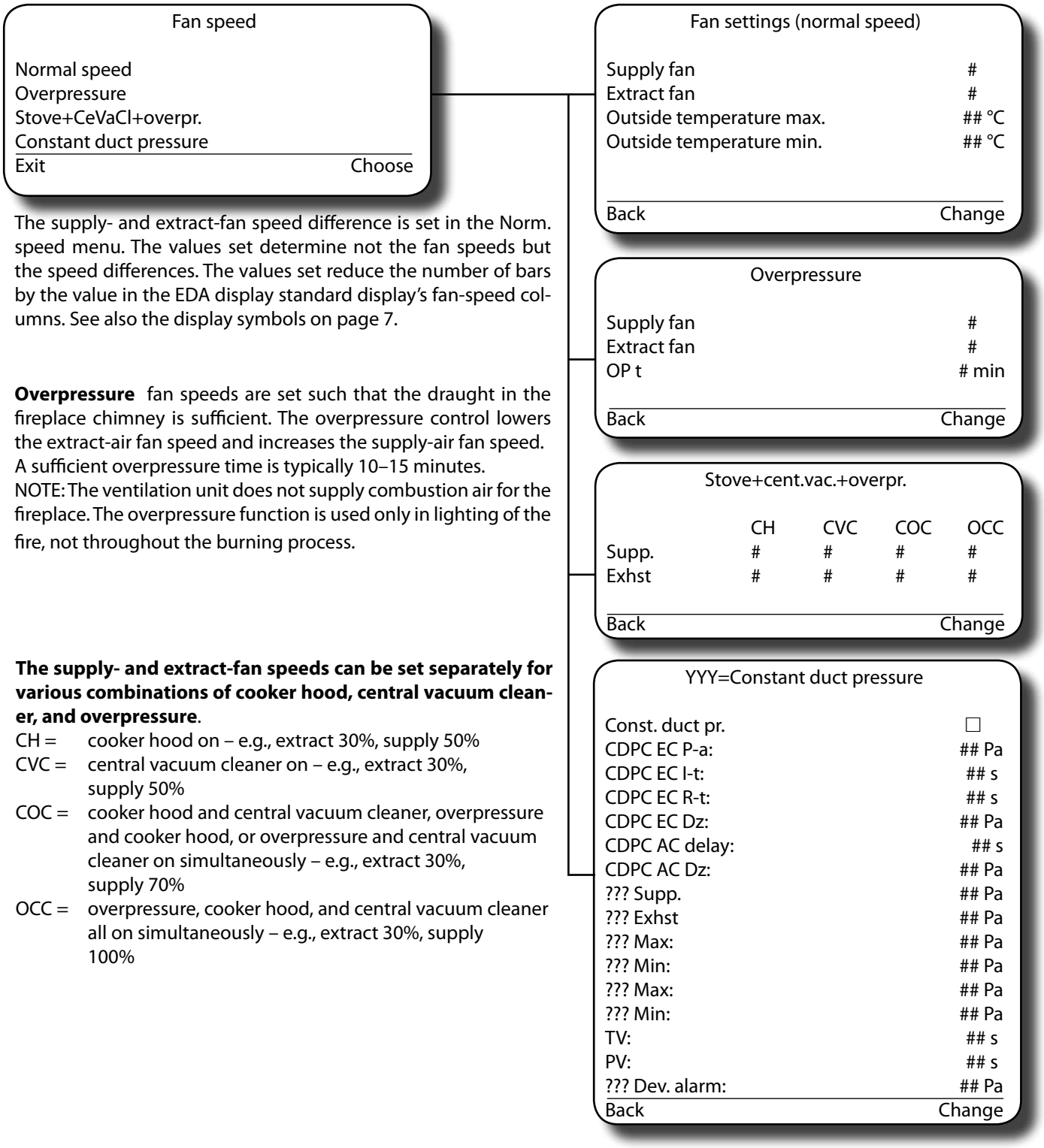
4) Select a lower fan speed from the ventilation unit control panel's standard display. In the above example, the fan speed to set is 79%.

5) Set the supply-air and extract-air difference as follows:
From the control panel, select the menu > Settings, then enter the code 6143 and choose Fan speed > Norm. speed. Enter the values obtained from the specific graph from the control panel; in the example, the values are supply fan 79% and extract fan 86%.

NOTE: This menu is not for setting the fan speeds but for setting the speed difference of the supply-air fan and the extract-air fan.

6) Measure the air flows, and change the air-flow settings if this is necessary.

7) Measure the building's underpressure by measuring the outside-air and inside-air pressure difference from, for example, the front door. The correct underpressure varies within the range 5–10 Pa.

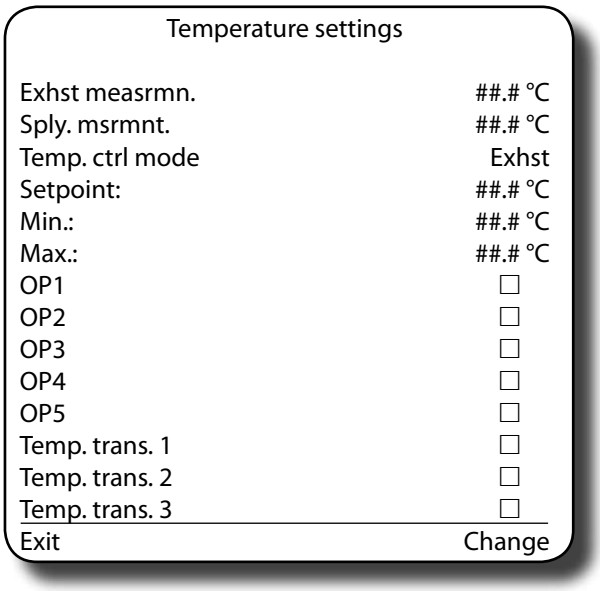


The supply- and extract-fan speed difference is set in the Norm. speed menu. The values set determine not the fan speeds but the speed differences. The values set reduce the number of bars by the value in the EDA display standard display's fan-speed columns. See also the display symbols on page 7.

Overpressure fan speeds are set such that the draught in the fireplace chimney is sufficient. The overpressure control lowers the extract-air fan speed and increases the supply-air fan speed. A sufficient overpressure time is typically 10–15 minutes.
NOTE: The ventilation unit does not supply combustion air for the fireplace. The overpressure function is used only in lighting of the fire, not throughout the burning process.

The supply- and extract-fan speeds can be set separately for various combinations of cooker hood, central vacuum cleaner, and overpressure.

CH = cooker hood on – e.g., extract 30%, supply 50%
CVC = central vacuum cleaner on – e.g., extract 30%, supply 50%
COC = cooker hood and central vacuum cleaner, overpressure and cooker hood, or overpressure and central vacuum cleaner on simultaneously – e.g., extract 30%, supply 70%
OCC = overpressure, cooker hood, and central vacuum cleaner all on simultaneously – e.g., extract 30%, supply 100%



Exhst meas.: The more accurate extract-air temperature measurement value. This displays the room temperature if room-temperature control is selected as the temperature (LT) control method (not dis played if the unit is supply-air-temperature-controlled).

Supp. meas.: The more accurate supply-air temperature measurement value.

Temp. ctrl mode: Constant-extract-air-temperature or constant-room-temperature control.

Setpoint: Extract-air temperature or room-temperature setting value to 1/10-degree precision. Quick setting at one-degree intervals via the control panel's '+' and '-' buttons.

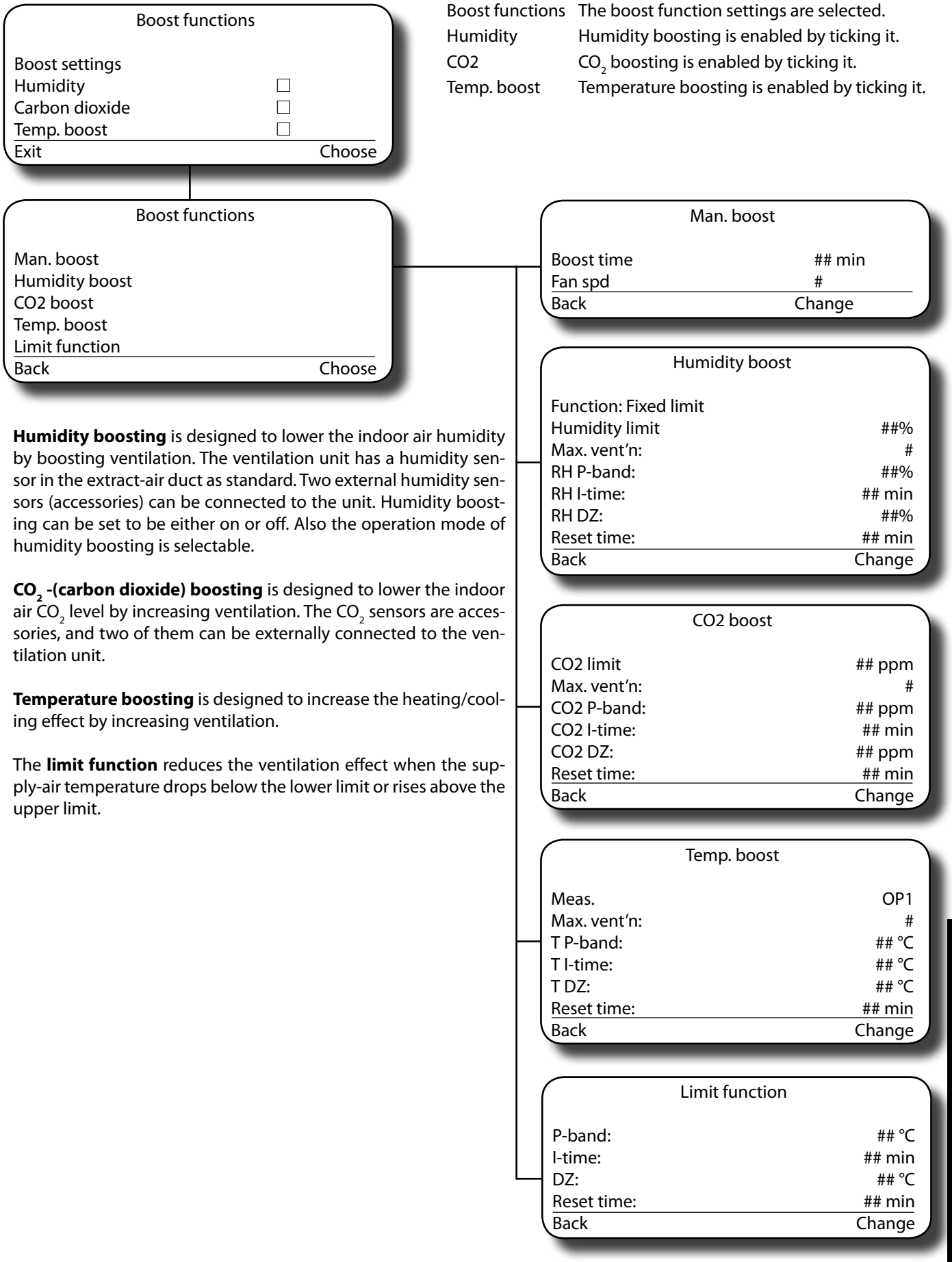
Min.: Minimum supply-air temperature.

Max.: Maximum supply-air temperature.

OP1–OP5: These settings indicate which control panels are to participate in the control of room temperature. If several control panels (accessory) are selected, their mean temperature value is used for control.

Temp. trans. 1–3: These settings indicate which temperature trans mitters (accessory) are to participate in the temperature control. If several are selected, their mean temperature value is used for control.

Boost functions	The boost function settings are selected.
Humidity	Humidity boosting is enabled by ticking it.
CO2	CO_2 boosting is enabled by ticking it.
Temp. boost	Temperature boosting is enabled by ticking it.



Humidity boosting is designed to lower the indoor air humidity by boosting ventilation. The ventilation unit has a humidity sensor in the extract-air duct as standard. Two external humidity sensors (accessories) can be connected to the unit. Humidity boosting can be set to be either on or off. Also the operation mode of humidity boosting is selectable.

CO_2 -(carbon dioxide) boosting is designed to lower the indoor air CO_2 level by increasing ventilation. The CO_2 sensors are accessories, and two of them can be externally connected to the ventilation unit.

Temperature boosting is designed to increase the heating/cooling effect by increasing ventilation.

The **limit function** reduces the ventilation effect when the supply-air temperature drops below the lower limit or rises above the upper limit.

Humidity boost:

Function:	Fixed limit or 48-hour average. A fixed limit works best during the heating season, when the outside air is dry or when it is dried. If the fixed limit is used during summertime, high outside-air humidity can increase the inside-air humidity and trigger the boost function. The 48-hour average value can be used also in the summer.
Humidity limit:	Boosting is started when this limit is exceeded.
Max. vent'n:	Maximum fan speed used during boosting.
RH P-band:	Humidity boosting gain range (P band). The gain range specifies how much the limit value can be exceeded for maximum boosting to occur. If the gain range is, for example, 10% RH, a value 10% over the limit initiates maximum boosting: three steps are performed if the fan speed is 40 % and the maximum power is 70 %.
RH I-time:	Humidity boosting integration time. The I value increases the boosting at the rate specified by the integration time (in minutes). Example: If the gain range is 10 % RH, the I value causes 100 % boosting in the integration time if the actual value is 10 % RH over the limit value.
RH DZ:	Range for deviation from the humidity limit value (so-called dead zone) in which boosting does not occur.
Reset time:	The controller has an anti-windup function, which changes the integration factor in the correct direction when the controller becomes saturated. The operation can be changed via modification of the resetting time ('Reset time' value). The effect of the anti-windup block is reduced when the value is increased. NOTE: The resetting time must be equal to or greater than the integration time. In other cases, the I value starts to grow when the controller reaches its maximum value.

Carbon dioxide boosting:

CO_2 limit:	Boosting is started when this limit is exceeded.
Max. vent'n:	Maximum fan speed used during boosting.
CO_2 P-band:	CO_2 amplification gain range (P band). The gain range specifies by how much the CO_2 level can exceed the limit value before maximum boosting occurs. If, for example, the gain range is 300 ppm, maximum boost starts at 300 ppm over the limit value: three steps are performed if the fan speed is 40 % and the maximum power is 70 %.
CO_2 I-time:	The CO_2 boosting integration time. The I value increases the boosting at the rate specified by the integration time (in minutes). Example: If the gain range is 300 ppm, the I value causes 100 % boosting in the integration time if the actual value is 300 ppm over the limit value.
CO_2 DZ:	Range of deviation from the CO_2 limit value (so-called dead zone) within which boosting does not occur.
Reset time:	The controller has an anti-windup function, which changes the integration factor to the correct direction when the controller becomes saturated.The operation can be changed through modification of the resetting time ('Reset time' value). The effect of the anti-windup block is reduced when the value is increased. NOTE: The resetting time must be equal to or greater than the integration time. In other cases, the I value starts to grow when the controller reaches its maximum value.

