Living HP

Heat Recovery Ventilation Unit

GB Installation instructions

Document in original language

209532-EN_GB
2015-03-09 A001

Contents

1 Declaration of Conformity

Manufacturer

Systemair UAB
Linų st. 101
LT–20174 Ukmergė, LITHUANIA
Office: +370 340 60165 Fax: +370 340 60166
www.systemair.com

hereby confirms that the following products:

Heat recovery ventilation units: Living HP 15, Living HP 20, Living HP 25

comply with all applicable requirements in the following directives

- **Machinery Directive 2006/42/EC**
- **Low Voltage Directive 2006/95/EC**
- **EMC Directive 2004/108/EC**

The following harmonized standards are applied in applicable parts:

EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN 13857	Safety of machinery – Safety distances to prevent hazard zones being reached by upper or lower limbs
EN 60204-1	Safety of machinery – Electrical equipment of machines – Part 1: General requirements
EN 60335-1	Household and similar electrical appliances – Safety Part 1: General requirements
EN 60335-2-40	Safety of household and similar electrical appliances - Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers
EN 50106:2007	Safety of household and similar appliances – Particular rules for routine tests referring to appliances under the scope of EN 60 335-1 and EN 60967
EN 60529	Degrees of protection provided by enclosures (IP Code)
EN 62233	Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure
EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61000-6-3	Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standards for residential, commercial and light-industrial environments

(The declaration applies only to product in the condition it was delivered in and installed in the facility in accordance with the included installation instructions. The insurance does not cover components that are added or actions carried out subsequently on the product)

The complete technical documentation is available.

Ukmergė, 22–10–2014

Mats Sándor
Technical Director

2 Warnings

⚠ Danger

The heat pump unit can cause personal injury if installed or used incorrectly. Read the documentation for the product carefully before it is installed or commissioned.

- Inspection doors must always be closed and locked with the corresponding key when the voltage is on. Under no circumstances may the box be left with the door unlocked.
- Any work on the product should be carried out by knowledgeable and authorised service personnel.
- When carrying out work/service on the cooling circuit(s), the power must be disconnected, and the work only performed by authorised personnel.
- Delivery pipes are hot during and after operation, and contact with bare skin may cause burn injuries.
- The refrigerant for this cooling unit is R410A and cannot be replaced with any other type of refrigerant without written approval from the supplier.
- The refrigerant must under no circumstances be released into the environment.
- As the refrigerant is heavier than air, the refrigerant may displace the air and cause asphyxiation in unfavorable conditions.

⚠ Warning

- There may be serious mechanical, electrical, noise or vibration hazards associated with using the equipment contained in the unit. In order to reduce the risk of these hazards, it is absolutely necessary to observe all regulations that apply to safety, installation, operation and maintenance.
- For safety reasons, only personnel with relevant technical competence may perform installation work. The installation instructions supplied must be followed.
- The unit is not to be taken into operation before all protective devices are in place and function tested. Any air intake and air exhaust must be protected with grilles.
- No maintenance work may be carried out and no inspection doors may be opened before the unit is switched off and isolated from the power supply. You must ensure that rotating parts have stopped and the electrical battery's heating rods have cooled.
- Service switches are locked to prevent unauthorized start-up during maintenance work. Where condensation water needs to be drained away, correct connection to the drain must ensure this. The installer must equip the unit with operating and maintenance instructions.
- These safety regulations only apply to products supplied by Systemair AB. It is the installer's responsibility to carry out a comprehensive safety assessment of the unit, as well as preparing safety regulations so that user is able to secure the unit such that it does not cause harm to people, animals, material or environment. If there is any doubt about how to interpret the regulations covering safety, installation, operation and maintenance, it is of the utmost importance that advice is sought from Systemair AB or its distributors.

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_2 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 Product information

4.1 General

This installation manual concerns Living HP manufactured by Systemair UAB. Living HP include the following model options:

- Living HP 15, Living HP 20, Living HP 25.

This manual consists of basic information and recommendations concerning the design, installation, start-up and operation, to ensure a proper fail-free operation of the unit.

The key to proper and safe operating of the unit is to read this manual thoroughly, use the unit according to given guidelines and follow all safety requirements.

4.1.1 Left and Right model versions

There are two versions of each model, right (R) and left (L). The different versions are recognized by the placing of the internal components and the extract air inlet , which is situated on the right side of the right (R) unit and on the left side of the left (L) unit.

Note:

This documents describes the right (R) version models. The inside of the left (L) model is mirrored.

