Extract Air Heat Pump

EcoHeater

Home Concept

Operation and Maintenance instructions

Order no. : .....

Project : .....

Original instructions

IV PRODUKT

Air handling with focus on LCC

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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.

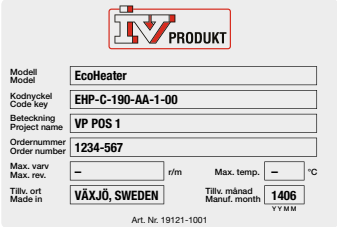
1.3 Manufacturer

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 comprises two block sections. Each block section is supplied with a model identification label located at the front. All the necessary designations needed for identifying the block section appear on the label.



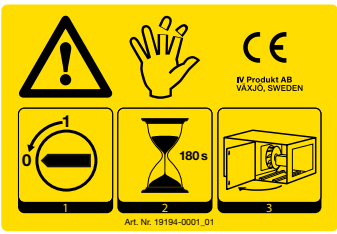
Typical model identification label

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.

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

The CE marking applies to units that IV Produkt AB manufactures and supplies with control equipment mounted on the unit casing. If e.g. the control equipment/electrical system is divided during transport, this must be reset and inspected by an qualified electrician.



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 Regulation (EU/517/2014 on fluorinated greenhouse gases) and the Swedish Refrigerant Regulation KMF (SFS 2007:846).

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 heat pump 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 applicable 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...".

Leakage inspection and registration

The following also applies to EcoHeater sizes 150 and 190:

- **Leakage inspections** must be carried out by a certified refrigeration technician:
  – On installation/commissioning
  – Periodically at least once every 12 months, i.e. there can be no more than 12 months between inspections
  – Within one month after any work is 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.

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 01 with supplement VU03, 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, see *Dismantling and decommissioning the air handling unit*.

2 Technical description

2.1 Design

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

Heat pump section *Fan 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, 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 97/23/EC, Module A1. 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 R134a.

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.

Fan section

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

Variants and accessories

The unit is available in an indoor or outdoor version with extract air connection to the left or right. The exhaust air connection can be either connected to the ceiling (top) or to the gable section.

Optional accessories:

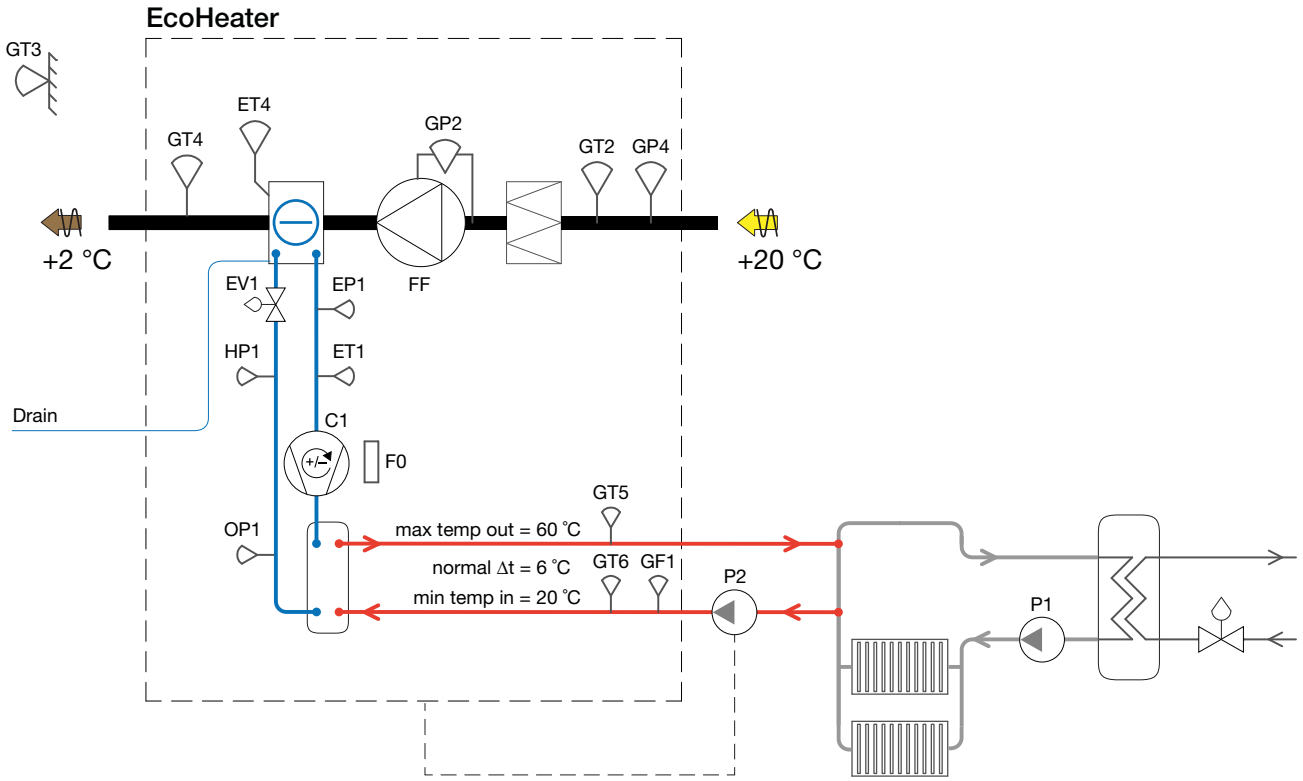
- Duct damper, length 1080 mm
- Duct slide valve
- Inspection window, light fitting
- Filter manometer, U-tube, alternatively Kytölä or Magnehelic

