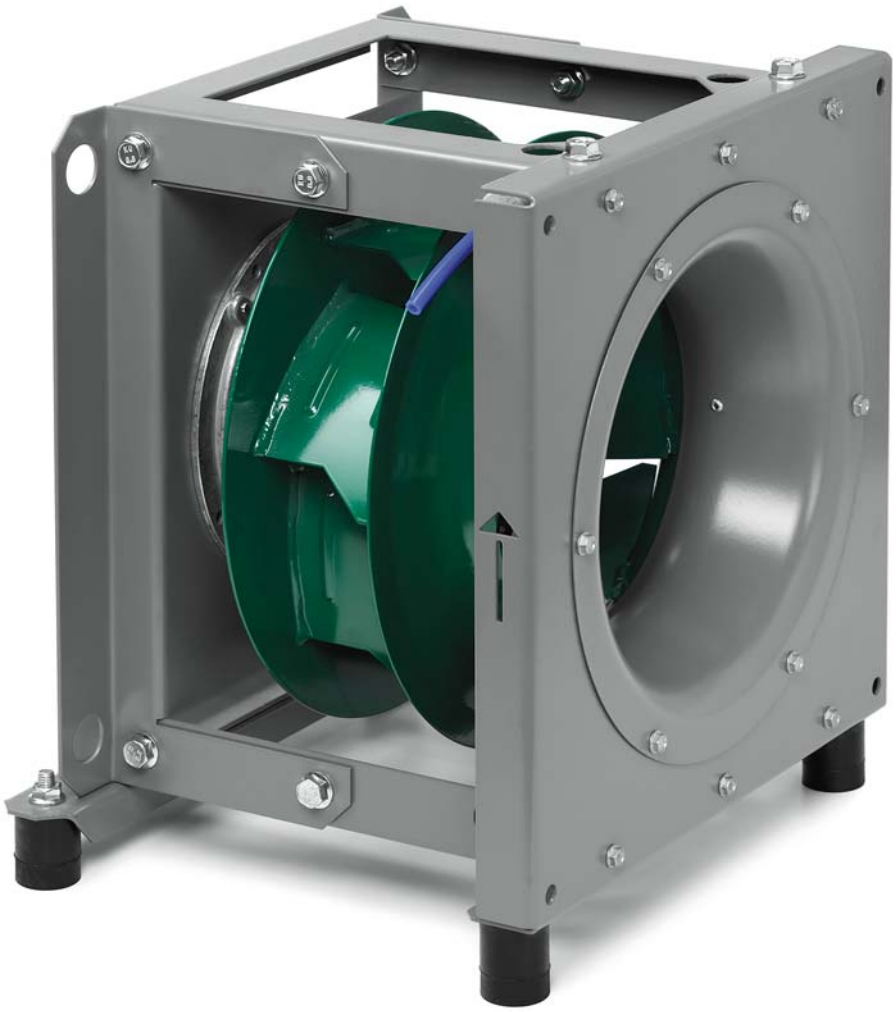
Centriflow Plus EC

Operating instructions

GPEB-3 and GPEV-3 Plug Fans with EC-motors
Alarm



FläktWoods

Operating instructions

Contents

The unit type, date of manufacture (calendar week/year) and the conformity sign are located on the type plate on the fan. For questions about the fan, please provide the entire content of the type plate.

1. SAFETY REGULATIONS AND NOTES

Please read these operating instructions carefully before starting to work with the device. Observe the following warnings to prevent malfunctions or danger to persons. These operating instructions are to be regarded as part of this device. If the device is sold or transferred, the operating instructions must accompany it. These operating instructions may be duplicated and forwarded for information about potential dangers and their prevention.

1.1 Hazard levels of warnings

These operating instructions use the following hazard levels to indicate potentially hazardous situations and important safety regulations:

Danger

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Compliance with the measures is mandatory.

Warning

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Exercise extreme caution while working.

Caution

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.

Note

A potentially harmful situation can occur and, if not avoided, can lead to property damage.

1.2 Staff qualification

Only specialised electrical personnel may install the device, perform the test run and work on electrical system. Only trained and authorised specialist personnel are permitted to transport, unpack, assemble, operate or maintain the device, or to use it in any other manner.

Basic safety rules

Observe the following when working on the unit:
→ Do not make any modifications, additions or conversions to the device without the approval of Fläkt Woods.

