

**Translation of the original
Operating Instructions
C-DLR 301
Compressor**



**C-Serie
C-Series**

**Klaue
Claw**



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Foreword

1 Foreword

1.1 Principles

These Operating Instructions:

- Are a part of the following contact-free running claw compressors.
 - C-DLR 301
 - C-DLR 301 with frequency converter (variants Fxxx)
- Describes the safe and proper use in all life phases and are to be observed by all responsible persons
- Include general information on installation, commissioning, maintenance and inspection
- Must be available at the place of application.

Figures presented in these Operating Instructions serve for better understanding and can deviate from the components installed. This does not influence the validity of the details set out in the instructions.

1.2 Target group

Target group for these Operating Instructions are the technically trained specialist personnel which have been qualified by appropriate training and instruction.

1.3 Supplier documentation and accompanying documents

Document	Contents	No.
Supplier documentation	Operating Instructions	BA 887
	Declaration of Conformity	C 0079
	Declaration of no-objection	7.7025.003.17
	Connection diagram (in the cover of the frequency converter)	–
Spare parts list	Spare parts documents	E 887
Data sheet	Technical data and characteristic curves	D 889
Info sheet	Storage guideline for lubricants	I 100
Info sheet	Storage guideline for machines	I 150
Operating Instructions	Operating instructions of the frequency converter INVEOR M	–

The documents can be ordered from our Service or downloaded using the following link:

- <http://www.gd-elmorietschle.com>

The operating instructions for the frequency converter is available at the following link:

- <https://www.kostal-industrie-elektrik.com>

1.4 Directives, standards, laws

See Declaration of Conformity.

1.5 Copyright

These Operating Instructions are intended for the customer's internal purposes.

Unless expressly permitted, passing on to third parties, copying of these documents, except for internal purposes, as well as using and providing their contents to third parties, even in excerpts, is prohibited.

Contraventions will lead to claims for damages.

1.6 Disclaimer

Please note that we cannot accept any liability for damages arising from failure to observe the instructions. Gardner Denver Schopfheim GmbH does not assume liability for the following cases:

- Not intended use
- Not complying with these instructions
- Nonobservance of all documents and specifications belonging to the overall documentation
- Erection, operation, maintenance and repair by insufficiently qualified staff
- Changing or removing of the manufacturing or serial number
- Using spare parts that have not been approved by **Gardner Denver Schopfheim GmbH**
- Unauthorised modifications to the machine or the accessories supplied by **Gardner Denver Schopfheim GmbH**

Please, also consider that repairs are only allowed to be done by authorised workshops using original spare parts; otherwise our guarantee will expire.

1.7 Specialist terms and meaning

Term	Explanation
Machine	Compressor and motor combination ready to be connected
Motor	Compressor drive motor
Compressor	Machine to produce excess pressure
Frequency converter	A frequency converter allows an infinitely variable control of the speed.
Claw	Design or operating principle of the machine
Volume flow	The volume flow determines how much air or gas volume per time unit is delivered by a compressor or flows through a pipe, specified in m ³ /h
Final compression pressure	Maximum excess pressure that a compressor can generate, given as excess pressure in bar (g)
Noise emission	Noise emitted at a specific loading state indicated as a numeric value, sound pressure level dB(A) as per EN ISO 3744.

Abbreviation	Meaning
Fig.	Figure
Tab.	Table
C-DLR	Type name of compressor
FC	Frequency converter

2 Safety

The manufacturer shall not be liable for damages caused by non-observance of the whole documentation.

2.1 General

These Operating Instructions contain basic instructions for installation, commissioning, maintenance and inspection works which must be obeyed to ensure the safe operation of the machine and prevent physical and material damages.

Observe the safety instructions in all chapters.

The operating instructions must be read by the responsible technical personnel / user before installing and commissioning and must be fully understood. The contents of the operating instructions must always be available on site for the technical personnel/user. Instructions attached directly to the machine must be obeyed and must always remain legible. For example, this applies to:

- Symbols for connections
- Data plate and motor data plate
- Information and warning signs

The data plates on the machine may not be removed, not even if the machine is resold. For all queries about the product, please always quote the serial number.

The user is responsible for observing local regulations.

2.2 Labelling of warnings

Warning	Danger level
 DANGER	...warns of a hazardous situation, which will lead to death or life-threatening injuries if not avoided.
 WARNING	...warns of a potentially dangerous situation, which can lead to death or serious injuries if not avoided.
 CAUTION	...warns of a hazardous situation, which can cause slight or medium personal injuries if not avoided.
 NOTICE	...warns of a situation that can cause damages to or destruction of material assets if not avoided.

2.3 Symbols and meaning

Symbol	Explanation
	Instructions, action
a), b),...	Instructions in several steps
	Results
	Reference

Symbol	Explanation
<p>Warning signs</p> 	<p>Obey all safety instructions with this symbol in order to avoid injury or death.</p> <p>Warns of the potential risk of injury</p> <p>Warns of electrical voltage</p> <p>Warns of suspended loads</p> <p>Warns of hot surface</p>
<p>Mandatory signs</p> 	<p>Obey all instructions with this symbol in order to avoid injury or death.</p> <p>Observe the Operating Instructions</p> <p>Wear eye protection</p> <p>Wear protective gloves</p> <p>Wear safety shoes</p> <p>Wear ear protection</p> <p>Disconnect the plant and secure it against unexpected restart</p>
	<p>Information, note</p>
	<p>Protection of environment</p>

2.4 Intended use

The machine is suitable for conveying the following media:

- All non-explosive, non-combustible, non-aggressive and non-poisonous, dry gases and gas-air mixtures

The machine is permitted to be operated only in such areas that are described in these Operating Instructions:

- Only operate the machine in technically perfect condition
- The machine must only be operated at an ambient temperature and inlet temperature of between 5 and 40 °C
Please contact us for temperatures outside this range
- The machine is only permitted to be operated within the speed range and frequency range that is specified on the data plate of the frequency converter

Any use extending beyond this use is seen as not in accordance with the intended use.

The intended use also includes the compliance with the operating data and operating agents specified in the operating instructions, the listed maintenance works, as well as the details in the documentation issued by the manufacturers of components and attachments.

If used under critical conditions and/or in case of any doubts, please contact the manufacturer. Non-observance can cause machine failures.

2.5 Inadmissible operating modes

- Extracting, conveying and compressing of explosive, inflammable, aggressive or poisonous media, e.g. dust as per ATEX zone 20-22, solvents as well as gaseous oxygen and other oxidation agents, water vapour, liquids or solids
- Erection and operation in potentially explosive environment (explosive gas/vapour/mist-air mixtures or dust-air mixtures or hybrid mixtures of air and flammable substances)
- Using the machine in non-commercial plants unless the necessary precautions and protective measures are taken in the plant
- Operation of the machine when it is only partially assembled
- Operation without cover sheet
- Operation without standard safety valve
- Using the machine in areas with ionising radiation
- Modifications to machine and accessories
- Changes of the basic settings of the frequency converter
- Operation by not or not sufficiently qualified personnel

2.6 Personnel qualification and training

All works are only allowed to be done by qualified and trained specialist personnel. Unauthorised persons are not allowed to stay within the operating area and must be prevented from entering operating rooms by suitable measures.

- Ensure that people entrusted with working on the machine have read and understood these operating instructions before starting work, particularly the safety instructions for installation, commissioning, maintenance and inspection work
- Responsibilities, competences and monitoring of personnel must be regulated by the operating company

- The following works are only allowed to be done by technical specialist personnel, who have been trained and instructed for the works assigned:
 - Transport only by forwarding agents
 - Erection, commissioning, maintenance and inspection works, as well as troubleshooting by technical specialist personnel (e.g. locksmith, mechanics)
 - Works on the electrical system are only allowed to be done by electricians
- Personnel to be trained and laypersons may only carry out work on the machine when under the supervision of authorised specialist personnel and must be instructed about possible hazards in a safety instruction

Specialist personnel:

Persons that can evaluate work assigned to them and evaluate possible risks as a result of their training, knowledge and experience as well as the applicable regulations.

Qualified electrician:

Specialist personnel that has obtained an electrotechnical specialist education and is familiar with work for setting up, operation and maintenance of electrical systems and operating material.

