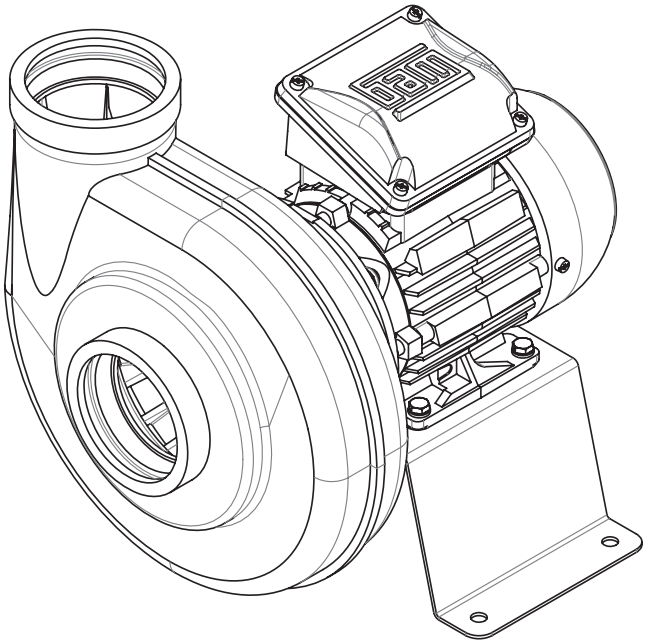
Operating instructions

CCV 75

Centrifugal fan with direct drive



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Version 1.1-en | 03/2026

Revision history table

Version		Description	Date	Name
1-en	EU	First version published.	10/01/2024	A. Roth
1.1-en	EU	Operating instructions revised.	3/20/2026	A. Roth

Document identification

Translation of the original German operating instructions.
Colasit TD-000883

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1 Operating instruction information

Scope

These operating instructions provide qualified personnel with all essential safety instructions, information, and guidance for working with CCV 75 type fans.

All phases of a fan's service life are covered, from transport, mounting, and placement in service to repairs and disposal.

Careful reading of and compliance with these operating instructions will help to avoid injuries as well as environmental and material damage, ensure operational safety and reliability of the fan, and minimize downtime.

Storage location

The operating instructions and associated documents are to be stored near the fan such that they are easily accessible to qualified personnel at all times.

Upon request, the operating instructions and associated documents are also to be provided in electronic form upon delivery of the fan. This gives the operator the ability to print new operating instructions in the event that they go missing or to replace illegible or missing pages.

Design notes

For the sake of simplification, in these operating instructions,

- the company COLASIT AG is referred to as the "manufacturer,"
- all sizes (CCV 75) are generally referred to as the "fan,"
- "frequency converter" is abbreviated as "FC,"
- chapter and page number references appear as follows: ⇨ Chap. 1 [▸ 6]

The images in these operating instructions are for illustrative purposes and could differ from the actual execution.

In the interest of our customers, we reserve the right to make changes as a result of technical developments.

Translation note

The German language version of this document is the original set of operating instructions.

Inquiries

If possible, clarify any ambiguities in a given language version with the aid of the original operating instructions. Ambiguities regarding the operating instructions are to immediately be clarified with the manufacturer. Placement in service of or other work on the fan is only permitted after successful clarification.

1.1 Further applicable documents

In addition to these operating instructions, the following documents and guidance shall be available as associated documents for working on the fan:

- Technical data sheet for the fan with complete technical data, including application limitations.

- Order confirmation or the specification sheet for the conveyed medium with information on the (limited) resistance of the fan to certain chemical substances. See also “Permissible conveyed media” ⇨ Chap. 2.2.1 [▶ 8].

The order confirmation also provides details regarding the full scope of delivery.

- Operating instructions for the electric motor.
- Operating instructions for devices or equipment that were installed or included (e.g. FC or isolation switch).

Additional document

- Fan manufacturer’s EMC Guidebook, if the fan is intended for operation with a frequency converter (FC).

1.2 Copyright

These operating instructions are protected by copyright.

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The use and distribution of the operating instructions is permitted in the context of using the fan. Any other use is only permitted with the written consent of the manufacturer.

2 Additional safety instructions

This chapter contains information relevant to safety and additional as well as more in-depth safety instructions for operators and technical specialists.

Additional safety instructions

Depending on the execution of the fan, associated documents can contain additional operating instructions with important safety instructions.

2.1 Use and storage of the operating instructions

- Before beginning mounting procedures or working on the fan, read these operating instructions carefully and completely.
- After use, always return the operating instructions to the marked storage location near the fan.

2.2 Intended application of the fan

The fan is intended for conveying gaseous media and is designed and manufactured in accordance with the state of the art and the recognized technical safety regulations.

Nevertheless, the fan may pose a danger to life and limb of personnel or third parties as well as material damage. Special care is therefore to be taken to ensure that the fan is in technically sound condition and that it is used as intended.

2.2.1 Intended use

The fan is intended exclusively for industrial and commercial use and for installation in a complete system. The fan may only be transported, mounted, operated, maintained, and repaired by trained technical specialists ⇨ Chap. 2.2.5 [▸ 12].

Permissible conveyed media

In general, conveyance of dust-free air is permissible within the parameters specified in the technical data sheet.

Conveyance of corrosive, hazardous, gaseous media is restricted as follows:

1. The following apply to a conveyed medium that is specified in the fan's technical data sheet:
   - The fan is suitable exclusively for conveyance of the specified medium.
   - The service life of the fan could be limited if there is a corresponding note in the order confirmation or the specification sheet.
2. The following apply to a conveyed medium that is specified as “undefined” in the fan's technical data sheet:
   - The fan is suitable for conveyance of those corrosive, hazardous media to which the plastics of the fan and sleeves are resistant.
   - For independent assessment, the operator is to consult the pertinent available resistance lists for plastics. The SIMCHEM guide is found on the manufacturer's website (www.colasit.com).

- The order confirmation or the additional specification sheet contains further information and notes regarding a potential reduction in service life of the fan.

3. The following apply if, according to the operator's information, the conveyed medium contains several chemical substances:
   - The named importer or the manufacturer confirms the resistance of the fan to these chemical substances in the order confirmation or the specification sheet, which is an associated document.
   - The service life of the fan can be limited if there is a corresponding note in the order confirmation or the specification sheet.

Permissible environmental conditions

1. The permissible operating and ambient temperature ranges are indicated on the fan nameplate.
   The minimum permissible operating temperature for the plastic parts of the fan is -20 °C.
2. The following applies if this information is missing from the nameplate:
   - Permissible ambient temperature range of the electric motor: See nameplate of the electric motor or the operating instructions/declaration of conformity of the motor manufacturer.
3. At operating temperatures below 4 °C, it is to be ensured by means of a constant minimum flow rate that
   - no condensate freezes in the fan or ductwork.
   - no pieces of ice from the ductwork get into the fan.

Procedure for process changes

- The operator is to ensure upon a process change that
  - the fan can withstand the parameters changed or the new conveyed medium,
  - the operating conditions according to the technical data sheet and nameplate plate are adhered to.

Operating conditions

- The permissible operating conditions of the fan are defined by the parameters and limit values on the technical data sheet or on the nameplate.

Note especially:

- The drive motor of the fan is designed for continuous operation (S1) or FC operation (S9).
- Maximum speed, which is dependent on
  - the temperature of the conveyed medium,
  - chemicals present and their concentration in the air stream.
- Prevention of excessive self-heating:
  - The operating point (see characteristic map on the technical data sheet) shall be above the minimum permissible conveyed volume.
- Operate the fan under negative pressure so that no or minimal conveyed medium escapes from the impeller hub.

The leakage value of the supplied fan can be requested from the distributor.

- The fan may not be mechanically stressed at the inlet and outlet connections.
  - Decouple the ductwork from the fan via the sleeves ⇨ Chap. 6.5 [▶ 30].
- When using a frequency converter,
  - observe limit values for the acceleration time and braking time ⇨ Chap. 7.3 [▶ 34],
  - the electrical connection to the motor is to be EMC compliant, with cable shield and grounding ⇨ Chap. 7.3.3 [▶ 37].
- Series or parallel operation of fans is permitted only after clarification and approval by the manufacturer or importer named in the operating instructions.

Intended use also includes compliance with all safety regulations and guidelines in these operating instructions.

2.2.2 Reasonably foreseeable misuse

Any use of the fan other than that for which it is intended or any other use is considered misuse and can lead to dangerous situations. The manufacturer assumes no responsibility for resulting injuries or material damage.

The following list of misuse is exemplary and not exhaustive.

- Operation of the fan in potentially explosive environments or with a flammable, explosive conveyed medium.
- Operation of the fan outside the parameters and limit values specified in the technical data sheet.
- Operation of the fan with prohibited conveyed media, such as solids and dust.
- Operation of the fan in spite of strong vibration or with disturbances that create an objectionable condition in terms of safety.
- Prohibited configurations of the frequency converter.
- Removal of components or tampering with components that ensure safe and proper functionality of the fan (e.g., protective grid, sleeves).
- Improperly conducted maintenance work.
- Use of non-original spare parts.
- Unauthorized modifications or alterations to the fan without the written consent of the manufacturer.
- Any use of the fan that does not comply with the essential safety regulations of these operating instructions.
  - Operation without operating instructions and associated documents.
  - Operation with illegible or missing warning signs.

2.2.3 Equipment limits

Spatial dimensions

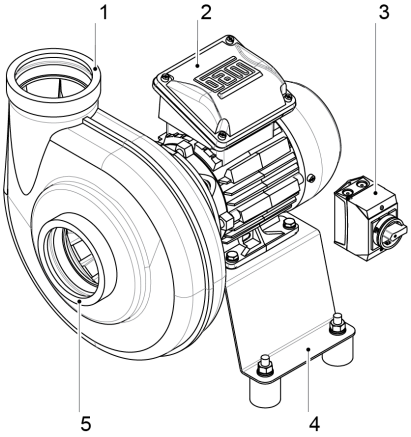
The dimensions of the fan are specified in the technical data sheet.

Application limits

The operating temperature range and further operating conditions are specified in the technical data sheet and on the nameplate.

Interfaces

The fan has the following interfaces:



1. Outlet connection (pressure side): Connection to discharge air ductwork with optional sleeve.
2. Terminal box on electric motor.
3. Isolation switch: Terminals for electrical supply to accessories and options (e.g., FC for electric motor).
4. Fan mounting: floor mounting option ⇨ Chap. 6.4 [▶ 30].
5. Inlet connection (suction side): Connection to supply air ductwork with optional sleeve.

Fig. 1: Interfaces on fan

Service life

The fan is designed for an expected service life of 15 years.

The motor bearings of quality motors are designed for a service life of 40,000 hours when used as intended.

The environmental, application, and operating conditions determine the service life of the hub seal (wear parts) of a given application.

2.2.4 Residual risks

The fan is designed and manufactured in accordance with the state of the art and the recognized technical safety regulations. Residual risks nevertheless remain. They are indicated by safety instructions in these operating instructions and require the user to proceed with caution.

Hazardous, aggressive conveyed media

Residue and deposits of the conveyed medium can reside in the fan or flow in from the ductwork.

- Qualified personnel responsible for maintenance and repair work shall
  - be trained in handling hazardous conveyed media,
  - wear suitable personal protective equipment,

- coordinate with the operator when taking suitable protective and lock-out measures.

When operating the fan in an overpressure condition, the conveyed medium can escape at the impeller hub and lead to adverse health effects.

