Operation and Maintenance Flexomix





Translation of the original instructions

Table of Contents

Safety precautions	3
Service schedule	11
EBA 060-3150 Mixing section	12
EBB 060-3150 Mixing section	13
EBC 060-600 Mixing section	14
EBC 740-3150 Mixing section	15
EBD 060-3150 Mixing section	16
EBE 060-1950 Recirculating unit	17
EAU 1080-3150 Outdoor exhaust air section	18
EMD 060-600 Media section	19
EMM 060-980 Standard module	
EMM 1080-3150 Standard module	21
EXG 100-600 Heat recovery section FlexoPool	
EXM 060-850 Counter-flow heat exchanger	
EXP 060-1280 Plate heat exchanger	25
EXR 060-3150 Rotary heat exchanger	27
EKV 060-600 Angle section	
EAD 100-850 Exhaust air section FlexoPool	
MIE-CL 060-980 Cooling/heating fitting	
MIE-CL 1080-3150 Cooling/heating fitting	
MIE-EF 060-980 Humidifier fitting	40
MIE-EL 060-1950 Electric air heater fitting	
MIE-FB/FC 060-980 Filter fitting	
MIE-FB 1080-3150 Filter fitting	
MIE-ID 060-3150 Inlet fitting	
MIE-IU 1080-3150 Outdoor intake fitting	
MIE-KL 060-980 Sound attenuator fitting	
MIE-KL 1080-3150 Sound attenuator fitting	
MIE-KM 060-3150 Inspection fitting	60
MIE-KS 060-3150 Damper fitting	61
MIE-MD 060-3150 Media section fitting	
MIE-TD 060-3150 Empty section fitting	
ELFF	64-227



1 Safety precautions

Follow all safety precautions in this document and pay attention to all warning signs on the air handling unit.

Failure to comply with the safety precautions may result in injury to persons or damage to air handling units.

1.1 Personal protective equipment

Personal protective equipment must always be used based on the risks present at the workplace. Comply with national and local laws and regulations.

The following personal protective equipment is recommended where the work requires:

- Protective shoes with steel cap
- Hearing protectors
- Safety helmet
- Gloves
- Goggles
- Covering clothing
- Protective overalls
- Mouthguard/protective mask
- Fall protection

1.2 Prevent injury to personal or damage to air handling units

To avoid injury to persons or damage to air handling units, pay attention to the following:

- Read the entire document before working on the unit.
- Comply with national and local laws and regulations for work safety.
- Do not wear loose clothing or jewellery that may get fasten.
- Do not step or climb on the heater.
- Use recommended tools and equipment intended for the job.
- Use recommended personal protective equipment when the work requires it.
- Observe the unit's product signs, information and warning stickers.
- Keep the unit clean and follow operating and care instructions.
- Make sure that all covers are in place and that inspection covers are closed.
- Lockable inspection covers must be locked before starting the unit and after maintenance/service.
- Use appropriate fall protection when working at heights normally over 2 meters. Even work at lower heights may require protective measures.



1.3 Product signs, information and warning stickers

Keep signs and stickers free from soiling and replace them if they are lost, damaged or illegible. Contact IV Produkt for replacement stickers; specify the item number.

1.4 Safety message

The following warning symbols and signal words are used in this document to inform of risks.



Danger - indicates an imminent dangerous situation which, if not avoided, can result in death or serious injury.



Warning - indicates a potentially dangerous situation which, if not avoided, can lead to serious injury.

WARNING!



Caution - indicates a less potentially dangerous situation which, if not avoided, can lead to less serious or minor injuries.

ľ	NB! - indicates a potentially hazardous situation which, if not avoided, may result in damage or impaired operation
NB!	of the air handling unit.



1.5 General safety messages

Comply with the following general safety messages.

to start and shut down the unit.

Lockable safety switch

\triangle	DANGER! Risk of serious injury. Electrical power can cause electric shock, burns and death.
	Working on/servicing the unit – Shut down the unit via the service switch in the control equipment, then turn the safety switch to the 0 position and lock it.
	There may be several safety switches serving the different parts of the unit. All safety switches must be switched off before repairs/service.
	1
!	NB! The safety switch is not designed for starting/stopping the unit. Always use the service switch in the control equipment

Electrical connection

$\underline{\mathbb{N}}$	DANGER! Risk of serious injury. Electrical power can cause electric shock, burns and death.
	Working on/servicing the unit – Shut down the unit via the service switch in the control equipment, then turn the safety switch to the 0 position and lock it.
	There may be several safety switches serving the different parts of the unit. All safety switches must be switched off before repairs/service.
	WARNING! Risk of personal injury. Rotating fan impellers can cause crushing injuries or lacerations. 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.



Inspection doors



WARNING! Risk of personal injury. Overpressure in unit. Allow the pressure to drop before you open the inspection doors.



Risk of personal injury. The doors in front of moving parts shall normally be locked; there are no safety guards.

During repairs/service, the inspection doors are locked with the supplied keys.

Make sure that all doors are in place, that inspection doors are closed and that lockable inspection doors are locked before starting the unit and after repairs/service.

Cooling unit



WARNING! Risk of personal injury. Hot surfaces can cause burns.

Working on/servicing the unit – Shut down the unit via the service switch in the control equipment, then turn the safety switch to the 0 position and lock it.

There may be several safety switches serving the different parts of the unit. All safety switches must be switched off before repairs/service.

Wait at least 30 minutes before opening the compressor inspection doors.

Heating coil



WARNING! Risk of personal injury.

Hot surfaces can cause burns.

Working on/servicing the unit – Shut down the unit via the service switch in the control equipment, then turn the safety switch to the 0 position and lock it.

There may be several safety switches serving the different parts of the unit. All safety switches must be switched off before repairs/service.

Wait at least 5 minutes before opening the battery inspection doors.



Fan

\triangle	

WARNING! Risk of personal injury. Rotating fan impellers can cause crushing injuries or lacerations.

Working on/servicing the unit – Shut down the unit via the service switch in the control equipment, then turn the safety switch to the 0 position and lock it.

There may be several safety switches serving the different parts of the unit. All safety switches must be switched off before repairs/service.

Wait at least 3 minutes before opening inspection doors.

Rotary heat exchanger

WARNING! Risk of personal injury. Rotating thermal wheels can cause crushing injuries or lacerations.
Working on/servicing the unit – Shut down the unit via the service switch in the control equipment, then turn the safety switch to the 0 position and lock it.
There may be several safety switches serving the different parts of the unit. All safety switches must be switched off before repairs/service.
Wait at least 3 minutes before opening inspection doors.

Damper

WARNING! Risk of personal injury. Moving parts can cause crushing injuries. Never place your hands inside the damper when it closes.
Working on/servicing the unit – Shut down the unit via the service switch in the control equipment, then turn the safety switch to the 0 position and lock it.
There may be several safety switches serving the different parts of the unit. All safety switches must be switched off before repairs/service.
Some dampers are closed via spring return in a de-energized state
Wait at least 3 minutes for the damper to close.

Filter



WARNING! Risk of personal injury – harmful dust. Use a face mask/respiratory protection to avoid inhaling dust.



2 General

2.1 Intended use

Flexomix is a modular device series designed for use as an air handling unit for comfort ventilation in buildings.

When installed indoors, the air handling unit must be installed in an area that maintains a temperature between +7 and +30°C, and with a moisture content of <3.5 g/kg in dry air in the winter. The unit, with the exception of FlexoPool, can also be equipped for cold attic or outdoor installations.

Any other use and installation in other environments are prohibited unless specifically permitted by IV Produkt AB.

It is not permitted to use the unit in potentially explosive environments, Eex.

2.2 Manufacturer

Flexomix air handling units are manufactured by:

IV Produkt AB Sjöuddevägen 7 SE-350 43 VÄXJÖ

2.3 Designations

Flexomix air handling units consist of a number of different modules.

Each module is equipped with a model identification label located on the front.

The model identification label shows the order number and the required designations for identifying the module.

Ordernr / Order No / Tilaus nr / Nr z	am / Auftragsnr.	
Modell / Model / Malli / Model / Mod	lell	
Produktkod / Product code / Tuotek	oodi / Kod produktu / P	roduktcode
Aggregatbeteckning / Project / Koh	de / Agregat / Bezeichr	nung
Tillv.ort / Made in / Valmistettu / Pro	odukcja / Herst.Ort	
Tillv.m / Manuf.m. / Valmistus. k / M	liesiav pr / Herst.Monat	
	Art.nr. 19121-1001	

Typical model identification label



2.4 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, e.g. Pressure Equipment Directive PED 2014/68/EU.

As certification confirming that the requirements have been met, we provide an EU Declaration of Conformity, which is available under Documentation at <u>ivprodukt.docfactory.com</u>, or under Order Unique Documentation at <u>docs.ivprodukt.com</u>.



Typical CE label for air handling units

	cooling unit
Order number	
Code Key	
Model	
Name of project	
Date of manufacture	
PS Max allowable pressure	bar (e)
PT Test pressure	bar (e)
TS Temperature range	3°
Protection level - low	bar (e)
Protection level - high	bar (e)
Refrigerant / Fluid group	
GWP	
Refrigerant charge Circuit 1	kg ton CO2e
Refrigerant charge Circuit 2	kg ton CO2e
Refrigerant charge Circuit 3	kg ton CO2e
Contains fluorinated greenhouse gases covered by the Kyotot protocol.	0409 ^{IV Produkt AB} văxJô, SWEDEN

Typical CE label for cooling units

For units without integrated control equipment

The EC declaration applies only to units in the configuration in which they were delivered and installed at the facility in accordance with the accompanying installation instructions. The declaration does not include components that were subsequently added or measures subsequently taken on the unit.

2.5 Maintenance

The ongoing 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 wellreputed service company.

2.6 Handling of refrigerant

For refrigerant handling of cooling unit EcoCooler (code ECO, ECX), see the separate Operation and Maintenance instruction on <u>docs.ivprodukt.com</u>.



2.7 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 17 with supplement VU20, 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.

2.8 Spare parts

Spare parts and accessories for this unit are ordered from your nearest IV Produkt sales representative. When ordering, state the order number and designation. These are stated on a model type plate, affixed to each component. There is a separate spare parts list for the unit, refer to Order Unique Documentation at <u>docs.ivprodukt.com</u>.

2.9 Dismantling and decommissioning

When an air handling unit is to be dismantled, separate instructions must be followed, see <u>Dismantling and decommissioning the AHU</u> under Documentation at <u>ivprodukt.docfactory.com</u>.



Flexomix service schedule

For relevant function parts, see the order document Technical data under order-unique documentation at <u>docs.</u> <u>ivprodukt.com</u>.

Service year 20 Order. nr Designation								
Comments				Service performed * (date and signature)				
Func	tional section	Code	Recommended action (insp.)	Incl. in unit	12 mths	24 mths	36 mths	48 mths
					date	date	date	date
	Inlet section	MIE-ID	Visual inspection Clean if necessary		signature	signature	signature	signature
	Mixing section, recirculating unit	EBA, EBB, EBC, EBD, EBE	Visual inspection Clean if necessary		signature	signature	signature	signature
\geq	Filter supply air, extract air	MIE-FB/FC ELEF	Check pressure drop Change filter if neces- sary		signature	signature	signature	signature
	Rotary heat exchanger	EXR	Visual inspection Check press. balance Check diff. pressure Clean if necessary		signature	signature	signature	signature
\bigotimes	Counter-flow/ Plate heat exchanger	EXM EXP	Visual inspection Clean if necessary Check function		signature	signature	signature	signature
\bigcirc	Coil recovery	MIE-CL/EDXT MIE-CL/EDXF	Visual inspection Check drainage Clean if necessary Check function		signature	signature	signature	signature
H₂O	Air heater water	MIE-CL/ELEV MIE-CL/ELTV	Visual inspection Clean if necessary Check function		signature	signature	signature	signature
$\bigoplus_{\frac{1}{2}}$	Air heater electric	MIE-EL/ELEE	Visual inspection Clean if necessary Check function		signature	signature	signature	signature
H ₂ O /DX	Air cooler wa- ter/DX	MIE-CL/ELBC MIE-CL/ELBD	Visual inspection Check drainage Clean if necessary Check function		signature	signature	signature	signature
	Fan unit	MIE-FF EFA-FF ELFF	Visual inspection Clean if necessary Check the air flow		signature	signature	signature	signature
	Damper	EMT-01	Visual inspection Clean if necessary Check tightness		signature	signature	signature	signature
	Sound attenu- ator	EMT-02 MIE-KL	Visual inspection Clean if necessary		signature	signature	signature	signature
	Cooling unit, EcoCooler	ECO/ECX	See separate brochure		signature	signature	signature	signature

*In some environments, service may be needed more often. Replace the filter if the pressure drop across the filter exceeds the specified final pressure drop.



Mixing section (code EBA)



The photo shows the right-hand version, size 190

The EBA mixing section is a functional section with a damper for mixing outdoor air and recirculated air.

- The dampers are manufactured from aluminium profiles and comply with the requirements for corrosion class C4 in accordance with SS-EN ISO 12944-2.
- The damper blades are powered by plastic cogwheels and a hose gasket made of silicon rubber creates a seal between the blades.
- Tightness class 3 in accordance with SS-EN1751 (VVS AMA-98).
- Permitted temperature: -40 to +80°C. Permitted differential pressure: max. 1.400 Pa

Damper

For damper data, see Damper overview under Documentation at <u>ivprodukt.docfactory.com</u>.

Operation and maintenance instructions

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 damper tight.
- 3. Check the sealing strips.

Cleaning



Mixing section (code EBB)



The EBB mixing section is a unit section with three dampers for mixing extract, return and outdoor air.

- The EBB mixing section has built-in dampers of IV Produkt type KJS.
- The dampers are manufactured from aluminium profiles and comply with the requirements for corrosion class C4 in accordance with SS-EN ISO 12944-2.
- The damper blades are powered by plastic cogwheels and a hose gasket made of silicon rubber creates a seal between the blades.
- Tightness class 3 in accordance with SS-EN1751 (VVS AMA-98).
- Permitted temperature: -40 to +80°C. Permitted differential pressure: max. 1.400 Pa
- The unit section comes with an inspection door as standard.

Damper

For damper data, see Damper overview under Documentation at <u>ivprodukt.docfactory.com</u>.

Operation and maintenance instructions

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 damper tight.
- 3. Check the sealing strips.

Cleaning

Mixing section (code EBC)



The EBC mixing section is a unit section with three dampers for mixing extract, return and outdoor air.

- The EBC mixing section has built-in dampers of IV Produkt type KJS.
- The dampers are manufactured from aluminium profiles and comply with the requirements for corrosion class C4 in accordance with SS-EN ISO 12944-2.
- The damper blades are powered by plastic cogwheels and a hose gasket made of rubber creates a seal between the blades.
- In the configuration with inside shafts, the damper is linked to two shafts.
- Tightness class 3 in accordance with SS-EN1751 (VVS AMA-98).
- Permitted temperature: -40 to +80°C. Permitted differential pressure: max. 1.400 Pa
- The EBC mixing section has an inspection door in both the upper and the lower level.

Damper

For damper data, see Damper overview under Documentation at <u>ivprodukt.docfactory.com</u>.

Operation and maintenance instructions

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 damper tight.
- 3. Check the sealing strips.

Cleaning

Mixing section (code EBC)



The EBC mixing section is a unit section with three dampers for mixing extract, return and outdoor air.