Operating instructions

1.3 Electrical voltage and current

Check the electrical equipment of the device at regular intervals, refer to Chapter 6.1 “Safety examination”. Remove loose connections and defective cables immediately.

Danger

Electrical load on the device
Electric shock
→ Stand on a rubber mat if you are working on an electrically loaded device.

Danger

Electrical load (>50 µC) between mains wire and protective earth connection when switching multiple devices in parallel
Electric shock, risk of injury
→ Ensure that sufficient protection against accidental contact is provided. Before working on the electrical connection, the connections to the mains supply and PE must be shorted.

Caution

In the event of fault, electric voltage is present at the rotor and impeller
The rotor and impeller are base insulated.
→ Do not touch the rotor and impeller when they are installed.

1.4 Safety and protective functions

Danger

Missing safety device and non-functioning protective features
If there is no safety device, you could be seriously injured, for example by reaching into the running device with your hands.
→ Operate the device only with a fixed guard and guard grille. The guard must withstand the kinetic energy of a fan blade. The device is an installation item that has no function on its own. As the operator, you are responsible for ensuring that the device is adequately secured.
→ Shut down the device immediately if you detect a missing or ineffective protective feature.

1.5 Electromagnetic radiation

Interference from electromagnetic radiation possible, e.g. in conjunction with open and closed-loop control devices. If unacceptable emission intensities occur when the fan is installed, suitable shielding measures must be taken before the device is commissioned.

1.6 Mechanical movement

Danger

Rotating device
Body parts that come into contact with the rotor and impeller can be injured.
→ Secure the unit to prevent contact.
Before working on the installation/machine, wait until all parts have come to a standstill.

Danger

If control voltage is applied or a speed setpoint is stored, the motor automatically restarts, for example after a power failure.
Danger of injury
→ Do not stay in the danger area of the fan.
→ When working on the fan, switch off the mains supply voltage and secure it from being switched on again.
→ Wait until the device stops.

Warning

Rotating device
Long hair, dangling items of clothing and jewellery could become entangled and pulled into the device. You could be injured.
→ Do not wear any loose clothing or jewellery while working on moving parts.
→ Protect long hair with a hood.

Warning

Ejected parts in the exhaust zone
Danger of injury
In the event of a fault, balancing weights or broken fan blades may be ejected.
→ Take appropriate safety measures. Do not stay in the exhaust zone.

1.7 Hot surface

Caution

High temperature at the electronics enclosure
Danger of burn injuries
→ Ensure that sufficient protection against accidental contact is provided.

1.8 Emission

Warning

Depending on the installation and operating conditions, a sound pressure level greater than 70 dB(A) can arise.
Danger of noise-induced hearing loss
→ Take appropriate technical safety measures.
→ Safeguard the operating personnel with appropriate protection measures, e.g. ear protectors.

Operating instructions

1.9 Transport

Caution

Transport of fan

→ Transport the fan in its original packaging only.
→ Secure the fan so that it does not slip, for example using a lashing strap.

1.10 Cleaning

Note

The impeller and the motor must be check at least once a year. If necessary clean the impeller and the motor (cooling ribs). Cleaning must be done carefully so that the impeller or motor are not damaged.

1.11 Disposal

When disposing of the device, please comply with all relevant requirements and regulations applicable in your country.

2. PROPER USE

The device is designed exclusively as built-in fan for moving clean air according to the technical data in air handling units. Any other or secondary use is deemed improper use and a misuse of the device. Installations necessary on the part of the commissioning party must meet the mechanical, thermal and service life-related stresses that can occur.

Proper use also includes:

– Operating the device with all protective features.
– Observing the operating instructions.
– Using the device in accordance with the permitted ambient temperature, refer to Chapter 3, “Technical data”.
– Using the device only in stationary systems.

The fan cannot be used for dusty air or in explosion hazardous areas.

3. TECHNICAL DATA

Additional device-specific data are available upon request from Fläkt Woods.

Mounting data

The following must be observed:
– Tightening torque of the screwed cable gland: 3.0 Nm
– Tightening torque of mounting screws of terminal box cover: 2.5 Nm
– Strength of mounting screws: 10.9

Secure mounting screws against accidentally coming loose (e.g. by self-locking screws).

Leakage current

Leakage current = 3.5 mA

Ambient conditions

Permitted ambient temperature of motor	Transport & storage	Operation
	-40 °C...+80 °C	-25 °C...+40 °C

Use the device in accordance with its protection type.

