Air handling unit

Envistar®

Operation and Maintenance Instructions for the Envistar Flex

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	060 ☐	100 ☐	150 ☐
	190 ☐	240 ☐	300 ☐
	360 ☐	480 ☐	600 ☐
	740 ☐	850 ☐	980 ☐
With control	CX ☐	MX ☐	
Without control	UC ☐	MK ☐	US ☐

IV PRODUKT

Air handling with focus on LCC

1 General

1.1 Intended use

The air handling units in the Envistar Flex 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 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.

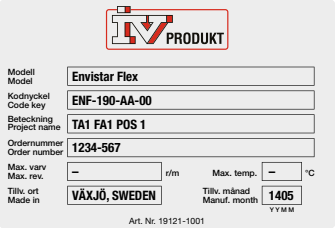
1.3 Manufacturer

The Envistar air handling units are manufactured by:

IV Produkt AB
Sjöuddevägen 7
SE-350 43 VÄXJÖ

1.4 Designations

Envistar Flex 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.



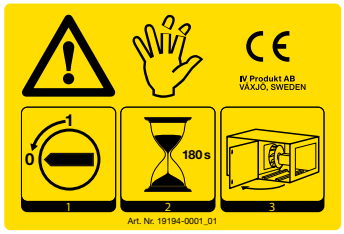
Typical model identification label

1.5 CE marking and EU Declaration of Conformity

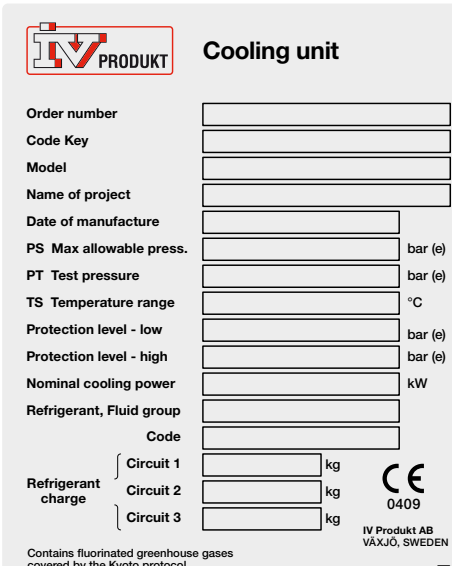
The air handling units and any incorporated cooling units are CE marked, which means that upon delivery they conform to applicable provisions in EU Machinery Directive 2006/42/EC as well as to other EU Directives applicable to the types of air handling units.

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 EU F-gas Regulation (EC) No 842/2006 and the Swedish Refrigerant Regulations (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...".

Leakage inspection and registration

The following applies to one-piece units with 3 kg refrigerant content or more per circuit:

- **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 of any work being performed (e.g. sealing a leak, replacing a component).
- The operator must **record** events, such as the volume and type of refrigerant topped up, refrigerant taken into possession, results of inspections and work done, person and company who carried out service and maintenance.

If the total refrigerant content of the ventilation system exceeds 10 kg, the result of the inspections (inspection report) must be sent to the regulatory authorities and be in their possession no later than 31 March of the following year.

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 Flex air handling unit

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

The Envistar Flex is fabricated as a modular unit comprising block sections in various sizes as a right- or left-handed version. The units are usually supplied with integrated control equipment (with control), but can also be obtained without control equipment (without control).

The EcoCooler cooling unit is available as an option

3 Wiring instructions and fuse protection

3.1 CX/MX – Complete control equipment

The following wiring instructions apply to units supplied complete with control equipment (code CX or MX).

Safety switch

A safety switch is mounted on the air handling unit.

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 unit functions are supplied with power separately. For recommended fuse protection, see our product selection program, IV Produkt Designer (Technical data and External wiring diagram).

Recommended fuse protection refers to fuses with type C characteristics.

Size	Ventilation (3×400V+N)		Cooling unit (3×400V+N) output variant			Electric heater
			1V	2V	3V	
060	10A		-	-	-	For electric heaters, see recommended fuse protection on the following pages.
100	10A		16A	-	-	
150	10A/16A	The size of the fuse protection depends on the fan variants; see the product selection program for a recommendation.	20A	25A	-	
190	10A/16A		20A	25A	-	
240	10A/16A/25A		25A	32A	-	
300	10A/16A/25A		25A	32A	-	
360	16A/25A		32A	50A	-	
480	25A/32A/40A		50A	63A	-	
600	25A/32A/40A		50A	63A	63A	
740	40A/63A		63A	80A	80A	
850	40A/63A/80A		63A	80A	100A	
980	40A/50A/63A/80A		63A	80A	100A	

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.

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 unit functions are supplied with power separately. For recommended fuse protection, see our product selection program, IV Produkt Designer (Technical data and External wiring diagram).

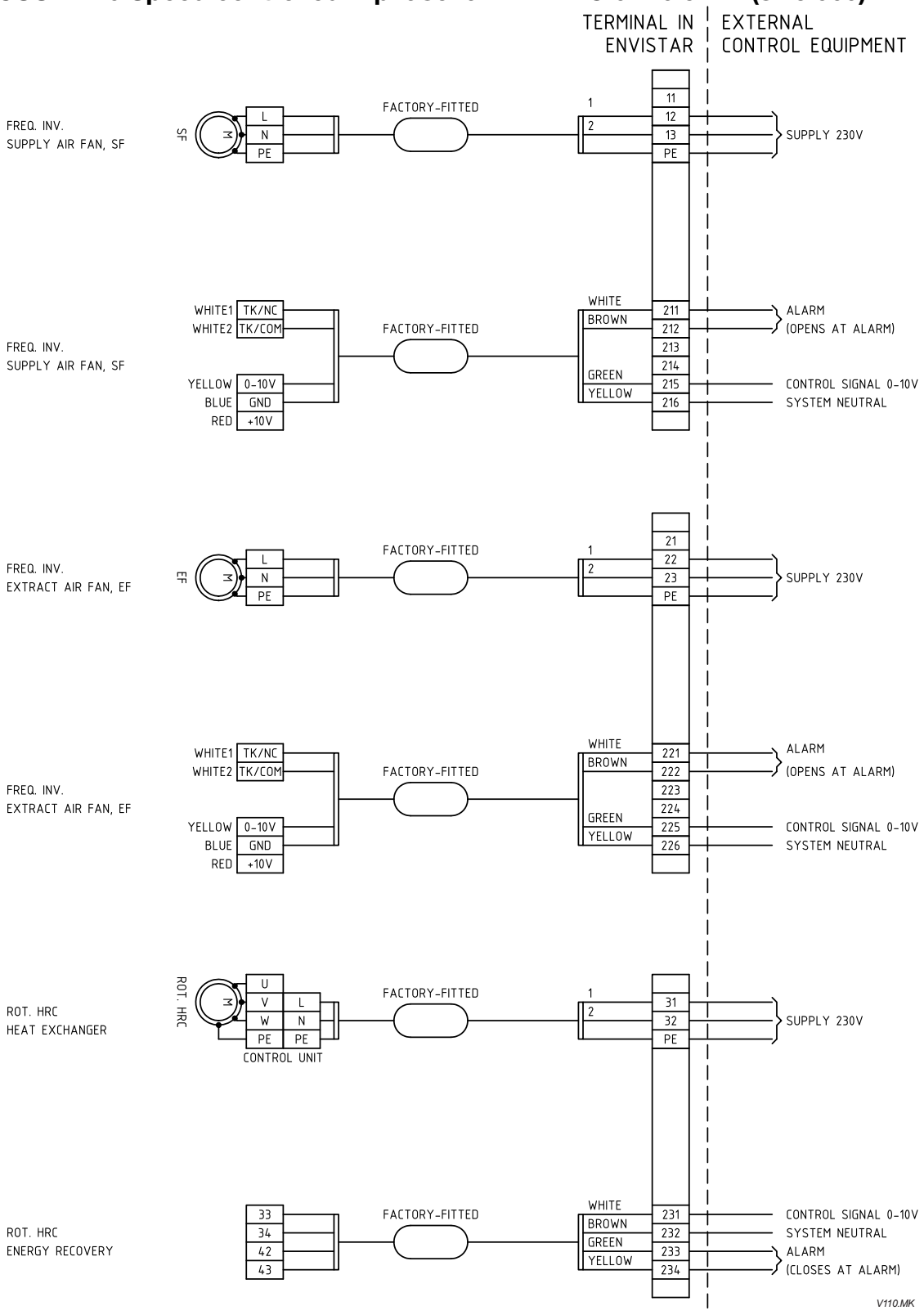
Recommended fuse protection refers to fuses with type C characteristics.

Size	Ventilation (3×400V+N)		Cooling unit (3×400V+N) output variant			Electric heater
			1V	2V	3V	
060	10A		-	-	-	For electric heaters, see recommended fuse protection on the following pages.
100	10A		16A	-	-	
150	10A/16A	The size of the fuse protection depends on the fan variants; see the product selection program for a recommendation.	20A	25A	-	
190	10A/16A		20A	25A	-	
240	10A/16A/25A		25A	32A	-	
300	10A/16A/25A		25A	32A	-	
360	16A/25A		32A	50A	-	
480	25A/32A/40A		50A	63A	-	
600	25A/32A/40A		50A	63A	63A	
740	40A/63A		63A	80A	80A	
850	40A/63A/80A		63A	80A	100A	
980	40A/50A/63A/80A		63A	80A	100A	

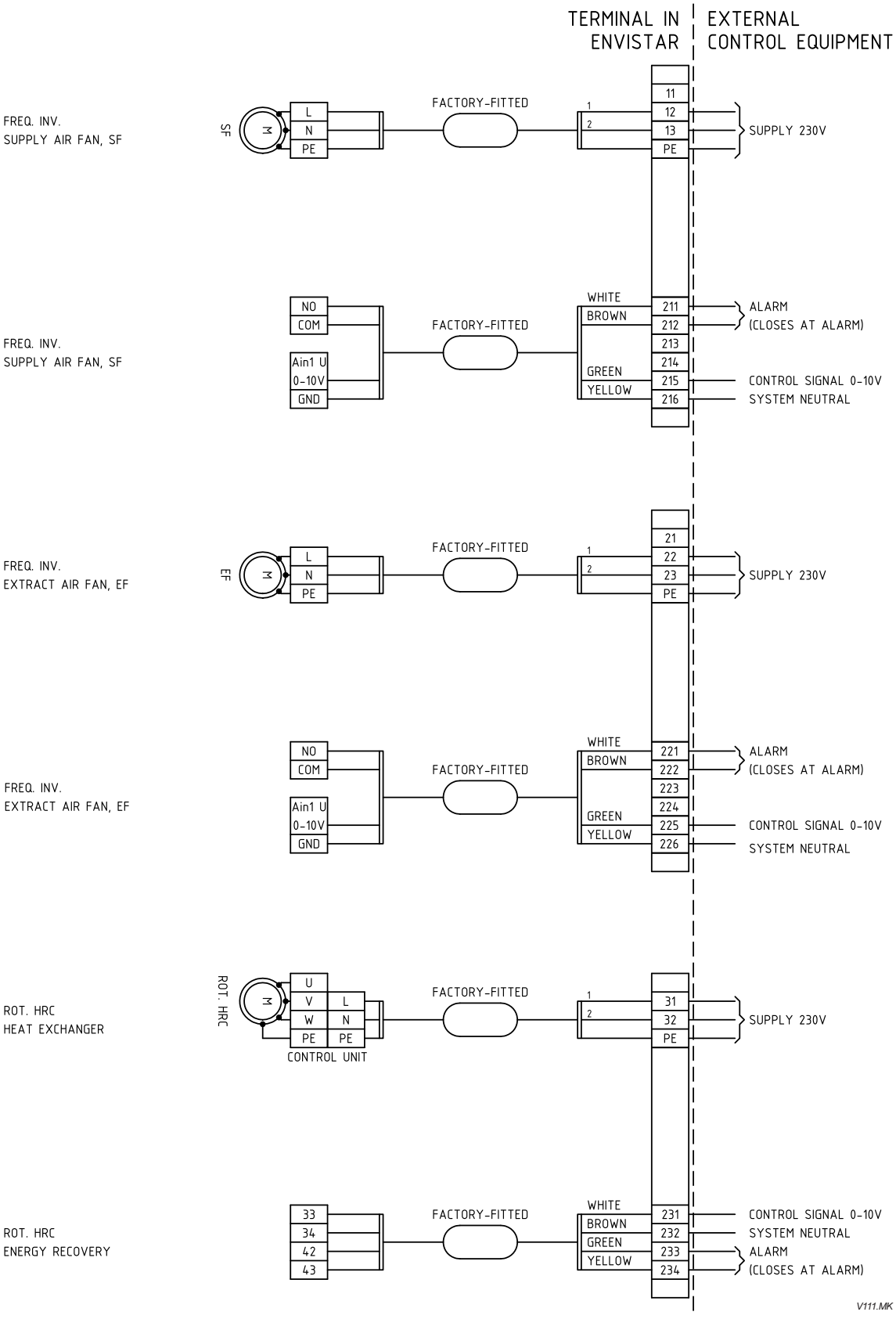
3.3 MK - Fans and hrc electrically connected to terminal

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. For recommended fuse protection, see 3.4 on page 14.