- The EBC mixing section has built-in dampers of IV Produkt type KJS.
- The dampers are manufactured from aluminium profiles and comply with the requirements for corrosion class C4 in accordance with SS-EN ISO 12944-2.
- The damper blades are powered by plastic cogwheels and a hose gasket made of rubber creates a seal between the blades.
- Tightness class 3 in accordance with SS-EN1751 (VVS AMA-98).
- Permitted temperature: -40 to +80°C. Permitted differential pressure: max. 1.400 Pa
- The EBC mixing section has an inspection door in both the upper and the lower level.

Operation and maintenance instructions

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 damper tight.
- 3. Check the sealing strips.

Cleaning

Clean the damper blades with a cloth. In the event of stubborn dirt, use a mild, alkaline detergent.

Damper

For damper data, see Damper overview under Documentation at <u>ivprodukt.docfactory.com</u>.



Mixing section (code EBD)



The EBD recirculating unit is a unit section with two dampers intended specifically for recirculated air operation to heat premises at night.

- The EBD mixing section has built-in dampers of IV Produkt type KJS.
- The dampers are manufactured from aluminium profiles and comply with the requirements for corrosion class C4 in accordance with SS-EN ISO 12944-2.
- The damper blades are powered by plastic cogwheels and a hose gasket made of silicon rubber creates a seal between the blades.
- Tightness class 3 in accordance with SS-EN1751 (VVS AMA-98).
- Permitted temperature: -40 to +80°C. Permitted differential pressure: max. 1.400 Pa
- Recirculating unit EBD has an inspection hatch in both the upper and lower level.

Damper

For damper data, see Damper overview under Documentation at <u>ivprodukt.docfactory.com</u>.

Operation and maintenance instructions

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 damper tight.
- 3. Check the sealing strips.

Cleaning



Recirculating unit (code EBE)



The EBE recirculating unit is a section unit with a damper designed to recirculate air in conjunction with heating premises at night.

To obtain the intended function, it is assumed that the unit will be equipped with shut-off dampers for outdoor air and exhaust air.

The unit section has an inspection door in both the upper and lower level.

- The EBE recirculating unit has a built-in damper of IV Produkt type KJS.
- The damper is manufactured from aluminium profiles and complies with the requirements for corrosion class C4 in accordance with SS-EN ISO 12944-2.
- The damper blades are powered by plastic cogwheels and a hose gasket made of silicon rubber creates a seal between the blades.
- Tightness class 3 in accordance with SS-EN1751 (VVS AMA-98).
- Permitted temperature: -40 to +80°C.
 Permitted differential pressure: max. 1.400 Pa

Damper

For damper data, see Damper overview under Documentation at <u>ivprodukt.docfactory.com</u>.

Operation and maintenance instructions

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 damper tight.
- 3. Check the sealing strips.

Cleaning

Clean the damper blades with a cloth. In the event of stubborn dirt, use a mild, alkaline detergent.



Schematic diagram – recirculation of air in the recirculating unit (marked in grey).



Outdoor exhaust air section (code EAU)

with damper



The picture shows EAU-1250 in the configuration with a damper

The EAU outdoor exhaust air section is a functional part that is used to reduce the risk of short-circuiting between outdoor air and exhaust air.

Two different versions of the exhaust hood are available:

- without damper (code -0)
- with damper (code -1).

The following is applicable to the version with a damper:

- The dampers are manufactured from aluminium profiles and comply with the requirements for corrosion class C4 in accordance with SS-EN ISO 12944-2.
- The damper blades are powered by plastic cogwheels and a hose gasket made of silicon rubber creates a seal between the blades.
- Tightness class 3 in accordance with SS-EN1751 (VVS AMA-98).
- Permitted temperature: -40 to +80°C. Permitted differential pressure: max. 1.400 Pa

Damper

For damper data, see Damper overview under Documentation at <u>ivprodukt.docfactory.com</u>.

Operation and maintenance instructions

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 damper tight.
- 3. Check the sealing strips.

Cleaning





Media section (code EMD)



The media section EMD has a shielded space for electrical and control cabinet installation. The media section has a two-level configuration.

Technical data

Configuration



For size-specific technical data, see the documentation enclosed with the unit/unit section, or see product selection program IV Produkt Designer.

Operation and maintenance

Vacuum and/or wipe all surfaces with a cloth.

Standard module (code EMM)



The photo shows the right-hand version, size 190

Standard module EMM size 060-980 is an insulated unit housing that combines with the selected fitting to form a complete functional section, e.g. for heating, cooling or other functions desired.

The unit's frame comprises extruded and anodised aluminium panels, 50×50 mm.

Covers and panels are of double-plate construction with intermediate insulation.

The panels are aluminium/zinc-treated sheet steel with a protective coating (ALC).

Housing and support meet the requirements for corrosion class C4 according to SS-EN ISO 12944-2. The casing is available in the following configurations:

Type of housing	Insulation	Thermal transmittance class	Thermal bridg- ing class
AA - Standard	Glass wool	ТЗ	TB4
BA - Insulation with fire resist- ance rating El 30	Ultimate (stone and glass wool)	ТЗ	TB4
PA - Low-energy ThermoLine	Polyure- thane	T2	ТВЗ
PA2 - Low-ener- gy ThermoLine Plus	Polyure- thane	T2	TB2

Optional fittings

- Damper fitting (code MIE-KS)
- Inlet fitting (code MIE-ID)
- Filter fitting (code MIE-FB/FC)
- Cooling/heating fitting (code MIE-CL)
- Electric air heater fitting (code MIE-EL)
- Humidifier fitting (code MIE-EF)
- Fan fitting (code MIE-FF)
- Inspection fitting (code MIE-KM)
- Empty section fitting (code MIE-TD)
- Sound attenuator fitting (code MIE-KL)
- Media section fitting (code MIE-MD)

Accessories

- Connection gable (code EMMT-01)
- Connection frame (code EMMT-02)
- Sleeve (code EMMT-03)
- Outdoor version (code EMMT-04)
- Support (code EMMT-05)
- Lifting bracket (code EMMT-08)
- Acid-proof bottom (code. EMMT-09)
- One-piece configuration 060-600 (code EMMT-10)
- Inspection window (code EMMT-11)
- Hygienic sealing (code EMMT-14)
- Bottom drain (code EMMT-15)
- Removable configuration 060-600 (code EMMT-22)
- Cover strip, bottom profile (code EMMT-29)

Operation and maintenance

The standard module requires no maintenance. See separate operation and maintenance instructions for the optional fittings for EMM.

Standard module (code EMM)



Standard module EMM is an insulated unit housing that combines with the selected fitting to form a complete functional section, e.g. for heating, cooling or other functions desired.

The unit's frame comprises extruded and anodised aluminium panels, 60×60 mm.

Covers and panels are of double-plate construction with intermediate insulation.

The panels are aluminium/zinc-treated sheet steel with a protective coating (ALC).

Housing and support meet the requirements for corrosion class C4 according to SS-EN ISO 12944-2. The casing is available in the following configurations:

Type of housing	Insulation	Thermal transmittance class	Thermal bridg- ing class
AA - Standard	Glass wool	Т3	TB4
BA - Insulation with fire resist- ance rating EI 30	Ultimate (stone and glass wool)	ТЗ	TB4

Optional fittings

- Damper fitting (code MIE-KS)
- Inlet fitting (code MIE-ID)
- Filter fitting (code MIE-FB)
- Cooling/heating fitting (code MIE-CL)
- Electric air heater fitting (code MIE-EL)
- Humidifier fitting (code MIE-EF)
- Inspection fitting (code MIE-KM)
- Empty section fitting (code MIE-TD)
- Sound attenuator fitting (code MIE-KL)
- Media section fitting (code MIE-MD)
- Outdoor intake fitting (code MIE-IU)

Accessories

- Connection gable (code EMMT-01)
- Connection frame (code EMMT-02)
- Sleeve (code EMMT-03)
- Outdoor sealing, fixed panelling (code EMMT-04)
- Support (code EMMT-05)
- Acid-proof bottom (code. EMMT-09)
- Lifting bracket (code EMMT-12)
- Hygienic sealing (code EMMT-14)
- Bottom drain (code EMMT-15)
- Inspection window (code EMMT-26)

Operation and maintenance

The standard module requires no maintenance. See separate operation and maintenance instructions for the optional fittings for EMM.

Heat recovery section (code EXG)



PRODUKT

Heat recovery unit FlexoPool EXG is a recovery unit according to the coil recovery principle, especially designed to withstand corrosive environments.

The FlexoPool EXG is constructed and supplied as a complete recovery unit comprising coils for supply air and extract air, including pipe joint with speed controlled pump.

- The system is filled with liquid, bled, adjusted and function tested at the factory.
- The heat transfer is controlled by a variable liquid flow via frequency controlled circulation pump. The circulation pump is located externally on the inspection side of the unit.
- Static pressure in the liquid system is monitored via a test gauge with signalling switch. Falling or rising pressure stops the circulation pump and triggers an alarm.
- Humidity is not recovered from the extract air. However, at low outdoor air temperatures, moisture is precipitated and energy is recovered. The condensate is collected in a drip tray with a drainage connection with ext. Ø 32 mm (a water trap is not required when the system is equipped with a pressure fan).
- The humidity precipitation means there is a risk of ice forming in the extract air coil. The formation of ice is counteracted by regulating the liquid flow in the system via the speed controlled circulation pump.
- The unit is supplied on a support.

Pump motor

Size	Output (W)	Current (A)	Voltage (V)	Rec. fuse protection (AT)
100– 600	750	2.2	230	10

Wiring instructions



Operation and maintenance

The coils consist of a number of copper tubes with aluminium fins pressed onto them. 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).

Inspection

- Check the coil fins to detect possible mechanical deformity.
- Check that the coils are not leaking.
- Check that the pressure in pipework holds at least 0.8 bar. Bleed and fill with brine solution if necessary. The circulation pump must be switched off during bleeding and filling.
- Check the drip tray and drain with water trap (clean if necessary).

Cleaning

If the fins on the coil are dirty, vacuum clean from the inlet side. Exercise care when vacuuming, as the fins are thin and can be damaged through careless contact. Alternatively, you can blow them clean with compressed air from the outlet side. In the event of heavier fouling, you can clean them with warm water mixed with dishwashing detergent that does not corrode aluminium. The exhaust air coil must be flushed with warm water at least once a year.

Bleeding

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



Counter-flow heat exchanger (code EXM)



Example EXM size 190

The EXM counter-flow heat exchanger is a complete heat recovery unit with a heat exchanger that works with heat transfer according to the air-air principle.

The counter-flow heat exchanger's task is to recover heat from the extract air and transfer this heat to the supply air so that energy use is minimized.

Counter-flow heat exchangers are of the counter-flow type and are made of aluminium plates. Smooth ducts in the direction of airflow provide a low pressure drop and minimal risk of dust building up.

If the counter-flow heat exchanger is malfunctioning, the recovery efficiency is reduced with subsequent increased energy use, and the projected supply air temperature cannot be achieved at low outdoor temperatures.

Possible reasons for reduced recovery efficiency could be the fouling of the heat-exchanging surfaces (fins) or that the bypass damper is not closing completely.

A reduction in the exhaust air flow, e.g. through fouling of exhaust air filters, entails reduced recovery efficiency.

At low temperatures the extract air humidity is precipitated. The condensate is collected in a drip tray with a drainage connection. The humidity precipitation also means there is a risk of ice forming in the exchanger. The formation of ice is counteracted by a frosting function.

Configuration





Example configuration in full block (also available in sections).

Drainage Connection = ø20 mm

Damper Damper motors are assembled at the factory.



Functional description, frosting function

The counter-flow heat exchanger may, under certain operating conditions, cause frost and ice formation on the exhaust air side. In order to optimise heat recovery, and avoid freezing, there is a built-in frosting function. The principle is based on the frosting function starting when the temperature of the exhaust air side's coldest surface falls below a certain value.

The freezing process is prevented by reducing heat recovery gradually through regulating dampers on the counter-flow exchanger's Exhaust Air side. The heat recovery damper closes and the bypass damper opens. In this way, the exhaust air temperature is increased and freezing is avoided.

During full heat recovery and when the unit is switched off, the dampers should be fully open (bypass damper closed).

The frosting and bypass functions are preset at the factory and any adjustments may only be performed by IV Produkt.

The bypass and shut-off dampers are of KJS type in tightness class 2 in accordance with SS-EN1751 (VVS AMA-98) and corrosion class C4 in accordance with SS-EN ISO 12944-2.

Counter-flow heat exchangers, operation and maintenance instructions

Inspection

- 1. Inspect the fins for fouling. Inspection can be carried out through e.g. an inspection door to the filter section.
- 2. Check the auto defrosting function and make sure that the bypass damper closes securely when defrosting is not in progress.
- 3. Check the drip tray, drainage and water trap function. A water trap without a non-return value should be filled with water.

Cleaning

Cleaning is recommended by vacuuming, blowing with compressed air and flushing with hot water (if necessary, with the addition of mild detergent that does not corrode aluminium). High pressure flushing must not be directed at the fins.

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

Damper, operation and maintenance instructions

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 damper tight.
- 3. Check the sealing strips.

Cleaning



Plate heat exchanger (code EXP)



The plate heat exchanger EXP is a complete unit with a plate changer that works with heat transfer according to the air-air principle.

The task of the plate 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.

The plate heat exchanger is of the cross-current type and is composed of aluminium plates that can also be supplied epoxy treated. Smooth ducts in the direction of airflow provide a low pressure drop and minimal risk of dust building up.

Inadequate operation of the plate heat exchanger through reduced recovery efficiency means increased energy use. This also means that the planned supply air temperature will not be reached when outdoor temperatures are low.

Possible reasons for reduced recovery efficiency could be the fouling of the heat-exchanging surfaces, the bypass damper not closing completely, or the extract air filter being dirty.

At low temperatures the extract air humidity is precipitated.

The condensate is collected in a drip tray with a drainage connection. The humidity precipitation also means there is a risk of ice forming in the exchanger. The formation of ice is counteracted by some of the outdoor air flow being bypassed past the exchanger.

Particular attention should be paid to any ice forming in the extract air section of the heat recovery unit. If operational disturbances occur caused by icing, the anti-freeze equipment for the unit undergoes a function check.

The bypass and shut-off dampers are of KJS type in tightness class 2 in accordance with SS-EN1751 (VVS AMA-98) and corrosion class C4 in accordance with SS-EN ISO 12944-2.

Drainage

Size 060-1080, 1280: 1 pcs connection = ø32 mm Size 1250: 2 pcs connection = ø42 mm

Damper

Damper shaft 12x12 mm

Size	Number of damper motors	Required torque (Nm)
060, 100	1	3
150	1	4
190, 240, 300	1	5
360	1	6
400	1	5
480, 600	1	10
740	2	13
750	2	9
850	2	10
950, 980	2	11
1080	4	15
1250	2	11
1280	4	15



Plate heat exchanger, operation and maintenance instructions

Inspection

- 1. Inspect the fins for fouling. Inspection can be carried out through e.g. an inspection door to the filter section.
- 2. Check the auto defrosting function and make sure that the bypass damper closes securely when defrosting is not in progress.
- 3. Check the drip tray, drainage and water trap function. A water trap without a non-return value should be filled with water.

Cleaning

Cleaning is recommended by vacuuming, blowing with compressed air and flushing with hot water (if necessary, with the addition of mild detergent that does not corrode aluminium). High pressure flushing must not be directed at the fins.

