ALMiG Compressor Systems

Manual

Screw compressor

G Drive 30 - 37
V Drive 30 - 37

Read the instructions prior to performing any task!

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Translation of original manual

Information on these operating instructions

These instructions enable you to use the machine safely and efficiently. The instructions are a component part of the machine and must be kept in the direct vicinity of the device and be accessible for staff at all times.

Staff must have carefully read and understood these instructions before starting all work. The basic prerequisite for safe working is compliance with all the safety instructions and instruction for actions included in these operating instructions.

The local occupational health and safety regulations and general safety rules for operational area of the machine also apply.

The instructions for the machine do not cover operation of the controller. Therefore, the instructions and content of the instructions for the controller in question must also be taken into account.

Furthermore, the instructions for the installed components found in the appendices also apply.

Copyright

Limitation of liability

All information and instructions in this manual have been compiled taking account of the applicable standards and regulations, state-of-the-art technology and our years of knowledge and experience.

The manufacturer assumes no liability for damages caused by:

- failure to adhere to these instructions
- improper use
- use of unqualified staff
- unauthorized conversions
- technical modifications
- use of non-approved spare parts

The actual scope of supply may differ from the descriptions and illustrations in these instructions in the case of special designs, the inclusion of additional ordering options or as a result of the latest technical modifications.

The obligations agreed in the contract of supply, the manufacturer's general terms and conditions of business and delivery and the legal regulations valid at the time of completion of the contract apply.

Customer Service

Our Customer Service department is available to provide technical information.
See page 2 for contact details.

Our employees are also constantly interested in receiving new information and hearing of your experiences from practice which may be valuable for improving our products.

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1.1 Overview

Screw compressor

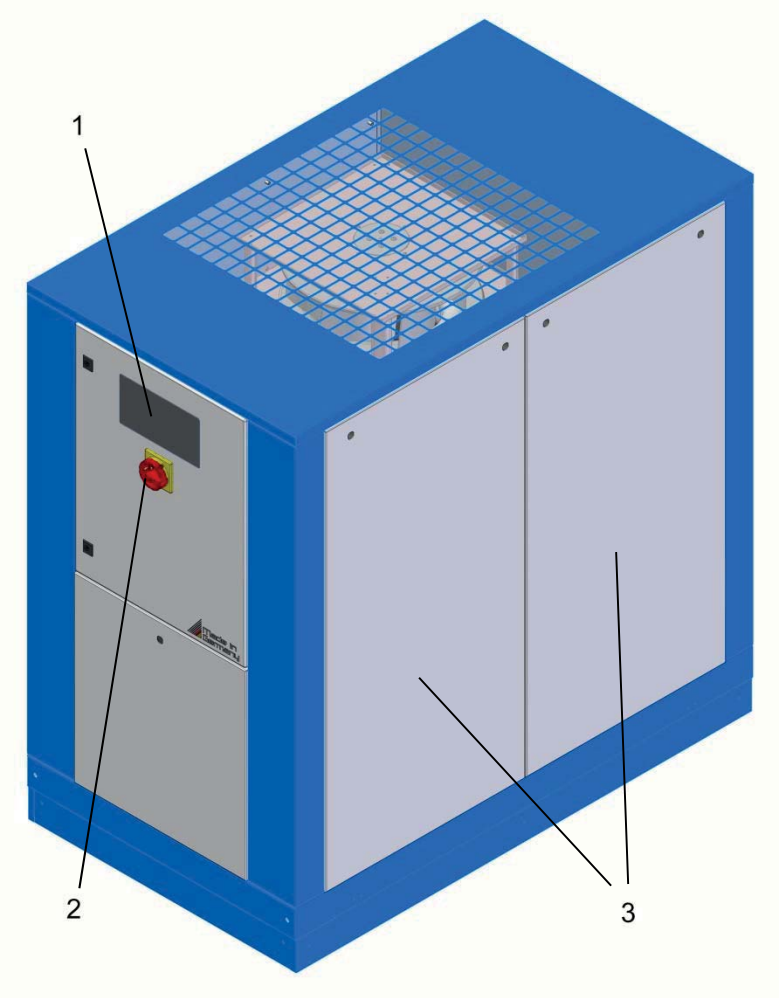


Fig. 1: Screw compressors G Drive 30 - 37 / V Drive 30 - 37

1 Controller
2 Main switch /Emergency stop button
3 Sound insulation covers

This chapter shows the screw compressors described in these instructions. The compressors differ primarily in the installed drive. However, their basic construction is the same.

Assemblies

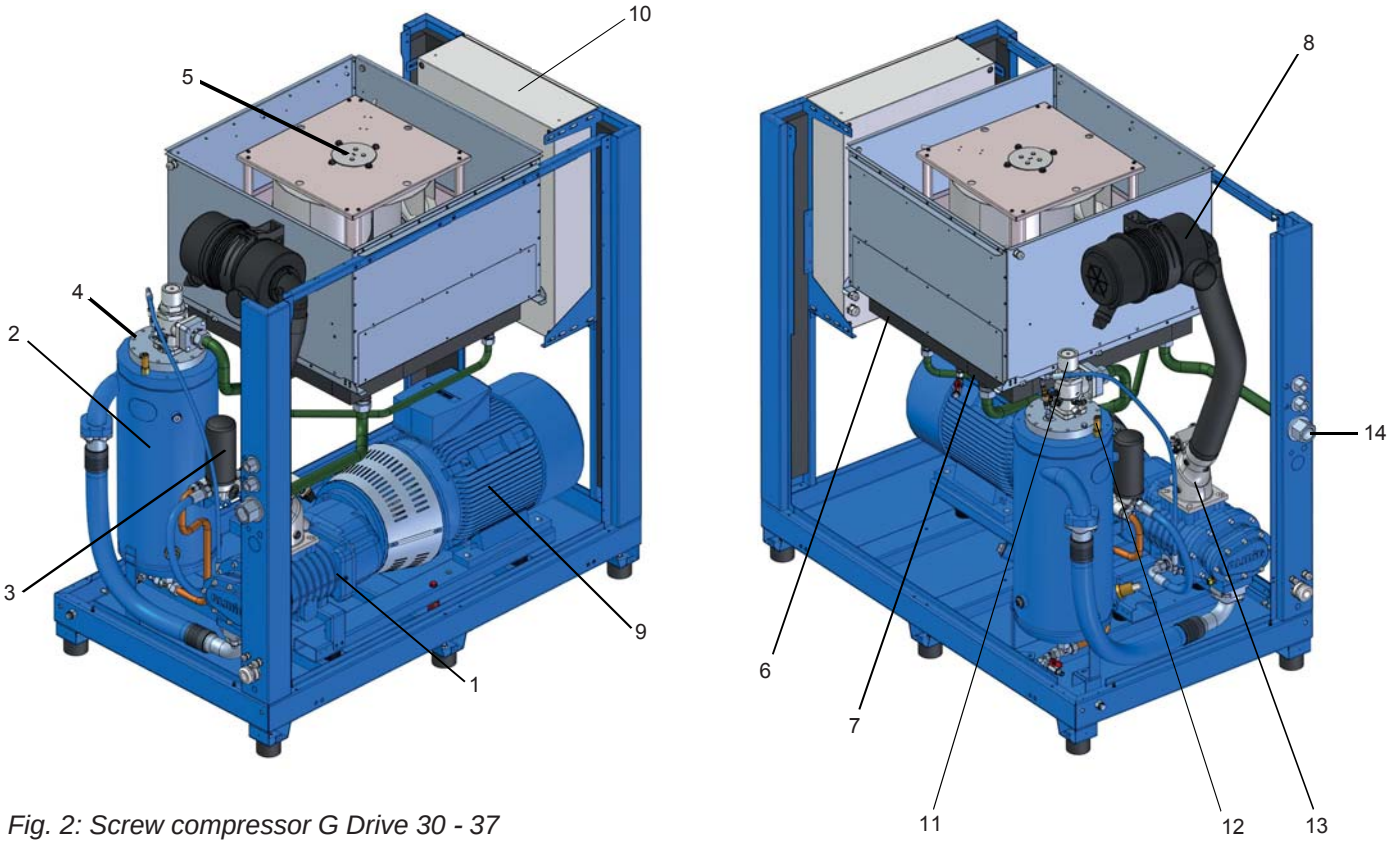


Fig. 2: Screw compressor G Drive 30 - 37

1	Air End (incl. gearing)	8	Intake filter
2	Coolant liquid pressure tank	9	Motor
3	Coolant liquid filter	10	Switch cabinet
4	Fine precipitator (inside)	11	Minimum pressure and return valve
5	Cooling air ventilator	12	Safety valve
6	Coolant liquid cooler	13	Intake valve
7	Compressed air after-cooler	14	Compressed air connection

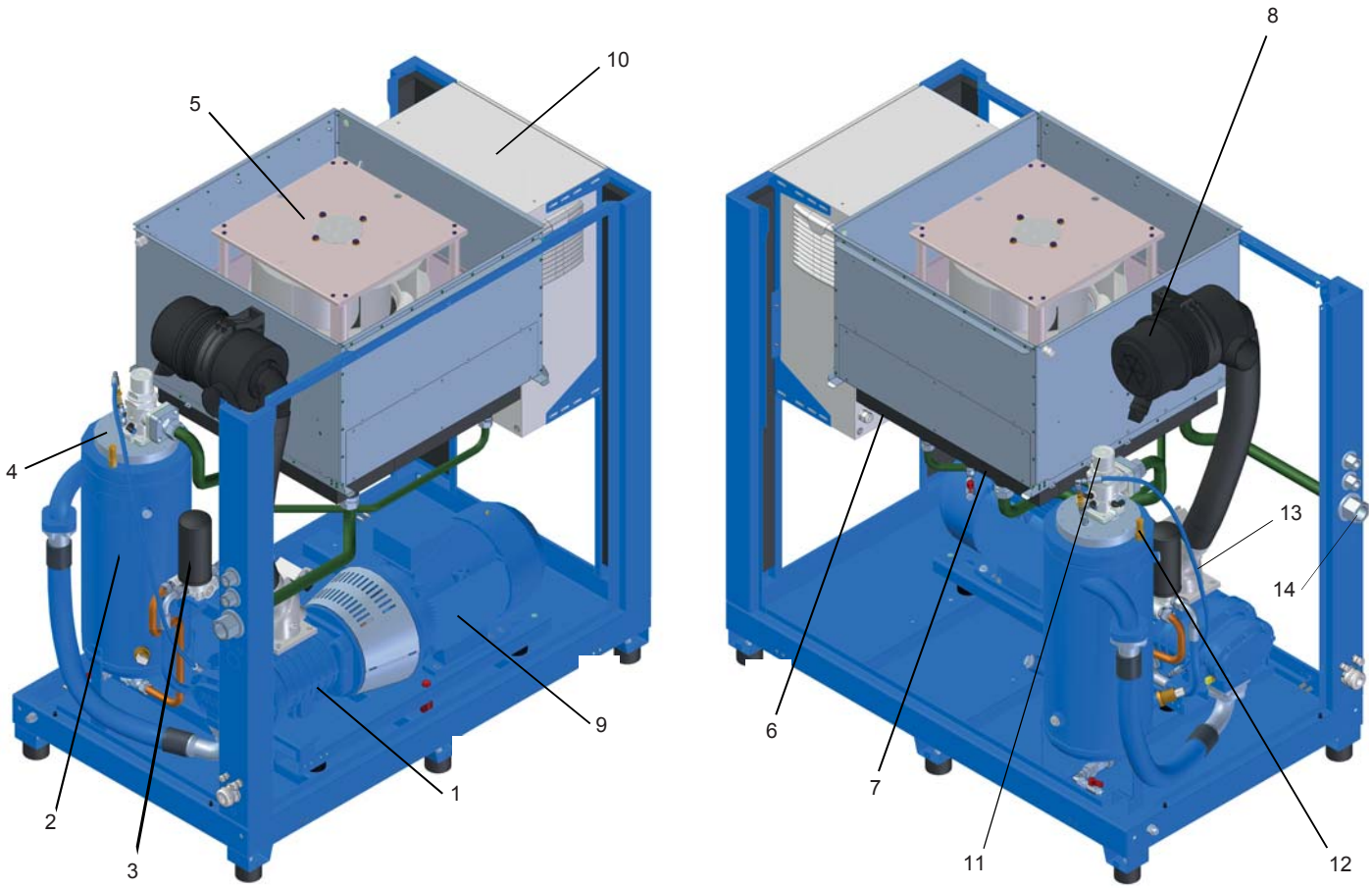


Fig. 3: Screw compressor V Drive 30 - 37

1 Air End
2 Coolant liquid pressure tank
3 Coolant liquid filter
4 Fine precipitator (inside)
5 Cooling air ventilator
6 Coolant liquid cooler
7 Compressed air after-cooler
8 Intake filter
9 Motor
10 Switch cabinet (including frequency converter)
11 Minimum pressure and return valve
12 Safety valve
13 Intake valve
14 compressed air connection

1.2 Brief description

The fresh air supplied by the installed cooling air ventilator is filtered through the intake filter. The air streams over the intake regulator into the compressor stage, where it is compressed together with the injected coolant liquid to the final pressure. The compressed air is largely separated from the coolant liquid in the coolant liquid pressure tank. The subsequent fine precipitator removes the remaining coolant liquid from the compressed air. The compressed air then streams over the minimum pressure and return valve into the compressed air after-cooler and is cooled down before it leaves the screw compressor via the compressed air connection.

The coolant liquid is separated from the compressed air in the coolant liquid pressure tank and the fine precipitator and streams to the coolant liquid cooler. The coolant liquid temperature regulator adds the cooled-off coolant liquid to the hot coolant liquid via the coolant liquid cooler bypass according to the set point temperature. Finally, the coolant liquid filter cleans the coolant liquid before it is injected into the compressor stage once again.

1.3 Assembly description

1.3.1 Controller

Controller variants

For the controller variant installed, please consult the label on the controller. For detailed information about the controller installed, consult the separate Controller documentation.

1.3.2 Sound insulation covers

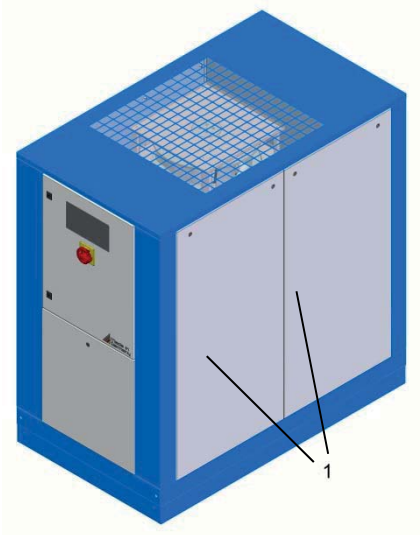


Fig. 4: Sound insulation covers

Only qualified personnel may remove the sound insulation covers (at 3 sites, example Fig. 4/1) with the included special spanner. Sound insulation covers are a part of the electric shock protection.

1.3.3 Drive unit

Various drive units are installed in the screw compressors. They differ in construction, their technical data and their functional principle as follows:

Screw compressor with gear drive

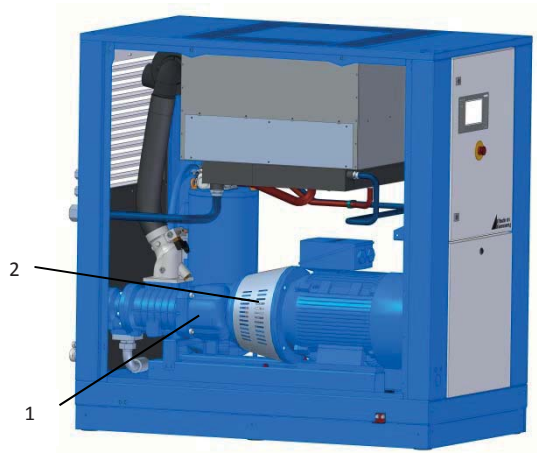


Fig. 5: Screw compressor G-Drive with gear drive

The screw compressor G-Drive is driven by a gear drive (Fig. 5/1) and a coupling (Fig.5/2).