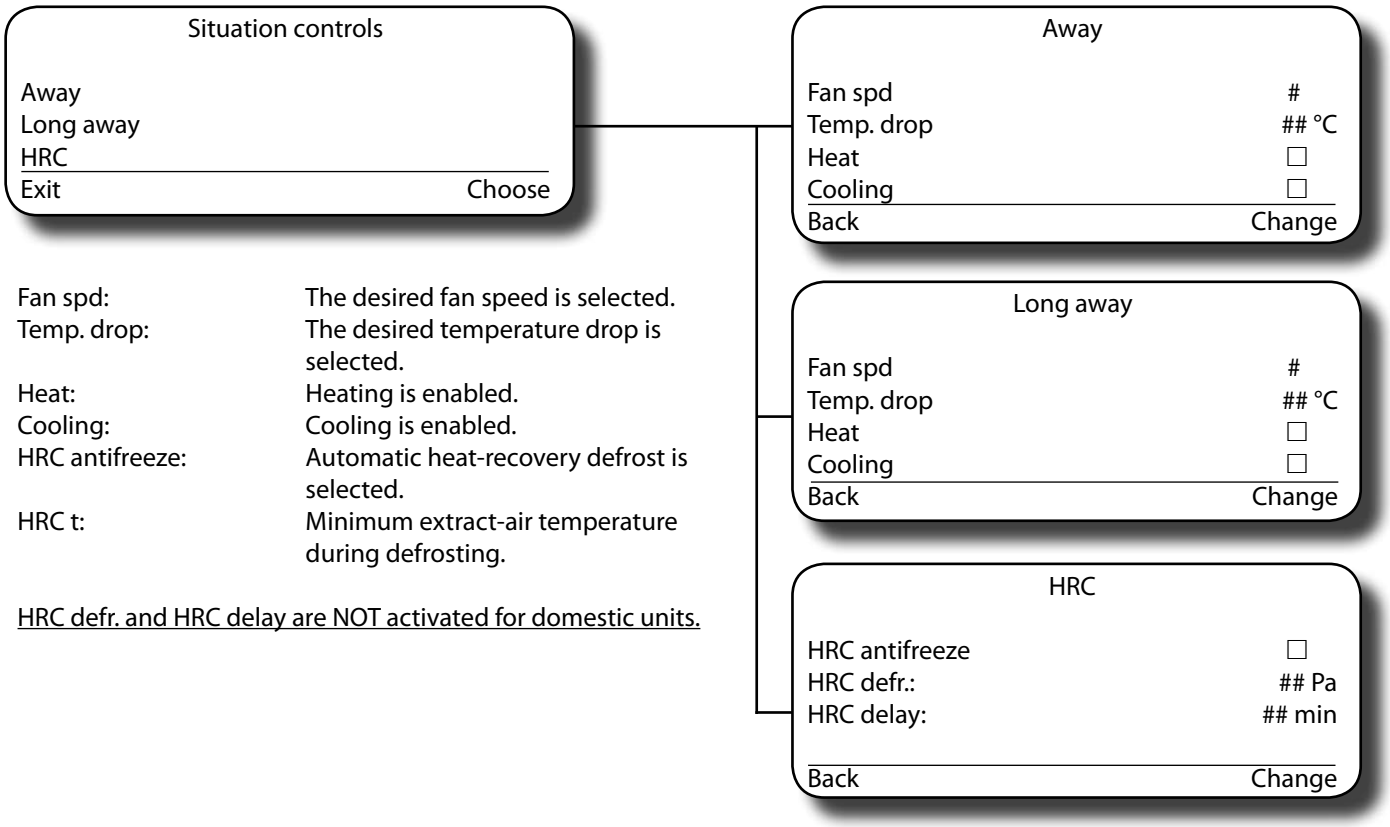
Temp. boost:

Meas.:	The temperature transmitter used for temperature boosting is selected: extract-air temperature sensor, room transmitter, or sensors OP 1–5.
Max. vent'n:	Maximum fan speed used during boosting.
T P-band:	Temperature boosting gain range. The gain range specifies how far the limit value can be exceeded for maximum boosting to occur. If, for example, the gain range is 3.0 °C, maximum boost is triggered at 3.0°C over the limit value: three steps are performed if the fan speed is 40 % and the maximum power is 70 %. The same boosting occurs when the temperature is 3.0 °C below the limit value.
T I-time:	Temperature boosting integration time. The I value increases the boosting at the rate specified by the integration time (in minutes). Example: If the gain range is 3.0 °C, the I value causes 100 % boosting in the integration time if the actual value is 3.0 °C over or under the limit value.
T DZ:	The range of deviation from the temperature limit value (so-called dead zone) in which boosting does not occur.
Reset time:	The controller has an anti-windup function, which changes the integration factor in the correct direction when the controller becomes saturated. The operation can be changed through modification of the resetting time ('Reset time' value). The effect of the anti-windup block is reduced when the value is increased. NOTE: The resetting time must be equal to or greater than the integration time. In other cases, the I value starts to grow when the controller reaches its maximum value.

Limit function:

P-band: The amplification is entered as a gain range specifying how much the actual temperature can differ from the limit value before full ventilation power drop.
I-time: Limit function integration time.
DZ: Range of deviation from the temperature limit value (so-called dead zone) within which limiting does not occur.
Reset time: The controller has an anti-windup function, which changes the integration factor in the correct direction when the controller becomes saturated. The operation can be changed through modification of the re-setting time. The effect of the anti-windup block is reduced when the value is increased. NOTE: The reset-ting time must be equal to or greater than the integration time. In other cases, the I value starts to grow when the controller reaches its maximum value.

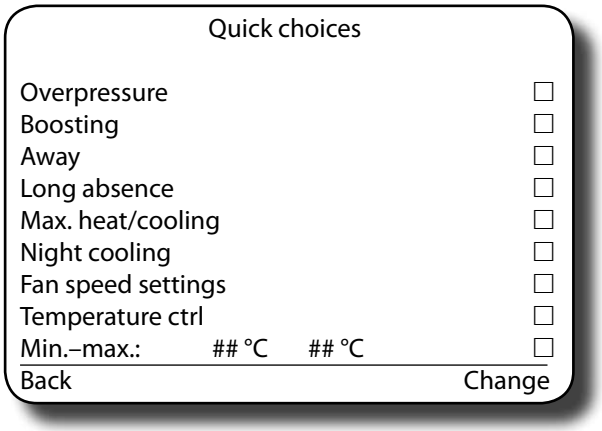
SITUATION CONTROLS



Fan spd: The desired fan speed is selected.
Temp. drop: The desired temperature drop is selected.
Heat: Heating is enabled.
Cooling: Cooling is enabled.
HRC antifreeze: Automatic heat-recovery defrost is selected.
HRC t: Minimum extract-air temperature during defrosting.

HRC defr. and HRC delay are NOT activated for domestic units.

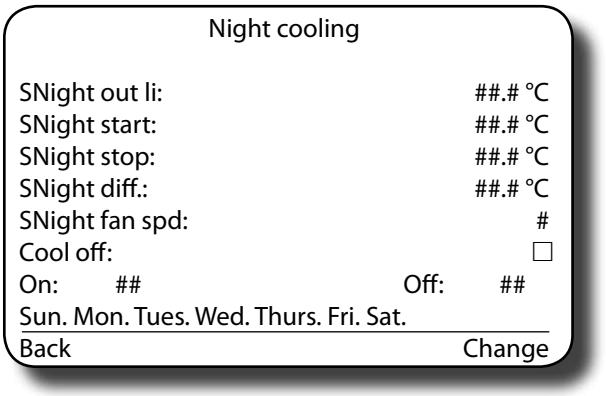
QUICK CHOICES



The desired quick-choice function for the control panel's left multi-choice button is selected from the list. The functions 'Away' and 'Long absence' are not displayed in the 'Quick choices' when they are configured as DI inputs (default). The fan speed and temperature control settings have an effect on the control panel's '+' and '-' buttons. Min.–max.: The control panel temperature control setpoint maximum and minimum values can be limited with this function.

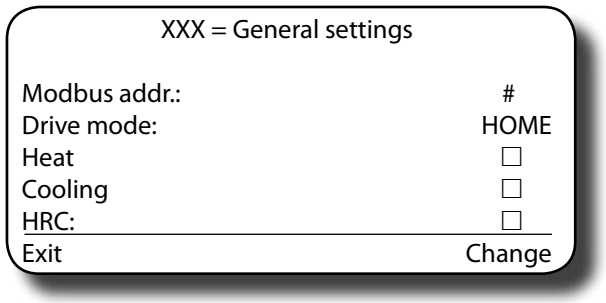
NIGHT COOLING

NOTE: Night cooling must be selected in the 'Quick choices' for it to be activated. In the PRO greenair HP, summer night cooling is available only when the heat pump is not running.



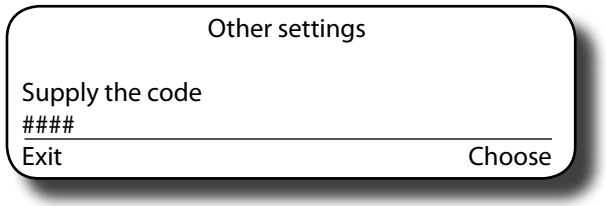
SNight out li:	Outside-air temperature limit above which summer night cooling is allowed.
SNight start:	Summer night cooling starts when the extract-air temperature or the room temperature is greater than the 'SNight start' value.
SNight stop:	Summer night cooling ends when the extract-air temperature or the room temperature falls below the 'SNight stop' value. SNight stop must always be 1 °C lower than SNight start.
SNight diff.:	Summer night cooling starts when the difference between the extract-air or room-air temperature and the outside temperature is greater than the 'SNight diff.' value.
SNight fan spd:	The fans run at this speed when summer night cooling is on.
Cool off:	Other modes of cooling are prevented during summer night cooling.
On:	Summer night cooling is allowed to start at this time.
Off:	Summer night cooling ends at this time.
Su Mo Tu We Th Fr Sa	The days of the week on which summer night cooling is available.

XXX GENERAL SETTINGS



Modbus addr.:	Motherboard Modbus address. Selectable between 1 and 10.
Drive mode:	Either HOME or OFFICE
Heat:	Heating is enabled or disabled. X = enabled.
Cooling:	Cooling is enabled or disabled. X = enabled.
HRC:	Heat recovery is enabled or disabled. X = enabled.

OTHER SETTINGS



This menu is not intended for the end user, and its functions are not required when the unit is commissioned. The parameters are pre-set at the factory. When required, please contact the unit's manufacturer.

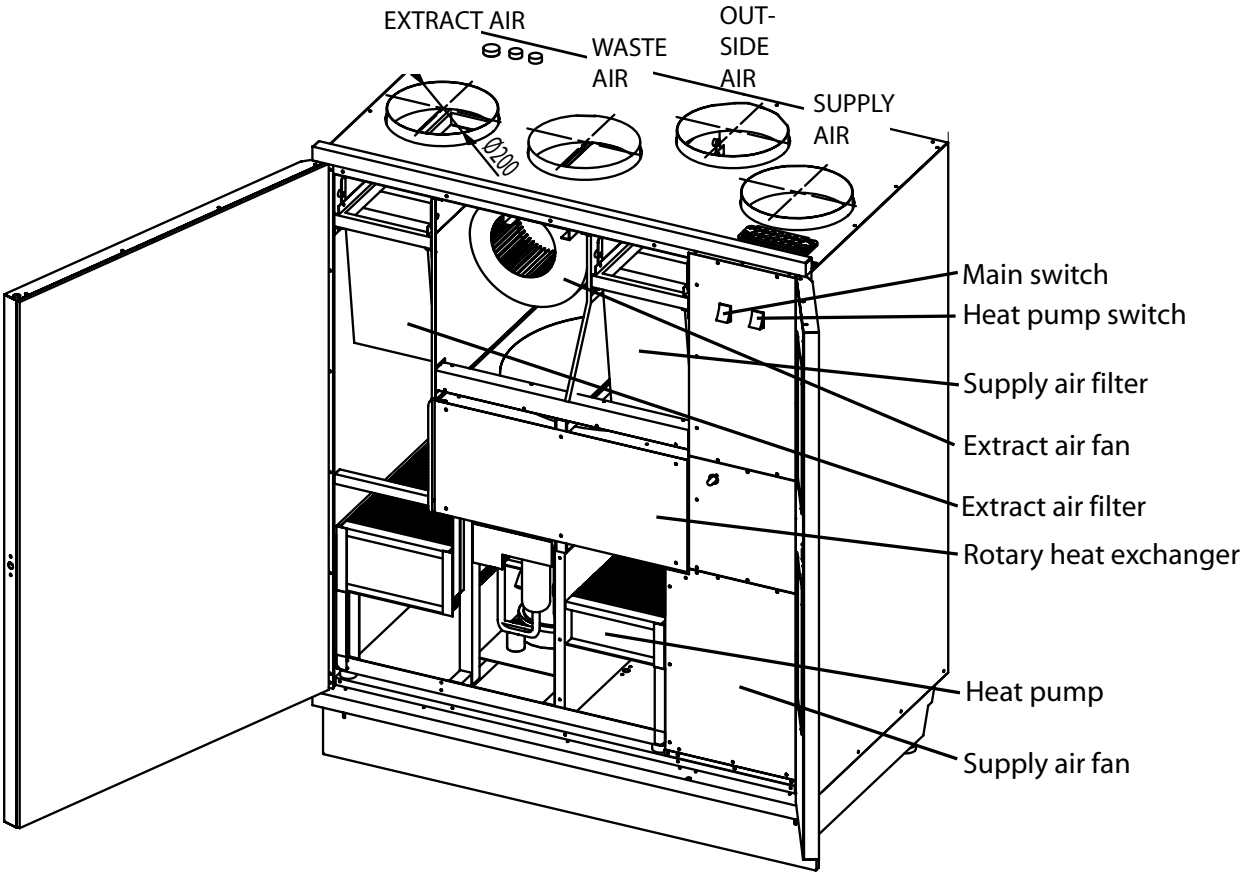
The ventilation unit does not require any regular maintenance, but the heat exchanger and the fans must be cleaned and the filters changed regularly. Disconnect the unit from the power supply before servicing it. Wait about two minutes before starting the servicing work, to allow the fans to stop and the compressor to cool down.

Cleaning the heat exchanger
Check the cleanness of the heat exchanger visually when changing the filters. If the heat exchanger is dirty, it is removed from the unit and washed under a shower with neutral detergent or pressurised air. The use of a pressure washer is strictly forbidden. The heat exchanger must not be submerged in water! There is an electric motor inside the exchanger body. It must not get wet. When the unit is started after cleaning, the rotation of the heat exchanger must be verified. Disconnect the heat pump when checking the heat exchanger. If the unit is operated with the heat pump on and the service door open, the heat-pump pressure switch will trip. You can switch the heat pump on once the service door has been closed.

Cleaning the fans
Check the cleanness of the fans visually when changing the filters. The fans are removed from the unit and cleaned with, for example, a toothbrush or pressurised air.

Changing the filters
The recommended change interval for bag filters is six months. The bag filters are changed by releasing the filter-locking levers, pulling the old filter out of the unit, and installing the new filter. Remember to engage the filter-locking levers. It is recommended to hoover the inside of the unit when changing the filters. NOTE: Make sure to close the service door properly!

Cleaning the supply- and extract-air radiators
Check the cleanness of the heat-pump unit's supply- and extract-air radiators visually when changing the filters. The unit stays clean when the filters are changed regularly. If the heat-pump unit's radiators are dirty, the heat-pump unit must be removed from the ventilation unit for cleaning. The rotating heat exchanger must be removed before removal of the heat-pump unit. Remember to disconnect the two heat-pump unit quick-connectors before removing the unit. The radiators are cleaned with pressurised air. Be careful not to damage the sheets of the radiators. After cleaning, the heat-pump unit is pushed back into the ventilation unit and the quick-connectors are connected.