4.2 Technical data

4.2.1 Dimensions and weights

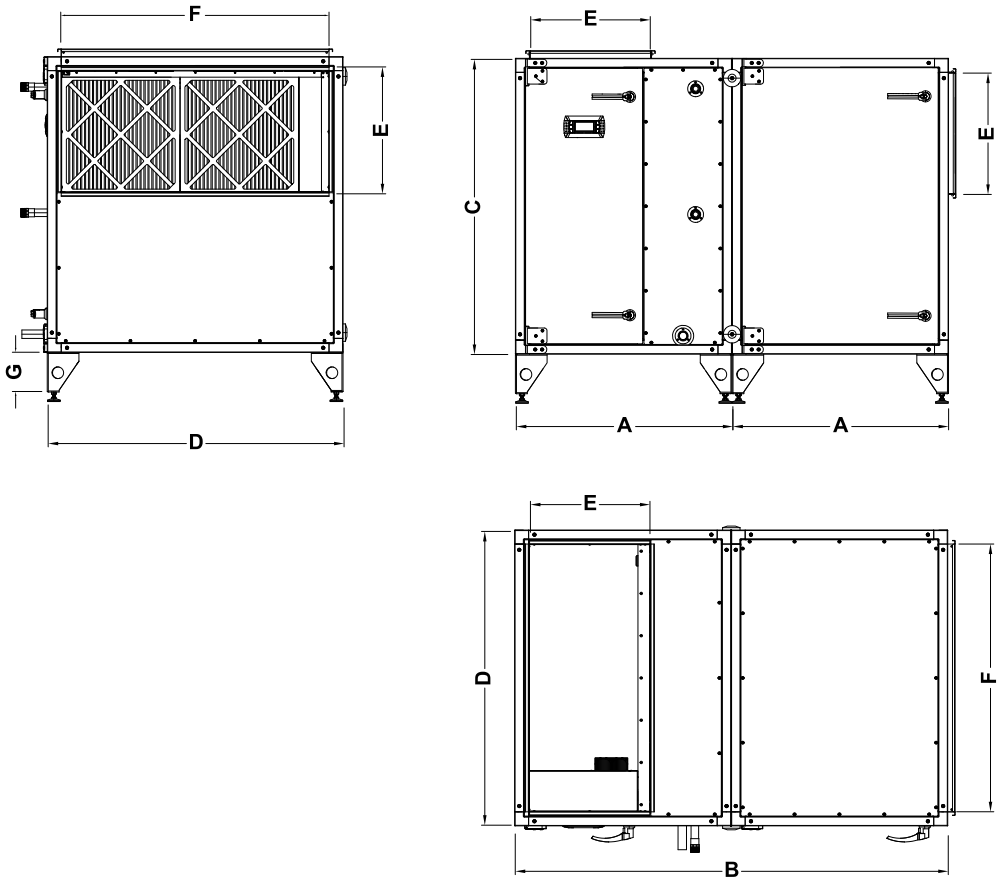


Fig. 1 Dimensions (mm) Living HP 15-25

Model	A	B	C	D	E	F	G
15	820	1640	1120	1120	450	1000	150
20	820	1640	1270	1270	500	1150	150
25	820	1640	1420	1270	600	1300	150

Table 1: Weights (kg)

Model	Heat pump section weight, kg	Air handling section weight, kg	Total weight, kg[1]	Total weight with roof, kg[2]
15	219	128	347	403
20	257	160	417	481
25	303	192	495	566

1. *Including legs, dampers and actuators, pre-filters and filters, refrigerant*
2. *Including baseframe, roof, extract air damper and actuator, exhaust louver, pre-filter and filters, refrigerant*

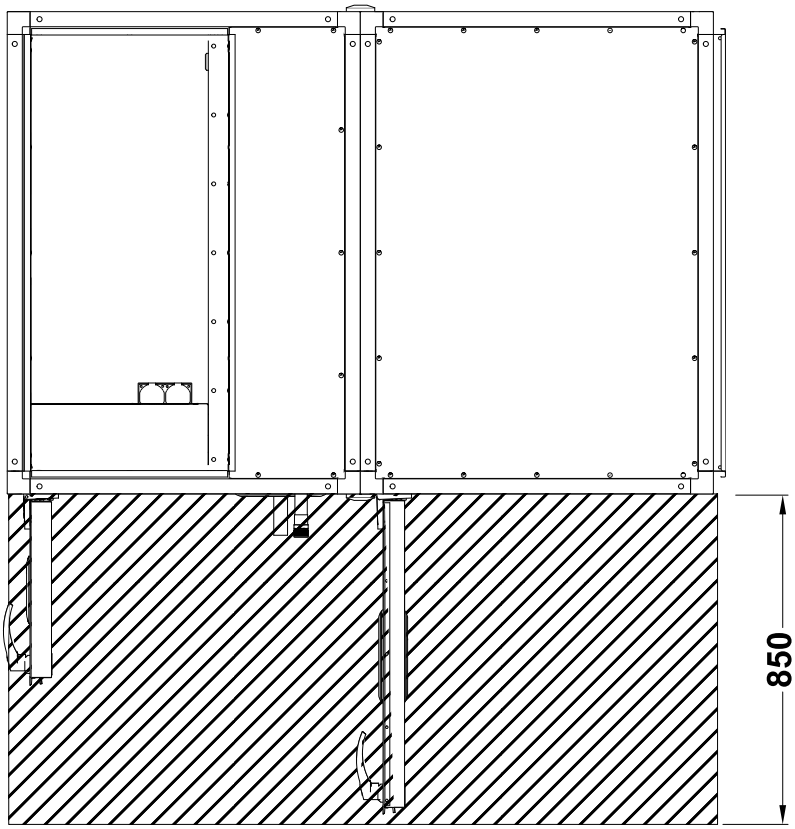


Fig. 2 Required space to open inspection doors

For service and inspection a free space (figure 2) is necessary on the inspection side of the unit.
When changing components a free space corresponding to the width of the component in question is necessary.

4.2.2 Electrical data

Model	Voltage	Current (A)	Power (kW)	Fuse, slow
15	400V 3N~, 50Hz	17.5	10	25
20	400V 3N~, 50Hz	26	15	40
25	400V 3N~, 50Hz	38	23	40

5 Transportation and storage

⚠ Warning

The unit is heavy. Be careful during transport and mounting. Risk of injury through pinching. Use protective clothing.