Screw compressor with direct drive and frequency converter

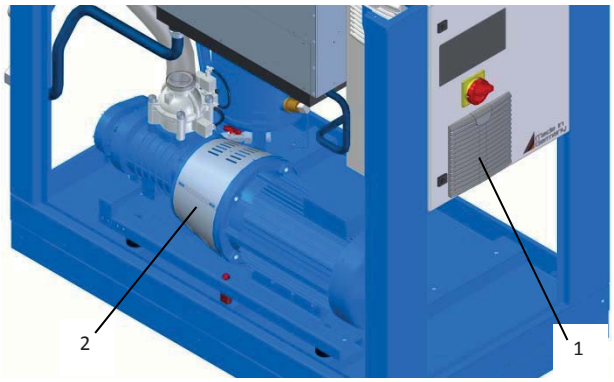


Fig. 6: Screw compressors V-Drive with direct drive and frequency converter

On the screw compressor V-Drive with frequency converter the electric motor is speed-controlled by the frequency converter in the switch cabinet (Fig. 6/1). Actuation is performed directly with a coupling (Fig. 6/2).

1.3.4 Intake filter

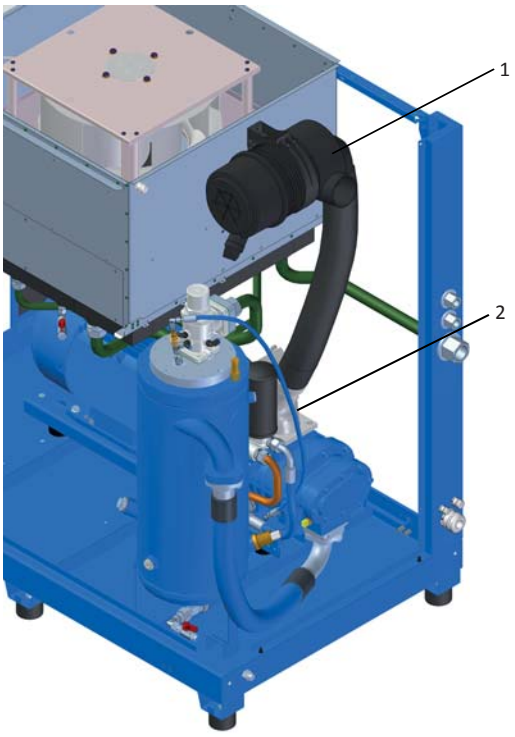


Fig. 7: Intake filter

The intake filter (Fig. 7/1) is fitted above the air end. The air which the cooling air fan conveys into the housing is filtered in the intake filter and fed to the air end by the intake valve (Fig. 7/2).

1.3.5 Compressor section

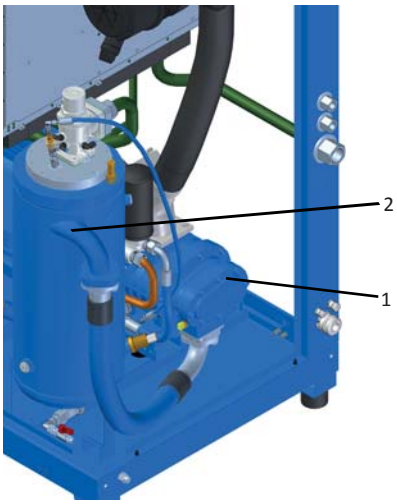


Fig. 8: Compressor section

The air taken in is compressed by the air end (Fig. 8/1) and fed to the coolant liquid pressure tank (Fig. 8/2) together with the injected coolant liquid.

1.3.6 Coolant liquid pressure tank

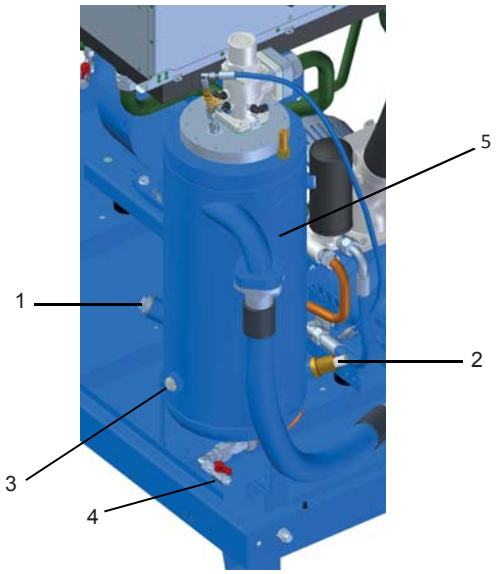


Fig. 9: Coolant liquid pressure tank with safety valve

1 Filler nozzle
2 Connection for coolant liquid heater (optional)
3 Inspection glass
4 Coolant liquid drain
5 Coolant liquid pressure tank

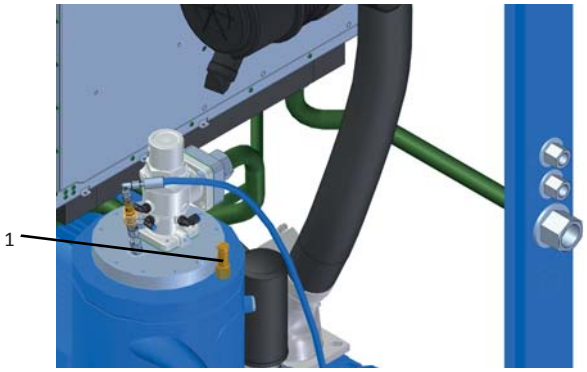


Fig.9/1: safety valve

The coolant liquid pressure tank comprises several components. The safety valve (Fig.9/1) protects the coolant liquid pressure tank from overpressure. The level of the coolant liquid can be read through the inspection glass. The coolant liquid is topped up via the filler nozzle and removed via the coolant liquid drain.

Coolant liquid heater (optional)

A coolant liquid heater can be installed in the coolant liquid pressure tank at the factory or retrofitted at a later time. It prevents damage from condensation, i.e. the freezing of the condensate, e.g. for a screw compressor which is set up in a cold or humid location.

1.3.7 Fine separator

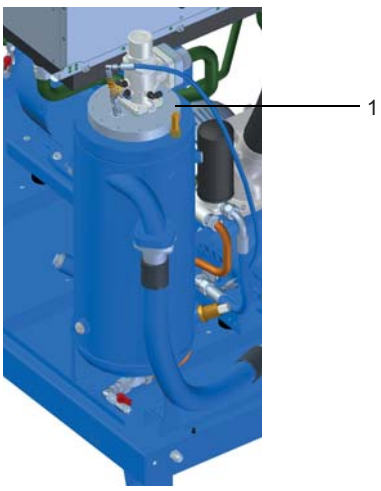


Fig. 10: Fine separator

The fine separator (Fig. 10/1) is inside the coolant liquid pressure tank and removes the residual coolant liquid from the compressed air.

1.3.8 Minimum pressure and non- return valve

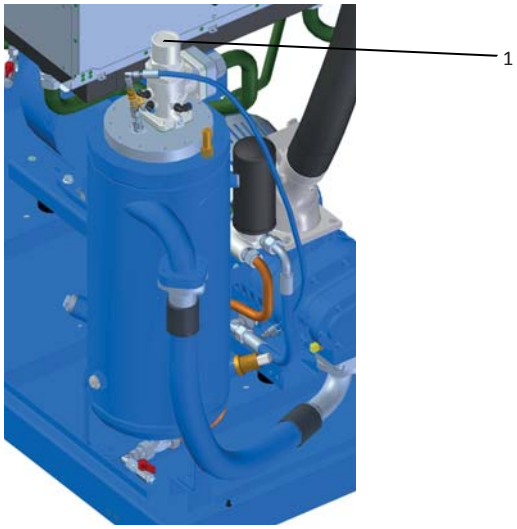


Fig. 11: Minimum pressure and non-return valve

The minimum pressure and return valve (Fig. 11/1) does not open until the system pressure has risen to 4,5 bar. After switching off the screw compressor the minimum pressure and non-return valve prevents the compressed air from flowing back out of the network.

1.3.9 Cooler

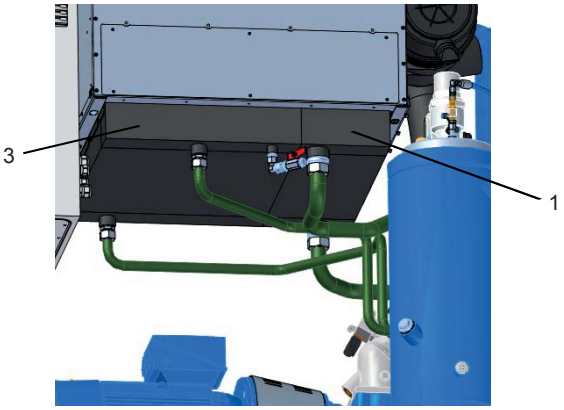


Fig. 12: Cooler

The compressed air is cooled in the compressed air after-cooler (Fig. 12/1) before it leaves the screw compressor via the compressed air connection.

The coolant liquid is cooled by the coolant liquid cooler (Fig. 12/3) and fed back into the coolant circuit.

Fig. 13: Connection water cooling

Water-cooled screw compressors (optional for screw compressors G-Drive 30 – 37 and V-Drive 30 - 37)

On water-cooled screw compressors a fresh air ventilator provides sufficient fresh intake air and the removal of the radiation heat.

1.3.10 Coolant liquid filter

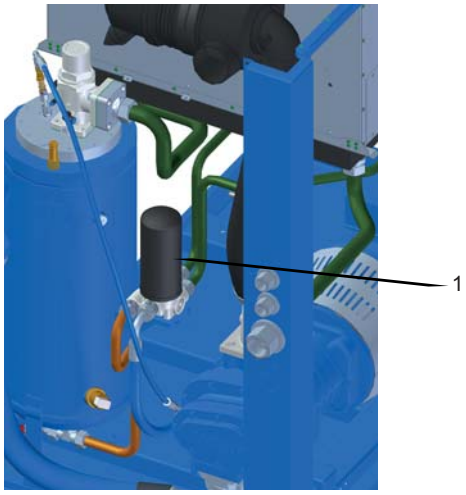


Fig. 14: Coolant liquid filter

The coolant liquid filter (Fig. 14/1) cleans the coolant liquid before it is injected into the air end once again.

1.3.11 Cooling air fan

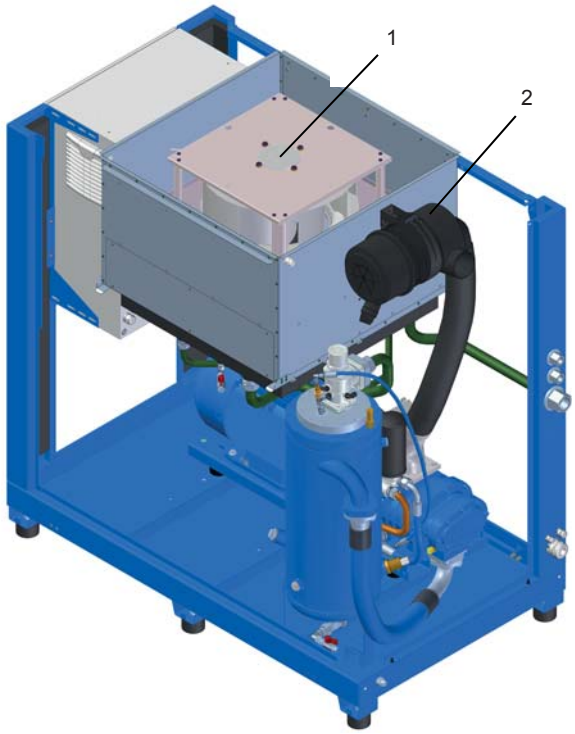


Fig. 15: Cooling air fan

The cooling of the compressed air after-cooler and of the coolant liquid cooler is performed by the cooling air fan (Fig.15/1). The cooling air fan also supplies the intake filter (Fig. 15/2) with sufficient intake air.

1.4 Interfaces

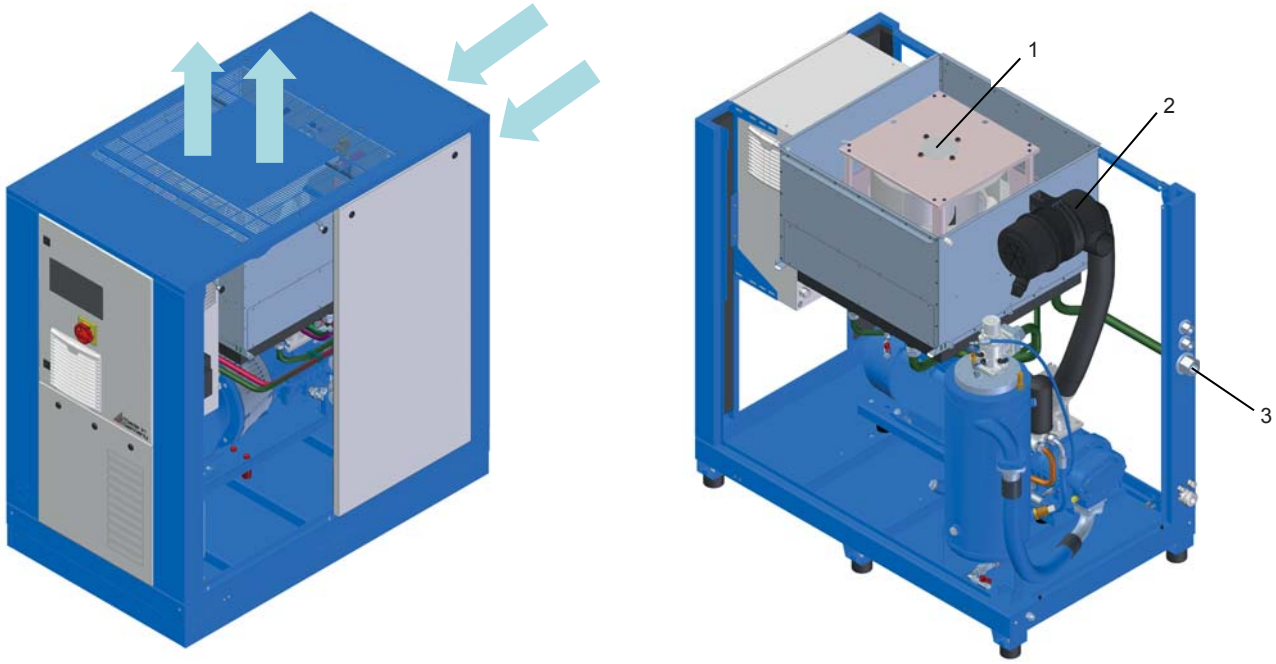


Fig. 16: Flow chart screw compressor G-Drive 30 - 37 / V -Drive 30 - 37

The following interfaces are in the screw compressor:

- Air supply
  - Cooling air ventilator (Fig. 16/1)
  - Intake filter (Fig. 16/2)
- Compressed air connection (Fig. 16/3)
- Water cooling and heat reclamation (optional)
  - Water inlet (Fig. 17/2)
  - Water outlet (Fig. 17/1)

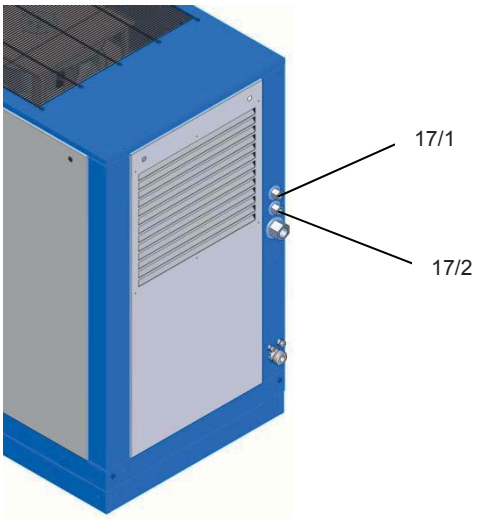


Fig. 17: Screw compressor with water cooling (optional)/ heat reclamation (optional)

Air supply

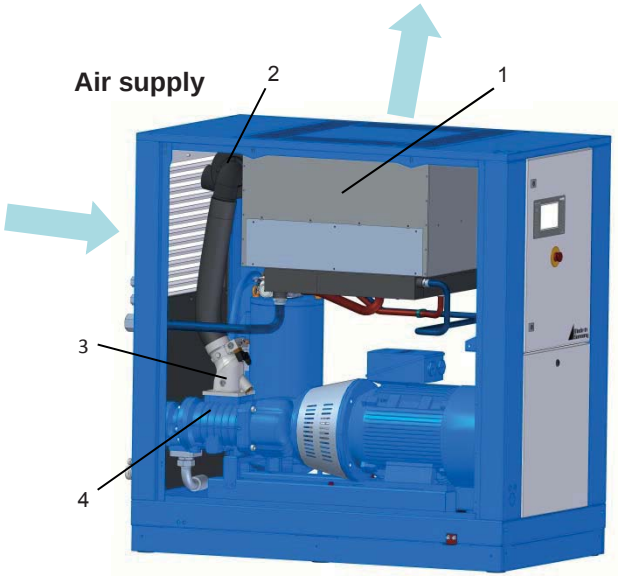


Fig. 18: Cooling air ventilator and intake filter

The cooling air ventilator (Fig. 18/1) draws the air through the screw compressor to the intake filter (Fig. 18/2). The filtered air directs into the air end (18/4), through a intake valve (Fig. 18/3), for compression. The air is also used for process cooling.

