IV PRODUKT

Air handling with focus on LCC

Operation and maintenance instructions

THE NEW
EcoHeater home concept

Extract Air Heat Pump
THE NEW EcoHeater 060-300

Order number :

Project :

Original instructions

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IV PRODUKT

Air handling with focus on LCC

1 General

1.1 Intended use

The EcoHeater is a series of highly efficient extract air handling units with a built-in, variable capacity-controlled heat pump. The EcoHeater is intended to be used for heat recovery from comfort ventilation in energy-efficient apartment blocks.

1.2 Safety precautions

Observe warning labels on the unit as well as the following safety precautions:

Lockable safety switch

WARNING!
High voltage and rotating fan impeller, risk of personal injury. Before working on/servicing the unit – shut down the unit via the control terminal, then turn the safety switch to the 0 position and lock it.

NB:
The safety switch is not designed for starting/stopping the unit. Always use the control equipment to start and shut down the unit.

Inspection doors

WARNING!
Positive pressure inside the unit, risk of personal injury. Allow the pressure to drop before you open the inspection doors.

WARNING!
Rotating fan impeller, risk of personal injury. Shut down the air handling unit and wait at least 3 minutes before you open the inspection doors.

NB:
The doors in front of moving parts should normally be locked; there are no safety guards. Before carrying out work, unlock the doors with the key provided.

Electrical connection

WARNING!
Rotating fan impeller, risk of personal injury. The unit must not be energised until all ducts have been connected.

NB:
Wiring of connections and other electrical work may only be carried out by a qualified electrician or by service personnel recommended by IV Produkt.

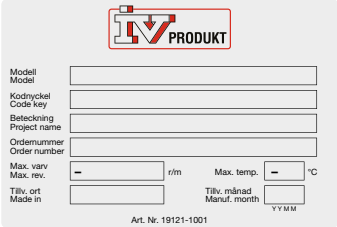
1.3 Manufacturer

The EcoHeater extract air heat pump is manufactured by:

IV Produkt AB
Sjöuddevägen 7
SE-350 43 VÄXJÖ

1.4 Designations

The EcoHeater extract air heat pump is comprised of two sections plus a possible combustion gas bypass. Each section has a model identification label placed on the front. All the necessary designations needed for identifying the section appear on the label.



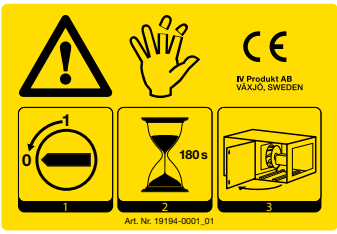
Typical model identification label

1.5 CE marking and EU Declaration of Conformity

EcoHeater extract air heat pumps are CE marked, which means that upon delivery, they conform to applicable provisions in EU Machinery Directive 2006/42/EC as well as to the EU Directives applicable to other types of air handling units, e.g. the Pressure Equipment Directive 2014/68/EU.

As certification confirming that the requirements have been met, we provide an EU Declaration of Conformity, which is available at docs.ivprodukt.com.

For the CE marking of IV products to apply, the applicable requirements of the EU Machinery Directive 2006/42/EC and related directives for control equipment shall be met when installed for the unit.



Typical CE label for air handling units

1.6 Maintenance

Continuous maintenance of this unit can be carried out either by the person normally in charge of maintaining the building or through a contract with a well-reputed service company.

1.7 Handling of refrigerant

The following information summarises the requirements and guidelines for handling the refrigerant used in cooling units. For further information, see the F-gas Regulations (EU/517/2014) and the Refrigerant Regulations (SFS 2016:1128). The purpose of the regulations is to contribute to achieving EU goals for reduced climate impact in accordance with the Kyoto Protocol.

Operator responsibilities

Generally speaking, the unit operator must:

- Minimise and prevent leakage
- Take corrective action to remedy any leakage that arises
- Ensure that the service and repair of the refrigerant circuit is carried out by a certified refrigeration technician
- Ensure that refrigerant is handled in an environmentally secure manner and in accordance with national regulations.

By operator, we refer to the European Parliament's definition: "...the natural or legal person exercising actual power over the technical functioning of the equipment and systems...".

The levels for the various actions to be taken for a system are calculated using carbon dioxide equivalents, CO_2 e(ton). This figure is calculated by multiplying the refrigerant's GWP value (Global Warming Potential) by the filling amount in kilos. GWP for R410a is 2088. A filling amount of 5.0 kg R410a therefore corresponds to
(5.0×2088)/1000 = 10.44 CO_2 e(tons). The unit is marked with refrigerant quantity and carbon dioxide equivalent.

Leakage inspection and registration

The following applies to one-piece units with 5 CO_2 e(ton) refrigerant content or more per circuit (EcoHeater sizes 150 – 300):

- **Leakage inspection** must be carried out by a certified refrigeration technician:
  – When installing/commissioning the unit
  – Periodically at least once per 12 months,
  i.e. no more than 12 months between inspections
  – within one month of any work being performed (e.g. sealing a leak, replacing a
  component).
- The operator must **record** events, such as the volume and type of refrigerant topped up, refrigerant taken into possession, results of inspections and work done, person and company who carried out service and maintenance.

If the total refrigerant content is below 5 CO_2 e (ton) (EcoHeater sizes 060 – 100) no periodic leak detection is needed, although an initial leak inspection should be performed in conjunction with installation.

If the total refrigerant content of the ventilation system exceeds 14 CO_2 e(ton), the result of the inspections (inspection report) must be sent to the regulatory authorities and be in their possession no later than 31 March of the following year. For a unit that will contain 14 CO_2 e(ton) or more, the intended operator must inform the supervisory authority of the installation well in advance.

1.8 Extended warranty

In cases in which the equipment delivered falls under a 5-year warranty, in accordance with ABM 07 with supplement ABM-V 07 or in accordance with NL 09 with supplement VU13, the IV Produkt Service and Warranty Manual is supplied with the product.

In order to lay claim to an extended warranty, a complete, documented and signed IV Produkt Service and Warranty Manual must be presented.

1.9 Spare parts

Spare parts and accessories for this unit are ordered from your nearest IV Produkt sales representative. When ordering, state the order number and designation.
These are stated on a data label, affixed to each component.
A separate spare parts list is supplied with the unit.

1.10 Dismantling and decommissioning

When an air handling unit is to be dismantled, separate instructions must be followed, refer to Dismantling and decommissioning the AHU under Documentation at docs.ivprodukt.com.