⚠ Important

During transportation the unit must be held in the upright position.

Loading and unloading as well as transport on the site is possible by fork-lift truck or by crane using suitable lifting straps.

The Living HP should be stored and transported in such a way that it is protected against physical damage that can harm panels, handles, display etc. It should be covered so that dust, rain and snow cannot enter and damage the unit and its components. The appliance is delivered in several sections that should be assembled on site. The appliance contains all necessary components, wrapped in plastic on a pallet for easy transportation.

Living HP unit must be protected from the weather and accidental impact. Plastic packaging must be removed and unit covered with tarpaulin or similar materials. In order to minimize condensation, sufficient air circulation must be ensured between the covering and the unit. During transportation the unit must be in the upright position.

Note:

Necessary parts like smoke sensor, disc-locks, ambient air sensor, etc are placed loosely inside the unit. The unit must not be put into operation before the enclosed parts are removed and installed properly.

5.1 Lifting/Unloading with forklift

When lifting with forklift trucks or pallet jacks, ensure that the forks go under the entire length of the box, otherwise the underside of the box may be damaged. During transportation the unit must be in the upright position.

The forks of the truck must be sufficiently long to avoid any damage to the AHU underside.

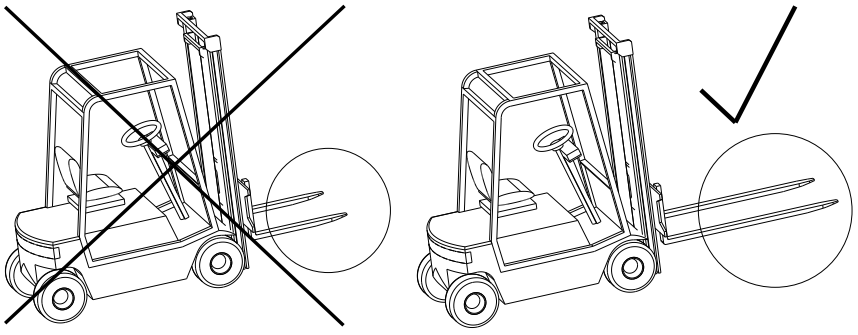


Fig. 3 Unloading with forklift

5.2 Lifting/Unloading with Crane

Living HP unit delivered with legs must be lifted by straps secured to the legs as shown in the illustration (figure 4). When lifting unit sections mounted on pallet or units mounted on a base frame, use metal tubes inserted through the holes in the frame and suspend the unit by soft cables (figure 5). Make sure that the upper part of the unit will not be damaged. Be particularly aware that the cooling section have a high center of gravity because the compressor is positioned at the top of the cooling section.

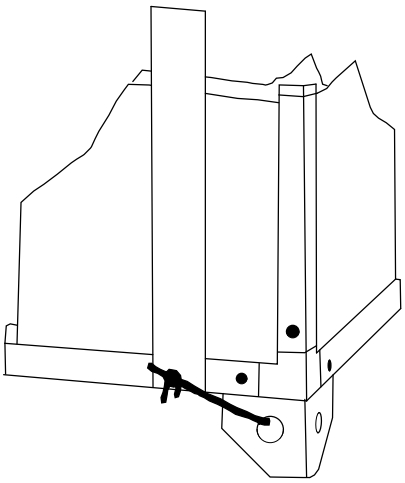


Fig. 4 Secured straps

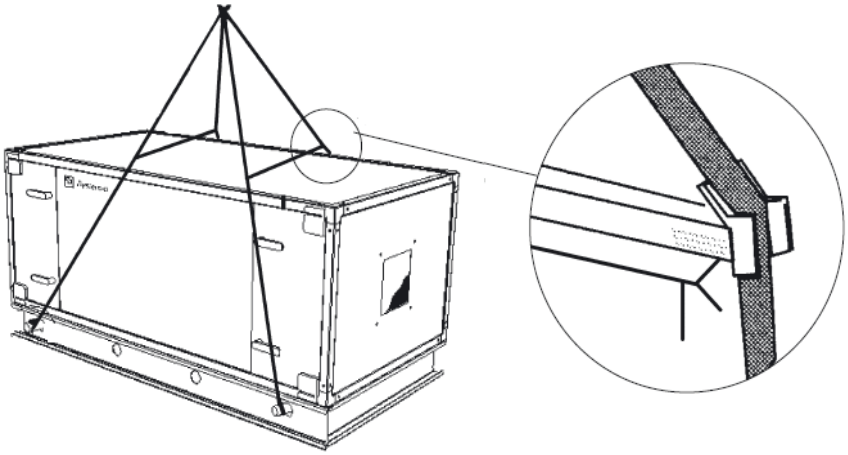


Fig. 5 Lifting by metal tubes

6 Installation

6.1 Unpacking

Verify that all ordered equipment are delivered before starting the installation. Any discrepancies from the ordered equipment must be reported to the supplier of Systemair products.

6.2 Where to Install the Unit

The unit without roof is meant for indoor installation. The electronic components should not be exposed to lower temperature than –30°C or higher than +50°C.

When mounting; make sure to leave enough space to access the service doors (figure 2).

Note:

If there is not sufficient space to open the inspection doors it is possible to unscrew the hinges to remove the doors completely for inspection and maintenance.

General maintenance includes replacing the filters and cleaning fan motor inside the unit.

Avoid placing the unit against a wall, as low frequency noise can cause vibrations in the wall.