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

Damper, operation and maintenance instructions

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 damper tight.
- 3. Check the sealing strips.

Cleaning

Rotary heat exchanger (code EXR)



The rotary heat exchanger EXR is a complete unit with a rotating heat exchanger that works with heat transfer according to the air-air principle.

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 power requirement and the energy used for heating the supply air.



A faulty heat recovery function resulting in 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.



EXR 060-1550

Rotor control manufactured by OJ Electronics

Wiring instructions



Rotor control

Size	Output	Voltage	Operating temperature
060-150	55 W	1×230 V	-40 °C - +40 °C
190-980	220 W	1×230 V	-40 °C - +40 °C
1080-1550	790 W	1×230 V	-40 °C - +40 °C

Motor data

Size	Rotor diameter *	Output	Current	Voltage
060-360	D1	55 W	0.6 A	1×230 V
400-600	D1	110 W	1.2 A	1×230 V
740, 750, 850, 950, 980	D1	220 W	2.4 A	1×230 V
850	D2	220 W	2.4 A	1×230 V
1080-1550	D1	790 W	4.4 A	1×230 V

*) For rotor diameters type D1 or D2, refer to the order-specific document Technical Data and the Product Code column, e.g. EXR-xxx-xx-D1-xx under docs.ivprodukt.com.

Or

EXR 1150-3150

Rotor control manufactured by IBC control

Wiring instructions

MiniMax Control Unit for Rotating Heat Exchanger





D1* - IBC control MiniMax

MicroMax Control Unit for Rotating Heat Exchanger L N Ļ Ŧ U V W T т M

3×230 V AC



Rotation 0-10 V monitor

D1/D2* - IBC control MicroMax370/750

Thermal

contact

Motor data

1×230 V AC

Size	Rotor diameter *	Output	Current	Voltage
1150, 1250	D2	370 W	1.7 A	1×230 V
1950, 2050	D1	370 W	1.7 A	1×230 V
2240, 2550, 3150	D1	750 W	3.5 A	1×230 V
1550, 1950, 2050, 2240, 2550, 3150	D2	750 W	3.5 A	1×230 V

*) For rotor diameters type D1 or D2, refer to the order-specific document Technical Data and the Product Code column, e.g. EXR-xxx-xx-D1-xx under docs.ivprodukt.com.

ingoing product developme	ent may introduce	changes to specific	ations without p	prior notice.



Rotor control function

The control unit and drive motor are component parts of the rotor control. The control unit built into the heat recovery unit comes with complete functions for purging, a rotation monitor, motor protection and an alarm.

A rotation monitor sensor is included as standard. Speed control takes place against a control graph that is almost linear to the temperature efficiency.

A hygroscopic rotor variant can absorb particles which in some cases give off odours. The particles may be made up of mould spores that bond to the hygroscopic surface. Under certain moisture and temperature conditions, these mould spores may undergo growth that gives off gases with an unwanted odour. To prevent odour, the hygroscopic rotor is "aired" via the extract air by rotating continuously at low speed.

For more information, see <u>Rotor control</u> on the IV Produkt website.

Purging and leakage flow

Rotary heat exchangers always transfer a certain extract air to the supply air or supply air to the extract air by means of co-rotation.

When purging sectors are used, the rotor is purged so that the transfer of extract air to the supply air is eliminated. When installing heat recovery units with purging sectors, the fans must be positioned so that P1>P4 and P2>P3 as shown in the figure.



Trim dampers may possibly be used in order to achieve the necessary pressure balance.

The purging flow is adjusted using the adjustable purging sector. IV Produkt Designer Calculates the leak flow and any trim damper requirement.

Operation and maintenance instructions

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.



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.
- 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. Rotation 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.
- 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 EMT-01 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.

	Adjustment hole in the purging sector		r			
	Rotor variant	5 open*	4	3	2	1 closed
Diff. pressure between P1 and	R20, R30, R40, NO, NE, HY, HE, EX	< 200	200 – 400	400–600	> 600	-
P3 (Pa)	R50, R60, NP, NX, HP	< 300	300–500	500–700	> 700	-

*maximum open purge sector, preset position from the factory

Adjust the purging sector if the need arises. The picture shows the purging sector set to the maximum open position (schematic diagram).





Cleaning

- Remove dust by carefully vacuum cleaning using a soft brush.
- In the event of severe contamination and heavyduty dirt, the rotor can be sprayed with a mild, alkaline detergent.
- Compressed air at low pressure (max. 6 bar) can be used for blowing the rotor 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: see the information under "Funktion rotorstyrning" sid 3. If any odour persists, we recommend cleaning the rotor with a mild, alkaline detergent.

Apply copious amounts of the detergents using a pressure spray, if possible when the unit is operational 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.

Lubrication

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



Angle section (code EKV)



The EKV angle section is used to deflect the air stream for sizes 060–600.

- The angle section is an empty unit section used for 90° vertical deflection.
- The section has an inspection door.
- The unit section can be fitted with a filter (code EKVT-01-a).
- The unit part can be equipped with external duct damper EMT-01.

Filter

The angle section can be equipped with deep-pleated bag filter, carbon filter or knitted aluminium filter.

For filter data, refer to <u>Filter Overview</u> under Documentation at <u>ivprodukt.docfactory.com</u>. For relevant filters, see orderunique documentation at <u>docs.ivprodukt.com</u> (Technical data and parts).

Damper

For damper data, see Damper overview under Documentation at <u>ivprodukt.docfactory.com</u>.

Filter, Operation and Maintenance

The air filters in a ventilation system are designed to prevent dust and other impurities from entering the building. They should also protect sensitive components inside the unit, e.g. coils and heat recovery units, 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 replace them.

According to guidelines for hygienic design VDI 6022 Part 1: The supply air filter must be class ePM1-50% (F7) or have a higher filtration capacity.

The filter is designed for one-time use. If the filter becomes fouled, the unit will lose capacity. The filter should therefore be changed if the pressure drop across it exceeds the specified value.

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 section should therefore also be cleaned when the filter is changed.

Inspection

Check the pressure drop across the filter. The pressure drop is measured with a manometer connected to measurement outlets. The measurement outlets are connected to each side of the filter. If the filter has reached its specified final pressure drop, it must be changed.



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 start and shut down the unit by means of the control equipment.

- 2. If there is a fixed filter monitor; loosen the necessary measuring hoses for the cover/post in order to open the inspection hatch.
- 3. Wait until the fans have stopped, then open the inspection hatch.



WARNING!

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

Release the eccentric rails. 4



Eccentric rails

- 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 7. engage them and close the inspection hatch.
- 8. If there is a fixed filter monitor, replace the measuring hoses to the measuring outlets on the cover/post.
- 9. Start the unit.

Cleaning

Vacuum and use a damp cloth to wipe clean the inside of the filter section.



Exhaust air section (code EAD)



Exhaust air section EAD is placed after the heat recovery unit. The EAD exhaust air section is a complete unit, which in its basic version contains a drip tray and drainage made from materials resistant to corrosive environments.

EAD can be equipped with a water cooling coil to enable energy recovery from the extract air, e.g. in those cases where a heat pump is connected to the unit.

- EAD can be equipped with a heat recovery coil for a heat pump.
- the heat recovery coil has tin-plated copper tubes with epoxy-treated aluminium fins. The casing is in AL plate. Connection pipes and outlets for bleeding and draining are made from copper.
- the heat recovery coil is equipped with a droplet eliminator that is easy to pull out.
- EAD is an inspectable function section equipped with a drip tray and drainage connection (a water trap is not required when the system is equipped with a pressure fan).
- EAD is always supplied with a support.

Pipe connections Drainage drip tray ext. Ø 32 mm.

For tube connection diameter heat recovery coil, see external document under order-unique documentation at <u>doc.ivprodukt.com</u>.

Operation and maintenance instructions

A coil consists of a number of copper tubes with pressed aluminium fins. 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).

Inspection

- Check the coil fins to detect possible mechanical deformity.
- Check that the coils are not leaking.
- Check the drip tray and drain (clean if necessary).

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. In the event of heavier fouling, you can clean them with warm water mixed with dishwashing detergent that does not corrode aluminium.



Cooling/heating fitting (code MIE-CL)



The cooling/heating fitting consists of assembly rails and a housing front section for integration into the standard module (code EMM).

The fitting is designed for:

- air heater water (code ELEV)
- air heater water, ThermoGuard type (code ELTV)
- air heater steam (code ELES)
- air cooler water (code ELBC)
- air cooler DX direct expansion (code ELBD)
- heat recovery coil, supply air (code EDXT)
- heat recovery coil, extract air (EDXF)
- Pipe connections up to and including 25 mm are made of copper, larger connections of steel. They have an outside thread connection and are fitted with outlets for bleeding and draining. ELEV also has an outlet for an immersion detector.
- ELBC, ELBD and EDXF have stainless drip trays with Ø32 mm drainage connection. Droplet eliminator is required at air speed >2.8 m/s.
- The ELTV air heater has ThermoGuard frost protection When installed in cold areas, the air heater must always be allowed to relieve the pressure to the heating system's return line. When a two-way valve is used for flow control, the valve must always be fitted to the intake pipe.

 Max. operating pressure: ELEV, ELBC, EDXT, EDXF 1.6 MPa (16 atm)

2.2 MPa (22 atm)
1.0 MPa (10 atm)
0.6 MPa (6 atm)

 Max. operating temperature: ELEV 100 °C EDXT/EDXF 100 °C ELES 185 °C ELTV 100 °C

For output variant, water volume and other technical data, see the product selection program IV Product Designer and the order document Technical data under order-unique documentation at <u>docs.ivprodukt.com</u>.

Accessories

- Air valve (code MIET-CL-01)
- Drain valve (code MIET-CL-02)
- T-pipe for frost protection and bleeding/draining (code MIET-CL-03)
- Water trap (code MIET-CL-04)
- Lid for external pipe connections (code MIET-CL-05-a)



Operation and maintenance

Air heater, water heating

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 the coil fins to detect possible mechanical deformity.
- Check that the 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. In the event of heavier fouling, you can clean them with warm water mixed with dishwashing detergent that does 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.

Check function

Check that the heat circulation is working: This can be done by temporarily increasing the temperature setting (setpoint).

Additional maintenance for ThermoGuard

The safety valve's function must be checked regularly (at least once a year). If you see that a valve is leaking, this is normally due to impurities from the pipe system that have accumulated on the actual 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.

Any shut-off valves on the supply or return lines may not be closed if freezing temperatures are likely.

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.


Air cooler, waterborne cooling

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 the coil fins to detect possible mechanical deformity.
- Check that the coil is not leaking.
- Check that cooling energy is uniformly distributed across the coil surfaces (in operation).
- Check the drip tray and drain with water trap (clean if necessary).
- Check 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. In the event of heavier fouling, you can clean them with warm water mixed with dishwashing detergent that does not corrode aluminium.

Bleeding

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

Check function

Check that the water circulation is working. This can be done by temporarily reducing the temperature setting (setpoint).

Air cooler, direct expansion

The cooling coil consists of a number of copper tubes with aluminium fins pressed onto them. The coil's surfaces must be clean in order to achieve the maximum cooling power and good operating economy. Seriously fouled coils reduce the air flow and impair the heat transmission, which can compromise the cooling compressors' operation.

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). If the fins are fouled, they must be cleaned with a vacuum cleaner. As an alternative, you can carefully blow them clean from the outlet side or rinse them with warm water.

NB: When using warm water to rinse the cooling coil for direct expansion, the cooling system must be drained (performed by cooling engineer). If this is not done, there is a major risk of explosion.

A drip tray with drain is located under the cooling coil for removing evaporation water, and there is sometimes a droplet eliminator downstream of the cooling coil which prevents drops of water accompanying the air stream.

Inspection

- Check the coil fins.
- The drip tray and drain with water trap should be checked carefully and cleaned if necessary.
- A water trap without a non-return value should be 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. In the event of heavier fouling, you can clean them with warm water mixed with dishwashing detergent that does not corrode aluminium.

NB: When using warm water to rinse the cooling coil for direct expansion, the cooling system must be drained (performed by cooling engineer). If this is not done, there is a major risk of explosion.

Clean the drip tray and drain if required.

Cooling/heating fitting (code MIE-CL)



The cooling/heating fitting consists of assembly rails and a housing front section for integration into the standard module (code EMM).

The fitting is designed for:

- air heater water (code ELEV)
- air cooler water (code ELBC)
- heat recovery coil, supply air (code EDXT)
- heat recovery coil, extract air (EDXF)
- The steel pipe connections have an outside thread connection and are fitted with outlets for bleeding and draining. ELEV also has an outlet for an immersion detector (frost protection).
- ELBC and EDXF have stainless drip trays with Ø32 mm drainage connection. Droplet eliminator is required at air speed > 2.8 m/s.
- Max. operating pressure: ELEV, ELBC, EDXT, EDXF 1.6 MPa (16 atm)
- Max. operating temperature: ELEV, EDXT, EDXF 100 °C

For output variant, water volume and other technical data, see the product selection program IV Product Designer and the order document Technical data under order-unique documentation at <u>docs.ivprodukt.com</u>.

Accessories

- Air valve (code MIET-CL-01)
- Drain valve (code MIET-CL-02)
- T-pipe for frost protection and bleeding/draining (code MIET-CL-03)
- Water trap (code MIET-CL-04)
- Lid for external pipe connections (code MIET-CL-05-a)



Operation and maintenance instructions

The coil consists of a number of copper tubes with pressed aluminium fins. 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.

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.

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. In the event of severe contamination, clean with a mild, alkaline detergent.

Bleeding

If necessary, bleed coil and pipework. Bleeder screws are on top of the coil or on the tube connections.

Check function

Check that the water circulation is working. This can be done by temporarily reducing the temperature setting (setpoint).

Inspection air heater, water heating

- Check the coil fins to detect possible mechanical deformity.
- Check that the coil is not leaking.

Inspection air cooler. waterborne cooling

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



Humidifier fitting (code MIE-EF)



The configuration is chosen together with an evaporative humidifier (code EFEF) with cold humidifier surfaces that can also be used for evaporative cooling. The fitting consists of a humidifier block, water reservoir, water distribution system and housing front section for integration into the standard module (code EMM).

- The water reservoir is made from stainless steel. Spraybars and pipe parts are made from PVC plastic.
- The humidifier is made from a specially impregnated composite material.
- Two humidifier configurations are available: circulating water or direct water. A droplet eliminator is also available.
- The humidifier is available withtwo different humidification rates: max 85% (FA5-85, FA6-85) or max 95% (FA6-95).
- A pump is included as standard for humidifiers using circulating water.

Accessories for fitting

- Damper motor installed (code KJST-04) (size 150-980)
- Water trap (code MIET-CL-04)
- Solenoid valve (code MIET-EF-01)

Configuration humidifier





Circulating water

Direct water

Water consumption

Direct water (size 060-980)

Total water consumption (T) (I/min) in direct water:

	Configuration		
Size	FA5	FA6-85/95	
060	2.0	-	
100	2.8	-	
150	-	6.3	
190	-	8.0	
240	-	8.5	
300, 360	-	10.0	
400, 480, 600	-	12.0	
740	-	15.0	
750	-	12.0	
850	-	15.0	
950	-	12.0	
980	-	18.0	

Circulating water (size 150-980)

The total water consumption is determined by the amount of evaporated and bled-off water respectively. To calculate the water consumption, see <u>Munters FA6</u> <u>Technical manual</u> at <u>docs.ivprodukt.com</u>.