Unauthorised persons:

Unauthorised persons are persons who cannot appropriately prove that they are qualified, trained, or instructed for the works on the compressor. Furthermore, those people are seen to be unauthorised persons, who are, because of their physical, cognitive, and health abilities, not able to recognise hazards, caused by this machine.

2.7 Personal protective equipment

The user must make sure that the required protective clothing and protective equipment is available on the plant and used by the personnel. The national legal provisions and the national regulations for industrial safety must be observed.

Recommended protective equipment:



Wear eye protection



Wear protective gloves



Wear safety shoes



Wear ear protection

2.8 Safety-conscious working

The following safety regulations apply in addition to the safety instructions and intended use listed in these instructions:

- Accident prevention regulations, safety and operating regulations
- Standards and laws in force
- Hot parts of the machine must not be accessible during operation or must be fitted with a guard
- Persons must not be endangered by the free extraction or discharge of pumped media
- Risks arising from electrical energy must be eliminated
- The machine must not come into contact with flammable materials.
Risk of fire due to hot surfaces, output of hot pumped media or cooling air

2.9 Responsibilities of the user

During the whole operating period of the machine, the operating company is obliged to prove that the limits have been met and the required maintenance and inspection works have been performed.

The user must ensure that:

- All works for installation, commissioning and maintenance are carried out by authorised and qualified specialist personnel, who gained enough information by an in-depth study of the operating instructions
- All works on electrical equipment are done by an electrician in compliance with the regulations for electrical installations
- The Operating Instructions are always available at the site of operation of the machine for the whole life phase
- All safety instructions and signs on the machine are always complete and legible
- The operating and maintenance personnel take note of all safety instructions - especially of information provided in these Operating Instructions - and observe them
- The personal protective equipment is available and is used by the personnel
- All safety-relevant regulations are met
- Unauthorised persons cannot enter the operating site
- Fire warning and firefighting possibilities have been installed and are active
- These Operating Instructions shall be amended by working instructions, as well as the duties to supervise and report. With this they shall consider the operational distinctions. Among others, it refers to instructions referring to:
 - Organization of work
 - Work procedures
 - Specialist personnel assigned

In the event of accidents caused by the machine notify the Gardner Denver Schopfheim GmbH. Please find contact data on the back page.

2.10 Hazardous substances

2.10.1 Conveying media

Machinery that may have contact to hazardous substances can cause serious burns, cauterisation or poisoning during disassembly, maintenance and repair work.

- Each time before using our services, it is necessary for reasons of occupational safety and environmental protection to indicate and declare hazardous substances on or in the plant.
- Send the completed and signed declaration of no objection back to Gardner Denver Schopfheim. If no declaration has been sent, we must assume that the plant is free from such substances. In case of doubt, our service department reserves the right to reject the acceptance until the safety has been determined without doubt.

2.10.2 Auxiliary materials and lubricant

Incorrect auxiliary materials and lubricants may decompose at high temperatures. The resulting vapours may be harmful to health and cause fires.

- Use exclusively the recommended auxiliary materials and lubricants
- Observe the oil recommendation sign on the machine
- Observe the safety data sheets of the substances used
- Ensure proper use
- Observe the maintenance intervals

2.11 Safety equipment, monitored functions

Missing or non-functional safety equipment may lead to dangerous operating states and thus result in life-threatening injuries.

- Do not modify or bypass safety equipment and safety functions
- Check the function at regular intervals

2.12 Emergency Stop / Emergency Off

Missing safety equipment may lead to hazardous operating states. This can result in severe to mortal injury.

- The machine does not have its own Emergency Stop or Emergency Off. This **must** be implemented by the user, for instance, by integration of the machine in the user's safety concept.

2.13 Protection of environment

Environmental damage may be caused by the incorrect disposal of operating material and materials. For questions about environmental protection as well as national regulations, please consult your local disposal company.

- All operating materials as well as all gases, vapours or liquids, e.g. lubricating oil escaping during operation and maintenance must be collected and disposed of in an environmentally friendly manner.

3 Transport and storage

3.1 Transport

! WARNING



Death by falling down or tipping over of the transported goods!

Falling or tipping over of transported goods can cause serious or fatal injuries. Limbs can be crushed.

- Select the lifting device according to the total weight to be transported.
- Secure the machine against tipping over and falling.
- Always attach the machine on all present load handling equipment.
- Do not stand underneath a suspended load.
- Put the goods to be conveyed on a horizontal base (max. inclination: 10° in all directions).

3.1.1 Unpack and check the as-delivered condition

- Unpack the machine on receipt and check for transport damage.
- Immediately notify the manufacturer of transport damages.
- Check the scope of deliveries for completeness.
- Dispose of the packaging in accordance with the local regulations in force.

3.1.2 Lift and transport

! WARNING



Bodily injury resulting from improper operation!

Improper operation of the lifting gear and the transported goods can cause serious or fatal injuries.

- Lift and transport the machine only on the permissible load handling equipment
- Loads crosswise to the load handling equipment are not permitted.
- Avoid impact stress.
- Wear your personal protective equipment.

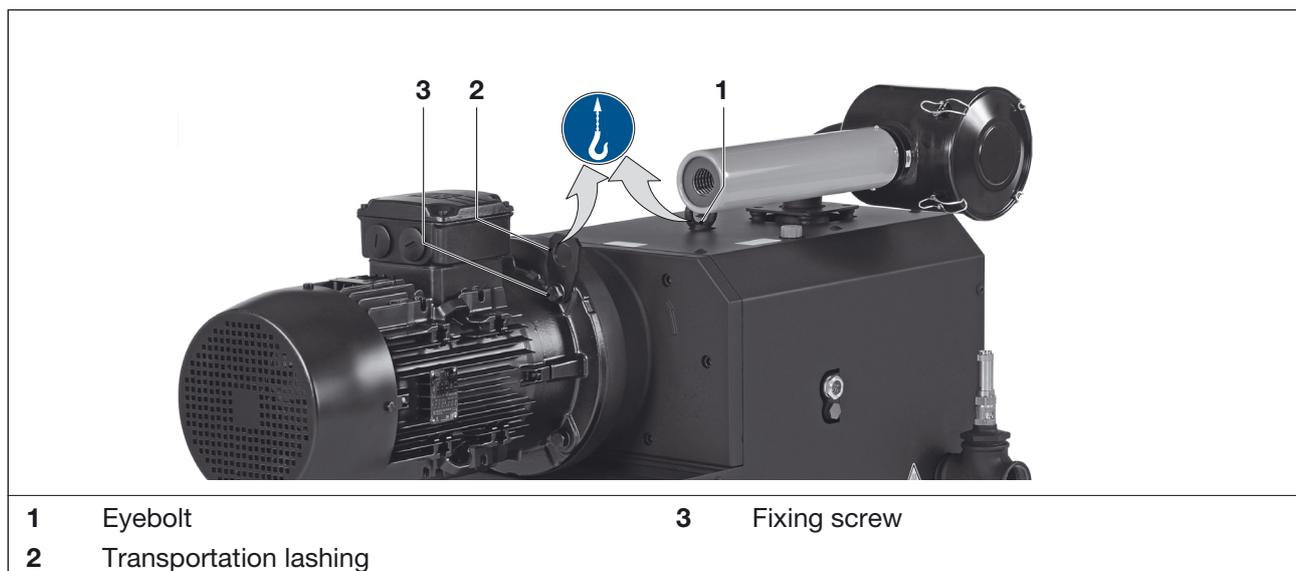


Fig. 1 Load handling equipment for lifting and transporting

The machine is supplied on a pallet.

- a) Unload the machine using a forklift or pallet truck and transport it to the place of installation.
- b) Tightly fasten the eyebolt (Fig. 1/1) and the fixing screw (Fig. 1/3) on the transportation lashing (Fig. 1/2).
- c) To lift and transport the machine, hook it in the eye bolt and the transportation lashing using a hoisting gear.
- d) Lift the machine off the pallet and align it.

3.2 Storage

NOTICE

Material damage caused by improper storage!

Improper storage can damage the machine.

- Observe the storage conditions described below.

3.2.1 Ambient conditions during storage

- Dust-free
- In a dry place
- Vibration free
- Protected against sun radiation
- Storage temperature: -20° c to +70° c
- Rel. air humidity: max. 80 %
- Close the openings air-tight



The machine must be stored in a dry environment with normal air humidity. It should not be stored for more than 6 months.