The extract air should ideally be led out via a roof cowl away from any outdoor air intakes, windows, balconies etc.

⚠ Warning

- The door handles are lockable. Make sure that the handles are locked during operation of the unit.
- The unit must be duct connected or in some other way provided with protection so that it is not possible to come in contact with the fans through the duct connections

6.3 Installing the unit

6.3.1 Installation procedure

1

Prepare the surface where the unit is to be mounted. Make sure that the surface is flat, levelled, vibration free and that supports the weight of the unit.Perform the installation in accordance with local rules and regulations.

2

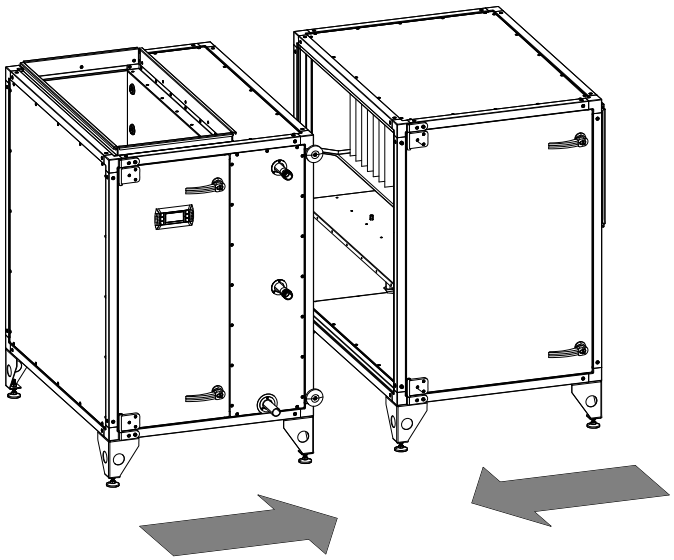
Make sure that the factory mounted rubber gaskets between the sections are undamaged.

⚠ Warning

Beware of sharp edges during mounting and maintenance. Make sure that a proper lifting device is used. Use protective clothing.

3

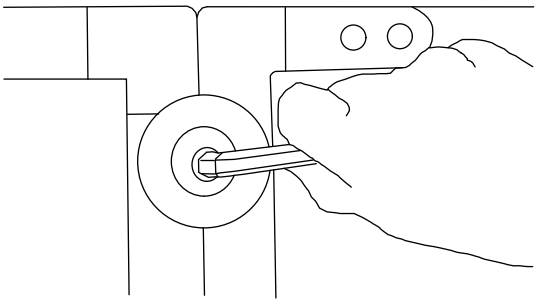
Position the sections directly in front of each other. Level the unit with help of the enclosed mounting feet to get the sections parallel and at the same height.



> **Important**
>
> Make sure not to pinch loose cables.

4

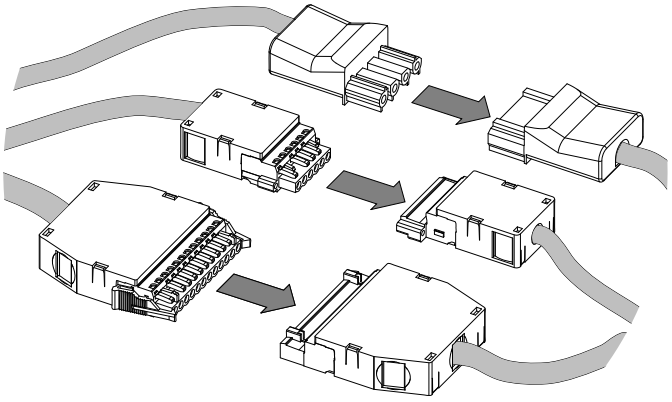
Lock the sections together with the disc-lock system. One disc-lock in every vertical part of the section corner is required. Place all 4 disc-locks loosely over the 2 factory mounted pins before fitting them properly. Lock the sections tightly together with the help of an Allen (hex) key.



> **Important**
>
> The disc-lock system must not be used to pull the sections together.

5

> **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.



Connect cables from the heat pump section to corresponding connectors from the air handling section. All connectors are different and can be connected only one way.

6

Install and connect all external components to the unit, for more information see: 7.5.2 *Installation/wiring of external components*, page 15.

7

> **⚠ Warning**
>
> The units electrical connection to the mains supply must be preceded by an all pole circuit breaker with a minimum 3 mm gap.

Connect the unit to the mains supply.

7 Connections

7.1 Duct connection principle

When Living HP heat pump section have been joined together with the air handling unit it should be in total 2 duct connections on the unit: Indoor Extract air and Exhaust air.