- Operate the fan at negative pressure for use with hazardous conveyed media.

2.2.5 Target groups and personnel requirements

These operating instructions are intended for:

- The operator of the system in which the fan is installed.
- The qualified personnel who carry out work on the fan during its various life cycle phases, from installation to disposal.

The duties and personnel requirements for these target groups are described next.

2.2.5.1 Operator

The operator is the person who operates the fan for commercial or economic purposes or who allows a third party to use it and who assumes legal liability during its operation.

The operator has the following duties:

- Comply with the minimum safety and health protection regulations for the use of work equipment and performance of activities on the fan.
- Keep current on national and local occupational safety and health regulations.
- Prepare Safety Data Sheets when the conveyed medium contains hazardous substances.
- Identify via risk assessment all additional dangers that arise due to special working conditions at the fan installation location.
  - Based on the risk assessment, derive, define, and implement for qualified personnel the appropriate protective measures and operating instructions for safe maintenance and other activities.
  - Adapt these operating instructions to current applicable standards and regulations at the time of operation.
- Ensure that the fan is always in a technically sound condition under observance of the maintenance intervals per these operating instructions.
- Initiate and verify that the function and integrity of all fan safeguards are checked regularly.
- Ensure that all manufacturer’s regulations are observed upon retrofitting of safeguards.
- Determine the priority of shutting down the fan upon system malfunction or in an emergency.
- Clearly determine and regulate the responsibility for installation, servicing, maintenance, and repair of the fan.
- Ensure that the responsible qualified personnel
  - have read and understood these operating instructions,
  - have adequate occupational qualifications,
  - are regularly trained in the dangers related to and measures to take upon malfunction or in an emergency.

- Store these operating instructions and associated documents in their entirety in legible condition in an identified location near the fan.
- Save and protect the electronic version of these operating instructions.
- Prepare the required protective equipment and direct the wearing of this protective equipment by qualified personnel based on the operating and environmental conditions.

2.2.5.2 Transport personnel

The transport personnel are responsible for the transport of the fan to the installation location and for its removal for disposal at the end of its lifespan.

The transport personnel:

- Possess all necessary occupational knowledge, qualifications, and authorizations for operating the necessary lifting and transport devices.
- Are trained in the proper application of lifting and load handling attachments.
- Are knowledgeable of the safety and accident prevention guidelines and directives as well as recognized regulations of the technology applicable to transport.
- Are authorized by the operator to perform transport operations.

2.2.5.3 Mounting personnel

Mounting personnel are responsible for the installation of the fan in the system and for the subsequent placement in service. Removal of the fan for disposal also falls in this area of responsibility.

- Mounting personnel consist exclusively of qualified technical specialists who possess the necessary occupational experience, knowledge, and qualifications for mechanical and electrical work on the fan.
- The technical specialist is dependable when it comes to current safety and accident prevention guidelines, directives, and recognized regulations of the technology in their line of activity, and they are instructed by the operator.
- All work on the fan's electrical components may only be carried out by electricians.
- The fan may only be connected to the frequency converter by an electrician
  - after its operating instructions have been read and understood,
  - including detailed knowledge of the respective frequency converter,
  - and specialized knowledge of EMC-compliant wiring (consult the manufacturer's EMC Guidebook).
- The fan manufacturer's declaration of conformity is invalidated upon erroneous connection of the frequency converter and electric motor.

2.2.5.4 Operating personnel

The fan is generally used in automatic operations with a controller.

If operating personnel are necessary, the operator ⇨ Chap. 2.2.5.1 [▶ 12] of the system is to determine the required education and qualifications for

- operating and outside cleaning of the fan ⇨ Chap. 9 [▶ 43].
- checking the operating condition of the fan ⇨ Chap. 10.3 [▶ 45].

2.2.5.5 Maintenance personnel

Maintenance personnel are responsible for the inspection, cleaning, maintenance, and repair of the fan.

- The same requirements apply as for the mounting personnel ⇨ Chap. 2.2.5.3 [▶ 13].
- An electrician is responsible for carrying out maintenance and repair work and for switching off and safely disconnecting the power supply from the fan.

3 Essential safety instructions

The associated documents can contain additional operating instructions with important safety instructions ⇨ Chap. 1.1 [▶ 6].

3.1 Notation of safety instructions

The safety instructions and warnings in these operating instructions are identified by the following warning symbols, signal words, and colors (electronic version of the operating instructions only), which convey the severity of the dangers.

Death or serious injuries

DANGER Danger to life due to... !

Outcome of the danger upon noncompliance...

- Conditions for prevention of the danger...
- ▶ Measures for prevention of the danger...

This safety instruction, the highest danger level, denotes and a direct and immediate dangerous situation. This indicates a hazardous situation which, if not avoided, will result in death or serious injury.

Serious injuries

WARNING Risk of injury due to... !

Outcome of the danger upon noncompliance...

- Conditions for prevention of the danger...
- ▶ Measures for prevention of the danger...

A safety instruction of this danger level denotes a possible dangerous situation. This indicates a hazardous situation which, if not avoided, will result in death or serious injury with lasting effects.

Minor injuries

CAUTION Bodily injuries due to... !

Outcome of the danger upon noncompliance...

- Conditions for prevention of the danger...
- ▶ Measures for prevention of the danger...

A safety instruction of this danger level denotes a possible dangerous situation. This indicates a hazardous situation which, if not avoided, may result in minor or moderate injury, possibly with lasting effects.

Material damage

NOTICE Material damage due to... !

Outcome of the danger upon noncompliance...

- Conditions for prevention of the danger...
- ▶ Measures for prevention of the danger...

This warning informs of a dangerous situation that can damage the fan or lead to other material damage.

3.2 Personal protective equipment

The personal protective equipment to be worn:

- is to be determined and made available by the operator based on the operating conditions and conveyed medium.
- is the personal responsibility of the qualified personnel to be worn as suitable for the work to be conducted and to be supplemented as necessary.

The manufacturer recommends personal protective equipment according to the following table:

Symbol	Meaning
	Class 2 fluorescent warning vest with reflective stripes for improved visibility during transport operations.
	Close-fitting industrial safety clothing with low tear resistance for protection against introduction into rotating machinery.
	Hardhat to protect the head from falling objects, swinging loads, and strikes from sharp, pointed machine parts.
	Safety glasses to protect the eyes from airborne particles, parts, and fluids. Protection from aggressive, hazardous conveyed media or residues.
	Hearing protection required at or above noise exposure levels of 85 dB(A) or 137 dB (CPeak).
	Suitable breathing protection when in contact with aggressive, toxic conveyed media or residues.
	Work gloves for protection from injuries, burns, or contact with aggressive, toxic residues of the conveyed medium.
	Safety shoes for protection from crushing and from falling parts as well as slips and falls on slick surfaces.

3.3 Mechanical hazards

DANGER Risk of injury due to
- rotating impeller,
- parts ejected with high force following impeller breakage,
- sharp corners or edges.

Serious injuries due to debris being launched out.

Crush, cut, strike, eye, or other injuries.

- Operation in a manner other than that intended (e.g. regarding temperature, speed, conveyed medium).

- ▶ Only authorized qualified personnel may conduct work on the fan.
- ▶ Prior to beginning mounting, maintenance, and repair work: Use the isolation switch to remove voltage on all phases.
- ▶ Prevent unauthorized start-up of the fan: Hang personal padlock and tag on isolation switch.
- ▶ Wear personal protective equipment.
- ▶ Do not leave any tools or mounting accessories in the fan.
- ▶ Comply with all current accident prevention guidelines.

WARNING Risk of injury due to automatic start-up

Entry and crushing of appendages.

- The fan is to be operated in a system and controlled by automatic controls.

- ▶ Prior to beginning mounting, maintenance, and repair work: Use the isolation switch to remove voltage on all phases.
- ▶ Prevent automatic start-up of the fan: Hang personal padlock and tag on isolation switch.

3.4 Electrical hazards

DANGER Danger to life due to electric shock from contact with current-carrying conductors or components under hazardous voltage.

Immediate danger to life due to respiratory and cardiac arrest.

- Only a qualified and authorized electrician may work on the power mains and the electrical components of the fan.

- ▶ Prior to beginning mounting, maintenance, and repair work: Use the isolation switch to remove voltage on all phases.
- ▶ Prevent unauthorized start-up of the fan: Hang personal padlock and tag on isolation switch.
- ▶ Establish an electrically safe work condition before beginning work.
- ▶ Promptly rectify any defects discovered in the electrical components and wiring of the fan.
- ▶ Eliminate moisture from current-carrying components to avoid a short circuit.

WARNING Risk of injury due to fire caused by short circuit

Burns, respiratory tract damage due to toxic fire smoke.

- ▶ Protect cables from mechanical, chemical, and thermal stresses.
- ▶ Regularly inspect the fan's electrical components. Replace damaged components and cables immediately.
- ▶ Have and periodically inspect suitable fire extinguishers. Observe the safety instructions on the fire extinguisher.

3.4.1 Danger due to electromagnetic interferences

Observe the following safety and hazard instructions if the fan is used with a frequency converter.

Frequency converters generate electromagnetic interference during operation and can cause high-frequency leakage current in the electric motor, supply power network, and grounding system.

⚠CAUTION Interference from electromagnetic fields

Disturbance of sensitive electronic equipment by electromagnetic fields.

- ▶ When the fan is running, persons with pacemakers and other implanted electronic devices must not remain in the immediate vicinity of the frequency converter and electric motor.

NOTICE Disturbances to other devices from electromagnetic fields as well as bearing damage to electric motor due to leakage current

Exceeding legally permissible emission limits.
Reduced lifespan of the motor bearing.
Possible system operating faults and production interruptions.

- ▶ Use of suitable interference suppression and shielding methods, such as a mains suppression filter and shielded motor connection cable.
- ▶ EMC-compliant equipment design, especially for cable routing and shielding connections. See EMC Guide of the manufacturer and/or third-party equipment manufacturer.
- ▶ Observe FC manufacturer's recommendations for avoiding electromagnetic interferences.

3.5 Thermal hazards

⚠CAUTION Risk of burn due to contact with hot surfaces

Burns to unprotected body parts.

- The fan housing and support can reach temperatures over 60 °C due to a hot conveyed medium.
- The fan's electric motor can reach temperatures over 60 °C on its surface during operation.
- ▶ Allow a hot fan or electric motor to cool off.
- ▶ Wear protective gloves when working on the fan or electric motor.
- ▶ When mounting the fan, observe the minimum distance between the fan cowl of the electric motor and neighboring components or walls ⇨ Chap. 6.2 [▶ 28].

3.6 Noise hazard

⚠CAUTION High noise level with start-up and operation of the fan

Response upon being startled as well as hearing damage and hearing loss as long-term consequences.

- ▶ Observe the information in the technical data sheet on noise emissions from ducts and the casing.
- ▶ Wear hearing protection in the vicinity of the fan when required.
- ▶ Comply with legally mandated noise control regulations. If the fan is installed outdoors, comply with environmental noise emission limit values.

3.7 Conveyed medium hazards

⚠WARNING Risk of injury due to escape or inflow of a conveyed medium with the ability to cause adverse health effects

Risk of eye irritation, cough, difficulty breathing, burn, and suffocation.

