

# Living HP

## Heat Recovery Ventilation Unit



### **GB** Operation and Maintenance Instructions

## Contents

1 Warnings.....	1
2 Product description .....	2
2.1 Internal components .....	2
2.2 External components .....	3
2.3 Electrical connection box .....	4
3 Refrigerant control/reporting .....	4
4 Function description .....	5
4.1 Unit diagram .....	5
4.2 General Description .....	6
4.3 Heat recovering .....	7
4.4 The cooling function .....	7
4.5 Power control .....	7
4.6 Power limitation .....	8
4.7 Components and function .....	8
5 Interface description.....	10
5.1 Terminal pGD1 user interface .....	10
6 Unit control .....	11
6.1 Before start-up .....	11
6.2 Turn the unit on/off .....	12
6.3 Quick setup .....	12
6.4 Information menu .....	14
6.5 Program menu .....	18
6.6 Alarm interface .....	21
7 Maintenance .....	25
7.1 Important .....	25
7.2 Maintenance Intervals.....	25
7.3 Maintenance Instructions .....	26
7.4 Additional maintenance.....	30
8 Disposal and recycling .....	31
8.1 Disposal of the heat pump unit .....	31
8.2 Disposal of the air handling unit.....	31
8.3 Disposal of electrical and electronic equipment.....	31
9 Information on personnel safety .....	32
9.1 Additional protective measures .....	32
10 Troubleshooting .....	33
11 Service .....	34

# 1 Warnings

The following admonitions will be presented in the different sections of the document.

## **Danger**

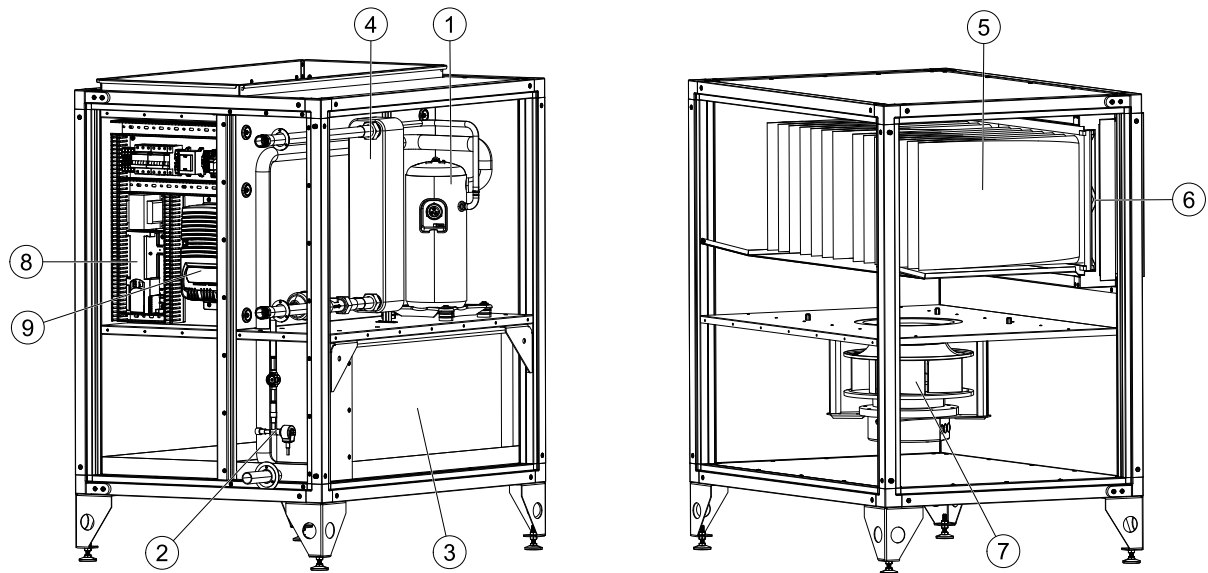
- Make sure that the Mains supply to the unit is disconnected before performing any maintenance or electrical work!
- All electrical connections must be carried out by an authorized installer and in accordance with local rules and regulations.
- Operation in the refrigerant circuit and handling refrigerants must be performed by certified personnel.

## **Warning**

- Beware of sharp edges during mounting and maintenance. Use protective clothing.
- Skin contact with the refrigerant must be avoided. Use protective equipment such as protective goggles, gloves and suitable clothing's. Good ventilation must be arranged.
- If freezing injury a doctor must be seen.
- If skin contact the exposed part of the body must be carefully washed.
- If eye contact use eye wash or lukewarmed water and wash for 20 minutes, visit a doctor.
- The units electrical connection to the mains supply must be preceded by an all pole circuit breaker with a minimum 3 mm gap.
- This product is not intended to be used by children or people with reduced physical or mental ability or lack of experience and knowledge, if no instruction concerning the use has been given by the person responsible for their safety or that this person is supervising the operation. Children should be supervised so that they can not play with the product.

## 2 Product description

### 2.1 Internal components

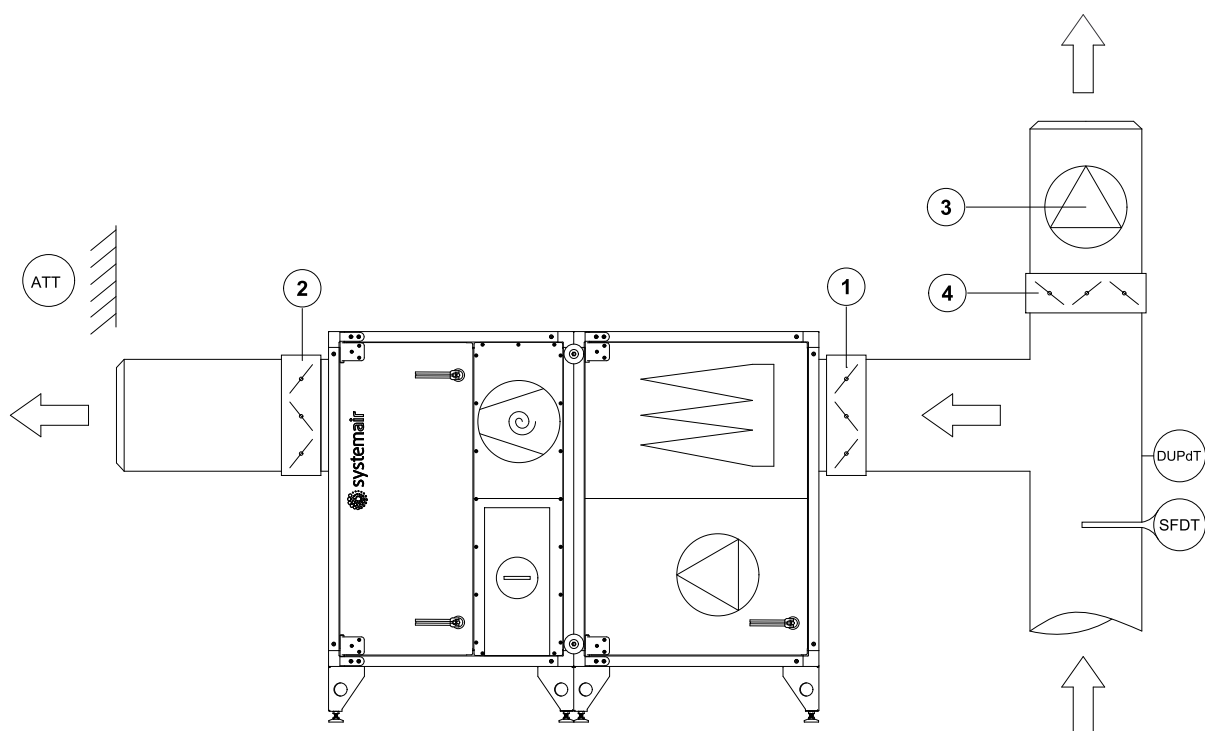


**Fig. 1 Basic internal components**

**Table 1: Component position and description**

Position	Description
1.	Compressor
2.	Expansion valve
3.	Evaporator coil
4.	Condenser
5.	Filter, extract air
6.	Pre-filter, extract air
7.	Fan motor with impeller, extract air
8.	pCOOEM+ controller
9.	Frequency converter

