Air handling unit

Envistar®

Operation and Maintenance Instructions for the Envistar Top 06, 10 and 12

Order no. : .....

Project : .....

Original instructions

IV PRODUKT

Air handling with focus on LCC

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PRODUKT

Air handling with focus on LCC

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Unit specifications

Size	06 ☐	10 ☐	12 ☐
With control	MX ☐		
Without control	UC ☐	MK ☐	US ☐

1 General

1.1 Intended use

The air handling units in the Envistar Top series are intended for comfort ventilation in buildings.

1.2 Safety precautions

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

Lockable safety switch

WARNING!
High voltage, 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.

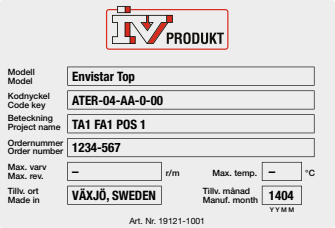
1.3 Manufacturer

The Envistar air handling units (AHUs) are manufactured by:

IV Produkt AB
Sjöuddevägen 7
SE-350 43 VÄXJÖ

1.4 Designations

Envistar Top air handling units consist of a number of different 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.



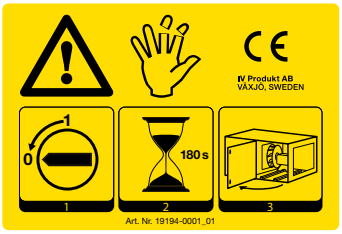
Typical model identification label

1.5 CE marking and EU Declaration of Conformity

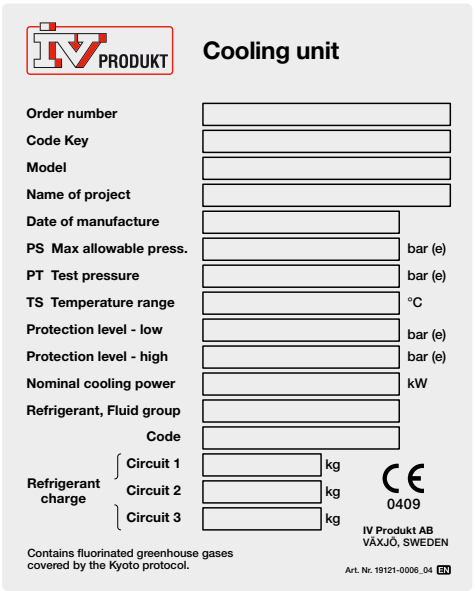
The air handling units and any incorporated cooling units are CE marked, which means that upon delivery they conform to applicable provisions in EU Machinery Directive 2006/42/EC as well as to other EU Directives applicable to the types of air handling units.

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



Typical CE label for cooling 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 2009:1605). 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 cooling 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 person
- Ensure that refrigerant is handled in an environmentally secure manner and in accordance with national regulations.

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

1.8 Extended warranty

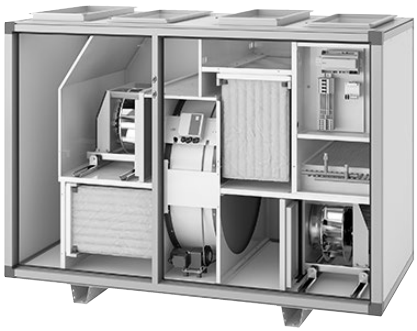
In cases in which the equipment delivered falls under a 5-year warranty, in accordance with ABM 07 with supplement ABM-V 07 or in accordance with NL 01 with supplement VU03, the IV Produkt Service and Warranty Manual is supplied with the product. In order to lay claim to an extended warranty, a complete, 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. Always specify the product code when ordering. The code is stamped on a separate data label, affixed to each functional section. A separate spare parts list is supplied with the unit.

2 Technical description

2.1 Envistar Top air handling unit



The air handling units in the Envistar Top series are intended for comfort ventilation in buildings.

The Envistar Top is fabricated as a one-piece unit in various sizes as a right- or left-handed version. Duct connections on the top (upwards) and rotors (rotary heat exchangers) are common to all sizes and configurations.

The units are usually supplied with integrated control equipment (incl. control), but can also be obtained without control equipment (excl. control).

An integrated cooling unit with cooling recovery is available as an option. Cooling recovery means that the heat exchanger (rotary heat exchanger) starts up when the extract air/room temperature drops below the outdoor temperature and cooling is required.

2.2 Cooling unit

The cooling unit in sizes 06, 10 and 12 is an EcoCooler (ATCR-06, ATCR-10 and ATCR-12) model. Power control takes place with a speed controlled compressor. The unit has an electronic expansion valve and R410a refrigerant.

Size	Refrigerant volume
06	1.7 kg
10	2.1 kg
12	2.4 kg

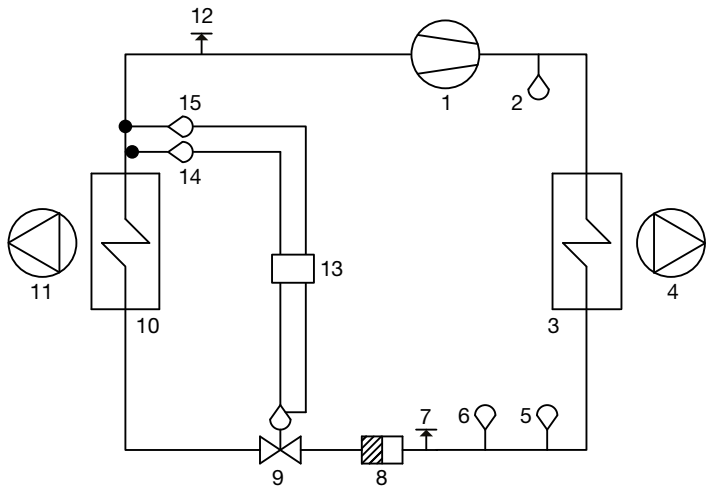
Cooling circuit function

From the compressor (position 1) the refrigerant is pressed as hot gas to the condenser (position 3) where heat is emitted. The refrigerant condenses from gas to liquid when it is cooled by the extract air.

The refrigerant passes the pressure reducing expansion valve (position 9) and undergoes a phase transformation in the evaporator (position 10) from liquid to gas (the refrigerant evaporates).

Inside the evaporator (position 10), the refrigerant absorbs the heat required for phase transformation. The heat is taken from the supply air which is thus cooled.

The cold refrigerant in gaseous form is drawn back into the compressor (position 1) where it is compressed and thus heated. The gas is also used for cooling the compressor's electric motor. The refrigerant now contains the heat from the supply air, the compressor's motor heat and the compression heat.



1 Compressor
2 Condensor
3 Extract air fan
4 High pressure switch
4 High pressure switch
5 Measurement tapping, high pressure
6 Drying filter
7 Expansion valve
8 Evaporator
9 Supply air fan
10 Measurement tapping, low pressure
11 Low pressure switch
12 Controller
13 Temperature sensor after evaporator
14 Pressure sensor

Flow chart for refrigerant system (sizes 06, 10 and 12)

Compressor

The cooling unit is equipped with a speed controlled scroll compressor. When cooling is required, the frequency inverter increases the speed of the compressor.

Compressor protection

In the event of an alarm initiated by the frequency inverter or the safety circuit, the compressor stops and an alarm indication is given. If the unit is equipped with integrated control equipment, the alarm can be read on the Climatix display.

In the event of an alarm, correct the fault and then reset the alarm. If the safety circuit alarm trips repeatedly, an authorised refrigeration service company must be called in.

The safety circuit consists of a high pressure switch (HP), which protects by tripping when there is high pressure in the system. Use the manual reset button on the pressure switch to perform a reset.

Cooling function

For internal control (MX), the cooling unit is interlocked across the ventilation unit. If any of the fans stop, the cooling unit will also stop. The interlock and demand signal is sent via Modbus.

For external control (US, UC and MK), the interlock signal must be sent via a potential-free relay. The demand signal must be sent via 0–10 V.

The cooling unit has internal communication between the frequency inverter and the expansion valve's control equipment. Communication takes place through the Modbus protocol.

Circuit board

The circuit board for the cooling unit contains the following:

- Inverter with integrated control unit
- Control unit for expansion valve

The circuit board is mounted inside the cooling unit and has been internally prewired and tested at the factory.

3 Wiring instructions and fuse protection

3.1 MX - Complete control equipment

The following wiring instructions apply to units supplied prewired with Siemens Climatix complete control equipment (code MX).

Safety switch

A safety switch must be fitted and wired on each power supply.

Wiring diagrams

For wiring diagrams for units with control equipment, see the order-unique wiring diagram supplied with the unit.

Unit functions, power supply and fuse protection

- The units have a common power supply 3×400 V+N to all functions as standard.
- Units with separate power supplies can be ordered specially.
- Electric heaters (air heater electric) have a 400 V power supply as standard (2×400 V or 3×400 V depending on the size/output variant). A special coil or a transformer is required for a 230 V power supply.

Common power supply 3×400 V+N

Recommended fuse protection as shown in the table below. Fuses with type C characteristics are recommended.

