



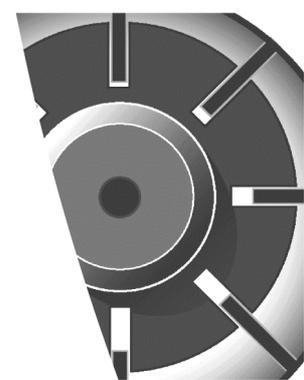
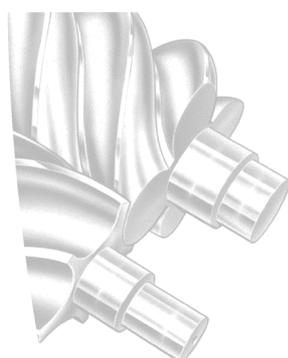
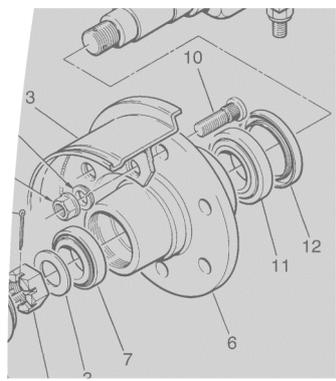
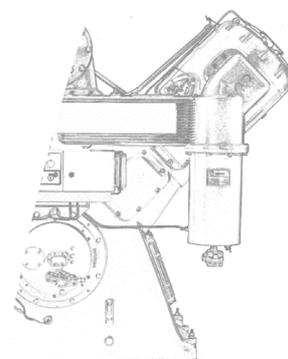
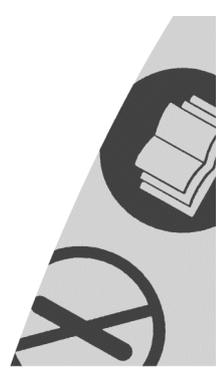
Original Operating and Service Manual

**Screw Air Compressor**

**L90 - L140**

**L90RS - L132RS**

**V3**





## General Information

These compressors are for compressing atmospheric air and are not suitable for compressing any other gas. They are designed and manufactured to give optimum performance with long life and reliability.

This manual gives the user all the information required to install and operate the compressors and carry out the regular schedules for servicing and maintenance, which will ensure the maximum satisfactory service life.

Servicing facilities and the supply of genuine replacement parts are provided through a worldwide network of CompAir Companies and Distributors. If replacement parts are needed, the user should, in the first instance, contact the local CompAir Company or Distributor.

The information given in this manual was correct at the time of printing, however, as part of continuous development, modifications to parts and procedures may be made without notice which could affect the servicing requirements of the compressors. Before any servicing or maintenance work is undertaken the user is advised to contact the local CompAir Company or Distributor who is supplied with revised and up-dated information.

In any communication concerning the compressor it is essential to quote the MODEL, SERIAL NUMBER and where possible the YEAR of MANUFACTURE.

All pressure data given in this manual refer to overpressures (pressure gauge pressures) unless specified otherwise.

## Maintenance

To ensure the continued trouble-free operation of the compressor unit it is important that periodic maintenance and servicing is carried out in accordance with the information given in the 'Maintenance' section of this manual. To assist in this matter your local CompAir Company or Distributor can provide a number of optional maintenance agreements to suit your requirements. These agreements provide the user with the expertise of our factory trained technicians and the guarantee that only Genuine CompAir parts will be used.

## Warranty

The conditions of the Gardner Denver Warranty are set out in the Company's standard Conditions of Sale available from the CompAir Company or Distributor supplying the machine.

**USE ONLY COMPAIR GENUINE PARTS. YOUR WARRANTY  
COULD BE AFFECTED IF A SERVICE OR REPAIR IS  
CARRIED OUT USING NON-GENUINE PARTS.**

Gardner Denver Deutschland GmbH Argenthaler Strasse 11 D - 55469 Simmern / Hunsrück		
Baujahr; anno; annee; ano 1 <input style="width: 100%;" type="text"/>	Identifizierungs-Nummer; Ref.-No. 2 <input style="width: 100%;" type="text"/>	
Typ; type; tipo 3 <input style="width: 100%;" type="text"/>		
<input type="radio"/> Gesamtgewicht; total weight; poids total; peso totale; peso total 6 <input style="width: 100%;" type="text"/> kg	Maschine; machine; macchina 4 <b>KOMPRESSOR</b>	Version; versione 5 <input style="width: 100%;" type="text"/>
Made in Germany <b>CE</b>		
7 <input style="width: 100%;" type="text"/>		

Einbauverdichter; air end; bloccompresseur à vis; vite; cabezal compresor	8 <input style="width: 100%;" type="text"/>
Auftrags-Nr.; order number; numéro de commande; numero di commessa; numero de pedido	9 <input style="width: 100%;" type="text"/>
Verdichtungsmedium; compression medium; médium de compression; médium di compressione; médium de compression	10 <input style="width: 100%;" type="text"/>
Spannung/Phase/Frequenz; voltage/phase/frequency; tension/phase/frequence; tensione/fase/frequenza; voltage/fase/frecuencia	11 <input style="width: 100%;" type="text"/>
Volumenstrom; volume rate of flow; debit - volume; portata effettiva; caudal efectivo	12 <input style="width: 100%;" type="text"/> m <sup>3</sup> /min
Stufendrucke; stage pressures; pression d'étages; pressioni degli stadi; presion de las etapas	13 <input style="width: 50%;" type="text"/> / <input style="width: 50%;" type="text"/> bar g
Ansaugdruck; suction pressure; pression d'aspiration; pressione d'aspirazione; presion de aspiracion	14 <input style="width: 100%;" type="text"/> bar
<input type="radio"/> Vollaststrom; full load current; Intensité à pleine charge; corrente a pieno carico; corriente de carga plena	15 <input style="width: 100%;" type="text"/> A
Drehzahl; speeds; vitesse; numero giri; revoluciones	16 <input style="width: 100%;" type="text"/> min <sup>-1</sup>
Installierte Motorleistung; installed motor capacity; puissance moteur installée; potenza installata del motore; potencia instalada del motor	17 <input style="width: 100%;" type="text"/> KW

ZS1048646

Fig. 1

\*) The values on the type plate are maximum values.

Your CompAir distributor

Name: _____	
Address: _____ _____ _____	
Telephone: _____	Fax: _____
Contact: _____	Spare Parts: _____
Service: _____	

# 1. Foreword

## 1.1 Notes on the compressor

CompAir screw compressors are the result of many years of research and development. These prerequisites combined with high quality standards guarantee the manufacture of screw compressors providing a long service life, high reliability and cost-effective operation. It stands to reason that all requirements concerning environmental protection are met.

## 1.2 Intended use

The machine/unit has been constructed in accordance with state-of-the-art technology and the recognized safety regulations. Nevertheless, its use may constitute a risk to life and limb of the user or third persons or cause damage to the machine or to other material property, if

- it is not used as intended,
- it is operated by unqualified personnel,
- it is improperly modified or changed,
- the safety regulations are not observed.

Therefore, any person entrusted with the operation, maintenance or repair of the machine must read and follow the safety regulations. If required, this has to be acknowledged by signature.

In addition,

- relevant accident prevention regulations,
- generally recognized safety regulations and
- national regulations

have to be observed.

The machine/unit must only be used in technically perfect condition and in accordance with its intended use and the instructions set out in the operating manual, and only by safety-conscious persons who are fully aware of the risks involved in operating the machine/unit! Any functional defects, especially those affecting safety, have to be rectified immediately (or rectified by others)!

The machine/unit is designed exclusively for the generation of compressed air to power air-driven devices. Using the machine/unit for purposes other than those mentioned above is considered contrary to its intended use. The manufacturer/supplier cannot be held responsible for damage resulting from such use. The risk of such misuse lies solely with the user.

Operating the machine within the limits of its intended use also involves observing the instructions set out in the operating manual and complying with the inspection and maintenance directives.

## 1.3 Maintenance

Carefully performed maintenance is imperative, this ensures that your screw compressor can meet all the requirements placed upon it. It is therefore imperative to adhere to the specified maintenance intervals and to carry out the maintenance work with particular care, especially when the unit is utilized under harsh operating conditions.

### Servicing

Please contact your authorized CompAir dealer in the case of malfunctions or when spare parts are required. In the case of damage, our fully trained personnel will ensure that a quick and proper repair is carried out using genuine CompAir spare parts. Genuine CompAir spare parts are manufactured utilizing state-of-the-art technology, thus guaranteeing the further reliable operation of the unit.

### In case of queries

Please enter the data on the nameplate of your compressor into the nameplate shown in fig.1 on p. 2. In the case of queries or spare parts orders, please refer to the compressor type indicated on the nameplate, the identification no. and the year of construction. With this information at hand it can be guaranteed that you will receive the right information or required spare parts.

## 1.4 Notes

### General

These operating instructions are intended to familiarize the user with the machine/unit and its intended use. The instructions contain important notes on how to operate the compressor safely, properly and cost-effectively. Observing these instructions helps to avoid risks, to reduce repair costs and downtimes and to increase the reliability and service life of the machine/unit.