2 Technical description

2.1 Design

The EcoHeater extract air heat pump consists of two sections; the fan section and heat pump section.

Fan section *Heat pump section*

Heat pump section

The heat pump section comprises a DX heat recovery coil, electronic expansion valve, a variable speed controlled compressor, fully soldered plate heat exchanger (between refrigerant and the liquid side of the radiator circuit), frost-protected evaporation water outlet for outdoor operation, and integrated control equipment with electrical connection.

The cooling circuit is integrated in the heat pump section. The compressor and control components are shielded from the extract air stream. The cooling circuit is factory tested and built in accordance with PED 2014/68/EU, Module A2. Designed in accordance with EN378.

The cooling circuit is supplied with a high pressure switch (manual reset), as well as protection and alarm functions for high/low pressure. The cooling circuit is controlled so freezing does not occur in the extract air coil. Refrigerant is R410a.

All piping and electrical connections are made via the front. Frost-protection (heating wire) for the condensation outlet is a maximum of 1 metre from the heat pump for outdoor operation.

Fan section

The fan section has a direct driven chamber fan with an EC motor and deep-ridged filter (filter class M5 as standard). EcoHeater sizes 240 and 300 have double fans. The fan unit is withdrawable. Replace the filter from the front of the unit.

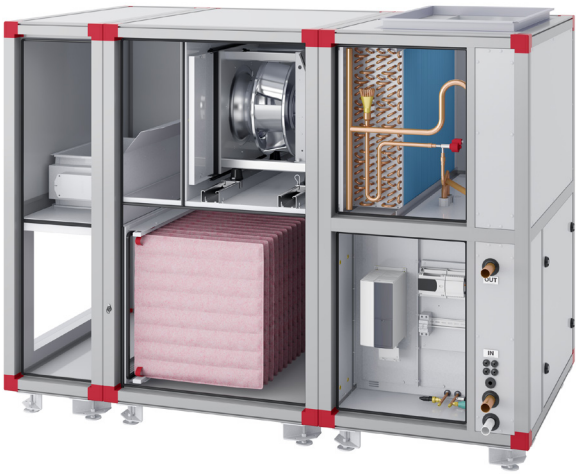
Variants and accessories

The unit can be delivered in the following configurations/variants:

- Indoor or outdoor configuration
- Extract air connection to the right or left
- Exhaust air connection can be either connected to the gable section or to the ceiling (top) (not for outdoor operation).
- Combustion gas bypass

Optional accessories:

- Evacuation damper
- Duct damper
- Inspection window
- Light fitting
- Duct slide valve
- Filter manometer (U-tube, Kytölä or Magnehelic)



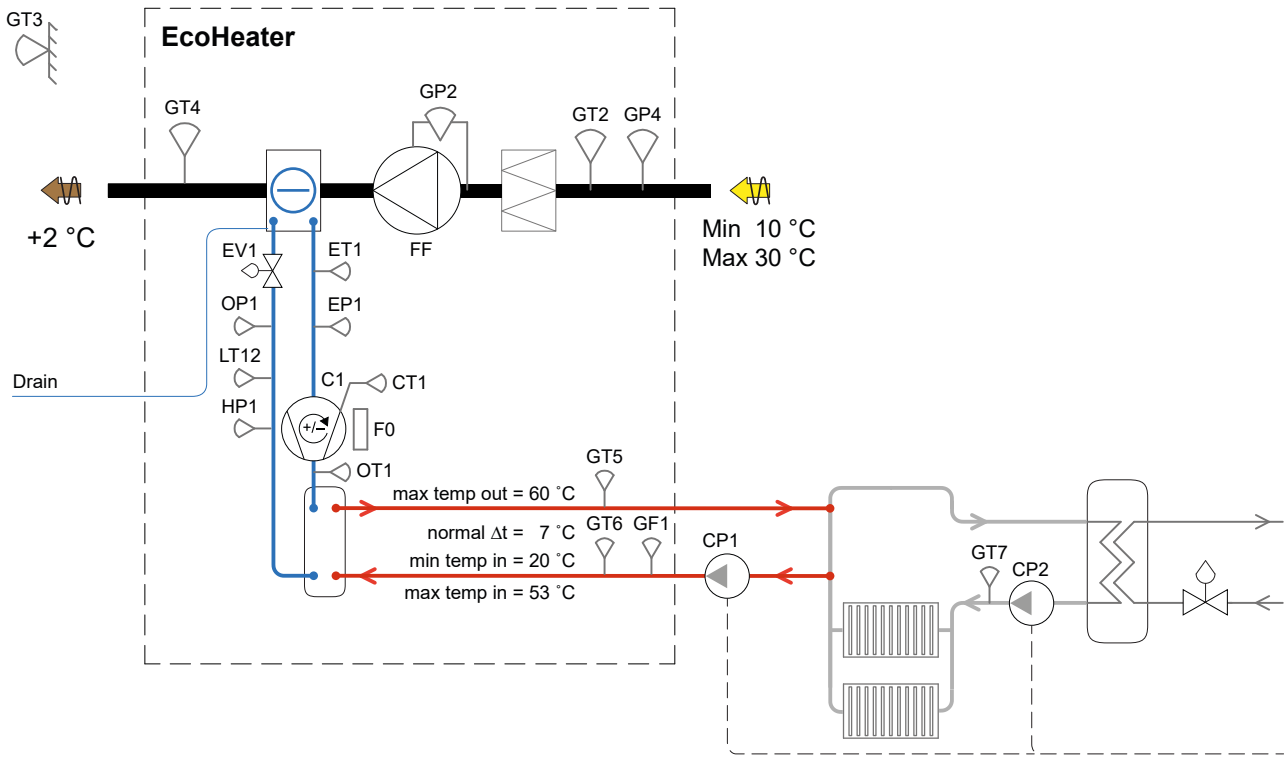
EcoHeater with combustion gas bypass

2.2 Function

General

The EcoHeater is intended for energy recovery from the extract air of apartment blocks.

Recovered energy is returned to the radiator circuit's return line, see the circuit diagram below. The function of the EcoHeater is designed for systems where the secondary side temperature is at least 20°C (incoming water to the EcoHeater).