## 2.2 External components

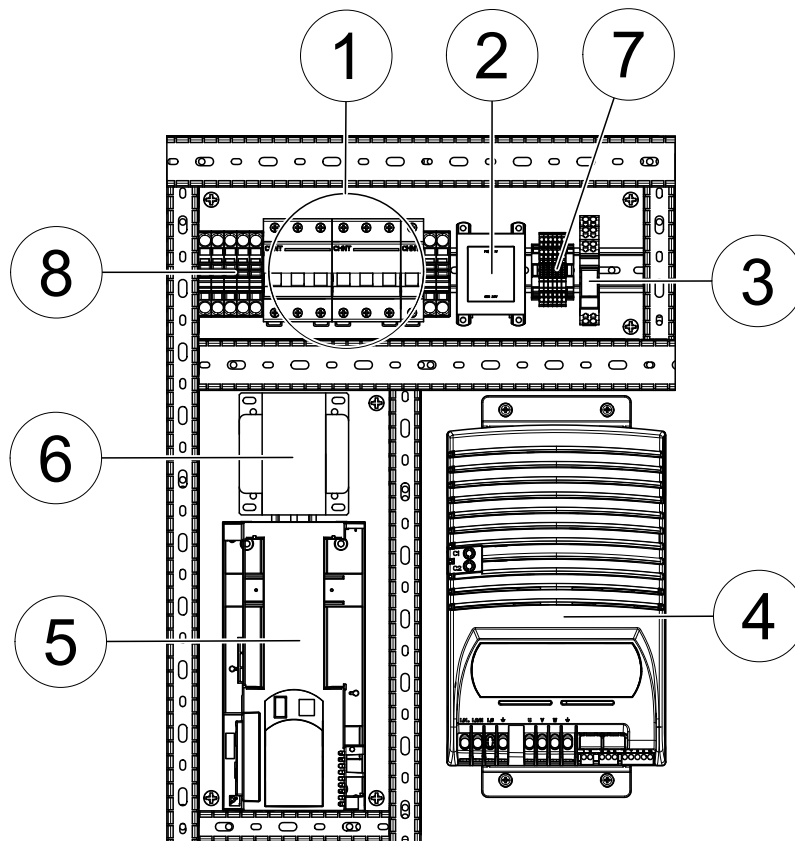


**Fig. 2 Basic external components**

**Table 2: Component position and description**

Position	Description
1.	Extract air damper A
2.	Exhaust air damper C
3.	Fire/Smoke fan
4.	Fire/Smoke damper B
DUPdT	Duct differential air pressure sensor
SFDT	Smoke and fire sensor
ATT	Ambient temperature sensor

## 2.3 Electrical connection box



**Fig. 3 Electrical cabinet**

**Table 3: Component position and description**

Position	Description
1.	Micro circuit breaker (MCB)
2.	Transformer 24V
3.	Compressor heater relay
4.	Frequency converter
5.	pCOOEM+ controller
6.	DC choke
7.	Terminal block, internal/external connections
8.	Terminal block, mains supply

## 3 Refrigerant control/reporting

Living HP comes pre-filled with R410A (50% R-32/50% R-125) refrigerant.

Living HP 15 comes with 1,8 kg of refrigerant and shall not be subject to leak checks and record keeping.

Living HP 20 comes with 2,0 kg of refrigerant and shall not be subject to leak checks and record keeping.

Living HP 25 comes with 3,2 kg of refrigerant and belongs to the groups “piece units containing more than 3 kg refrigerants per circuit” and “equipment that contains fluorinated greenhouse gases in quantities of 5 tones of CO<sub>2</sub> equivalent or more” and it must be checked for leaks. Leakage control with record keeping

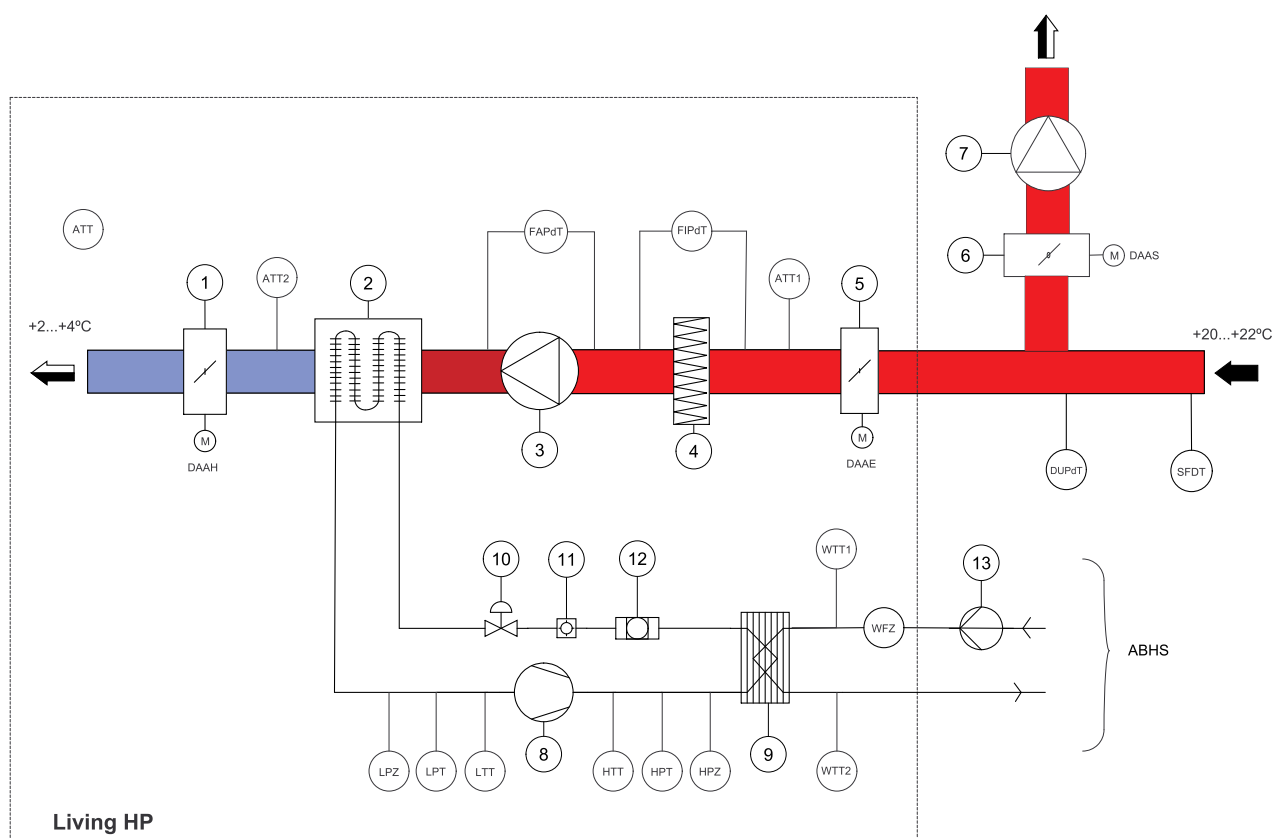
shall be done once per year. Refrigerant control report must be always established by a cooling certified person before commissioning of the unit. Any quantities added or recovered during maintenance, servicing and final disposal will need to be recorded along with:

- leak checks
- actions taken
- the name of the service Company, the engineer / technician who performed the servicing and maintenance
- dates
- results of inspections

These records have to be made available to the competent authority upon request. Different regulations can be valid in different countries. Check with your local government.

## 4 Function description

### 4.1 Unit diagram



**Fig. 4 Unit diagram**

**Table 4: Component position and description**

Position	Description
1.	Exhaust air damper C
2.	Evaporator coil
3.	Extract air fan
4.	Filters
5.	Extract air damper A

## Component position and description cont'd

Position	Description
6.	Fire/smoke damper B
7.	Fire/smoke fan
8.	Compressor
9.	Condenser
10.	Expansion valve
11.	Sight glass
12.	Filter dryer
13.	Water pump
HPT	Refrigerant High pressure sensor
LPT	Refrigerant Low pressure sensor
LTT	Refrigerant suction gas temperature sensor
HTT	Refrigerant discharge gas temperature sensor
WTT1	Water in temperature sensor
WTT2	Water out temperature sensor
HPZ	Refrigerant High pressure safety switch
LPZ	Refrigerant Low pressure safety switch
FAPdC	Fan differential air pressure sensor
SFDT	Smoke and fire sensor
ATT1	Extract air temperature sensor
ATT2	Exhaust air temperature sensor
FIPdT	Filter air pressure sensor
ATT	Ambient temperature sensor
WFZ	Water flow switch
DUPdT	Duct differential air pressure transmitter
DAAE	Extract air damper actuator
DAAS	Fire/Smoke damper actuator
DAAH	Exhaust air damper actuator
ABHS	Apartment building heating system

## 4.2 General Description

The Living HP is extract air ventilation unit with integrated heat pump section to recover heat from extract air and deliver heat to building heating system. The Living HP unit should be integrated in building extract air ventilation system and is designed to control fire/smoke fan during normal operation.