The operating instructions have to be supplemented by the respective national rules and regulations regarding the prevention of accidents and environmental protection. They must always be available at the location of the machine/unit. The operating instructions must be read and followed by any person carrying out work in connection with the machine/unit, e.g. operation, including setting up, trouble-shooting in the operation cycles, disposal of production waste, care, service, and disposal of waste fuels and consumables, upkeep (maintenance, inspection, repair), transport.

## 1. Foreword

Besides the operating instructions and the binding regulations for the prevention of accidents, which are valid in the country and place of operation of the machine/unit, the generally recognized technical regulations for safe and proper working have also to be observed.

### Guarantee

Operate this compressor only if you have an exact knowledge of the machine taking into respect these instructions.

Gardner Denver cannot be held responsible for the safe operation of the machine/unit if it is used in a manner which does not correspond to the intended use, or for other applications which are not mentioned in these instructions.

Warranty claims will not be accepted in the case of

- Operating errors
- Incorrect maintenance
- Wrong auxiliary materials
- Use of spare parts other than CompAir genuine spare parts
- Modifications and changes to the installation

The warranty and liability conditions of the general terms and conditions of Gardner Denver will not be extended by the notes above.

Any unauthorized change to the compressor unit/station, or the installation of components not accepted by the manufacturer (e.g. fine separator) will result in the withdrawal of the CE mark. As a consequence, any liability and warranty claims will not be accepted by the manufacturer.

### Safety regulations



**Danger**

**The safety regulations in chapter chapter 3 of the operating instructions have to be strictly observed.**

### Technical changes

In the course of technical development we reserve the right to modify the units without further notice.

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## 3. Safety regulations

### 3.1 Identification of safety guidelines

Gardner Denver is not liable for any damage or injury resulting from the non-observance of these safety instructions or negligence of the usual care and attention required during handling, operation, maintenance or repair, even if this is not explicitly mentioned in these operating instructions.

If any of the regulations contained in these instructions - especially with regard to safety - does not correspond to the local legal provisions, the stricter of both shall prevail.

These safety regulations are general and valid for various types of machines and equipment. It is therefore possible that some references do not apply to the unit(s) described in these instructions.

#### **Danger**

**indicates a directly dangerous situation which, if not protected against, could result in death or serious (irreversible) injuries.**

#### **Warning**

**indicates a potentially dangerous situation which, if not protected against, could result in death or serious (irreversible) injuries.**

#### **Important**

**Passages marked with this sign indicate a possible danger to machines or part of machines.**

#### *Note*

*Passages marked with this sign provide technical information on an optimal cost-effective use of the machine.*

### 3.2 General safety regulations

#### **Danger**

#### **Safety measure required**

Working with compressors involves dangers that are not immediately apparent.

Everyone working with the machine must have first read and understood the operating manual. Don't leave this until you start work – it's too late.

Please keep this operating manual handy at all times on the site of the machine / installation, in the bag provided.

Pay attention to all safety and danger warnings on the machine/ installation!

Deploy trained staff only. The responsibility of the personnel for operating, setting up and maintaining the machine / installation must be clearly defined.

Make sure that only authorized personnel use the machine.

Define who is responsible for operating the machine, and authorize him to ignore instructions from third parties if these instructions could compromise safety.

Symbols on the machine indicating dangers may become dirty or disappear.

Ensure that all safety and danger notices on the machine/system stay fully legible.

Faults and modifications to the machine may jeopardise safety.

In the event of malfunctions, shut the machine/system down immediately and secure it from being switched on again! Have malfunctions corrected immediately.

Check the machine / installation for external damage and faults at least once per shift.

Any changes noticed (including changes in operating performance) must be reported immediately to the authority or person in charge. If necessary, shut down and secure it from being switched on again.

### 3. Safety regulations

#### 3.3 Particular dangers associated with compressed air

<b>Danger</b>	<b>Safety measure required</b>
Compressed air is very powerful. It can be used for example to break open concrete but can also put lives at risk.	Never play about with compressed air.
Small parts propelled at high speed by compressed air can penetrate the skin or destroy an eye.	When using compressed air to clean equipment, work with extreme caution and always wear suitable eye protection. Never direct compressed air onto the skin or towards another person. Never use compressed air for cleaning clothing.
Compressed air connections may split and put people at risk.	Only connect the compressor to the existing compressed air system when the service temperatures and service pressures are correct and the connecting flange and connecting thread are in full working order.  All connected components must be of the correct size and be suitable for the specified operating pressure and temperature (i.e. distributing pipes and pipe connections).  A hose connected to an air valve must be fitted with a safety wire for operating pressures above 7 bars; it is in fact recommended that this safety device should be used for pressures above 4 bars. The steel wire has a diameter of 8 mm and is firmly clamped to the hose at least every 500 mm. Both ends are fitted with cable lugs.  Do not use chafed, damaged or poor-quality hoses.  Only use the correct type and size of hose coupling and connection.  The compressed air line connected at the air exit of the unit must not be under strain.  No force should be applied to the outlet thread or the outlet flange by, for example, pulling on the lines or by mounting additional equipment (e.g. a water separator or a pneumatic oiler, etc.)
Compressed air lines may be breached by accident.	Compressed-air lines have to be marked distinctly according to local regulations.
Compressed air lines get hot and expand.	Make sure that the compressed air line from the compressor to the air network can expand as a result of heat and cannot come into contact with inflammable materials.  Pipes and other parts with a surface temperature of more than 70 °C (158 °F) must be suitably secured against contact and suitably marked.
Loose hose ends may flog and result in injury.	Fix the hose in such a way that it does not lash if the connection is broken.  Before blowing through a hose or air line, it is essential to hold the open end firmly.  Before disconnecting a hose, always make sure that it is not under pressure.

### 3. Safety regulations

<b>Danger</b>	<b>Safety measure required</b>
Compression results in high temperatures. Risk of explosion from drawn in materials.	<p>The system should be set up such that hazardous mixtures (inflammable solvent vapours etc. but also dusts and other dangerous or toxic materials) cannot be drawn in. The same applies to flying sparks.</p> <p>Never use the machine in environments where the possibility cannot be ruled out that inflammable or toxic vapours may be taken in.</p> <p>The installation is to be set up in such a way that it is adequately accessible and that the necessary cooling is ensured. Never block the admission of air.</p> <p>Compressor units must never be operated in areas subject to explosion hazards! (Exception: Special units with the corresponding technical modifications)</p>
There is strong suction at the air inlet.	<p>The air intake is to be designed in such a way that no loose clothing can be drawn in.</p>
There is a risk of injury, e.g. from getting stuck or being drawn in.	<p>The personnel must not have long, loose hair, or wear loose clothing or jewellery, including rings, due to risk of injury through catching. Personal protective equipment should be worn if necessary.</p>
Connected compressed air tools may start up unexpectedly when switching on.	<p>Before switching on the machine / installation, or starting it up, make sure that nobody can be injured by the machine / installation as it starts up.</p>
Compressed air may contain substances that may damage your health if inhaled.	<p>The compressed air produced by these compressors must not be used as breathable air, unless it has been processed specially for such an application in accordance with the "Safety requirements for breathable air."</p> <p>When breathing apparatus with cartridges is used, make sure that the correct cartridge has been inserted and that its service life has not expired.</p>
The safety valves in the system only guarantee the pressure relief for the compressor unit.	<p>The pressure devices/systems connected to the compressor must be secured allowing for the weakest pressurised component (safety valve or similar).</p>
As a rule:	<p>If several compressors are arranged in a system, manually operated valves have to be installed so that each machine may be shut off individually. For the purpose of shutting off pressurized systems, you should never rely on the effectiveness of return valves alone.</p> <p>All pressure tanks located outside the unit with an approved operating pressure higher than atmospheric pressure and fitted with two or more pressure feed lines must be equipped with an additional safety device to automatically prevent the approved operating pressure from being exceeded by more than 10%.</p> <p>Never operate the system at temperatures and/or pressures below or above the values indicated in the technical data sheet.</p>

### 3. Safety regulations

#### 3.4 Particular dangers associated with machines

<b>Danger</b>	<b>Safety measure required</b>
Risk of electric shock.	Electrical connections must meet the local regulations. Power units must be connected to earth and protected from short-circuits by means of fuses.
Insufficient power quality could have a strong effect on health & safety and may constitute a risk to life and limb of the user or third persons.	Always check a correct power supply to the compressor before commissioning. The voltage supply has to fulfill the requirements of EN60204-1/IEC60204-1 for such kind of industrial equipment.
Remote-controlled units may start up unexpectedly.	<p>If a remote control is used, the system must carry a clearly visible sign with the following note: Attention! This installation is operated by remote control and can start up without prior warning!</p> <p>As an additional safety measure, persons, who start remotely controlled systems, have to take sufficient safety precautions in order to ensure that nobody is checking the system or working on it. For this, a label with a corresponding warning notice has to be attached to the remote control equipment.</p>
Noise, even when it is not very loud, can make us nervous and irritated, and after a longer period of time our nervous system can suffer serious damage.	<p>We recommend a separate machine room in order to keep the noise of the machine away from the workshop.</p> <p>Where necessary, wear the personal hearing protection.</p> <p>In order to consider all noise-relevant parameters and to adequately protect the health of the operator, the European Regulation 2003/10/EC must be satisfied completely by the user. In states outside the European Community, the respective noise protection directives must be taken into consideration.</p> <p>Shielding and doors must be closed during operation so that the efficiency of the sound insulating is not reduced.</p>

### 3. Safety regulations

#### 3.5 Particular dangers associated with water-cooled units

<b>Danger</b>	<b>Safety measure required</b>
If open cooling towers are used in the cooling water circuit, it is possible for legionella ( <i>Legionella pneumophila</i> ) and other bacteria to grow and spread.	The growth and spread of bacteria must be prevented by corresponding service and water treatment methods.
As a result of leakage in oil/water coolers, some oil may get into the cooling water circuit.	Have the cooler checked regularly by specially trained technicians. Strictly observe the relevant waste water regulations. Cooling water must not be drained in an uncontrolled manner into public sewage systems. Uncontrolled overflowing of the oil separation reservoir into public sewage systems must be ruled out.