Compressed air connection

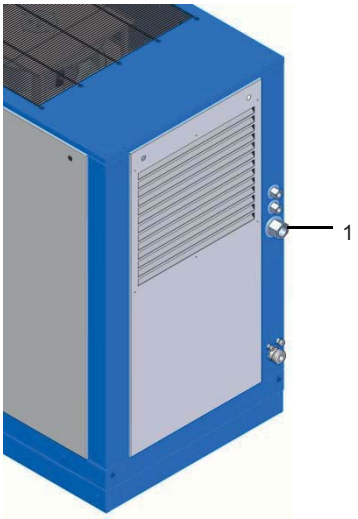


Fig. 19: Compressed air connection

The air compressed by the compressor is available to the compressed air network at the compressed air connection (Fig.19/1) after it has been filtered and cooled.

Water cooling and heat reclamation (optional)

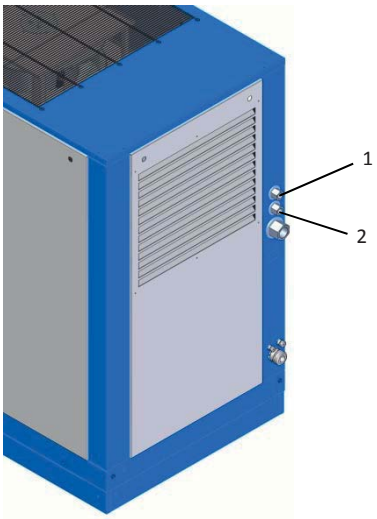


Fig. 20: Water connection

The cooling water required for water cooling is taken from the water inlet (Fig.20/2) and used to cool the system. After the cooling process the cooling water is expelled again via the water outlet (Fig. 20/1).

The water required for heat reclamation (HR) is taken from the water inlet and used to cool the system. After the cooling process the heated water is expelled again via the water outlet.

The water circuit for heat reclamation is not released until it has reached operating temperature. Changes to the preset temperature will render the warranty null and void.

Heat reclamation and water cooling (optional)

The respective heat exchangers are integrated into the screw compressor's coolant liquid circuit and transfer the generated compression heat from the coolant liquid to the water.

2 Safety

This section is a summary of all the important safety aspects to ensure optimum protection of the personnel and safe and trouble-free operation.

Disregard of the procedures and safety instructions given in this manual can give rise to dangerous situations.

2.1 Symbols in these instructions

Safety instructions

The safety instructions and safety information in these instructions are denoted by symbols. The safety instructions are prefaced by signal words which express the extent of the risk.

DANGER!

This combination of symbol and signal word indicates a directly hazardous situation which will lead to serious or even fatal injuries if not avoided.

WARNING!

This combination of symbol and signal word indicates a possibly hazardous situation which may lead serious or even fatal injuries if not avoided.

CAUTION!

This combination of symbol and signal word indicates a possibly hazardous situation which may cause minor or light injuries if not avoided.

NOTICE!

This combination of symbol and signal word indicates a possibly hazardous situation which may cause material damage if not avoided.

ENVIRONMENTAL PROTECTION!

This combination of symbol and signal word indicates possible hazards for the environment.

Safety instructions in instructions for actions

Safety instructions may relate to certain, individual instructions for actions. These safety instructions are embedded in the instruction for action so that they do not interrupt the flow of reading when performing the action. The signal words described above are used.

Example:

1. Unfasten the screw.
2. **CAUTION!**
   Risk of entrapment on the cover!

   Close the cover carefully.
3. Tighten the screw.

Special safety instructions

The following symbols are used in conjunction with the safety instructions in order to draw attention to particular hazards:

Warningsigns	Type of danger
	Warning – high voltage
	Warning – explosive substances
	Warning - danger zone

Tips and recommendations

This symbol indicates tips and recommendations and information for efficient and fault-free operation.

Further markings

The following markings are used in these instructions for emphasising instructions for actions, results, lists, cross references and other elements:

Marking	Explanation
→	Step-by-step instructions for actions
-	Results of actions
■	Lists without a set order
[Button]	Operating controls (e.g. buttons, switches), display elements (e.g. indicator lamps)
'Display'	Screen elements (e.g. buttons, assignment of function keys)

2.2 Proper use

The machine is designed and constructed exclusively for the proper use described here.

The screw compressor serves exclusively to generate compressed air in an environment not subject to explosion. The screw compressor may be supplied exclusively with cool, dry and dust-free cooling air.

The proper use also includes adherence to all details in these instructions.

Any use beyond the proper use or other type of use counts as misuse.

⚠ WARNING!

Danger due to misuse!

Misuse of the compressor can cause dangerous situations.

- The compressed air may not be used for breathing without previous preparation.
- The compressed air may not be used directly for pharmaceutical or sanitary purposes or for the direct handling of food without appropriate after-treatment.
- The screw compressor may not be operated outdoors.
- The screw compressor or individual components may not be rebuilt, modified or re-equipped.
- The screw compressor may not be used in an atmosphere subject to explosion.
- The intake of media other than cool, dry and dust-free cooling air is forbidden.

Claims of any type for damage due to misuse are excluded.

2.3 Responsibility of the owner

Owner

The term 'owner' refers to the person who himself operates the machine for trade or commercial purposes, or who surrenders the machine to a third party for use/application, and who bears the legal product liability for protecting the user, the personnel or third parties during the operation.

Duties of the owner

The machine is used in the commercial realm. Therefore, the owner of the machine is subject to legal occupational safety regulations.

In addition to the safety instructions in these instructions, the valid safety, accident prevention and environmental protection regulations for the area of application of the machine must be adhered to.

Here, the following points apply in particular:

- The owner must inform himself about the applicable occupational safety provisions and also determine in a hazard assessment the dangers that arise due to the special working conditions in the machine's area of application. He must implement these in the form of operating instructions for the operation of the machine.
- During the entire time the machine is used, the owner must check whether the operating instructions he has created correspond to the current state of the body of rules and regulations and adapt the operating instructions if necessary.
- The owner must regulate and specify clearly the responsibilities for the installation, operation, troubleshooting, maintenance and cleaning.
- The owner must ensure that all employees who handle the machine have read and understood these instructions. In addition, he must train the personnel at regular intervals and inform them about the dangers.
- The owner must provide personnel with the required protective equipment and instruct them in binding fashion about how to wear the required protective equipment.

Furthermore, the owner is responsible for ensuring that the machine is always in technically-perfect condition. Therefore, the following points apply:

- The owner must ensure that the maintenance intervals described in these instructions are adhered to.
- The owner must have all safety equipment checked regularly to ensure that it is functional and complete.
- The owner must ensure that the appropriate media connections are provided.
- The owner must ensure that the supply of the required quantity of cool medium (air/water) is guaranteed.
- The owner must ensure that the required heat extraction is guaranteed.

2.4 Personnel requirements

2.4.1 Qualifications

⚠ WARNING!

Danger of injury if personnel are insufficiently qualified!

If unqualified personnel perform work on the machine or are in the machine's danger zone, hazards may arise which can cause serious injury and substantial damage to property.

– Therefore, all work must only be carried out by appropriately qualified personnel.
– Unqualified personnel must be kept away from the danger zones.

This manual specifies the personnel qualifications required for the different areas of work, listed below:

Forklift driver
The forklift driver must be at least 18 years old and, based on his physical and intellectual attributes and character, suited to driving industrial trucks with a driver's seat or driver's platform.

Furthermore, the forklift driver has been trained to drive industrial trucks with a driver's seat or driver's platform.

The forklift driver has provided the owner with evidence of his skills in driving industrial trucks with a driver's seat or driver's platform and has therefore been authorised in writing by the owner to drive the forklift.

Manufacturer
Certain work may only be performed by us or by experts authorised by us. Other personnel is not authorized to perform such work. Contact our service department to schedule an appointment for any required work.

Qualified Electrician
Based on his technical training, knowledge, experience and knowledge of the applicable standards and regulations, the Qualified Electrician is able to perform work on electrical systems and recognise and avoid potential hazards himself.

The Qualified Electrician is specially trained for the area of responsibility he is involved with and knows the relevant standards and regulations.

The Qualified Electrician must comply with the requirements of the applicable legal regulations for accident prevention.

Qualified personnel
Qualified personnel is able to carry out assigned work and to recognize and prevent possible dangers self-reliantly due to its professional training, knowledge and experience as well as profound knowledge of applicable regulations.

Trained Person
The trained person has been instructed in an instruction by the owner about the tasks assigned to him and possible hazards in the case of improper behaviour.

The workforce must only consist of persons who can be expected to carry out their work reliably. Persons with impaired reactions due to, for example, the consumption of drugs, alcohol, or medication are prohibited.

When selecting personnel, the age-related and occupation-related regulations governing the usage location must be observed.

2.4.2 Unauthorised persons

WARNING!

Risk to life for unauthorised persons due to hazards in the danger and working zone!

Unauthorised persons who do not meet the requirements described here will not be familiar with the dangers in the working zone. Therefore, unauthorised persons face the risk of serious injury or death.

- Unauthorised persons must be kept away from the danger and working zone.
- If in doubt, address the persons in question and ask them to leave the danger and working zone.
- Cease work while unauthorised persons are in the danger and working zone.

2.4.3 Training

The personnel must be trained regularly by the customer. For better tracing, the execution of the training must be logged (*Appendix A 'Training log' on page 70*).

2.5 Personal protective equipment

Personal protective equipment is used to protect the personnel from dangers which could affect their safety or health while working.

The personnel must wear personal protective equipment while carrying out the different operations at and with the machine. This equipment will be indicated separately in the individual chapters of this manual. This personal protective equipment is described below:

- It is mandatory to put on the personal protective equipment specified in the different chapters of this manual before starting work.
- Always comply with the instructions governing personal protective equipment posted in the work area.

Description of the personal protective equipment

Ear protection

Ear protection provides protection against hearing damage.

Light respiratory protection

Light respiratory protection is used to protect against harmful dusts.

Protective gloves

Protective gloves protect hands from friction, abrasion, puncture wounds, or deeper injuries, as well as from contact with hot surfaces.

Protective work clothing

Protective clothing are tight fitting working clothes with low tear resistance, with tight sleeves and without any parts sticking out. These clothes primarily protect against getting caught by moving machine parts. Do not wear rings, chains, necklaces, and other jewellery.

Safety boots

Safety boots are intended to protect against slipping hazards or foot hazards like heavy gear.

Safety goggles

The protective goggles protect the eyes from flying parts and liquid splashes.

2.6 Basic dangers

The following section specifies residual risks which may result from using the machine and have been established by means of a risk assessment.

In order to minimize health hazards and avoid dangerous situations, follow the safety instructions specified here as well as in the following chapters of this manual.

2.6.1 General dangers in the workplace

Noise

WARNING!

Danger of injury from noise!

The noise levels arising in the workplace may result in serious hearing damage.

- Always wear ear protection while working.
- Do not stay in the danger zone more than necessary.

Accumulations of liquid

CAUTION!

Danger of injury from slipping in accumulations of liquid!

Slipping in accumulations of liquid on the floor may result in a fall. A fall may result in injuries.

- Remove accumulations of liquid immediately using appropriate means.
- Wear anti-slip safety shoes.
- Post warnings and mandatory signs at or in the vicinity of any area where liquid could accumulate on the floor.

2.6.2 Dangers due to electric energies

Electric current

DANGER!

Danger to life from electric power.

There is an immediate danger to life from electric shock in the case of contact with live parts. Damage to the insulation or individual components can be fatal.

- Only allow qualified electricians to work on the electrical system.
- In the case of damage to the insulation, immediately disconnect the power supply and arrange repairs.
- Establish the absence of voltage before starting work on active parts of electrical systems and equipment and ensure this remains so for the duration of the work. Observe the 5 safety rules:
  - Disconnect from the power supply.
  - Secure against restarting.
  - Verify absence of voltage.
  - Earth and short-circuit.
  - Cover or shield any neighbouring live parts.
- Never bypass or disable fuses. Comply with the correct current intensity information when replacing fuses.
- Keep moisture away from live parts. This can result in short circuits.

Stored charges

DANGER!

Danger to life from stored charges!

Electric charges may be stored in electrical components; these charges may be maintained even after the system has been switched off and disconnected from the power supply. Contact with these components may result in serious or fatal injury.

– Before working on the specified components, ensure that they have been completely disconnected from the power supply. Allow 10 minutes to elapse in order to ensure that the internal capacitors have been fully discharged.

2.6.3 Dangers due to mechanical elements

Moving parts

WARNING!

Danger of injury from moving parts!

Rotating parts and/or parts moving in linear fashion may cause serious injuries.

– During operation, do not reach into or handle moving parts.
– Do not open covers during operation.
– Observe the run-on time: Before opening the covers, make sure that all parts have stopped moving.
– When in the danger zone, wear close-fitting protective work clothing with low tear strength.

Sharp edges and pointed corners

CAUTION!

Danger of injury posed by sharp edges and pointed corners!

Sharp edges and pointed corners may cause skin grazes and cuts.

– Proceed with caution when working in the vicinity of sharp edges and pointed corners.
– If in doubt, wear safety gloves.

2.6.4 Dangers due to hydraulic energies

Liquid stream

WARNING!

Danger to life due to escaping liquid stream under high pressure!

In case of defective lines or components, a stream of liquid under high pressure can escape. The stream of liquid can cause extremely severe injuries or even death.

– Never hold body parts or objects in the liquid stream. Keep people out of the danger zone. In case of accidental contact with the liquid stream, take first aid measures and consult a doctor immediately.
– Initiate emergency off immediately. If necessary, take additional measures in order to reduce the pressure and stop the stream of liquid.
– Catch and dispose of escaping liquids properly.
– Have faulty components repaired immediately.

2.6.5 Dangers due to pneumatics and stored residual energies

Pressure accumulator(s)

⚠ WARNING!

Danger to life from improper work on the pressure accumulator!