The stops and starts of the unit are based on the ambient air temperature. The default value set to start the unit is +15°C. This value can be changed in the control panel. Other conditions which should be met for the heat recovery to start:

- water flow should be more than 0,5 m³/h
- extract air temperature should be more than +10°C
- air pressure drop should be more than 30 Pa

These values can also be changed in the control menu.



The heat pump reduces the extract air temperature as much as possible without going below safety limits and controlling the unit to produce maximum heating capacity at maximum efficiency. The max leaving water temperature can be +60°C.

The Living HP unit can work in two modes: summer and winter.

## 4.2.1 Summer/Winter mode

Summer mode: when ambient air temperature exceeds set temperature value in the control panel (default +20°C), a signal is sent to stop the extract air fan and heat pump. Dampers A and C are closed. Another signal is sent to open fire/smoke damper B and to start fire/smoke fan in order for waste air from the residence to be vented outside. In summer mode heat recovery is not possible.

Winter mode: when ambient air temperature goes below set temperature value in the control panel (default +15°C), a signal is sent to stop fire/smoke fan, fire/smoke damper B will be closed. The Living HP extract air fan and heat pump is turned on, dampers A and C are open, air travels through the unit. The heat recovery is fully operational.

## 4.2.2 Fire function

Fire function is activated by smoke and fire sensor. The sensor must be mounted in the duct before fire/smoke damper B. Fire function is used to protect the Living HP unit from smoke and heat in case of fire emergency. If smoke is detected in winter mode the unit is stopped, dampers A and C are closed. Signal is sent to open smoke fan damper B and to start smoke fan at full capacity immediately in order to extract smoke from the residence.

In the summer mode if fire/smoke alarm is activated, the fire/smoke fan from regulation mode will be immediately switched to full capacity. In normal conditions fire/smoke fan speed is controlled by the unit based on differential pressure in extract air duct.

## 4.3 Heat recovering

The heat from extract air is recovered through the heat pump to produce hot water, which then can be used to heat the radiator system.

## 4.4 The cooling function

The refrigerant is circulated in a completely closed system in the following order: an evaporator, a compressor, a condenser and the expansion valve. At the beginning of the cycle the liquid refrigerant goes through the expansion valve, pressure decreases and cold mixture of liquid and gas enters the evaporator. The expansion valve keeps a low pressure in the evaporator and controls stable superheating of refrigerant gas. Heat is taken from extract air when passing the evaporator and therefore extract air temperature is lowered. After the refrigerant leaves the evaporator coil it has absorbed heat from extract air and become a gas. The superheated refrigerant gas enters the compressor which mechanically pressurizes the gas. This process increases refrigerant temperature so the refrigerant leaves the compressor as the hot gas. After a pressure increase in the compressor, the refrigerant gas passing the condenser is transformed into fluid through condensation and thereby heat emission. Heat is submitted to the water circuit that is passing the condenser. Heat has accordingly been transferred from the condenser to the water. After leaving the condenser in a warm liquid state the refrigerant passes the expansion valve which drops the pressure on the warm liquid and thus drops its temperature. The refrigerant leaves the expansion valve as a mixture of cold liquid and gas and thereby the refrigeration cycle starts again.

## 4.5 Power control

The compressor (CPR) are step-less controlled between, in the frequency converter (FC), set minimum and maximum frequency.

## 4.6 Power limitation

The frequency converter (FC) is continuously sensing the condensing pressure via the high pressure sensor (HPT) and gradually slows down the speed of the compressor, if the pressure exceeds the set limitation value. This is done to avoid a high pressure alarm.

## 4.7 Components and function

### 4.7.1 Compressor

The compressor in Living HP is a high-efficiency, variable speed scroll compressor. It is designed especially for speed control and can not run without frequency converter. Speed and by that cooling capacity is regulated by changing the operating frequency, the maximum working range of the compressor is no less than 20 to 120 rps (revolutions per second). In the smaller unit sizes the maximum frequency is limited via a setting in the frequency converter. Controlling of the compressor is completely automatic according to the need of the premises and the signal comes via the control unit Carel to the frequency converter.

### 4.7.2 Compressor protection

The compressor is protected by the following:

- High pressure switch in the high pressure side (HPZ)
- Low pressure switch on the low pressure side (LPZ)
- Refrigerant discharge gas temperature sensor (HTT)
- If any of the above protections are triggered the unit will be stopped and cause will be displayed in the alarm screen. Manual acknowledgment and reset must be done before the compressor can start again.

### 4.7.3 Frequency converter

The frequency converter of the compressor is located in the electrical cabinet. The programmable controller receives a control signal corresponding to the current heating load from the control unit Carel and then, via frequency converter, regulates the compressors speed according to the actual heating load. The programmable controller has also a high pressure sensor (HPT) connected. This sensor continuously measuring the pressure in the heating system. If the pressure exceeds the set value in the programmable controller the output frequency is reduced and thereby the compressors speed will be reduced so that the pressure will not rise to the level were the high pressure switch (HPZ) on the high pressure side will trigger. The compressor is protected from fast start and stops by a restart delay function in the programmable controller.

### 4.7.4 Refrigerant

The refrigerant is of type R410 A, the system comes pre-filled and tested at the factory. On top of the Living HP are the high and low pressure side measuring points (tappings). Concerning the control and reporting of the refrigerant installation, see chapter .

### 4.7.5 Condenser and Evaporator

The evaporator coil is made of copper tubes with aluminium fins and is used to absorb heat from extract air. A brazed plate heat exchanger is used as a condenser to transfer heat to the water system. The condenser is made of stainless steel plates brazed together with every plate turned 180 degrees in opposition to each other. This design creates two highly turbulent fluid channels that flow in opposite directions over a massive surface area.

## 4.7.6 Filters

Living HP comes with the pair of class M5 filters and G4 pre-filters installed in the factory. Filters are used to filter extracted air from the residence in order to prevent dust gathering on components inside of the unit. Filters need to be replaced when polluted. New sets of filters can be acquired from your installer or a wholesaler. Optionally, filter quality F7 can be installed for extract air filtering.

The filter type is labelled on the top of the filter.

## 4.7.7 Damper

The function of the damper is to direct the airflow. When the unit is off, extract damper A and exhaust damper C are closed and the Fire/Smoke damper B is open to make air flow directly to the outside. When the unit is operating, extract and exhaust dampers are open and the Fire/Smoke damper is closed to make air flow through the unit. For more information see chapter 4 *Unit diagram*.

## 4.7.8 Drip tray

The drip tray is located under the evaporator/brine coil and collects the water condense that periodically occur during the cooling operation. The drip tray is made of stainless steel and has a 32 mm connection for connecting the drain pipe. The drip tray has an electrical heater to prevent the water condense from freezing.







## 5 Interface description

### 5.1 Terminal pGD1 user interface

Information on the status of the unit is accessible directly from the main menu, without needing to access the submenus. Configuration, active function and operating temperature information are arranged in loops of screens, scrolled by pressing the **DOWN** button from the main screen.



**Fig. 5 Terminal pGD1**

Display	Description
	<ul style="list-style-type: none"> <li>• <b>Alarm symbol</b> Display the list of active alarms</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Prg — programming key</b> Access the main menu</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Esc</b> Return to the previous screen</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Enter arrow</b> Switch from parameter display to edit Confirm value and return to the parameter list</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Up arrow</b> Scroll a list upwards or increase the value shown on the display</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Down arrow</b> Scroll a list downwards or decrease the value shown on the display</li> </ul>

## 5.1.1 Display

The following illustration is an example of the main screen with an active unit, highlighting the fields and icon used:



1. Date and time.

2. Current unit status:



Unit OFF



Winter mode



Defrosting in progress

3. Info extract and exhaust air temperature also unit operating mode.

- HP ACTIVE — unit is active; heating mode (winter time).
- FIRE SMOKE — unit is off; fire/smoke fan active, full speed.
- SUMMER MODE — unit is off, fire/smoke fan active.