Alarm

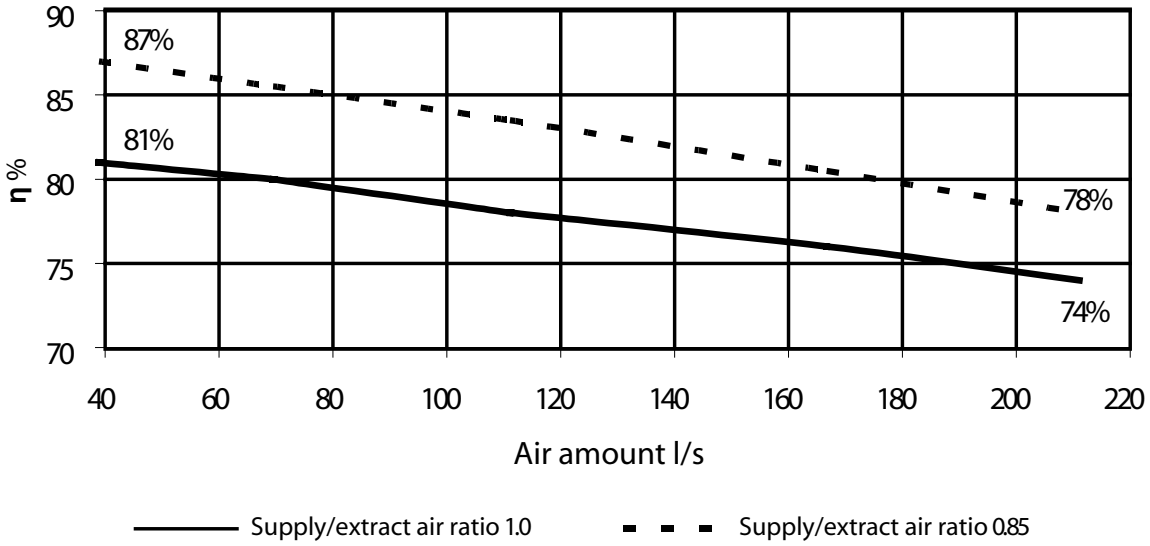
Alarm name	Alarm name	Explanatory alarm text, row 1	Explanatory alarm text, row 2	Alarm name	Delay	NOTE:
TE10 lower limit	B	Supply air cold		10 °C	10 min	Unit in failsafe mode: supply air off, extract air at minimum flow.
TE10 upper limit	A	Risk of fire	Supply air hot	55 °C	2 s	The alarm is cleared only after reset.
TE20 upper limit	A	Risk of fire	Room air hot	55 °C	2 s	The same setting is used for all room transmitters.
TE30 lower limit	B	Extract air cold		15 °C	10 min	Unit in failsafe mode: supply air off, extract air at minimum flow.
TE30 upper limit	A	Risk of fire	Extract air hot	55 °C	2 s	The alarm is cleared only after reset.
Emergency stop	A	External emergency stop	Emergency stop		0 s	If the external emergency stop digital input is active. The alarm is cleared only after reset.
Risk of fire	A	External	Risk of fire		0 s	If the external digital input for fire risk is active. The alarm is cleared only after reset.
Service reminder	B	Service reminder			6 months	Service reminder
Supply-air filter	B	Filter alarm	Supply-air filter		10 min	Accessory
Extract-air filter	B	Filter alarm	Extract-air filter		10 min	Accessory

* DI = Digital Input

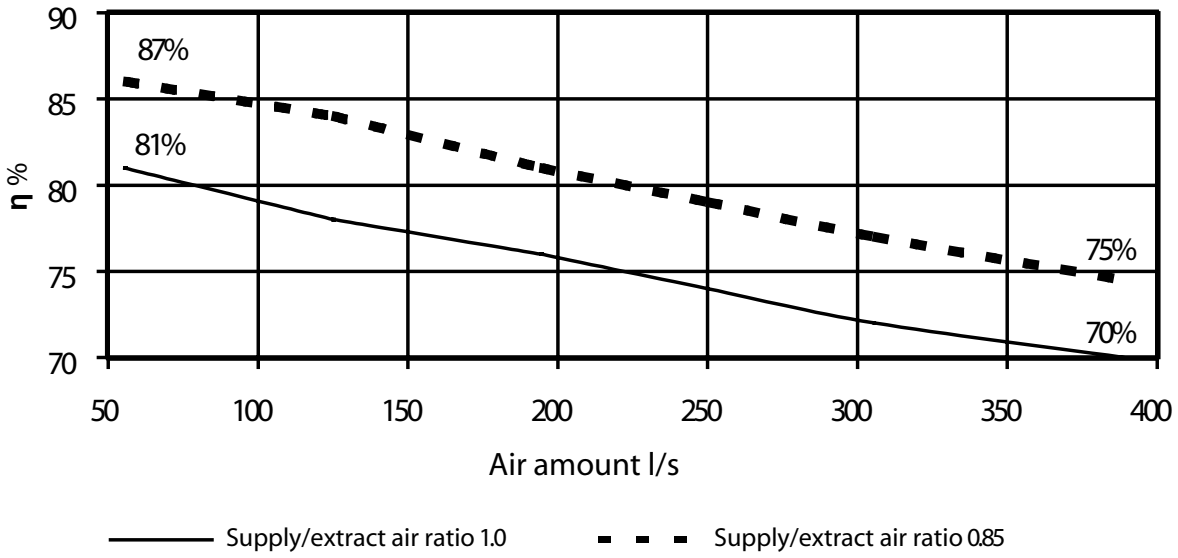
TECHNICAL SPECIFICATIONS

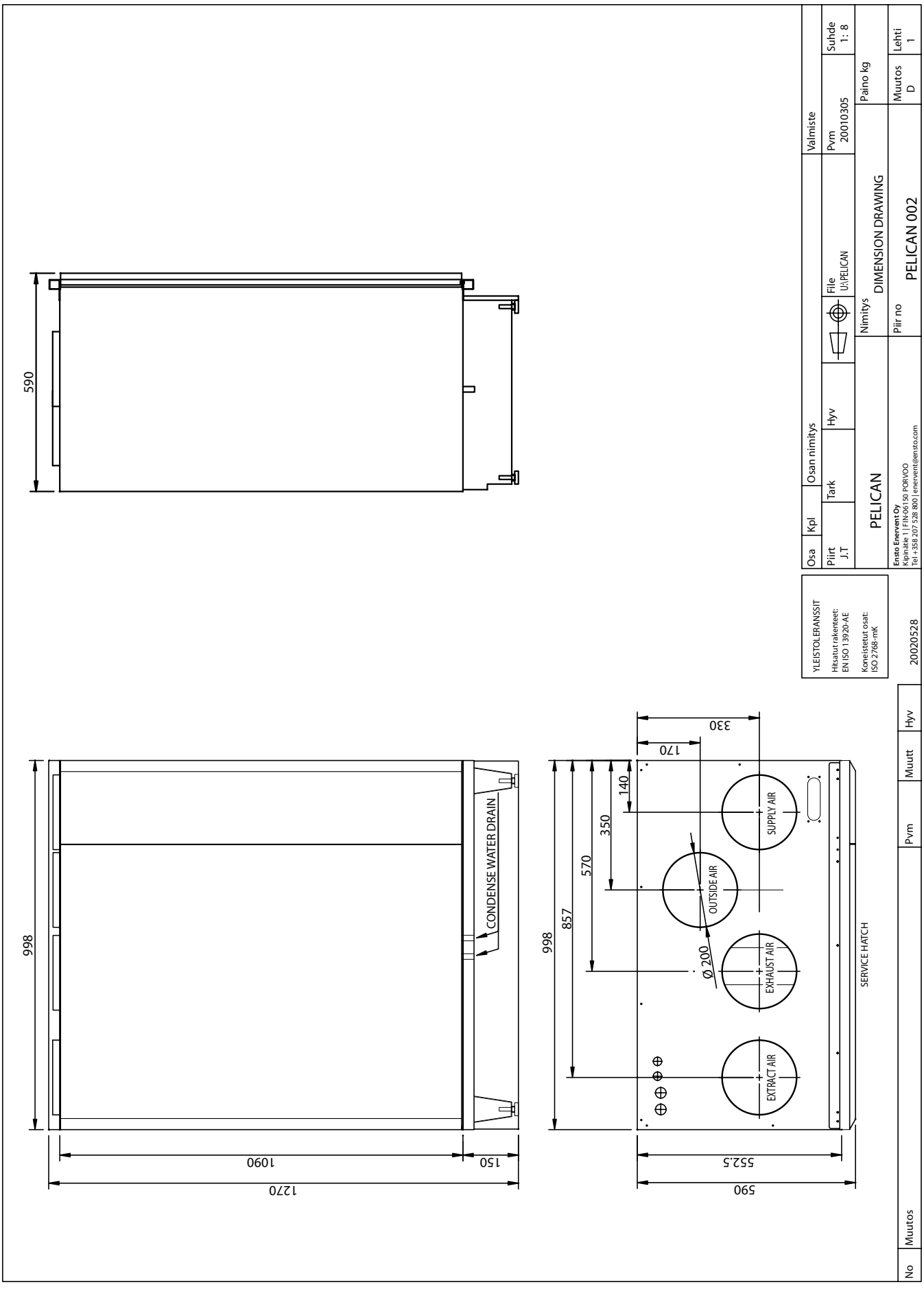
UNIT:	Pelican eco PRO greenair HP	Pegasos eco PRO greenair HP
Width Depth Height	998 mm 590 mm 1,270 mm	1,250 mm 677 mm 1,400 mm
Mass	150 kg	250 kg
Duct size	Ø 200 mm	Ø 250 m
DC fans' supply/extract	170 W, 1.22 A	565 W, 3.5 A
Voltage Fuse Control board: 5 x 20 mm glass tube fuse	230 V~, 50 Hz 16 A slow F1: T250 mA F2: T3.15 A F3: T160 mA	400 V 3~, 50 Hz 3 x 16 A slow F1: T250 mA F2: T8 A F3: T160 mA
Over-voltage protection	Built in	Built in
Heat exchanger motor	5 W, 0.04 A	5 W, 0.04 A
Communication bus	RS-485	RS-485
Standard protocol	Modbus RTU	Modbus RTU
Refrigerant	R410A, 1.5 kg	R410A, 1.5 kg
Compressor nominal power	1.1 kW	2.6 kW

ENERVENT PELICAN
HEAT RECOVERY TEMPERATURE EFFICIENCY



ENERVENT PEGASOS XL
HEAT RECOVERY TEMPERATURE EFFICIENCY

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998
CONDENSE WATER DRAIN
1270
1090
150
330
170
140
350
570
857
998
SUPPLY AIR
OUTSIDE AIR
EXHAUST AIR
EXTRACT AIR
Ø 200
SERVICE HATCH
590
552.5
YLEISTOLERANSSIT
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Koneistetut osat:
ISO 2768-mK
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Kiphaikantie 1 | FIN-06150 PORVOO
Tel +358 207 528 800 | enervent@ensto.com
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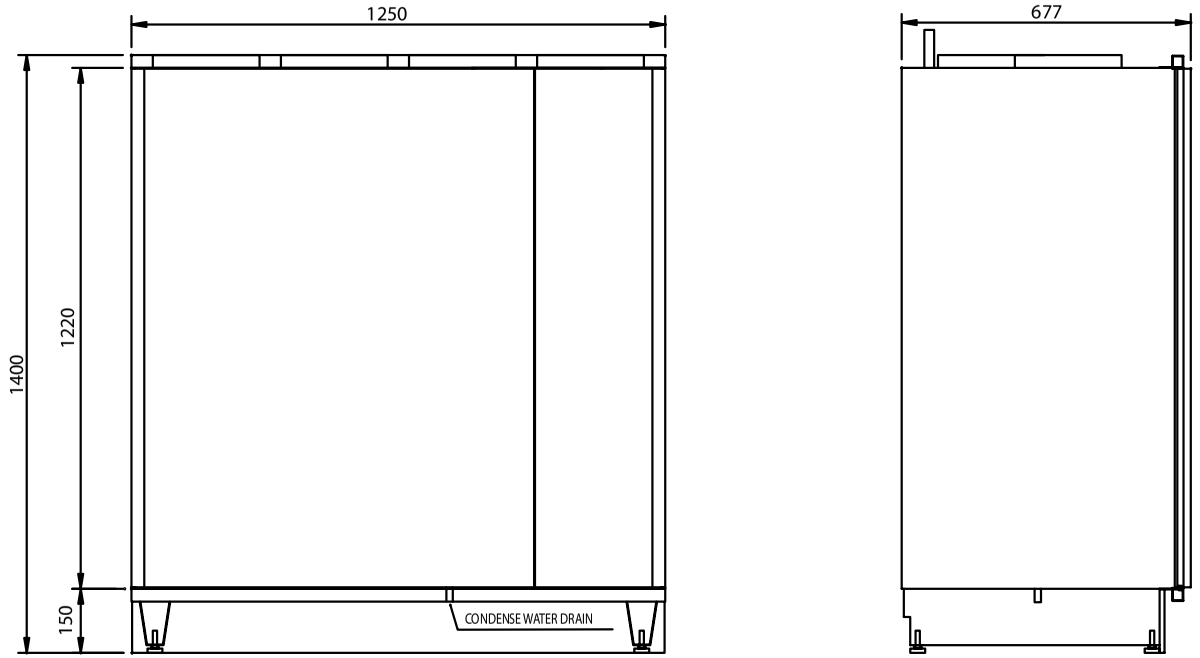