C1	Compressor, variable speed controlled		GT2	Temperature sensor extract air
Drain	Condensate drain, frost protected		GT3	Temperature sensor outdoor air (north east location)
EP1	Pressure sensor cooling circuit low pressure		GT4	Temperature sensor exhaust air
ET1	Pressure sensor cooling circuit suction gas		GT5	Temperature sensor water out (to radiator circuit)
CT1	Temperature sensor compressor sump		GT6	Temperature sensor water in (return)
LT12	Temperature sensor liquid line heating mode		OT1	Temperature sensor hot gas
EV1	Expansion valve, electronic		HP1	High pressure switch
F0	Frequency inverter for compressor		OP1	High pressure sensor cooling circuit
EA	Extract air fan, variable speed controlled		CP2	Circulation pump radiator circuit
GF1	Water flow sensor		CP1	Circulation pump heat pump
GP4	Pressure extract air duct		GT7	Temperature sensor radiator circuit (for internal control only, not used for external control 0-10v).

Control

The EcoHeater has a factory-set time programme for continuous operation at one speed. The time programme can be changed in the processing unit for control at up to three fan speeds.

In case of malfunction of FF (extract air fan), an alarm sounds and the unit stops. The EcoHeater must be interlocked via circulation pump CP1.

If GT6 (temperature sensor water in) registers a temperature that is too high, the compressor stops. It restarts automatically when the temperature falls to the permitted value.

If EP1 (pressure sensor cooling circuit) and/or GT4 (temperature sensor exhaust air) register a temperature that is too low, the compressor's speed is reduced until the temperature reaches the permitted value.

If OP1 (high pressure sensor cooling circuit) registers a condensation temperature that is too high, the speed of the compressor is reduced.

If GT4 (temperature sensor exhaust air) is lower than 12 °C, the compressor cannot be started.

If GT4 (temperature sensor exhaust air) is more than 3 °C lower than GT2 (temperature sensor extract air), the compressor cannot be started.

If GF1 (water flow sensor) registers too low flow, the compressor cannot be started.

Compressor protection

In case of an alarm from F0 (frequency inverter) or HP1 (high pressure switch), the compressor stops. The high pressure switch is reset manually.

Temperature control

Heat demand from EcoHeater can be controlled via external control signal (0-10 VDC from the district heating central unit) so that full capacity from the heat pump is utilised before district heating is used.

Alternatively, EcoHeater can be controlled via an internal radiator curve or an external tank temperature.

Pressure control

Pressure control can be used by GP4 maintaining a constant pressure in the extract air duct.

If the duct pressure deviates from the setpoint after a set time, an alarm sounds.

The current air flow can be read from the hand-held terminal.

Smoke/fire

If GT2 (temperature sensor extract air) registers a temperature higher than the set alarm limit, a smoke/fire alarm sounds.

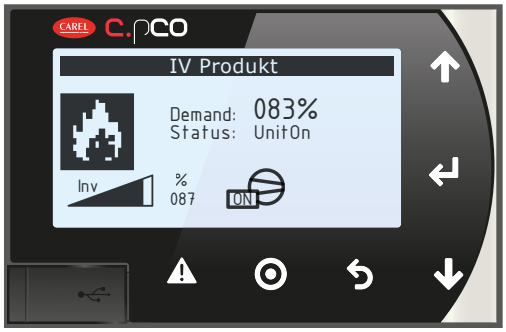
Communication

Communication via Modbus TCP/IP and text-web included as standard.

Current limiting

The control unit for EcoHeater is equipped with a function that measures the heat pump's power consumption. The power consumption can be limited to an adjustable value. If the unit is connected to a fuse that is less than the one recommended in Chapter 3, this function should be used.

To activate the function, do the following in the control unit:



1. Press the circle button.
2. Press the down arrow to highlight status – I/O.
3. Press the enter arrow button.
4. Press the up arrow to access the "Current limit" menu.
5. Press the enter arrow so the cursor starts flashing.
6. Press the up arrow to change "NO" to "YES".
7. Press the enter arrow so the cursor starts flashing on the row below.
8. Use the up/down arrows to set the fuse size. Reduce the value of the fans' power consumption, see Product Selection Program IV Produkt Designer (Technical data).
9. Press the enter arrow button.
10. Press the back arrow button twice to return to the start menu.

3 Wiring instructions and fuse protection

3.1 Recommended external fuse

Recommended external fuse for the unit depends on size and fan variant.

Size	Fan variant	Rec. fuse protection at (3×400V+N) Fuses with type C character-istics.
060-1	ELFF-025Z-EC01-0078-1-F-0, 1×230V	16A
100-1	ELFF-031Z-EC01-0135-1-F-0, 1×230V	16A
150-1	ELFF-035E-EC01-0110-2-F-0, 3×400V	16A
	ELFF-040E-EC01-0250-2-F-0, 3×400V	20A
	ELFF-040E-EC01-0335-2-F-0, 3×400V	20A
190-1	ELFF-035E-EC01-0110-2-F-0, 3×400V	32A
	ELFF-040E-EC01-0250-2-F-0, 3×400V	32A
	ELFF-040E-EC01-0335-2-F-0, 3×400V	32A
240-1	ELFF-035E-EC01-0190-2-F-0, 3×400V	32A
300-1	ELFF-035E-EC01-0190-2-F-0, 3×400V	40A

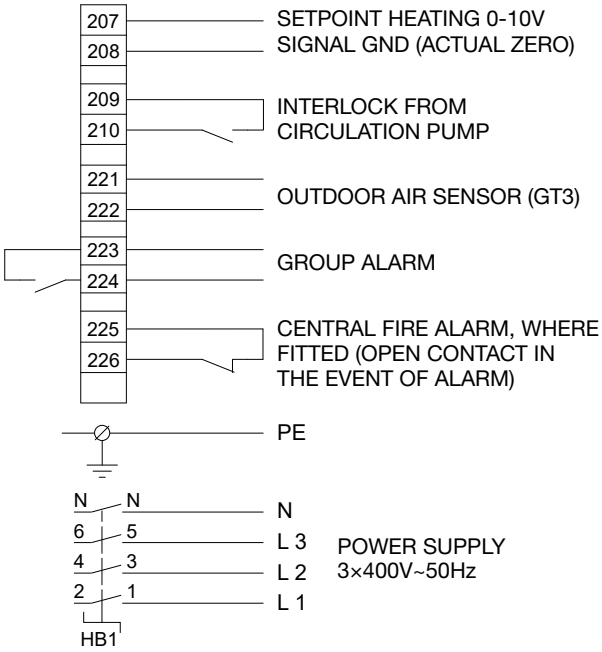
3.2 Power supply

Power supply 3x400V+N connected to the switch in the compressor section.