📄 See Info "Storage instructions", Page 4.

4 Product overview and functioning

4.1 Product overview C-DLR 301

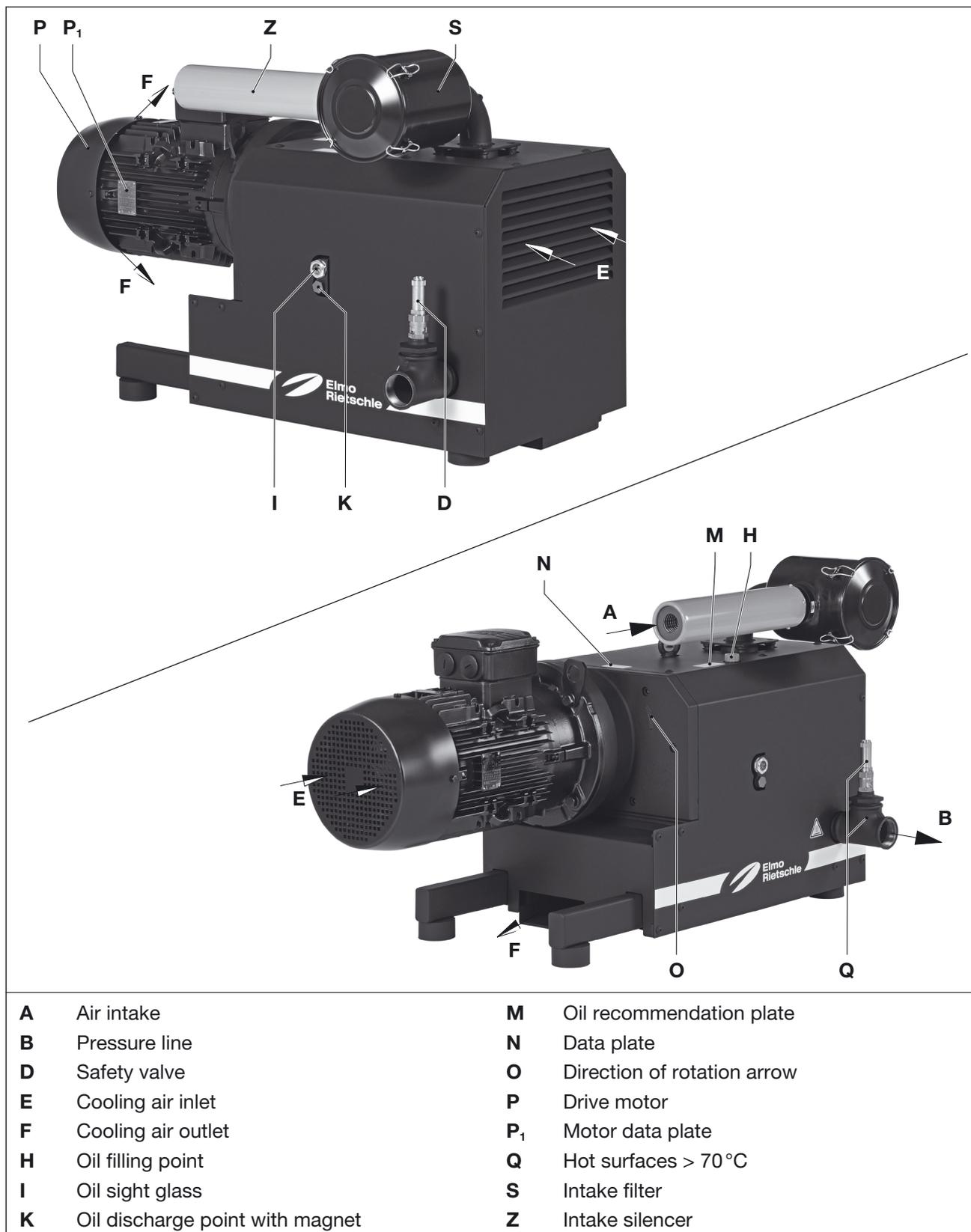


Fig. 2 Compressor C-DLR 301

4.2 Product overview C-DLR 301 with frequency converter

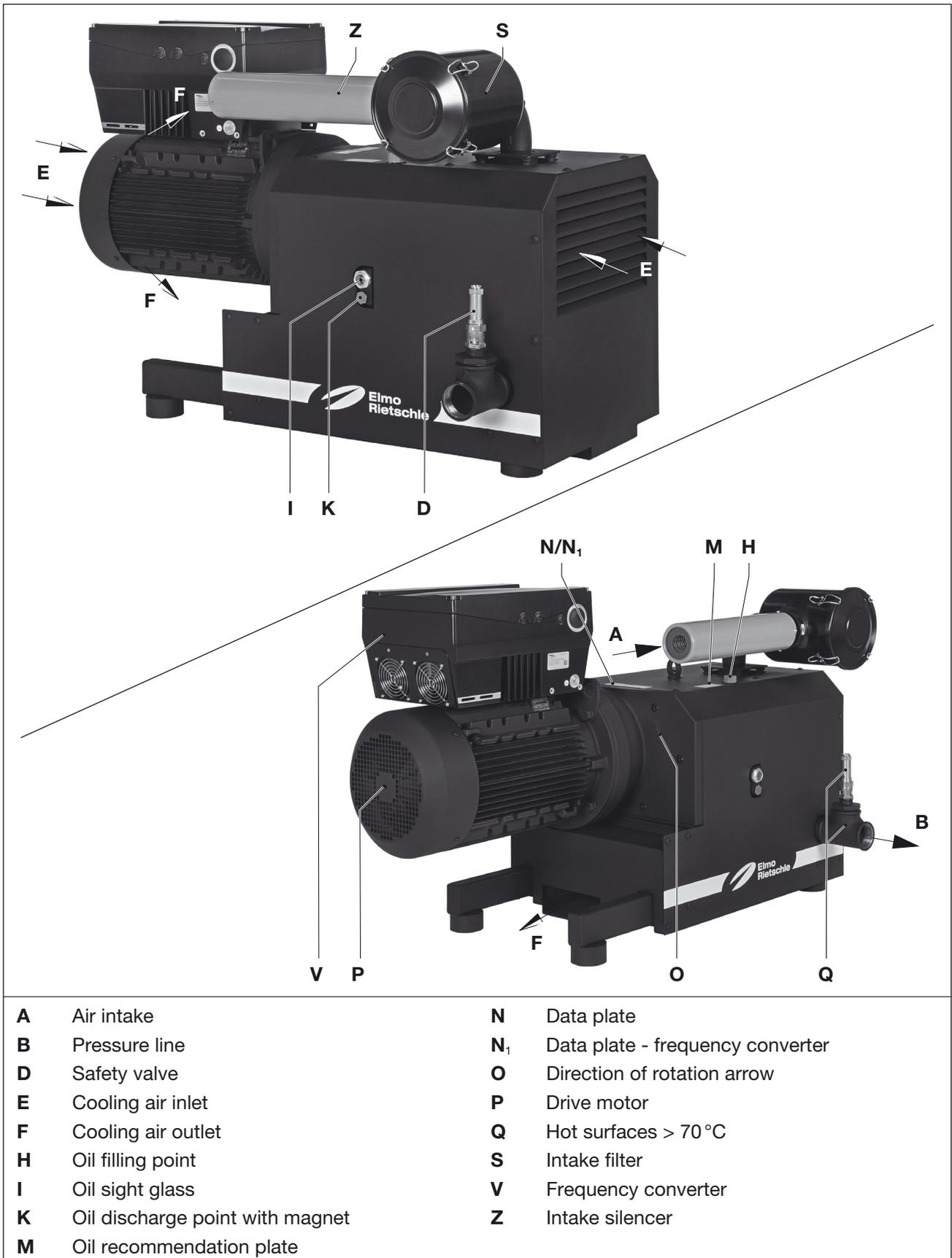


Fig. 3 Compressor C-DLR 301 with frequency converter

4.3 Data plate

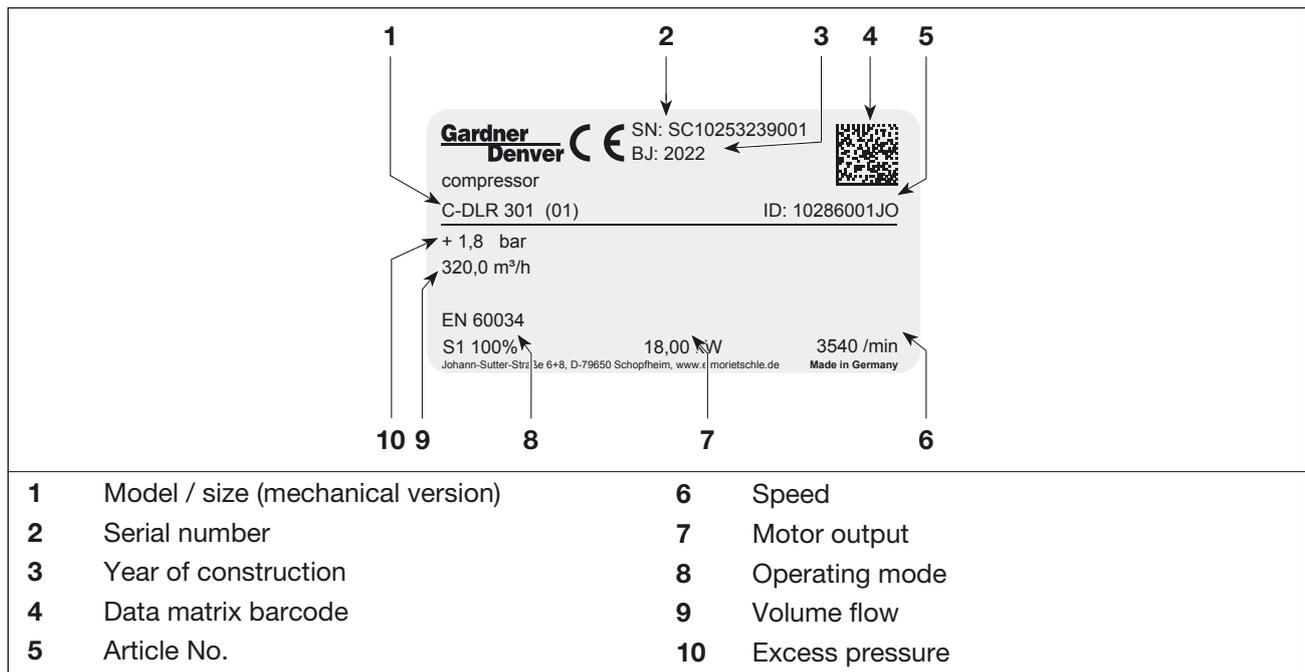


Fig. 4 Data plate for machines without frequency converter

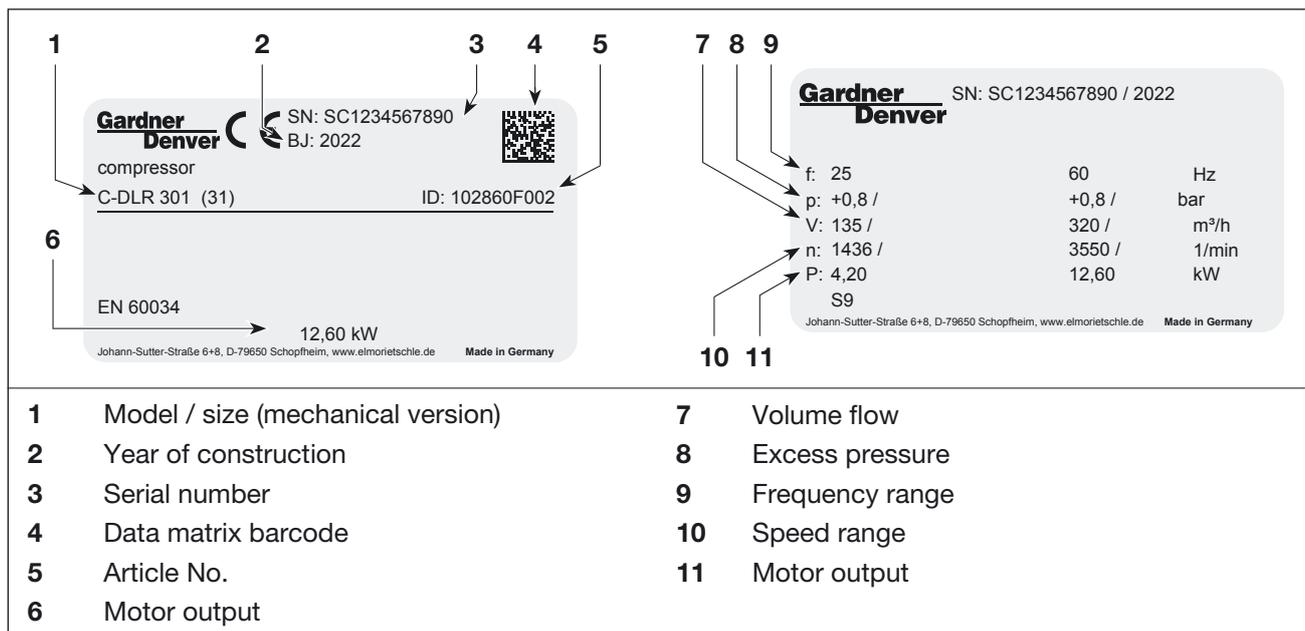


Fig. 5 Data plates for machines with frequency converter

The following information is encoded as barcode:

- Material number (MA)
- Production order (PR)
- Serial Number (SC)

4.4 Description

The C-DLR 301 model is a double-shaft, rotary piston compressor, in which the claws roll against each other without contacting each other and are dry. The counter-rotating claw rotors are synchronised by a gear pair in the gearbox. The gears of the synchronized gearbox and the bearings are lubricated with oil. These components are in a gearbox that also contains the oil supply. Oil conveying devices always ensure that the bearings and the gears are sufficiently supplied with oil at all permissible speeds. The gearbox and the compression chamber are separated from each other by special seals. The gearbox is sealed from the outside with piston sealing rings and O-rings, the compressor chamber with piston rings.

The C-DLR 301 range has a connecting thread on the outlet side and an intake silencer on the inlet side. The intake air is cleaned by a filter cartridge.

The C-DLR 301 is enclosed in an insulation hood. In order to dissipate compression heat, the cooling air is sucked through between the compressor and the hood using a drum fan that sucks in the fresh cooling air and discharges the heated air out of the cooling air outlet.

The C-DLR 301 is driven via a coupling by a flanged, three-phase standard motor.

In machines with frequency converter, the frequency converter is installed on the motor and allows the infinitely variable control of the speed.

To protect it against overload a safety valve is installed as standard.