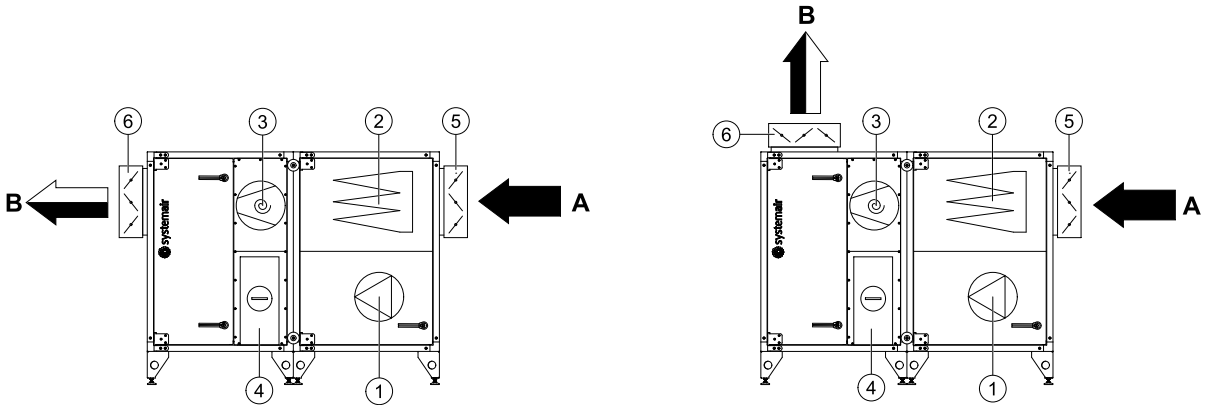


Fig. 6 Right hand connected unit, side and top connected

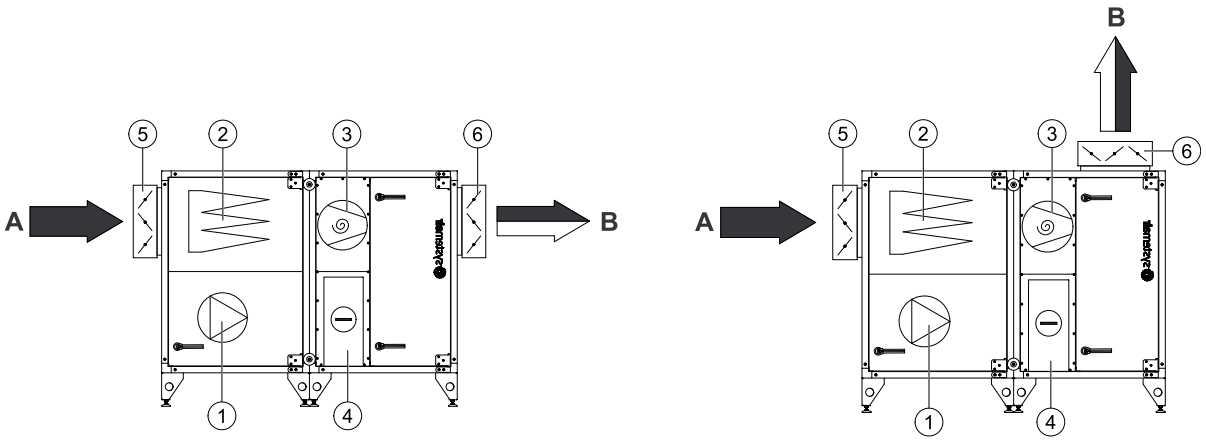


Fig. 7 Left hand connected unit, side and top connected

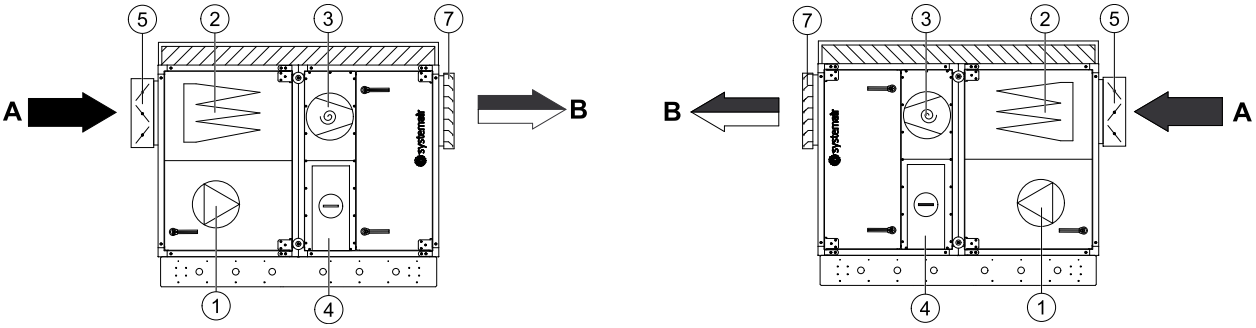


Fig. 8 Left and right hand units with roof

Position	Position	Symbol
A	Connection extract air	
B	Connection exhaust air	
1	Fan extract air	
2	Filters extract air	
3	Compressor	
4	Evaporator	
5	Extract air damper	
6	Exhaust air damper	
7	Exhaust air louvers	