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	GT4	Temperature sensor exhaust air
ET1	Temperature sensor cooling circuit	GT5	Temperature sensor water out (to radiator circuit)
ET4	Temperature sensor evaporator	GT6	Temperature sensor water in (return)
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	P1	Circulation pump radiator circuit
GF1	Water flow sensor	P2	Circulation pump heat pump, to interlock EcoHeater
GP2/GP4	Pressure sensor for air flow control		

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 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 P2.

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.

Pressure control

GP4 can be used to maintain the pressure in the extract air duct. If the duct pressure deviates from the setpoint after a set time, an alarm will sound. The current air flow can be read from the hand-held terminal.

Smoke/fire

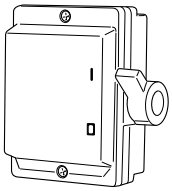
If GT2 (temperature sensor extract air) registers a temperature higher than the set alarm limit, a smoke/fire alarm sounds.

Communication

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

3 Wiring instructions and fuse protection

3.1 Safety switch



A safety switch should be fitted and wired to the power supply.

3.2 Recommended external fuse

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

Size	Fan variant	Rec. external fuse at (3×400 V+N) Fuse with type C characteristics.
060-1	EC250R63D, 1×230 V	16A
100-1	EC280R63D, 1×230 V	20A
	EC280R63D, 3×400 V	16A
	EC310R63D, 1×230 V	20A
100-2	EC280R63D, 1×230 V	25A
	EC280R63D, 3×400 V	20A
	EC310R63D, 1×230 V	25A
150-1	EC355R63D, 3×400 V	25A
	EC400R63D, 3×400 V	25A
	EC400R63D, 3×400 V	32A
190-1	EC355R63D, 3×400 V	32A
	EC400R63D, 3×400 V	32A
	EC400R63D, 3×400 V	40A