4.5 Fields of application

These contact-free running claw compressors C-DLR 301 are suitable for the generation of excess pressure between 0 bar and the maximum pressure stated on the data plate (Fig. 4/10). Constant operation is permissible.

The compressor has a flow rate of **290 m³/h at 50 Hz**. The load limits (overpressure in bar) on the outlet side are stated on the data plate. Data sheet D889 or D887-60 (C-DLR 301 with frequency converter) shows the dependence of the flow rate from the overpressures.



If the unit is switched on more frequently (at regular intervals of approx. 10 times per hour) or at higher ambient temperatures and inlet temperatures, excess temperature limit of the motor winding and the bearings may be exceeded.

Contact the manufacturer regarding such operating conditions.

Observe the ambient and inlet temperature (see chapter 2.4)



If it is installed in the open air the unit must be protected from environmental influences (e.g. by a protective roof).

4.6 Accessories

The following accessories are options and on request available from Gardner Denver.

5 Installation

We urgently recommend having the installation carried out by qualified specialist personnel. Gardner Denver does not accept liability for damages caused by improper carrying out of installation.

5.1 Preparation of installation

Ensure the following conditions:

- Machine freely accessible from all sides
- Do not close ventilation grids and holes
- Sufficient space for installing and removing pipes and for maintenance work, particularly for the installation and deinstallation of the machine
- No influence by external vibrations
- Hot exhaust air from other machines may not be sucked in the cooling system
- Oil filling position (Fig. 2/H), oil inspection glass (Fig. 2/I) and oil drain (Fig. 2/K) must easily be available.
- For maintenance works, provide for a space of **at least 40 cm** around the machine.

5.2 Installation

NOTICE

Property damage caused by improper installation!

Improper erection and installation can damage the machine.