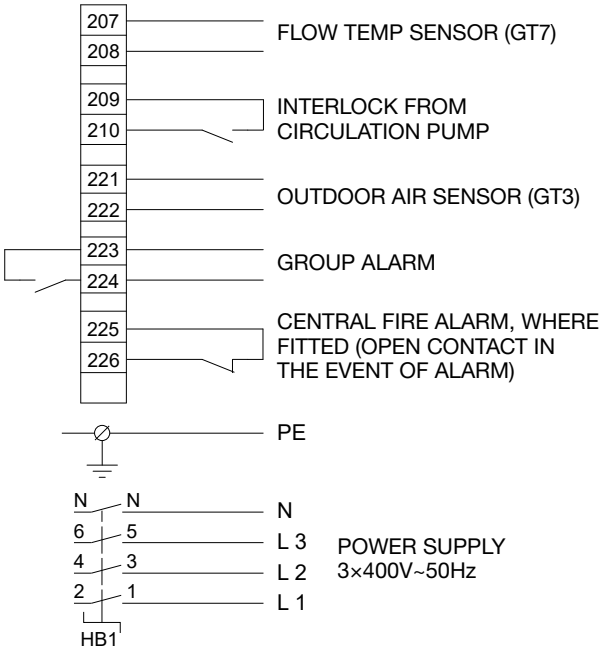
3.3 Wiring diagram

See the order-unique wiring diagram supplied with the unit, or at docs.ivprodukt.com.

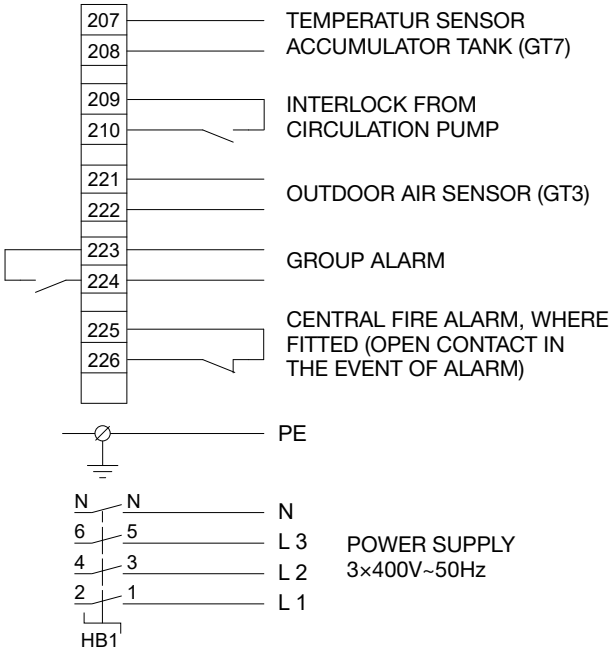
Option 1 – external control of heat demand (0–10 VDC)



Option 2 – internal control of heat demand (radiator curve)



Option 3 – tank charging



4 Operation

4.1 Commissioning, general

The EcoHeater extract air heat pump is a modular unit consisting of sections, components for duct mounting, and accessories. The unit does not require special commissioning by a certified technician, but leakage inspections need to take place during installation, see "1.7 Handling of refrigerant" on page 4.

When commissioning the extract air heat pump for an occupied property, the fan section must be started immediately after installation to avoid disruption to the property's ventilation. The heat pump section is then commissioned separately.

The commissioning must be carried out in accordance with a separate check list;

EcoHeater, commissioning check list

and applicable sections in separate protocol;

EcoHeater, service protocol.

The validity of the product warranty is conditional on the system having been correctly commissioned. No modifications to the refrigerant circuit may be made during the warranty period without the approval of IV Produkt.

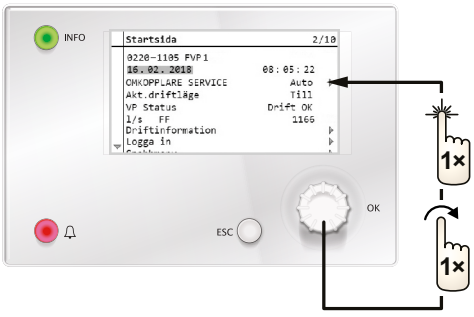
Follow the instructions under "6 Troubleshooting" on page 31 before contacting a service representative for servicing a unit. This will prevent any unnecessary service calls.

4.2 Fan section, commissioning

Check list.
Check that the fan section is:

1.	correctly set up on a waterproof, vibration-dampening plinth, that there is sufficient space for the backing and for servicing, and that any supplementary material is removed from the unit	☐
2.	connected via sleeves to the exhaust air duct and the extract air duct (via heat pump section)	☐
3.	connected to the power supply, contact a qualified electrician or service technician if required	☐

Fan start procedure (via Climatix):

A.	set the main switch to ‘On’	☐
B.	check that no error messages are displayed, address any errors	☐
C.	**Start** by navigating to the menu line SERVICE SWITCH, press the dial and select Auto. 	☐

4.3 Heat pump section, commissioning

Check list.
Check that the heat pump:

1. can communicate with sub-central unit, via COM or signal cable, with one of the following operating options:
   - External control: Signal for required heat
   - Internal control: Signal temperature sensor supply line
   - Tank charging: Signal temperature sensor accumulator tank

   ☐

   Internal control or tank charging can be used even in those cases when the option for communication with the sub-central unit is lacking or not to be used. The temperature sensor is then connected directly to the Eco-Heater.

2. receives a signal from the temperature sensor for outdoor air (via COM or signal cable) ☐

3. - is connected with flexible hoses (particle filter on inlet, possible safety valve at heat pump side)
   - is vented to the highest point of the liquid
   - has the liquid flow adjusted to value according to Technical data

   ☐

4. has condensation outlet connected to floor drain/sewer (outdoor not via water trap, insulated pipe if in cold area) ☐

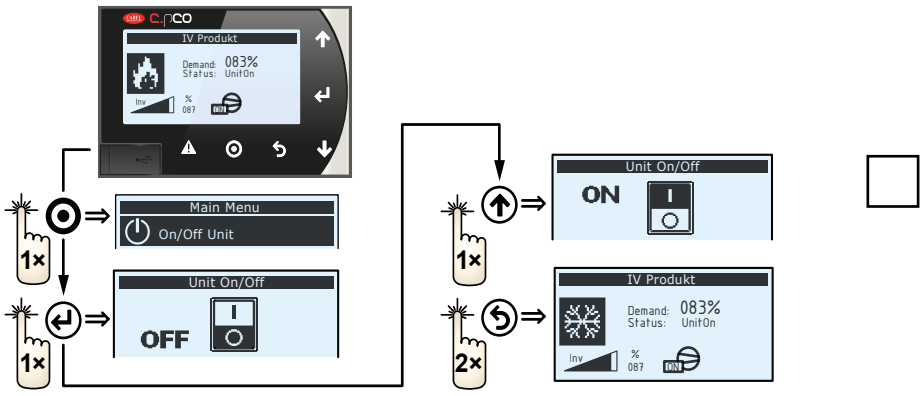
5. for internal control: is aligned with parallel temperature curves for the property (rec. 3 °C higher curve for supply temperature in Climatix than in the property) ☐

For detailed wiring instructions, refer to the Order specific Control Schedule, for communication settings, refer to New EcoHeater, Quick Start Guide for Climatix, and for connection instructions, refer to New EcoHeater Assembly Instructions at docs.ivprodukt.com.