- ▶ Clarify what medium is being conveyed.
- ▶ Observe the Safety Data Sheet(s) of the conveyed medium.
- ▶ Wear suitable personal protective equipment.
- ▶ Close the shut-off damper in the ductwork.
- ▶ Ventilate closed rooms.
- ▶ Take special safety precautions when working in confined spaces:
  - Request permit.
  - Inform supervisory personnel.
  - Assign an attendant.
  - Measure gas content in the work area.

⚠WARNING Risk of injury due to aggressive, hazardous residue and deposits

Chemical burn and poisoning upon contact.

- Conveyed medium forms deposits in the fan and ductwork that can cause adverse health effects.
- ▶ Wear suitable personal protective equipment.
- ▶ Observe the Safety Data Sheet(s) of the conveyed medium.
- ▶ For leaking condensate: neutralize, immediately wipe up, and dispose of in accordance with current local regulations.

3.8 Dangers due to insufficient safety

⚠WARNING Risk of injury due to missing or non-functioning safeguards

- Safeguards on fan: Isolation switch, protective grid for free-sucking/blowing installation.
- ▶ Regularly inspect safeguards for function and damage.
- ▶ Replace missing or damaged safeguards immediately.

3.9 Actions to take in an emergency

Explosion or melting of the plastic components during fan operation constitutes an emergency situation.

Possible causes (due to use in a manner other than that intended):

- Mechanical damage to the impeller due to foreign objects or speeds above the permissible limit.
- Prohibited chemical or thermal factors (compare with technical data sheet).

Possible consequences:

- Parts ejected from the fan with high force.
- Casing explosion.
- Escape of conveyed medium.
- Development of hot, corrosive, hazardous, or flammable gases.

⚠WARNING Risk of injury due to damaged fan

- Fan can continue coasting for a long time after being switched off.
- Danger by contact with dangerous parts and conveyed medium if casing is damaged.

▶ Use caution when approaching the fan.
▶ Observe the Safety Data Sheet(s) of the conveyed medium.

If no emergency measures are directed by the operator, proceed as follows:

1. Use the isolation switch to remove voltage on all phases.
2. Get personnel who are injured or in danger to safety. Get personnel who are having difficulty breathing to fresh air immediately.
3. Perform first aid.
4. Alert rescue/emergency personnel and inform them of the hazards of the conveyed medium according to the Safety Data Sheet.
5. Safeguard the hazardous area.
6. Fight small incipient fires only with fire extinguishers approved for low-voltage electrical equipment and the conveyed medium.

⚠WARNING Risk of burn, risk of poisoning from smoke inhalation

Burns, damage to respiratory tract.

- The thermoplastic of the fan generates smoke when burnt.
- If the fan housing is made of PVC, there will be adverse health effects and caustic smoke when burnt.

▶ Maintain a safe distance when extinguishing.
▶ Pay attention to the direction in which the smoke is spreading.

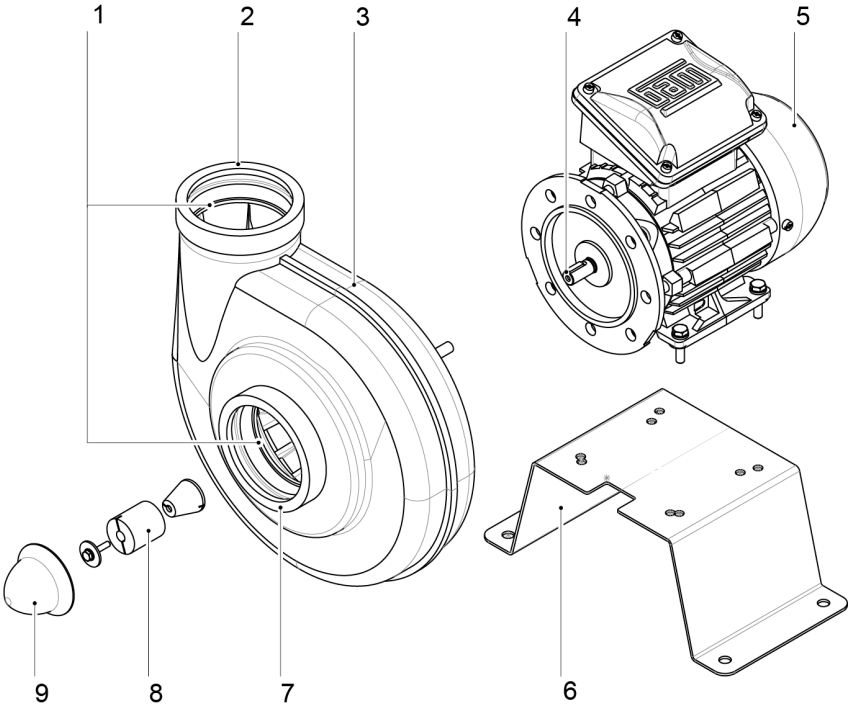
⚠WARNING Danger of asphyxiation with carbon dioxide (CO_2) fire extinguisher use

- There could be a high concentration of carbon dioxide (CO_2) in the breathing air.

▶ Do not attempt to extinguish in confined, small, or enclosed spaces.
▶ Instead, fight fire from outside through open door.
▶ Do not access area where fire occurred until it has been thoroughly ventilated.

4 Structure and function

4.1 Overview



1	Sealing ring in inlet connection (7) and outlet connection (2)
2	Outlet connection
3	Subassembly, impeller with casing
4	Motor shaft
5	Electric motor
6	Support
7	Inlet connection
8	Clamping adapter: secures the impeller to the motor shaft (4) via positive fit
9	Hub cap: seals the clamping adapter (8) and motor shaft (4) from contact with the conveyed medium

Function description

In the fan, a rotating impeller draws in a gaseous medium through the inlet connection and conveys it in the direction of the motor axis.

The mechanical energy supplied by the electric motor causes an increase in pressure and speed of the conveyed medium. The spiral-shaped casing directs the conveyed medium to the outlet connection.

4.2 Signs and warning symbols on the fan

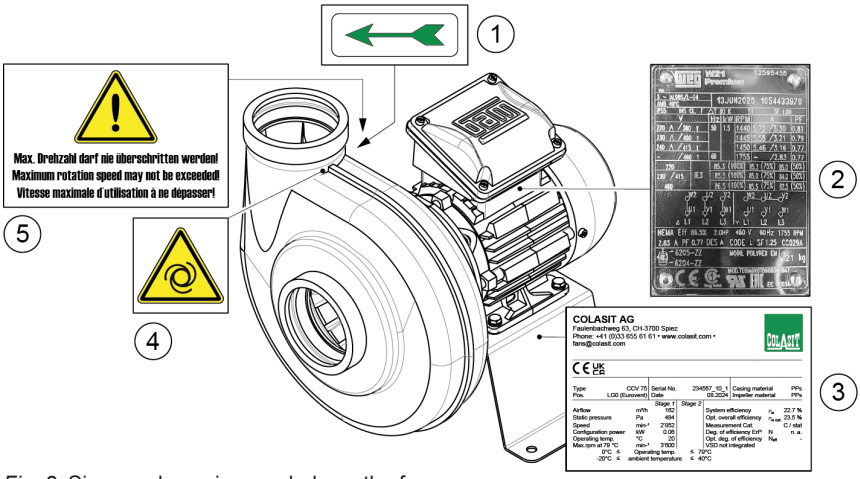


Fig. 2: Signs and warning symbols on the fan

1 Direction of rotation arrow	4 “Automatic start-up” warning sign
2 Electric motor nameplate	5 “Maximum speed” warning sign
3 Fan nameplate	

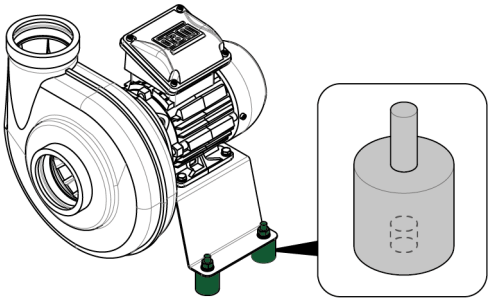
For FC operation, the nameplate or a supplementary nameplate of the electric motor contains additional information on limit values according to EN 60079-7 (max. frequency [f_{max}] and other information).

The operator's responsibilities regarding these signs on the fan are to

- keep them clean and uncovered,
- replace them if damaged or missing.

4.3 Options and accessories

4.3.1 Vibration absorbers (round isolators) for floor mounting

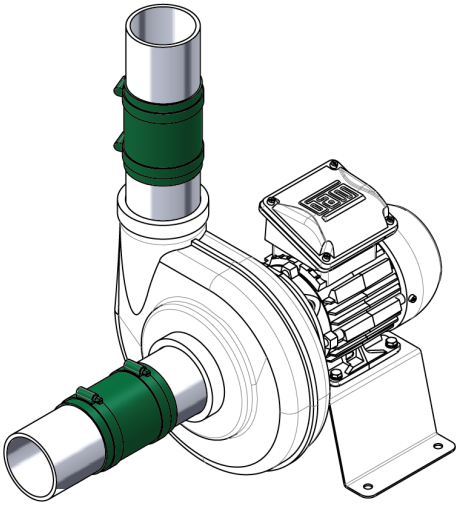


- **Required accessory.**
- For attaching the fan to the floor.
- Dampens vibration and prevents operating faults.
- Designed for permissible fan vibration according to ISO 14694.

Fig. 3: Vibration absorbers for floor mounting

Instructions for vibration absorber selection and item characteristics
⇨ Chap. 6.3 [▸ 29].

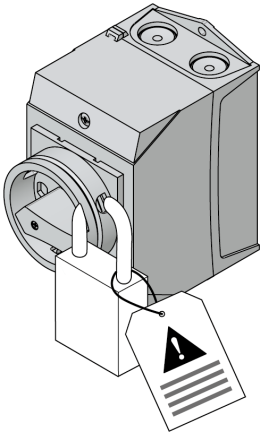
4.3.2 Sleeves



- For flexible connection of the inlet and outlet connections to straight ductwork via worm-gear hose clamps.
- Sleeves inhibit the transfer of mechanical loads to the fan housing.
- Executions: See accessories for the CCV 75 on the manufacturer's website (www.colasit.com).
- Permissible distance between fan connection and ductwork ⇨ Chap. 6.5 [▸ 30].

Fig. 4: Sleeve installation locations

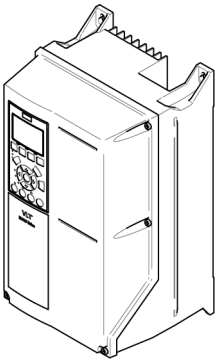
4.3.3 Isolation switch



- **Required accessory.**
- For removal of voltage on all phases before maintenance and repair work.
- Can be locked in the OFF position with a customer-supplied padlock.
- Note: The isolation switch is also referred to as a maintenance switch.

Fig. 5: Isolation switch

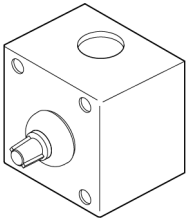
4.3.4 Frequency converter (FC)



- Optional accessory.
- For fan speed control.
- FC installation options ⇨ Chap. 7.3.1 [▶ 35].
- EMC-compliant wiring ⇨ Chap. 7.3.3 [▶ 37].
- FC parameterization ⇨ Chap. 7.3 [▶ 34].

Fig. 6: Frequency converter (example)

4.3.5 Speed adjustment potentiometer



- Optional accessory.
- For setting the nominal speed on the frequency converter (FC) according to the technical data sheet.
- FC parameterization ⇨ Chap. 7.3 [▶ 34].