Electrical data circulation pump (size 150-980)

Enclosure class IP54.

Size	Configu- ration	Voltage 3-phase (V)	Output (W)	Rated current ∆ / Y (A)
150	FA6-85 FA6-95	∆230/Y400	49	0.26/0.15
190, 240, 300, 360,	FA6-85	∆230/Y400	49	0.26/0.15
400, 480, 600, 750	FA6-95	∆230/Y400	75	0.38/0.22
740, 850	FA6-85	∆230/Y400	75	0.38/0.22
740, 050	FA6-95	∆230/Y400	140	0.71/0.41
950	FA6-85 FA6-95	∆230/Y400	75	0.38/0.22
980	FA6-85	∆230/Y400	75	0.38/0.22
900	FA6-95	∆230/Y400	140	0.71/0.41

Operation and maintenance instructions

The purpose of the air humidifier is to add moisture to an air flow. One operation case is to add moisture to the supply air, another is to add moisture to the extract air in order to reduce the air temperature before the air passes through e.g. a rotary heat exchanger (evaporative cooling).

Faulty function leads to a lower humidification rate.

If the humidifier is to be out of service for a longer period of time, the humidifier blocks must be removed, cleaned and stored in a suitable space.

Size 060-100

Check:

- 1. that the humidifier surface is equally damp on both sides; if not, clean the sprayer above the humidifier cartridge
- 2. that the humidifier cartridges are clean; if not, clean them
- 3. the drainage and water trap function.

Cleaning

Stop the water supply and leave the fans running for approximately 30 minutes so that the humidifier dries. The humidifier cartridges are relatively fragile when wet and should be handled with care.

To clean the humidifier cartridges and spraybar:

- 1. detach the coupling (pos. 1) and pull out the modules (pos. 2)
- 2. undo the clamp (pos. 3) and lift up the sprayplate (pos. 4)
- 3. take the spraybar out from the sprayplate and remove the cleaning hole plugs (pos. 5)
- 4. clean the holes in the spraybar (pos. 6) and rinse the bar and cartridges clean.



Size 150-980

For instructions on the humidifier, see <u>Munters FA6</u>, <u>operation and maintenance</u> at <u>docs.ivprodukt</u>. <u>com</u>.



Electric air heater fitting (code MIE-EL)



MIE-EL coil fitting is designed for electric air heater (code ELEE). The fitting consists of assembly rails, inspection doors and a housing front section for integration into the standard module (code EMM).

The electric air heater (code ELEE) is an electric heater in a high-temperature design.

- The heating rods consist of stainless pipe elements
 SS 2337 / AISI 321.
- The heater has double over-temperature guards that cut the power if there is a risk of overheating. One of the guards is reset manually.
- Protection IP43 in accordance with SS-EN 60529.
- There are up to five output variants per size available as standard. Other outputs may, however, be supplied to specification.
- Also available with integrated control equipment (HS) for power control in sizes 060-1080 and 1250-1540.

Fuse

For recommended external fuse, please refer to the product selection program IV Product Designer and the order document Technical data under order-unique documentation at <u>docs.ivprodukt.com</u>.



Electrical data

Power variant	Min. air flow (m ³ /s)	Total output (kW)	Rated cur- rent (A) at 3×230V~50Hz	Rated cur- rent (A) at 3×400V~50Hz
01	0.2	2.0	5.0	2.9
02	0.2	3.4	8.5	4.9
03	0.2	6.0	15.1	8.7
04	0.2	10.0	25.1	14.4
05	0.2	15.0	37.7	21.7

Power stage HT (without control system)

Power	Power step (kW)			
variant	1	2	3	4
01	2	-	-	-
02	3.4	-	-	-
03	6	-	-	-
04	10	-	-	-
05	15	-	-	_

Size 100

Electrical data

Power variant	Min. air flow (m ³ /s)	Total output (kW)	Rated cur- rent (A) at 3×230V~50Hz	Rated cur- rent (A) at 3×400V~50Hz
01	0.33	3.0	7.5	4.3
02	0.33	5.0	12.6	7.2
03	0.33	8.0	20.1	11.5
04	0.33	13.0	32.6	18.7
05	0.33	23.0	57.7	33.2

Power stage HT (without control system)

Power	Power step (kW)			
variant	1	2	3	4
01	3	_	_	_
02	5	-	-	-
03	8	-	-	-
04	13	-	-	-
05	23	-	-	-

Size 150

Electrical data

Power vari- ant	Min. air flow (m³/s)	Total output (kW)	Rated cur- rent (A) at 3×230V~50Hz	Rated current (A) at 3×400V~50Hz
01	0.50	4.0	10.0	5.8
02	0.50	7.5	18.8	10.88
03	0.50	12.0	30.1	17.38
04	0.50	21.0	52.7	30.38
05	0.50	36.0	90.4	52.0

Power stage HT (without control system)

Power	Power step (kW)			
variant	1	2	3	4
01	4	-	-	-
02	7.5	-	-	-
03	12	-	-	-
04	21	-	-	-
05	2.4	4.8	9.6	19.2

Size 190

Electrical data

Power variant	Min. air flow (m³/s)	Total output (kW)	Rated cur- rent (A) at 3×230V~50Hz	Rated cur- rent (A) at 3×400V~50Hz
01	0.63	6.0	15.1	8.7
02	0.63	11.0	27.6	15.9
03	0.63	17.0	42.7	24.5
04	0.63	30.0	75.3	43.3
05	0.63	54.0	135.6	77.9

Power stage HT (without control system)

Devuer				
Power variant	1	2	3	4
01	6	-	-	-
02	11	-	-	-
03	17	-	-	-
04	2.0	4.0	8.0	16.0
05	3.6	7.2	14.4	28.8 2×14.4*

*Applicable to 230V



Electrical data

Power vari- ant	Min. air flow (m³/s)	Total output (kW)	Rated cur- rent (A) at 3×230V~50Hz	Rated cur- rent (A) at 3×400V~50Hz
01	0.80	7.0	17.6	10.1
02	0.80	13.0	32.6	18.8
03	0.80	24.0	60.2	34.6
04	0.80	40.0	100.4	57.7
05	0.80	60.0	150.6	86.6

Power stage HT (without control system)

Power	Power step (kW)			
variant	1	2	3	4
01	7	-	-	-
02	13	-	-	-
03	24	-	-	-
04	2.7	5.3	10.7	21.3
05	4.0	8.0	16.0	32.0 2×16.0*

*Applicable to 230V

Size 300

Electrical data

Power variant	Min. air flow (m ³ /s)	Total output (kW)	Rated cur- rent (A) at 3×230V~50Hz	Rated cur- rent (A) at 3×400V~50Hz
01	1.0	8.0	20.1	11.5
02	1.0	15.0	37.7	21.7
03	1.0	27.0	67.8	39.0
04	1.0	45.0	113.0	65.0
05	1.0	75.0	188.3	108.3

Power stage HT (without control system)

Power		Power s	tep (kW)	
variant	1	2	3	4
01	8	-	-	-
02	15	-	-	-
03	1.8	3.6	7.2	14.4
04	3.0	6.0	12.0	24.0
05	5.0	10.0	20.0	40.0 2×20.0*

*Applicable to 230V

Size 360

Electrical data

Power variant	Min. air flow (m³/s)	Total output (kW)	Rated cur- rent (A) at 3×230V~50Hz	Rated cur- rent (A) at 3×400V~50Hz
01	1.2	10.0	25.1	14.4
02	1.2	15.0	37.7	21.7
03	1.2	27.0	67.8	39.0
04	1.2	54.0	135.6	77.9
05	1.2	90.0	225.9	129.9

Power stage HT (without control system)

Power		Power step (kW)			
variant	1	2	3	4	
01	10	-	-	-	
02	15	-	-	-	
03	1.8	3.6	7.2	14.4	
04	3.6	7.2	14.4	28.8 2×14.4*	
05	6.0	12.0	24.0	2×24.0	

*Applicable to 230V

Size 480

Electrical data

Power variant	Min. air flow (m³/s)	Total output (kW)	Rated cur- rent (A) at 3×230V~50Hz	Rated cur- rent (A) at 3×400V~50Hz
01	1.6	13.0	32.6	18.8
02	1.6	24.0	60.2	34.6
03	1.6	40.0	100.4	57.7
04	1.6	70.0	175.7	101.0
05	1.6	120.0	301.2	173.2

Power stage HT (without control system)

Power	Power step (kW)					
variant	1	2	3	4		
01	13	-	-	-		
02	24	-	-	-		
03	2.7	5.3	10.7	21.3		
04	4.7	9.3	18.7	37.3 2×18.7*		
05	8.0	16.0	32.0 2×16.0*	2×32.0 4×16.0*		

*Applicable to 230V



Electrical data

Power variant	Min. air flow (m ³ /s)	Total output (kW)	Rated cur- rent (A) at 3×230V~50Hz	Rated cur- rent (A) at 3×400V~50Hz
01	2.0	15.0	37.7	21.7
02	2.0	27.0	67.8	39.0
03	2.0	45.0	113.0	65.0
04	2.0	81.0	203.3	116.9
05	2.0	145.0	364.0	209.3

Power stage HT (without control system)

Power	Power step (kW)				
variant	1	2	3	4	
01	15.0	-	-	-	
02	1.8	3.6	7.2	14.4	
03	3.0	6.0	12.0	24.0	
04	5.4	10.8	21.6	2×21.6	
05	9.7	19.3	38.7 2×19.3*	2×38.7 4×19.3*	

*Applicable to 230V

Size 740

Electrical data

Power variant	Min. air flow (m³/s)	Total output (kW)	Rated cur- rent (A) at 3×230V~50Hz	Rated cur- rent (A) at 3×400V~50Hz
01	3.26	20.0	50.2	28.9
02	3.26	34.0	85.3	49.1
03	3.26	54.0	135.6	77.9
04	3.26	103.0	258.6	148.7
05	3.26	180.0	451.8	259.8

Power stage HT (without control system)

Power	Power step (kW)				
variant	1	2	3	4	
01	20	-	-	-	
02	2.3	4.5	9.1	18.1	
03	3.6	7.2	14.4	28.8 2×14.4*	
04	6.9	13.7	27.5 2×13.7*	2×27.5 4×13.7*	
05	12.0	24.0	2×24.0	4×24.0	

*Applicable to 230V

Size 750

Electrical data

Power variant	Min. air flow (m³/s)	Total output (kW)	Rated cur- rent (A) at 3×230V~50Hz	Rated cur- rent (A) at 3×400V~50Hz
01	2.87	18.0	45.2	26.0
02	2.87	27.0	67.8	39.0
03	2.87	54.0	135.6	77.9
04	2.87	90.0	225.9	129.9
05	2.87	162.0	406.7	233.8

Power stage HT (without control system)

Power	Power step (kW)				
variant	1	2	3	4	
01	18	6.4	12.8	25.6	
02	1.8	3.6	7.2	14.4	
03	3.6	7.2	14.4	28.8 2×14.4*	
04	6.0	12.0	24.0	2×24.0	
05	10.8	21.6	2×21.6	4×21.6	

*Applicable to 230V

Size 850

Electrical data

Power variant	Min.TotalRated cur-air flowoutputrent (A) at(m³/s)(kW)3×230V~50Hz		Rated cur- rent (A) at 3×400V~50Hz	
01	3.81	22.0	55.2	31.7
02	3.81	39.0	97.9	56.3
03	3.81	60.0	150.6	86.6
04	3.81	120.0	301.2	155.9
05	3.81	210.0	527.1	294.4

Power stage HT (without control system)

	Power step (kW)					
Power variant	1	2	3	4		
01	22	-	-	-		
02	2.6	5.2	10.4	20.8		
03	4.0	8.0	16.0	32.0 2×16.0*		
04	8.0	16.0	32.0 2×16.0*	2×32.0 4×16.0*		
05	14.0	28.0 2×14.0*	2×28.0 4×14.0*	4×28.0 8×14.0*		

*Applicable to 230V



Electrical data

Power variant	Min. air flow (m³/s)	Total output (kW)	Rated cur- rent (A) at 3×230V~50Hz	Rated cur- rent (A) at 3×400V~50Hz
01	3.58	22.0	55.2	31.7
02	3.58	39.0	97.9	56.3
03	3.58	60.0	150.6	86.6
04	3.58	108.0	271.1	155.9
05	3.58	204.0	512.1	294.4

Power stage HT (without control system)

Power	Power step (kW)					
variant	1	2	3	4		
01	22	-	-	-		
02	2.6	5.2	10.4	20.8		
03	4.0	8.0	16.0	32.0 2×16.0*		
04	7.2	14.4	28.8 2×14.4*	2×28.8 4×14.4*		
05	13.6	27.2 2×13.6*	2×27.2 4×13.6*	4×27.2 8×13.6*		

*Applicable to 230V

Size 980

Electrical data

Power variant	Min. air flow (m³/s)	Total output (kW)	Rated cur- rent (A) at 3×230V~50Hz	Rated cur- rent (A) at 3×400V~50Hz
01	4.61	27.0	67.8	39.0
02	4.61	54.0	135.6	77.9
03	4.61	81.0	203.3	116.9
04	4.61	150.0	376.5	216.5
05	4.61	226.0	564.8	326.2

Power stage HT (without control system)

Power	Power step (kW)						
variant	1	2	3	4			
01	1.8	3.6	7.2	14.4			
02	3.6	7.2	14.4	28.8 2×14.4*			
03	5.4	10.8	21.6	2×21.6			
04	10.0	20.0	40.0 2×20.0*	2×40.0 4×20.0*			
05	15.0	30.0 2×15.0*	2x30.0 4×15.0*	4×30.0 8×15.0*			

*Applicable to 230V

Size 1080

Electrical data

Power variant	Min. air flow (m³/s)	Total output (kW)	Rated cur- rent (A) at 3×230V~50Hz	Rated cur- rent (A) at 3×400V~50Hz
01	4,97	54,0	135,6	77,9
02	4,97	81,0	203,3	116,9
03	4,97	135,0	338,9	194,9
04	4,97	189,0	474,4	272,8
05	4,97	243,0	610,0	350,7

Size 1150

Electrical data

Power variant	Min. air flow (m³/s)	Total output (kW)	Rated current (A) at 3×400V~50Hz
01	4.5	72	104
02	4.5	130	188
03	4.5	187	270
04*	4.5	245	354

* Not available in variant HS

Power s	stage	HΤ	(without	control	system)
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Power	Power step (kW)					
variant	1	2	3	4		
01	4.8	9.6	16.2	38.4		
02	8.7	17.3	34.7	2 × 34.7		
03	12.5	25.0	2 × 25.0	4 × 25.0		
04	16.3	32.7	2 × 32.7	4 × 32.7		



Electrical data

Power variant	Min. air flow (m³/s)	Total output (kW) (no. of steps × output)	Rated current (A) at 3×400V~50Hz
01	4.8	72 (3 × 24)	104
02	4.8	136 (5 × 27)	196
03	4.8	192 (8 × 24)	276
04	4.8	256 (16 × 16)	369

Power stage HT (without control system)

Power	Min. air flow	Total				
variant	(m ³ /s)	output (kW)	1	2	3	4
01	4.8	68	4.5	9.1	18	36
02	4.8	136	9.1	18	36	2 × 36
03	4.8	180	12	24	2	4 × 24
04	4.8	240	16	32	2 × 32	4 × 32