Heat pump start procedure (via CAREL):

A. **IMPORTANT!** The compressor's crankcase must warm up before being started. Heating takes place automatically using an in-built heating coil when the compressor is connected to the power supply. Heating time depends on the ambient temperature. Heating can take several hours.
When the underside of the compressor feels warm, it may be started. ☐

B. Allow the compressor to start as follows



☐

4.4 Combustion gas bypass, commissioning

Check list.
Check that the combustion gas bypass:

1. is connected to the unit's fan section and wired according to the wiring instructions, see Order specific wiring diagram.	☐
2. shows Control *Send* and Return.open mode *Yes* in Climatix hand-held unit (**Main menu > Unit > Damper control > Fire damper**). If error messages are displayed, address any errors.	☐
3. has a working end position function. Go to Start manual test on the Climatix hand-held unit (**Main menu > Unit > Damper control > Fire damper - Start manual test**). Select *Active*. If error messages are displayed, address any errors and restart the test.	☐

5 Maintenance instructions

5.1 General

Commissioning

See chapter "4.1 Commissioning, general" on page 14 and separate check list *EcoHeater, commissioning check list*.

Daily inspection

EcoHeater requires no daily inspection.

Periodic service every six months.

It is recommended that EcoHeater undergo servicing every six months in accordance with the service schedule (next page) and accompanying instructions.

Periodic inspection at least once a year

EcoHeater in sizes 150 – 300 must be inspected by a certified refrigeration technician at least once a year. This means that there may not be more than one year between inspections. It is also advisable to inspect other sizes, but there are no requirements.

Inspections include e.g. checking for leaks, reading the overheating status, evaporation temperature and condensation temperature, and checking drainage.

The inspection points and other annual service are specified in a separate protocol, see *EcoHeater, service protocol*.

After any work

Leakage inspection must be carried out by a certified refrigeration technician within a month of any work (e.g. after any leaks are sealed, components replaced).

Documenting events

The operator must document and record events such as the content and type of refrigerant topped up, refrigerant taken into possession, results of inspections and work done, person and company who carried out service and maintenance.

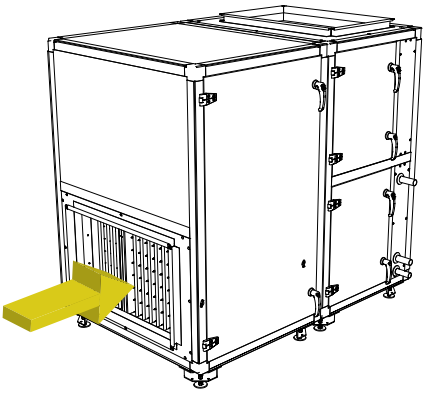
Service schedule

The service schedule comprises actions and service intervals for functional sections that may be part of the EcoHeater extract air heat pump. Make copies of the service schedule for future use before you fill in servicing data for the first time.

Service year 20.....-..... for unit no.					**Service performed * (date and signature)**			
Functional section		**Code**	**Recommended action (insp.)**	**Page ref.**	**6 months**	**12 months**	**18 months**	**24 months**
					date	date	date	date
	**Filter extract air**	ELEF	Check pressure drop Change filter if necessary	20	signature	signature	signature	signature
	**DX coil**		Visual inspection Check drainage Clean if necessary Check function	30	signature	signature	signature	signature
	**Fan unit**	ENF	Visual inspection Clean if necessary Check the air flow	23	signature	signature	signature	signature
	**Damper**	EMT-01	Visual inspection Clean if necessary Check tightness	25	signature	signature	signature	signature
	**Combustion gas bypass**	EHP-B	Visual inspection Clean if necessary Check tightness	26	signature	signature	signature	signature
			Check function	17	signature	signature	signature	signature
	**Sound attenuator**	EMT-02	Visual inspection Clean if necessary	27	signature	signature	signature	signature
	**Compressor part**	–	Visual inspection Check drainage. Clean if necessary Check function	28	signature	signature	signature	signature
			Periodic inspection 12 months	18	–	Separate service protocol	–	Separate service protocol

* The service intervals specified are general recommendations. The environment and operating mode are both crucial to determining whether a shorter/longer interval is appropriate.

5.2 Filters (code ELEF)



The air filter should protect sensitive components inside the unit, such as the heat recovery coil, from exposure to impurities.

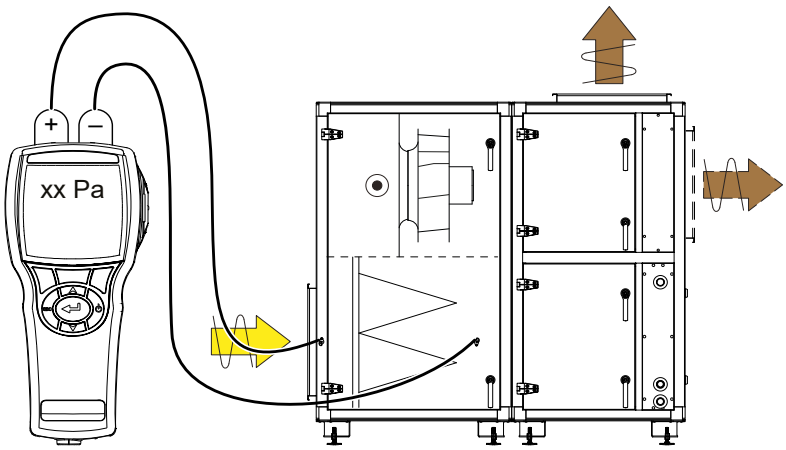
The dust separation efficiency varies considerably between various filter types. The dust collecting efficiency also varies substantially. It is therefore important to use filters of the same quality and capacity when you change them.