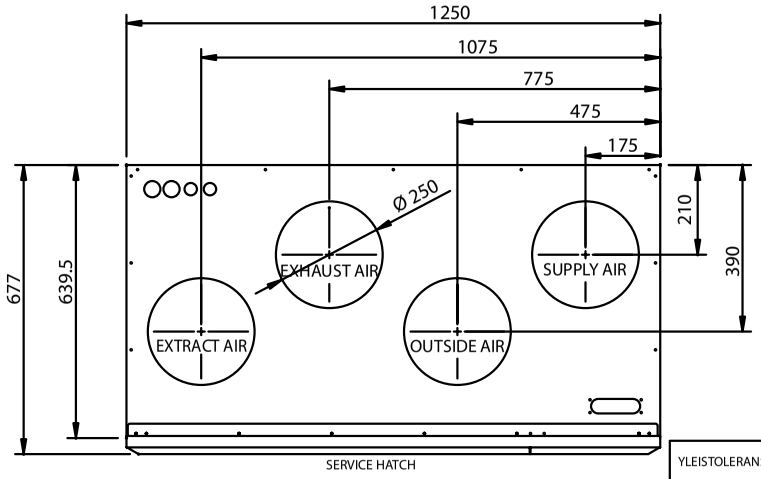

Nr	Rev	Dat	Rit	Godk
		20050111		

YLEISTOLERANSSIT

Hitsatut rakenteet:
EN ISO 13920-AE

Koneistetut osat:
ISO 2768-mK

Del	Antal	Beskrivning	Tillverkning

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	Ritning	Vikt kg
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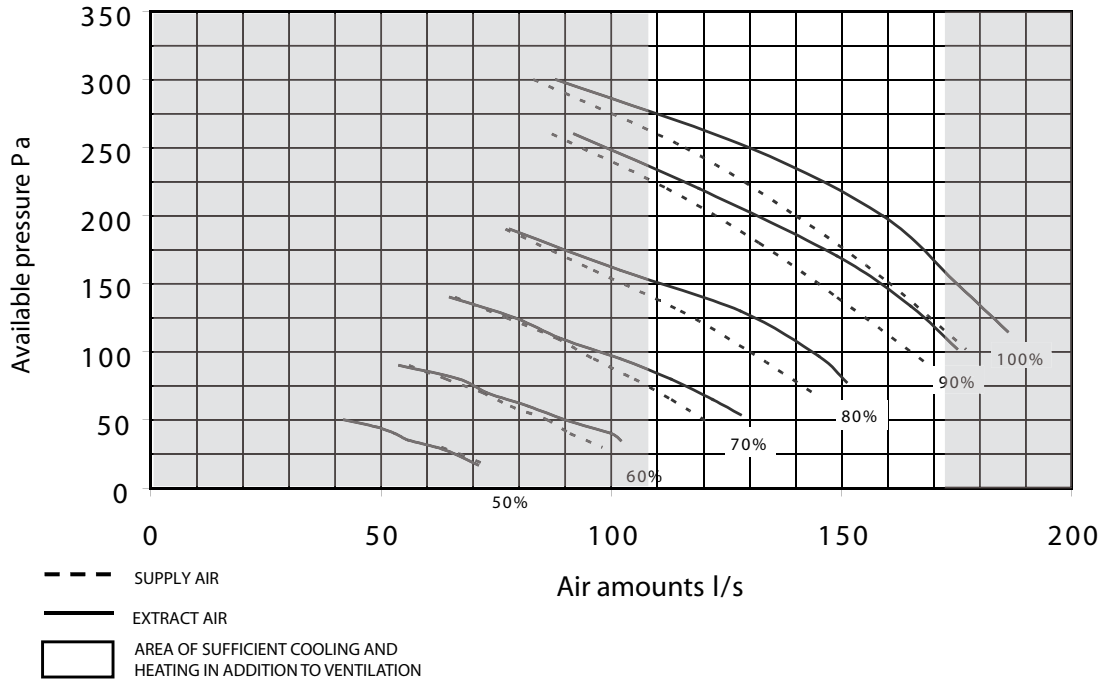
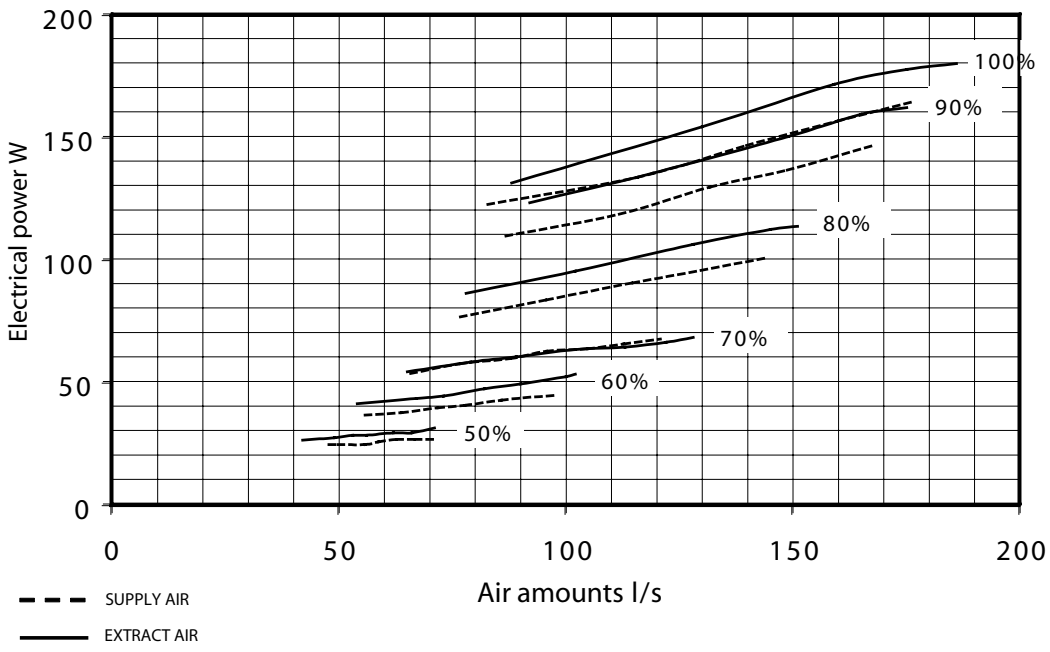
Ensto Enervent Oy
Kipinätie 1 | FIN-06150 PORVOO
Tel +358 207 528 800 | enervent@ensto.com

Ritning nr	Version	Blad
PEGASOS-001	A	1

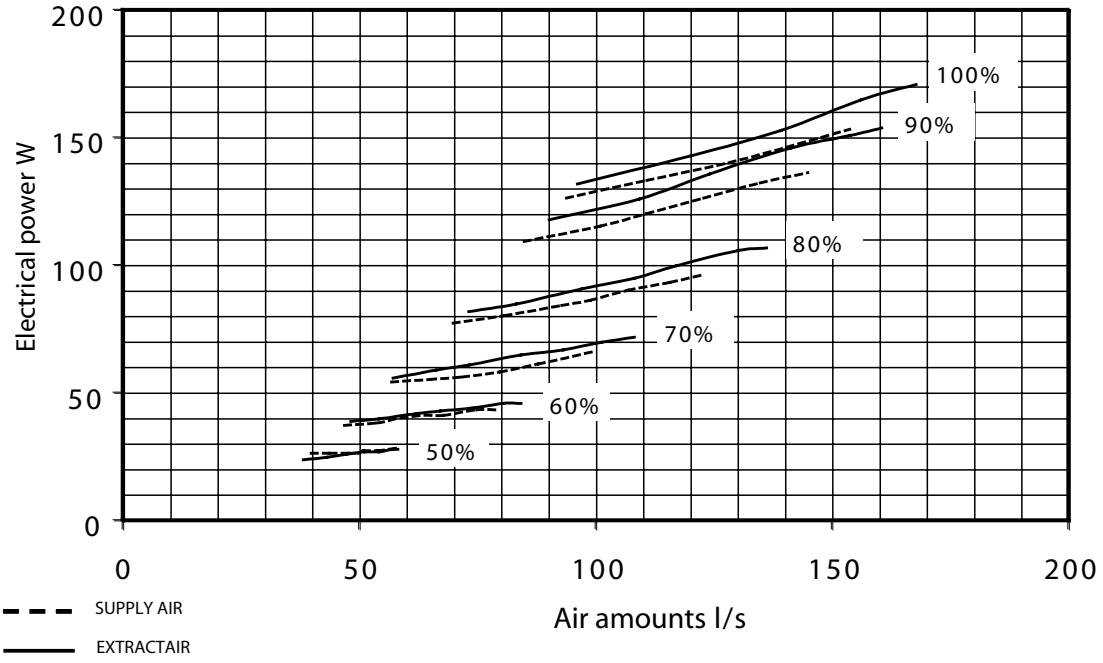
Pelican eco PRO greenair HP™ supply and extract air characteric curves with F5 filters



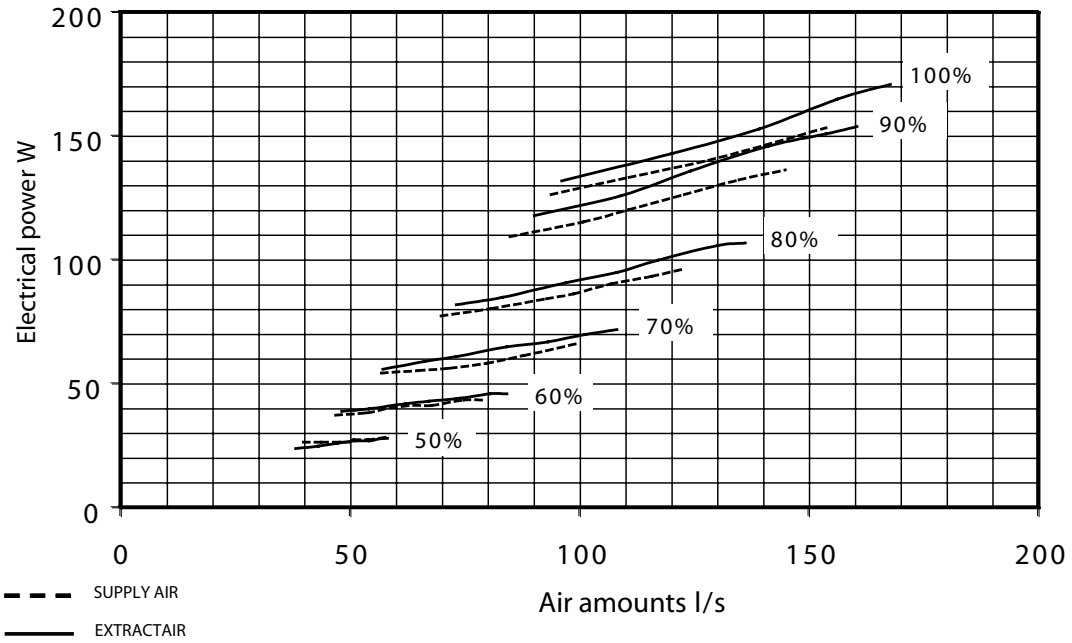
Pelican eco PRO greenair HP™ supply and extract air fans electrical power with F5 filters



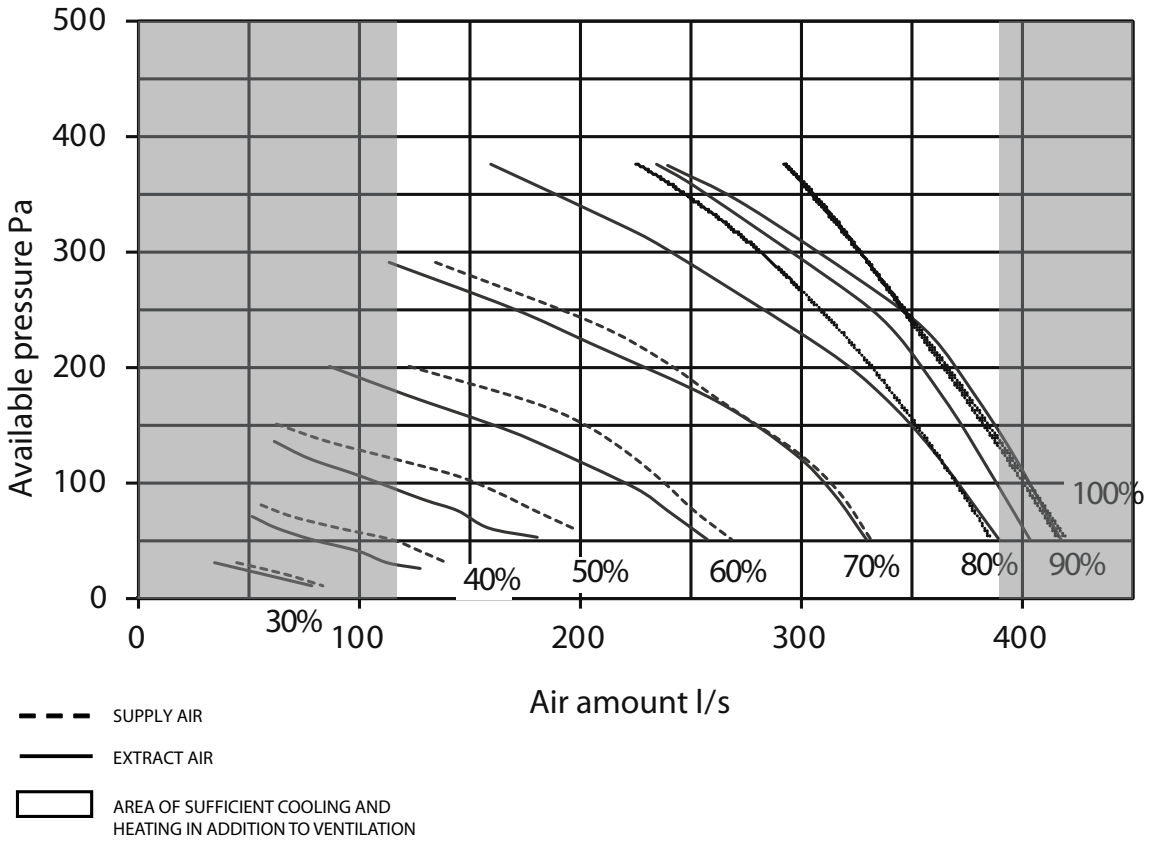
Pelican eco PRO greenair HP™ supply and extract air fans' electrical power with F7 filters



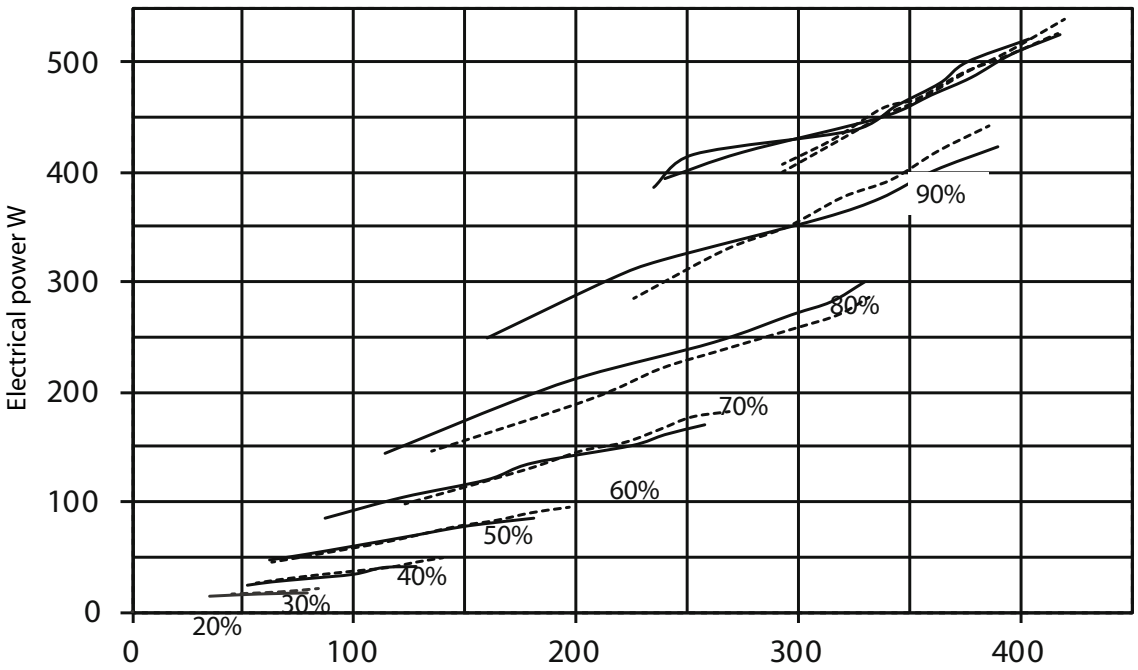
Pelican eco PRO greenair HP™ supply and extract air fans' electrical power with F7 filters



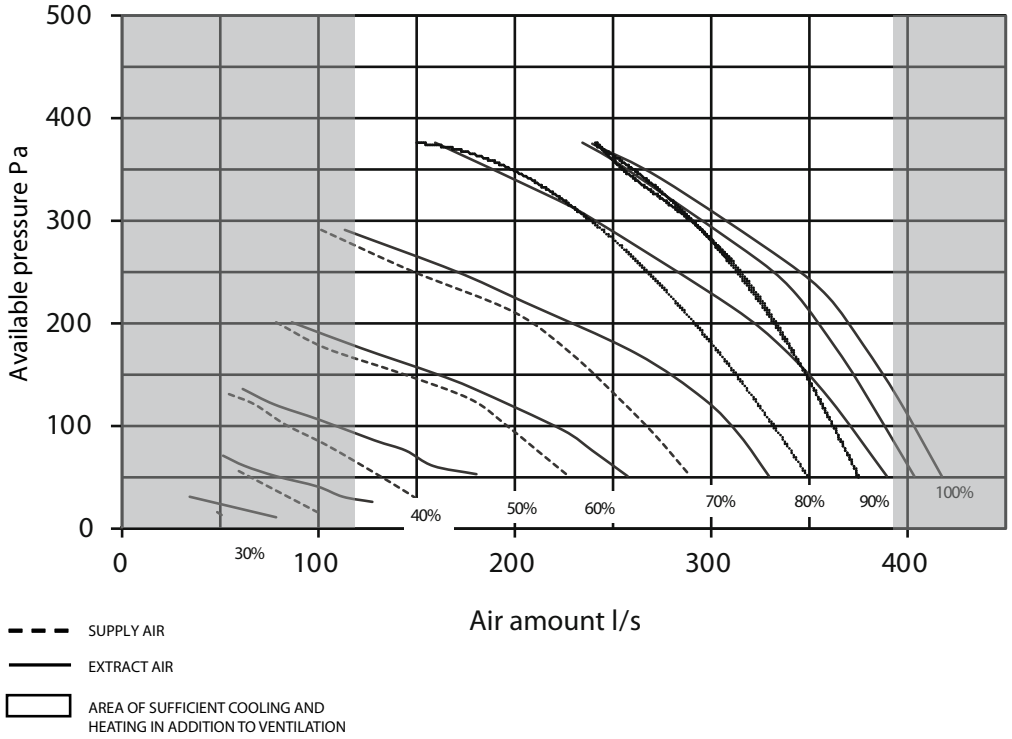
Pegasos eco PRO greenair HP™ supply and extract air characteric curves with F5 filters