Improper handling of pressure accumulators may cause a sudden release of pressure, resulting in very serious injuries or death and in significant damage to property.

- Never carry out welding or soldering work on the pressure accumulator vessel.
- Never perform any mechanical machining on the pressure accumulator vessel.
- Once it is connected to the hydraulic line, vent the pressure accumulator vessel using the fitted vent screw.
- Only carry out work on systems with a pressure accumulator once the hydraulic pressure has been completely relieved and depressurisation has been verified.
- Do not start work on the pressure accumulator until the gas charging pressure has been completely released.

Compressed air

⚠ WARNING!

Danger of injury from compressed air!

Compressed air can escape from compressed air hoses or components under pressure in case of improper handling or in case of a fault. It can injure eyes, whip up dust or cause uncontrolled movements of hoses.

Components under pressure can move in uncontrolled fashion with improper handling and cause injuries.

- Before removing hoses or components under pressure, make sure the pressure is relieved.
- Have faulty components that are under pressure during operation replaced by appropriate specialist personnel immediately.
- Before all work, make sure that the compressor is not under pressure; wait at least 5 minutes.

2.6.6 Dangers due to chemical substances

Coolant liquid fog

⚠ CAUTION!

Danger of injury from coolant liquid fog!

In case of high temperatures or mechanical dust, coolant liquid fog can form. Coolant liquid fog can irritate eyes and the respiratory system.

- When working on the coolant liquid system and if a coolant liquid fog arises, wear breathing protection and protective goggles and ensure that there is a fresh air supply.

2.6.7 Dangers due to high temperatures

Hot surfaces

⚠ WARNING!

Danger of injury from hot surfaces!

Surfaces of components can heat up a lot during operation. Skin contact with hot surfaces will cause severe skin burns.

– During all work hear hot surfaces, wear heat-resistant protective clothing and protective gloves.
– Before all work, make sure that all surfaces have cooled off to the ambient temperature, wait at least 30 minutes.

Hot consumables

⚠ WARNING!

Danger of injury from hot consumables!

Consumables may reach high temperatures during operation. Skin contact with hot consumables will cause severe skin burns.

– Always wear heat-resistant protective work clothing and protective gloves as a matter of principle when carrying out any work with consumables.
– Always check whether consumables are hot before working with them. Allow to cool down if necessary.

2.7 Safety devices

⚠ WARNING!

Danger to life from nonfunctional safety devices!

If safety devices are not functioning or are disabled, there is a danger of grave injury or death.

– Check that all safety devices are fully functional and correctly installed before starting work.
– Never disable or bypass safety devices.
– Ensure that all safety devices are always accessible.

2.7.1 Position of the safety devices

The following illustrations show the position of the safety devices.

Fig. 21: Emergency stop button (Fig.21/1) on the screw compressor G Drive 30 -37

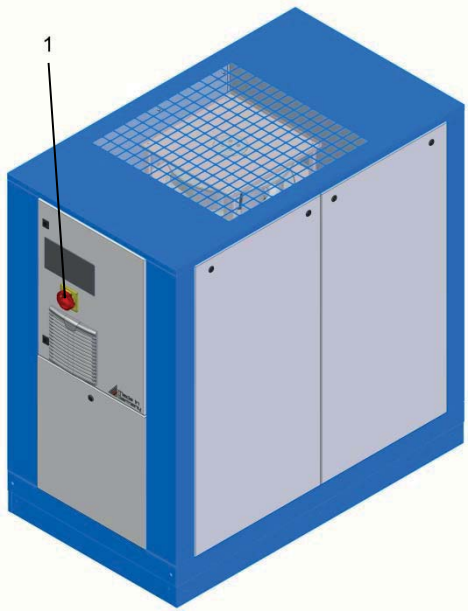


Fig. 22: Emergency stop button (Fig. 22/1) on the screw compressor V Drive 30 - 37

2.7.2 Description of the installed safety devices

Main switch with emergency off function

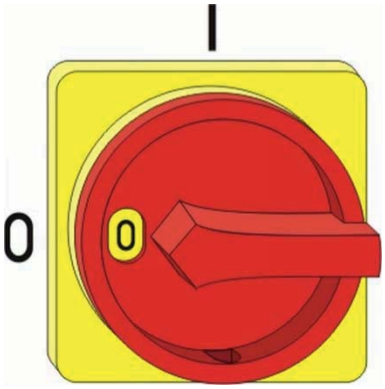


Fig. 23: Main switch

The main switch is also set up as an emergency stop switch. By turning the main switch to the "0" position, the machine is stopped by switching off the power immediately and an emergency stop is thus triggered.

⚠ WARNING!

Danger to life from an unauthorised restart!

An uncontrolled restart of the machine may cause serious injuries including death.

– Before switching the machine back on, make sure the cause of the emergency stop has been removed and all safety devices have been installed and function properly.
– Only turn the main switch to the "I" position when there is no more danger.

Emergency stop key

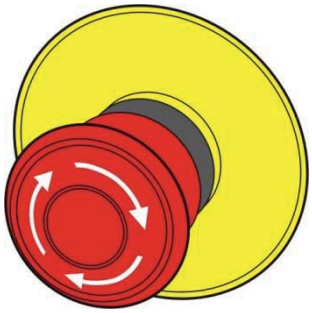


Fig. 24: Emergency stop key

By pressing the emergency stop key, the machine is stopped by an immediate switching off of the power supply. After an emergency stop key has been pressed, it must be unlocked by turning it so that a switching on is possible.

⚠ WARNING!

Danger to life from an unauthorised restart!

An uncontrolled restart of the machine may cause serious injuries including death.

– Before switching the machine back on, make sure the cause of the emergency stop has been removed and all safety devices have been installed and function properly.
– Do not unlock the EMERGENCY-STOP button until there is no more danger.

Safety valves

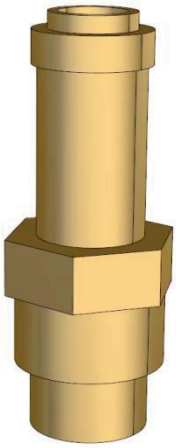


Fig. 25: Safety valve

Safety valves belong to the safety taps and are unburdening equipment for the areas under pressure such as the boiler, pressure tank, pipes, transport container. In case of an impermissible pressure increase, safety valves bleed off gases, vapours or liquids into the atmosphere.

2.8 Securing to prevent restart

⚠ WARNING!

Life-threatening danger if restarted without authorisation or due to uncontrolled restart!

Uncontrolled or unauthorised switching on of the machine can cause severe or fatal injuries.

– Prior to restart ensure that all safety devices are mounted and functional, and that there is no danger for personnel.
– Always adhere to the procedure described below to secure against restart.

Securing to prevent restart

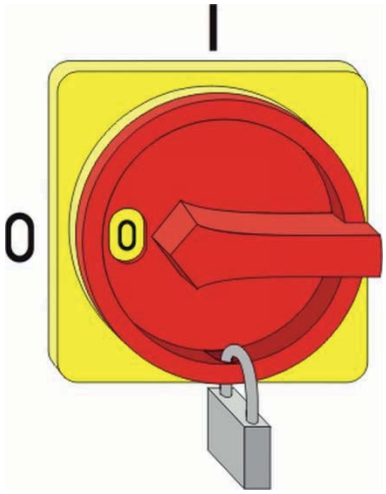


Fig. 26: Securing the main switch

1. Switch off the power supply. To do this, turn the main switch to the "0" position.
2. Secure the main switch with a padlock (Fig. 26).
3. Have a responsible employee keep the key for the padlock.
4. After all work has been performed, make sure that there are no dangers to people.
5. Ensure that all safety and protective equipment is installed and functional.

WARNING!

Danger to life from an unauthorised restart!

If the main switch is secured with a padlock, people can be in the danger zone. These people can be fatally injured by the switching on of the power supply.

– Before removing the padlock and switching the power supply back on, make sure that there are no dangers to people.

6. Remove the padlock from the main switch.

If no main switch is installed, proceed as follows.

WARNING!

Life-threatening danger if restarted without authorisation or due to uncontrolled restart!

Uncontrolled or unauthorised switching on of the machine can cause severe or fatal injuries.

– Prior to restart ensure that all safety devices are mounted and functional, and that there is no danger for personnel.
– Always adhere to the procedure described below to secure against restart.

Securing to prevent restart

1. Switch off the power supply.
2. Inform responsible people about work in the danger zone.
3. Mark machine with a sign that indicates the work in the danger zone and forbids switching on. Include the following details on the sign:
   - Switched off on:
   - Switched off at:
   - Switched off by:
   - Note: do not switch on!
   - Note: Only switch on after it has been ensured that there are no dangers to people.
4. After all work has been performed, make sure that there are no dangers to people.
5. Ensure that all safety and protective equipment is installed and functional.

WARNING!

Danger to life from an unauthorised restart!

People in the danger zone can be fatally injured by the unauthorised or uncontrolled switching on of the power supply.

– Before switching the power supply back on, ensure that there are no dangers for people.

6. Remove the sign.

2.9 Behaviour in case of fire or accidents

Preventive measures

- Be prepared for fire and accidents at all times!
- Keep first-aid equipment (first-aid kit, blankets, etc.) and fire extinguishing devices operational and readily available.
- Make your personnel familiar with accident reporting equipment as well as first-aid and rescue equipment.
- Keep access paths clear for rescue vehicles.

Steps in case of fire and accidents

- Immediately trigger an Emergency Stop using EMERGENCY-STOP devices.
- Provided your own health is not in danger, rescue all personnel from the danger area.
- If necessary, initiate first aid measures.
- Alert the fire department and/or emergency medical services.
- In case of fire: provided your own health is not in danger, extinguish the fire using fire extinguishing equipment and continue to do so until the fire department arrives.
- Notify the person in charge at the machine's place of installation.
- Clear access paths for rescue vehicles.
- Wave rescue vehicles into position.

2.10 Environmental protection

ENVIRONMENTAL PROTECTION!

Risk to the environment as a result of incorrect handling of environmentally hazardous substances!

If environmentally hazardous substances are handled incorrectly, in particular if they are disposed of incorrectly, there is a risk of considerable damage to the environment.

– Always adhere to the instructions below when handling and disposing of environmentally hazardous substances.
– If environmentally hazardous substances are accidentally released into the environment, take suitable measures immediately. In case of any doubt inform the respective community authority of the damage and enquire as to the suitable measures which need to be taken.

The following harmful substances are used:

Coolant liquid

Coolant liquids can contain poisonous substances and substances that are harmful to the environment. They must not be allowed to escape into the environment. Disposal must be carried out by a specialist disposal company.

Lubricants

Lubricants such as greases and oils contain toxic substances. They must not be allowed to escape into the environment. Disposal must be carried out by a specialised disposal company

2.11 Signage

The following symbols and information signs can be found in the work area. They refer to their immediate surroundings.

WARNING!

Danger of injury from illegible symbols!

Stickers and signs can become dirty or otherwise obscured over time, with the result that dangers cannot be recognised and the necessary operating instructions cannot be complied with. This, in turn, poses a risk of injury.

– All safety, warning and operating instructions must always be maintained in a completely legible condition.
– Damaged signs or stickers must be replaced immediately.

2.11.1 Warning signs

Electrical voltage

Only qualified electricians are permitted to work in a work room marked by this sign.

Unauthorised persons must not enter the workplaces thus marked and must not open the marked cabinet.

Automatic start-up

Maintain sufficient distance from all parts that can move; there is a danger of crushing or pulling in there.

Hot surface

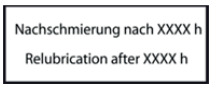
Hot surfaces such as hot machine parts, containers or materials, as well as hot liquids, may not always be detected. Never touch these without protective gloves.

2.11.2 Instructions on the machine

Direction of rotation

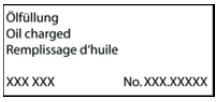
There is a direction of rotation sticker on the drive unit and on the cooling air ventilator. This sticker shows the appropriate direction of rotation.

Re-lubrication



The sticker for re-lubrication is on the drive unit.

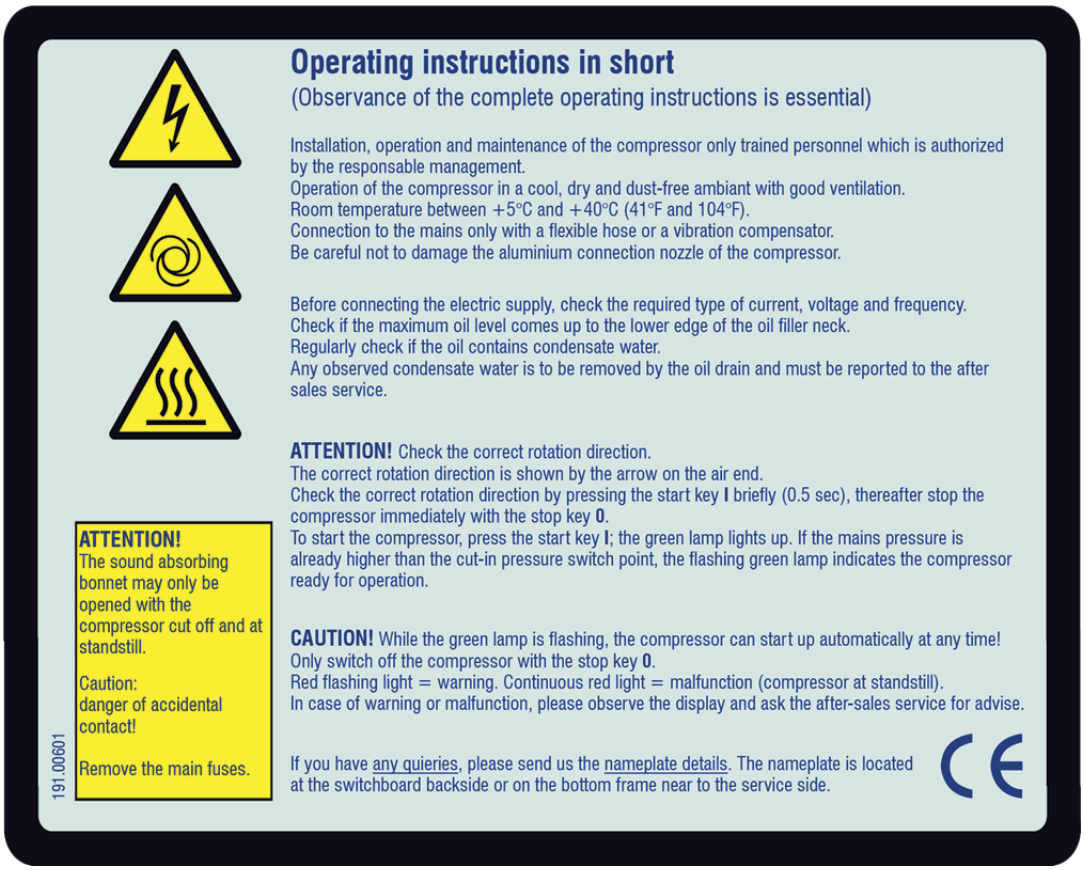
Oil filling



The sticker for oil filling is on the coolant liquid pressure tank and next to the installed controller.

Brief instructions for commissioning

The stickers on the switch cabinet and contains brief instructions for commissioning



Operating instructions in short

(Observance of the complete operating instructions is essential)

Installation, operation and maintenance of the compressor only trained personnel which is authorized by the responsable management.
Operation of the compressor in a cool, dry and dust-free ambiant with good ventilation.
Room temperature between +5°C and +40°C (41°F and 104°F).
Connection to the mains only with a flexible hose or a vibration compensator.
Be careful not to damage the aluminium connection nozzle of the compressor.

Before connecting the electric supply, check the required type of current, voltage and frequency.
Check if the maximum oil level comes up to the lower edge of the oil filler neck.
Regularly check if the oil contains condensate water.
Any observed condensate water is to be removed by the oil drain and must be reported to the after sales service.