The filters are designed for one-time use. If they become fouled, the unit will lose capacity. The filters should therefore be changed if the pressure drop across them exceeds the specified final pressure drop. It is important to stop the unit before changing filters to prevent dust from coming loose and being drawn into the unit. The inside surfaces of the filter sections should therefore also be cleaned when the filters are changed.

For filter data, see "Filter Overview" under Documentation at docs.ivprodukt.com. Current filters are shown in the order-unique documents Technical Data and Spare Parts List.

Inspection

Check the pressure drops across the filters. A manometer connected to probes is used for these measurements. The probes are connected to each side of the filters.



If the filter has reached its specified final pressure drop, it should be changed. The final pressure drop is specified on the filter section decal (filled in when the air handling unit is put into operation).

FILTERDATA

Nominellt luftflöde ☐ m^3/s
Nominal air flow..... ☐ m^3/h

Antal filter Mått
Number of filters.....Dimensions.....
....
....

Filterklass/Filter Class.....

Begynnelsetryckfall
Initial Pressure Drop.....Pa

Sluttryckfall
Final Pressure Drop.....Pa

Art. Nr: 19121-1101_02SV

Filter replacement (ELEF)

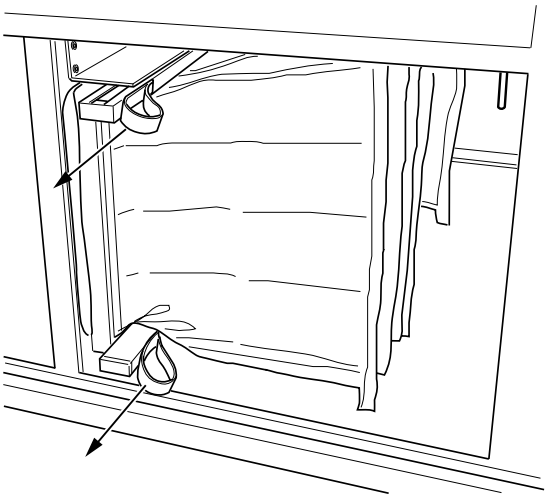
1. Shut down the unit via the control terminal and lock the safety switch in the 0 position.

NB:
The safety switch is not designed for starting/stopping the unit. Always use the control equipment to start and shut down the unit.

2. Wait until the fans have stopped, then open the inspection door.

WARNING!
Positive pressure inside the unit, risk of personal injury. Allow the pressure to drop before you open the inspection doors.

3. Release the eccentric rails.



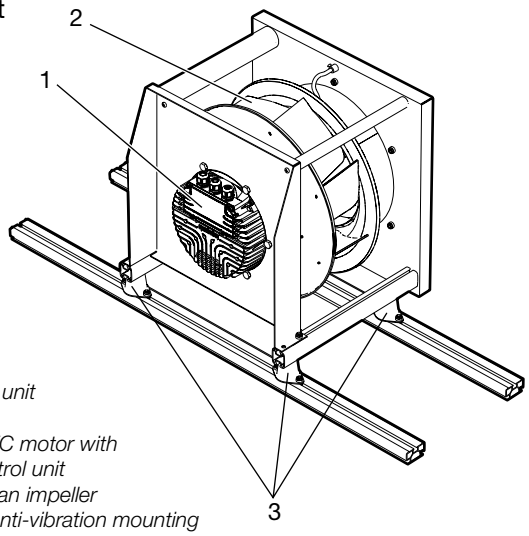
Eccentric rails

4. Remove the old filter by pulling it towards you. Discarded filters should be disposed of correctly. The filters are combustible in their entirety.
5. Clean the filter cabinets.
6. Install the new filter, press in the eccentric rails to engage them and close the inspection door.
7. If there is a non-removable filter monitor: attach the probes on each side of the filter.
8. Start the unit.

5.3 Fan unit (code ENF)

The function of the fan is to transport air through the system, i.e. the fan must overcome the flow resistance in air terminals, air registers, air ducts and the unit.

The fan speed is regulated to provide correct air flow. If the fan generates a lower air flow, this will impair the function of the ventilation system.



Fan unit

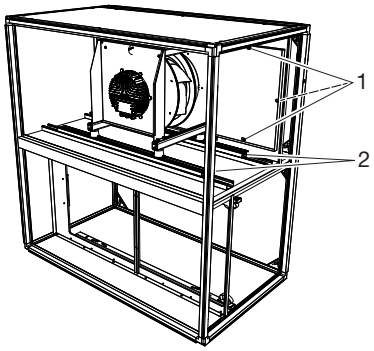
1. EC motor with control unit
2. Fan impeller
3. Anti-vibration mounting

- If the extract air flow is too low, the ventilation capacity will be unsatisfactory. Imbalance may also force moist air out into the building structure.
  One reason for why the fans generate too little air flow may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

WARNING!
High voltage and rotating fan impeller, risk of personal injury. Before working on/servicing the unit – shut down the unit via the control terminal, then turn the safety switch to the 0 position and lock it.

WARNING!
Rotating fan impeller, risk of personal injury. Shut down the air handling unit and wait at least 3 minutes before you open the inspection doors.

Fan, inspection



1. Loosen the screws (pos 1) and the pins/screws (pos 2), and pull out the fan unit (fan and motor are mounted on rails).
2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clean from any accumulation of particles. Imbalance may be due to a coating or damage to the fan impeller blades.
3. Listen to the sound from the motor bearings. If the bearings are in good condition, you will hear a slight purring sound. A scraping or pounding sound may mean that the bearings are damaged and service is then required.
4. Check that the fan impeller is fixed and overlaps the inlet cone.
5. The fan impeller and motor are mounted on a support fitted with rubber anti-vibration mountings. Check that the anti-vibration mountings are securely mounted and are intact.
6. Check the mounting screws as well as the suspension devices and support.
7. Check that the gaskets on the connection plates around the connection openings are intact and firmly fitted.
8. Check that the measurement tubes are securely fitted on each measurement outlet.
9. Check that the ground cable is secure.
10. Remount the fan unit.

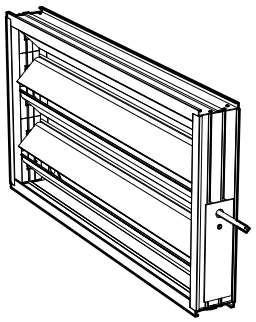
Fan, cleaning

1. Follow item 1 under *Inspection*.
2. Wipe the fan impeller blades to remove any coatings. Use an environmentally friendly degreasing agent.
3. The external surfaces of the motor must be kept clean from dust, dirt and oil. Clean with a dry cloth. If they are severely fouled, use an environmentally friendly degreasing agent. The motor is likely to overheat inside if thick layers of dirt prevent air from entering the motor to cool the stator structure.
4. Vacuum clean the air handling unit so that particles will not be blown out into the duct system.
5. Clean the other parts in the same way as the fan impellers. Check that the inlet cones are securely mounted.
6. Follow item 9 under *Inspection*.