Size 1540

Electrical data

Power variant	Min. air flow (m³/s)	Total output (kW) (no. of steps × output)	Rated current (A) at 3×400V~50Hz
01	6.0	90 (4 × 22.6)	130
02	6.0	160 (8 × 20.0)	230
03	6.0	211 (8 × 26.4)	304
04	6.0	320 (16 × 20.0)	461

Power stage HT (without control system)

Power	Min. air flow	Total		Power s	tep (kW)	
variant	(m ³ /s)	output (kW)	1	2	3	4
01	6.0	85	6.1	11.3	23	2 × 23
02	6.0	170	11.3	23	2 × 23	4 × 23
03	6.0	255	17	34	2 × 34	4 × 34
04	6.0	340	23	2 × 23	4 × 23	8 × 23

Size 1280

Electrical data

Power variant	Min. air flow (m³/s)	Total output (kW)	Rated cur- rent (A) at 3×230V~50Hz	Rated cur- rent (A) at 3×400V~50Hz
01	5,69	54,0	135,6	77,9
02	5,69	81,0	203,3	116,9
03	5,69	135,0	338,9	194,9
04	5,69	189,0	474,4	272,8
05	5,69	243,0	610,0	350,7

Size 1550

Electrical data

Power variant	Min. air flow (m³/s)	Total output (kW)	Rated current (A) at 3×400V~50Hz
01	5.9	96	139
02	5.9	173	250
03	5.9	250	361
04*	5.9	323	466

* Not available in variant HS

Power stage HT (without control system)

Power	Power step (kW)						
variant	1	2	3	4			
01	6.4	12.8	25.6	2 × 25.6			
02	11.5	23.0	2 × 23.0	4 × 23.0			
03	16.7	33.3	2 × 33.3	4 × 33.3			
04	21.5	43.0	2 × 43.0	4 × 43.0			



Electrical data

Power variant	Min. air flow (m³/s)	Total output (kW)	Rated current (A) at 3×400V~50Hz
01	7.7	132	191
02	7.7	238	344
03	7.7	343	495
04*	7.7	450	650

* Not available in variant HS

Power stage HT (without control system)

Power	Power step (kW)						
variant	1	2	3	4			
01	8.8	17.6	35.2	2 × 35.2			
02	15.9	31.7	2 × 31.7	4 × 31.7			
03	22.8	2 × 22.8	4 × 22.8	8 × 22.8			
04	30.0	2 × 30.0	4 × 30.0	8 × 30.0			



Wiring instructions

Electric heater HS (with integrated control)



*** 24V connection on certain models

Electric heater HT (without control)

Ø 1 Ø 2	Overheat protection with automatic reset.
Ø 3 Ø 4	Overheat protection with manual reset.
Ø 5 Ø 6 Ø 7	Connecting the first step (1) 3×400 V
Ø Ø Ø	Connecting the second step (2) 3×400 V
Ø Ø Ø	Connecting the third step (3) 3×400 V
Ø Ø Ø	Connecting the fourth step (4) 3×400 V

Power steps are connected continuously, starting with terminal no. 5.

Operation and maintenance

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.



Filter fitting (code MIE-FB/FC)



The filter fitting consists of securing rails for filters and a housing front section.

The fitting is adapted for integration into the standard module (code EMM).

The configuration is available in two variants:

- FB for deep-pleated bag filters, carbon filters or knitted aluminium filters.
- FC for panel filter.

For both versions:

- The filters are mounted on rails and can easily be removed and replaced.
- Filter slide rails are available in acid-proof, stainless steel.
- The filter slide rails are equipped with effective sealing strips.
- The model FB filter inserts are locked with eccentric rails.
- Measurement outlets are available for connecting differential pressure gauges.

For filter data, see Filter overview under Documentation at <u>ivprodukt.docfactory.com</u>. For relevant filters, see orderunique documentation at <u>docs.ivprodukt.com</u> (Technical data and spare parts).

Filter section accessories

- Filter monitor, U-tube manometer (code MIET-FB-01)
- Filter monitor, Kytölä manometer (code MIET-FB-02)
- Filter monitor, Magnehelic manometer (code MIET-FB-03)

Operation and maintenance instructions

The air filters in a ventilation system are designed to prevent dust and other impurities from entering the building. They should also protect sensitive components inside the unit, e.g. coils and heat recovery units, 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 replace them.

According to guidelines for hygienic design VDI 6022 Part 1: The supply air filter must be class ePM1-50% (F7) or have a higher filtration capacity.

The filter is designed for one-time use. If the filter becomes fouled, the unit will lose capacity. The filter should therefore be changed if the pressure drop across it exceeds the specified value.

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 section should therefore also be cleaned when the filter is changed.

Inspection

Check the pressure drop across the filter. The pressure drop is measured with a manometer connected to measurement outlets. The measurement outlets are connected to each side of the filter. If the filter has reached its specified final pressure drop, it must be changed.



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 start and shut down the unit by means of the control equipment.

- 2. If there is a fixed filter monitor; loosen the necessary measuring hoses for the cover/post in order to open the inspection hatch.
- 3. Wait until the fans have stopped, then open the inspection hatch.



WARNING! Positive pressure inside the unit, risk

of personal injury. Allow the pressure to drop before you open the inspection doors.

4. Release the eccentric rails.



Eccentric rails

- 5. Remove the old filter by pulling it towards you.
- 6. Clean the filter cabinets.
- 7. Install the new filter, press in the eccentric rails to engage them and close the inspection hatch.
- 8. If there is a fixed filter monitor, replace the measuring hoses to the measuring outlets on the cover/post.
- 9. Start the unit.

Cleaning

Vacuum and use a damp cloth to wipe clean the inside of the filter section. The aluminium filter can be cleaned using hot water and a mild alkaline detergent. The carbon filters are designed for one-time use and are combustible in their entirety.



Filter fitting (code MIE-FB)



The filter fitting consists of securing rails for filters and a housing front section. The fitting is adapted for integration into the standard module (code EMM).

The filter fitting can be equipped with deep-pleated bag filters, carbon filters or knitted aluminium filters.

The following is applicable to fittings:

- The filters are mounted on rails and can easily be removed and replaced.
- Filter slide rails are available in acid-proof, stainless steel.
- The filter slide rails are equipped with effective sealing strips.
- The filter inserts are locked with eccentric rails.
- Measurement outlets are available for connecting differential pressure gauges (filter monitors).

For filter data, see Filter overview under Documentation at <u>ivprodukt.docfactory.com</u>. For relevant filters, see orderunique documentation at <u>docs.ivprodukt.com</u> (Technical data and parts).

Filter section accessories

- Filter monitor, U-tube manometer (code MIET-FB-01)
- Filter monitor, Kytölä manometer (code MIET-FB-02)
- Filter monitor, Magnehelic manometer (code MIET-FB-03)

Operation and maintenance

The air filters in a ventilation system are designed to prevent dust and other impurities from entering the building. They should also protect sensitive components inside the unit, e.g. coils and heat recovery units, 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 replace them.

According to guidelines for hygienic design VDI 6022 Part 1: The supply air filter must be class ePM1-50% (F7) or have a higher filtration capacity.

The filter is designed for one-time use. If the filter becomes fouled, the unit will lose capacity. The filter should therefore be changed if the pressure drop across it exceeds the specified value.

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 section should therefore also be cleaned when the filter is changed.

Inspection

Check the pressure drop across the filter. The pressure drop is measured with a manometer connected to measurement outlets. The measurement outlets are connected to each side of the filter. If the filter has reached its specified final pressure drop, it must be changed.



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 start and shut down the unit by means of the control equipment.

- 2. If there is a fixed filter monitor; loosen the necessary measuring hoses for the cover/post in order to open the inspection hatch.
- 3. Wait until the fans have stopped, then open the inspection hatch.



WARNING!

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

4. Release the eccentric rails.



Eccentric rails

- 5. Remove the old filter by pulling it towards you.
- 6. Clean the filter cabinets.
- 7. Install the new filter, press in the eccentric rails to engage them and close the inspection hatch.
- 8. If there is a fixed filter monitor, replace the measuring hoses to the measuring outlets on the cover/post.
- 9. Start the unit.

Cleaning

Vacuum and use a damp cloth to wipe clean the inside of the filter section. The aluminium filter can be cleaned using hot water and a mild alkaline detergent. The carbon filters are designed for one-time use and are combustible in their entirety.

Inlet fitting (code MIE-ID)



The MIE-ID fitting is designed to be used for inlets of outdoor air or extract air. The fitting consists of dampers, assembly rails for filter cassettes, connection gable and a housing front section for integration into the standard module (code EMM).

MIE-ID equipped with deep-pleated bag filters, carbon filters or knitted aluminium filters.

- The damper is manufactured from aluminium profiles and complies with the requirements for corrosion class C4 in accordance with SS-EN ISO 12944-2.
- The damper blades are powered by plastic cogwheels and a hose gasket made of silicon rubber creates a seal between the blades.
- Tightness class 3 in accordance with SS-EN1751 (VVS AMA-98).
- Permitted temperature: -40 to +80°C. Permitted differential pressure: max. 1.400 Pa
- The filters are mounted on rails and can easily be removed and replaced.
- Filter slide rails are available in acid-proof, stainless steel.
- The filter slide rails are equipped with effective sealing strips.
- The model FB filter inserts are locked with eccentric rails.
- Measurement outlets are available for connecting differential pressure gauges.
- The inlet is fitted as standard with a connection gable.

Accessories for fitting

- Damper motor installed (code KJST-04) (size 060-980)
- Manual control (code KJST-03) (Size 1080-3150)
- Set of filters (code ELEF)

Filter section accessories

- Filter monitor, U-tube manometer (code MIET-FB-01)
- Filter monitor, Kytölä manometer (code MIET-FB-02)
- Filter monitor, Magnehelic manometer (code MIET-FB-03)

Damper

For damper data, see Damper overview under Documentation at <u>ivprodukt.docfactory.com</u>.

Filter

For filter data, see Filter overview under Documentation at <u>ivprodukt.docfactory.com</u>. For relevant filters, see orderunique documentation at <u>docs.ivprodukt.com</u> (Technical data and spare parts).



Damper, Operation and Maintenance Instructions

The function of the dampers is to control, block and divert the air.

Faulty function gives rise to disturbances that may result in serious problems. For example, if the outdoor air damper does not close completely when the unit stops, the air heating coil is likely to freeze.

If the damper is leaking, this results in increased energy consumption because of leaks caused by thermal buoyancy forces.

If the exhaust gas damper is leaking, the ventilation effect is impaired and the air is heated for no benefit.

If the outdoor air damper does not open fully, the air flow is reduced.

Inspection

- 1. Check function of the actuator.
- 2. Check the dampers for tightness when they are closed. If they are not sealed, adjust the damper actuator to make the damper tight.
- 3. Check the sealing strips.

Cleaning

Clean the damper blades with a cloth. In the event of stubborn dirt, use a mild, alkaline detergent.

Filter, Operation and Maintenance Instructions

The air filters in a ventilation system are designed to prevent dust and other impurities from entering the building. They should also protect sensitive components inside the unit, e.g. coils and heat recovery units, 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 replace them.

According to guidelines for hygienic design VDI 6022 Part 1: The supply air filter must be class ePM1-50% (F7) or have a higher filtration capacity.

The filter is designed for one-time use. If the filter becomes fouled, the unit will lose capacity. The filter should therefore be changed if the pressure drop across it exceeds the specified value.

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 section should therefore also be cleaned when the filter is changed.

Inspection

Check the pressure drop across the filter. The pressure drop is measured with a manometer connected to measurement outlets. The measurement outlets are connected to each side of the filter. If the filter has reached its specified final pressure drop, it must be changed.



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 start and shut down the unit by means of the control equipment.

- 2. If there is a fixed filter monitor; loosen the necessary measuring hoses for the cover/post in order to open the inspection hatch.
- 3. Wait until the fans have stopped, then open the inspection hatch.

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

4. Release the eccentric rails.



Eccentric rails

- 5. Remove the old filter by pulling it towards you.
- 6. Clean the filter cabinets.
- 7. Install the new filter, press in the eccentric rails to engage them and close the inspection hatch.
- 8. If there is a fixed filter monitor, replace the measuring hoses to the measuring outlets on the cover/post.
- 9. Start the unit.

Cleaning

Vacuum and use a damp cloth to wipe clean the inside of the filter section.



Outdoor intake fitting (code MIE-IU)

configuration with damper



Inlet fitting MIE IU comprises an inspection section provided with intake louvres and drainage.

It is designed primarily for outdoor air intake when set up outdoors. The fitting is designed for integration into the standard module (code EMM).

- The louvre can be removed from the outside.
- Drainage connection ø15 mm.

Two different versions of the exhaust hood are available:

- without damper (code -0)
- with damper (code -1).

The following is applicable to the version with a damper:

- The dampers are manufactured from aluminium profiles and comply with the requirements for corrosion class C4 in accordance with SS-EN ISO 12944-2.
- The damper blades are powered by plastic cogwheels and a hose gasket made of silicon rubber creates a seal between the blades.
- Tightness class 3 in accordance with SS-EN1751 (VVS AMA-98).
- Permitted temperature: -40 to +80°C. Permitted differential pressure: max. 1.400 Pa

Damper

For damper data, see Damper overview under Documentation at <u>ivprodukt.docfactory.com</u>.

Operation and maintenance instructions

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 damper tight.
- 3. Check the sealing strips.
- 4. Check the function of the drainage.

Cleaning

Clean the damper blades with a cloth. In the event of stubborn dirt, use a mild, alkaline detergent.



Sound attenuator fitting (code MIE-KL)



The MIE-KL fitting consists of pointed baffle elements. The fitting is designed for integration into the standard module (code EMM).

- The sound attenuators are 200 mm thick baffle elements.
- The baffle material, which is mineral wool, is clad on the outside with washable fabric. The material is type-approved for internal cladding of ventilation ducts.
- In configuration UB (extendible), the baffles are mounted on rails and can easily be pulled out for cleaning.
- In configuration EB (non-extendible), the baffled are permanently mounted.
- Permitted temperature: 50°C max.
- To minimise the pressure drop, the baffles are pointed.
- Sound attenuators are available in five different module lengths, depending on the damping performance required.

Integral attenuation (dB)

Configu	Mod- ule		Oct	ave ban	d interme	ediate fre	quency	(Hz)	
Configu- ration	length	63	125	250	500	1000	2000	4000	8000
	20	5	7	12	23	38	30	27	13
	25	5	8	15	26	39	32	28	14
UB	30	6	10	18	30	41	35	30	16
UB	40	7	11	20	32	43	37	31	17
	50	8	12	25	38	46	41	35	21
	60	10	16	30	44	49	44	38	24
	20	5	7	12	23	38	30	27	13
	25	5	8	15	26	39	32	28	14
EB	30	6	10	18	30	41	35	30	16
ED	40	8	13	23	36	45	39	33	20
	50	9	15	28	42	48	43	37	23
	60	10	19	33	47	50	46	40	26

Operation and maintenance

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

Inspection

Check that the baffle elements are intact and have clean surfaces; if not, they must be repaired and cleaned.

Cleaning

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



Sound attenuator fitting (code MIE-KL)



The MIE-KL fitting consists of pointed baffle elements and sliding rails. The fitting is designed for integration into the standard module (code EMM).