#### 3.6 Dangers present when loading/moving machines

<b>Danger</b>	<b>Safety measure required</b>
Loose parts may fall off when lifting.	All loose parts must first be removed or secured; parts fitted so that they can turn like doors etc. must be secured and made immobile. Parts to be removed for transport purposes must be carefully refitted and fixed again before putting the machine / installation back into operation.
The compressor may fall if mistakes are made when lifting.	Only use lifting tackle approved for the weight in question. Observe the operating manual for the lifting tackle. When heavy loads are being conveyed by means of hoisting gear, it is imperative to keep well clear of the load in order to avoid accidents. The person giving the instructions must be within sight or voice contact with the operator.
Safety components may be damaged if lifted incorrectly.	Machines may only be hoisted correctly using hoisting gear in accordance with the information in the operating manual (lifting spots for heavy-lift facilities etc.) To avoid damage to the system or external installations, the compressed air connection, cooling water connection, condensate drain and electrical connection should be isolated from external lines and hoses. The system must be set up on a level surface with full contact between its base frame and the supporting surface.

### 3. Safety regulations

#### 3.7 General workplace dangers

Danger	Safety measure required
This manual only describes how to work safely with the compressor itself. But other dangers will arise during work.	<p data-bbox="596 387 1425 533">Please note and pass on general statutory and other binding regulations that may supplement the operating manual for the prevention of accidents and the protection of the environment. Such obligations may be for example the handling of hazardous materials, or the provision and/or wearing of personal protective equipment, or traffic regulations.</p> <p data-bbox="596 555 1425 667">Instructions, including supervisory responsibility and duty of notification for taking account of special in-plant factors, for example regarding work organization, sequences of operations, personnel assigned to certain tasks, are to be added to the operating manual.</p> <p data-bbox="596 689 1425 745">Before starting work, make yourself familiar with the working environment at the installation site.</p> <p data-bbox="596 768 1425 824">The location and operation of fire extinguishers must be made known. Observe the instructions concerning fire alarm and fire fighting.</p> <p data-bbox="596 846 1425 880">Set up the machine in such a way that no inlets, outlets or gates are blocked.</p> <p data-bbox="596 902 1425 958">When handling chemical substances observe the safety regulations applicable for the product.</p> <p data-bbox="596 981 1425 992">Caution when handling process materials (risk of burning / scalding).</p>

#### 3.8 Dangers resulting from neglecting to perform maintenance

Danger	Safety measure required
Components of importance to safety wear over time.	<p data-bbox="596 1245 1422 1357">Observe the setting, maintenance, and inspection work and intervals stipulated in the operating manual, including information about the replacement of parts / partial sections. This work may only be carried out by specialists.</p> <p data-bbox="596 1379 1422 1435">Observe the intervals stipulated or those given in the operating manual for routine checks and inspections.</p> <p data-bbox="596 1458 1422 1514">Verify regularly that safety valves and other pressure-relief devices are in perfect condition and are not blocked, for example by dirt or paint</p> <p data-bbox="596 1536 1422 1592">Check regularly that the safety mechanisms are fully functional. Have malfunctions corrected immediately.</p>
Lines perish.	<p data-bbox="596 1630 1422 1686">Check regularly that all hoses and/or pipes within the system are in good condition, firmly fixed and do not chafe.</p> <p data-bbox="596 1709 1422 1765">Replace hydraulic hose lines at the stated or at reasonable intervals even if no defects of relevance to safety are apparent!</p>
Spurting oil can result in injuries.	<p data-bbox="596 1805 1422 1888">Check all lines, hoses, and bolted connections regularly for leaks and visible damage. Repair damage immediately and always arrange for damaged parts to be replaced!</p>

### 3. Safety regulations

<b>Danger</b>	<b>Safety measure required</b>
Risk of electric shock.	Have the electrical equipment on a machine/system checked regularly. Have defects like loose connections or charred cables rectified immediately.  Use only original fuses with the specified current rating. In the event of faults with the electrical power supply, switch the machine/system off immediately, and secure it from being switched on again!
In the event of faulty sensors, the system can be led into a dangerous state of operation.	Check the accuracy of pressure and temperature indicators at regular intervals. If the admissible tolerance limits have been exceeded, these devices have to be replaced.

#### 3.9 Dangers during maintenance and repairs

<b>Danger</b>	<b>Safety measure required</b>
During maintenance and repairs, parts that may be pressurised must be removed. If you maintain the compressor and have not been trained by CompAir, you will put yourself and others at risk.	The compressor can only be maintained by specially trained technicians. Contact your CompAir agent.  Only persons with special knowledge and experience of hydraulics may work on system elements, for example components under pressure.
Incorrectly configured spare parts may jeopardise safety, e.g. tear when loaded.	Spare parts must meet the technical requirements laid down by the manufacturer. This is always guaranteed when original spare parts are used.
Risk of electric shock.	Work on the electrical systems of the machine / installation may only be carried out by a trained electrician in accordance with electrical regulations. The system must be secured from being switched on. Seal off the main switch and remove the key and/or attach a warning sign to the main switch.  L90RS-L132RS only: Danger of electric shock from loaded condensers! Always first disconnect the system from the power supply and wait another 10 minutes before touching the electrical components. The power condensers require this time in order to discharge!  Check the DC bus voltage at the system terminal strip of the frequency converter by measuring this between the +DC and -DC terminals (the exact position can be found in the supplied operating manual of the frequency converter), between the +DC terminal and the chassis as well as between the -DC terminal and the chassis. The voltage must read zero in the case of all three measurements.
The machine may start up unexpectedly.	Only carry out maintenance and repair work when the system is not in operation and the power supply disconnected. Ensure that the power unit cannot be switched on inadvertently. The system must be secured from being switched on.  Seal off the main switch and remove the key and/or attach a warning sign to the main switch.

### 3. Safety regulations

<b>Danger</b>	<b>Safety measure required</b>
Risk of injury from pressurised or moving parts.	<p>Only carry out inspection, maintenance, and repair work when the screw compressor system is at a standstill and is not under pressure. The system must be secured from being switched on.</p> <p>Before removing or opening pressurized components, positively isolate any source of pressure and depressurize the entire system.</p>
During the course of maintenance and repairs, parts can be damaged which are important for safety.	<p>Never weld any pressure reservoir or change it in any way.</p> <p>If work which produces heat, flames or sparks has to be carried out on a machine, the adjacent components have to be protected by means of non inflammable material.</p> <p>Motor, air filter, electrical components and regulating equipment have to be protected from the ingress of humidity, e.g. when cleaning the system by means of a steam jet.</p> <p>Under no circumstance must the sound-proofing material be removed or modified.</p> <p>Never use etching solvents which could attack the materials used.</p> <p>Before cleaning the machine with water or steam jet (high pressure cleaner) or other cleaning agents, cover/mask all openings which have to be protected from the ingress of water, steam or detergents for safety and/or functional reasons, in particular electric motors and switch cabinets. After cleaning, remove the covers/masking completely.</p>
Modifications to the machine impair safety.	<p>After completing repair work, always check to see whether any tools, loose parts or cloths have been left in or on the machine, driving engine or driving equipment.</p> <p>After the work has been completed, replace any protective devices that have been removed. Operation without protective devices is not permissible.</p> <p>Always re-tighten screwed connections which have been loosened for maintenance and repair work.</p> <p>Machines performing a rotating movement have to be cycled several times in order to ensure that there are no mechanical faults in the machine or the drive member.</p> <p>Before releasing the power unit for operation after maintenance or overhaul, check that the operating pressures, temperatures and time settings are correct and that the regulating and shut-down equipment function properly.</p>

### 3. Safety regulations

#### 3.10 Dangers resulting from conversion work/modifications on the machine

Danger	Safety measure required
Genuine parts are designed especially for the machine. Modifications may interfere with safety equipment or give rise to new dangers for which protection is not provided.	<p>No alterations, additions, or modifications to the machine may be carried out without the approval of the manufacturer. Unauthorized modifications to the machine are prohibited for reasons of safety.</p> <p>Original parts are specially designed for our machines. We must explicitly point out that parts and special accessories not supplied by us are not approved by us. Installing or using such products may thus adversely affect active and/or passive safety.</p> <p>The manufacturer accepts no liability whatsoever for damage resulting from the use of non-original parts or special accessories.</p> <p>This also applies to the installation and adjustment of safety devices and valves as well as to welding on bearing and pressurized parts</p>
If protective equipment is not functioning, operating the system may put lives at risk.	<p>Only operate the machine when all protective devices, shutdown devices, sound-insulating equipment and extraction equipment are in place and working.</p> <p>Safety devices, protective covers, or insulations mounted on the system must not be removed or modified in any way.</p>

### 3. Safety regulations

#### 3.11 Symbols and explanations



Carefully read the operating manual before commissioning or servicing this compressor.