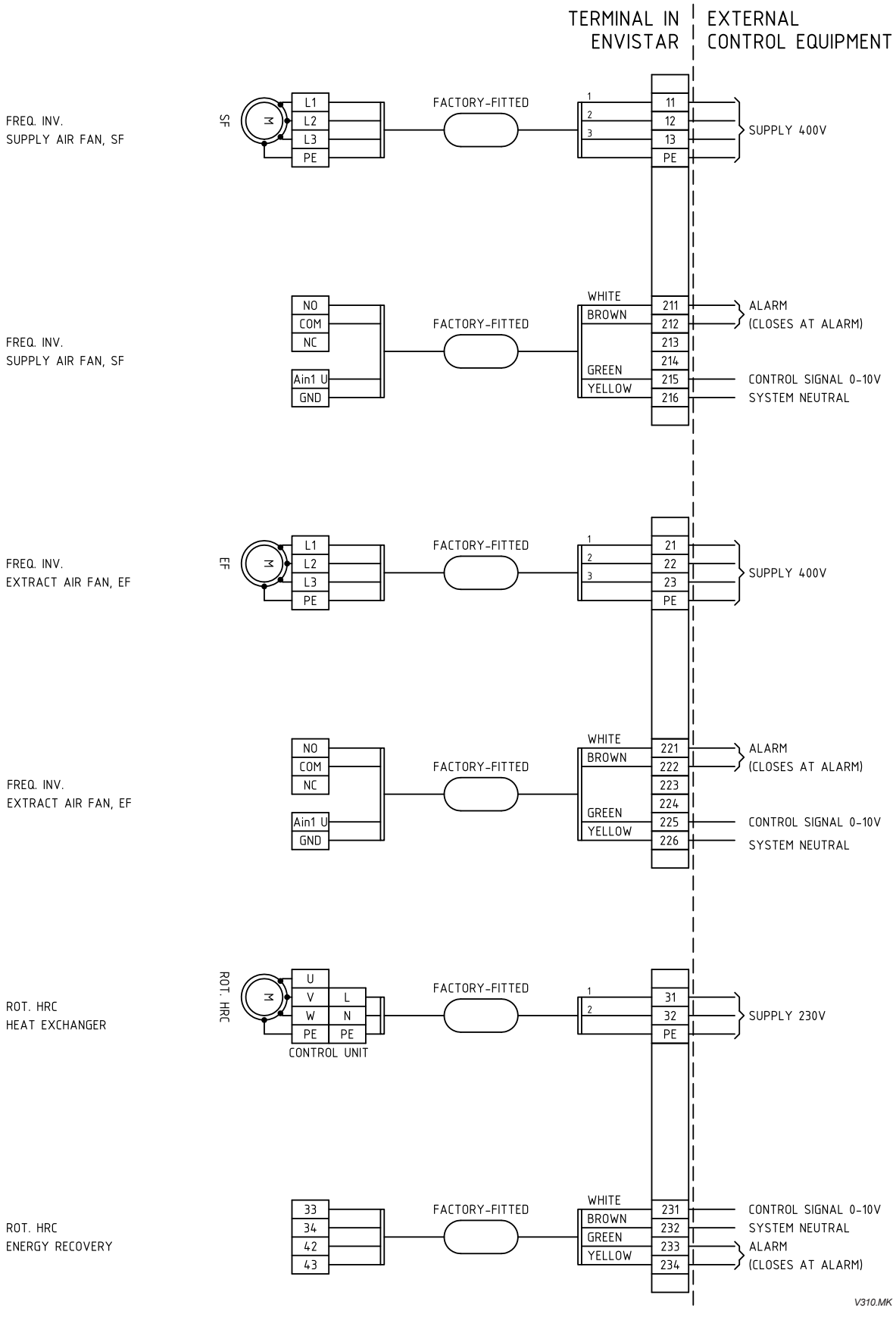
CSF/CSU-V110 Speed controlled 1-phase fan EBM EC 0.4-0.5 kW (size 060)



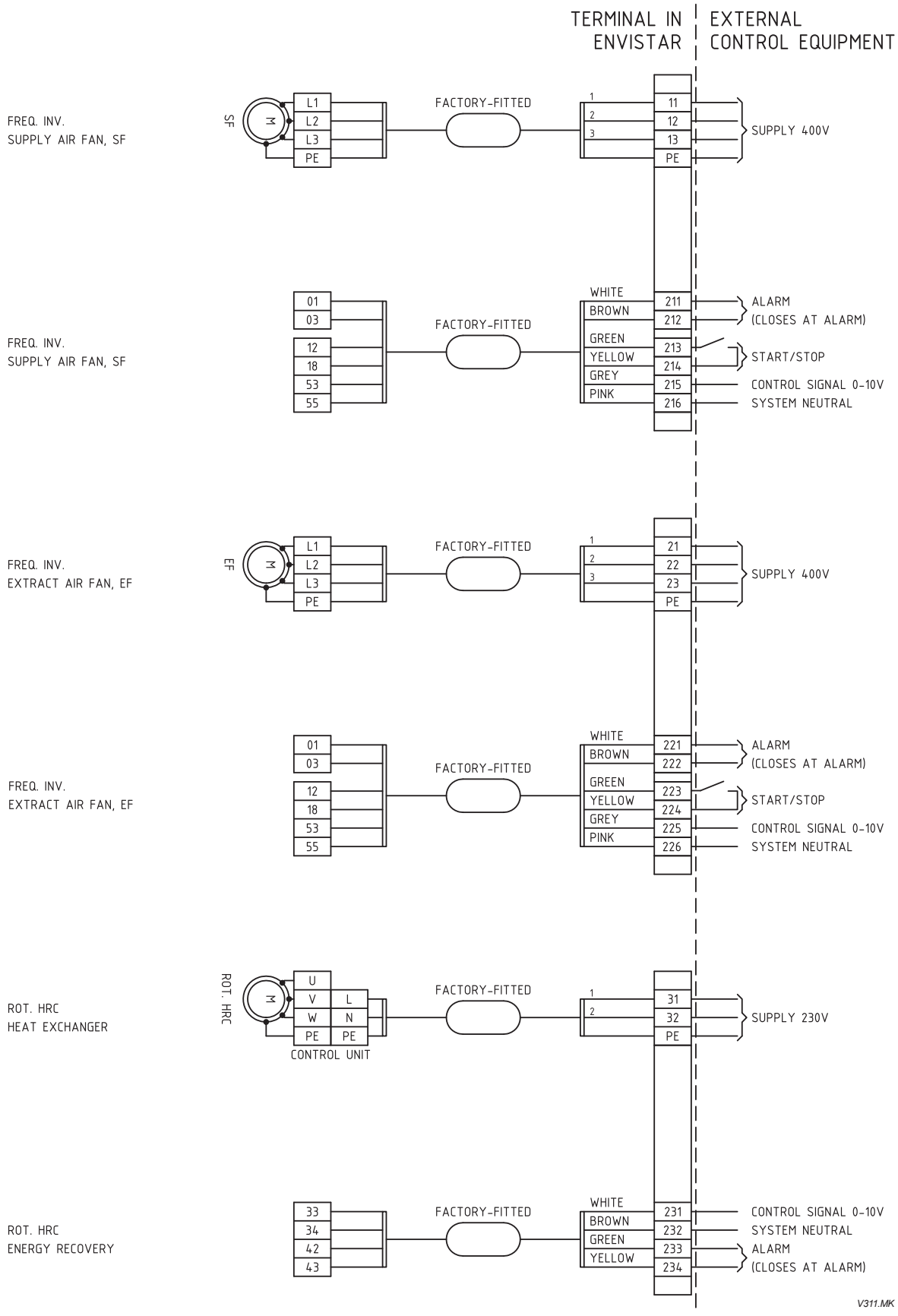
CSF/CSU-V111 Speed controlled 1-phase fan EBM 0.7-1.3 kW (size 060-100)



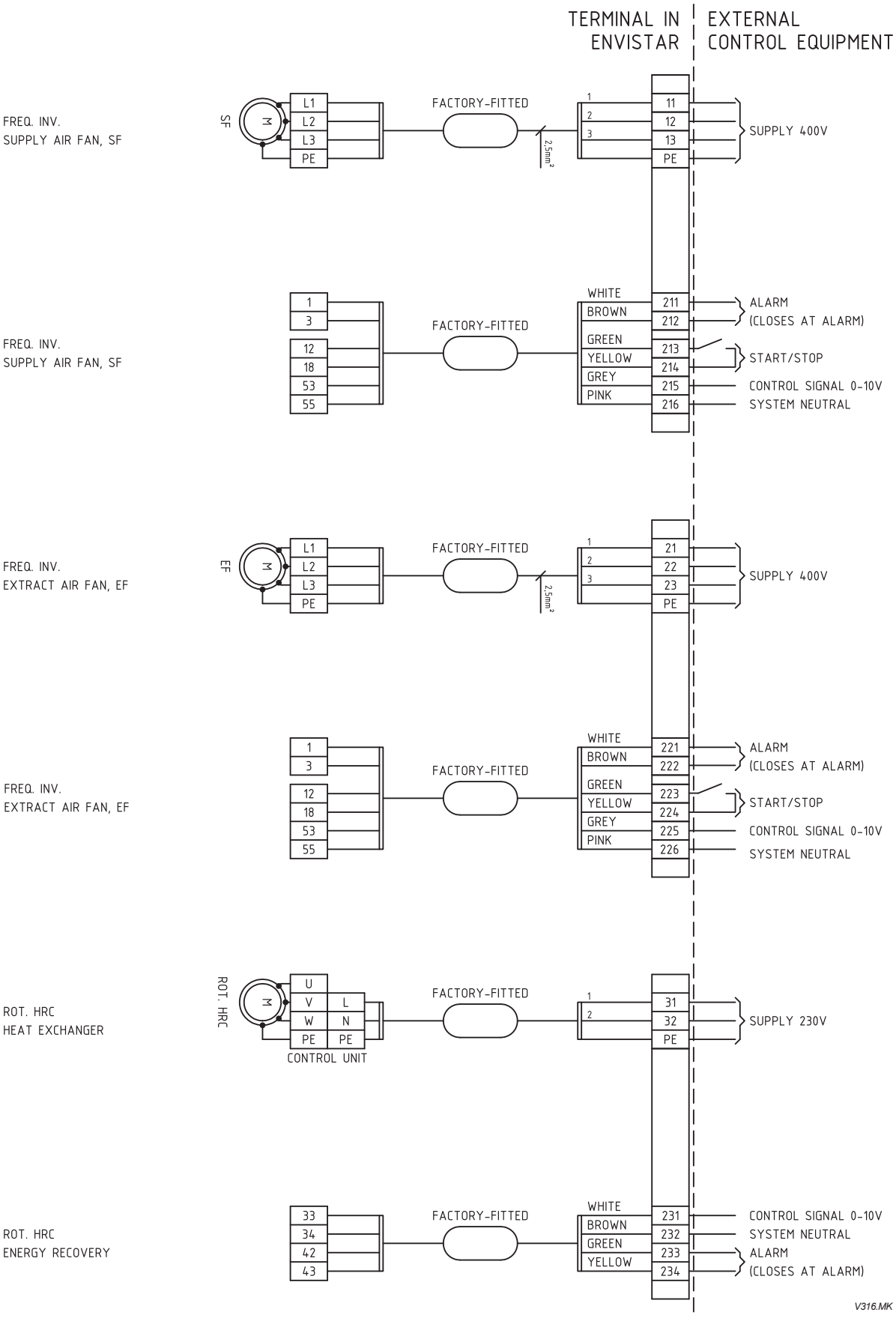
CSF/CSU-V310 Speed controlled 3-phase fan EBM EC 1.0-5.5 kW (size 100-360)