4. CONNECTION AND START-UP

4.1 Connecting the mechanical system

Warning

Hot motor housing
Danger of fire
→ Ensure that no combustible or flammable materials are located in the vicinity of the fan.

Caution

Cutting and crushing hazard when removing the blower from the packaging

→ Carefully lift the blower by the housing from the packing; be sure to avoid impacts.
→ Wear safety shoes and cut-resistant safety gloves.

Caution

Heavy load when taking out the device
Bodily injuries, e.g. back injuries, are possible.
→ Two people should lift the blower out of its packaging if it is heavier than 10 kg.

Note

Incorrect mounting position, condensation occurs
The condensation water cannot run off.
→ Install the device only in an installation position with the shaft horizontal or the rotor at the bottom. This allows the condensation water to run off, i.e. **GPEV-3 fans can be mounted only for air flow direction “from down to up”.**
→ Install the device according to your application.

4.2 Connecting the electrical system

The connection to the electrical system is made after the connection to the mechanical system.

Danger

Electric voltage on the device
Electric shock
→ Always install an earth wire. Check the protective earth.

Danger

Incorrect insulation
Risk of fatal injury from electric shock
→ Use only cables that meet the specified installation requirements for voltage, current, insulation material, load etc.

Operating instructions

Note

Device malfunctions are possible
→ Do not route the control lines of the device directly parallel to the power supply line. Ensure a sufficiently large clearance. Recommendation: clearance > 10 cm (separate cable routing).

Connect the fan only to circuits that can be switched off using an allpole disconnecting switch.

Prerequisites
→ Before connecting the device, ensure that the mains supply voltage matches the fan voltage.
→ Check whether the data on the type plate agree with the connection data.
→ Only use cables that are configured for current according to the type plate.

Power supply connection, fuse protection

Nominal voltage	Safety fuse		Circuit breaker	Cable cross section	
	VDE	UL	VDE	mm²	AWG
1~/PE 200-277 VAC	10 A	10 A	C10 A	1,5	16
3~/PE 380-480 VAC	16 A	15 A	C16 A	1,5	16
	20 A	20 A	C20 A	2,5	14
3~/PE 200-240 VAC	–	15 A	–	1,5	16
	–	20 A	–	2,5	14

Residual current operated device

Only all-current-sensitive RCD protective devices (type B) are permissible. Like frequency inverters, RCD protective devices cannot provide personal safety while operating the device.

4.3 Connection in terminal box

(for EC devices, three-phase mains-powered)

Stripping connecting cables
Strip the cable just enough so that the screwed cable gland is tight and the terminals are relieved of strain (for tightening torques, refer to Chapter 3 “Technical data”).

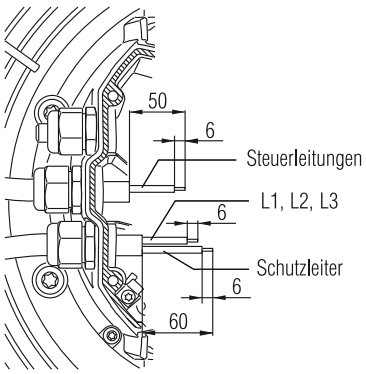


Figure 1: Recommended stripping lengths in mm (inside the terminal box)

Connecting cables with terminals

Warning

Terminals and connections have voltage even in a unit that is shut off
Electric shock
→ Wait five minutes after disconnecting the voltage at all poles before touching the unit.

Caution

Electrical voltage
The fan is a built-in component and features no electrically isolating switch.
→ Connect the fan only to circuits that can be switched off using an all-pole disconnecting switch. When working on the blower, you must switch off the system/machine in which the blower is installed and secure it from being switched on again.

Dangerous external voltages may be present at the terminals and connections, even when the device is switched off.

– Open the terminal box.
– Open the screwed cable gland.

Three-phase motors, size 112

For two cables Ø 5 mm, see Figure 4, you must equip the screwed cable glands with the seal inserts provided in the terminal box.
All screwed cable gland are supplied with a sealing cap and insert for cables with Ø 4 - 10 mm, see Fig. 2.

Three-phase motors, size 150

With two cables Ø 4 - 6 mm, see Figure 4, or a cable with Ø 6 - 12 mm, you must equip the screwed cable glands with the seal inserts provided in the terminal box.
All screwed cable gland are supplied with a sealing cap and insert for cables with Ø 5 - 9 mm, see Fig. 2.