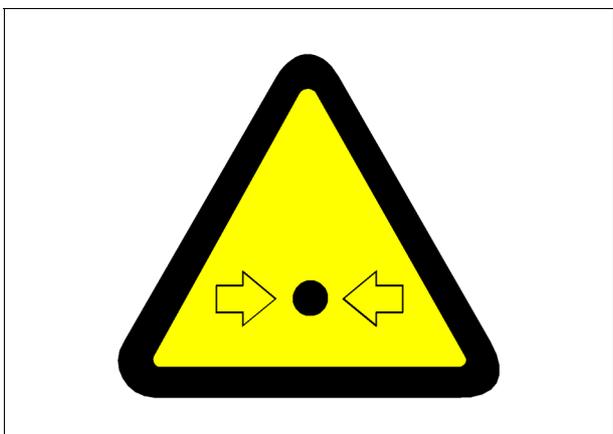
Never breathe in compressed air from this system.



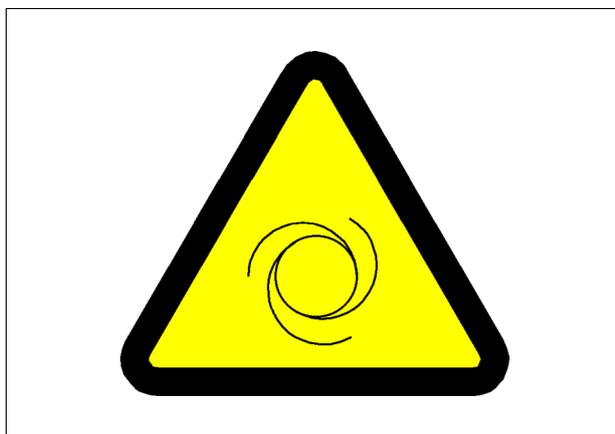
Never operate the unit with open doors or loose access panels.



**Warning:** Hot surface

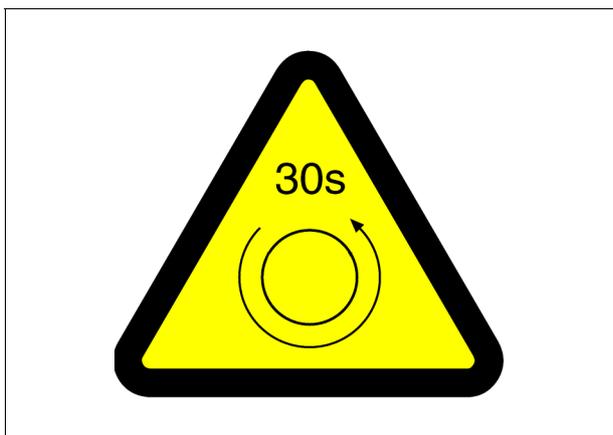


**Warning:** Pressurized part or system

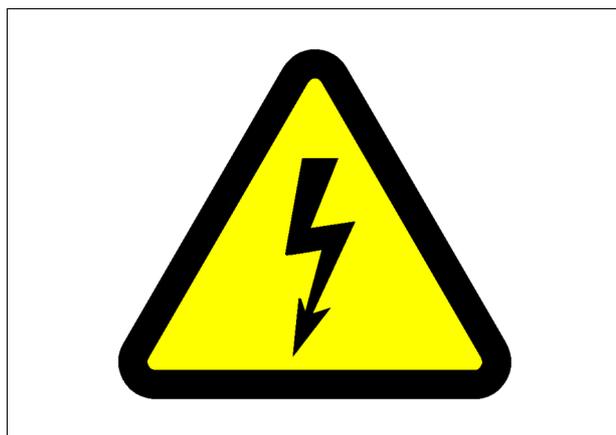


**Warning:** This system can start up by means of a remote control or automatically after a power failure.

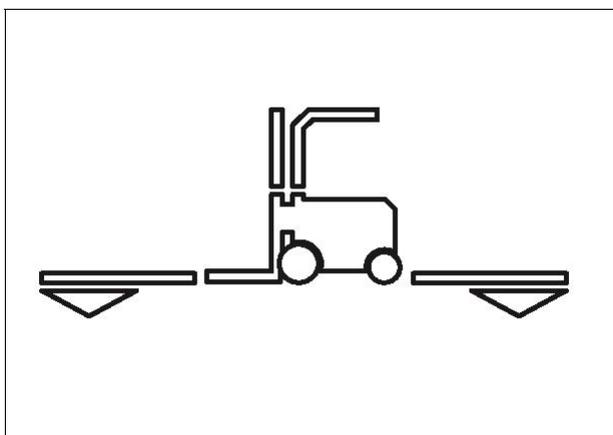
### 3. Safety regulations



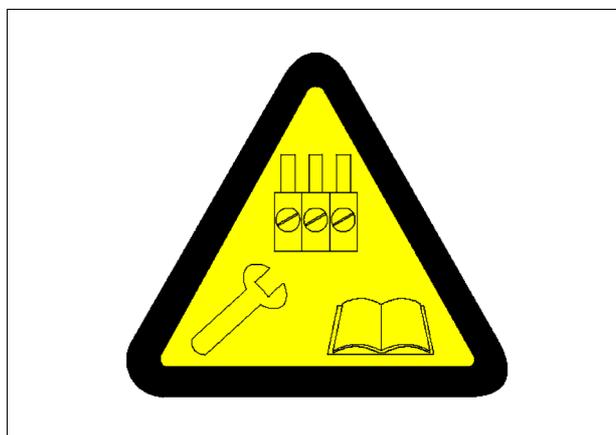
**Warning:** The system continues to run for 30 seconds after pressing the O-key



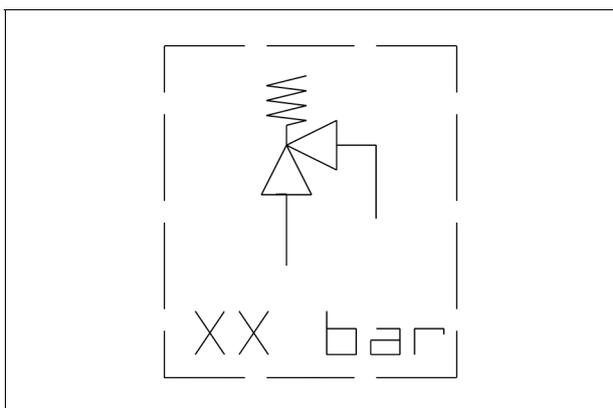
**Warning:** Danger of electric shock



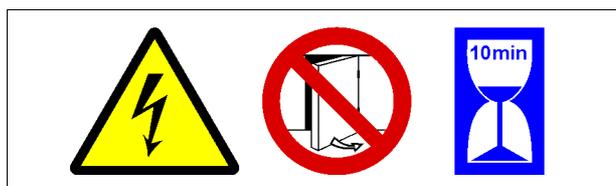
**Attention:** Lifting point



**Attention:** Check and, if required, re-tighten connection terminals. For further details, see the operating instructions.



**Attention:** Opening pressure safety valve = xx bar (value "xx" see sticker on compressor)

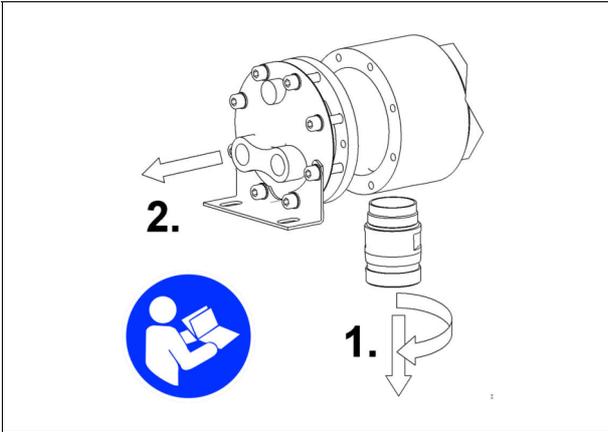


**Attention:** Danger of electric shock from loaded condensers! Please always first disconnect the system from the power supply and wait another 10 minutes before touching the electrical components. The power condensers require this time in order to discharge!