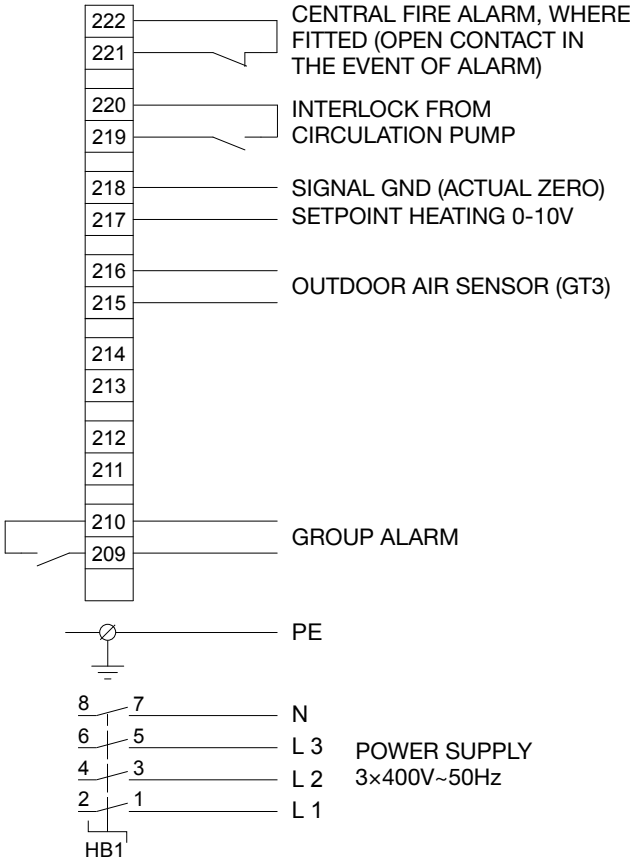
3.3 Power supply

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

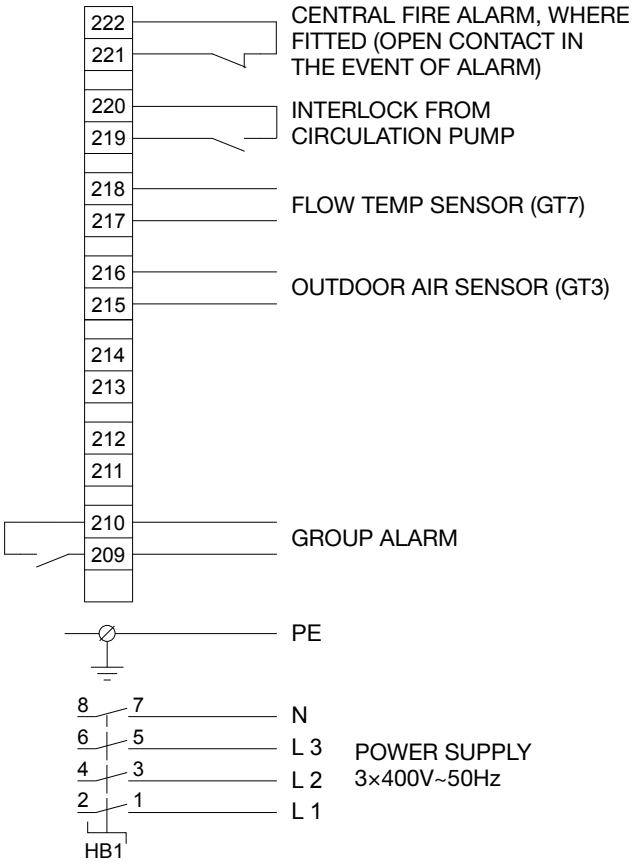
3.4 Wiring diagram

See the order-unique wiring diagram supplied with the unit.

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



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



4 Operation

4.1 Commissioning, general

The EcoHeater extract air heat pump is a modular unit consisting of block sections, components for duct mounting, and accessories. The unit does not require special commissioning by a certified technician, but for sizes 150 and 190, leakage inspections must take place during installation, see "1.7 Handling of refrigerant" 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 parts 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.

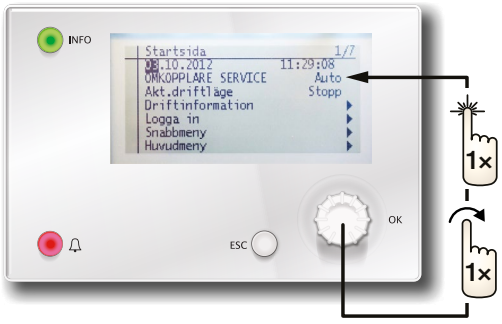
Before contacting a service representative for servicing a unit under warranty, the instructions under "6 Troubleshooting" page 24 must be followed so that unnecessary service calls are avoided.