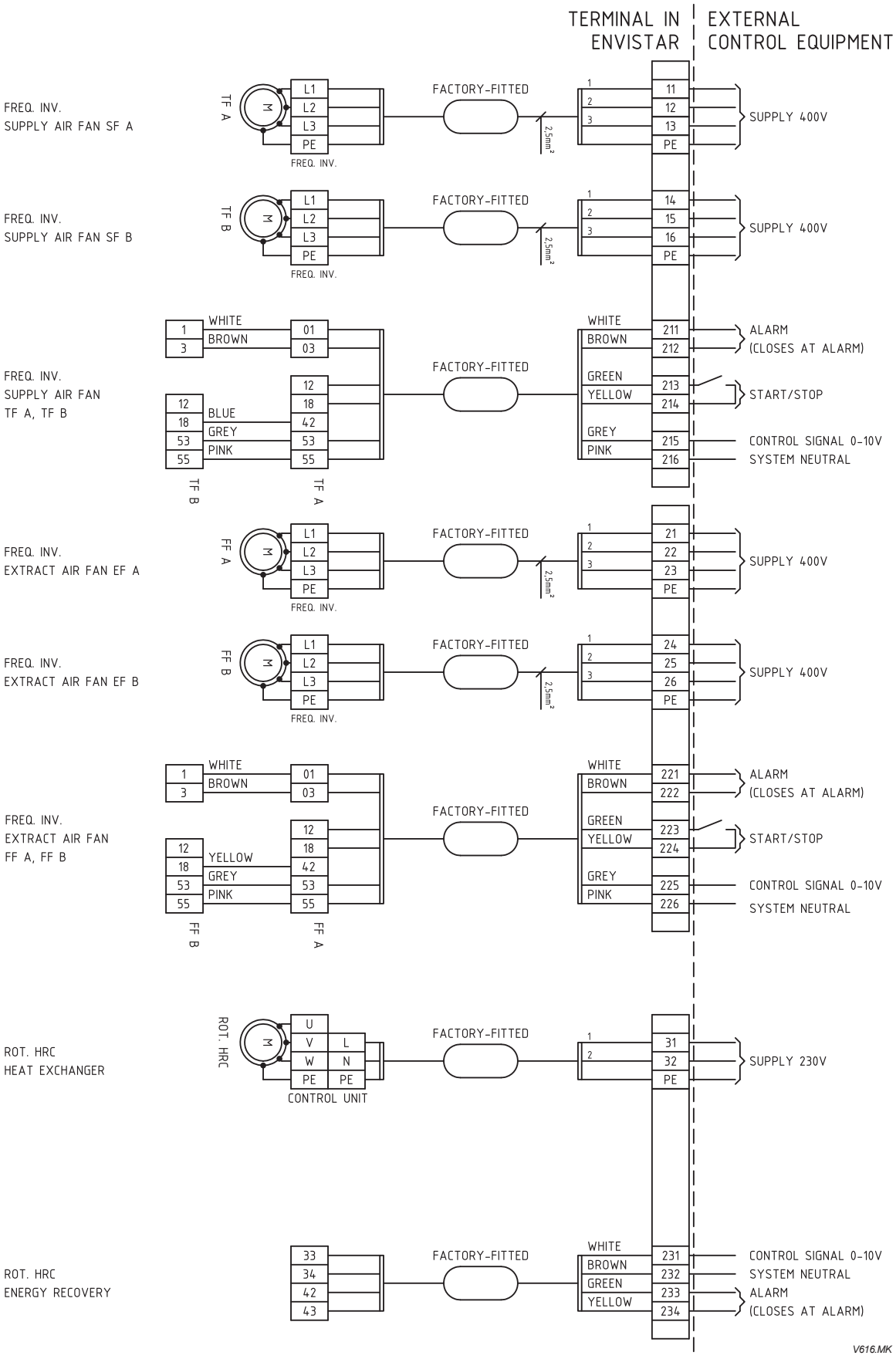
CSF/CSU-V311 Speed controlled 3-phase fan Danfoss 3.0-4.0 kW (size 480-600)



CSF/CSU/CSM-V316 Speed controlled 3-phase fan Danfoss 5.5-7.5 kW (size 480-980)



V616 Speed controlled 3-phase fans Danfoss 2x4 - 2x7.5 kW (size 740-980)



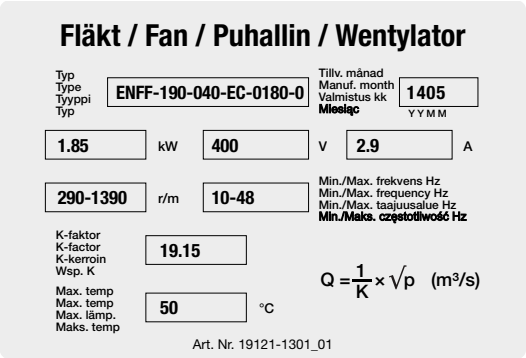
3.4 US - Without control and without electrical connection

The following wiring instructions apply to units supplied without control equipment and without electrically connected fans, heat exchangers, etc. Recommended fuse protection refers to fuses with type C characteristics. A safety switch should be fitted and wired on each power supply.

Fan, power supply and fuse protection

When each fan has a separate power supply:

- Read and make a note of the "Type" shown on the fan data label.



Typical fan data label

- Read the actual power supply and recommended fuse protection in the following table.

  NB: The fans may be different sizes/variants. Read both the supply air and extract air fan labels.

Fan data label			
Type	Output kW *	Rated current	Rated current
ENFF-060-025-EC-0042-0	0.50	2.2A	1×230V / 10A
ENFF-060-025-EC-0070-0	0.70	3.0A	1×230V / 10A
ENFF-100-028-EC-0072-0	0.72	3.1A	1×230V / 10A
ENFF-100-028-EC-0094-0	1.00	1.6A	3×400V / 10A
ENFF-100-031-EC-0127-0	1.27	5.6A	1×230V / 10A
ENFF-150-035-EC-0100-0	1.00	1.7A	3×400V / 10A
ENFF-150-040-EC-0180-0	1.85	2.9A	3×400V / 10A
ENFF-150-040-EC-0300-0	3.00	4.6A	3×400V / 10A
ENFF-190-035-EC-0100-0	1.00	1.7A	3×400V / 10A
ENFF-190-040-EC-0180-0	1.85	2.9A	3×400V / 10A
ENFF-190-040-EC-0300-0	3.00	4.6A	3×400V / 10A
ENFF-240-045-EC-0160-0	1.62	2.5A	3×400V / 10A
ENFF-240-050-EC-0280-0	2.82	4.3A	3×400V / 10A
ENFF-240-050-EC-0550-0	5.50	8.4A	3×400V / 10A
ENFF-300-045-EC-0160-0	1.62	2.5A	3×400V / 10A
ENFF-300-050-EC-0280-0	2.82	4.3A	3×400V / 10A
ENFF-300-050-EC-0550-0	5.50	8.4A	3×400V / 10A
ENFF-360-050-EC-0280-0	2.82	4.3A	3×400V / 10A
ENFF-360-050-EC-0550-0	5.5	8.4A	3×400V / 10A
ENFF-360-056-EC-0470-0	4.7	7.3A	3×400V / 10A
ENFF-480-056G-I2F10300-0	3.0	6.8A	3×400V / 10A
ENFF-480-063G-I2F10400-0	4.0	8.4A	3×400V / 10A
ENFF-480-063G-I2F10550-0	5.5	11.4A	3×400V / 16A
ENFF-480-063G-I2F10750-0	7.5	14.7A	3×400V / 16A
ENFF-480-056G-I2F20300-0	3.0	6.3A	3×400V / 10A
ENFF-480-063G-I2F20400-0	4.0	8.3A	3×400V / 10A
ENFF-480-063G-I2F20550-0	5.5	11A	3×400V / 16A
ENFF-480-063G-I2F20750-0	7.5	15A	3×400V / 16A
ENFF-480-056G-PFD10300-0	3.0	6.3A	3×400V / 10A
ENFF-480-063G-PFD10400-0	4.0	8.3A	3×400V / 10A
ENFF-480-063G-PFD10550-0	5.5	11A	3×400V / 16A
ENFF-480-063G-PFD10750-0	7.5	15A	3×400V / 16A
ENFF-600-063G-I2F10400-0	4.0	8.4	3×400V / 10A
ENFF-600-063G-I2F10550-0	5.5	11.4	3×400V / 16A
ENFF-600-063G-I2F10750-0	7.5	14.7	3×400V / 16A
ENFF-600-071G-I2F10750-0	7.5	14.7	3×400V / 16A
ENFF-600-063G-I2F20400-0	4.0	8.3	3×400V / 10A
ENFF-600-063G-I2F20550-0	5.5	11	3×400V / 16A
ENFF-600-063G-I2F20750-0	7.5	15	3×400V / 16A
ENFF-600-071G-I2F20750-0	7.5	15	3×400V / 16A

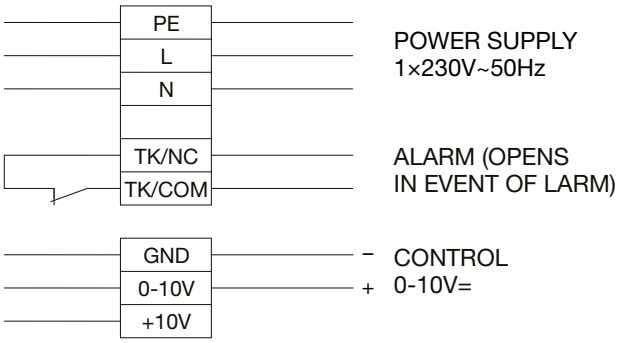
Fan data label			
Type	Output kW *	Rated current	Rated current
ENFF-600-063G-PFD10400-0	4.0	8.3	3×400V / 10A
ENFF-600-063G-PFD10550-0	5.5	11	3×400V / 16A
ENFF-600-063G-PFD10750-0	7.5	15	3×400V / 16A
ENFF-600-071G-PFD10550-0	5.5	11	3×400V / 16A
ENFF-600-071G-PFD10750-0	7.5	15	3×400V / 16A
ENFF-740-071G-I2F10750-0	7.5	14.7A	3×400V / 16A
ENFF-740-256G-I2F10550-0	2×5.5	2x11.4A	3×400V / 2×16A
ENFF-740-071G-I2F20750-0	7.5	15A	3×400V / 10A
ENFF-740-256G-I2F20550-0	2×5.5	2x11A	3×400V / 2×16A
ENFF-740-071G-PFD10550-0	5.5	11A	3×400V / 10A
ENFF-740-071G-PFD10750-0	7.5	15A	3×400V / 10A
ENFF-740-256G-PFD10550-0	2×5.5	2x11A	3×400V / 2×16A
ENFF-850-071G-I2F10750-0	7.5	14.7	3×400V / 16A
ENFF-850-263G-I2F10550-0	2×5.5	2x11.4	3×400V / 2×16A
ENFF-850-263G-I2F10750-0	2×7.5	2x14.7	3×400V / 2×16A
ENFF-850-071G-I2F20750-0	7.5	15	3×400V / 16A
ENFF-850-263G-I2F20550-0	2x5.5	2x11	3×400V / 2×16A
ENFF-850-263G-I2F20750-0	2x7.5	2x15	3×400V / 2×16A
ENFF-850-071G-PFD10550-0	5.5	11	3×400V / 16A
ENFF-850-071G-PFD10750-0	7.5	15	3×400V / 16A
ENFF-850-263G-PFD10550-0	2x5.5	2x11	3×400V / 2×16A
ENFF-850-263G-PFD10750-0	2x7.5	2x15	3×400V / 2×16A
ENFF-980-071G-I2F10750-0	7.5	14.7A	3×400V / 16A
ENFF-980-263G-I2F10400-0	2×4.0	2×8.4A	3×400V / 2×10A
ENFF-980-263G-I2F10550-0	2×5.5	2×11.4A	3×400V / 2×16A
ENFF-980-263G-I2F10750-0	2×7.5	2×14.7A	3×400V / 2×16A
ENFF-980-271G-I2F10750-0	2×7.5	2×14.7A	3×400V / 2×16A
ENFF-980-071G-I2F20750-0	7.5	15A	3×400V / 16A
ENFF-980-263G-I2F20400-0	2×4.0	2×8.3A	3×400V / 2×10A
ENFF-980-263G-I2F20550-0	2×5.5	2×11A	3×400V / 2×16A
ENFF-980-263G-I2F20750-0	2×7.5	2×15A	3×400V / 2×16A
ENFF-980-271G-I2F20750-0	2×7.5	2×15A	3×400V / 2×16A
ENFF-980-071G-PFD10550-0	5.5	11A	3×400V / 16A
ENFF-980-071G-PFD10750-0	7.5	15A	3×400V / 16A
ENFF-980-263G-PFD10400-0	2×4.0	2×8.3A	3×400V / 2×10A
ENFF-980-263G-PFD10550-0	2×5.5	2×11A	3×400V / 2×16A
ENFF-980-263G-PFD10750-0	2×7.5	2×15A	3×400V / 2×16A
ENFF-980-271G-PFD10750-0	2×7.5	2×15A	3×400V / 2×16A

* For sizes 060–360 the value indicates the power consumption, for sizes 480–980 the value indicates the shaft power.