7.2 Unit diagram

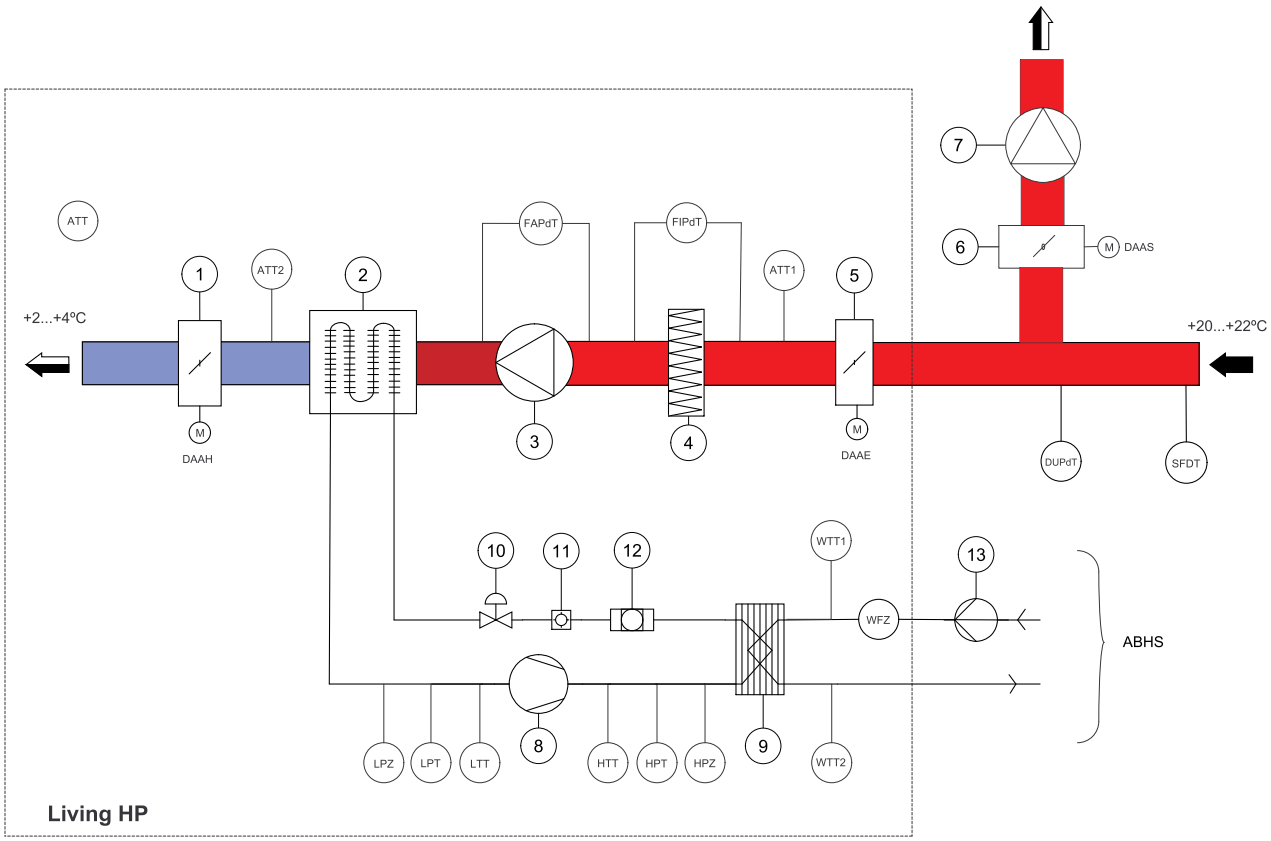


Fig. 9 Unit diagram

Table 2: 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
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

Component position and description cont'd

Position	Description
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

7.3 Condensation and Heat Insulation

Extract and exhaust ducts must always be well insulated against condensation and heat loss. Correct insulation installation on ducts connected to the unit is especially important. All ducts installed in cold rooms/areas must be well insulated. Use insulating covering (minimum 100 mm mineral wool) with plastic diffusion barrier. In areas with extremely low outdoor temperatures during the winter, additional insulation must be installed. Total insulation thickness must be at least 150 mm.

⚠ Caution

- If the unit is installed in a cold place make sure that all joints are covered with insulation.
- Duct connections/duct ends should be covered during storage and installation

7.4 Condensation drain

⚠ Warning

- The unit is not to be taken into operation before the condensation drain is connected from the Living HP to the sewerage.
- Drainage installation must be carried out by an authorized installer.

The drainage connection is located at the bottom front side of heat pump section. To use the drainage: remove the rubber seal and connect the drainage pipe. Connect the drainage pipe to the sewer. The water can not be led straight to the sewer without a proper water trap. Make sure to use correct drainage pipes.

7.5 Electrical connections

⚠ 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 cycle and handling refrigerants must be performed by certified personnel.

All electric connections are made in the electrical connection box which can be found behind the doors of heat pump section.

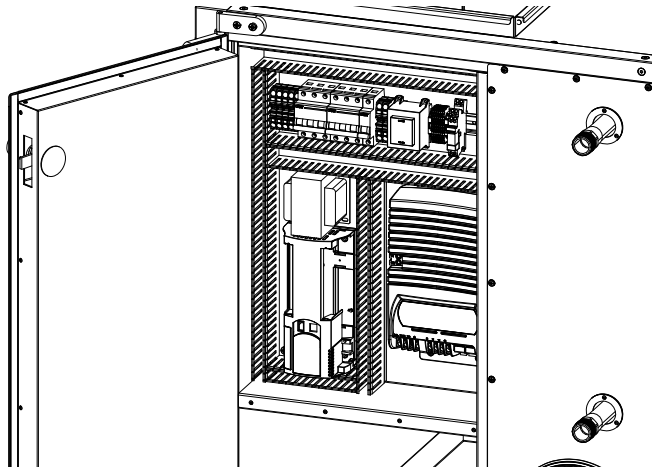


Fig. 10 Electric connection box

Living HP 15-25 are delivered with enclosed control. Internal and external wiring is connected to terminals in the enclosed electrical connection box placed on the front of the unit.

The unit must not be put into operation before all the electrical safety precautions have been read and understood. See the enclosed wiring diagram for internal and external wiring.