Fig. 7: Speed adjustment potentiometer (example image)

5 Transport

5.1 Safety instructions

These safety instructions warn against dangers that can arise when transporting the fan.

⚠WARNING Danger to life when remaining under suspended loads

Injuries due to falling or swinging loads.

- ▶ Avoid hazardous area under the suspended load.
- ▶ Never stand under or in swinging range of suspended loads.
- ▶ Maintain a safe distance from suspended loads.
- ▶ Do not leave suspended loads unattended.

⚠WARNING Risk of injury due to packing pieces falling or tipping over

Bruising and contusion injuries.

SAFETY INSTRUCTIONS

- ▶ Wear personal protective equipment.
- ▶ Only use hoisting gear, load handling attachments, and slings that are undamaged, approved, and have suitable load-bearing capacity.
- ▶ Use all attachment points provided, and observe the center of gravity ⇨ Chap. 5.5.1 [▸ 26]. Exception: **The lifting eye bolt on the electric motor is not an attachment point for transport.**
- ▶ Do not place slings on sharp edges or corners, and do not knot or twist them.
- ▶ The transport route must be free of obstacles and safeguarded in accordance with local regulations.

NOTICE Risk of damage due to improper transport

Damage to the fan and other material damage.

- A package with a center of gravity that is off center can tip, swing out, or fall down when lifted.
- ▶ Use provided attachment points.
- ▶ Use additional transport aids as transport protection.
- ▶ Lift package cautiously.
- ▶ Avoid rocking and swinging movements during transport.

5.2 Incoming goods inspection

For the delivered fan:

- Check for completeness based on the shipping documents.
- Inspect for possible transport damage.

If transport damage is detected:

1. Do not receive delivery, or doing so only conditionally.
2. Record transport damage (photos).
3. Note the extent of the damage on the transport paperwork or on the transport company's bill of lading.
4. File a complaint immediately.

Claims for damages can only be made within the complaint period and in accordance with the general terms and conditions (T&C). Save packing for a possible return shipment.

5. Mount the fan and place it in service only after repairs and resolution of complaints.

5.3 Packing

The packing and provided transport protection protect the fan from transport damage and environmental influences.

Do not damage the packing, and remove it only shortly before mounting.

Disposal instructions

The transport packing is intended as disposable packing and is to be disposed of after use in accordance with current local disposal instructions.

5.4 Intermediate storage

Pack the fan in the original packaging as follows:

- Covered, dry, and dust-free location.
- Protect from sun, weather, and condensation.
- Storage temperature +10 °C to +50 °C with max. 50 % humidity.

Measures for longer intermediate storage

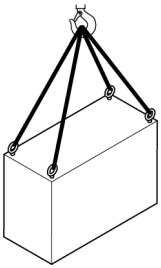
After every 3 months of storage time, turn the impeller several rotations to prevent bearing damage.

5.5 Transport to installation location

Provide suitable hoisting gear and load handling attachments for transport.

5.5.1 Transport by crane

Transporting package with lifting eye bolts

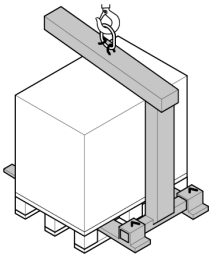


- Position crane hook over the middle of the package.
- Attach sling to all lifting eye bolts of the packing.
  ⚠WARNING Do not lift the fan by the lifting eye bolt of the electric motor.
- Check: Slings are not twisted. Sling legs and bends are in permissible positions.
- Lift package slightly and check that it hangs level.

Fig. 8: Package with lifting eye bolts

- Let down and adjust a package that doesn't hang level: Shorten or lengthen legs on one side appropriately until all legs are loaded equally.

Transporting package on a pallet



- Inspect pallet: A damaged or rotted pallet may not be transported by crane.
- Preferably, transport pallet by crane fork or pallet jack.
- Otherwise, attach sling to pallet such that it will not slip.
- Further procedure same as for as transport with lifting eye bolts.

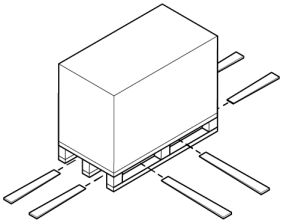
Fig. 9: Package on transport pallet

Transport note

The fan does not have rigging points for slings or chains. Transport the fan to the installation site with the pallet and packaging and position the fan there by hand.

Maximum weight of the fan: 20 kg

5.5.2 Transport by pallet stacker or forklift



A package on a pallet can be transported by pallet stacker or forklift under the following conditions:

- Forks inserted under the pallet as depicted such that they stick out from the opposite side.

Fig. 10: Package on transport pallet

6 Mechanical installation

6.1 Safety instructions

These safety instructions warn against dangers that can arise when mounting the fan.

⚠WARNING Risk of injury due to unsecured work area

Injuries due to objects falling or being bumped.

- The installation location of the fan could be inaccessible or at a dangerous height.

- ▶ Set up safe means for accessing the installation location (e.g. walkway with banisters, platform).
- ▶ Safeguard work area with enclosures, safety nets, etc.
- ▶ Secure work area against unauthorized access.

⚠WARNING Risk of injury due to improper mounting.

Injuries by pinching and crushing of body parts.

- ▶ Confirm the design and load capacity of the foundation and fastening elements with a structural or civil engineer.

- ▶ Safeguard the fan against tipping by suitable means.
- ▶ Immediately following completion of mounting work, remove all braces, supports, etc.
- ▶ Use a protective grid for guarding with a free-sucking or free-blowing execution. Use safety protection devices to prevent the ingress of dirt or foreign objects (IP20 degree of protection).

⚠WARNING Risk of injury due to escape or inflow of a conveyed medium with the ability to cause adverse health effects

Risk of eye irritation, cough, difficulty breathing, burn, and suffocation.

- ▶ Wear protective equipment.
- ▶ Close shut-off damper to inlet and outlet connections until all installation work is complete.
- ▶ Watch for escaping conveyed medium as well as deposits and condensate when using the service opening and inspecting the ductwork.

6.2 Installation location requirements

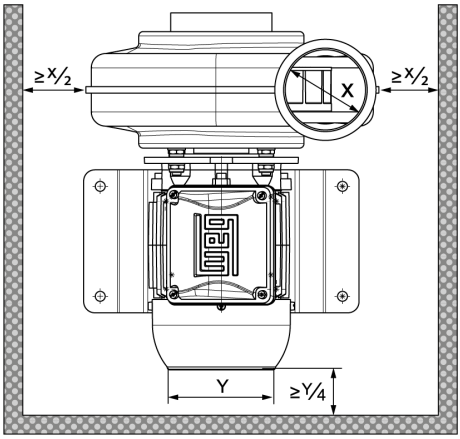
NOTICE Risk of damage due to improper outside mounting

Material damage and production downtime.

- ▶ Protect fan and FC (option) from exposure to weather as much as possible.
- ▶ Use platform for installation sites with poor drainage.

Foundation (baseplate) or mounting surface shall meet the following requirements:

- Vibration resistant
- Flat surface
- Suitable for absorption of static and dynamic loads.
  - For calculations for the mounting parts, assume four times the fan weight.



- Provide suitable clearance around the fan for
  - maintenance and repair work,
  - motor cooling.

Fig. 11: Space requirement for work area and motor cooling

Dimensioning notes

The minimum distance at the installation site for the fan cowl of the electric motor must be larger than one fourth the diameter (Y) of the fan cowl. Deviations are permitted if they are allowed per the motor manufacturer's operating manual.

6.3 Vibration absorbers mounting

⚠WARNING Risk of injury due to fan falling

Injuries by pinching and crushing of body parts.

- Undersized vibration absorbers can come off.

▶ Use the supplied vibration absorbers.
▶ Externally sourced vibration absorbers shall be equivalent.
▶ Only replace vibration absorbers with identical components during maintenance work.

NOTICE Risk of damage due to vibration

Material damage and production downtime, reduced service life.

- Missing or improperly sized vibration absorbers lead to damage of the motor, impeller, and installation site.

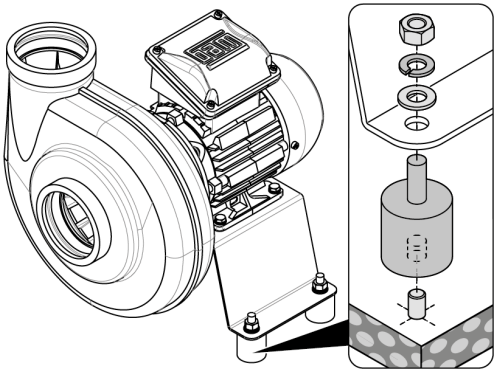
▶ Always mount fan with suitable vibration absorbers.

- Mount suitable vibration absorbers on the mounting holes of the support ⇨ Chap. 6.4 [▶ 30].

Suitable vibration absorbers (round isolators) for floor mounting

Fan	Round isolator type	Connection thread	Load capacity [N/pc]	Shore hardness [A]	Quantity [pc]
CCV 75	Type B Ø30 x 30	M8 x 20	499	68	4

6.4 Floor mounting



Conditions:

- Installation location requirements ⇨ Chap. 6.2 [▶ 28].
- Round isolators and fastening elements present.

Fig. 12: Fastening recommendation for floor mounting

1. Transfer fan support hole pattern to the foundation (baseplate).

Hole pattern dimensioning according to technical data sheet.

2. Install anchoring elements (anchors) according to supplier's instructions.
3. Fix round isolators to anchoring elements.
4. Set fan on round isolators and fasten tightly.

6.5 Connecting fan to ductwork

NOTICE **Risk of damage due to deformation of fan housing**

Impeller touches casing.

- Connection tubes attached directly to fan connections transmit prohibited stresses to the fan housing, e.g. due to thermal expansion.

▶ Only connect fan connections to ductwork with sleeves.
▶ Mount sleeves properly.

NOTICE **Risk of damage due to lateral forces**

Cracking of the sleeve.

- Sleeves can only minimally compensate for a lateral/radial duct misalignment.

▶ Align connection tubes precisely.
▶ Use supports for supplemental securing of connection tubes.

A detachable duct section (1, see image) is provided at the inlet connection for maintenance and repair work on the impeller. The length of the duct section shall correspond to at least the diameter of the inlet connection or the fan size.

Check beforehand:

- Turn the impeller by hand and check that it is smooth running.
- Check the fan and ductwork for tools left behind, mounting residues, or foreign objects.

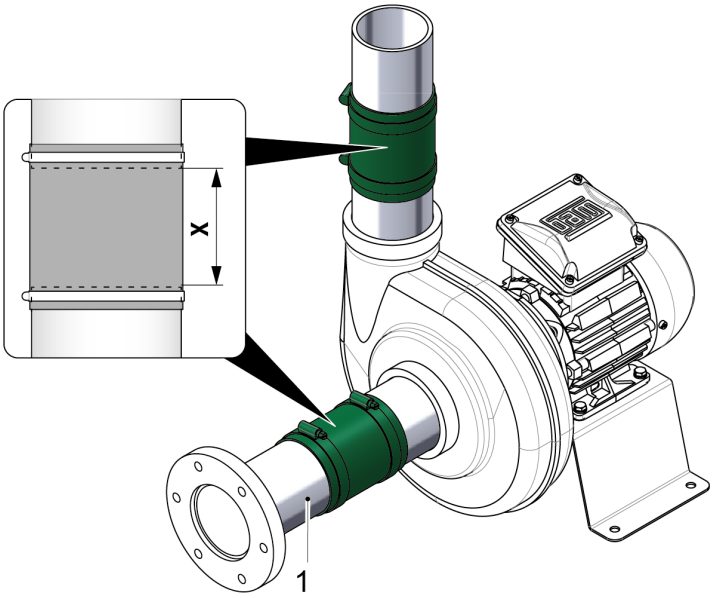


Fig. 13: Distance to ductwork connection

Procedure:

1. Push the duct section into the inlet or outlet connection.

Each fan connection has a lip seal that provides a sufficient seal for the standard execution. A flange connection is recommended for higher requirements (e.g., ATEX execution) Flange connections.