Output / variant	Ventilation (ATER)	Ventilation with cooling unit (ATCR)		Ventilation (ATER) + air heater electric (ATEE)		Ventilation with cooling unit (ATCR) + air heater electric (ATEE)			
	-	1V	2V	1	2	1V + 1	1V + 2	2V + 1	2V + 2
Size 06	10A	-	20A	20A	20A	-	-	20A	20A
Size 10	10A	-	25A	20A	32A	-	-	25A	32A
Size 12	10A	25A	25A	25A	32A	25A	32A	25A	32A

Separate power supply

In the case of a separate power supply, see the recommendations under "3.4 Components excl. control" page 11.

3.2 UC - Complete electrical connection to terminal (without DUC)

The following wiring instructions apply to units supplied without process unit (DUC) but with sensor and damper actuator connected electrically to the terminal. Fans and heat exchangers are fused and connected electrically to the terminal.

The terminal connections are positioned at a shared place in the unit.
For further connection to an external process unit (DUC), we recommend the use of a multi-conductor cable.

Safety switch

A safety switch must be fitted and wired on each power supply.

Wiring diagrams

For wiring diagrams for units with control equipment to the terminal, see the order-unique wiring diagram supplied with the unit.

Unit functions, power supply and fuse protection

- The units have a common power supply 3×400 V+N to all functions as standard.
- Units with separate power supplies can be ordered specially.
- Electric heaters (air heater electric) have a 400 V power supply as standard (2×400 V or 3×400 V depending on the size/output variant). A special coil or a transformer is required for a 230 V power supply.

Common power supply 3×400 V+N

Recommended fuse protection as shown in the table below. Fuses with type C characteristics are recommended.

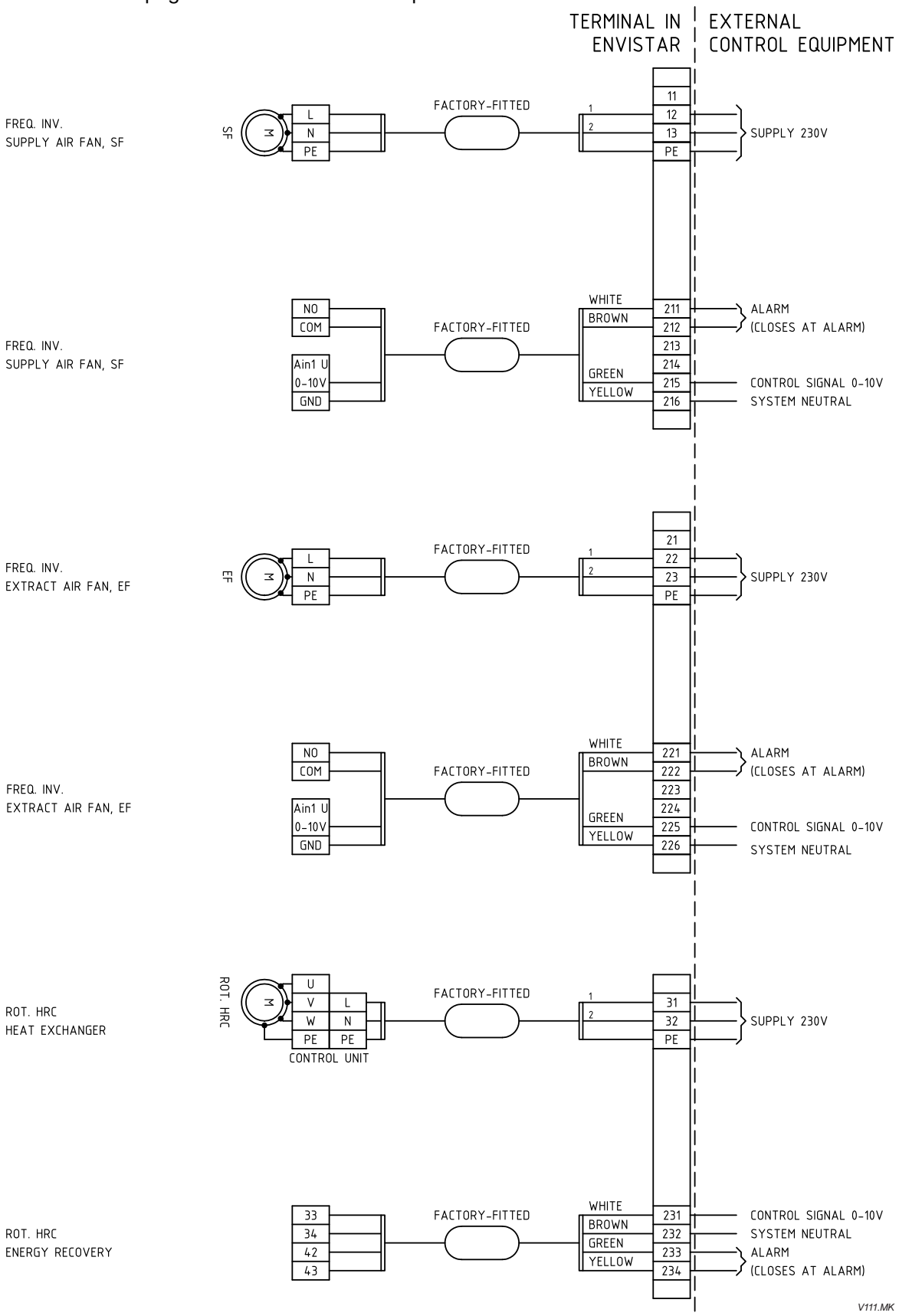
Output / variant	Ventilation (ATER)	Ventilation with cooling unit (ATCR)		Ventilation (ATER) + air heater electric (ATEE)		Ventilation with cooling unit (ATCR) + air heater electric (ATEE)			
	-	1V	2V	1	2	1V + 1	1V + 2	2V + 1	2V + 2
Size 06	10A	-	20A	20A	20A	-	-	20A	20A
Size 10	10A	-	25A	20A	32A	-	-	25A	32A
Size 12	10A	25A	25A	25A	32A	25A	32A	25A	32A

Separate power supply

In the case of a separate power supply, see the recommendations under "3.4 Components excl. control" page 11.

3.3 MK - Fans and hrc electrically connected to terminal

The following wiring instructions apply to units supplied without control equipment but with fans and heat exchangers connected electrically to the terminal. The terminal connections are positioned at a shared place in the unit. See next page for recommended fuse protection.



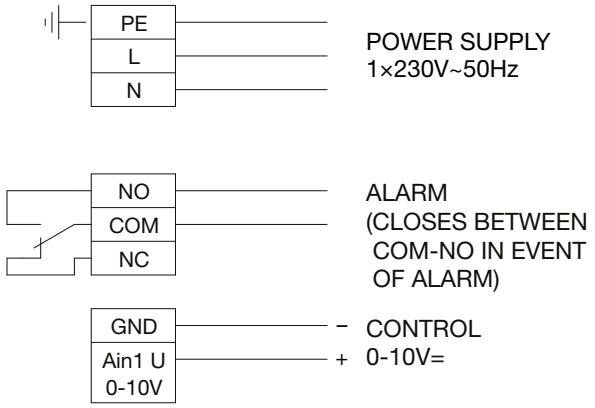
3.4 Components excl. control

The following wiring instructions apply to components supplied without control equipment (code UC, MK or US) and to units with control (code MX and UC) supplied with a separate power supply.
These concern fuses with type C characteristics.

Safety switch

A safety switch should be fitted and wired on each power supply.

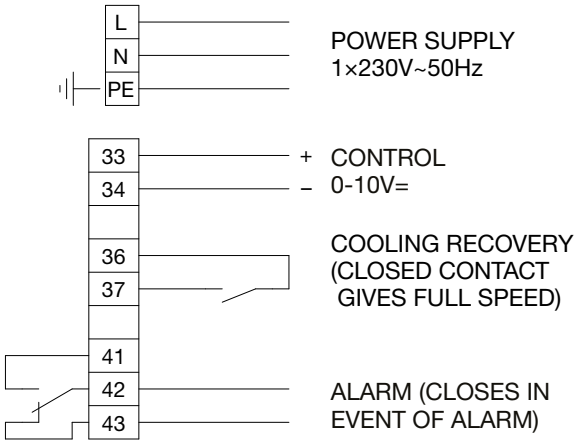
Fan



Size	Rated current	Rec. fuse protection
06	3.1A	10A
10	5.6A	10A
12	6.0A	10A

The motor starts/stops on a 0.5 V control signal.