1. Connect fan section control cables to the electrical cabinet via prepared connectors in the heat pump section. Connect external components according to labelling on the wires and the electrical wiring diagram. See 7.5.2 *Installation/wiring of external components*, page 15 for more information.
2. Connect the unit to the mains (400V 3N~, 50Hz) through the all pole circuit breaker (safety switch), which is enclosed inside the unit on delivery. The wiring is lead through the bottom of the unit casting directly to the Living HP electrical connection box. Dimension the wires and fuses according 4.2.2 *Electrical data*, page 5 .
3. Do the electrical connections for the Living HP air handling unit according to the installation instructions that follows that unit.

7.5.1 Electrical connection box

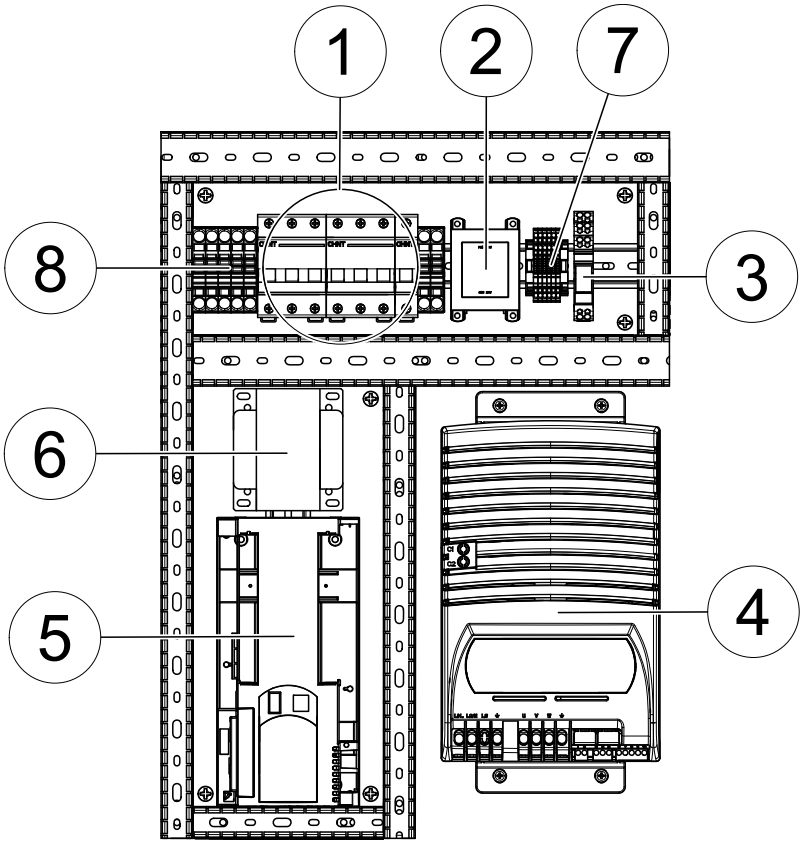


Fig. 11 Electrical cabinet

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

7.5.2 Installation/wiring of external components

⚠ 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.

Living HP have in total 5 external components that are delivered loosely with the unit and must be connected manually:

1. Ambient temperature sensor (ATT);
2. Differential pressure transmitter on duct (DUPdT);
3. Fire/Smoke fan (optional, needs to be ordered separately);
4. Fire/Smoke sensor (SFDT);
5. Fire/Smoke damper actuator (DAAS) (optional, needs to be ordered separately)

Other sensors are built in to the unit.

Ambient temperature sensor (ATT)

Use temperature sensor supplied together with the unit. Ambient temperature sensor cable should be installed outside of the building, far enough from places that can effect temperature readings Connect it to the control unit with two-wire cable according to attached wiring diagram.

Differential pressure transmitter on duct (DUPdT)

Use differential pressure transmitter supplied together with the unit. Differential pressure transmitter (pos 1) must be installed before duct intersection (pos 2) . Connect it to the control unit with three-wire cable according to attached wiring diagram.

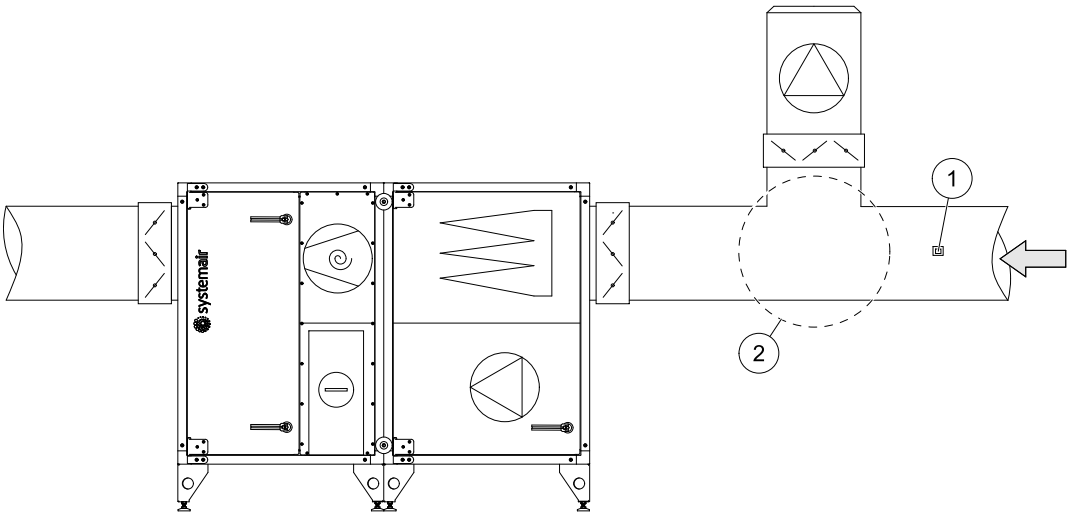


Fig. 12 Differential pressure transmitter installation location

Fire/Smoke fan

Note:

Fire/Smoke fan needs external power supply. Unit provides only control functions.