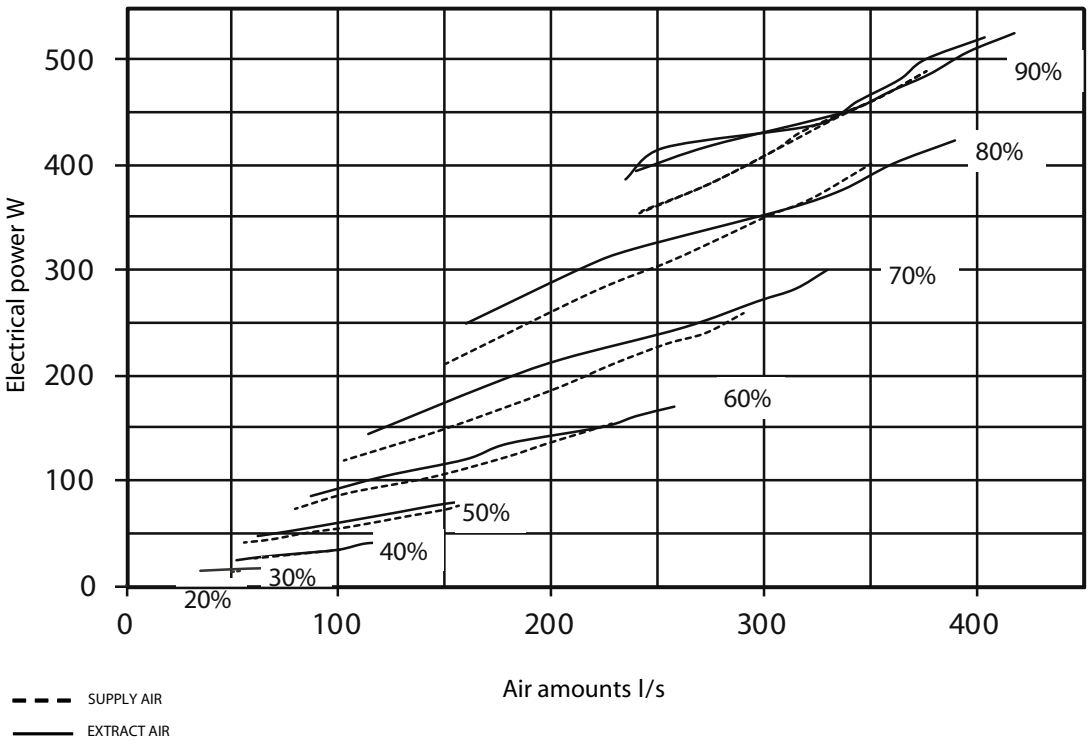
Pegasos eco PRO greenair HP™ supply and extract air fans electrical power with F5 filters

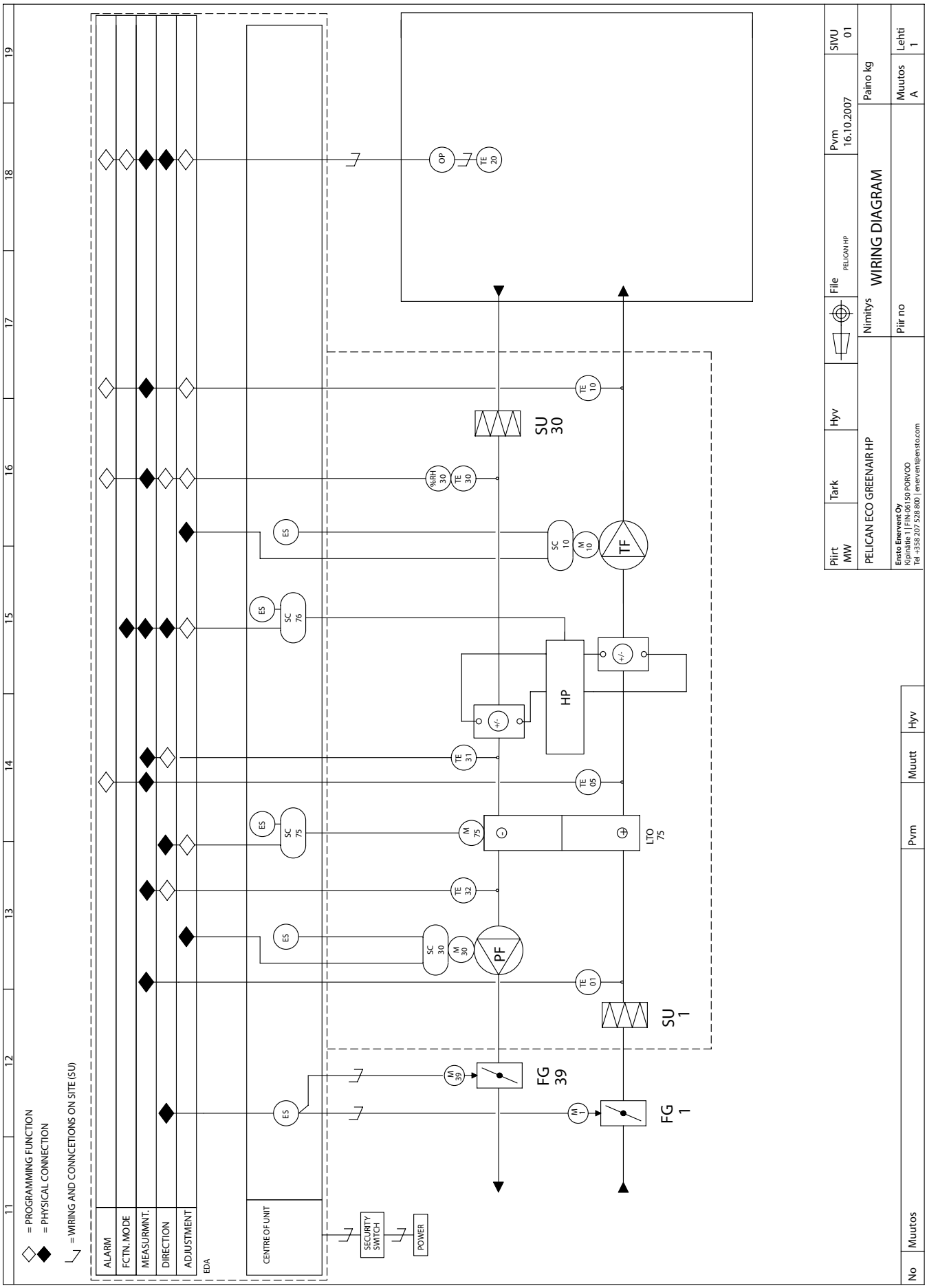


Pegasos eco PRO greenair HP™ supply and extract air characteric curves with F7/F5 filters



Pegasos eco PRO greenair HP™ supply and extract air fans electrical power with F7/F5 filters




= PROGRAMMING FUNCTION
= PHYSICAL CONNECTION
= WIRING AND CONNCETIONS ON SITE (SU)
ALARM
FCTN.MODE
MEASURMNT.
DIRECTION
ADJUSTMENT
EDA
CENTRE OF UNIT
SECURITY SWITCH
POWER
OP
TE 20
SU 30
TE 10
%RH 30
TE 30
ES
SC 10
M 10
TF
SC 76
HP
TE 31
TE 05
SC 75
M 75
LTO 75
TE 32
SC 30
M 30
PF
TE 01
SU 1
FG 39
M 39
FG 1
M 1
Piirt MW
Tark
Hyv
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Pvm 16.10.2007
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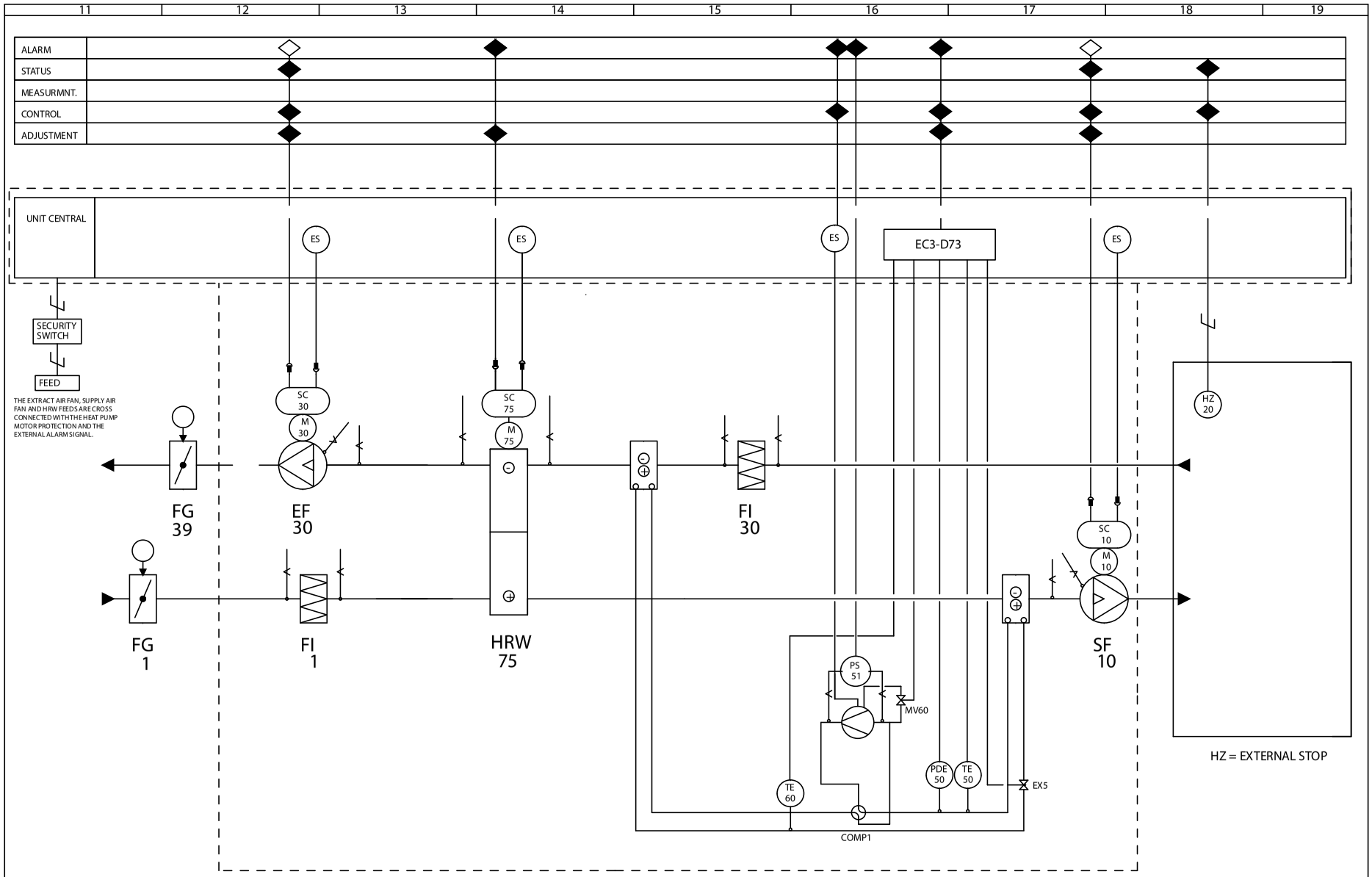
PELICAN ECO GREENAIR HP
Nimitys WIRING DIAGRAM
Paino kg
Piir no
Muutos A
Lehti 1
Ensto Enervent Oy
Kipinätie 1 | FIN-06150 PORVOO
Tel +358 207 528 800 | enervent@ensto.com
No Muutos
Pvm
Muutt
Hyv



No	Muutos	Pvm	Muutt	Hyv

Piirt JP	Tark	Hyv		File	Pvm 04.09.2012	SIVU 01
PEGASOS HP SCROLL				Nimitys CONTROL CHART		Paino kg
Ensto Enervent Oy Kipinätie 1 | FIN-06150 PORVOO Tel +358 207 528 800 | enervent@ensto.com				Piir no Pegasos HP		Muutos A / Lehti 1