2. Push the sleeve ⇨ Chap. 4.3.2 [▶ 23] over the ductwork end together with the hose clamps.
3. Mount the ductwork and adjust it to the fan connection.
4. Observe the permissible distance X (see detail view).
   Standard: X = 30 – 40 mm
5. Push the sleeve onto the ductwork end and fan connection equally, and secure it with hose clamps.
6. Check that the sleeve has been mounted in a flexible, stress-free manner.

Available alternatives are conductive sleeves with flanges on both sides (use in Zone 2 environment if the piping is in the explosion protection zone).

6.6 Guarding and safety protection for free-sucking or free-blowing execution

WARNING Risk of injury due to unguarded inlet or outlet connection on fan.

Risk of injury due to rotating impeller.

- ▶ A protective grid must be installed as guarding on the inlet or outlet connection for free-sucking or free-blowing execution.

NOTICE Risk of damage to the fan.

The fan must generally be protected against the ingress of dirt and foreign objects that could enter through the air passage.

Contact your Colasit distributor for appropriate guarding and safety protection device solutions.

6.7 Final inspection

- Check that all screw connections on the fan and all fastening elements of the foundation (baseplate) or mounting surface are tight.
- If present in ductwork:
  - Service openings are shut.

7 Electrical installation

7.1 Safety instructions

These safety instructions warn against dangers that can arise during electrical installation of the fan.

DANGER Risk of injury due to electrical energy

Immediate danger to life due to respiratory and cardiac arrest.

- Erroneous or insufficient execution of the electrical connections, the wiring, and the cable routing as well as the electrical safeguards of the fan.

- ▶ Only authorized, qualified electricians may carry out the electrical installation and connect the fan to the power supply.
- ▶ The electrical installation is to be executed in accordance with the standard EN 60204-1, the technical connection requirements, and the relevant regulations.

WARNING Trip and fall hazard due to cables run along the floor

Bruises and other injuries.

- ▶ Motor connection cables run along the floor are to be run properly and protected by a cover.
- ▶ Indicate the trip hazard with floor markings.

WARNING Risk of electrical shock due to electrostatic charge

Subsequent injuries due to response upon being startled.

- As a precaution, take protective measures against electrostatic charge when operating the fan.

- ▶ Ground the fan support.
- ▶ For outside mounting, connect the fan support to the lightning protection system.

CAUTION Electrical hazards due to improper layout/undersizing of the electric motor and protective devices.
Operation outside of the specified characteristic curves.

- ▶ The application limits of the electric motor must be greater than or equal to the application limits of the fan.
- ▶ Size electrical protective devices according to the electric motor and connection cables.
- ▶ Operate only within the specified characteristic curves (flow rate and differential pressure) according to the technical data sheet.

7.2 Electrical protective devices

7.2.1 Isolation switch installation

Improper use of isolation switch

The isolation switch is only a protective device for disconnecting the fan from electrical power during mounting, maintenance, or repair work and not to turn the fan on and off in the context of operation.

The isolation switch

- is a required protective device,
- shall be installed in an easily-accessible location near the fan,
- provides qualified personnel a means of directly controlling and disconnecting the electrical power supply from the fan,
- shall therefore be executed as a lockable all-pole disconnect switch.

7.2.2 Motor protection switch installation

An electric motor with a nominal power rating over 0.5 kW is to be protected against overload and connected to the electrical power supply with a motor protection device (overload and short circuit protection) suitable for this.

NOTICE Risk of overheating of the electric motor

Damage to motor

The motor protection switch does not reliably protect the electric motor from overheating, particularly with insufficient motor cooling due to low speed, defective fan impeller, or clogged ventilation grid.

- ▶ The installation of a motor protection switch is the responsibility of the operator.
- ▶ Specify the motor protection switch based on the motor rated current on the nameplate.

If a frequency converter (FC) is used, clarify whether integrated motor protection functions allow for fan operation without an additional motor protection switch.

The FC is to be parameterized with the motor data by qualified personnel.

7.3 Instructions for frequency converter (FC) use

DANGER Risk of injury due to impeller explosion

Serious injuries due to debris being launched out.

- Exceeding the maximum speed after a malfunction or faulty operating condition of the frequency converter.
- ▶ The manufacturer recommends using a frequency converter with an integrated SLS safety function.
- ▶ Alternatively, implement higher-level drive control with an SLS safety subfunction.

The SLS (Safely Limited Speed) safety function prevents the electric motor from exceeding a specified speed limit.

WARNING Risk of injury due to high contact voltage

Injury by electric shock.

- If long cable shields are not connected/grounded, high contact voltages can occur during operation.
- ▶ Connect cable shields of motor connection cables and signal lines to a common reference potential.
- ▶ Do not use protective earth connections for shielding purposes.

⚠WARNING Risk of injury due to dangerous residual voltage

Injury by electric shock.

- After the fan has been switched off, dangerous residual voltage is still present in the frequency converter.
- ▶ The operating instructions of the frequency converter provide information about the time to be observed until this residual voltage has dropped to a safe value.
- ▶ Before beginning work on the electrical components, always establish an electrically safe work condition of the frequency converter.

7.3.1 Frequency converter (FC) installation options

For centrifugal fans, different executions of electric motors (IM, PM, EC) can be selected as a drive:

- IM ... Standard asynchronous motor/three-phase motor
- PM ... Permanent magnet motor
- EC ... Brushless DC motor

Connection options

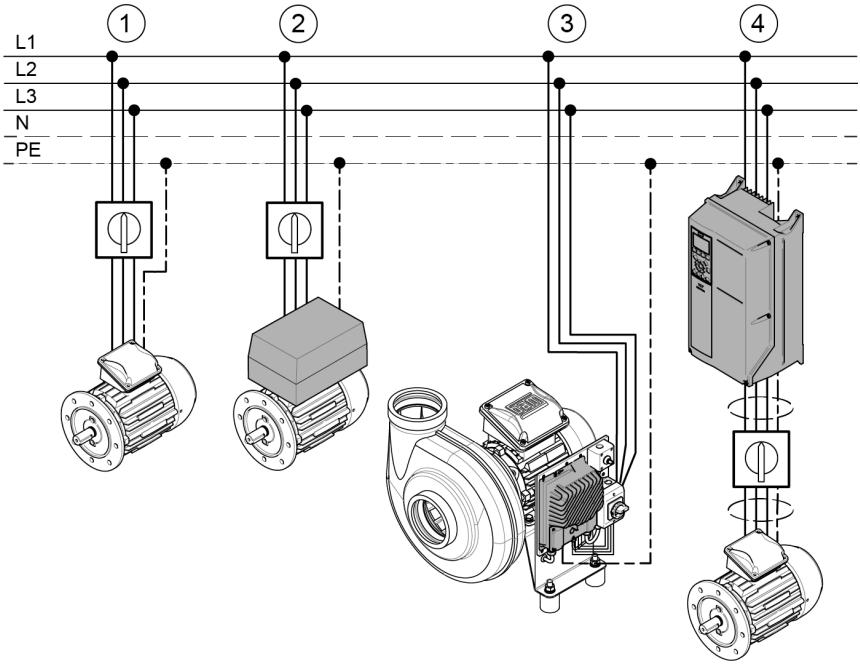


Fig. 14: Frequency converter (FC) installation options

Depending on the execution, an electric motor can either be connected directly (1) to the electrical mains or can/shall be operated with a FC.

L2 and L3 do not exist for a single-phase feed (230 V).

The FC is either

- directly attached to the electric motor (2, order option),
- mounted on the fan support (3, special option),
- or installed separately (4, customer solution).

NOTICE **Risk of damaging the frequency converter**

Do not manipulate the isolation switch when the electric motor is running if connection option 4 is used.

7.3.2 Frequency converter (FC) parameterization

NOTICE **Risk of damage due to erroneous parameterization**

Unpredictable fan behavior resulting in damage.

- ▶ Carry out parameterization carefully according to the FC operating instructions. The specialist shall be familiar with the FC. If necessary, consult the supplier.
- ▶ For basic setup, enter the motor data according to the nameplate on the electric motor.
- ▶ Enter the maximum frequency/speed limit according to the fan nameplate or technical data sheet.
- ▶ Enter the acceleration and braking times with regard to the following table.
- ▶ Record the parameters that were entered.

To prevent mechanically overloading the fan, observe these minimum permissible acceleration and braking times:

Electric motor nominal power [kW]	Acceleration/braking time [s]
< 1.5	min. 15
> 1.5	min. 30

To avoid an FC error message, a longer acceleration/braking time could be necessary.

Parameterization for PM motors

Parameterization for PM motors differs significantly from three-phase motors. The FC and motor manufacturers offer support for this.

7.3.3 Connecting the electric motor to a frequency converter (FC)

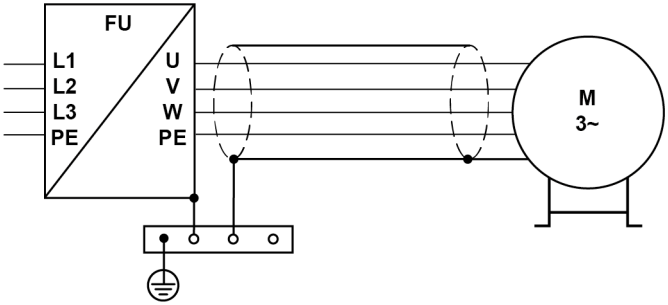


Fig. 15: Connection principle for short motor cable (FC close to fan)

EMC-compliant connection for FC operation

Observe the EMC instructions of the fan manufacturer as well as the operating instructions of the FC manufacturer.
In particular, the maximum permissible length of the motor connection cable between the FC and the electric motor as well as the corresponding grounding concept.

1. If possible, connect the cable shield of the motor connection cable directly to the FC output with a grounding bar.
2. Install the isolation switch in the EMC execution and/or ATEX execution given in the guidelines of these operating instructions.

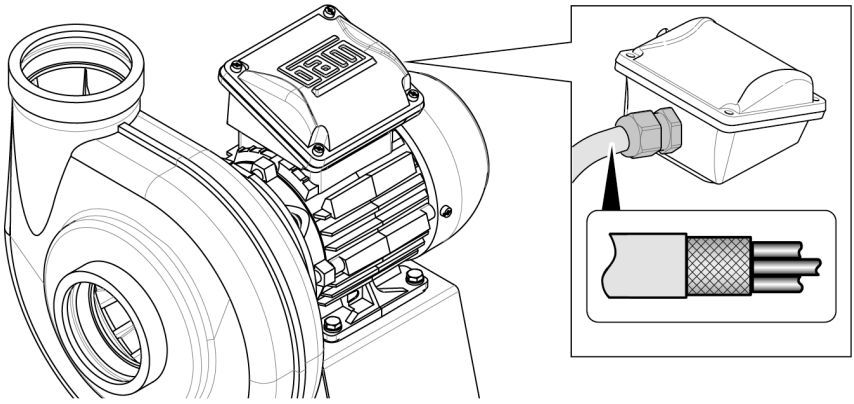


Fig. 16: EMC cable gland

3. Secure the motor connection cable to the motor terminal box with an EMC cable gland.
   - Strip the cable end appropriately so that contact can be made with the cable shield.
4. Connect the motor connection cable to the electric motor ⇨ Chap. 7.4 [▶ 38].