Fan, wiring instructions

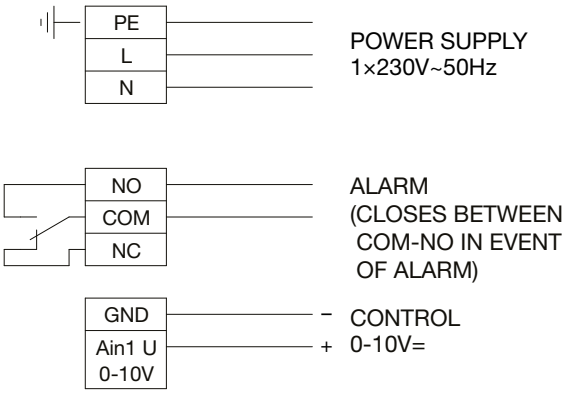
Read and make a note of the size and power shown on the fan data label; see example on previous page. The relevant wiring diagram is indicated below.

ENFF-060
EBM EC 0.4-0.5 kW (fan impeller 025)



The motor starts/stops on a 0.5 V control signal.
Rated current 2.2A.

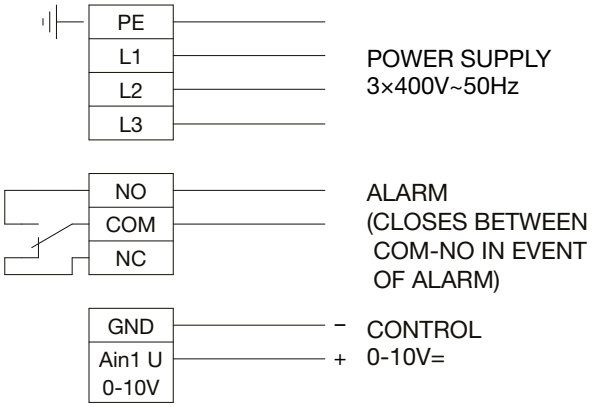
ENFF-060--100
EBM EC 0.7-1.3 kW (fan impeller 025-031)



The motor starts/stops on a 0.5 V control signal.
Fan impeller, output and rated current:

025	0.70 kW	3.0A
028	0.72 kW	3.1A
031	1.27 kW	5.6A

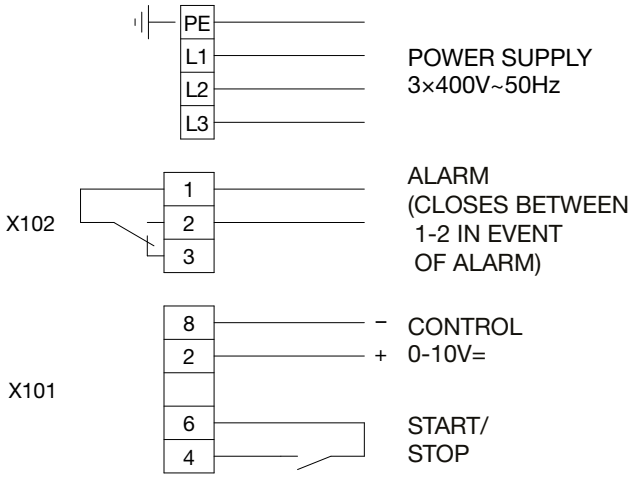
ENFF-100--360
EBM EC 1.0-5.5 kW (fan impeller 028-056)



The motor starts/stops on a 0.5 V control signal.
Fan impeller, output and rated current:

028	1.0 kW	1.6A
035	1.0 kW	1.75A
040	1.85 kW	2.9A
040	3.0 kW	4.6A
045	1.62 kW	2.5A
050	2.82 kW	4.3A
050	5.5 kW	8.4A
056	4.7 kW	7.3A
056	5.5 kW	8.4A

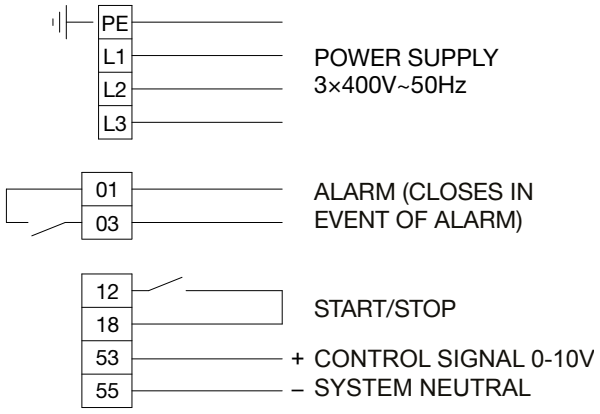
ENFF-480--980
Danfoss I2F1 (IE2)
3.0-7.5 kW (fan impeller 056-071)



With integrated frequency converter FCM-300.
Fan impeller, output and rated current:

056	3.0 kW	6.8A
063	4.0 kW	8.4A
063	5.5 kW	11.4A
063	7.5 kW	14.7A
071	7.5 kW	14.7A

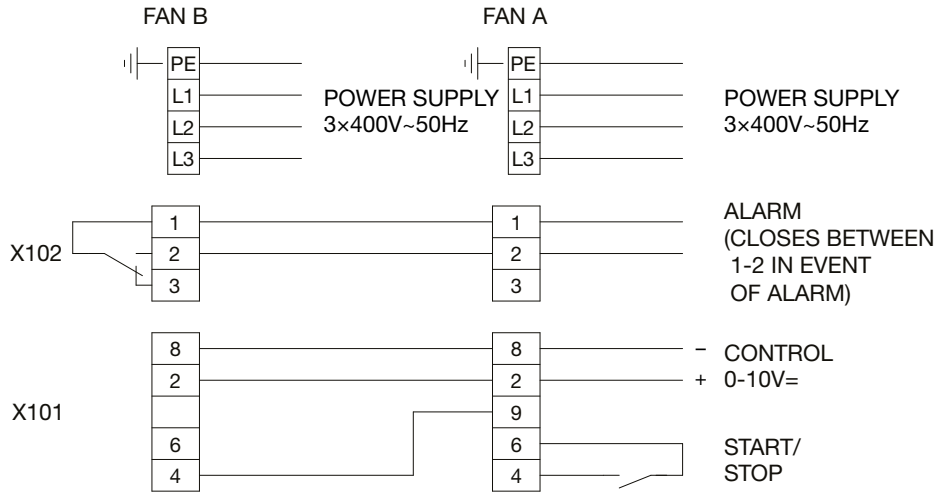
ENFF-480--980
Danfoss PFD1 (PM/IE4) and I2F2 (IE2)
3.0-7.5 kW (fan impeller 056G-071G)



With integrated frequency inverter FCM-106.
Fan impeller, output and rated current:

056G	3.0 kW	6.3A
063G	4.0 kW	8.3A
063G	5.5 kW	11.0A
063G	7.5 kW	15.0A
071G	5.5 kW	11.0A
071G	7.5 kW	15.0A

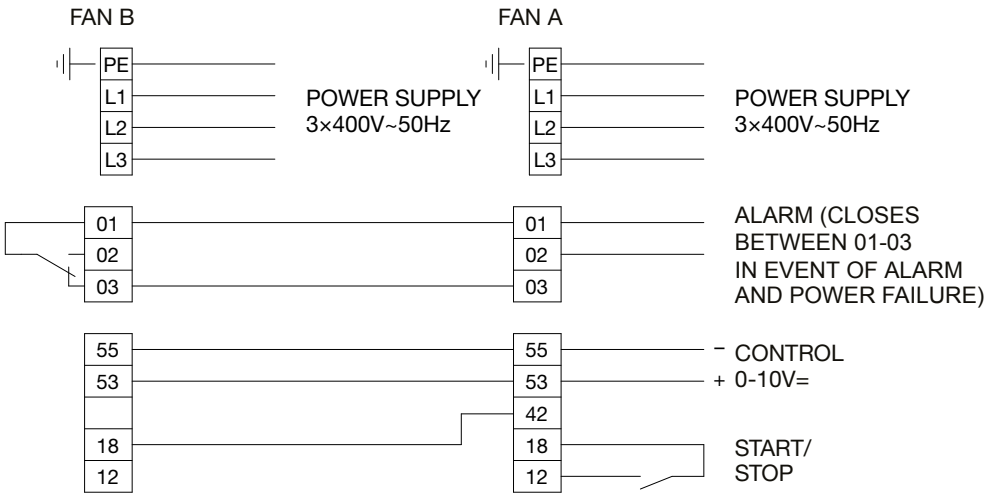
ENFF-740--850 dual fans Danfoss I2F1 (IE2) 2×3.0-7.5 kW (fan impeller 056G-071G)



Med påbyggd frekvensomformare FCM-300.
Fläkthjul, effekt och märkström:

256G	2×5.5 kW	2×11.4A
263G	2×4.0 kW	2×8.4A
263G	2×5.5 kW	2×11.4A
263G	2×7.5 kW	2×14.7A
271G	2×7.5 kW	2×14.7A

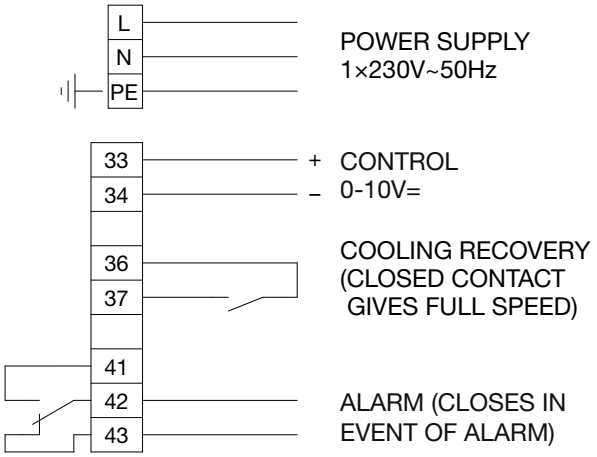
ENFF-740--980 dual fans Danfoss PFD1 (PM/IE4) and I2F2 (IE2) 2×4.0-7.5 kW (fan impeller 256G-271G)



Med påbyggd frekvensomformare FCM-106.
Fläkthjul, effekt och märkström:

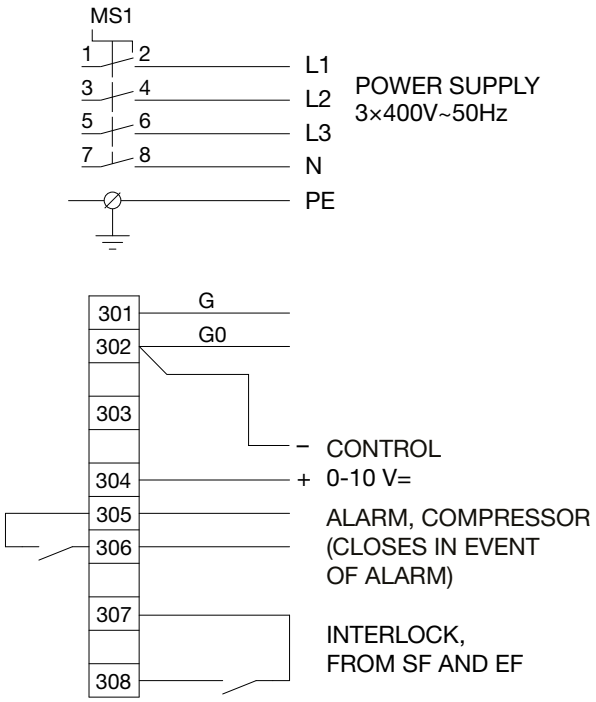
256G	2×5.5 kW	2×11.0A
263G	2×4.0 kW	2×8.3A
263G	2×5.5 kW	2×11.0A
263G	2×7.5 kW	2×15.0A
271G	2×7.5 kW	2×15.0A