11	12	13	14	15	16	17	18	19

PF= EXHAUST AIR FAN

TF= SUPPLY AIR FAN

SU1= SUPPLY AIR FILTER

SU30= EXHAUST AIR FILTER

LTO75= HRC

HP= HEAT PUMP UNIT

FG1= OUTSIDE AIR'S SHEET METAL

FG39= WASTE AIR'S SHEET METAL

SC75= HRC CONTROL CARD

SC76= HP CONTROL CARD

SC10= TF CONTROL CARD

SC30= PF CONTROL CARD

OP= CONTROL PANEL

TE01= OUTSIDE AIR DETECTOR

TE05= AFTER HRC SUPPLY AIR DETECTOR

TE10= SUPPLY AIR DETETCTOR

TE20= ROOM DETECTOR

TE30 & %RH30= EXHAUST- AND HUMIDITY DETECTOR

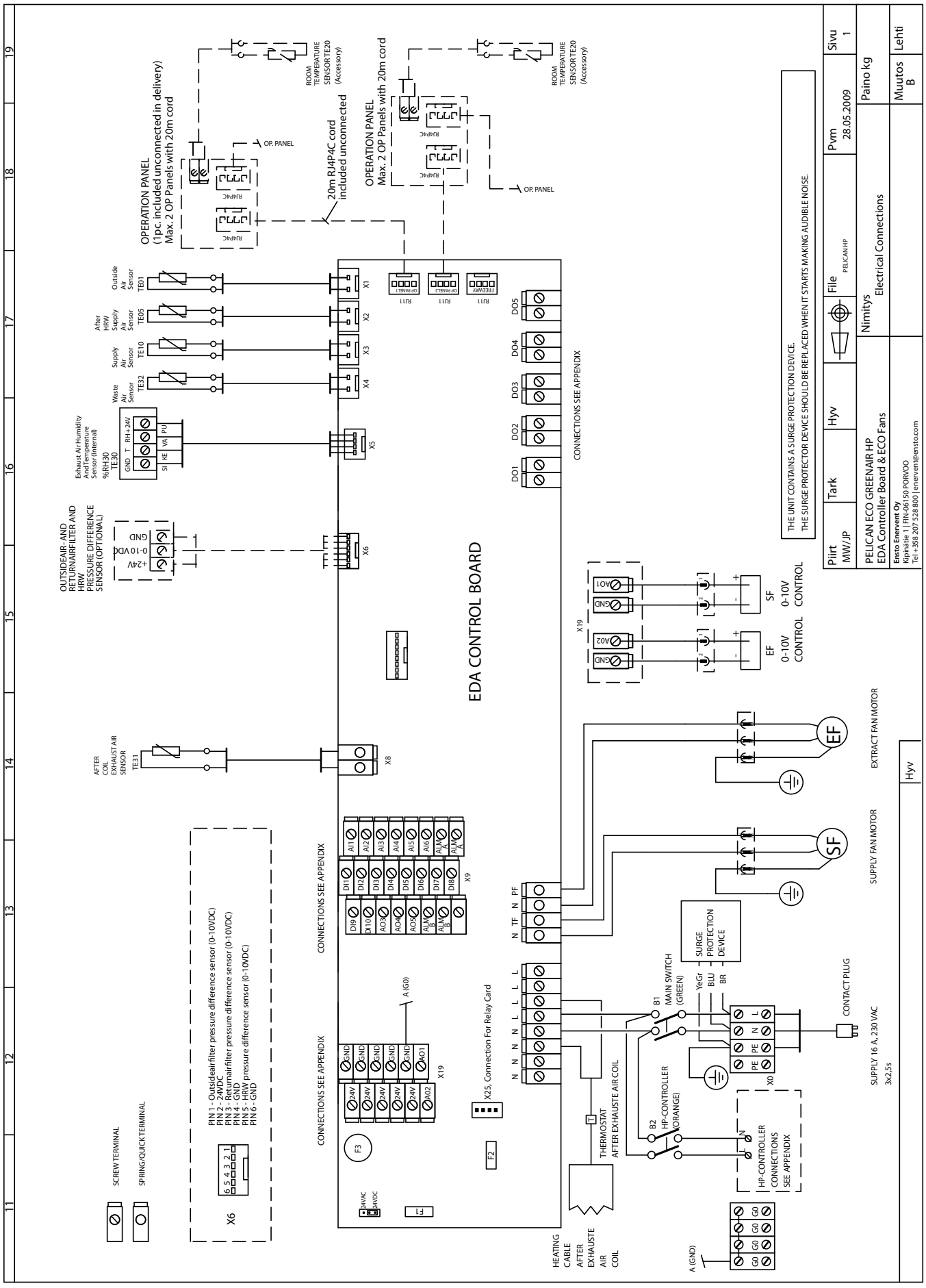
TE31= AFTER EXHAUST AIR COIL'S DETECTOR

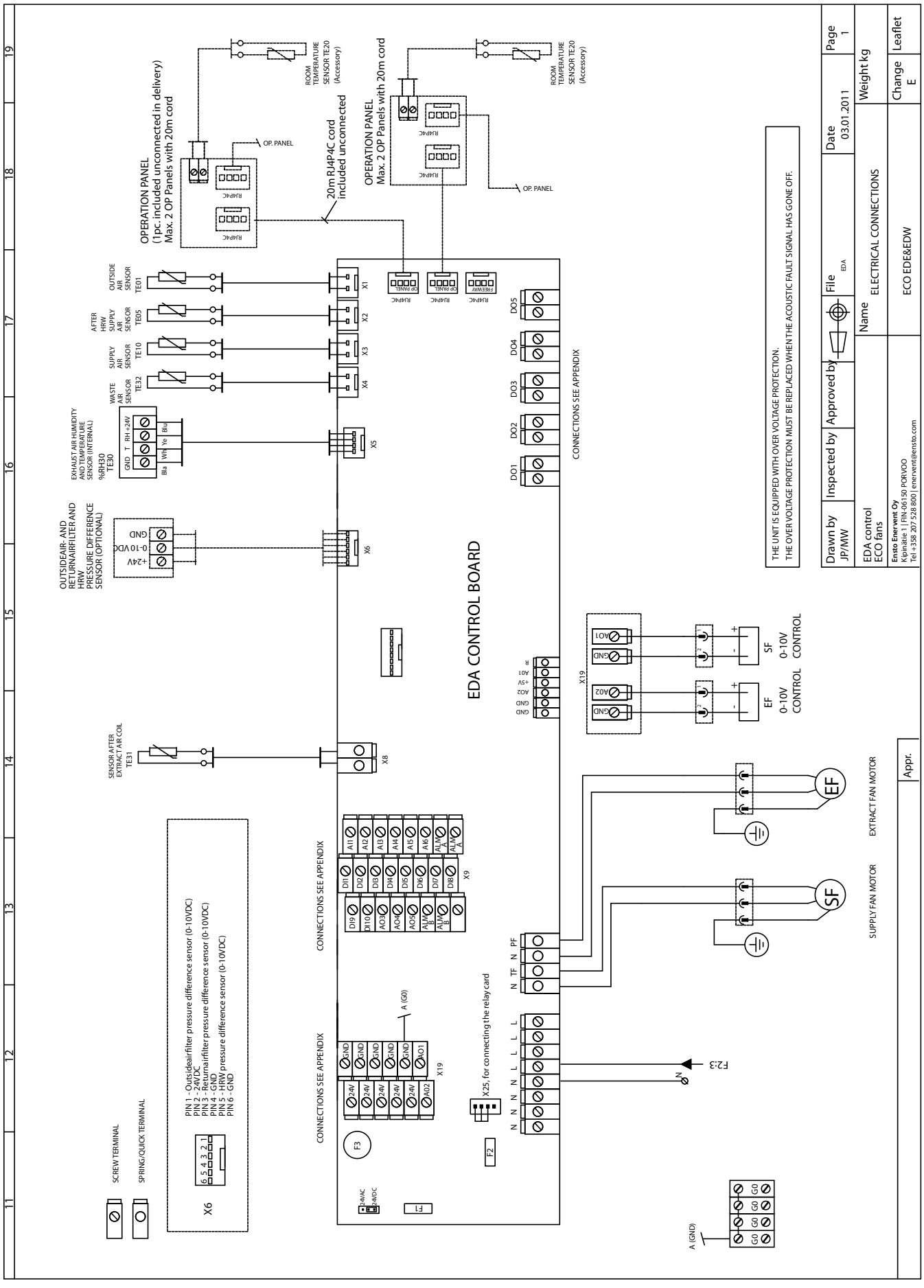
TE32= WASTE AIR DETECTOR

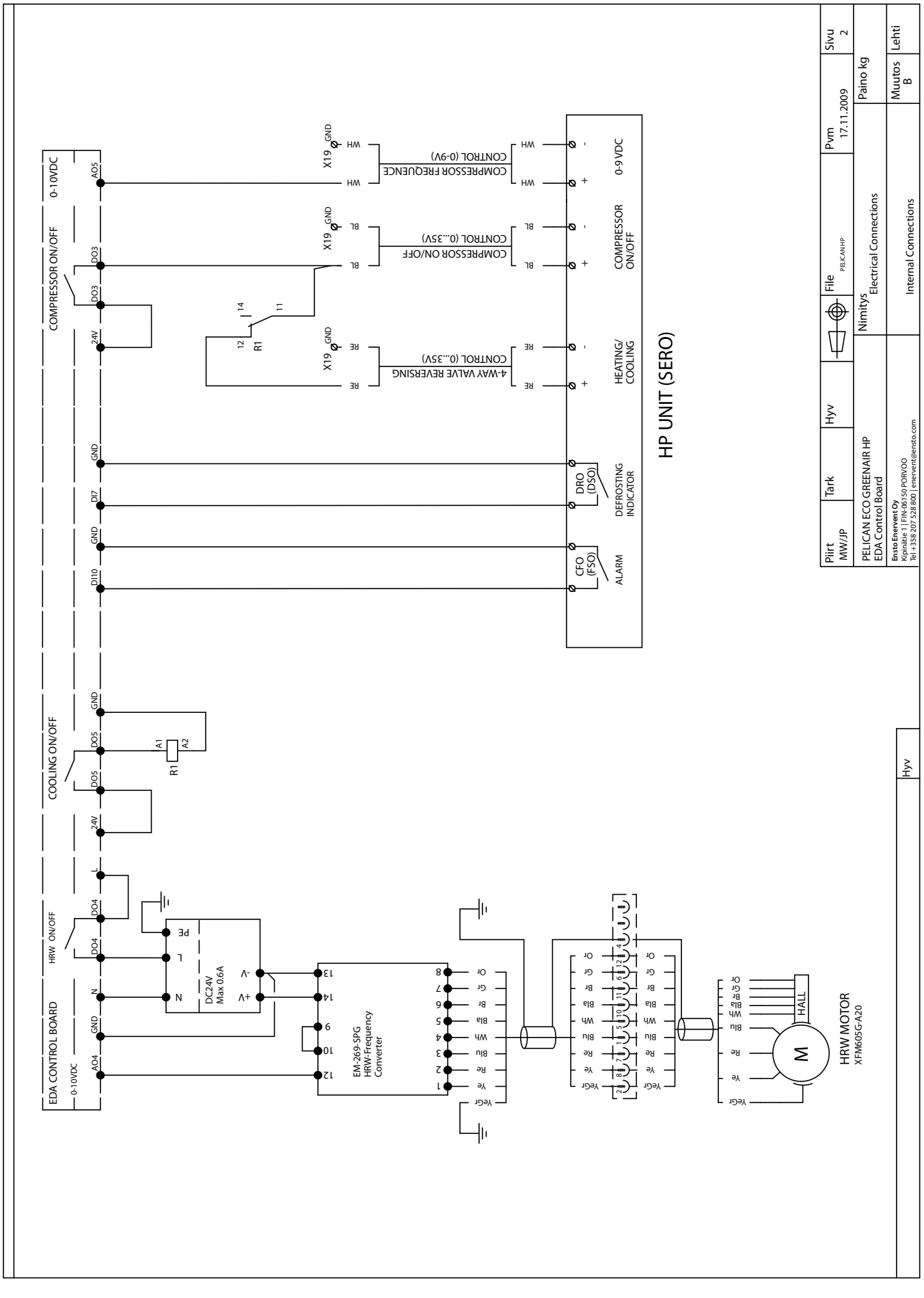
No	Muutos	Pvm	Muutt	Hyv

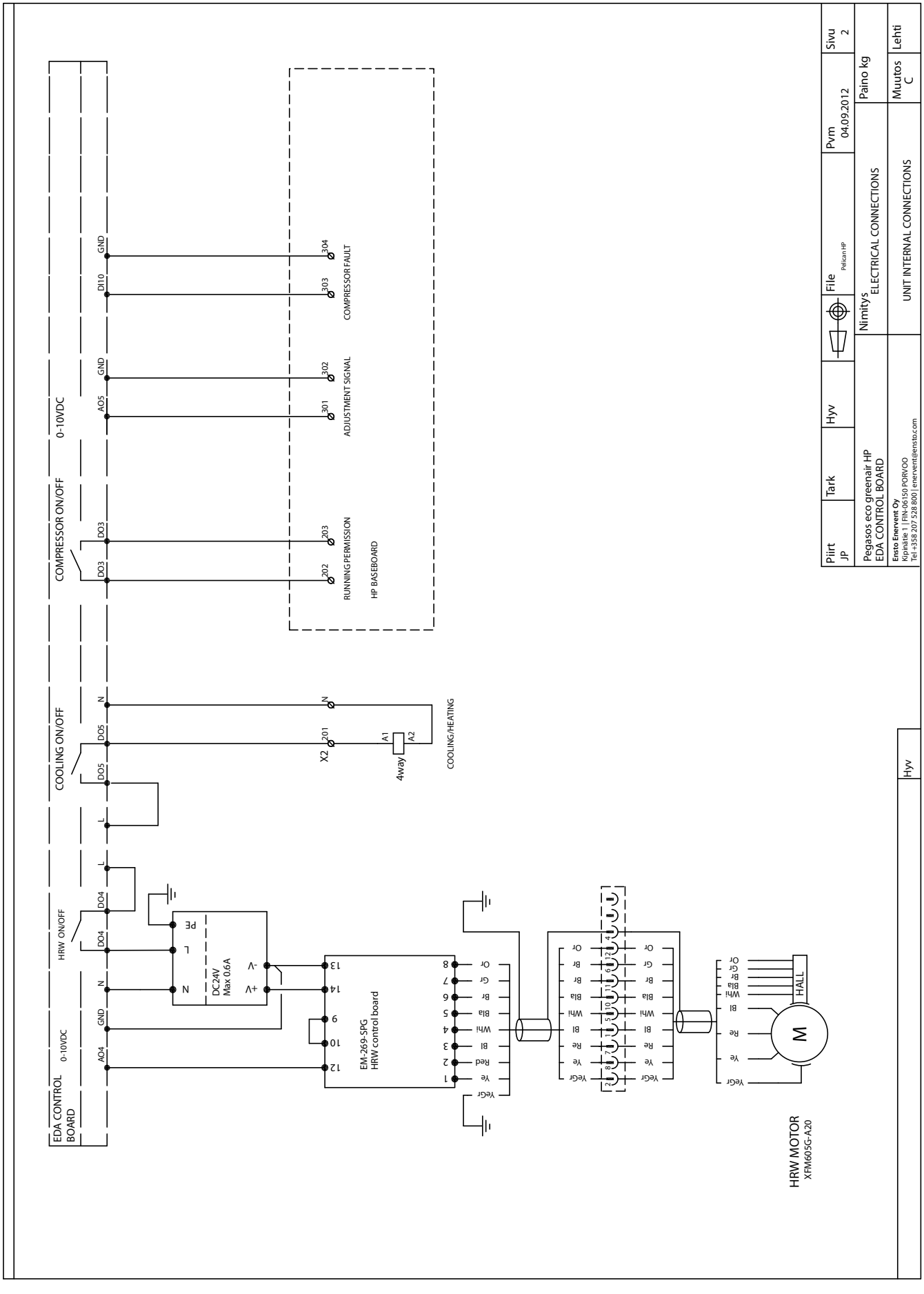
Piirt	Tark	Hyv		File	Pvm	SIVU
MW					16.10.2007	02
ECO GREENAIR HP			Nimitys	ABBREVIATIONS		Paino kg
Ensto Enervent Oy Kipinätie 1 | FIN-06150 PORVOO Tel +358 207 528 800 | enervent@ensto.com			Piir no			Muutos A / Lehti 1