7.4 Connecting the electric motor

This chapter describes the direct connection of a three-phase motor (IM) to the electrical power supply (connection option No. 1 in overview ⇨ Chap. 7.3.1 [▶ 35]). For instructions on connection to a frequency converter ⇨ Chap. 7.3.3 [▶ 37].

Sizing and installing the motor connection cable

Adequately size the cross section of the motor connection cable, taking into account:

- Applicable standards and regulations
- Cable lengths
- Rated current
- Environmental conditions
- Type of installation

To size the connection cable, consult the cable manufacturer's tables for current-carrying capacity or request sizing information directly from the cable manufacturer.

When running the cable, observe the following essential principles:

- Avoid damaging the cable by pinching, cutting, pulling, etc. during installation.
- Run connection cables in the building securely with clamps or mounting brackets, and protect them from damage with cable conduit.
- For protection against vibration, run the connection cable between the fan and cable fasteners to the installation location such that it is flexible and movable.

Making the cable connection

- DANGER Establish an electrically safe work condition before beginning work.
- Connect the connection cable to the motor protection switch/fuses and the isolation switch.
  - Ensure correct connection of the phase conductors.
  - Seal all cable entries such that they are splash-proof.
- Compare the mains voltage and mains frequency with the information on the motor nameplate and determine the connection type of the electric motor (star or delta connection).

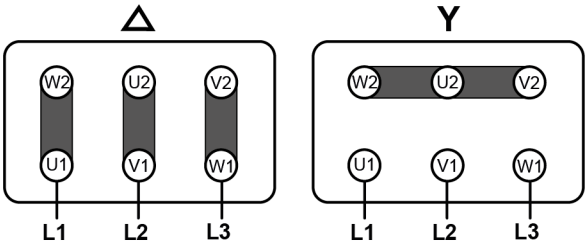


Fig. 17: Terminal assignment for delta and star connection

- Open the terminal box on the electric motor.
- If necessary, move the jumpers on the terminal board according to the terminal assignment.

The terminal assignment is also located on the inside of the terminal box cover.

- Connect the phase conductors (L1, L2, L3) of the motor connection cable to the terminal board in the correct order.
  - Use insulated ring terminals for phase conductors.
- Attach the protective earthing (PE) to the protective earthing connection in the terminal box using a ring terminal and serrated lock washer.
- Check:
  - Cable gland on the terminal box is suitable for the diameter of the connection cable.
  - All unused cable inlets on the terminal box are sealed watertight with blind plugs.
  - Sealing ring and sealing surface on the terminal box are clean.
- Close terminal box.

7.5 Final inspection

- Verify mains and motor connections with motor nameplate data.
- Check the sizing and setting of the electrical protective devices (fuses, motor protection switch).
- Check installation of motor connection cable and isolation switch.
  - Three-phase mains voltage is applied to the line side of the isolation switch.
- Check connections of protective earthing (PE) and grounding for fixed position and for execution compliant with standards.
- If frequency converter (FC) is used:
  - Check FC terminal assignment, shield connection, and cable strain relief.
  - Check and record important FC parameters and settings: Maximum output frequency, V/f characteristic curves, acceleration and braking times ⇨ Chap. 7.3 [▸ 34].

If required for control and placement in service, connect an external control unit to the FC.

8 Placement in service

8.1 Safety instructions

These safety instructions warn against dangers that can arise when placing the fan in service.

⚠WARNING Risk of injury when placing the fan in service.

Injuries due to electrical, mechanical, and chemical hazards.

- ▶ Installation work on the fan as well as final inspection have been completed in their entirety ⇨ Chap. 6 [▶ 28], ⇨ Chap. 7 [▶ 33].
- ▶ Initial and subsequent placement in service is only to be completed by authorized mounting personnel.
- ▶ Secure the isolation switch with a personal padlock to prevent unauthorized energization until all checks and preparations have been carried out. Hang tag on isolation switch.
- ▶ For free sucking or blowing out installation of the fan:
  Before energization, ensure that no one remains in the hazardous area of the inlet and/or outlet connections.
- ▶ Do not place a fan in service that is iced over. Pieces of ice can then come off and cause serious injuries and material damage. Do not remove ice from the fan forcibly or with chemical deicers.
- ▶ An electrician is responsible for energization of the fan.

8.2 Carrying out placement in service

Open the shut-off or damper valves of the fan's supply air duct and discharge duct.

8.2.1 Check motor rotation direction

Procedure:

- Briefly turn the fan on and off with the isolation switch.
- Check motor rotation direction and compare with direction of rotation arrow on the fan housing. ⇨ Chap. 4.2 [▶ 22].

To check the direction of rotation, observe the fan impeller of the electric motor or use a motor tester for non-contact determination of the direction of rotation.

- If the direction of rotation is incorrect, have an electrician switch two phase connections of the isolation switch or in the terminal box of the electric motor, or, if available, change the direction of rotation on the frequency converter.

8.2.2 Functional test of the frequency converter (FC, optional accessory)

Procedure:

- Test start/stop and acceleration behavior starting at a low frequency (25 Hz).
- Increase fan speed from minimum to maximum speed ⇨ Chap. 7.3.2 [▶ 36].
  - with an external signal from the higher-level controller,
  - with FC control elements or an external control unit,
  - with the local potentiometer ⇨ Chap. 4.3.5 [▶ 24].

Check during the functional test:

- Check acceleration and braking time ⇨ Chap. 7.3 [▶ 34].
- Commands shall cause corresponding speed changes.
- The electric motor may not generate any unusual vibration or noises when operating within the characteristic curve range according to the technical data sheet.
- Conduct speed measurement.
  NOTICE Do not exceed the maximum speed of the impeller or the maximum frequency of the electric motor according to the technical data sheet/ motor nameplate.
- During start/stop operations, the FC may not display an error message or trigger a protective function.

8.2.3 Conduct test run

Run the fan at the designated operating point, or at the operating impeller speed on the nameplate, for at least 1 hour.

At the beginning of the test run:

- Check for irregular running, unusual vibration, or noises.
- Once the operating speed has been reached, the current draw of the electric motor may not exceed the nominal value according to the motor nameplate.
- Check for leak tightness and flexible mounting of the sleeves on the fan.
- Perform vibration measurement on the fan's electric motor and compare with the table for vibration limits according to ISO 14694:

Status	Category	Permissible vibration when flexibly mounted (effective value/RMS) [mm/s]
Start-up	BV-2	9.0
Alarm	BV-2	14.0
Shutdown	BV-2	*

* Establish based on historical limit values.

The measured data provides comparison values during maintenance.

Heating, ventilation, air conditioning (HVAC), and agriculture: BV-2 < 3.7 kW

At the end of the test run:

- Compare current values and parameters with initial values and parameters from the beginning of the test run:
  - Irregular running, vibration, or noises.
  - Current draw of the electric motor.
  - Vibration measurement.
- Check leak tightness of the sleeves.

- Measure temperature of the electric motor and compare with information in the technical data sheet or on the nameplate.
- Create a test report during initial commissioning.
- Leakage value: The leakage value of the supplied fan can be requested from the distributor.

9 Operation

9.1 Safety instruction

This safety instruction warns against dangers that can arise during fan operation.

⚠WARNING Risk of injury due to fan operation

Injuries due to electrical, mechanical, and chemical hazards.

- ▶ Only qualified and authorized operating personnel may operate the fan and clean the outside of it.
- ▶ In the event of an operating fault, assign qualified personnel to rectify the fault.

9.2 Operating instructions

The fan is

- either operated with a higher-level, automatic control
- or manually switched on and off with operating elements on the plant side.

The operating personnel are also responsible for regularly checking the operating condition of the fan ⇨ Chap. 10.3.1 [▶ 45].

Actions to take in the event of a malfunction

1. Shut the fan down and inform supervisory personnel.
2. In case of emergency, immediately carry out emergency measures ⇨ Chap. 3.9 [▶ 19].
3. Shut down system components affected by fan failure.
4. Assign qualified personnel to rectify the fault ⇨ Chap. 11.2 [▶ 48].

9.3 Outside cleaning

Procedure:

- Clean fan housing and plastic parts with a damp cloth.
  ⚠CAUTION Do not use a dry cloth (static charge).
- Contamination and dust deposits on the cooling fins and fan cowl of the electric motor are only to be removed by dry means or with a damp cloth.
- Keep the installation site of the fan clean.

Observe cleaning interval and adjust if necessary ⇨ Chap. 10.2 [▶ 44].

10 Maintenance

10.1 Safety instructions

These safety instructions warn against dangers that can arise when performing maintenance on the fan.

⚠WARNING Risk of injury due to maintenance work on the fan

Injuries due to electrical, mechanical, and chemical hazards.

- ▶ Control the operating condition via authorized operating personnel.
- ▶ All other maintenance work only to be performed by authorized maintenance personnel.
- ▶ An electrician is responsible for energization of the fan.

SAFETY INSTRUCTIONS

- ▶ Wear personal protective equipment.
- ▶ In the access and work areas of the maintenance work
  - eliminate trip and fall hazards,
  - ensure sufficient lighting,
  - keep clean and tidy.
- ▶ Secure the isolation switch with a personal padlock to prevent unauthorized energization until completion of the maintenance work. Hang tag on isolation switch.
- ▶ When working inside the fan, as protection from hazardous, aggressive conveyed media:
  - Close the shut-off damper to the supply air duct and discharge duct.
  - Ensure that no conveyed medium can flow in.
  - Be mindful of harmful deposits and condensate residue.
- ▶ When working inside the fan, ensure that the impeller is stationary and prevented from automatically being rotated by supply or discharge air.
- ▶ After completion of work
  - check functionality of all safeguards,
  - remove all tools and materials from the work area,
  - wipe up spilled substances and dispose of them properly.

⚠CAUTION Risk of injury due to electrostatic discharge

Subsequent injuries due to response upon being startled.

- During operation and maintenance, the impeller can build up electrostatic charge.
- Cleaning the fan housing, impeller, or plastic parts with a dry cloth leads to electrostatic charge.

- ▶ Only clean the fan with a damp cloth.

10.2 Maintenance table

The maintenance intervals (W/weekly, M/monthly, 6M/semi-annually and 12M/annually) are to be adapted to the current operating conditions of the fan as determined by the customer.

Maintenance activity	Cross reference	W	M	6M	12M*
Check operating condition	⇨ Chap. 10.3.1 [▸ 45]	X			
Outside cleaning	⇨ Chap. 9.3 [▸ 43]		X		
Test run during extensive downtime	⇨ Chap. 8.2.3 [▸ 41]			X	
Inside inspection (if necessary)	⇨ Chap. 10.3.2 [▸ 45]			X	
Inside cleaning (if necessary)	⇨ Chap. 10.3.3 [▸ 46]			X	
Annual inspection	⇨ Chap. 10.3.4 [▸ 46]				X
Checking of electrical components by electrician	—				X

* Or before placement in service after an extensive downtime period.