Check the DC bus voltage at the system terminal strip of the frequency converter by measuring this between the +DC and -DC terminals (the exact position can be found in the supplied operating manual of the frequency converter), between the +DC terminal and the chassis as well as between the -DC terminal and the chassis.

The voltage must read zero in the case of all three measurements.

### 3. Safety regulations



**Attention:** Before disassembling the tube bundle, the intake union must be disassembled!  
(Only for Lxx W – water-cooled units)

## 4. Design and functioning

### 4.1 Design of the unit

#### 4.1.1 Design of air-cooled units

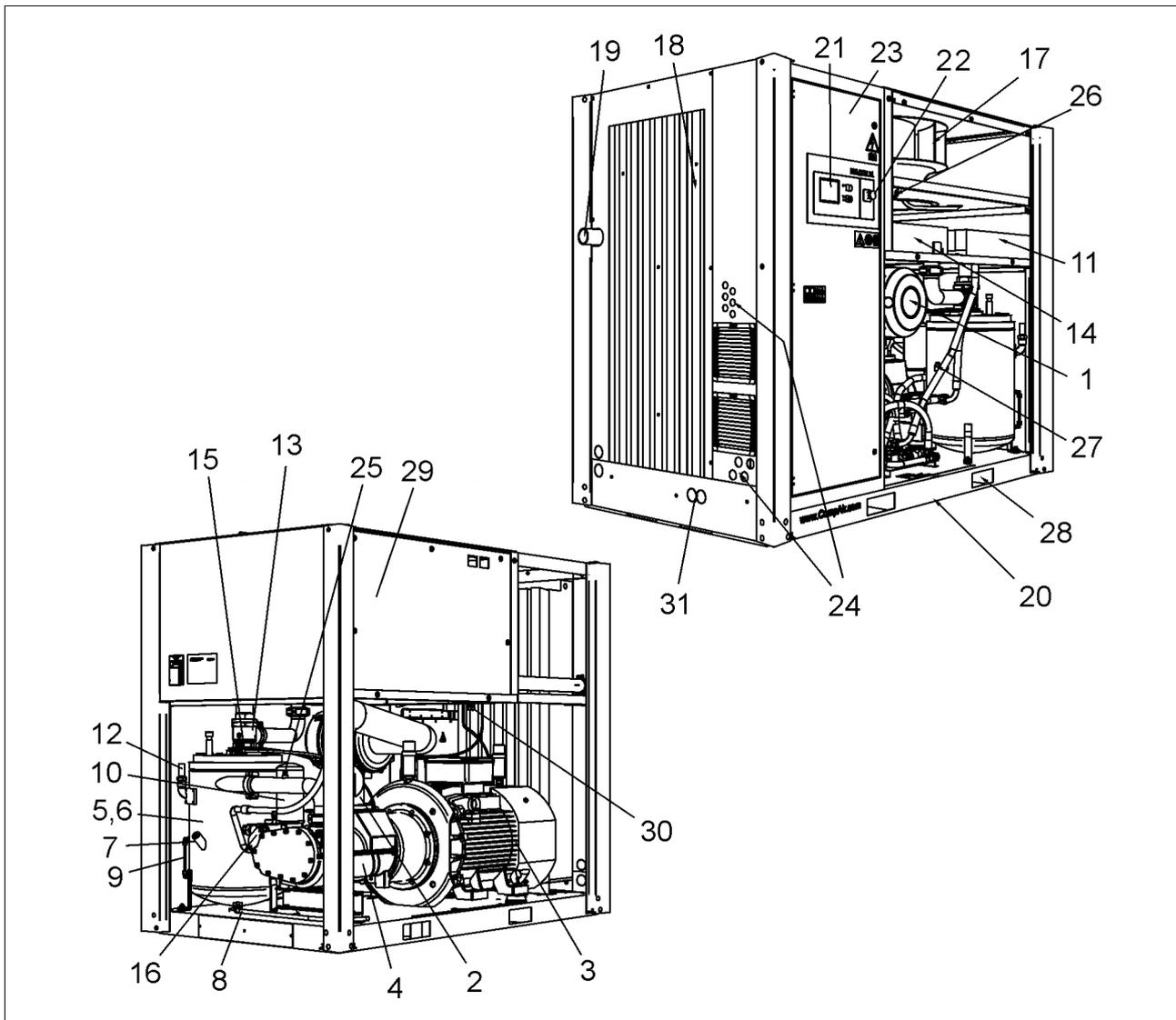


Fig. 2

- |                       |                                     |  |
|-----------------------|-------------------------------------|--|
| 1 Intake filter       | 13 Pressure holding and check valve | 25 Final compression temperature sensor  |
| 2 Intake regulator    | 14 Air cooler                       | 26 Network pressure sensor               |
| 3 Electric motor      | 15 Oil fine separator extractor     | 27 Final compression pressure sensor     |
| 4 Screw compressor    | 16 Oil temperature regulator        | 28 Opening for lifting gear              |
| 5 Pressure reservoir  | 17 Cooling air ventilator           | 29 Fan protection panel                  |
| 6 Oil fine separator  | 18 Cooling air inlet filter mat     | 30 Pressure relief for cooler            |
| 7 Oil filling port    | 19 Compressed air outlet            | 31 WRG heat-recovery connection (option) |
| 8 Oil drain           | 20 Base frame                       |  |
| 9 Oil level indicator | 21 Control keypad                   |  |
| 10 Oil filter         | 22 EMERGENCY OFF push-button        |  |
| 11 Oil cooler         | 23 Control cabinet                  |  |
| 12 Safety valve       | 24 Supply cable gland               |  |