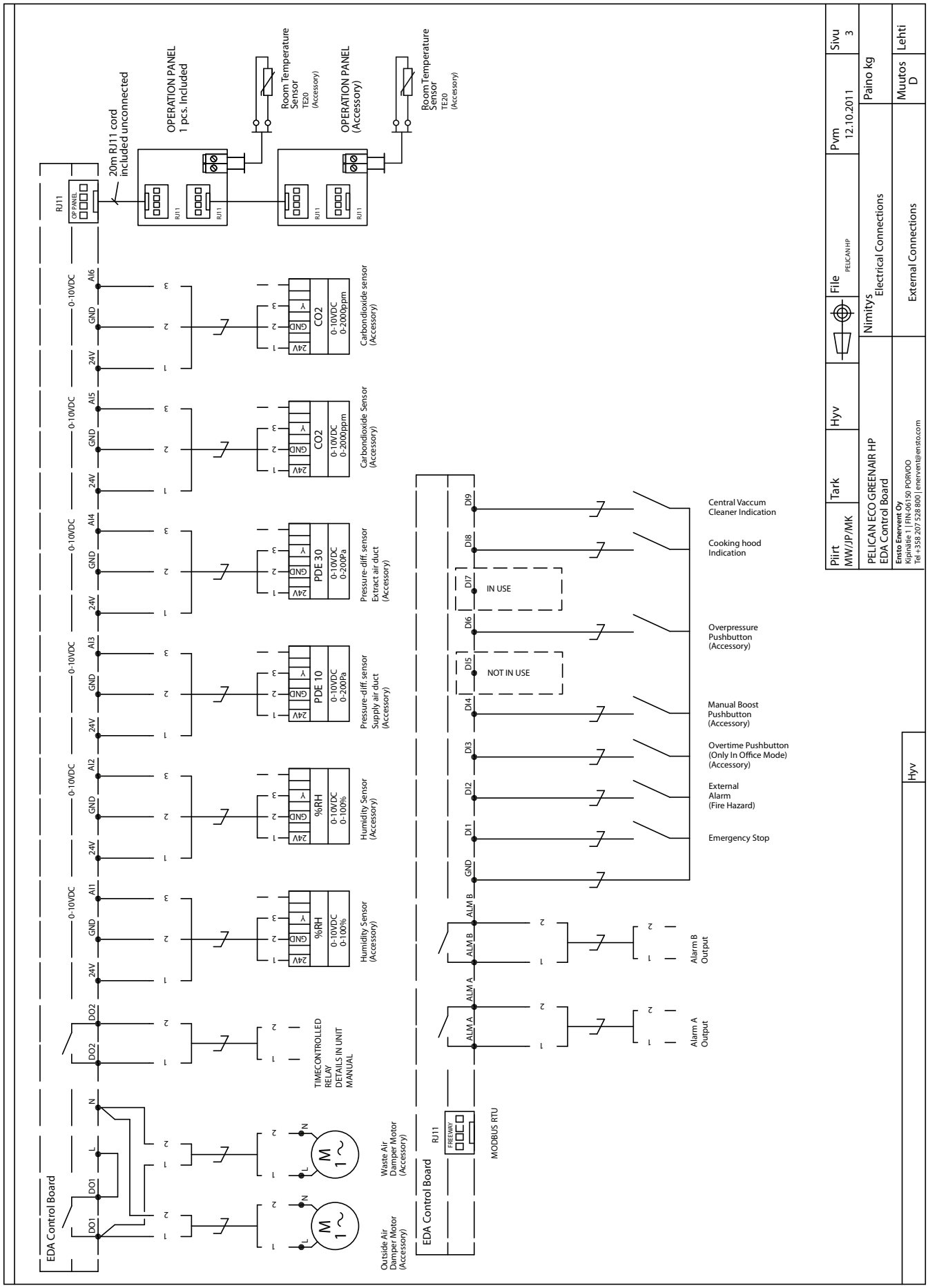
SCHEMATICS for PELICAN eco PRO greenair HP

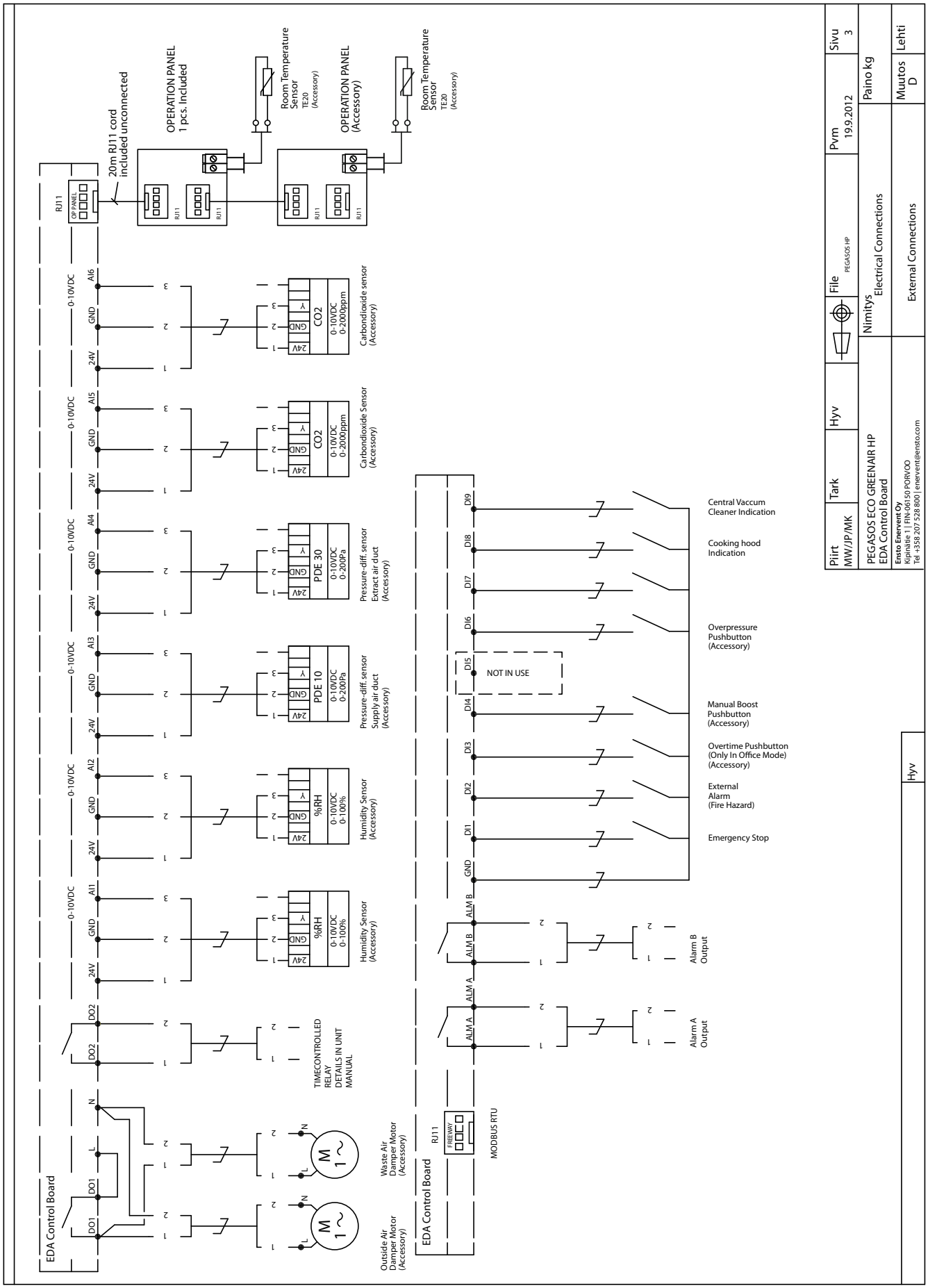



OPERATION PANEL
(1pc. included unconnected in delivery)
Max. 2 OP Panels with 20m cord
OP. PANEL
ROOM TEMPERATURE SENSOR TE20 (Accessory)
20m RJ4P4C cord included unconnected
OPERATION PANEL
Max. 2 OP Panels with 20m cord
OP. PANEL
ROOM TEMPERATURE SENSOR TE20 (Accessory)
OUTSIDE AIR SENSOR TE01
AFTER HRW SUPPLY AIR SENSOR TE05
SUPPLY AIR SENSOR TE10
WASTE AIR SENSOR TE32
EXHAUST AIR HUMIDITY AND TEMPERATURE SENSOR (INTERNAL) %RH30 TE30
GND T RH +24V
Bla Wh Ye Blu
OUTSIDEAIR- AND RETURNAIRFILTER AND HRW PRESSURE DIFFERENCE SENSOR (OPTIONAL)
+24V 0-10VDC GND
SENSOR AFTER EXTRACT AIR COIL TE31
EDA CONTROL BOARD
CONNECTIONS SEE APPENDIX
DO1 DO2 DO3 DO4 DO5
GND AO2 +5V AO1
SF 0-10V CONTROL
EF 0-10V CONTROL
THE UNIT IS EQUIPPED WITH OVER VOLTAGE PROTECTION.
THE OVER VOLTAGE PROTECTION MUST BE REPLACED WHEN THE ACOUSTIC FAULT SIGNAL HAS GONE OFF.
Drawn by JP/MW
Inspected by
Approved by
File EDA
Date 03.01.2011
Page 1
EDA control ECO fans
Name
ELECTRICAL CONNECTIONS
Weight kg
Ensto Enervent Oy
Kipinätie 1 | FIN-06150 PORVOO
Tel +358 207 528 800 | enervent@ensto.com
ECO EDE&EDW
Change E
Leaflet
Appr.
SCREW TERMINAL
SPRING/QUICK TERMINAL
PIN 1 - Outsideairfilter pressure difference sensor (0-10VDC)
PIN 2 - 24VDC
PIN 3 - Returnairfilter pressure difference sensor (0-10VDC)
PIN 4 - GND
PIN 5 - HRW pressure difference sensor (0-10VDC)
PIN 6 - GND
X6
CONNECTIONS SEE APPENDIX
DI1 DI2 DI3 DI4 DI5 DI6 DI7 DI8 X9
DI9 DI10 AO3 AO4 AO5 ALM B ALM B
24V GND AO1 AO2 X19
A (G0)
X25, for connecting the relay card
F1 F2 F3
N TF N PF
N L L L L L
N N N N N
F2:3
SUPPLY FAN MOTOR
EXTRACT FAN MOTOR
EF
SF
A (GND)
G0 G0 G0 G0


HP UNIT (SERO)
EDA CONTROL BOARD
0-10VDC
AO4
GND
N
DO4
HRW ON/OFF
L
24V
DO5
COOLING ON/OFF
GND
DO5
24V
DO3
COMPRESSOR ON/OFF
DO3
AO5
0-10VDC
DI10
GND
D7
GND
R1
A1
A2
DC24V
Max 0.6A
PE
L
N
-V
+V
EM-269-SPG
HRW-Frequency
Converter
HRW MOTOR
XFM605G-A20
HALL
M
CFO
(FSO)
ALARM
DRO
(DSO)
DEFROSTING
INDICATOR
HEATING/
COOLING
COMPRESSOR
ON/OFF
0-9 VDC
4-WAY VALVE REVERSING
CONTROL (0...35V)
COMPRESSOR ON/OFF
CONTROL (0...35V)
COMPRESSOR FREQUENCE
CONTROL (0-9V)
X19
GND
R1
11
14
12
Piirt
MW/JP
Tark
Hyv
File
PELICAN HP
Pvm
17.11.2009
Sivu
2
PELICAN ECO GREENAIR HP
EDA Control Board
Nimitys
Electrical Connections
Paino kg
Internal Connections
Muutos
B
Lehti
Ensto Enervent Oy
Kipinätie 1 | FIN-06150 PORVOO
Tel +358 207 528 800 | enervent@ensto.com
Hyv


EDA CONTROL BOARD
0-10VDC
AO4
GND
HRW ON/OFF
DO4
DO4
L
N
PE
L
DC24V
Max 0.6A
-V
+V
EM-269-SPG
HRW control board
13
14
9
10
12
8
7
6
5
4
3
2
1
Or
Gr
Br
Bla
Whi
Bl
Red
Ye
YeGr
HALL
M
HRW MOTOR
XFM605G-A20
COOLING ON/OFF
0-10VDC
DO5
DO5
L
N
X2
201
N
A1
A2
4way
COOLING/HEATING
COMPRESSOR ON/OFF
0-10VDC
DO3
DO3
202
203
RUNNING PERMISSION
HP BASEBOARD
AO5
GND
301
302
ADJUSTMENT SIGNAL
DI10
GND
303
304
COMPRESSOR FAULT
Piirt
JP
Tark
Hyv
Hyv
File
Pelican HP
Pvm
04.09.2012
Sivu
2
Pegasos eco greenair HP
EDA CONTROL BOARD
Nimitys
ELECTRICAL CONNECTIONS
Paino kg
Ensto Enervent Oy
Kipinätie 1 | FIN-06150 PORVOO
Tel +358 207 528 800 | enervent@ensto.com
UNIT INTERNAL CONNECTIONS
Muutos
C
Lehti


EDA Control Board
RJ11
OP PANEL
20m RJ11 cord
included unconnected
OPERATION PANEL
1 pcs. Included
OPERATION PANEL
(Accessory)
Room Temperature
Sensor
TE20
(Accessory)
Room Temperature
Sensor
TE20
(Accessory)
RJ11
RJ11
RJ11
RJ11
0-10VDC
AI6
GND
24V
CO2
0-10VDC
0-2000ppm
Carbondioxide sensor
(Accessory)
AI5
PDE 30
0-10VDC
0-200Pa
Pressure-diff. sensor
Extract air duct
(Accessory)
AI4
PDE 10
0-10VDC
0-200Pa
Pressure-diff. sensor
Supply air duct
(Accessory)
AI3
%RH
0-10VDC
0-100%
Humidity Sensor
(Accessory)
AI2
AI1
DO2
DO1
TIMECONTROLLED
RELAY
DETAILS IN UNIT
MANUAL
Waste Air
Damper Motor
(Accessory)
Outside Air
Damper Motor
(Accessory)
EDA Control Board
RJ11
FREEWAY
MODBUS RTU
ALM A
ALM B
Alarm A
Output
Alarm B
Output
DI1
DI2
DI3
DI4
DI5
DI6
DI7
DI8
DI9
Emergency Stop
External
Alarm
(Fire Hazard)
Overtime Pushbutton
(Only In Office Mode)
(Accessory)
Manual Boost
Pushbutton
(Accessory)
NOT IN USE
Overpressure
Pushbutton
(Accessory)
IN USE
Cooking hood
Indication
Central Vaccum
Cleaner Indication
Piirt
MW/JP/MK
Tark
Hyv
File
PELICAN HP
Pvm
12.10.2011
Sivu
3
PELICAN ECO GREENAIR HP
EDA Control Board
Nimitys
Electrical Connections
Paino kg
External Connections
Muutos
D
Lehti
Ensto Enervent Oy
Kipinätie 1 | FIN-06150 PORVOO
Tel +358 207 528 800 | enervent@ensto.com
Hyv


EDA Control Board
RJ11
OP PANEL
20m RJ11 cord
included unconnected
OPERATION PANEL
1 pcs. Included
OPERATION PANEL
(Accessory)
Room Temperature
Sensor
TE20
(Accessory)
Room Temperature
Sensor
TE20
(Accessory)
0-10VDC
AI6
AI5
AI4
AI3
AI2
AI1
GND
24V
CO2
0-10VDC
0-2000ppm
Carbondioxide sensor
(Accessory)
Carbondioxide Sensor
(Accessory)
PDE 30
0-10VDC
0-200Pa
Pressure-diff. sensor
Extract air duct
(Accessory)
PDE 10
Pressure-diff. sensor
Supply air duct
(Accessory)
%RH
0-10VDC
0-100%
Humidity Sensor
(Accessory)
DO1
DO2
TIMECONTROLLED
RELAY
DETAILS IN UNIT
MANUAL
Outside Air
Damper Motor
(Accessory)
Waste Air
Damper Motor
(Accessory)
FREEWAY
MODBUS RTU
ALM A
ALM B
Alarm A
Output
Alarm B
Output
DI1
DI2
DI3
DI4
DI5
DI6
DI7
DI8
DI9
NOT IN USE
Emergency Stop
External
Alarm
(Fire Hazard)
Overtime Pushbutton
(Only In Office Mode)
(Accessory)
Manual Boost
Pushbutton
(Accessory)
Overpressure
Pushbutton
(Accessory)
Cooking hood
Indication
Central Vaccum
Cleaner Indication
Piirt
MW/JP/MK
Tark
Hyv
File
PEGASOS HP
Pvm
19.9.2012
Sivu
3
Nimitys
Electrical Connections
Paino kg
PEGASOS ECO GREENAIR HP
EDA Control Board
External Connections
Muutos
D
Lehti
Ensto Enervent Oy
Kipinätie 1 | FIN-06150 PORVOO
Tel +358 207 528 800 | enervent@ensto.com
Hyv

EXTERNAL WIRING

Point	Explanation	Delivery	Voltage	Cable example
OP panel 1	Control panel	1 pc. in standard delivery	RS-485 / Modbus RTU bus	20 m RJ4P4C cable included in the delivery
OP panel 2	Control panel	Accessory (max. 2 can be connected)	RS-485 / Modbus RTU bus	20 m RJ4P4C cable included in the delivery
TE20	TE 20 room-temperature sensor (connected to the control panel)	Accessory	max. 2 V	KLM, 2 x 0.8
DO1	Outside-air damper, damper actuator	Accessory	max. 250 VAC, 1 A	MMJ, 3 x 1.5
DO1	Exhaust-air damper, damper actuator	Accessory	max. 250 VAC, 1 A	MMJ, 3 x 1.5
DO2	Time-controller relay output	Standard	max. 250 VAC, 1 A	MMJ, 3 x 1.5
AI1, AI2	% RH value transmitter (max. 2 can be connected)	Accessory	0–10 V / 24 V	KLM, 4 x 0.8
AI5, AI6	CO_2 (max. 2 can be connected)	Accessory	0–10 V / 24 V	KLM, 4 x 0.8
ALM A	Class-A alarm output	Must be cabled	max. 24 V, 1 A	KLM, 2 x 0.8
ALM B	Class-B alarm output	Must be cabled	max. 24 V, 1 A	KLM, 2 x 0.8
DI1	Emergency stop	Must be cabled	potential-free switch point	KLM, 2 x 0.8
DI2	External alarm information (fire risk)	Must be cabled	potential-free switch point	KLM, 2 x 0.8
DI3	Time extension on/off switch (only in the OFFICE operation mode)	Accessory	potential-free switch point	KLM, 2 x 0.8
DI4	Boost button	Accessory	potential-free switch point	KLM, 2 x 0.8
DI6	Fireplace switch, button (overpressure)	Accessory	potential-free switch point	KLM, 2 x 0.8

The low-voltage control cables must be separated from the high-voltage supply cable!
The control panel is supplied separately with all unit models. The control panel (IP20) is installed in a dry space.