- The sound attenuators are 200 mm thick baffle elements.
- The baffle material, which is mineral wool, is clad on the outside with washable fabric. The material is type-approved for internal cladding of ventilation ducts.
- The baffles are mounted on rails and can easily be pulled out for cleaning.
- Permitted temperature: 50°C max.
- To minimise the pressure drop, the baffles are pointed.
- Sound attenuators are available in four different module lengths, depending on the damping required.

Integral attenuation (dB)

Module	Octave band intermediate frequency (Hz)								
length	63	125	250	500	1000	2000	4000	8000	
40	6	9	15	27	40	33	28	14	
60	7	10	19	31	42	36	31	17	
70	7	12	23	35	44	39	33	19	
80	8	14	26	39	46	41	35	22	

Operation and maintenance

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

Inspection

Check that the baffle elements are intact and have clean surfaces; if not, they must be repaired and cleaned.

Cleaning

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



Inspection fitting (code MIE-KM)



The configuration consists of a housing front section in the form of an inspection hatch. An air distributor can be installed as an accessory. The fitting is designed for integration into the standard module (code EMM).

Operation and maintenance

Vacuum and/or wipe all surfaces with a damp cloth.

Damper fitting (code MIE-KS)



The MIE-KS fitting is intended for use as a regulating slide valve or shut-off damper. The fitting consists of a damper and housing front section for integration into the standard module (code EMM).

- The multiple-leaf damper is manufactured from aluminium profiles and complies with the requirements for corrosion class C4 in accordance with SS-EN ISO 12944-2.
- The damper blades are powered by plastic cogwheels and a hose gasket made of silicon rubber creates a seal between the blades.
- Permitted pressure: -40 to +80 °C
 Permitted differential pressure: max. 1400 Pa
- Tightness class 3 in accordance with SS-EN1751 (VVS AMA-98).

Accessories

- Manual control (KJST-03)
- Damper motor installed (code KJST-04) (size 060-980)

Damper

For damper data, see Damper overview under Documentation at <u>ivprodukt.docfactory.com</u>.

Operation and maintenance

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 damper tight.
- 3. Check the sealing strips.

Cleaning

Clean the damper blades with a cloth. In the event of stubborn dirt, use a mild, alkaline detergent.



Media section fitting (code MIE-MD)



The fitting consists of a shielded compartment for electrical and control equipment with a door that opens. The fitting is adapted for integration into the standard module (code EMM).

For size-dependent technical data, see the product selection program IV Product Designer and the order document Technical data under order-unique documentation at <u>docs.ivprodukt.com</u>.

Operation and maintenance

Vacuum and/or wipe all surfaces with a damp cloth.



Empty section fitting (code MIE-TD)



The fitting can be used special functions (e.g. steam spear) or for filling. The fitting consists of a fixed housing front section and is intended for integration into the standard module (code EMM).

For size-dependent technical data see the product selection program IV Product Designer and the order document Technical data under order-unique documentation at <u>docs.ivprodukt.com</u>.

Accessories

• Drip tray (code MIET-TD-01-a)

Operation and maintenance

Vacuum and/or wipe all surfaces with a damp cloth.



Direct driven fan (code ELFF)



This picture shows an example of direct driven fan ELFF (motor type EC01)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-025Z-EC01-0050-1-x-x (0.5 kW)
- ELFF-025Z-EC01-0078-1-x-x (0.78 kW)

Technical data

- Motor type EC01 = EC motor with built-in electronic speed control.
- Fan impeller 025Z = ZIEHL-ABEGG diameter 250 mm, K-factor = 60.0
- Supply = $1 \times 230 V \sim 50 Hz$
- Output below refers to infed electrical power

Output (kW)	Rated current (A)
0.5	2.18
0.78	3.39





Fan impeller ELFF-025Z-EC01-0050-1-x-x (0.5 kW) K-factor 60.0



Fan impeller ELFF-025Z-EC01-0078-1-x-x (0.78 kW) K-factor 60.0





Operation and maintenance instructions

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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



Inspection

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

Cleaning

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.

Direct driven fan (code ELFF)



This picture shows an example of direct driven fan ELFF (motor type ECx1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-025Z-ECx1-0050-2-F-x (0.5 kW)
- ELFF-025Z-ECx1-0078-2-F-x (0.78 kW)

Technical data

- Motor type EC01 = EC motor with built-in electronic speed control.
- Fan impeller 025Z = ZIEHL-ABEGG diameter 250 mm, K-factor = 53.73
- Supply = $1 \times 230 V \sim 50 Hz$
- Output below refers to infed electrical power

Output (kW)	Rated current (A)
0.5	2.5
0.78	4.0





Fan impeller

ELFF-025Z-ECx1-0050-2-F-x (0.5 kW) (II)

ELFF-025Z-ECx1-0078-2-F-x (0.78 kW) (I)

K-factor 53.73





Operation and maintenance instructions

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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



Inspection

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

Cleaning

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.

Direct driven fan (code ELFF)



This picture shows an example of direct driven fan ELFF (motor type I3S1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-025Z-I3S1-0037-1-F-x (0.37 kW)
- ELFF-025Z-I3S1-0055-1-F-x (0.55 kW)

Technical data

- Motor type I3S1 = motor in accordance with efficiency class IE3 for connection to external frequency inverter. The motors are fitted with a thermistor.
- Fan impeller 025C = ZIEHL-ABEGG diameter 250 mm, K-factor = 60.0
- Output below refers to shaft output

Output (kW)	Rated current (A) at power supply (voltage)	
	3×230V~ 50Hz	3×400V~ 50Hz
0.37	1.74	1.00
0.55	2.43	1.40

Wiring instructions

3×230V fan impeller 025-071, D-coupling (triangular coupling)



3×400V fan impeller 025-071, Y-coupling (star coupling)




Fan impeller 025C

K-factor 60.0





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.





This picture shows an example of direct driven fan ELFF (motor type EC01)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-028E-EC01-0075-2-F-x (0.75 kW)
- ELFF-028E-EC01-0105-2-F-x (1.05 kW)

Technical data

- Motor type EC01 = EC motor with built-in electronic speed control.
- Fan impeller 028E = ebm-papst diameter 280 mm, K-factor = 46.75
- Output below refers to infed electrical power

Output (kW)	Rated current (A)
0.75	3.3
1.05	1.6





Fan impeller ELFF-028E-EC01-0075-2-F-x (0.75 kW) K-factor 46.75



	n rpm	P _{ed} kW	I A	L _W A dB(A)
0	3260	0,64	2,81	87
2	3115	0,73	3,18	82
3	3000	0,75	3,30	77
4	3180	0,72	3,15	82

ELFF-028E-EC01-0075-2-F-0 R3G 280-PR04-I1 0,75 kW

ebmpapst

Fan impeller ELFF-028E-EC01-0105-2-F-x (1.05 kW) K-factor 46.75



	n rpm	P _{ed} kW	I A	L _W A dB(A)
0	3400	0,74	1,17	88
2	3400	0,96	149	83
3	3400	1,05	160	80
4	3400	0,93	143	85

ELFF-028E-EC01-0105-2-F-0 R3G 280-PS10-J1 1,05 kW





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type I3S1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-028G-I3S1-0075-1-F-x (0.75 kW)
- ELFF-028G-I3S1-0110-1-F-x (1.1 kW)
- ELFF-028G-I3S1-0150-1-F-x (1.5 kW)

Technical data

- Motor type I3S1 = motor in accordance with efficiency class IE3 for connection to external frequency inverter. The motors are fitted with a thermistor.
- Fan impeller 028G = Gebhardt diameter 280 mm, K-factor = 35.3
- Output below refers to shaft output

Output	Rated current (A) at power supply (voltage)	
(kW)	3×230V~ 50Hz 3×400V~ 50Hz	
0.75	3.3	1.9
1.1	4.0	2.3
1.5	5.4	3.1

Wiring instructions

3×230V fan impeller 025-071, D-coupling (triangular coupling)



3×400V fan impeller 025-071, Y-coupling (star coupling)





Fan impeller 028G

K-factor 35.3

NICOTRA Gebhardt

RLM E6-2528





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type ECx1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

• ELFF-028Z-ECx1-0078-2-F-x (0.78 kW)

Technical data

- Motor type ECx1 = EC motor with built-in electronic speed control.
- Fan impeller 028Z = ZIEHL-ABEGG diameter 280 mm, K-factor = 42.35
- Supply = $1 \times 230 V \sim 50 Hz$
- Output below refers to infed electrical power

Output (kW)	Rated current (A)
0.78	4.0





Fan impeller

ELFF-028Z-ECx1-0078-2-F-x (0.78 kW)

K-factor 42.35





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type EC01)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

• ELFF-031E-EC01-0123-2-F-x (1.23 kW)

Technical data

- Motor type EC01 = EC motor with built-in electronic speed control.
- Fan impeller 031E = ebm-papst diameter 310 mm, K-factor = 31.03
- Supply = 3×400V~ 50Hz
- Output below refers to infed electrical power

Output (kW)	Rated current (A)
1.23	1.9





Fan impeller ELFF-031E-EC01-0123-2-F-x (1.23 kW)

K-factor 31.03



	n rpm	P _{ed} kW	I A	L _W A dB(A)
0	3010	0,67	1,06	92
2	3010	1,05	1,61	84
3	3010	1,23	1,90	78
4	3010	1,19	1,82	85

ELFF-031E-EC01-0123-2-F-0 R3G 310-PT08-J1 1,23 kW

ebmpapst



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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.





This picture shows an example of direct driven fan ELFF (motor type EC01)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-31Z-EC01-0078-1-F-x (0.78 kW)
- ELFF-31Z-EC01-0135-1-F-x (1.35 kW)

Technical data

- Motor type EC01 = EC motor with built-in electronic speed control.
- Fan impeller 031Z = ZIEHL-ABEGG diameter 310 mm, K-factor = 37.89
- Supply = $1 \times 230 V \sim 50 Hz$
- Output below refers to infed electrical power

Output (kW)	Rated current (A)
0.78	3.39
1.35	5.83





Fan impeller ELFF-031Z-EC01-0078-1-F-x (0.78 kW) K-factor 37.89



Fan impeller ELFF-031Z-EC01-0135-1-F-x (1.35 kW) K-factor 37.89





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type ECx2)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

• ELFF-31Z-ECx2-0130-2-F-x (1.30 kW)

Technical data

- Motor type ECx2 = EC motor with built-in electronic speed control.
- Fan impeller 031Z = ZIEHL-ABEGG diameter 310 mm, K-factor = 33.96
- Supply = 1×230V~ 50Hz
- Output below refers to infed electrical power

Output (kW)	Rated current (A)
1.30	6.6





Fan impeller

ELFF-031Z-ECx2-0130-2-F-x (1.30 kW)

K-factor 33.96





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.





This picture shows an example of direct driven fan ELFF (motor type EC01)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

INKOPPLING / WIRING EBM 3×400 V - P8, M3, M5



Applies to fan code

- ELFF-035E-EC01-0110-2-F-x (1.1 kW)
- ELFF-035E-EC01-0190-2-F-x (1.9 kW)

Technical data

- Motor type EC01 = EC motor with built-in electronic speed control.
- Fan impeller 035E = ebm-papst diameter 350 mm,K-factor = 24.32K-factor dual fans = 12.16
- Supply = 3×400V~ 50Hz
- Output below refers to infed electrical power

Output (kW) *	Rated current (A) *
1.1	1.7
1.9	3.0

* Double values for dual fan.

INKOPPLING DUBBELFLÄKT / WIRING DOUBLE FAN 2×EBM 3×400 V - M3, M5





Fan impeller ELFF-035E-EC01-0110-2-F-x (1.1 kW) / ELFF-035E-EC01-0190-2-F-x (1.9 kW)

K-factor 24.32

K-factor dual fans 12.16

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.



n rpm	P _{ed} kW	l A	L _W A dB(A)
2400	0,62	0,98	87
2400	0,97	1,49	78
2400	1,10	1,70	76
2400	1,07	1,65	80
2870	1,05	1,69	92
2870	1,58	2,46	85
2870	1,90	3,00	81
2870	1,89	2,92	86



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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type I3S1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-035G-I3S1-0110-1-F-x (1.1 kW)
- ELFF-035G-I3S1-0150-1-F-x (1.5 kW)
- ELFF-035G-I3S1-0220-1-F-x (2.2 kW)
- ELFF-035G-I3S1-0300-1-F-x (3.0 kW)

Technical data

- Motor type I3S1 = motor in accordance with efficiency class IE3 for connection to external frequency inverter. The motors are fitted with a thermistor.
- Fan impeller 035G = Gebhardt diameter 350 mm, K-factor = 26.31
- Output below refers to shaft output

Output	Rated current (A) at power supply (voltage)		
(kW)	3×230V~ 50Hz 3×400V~ 50Hz		
1.1	4.40	2.53	
1.5	5.70	3.30	
2.2	7.48	4.30	
3.0	9.82	5.65	

Wiring instructions

3×230V fan impeller 025-071, D-coupling (triangular coupling)



3×400V fan impeller 025-071, Y-coupling (star coupling)





Fan impeller 035G

K-factor 26.31

NICOTRA Gebhardt

RLM E6-3135





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type ECx2)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-035Z-ECx2-0135-2-F-x (1.35 kW)
- ELFF-035Z-ECx2-0250-2-F-x (2.50 kW)

Technical data

- Motor type ECx2 = EC motor with built-in electronic speed control.
- Fan impeller 035Z = ZIEHL-ABEGG diameter 350 mm, K-factor = 25.71 K-factor dual fans = 12.86
- Supply = 1×230V~ 50Hz
- Output below refers to infed electrical power

Output (kW) *	Rated current (A) *
1.35	6.8
2.50	4.0

* Double values for dual fan




Fan impeller

ELFF-035Z-ECx2-0135-2-F-x (1.35 kW) (III)

ELFF-035Z-ECx2-0250-2-F-x (2.50 kW) (II)

K-factor25.71 K-factor dual fans 12.86

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.





This picture shows an example of direct driven fan ELFF (motor type EC01)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-040E-EC01-0250-2-F-x (2.5 kW)
- ELFF-040E-EC01-0335-2-F-x (3.35 kW)

Technical data

- Motor type EC01 = EC motor with built-in electronic speed control.
- Fan impeller 040E = ebm-papst diameter 400 mm, K-factor = 19.15K-factor dual fans = 9.58
- Supply = 3×400V~ 50Hz
- Output below refers to infed electrical power

Output (kW) *	Rated current (A) *
2.5	3.8
3.35	5.2

* Double values for dual fan.