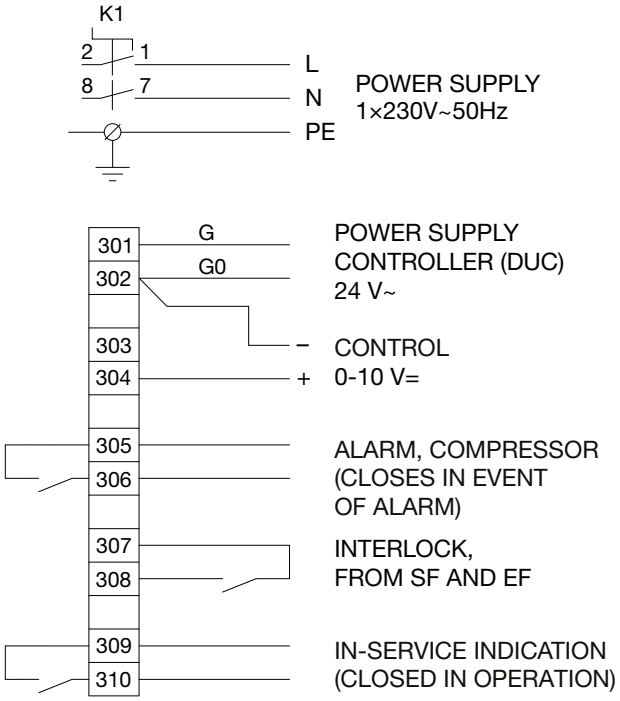
Rotary heat exchanger



Rated current	Rec. fuse protection
0.7A	10A

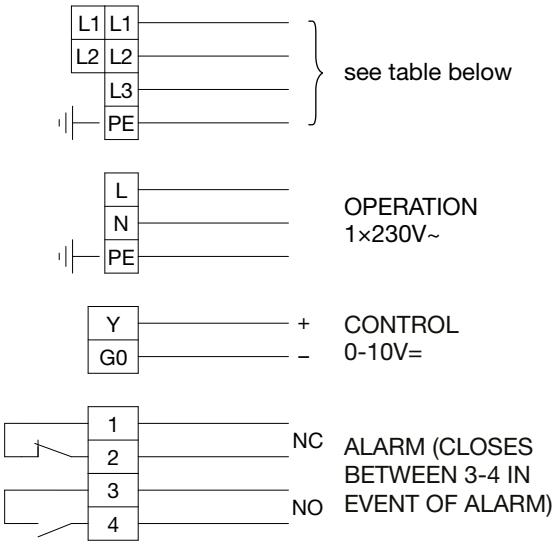
contd. *Components excl. control (*code UC, MK or US)

Cooling unit, EcoCooler



Size output variant	Rated current	Rec. fuse protection
06-2V	14.5A	16A
10-2V	18.0A	20A
12-1V	18.0A	20A
12-2V	21.5A	25A

Air heater electric (code ATEE)



Size output variant	Supply	Rated power	Rated current	Rec. fuse protection
06-1	2×400 V	6 kW	15A	16A
06-2	3×400 V	9 kW	13A	16A
10-1	3×400 V	9 kW	13A	16A
10-2	3×400 V	15 kW	22A	25A
12-1	3×400 V	9 kW	13A	16A
12-2	3×400 V	15 kW	22A	25A

4 Operation

4.1 Unit commissioning (ATER) with control

The Envistar Top with rotor (code ATER) is a factory-built one-piece air handling unit which has been tested and documented at the factory. It does not require special commissioning by a certified technician.

Prior to commissioning, the contractor must:

1. Connect the unit to the power supply via a lockable safety switch.

   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.

2. Connect the heating/cooling coil.

3. Connect all ducts.

   WARNING!
   Rotating fan impeller. The unit must not be energised until all ducts have been connected.

4.2 Cooling unit commissioning (ATCR) with control

The Envistar Top with rotor and cooling unit (code ATCR) is a factory-built one-piece unit that has been tested and documented at the factory.

Commissioning may only be carried out by competent personnel and in accordance with the following checklist. The validity of the product warranty is conditional on the system having been correctly commissioned.
No modifications to the cooling unit may be made during the warranty period without the approval of IV Produkt.

Follow the troubleshooting instructions in the troubleshooting chart before contacting a service representative for servicing a unit under warranty. This will prevent any unnecessary service calls.

4.3 Check list for commissioning cooling unit

The cooling unit must not be put into operation until all the items in the check list have been checked off.

1. Visually inspect the cooling unit for damage after transport and assembly. ☐
2. Check that the cooling unit is correctly positioned and that the open space in front of the unit for servicing is sufficient (1.5 x depth of the unit, min. 1200 mm). For more information, see the separate assembly instructions for each unit series. ☐
3. Check that the drain connection (evaporation water drainage) is connected to a floor drain. There is normally no need for a water trap. Check that the drainage pipe slopes correctly and that the size of the pipe does not create a high pressure drop.
   For more information, see the separate assembly instructions for each unit series. ☐
4. Check that the incoming supply voltage, zero and earth are connected (see Section 3). ☐
5. Check that the incoming control cabling is connected to the correct terminals (see Section 3). ☐
6. Check that the automatic circuit breaker is set to the ON position and switch on the voltage. ☐
7. Start the air handling unit (supply and extract air fans). ☐
8. Check that there are supply and extract air flows and that they have been adjusted and recorded. ☐
9. Test all control functions according to the air handling unit's functional description. ☐
10. Read the values for high and low pressure from the Climatix hand-held unit (Main menu/Unit/Cooling) or alternatively from the Carel display. The pressure readings should be about equal before the cooling unit is started. ☐
11. Start the cooling unit by decreasing the cooling setpoint. ☐
12. Allow the unit to operate until it stops according to the desired control function for the air handling unit. ☐

4.4 Cooling status

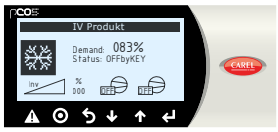
Incl. control (Climatix code MX)

Status information can be read on the Climatix display (Main menu/Unit/Cooling).

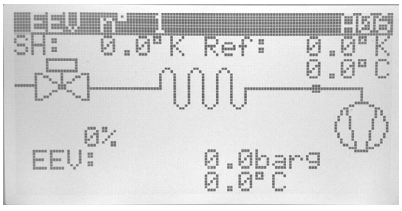
The following is presented:

	Value	Explanation
Danfoss-VSD		Danfoss Variable Speed Drive
High pressure	x.x bar	Relative pressure from high pressure sensor.
Low pressure	x.x bar	Relative pressure from low pressure sensor.
Compressor C1	On/Off	Compressor operating mode.
Cooling unit status	Normal	Status of compressor.
Cooling unit alarm	OK/ Alarm	The alarm is displayed when the high pressure switch is tripped. In the event of an alarm, see "High pressure switch alarm" page 36.
Alarm	No/Yes	The alarm is displayed if there is a fault with the inverter or compressor. In the event of an alarm, see "Alarm information for inverter and compressor" page 34.
Safety mode	OK	
VSD restr.	No	The inverter restricts the speed.
Cooling	x%	Cooling load from Climatix cooling regulator.
Compr. frequency	x.xHz	Frequency to the compressor.
Hot gas temp	x.x°C	Hot gas temperature
**********		
Danfoss-VSD-EEV		Electronic Expansion Valve
Suction gas temp	x.x°C	Measured suction gas temp.
Evaporating temp	x.x°C	Calculated evaporation temp based on low pressure.
Overheat. ref	x.xK	Setpoint for overheating. Adjusted automatically.
Overheating	x.xK	Measured overheating.
Expansion valve	x.x%	Expansion valve position.
**********		
Danfoss-VSD-MOC		Motor Orientated Control
Inverter temp	x.x°C	Internal temperature of the inverter.
Supply voltage	x.x V	Supply voltage
C1 Output	x.x Wa	Compressor output
Int. DC voltage	x.x V	Internal DC voltage
Motor current phase A	x.xx A	Power consumption phase A
Motor current phase B	x.xx A	Power consumption phase B
Motor current phase C	x.xx A	Power consumption phase C

Excl. control (Carel code UC, MK or US)



Status information can be read on the Carel display (Main menu/Status - I/O).
The following is presented:

Status A01	**Value, example**	**Explanation**
Compressor:	Off 0.0 Hz	Compressor frequency.
Drive status:	Compressor Off	Status of compressor.
Derating status:	Normal, inactive	Restriction of the maximum frequency due to pressure/temp. ratio.
Status A02		
B1=Cool.demand:	0.0%	The cooling demand signal based on 0–10 V input.
B3=Ambient:	21.7°C	Compressor's ambient temp. (extract air)
High pressure:	0.0 b	High pressure (relative)
Discharge:	0.0°C	Hot gas
Status A03		
Inverter temp:	0.0°C	Internal temp. of the inverter.
Voltage supply:	0 V	Supply voltage to inverter (1 phase).
Voltage DClink:	0.0 V	Internal DC voltage of the inverter.
Compressor power:	0 W	Electrical power use.
Compressor current:	0.0 0.0 0.0 A	Compressor current.
Status A05		
NO1=Compressor:	O	Relay status of operating indication.
NO2=Global alarm:	C	Relay status of alarms.
Status A06		
		Overheating/Setpoint overheating Suction gas temp Valve opening Low pressure (relative) Evaporation temp
Status A06		
Working hours Comp.1	000000 h	Operating time
Status A11		
Modbus online: Drive application: Drive motor: Expansion valve:	 Yes Yes Yes	Status of communication – control application – motor control – expansion value control
Auto setup:	On	Auto setup for communication, result.
Start auto setup:	Off	Auto setup for communication.