## 4. Design and functioning

### 4.1.2 Design of water-cooled units

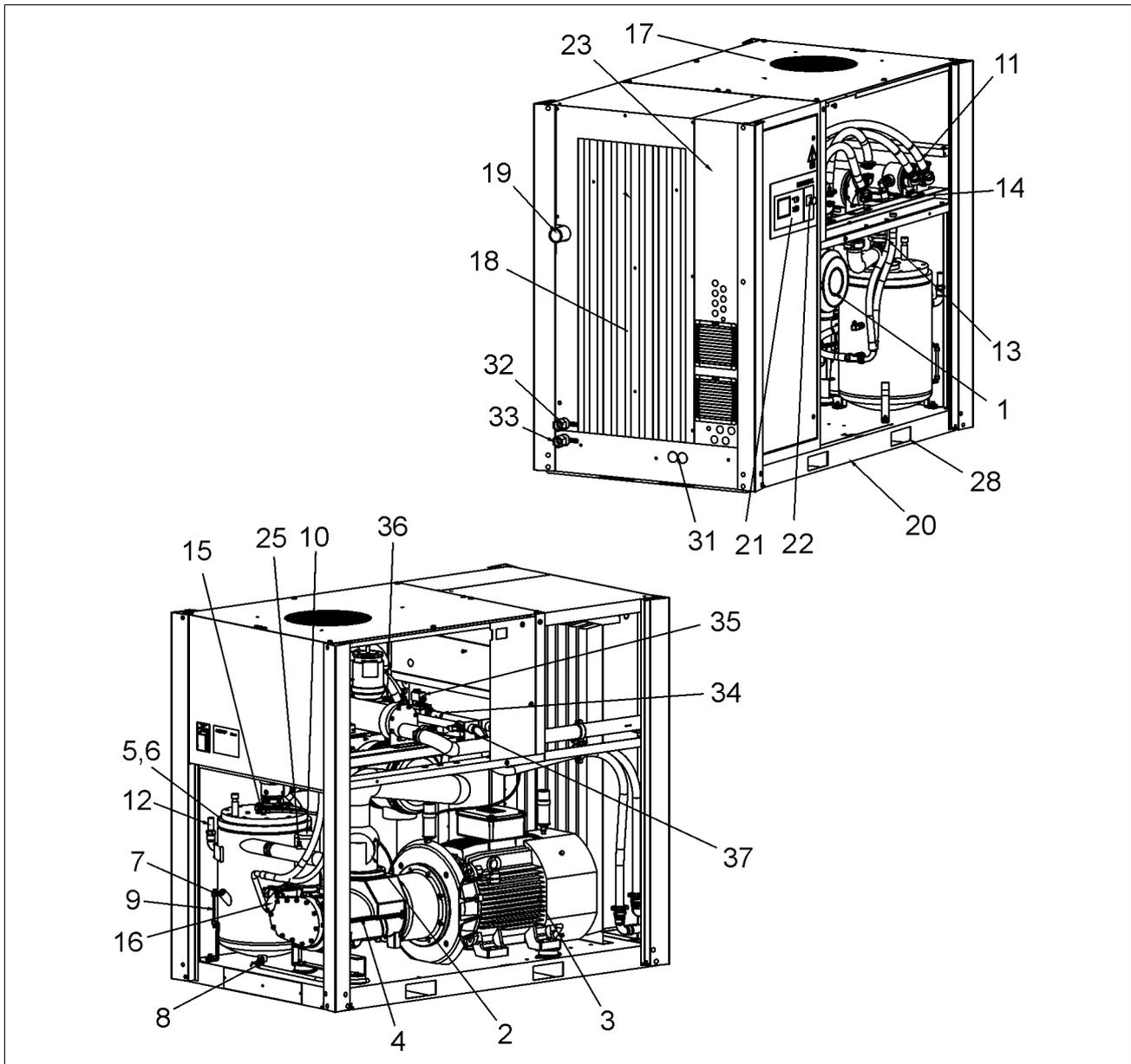


Fig. 3

- |                                     |   |   |
|-------------------------------------|---|---|
| 1 Intake filter                     | 15 Oil fine separator extractor         | 28 Opening for lifting gear                           |
| 2 Intake regulator                  | 16 Oil temperature regulator            | 29 Fan protection panel                               |
| 3 Electric motor                    | 17 Cooling air ventilator               | 30 Pressure relief for cooler                         |
| 4 Screw compressor                  | 18 Cooling air inlet filter mat         | 31 WRG heat-recovery connection (option)              |
| 5 Pressure reservoir                | 19 Compressed air outlet                | 32. Cooling water inlet (Lxx W only)                  |
| 6 Oil fine separator                | 20 Base frame                           | 33. Cooling water outlet (Lxx W only)                 |
| 7 Oil filling port                  | 21 Control keypad                       | 34. Dirt interceptor (Lxx W only)                     |
| 8 Oil drain                         | 22 EMERGENCY OFF push-button            | 35. Cooling-water solenoid valve (Lxx W only)         |
| 9 Oil level indicator               | 23 Control cabinet                      | 36. Regulating valve (Lxx W only)                     |
| 10 Oil filter                       | 24 Supply cable gland                   | 37. Monitoring cooling-water temperature (Lxx W only) |
| 11 Oil cooler                       | 25 Final compression temperature sensor |   |
| 12 Safety valve                     | 26 Network pressure sensor              |   |
| 13 Pressure holding and check valve | 27 Final compression pressure sensor    |   |
| 14 Air cooler                       |   |   |

## 4. Design and functioning

### 4.2 Schematic diagram

#### 4.2.1 Schematic diagram L90 - L132

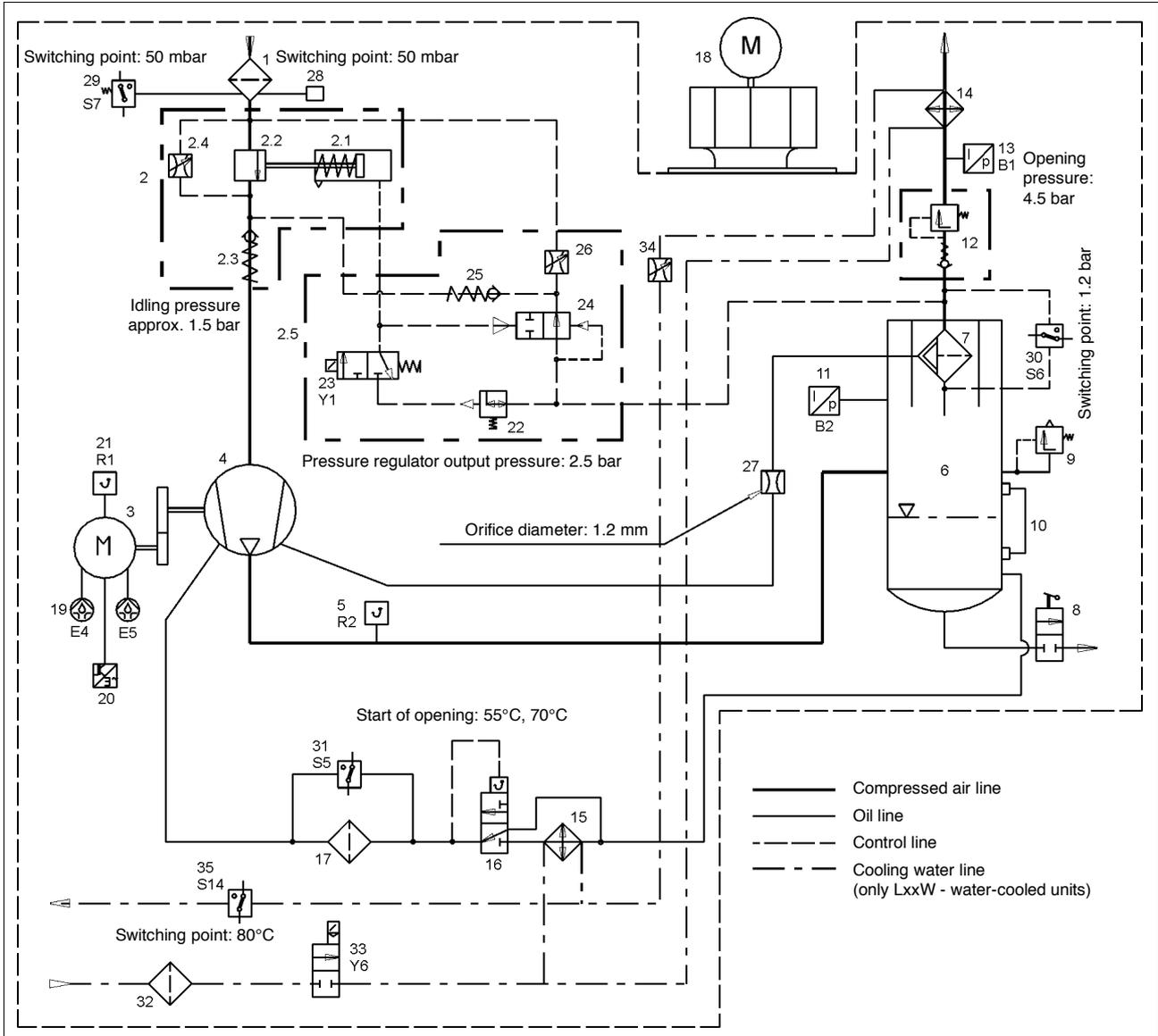


Fig. 4

- |   |   |  |
|---|---|--|
| 1 Intake filter                             | 11 Final compression pressure sensor            | 24 Blow-off valve  |
| 2 Intake regulator                          | 12 Pressure holding and check valve             | 25 Check valve   |
| 2.1 Actuator                                | 13 Network pressure sensor                      | 26 Choke valve, adjustable                                 |
| 2.2 Throttle valve                          | 14 Air cooler                                   | 27 Choke valve   |
| 2.3 Check valve                             | 15 Oil cooler                                   | 28 Intake monitor, visual                                  |
| 2.4 Choke valve, adjustable                 | 16 Oil temperature regulator                    | 29 Intake filter monitor (S7) *)                           |
| 2.5 Controller block                        | 17 Oil filter                                   | 30 Fine separator monitor (S6) *)                          |
| 3 Electric motor                            | 18 Cooling air ventilator                       | 31 Oil filter monitor (S5) *)                              |
| 4 Compressor block                          | 19 Motor lubrication system E4, E5              | 32 Dirt interceptor (Lxx W only)                           |
| 5 Final compression temperature sensor (R2) | 20 RS frequency converter (only L90RS - L132RS) | 33 Cooling-water solenoid valve (Y6) (Lxx W only)          |
| 6 Pressure reservoir                        | 21 Motor temperature (R1)                       | 34 Manual regulating valve (Lxx W only)                    |
| 7 Fine separator                            | 22 Pressure regulator                           | 35 Monitoring cooling-water temperature (S14) (Lxx W only) |
| 8 Oil drain                                 | 23 3/2-way solenoid valve (control valve) (Y1)  |  |
| 9 Safety valve                              |   |  |
| 10 Oil level indicator                      |   |  |
- \*) Option