Rotary heat exchanger (code EXR)



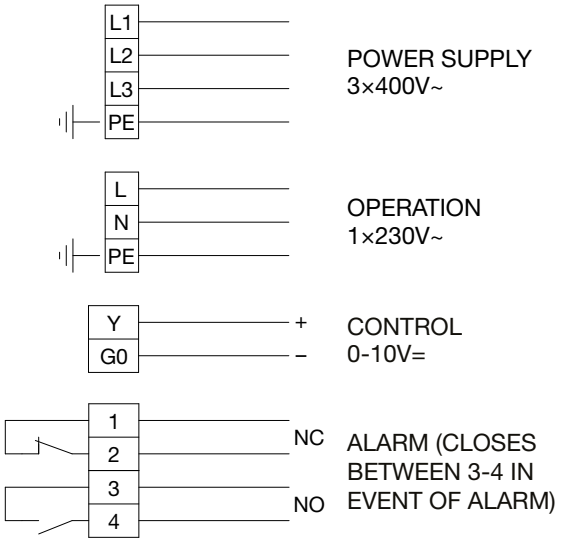
EXR – rec. fuse protection (1×230V)
10A

Cooling unit: EcoCooler (code ACU) EcoCooler with cooling recovery (code ACR)



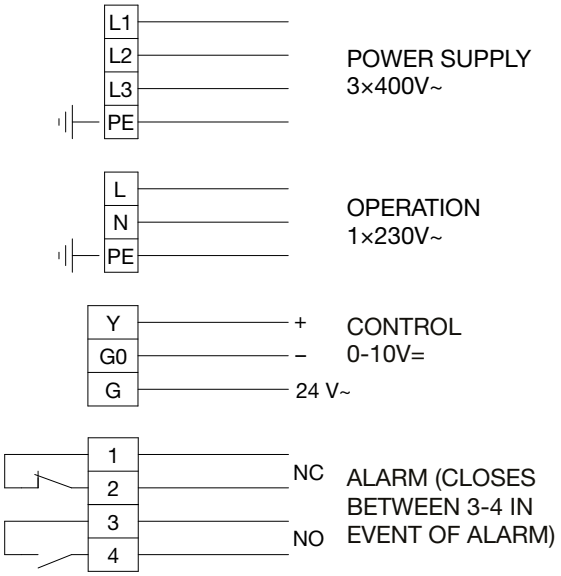
Size	ACU/ACR – rec. fuse protection (3×400V+N) / output variant		
	01	02	03
060	-	-	-
100	16A	-	-
150	20A	25A	-
190	20A	25A	-
240	25A	32A	-
300	25A	32A	-
360	32A	50A	-
480	50A	63A	-
600	50A	63A	63A
740	63A	80A	80A
850	63A	80A	100A
980	63A	80A	100A

Air heater electric ≤ 27 kW (code ESET-EV)



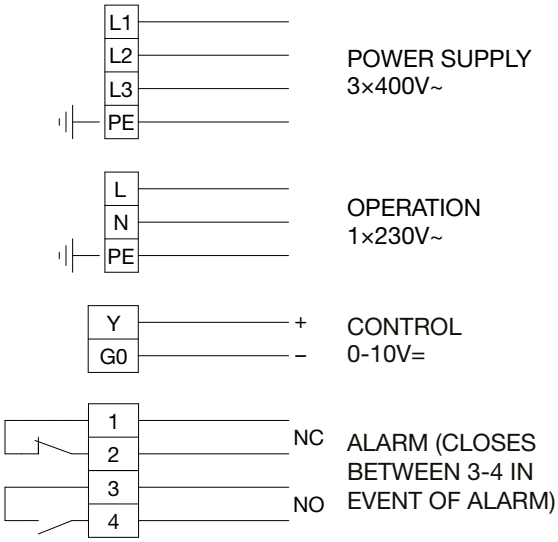
Size	ESET-EV ≤ 27 kW – rec. fuse protection (3×400V+N) / output variant		
	1	**2**	**3**
060	10A	16A	-
100	10A	20A	40A
150	10A	25A	40A
190	16A	40A	-
240	20A	40A	-
300	25A	-	-
360	32A	-	-

Air heater electric ≥ 30 kW (code ESET-EV)



Size	ESET-EV ≥ 30 kW – rec. fuse protection (3×400V+N) / output variant			
	1	**2**	**3**	**4**
060	-	-	-	-
100	-	-	-	-
150	-	-	-	63A
190	-	-	50A	80A
240	-	-	80A	125A
300	-	50A	80A	125A
360	-	63A	100A	160A

Air heater electric (code MIE-EL/ELEE)



	MIE-EL/ELEE – rec. fuse protection (3×400V+N)/ output variant				
Size	**01**	**02**	**03**	**04**	**05**
060	10A	10A	32A	50A	50A
100	16A	16A	32A	50A	80A
150	16A	25A	40A	80A	100A
190	16A	25A	63A	100A	160A
240	20A	40A	80A	125A	200A
300	25A	40A	80A	160A	-
360	25A	50A	100A	200A	-
480	35A	80A	160A	-	-
600	40A	80A	200A	-	-
740	80A	160A	200A	-	-
850	80A	160A	200A	-	-
980	80A	160A	200A	-	-

4 Operation

4.1 Commissioning unit incl. control

The Envistar Flex is a modular unit consisting of block sections, components for duct mounting and functional fittings. No special commissioning by a certified technician is required except for the EcoCooler cooling unit.

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 before all ducts have been connected.

4.2 Commissioning EcoCooler cooling unit incl. control

For commissioning of the EcoCooler cooling unit, see separate Operation and Maintenance Instructions.

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.

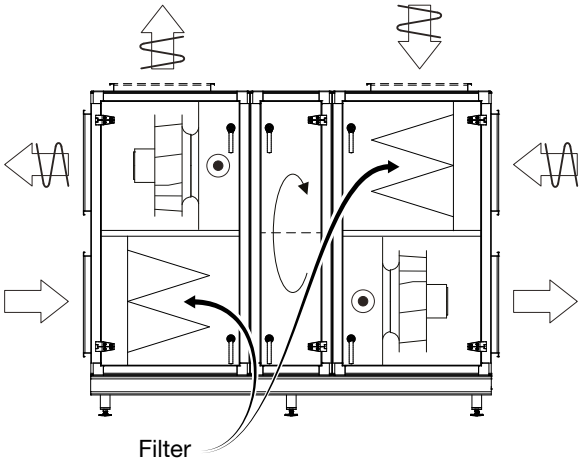
Make copies of the service schedule for future use before you fill in servicing data for the first time.

Service year 20.....-..... or unit no.					**Service performed * (date and signature)**			
Functional section		**Code**	**Recommended action (insp.)**	**Page ref.**	**3000 h / 6 mths**	**6000 h / 12 mths**	**9000 h / 18 mths**	**12,000 h / 24 mths**
					date	date	date	date
	**Filter supply air, extract air**	ELEF	Check pressure drop Change filter if necessary	24	signature	signature	signature	signature
	**Rotary heat exchanger**	EXR	Visual inspection Check press. balance Check diff. pressure Clean if necessary	29	signature	signature	signature	signature
	**Plate heat exchanger**	EXP	Visual inspection Clean if necessary Check function	32	signature	signature	signature	signature
	**Run-around coil unit**	EXL	Visual inspection Check drainage Clean if necessary Check function	33	signature	signature	signature	signature
 H_2O	**Air heater water**	ESET-VV, MIE-CL/ELEV, ESET-TV, MIE-CL/ELTV	Visual inspection Clean if necessary Check function	35	signature	signature	signature	signature
	**Air heater electric**	ESET-EV, MIE-CL/ELEE	Visual inspection Clean if necessary Check function	36	signature	signature	signature	signature
 H_2O	**Air cooler water/DX**	ESET-VK, MIE-CL/ELBC, MIE-CL/ELBD	Visual inspection Check drainage Clean if necessary Check function	37	signature	signature	signature	signature
	**Fan unit**	ENF	Visual inspection Clean if necessary Check the air flow	38	signature	signature	signature	signature
	**Damper**	EMT-01, ESET-TR	Visual inspection Clean if necessary Check tightness	40	signature	signature	signature	signature
	**Sound attenuator**	EMT-02, MIE-KL	Visual inspection Clean if necessary	41	signature	signature	signature	signature
	**Cooling unit, EcoCooler**	ACU, ACR	See separate brochure	-	signature	signature	signature	signature

** Every 3000 hours of operation or every 6 months, whichever occurs first. More frequent servicing may be required in certain environments.*

5.2 Filters (code ELEF)

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. Dust separation class is specified with standard designations:

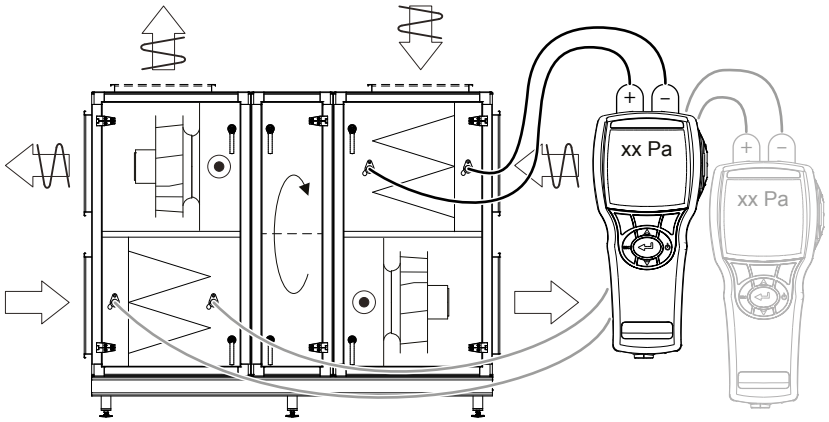
- G4 for pre filters
- M5 and M6 for medium filters
- F7, F8 and F9 for fine filters

Higher digits denote a higher separation 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	1.8
	Bag filter M5	1	736 × 287	380	8	2.1
	Bag filter M6, F7	1	736 × 287	380	10	2.5
	Bag filter F8, F9	1	736 × 287	380	11	2.7
	Panel filter P4	1	736 × 287	48	-	0.2
	Aluminium filter	1	736 × 287	25	-	0.2
	Carbon filter C7	-	-	-	-	-
100	Bag filter G4	1	892 × 409	360	8	2.8
	Bag filter M5	1	892 × 409	370	9	3.2
	Bag filter M6, F7	1	892 × 409	370	12	4.0
	Bag filter F8, F9	1	892 × 409	370	14	4.6
	Panel filter P4	1	736 × 393	48	-	0.4
	Aluminium filter	1	892 × 409	25	-	0.4
	Carbon filter C7	-	-	-	-	-
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
	Carbon filter C7	1 1	287 × 592 592 × 592	292 292	- -	8.0
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
	Carbon filter C7	2	592 × 592	292	-	16.0
240	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
	Carbon filter C7	2	592 × 592	292	-	16.0