4.2 Fan section/ventilation, Commissioning

Checklist, 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 to the extract air duct (via heat pump section) and to the exhaust air duct	☐
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 going into the menu bar SERVICE SWITCH, press the wheel and select Auto. 	☐

4.3 Heat pump/recovery, Commissioning

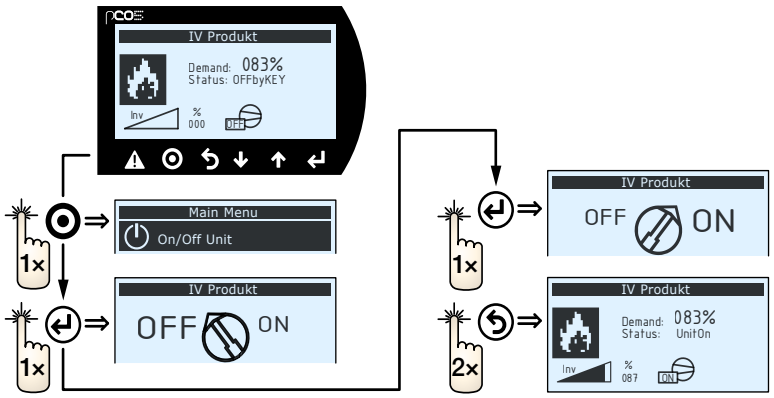
Check list, check that the heat pump:

1. has a 10-core cable connected to the plant room including the following connections:
   - interlock via the circulation pump on the liquid side, signal from the outdoor air temperature sensor
   - for external control: signal for heat demand (from the district heating central unit for example)
   - for internal control: signal for temperature sensor supply line (e.g. from radiator system) For detailed wiring instructions, refer to the order-specific wiring diagram. ☐
2. is connected to the liquid side, vented at the liquid's highest point, and that the liquid flow is adjusted to the value according to the design data ☐
3. has condensation outlet connected to floor drain/sewer (not via water trap, insulated pipe if in cold area) ☐
4. 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) ☐

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 ☐



5 Maintenance instructions

5.1 General

Commissioning

See chapter "4.1 Commissioning, general" page 11 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 and 190 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

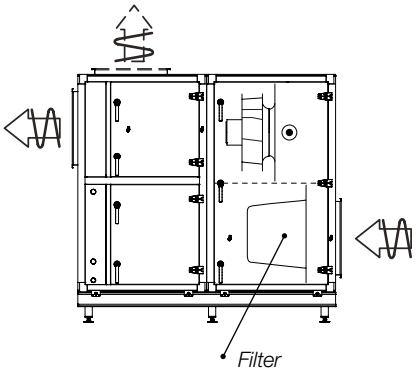
The service schedule comprises actions and service intervals for functional sections that may be part of the EcoHeater extract air heat pump. Make copies of the service schedule for future use before you fill in servicing data for the first time.

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	16	signature	signature	signature	signature
	**DX coil**		Visual inspection Check drainage Clean if necessary Check function	23	signature	signature	signature	signature
	**Fan unit**	ENF	Visual inspection Clean if necessary Check the air flow	19	signature	signature	signature	signature
	**Damper**	EMT-01	Visual inspection Clean if necessary Check tightness	21	signature	signature	signature	signature
	**Sound attenuator**	EMT-02	Visual inspection Clean if necessary	22	signature	signature	signature	signature
	**Compressor part**	-	Visual inspection Check drainage. Clean if necessary Check function	23	signature	signature	signature	signature
			Periodic inspection 12 months	14	-	Separate service protocol	-	Separate service protocol

* The service intervals specified are generally 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. Dust separation class is specified with standard designations:

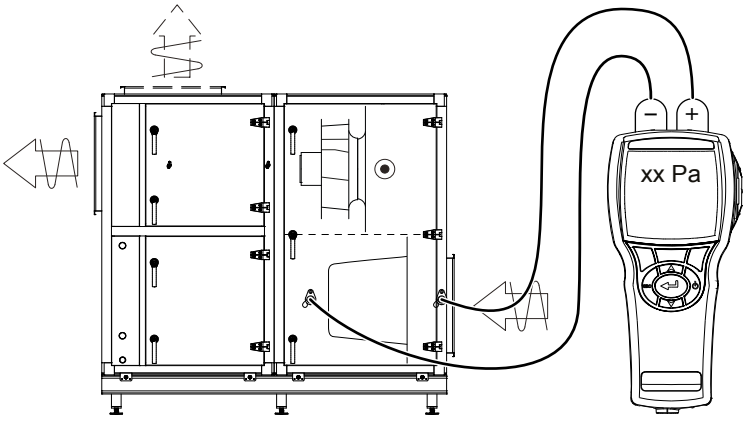
- Pre-filter G4
- Medium filter M5, M6
- Fine filter F7, F8 and F9

Higher digits denote a higher collecting efficiency.