5 Maintenance instructions

5.1 Service schedule

The service schedule comprises actions and service intervals for functional sections that may be part of the air handling unit. The unit consists of one or more of these functional sections. The sections that pertain to your unit are marked on the list in the table of contents. See page 1.

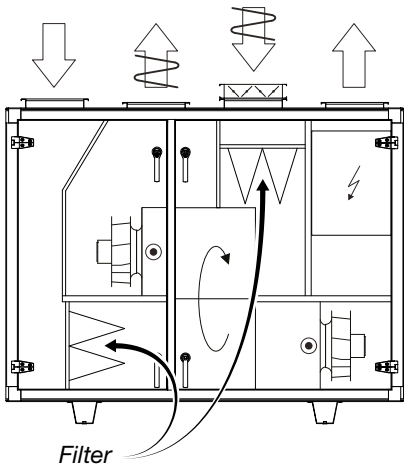
Make copies of the service schedule for future use before you fill in servicing data for the first time.

Service year 20.....-..... for unit no.					**Service performed * (date and signature)**			
Functional section		**Code**	**Recommended action (insp.)**	**Page ref.**	**3 000 h/ 6 mths**	**6 000 h/ 12 mths**	**9 000 h/ 18 mths**	**12 000 h/ 24 mths**
					date	date	date	date
	Filter supply air, extract air	ATEF	Check pressure drop Change filter if necessary	18	signature	signature	signature	signature
	Rotary heat exchanger	ATRR	Visual inspection Check press. balance Check diff. pressure Clean if necessary	20	signature	signature	signature	signature
	Air heater water	ATEV, ATTV	Visual inspection Clean if necessary Check function	24	signature	signature	signature	signature
	Air heater electric	ATEE	Visual inspection Clean if necessary Check function	25	signature	signature	signature	signature
	Air cooler water	-	Visual inspection Check drainage Clean if necessary Check function	26	signature	signature	signature	signature
	Fan unit	-	Visual inspection Clean if necessary Check the air flow	27	signature	signature	signature	signature
	Damper	ETET-UM, ETET-TR	Visual inspection Clean if necessary Check tightness	30	signature	signature	signature	signature
	Sound attenuator	ETET-LD	Visual inspection Clean if necessary	31	signature	signature	signature	signature
	Cooling unit	-	Visual inspection Check drainage. Clean if necessary Check function Check for leakage and report if necessary	32	signature	signature	signature	signature

** Every 3,000th hour in operation or every 6th month depending on which occurs first.*
More frequent servicing may be required in certain environments.

5.2 Filters (code ATEF)

The air filters in an air handling unit are designed to prevent dust and other impurities from entering the building. They should also protect sensitive components inside the unit, e.g. water coils and heat exchangers, from exposure to impurities.

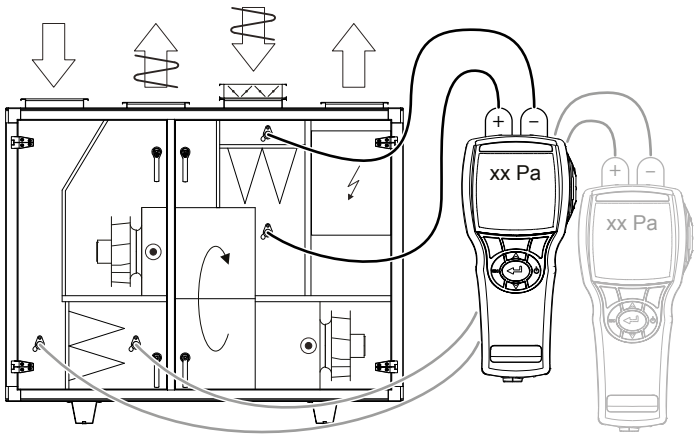


The dust separation efficiency varies considerably between various filter types. The dust collecting efficiency also varies substantially. It is therefore important to use filters of the same quality and capacity when you change them. Separation class is specified with standard designations M5 for medium filters and F7 for fine filters. 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

Size	Filter type	No of filters	Dimensions (mm)		No of bags/ filters	Face area total (m^2)
			W × H	Length		
06	Bag filter M5	1	790 × 287	370	8	2.1
	Bag filter F7	1	790 × 287	370	11	2.7
10	Bag filter M5	1	892 × 380	520	9	4.2
	Bag filter F7	1	892 × 380	520	15	6.4
12	Bag filter M5	2	550 × 315	520	6	4.6
	Bag filter F7	2	550 × 315	520	10	7.0

Filter replacement

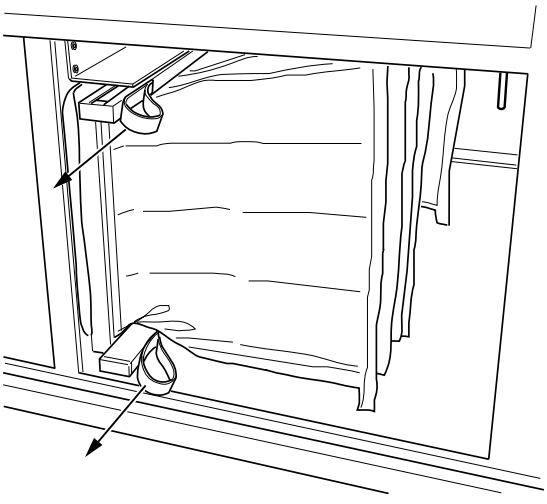
1. Shut down the unit via the control terminal and lock the safety switch in the 0 position.

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.

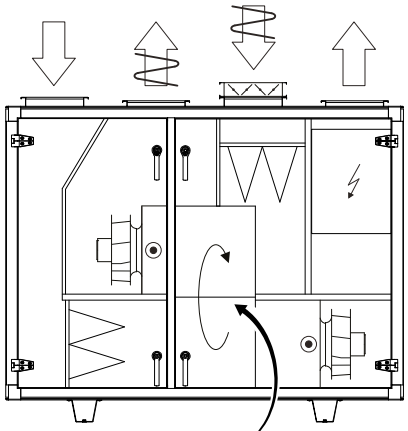
3. Release the eccentric rails.
4. Remove the old filter by pulling it towards you.
5. Clean the filter cabinets.
6. Install the new filter, press in the eccentric rails to engage them and close the inspection door.
7. If there is a non-removable filter monitor: attach the probes on each side of the filter.
8. Start the unit.



Eccentric rails inside the unit

5.3 Rotary heat exchanger (code ATRR)

The purpose of the heat exchanger is to recover heat from the extract air and transfer this heat to the supply air. This reduces the output required and the energy use.



Rotary heat exchanger

A faulty heat recovery function through reduced recovery efficiency entails increased energy use. This also means that the planned supply air temperature will not be reached when outdoor temperatures are low.

A conceivable reason for reduced recovery efficiency may be that the rotor rotates too slowly because the drive belt is slipping. Rotation should not be lower than 8 RPM during full energy recovery.

It is not usual for the rotor passages to become fouled with dust, since the rotor is normally self-cleaning. However, this might occur if the dust is of a sticky nature. A reduction of the extract air flow, e.g. due to fouling of the extract air filter, entails reduced heat recovery efficiency.

Inspection

1. Shut down the unit via the control terminal and lock the safety switch in the 0 position.
2. Wait until the fans have stopped, then open the inspection door.

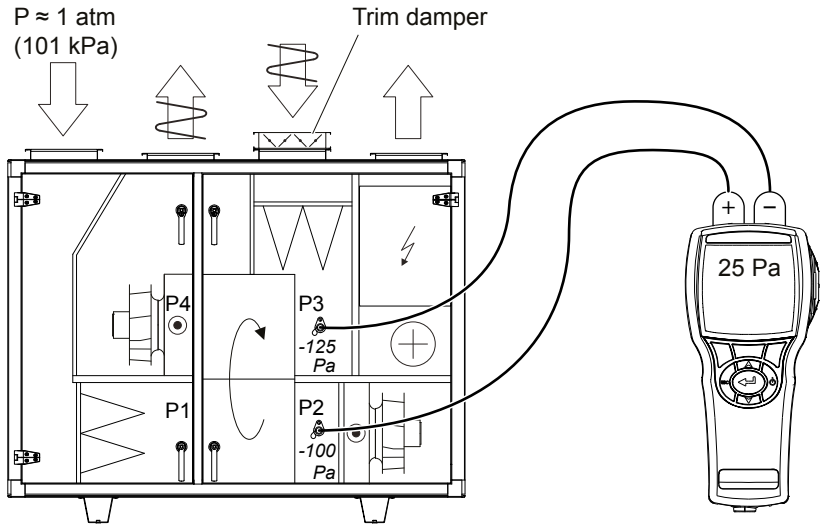
WARNING!
Positive pressure inside the unit, risk of personal injury. Allow the pressure to drop before you open the inspection doors.