4. Compressor request and actual run.

5. Info about water temperatures and ambient temperature.

6. Indicates access to the user menu using the **UP**, **DOWN** and **ENTER** keys to confirm.

## 5.1.2 User menu

On the main screen, the **UP** and **DOWN** buttons can be used to scroll through the functions:



Info



On-Off



Set

**ENTER** button used to select them. Password is not needed to access and edit these parameters.

# 6 Unit control

## 6.1 Before start-up



### Important

- After connecting the unit to the main supply, the unit must be kept turned off for at least 12 hours to heat the compressor and evaporate the refrigerant. Automatic heating will start once the main switch and all circuit breakers are switched on.
- The compressor can be damaged if the unit is turned on in the User menu before the compressor was heated for at least 12 hours.

When all external components are connected, wiring and ducting work is done, the unit can be activated. To activate the unit, switch on the main switch and all circuit breakers. After some time the terminal pGD1 will start. It is important to wait at least 12 hours before the unit can be turned on from the User menu.

## 6.2 Turn the unit on/off

Select **On—Off** on display window, press **ENTER** .



In the next display use **UP** or **DOWN** buttons to select ON or OFF option. This function works like a switch and no confirmation is needed.



Once the unit is turned on, depending on conditions, dampers will move to appropriate positions and ventilation together or without heat recovery will start.

The unit should stay turned on all the time, otherwise ventilation and heat recovery is not possible. Fire/smoke fan cannot be activated and regulated in summer mode neither when unit is turned off.

## 6.3 Quick setup





In **SET** menu the following can be set:



- Regulation temperature set point or heating curve number.
- Differential air pressure set point.
- Antifreeze and high pressure prevention set points.
- Date and time settings.
- Date and time formats.

Select **SET** on display window, press **ENTER** to enter settings menu.



## 6.3.1 Settings menu

Display/Mask No.	Description
<p>Set user menu (SET1)</p> 	<p>The unit has adaptive heating capacity.</p> <p>The unit can regulate capacity in three ways:</p> <ul style="list-style-type: none"> <li>• Delta T extract-exhaust air. Unit will try to maintain set value (default 18°C)</li> <li>• Delta T water in-out. Unit will try to maintain settled value (default 6°C)</li> <li>• By heating curve. Possible to choose from 5 heating curves.</li> </ul>
<p>Set user menu (SET3)</p> 	<p><b>Note:</b></p> <p>The regulation type can be selected from Main menu in Unit settings.</p>
<p>Set user menu (SET2)</p> 	<p>Ventilation process can be regulated in two ways:</p> <ol style="list-style-type: none"> <li>1. By differential pressure on duct (VAV);</li> <li>2. By constant air flow (CAV).</li> </ol> <p><b>Note:</b></p> <p>The regulation type can be selected from Main menu In Unit settings.</p> <p><b>Note:</b></p> <p>In “Summer mode”, when the ventilation process is switched from the unit to fire/smoke fan, regulation will be carried by differential pressure on duct.</p>
<p>Set user menu (SET4)</p> 	<ol style="list-style-type: none"> <li>1. Antifreeze prevention helps to protect evaporator from icing and saves energy not letting compressor work at very low evaporation temperatures.</li> <li>2. High pressure prevention helps to protect compressor from very high condensing temperatures.</li> </ol> <p><b>Note:</b></p> <p>It is strongly recommended to keep factory settings for proper and safe operation.</p>

Display/Mask No.	Description
Set user menu (SET5) 	Date and time settings.
Set user menu (SET6) 	Date and time formats.

## 6.4 Information menu

Select **INFO** menu on display window, press **ENTER** information menu.



In the **INFO** menu information about the unit is displayed in a loop of screens.





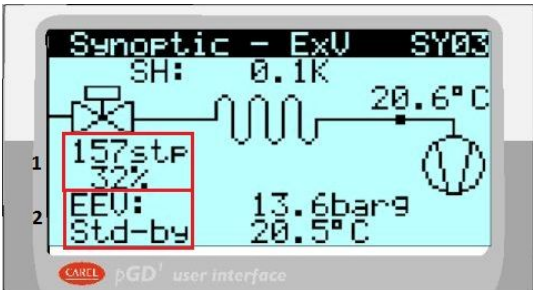
The general synoptics for the unit can be shown from the information menu. The physical status of the inputs, device outputs and probes are available in a menu connected to the synoptic. If the input or output is not enabled, the screen does not appear. The individual screens of the synoptic are shown below.

- Unit synoptic



- Compressor synoptic
- ExV (electronic expansion valve) synoptic

## 6.4.1 Synoptics menu

Display (mask No.)	Description
<p>Synoptic (SY01)</p>  <p>The SY01 display shows 'Synoptic SY01' at the top. Below it, 'Water inlet&lt;- 30.4°C' and '36.8°C -&gt;Water outlet'. A red box highlights the bottom section with three items: '1 Request: 0.0%', '2 Antifreeze lim.: 0.0%', and '3 HP limit: 0.0%'. The bottom of the screen shows 'CAREL pGD user interface'.</p>	<p><b>Unit synoptic</b></p> <ol style="list-style-type: none"> <li>1. Request of unit.</li> <li>2. Antifreeze limitation: when the temperature after the evaporator is decreasing, there is a proportional function to avoid the freeze on the coil.</li> </ol> <p>High pressure limitation: there is proportional function that limits the request in the case that the high pressure is increasing.</p>
<p>Synoptic (SY02)</p>  <p>The SY02 display shows 'Synoptic SY02' at the top. Below it, '1 Req: 0% -&gt; 0.0rps - 0%' and '2'. A red box highlights '3 DZ1:Ok 0.0°'. Below that, '-5.6bar9 -&gt; 0.0°'. A red box highlights '4 EZ8:LoDscgP 60s 0.0°'. At the bottom, '0.0bar9 -&gt; 0.0°'. The bottom of the screen shows 'CAREL pGD user interface'.</p>	<p><b>Compressor synoptic</b></p> <ol style="list-style-type: none"> <li>1. Compressor request for thermoregulation.</li> <li>2. Compressor status in rps and percentage.</li> <li>3. Discharge gas temperature zone: <ul style="list-style-type: none"> <li>• DZ1: Ok — zone within operating limits.</li> <li>• DZ2: Controlled — BLDC compressor decrease acceleration speed.</li> <li>• DZ3: Limited — BLDC compressor reduce power.</li> </ul> </li> <li>1. Envelope zone: <ul style="list-style-type: none"> <li>• EZ1: Ok: zone within operating limits.</li> <li>• EZ2: HiDP: High compression ratio.</li> <li>• EZ3: HiDPscgP: High condensation temperature.</li> <li>• EZ4: HiCurr: High motor current.</li> <li>• EZ5: HiSuctP: High suction pressure.</li> <li>• EZ6: LoDP: Low differential pressure.</li> <li>• EZ7: LoPRat: Low compression ratio.</li> <li>• EZ8: LoDscgP: Low condensation pressure.</li> <li>• EZ9: LoSuctP: Low evaporation pressure.</li> </ul> </li> </ol>
<p>Synoptic — ExV (SY03)</p>  <p>The SY03 display shows 'Synoptic - ExV SY03' at the top. Below it, 'SH: 0.1K' and '20.6°C'. A red box highlights '1 157stP 32%' and '2 EEV: 13.6bar9 20.5°C'. The bottom of the screen shows 'CAREL pGD user interface'.</p>	<ol style="list-style-type: none"> <li>1. Valve opening percentage and steps.</li> <li>2. Valve status: <ul style="list-style-type: none"> <li>• Close: Valve closed.</li> <li>• Std-by: valve in standby.</li> <li>• Pos: Valve in positioning.</li> <li>• Wait: valve in activation.</li> <li>• On: valve in control.</li> <li>• Init: driver initialization.</li> </ul> </li> </ol>