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.

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

Filterklass / Filter Class.....
Begynnelsetryckfall
Initial Pressure Drop.....Pa
Sluttryckfall
Final Pressure Drop.....Pa

Art. Nr: 19121-1101_01

Filter data

Unit size	Filter type	No of filters	Dimensions (mm)		No of bags/ filters	Total filter surface (m^2)
			W × H	Length		
060	Bag filter G4	1	736 × 287	360	7	2.4
	Bag filter M5	1	736 × 287	380	8	2.1
	Bag filter M6–F9	1	736 × 287	380	10	3.5
	Panel filter P4	1	736 × 287	48	-	0.3
	Aluminium filter	1	736 × 287	25	-	0.4
100	Bag filter G4	1	892 × 409	360	8	2.4
	Bag filter M5	1	892 × 409	370	9	3.3
	Bag filter M6–F9	1	892 × 409	370	12	4.1
	Panel filter P4	1	736 × 393	48	-	0.3
	Aluminium filter	1	892 × 409	25	-	0.4
150	Bag filter G4	1 1	287 × 592 592 × 592	360 360	3 6	3.6
	Bag filter M5	1 1	287 × 592 592 × 592	534 534	3 6	6.3
	Bag filter M6	1 1	287 × 592 592 × 592	534 534	4 8	8.1
	Bag filter F7–F9	1 1	287 × 592 592 × 592	534 534	5 10	9.9
	Panel filter P4	1 1	292 × 596 596 × 596	48 48	- -	0.5
	Aluminium filter	1 1	287 × 592 592 × 592	25 25	- -	0.5
190	Bag filter G4	2	592 × 592	360	6	4.8
	Bag filter M5	2	592 × 592	534	6	8.4
	Bag filter M6	2	592 × 592	534	8	10.8
	Bag filter F7–F9	2	592 × 592	534	10	13.2
	Panel filter P4	2	596 × 596	48	-	0.7
	Aluminium filter	2	592 × 592	25	-	0.7

Filter replacement (ELEF)

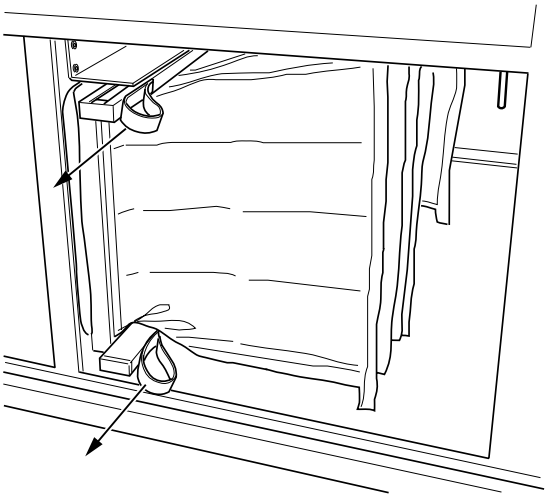
1. Shut down the unit via the control terminal and lock the safety switch in the 0 position.

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.



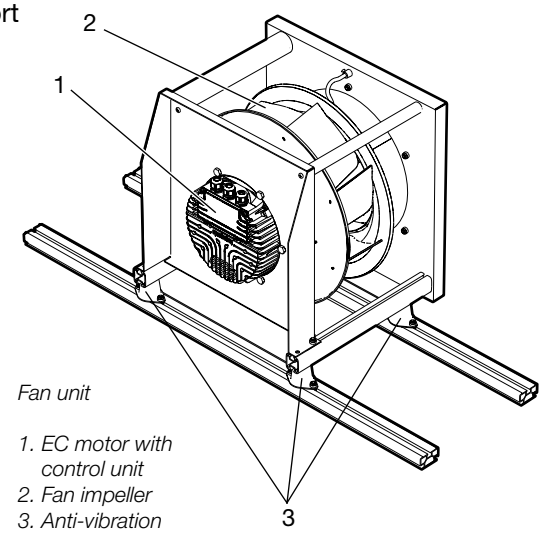
Eccentric rails

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

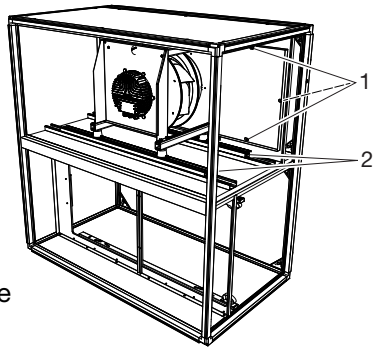
1. EC motor with control unit
2. Fan impeller
3. Anti-vibration mounting

- 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 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. Therefore 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. Remount the fan unit.