ATTENTION! Check the correct rotation direction.
The correct rotation direction is shown by the arrow on the air end.
Check the correct rotation direction by pressing the start key **I** briefly (0.5 sec), thereafter stop the compressor immediately with the stop key **0**.
To start the compressor, press the start key **I**; the green lamp lights up. If the mains pressure is already higher than the cut-in pressure switch point, the flashing green lamp indicates the compressor ready for operation.

CAUTION! While the green lamp is flashing, the compressor can start up automatically at any time!
Only switch off the compressor with the stop key **0**.
Red flashing light = warning. Continuous red light = malfunction (compressor at standstill).
In case of warning or malfunction, please observe the display and ask the after-sales service for advise.

If you have any quieries, please send us the nameplate details. The nameplate is located at the switchboard backside or on the bottom frame near to the service side.

ATTENTION!
The sound absorbing bonnet may only be opened with the compressor cut off and at standstill.

Caution:
danger of accidental contact!

Remove the main fuses.

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3 Technical data

3.1 Type plate

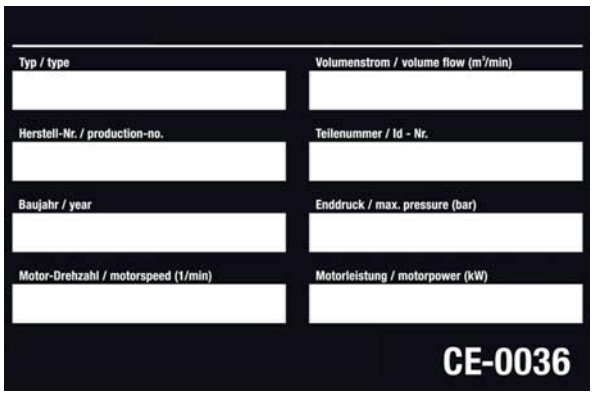


Fig. 27: Type plate

The type plate is on the lower frame on the maintenance side and on the sound insulation cover on the Cooling air exhaust side or cooling water intake and outlet side and includes the following details:

- Manufacturer
- Product type
- Manufacturer no.
- Year of construction
- Direction of rotation
- Volume flow rate
- Part number
- Final pressure
- Motor output

3.2 Emissions

Noise emissions G Drive 30 – 37

G Drive	Noise emission
	dB (A)
30	69
37	70

Noise emissions V Drive 30 – 37

V Drive	Noise emission	
	dB (A) n = 50 %	dB (A) n = 100 %
30	65	69
37	65	69

3.3 General specifications

3.3.1 Operating conditions

Environment

Data	Value	Unit
Temperature range	+37 to +113 (+3 to +45)	°F (°C)
Relative humidity, maximum	60	%
Maximum installation altitude above sea level	3281 (1000)	ft (m)

3.3.2 Coolant liquid

The following coolant liquids have been tested and approved for use in the compressors:

Designation	Type	Article number
Standard coolant liquid (semi-synthetic)	ALUB BLUE S+	583.04055 (10l container)
Synthetic coolant liquid	ALUB Syn S	583.00004 (10l container)
Food grade coolant liquid	ALUB Food H1	583.04010 (10l container)
Biodegradable coolant liquid	ALUB GREEN S	583.10051 (10l container)

Only fully synthetic coolant is suitable for high-temperature systems.

3.3.3 Consumables

Screw compressor G Drive 30 - 37

Typ	Lubricant	Fill level	Unit
30	Coolant liquid	23	l
37	Coolant liquid	23	l

Screw compressor V Drive 30 - 37

Typ	Lubricant	Fill level	Unit
30	Coolant liquid	23	l
37	Coolant liquid	23	l

3.4 Screw compressor G Drive 30 - 37

3.4.1 Plant data

Screw compressor G Drive 30 - 37

Type	Nominal motor output	Screw compressor air cooled		Screw compressor water cooled	
	kW	L x W x H [mm]	Weight [kg]	L x W x H [mm]	Weight [kg]
30	30	1700 x 958 x 1633	860	1700 x 958 x 1633	815
37	37	1700 x 958 x 1633	885	1700 x 958 x 1633	842

3.4.2 Air supply and cooling

Air-cooled screw compressor G Drive 30 - 37

Type	Compressed air connection	Heat recovery	Cooling air rate	Supply air opening	Air outlet opening
	G / DN	G	m³/h	mm	mm
30	1 ½ “	¾ “	4500	616 x 517	805 x 812
37	1 ½ “	¾ “	4500	616 x 517	805 x 812

Water-cooled screw compressors G Drive 30 and 37

Type	Compressed air connection	Heat recovery / cooling water connection	Cooling air rate	Supply air opening	Air outlet opening
	G / DN	G	m³/h	mm	mm
30	1 ½	¾	1200	616 x 517	805 x 812
37	1 ½	¾	1200	616 x 517	805 x 812

3.4.3 Connection values

3.4.3.1 Screw compressor G Drive 30 - 37 Hz

Screw compressor G Drive 30 and 37

Type	Current at 230 V / 50 Hz		Current at 380 V / 50 Hz		Current at 400 V / 50 Hz	
	I_N	I_{Fuse}	I_N	I_{Fuse}	I_N	I_{Fuse}
	A	A_{gL}	A	A_{gL}	A	A_{gL}
30	108	125	65	80	62	80
37	130	160	79	100	75	100

Screw compressor G Drive 30 and 37

Type	Current at 415 V / 50 Hz		Current at 440 V / 50 Hz		Current at 500 V / 50 Hz		Max. switching frequency
	I_N	I_{Fuse}	I_N	I_{Fuse}	I_N	I_{Fuse}	
	A	A_{gL}	A	A_{gL}	A	A_{gL}	1/h
30	60	80	56	80	50	63	15
37	72	100	68	100	60	80	12

3.4.3.2 Screw compressor G Drive 30 - 37 with refrigeration dryer 50Hz

Screw compressor G Drive 30 and 37 with refrigeration dryer

Type	Current at 230 V / 50 Hz		Current at 380 V / 50 Hz		Current at 400 V / 50 Hz	
	I_N	I_{Fuse}	I_N	I_{Fuse}	I_N	I_{Fuse}
	A	A_{gL}	A	A_{gL}	A	A_{gL}
30	120	160	73	80	69	80
37	143	160	86	100	82	100

Screw compressor G Drive 30 and 37 with refrigeration dryer

Type	Current at 415 V / 50 Hz		Current at 440 V / 50 Hz		Current at 500 V / 50 Hz		Max. switching frequency
	I_N	I_{Fuse}	I_N	I_{Fuse}	I_N	I_{Fuse}	
	A	A_{gL}	A	A_{gL}	A	A_{gL}	1/h
30	67	80	63	80	55	80	15
37	79	100	75	100	66	80	12

3.4.3.3 Screw compressor G Drive 30 - 37 60Hz

Screw compressor G Drive 30 and 37

Type	Current at 230 V / 60 Hz		Current at 380 V / 60 Hz		Current at 400 V / 60 Hz	
	I_N	I_{Fuse}	I_N	I_{Fuse}	I_N	I_{Fuse}
	A	A_{gL}	A	A_{gL}	A	A_{gL}
30	108	125	65	80	62	80
37	130	160	79	100	75	100

Screw compressor G Drive 30 and 37

Type	Current at 415 V / 60 Hz		Current at 440 V / 60 Hz		Current at 500 V / 60 Hz		Max. switching frequency
	I_N	I_{Fuse}	I_N	I_{Fuse}	I_N	I_{Fuse}	
	A	A_{gL}	A	A_{gL}	A	A_{gL}	1/h
30	60	80	56	80	50	63	15
37	72	100	68	100	60	80	12

3.4.3.4 Screw compressor G Drive 30 - 37 with refrigeration dryer 60 Hz

Screw compressor G Drive 30 and 37 with refrigeration dryer

Type	Current at 230 V / 60 Hz		Current at 380 V / 60 Hz		Current at 400 V / 60 Hz	
	I_N	I_{Fuse}	I_N	I_{Fuse}	I_N	I_{Fuse}
	A	A_{gL}	A	A_{gL}	A	A_{gL}
30	120	160	73	80	69	80
37	143	160	86	100	82	100

Screw compressor G Drive 30 and 37 with refrigeration dryer

Type	Current at 415 V / 60 Hz		Current at 440 V / 60 Hz		Current at 500 V / 60 Hz		Max. switching frequency
	I_N	I_{Fuse}	I_N	I_{Fuse}	I_N	I_{Fuse}	
	A	A_{gL}	A	A_{gL}	A	A_{gL}	1/h
30	67	80	63	80	55	80	15
37	79	100	75	100	66	100	12

3.5 Screw compressor V Drive 30 - 37

3.5.1 Plant data

Screw compressor V Drive 30 - 37

Type	Nominal motor output	Screw compressor air cooled		Screw compressor water cooled	
	kW	L x W x H [mm]	Weight [kg]	L x W x H [mm]	Weight [kg]
30	30	1700 x 958 x 1633	720	1700 x 958 x 1633	675
37	37	1700 x 958 x 1633	740	1700 x 958 x 1633	697

3.5.2 Air supply and cooling

Air – cooled screw compressor V Drive 30 - 37

Type	Compressed air connection	Heat recovery	Cooling air rate	Supply air opening	Cross-section - air outlet duct
	G / DN	G	m³/h	mm	mm
30	1 ½	¾	4500	616 x 517	805 x 812
37	1 ½	¾	4500	616 x 517	805 x 812

Water-cooled screw compressor V Drive 30 and 37

Type	Compressed air connection	Heat recovery / cooling water connection	Cooling air rate	Supply air opening	Cross-section - air outlet duct
	G / DN	G	m³/h	mm	mm
30	1 ½	¾	1200	616 x 517	805 x 812
37	1 ½	¾	1200	616 x 517	805 x 812

3.5.3 Connection values

3.5.3.1 Screw compressor V Drive 30 - 37 50Hz

Screw compressor V Drive 30 and 37

Type	Current at 230 V / 50 Hz		Current at 380 V / 50 Hz		Current at 400 V / 50 Hz	
	I_N	I_{Fuse}	I_N	I_{Fuse}	I_N	I_{Fuse}
	A	A_{gL}	A	A_{gL}	A	A_{gL}
30	104	125	63	80	60	80
37	128	160	77	100	73	100

Screw compressor V Drive 30 and 37

Type	Current at 415 V / 50 Hz		Current at 440 V / 50 Hz		Current at 500 V / 50 Hz		Max. switching frequency
	I_N	I_{Fuse}	I_N	I_{Fuse}	I_N	I_{Fuse}	
	A	A_{gL}	A	A_{gL}	A	A_{gL}	1/h
30	58	80	55	80	48	63	15
37	71	100	67	100	58	80	9

3.5.3.2 Screw compressor V Drive 15 - 37 with refrigeration dryer 50Hz

Screw compressor V Drive 30 and 37 with refrigeration dryer

Type	Current at 230 V / 50 Hz		Current at 380 V / 50 Hz		Current at 400 V / 50 Hz	
	I_N	I_{Fuse}	I_N	I_{Fuse}	I_N	I_{Fuse}
	A	A_{gL}	A	A_{gL}	A	A_{gL}
30	117	160	70	80	67	80
37	140	160	84	100	80	100

Screw compressor V Drive 30 and 37 with refrigeration dryer

Type	Current at 415 V / 50 Hz		Current at 440 V / 50 Hz		Current at 500 V / 50 Hz		Max. switching frequency
	I_N	I_{Fuse}	I_N	I_{Fuse}	I_N	I_{Fuse}	
	A	A_{gL}	A	A_{gL}	A	A_{gL}	1/h
30	65	80	61	80	54	80	15
37	77	100	73	100	82	100	9

3.5.3.3 Screw compressor V Drive 30 - 37 60Hz

Screw compressor V Drive 30 and 37

Type	Current at 230 V / 60 Hz		Current at 380 V / 60 Hz		Current at 400 V / 60 Hz	
	I_N	I_{Fuse}	I_N	I_{Fuse}	I_N	I_{Fuse}
	A	A_{gL}	A	A_{gL}	A	A_{gL}
30	104	125	63	80	60	80
37	128	160	77	100	73	100

Screw compressor V Drive 30 and 37

Type	Current at 415 V / 60 Hz		Current at 440 V / 60 Hz		Current at 500 V / 60 Hz		Max. switching frequency
	I_N	I_{Fuse}	I_N	I_{Fuse}	I_N	I_{Fuse}	
	A	A_{gL}	A	A_{gL}	A	A_{gL}	1/h
30	58	80	55	80	48	63	15
37	71	100	67	100	58	80	9

3.5.3.4 Screw compressor V Drive 15 - 37 with refrigeration dryer 60Hz

Screw compressor V Drive 30 and 37 with refrigeration dryer

Type	Current at 230 V / 60 Hz		Current at 380 V / 60 Hz		Current at 400 V / 60 Hz	
	I_N	I_{Fuse}	I_N	I_{Fuse}	I_N	I_{Fuse}
	A	A_{gL}	A	A_{gL}	A	A_{gL}
30	117	160	70	80	67	80
37	140	160	84	100	80	100

Screw compressor V Drive 30 and 37 with refrigeration dryer

Type	Current at 415 V / 60 Hz		Current at 440 V / 60 Hz		Current at 500 V / 60 Hz		Max. switching frequency
	I_N	I_{Fuse}	I_N	I_{Fuse}	I_N	I_{Fuse}	
	A	A_{gL}	A	A_{gL}	A	A_{gL}	1/h
30	65	80	61	80	54	80	15
37	77	100	73	100	64	80	9

4 Transportation, packaging and storage

4.1 Safety instructions for transportagen

Improper transport

NOTICE!

Damage to property due to improper transport!

Transport units may fall or tip over as a result of improper transport. This can cause a significant level of property damage.

- Proceed carefully when unloading transport units at delivery and during in-house transport; observe the symbols and instructions on the packaging.
- Only use the attachment points provided.
- Only remove the packaging shortly before assembly.

4.2 Transportation inspection

On receipt, immediately inspect the delivery for completeness and transport damage.

Proceed as follows in the event of externally apparent transport damage:

- Do not accept the delivery, or only accept it subject to reservation.
- Note the extent of the damage on the transport documentation or the shipper's delivery note.
- Initiate complaint procedures.

Issue a complaint in respect of each defect immediately following detection. Damage compensation claims can only be asserted within the applicable complaint deadlines.

4.3 Packaging

About the packaging

The individual screw compressors are packaged in cartons or sometimes on wooden frames and according to the anticipated transport conditions. Only environmentally-friendly materials are used for the packaging.

The packaging should protect the individual components against transport damage, corrosion and other damage until assembly. Therefore, do not destroy the packaging and only remove it shortly before assembly.

Handling packaging materials

Dispose of packaging material in accordance with the relevant applicable legal requirements and local regulations.

NOTICE!

Danger to the environment due to incorrect disposal!

Packaging materials are valuable raw materials and in many cases can continue to be used or can be properly processed and recycled. Incorrect disposal of packaging materials may pose risks to the environment.

- Dispose of packaging materials in accordance with the environmental regulations.
- Observe locally applicable waste disposal regulations. If necessary, outsource the disposal to a specialist company.

4.4 Symbols on the packaging

The following symbols are on the packaging. Always heed the symbols during transportation.

Top

The arrow tips on the sign mark the top of the package. They must always point upwards; otherwise the content could be damaged.

Fragile

Marks packages with fragile or sensitive contents.

Handle the package with care; do not allow to fall and do not expose to impacts.

Protect against moisture

Protect packages against moisture and keep dry.

4.5 Transportation

Transportation with a fork lift

Packages can be transported with a fork lift under the following conditions:

- The fork lift must be engineered for the weight of the packages.
- Existing guide rails on the frame must be used.
- The length of the forks must be at least 1400 mm.