- The machine may only be operated when it is set up horizontally (Max. inclination: 8° in all directions).
- Secure the machine against tipping over and falling.
- The floor must be plane and even.
- The bearing surface must be designed to be able to carry the weight of the machine (see chapter 10).

NOTICE

Property damage from overheating!

Due to too low cooling capacity, the machine can overheat and can be damaged.

- Ensure for a good aeration and venting of the installation room. Observe the ambient temperature: min. +5 °C, max. +40 °C
- The cooling air inlets and the cooling air outlets must be **at least 30 cm** away from the adjacent walls. Cooling air coming out must not be sucked in again.

- a) Align the compressor in the place of installation and, if necessary, bolt to the ground.
- b) If available, check optional accessories for the correct mounting and correct electrical connection.



An output reduction is noticeable when installed at more than 1000m above sea level. In this case, please contact us.



It is possible to install the machine on a firm base without anchoring. When installing on a sub-structure we recommend fixing it with flexible buffers.

5.3 Connection of pipes

NOTICE

Material damage resulting from too high forces and torques of the pipes acting on the machine!

If forces and torques during installation and operation are too high, the machine can be damaged.

- Only screw in pipes by hand.
- If necessary, use flexible connections.

The outlet connection is on the side of the machine (Fig. 2/B).

- a) Remove the blind plug/adhesive film on the inlet (Fig. 2/A) and outlet connection (Fig. 2/B).
- b) Connect the pipe to the outlet connection (Fig. 2/B).
For connection lines (with the same pipe cross section as the machine connection) and more than 3 m length, it is reasonable to install a non-return valve, in order to avoid reverse running after switching off. For suitable non-return valves for your application (accessories ZRK), please contact our Service department.
- c) Make sure that the outlet line is connected correctly and is leakproof!



The compressor volume flow is reduced if the pressure pipe is too narrow and/or too long.

5.4 Check lubricating oil

- a) Check the lubricating oil level through the oil sight glass (Fig. 2/I) and top up, if necessary.
- b) Fill the lubricating oil for the gear wheels and bearings at the oil filling point (Fig. 2/H) up to the middle of the sight glass (Fig. 2/I).
For suitable types: see chapter 7.5
- c) Reclose the oil filling point.

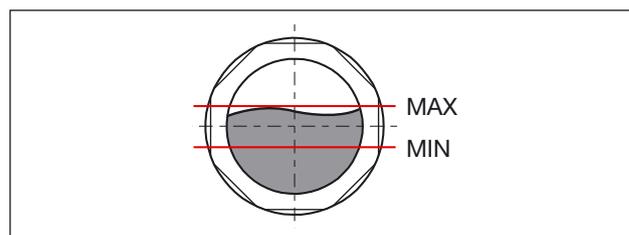


Fig. 6 Oil level in the sight glass

5.5 Connect to the energy supply network

! DANGER



Danger to life if the electrical installation has not been carried out professionally!

Installation that has not been carried out professionally or properly can cause serious injuries or death. The whole electrical system can be destructed.

- The electrical installation must only be carried out by a qualified electrician observing EN 60204.
- The main switch has to be provided by the user.
- The motor must be safeguarded via a motor protection switch. This must be installed by the operating company.

NOTICE

Property damage due to wrong energy supply!

Wrong operating voltages, frequencies or currents can cause loss of power or damages to the machine.

- The conditions at the installation location must comply with the details on the motor data plate.

Installation

5.5.1 Connect motor, machine without frequency converter

Please find the electrical motor data on the data plate (Fig. 2/N) or the motor data plate (Fig. 2/P₁). The motors comply with DIN EN 60034 and are designed in protection class IP 55 and insulation class F. The appropriate connection diagram is located in the terminal box of the motor (not existing for the version with plug connection).

If not otherwise specified on the motor data plate, the following tolerances apply:

- $\pm 5\%$ voltage deviation referred to nominal value
 - $\pm 2\%$ frequency deviation
- a) Compare the motor data with the data of the existing mains network (current type, voltage, network frequency, permitted current value).
 - b) The direction of rotation of the motor must correspond with the direction of rotation arrow (Fig. 2/O) on the motor flange. Check the rotation direction!
 - c) Directly connect the motor in the terminal box or use the optional connector (accessories).
For securing, a motor protection switch and a strain relief provide for a screwed cable connection to connect of the connecting cable.



We recommend using motor protection circuit breakers with delayed switch off, depending on a possible excess current. Temporary excess current can occur when the machine is started under cold conditions.

5.5.2 Connect motor, machine with frequency converter

The drive consists of the motor and the frequency converter. The mechanical and electrical connection between engine and frequency converter has already been established at the time of delivery. The frequency converter is parameterized with the basic settings.

Please find the electrical data on the data plate (Fig. 5, on the right). The electrical power supply values are indicated on the data plate of the frequency converter.

If not otherwise specified on the data plate, the following tolerances apply:

- Input voltage: 3~ AC , 400 V -15 % to 480 V +10 %
 - Input frequency: 47 to 63 Hz $\pm 0\%$
 - Appropriate network configurations: TN / TT
- a) Compare the motor data with the data of the existing mains network (current type, voltage, network frequency, permitted current value).
 - b) Connect the frequency converter (Fig. 3/V) according to the operating instructions or the enclosed pin configuration. Use suitable cable fittings or fasteners to comply with the protection class (IP 65).

6 Commissioning and decommissioning

6.1 Start-up

WARNING

Risk of injury due to improper operation!

Improper operation of the machine can cause serious or fatal injuries.

- Strictly observe the safety instructions. Especially observe the safety instructions in chapter 2 .

CAUTION

Risk of burns on hot surfaces!

When the machine is at operating temperature the surface temperatures on the components may rise to above 70 °C. This can cause serious burns.



- Do not touch hot surfaces (indicated by warning signs).
- Wear suitable protective gloves, if necessary.

CAUTION

Risk of injury due to noise emission!

High sound pressure level can permanently damage hearing.



- Observe measured sound pressure level, see chapter 10.
- When spending a long time in the vicinity of the running machine use ear protection to avoid permanent damage to hearing.

NOTICE

Property damage!

If the permissible final compression pressure is exceeded the machine may be damaged.

- Operation without safety valve does not comply with the intended use.

NOTICE

Property damage!

Restart of the machine while the machine has not coasted down completely can damage the machine.

- The machine is only allowed to be switched on again after it stands still.

6.1.1 Installation check

WARNING

Risk of injury!

A faulty installation as well as missing or non-functional safety equipment may lead to severe injury.

- Put the machine into operation only after it has been ensured that the installation has been carried out flawlessly and the requirements for installation, assembly and electrical installation have been observed.

The following checks must be carried out:

- For damages due to transport or assembly of the machine and the accessories attached
- Machine stands stable on the floor in a horizontal installation position
- Correct connection of the pipelines (inlet side, outlet side), check for leak tightness!
- Tight fit of the screw and flange connections
- Electrical installation complies with the specifications (connection diagram)
- The installation room is equipped with an adequate ventilation system
- Oil filled and oil level checked
- Machine and pipelines cleaned
- check the function of optional accessories (if present)

Commissioning and decommissioning

6.1.2 Check the rotation direction

NOTICE

Property damage due to wrong direction of rotation!

Running in reverse for a long time may damage the machine.

- Use a phase sequence indicator to check the direction of rotation (**clockwise**).

The drive shaft direction of rotation is shown by the arrow for the direction of rotation (Fig. 2/O) on the motor flange.

- Start the motor briefly (max. two seconds) to check the direction of rotation. When looking at the motor blower, it must rotate counter-clockwise.

After successfully checking the installation and the direction of rotation, the machine will be ready for operation.

6.2 Decommissioning

6.2.1 Decommissioning of the machine

DANGER



Danger of death from touching live parts!

Touching of live parts cause serious injuries or death.

- Disconnect the machine from the power supply by actuation of the main switch or disconnection of the plug and secure it against unexpected restart.
- Works on the electrical installation or electrical components must be carried out by an electrician only.

CAUTION



Risk of injury due to hot surfaces!

When the machine is at operating temperature the surface temperatures on the components may rise to above 70 °C. This can cause burns.

- Avoid touching the hot surfaces. They are marked by warning signs.
- Wear suitable protective gloves, if necessary.