Resetting the overheat protection

1. Cut the power supply to the fan motor.
2. Wait at least 20 seconds after the fan impeller has stopped rotating.
3. Close the power supply to the fan motor.

5.4 Damper (code EMT-01)



Damper (code EMT-01)

The purpose of the dampers is to regulate the air flow. Faulty function gives rise to disturbances that may result in serious problems.

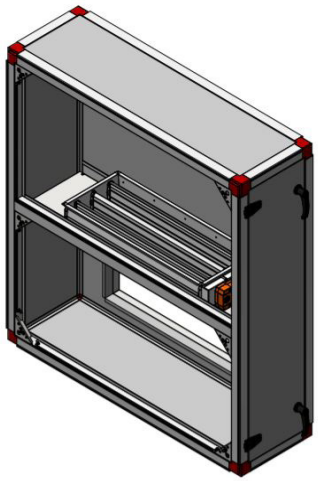
Inspection

1. Check the function of the damper actuator.
2. Check that damper tightens when closed. If they are not sealed, adjust the damper actuator to make the dampers tight (does not apply to trim dampers).
3. Check the sealing strips.
4. If the damper is not working, check that there are no screws penetrating the drive mechanism/damper blades to interfere with damper function.

Cleaning

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

5.5 Combustion gas bypass (code EHP-B)



Combustion gas bypass (code EHP-B)

The purpose of the combustion gas bypass is to reroute the air flow in the event of a fire. Faulty function gives rise to disturbances that may result in serious problems.

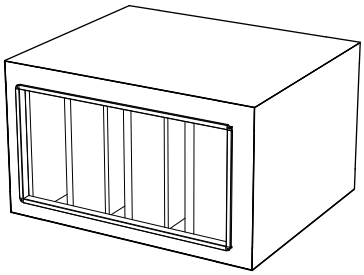
Inspection

1. Check the function of the damper actuator.
2. Check that damper tightens when closed, follow point 3 under "Combustion gas bypass, commissioning" on page 17. If they are not sealed, adjust the damper actuator to make the damper tight.
3. Check the sealing strips.
4. If the damper is not working, check that there are no screws penetrating the drive mechanism/damper blades to interfere with damper function.

Cleaning

Vacuum and/or wipe all surfaces with a damp cloth. If more intense cleaning is needed, do so with rotating nylon brushes.

5.6 Sound attenuator (code EMT-02)



Sound attenuator (code EMT-02)

The purpose of the sound attenuator is to reduce the sound power level in the system.

Inspection

Check that the baffle elements are intact and have clean surfaces. Take action if necessary.

Cleaning

Vacuum and/or wipe all surfaces with a damp cloth. If more intense cleaning is needed, do so with rotating nylon brushes.

5.7 Heat pump section (compressor part)

General

The IV Produkt EcoHeater has been designed and fabricated along given operating parameters that must be met in order for the unit to operate optimally and provide good operating economy. The operating parameters must not be changed unless a check is first made to ascertain that the changes will be within the unit's operating range.

Requirements and guidelines for handling refrigerant

See "1.7 Handling of refrigerant" on page 4.

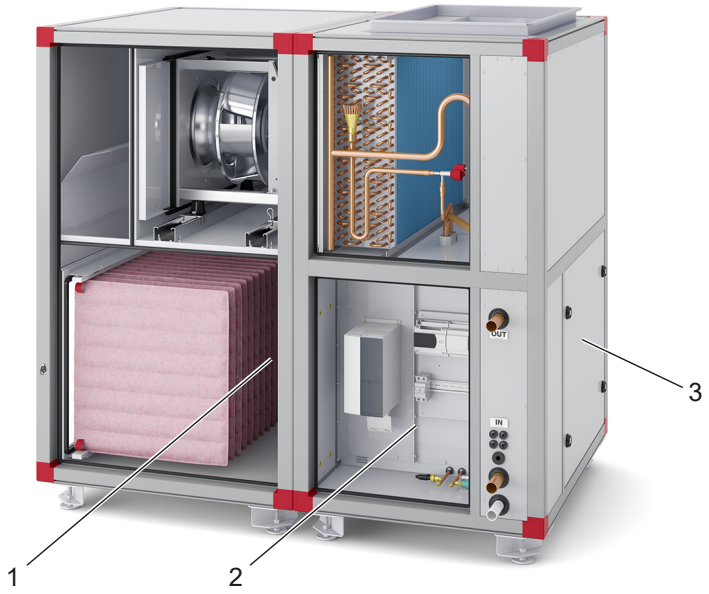
Periodic service and inspection

Conditions and guidelines for service are described under "5.1 General" on page 18.

The inspection points and other annual service are specified in a separate protocol, see *EcoHeater, service protocol*.

Access to compressor

The compressor is accessed from three different access points; inspection door, control cabinet and service hatch, depending on available space and service operation.



1. Inspection door
2. Control cabinet
3. Service hatch

Via inspection door

1. Shut down the unit via the control terminal and lock the safety switch in the 0 position.
2. Remove the filter for access. See “Filter replacement (ELEF)” on page 20.
3. Open the inspection door.

WARNING!
Hot surfaces, risk of personal injury. Shut down the unit and wait at least 30 minutes before opening the inspection doors to access the compressor.

3. Close the inspection door after completing the service operation.

Via control cabinet

1. Shut down the unit via the control terminal and lock the safety switch in the 0 position.
2. Open the control cabinet door.

WARNING!
Hot surfaces, risk of personal injury. Shut down the unit and wait at least 30 minutes before opening the inspection doors to access the compressor.

3. Remove the frequency inverter and plates. Fold the circuit board to the side.
4. Reassemble parts after completing the service operation.

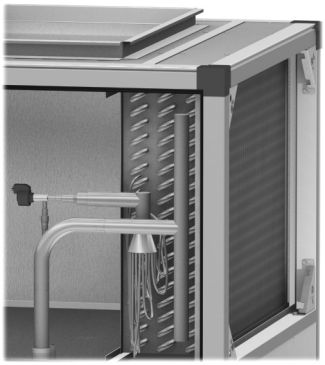
Via service hatch

1. Shut down the unit via the control terminal and lock the safety switch in the 0 position.
2. Remove the service hatch.