– Remove the cap, see image 3.
– Remove the cap only at those places where cables are introduced.


Figure 2. Screwed cable gland with cap


Figure 3. Cap removed


Figure 4. Seal insert, equipped for two cables


Figure 5. Seal inserts fitted with one cable are prohibited!

– Guide the cable through the screwed cable gland.
→ Connect the “PE” (protective earth) wire.
→ Connect the remaining leads to the respective terminals.
To do so, use a 3.5 mm screwdriver, see Figure 6.

During the connection work, ensure that no wires splice off.

Operating instructions

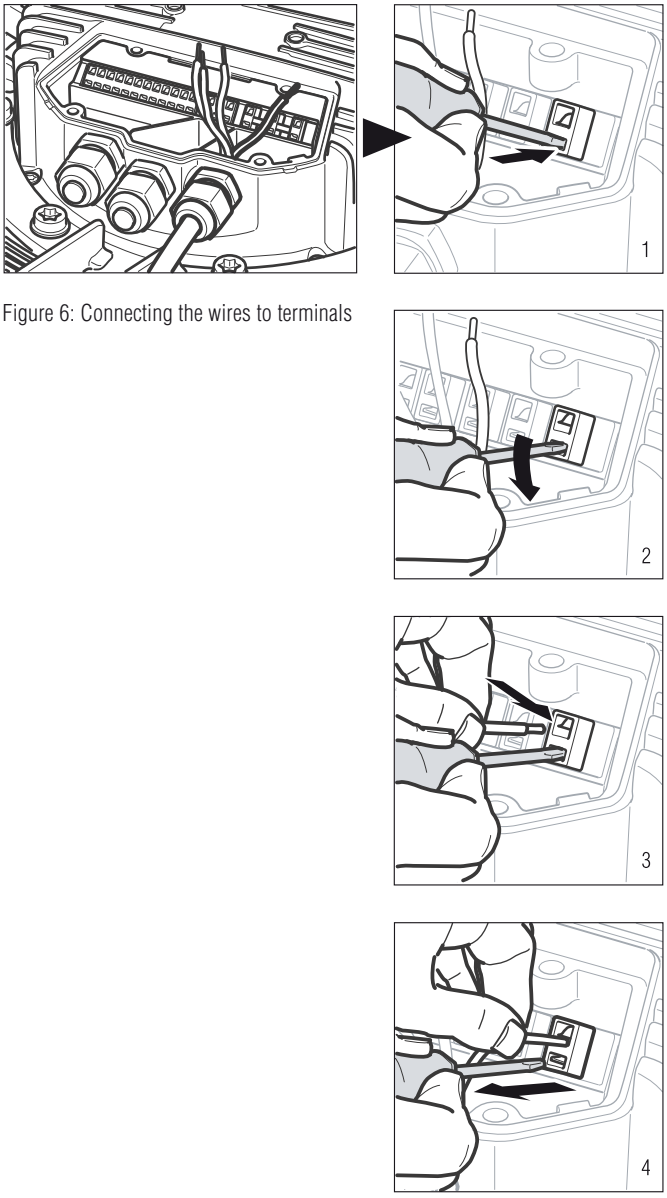


Figure 6: Connecting the wires to terminals

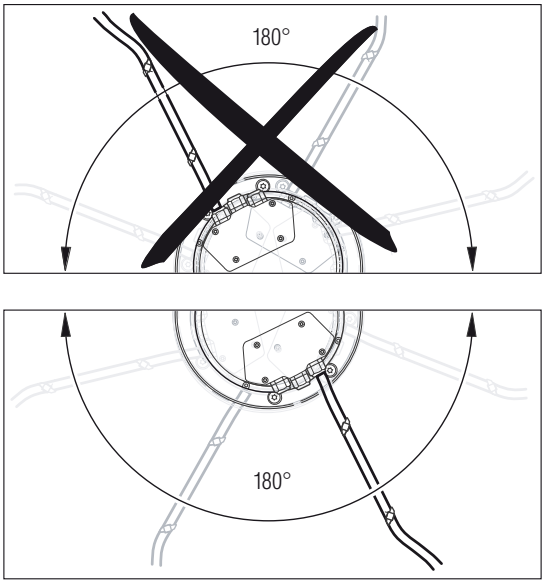


Figure 7: Cable routing for upright built-in fans (shaft horizontal)

Factory settings

The factory settings/modes of operation have the following default values upon delivery:

Mode of operation: 0-10V control
Set value input: Analogue input
Store set value in EEPROM: ✓(ticked)
Min.: 0%
Max.: 100 %
Direction of action of controller: positive
Fan address: 1
Group address: 1

If you have not obtained your device directly from Fläkt Woods, we recommend that you obtain the default settings from your supplier. Your supplier may have modified the settings.