## 4. Design and functioning

### 4.2.2 Schematic diagram L140

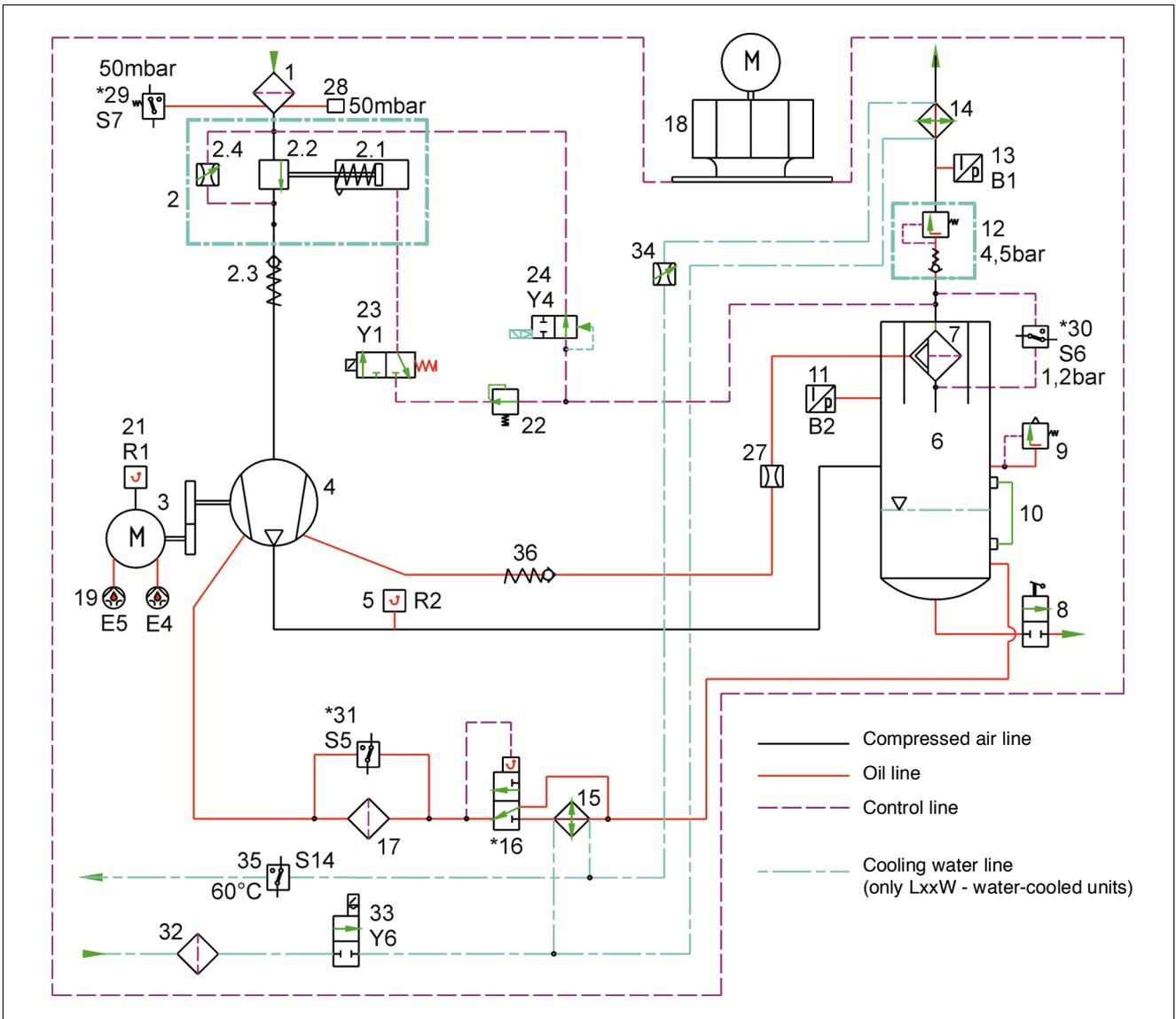


Fig. 5

- |   |  |  |
|---|--|--|
| 1 Intake filter                             | 11 Final compression pressure sensor           | 24 Blow-off valve  |
| 2 Intake regulator                          | 12 Pressure holding and check valve            | 27 Choke valve   |
| 2.1 Actuator                                | 13 Network pressure sensor                     | 28 Intake monitor, visual                                  |
| 2.2 Throttle valve                          | 14 Air cooler                                  | 29 Intake filter monitor (S7) *)                           |
| 2.3 Check valve                             | 15 Oil cooler                                  | 30 Fine separator monitor (S6) *)                          |
| 2.4 Choke valve, adjustable                 | 16 Oil temperature regulator                   | 31 Oil filter monitor (S5) *)                              |
| 3 Electric motor                            | 17 Oil filter                                  | 32 Dirt interceptor (Lxx W only)                           |
| 4 Compressor block                          | 18 Cooling air ventilator                      | 33 Cooling-water solenoid valve (Y6) (Lxx W only)          |
| 5 Final compression temperature sensor (R2) | 19 Motor lubrication system E4, E5             | 34 Manual regulating valve (Lxx W only)                    |
| 6 Pressure reservoir                        | 21 Motor temperature (R1)                      | 35 Monitoring cooling-water temperature (S14) (Lxx W only) |
| 7 Fine separator                            | 22 Pressure regulator                          |  |
| 8 Oil drain                                 | 23 3/2-way solenoid valve (control valve) (Y1) |  |
| 9 Safety valve                              |  |  |
| 10 Oil level indicator                      |  |  |
- \*) Option

## 4. Design and functioning

### 4.3 Oil circuit

The oil flows from the pressure reservoir (- 6 -) into the oil thermostat (- 16 -). With oil temperatures < 55 °C (131 °F) the oil flows via the by-pass of the oil cooler directly into the oil filter (- 17 -) and is then injected into the screw compressor (- 4 -).

With oil temperatures of between 55 °C (131 °F) and 70 °C (158 °F) the oil flow is divided and fed into the oil cooler (- 15 -) and the by-pass.

With oil temperatures above 70 °C (158 °F) the entire oil flow is directed via the oil cooler through the oil filter into the screw compressor.

The oil separated by the oil separator element (- 7 -) is fed through an oil scavage line to the screw compressor.

The entire oil circulation is based on a differential pressure in the system. Considering the pressure difference of approx. 2 bar (29 PSI) within the oil circuit, the oil is then injected into the screw compressor with approx. 8 bar (116 PSI) at a reservoir pressure of e.g. 10 bar (145 PSI).

When the screw compressor is in the off-load mode, a sufficiently high pressure differential and thus the required oil injection quantity is achieved owing to the fact that when the intake regulator (- 2 -) is closed, a vacuum pressure occurs in the intake connection and at the place of injection.

Excess pressure of approx. 1.5 bar (22 PSI) (off-load pressure) is produced in the pressure reservoir at the same time.

### 4.4 Air circuit

The intake air passes through the intake filter (- 1 -) and the intake regulator (- 2 -) into the screw compressor (- 4 -). During the compression process, the intake air is cooled via the injected oil. The developed air/oil mixture flows tangentially into the pressure reservoir (oil reservoir) (- 6 -). After pre-separation and subsequent fine separation by the separator element (- 7 -), the compressed air with a low oil content is fed via the minimum pressure valve (- 12 -) and the air cooler (- 14 -) into the consumer network.

### 4.5 System control

(See also operating instructions for the compressor control DELCOS XL)

#### Standstill of the system

- If the plant is shut down, the suction controller (- 2 -) is closed by a pressure spring at the adjusting cylinder (- 2.1 -).
- The solenoid valve (- 23 - (Y1)) is deenergised.
- The oil separator vessel is released via valve (- 24 -) to atmospheric pressure.
- The cooling water solenoid valve (-33-(Y6)) is closed in a deenergised state (only Lxx W – water-cooled units)

#### Starting the system

- The motor starts up in the Y-mode.
- The cooling water solenoid valve (-33-(Y6)) is supplied with power and opens (Lxx W only).
- The intake regulator is closed.
- The compressor aspirates a certain amount of air through an adjustable choke valve (bypass valve) (- 2.4 -). Pressure builds up in the pressure vessel.
- The oil supply of the screw compressor takes place through a drop in pressure between the pressure vessel and the injection spot in the screw compressor.
- If the drive motor is switched over to  $\Delta$  operation, the magnetic valve switches over (-23-(Y1) since it is supplied with current.
- The air circulated in the system streams over the solenoid valve (-23- (Y1)) in the upper control area of the operating cylinder (-2.1-). The blow off valve (-24-) is closed. The lower control space of the adjusting cylinder is ventilated.
- The choke valve (- 2.2 -) in the intake regulator (- 2 -) opens.
- At a reservoir pressure of approx. 4.5 bar (65 PSI) the pressure holding and check valve (- 12 -) opens.
- Compressed air is now delivered into the consumer network.
- The system is now in load running mode.

## 4. Design and functioning

### Stopping the system

- Solenoid valve (-23-(Y1)) is deenergised when the STOP button on the operating panel of the compressor control DELCOS XL is pressed.
- The upper control space of the adjusting cylinder (2.1) is ventilated by the solenoid valve (-23-(Y1)), the pressure spring in the adjusting cylinder causes the choke valve (-2.2-) in the intake regulator to close.
- After 30 seconds, the drive motor (- 3 -) and the cooling air ventilator motor (- 18 -) are shut down. The cooling water solenoid valve -28- deenergises and closes (Lxx W only).

### Automatic operation (open-close operation)

- When the pressure reaches the upper switching point set on the network pressure sensor (-13-(B1)), solenoid valve (- 23 - (Y1)) is deenergised.
- The upper control space of the adjusting cylinder (2.1) is ventilated by the solenoid valve (-23-(Y1)), the pressure spring in the adjusting cylinder causes the choke valve (-2.2-) in the intake regulator to close.
- The oil separator tank is relieved to no-load pressure (residual pressure) via the blow-off valve (- 24 -).
- The screw compressor is now running in the offload mode.
- The cooling air ventilator (- 18 -) is switched on or off in dependence upon the final compression temperature (only Lxx A - air-cooled units).
- The cooling water solenoid valve (-33-(Y6)) is opened and closed depending on the compression end temperature (only Lxx W – water-cooled units).
- When the pressure at the network pressure sensor (- 13 - (B1)) does not fall to the set lower switching point within the set motor run-on time (e.g. 120 seconds), the drive motor (- 3 -) and the cooling air ventilator motor (- 18 -) are shut down and the system is depressurised to atmospheric pressure. The cooling water solenoid valve -28- deenergises and closes (Lxx W only).
- The system is now in the “stand-by” mode and can restart at any time when the network pressure falls to the lower switching point (see section “Starting of the system”).
- When the pressure falls to the preset lower switching point before the set motor run-on time has elapsed, solenoid valve (- 23 - (Y1)) is energised again.
- The unit now changes over to on-load operation.