Transporting

Personnel:

- Forklift driver

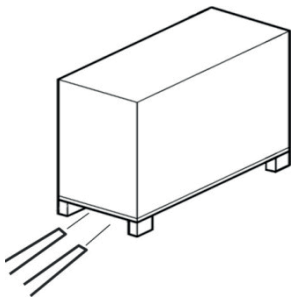


Fig. 28: Transportation with a fork lift

1. Drive the fork lift with the forks as shown in Fig. 28.
2. Insert the forks so that they stick out on the other side.
3. Ensure that the package cannot tip if the centre of gravity if off-centre.
4. Lift the package and begin transportation.

4.6 Storage

Storage of the packaging pieces

Store the packaging pieces under the following conditions:

- Do not store outdoors.
- Store dry and dust-free.
- Do not expose to any aggressive media.
- Protect against solar radiation.
- Avoid mechanical jolts.
- Storage temperature: 15 to 35 °C.
- Relative humidity: max. 60 %.
- In case of storage for longer than 3 months, check the general condition of all parts and the packaging regularly. If necessary, refresh or replace the rust-proofing.

Under some circumstances there may be notes about storage on the packaging pieces that extend beyond the requirements named here. Adhere to these accordingly.

5 Installation and commissioning

5.1 Safety instructions for the installation and commissioning

Electrical system

DANGER!

Danger to life from electric power!

Contact with live parts may prove fatal. When switched on, electric components can be subject to uncontrolled movements and may cause grave injury or death.

– Switch off the power supply before starting work and make sure that it cannot be switched on again.

Improper initial commissioning

WARNING!

Danger of injury due to improper initial commissioning!

Improper initial commissioning can result in serious injury and significant damage to property.

– Before the initial commissioning, ensure that all installation work has been carried out and completed in accordance with the information and instructions in this manual.
– Ensure that no persons are in the danger zone before the initial commissioning.

Securing to prevent restart

WARNING!

Danger to life from an unauthorised restart!

In the event of an unauthorised restart of the power supply during installation, there is a danger of serious injuries or death for persons in the danger zone.

– Switch off all power supplies before starting work and make sure they cannot be switched on again.

Improper installation and commissioning

WARNING!

Risk of injury due to improper installation or commissioning!

Improperly performed installation and commissioning may lead to serious injury and significant material damage.

– Provide for sufficient mounting clearance before starting to work.
– Use caution when handling exposed components with sharp edges.
– Keep the assembly area tidy and clean! Loose components and tools lying around or on top of each other may lead to accidents.
– Mount all components properly. Tighten all screws to the prescribed torque.
– Secure components to prevent them from falling down or tipping over.
– Observe the following prior to commissioning:
  – make sure that all installation work has been performed and completed following the instructions and information provided in this manual.
  – make sure that no persons are still in the danger zone of the machine.

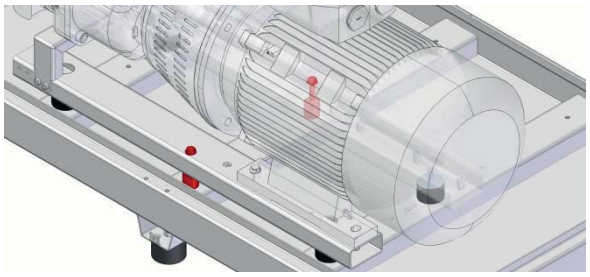
5.2 Requirements in the installation location

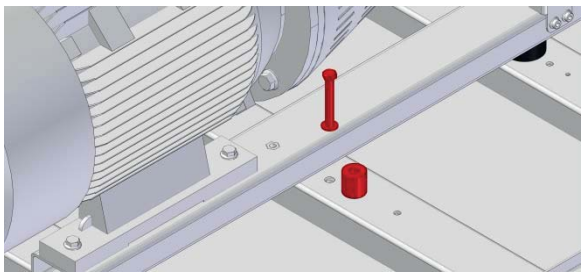
Set up the screw compressor so that the following conditions are fulfilled:

- The installation location is level.
- The installation location is frost proof (min. +3C°)
- The secure standing of the machine is guaranteed.
- The machine is easily accessible and can be accessed from all sides.
- There is sufficient lighting.
- There is sufficient ventilation.
- There is a power supply available.
- Escape paths and rescue equipment are freely accessible.
- The machine is not subjected to an explosive atmosphere.
- The machine is not subjected to a corrosive atmosphere.
- The machine is not subjected to direct solar radiation.
- Outside heating from surrounding heat sources is excluded.
- There is no dust accumulation.
- Fire protection measures have been taken.
- The machine is not subjected to vibrations.
- The surface is resistant to solvents, impermeable to liquids, anti-static and easy to clean.
- There are no machines in the vicinity that cause electrical or electromagnetic disturbance.

5.3 Installation

Before initial installation remove the transport lock!





5.3.1 Ventilation

DANGER!

Danger to life from the use of explosive gas mixtures, vapours, dust or aggressive hazardous substances!

The use of explosive gas mixtures, vapours, dust or aggressive hazardous substances to ventilate the screw compressor can cause severe or even fatal injuries as well as significant material damage.

- Never use explosive gas mixtures, vapours, dust or aggressive hazardous substances to ventilate the screw compressor.
- Ensure that no explosive gas mixtures, vapours, dust or aggressive hazardous substances get into the ventilation of the screw compressor.

The air supplied via the intake openings is used for compression and system cooling.

Personnel:
- Qualified personnel

Protective equipment:
- Safety boots
- Protective work clothing

NOTICE!

Material damage due to condensation!
Cooling air with moisture content can cause condensation.

– Make sure that the cooling air is cool, dry and free of dust.
– Use a circulation air flap for the intake of external air.

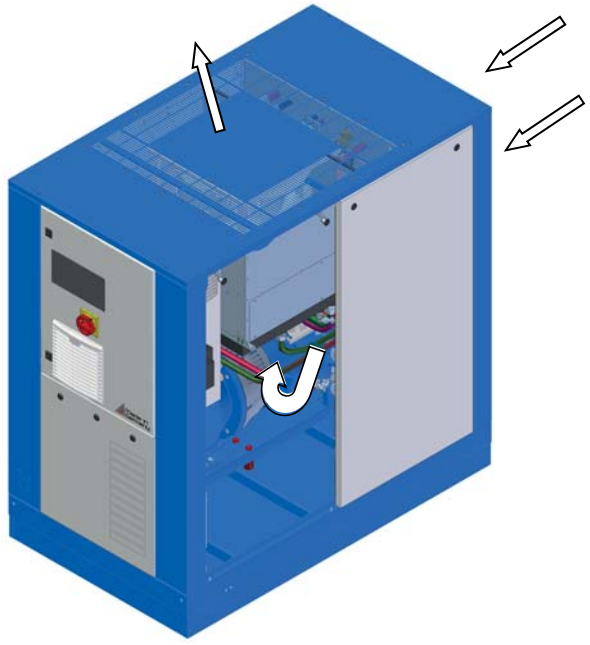


Fig. 29: Screw compressor V Drive 30 - 37

1. Provide the required quantity of cooling air according to the technical data for the screw compressor.

2. Extract the exhaust air as per the technical data for the screw compressor

   – This way, you prevent the installation room and the screw compressor from heating up.

Forced ventilation and bleeding (optional)

The forced ventilation and bleeding must be dimensioned so that the required supply and exhaust air can be supplied and extracted taking into account the existing residual thrust from the cooling air ventilator. The exhaust air can also be used for heat reclamation.

Personnel:
- Qualified personnel

Protective equipment:
- Safety boots
- Protective work clothing

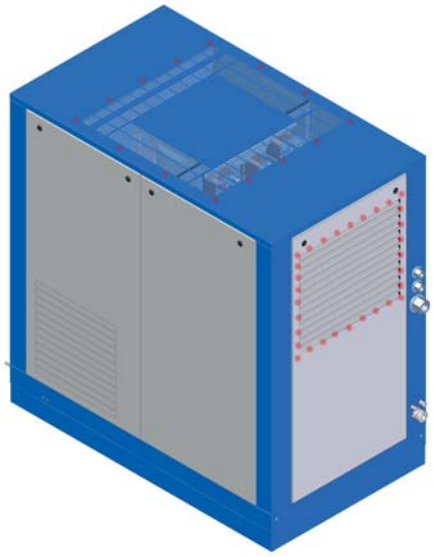


Fig. 30: Overview illustration of air duct connection

1. For the nominal diameters of the duct connections and details about residual thrust refer to the technical data sheet and the installation diagrams included in the scope of delivery.

2. When connecting air ducts include the appropriate additional supporting fans for installation in the ducts.

5.3.2 Water cooling (optional)

On water-cooled plants the compressed air after-cooler and the coolant liquid cooler are cooled with external cooling water.

The table below should give an overview about the resistance to corrosion of the plate heat exchangers, which are mounted in the screw compressors as standard. The important chemical components are listed at the table below. Corrosion is a very extensive process, which will be affected from divers elements and their combinations. This table shows a simplification, but the limit values should be not overstepped !

Requirements
Inlet temperature max. +35°C / Primary pressure 4-10bar / Prefilteration 0,1-0,3mm

WATER CONTENT	CONCENTRATION (mg/l or ppm)	
	X	O
Alkalinity (HCO_3^-)	70-300	>300
Sulphate[1] (SO_4^{2-})	< 70	70-300
HCO_3^- / SO_4^{2-}	>1	<1
Electrical conductivity	10-500 µS/cm	<10 µS/cm / >500 µS/cm
pH [2]	7.5-9.0	<7.5 / >9.0
Ammonium (NH_4^+)	<2	2 - 20
Chlorides (Cl^-)	<300	>300
Free chlorine (Cl_2)	<1	1-5
Hydrogen sulphide (H_2S)	<5.05	>0.05
Free (aggressive) carbon dioxide (CO_2)	<5	5-20
Total hardness (°dH)	4-8.5	
Nitrate[1] (NO_3^-)	<100	>100
Iron[3] (Fe)	<0.2	>0.2
Aluminium (Al)	<0.2	>0.2
Manganese[3] (Mn)	<0.1	>0.1

X Good resistance

O Corrosion can occur when multiple components come together

Only use with the prior written permission of ALMiG!

[1] Sulphates and nitrates work as inhibitors for pitting corrosion caused by chlorides in pH-neutral environments

[2] Generally, a lower pH-value (under 6) increases the corrosion risk and a higher pH-value (over 7,5) reduces the corrosion risk.

[3] Fe^{3+} and Mn^{4+} are strong oxidising agents and can increase the risk of localised corrosion in stainless steels. SiO_2 over 150 ppm increases the calcification risk

Solenoid valve

An solenoid valve (optional) must be attached upstream of the cooling water inlet

Personnel:

- Qualified personnel

Protective equipment:

- Safety boots
- Protective work clothing

Fig. 31: Cooling water connections (for screw compressors G Drive 30-37 / V Drive 30 - 37)

Establish the cooling water connections with flexible and water-resistant hoses.

5.3.3 Heat reclamation for heating and drinking water (optional)

Screw compressors can be equipped with an optional heat reclamation function for heating water or with an optional heat reclamation function for drinking water (safety heat exchanger with blocking medium).

Specification	Value	Unit
Input temperature max.	+35	°C
Pre-pressure	4 – 10	bar

Personnel:
- Qualified personnel

Protective equipment:
- Safety boots
- Protective work clothing

1. Refer to the technical data sheet for water quantity, water temperatures and water pressures.

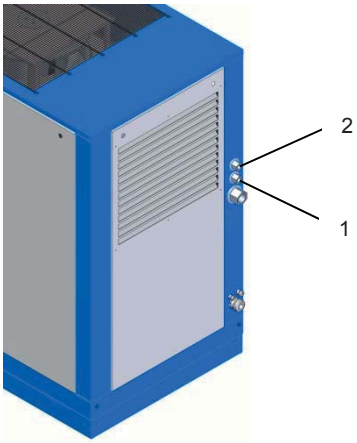


Fig. 32: Screw compressor with heat reclamation (optional)

1 Cooling water inlet
2 Cooling water outlet

2. Connect heat reclamation system with the connections.

5.3.4 Connection to the compressed air network

Personnel:
- Qualified personnel

Protective equipment:
- Protective work clothing
- Safety boots

Materials:
- Flexible compressed air hose, max. 1.5 m

WARNING!

Danger of injury due to unpredictable movement of the compressed air hose!

Load switches in the compressed air network cause jerky movements of the compressed air hose with high force.

– Anchor and fasten the compressed air hose sufficiently.

The prerequisite for the correct installation is the presence of a professionally-planned, installed and maintained compressed air network and an additional cut-off valve installed at the entrance to the compressed air network.

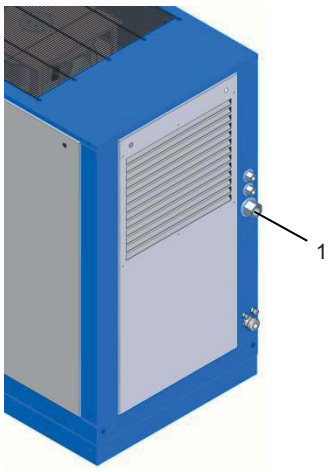


Fig. 33: Compressed air connection

1. Connect the compressed air according to the data sheet.
2. Ensure that the compressed air hose does not represent a stumbling hazard.

3. Anchor and fasten the flexible compressed air hose sufficiently.

5.3.5 Connecting to the power supply

Personnel:
- Qualified Electrician

Protective equipment:
- Protective work clothing
- Safety boots

NOTICE!

Risk of material damage to the compressor section as a result of incorrect connection of the power supply!

In case of incorrect connection of the power supply, the compressor section may be destroyed due to a drive turning incorrectly.

– Connect the power according to the wiring diagram and check the rotating field before starting the screw compressor.

The prerequisite for the correct installation are professionally-dimensioned fuses in the network supply (person/system protection) and an appropriate main switch (for switching the supply on and off).

1. Using the data in the wiring diagram (in the switch cabinet), check whether the existing supply network is suitable. Voltage deviations of more than 10 % are not permitted.
2. Connect the power according to the included wiring diagram (in the switch cabinet) and the technical data (*Chapter 3 'Technical data' on page 32*).
3. Check right-rotating direction of rotation with a rotating field measurement device.
4. Ensure that the power cable does not represent a stumbling hazard.

5.4 Checking the coolant liquid level

Personnel:
- Qualified personnel

Protective equipment:
- Protective work clothing
- Safety boots
- Protective gloves

1. Switch the screw compressor off and secure it to prevent it from being switched back on again.
2. Open and remove the sound insulation covers with the special spanner.

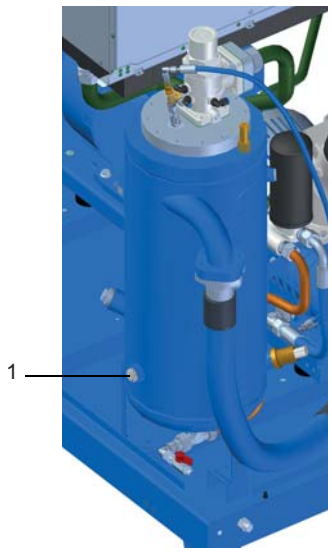


Fig. 34: Inspection glass

3. Check the inspection glass (Fig. 34/1) to make sure it is completely covered in liquid.
4. If necessary, top up coolant liquid *Chapter 7.4.2 'Checking the coolant liquid level / topping up the coolant liquid' on page 60*.

5.5 Start-up lubrication of the compressor section

Personnel:
- Qualified personnel

Protective equipment:
- Protective work clothing
- Safety boots

NOTICE!

Risk of material damage due to a lack of coolant liquid in the compressor section!