Cable routing as water trap

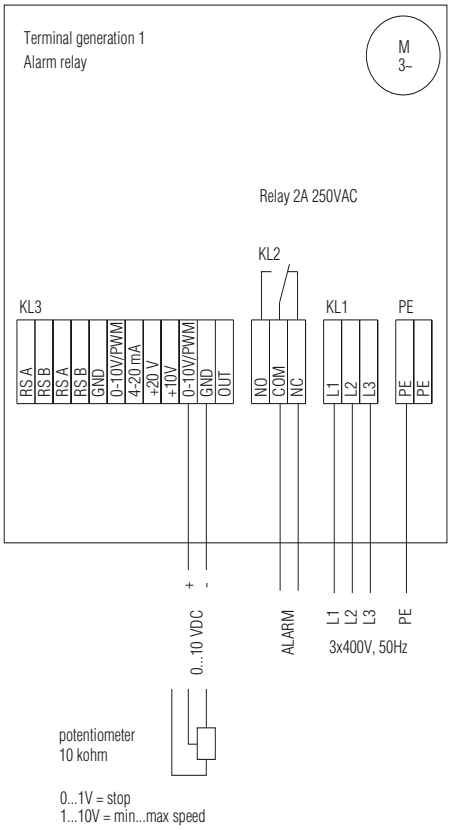
No water may penetrate along the cable in the direction of the cable gland.

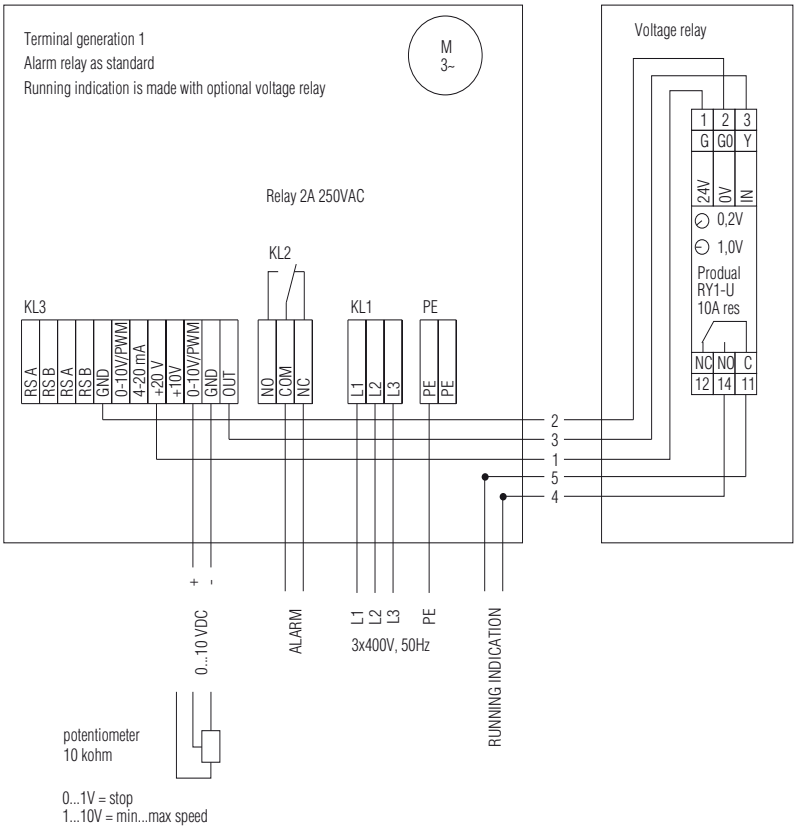
Mounting position: shaft horizontal

When routing the cables, make sure that the screwed cable gland is located at the bottom, see Fig. 7. The cables must always be routed downwards.