## 6.4.2 Output menu





Mask No.	Mask description	Status
IO01	Compressor status Error code Speed Motor Hours	Run/Stop Alarm code %, rps A, V h
IO03	Damper A status [NO02] (Extract air)	On/Off
IO04	Damper B [NO03] (Smoke & fire)	On/Off
IO05	Damper C [NO04] (Exhaust air)	On/Off
IO06	BLDC Compressor [NO05]	On/Off
IO07	Exhaust fan • Exhaust fan operating ratio [Y1] • Exhaust fan status [NO06]	% On/Off
IO08	Extract fan • Extract fan operating ratio [Y1] • Extract fan status [NO06]	% On/Off
IO09	General alarm status	Alarm/No

## 6.4.3 Input menu

Mask No.	Mask description	Status
IO0A	Suction pressure LPT [U3] Evaporation temperature Suction temperature LTT [U4]	Bar °C °C
IO0B	Discharge pressure HPT [U5] Condensation temperature Discharge temperature HTT [U6]	Bar °C °C
IO0C	External temperature [U1]	°C
IO0D	Return air temperature [U2]	°C
IO0E	Exhaust air temperature ATT2 [U2]	°C
IO0F	Differential air pressure on duct DAPdc [U8]	Pa
IO0G	Differential air pressure on fan FAPdc [U9] Operating Air flow	Pa l/s
IO0H	Operating water flow WFZ [U10]	l/s
IO0I	Water inlet temperature WTT1 [U11]	°C

Mask No.	Mask description	Status
IO0L	Water outlet temperature WTT2 [U12]	°C
IO0L	Overload exhaust fan status [ID1]	Alarm/Ok
IO0M	Overload extract fan status [ID2]	Alarm/Ok
IO0N	Dirty filter alarm status FIPdT [ID3]	Alarm/Ok
IO0O	Fire/smoke alarm status SFDT [ID4]	Alarm/Ok

## 6.4.4 Information menu

Display/mask No.	Description
IO0P 	Software information 1. User interface code and pGD1 terminal version. 2. Release date. 3. System Bios & Boot versions.
IO0Q 	PC00EM information 1. Board type. 2. Total system memory. 3. The number of program cycles per second.
IO0R 	Power+ information 1. Communication type of the inverter. 2. Polling time. 3. Boot of the inverter. 4. Firmware release. 5. Firmware checksum. 6. MC release. 7. Hardware ID.
IO0S 	E2V information 1. Firmware version. 2. Service version.

## 6.5 Program menu



### Important

- Program menu is protected with a password and should be accessed only by authorized personnel.

Regardless of the displayed screen, pressing the programming key accesses the password entry screen which allows access to the Program menu. Select **PRG** button on display and insert the correct password (1234) to access Program menu.



In the Program menu the following advanced settings can be adjusted:





	A. ExV	
		Aa. ExV regulation Ab. ExV configuration Ac. ExV custom
	B. Compressors	
		Ba. Maintenance Bb. Compressor reg. Bc. Power+ conf. Bd. Compressor config. Be. Power+ custom
	C Unit settings	
	D. Input/Output	
	E. Manual	
	F. Log-out	



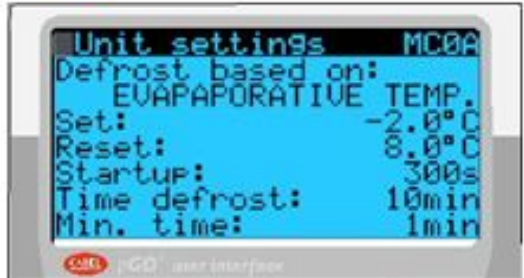
### Note:

The electronic expansion valve and the compressor are pre-configured at the factory and their settings should not be changed.

## 6.5.1 Unit settings

In the Unit settings menu the installer can choose:

Display	Description
	Ventilation regulation type: <ul style="list-style-type: none"> <li>• By constant air flow (CAV) "AIR FLOW"</li> </ul> Or <ul style="list-style-type: none"> <li>• By differential pressure on duct (VAV) "DIFFERENTIAL PRESSURE"</li> </ul>
	Heat pump module regulation type: <ul style="list-style-type: none"> <li>• By Delta temperature extract-exhaust air "DELTA TEMP EVAPOARTOR"</li> </ul> Or <ul style="list-style-type: none"> <li>• By Delta temperature water in-out "DELTA TEMP WATER"</li> </ul> Or <ul style="list-style-type: none"> <li>• Water outlet temperature ( by heating curve) " TEMP WATER OUTLET"</li> </ul>
 	Heat recovery activation/protection set points: <ul style="list-style-type: none"> <li>• External temperature set to start heat recovery (default +15°C)</li> <li>• Extract air min temperature set (default +10°C)</li> <li>• Minimum air flow- indicated by pressure difference (default 30 Pa)</li> </ul>

Display	Description
	<p>Summer mode activation set point:</p> <ul style="list-style-type: none"> <li>Smoke/fire fan activation temperature (switch from winter to summer mode) (Default +20°C)</li> </ul>
 	<p>Defrost protection control is always active when the unit is turned on.</p> <p>Defrost can be managed by:</p> <ul style="list-style-type: none"> <li>by temperature of the exhaust air (ATT2)</li> <li>by evaporating temperature</li> </ul> <p>The defrost management cut the request of the BLDC compressor.</p>




## 6.5.2 Input/Output

In this menu offsets for probes can be adjusted if needed.

## 6.5.3 Manual

The compressor, fans and dampers can be controlled manually from this menu. The manual control can be done only when unit is in OFF mode.



Display	Description
	<ul style="list-style-type: none"> <li>The compressor manual control set by percentage;</li> </ul> <p>The compressor speed in revolutions per second and request in percentage can be checked in the Info menu.</p>
	<ul style="list-style-type: none"> <li>Extract/Exhaust air fan control set by percentage.</li> </ul> <p>Airflow in liters per second can be checked in the Info menu.</p> <ul style="list-style-type: none"> <li>Smoke/fire fan always operating in max value if fire alarm is detected;</li> </ul> <p>In summer mode the fire/smoke fan is regulated by pressure difference in the extract air duct.</p>
	<ul style="list-style-type: none"> <li>Open/close dampers</li> </ul> <hr/> <p><b>Note:</b></p> <p>The damper state means not the actual damper position but the digital output state.</p> <hr/>

## 6.5.4 Log-out

Select Log-out option to exit from the Program menu.

## 6.6 Alarm interface

Press **ALARM** button to enter alarm interface.



If there is no alarm, the following screen is displayed:



This screen makes it possible to easily enter the alarm data log using the **ENTER** key. If there is at least one alarm, the alarms screen is displayed and alarms sorted by code from lesser to greater.

Each alarm contains the information needed to understand the cause of the alarm.



In the alarm screen the following information is displayed:

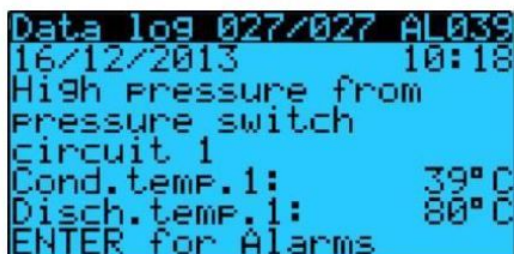
1. Alarm number/total alarms.
2. Unique alarm code.
3. Alarm date and time.
4. Long alarm description.
5. Value of the probe linked to the alarm.

The red LED under the **ALARM** button can be:

- **Off**: no active alarm.
- **Flashing**: there is at least one active alarm and the display shows a screen that is not part of the alarms loop.
- **On**: there is at least one active alarms and a screen that is part of the alarms loop is displayed.

## 6.6.1 Alarm data log

The alarm data log can be displayed by pressing **ENTER** in the alarm screen.



The alarm data log memorizes the unit operation status when the alarms are triggered. Each log entry is an even that can be displayed from among all of the events available in the memory.

The information saved in the alarms screen will also be saved in the alarm data log. The maximum number of events that can be saved is 100. Once the limit is reached, the most recent alarm will overwrite the oldest one. The alarms log can be cleared in the HW-SW menu through the E010 parameter or by restoring the pCO to default values.