3. Check that the rotor rotates easily. If it is sluggish, you might have to adjust the bristled sealing strip.
4. Check that the rotor's bristled sealing strip seals against the side plates and that it is not worn. The bristled sealing strip is subject to wear and can be adjusted or replaced if the need arises.
5. Check that the drive belt is properly tensioned and does not slip. If it slips, it will have to be shortened. The rotor speed should not be lower than 8 RPM during full energy recovery.
6. Check that the drive belt is intact and clean.
7. Check that the rotor's inlet surfaces are not covered with dust or other impurities. NB: Avoid touching the rotor inlet and outlet surfaces with your hands or tools.

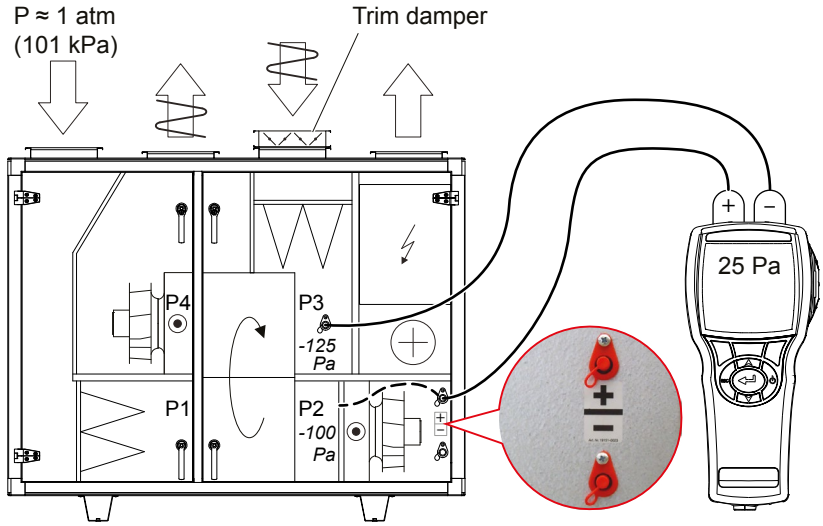
8. Check the pressure balance. To ensure correct function of the purging sector, the negative pressure at P3 should be greater than the negative pressure at P2 (min. diff. 25 Pa). Otherwise an ETET-TR trim damper can be used on the extract air side in order to throttle in the correct pressure balance.

   Example:
   Measurement outlets for P2: Downstream supply air fan (SF) generates negative pressure in relation to the atmospheric pressure (atm), e.g. -100 Pa

   Measurement outlets for P3: Downstream extract air fan (EF) and any trim damper generate greater negative pressure than at P2, e.g. -125 Pa.



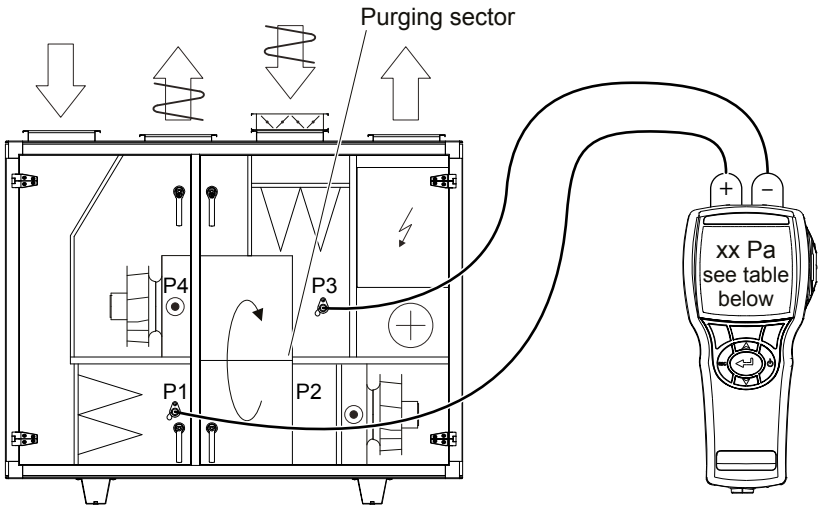
Measurement outlets for pressure balance – unit incl. control equipment (code MX).



Measurement outlets for pressure balance – unit excl. control equipment (code UC, MK or US).

9. Check the differential pressure across the rotor. The purging sector is factory-installed, set to the maximum open position. Depending on the unit's pressure ratios, the purging sector may need adjustment. An incorrect setting may impair the efficiency. Inspection and adjustment should be carried out as follows:

- Measure and write down the differential pressure between the outdoor air (P1) and the extract air (P3).

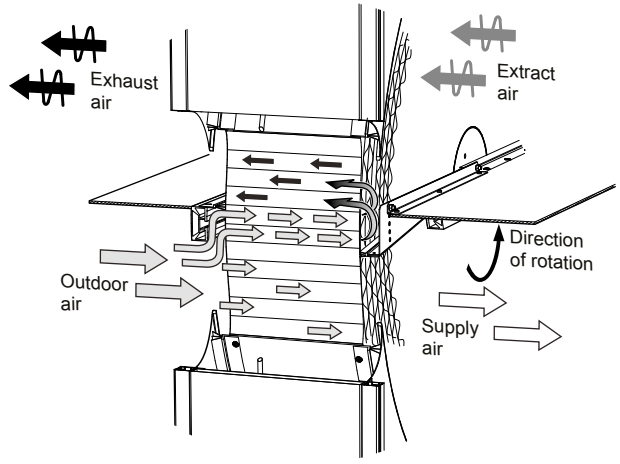


- Read the recommended setting (adjustment hole in the purge sector) from the table below.

	Rotor variant	Adjustment hole in the purging sector		
		3 open*	**2 intermediate position**	**1 closed**
Diff. pressure between P1 and P3 (Pa)	Normal	< 300	> 300	-
	Plus	< 400	> 400	-

****maximum open purge sector, preset position from the factory***

- Adjust the purging sector if the need arises. The illustration shows the purging sector set to the maximum open position.



Cleaning

- Remove dust by carefully vacuum cleaning using a soft brush.
- If the rotor surfaces are severely fouled by greasy dust, spray the rotor with water mixed with a dishwashing detergent that will not corrode aluminium. Alternatively, use detergent designed for heat exchangers, e.g. Re-Coilex (see below).
- Compressed air at low pressure (max. 6 bar) can be used for blowing the surfaces clean. To avoid damage, the nozzle should not be held any closer to the rotor than 5–10 mm.

A hygroscopic rotor variant can absorb particles which in some cases give off odours. To prevent odours arising, exercise run the hygroscopic rotor using the integrated control function. If an odour still arises, we recommend cleaning the rotor with e.g. Re-Coilex, see below.

Re-Coilex is a weak alkaline, highly concentrated, special cleaner that is diluted with water and applied liberally with a pressure sprayer, if possible when the unit is in use so that the detergent is sucked through the rotor.

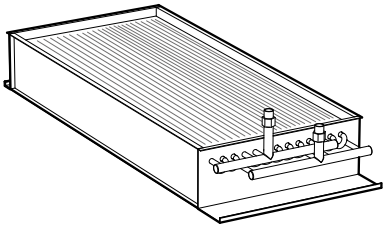
For cleaning it is recommended that the purge sector is fully open and the rotational speed is 8 RPM. This assists with the sucking through of the detergent. Post-rinsing is not normally required.

Re-Coilex is marketed by Resema AB.

Lubrication

The bearings and drive motor are permanently lubricated and do not require additional lubrication.

5.4 Air heater water



Air heater water (code ATEV)

The heating coil (code ATEV) consists of a number of copper tubes with aluminium fins pressed on them. 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).
To utilise its full capacity, the coil must be well vented. The pipework should be vented by opening the bleeder screws in pipe connections and/or an air vessel.

Inspection

Check:

1. The coil fins to detect possible mechanical deformity
2. That the water coil is not leaking.

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 (that will not corrode aluminium).

Bleeding

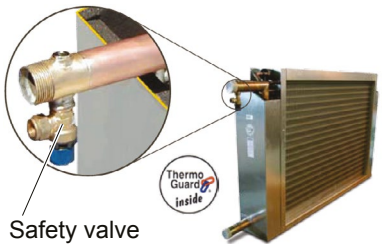
Bleed the heating coil and the pipework if needed. Bleeder screws are on top of the coil or on the tube connections.

Function

Check that the coil is radiating heat. This can be done by temporarily increasing the temperature setting (setpoint).

Additional maintenance for ThermoGuard (code ATTV)

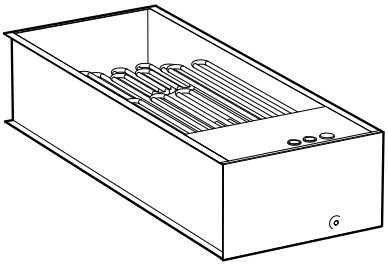
1. Regularly check safety valve function (at least once a year). If you see that the valve is leaking, this is normally due to impurities from the pipe system that have accumulated on the valve seat.
   In normal cases, it is sufficient to carefully turn the valve knob and in this way “flush” the valve seat clean. If the safety valve continues to leak, you will have to replace it with a new one of the same type and with the same opening pressure.