Connect it to the control unit with six-wire cable according to attached wiring diagram.

Fire/Smoke sensor (SFDT)

Use Fire/Smoke sensor supplied together with the unit. The sensor must be mounted in the duct before fire/smoke duct intersection. Connect it to the control unit with four-wire cable according to attached wiring diagram.

Fire/Smoke damper actuator (DAAS)

Connect it to the control unit with two-wire cable according to attached wiring diagram.

7.6 Additional Equipment

For information concerning additional external equipment such as valve actuators, motorized dampers, E-tool, roof units, wall grilles etc. see technical catalogue and their enclosed instructions.

For electrical connections of external components see enclosed wiring chart.

8 Commissioning record

8.1 Commissioning Instructions

Systemair assemblies are tested and function tested at the factory before delivery. A thorough inspection of the unit is done by the manufacturer. The unit should still be checked again by an electrician before deployment.

It is important that any changes to settings are recorded in the commissioning protocol.

Before starting the unit

- The unit is delivered in sections, fitted with quick connectors for the control and motor cables between each section. Make sure that these couplings are connected.
- The unit is supplied with a master switch, which is also the point at which the electrician will connect the unit to the mains supply. Check voltage — measure between all phases and between all phases and ground.
- **Ambient temperature sensor** supplied together with the unit. Ambient temperature sensor cable should be installed outside of the building; far enough from places that can effect temperature readings Connect it to the control unit with two-wire cable according to attached wiring diagram.
- **Differential pressure transmitter** supplied together with the unit. Probe of DPT must be installed before duct intersection. Connect it to the control unit with three-wire cable according to attached wiring diagram.
- **Fire/Smoke sensor** supplied together with the unit. Connect it to the control unit with four-wire cable according to attached wiring diagram

Turn on main switch and circuit breakers in the electrical cabinet. Wait a few minutes while the control panel loads all the values. Any error messages are shown on the display.

8.2 Before first compressor start

To avoid damage on the compressor the oil in the compressor crankcase must be heated before the first start. Heating is done automatically using an in-built heating coil when the compressor is connected to the power supply.

Moment	Done	Note
Turn on the mains supply for the Living HP via the safety switch, make sure that the voltage is on (the display in the frequency converter lights up) **Wait for minimum 12 hours so that the oil will reach about +30°C!**	☐	

8.3 General

Company:

Responsible:

Customer:	Date:	Installation:
Object/unit:	Item no:	Installation address:
Model/size	Serial no:	Designation:

8.3.1 Installation control

Moment	Done	Note
All unit parts undamaged.	☐	
Installation carried out according to instructions (see 6.3 *Installing the unit*, page 8).	☐	
Condensation drain connected.	☐	
All external cables connected and sensors installed in appropriate locations (see 7.5.2 *Installation/wiring of external components*, page 15).	☐	
Mains supply connected via the Safety switch.	☐	

8.3.2 Control cooling operation

Moment	Done	Note
Start the unit. Check the control panel for any alarms.	☐	
Run the compressor for at least 10 minutes. If compressor working conditions are stable, read the Extract, Exhaust air temperature via the display of the pGD1 control panel (in the menu `Info`).	☐	Extract air temperature ___ °C Exhaust air temperature ___ °C
Read refrigerant suction gas temperature and refrigerant discharge gas temperature.	☐	Suction gas temperature ___ °C Discharge gas temperature ___ °C
Let the compressor run. Read water in and water out temperatures and operating water flow.	☐	Water in temperature ___ °C Water out temperature ___ °C Water flow ___ l/s
Check refrigerant suction and discharge pressure.	☐	Refrigerant suction pressure ___ bar(g) Refrigerant discharge pressure ___ bar(g)

8.4 Commissioning protocol

Function	Default settings		Set value	
Heat pump regulation	Delta Temp evaporator	☒	Delta Temp evaporator	☐
	Set point:	18 K	___ K	
	Delta Temp water	☐	Delta Temp water	☐
	Set point:	6 K	___ K	
	Delta Outlet (by heating curve)	☐	Delta Outlet (by heating curve)	☐
	Heating curve No.	1	___	
	Offset:	0	___	
Fan regulations	Air flow (l/s) (CAV)	☒	Air flow (CAV)	☐
			___ l/s	
	Differential pressure on duct (Pa) (VAV)	☐	Differential pressure on duct (VAV)	☐
	Set point:	150 Pa	___ Pa	
Heat pump activation parameters	Min. temperature return air	10 °C	___ °C	
	Max. temperature external air	15 °C	___ °C	
	Threshold alarm air flow	30 Pa	___ Pa	
Fire/smoke activation (Summer mode)	Max. external air temperature	20 °C	___ °C	
Defrost protection	Exhaust air temperature	☒	Exhaust air temperature	☐
	Evaporative temperature	☐	Evaporative temperature	☐
	Set point:	–2 °C	___ °C	
	Reset:	8°C	___ °C	
	Startup:	300 s	___ s	
	Defrost duration:	10 min.	___ min.	
	Min. time:	1 min.	___ min.	

Notes:

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

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