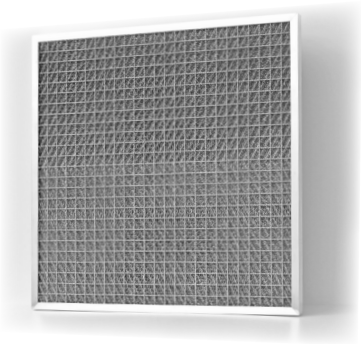
Filter data cntd

Unit size	Filter type	No of filters	Dimensions (mm)		No of bags/ filters	Total filter surface (m^2)
			W × H	Length		
300	Bag filter G4	1 2	287 × 592 592 × 592	360 360	3 6	6.0
	Bag filter M5	1 2	287 × 592 592 × 592	534 534	3 6	10.5
	Bag filter M6	1 2	287 × 592 592 × 592	534 534	4 8	13.5
	Bag filter F7–F9	1 2	287 × 592 592 × 592	534 534	5 10	16.5
	Panel filter P4	1 2	292 × 596 596 × 596	48 48	-	0.9
	Aluminium filter	1 2	287 × 592 592 × 592	25 25	-	0.9
	Carbon filter C7	1 2	287 × 592 592 × 592	292 292	-	19.5
360	Bag filter G4	3 2	287 × 592 592 × 592	360 360	3 6	8.4
	Bag filter M5	3 2	287 × 592 592 × 592	534 534	3 6	14.7
	Bag filter M6	3 2	287 × 592 592 × 592	534 534	4 8	18.9
	Bag filter F7–F9	3 2	287 × 592 592 × 592	534 534	5 10	23.1
	Panel filter P4	3 2	292 × 596 596 × 596	48 48	-	1.2
	Aluminium filter	3 2	287 × 592 592 × 592	25 25	-	1.2
	Carbon filter C7	3 2	287 × 592 592 × 592	292 292	-	26.5
480	Bag filter G4	3 3	287 × 592 592 × 592	360 360	3 6	10.8
	Bag filter M5	3 3	287 × 592 592 × 592	534 534	3 6	18.9
	Bag filter M6	3 3	287 × 592 592 × 592	534 534	4 8	24.3
	Bag filter F7–F9	3 3	287 × 592 592 × 592	534 534	5 10	29.7
	Panel filter P4	3 3	292 × 596 596 × 596	48 48	-	1.6
	Aluminium filter	3 3	287 × 592 592 × 592	25 25	-	1.5
	Carbon filter C7	3 3	287 × 592 592 × 592	292 292	-	34.5

Filter data cntd

Unit size	Filter type	No of filters	Dimensions (mm)		No of bags/ filters	Total filter surface (m^2)
			W × H	Length		
600	Bag filter G4	4 3	287 × 592 592 × 592	360 360	3 6	12.0
	Bag filter M5	4 3	287 × 592 592 × 592	534 534	3 6	21.0
	Bag filter M6	4 3	287 × 592 592 × 592	534 534	4 8	27.0
	Bag filter F7–F9	4 3	287 × 592 592 × 592	534 534	5 10	33.0
	Panel filter P4	4 3	292 × 596 596 × 596	48 48	-	1.8
	Aluminium filter	4 3	287 × 592 592 × 592	25 25	-	1.7
	Carbon filter C7	4 3	287 × 592 592 × 592	292 292	-	38.0
740	Bag filter G4	4 4	287 × 592 592 × 592	360 360	3 6	14.4
	Bag filter M5	4 4	287 × 592 592 × 592	534 534	3 6	25.2
	Bag filter M6	4 4	287 × 592 592 × 592	534 534	4 8	32.4
	Bag filter F7–F9	4 4	287 × 592 592 × 592	534 534	5 10	39.6
	Panel filter P4	4 4	292 × 596 596 × 596	48 48	-	2.2
	Aluminium filter	4 4	287 × 592 592 × 592	25 25	-	2.0
	Carbon filter C7	4 4	287 × 592 592 × 592	292 292	-	46.0
850	Bag filter G4	8	592 × 592	360	6	19.2
	Bag filter M5	6	592 × 592	534	6	33.6
	Bag filter M6	6	592 × 592	534	8	43.2
	Bag filter F7–F9	8	592 × 592	534	10	52.8
	Panel filter P4	8	596 × 596	48	-	2.8
	Aluminium filter	8	592 × 592	25	-	2.8
	Carbon filter C7	8	592 × 592	292	-	64.0
980	Bag filter G4	2 8	287 × 592 592 × 592	360 360	3 6	21.6
	Bag filter M5	2 8	287 × 592 592 × 592	534 534	3 6	37.8
	Bag filter M6	2 8	287 × 592 592 × 592	534 534	4 8	48.6
	Bag filter F7–F9	2 8	287 × 592 592 × 592	534 534	5 10	59.4
	Panel filter P4	2 8	287 × 592 592 × 592	48 48	-	3.0
	Aluminium filter	2 8	287 × 592 592 × 592	25 25	-	3.0
	Carbon filter C7	2 8	287 × 592 592 × 592	292 292	-	72.0

Cleaning



Aluminium filter

The aluminium filter is intended for use where the extract air contains grease particles to avoid grease being sucked into the unit.
The filter is a knitted flat-type filter.

The aluminium filter can be cleaned using hot water and a mild detergent.

Bag filters and carbon filters are disposable.

Filter replacement

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

NB:

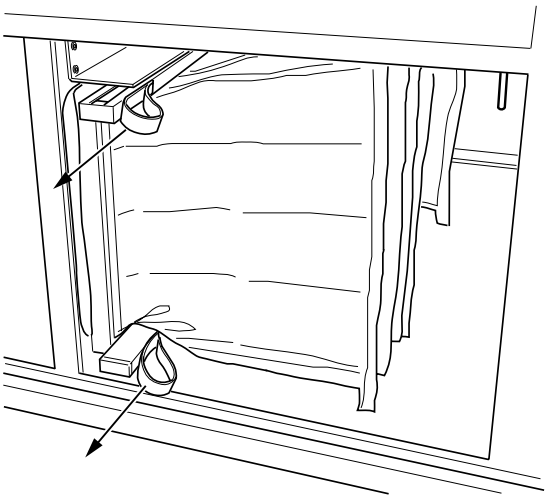
The safety switch is not designed for starting/stopping the unit. Always use the control equipment to start and shut down the unit.

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.

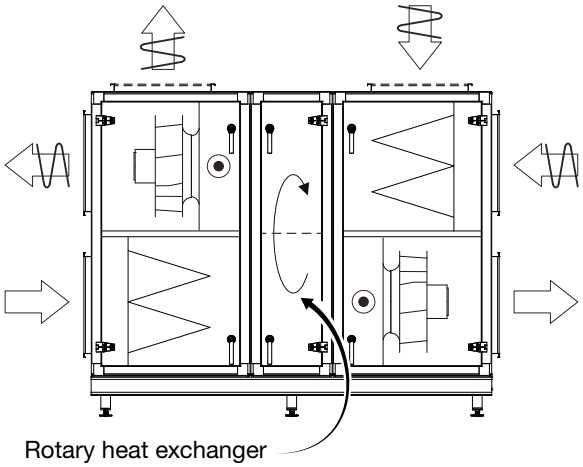


Eccentric rails

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.

5.3 Rotary heat exchanger (code EXR)

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.



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.

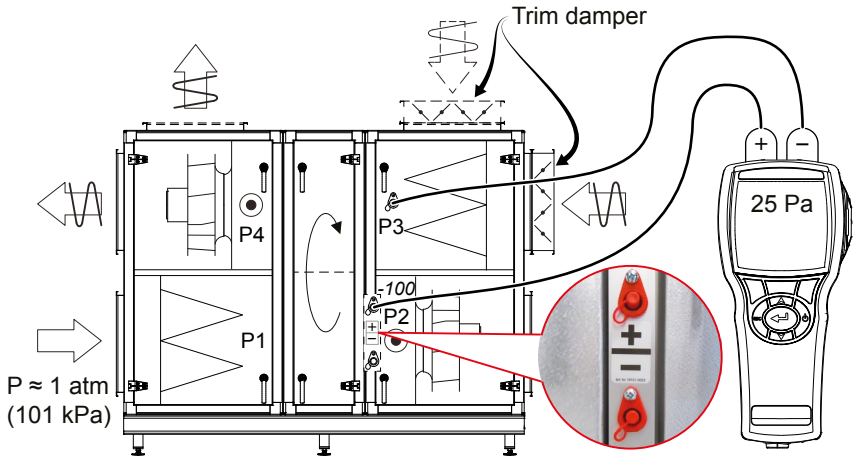
WARNING!
Positive pressure inside the unit, risk of personal injury. Allow the pressure to drop before you open the inspection doors.

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.

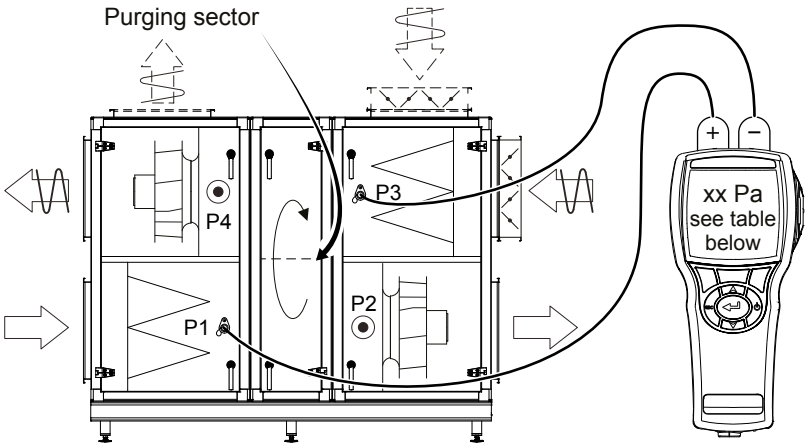
   Example:
   Measurement outlets for P2: Downstream supply air fan (SF) generates negative pressure in relation to the atmospheric pressure (atm), e.g. -100 Pa

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



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).

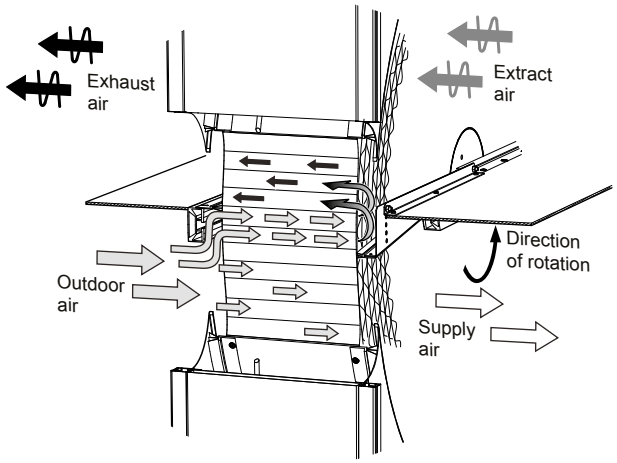


- Read the rec. setting (adjustment hole in the purging sector) from the table below.

	Rotor variant	Adjustment hole in the purging sector				
		5 open*	4	3	2	1 closed
Diff. pressure between P1 and P3 (Pa)	Normal	< 200	200 – 400	400–600	> 600	-
	Plus	< 300	300–500	500–700	> 700	-

**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.

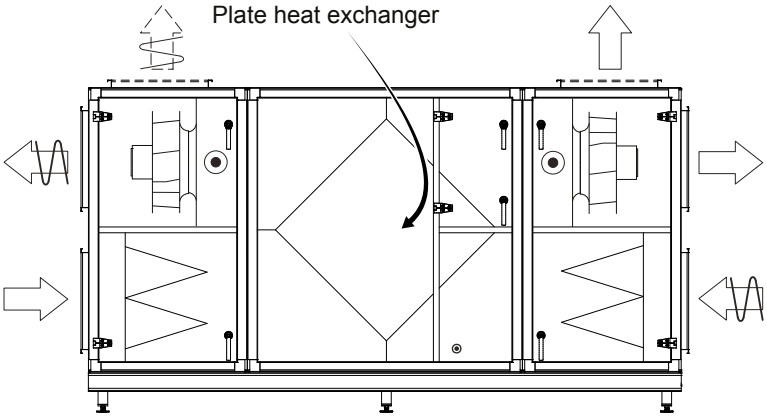
Re-Coilex is marketed by Resema AB.

Lubrication

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

5.4 Plate heat exchanger (code EXP)

The primary purpose of the plate heat exchanger is to recover heat from the extract air and transfer this heat to the supply air, whereby the energy use is reduced.



A faulty plate heat exchanger function through reduced recovery efficiency primarily means increased energy use and secondarily that it is impossible to obtain the designed supply air temperature when outdoor temperatures are low.

Possible reasons for reduced recovery efficiency could be the fouling of the heat-exchanging surfaces or that the bypass damper is not closing completely. A reduction of the extract air flow, e.g. due to fouling of the extract air filter, entails reduced heat recovery efficiency.

Particular attention should be paid to the problem of ice forming in the extract air section of the heat recovery unit. If operation problems caused by ice forming occur, the function of the frost protection equipment on the heat recovery unit should be checked.