MODBUS INFORMATION

- Modbus address 1 as default
- Communication format: RS485
- Modbus traffic through the control board's Freeway connector
- Speed: 19,200 bps
- 8 bits
- No parity

Freeway connector pin out:
1 = +5 V
2 = L1 RxD receive
3 = L2 TxD transmit
4 = GND

EC DECLARATION OF CONFORMITY

We declare that the electrical appliance manufactured by us is in conformity with the regulations of the Low Voltage Directive (LVD), 2006/95/EC; the Electromagnetic Compatibility Directive, 2004/108/EC; and the Machine Directive (MD), 2006/42/EC.

Manufacturer name:	Ensto Enervent Oy
Manufacturer's contact:	Kipinätie 1, 06150 PORVOO, FINLAND; tel. +358 207 528 800, fax. +358 207 528 844 enervent@enervent.fi, www.enervent.fi
Unit description:	Ventilation unit with heat recovery
Unit trade name, model:	Enervent series: Piccolo, Plaza, Pingvin, Pandion, Pelican, Pegasos, LTR-2,LTR-3, LTR-6, LTR-7

Name and contact information of the manufacturer's authorised representative(s) in the EEA:

Sweden:	Ensto Sweden AB, Västberga Allé 5, 12630 HÄGERSTEN, SVERIGE, tel. +46 8 556 309 00 Ventilair AB; Ulvsjövägen 68, 79699 ÄLVDALEN, SVERIGE; tel. +46 70 326 0759 Climatprodukter AB; Box 366, 184 24 ÅKERSBERGA, SVERIGE; tel. +46 8 540 87515 DeliVent AB; Markvägen 6, 43091 HÖNÖ, SVERIGE; tel. +46 70 204 0809
Norway:	Noram Produkter AS; Gml. Ringeriksvei 125, 1356 BEKKESTUA, NORGE; tel. +47 33471245
Denmark:	Covent EMJ; Donsvej 55, 6052 VIUF, DANMARK; tel. +45 7556 1534
Estonia:	AS Comfort AE; Jaama 1, 72712 PAIDE, EESTI; tel. +372 38 49 430
Ireland:	Entropic Ltd; Unit 3, Block F, Maynooth Business Campus, Maynooth, Co. Kildare, IRELAND; tel. +353 64 34920
Germany:	e4 Energietechnik GmbH; Burgunderweg 2, 79232 MARCH, GERMANY; tel. +49 7665 947 25 33
Austria:	Inocal Wärmetechnik Gesselschaft m.b.H.; Friedhofstrasse 4, 4020 LINZ, AUSTRIA; tel. +43 732 65 03 910 M-Tec Mittermayr GmbH, 4122 ARNREIT, AUSTRIA; tel. +43 7282 7009-0
Poland:	Iglotech; ul. Toruńska 41, 82-500 KWIDZYN, POLAND; tel. +48 55 279 33 43

The unit structure is in conformity with the following harmonised standard(s):

LVD	EN 60 335-1 (2002) +A1 (2004), +A2 (2006), +A11 (2004), +A12 (2006)
MD	EN ISO 12100-1 + A1(2009), EN ISO 12100-2 + A1 (2009), EN ISO 14121-1 (2007)
EMC	Interference emissions: EN 55014-1 (2006), EN 61 000-3-2 (2006), and EN 61 000-3-3 (1995) Interference tolerance: EN 55014-2 (1997) + A1 (2001)

Our quality control instructions are followed for ensuring that each unit manufactured is in conformity with the relevant directives.
The unit has been CE marked in 2010.

In Porvoo, 1st June 2012

Ensto Enervent Oy

Tom Palmgren

Technology Manager

PARAMETERS OF THE EDA AUTOMATION

ID	MENU	SUBMENU	PARAMETER	MANUFAC-TURER SETTING	NOTE	FIELD SETTING
	Settings					
4x51	Fan speed	Norm. speed	Supply fan	30		
4x52			Extract fan	30		
4x641			Outside max.	-10.0 °C	Only for PRO-series units	
4x642			Outside min.	-0.1 °C	Only for PRO-series units	
4x54		Overpressure	Supply fan	50		
4x55			Extract fan	30		
4x57			OP t	10 min		
4x58		Stove+cent.vac.+overpr.	CH supp.	50		
4x59			CH exhst	30		
4x60			CVC supp.	50		
4x61			CVC exhst	30		
4x62			COC supp.	70		
4x63			COC exhst	30		
4x64			OCC supp.	100		
4x65			OCC exhst	30		
1x23		Constant duct pressure	Const. duct pr.			
4x645			CDPC EC P-a	2,500 Pa		
4x646			CDPC EC I-t	5 s		
4x647			CDPC EC R-t	5 s		
4x648			CDPC EC Dz	2 Pa		
4x649			CDPC AC delay	20 s		
4x650			CDPC AC Dz	10 Pa		
4x637			Supp.	## Pa		
4x638			Exhst	## Pa		
4x633			Supp. min.	0 Pa		
4x635			Supp. max.	200 Pa		
4x634			Exhst min.	0 Pa		
4x636			Exhst max.	200 Pa		
4x544			TV	600 s		
4x545			PV	600 s		
4x632			Dev. alarm	10 Pa		
4x10	Temperatures		Supply / extract / room meas.	## °C	Depends on the temperature-control mode	
4x8			Supp. meas.	## °C		
4x136			Temp. ctrl mode	Exhst	Extract control is the factory default if the unit is equipped with cooling	
4x135			Setpoint	## °C		
4x140			Min.	13.0 °C		
4x141			Max.	40.0 °C		
1x56			OP 1	√		
1x57			OP 2			
1x58			OP 3			
1x59			OP 4			
1x60			OP 5			
1x61			Temp. trans. 1			
1x62			Temp. trans. 2			
1x63			Temp. trans. 3			
	Boosting functions	Other settings ->				
4x66		Man. boost	Boost time	30 min		
4x67			Fan spd	90		
1x17		Humidity boost	Function	Fixed limit		
4x69			Humidity limit	50%		
4x74			Max. vent'n	100		
4x71			RH P-band	20%		
4x73			RH I-time	1 min		

4x75			RH DZ	3%		
4x72			Reset time	2 min		
4x76		CO2 boost	CO2 limit	1,000 ppm		
4x77			Max. vent'n	100		
4x78			CO2 P-band	200 ppm		
4x80			CO2 I-time	1 min		
4x81			CO2 DZ	50 ppm		
4x79			Reset time	1 min		
4x82		Temp. boost	Meas.	Extract-air temperature		
4x83			Max. vent'n	100		
4x84			T P-band	5.0 °C		
4x86			T I-time	1 min		
4x87			T DZ	0.5 °C		
4x85			Reset time	2 min		
4x88		Limit function	P-band	5.0 °C		
4x90			I-time	1 min		
4x91			DZ	0.5 °C		
4x89			Reset time	2 min		
1x9	Boosting functions		Humidity			
1x8			CO2			
1x11			Temp. boost			
4x100	Situation controls	Away	Fan spd	30		
4x101			Temp. drop	2.0 °C		
1x18			Heat	√		
1x19			Cooling	√		
4x102		Long absence	Fan spd	20		
4x103			Temp. drop	3.0 °C		
1x20			Heat			
1x21			Cooling			
1x55		HRC	HRC antifreeze			
4x170			HRC t	-5.0 °C		
4x168			HRC defr.	30 Pa		
4x169			HRC delay	12 min		
1x64	Quick choices		Overpressure	√		
1x65			Boosting	√		
1x66			Away	√		
1x67			Long absence	√		
1x68			Max. heat/cooling	√		
1x69			Night cooling	√		
1x70			Fan speed settings	√		
1x71			Temperature ctrl	√		
4x140 - 4x141			Min.–max.	16–26 °C		
4x93	Night cooling		SNight out li	10.0 °C		
4x94			SNight start	25.0 °C		
4x95			SNight stop	21.0 °C		
4x96			SNight diff.	1.0 °C		
4x92			SNight fan spd	80		
1x15			Cool off	√		
4x98			Star	22		
4x99			Off	7		
4x97				Sun. Mon. Tues. Wed. Thurs. Fri. Sat.		
4x640	General settings		Modbus addr.	1		
4x199			Drive mode	HOME	Specified at the time of ordering of the unit	
1x54			Heat	√		
1x52			Cooling	√		
1x53			HRC	√		

VENTILATION UNIT MAINTENANCE AND SERVICING

The ventilation unit does not require any regular maintenance, but the heat exchanger and the fans must be cleaned and the filters changed regularly. Disconnect the unit from the power supply before servicing it. Wait about two minutes before starting the servicing work, to allow the fans to stop and the compressor to cool down.

Cleaning the heat exchanger
Check the cleanness of the heat exchanger visually when changing the filters. If the heat exchanger is dirty, it is removed from the unit and washed under a shower with neutral detergent or pressurised air. The use of a pressure washer is strictly forbidden. The heat exchanger must not be submerged in water! There is an electric motor inside the exchanger body. It must not get wet. When the unit is started after cleaning, the rotation of the heat exchanger must be verified. Disconnect the heat pump when checking the heat exchanger. If the unit is operated with the heat pump on and the service door open, the heat-pump pressure switch will trip. You can switch the heat pump on once the service door has been closed.

Cleaning the fans
Check the cleanness of the fans visually when changing the filters. The fans are removed from the unit and cleaned with, for example, a toothbrush or pressurised air.

Changing the filters
The recommended change interval for bag filters is six months. The bag filters are changed by releasing the filter-locking levers, pulling the old filter out of the unit, and installing the new filter. Remember to engage the filter-locking levers. It is recommended to hoover the inside of the unit when changing the filters. NOTE: Make sure to close the service door properly!

Cleaning the supply- and extract-air radiators
Check the cleanness of the heat-pump unit's supply- and extract-air radiators visually when changing the filters. The unit stays clean when the filters are changed regularly. If the heat-pump unit's radiators are dirty, the heat-pump unit must be removed from the ventilation unit for cleaning. The rotating heat exchanger must be removed before removal of the heat-pump unit. Remember to disconnect the two heat-pump unit quick-connectors before removing the unit. The radiators are cleaned with pressurised air. Be careful not to damage the sheets of the radiators. After cleaning, the heat-pump unit is pushed back into the ventilation unit and the quick-connectors are connected.

Retailers, building material stores, and Enervent Service Oy sell filters, other accessories, and spare parts for Enervent ventilation units. Remember to check the type of the ventilation unit before ordering any supplies.

VENTILATION UNIT QUICK GUIDE

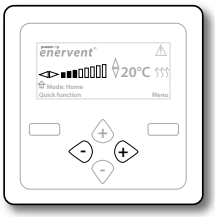
GENERAL VENTILATION INFORMATION

They key task of ventilation is to maintain good room-air quality. The National Building Code of Finland specifies that the indoor air of a building must be changed once every two hours.

The ventilation engineer calculates the size of ventilation unit required for meeting the requirement. In the installation stage, the ventilation installer specifies what the required fan speeds are and adjusts each valve so that all air flows are correct and that the inside of the building is sufficiently underpressurised.

OPERATING THE VENTILATION UNIT

The ventilation unit is very easy to operate. Most of the time, the unit does not require any attention. The key issues for the user to be familiar with as listed below:

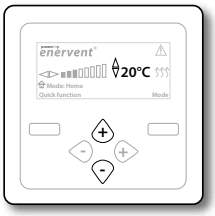


Fan speed

The unit's fan speed is selectable between 20% and 100% from the control panel. Three speeds are normally used; ***normal speed***, at which the ventilation unit runs most of the time (this is specified by the ventilation installer); ***airing speed***, which is higher than normal speed and intended for temporary airing; and the ***'Away' speed***, used when nobody is at home. The control panel's bar column displays the speed in use. The speed is increased or decreased by pushing of the horizontal buttons '+' and '-'.
NOTE: Fan speed is forced to 70% when the heat pump starts.

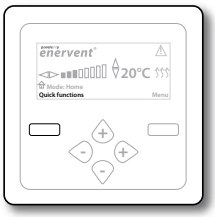
THE VENTILATION UNIT MUST NEVER BE TURNED COMPLETELY OFF!

THE NORMAL RUNNING SPEED SPECIFIED BY THE INSTALLER FOR THIS UNIT IS: _____



Temperature

The user can set the temperature between 15 °C and 30 °C. Depending on the settings, the temperature selected is the supply-air, extract-air, or room-air temperature. The control panel displays the desired temperature. To increase or decrease the temperature, press the vertical buttons '+' and '-'.



Quick choices

The overpressure (***fireplace function***) and boosting (***airing function***) options are found in the quick-choices menu. The functions are enabled by pushing the left (rectangular) multi-choice button ('Quick choice'), selecting the correct row with the '+' and '-' buttons, and then pushing the right (rectangular) multi-choice button ('Choose').

Service need

An alarm symbol is illuminated on the control panel's display when the control system reminds of the need for a filter change or warns of a fault in the unit's operation. For information on the alarms, please consult the information elsewhere in this manual.

Keypad lock

The control panel's buttons can be locked by pressing the left multi-choice button and the up-arrow button simultaneously. The keypad lock is released with the same key combination.

A BRIEF LEXICON OF VENTILATION

Outside air	Outside air is the flow of fresh air coming from outside to the ventilation unit.
Supply air	Supply air is the flow of air coming from the ventilation unit to the rooms.
Extract air	Extract air is the flow of air coming from the rooms to the ventilation unit.
Exhaust air	Exhaust air is the flow of air flowing from the ventilation unit to outside.
Heat exchanger	The heat exchanger is a ventilation-unit component that transfers heat energy from the extract-air flow to the supply-air flow. The Enervent ventilation units have a rotating heat exchanger. In practice, it is a disk made of thin sheet metal, which transfers the heat energy from the extract air to the supply air. The heat exchanger prevents the heat in the room air from flowing out with the exhaust-air flow.
Post-heating	Post-heating warms the supply air before it is blown into the rooms. In EDA units, an electric heater or water-circulated radiator is used for post-heating.
EDA	EDA is the ventilation unit's control system type. The term stands for 'Enervent Digital Automation'.