A lack of coolant liquid in the compressor section after longer downtimes, e.g. between factory delivery and initial commissioning or after a longer downtime, can cause significant material damage to the screw compressor.

– Top up the coolant liquid directly in the compressor section before initial commissioning or after a longer downtime.

Coolant liquid quantities for direct filling in the compressor section

Screw compressor	Coolant liquid filling
	l
G Drive 30 - 37	0,5
V Drive 30 - 37	0,5

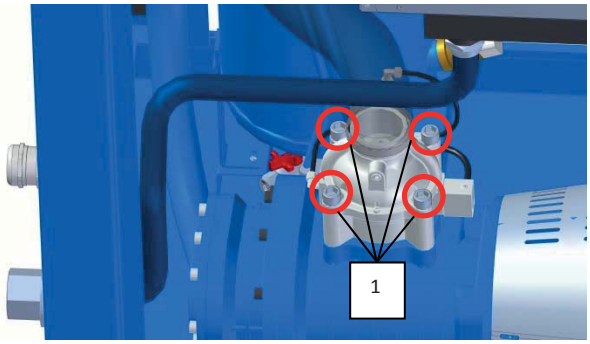


Fig. 35: Intake regulator fastening screw

1. Unfasten the fastening screws on the intake regulator (Fig. 35/1).

NOTICE!

Property damage due to incorrect coolant liquid!

Mixing different coolant liquids or using incorrect coolant liquids causes significant property damage to the screw compressor.

– Only use the coolant liquid prescribed in the technical data.
– For high temperature systems, use only fully synthetic coolant ALUB Syn S.

2. Unscrew the intake regulator.
3. Pour coolant liquid directly into the compressor section.
4. Refit the intake regulator and tighten the screws (Fig. 35/1).

5.6 Switching on after installation

Personnel:
- Qualified personnel

Protective equipment:
- Ear protection
- Protective work clothing
- Safety boots

1. Check the media connections to make sure that they are installed correctly.
2. Make sure that there are no tools or loose objects lying in or on the machine.
3. Check the connectors for the components and tighten the screws.
4. Install the sound installation covers and make sure that they are sealed.
5. Carefully open the shut-off gate valve downstream of the compressed air port between the screw compressor and the compressed air network.

   The screw compressor is now connected to the compressed air network.
6. Switch on the main switch.
7. Start the screw compressor (*controller documentation)*.
   - The compressor is ready and may start up automatically at any time.

5.7 Work after the initial commissioning

Personnel:
- Qualified personnel

Protective equipment:
- Protective work clothing
- Safety boots
- Protective gloves
- Light respiratory protection
- Safety goggles

WARNING!

Danger of injury from hot surfaces!

Surfaces of components can heat up a lot during operation. Skin contact with hot surfaces will cause severe skin burns.

- During all work hear hot surfaces, wear heat-resistant protective clothing and protective gloves.
- Before all work, make sure that all surfaces have cooled off to the ambient temperature, wait at least 30 minutes.

CAUTION!

Danger of injury from coolant liquid fog!

In case of high temperatures or mechanical dust, coolant liquid fog can form. Coolant liquid fog can irritate eyes and the respiratory system.

- When working on the coolant liquid system and if a coolant liquid fog arises, wear breathing protection and protective goggles and ensure that there is a fresh air supply.

1. Switch the screw compressor off and secure it to prevent it from being switched back on again.
2. Open and remove the sound insulation covers with the special spanner.
3. Wait until the components have cooled.
4. Check all coolant liquid and compressed air lines for leaks.
5. Remove any coolant liquid which is still in the system.

6. Check the connectors of the components and tighten the screws.

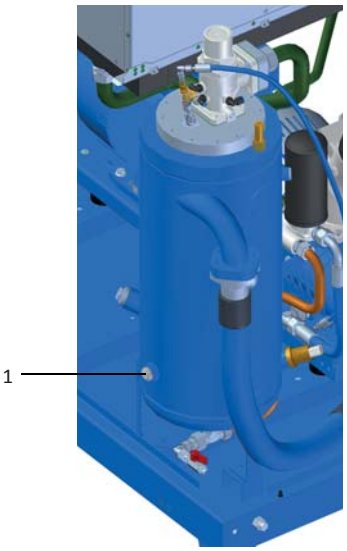


Fig. 36: Checking the coolant liquid level in the inspection glass

7. Check the coolant liquid level in the inspection glass (Fig. 36/1) and top up as described in *Chapter 7.4.2 'Checking the coolant liquid level/topping up the coolant liquid' on page 66* if necessary.

8. Install the sound installation covers and make sure that they are sealed.

! NOTICE!

Risk of material damage due to too low or too high compressor temperature!

If the compressor temperature is too low or too high, the screw compressor may become damaged.

– For detailed information, contact the manufacturer.

If the compression temperature is sufficiently high, this ensures that the air humidity taken in does not form condensation. Frequent switching on and off of the screw compressor can prevent the compressor from reaching the required operating temperature

9. Check the compressor temperature *Chapter 7.4.3 'Checking the compressor temperature' on page 62*.

5.8 Setting parameters

For settings for the screw compressor, consult the Controller documentation.

6 Operation

6.1 Safety instructions for operation

Improper operation

WARNING!

Danger of injury due to improper operation!

Improper operation can cause serious injury and significant material damage.

- Carry out all operating steps in accordance with the information and notices in this manual.
- Pay attention to the following points before starting work:
  - Ensure that all covers and safety devices are installed and work properly.
  - Ensure that that no one is in the danger zone.
- Never override or bridge safety features during operation.

6.2 Controller

Controller documentation

For information about the controller of the screw compressor, consult the Controller documentation.

6.3 Shutdown in emergency situations

In dangerous situations component movements must be stopped as quickly as possible and the power supply must be switched off.

Shutdown in emergency situations

In an emergency situation proceed as follows:

1. Immediately trigger an emergency stop through the emergency stop device.
2. If there is no danger to your own health get people out of the danger zone.
3. Initiate first-aid measures if necessary.
4. Alert the fire department and/or rescue service.
5. Inform the responsible parties at the implementation site.
6. Switch off the machine and safeguard it from being switched on again.
7. Keep entry ways clear for rescue vehicles.
8. Give directions to rescue vehicles.

After the rescue measures

9. Depending on the seriousness of the emergency situation, inform the responsible government agencies.
10. Assign specialized personal to resolve the malfunction.

WARNING!

Life-threatening danger if restarted without authorization or due to uncontrolled restart!

Uncontrolled or unauthorized switching on of the power supply can cause severe or fatal injuries.

- Prior to restart ensure that all safety devices are mounted and functional, and that there is no danger for personnel.

11. Prior to restarting the machine check and ensure that all safety devices are installed and functioning.

7 Maintenance

7.1 Safety instructions for maintenance

Electrical system

DANGER!

Danger to life from electric power!

Contact with live parts may prove fatal. When switched on, electric components may be subject to uncontrolled movements and may cause grave injury.

– Switch off the power supply before starting work and make sure that it cannot be switched on again.

Moving parts

WARNING!

Danger of injury from moving parts!

Rotating parts and/or parts moving in linear fashion may cause serious injuries.

– Before carrying out any maintenance work on moving parts, shut down the machine and take precautions to prevent restarting. Wait until all parts have stopped moving.
– When in the danger zone, wear close-fitting protective work clothing with low tear strength.

Securing to prevent restart

WARNING!

Danger to life from an unauthorised restart!

In the event of an unauthorised restart of the power supply during maintenance, there is a danger of serious injuries or death for persons in the danger zone.

– Switch off all power supplies before starting work and make sure they cannot be switched on again.

Hot surfaces

WARNING!

Danger of injury from hot surfaces!

Surfaces of components can heat up a lot during operation. Skin contact with hot surfaces will cause severe skin burns.

– During all work hear hot surfaces, wear heat-resistant protective clothing and protective gloves.
– Before all work, make sure that all surfaces have cooled off to the ambient temperature, wait at least 30 minutes.

Improperly performed maintenance

WARNING!

Danger of injury due to improperly performed maintenance!

Improperly performed maintenance may lead to serious injury and significant material damage.

– Provide for sufficient mounting clearance before starting to work.
– Keep the assembly area tidy and clean! Loose components and tools lying around or on top of each other may lead to accidents.
– When reinstalling previously removed components, make sure that the components are mounted properly, all fixing elements are reinstalled, and all screws are tightened to torque.
– Before putting the machine back into operation:
  – make sure that all maintenance work has been performed and completed following the instructions and information provided in this manual.
  – make sure that no persons are still in the danger zone of the machine.
  – make sure that all covers and safety devices have been installed and function properly.

Compressed air

WARNING!

Danger of injury from compressed air!

Compressed air can escape from compressed air hoses or components under pressure in case of improper handling or in case of a fault. It can injure eyes, whip up dust or cause uncontrolled movements of hoses.

Components under pressure can move in uncontrolled fashion with improper handling and cause injuries.

– Before removing hoses or components under pressure, make sure the pressure is relieved.
– Have faulty components that are under pressure during operation replaced by appropriate specialist personnel immediately.
– Before all work, make sure that the compressor is not under pressure; wait at least 5 minutes.

Coolant liquid fog

CAUTION!

Danger of injury from coolant liquid fog!

In case of high temperatures or mechanical dust, coolant liquid fog can form. Coolant liquid fog can irritate eyes and the respiratory system.

– When working on the coolant liquid system and if a coolant liquid fog arises, wear breathing protection and protective goggles and ensure that there is a fresh air supply.

Accumulations of liquid

CAUTION!

Danger of injury from slipping in accumulations of liquid!

Slipping in accumulations of liquid on the floor may result in a fall. A fall may result in injuries.

– Remove accumulations of liquid immediately using appropriate means.
– Wear anti-slip safety shoes.
– Post warnings and mandatory signs at or in the vicinity of any area where liquid could accumulate on the floor.

Environmental protection

Observe the following environmental protection instructions during maintenance work:

- In respect of all lubrication points supplied manually with lubricant, remove any escaping, used or surplus grease and dispose of in accordance with applicable local regulations.
- Catch replaced oils in suitable containers and dispose of in accordance with applicable local regulations.

7.2 Spare parts

WARNING!

Danger of injury due to use of incorrect spare parts!

The use of incorrect or defective spare parts can lead to personal injury, material damage, malfunction or total failure.

– Use only original manufacturer's spare parts or spare parts that have been approved of by the manufacturer.
– Always contact the manufacturer if in doubt.

Loss of warranty

The manufacturer's warranty will be rendered null and void if spare parts are used that are not approved.

Spare parts must be procured through an authorised dealer or directly from the manufacturer. Contact details, see page 2.

The spare parts list can be found in the Appendix.

7.3 Maintenance schedule

The next sections describe the maintenance work that is required for optimal and fault-free operation of the machine.

Insofar as increased wear can be detected during regular checks, the required maintenance intervals must be abbreviated according to the actual signs of wear. For questions about maintenance work or intervals contact the manufacturer.

All works must be documented at the service manual (chapter C service, site 74)

Interval	Maintenance work	Personnel
Daily	Checking the coolant liquid level *Chapter 7.4.2 'Checking the coolant liquid level/topping up the coolant liquid' on page 60*	Qualified personnel
	Check for leaks *Chapter 7.4.1 'Checking for leaks' on page 59*	Qualified personnel
	Check the compressor temperature, the warning messages and the fault messages(*controller documentation)*	Trained Person
Weekly	Check the cooler for soiling *Chapter 7.4.4 'Checking soiling of the cooler' on page 62. Remove soiling, if necessary*	Qualified personnel
	Replace the intake filter* *Chapter 7.4.5 'Replacing the intake filter' on page 63*	Qualified personnel
Latest by every 4000 Operating hours (G/V Drive 30, 37) At least 1 time a year	General compressor maintenance	Manufacturer

The change intervals refer to:

- Max. humidity of 60%
- Compressor temperature of max. 85 °C
- Requirements in the location (chapter 5.2, site 45)

The maintenance intervalls depents on the operating conditions and get along with cool and clean ambient conditions, a high operating grade and low load runs.
At differing requirements the manufacturer have to be informed !

7.4 Maintenance work

Necessary maintenance work

Necessary maintenance work appears on the display of the controller as a warning .

7.4.1 Checking for leaks

Personnel:

- Qualified personnel

Protective equipment:

- Safety boots
- Protective work clothing
- Light respiratory protection
- Safety goggles
- Protective gloves

1. Switch the screw compressor off and secure to prevent restarting.
2. Close compressed air network-side gate valve and secure against re-opening.
3. Open and remove the sound insulation covers with the special spanner.
4. Check all lines and the base for leaks.
5. If there is coolant liquid in the system, remove it.
6. Check the connectors of the components and tighten the screws.

7.4.2 Checking the coolant liquid level/topping up the coolant liquid

Checking the coolant liquid level

Personnel:
- Qualified personnel

Protective equipment:
- Safety boots
- Protective work clothing
- Light respiratory protection
- Safety goggles
- Protective gloves

Before visual checking the sight glas, waiting 10 min., after switching of, thus the coolant liquid can drip back into the receiver

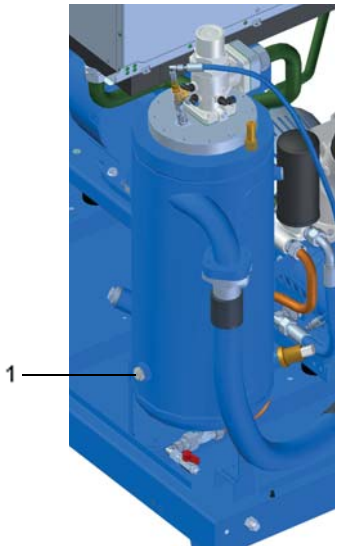


Fig. 37: Inspection glass

1. Switch the screw compressor off and secure it to prevent it from being switched back on again.
2. Close the shut-off valve on the pressure network side and secure it to prevent it from being opened again.
3. Open and remove the sound insulation covers with the special spanner.
4. Check the inspection glass (Fig. 37/1) to make sure it is completely covered in liquid.
5. If the full height of the inspection glass is not covered with coolant liquid, the coolant liquid will need to be topped up.

Topping up the coolant liquid

Personnel:

- Qualified personnel

Protective equipment:

- Safety boots
- Protective work clothing
- Light respiratory protection
- Safety goggles
- Protective gloves

Materials:

- Drip pan for coolant liquid
- Funnel with filling aid

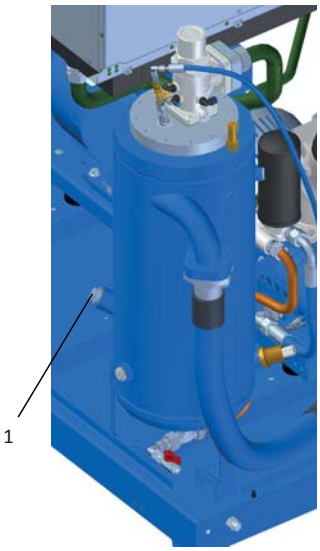


Fig. 38: Filler nozzle

1. Switch the screw compressor off and secure it to prevent it from being switched back on again.
2. Close the shut-off valve on the pressure network side and secure it to prevent it from being opened again.
3. Open and remove the sound insulation covers with the special spanner.
4. Use a drip pan to make sure that the leaking coolant liquid is collected.
5. Unfasten the filler nozzle (Fig. 38/1), remove it and make sure that the gasket is not misplaced.

WARNING !

Before unfastening the filler nozzle complete, let the residual pressure escape from the receiver !

4. Use a drip pan to make sure that the leaking coolant liquid is collected.
5. Unfasten the filler nozzle (Fig. 38/1), remove it and make sure that the gasket is not misplaced.

NOTICE!

Property damage due to incorrect coolant liquid!
Mixing different coolant liquids or using *incorrect coolant liquids causes significant property damage to the screw compressor. Only use the coolant liquid prescribed in the technical data.*
For high temperature systems, use only fully synthetic coolant ALUB Syn S.