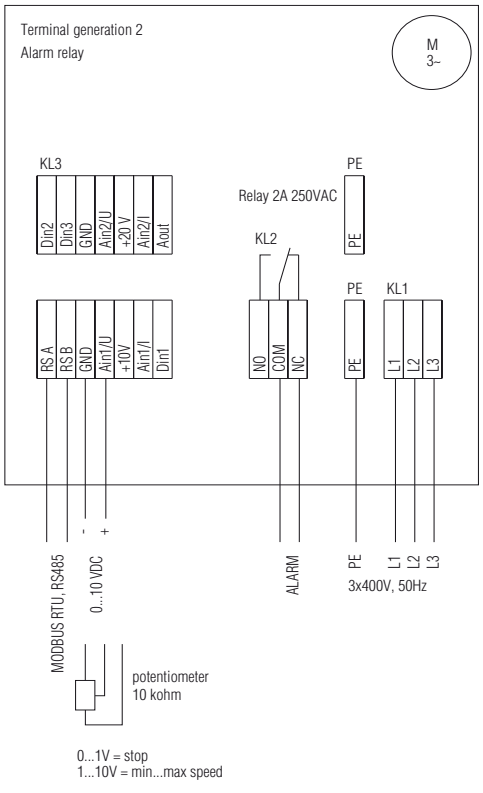
Wiring diagrammes

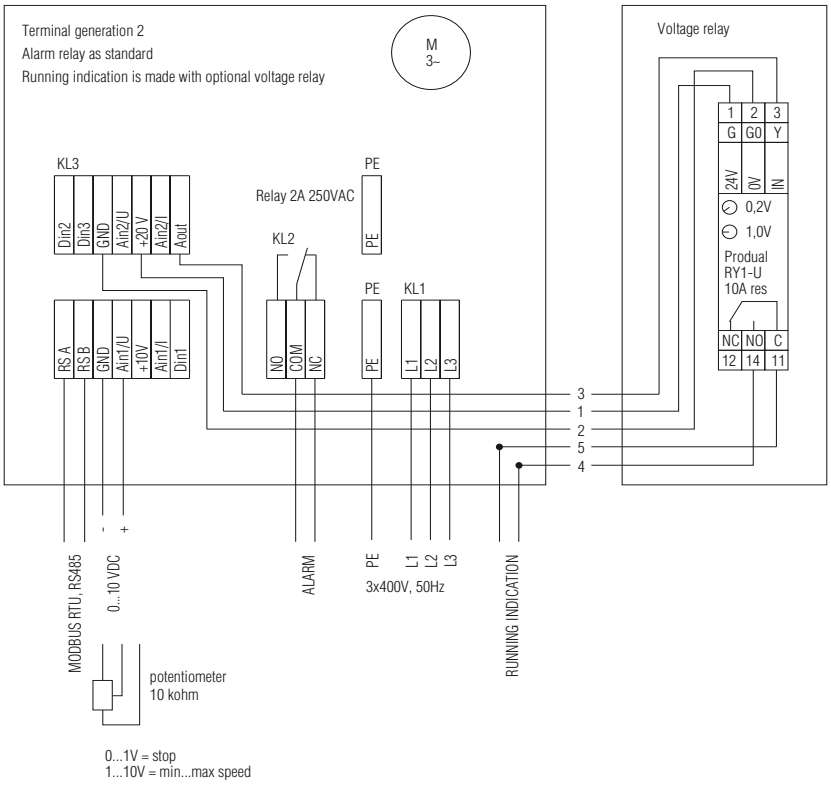
Three-phase motors – Generation 1 – with alarm





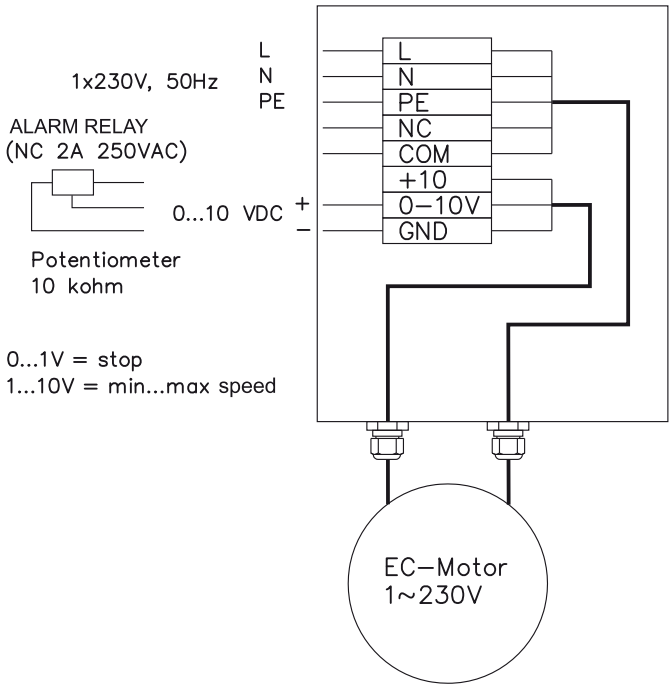
Three-phase motors – Generation 2 – with alarm