2. Any shut-off valves on the supply or return lines may not be closed if freezing temperatures are likely.
3. If a ThermoGuard coil has frozen, let it thaw completely before restarting operation. If the heat recovery unit is installed upstream of the coil, it is often sufficient to run heat recovery to thaw the coil. If this does not work, some other external heating source will have to be used for thawing the water coil.

   Important! To ensure correct ThermoGuard coil function, the entire coil must be allowed to thaw before returning it to full operation. Make sure that water is circulating in the entire coil when you start it up.

5.5 Air heater electric (code ATEE)



Air heater electric (code ATEE)

The heating coil consists of “unsheathed” electric heating rods. A substantial accumulation of dust or other impurities on the heating rods will cause them to overheat. This could shorten their service life. This might also entail an odour of burnt dust and, in the worse case, the risk of fire. Overheated electric heating rods may become deformed or loosen from their suspension fasteners and heat the air unevenly.

Inspection

Check that the electric heating rods are correctly positioned and that they are not deformed in any way.

Cleaning

Vacuum or wipe surfaces with a moist cloth to remove any dust or impurities.

Function

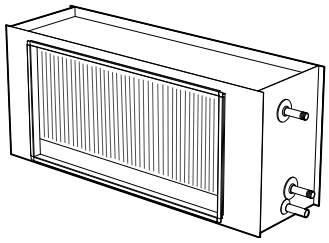
1. Simulate reduced required output by temporarily lowering the temperature setting (setpoint), so that all the electric output steps (contactors) switch out.
2. Then sharply increase the setpoint setting and check that the electric output steps switch in.
3. Restore the temperature setting.
4. Stop the air handling unit (NB: Do not break the circuit with the safety switch). All the electric output steps should switch out (i.e. the contactors in the OFF position). Stopping the unit may be delayed approx. 2–5 minutes to allow the fans to cool the heat energy stored in the air heater.

The electric heater is equipped with dual temperature limiters. The one that resets itself automatically should be set to 70°C.

The overheat protection with manual reset interrupts operation when the heater reaches approx. 120°C and is located on the cover panel on the side of the heater. **Determine the cause of overheating and take corrective action before you reset the protection device.**

Please note that the risk of overheating increases as the air flow through the unit decreases. The air speed should not be lower than 1.5 m/s.

5.6 Air cooler water



Air cooler water

The cooling coil consists of a number of copper tubes with aluminium fins pressed onto them. 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). A drip tray with drain is located under the cooling coil for collecting and removing evaporation water.

Inspection

Check:

1. The coil fins to detect possible mechanical deformity
2. That the water coil is not leaking
3. That cooling energy is uniformly distributed across the coil surfaces (in operation)
4. The drip tray and drain with water trap (clean if necessary)
5. That the water trap (without non-return valve) is filled with water.

Cleaning

If the fins on the coil are dirty, vacuum clean from the inlet side. Alternatively, you can blow them clean with compressed air from the outlet side. If they are severely fouled, you can clean them with warm water mixed with dishwashing detergent that will not corrode aluminium.

Bleeding

Bleed the cooling coil and the pipe connections if needed. Bleeder screws are on top of
the coil or on the tube connections.

Function

Check that the coil is emitting cooling energy. This can be done by temporarily lowering the temperature setting (setpoint).

5.7 Fan unit

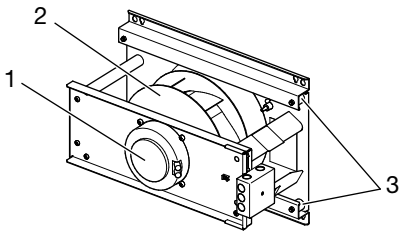
The purpose of the fans is to transport air through the system, i.e. the fan must overcome the flow resistance in air terminals, air ducts and the unit.

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

- If the supply air flow is too low, the system will be out of balance, causing poor room climate.
- 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 are generating too little air flow may be that impurities have collected on the fan impeller blades.

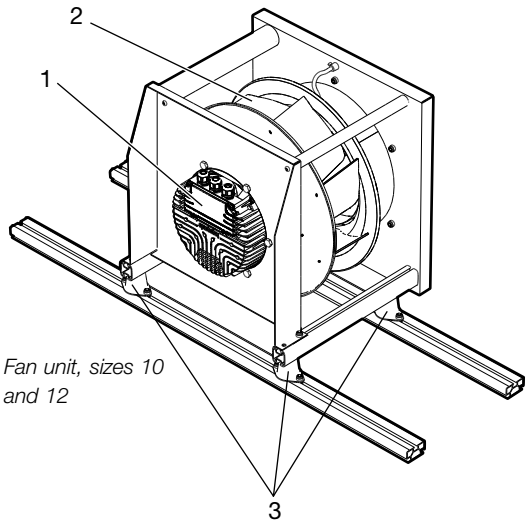
WARNING!
High voltage, risk of personal injury. Before working on/servicing the unit – shut down the unit via the control terminal, then turn the safety switch to the 0 position and lock it.

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 unit size 06

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

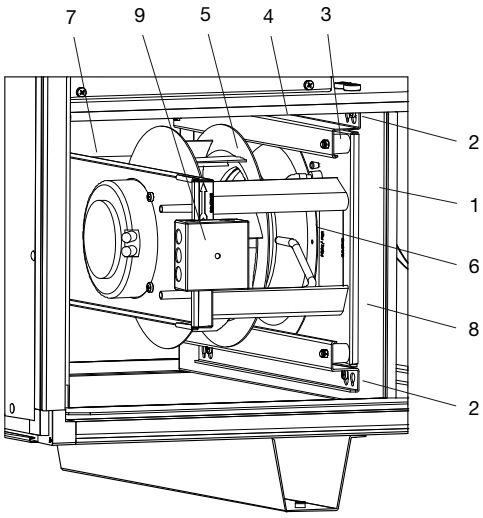


Fan unit, sizes 10 and 12

Fan unit, size 06

Inspection

1. Remove one end of the fan assembly's earth braid. Remove the screws (position 2) in the connection plate (position 1) and unhook the fan unit from the key holes in the anti-vibration supports (position 4), both upper and lower.
2. Check that the fan impeller with motor (position 5) 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 with motor (position 5) is firmly mounted in the upper fan support (position 7) and that it has not shifted sideways toward the inlet cone (position 6). Also check to make sure that the inlet cone is properly secured.



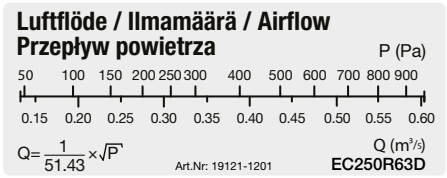
Fan unit, size 06

1. Connection plate
2. Screws (suspension)
3. Anti-vibration mounting
4. Anti-vibration support
5. Fan impeller with motor
6. Inlet cone
7. Fan support, upper
8. Fan support, lower
9. Junction box

5. The fan unit is mounted on the connection plate by means of rubber anti-vibration mountings (position 3) between the lower fan support (position 8) and the anti-vibration supports (position 4). Check that the anti-vibration mountings are intact and are firmly fitted.
6. Check that the gasket on the connection plate (position 1) around the connection opening is intact and is firmly fitted.
7. Check that the measurement tubes are securely fitted on each measurement outlet.
8. Check that the edge protection on the upper fan support (position 7) is firmly mounted and protects the cables that are wired to the junction box (position 9).
9. Reinstall the fan unit by hooking in on the key holes in the anti-vibration supports (position 4), both uppe r and lower, and secure the screws (position 2) in the connection plate (position 1).
10. Check the air flows by
    – reading the flow display on the Climatix hand-held unit for unit with control (code MX)

    – measuring Δp in the connections (measurement outlets +/–) for flow measurement for units without control (code UC, MK or US)

    Use the unit's air flow label and see which flow corresponds to the measured Δp, see example below.

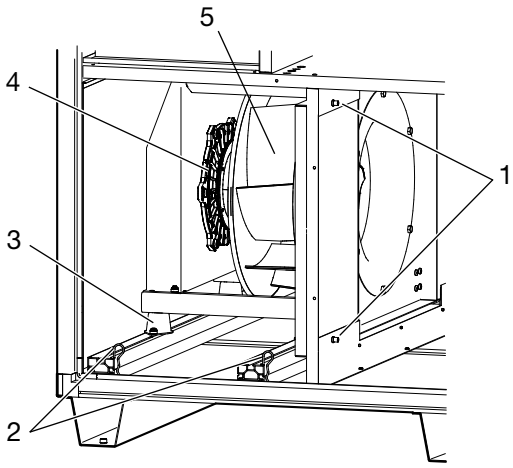


Cleaning

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. Remove any 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 inside the 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 impeller. Check that the inlet cones are securely mounted.
6. Follow item 9 under *Inspection.*

Fan units, sizes 10 and 12

Inspection



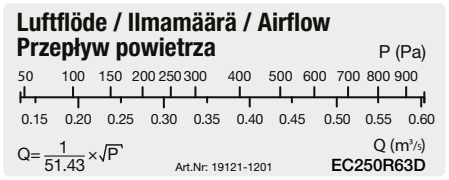
Fan unit, sizes 10 and 12

1. Screws, fan unit
2. Pins
3. Anti-vibration mounting
4. Motor
5. Fan impeller

1. Remove one end of the fan assembly's earth braid. Remove the screws (position 1) and the pins (position 2). Pull out the fan units (fan and motor are mounted on slide 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. 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.
5. Check the mounting bolts as well as the suspension devices and support.
6. Check that the gasket on the connection plate around the connection opening is intact and is firmly fitted.
7. Check that the measurement tubes are securely fitted on each measurement outlet.
8. Remount the fan units.
9. Check the air flows by
   – reading the flow display on the Climatix hand-held unit for unit with control (code MX)

   – measuring Δp in the connections (measurement outlets +/–) for flow measurement for units without control (code UC, MK or US).