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. Inspect the fins for fouling. Inspection can be carried out through e.g. an inspection door to the filter section.
4. Check the auto defrosting function and make sure that the bypass damper closes securely when defrosting is not in progress.

Cleaning

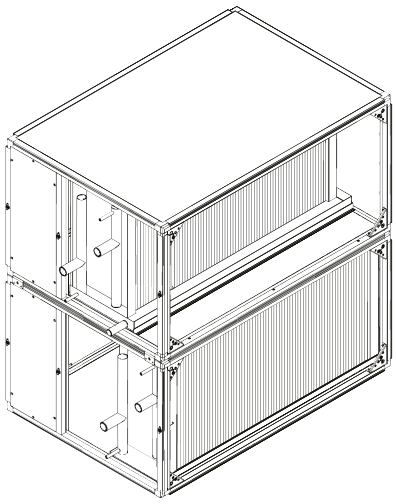
If cleaning is required this can be done with a vacuum cleaner, blowing with compressed air or by using detergent suitable for aluminium and rinsing off with hot water. Cleaning is best done by flushing water through every single air duct (possibly adding ordinary detergent that does not corrode aluminium) across the entire length of the heat exchanger.

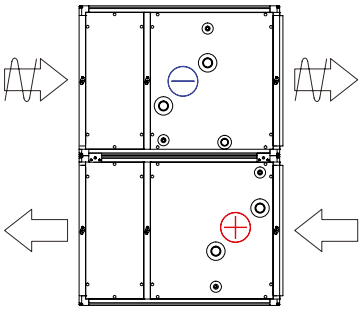
At operating temperatures below 0°C the heat exchanger assembly must be dry before being commissioned.

The drip tray underneath the heat exchanger with incorporated drain and water trap should be checked at the same time.

A water trap without a non-return value should be filled with water.

5.5 Run-around coil unit (code EXL)





Run-around coil unit (code EXL)

The run-around coil unit is used to recover heat from the extract air and transfer this heat to the supply air for reduced energy use. The run-around coil unit consists of the extract air coil with drip tray and the supply air coil (heating coil) mounted in the casing.

Moisture precipitation in the extract air's heat recovery coil entails a risk of freezing and possibly frost/ice forming. This freezing is counteracted by installing and connecting a freezing sensor that controls the valve actuator (liquid flow) in the extract air coil.

The coils 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 coils 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 coils are not leaking
3. The drip tray and drain with water trap (clean if necessary)
4. That the water trap (without non-return valve) is filled with water.

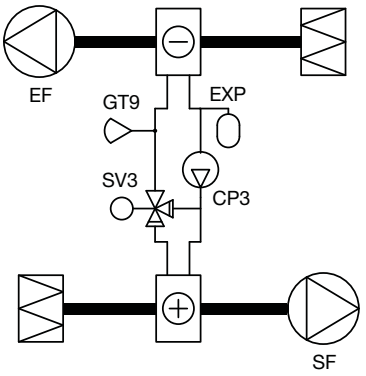
Cleaning

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 coils or on the pipe connections.

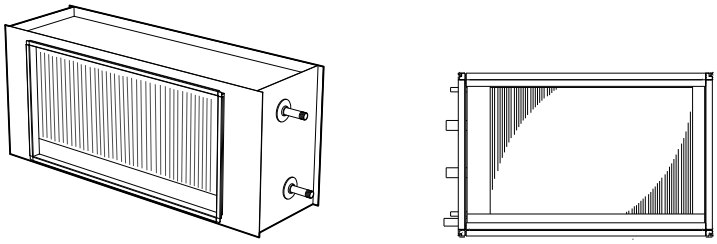
Function



SF	Supply air fan
EF	Extract air fan
CP3	Circulation pump energy recovery circuit
SV3	Valve actuator energy recovery circuit
GT9	Freezing sensor

Check that the circulation pump is running in the correct direction and that the valve changes to opening/closing when the setpoints/conditions are changed.

5.6 Air heater water



Air heater water (code ESET-EV) and air heater water (code MIE-CL/ELEV)

The heating coil 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

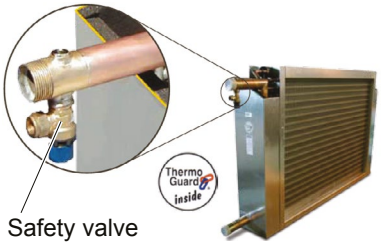
Bleed the heating coil and the pipework if needed. Bleeder screws are on top of the coil or on the tube connections.

Function

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

Additional maintenance for Thermoguard (code ESET-TV, MIE-CL/ELTV)

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.



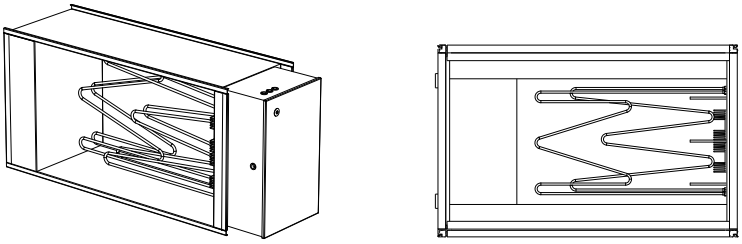
Safety valve

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.

5.7 Air heater electric



Air heater electric (code ESET-EV) and air heater electric (code MIE-EL/ELEE)

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

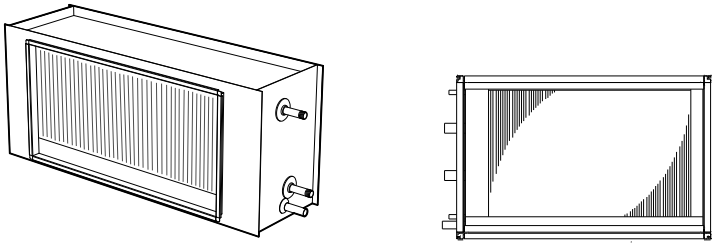
1. Simulate reduced required output by temporarily lowering the temperature setting (setpoint), so that all the electric output steps (contactors) switch out.
2. Then sharply increase the setpoint setting and check that the electric output steps switch in.
3. Restore the temperature setting.
4. Stop 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.

5.8 Air cooler water



Air cooler (code ESET-VK, ESET-DX) and air cooler (code MIE-CL/ELBC, MIE-CL/ELBD)

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, and in some cases there is a droplet eliminator downstream of the cooling coil which prevents drops of water accompanying the air stream.

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 (NB: ESET-VK and MIE-CL/ELBC only)

Bleed the water 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 emitting cooling energy. This can be done by temporarily lowering the temperature setting (setpoint).

5.9 Fan unit (code ENF)

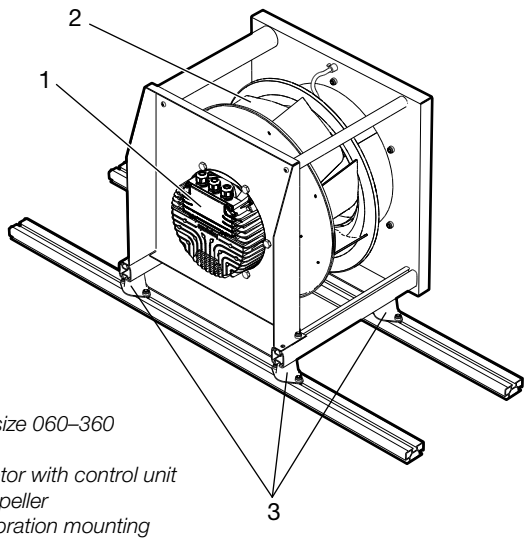
The purpose of the fans is to transport air through the system, i.e. the fan must overcome the flow resistance in air terminals, air ducts and the unit.

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.
- 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.

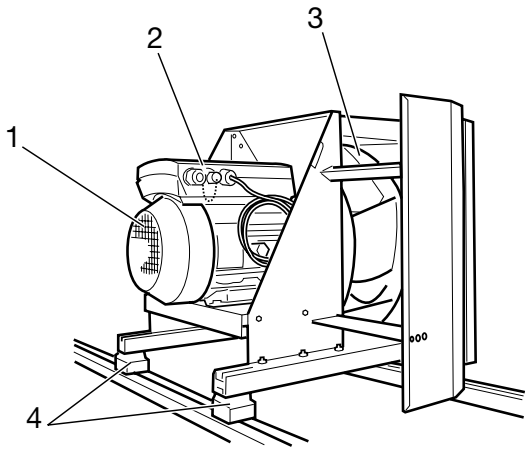
WARNING!
High voltage and rotating fan impeller, risk of personal injury. Before working on/servicing the unit – shut down the unit via the control terminal, then turn the safety switch to the 0 position and lock it.

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 unit size 060–360

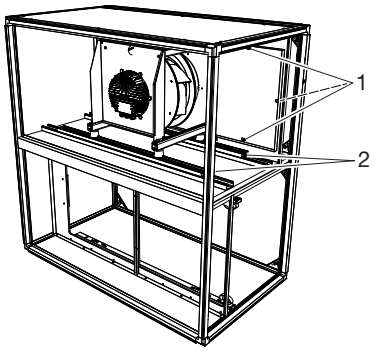
1. EC motor with control unit
2. Fan impeller
3. Anti-vibration mounting



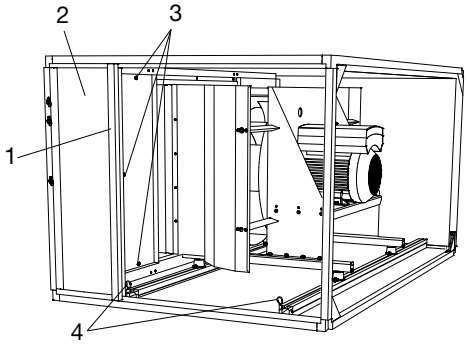
Fan unit size 480–980

1. Motor
2. Control unit
3. Fan impeller
4. Anti-vibration mounting

Fan



Fan unit 060–360



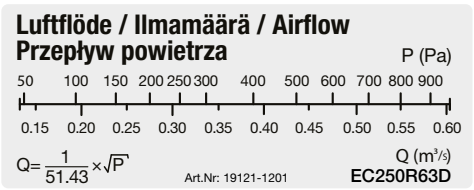
Fan unit 480–600

Inspection

1. Sizes **060–360**: Remove one end of the fan assembly's earth braid. Loosen the screws (position 1) and the pins/screws (position 2) and pull out the fan units (fan and motor are mounted on rails).

   Sizes **480–600**: Access to the fan takes place normally via the inspection door. Where necessary remove the centre bar (position 1) and fixed door (position 2). Remove one end of the fan assembly's earth braid. Loosen the screws (position 3) and the pins (position 4), and pull out the fan units (fan and motor are mounted on rails).

   Sizes **740-980**: The fans are firmly mounted and access takes place through an inspection door(s).
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 impellers are firmly mounted on the shaft/hub, are centred in the inlet cones and project into the inlet cones with overlap.
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 units.
10. Check the air flows by measuring Δp in the connections for flow measurement. Use the unit's air flow label and see which flow corresponds to the measured Δp, see example below.



Air flow label

Connections for flow measurement (measurement outlets)

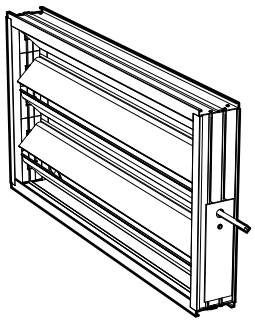
Cleaning

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 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 (sizes 100–360)

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.

5.10 Dampers (code ESET-TR, EMT-01)



Dampers (code ESET-TR, 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.

- 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.

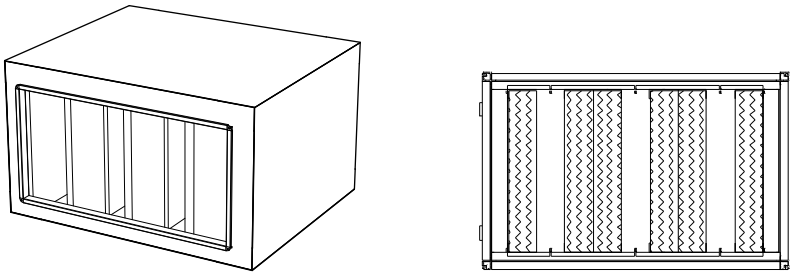
Inspection

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.

5.11 Sound attenuators (code EMT-02, MIE-KL)



Sound attenuator (code EMT-02) 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.