- Switch the machine off and allow it to cool down.
- If available, close the cut-off device in the inlet and outlet line.
- Disconnect the machine from the power supply.
- Depressurise the machine: Open the pipes slowly.
 - ⇒ The pressure reduces slowly.
- Remove the pipes and hoses.
- Seal the connections for inlet and outlet stubs using adhesive foil.

6.2.2 Storing the machine

☰ See also chapter 3.2, Page 13

6.3 Recommissioning

- Check the condition of the machine (cleanliness, cabling etc.).

☰ For installation see chapter 5, Page 18

☰ For commissioning see chapter 6.1, Page 21

7 Maintenance and repair

DANGER



Danger of death from touching live parts!

Touching of live parts cause serious injuries or death.

- Before starting any maintenance work, disconnect the machine by actuation of the main switch or disconnection of the plug and secure it against accidental switching.
- Works on the electrical installation or electrical components must be carried out by an electrician only.
- Repair works are only allowed to be done by authorised specialists.

CAUTION



Risk of injury due to hot surfaces!

When the machine is at operating temperature the surface temperatures on the components may rise to above 70 °C. This can cause burns.

- Wait for the machine to cool down.
- Before maintenance and repair works allow the machine to cool down.
- Wear suitable protective clothes, if necessary.

CAUTION

Risk of injury due to missing safety devices!

Missing safety devices can cause injuries.

- Safety devices as well as safety guards on motor fans and ventilators may not be removed.

7.1 Ensure operational safety

Regular maintenance work must be carried out in order to ensure operational safety.

For some maintenance intervals we are offering service kits that include the necessary spare parts.

The cleaning and oil change intervals strongly depend on how the machine is loaded (operating time, operating conditions, etc.) and the type of oil used. Depending on the pollution of the sucked in medium and the environmental conditions, the cleaning intervals of the intake filter and the safety valve can be shorter. Extreme temperatures or pollutions can reduce the lifetime of the oil to 5,000 operating hours. The specified interval of up to 20,000 operating hours only applies to types of oil delivered or approved by Elmo Rietschle. Please find an overview in Tab. 2 on page 30.

For all works, observe the safety instructions described in chapter 2 “Safety”.

The whole plant should always be kept in a clean condition.

7.2 Maintenance table

Interval (Operating hours)	Maintenance activities	Chapter
At least 1 x per month	Check the pipes and screws for leaks and ensure their tight fit and if necessary re-seal or re-tighten.	–
	Check the terminal box and cable inlet holes for leaks and if necessary re-seal.	–
	Cleaning of the compressor: Clean the louvres of the compressor and the cooling ribs of the motor	Chapter 7.4
	Check the oil level	Chapter 7.5.1
	Check, clean, and replace the air filters, if necessary	Chapter 7.6
Depending on the degree of pollution	Cleaning of the compressor	Chapter 7.4
every 6 months	Replace the filter cartridge in the air filter	Chapter 7.6
At least 1 x per year	Visual inspection of the coupling, Check the cooling air fan for tight fit and damage	Chapter 7.7.2
20000 h	Oil change	Chapter 7.5.2
As per manufacturer's instructions	Motor (maintenance, lubrication and cleaning)	Chapter 7.7.1
	Safety valve	Chapter 7.8
	Frequency converter	Chapter 7.9
40000 h	General overhaul of the machine (Elmo Rietschle Service)	–

Tab. 1 Maintenance table

7.3 Preparing maintenance works

- a) Switch the plant off electrically and secure it against unexpected restart.
- b) Depressurise the compressor; for this purpose open the gate valve on the outlet side (if installed) or bleed through the safety valve.
Exceptions: Clean the outside of the compressor and check the safety valve for functioning
- c) Allow the compressor to cool down.
Exception: Oil change, here the compressor shall be still warm, because oil can then flow off better.
- d) Post the warning sign "Caution, maintenance works!".

7.4 Cleaning of the compressor

The compressor must be checked regularly for dust deposits and cleaned, if necessary. The cleaning interval depends on the operational requirements.

- a) Clean the compressor with a damp cloth or use a vacuum cleaner. Remove dust deposits:
 - From the compressor housing
 - Between the cooling ribs of the motor
 - On the silencer and the piping
 - On the intake filter and the safety valve
 - On the accessories attached

7.5 Lubricating Oil

CAUTION



Risk of burns on hot equipment!

There is the risk of burning on hot equipment when changing oil.

- Allow the machine to cool down to approx. 40 °C (lukewarm).
- Avoid contact with the hot oil because the oil temperature can be higher than the ambient external temperature of machine.
- Wear suitable protective gloves, if necessary.

CAUTION



Risk of injury due to slipping and falling!

The floor can be slippery due to leaked oil and cause slipping, tripping or falling.

- For oil change wear non-slip shoes.
- Remove leaked oil immediately.



Always change the oil when the machine is at operating temperature and in an atmospherically ventilated area. If it is not completely emptied, the refilling quantity is reduced.

If you change the type of oil, empty the oil tank completely.

A minimum oil quantity may escape from the vent screw due to pressure compensation. If larger quantities of oil escape, wash the internal filter of the vent screw.



The waste oil must be disposed of in compliance with the local environmental protection regulations.

We recommend using Elmo Rietschle oils (also see Oil recommendation plate (Fig. 7/M)) as well as Tab. 2 on page 30:

- GEAR-LUBE 150
- ECO-GEAR-LUBE 150

The viscosity of the oil used must comply with ISO VG 150 as per DIN 3448. Also consider the safety data sheet of the oil type used.

If you want to change the oil type, please contact us.

7.5.1 Check/refill oil level

Check the oil level in the sight glasses (Fig. 7/I) every month.

- a) Switch the machine off, secure it against accidental switching on and relieve pressure.
- b) Open the cap of the oil filling point (Fig. 7/H) and refill oil until it reaches the upper edge of the sight glass (Fig. 7/I).
- c) Reclose the oil filling point.

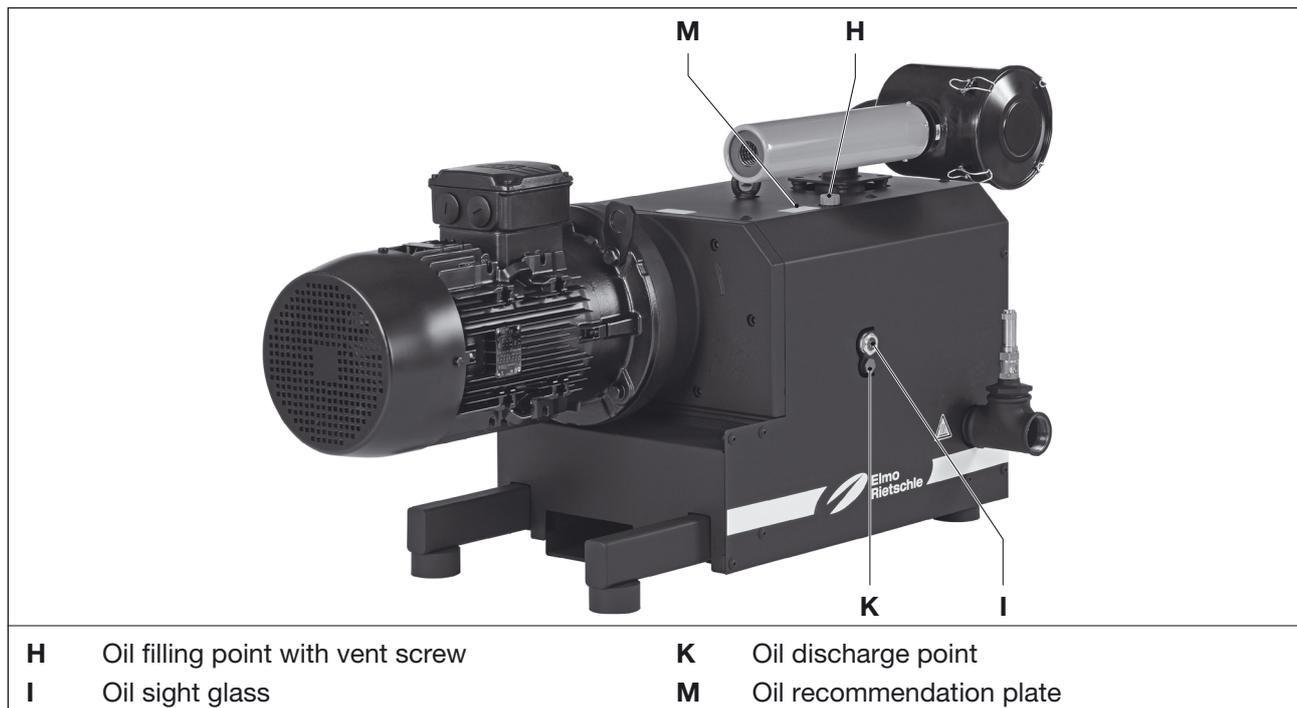


Fig. 7 Oil change

7.5.2 Oil change

In case of clean operation, replace oil every 20,000 operating hours.