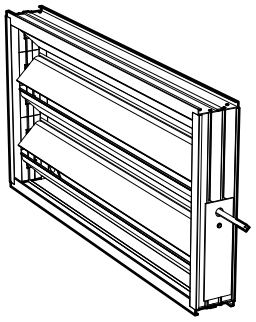
   Use the unit's air flow label and see which flow corresponds to the measured Δp, see example below.



Cleaning

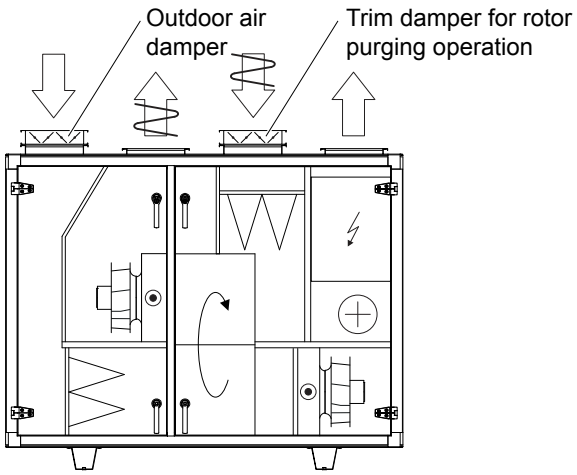
1. Follow items 1-7 under *Inspection*.
2. Wipe the fan impeller blades to remove any coatings. Use an environmentally friendly degreasing agent.
3. The external surfaces of the motor must be kept clean from dust, dirt and oil. Clean with a dry cloth. If they are severely fouled, use an environmentally 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. Remount the fan units.

5.8 Damper (code ETET-UM, ETET-TR)



Outdoor air damper (code ETET-UM) and trim damper (code ETET-TR)

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



- If the outdoor damper does not;
  – Open completely this reduces the air flow
  – Close completely when the unit stops, the heating coil is likely to freeze
  – Seal properly (leaks) this will result in increased energy use.
- If the trim damper for the rotor purging function is not working or is not correctly adjusted, possible odours in the extract air are likely to be transferred via the rotor to the supply air.

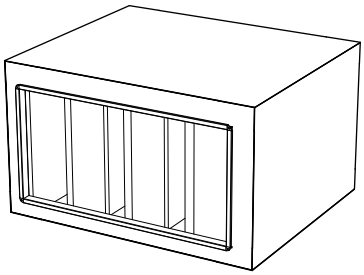
Inspection

1. Check the function of the damper actuator.
2. Check the dampers for tightness when they are 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.

5.9 Sound attenuator (code ETET-LD)



Sound attenuator (code ETET-LD) and sound attenuator (code MIE-KL)

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.

5.10 Cooling unit

General

The IV Produkt cooling unit 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

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 2009:1605). 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 cooling 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...".

Inspection

Check:

1. The fins on the condenser and evaporator to detect mechanical deformations
2. drip tray and drainage/drain (clean if necessary).

Cleaning

If the fins are fouled, they should be vacuumed from the inlet side. Alternatively, you can blow them clean with compressed air from the outlet side. If they are severely fouled, you can clean them with warm water mixed with dishwashing detergent that will not corrode aluminium.

Function

Check that the cooling unit is operating as it should by temporarily lowering the temperature setting (setpoint).

6 Alarm management and troubleshooting

6.1 Cooling unit

Troubleshooting via symptoms (unit with Climatix control, code MX).

The alarms for the cooling circuits are presented on the control unit display. To ascertain what has caused the alarm, follow the procedure below.

Symptom	Possible cause	Corrective action
The high pressure switch has tripped	No or too low air flow across the condenser	Check the air flow across the condenser. The high pressure switch may have tripped due to a momentary lack of air flow caused by e.g. a closed damper, clogged filter or incorrectly set time control program. Reset the pressure switch manually.
	Defective high pressure switch	Check/replace.
LOC alarm	Insufficient refrigerant volume	Look for leakage, seal the leak and top up with refrigerant.
	No or too low air flow across the evaporator	Check/adjust the flow.
	Defective expansion valve or low pressure control	Check/replace.
The LED is off or flashing green on the frequency inverter (see also information below).	Phase failure/voltage failure	Check the 1-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.

Green light emitting diode (LED) on the inverter

There is a green LED on the inverter's circuit board to indicate status:

Off – No power supply or faulty power supply. If the LED is off in spite of correct power supply, there could be an internal fault in the inverter.

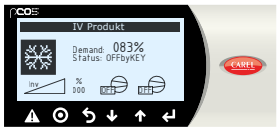
Lit – Normal mode, power supply is OK.

Flashing – The inverter is indicating a problem. Read off the alarm according to "Alarm information for inverter and compressor" page 34 and rectify.

Alarm information for inverter and compressor

For unit incl. control (code MX), alarm information can be read on the Climatix display (Main menu/Unit/Cooling/Alarms).

For unit excl. control (code UC, MK, US), alarm information can be read on the Carel display. Press the alarm symbol to view alarms.

		
Climatix alarm (MX)	**Carel alarm** (UC, MK, US)	**Explanation and corrective action**
Peripherals	AL P02 Compressor Drive: PERIPHERALS_ERROR	Communication error with the electronic expansion valve. Compressor runs at limited speed.
Outside operating range	AL C01 Compressor Drive: OUT_OF_ENVELOPE	The compressor has worked outside its normal operating range for a long time and stopped. Automatic restart occurs after 60 seconds. After 10 repeated restart attempts, the error must be remedied and the alarm reset.
Overcurrent	AL H01 Compressor Drive: OVER_CURRENT	A too high current has been registered and the inverter stopped. The alarm may be caused by e.g. missing phase (power supply), earth fault, short circuit, compressor fault or internal fault in the inverter. The alarm needs to be reset after repeated start attempts.
High DC voltage	AL H02 Compressor Drive: DCLINK_VOLTAGE_HIGH	A too high voltage has been registered. The alarm may be caused by e.g. a power outage. After 10 repeated alarms, the error must be remedied and the alarm reset.
High inverter temp	AL H03 Compressor Drive: DRIVE_TEMPERATURE_HIGH	A too high temperature in the inverter has been registered (>115°C) and the inverter stopped. The alarm may be caused by e.g. a defective cooling fan, blocked air flow or abnormally high ambient temperature. The alarm needs to be reset.
Low supply voltage	AL H04 Compressor Drive: SUPPLY_VOLTAGE_LOW	A too low supply voltage has been registered (<180 V). Check the voltage level. When the voltage reaches normal level the inverter restarts. **The alarm may be the result of a tripped high pressure switch (the inverter loses all power). Reset by pressing the button on the pressure switch.**
High hot gas temp	AL D01 Compressor Drive: DISCHARGE_TEMP_HIGH	A too high refrigerant temperature has been registered. The inverter attempts to restart once normal temperature has been registered. After 10 restart attempts, the error must be remedied and the alarm reset.
Hot gas temp error	AL D03 Compressor Drive: DISCHARGE_TEMP_INVALID	Hot gas temperature signal is faulty. There is probably a fault with the wiring or sensor. The inverter is stopped and restarts when the fault is fixed.
MB communication error	AL D04 Compressor Drive: MODBUS_COM_TIMEOUT	The inverter has lost Modbus communication with Climatix control equipment and stopped. When communication is restored, the inverter is automatically started after 2 minutes.