6 Ordering keys

6.1 Block sections

Fan section (code ENF)

ENF -a-b-c	**Fan section**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30
ENFF -a-b-c-0	**Fan system**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Fan impeller	025, 028, 031, 035, 040, 045, 050, 056, 056G, 063G, 071G, 256G, 263G
c - Motor	Example EC-0550 = EC motor 5.5 kW
Accessories:	
ENFT-01 -a-b-c	Connection kit
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30
c - Connection number	01, 02, 03, 04, 04, 05
ENFT-02	Pivot arm kit (sizes 060–190)
ESET-04 -a-b	Flow meter, manometer type
a - Fan impeller	025, 028, 031, 035, 040, 045, 050, 056, 056G, 063G, 071G, 256G, 263G
b - Fan type	EC = EC motor DD = Direct driven
ESET-06 -a-b	Stainless bottom plate into the outdoor inlet
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b – Supply air	U = Up N = Down
ESET-07 -a	Pre-filter (supply air only)
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
ELEF -a-b	Filter
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Filter class	G4, M5, M6, F7, F8, F9, P4, C7, AL
MIET-FB -b	Filter monitor
b - Type	01 = U-tube manometer 02 = Kytölä manometer 03 = Magnehelic manometer

Electrical connection (code ESEK)

ESEK -a-b-c-d-e-f-g

a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Configuration	11 = Compact unit 12 = Block 13 = Block module (sizes 240–600) 14 = Outdoor
c - Rotary heat exchanger (code EXR)	R = With U = Without
d - Energy recovery hrc	P = Plate heat exchanger B = Coil recovery M = Counter-flow heat exchanger (Home) U = Without
e - Cool. unit (code ACU)	C = With U = Without
f - Cool. unit cool. recovery (code ACR)	R = With U = Without
g - Recirculating unit (code EBE)	B = With U = Without

Rotary heat exc. (code EXR) (rotary heat exchanger)

EXR -a-b-c	**Rotor section**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30
c - Rotor diameter	D1 = Standard diameter D2 = Large diameter (for size 850 only)
EXRR -a-b-c	**Rotor**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Rotor variant	NO = Normal HY = Hygroscopic NP = Normal Plus HP = Hygroscopic Plus EX = Epoxy
c - Rotor diameter	D1 = Standard diameter D2 = Large diameter (for size 850 only)
Accessories:	
EXAT-01-a	Reinforced rotor (For rotor variant NO/NP only)

Plate heat exchanger (code EXP)

EXP -a-b	**Plate heat exchanger**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30

EXPP -a-b-c	**Plate heat exchanger incl. bypass damper**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Material	A = Aluminium E = Epoxy
c - Configuration	NO = Normal HP = Normal Plus XP = Extra Plus

Run-around coil unit (code EXL)

EXL -a-b-c-0	**Module for heat recovery coils**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Module, coil section	20
c - Module, empty section	10

EcoCooler cooling unit (code ACU, ACR)

ACU -a-b-c-0-e **ACR -a-b-c-0-e**	**Cooling unit ACU** **Cooling unit with cooling recovery ACR**
a - Size	100, 150, 190, 240, 300, 360, 480, 600, 740, 850
b - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30
c - Output variant	1V = 1 (sizes 100–850) 2V = 2 (sizes 150–850) 3V = 3 (sizes 600–850)
e - Voltage	40 = 3×400V+N, 50Hz

ACU-R -a-b-c-d **ACR-R -a-b-c-d**	**Set of pipes ACU** **Set of pipes ACR**
a - Size	100, 150, 190, 240, 300, 360, 480, 600, 740, 850
b - Output variant	1V = 1 (sizes 100–850) 2V = 2 (sizes 150–850) 3V = 3 (sizes 600–850)
c - Supply air	U = Up N = Down
d - Insp. side	H = Right V = Left

In sections for ACR

ACRT-01 -a-c	In sections
a - Size	100, 150, 190, 240, 300, 360, 480, 600, 740, 850
c - Output variant	1V = 1 (sizes 100–850) 2V = 2 (sizes 150–850) 3V = 3 (sizes 600–850)
e - Voltage	40 = 3×400V+N, 50Hz

Recirculating unit (code EBE)

EBE -a-b	
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30

Media section (code EMR)

EMR -a-b-c-1	
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600
b - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30
c - Recirculated air damper	0 = Without 1 = With

6.2 Components for duct installation

Damper (code EMT-01, ESET-TR)

EMT-01 -a	**Damper excl. motor**
ESET-TR -a	**Damper with manual control**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980

Air heater water (code ESET-VV, -TV)

ESET-VV -a-b	**Air heater water**
ESET-TV -a-b	**Air heater water, Thermoguard**
a - Size	060, 100, 150, 190, 240, 300, 360
b - Output variant	1, 2

Air heater electric (code ESET-EV)

ESET-EV -a-b

a - Size	060, 100, 150, 190, 240, 300, 360	
b - Output variant	1, 2	(size 060)
	1, 2, 3	(size 100)
	1, 2, 3, 4	(sizes 150, 190, 240, 300, 360)

Air cooler water (code ESET-VK)

ESET-VK -a-3

a - Size	060, 100, 150, 190, 240, 300, 360

Sound attenuator (code EMT-02)

EMT-02 -a

a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980

6.3 Functional fittings

Unit casing (code EMM)

EMM -a-b-c

a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Module	10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80
c - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30

Filter fitting (code MIE-FB)

MIE-FB -a-b-c-d	**Bag filter fitting**
MIE-FC -a-b-c-d	**Panel filter fitting**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Module	10 = for panel filter FC 15 = for filter classes AL, G4, M5-M6, F7-F9 sizes 060-100 20 = for other filter types and sizes
c - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30
d - Filter slide rails	ST = Standard SF = Acid-proof stainless steel
ELEF -a-b	**Set of filters**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Filter class	AL, G4, P4, M5-M6, F7-F9, C7 sizes 150-980

Filter section accessories:

MIET-FB-01	**Filter monitor, U-tube manometer**
MIET-FB-02	**Filter monitor, Kytölä manometer**
MIET-FB-03	**Filter monitor, Magnehelic manometer**

Air cooler/heater (code MIE-CL/ELEV/ELTV/ELBC/ELBD)

MIE-CL -a-b-c	**Fitting**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Module	10, 15, 20
c - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30
Accessories:	
MIET-CL 01	Air valve
MIET-CL 02	Drain valve
MIET-CL 03	T-pipe for frost protection and bleeding/draining
ELEV -a-b	**Air heater water**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Output variant	00, 01, 02, 03, 04
ELTV -a-b-c	**Air heater water, Thermoguard**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850
b - Output variant	00, 01, 02, 03, 04
c - Connection side	H = Right V = Left
ELBC -a-b-c-d-e-f	**Air cooler water**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Output variant	02, 03, 04, 06, 08
c - Loop length	1 = Short loop length 2 = Long loop length
d = Fin pitch	20 = 2.0 mm 30 = 3.0 mm
e - Droplet eliminator	0 = Without 1 = With
f - Connection side	H = Right V = Left
ELBD -a-b-c-d-e-f	**Air cooler DX**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Output variant	02, 03, 04
c - Loop length	Generated from design program
d = Fin pitch	20 = 2.0 mm 30 = 3.0 mm
e - Droplet eliminator	0 = Without 1 = With
f - Connection side	H = Right V = Left
Accessories:	
ELBDT-01 -a	Number of power steps, air cooler DX
a - Number of power steps	1, 2, 3

Air heater electric (code MIE-EL/ELEE)

MIE-EL -a-b-c	**Fitting**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Module	15, 20, 25, 35
c - Front	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30
ELEE -a-b-HS	**Electric heater**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Output variant	01,02,03 = 060–980 04 = 060–360 05 = 060–360

Inspection (code MIE-KM)

MIE-KM -a-b-c	**Fitting**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Module	10, 15, 20
c - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30
Accessories	
MIET-KM-01-a	**Air distributor**

Empty section (code MIE-TD)

MIE-TD -a-b-c	**Fitting**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Module	10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80
c - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30
Accessories	
MIET-TD-01-a	**Drip tray**

Sound attenuator (code MIE-KL)

MIE-KL -a-b-c-d	**Fitting**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Module	20, 30, 40, 50, 60
c - Casing	AA = Standard (class T3) PA = ThermoLine low energy (class T2) BA = Insulation to fire resistance rating EI 30
d - Type of baffle	EB = Non-retractable baffle UB = Retractable baffle

6.4 Accessories

Sleeve (code EMMT-03)

Flexible woven fabric, l = 110–150 mm.

EMMT-03 -a	
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980

Outdoor version (code EMMT-04)

EMMT-04 -a-50-b-c	**Outdoor version**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Number of levels	2
c - Number of delivery units	01, 02, 03, 04, 05, 06, 07, 08, 09, 10
Accessories:	
EMMT-04T -a-b	**Exhaust hood**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Fan type	FD
EMMT-04G-a-0	**Intake louvre**
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
EMMT-04H-a-0	**Weather hood**
a - Size	060, 100, 150, 190, 240, 300

Support (code EMMT-05)

EMMT-05 -a-50-b	
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600, 740, 850, 980
b - Length range	0, 1, 2, 3, 4, 5 0 = 0–1000, 1 = 1000–2000 and so on

Inspection window (code EMMT-06, EMMT-11)

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

EMMT-06	sizes 100–600:
EMMT-11	sizes 740–980

Inside light fitting (code EMMT-07)

IP 44, with protective grille.

Lifting bracket (code EMMT-08)

For aluminium section.

One-piece configuration (code EMMT-10)

EMMT-10 -a-50-b	
a - Size	060, 100, 150, 190, 240, 300, 360, 480, 600
f - Number of delivery units	01, 02, 03, 04, 05, 06, 07, 08, 09, 10

Thermometer (code EMMT-16)

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

Water trap (code MIET-CL 04)

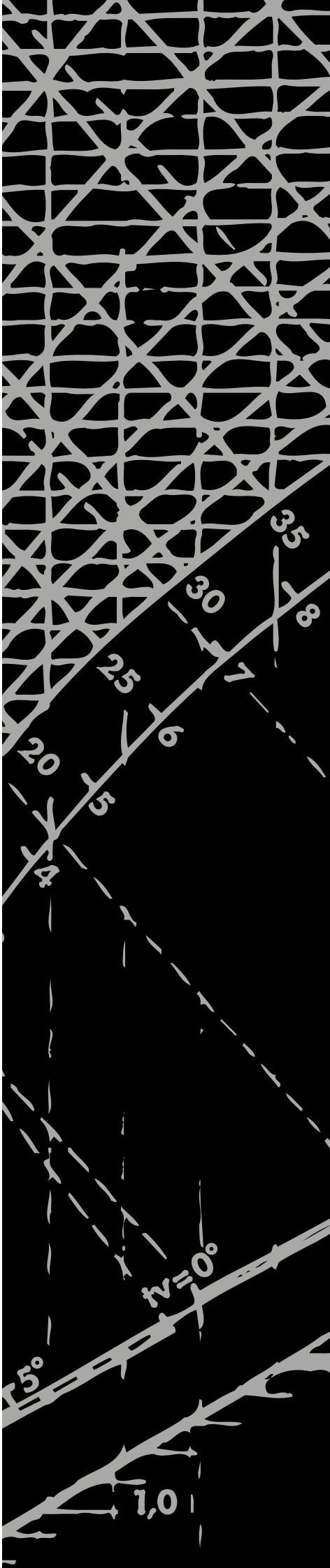
Plastic, built-in non-return valve.

6.5 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 740-980
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	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

Change history

101112.05	Addition of EcoCooler
110217.06	Addition of EC fans -360
110217.06 rev.01	Updated EC fans
110217.06 rev.02	Updated EcoCooler decal
110929.07	Cable colour markings removed. Fan inspection, updated size info. EMMT-04H added to ordering keys.
120217.08	Addition of run-around coil unit (EXL), rated current of fan motors, updated service schedule.
130205.09	Updated fan data (rated current and rec. fuse protection) plus filter data.
130318.10	Updated refrigerant handling. Addition of earth braid fan installation.
130318.10 rev01	AL filter checkbox for unit specifications. Line for date in service schedule
140516.11	Size 060 added, new casing
150828.12	Size 980 and PFD motors added. More wiring instructions.



Luftbehandling med LCC i fokus

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