A container is required for collecting the used oil with a minimum capacity of the filling volume of the compressor (see chapter 10).

- a) Switch the machine off, secure it against accidental switching on and relieve pressure. Let the machine cool down (lukewarm).
- b) Place the container below the oil discharge position (Fig. 7/K).
- c) Open the screw of the oil filling point (Fig. 7/H), open the oil discharge point (Fig. 7/K) and completely discharge the used oil.
- d) Close the oil discharge (Fig. 7/K) and fill in new oil in the oil filling position (Fig. 7/H) until the oil level has reached the middle of the inspection glass.
CAUTION! Tighten the screw plug of the oil discharge. Leaks cause the loss of oil and can damage the machine.
- e) Close the screw in the oil filling point (Fig. 7/H).

7.6 Air filter

CAUTION**Danger of injury when dealing with compressed air!**

When the filter is blown off with compressed air, loose solid particles or powder dust swirling around may cause injury to the eyes. Inhaling can damage lungs.

- Wear protective glasses and dust mask when cleaning the filter with compressed air.

NOTICE**Property damage due to insufficient maintenance of the air filter!**

Performance of the machine is reduced by a polluted air filter and insufficient maintenance. This can cause damage of the machine.

- Regularly check and clean the integrated air filters.
- Replace highly polluted or damaged air filters.

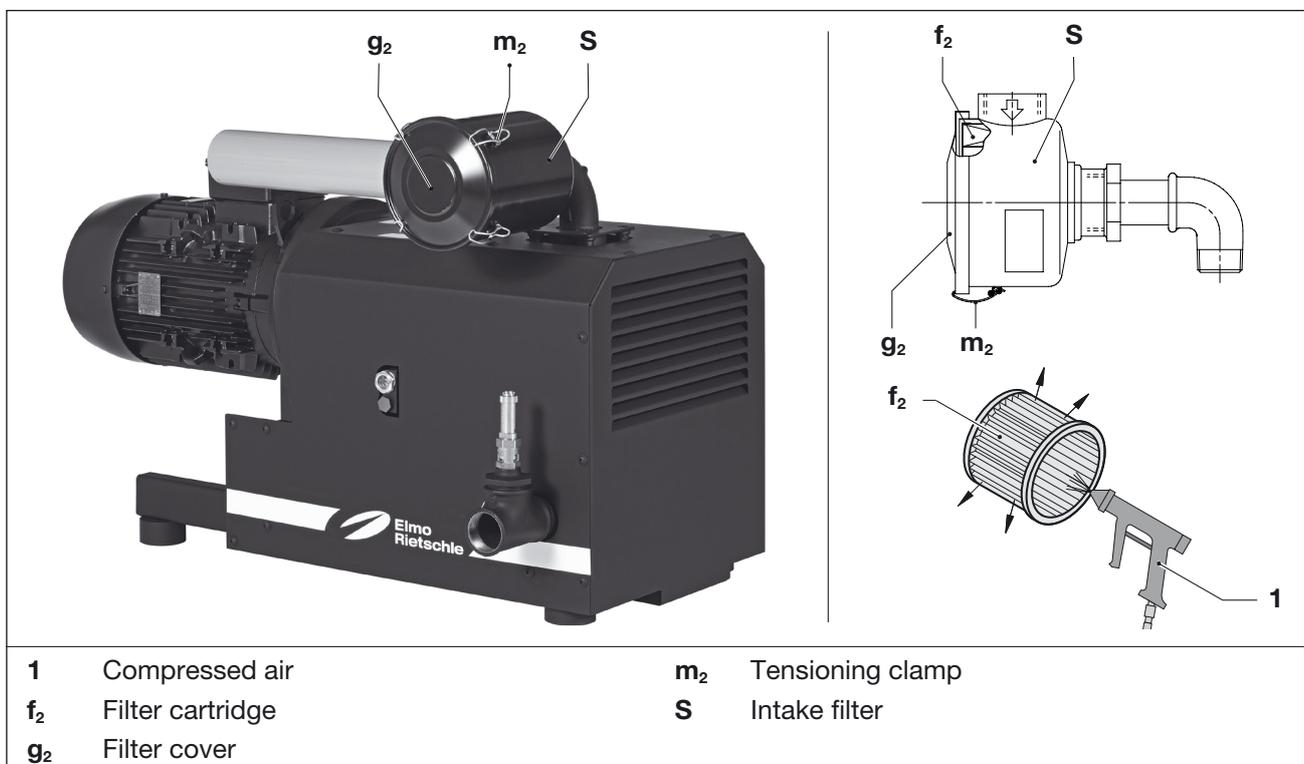


Fig. 8 Intake filter

Clean the filter cartridge of the suction filter every month or more often, depending on pollution, by blowing off from the inside to the outside.

In spite of cleaning the filter its separation efficiency will continue to deteriorate. Therefore the filter cartridges should be replaced every six months.

- a) Switch the machine off, secure it against accidental switching on and relieve pressure.
- b) Release the brackets (Fig. 8/m₂) on the filter cover (Fig. 8/g₂).
- c) Remove the filter cartridge (Fig. 8/f₂) from the filter and clean or replace.
CAUTION! Do not damage the filter cartridge when cleaning it. Replace damaged filter cartridges.
- d) Re-insert the filter cartridge in the filter and fasten the filter cover (Fig. 8/g₂) with the brackets (Fig. 8/m₂).

7.7 Motor and coupling

7.7.1 Motor



Perform the maintenance of the motor in accordance with the manufacturer's operating and maintenance instructions. For this, contact our service people.

7.7.2 Coupling / Fan

The coupling requires low-maintenance. We recommend visually checking the coupling in connection with the inspection of the fan at least once a year. With this, thoroughly check the condition of the elastomer components. All parts of the coupling should be checked for damages in the same way.



Perform the maintenance of the coupling in accordance with the manufacturer's operating and maintenance instructions. For this, contact our service people.

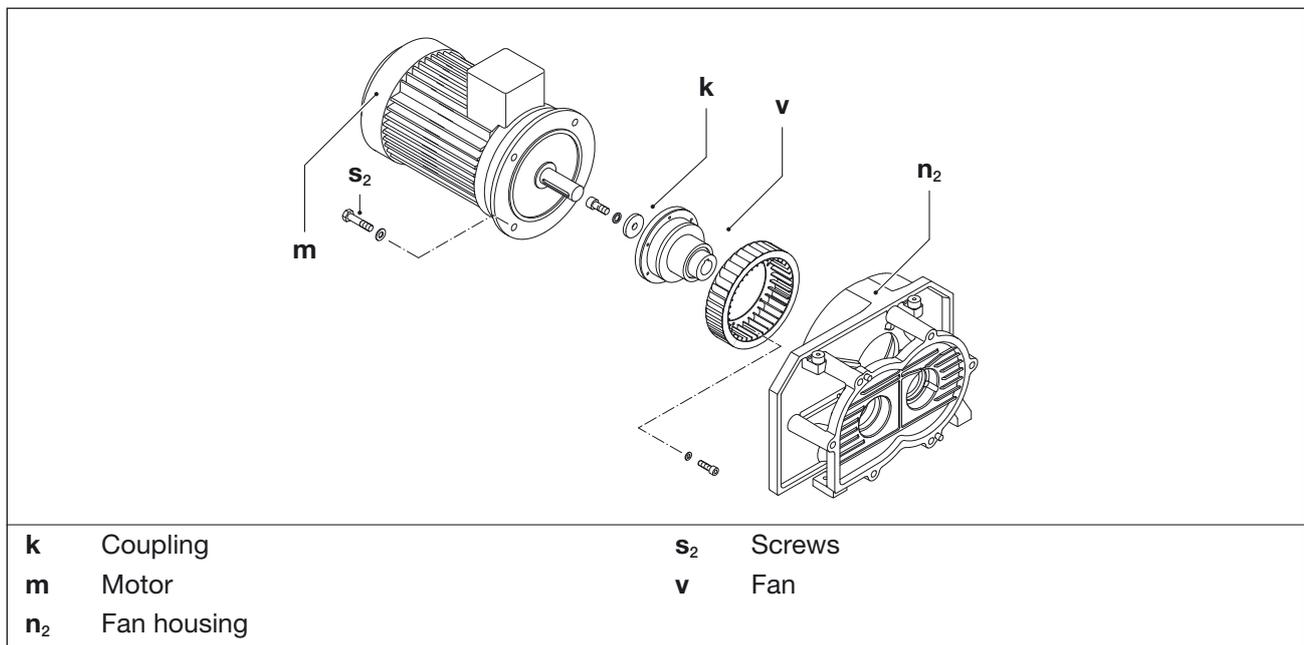


Fig. 9 Check the fan

The fan (Fig. 9/v) for cooling the compressor must be checked for tight fit and damages at least 1 x per year. If necessary, the screw connections must be retightened or the fan is to be replaced.