WARNING!
Hot surfaces, risk of personal injury. Shut down the unit and wait at least 30 minutes before opening the inspection doors to access the compressor.

3. Close the service hatch after completing the service operation.

5.8 Evaporator (extract air coil)



The extract air coil is used to recover heat from the extract air and transfer this heat to the water-borne radiator circuit.

The coil will have impaired capacity if dust forms a coating on the coil surfaces. Not only does this impair the heat transfer capacity of the coil, it also increases the pressure drop on the air side.

Even if the ventilation system is fitted with high quality filters, as time passes dust deposits will form on the front edges of the coil fins (at the inlet side).

Inspection

Check:

1. The coil fins to detect possible mechanical deformity
2. That the water coil is not leaking
3. the drip tray and drain (clean if necessary)
4. frost protection for outlet pipe (insulation and frost protection cable).

Cleaning

If the fins on the coils are dirty, vacuum them from the inlet side. Alternatively, you can blow them clean with compressed air from the outlet side. If they are particularly dirty, clean them with hot water mixed with dishwashing detergent (of a type that will not corrode aluminium) and rinse using water.

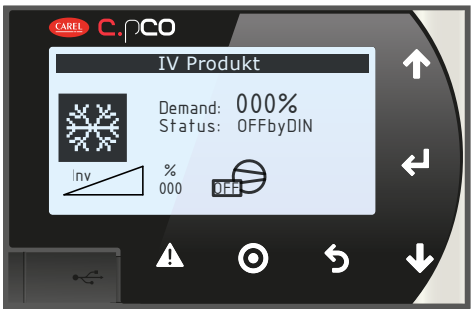
6 Troubleshooting

6.1 Troubleshooting in the event of an alarm

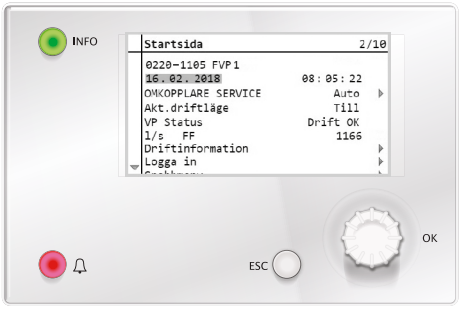
The alarms for the refrigerant circuits are presented on the step switch display: see "2.2 Function" on page 8. Alarms may, for example, be generated by the high pressure switch and frequency inverter. To ascertain what has caused the alarm, follow the procedure below.

Inspection		Possible cause	Corrective action
Is the alarm “94 Drive offline”displayed?	YES ⇒	The frequency inverter does not have supply voltage 3×400V	Check the supply voltage to the frequency inverter Check fuses Check cabling for communication between frequency inverter and Carel
NO ⇓			
Has the high pressure switch tripped? Is the alarm "121 Compr 1, High pressure switch" or "180 Compr 1, High pressure switch" displayed?	YES ⇒	No or too low flow of water across the condenser	Check the flow of water across the condenser
		Defective high pressure switch	Reset the pressure switch manually Check/replace
NO ⇓			
Is the alarm ”118 Compr 1, Low evaporation pressure” displayed?	YES ⇒	Insufficient refrigerant volume	Look for leakage, seal the leak and top up with refrigerant
		No or too low air flow across evaporator	Check/adjust the flow
		Defective expansion valve	Check/replace
NO ⇓			
Is the LED flashing red on the frequency inverter?	YES ⇒	Phase failure/voltage failure	Check the 3-phase supply, measure the incoming voltage. Reset the frequency inverter by switching off the voltage for 1 minute or more. Check that the compressor is running without dissonance.
		Overload/defective stepless compressor	Reset the frequency inverter by switching off the voltage for 1 minute or more. Check that the compressor is running without dissonance.
NO ⇓			
Is the alarm "AL 120 Compr 1 Low pressure diff." displayed?	YES ⇒	No pressure difference between the high-pressure and low-pressure side	Contact service
NO ⇓			
Is the alarm "AL 59 Compr 1 Low Cond Temp" displayed?	YES ⇒	Condensation temperature too low	Contact service

6.2 Troubleshooting via symptoms and status message



Carel



Climatix hand-held unit

Symptom	Status message heat pump	Possible cause	Corrective action
Compressor does not start	OFFbyKey	Menu in Carel "⏻ On/Off Unit" is not set to ON	Set ⏻ to ON.
	OFFbyDIN	Interlock from Climatix missing.	Move CHANGEOVER SWITCH SERVICE to "Auto".
	UnitOn	1. The demand indicator is lower than 10% (menu in Climatix "Heat demand"). 2. The start delay for the compressor has not counted down to 0.	1. Check external control 0-10V, heat curve and temperature sensor outdoor air. 2. Wait or jump start.
	FrostTemp	1. The difference between the return air temperature and extract air temperature is greater than 3°C (menu "End defrost-diff"). 2. The exhaust air temperature is lower than 12°C (menu "End temp min freq:"). 3. The compressor has stopped due to the evaporating temperature or exhaust air temperature having fallen below its respective minimum temperature at the compressor's lowest possible speed.	1a. Wait until the exhaust air temperature has risen to the starting level. 1b. Jump start. 2. Wait for the exhaust air temperature to rise. 3. Check that the air flow is not too low.
	Low water flow	Insufficient water flow through the compressor.	1. Check that the circulation pump heat pump CP1 is running. 2. Check that the water flow is in the correct direction.
The compressor speed drops	HiPress	1. Insufficient water flow through the heat pump. 2. High return water temperature to the heat pump.	1. Adjust the water flow. 2. Check the incoming water temperature.
	FrostTemp	The compressor speed is limited to prevent frost formation on the evaporator.	Normal condition when the extract airflow is not high enough to run the compressor at maximum power.

Change history

1800401.00	New generation EcoHeater. New sizes 240 and 300.

Air handling with focus on LCC

You are welcome to contact us

IV Produkt AB
Sjöuddevägen 7
SE-352 46 Växjö

Switchboard: +46 (0)470 – 75 88 00
Control support: +46 (0)470 – 75 89 00
Service: +46 (0)470 – 75 89 99
Spare parts: +46 (0)470 – 75 88 00
Order-controlled Documentation:

www.ivprodukt.com
control@ivprodukt.se
service@ivprodukt.se
order@ivprodukt.se
docs.ivprodukt.com