Wiring diagrammes

Single-phase motors – with alarm



4.4 Checking the connections

→ Ensure that the power is off.
→ Secure it from being switched on again.
→ Check the correct fit of the connecting cables.
→ Fasten the screwed cable gland again.
→ Ensure that the cable gland is securely tightened. Any unused screw connections must always be fitted with a cap and securely tightened.
→ Tighten the cable gland enough to ensure that water cannot ingress. Refer to Chapter 3, “Mounting data” section, for the maximum tightening torque.
→ Fasten the terminal box again. Refer to Chapter 3, “Mounting data” section, for the maximum tightening torque.

Make sure that the terminal box is correctly closed and sealed after completing the work and that all screws are properly tightened.

4.5 Connection via external leads

(valid for single-phase supplied EC motors)

External leads are run from the device. The leads are protected with brass lead tips.

→ Connect the leads according to your application.

4.6 Switching on the device

→ Inspect the device for visible external damage and the proper function of the protective features before switching it on.
→ Apply the voltage to the device.
→ Switch on the device via the control voltage.

4.7 Switching off the device

– Switch off the device during operation:
→ Switch the EC motors on and off using the control input (0-10 VDC) as much as possible to protect the device.
→ Do not switch the motor on and off (e.g. in intermittent mode) by means of the power supply.
– Switching off the device for maintenance work
→ Separate the device from the supply voltage.

5. INTEGRATED PROTECTIVE FUNCTIONS

The integrated protective functions cause the motor to switch off automatically in the case of the faults described in the table. The status relay drops out.

Error	Description/Function of safety feature
Overtemperature of electronics	No automatic restart occurs. → Reset by switching off the mains supply voltage for at least 20 s. after motor standstill.
Overtemperature of motor	
Rotor position detection error	
Blocked rotor	→ After the block is removed, the motor automatically restarts.
Line under-voltage	The mains input voltage drops below the voltage 3~ 290 VAC (nominal voltage 380 - 480 V) or 3~ 145 VAC (nominal voltage 200 - 240 V) for at least 5 s. → If the supply voltage returns to permitted values, the motor automatically restarts.
Phase failure	A phase of the supply voltage fails for at least 5 s. → If all 3 phases are correctly supplied again, the motor automatically restarts after approx. 10 – 40 s.

Operating instructions

6. MAINTENANCE, MALFUNCTIONS, POSSIBLE CAUSES AND REMEDIES

XDo not perform any repairs on your device. Return the fan to Fläkt Woods for repair or exchange.

Danger

Electric voltage on the motor

Electric shock in case of contact

→ Wait five minutes after disconnecting the voltage at all poles before opening the device.

Malfunction/error	Possible cause	Possible remedy
Motor does not turn	Mechanical blockage – Mains supply voltage faulty	– Switch it off and remove mechanical blockage – Check mains supply voltage, restore power supply – Apply control voltage
Overtemperature of electronics	– Ambient temperature too high – Insufficient cooling – Unacceptable operatingpoint	– Reset by switching off the mains supply voltage for at least 20 s. after motor standstill
Overtemperature of motor		
Incorrect rotor position detection	– Failure of electronics	

If you have any other problems, contact Fläkt Woods.

6.1 Safety examination

What has to be tested?	How to test?	Frequency
Protective covering	Visual inspection	at least every 6 months
Fan for damage	Visual inspection	at least every 6 months
Mounting of fan	Visual inspection	at least every 6 months
Mounting of connecting cables	Visual inspection	at least every 6 months
Mounting of protective earth connection	Visual inspection	at least every 6 months
Insulation of the cables	Visual inspection	at least every 6 months

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