- Switch the machine off, secure it against accidental switching on and vent to atmospheric pressure. Allow the machine to cool down.
- Hook the motor (Fig. 9/m) in the eyebolts and lift it by means of lifting gear. If no eyebolts exist, suspend the Motor with round loops.
- Release the screws (Fig. 9/s₂) on the motor flange and axially pull the motor with coupling (Fig. 9/k) and fan (Fig. 9/v) out of the fan housing (Fig. 9/n₂).
- Check the fan (Fig. 9/v) and clean it, if necessary. If the fan is damaged, replace it.
- Axially push on the motor with the coupling (Fig. 9/k) and fan (Fig. 9/v) and using the screws (Fig. 9/s₂), fix it to the flange (Fig. 9/n₂) of the housing.
- Remove the lifting device.

7.8 Safety valve



Perform maintenance and replace the safety valve in accordance with the manufacturer's operating and maintenance instructions. For this, contact our service people.

7.9 Frequency converter



Perform the maintenance of the frequency converter in accordance with the manufacturer's operating and maintenance instructions. For this, contact our service people.

7.10 Repair / service

For repairs contact the manufacturer, its branch offices or authorised dealers. Please contact the manufacturer for the address of the authorized service centre (see manufacturer's address at the rear side).



WARNING

Risk of injury due to substances hazardous to health!

Due to contamination with hazardous substances and operating agents during operation, there is a high health risk for the repair personnel.

- For each machine that is sent to an Elmo Rietschle Service centre for inspection, maintenance or repair, a fully completed, signed declaration of harmlessness must be enclosed.
The Declaration of No Objection is part of the supplier's documentation.
- Before returning, properly clean the machine.

After a repair or re-commissioning, the actions listed in chapter 5 "Installation" and chapter 6 "Commissioning and decommissioning" are to be performed as in the first commissioning.

7.11 Spare parts

NOTICE

Property damage due to wrong or defective spare parts!

Wrong or defective spare parts can cause malfunctions or blackout failure of the machine.

- Only use original spare parts or parts approved by the manufacturer.
- The use of other parts may revoke liability or guarantee for any resulting consequences.

Please find an overview of the spare parts in the list of spare parts **E887**.

Wearing parts and sealings are separately listed. For ordering spare parts, please contact the Elmo Rietschle Service (address on the back of the page).

Oils can directly be ordered from our Elmo Rietschle Service with quotation of the material numbers.

Maintenance and repair

Oil	Trading units	Material number	Description
GEAR LUBE 150 20,000 h	Can, 1 l	7201706000	Synthetic oil, highly loadable with high resistance to aging and with excellent wear protection.
ECO GEAR LUBE 150 20,000 h	Can, 1 l	7203850000	Synthetic oil, especially developed for the food and pharmaceutical industry. Refers to FDA 21 CFR 178.3570 and USDA H-1. With Halal and Koscher certificate.

Tab. 2 Oils

8 Errors

**Danger to life!**

If malfunctions are disregarded and/or removed only insufficiently, serious to lethal injuries can occur.

- Never put the compressor in operation again if it was automatically switched off and the reason has not been found out doubtlessly and remedied.

Malfunction	Cause	Elimination	Note
Machine is switched off by the motor protection switch	Mains voltage/ Frequency does not correspond with the motor data	Check by qualified electrician	Chapter 5.5
	Connection to motor terminal board is not correct		
	Motor protection switch is not set correctly		
	Motor protection switch is triggered too quickly	Use a motor protection switch with an overload-dependent turn-off delay that considers the short excess current at start up (version with short circuit and overload trigger as per VDE 0660 Part 102 or IEC 60947-4-1)	
	The safety valve is dirty so that the permissible pressure is exceeded	See Operating Instructions of safety valve	–
Machine does not start or the frequency converter displays an error message	Malfunctions in the integrated frequency converter	See Operating Instructions of frequency converter	–
	The safety valve is dirty so that the permissible pressure is exceeded	See Operating Instructions of safety valve	–
The volumetric flow rate is not sufficient	The intake filter is dirty	Clean / replace intake filter	Chapter 7.6
	The pressure line is too long or too narrow	Check the hose and/or the pipe	Chapter 5.3
	Machine or system leaking	Check the pipework and screw connections for leaks and check for tight fit	Chapter 5.3
Final pressure (max. excess pressure) has not been reached	Machine or system leaking	Check the pipework and screw connections for leaks and check for tight fit	Chapter 5.3
	The intake filter is dirty	Clean / replace intake filter	Chapter 7.6
	Driving power selection too low	Use next largest motor output	Data sheet D 889 / D 887-60

Tab. 3 Table of malfunctions

Errors

Malfunction	Cause	Elimination	Note
Machine gets too hot	Ambient or inlet temperatures too high	Ensure proper use	Chapter 2.4
	Cooling air supply is obstructed	Check ambient conditions	Chapter 5.1
		Clean ventilation slots	Chapter 7.4
	The safety valve is dirty so that the permissible pressure is exceeded	See Operating Instructions of safety valve	–
The machine makes a strange noise	Deposits on the rotary piston	Clean the working space and the rotary piston	Elmo Rietschle Service
	Safety valve is floating	Replace the valve	
	Coupling is damaged	Replace coupling	

Tab. 3 Table of malfunctions



Please contact Elmo Rietschle Service for other malfunctions or those that cannot be eliminated.

9 Disassembly and disposal

9.1 Disassembly



WARNING

Risk of injury due to substances hazardous to health!

Due to contamination with hazardous substances and operating agents during operation, there is a high health risk for the personnel.

- Before disassembly, properly clean the machine.
- Wear suitable protective clothing.

- a) Put the machine out of service according to chapter 6.2.
- b) Disassemble the machine.
Dismantle large components and assemblies.

9.2 Disposal

NOTICE



Damage to the environment!

Environmental damage may be caused by the incorrect disposal of operating material and materials.

- All operating materials, as well as all liquids, such as cooling water and cooling oil, required during operation and maintenance, must be collected and disposed of in an environmentally friendly manner.
- Separate components according to the materials and if possible, recycle.

- a) Collect oils and grease separately and dispose of in accordance with the local regulations in force.
- b) Do not mix solvents, cold cleaning agent and paint residues.
- c) Remove components and dispose of them in accordance with the local regulations in force.
- d) Dispose of the machine in accordance with the national and local regulations in force.
- e) Parts subject to wear and tear (marked as such in the spare parts list) are special waste and must be disposed of in accordance with the national and local waste laws.

10 Technical Data

C-DLR		301	301 FU (Fxxx)
Sound pressure level (max.) EN ISO 3744 Tolerance ± 3 dB(A)	dB(A)	50 Hz	81
		60 Hz	83
Weight *	kg	330	375
Length *	mm	1229	1236
Width	mm	635	635
Height	mm	771	798
Pressure line		G 2	G 2
Oil filled volume	l	1.5	1.5

* Length and weight may differ from the information listed here depending on the motor manufacturer.

Further technical data can be found in the data sheet:

D 889 → C-DLR 301

D 887-60 → C-DLR 301 (Fxxx) with frequency converter



Subject to technical changes!



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