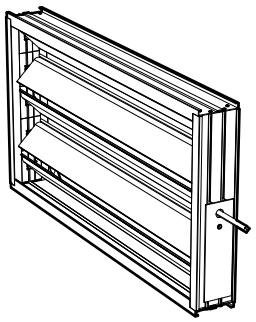
Fan, cleaning

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.

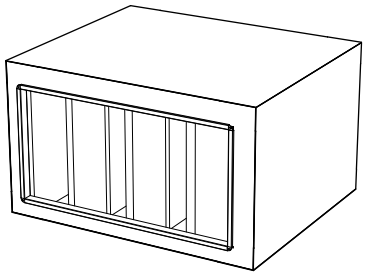
Inspection

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 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.

5.6 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

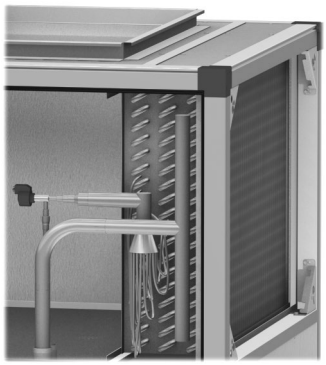
See "1.7 Handling of refrigerant" page 4.

Periodic service and inspection

Conditions and guidelines for service are described under "5.1 General" page 14. The inspection points and other annual service are specified in a separate protocol, see *EcoHeater, service protocol*.

5.7 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 event of an alarm

The alarms for the refrigerant circuits are presented on the step switch display: see "2.2 Function" page 7. 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
Has the high pressure switch tripped?	YES ⇒	No or too low flow of water across the condenser	Check the flow of water across the condenser Reset the pressure switch manually.
		Defective high pressure switch	Check/replace
NO ⇓			
Low evaporating temperature alarm? Can be read via menu “Status: Alarm”.	YES ⇒	Insufficient refrigerant volume	Look for leakage, seal the leak and top up with refrigerant
		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.

6.2 Troubleshooting via symptoms and status message

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 defrostdiff"). 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 / surface temperature of the evaporator 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.
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.

7 Ordering keys

7.1 Block sections

Fan section (code EHP-F)

EHP-F -a-b-c-d-00	**Fan section**
a - Size	060, 100, 150, 190
b - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30
c - Fan variant	C = 100 D, E = 060, 100, 150, 190 F = 150, 190
d - Connection	01 = Duct connection gable 02 = Unit connection gable

EHPF -a-b-c-0	**Fan system**
a - Size	060, 100, 150, 190
b - Fan impeller	025, 028, 031, 035, 040
c - Motor	Example EC-0100 = EC motor 1.0 kW

EHP-FT-01 -a-b-c	**Connection kit**
a - Size	060, 100, 150, 190
b - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30
c - Connection number	10, 11, 12, 13, 20, 21, 22, 23
Accessories:	
ELEF -a-b	Filter
a - Size	060, 100, 150, 190
b - Filter class	AL, G4, M5, M6, F7-F9, C7
MIET-FB -b	Filter monitor
b - Type	01 = U-tube manometer 02 = Kytölä manometer 03 = Magnehelic manometer

Compressor section (code EHP-C)

EHP-C -a-b-c-00	**Compressor part**
a - Size	060, 100, 150, 190
b - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30
c - Output variant	060, 150 190 = 1 100 = 1, 2

EHP-CT-01 -a-b-c	**Connection kit**
a - Size	060, 100, 150, 190
b - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30
c - Configuration	01 = Duct connection gable 03 = Duct connection ceiling

7.2 Components for duct installation

Damper (code EMT-01)

EMT-01 -a	**Damper excl. motor**
a - Size	060, 100, 150, 190
Accessories:	
KJST-03	Manual control
KJST-04	Spring return actuator, mounted

Sound attenuator (code EMT-02)

EMT-02 -a	
a - Size	060, 100, 150, 190

7.3 Accessories

Stand leg kit (code EHPT-01)

EHPT-01 -a	
a - Size	060, 100, 150, 190

Outdoor version (code EHPT-02)

EHPT-02 -a-b	**Outdoor version**
a - Size	060, 100, 150, 190
b - Length range	01, 02, 03, 04, 05, 06, 07

Sleeve (code EMMT-03)

Flexible woven fabric, l = 110–150 mm.