An hour meter is helpful.
Enter all maintenance performed in a machine logbook. A template is available from the point of contact.

10.3 Maintenance work

For questions regarding maintenance work and intervals, contact the distributor or manufacturer. Draw up a service contract if required.

10.3.1 Check operating condition

Visually check during fan operation:

- For proper mounting, damage, and contamination: protective devices, fan housing, motor, and support for floor mounting.
- For leak tightness: sleeves, sealing ring.
- For loose screw connections.
- Smooth operation of fan: For irregular running, check for vibration or noise ⇨ Chap. 8.2.3 [▸ 41].
- Check electric motor, housing, and hub seal for overheating (overload).
  ⚠CAUTION Risk of burns

Promptly report any defects found and have them properly rectified.

10.3.2 Inside inspection

NOTICE Risk of damage due to vibration

Material damage and production downtime, reduced service life.

- Improper use or deposits on the impeller lead to imbalance and vibration.

▶ Switch fan off immediately in case of unusual vibration.
▶ Check parts in contact with the medium.

Procedure:

- Remove sleeve from the inlet connection ⇨ Chap. 6.5 [▸ 30]. If available, insert a borescope into the gap.

- Check impeller as well as internal housing for corrosion, stress cracks, deformations, and deposits.
- If necessary, clean the impeller and inside of the casing ⇨ Chap. 10.3.3 [▸ 46].
- Replace damaged impeller immediately. **NOTICE** Replace impeller with casing. Use only genuine spare parts.
- Clean the electric motor if necessary ⇨ Chap. 9.3 [▸ 43].

10.3.3 Inside cleaning

⚠WARNING Risk of injury due to moisture penetration in current-carrying components

Injury by electric shock.

▶ Never clean the electric motor or associated electrical components with a water jet, pressure washer, or steam cleaner.

NOTICE Risk of damage due to aggressive cleaning agents and sharp cleaning tools

Damage to plastic surfaces.

▶ Select cleaning agent appropriate for conveyed medium and plastic fan material.
▶ If possible, use warm water and a household cleaning agent.
▶ Use a brush or a wooden scraper to loosen deposits.

Procedure:

- Loosen sleeve at inlet connection and remove ductwork end ⇨ Chap. 6.5 [▸ 30].
- Remove impeller with casing ⇨ Chap. 11.6 [▸ 53].
- Clean the impeller and the inside of the housing thoroughly. **NOTICE** Do not damage the impeller blades when doing so.
- If there are heavy deposits, also clean the fan connection tubes.
- Contamination and dust deposits on the cooling fins and fan cowl of the electric motor are only to be removed by dry means or with a damp cloth.

10.3.4 Annual inspection

The mechanical and electrical functionality of the fan are assessed in the annual inspection, and its continued operation is ensured. This also applies in the event of extensive downtime.

1. Check during outside inspection
   - Cracking: Fan housing
   - Noise: Motor bearings
   - Proper mounting and damage of: protective devices (isolation switch), support for floor mounting.
   - Damaged parts. Replace these parts immediately.
2. Test run
   - Vibration measurement and condition check of the motor bearings.

Compare measured values with
- limit value according to table ⇨ Chap. 8.2.3 [▶ 41],
- information in the test report from initial commissioning.

- Replace motor bearings at the end of their service life or if they exhibit significant noise development due to bearing wear. To do this, remove the electric motor ⇨ Chap. 11.7 [▶ 55].

The motor bearings are lifetime lubricated ⇨ Chap. 2.2.3 [▶ 11]. For information on the bearing service life, see the operating instructions of the electric motor.

- Measure the current draw of the electric motor. The measured value may not exceed the rated current on the nameplate.
- Measure the temperature of the electric motor and compare the result with the information in the technical data sheet.
  ⚠CAUTION Risk of burns

3. Inside inspection and cleaning
   - Check the impeller and casing for deformation and for damage such as cracking and corrosion ⇨ Chap. 11.5 [▶ 53].
   - If necessary, conduct outside and inside cleaning.
4. Assembly and final inspection
   - Fixed position of all screw connections.
   - Check that ductwork connections are securely attached to fan connections. Check that the seal in the casing is present and intact.
   - Fixed position of all fastening elements (anchors) in the foundation (baseplate).
   - Short test run, checking for vibration and noise.

11 Repair

11.1 Safety instructions

These safety instructions warn against dangers that can arise when repairing the fan.

⚠WARNING Risk of injury due to repair work on the fan

Injuries due to electrical, mechanical, and chemical hazards.

- ▶ Only maintenance personnel authorized by the operator as well as service personnel authorized by the distributor or manufacturer may carry out repair work.
- ▶ The same safety instructions as for maintenance work apply ⇨ Chap. 10.1 [▶ 44].
- ▶ Allow the fan to cool off with the electric motor before beginning work.
- ▶ An electrician is responsible for energization of the fan.

11.2 Fault table

Identify and rectify fan faults using this table, and enter them in the machine logbook. For further information, contact customer service (see title page).

Fault	Possible cause	Fault discovery	Remedy
No function	No electrical power.	Check phase voltage.	Check electrical installation.
Conveying capacity insufficient: operating point according to technical data sheet cannot be reached.	Incorrect direction of rotation of the impeller.	Visual inspection.	Swap phases ⇨ Chap. 7.4 [▶ 38].
	Damper valve improperly positioned.	Visual inspection.	Set damper valve to proper position.
	Pressure loss in ductwork.	Measure flow rate and pressure at the operating point.	Optimize ductwork layout.
	Inflow or outflow at the fan causes high pressure loss.		Adjust the speed for the new conditions within the limits of the intended use.
	Damper valve improperly positioned in ductwork.		Adjust the system.
			Observe minimum distance between fan connection and damper valve or duct bends (L ≥ 3 x duct Ø).
Operating speed cannot be reached.	Faulty motor winding.	Winding measurement.	Replace electric motor ⇨ Chap. 11.7 [▶ 55].
	Improper phase voltage.	Measure phase voltage.	Check/replace fuses, motor connection cable, FC cable.

Fault	Possible cause	Fault discovery	Remedy
	Motor overload due to improperly positioned damper valve.	Measure flow rate and pressure at the operating point.	Set damper valve to proper position.
	Motor overload due to system changes.	Fan/electric motor no longer meeting the operating point.	Consult with point of contact (see title page).
FC error message.	Improper setting of motor characteristics, start/stop ramps, acceleration/braking time.	FC display: check relevant parameters.	Set parameters properly ⇨ Chap. 7.3.2 [▶ 36].
FC error message. No acceleration from low frequency.	FC current limits are exceeded due to insufficient power factor (cos φ).	FC current limits too low?	Adjust FC parameter "Motor characteristic" (torque quadratic to speed) ⇨ Chap. 7.3 [▶ 34].
	Improper motor and/or FC size.	Motor and/or FC too small?	Design FC according to motor ⇨ Chap. 7.3 [▶ 34].
	Start ramp too steep or acceleration time too short.	Check FC parameters.	Adjust start ramp. Increase acceleration time.
Motor protection switch or FC switches off.	Improper setting.	Measure current draw.	Set motor protection switch properly ⇨ Chap. 7.2.2 [▶ 34].
		Check FC parameters.	Parameterize FC properly.
	Faulty motor connection.	Measure current draw.	Check motor connection (star/delta) ⇨ Chap. 7.4 [▶ 38].
	Impeller stiff or stopped.	Visual inspection.	Remove deposits or foreign objects ⇨ Chap. 10.3.3 [▶ 46].
	Winding damage on the electric motor.	Winding measurement.	Repair or replace electric motor ⇨ Chap. 11.7 [▶ 55]. Check EMC guidelines.
	Electric motor bearing damage.	Turn electric motor by hand.	
	Damaged cable, faulty cable connection.	Measurement, visual inspection.	Replace cable.

Fault	Possible cause	Fault discovery	Remedy
Strong vibration.	Deposits on impeller, imbalance.	Visual inspection, vibration measurement.	Clean impeller ⇨ Chap. 10.3.3 [▸ 46]. Balance the impeller.
			Adjust cleaning interval.
	Damaged or malformed impeller due to (prohibited) conveyed medium.	Visual inspection.	Replace impeller ⇨ Chap. 11.6 [▸ 53].
		Points to observe: ⇨ Chap. 2.2.1 [▸ 8] and ⇨ Chap. 2.2.2 [▸ 10].	Clarify composition of conveyed medium and plastic resistance.
		Measure temperature of the conveyed medium.	Adjust operating conditions to intended use ⇨ Chap. 2.2.1 [▸ 8].
		Check operating point.	
		Check environmental conditions.	
		Ductwork connected directly to fan casing.	Adjust connection (sleeve) and ductwork distance appropriately ⇨ Chap. 6.5 [▸ 30].
		Change in length of ductwork due to thermal expansion.	
	Loose impeller.	Impeller loosened on the motor shaft?	Tighten impeller ⇨ Chap. 11.6 [▸ 53].
	Impeller dips into condensate at bottom of casing.	Visual inspection.	Clean casing. Drain condensate.
	Loose or defective fastening elements.	Visual inspection.	Tighten or replace fastening elements.
	Improper mounting.	Installation location requirements met ⇨ Chap. 6.2 [▸ 28].	Fortify foundation (baseplate). Resize fastening elements (anchors).
Overheating of electric motor.	Bearing or winding damage.	Auditory inspection, current draw measurement, winding measurement.	Repair or replace electric motor ⇨ Chap. 11.7 [▸ 55].

Fault	Possible cause	Fault discovery	Remedy
	Impeller stiff or stopped.	Visual inspection.	Remove deposits or foreign objects ⇨ Chap. 10.3.3 [▶ 46].
	Motor overload due to improperly positioned damper valve.	Measure flow rate and pressure at the operating point.	Set damper valve to proper position.
	Motor overload due to system changes.	Fan/electric motor no longer meeting the operating point.	Consult with point of contact (see title page).
	FC does not reach required voltage.	Check FC.	Use a suitable FC.
Prohibited operating conditions.	Ductwork not leak tight.	Check for leakage.	Seal up.
	Loose hose clamps or damaged sleeves.		Re-tighten hose clamps or replace sleeves ⇨ Chap. 6.5 [▶ 30].
	FC parameter "max. frequency" set improperly (speed too high, overheating of electric motor).	Check FC parameters ⇨ Chap. 7.3.2 [▶ 36].	Adjust parameters according to characteristic map in technical data sheet.
Grinding noise coming from the impeller.	Casing too tight.	Check distance and alignment of ductwork to fan connection.	Adjust ductwork distance and connection (sleeves) appropriately.
	Ductwork connected to fan without sleeves.		Connect ductwork to fan with sleeves ⇨ Chap. 6.5 [▶ 30].
	Impeller misaligned.	Impeller loosened on the motor shaft?	Tighten the impeller. Replace impeller ⇨ Chap. 11.6 [▶ 53].
	Deposits or foreign objects between impeller and casing.	Determine grinding point. Check with feeler gauge.	Remove deposits or foreign objects ⇨ Chap. 10.3.3 [▶ 46].
	Impeller defect.	Visual inspection.	Replace impeller with casing ⇨ Chap. 11.6 [▶ 53].
Audible sound from bearings.	Bearing damage.	Auditory inspection.	Replace motor bearings or exchange electric motor ⇨ Chap. 11.7 [▶ 55].
	End of service life reached.		