INKOPPLING / WIRING EBM 3×400 V - P8, M3, M5



INKOPPLING DUBBELFLÄKT / WIRING DOUBLE FAN 2×EBM 3×400 V - M3, M5





Fan impeller ELFF-040E-EC01-0250-2-F-x (2.5 kW)

K-factor 19.15

K-factor double factor 9.58

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.



	n rpm	P _{ed} kW	l A	L _W A dB(A)
0	2450	1,32	2,07	96
2	2450	2,21	3,38	85
3	2450	2,50	3,80	82
4	2450	2,34	3,57	86

ELFF-040E-EC01-0250-2-F-0 R3G 400-PI92-01 2,50 kW

ebmpapst

L_WA

dB(A)

100

90

85

86

Fan wheel ELFF-040E-EC01-0335-2-F-x (3.35 kW)

k-factor 19.15

K-factor double factor 9.58

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type I3S1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-040G-I3S1-0110-1-F-x (1.1 kW)
- ELFF-040G-I3S1-0150-1-F-x (1.5 kW)
- ELFF-040G-I3S1-0220-1-F-x (2.2 kW)
- ELFF-040G-I3S1-0300-1-F-x (3.0 kW)
- ELFF-040G-I3S1-0400-1-F-x (4.0 kW)

Technical data

- Motor type I3S1 = motor in accordance with efficiency class IE3 for connection to external frequency inverter. The motors are fitted with a thermistor.
- Fan impeller 040G = Gebhardt diameter 400 mm, K-factor = 21.79

Output	Rated current (A) (volta	
(kW)	3×230V~ 50Hz	3×400V~ 50Hz
1.1	4.40	2.53
1.5	5.70	3.30
2.2	8.17	4.70
3.0	10.4	6.00
4.0	13.0	7.45

• Output below refers to shaft output

Wiring instructions

3×230V fan impeller 025-071, D-coupling (triangular coupling)



3×400V fan impeller 025-071, Y-coupling (star coupling)





Fan impeller 040G

K-factor 21.79

NICOTRA Gebhardt

RLM E6-3540





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type ECx2)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

INKOPPLING FLERA FLÄKTAR / WIRING SEVERAL FANS ZIEHL 3×400 V - DC, DG, GG



Applies to fan code

- ELFF-040Z-ECx2-0250-2-F-x (2.50 kW)
- ELFF-040Z-ECx2-0370-2-F-x (3.70 kW)

Technical data

- Motor type ECx2 = EC motor with built-in electronic speed control.
- Fan impeller 040Z = ZIEHL-ABEGG diameter 400 mm, K-factor = 20.00 K-factor dual fans = 10.00
- Supply = 3×400V~ 50Hz
- Output below refers to infed electrical power

Output (kW) *	Rated current (A) *
2.50	4.0
3.70	5.8

* Double values for dual fan





Fan impeller

ELFF-040Z-ECx2-0250-2-F-x (2.50 kW) (II)

ELFF-040Z-ECx2-0370-2-F-x (3.70 kW) (I)

K-factor20.00 K-factor dual fans 10.00

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type EC01)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-045E-EC01-0174-2-F-x (1.74 kW)
- ELFF-045E-EC01-0290-2-F-x (2.9 kW)

Technical data

- Motor type EC01 = EC motor with built-in electronic speed control.
- Fan impeller 045E = ebm-papst diameter 450 mm, K-factor = 15.0K-factor dual fans = 7,0
- Supply = 3×400V~ 50Hz
- Output below refers to infed electrical power

Output (kW) *	Rated current (A) *
1.74	2.7

* Double values for dual fan.

INKOPPLING / WIRING EBM 3×400 V - P8, M3, M5



INKOPPLING DUBBELFLÄKT / WIRING DOUBLE FAN 2×EBM 3×400 V - M3, M5





Fan impeller ELFF-045E-EC01-0174-2-F-x (1.74 kW) / ELFF-045E-EC01-0290-2-F-x (2.9 kW)

K-factor 15.0

K-factor double fans 7.0

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.



	n rpm	P _{ed} kW	l A	L _W A dB(A)
0	1790	1,00	1,61	91
2	1790	1,53	2,38	82
3	1790	1,74	2,70	77
4	1790	1,66	2,57	82

ELFF-045E-EC01-0174-2-F-0 R3G 450-PI86-01 1,74 kW

ebmpapst



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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type I3S1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-045G-I3S1-0110-1-F-x (1.1 kW)
- ELFF-045G-I3S1-0150-1-F-x (1.5 kW)
- ELFF-045G-I3S1-0220-1-F-x (2.2 kW)
- ELFF-045G-I3S1-0300-1-F-x (3.0 kW)
- ELFF-045G-I3S1-0400-1-F-x (4.0 kW)

Technical data

- Motor type I3S1 = motor in accordance with efficiency class IE3 for connection to external frequency inverter. The motors are fitted with a thermistor.
- Fan impeller 045G = Gebhardt diameter 450 mm, K-factor = 18.0

Output	Rated current (A) at power su (voltage)	
(kW)	3×230V~ 50Hz	3×400V~ 50Hz
1.1	4.40	2.53
1.5	5.70	3.30
2.2	7.83	4.50
3.0	10.4	6.00
4.0	14.2	8.15

• Output below refers to shaft output

Wiring instructions

3×230V fan impeller 025-071, D-coupling (triangular coupling)



3×400V fan impeller 025-071, Y-coupling (star coupling)





Fan impeller 045G

K-factor 18.0

NICOTRA Gebhardt

RLM E6-4045





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type EC02)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

INKOPPLING FLERA FLÄKTAR / WIRING SEVERAL FANS ZIEHL 3×400 V - DC, DG, GG



Applies to fan code

- ELFF-045Z-EC02-0170-2-F-x (1,70 kW)
- ELFF-045Z-EC02-0340-2-F-x (3,40 kW)

Technical data

- Motor type EC02 = EC motor with built-in electronic speed control.
- Fan impeller 045Z = ZIEHL-ABEGG diameter 450 mm, K-factor = 16.36 K-factor dual fans = 8.18
- Supply = 3×400V~ 50Hz
- Output below refers to infed electrical power

Output (kW) *	Rated current (A) *
1,70	2,8
3,40	5,4

* Double values for dual fan







Fan impeller K-factor 16.36 K-factor dual fans 8.18

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.



ELFF-045Z-EC02-0170-2-F-x (1,70 kW)





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.





This picture shows an example of direct driven fan ELFF (motor type EC01)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a nonvibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

PE

L1

L3

RSB

NC

сом

A in 1L 0-10V

GND

RSA RSB

GND Brun/Bron RSA Vit/White

Blå/Blue

Vit/White

Brun/Brow

Grön/Green

Gul/Yellow

Art Nr 19151-0420 02

Ref.

Applies to fan code

- ELFF-050E-EC01-0345-2-F-x (3.45 kW)
- ELFF-050E-EC01-0570-2-F-x (5.7 kW)

Technical data

- Motor type EC01 = EC motor with built-in electronic speed control.
- Fan impeller 050E = ebm-papst diameter 500 mm, K-factor = 12.81K-factor dual fans 6.41
- Supply = 3×400V~ 50Hz
- Output below refers to infed electrical power

Output (kW) *	Rated current (A) *
3.45	5.3
5.7	9.0

* Double values for dual fan.

INKOPPLING / WIRING EBM 3×400 V - P8, M3, M5

Extern styr External

0-10 V = *0-10* V =

Control 485

Gul/Yellow

Styrning

controls

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INKOPPLING DUBBELFLÄKT / WIRING DOUBLE FAN 2×EBM 3×400 V - M3, M5 FLÄKT A / FAN A FLÄKT B / FAN B

46

PE L1

Lá

L3

GND RSA

RSB

NC

CON

A in 1L 0-10\

GND

RSA

RSB

Brun/Brown

Vit/White

Blå/Blue

Vit/White

Brun/Brown

Grön/Green

Gul/Yellow



Fan impeller ELFF-050E-EC01-0345-2-F-x (3.45 kW)

K-factor 12.81

K-factor dual fans 6.41

NB: The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.



	n rpm	P _{ed} kW	l A	L _W A dB(A)
0	1910	1,98	3,09	102
2	1910	2,92	4,49	92
3	1910	3,38	5,19	86
4	1910	3,45	5,30	53

ELFF-050E-EC01-0345-2-F-0 R3G 500-PA23-71 3,45 kW

ebmpapst

Fan impeller ELFF-050E-EC01-0570-2-F-x (5.7 kW) K-factor 12.81

K-factor dual fans 6.41

NB: The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type I3S1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-050G-I3S1-0150-1-F-x (1.5 kW)
- ELFF-050G-I3S1-0220-1-F-x (2.2 kW)
- ELFF-050G-I3S1-0300-1-F-x (3.0 kW)
- ELFF-050G-I3S1-0400-1-F-x (4.0 kW)

Technical data

- Motor type I3S1 = motor in accordance with efficiency class IE3 for connection to external frequency inverter. The motors are fitted with a thermistor.
- Fan impeller 050G = Gebhardt diameter 500 mm, K-factor = 14.68K-factor dual fans = 7.34
- Output below refers to shaft output

	Rated current (A) at power supply (voltage) *	
Output (kW) *	3×230V~ 50Hz	3×400V~ 50Hz
1.5	5.70	3.30
2.2	7.83	4.50
3.0	10.4	6.00
4.0	14.2	8.15

* Double values for dual fan.

Wiring instructions

3×230V fan impeller 025-071, D-coupling (triangular coupling)



3×400V fan impeller 025-071, Y-coupling (star coupling)





Fan impeller 050G

K-factor 14.68

K-factor dual fans 7.34

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.

NICOTRA Gebhardt

RLM E6-4550





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type EC02)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

INKOPPLING FLERA FLÄKTAR / WIRING SEVERAL FANS ZIEHL 3×400 V - DC, DG, GG



Applies to fan code

- ELFF-050Z-EC02-0350-2-F-x (3,50 kW)
- ELFF-050Z-EC02-0480-2-F-x (4,80 kW)

Technical data

- Motor type EC02 = EC motor with built-in electronic speed control.
- Fan impeller 050Z = ZIEHL-ABEGG diameter 500 mm, K-factor = 12.86 K-factor dual fans = 6.43
- Supply = 3×400V~ 50Hz
- Output below refers to infed electrical power

Output (kW) *	Rated current (A) *
3,50	5,6
4,80	7,8

* Double values for dual fan




Fan impeller K-factor 12.86 K-factor dual fans 6.43

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.



ELFF-050Z-EC02-0350-2-F-x (3,50 kW)



ELFF-050Z-EC02-0480-2-F-x (4,80 kW)



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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.





This picture shows an example of direct driven fan ELFF (motor type EC01)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

INKOPPLING DUBBELFLÄKT / WIRING DOUBLE FAN 2×EBM 3×400 V - M3, M5 FLÄKT B / FAN B FLÄKT A / FAN A 46 H١ PE Kraftmatning Power supply 3×400 V ~ 50 Hz L2 L3 L3 Brun/Brown Brun/Brown / Grå/Grey / Gul/Yellow МΧ GND RSA GNE | IVP-stvr RSA Vit/White RSB Blå/Blue Grön/Green Blå/Blue LARM vid larm) Vit/White Vit/White MK NC



Art. Nr. 19151-0420_02

Applies to fan code

- ELFF-056E-EC01-0330-2-F-x (3.3 kW)
- ELFF-056E-EC01-0500-2-F-x (5.0 kW)

Technical data

- Motor type EC01 = ebm-papst motor with built-in electronic speed control.
- Fan impeller 056E = ebm-papst, diameter 560 mm, K-factor = 10.34K-factor dual fans = 5.17
- Supply = 3×400V~ 50Hz
- Output below refers to infed electrical power

Output (kW) *	Rated current (A) *
3.3	5.1
5.0	7.7

* Double values for dual fan.

INKOPPLING / WIRING EBM 3×400 V - P8, M3, M5





Fan impeller 056E

K-factor 10.34

K-factor dual fans 5.17

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.

Curves: Ра gw ni 3 =η max. 1200 4 800 3 2 ~ 400 ٨ 4000 10000 1200 4 2000 6000 8000 cfm 4000 m³/h q, > 8000 12000 16000 20000

	n rpm	P _{ed} kW	I A	L _W A dB(A)
(A)	1540	1,83	2,88	97
A 2	1540	2,81	4,32	88
A 3	1540	3,30	5,10	82
A 4	1540	3,23	4,95	82
•	1760	2,79	4,36	101
B 2	1760	4,25	6,52	92
B 3	1760	5,00	7,70	84
B 4	1760	4,79	7,32	87

Air performance measured according to: ISO 5801, installation category A, with ebm-papst inlet ring without contact protection. Intake-side sound level: LwA according to ISO 13347, LpA measured at 1 m distance from fan axis. The values given are only applicable under the specified measuring conditions and may differ depending on the installation conditions. In the event of deviation from the standard configuration, the parameters must be checked in installed condition. See Page 98 ff for detailed information.

ebmpapst



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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type I3S1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-056G-I3S1-0300-1-F-x (3.0 kW)
- ELFF-056G-I3S1-0400-1-F-x (4.0 kW)
- ELFF-056G-I3S1-0550-1-F-x (5.5 kW)

Technical data

- Motor type I3S1 = motor in accordance with efficiency class IE3 for connection to external frequency inverter. The motors are fitted with a thermistor.
- Fan impeller 056G = Gebhardt diameter 560 mm, K-factor = 11.52K-factor dual fans = 5.76
- Output below refers to shaft output

	Rated current (A) at power supply (voltage) *	
Output (kW) *	3×230V~ 50Hz	3×400V~ 50Hz
3.0	10.4	6.0
4.0	13.8	7.9
5.5	19.3	11.1

* Double values for dual fan.

Wiring instructions

3×230V fan impeller 025-071, D-coupling (triangular coupling)



3×400V fan impeller 025-071, Y-coupling (star coupling)





Fan impeller 056G

K-factor 11.52

K-factor dual fans 5.76

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.

NICOTRA Gebhardt

RLM E6-5056





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type PFJ1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

INKOPPLING DUBBELFLÄKT / WIRING DOUBLE FAN 2×OJ-DV 3×400 V



Applies to fan code

- ELFF-056G-PFJ1-0430-1-F-x (4.3 kW)
- ELFF-056G-PFJ1-0650-1-F-x (6.5 kW)

Technical data

- Motor type PFJ1 = Domel motor corresponding to efficiency class IE4 with integrated OJ Electronics frequency inverter.
- Fan impeller 056G = Gebhardt diameter 560 mm, K-factor = 11,52 K-factor dual fans = 5,76 K-factor triple fans = 3.84
- Supply = 3×400V~ 50Hz
- Output below refers to shaft output

Output (kW) *	Rated current (A) *
4.3	5.4
6.5	12.2

* Double the value for dual fan, triple the value for triple fan.

INKOPPLING / WIRING OJ-DV 3×400 V





Fan impeller 056G

K-factor 11,52

K-factor dual fans 5,76

K-factor triple fans = 3.84

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans. Triple fan provides triple airflow.

NICOTRA Gebhardt

RLM E6-5663





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type ECx2)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

INKOPPLING FLERA FLÄKTAR / WIRING SEVERAL FANS ZIEHL 3×400 V - DC, DG, GG



Applies to fan code

- ELFF-056Z-ECx2-0340-2-F-x (3.40 kW)
- ELFF-056Z-ECx2-0520-2-F-x (5.20 kW)

Technical data

- Motor type ECx2 = EC motor with built-in electronic speed control.
- Fan impeller 056Z = ZIEHL-ABEGG diameter 560 mm, K-factor = 10,14 K-factor dual fans = 5.07 K-factor triple fans = 3.38
- Supply = 3×400V~ 50Hz
- Output below refers to infed electrical power

Output (kW) *	Rated current (A) *
3.4	5.4
5.2	8.2

* Double the value for dual fan, triple the value for triple fan



INKOPPLING / WIRING



Fan impeller

ELFF-056Z-ECx2-0340-2-F-x (3.40 kW) (III)

ELFF-056Z-ECx2-0520-2-F-x (5.20 kW) (I) K-factor = 10,14 K-factor dual fans 5.07 K-factor triple fans = 3.38

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans. Triple fan provides triple airflow.