## 6.6.2 Reset alarms

The alarms can be reset manually, automatically or automatically with retries:

- Manual reset: when the cause of the alarm has stopped, the buzzer must first be reset using the **ALARM** button and then the **ALARM** button pressed a second time for a true reset. At this point, even the specific alarm action is reset and the device can restart.
- Automatic reset: when the alarm condition stops automatically, the buzzer is silenced and the alarm reset.
- Automatic reset with retries: The number of interventions per hour is checked. If that number is less than the set maximum, the alarm is on automatic reset, once the limit is exceeded it becomes manual.

## 6.6.3 Alarms

Code	Description on display	Reset	Action	Delay
AL001	Probe U1 broken or disconnected	A	None	Parameter
AL002	Probe U2 broken or disconnected	A	None	10s
AL003	Probe U3 broken or disconnected	A	Circuit OFF	10s
AL004	Probe U4 broken or disconnected	A	Circuit OFF	10s
AL005	Probe U5 broken or disconnected	A	Circuit OFF	10s
AL006	Probe U6 broken or disconnected	A	Circuit OFF	10s
AL007	Probe U7 broken or disconnected	A	Circuit OFF	10s
AL008	Probe U8 broken or disconnected	A	Circuit OFF	10s
AL009	Probe U9 broken or disconnected	A	Circuit OFF	10s
AL010	Probe U10 broken or disconnected	A	Circuit OFF	10s
AL011	Alarm extract fan	A	Stop unit	Parameter
AL012	Alarm exhaust fan	A	Stop unit HP	Parameter
AL013	Clock alarm	A	None	No
AL014	Memory expansion damaged	A	None	No
AL015	This is beta version Update the official	M	Unit OFF	30 days
AL016	Dirty filter	M	None	No
AL017	Low SH alarm circ.1	M	Circuit OFF	Parameter
AL018	LOP alarm circuit 1	A	Circuit OFF	Parameter
AL019	MOP alarm circuit 1	A	Circuit OFF	Parameter
AL020	Low suction temp. circuit 1	A	Circuit OFF	Parameter
AL021	High discharge press. circuit 1	M	Circuit OFF	No
AL022	Low suction pressure circuit 1	A	Circuit OFF	Start/Run parameter
AL023	Probe U11 broken or disconnected	A	Unit OFF	10 s
AL024	Probe U12 broken or disconnected	A	Unit OFF	10 s
AL025	No water flow	A	Stop unit HP	Parameter
AL026	Maintenance request compressor	A	None	No
AL027	Defrost running	A	No	
AL028	Fire smoke alarm	A	Activation procedure	No
AL029	Defrost running	A	Defrost procedure	No
AL030	Error BLDC management circuit 1	A	Circuit 1 OFF	No
AL031	High discharge temp. circuit 1	A	Circuit 1 OFF	No
AL032	Alarm delta pressure circuit 1	A	Circuit 1 OFF	Parameter
AL033	Start failure BLDC circuit 1	A	Circuit 1 OFF	Parameter
AL034	Envelope alarm circuit 1	A	Circuit 1 OFF	Parameter
AL035	Offline Power+ circuit 1	A	Circuit 1 OFF	Parameter
AL036	Alarm Power+ circuit 1	M	Circuit 1 OFF	No

## 7 Maintenance

Maintenance of the Living HP 15-25 is of great importance for the whole installations environmental influence, operating economy, durability, security and functions.



### Important

- Read the Warnings chapter 1 and Refrigerant Control/Reporting chapter before doing any work on the Living HP unit.

Maintenance should be carried at least once a year, apart from general cleaning the following should be done:

#### 1. Leakage control with registration for unit Living HP 25.

Different regulations can be valid in different countries. Check with your local government.

#### 2. General control.

When unit is running listen for abnormal sounds and vibrations. Inspect occurrence of oil leakage (can be a symptom on refrigerant leakage). Inspect occurrence of corrosion, fretting damages, loosen pipe suspensions.

#### 3. Control of the cooling coil (evaporator coil) and condenser coil.

After a long time of use the coils can obtain a deposit that obstructs the heat transfer and airflow. Vacuum clean the coils carefully from the dirty side.

#### 4. Control of the drip tray.

After a long time of use the drip tray and the drain can obtain a deposit that obstructs the drain of the condensation water. Clean the drip tray, drain, water seal and pipes from dirt and deposits.

## 7.1 Important



### Danger

- Make sure that the Mains supply to the unit is disconnected before performing any maintenance or electrical work!
- All electrical connections must be carried out by an authorized installer and in accordance with local rules and regulations.



### Warning

- Although the Mains supply to the unit has been disconnected there is still risk for injury due to rotating parts that have not come to a complete standstill.
- Beware of sharp edges during mounting and maintenance. Use protective clothing.

## 7.2 Maintenance Intervals

Type of maintenance	Once a year	When necessary
<b>Unit</b> <ul style="list-style-type: none"> <li>• Cleaning the unit</li> <li>• Inspection of seals and locks</li> </ul>	X	
<b>Filters</b> <ul style="list-style-type: none"> <li>• Replacing filters</li> </ul>		X

Type of maintenance	Once a year	When necessary
<b>Heat pump</b> <ul style="list-style-type: none"> <li>• Checking the compressor</li> <li>• Checking the evaporator for potential leakage</li> <li>• Checking the condenser for potential leakage</li> </ul>	X	
<b>Fans</b> <ul style="list-style-type: none"> <li>• Cleaning the fans</li> <li>• Inspecting of vibration dampers and flexible connections</li> </ul>	X	
Cleaning the duct system		X <sup>1</sup>
Cleaning the condenser/drip tray	X	
<b>Dampers</b> <ul style="list-style-type: none"> <li>• Checking the dampers</li> <li>• Cleaning the dampers</li> </ul>	X	

1. Or in accordance with local rules and regulations.

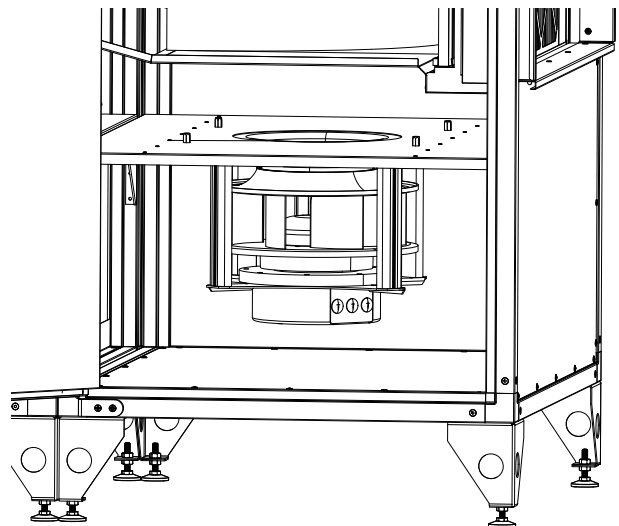
## 7.3 Maintenance Instructions

### 7.3.1 Checking the fan

#### 7.3.1.1 Cleaning

Even if the required maintenance, such as change of filters, is carried out dust and grease may slowly build up inside the fans. This will reduce the efficiency. The fan motor can overheat if a thick layer of dust prevents the air from entering the motor to cool down the stator structure.

- The external surfaces may be cleaned with a cloth or a soft brush. If they are severely fouled, use an environmentally friendly de-greasing agent. Do not use water. White spirit can be used to remove obstinate settlements. Allow drying properly before starting the unit.
- Wipe the fan impeller blades to remove any coatings. Use only the environmentally friendly de-greasing agent.



#### 7.3.1.2 Inspection

- Check if the fan impeller rotates easily, is in balance and does not vibrate.
- Check if the fan impeller is fixed and overlaps inlet cone.
- Listen to the sound coming from the motor bearings. It should make a slight purring sound. A scraping or pounding sound can indicate that the bearings are damaged and should be changed.
- Check if the rubber anti-vibration mountings are not damaged and intact.

- Check the mounting screws and tighten if necessary.