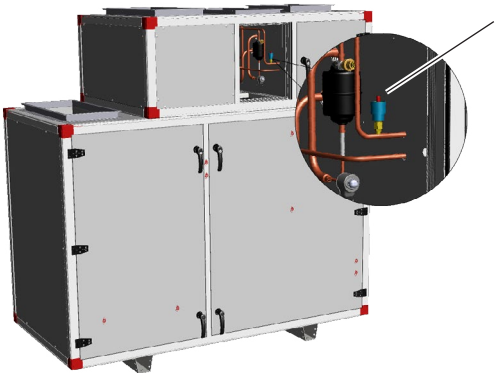
MOC safety	AL D06 Compressor Drive: MOC_SAFETY	Motor Orientated Control has detected an error. The inverter is stopped. Errors must be remedied and alarms reset. **The alarm may be the result of a tripped high pressure switch (the inverter loses all power). Reset by pressing the button on the pressure switch.**
Low DC voltage	AL D07 Compressor Drive: DCLINK_VOLTAGE_LOW	The DC voltage in the inverter is too low. The inverter is stopped. When the voltage reaches the correct level the inverter restarts.
Low pressure error	AL D09 Compressor Drive: SUCTION_PRESS_INVALID	Faulty pressure signal for low pressure (suction side). There is probably a fault with the wiring or sensor. The inverter is stopped and restarts when the fault is fixed.
High pressure error	AL D10 Compressor Drive: CONDENSEPRESS_INVALID	Faulty pressure signal for high pressure. There is probably a fault with the wiring or sensor. The inverter is stopped and restarts when the fault is fixed.
High pressure low	AL D12 Compressor Drive: CONDENSER_PRESS_LOW	The pressure at the condenser is too low after starting. After 10 repeated alarms, the error must be remedied and the alarm reset.
Too many starts	AL D15 Compressor Drive: RESTART_TOO_FREQUENT-LY	The compressor has been restarted too many times in a 10-minute period and the inverter stopped. The alarm needs to be reset. Check that the air flow is correct. Set the start delay for the compressor to 3 minutes after the compressor is turned off. For UC/MK/US: Check that the regulator that starts/ stops cooling mode is not too fast so that the cooling mode hovers between ON and OFF. A maximum of six starts are permitted in 10 minutes; an alarm will be activated otherwise.
Internal inverter error	AL D16 Compressor Drive: INTERNAL_ERROR	An internal communication error has been registered and the inverter stopped. It is likely that the inverter cannot be restarted if this error occurs.
Cooling unit alarm: High pressure switch	AL C02 Compressor 1: Alarm	Alarm from tripped high pressure switch. **Reset by pressing the button on the pressure switch.**
Outdoor temp error	AL P01 B03 Ambient temp. probe fault or disconnected	The inverter does not receive a value for the ambient temperature and cannot regulate the compressor heat.
-	AL G01 Clock Board fault or not connected	-
-	AL G02 Extended memory Fault	-
Com.Modbus alarm Danfoss: Alarm	AL D18 Modbus communication: Compressor drive AOC	**The alarm may be the result of a tripped high pressure switch (the inverter loses all power). Reset by pressing the button on the pressure switch.**
	AL D18 Modbus communication: Compressor drive MOC	
	AL D18 Modbus communication: Compressor drive EEV	

High pressure switch alarm

If the high pressure switch has tripped, “Cooling unit alarm: Alarm” is displayed. Since the inverter loses all power when the high pressure switch is tripped, a communication error alarm is also displayed, “Com.Modbus alarm Danfoss: Alarm”.

Alarm reset

- Reset alarms from the inverter or the compressor by turning off the power to the unit (inverter) for at least 1 minute.
- Manually reset alarms caused by a tripped high pressure switch by pressing the red button on the pressure switch.



7 Ordering keys, Envistar Top

7.1 Air handling unit and unit components

Unit (code ATER, ATCR)

ATER -a-b-0-00
ATCR -a-b-c-00

a - Size	04, 06, 10, 16, 21
b - Casing	AA = Standard PA = Low energy BA = Fire resistance rating E3
c - Output variant cooling unit	0 = Without cooling unit 1V = Capacity variant 1 (sizes 12 and 21) 2V = Output variant 2 (sizes 04–21)

Accessories:

ATET-04 -a	Flow meter, manometer type
a - Size	04, 06, 10, 12, 16, 21

Inspection side is specified upon ordering

Rotor (code ATRR)

ATRR -b-c

b - Size	04, 06, 10, 12, 16, 21
c - Rotor variant	NO = Normal HY = Hygroscopic NP = Normal Plus NX = Normal Plus Extra HP = Hygroscopic Plus EX = Epoxy

Electrical connection (code ATEK)

ATEK -a-b

a - Size	04, 06, 10, 12, 16, 21
b - Cooling unit	0 = Without 1 = With

Filter (code ATEF)

ATEF -a-b

a - Size	04, 06, 10, 12, 16, 21
b - Filter class	M5, F7

Accessories:

ATET-06 -a	Rotation monitor
a - Size	04, 06, 10, 12, 16, 21
MIET-FB -a	Filter monitor
a - Type	01 = U-tube manometer 02 = Kytölä manometer 03 = Magnehelic manometer

Air heater water (code ATEV, ATTV)

ATEV -a-b ATTV -a-b	Air heater water Air heater water, ThermoGuard
a - Size	04, 06, 10, 12, 16, 21
b - Output variant	01, 02, 03 = ATEV 1, 2 = ATTV

Air heater electric (code ATEE)

ATEE -a-b

a - Size	04, 06, 10, 12, 16, 21
b - Output variant	1 = Sizes 04, 06, 10, 12, 16, 21 2 = Sizes 04, 06, 10, 12, 16, 21 3 = Sizes 16, 21

7.2 Components for duct installation

Shut-off damper excl. motor (code ETET-UM)

ETET-UM -a

a - Size	04, 04C*, 06, 10, 12, 16, 21

Trim damper incl. manual control (code ETET-TR)

ETET-TR -a

a - Size	04, 04C*, 06, 10, 12, 16, 21

Sound attenuator (ETET-LD)

ETET-LD -a-b

a - Size	04, 04C*, 06, 10, 12, 16, 21
b - Type	1, 2 = Size 04 2 = Size 04C*, 06, 10, 12, 16, 21

** Refers to the ATCR-04 with rectangular duct connections.*

7.3 Accessories

Adjustable foot (code ETET-01)

For installation on a base frame, set of 4 feet.

Sleeve (code ETET-02)

Flexible woven fabric, l = 110–150 mm.

ETET-02 -b	
a - Size	04, 04C*, 06, 10, 12, 16, 21

** Refers to the ATCR-04 with rectangular duct connections.*

Inspection door handle (code ATET-07)

ATET-07 -b-c-d-0	
a - Size	04, 06, 10, 12, 16, 21
c - Casing	AA = Standard PA = Low energy BA = Fire resistance rating E3
d - Panel type	01 = Inspection door, small 02 = Inspection door, large

Return air damper (code ATET-09)

ATET-09 -b-1	
a - Size	04, 06, 10, 12, 16, 21

Inspection window (code EMMT-06)

Plexiglass, not for E3 casing (insulation for fire-resistance rating EI 30)

Inside light fitting (code EMMT-07)

IP 44, with protective grille.

Thermometer (code EMMT-16)

Dial thermometer, insertion type, -40 to +40°C.

Water trap (code MIET-CL 04)

Plastic, built-in non-return valve.

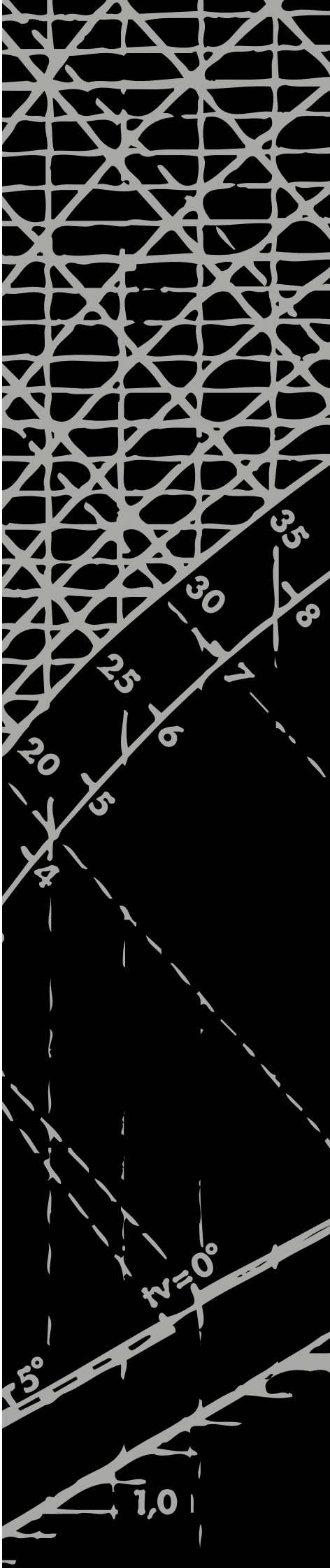
7.4 Control equipment

-a-b-c-d

a - Air handling unit	MST = Top MSC = Mompact MSF = Flex 100–600 indoor MSU = Flex 100–600 outdoor MSM = Flex 740–850
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
d - Control system	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 MX = Siemens Climatix Modbus HS = Special heat exchanger control system

Change history

100526.04	Ordering keys section added
100526.04 rev.01	Addition of order no, updated wiring diagrams for fans
110415.05	Updated: Section 1, warning texts, refrigerant text, refrigerant volume
110415.05 rev.01	Cable colour markings removed.
120217.06	Addition of Top size 21, rated current, fan motors, updated service schedule.
130318.07	Rated current updating, filter data and refrigerant handling. Addition of earth braid fan installation.
140425.08	New EcoCooler cooling units, sizes 06, 10 and 16. New casing and Modbus. Method for cleaning the rotor more detailed.
150911.09	Size 12 and rotor type NX added. More wiring instructions.



Air handling with focus on LCC

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