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.

Resetting the overheat protection

- 1. Cut the power supply to the fan motor.
- 2. Wait for at least 1 minute.
- 3. Close the power supply to the fan motor.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type I3S1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-063G-I3S1-0400-1-F-x (4.0 kW)
- ELFF-063G-I3S1-0550-1-F-x (5.5 kW)
- ELFF-063G-I3S1-0750-1-F-x (7.5 kW)
- ELFF-063G-I3S1-1100-1-F-x (11.0 kW)

Technical data

- Motor type I3S1 = motor in accordance with efficiency class IE3 for connection to external frequency inverter. The motors are fitted with a thermistor.
- Fan impeller 063G = Gebhardt diameter 630 mm, K-factor = 9.0K-factor dual fans = 4.5
- Output below refers to shaft output

	Rated current (A) at power supply (voltage) *	
Output (kW) *	3×230V~ 50Hz	3×400V~ 50Hz
4.0	13.8	7.9
5.5	18.6	10.7
7.5	24.9	14.3
11.0	36.4	20.9

* Double values for dual fan.

Wiring instructions

3×230V fan impeller 025-071, D-coupling (triangular coupling)



3×400V fan impeller 025-071, Y-coupling (star coupling)





Fan impeller 063G

K-factor 9.0

K-factor dual fans 4.5

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.

NICOTRA Gebhardt

RLM E6-5663





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type PFJ1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

INKOPPLING / WIRING OJ-DV 3×400 V External US Extern s 3×400 V ~ 50 Hz 3×400 V ~ 50 Hz 0-10/0 Modb Kraftmatning Vlddns Styrning 485 Control Power ALARN ş Gul/Yellov Grön/Gr

Art. Nr. 19151-0480 01

Applies to fan code

- ELFF-063G-PFJ1-0430-1-F-x (4.3 kW)
- ELFF-063G-PFJ1-0650-1-F-x (6.5 kW)

Technical data

- Motor type PFJ1 = Domel motor corresponding to efficiency class IE4 with integrated OJ Electronics frequency inverter.
- Fan impeller 063G = Gebhardt diameter 630 mm, K-factor = 9.0K-factor dual fans = 4.5
- Supply = 3×400V~ 50Hz
- Output below refers to shaft output

Output (kW) *	Rated current (A) *
4.3	5.4
6.5	12.2

* Double values for dual fan.

INKOPPLING DUBBELFLÄKT / WIRING DOUBLE FAN 2×OJ-DV 3×400 V





Fan impeller 063G

K-factor 9.0

K-factor dual fans 4.5

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.

NICOTRA Gebhardt

RLM E6-5663





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type I3S1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-071G-I3S1-0550-1-F-x (5.5 kW)
- ELFF-071G-I3S1-0750-1-F-x (7.5 kW)
- ELFF-071G-I3S1-1100-1-F-x (11.0 kW)

Technical data

- Motor type I3S1 = motor in accordance with efficiency class IE3 for connection to external frequency inverter. The motors are fitted with a thermistor.
- Fan impeller 071G = Gebhardt diameter 710 mm, K-factor = 7.24K-factor dual fans = 3.62
- Output below refers to shaft output

	Rated current (A) at power supply (voltage) *	
Output (kW) *	3×230V~ 50Hz	3×400V~ 50Hz
5.5	20.9	12.0
7.5	24.9	14.3
11.0	36.4	20.9

* Double values for dual fan.

Wiring instructions

3×230V fan impeller 025-071, D-coupling (triangular coupling)



3×400V fan impeller 025-071, Y-coupling (star coupling)





Fan impeller 071G

K-factor 7.24

K-factor dual fans 3.62

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.

NICOTRA Gebhardt

RLM E6-6371





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type PFJ1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

INKOPPLING DUBBELFLÄKT / WIRING DOUBLE FAN

2xOJ-DV 3x400 V FLÄKT B / FAN B FLÄKT A / FAN A PE L1 PE Kraftmatning L1 Power supply L2 L2 3×400 V ~ 50 Hz L3 13 Bus A Vit / White MX Vit / White Bus A / Gul / Yellow / Grön / Green Blå / Bl Blå / Blu I IVP-stvr Bus B Bus B Brun / Brown Brun / Brown / Grå / Grey GND GND **IVP** Controls LARM (Sluter vi vid larm Vit / White Vit / White MK 14 NC 14 NC ALARM Brun / Brown Brun / Brown UC 15 C 15 C US 0-10V Grön / Greer 0-10V Grön / Gree Styrning 0-10 V Extern stvr Gul / Yellow Gul / Yellov Control 0-10 V = GND GND External Bus A Bus A RS-485 Modbus controls Bus E GND GND Art. Nr. 19151-0490_01

Applies to fan code

• ELFF-071G-PFJ1-0650-1-F-x (6.5 kW)

Technical data

- Motor type PFJ1 = Domel motor corresponding to efficiency class IE4 with integrated OJ Electronics frequency inverter.
- Fan impeller 071G = Gebhardt diameter 710 mm, K-factor = 7.24K-factor dual fans = 3.62
- Supply = 3×400V~ 50Hz
- Output below refers to shaft output

Output (kW) *	Rated current (A) *
6.5	11.5

* Double values for dual fan.

INKOPPLING / WIRING OJ-DV 3×400 V





Fan impeller 071G

K-factor 7.24

K-factor dual fans 3.62

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.

NICOTRA Gebhardt

RLM E6-6371





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)

The fans are firmly mounted and access takes place through an inspection door/s.



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



The picture shows examples of direct driven fan ELFF (motor type I3S1/I2S1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-080G-IxS1-0550-1-F-x (5.5 kW)
- ELFF-080G-IxS1-0750-1-F-x (7.5 kW)
- ELFF-080G-IxS1-1100-1-F-x (11.0 kW)
- ELFF-080G-IxS1-1500-1-F-x (15.0 kW)
- ELFF-080G-IxS1-1850-1-F-x (18.5 kW)

Technical data

- Motor type I3S1/I2S1 = motor in accordance with efficiency class IE3/I2S1 for connection to external frequency inverters. The motors are fitted with a thermistor.
- Fan impeller 080G = Gebhardt diameter 800 mm, K-factor = 5.69K-factor dual fans = 2.85
- Supply = 3×400V~ 50Hz
- Output below refers to shaft output

Output (kW) *	Rated current (A) * I3S1	Rated current (A) * I2S1
5.5	11.0	12.0
7.5	14.5	16.1
11.0	20.7	22.5
15.0	25.6	28.0
18.5	33.2	33.7

* Double values for dual fan.

Wiring instructions

D-coupling 3×400V




Fan impeller 080G

K-factor 5.69

K-factor dual fans 2.85

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.

NICOTRA Gebhardt





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.





This picture shows an example of direct driven fan ELFF (motor type I3S1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-080G-PSE1-1100-1-F-x (11.0 kW)
- ELFF-080G-PSE1-1500-1-F-x (15.0 kW)

Technical data

- PSE1 = PM motor corresponding to efficiency class IE4 for connection to external frequency inverter.
- Fan impeller 080G = Gebhardt diameter 800 mm, K-factor = 5.69K-factor dual fans = 2.85
- Supply = 3×400V~ 50Hz
- Output below refers to shaft output

Output (kW) *	Rated current (A) *
11.0	23.2
15.0	28.1

* Double values for dual fan.

Wiring instructions

3×400V

3×400 V - Δ (Delta)





Fan impeller 080G

K-factor 5.69

K-factor dual fans 2.85

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.

NICOTRA Gebhardt





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.





This picture shows an example of direct driven dual fans ELFF

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-080G-PSM1-1100-1-F-x (2 pcs 11.0 kW)
- ELFF-080G-PSM1-1500-1-F-x (2 pcs 15.0 kW)

Technical data

- PSM1 = PM motor corresponding to efficiency class IE4 connected to external frequency inverter.
- Fan impeller 080G = Gebhardt diameter 800 mm, K-factor dual fans = 2.85
- Supply = 3×400V~ 50Hz
- Output below refers to shaft output

Output (kW)	Rated current (A)
2 × 11.0	2 × 23.2
2 × 15.0	2 × 28.1

Wiring instructions

3×400V

INKOPPLING DUBBELFLÄKT / WIRING DOUBLE FAN FCM 106 / FC 101 / FC 102





Fan impeller 080G

K-factor dual fans 2.85

NB: The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.

NICOTRA Gebhardt





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



The picture shows examples of direct driven fan ELFF (motor type I3S1/I2S1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-090G-IxS1-0550-1-F-x (5.5 kW)
- ELFF-090G-IxS1-0750-1-F-x (7.5 kW)
- ELFF-090G-IxS1-1100-1-F-x (11.0 kW)
- ELFF-090G-IxS1-1500-1-F-x (15.0 kW)
- ELFF-090G-lxS1-1850-1-F-x (18.5 kW)
- ELFF-090G-IxS1-2200-1-F-x (22.0 kW)

Technical data

- Motor type I3S1/I2S1 = motor in accordance with efficiency class IE3/IE2 for connection to external frequency inverter. The motors are fitted with a thermistor.
- Fan impeller 090G = Gebhardt diameter 900 mm, K-factor = 4.44K-factor dual fans = 2,22
- Supply = 3×400V~ 50Hz
- Output below refers to shaft output

Output (kW) *	Rated current (A) * I3S1	Rated current (A) * I2S1
5.5	-	13.3
7.5	14.5	16.1
11.0	20.7	22.5
15.0	28.6	30.0
18.5	34.3	36.5
22.0	38.4	39.0

* Double values for dual fan.

Wiring instructions

D-coupling 3×400V

3×400 V - Δ (Delta)





Fan impeller 090G

K-factor 4.44

K-factor dual fans 2.22

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.

NICOTRA Gebhardt





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



This picture shows an example of direct driven fan ELFF (motor type I3S1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-090G-PSE1-1500-1-F-x (15.0 kW)
- ELFF-090G-PSE1-1850-1-F-x (18.5 kW)

Technical data

- PSE1 = PM motor corresponding to efficiency class IE4 for connection to external frequency inverter.
- Fan impeller 090G = Gebhardt diameter 900 mm, K-factor = 4.44K-factor dual fans = 2,22
- Supply = 3×400V~ 50Hz
- Output below refers to shaft output

Output (kW) *	Rated current (A) *
15.0	31.8
18.5	35.3

* Double values for dual fan.

Wiring instructions

3×400V







Fan impeller 090G

K-factor 4.44

K-factor dual fans 2.22

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.

NICOTRA Gebhardt





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



The picture shows examples of direct driven fan ELFF (motor type I3S1/I2S1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-100G-IxS1-0550-1-F-x (5.5 kW)
- ELFF-100G-lxS1-0750-1-F-x (7.5 kW)
- ELFF-100G-lxS1-1100-1-F-x (11.0 kW)
- ELFF-100G-IxS1-1500-1-F-x (15.0 kW)
- ELFF-100G-IxS1-1850-1-F-x (18.5 kW)
- ELFF-100G-IxS1-2200-1-F-x (22.0 kW)
- ELFF-100G-IxS1-3000-1-F-x (30.0 kW)

Technical data

- Motor type I3S1/I2S1 = motor in accordance with efficiency class IE3/IE2 for connection to external frequency inverter. The motors are fitted with a thermistor.
- Fan impeller 100G = Gebhardt diameter 1000 mm, K-factor = 3.5K-factor dual fans = 1.75
- Supply = 3×400V~ 50Hz
- Output below refers to shaft output

Output (kW) *	Rated current (A) * I3S1	Rated current (A) * I2S1
5.5	-	13.3
7.5	-	17.3
11.0	20.7	22.5
15.0	28.6	31.0
18.5	34.3	36.0
22.0	40.1	42.5
30.0	54.9	55.6

* Double values for dual fan.

Wiring instructions

D-coupling 3×400V





Fan impeller 100G

K-factor 3.51

K-factor dual fans 1.75

NB! The fan chart shows the air flow for a single fan. Twice the air flow is achieved for dual fans.

NICOTRA Gebhardt





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



The picture shows examples of direct driven fan ELFF (motor type I3S1/I2S1)

General

The direct driven ELFF fan is fitted in unit section EMM with fitting MIE-FF or MIE-FE for horizontal outlet or unit section EFA-FF for vertical outlet.

- To facilitate service, the fan and motor unit is mounted on slide rails (up to and including fan impeller size 071).
- To ensure sufficient cooling for the motor, the air temperature should not exceed 50°C.
- The fan and motor are very effectively insulated against vibration from the housing with a non-vibrating outlet connector and rubber springs that are designed according to the fan's operating conditions.

The normal resonance frequency is 7-10 Hz.

• The configuration of some of the components in the fan systems is not in corrosion class C4.

Applies to fan code

- ELFF-112G-IxS1-1500-1-F-x (15.0 kW)
- ELFF-112G-IxS1-1850-1-F-x (18.5 kW)
- ELFF-112G-IxS1-2200-1-F-x (22.0 kW)
- ELFF-112G-IxS1-3000-1-F-x (30.0 kW)
- ELFF-112G-IxS1-3700-1-F-x (37.0 kW)

Technical data

- Motor type I3S1/I2S1 = motor in accordance with efficiency class IE3/IE2 for connection to external frequency inverter. The motors are fitted with a thermistor.
- Fan impeller 112G = Gebhardt diameter 1120 mm, K-factor = 2.74
- Supply = 3×400V~ 50Hz
- Output below refers to shaft output

Output (kW)	Rated current (A) I3S1	Rated current (A) I2S1
15.0	-	32.1
18.5	-	37.8
22.0	40.1	40.6
30.0	54.9	55.6
37.0	69.0	69.8

Wiring instructions

D-coupling 3×400V





Fan impeller 112G

K-factor 2.74

NICOTRA Gebhardt





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

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

- If the supply air flow is too low, the system will be out of balance, which may cause problems with draughts. The ventilation capacity is too low, which can result in a poor climate in the room.
- If the extract air flow is too low, the ventilation capacity will be poor. Imbalance may also force moist air out into the building structure.
 If the extract air is too low, this will cause increased energy usage if heat recovery is installed. One reason why the fan generates too little air may be that impurities have collected on the fan impeller blades.
- If a centrifugal fan is rotating in the wrong direction, the air flow will still go the right way, but with a considerable reduction in capacity. Check the direction of rotation.

Actions

Before starting work, stop the unit using its switch, and then turn the main circuit breaker to the 0 position. There may be two main circuit breakers if there are dual motors.



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.

Access to fan

(up to and including fan impeller size 071)

Access to the fan takes place via the inspection door.

Remove one end of the fan assembly's earth braid. Loosen the screws and the pins/screws and pull out the fan units (fan and motor are mounted on rails).

Where necessary remove the centre bar and fixed door.

(from fan impeller size 080)



- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 2. Check that the fan impeller rotates easily, is in balance and does not vibrate. Also check that the fan impeller is clear of 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 and that they have not shifted sideways towards the inlet cones.
- 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.
- Check the air flows by measuring Δp at the connections for flow measurement. Δp is used to obtain the air flow in a diagram on the unit. Read the pressure difference Δp on the measuring tube. Go into Δp in the diagram that is on the unit, find the relevant unit size and read the flow.

- 1. Make the fan unit accessible as described in the previous section entitled "Access to fan".
- 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. For sizes up to 071, remount the fan units.



Air handling with focus on LCC

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