Fault	Possible cause	Fault discovery	Remedy
	Bearing damage due to electrical discharge machining (bearing currents).	Measure voltage between the motor shaft and casing of the electric motor.	Interference suppression measures with FC operation; see FC manufacturer's guidance. Check EMC guidelines.
			Use current-insulated roller bearings or ceramic hybrid bearings.
Excessive leakage at impeller hub.	Overpressure operation of the fan.	Pressure measurement.	Operate fan at negative pressure.

11.3 Spare parts and wear parts

DANGER Risk of injury due to impeller explosion

Serious injuries due to debris being launched out.

- Prohibited spare parts.

▶ Only use an original impeller from the manufacturer as a spare part.

NOTICE Risk of damage due to prohibited spare parts

Component and material damage as well as production downtime.

- Invalidation of warranty.

▶ Only use original spare parts from the manufacturer for maintenance activities and repairs.

Order spare parts and wear parts from customer service (see title page) in a timely manner with the following information:

- Type classification of fan according to nameplate or technical data sheet.
- Desired quantity.
- Specific designation
  - of the spare part or wear part ⇨ Chap. 4.1 [▶ 21].
  - or of the option or accessory ⇨ Chap. 4.3 [▶ 22].

Spare parts and wear parts

Pc.	Designation	Spare part	Wear part
1	Impeller with casing	X	
1	Hub cap	X	
1	Sealing ring (in casing)		X

11.4 Preparation for repairs

Installation tools

Special centering pieces are needed for proper installation and alignment of the electric motor/motor shaft and impeller to the casing.

Contact your Colasit distributor for details and a comprehensive installation manual.

Prepare the fan for repairs (impeller, electric motor, etc.) as follows:

1. Observe safety instructions ⇨ Chap. 11.1 [▶ 48].
2. Switch off the fan and FC (option) and use the isolation switch to remove voltage on all phases.
3. Secure the isolation switch with a personal padlock to prevent unauthorized energization until completion of the repair work. Hang tag on isolation switch.
4. Close the shut-off dampers to the supply air duct and discharge duct.
5. Remove the sleeves from the inlet connection and outlet connection.

Risk of contamination of the ductwork

Cover open ductwork ends with plastic sheeting during repairs.

11.5 Check impeller

NOTICE **Risk of damage due to grinding impeller**

Damage to impeller.

- ▶ If necessary, tighten the fastening screws on the housing and impeller.
- ▶ Determine grinding point. Inspect the casing and impeller for grinding marks and replace damaged parts after consulting the manufacturer. Remove deposits or foreign objects present in the casing ⇨ Chap. 10.3.3 [▶ 46].

11.6 Replacing the impeller with casing

Conditions:

- Fan has been prepared for repairs ⇨ Chap. 11.4 [▶ 53].

The CMV impeller (LG execution) is used for CCV fans.

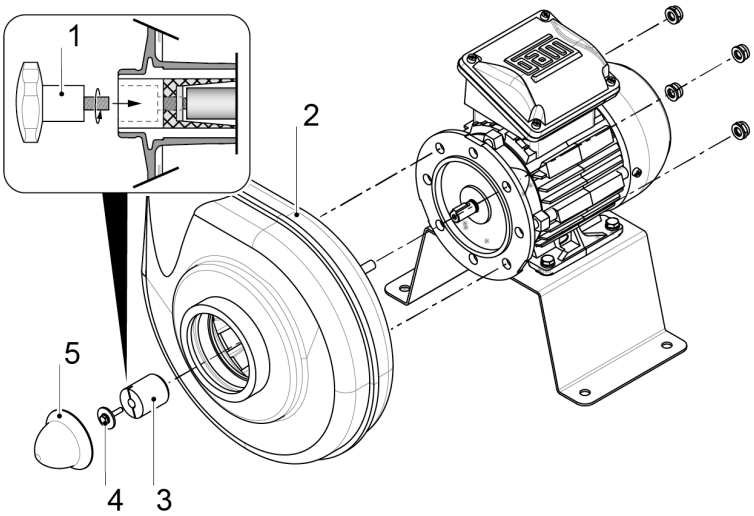


Fig. 18: Removing the impeller with casing

Procedure:

- Cut out and remove the hub cap (5) with appropriate tools.

The hub cap cannot be removed non-destructively – order a spare in a timely manner.

NOTICE Do not reuse a hub cap that has been removed! Only a leak-proof, undamaged hub cap prevents aggressive conveyed media from corroding the motor shaft and impeller hub, which could destroy the impeller.

- Remove the clamping adapter (3):
  - Remove the fastening screw (4).
  - Remove the outer cone of the clamping adapter from the motor shaft with a release bolt (1) (see detail).
- Remove impeller and clamping adapter from motor shaft.
- Remove the mounting nuts on the motor flange. Remove the casing (2) from the electric motor.

Mounting instructions

- For slip-free power transmission, the following shall be free of grease:
  - Motor shaft
  - Impeller borehole.
  - The outside and borehole of the clamping adapter.
- **NOTICE** Risk of bearing damage! Never strike the motor shaft when mounting the impeller.
- Push the impeller onto the motor shaft as far as it will go.
- Place the impeller approximately in the center of the casing.
- Mount clamping adapter:

- Nest cones together such that the slots do not overlap.
- Tighten the clamping adapter with the fastening screw, with RIPP LOCK® for fastener security, in accordance with the following table:

Fan motor size	Fastener threads	Max. tightening torque for bolt grade 8.8 [Nm]
IEC 56/63	M4	6
IEC 71	M5	8
IEC 80	M6	15
IEC 90	M8	20

- **NOTICE** Risk of damage The impeller must not scrape the bottom of the housing.
- Check impeller mobility.
- Heat new hub cap evenly to approx. 60 °C with heat gun and press onto hub.
- Check mounted hub cap for cracks and damage.

11.7 Electric motor exchange

Conditions:

- Fan has been prepared for repairs ⇨ Chap. 11.4 [▸ 53].
- Impeller with casing is removed ⇨ Chap. 11.6 [▸ 53].

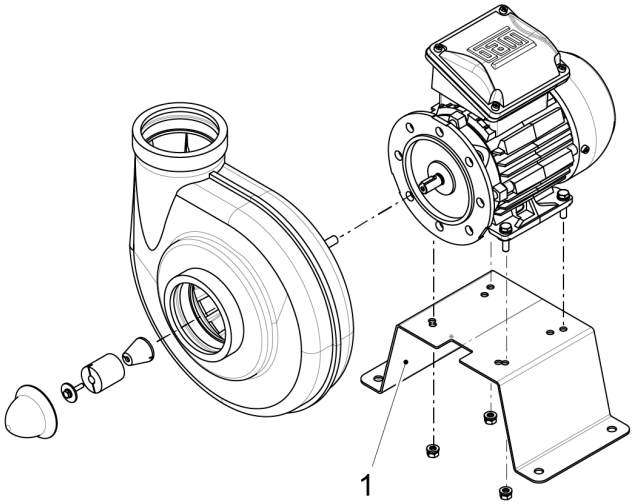


Fig. 19: Removing the electric motor

Procedure:

1. Remove all cables from the terminal box of the electric motor and protect from damage.
2. Remove fastening screws on support (1).

Mounting instructions

- Center the motor shaft in the casing.
  - Use the centering piece to do so.

NOTICE **Risk of damage to the electric motor**

Damaged motor bearings.

▶ Protect the motor shaft/bearings from being hit during transport and mounting of the electric motor.

▶ Observe the instructions in the manual from the motor manufacturer.

1. Tighten mounting nuts (for casing) and screws (for support) in accordance with the table.
   The thread is based on the motor size.

Thread	Max. tightening torque [Nm]
M6	9
M8	16

2. Connect electric motor ⇨ Chap. 7.4 [▸ 38].
3. Check motor rotation direction ⇨ Chap. 8.2.1 [▸ 40].
4. Install the impeller with casing ⇨ Chap. 11.6 [▸ 53].
   NOTICE Place the impeller approximately in the center of the casing.
5. Conduct test run ⇨ Chap. 8.2.3 [▸ 41].

12 Removal from service, disposal, and recycling

12.1 Safety instructions

These safety instructions warn against dangers that can arise during removal from service and disposal of the fan.

WARNING Risk of injury during removal from service and disposal of the fan

Injuries due to electrical, mechanical, and chemical hazards.

- ▶ An electrician is responsible for removal of the power supply from all phases.
- ▶ Removal of the fan to be completed only by authorized mounting personnel.
- ▶ Removal for disposal is to be completed only by authorized transport personnel.

12.2 Environmental protection

NOTICE Environmental hazards upon disposal of the fan

Water and soil pollution

- ▪ Check the fan for conveyed medium deposits that are harmful to health and the environment.
- ▶ Dispose of contaminated components such as casing and impeller as special waste.

The casing and impeller can be made of different plastics.

For proper recycling, the impeller and casing have a symbol indicating the type of plastic.

12.3 Removal from service

WARNING Risk of injury due to improper removal

Injuries by pinching and crushing of body parts.

- ▶ Wear protective equipment.
- ▶ Safeguard work area and prevent unauthorized access using enclosures, safety nets, etc.
- ▶ Secure a fan that is mounted on the wall or ceiling against falling or tipping over by attaching suitable supports.
- ▶ Provide suitable transport aids for transportation of the fan.

WARNING Risk of injury due to escape or inflow of a conveyed medium with the ability to cause adverse health effects

Risk of eye irritation, cough, difficulty breathing, burn, and suffocation.

- ▶ Wear protective equipment.
- ▶ Close shut-off damper to inlet and outlet connections.
- ▶ Watch for deposits and condensate of the conveyed medium in the fan and ductwork.

Procedure:

- Switch off fan and FC (option) and prepare them for removal:
  - Allow to cool down.

- Close the shut-off dampers in the supply air and discharge air lines.

- To be completed by electrician:
  - Switch off higher-level control and FC.
  - Secure isolation switch with a personal padlock to prevent unauthorized energization and hang tag.
  - Remove power to the fan and additional electrical components on all phases, and disconnect the electrical connection.
- Remove piping and ductwork connections:
  - Remove the sleeves from the inlet connection and outlet connection.
- Prepare fan for disposal in a location suitable for this purpose.

12.4 Disposal instructions

When disposing of the fan, observe all nationally applicable regulations and legal requirements for waste disposal, and comply with regional environmental protection regulations.

Preferably, commission a waste disposal company for proper recycling or disposal.

Disassembly instructions

- Separate the fan components into material groups and dispose of them separately:
  - Metals
  - Plastics
  - Electrical components

Dispose of plastic parts contaminated by conveyed media that are harmful to health and the environment as special waste.

13 EU - Declaration of conformity

We, the manufacturer	COLASIT AG Faulenbachweg 63 3700 Spiez Switzerland
declare under our sole responsibility that the product of the series CCV 75 with direct drive	Plastic industrial fan CCV 75

to which this declaration refers is in conformity with the provisions of the following EU directives and harmonized standards as of the date of issue stated:

EU Directives	Machinery Directive 2006/42/EC
	EMC Directive 2014/30/EU
Harmonized standards	EN 12100:2010
	EN ISO 12499:2008
	EN 60204-1:2019
	EN IEC 61000-6-4:2019
Name and address of the document manager	Andreas Roth COLASIT AG Faulenbachweg 63 3700 Spiez Switzerland

Spiez, 2/1/2026

R. Zwahlen (Division manager)

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