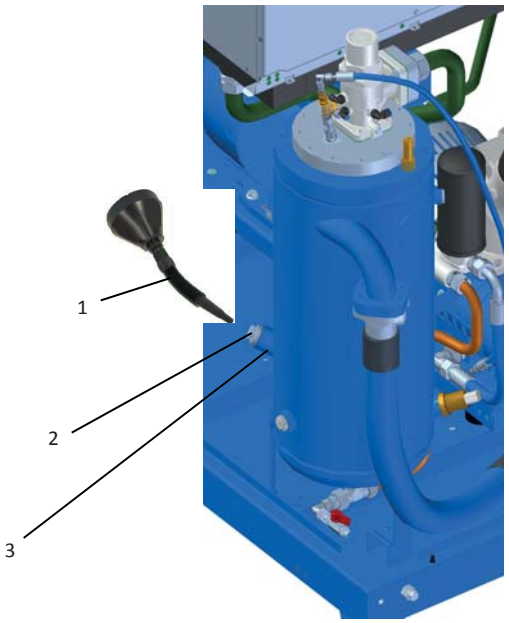


Fig. 39: Filler nozzle

6. Use a funnel (Fig. 39/1) to top up the coolant liquid to the filling edge on the filler nozzle (Fig. 39/3).
7. Position the gasket and check that it is firmly in place.
8. Insert the screw plug (Fig. 39/2) and tighten.

7.4.3 Checking the compressor temperature

Personnel:
- Qualified personnel

Protective equipment:
- Safety boots
- Protective work clothing

NOTICE!

Property damage due to compressor temperature that is too low or too high!

A compressor temperature that is too low or too high can cause damage to the screw compressor.

– For detailed information, contact the manufacturer.

– *The compressor temperature should be between 70 °C and 100 °C.*
– *At 105 °C a warning is output.*
– *At 110 °C the screw compressor is switched off automatically.*

→ Check compressor temperature.

7.4.4 Checking soiling of the cooler

Personnel:
- Qualified personnel

Protective equipment:
- Safety boots
- Protective work clothing
- Light respiratory protection
- Safety goggles
- Protective gloves

1. Switch the machine off and secure to prevent restarting.
2. Close compressed air network-side gate valve and secure against re-opening.
3. Open and remove the sound insulation covers with the special spanner.
4. Check compressed air and coolant liquid cooler from inside and outside for soiling.
5. Remove soiling.

Soiling can be removed by blowing it out, e.g. While doing this, make sure that the soiling from the device is blown out of rather than into the machine. In case of severe soiling, consult the manufacturer.

7.4.5 Replacing the intake filter

Standard intake filter

Personnel:

- Qualified personnel

Protective equipment:

- Safety boots
- Protective work clothing
- Light respiratory protection
- Safety goggles
- Protective gloves

1. Switch the screw compressor off and secure it to prevent it from being switched back on again.

2. Close the shut-off valve on the pressure network side and secure it to prevent it from being opened again.

3. Open and remove the sound insulation covers with the special spanner.

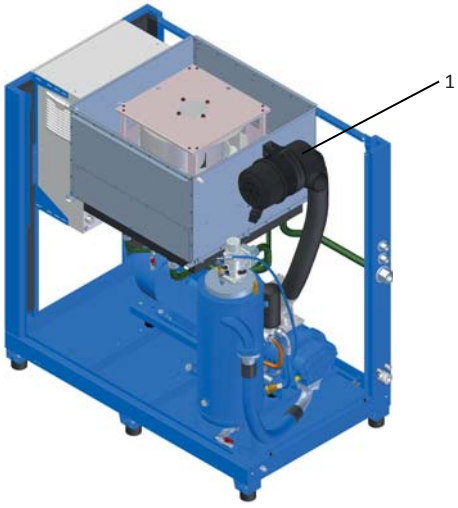


Fig. 40: intake filter

4. Unfasten the intake filter (Fig. 40/1).

Fig. 41: Removing the cover from the intake filter

5. Remove the cover from the intake filter (Fig 41/2).

6. Remove the old filter element (Fig. 41/1).

7. Insert the new filter element (Fig. 41/1).

8. Replace the cover on the intake filter (Fig. 41/2).

9. lock the cover on the intake filter (Fig. 40/1).

7.5 Measures after maintenance has been performed

After completion of the maintenance work and before switching the machine on, carry out the following steps:

1. Check all previously-loosened screw connections to make sure they are tight.
2. Check whether all previously-removed protective equipment and covers have been replaced properly.
3. Ensure that all tools, materials and other equipment used has been removed from the work area.
4. Carefully open the compressed air network-side gate valve.
5. Clean the work area and remove any substances such as liquids, processing material or similar that may have escaped.
6. Ensure that all safety equipment on the machine functions perfectly.
7. Document work on the machine in the service manual (*Appendix C 'Service manual' on page 74*).

8 Faults

The following section describes possible causes of faults and the work to remedy them.

In case of faults that occur more than once, abbreviate the maintenance intervals according to the actual utilisation.

In case of faults that cannot be remedied using the following instructions, contact the manufacturer, see contact data on page 2.

8.1 Safety instructions for fault clearance

Electrical system

DANGER!

Danger to life from electric power!

Contact with live parts may prove fatal. When switched on, electric components may be subject to uncontrolled movements and may cause grave injury.

– Switch off the power supply before starting work and make sure that it cannot be switched on again.

Securing to prevent restart

WARNING!

Danger to life from an unauthorised restart!

In the event of an unauthorised restart of the power supply while tracking down and rectifying a fault, there is a danger of serious injuries or death for persons in the danger zone.

– Switch off all power supplies before starting work and make sure they cannot be switched on again.

Improperly executed troubleshooting work

WARNING!

Danger of injury from improper troubleshooting!

Improperly executed troubleshooting work may result in serious injury and significant damage to property.

– Ensure sufficient assembly space before starting work.
– Pay attention to orderliness and cleanliness in the assembly location! Loosely stacked or scattered components and tools could cause accidents.
– If components have been removed, pay attention to correct assembly, refit all fixing elements and comply with bolt tightening torques.
– Before the restart, ensure that
  – all troubleshooting work has been carried out and completed in accordance with the information and instructions in this manual.
  – no persons are in the danger zone.
  – all covers and safety devices are installed and functioning properly.

Hot surfaces

WARNING!

Danger of injury from hot surfaces!

Surfaces of components can heat up a lot during operation. Skin contact with hot surfaces will cause severe skin burns.

– During all work hear hot surfaces, wear heat-resistant protective clothing and protective gloves.
– Before all work, make sure that all surfaces have cooled off to the ambient temperature, wait at least 30 minutes.

Compressed air

WARNING!

Danger of injury from compressed air!

Compressed air can escape from compressed air hoses or components under pressure in case of improper handling or in case of a fault. It can injure eyes, whip up dust or cause uncontrolled movements of hoses.

Components under pressure can move in uncontrolled fashion with improper handling and cause injuries.

– Before removing hoses or components under pressure, make sure the pressure is relieved.
– Have faulty components that are under pressure during operation replaced by appropriate specialist personnel immediately.
– Before all work, make sure that the compressor is not under pressure; wait at least 5 minutes.

Coolant liquid fog

CAUTION!

Danger of injury from coolant liquid fog!

In case of high temperatures or mechanical dust, coolant liquid fog can form. Coolant liquid fog can irritate eyes and the respiratory system.

– When working on the coolant liquid system and if a coolant liquid fog arises, wear breathing protection and protective goggles and ensure that there is a fresh air supply.

Behaviour in the event of faults

The following applies in principle:

1. Immediately initiate an emergency stop in the event of faults posing an immediate danger to people or property.
2. Ascertain the cause of the fault.
3. If fault rectification requires work in the danger zone, shut down the machine and secure to prevent restarting.

   Immediately notify those responsible at the place of use about the fault.
4. Depending on the nature of the fault, have it rectified by authorised specialised personnel or rectify it yourself.

The fault table below provides information about who is authorised to rectify the fault.

8.2 Fault displays

For the fault displays, consult the *controller documentation*.

8.3 Fault table

Fault description	Cause	Remedy	Personnel
Compressor temperature too high	Intake or ambient temperature too high	Ventilate compressor room	Qualified personnel
	Cooling air intake or outlet blocked	Unblock cooling air intake or outlet sufficiently	Qualified personnel
	Coolant liquid is soiled	Change coolant liquid	Manufacturer
	Coolant liquid low	Top up coolant liquid (*Chapter 7.4.2 'Checking the coolant liquid level/topping up the coolant liquid' on page 60)*	Qualified personnel
	Coolant liquid cooler soiled	Clean coolant liquid cooler (*Chapter 7.4.4 'Checking soiling of the cooler' on page 62)*	Qualified personnel
Network pressure drops	Compressed air consumption higher than delivery quantity of the screw compressor	Reduce compressed air consumption	Manufacturer
	Intake filter soiled	Replace intake filter (*Chapter 7.4.5 'Replacing the intake filter' on page 63)*	Qualified personnel
	Bleeder valve blows during compression	Check bleeder valve and replace gaskets if necessary	Manufacturer
	Intake regulator does not open	Check magnet valve and plunger and replace if necessary	Manufacturer
	Leaks in the compressed air network	Seal up the compressed air network	Qualified personnel
Screw compressor blows via safety valve	Minimum pressure valve blocked	Clean or replace minimum pressure valve	Manufacturer
	Safety valve faulty	Check safety valve and replace if necessary	Manufacturer
	Fine precipitator soiled	Change fine precipitator	Manufacturer
'Overpressure fault' or *'Network pressure too high'*	Fine precipitator soiled	Change fine precipitator	Manufacturer
	Higher outside pressure present in compressed air network	Balance out outside pressure or disconnect from the network	Qualified personnel

Faults

Fault description	Cause	Remedy	Personnel
Screw compressor does not start automatically or does not discharge after previous switching-off by reaching the final pressure or from idle.	Network pressure set too high	Reset network pressure (*Controller documentation)*	Trained Person
	Interruption in the power circuit	Check power circuit for interruption	Qualified Electrician
	Ambient temperature below +1 °C, message *'Coolant liquid temperature too low'*	Install additional heating or temper compressor room and also contact the manufacturer	Manufac - torer
	Switching times are activated in the circuitry	Check switching and pressure times in the circuitry (*Controller documentation)*	Trained Person
System does not start up when the start key is pressed	Network pressure greater than switch-on pressure	Heed network pressure and change settings (*Controller documentation)*	Trained Person
	Symbol *'remote'* flashes	Remote control activated (*Controller documentation)*	Trained Person
	Lacking voltage on the screw compressor	Check whether there is voltage	Qualified Electrician
	Electrical fault in the controller	Check controller	Qualified Electrician
	Switching times are activated in the circuitry	Check switching and pressure times in the circuitry (*Controller documentation)*	Trained Person
Compressed air contains a lot of coolant liquid (coolant liquid consumption too high)	Return line for the coolant liquid is blocked	Clean or replace return line for the coolant liquid	Manufac - torer
	Flawed fine precipitator	Change fine precipitator	Manufac - torer
System stops before reaching the final pressure	Overtemperature or overpressure	Remedy fault (*Controller documentation)*	Qualified Person
	Interruption in the control power circut	Check power circuit	Qualified Electrican
Pressure drop	Pressure difference of the filter too high	Replace filter	Qualified personal

8.4 Commissioning after remedied fault

After remedying the fault, carry out the following steps for re-commissioning:

1. Reset emergency stop equipment.
2. Acknowledge fault (*Controller documentation)*.
3. No persons are in the danger zone.
4. Start the screw compressor (*Controller documentation)*.

9 Dismantling and disposal

Following the end of its useful life, the machine must be dismantled and disposed of in accordance with the environmental regulations.

9.1 Safety instructions for dismantling and disposal

Electrical system

DANGER!

Danger to life from electric power!

Contact with live parts may prove fatal. When switched on, electric components may be subject to uncontrolled movements and may cause grave injury.

– Before starting the dismantling, switch off the electric power supply and disconnect completely.

Improper dismantling

WARNING!

Danger of injury due to improper dismantling!

Stored residual energy, angular components, points and edges on or in the machine or on the tools needed can cause injuries.

– Ensure sufficient space before starting work.
– Handle exposed, sharp-edged components with care.
– Pay attention to orderliness and cleanliness in the workplace! Loosely stacked or scattered components and tools could cause accidents.
– Dismantle the components properly. Note that some components may have a high intrinsic weight. Use hoists if necessary.
– Secure components so that they cannot fall down or topple over.
– Consult the manufacturer if in doubt.

9.2 Dismantling

Before starting dismantling:

- Shut down the machine and secure to prevent restarting.
- Physically disconnect the power supply from the machine; discharge stored residual energy.
- Remove consumables, auxiliary materials and other processing materials and dispose of in accordance with the environmental regulations.

Then clean assemblies and parts properly and dismantle in compliance with applicable local occupational safety and environmental protection regulations.

9.3 Disposal

If no agreement has been made for return or disposal, recycle the dismantled components:

- Scrap metals.
- Recycle plastic elements.
- Sort other components by material properties and dispose of them separately.

ENVIRONMENTAL PROTECTION!

Risk to the environment as a result of incorrect disposal!

Incorrect disposal can cause environmental hazards.

– Have electrical scrap, electronic components, lubricants and other consumables disposed of by certified specialist companies.
– In case of any doubt on environmentally friendly disposal contact the local community authority or specialist disposal company for information.

Appendix

A Training log

Date	Name	Type of training	Training conducted by	Signature

B Bolt tightening torque requirements

Lock screw/nuts (black background) B 158/193/196/251 design or similar				
Thread	**Category 8.8**	**Unit**	**Category 10.9**	**Unit**
M 5	3.69 (5)	lbf ft (Nm)	7.38 (10)	lbf ft (Nm)
M 6	5.9 (8)	lbf ft (Nm)	13.28 (18)	lbf ft (Nm)
M 8	14.75 (20)	lbf ft (Nm)	32.45 (44)	lbf ft (Nm)
M 10	29.5 (40)	lbf ft (Nm)	64.17 (87)	lbf ft (Nm)
M 12	50.89 (69)	lbf ft (Nm)	111.37 (151)	lbf ft (Nm)
M 16	125.39 (170)	lbf ft (Nm)	280.27 (380)	lbf ft (Nm)

Lock screw/nuts (black background) DIN 912/931/933/934/982 design or similar				
Thread	**Category 8.8**	**Unit**	**Category 10.9**	**Unit**
M 5	4.43 (6)	lbf ft (Nm)	6.27 (8.5)	lbf ft (Nm)
M 6	7.38 (10)	lbf ft (Nm)	10.33 (14)	lbf ft (Nm)
M 8	18.44 (25)	lbf ft (Nm)	25.81 (35)	lbf ft (Nm)
M 10	36.14 (49)	lbf ft (Nm)	50.89 (69)	lbf ft (Nm)
M 12	63.43 (86)	lbf ft (Nm)	88.51 (120)	lbf ft (Nm)
M 16	154.89 (210)	lbf ft (Nm)	217.58 (295)	lbf ft (Nm)

C Service manual

Compressor type:	
System number: Please specify for all enquiries, orders and correspondence.	

Motor number:	
Pressure tank number:	
Date of commissioning:	

ALMiG Customer Service department:

Operating hours	Daily checks			Weekly checks				
	Coolant liquid level	Leakage	Compressor temperature	Cooler soiling	Build-up of condensation	Clean intake filter mats	Date	Name

Coolant liquid change			Filter change (coolant liquid filter/intake filter/fine separator)			
Operating hours	Date	Name	Operating hours	Date	Filter type	Name

Additional maintenance and repair work			
Operating hours	**Date**	**Spare parts**	**Name**

D Spare parts list

Spare parts list

The spare parts list is included with the documents.

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