EMMT-03 -a	
a - Size	060, 100, 150, 190

Support (code EMMT-05)

EMMT-05 -a-b	
a - Size	060, 100, 150, 190
b - Length range	1 = 1000–2000 mm

Inspection window (code EMMT-06)

Plexiglass, not for E3 casing (insulation for fire-resistance rating EI30)

Inside light fitting (code EMMT-07)

IP 44, with protective grille.

Lifting bracket (code EMMT-08)

For aluminium section.

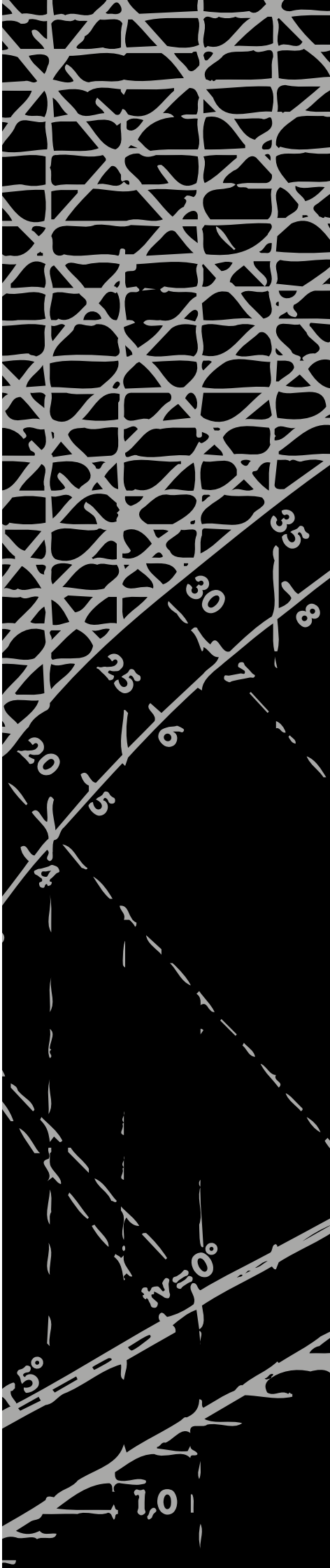
7.4 Control equipment

-a-b-c-d

a - Air handling unit	CST = Top CSC = Compact CSF = Flex 100–600 indoor CSU = Flex 100–600 outdoor CSM = Flex 740-850 **MSE = EcoHeater**
b - Motor control	V110 = Speed controlled 1-phase 10A-230V V111 = Speed controlled 1-phase 10A-230V V310 = Speed controlled 3-phase 10A-400V V311 = Speed controlled 3-phase 10A-400V V316 = Speed controlled 3-phase 16A-400V V320 = Speed controlled 3-phase 20A-400V V616 = Speed controlled 2×3-phase 16A-400V
c - Energy recovery	R = Rotary heat exchanger P = Plate heat exchanger M = Counter-flow heat exchanger **H = Heat recovery coil EcoHeater**
d - Control system	CX = Siemens Climatix 600 UC = Control equipment wired to terminals, without controller unit (DUC) MK = Without control equipment and cabling (fans and rotor wired to terminal block) US = Without control equipment and cabling HS = Special heat exchanger control system **MX = Heat pump control EcoHeater**

Change history

130620.01	Issue 1
131010.02	Updated wiring diagrams and fuse protection values
140821.03	Supplemented with GF1 flow sensor, amended code keys and cover pictures.
140821.03 rev.01	Amended data for fuse protection, updated handling of refrigerant.
150828.04	Updated service schedule and supplemented with maintenance instructions for compressor part.
151008.05	Introduced references to e.g. separate information for commissioning and service.



PRODUKT

Air handling with focus on LCC

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