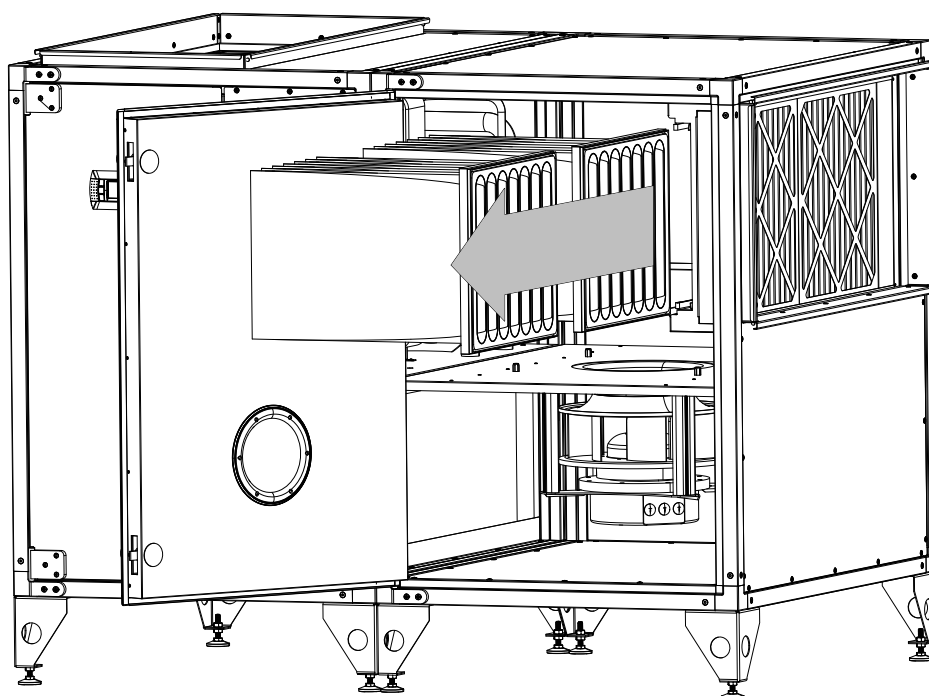
## 7.3.2 Changing Extract air filter

The bag filter cannot be cleaned and must be changed when necessary. New filters can be ordered from Systemair. Operation time between filter changes depends on the air pollution at the installation site. A differential pressure switch indicates when it's time to change the filters. This will trigger an alarm in the control panel.

### Caution

- A high concentration of dust collected the bag filter and the unit might be harmful to health. It is recommended to use the air-purifying respirator during maintenance and cleaning.

There is one pair of filters in the unit. Filters are taken out by releasing the filter locking handle after which filters can be taken out and replaced.



### 7.3.2.1 Supported filter types

Unit model	Filter class	Dimensions	Quantity
15	M5	490x392x520	2
20	M5	592x490x520	2
25	M5	592x592x520	2

Optionally, F7 class filters can be used instead of M5 for extract air filtering.

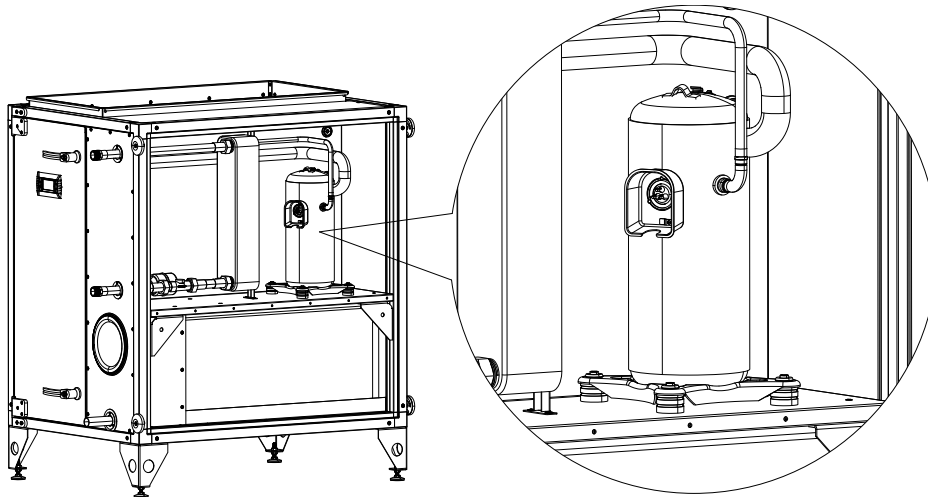
## 7.3.3 Cleaning the unit

During long term operation dust and grease may slowly build up inside the unit. The unit should be cleaned once a year when operating under normal air conditions with no special hygiene requirements. Clean the unit with a dry cloth or use water mixed with non corrosive cleaning medium. Any corrosion should be cleaned off immediately and the surface treated. In special operating conditions the unit shall be cleaned more frequency than required. Cleaning medium and method should be adapted to the relevant conditions.

Closing mechanisms should be lubricated at least once a year. Synthetic door hinges are service free. Seals around inspection doors should be cleaned at least once a year. It is recommended to treat the seals with a moisture of repellent agent. Connecting pieces for the unit sections, including the disc-lock types are to be checked for tightness at least once a year. All seals have to be inspected at least one a year.

## 7.3.4 Checking the compressor

Mandatory annual control must be done by trained service personnel. The service issued by the pump manufacturer must be followed. The pressure expansion system must be checked once a year. If necessary, the pressure must be increased to the correct level.



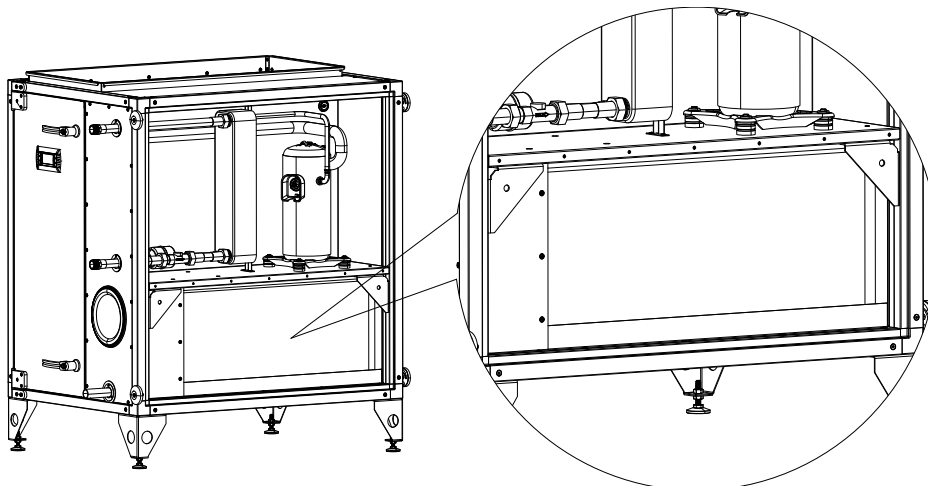
### 7.3.4.1 Inspection

Suggestion for checks may include:

- Any abnormal noises from the compressor;
- Oil leaks from pipes or compressor;
- Any corrosion on soldering or pipes;
- Any refilling with refrigerant R410A;
- Visual checks in sight glass.

## 7.3.5 Checking the evaporator coil

The evaporator coil is used to absorb heat from extracted air. The coil will have reduced capacity if dust forms a coating on the coil surface and increases the pressure drop on the air side. Even if the Living HP is fitted with the extract air filters, dust eventually will deposit on the coil fins.



### 7.3.5.1 Inspection

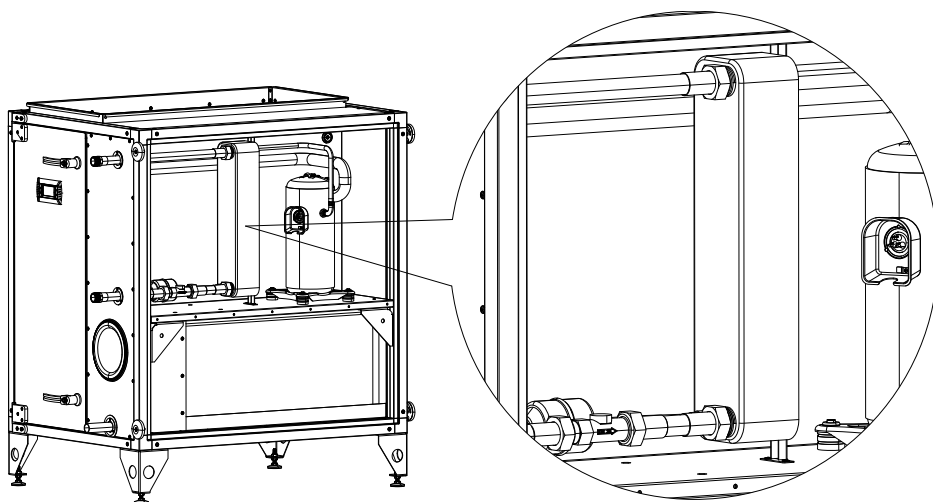
- Check the coil fins for any damage;
- Check if refrigerant is not leaking;
- Check the dip tray and drain, clean if necessary;

### 7.3.5.2 Cleaning

- Use the vacuum cleaner to remove dust from the inlet side of you can blow them with compressed air from the outlet side;
- Use hot water mixed with non corrosive cleaning medium and rinse using water. Any corrosion should be cleaned off immediately and the surface treated.

## 7.3.6 Checking the condenser

A brazed plate heat exchanger is used as the condenser to transfer heat from refrigerant gas to the water system. Inspection and cleaning procedure is similar to the evaporator coil maintenance.



### 7.3.6.1 Inspection

- Check the heat exchanger cover for any damage;
- Check if water is not leaking;
- Check if refrigerant is not leaking;

### 7.3.6.2 Cleaning

- Use hot water mixed with non corrosive cleaning medium and rinse using water. Any corrosion should be cleaned off immediately and the surface treated.

## 7.3.7 Checking the damper

A faulty damper can give rise to disturbances that may result in serious problems. Make sure to check all three dampers.

- Check operation of the damper actuator.
- Check that the damper tightens when closed. If not, adjust the damper actuator to make the damper tight (does not apply to trim dampers).
- Check the sealing strips.
- If the damper does not operate, check that nothing is stuck between the drive mechanism and damper blades to interfere with the damper function.

Clean the damper blades with a cloth. If they are severely fouled, an environmentally friendly degreasing agent can be used.

## 7.4 Additional maintenance

Living HP does not require any maintenance other than the annual service. However things to be checked in addition could include:

- Tightening of clamps in the cabinet.
- Measuring power consumption.
- Reviewing settings and set points.



### **Warning**

- Frequency converters must not be touched normally. The settings are made at the factory, and it is important that the parameters are not changed without consultation with Systemair. This could have critical consequences for compressors and the warranty may be invalidated.

All technical data for Living HP is supplied and is stuck to the inside of the control panel cabinet. The test diagram from the factory, instructions for installation, maintenance and operation, connection diagram and other documents are also supplied with the unit.



## 8 Disposal and recycling

Disposal must be carried out professionally and environmentally friendly in accordance with the legal stipulations.

### 8.1 Disposal of the heat pump unit

Prior to the disposal of the Living HP unit the refrigerant in the cooling system must be drained off by trained service personnel from a certified company. After correct evacuation of the refrigerant the disposal of the unit section is similar to the disposal of the rest of the air handling unit.

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**Note:**

Different regulations can be valid in different countries. Check with your local government before disposal of the compressor.

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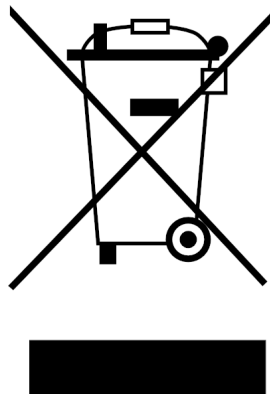
### 8.2 Disposal of the air handling unit

The unit can be dismantled or disposed in one piece in the same way it was installed only in reverse order (see: Living HP Installation instructions). A special vehicle capable of transporting the unit safely should be used to deliver the unit to the metal waste collection point where it can be recycled. Contact your local waste management company for more information.

### 8.3 Disposal of electrical and electronic equipment

In reference to European Union directive 2002/96/EC issued on 27 January 2003 and the related national legislation, please note that:

- the waste electrical and electronic equipment (WEEE) cannot be disposed of as municipal waste and such waste must be collected and disposed separately;
- the public or private waste collection system defined by local legislation must be used. In addition, the equipment can be returned to the distributor at the end of its working life when buying new equipment;
- the equipment may contain hazardous substances: the improper use or incorrect disposal of such may have negative effects on human health and on the environment;
- the symbol (crossed-out wheeled bin) shown on the product or on the packaging and on the instruction sheet indicates that the equipment has been introduced onto the market after 13 August 2005 and that it must be disposed separately;



- in the event of illegal disposal of electrical and electronic waste, the penalties are specified by local waste disposal legislation.

## **9 Information on personnel safety**

### **9.1 Additional protective measures**

Adjustments and maintenance must be done only by trained service personnel. The potential sources of harm are the fans with fast rotating impellers and the hot surface of the compressor. The impellers are still a potential hazard even after power cut-off because of after-run that can last up to 30 seconds.

The inspection doors are provided with a lock.

# 10 Troubleshooting



## Important

- Read the Warnings (figure 1) and Refrigerant Control/Reporting (figure ) before doing any work on the Living HP unit.

If operational disturbance would occur, the below schedule should be followed before contacting service personnel. Always check if there are any alarm indications in the Living HP unit control panel. Remember that the compressor have 3 minute delay before starting.

### 1. Compressor do not start

- Check if there are any alarm messages
- Check if mains supply to the heat pump section is not missing. Inspect external fuses and safety switch

### 2. Fan(s) do not start

- Check if there are any alarm messages
- Check if mains supply to the air handling section is not missing
- Check that the fuses are not defect

### 3. Reduced airflow

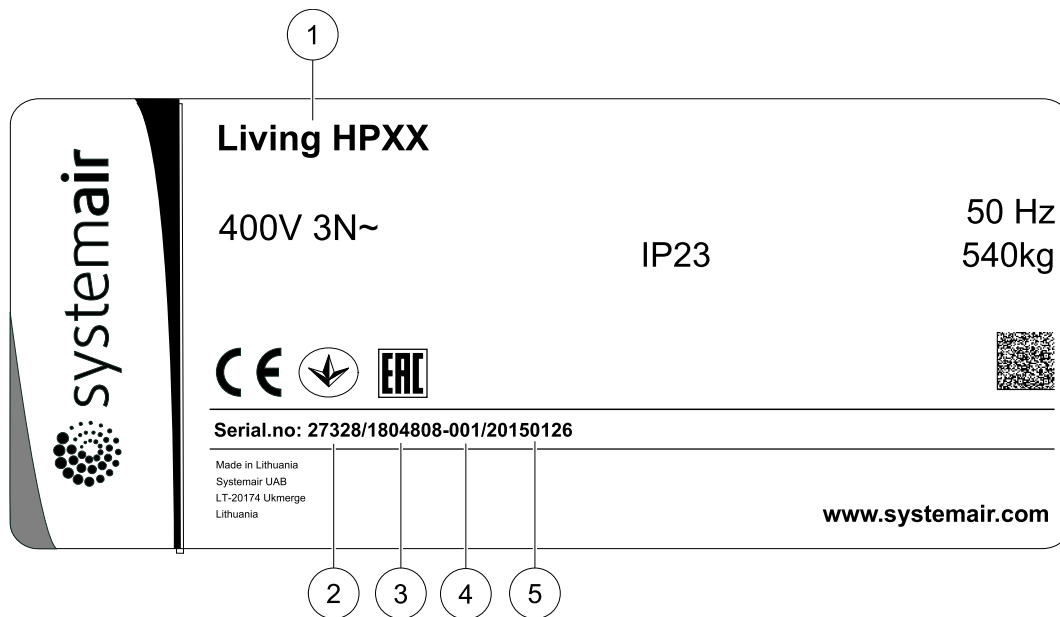
- Check that extract/exhaust (in winter) and fire/smoke (in summer) air dampers open
- Check if filters need changing
- Check if fan and evaporator coils need cleaning
- Check ducts for visible damage and/or build up of dust/pollution

### 4. Noise/vibrations

- Check that the unit is completely levelled
- Clean the fan impellers
- Check that the screws holding the fan are tightened properly
- Check anti vibration pads and flexible connections

# 11 Service

Before calling your service representative, make a note of the specification and product number from the type label (figure 6).



**Fig. 6 Type label**

Position	Description
1	Product code (product specification)
2	Item number
3	Production order number
4	Consecutive number
5	Production date (YYYY.MM.DD)

Systemair AB reserves the right to make changes and improvements to the contents of this manual without prior notice.



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