## 5. Transport and installation

### 5.1 Transport

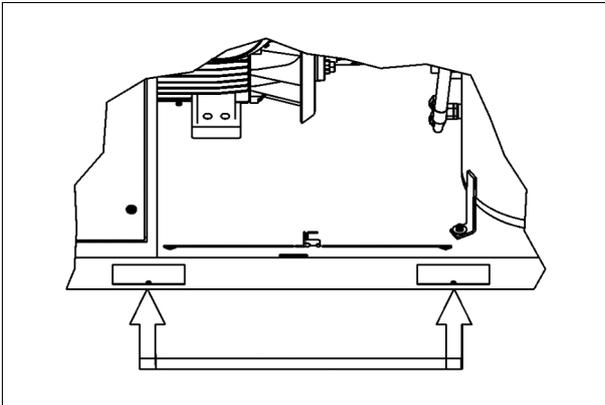


Fig. 6

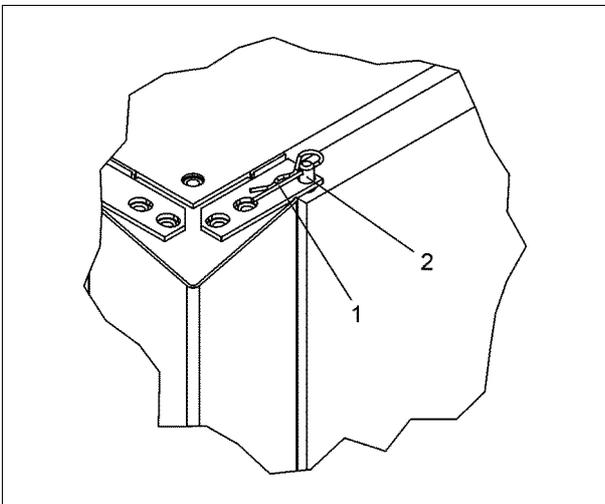


Fig. 7

- 1 Wire pin
- 2 Hinge pin

#### Note

The wire pins (-1- Fig. 7) and the doors must be removed prior to transportation.

#### Danger

The compressor must be lifted using a suitable forklift truck which complies with the local safety regulations.

The length of the forks must correspond at least to the width of the unit (see Chapter 11.2).

Before lifting, all loose or slewable parts of the machine have to be firmly secured.

It is strictly prohibited to work or stand in the danger zone of a lifted load.

The proper lifting of the load (according to the operating instructions of the load suspension device) has to be ensured.

#### Important

Never lift or lash the compressor and its hood via the enclosure. The screw compressor is lifted with the help of a fork lift truck (Fig. 6). The separation of the forks and their length must be taken into account for transportation.

Only use the identified lifting points. Do not slide the unit when it is standing on the floor.

#### Weights

The values listed below are approximate values, they refer to a screw compressor unit including oil fill:

Air-cooled unit	50 Hz	60 Hz
L90 A	2513 kg	2518 kg (5551 lbs)
L110 A	2614 kg	2658 kg (5860 lbs)
L132 A	2778 kg	2778 kg (6124 lbs)
L140 A	3254 kg	3254 kg (7174 lbs)
L90RS A	2768 kg	2768 kg (5514 lbs)
L110RS A	2786 kg	2786 kg (6768 lbs)
L132RS A	2786 kg	2786 kg (6142 lbs)
Water-cooled unit	50 Hz	60 Hz
L90 W	2377 kg	2382 kg (5251 lbs)
L110 W	2478 kg	2483 kg (5474 lbs)
L132 W	2599 kg	2602 kg (5736 lbs)
L140 W	3075 kg	3078 kg (6786 lbs)
L90RS W	2327 kg	2327 kg (5130 lbs)
L110RS W	2361 kg	2361 kg (5205 lbs)
L132RS W	2361 kg	2361 kg (5205 lbs)

## 5. Transport and installation

### 5.2 Installation

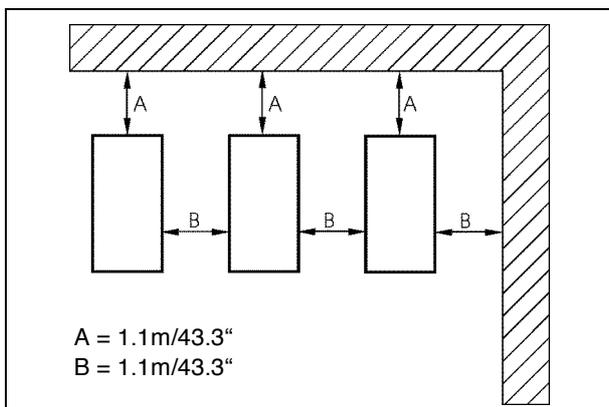


Fig. 8

#### Warning

**Pipes and/or other parts with a surface temperature higher than 70 °C (158 °F) have to be suitably identified and secured against touching.**

**See also the safety regulations in chapter 3 of the operating instructions.**

#### Important

**The weight carrying capacity of the foundation has to be taken into account when installing the compressor.**

**Provide for a solid and plane base.**

**The system may not be operated on the transport pallet.**

**The intakes are to be located so that no hazardous constituent (solvent vapour, etc., but also dusts and other hazardous material) can be sucked in. This applies also to flying sparks.**

**The operator has to provide adequate ventilation for the compressor station.**

The screw compressor unit has to be levelled. A minimum distance from walls, other machines, etc. should be maintained so that there is sufficient clearance for maintenance and repair work (Fig. 8).

During operation of the screw compressor unit, heat is generated by the electric motor and the compression process. The screw compressor radiates a part of this heat into the surroundings.

Proper ventilation has a considerable effect on the service life and the performance of a compressor.

Once the compressor has been installed, the wire pins (-1- Fig. 7) can be removed from the hinge pins (-2- Fig. 7). The wire pins (-1- Fig. 7) prevent the doors from falling off in the case of transportation from the manufacturer's site.

## 6. Preparations for commissioning

### 6.1 Cooling air volume/minimum cross

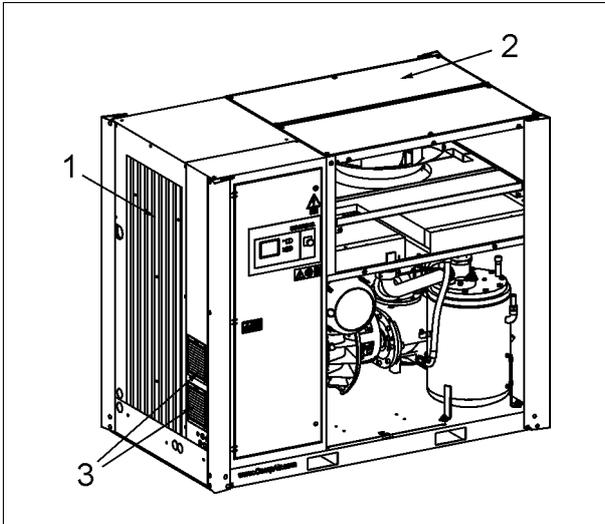


Fig. 9

- 1 Cooling air intake
- 2 Cooling air outlet
- 3 Control cabinet cooling-air inlet  
(L90RS - L132RS only)

The cooling air volume required by these screw compressors is as follows:

	50 Hz	60 Hz
L90 A	223m <sup>3</sup> /min	197m <sup>3</sup> /min (6957 cfm)
L110 A/L110RS A	227m <sup>3</sup> /min	248m <sup>3</sup> /min (8758 cfm)
L110 A/L90RS A	223m <sup>3</sup> /min	197m <sup>3</sup> /min (6957 cfm)
L132 A/L132RS A	273m <sup>3</sup> /min	248m <sup>3</sup> /min (8758 cfm)
L140 A	273m <sup>3</sup> /min	248m <sup>3</sup> /min (8758 cfm)
L90 - L132 W/ L90RS - L132RS W	100m <sup>3</sup> /min	100m <sup>3</sup> /min (3531 cfm)

Under unfavourable local conditions, we recommend the installation of venting ducts. However, the velocity of the cooling air should not exceed 5 m/s (17 ft/sec). We recommend a minimum duct cross-section of approx. 0.91 m<sup>2</sup>.

#### Important

The stated minimum cross-section refers to a maximum duct length of 5 m (16.4 ft) and a maximum of one bend. In the event of differing values (over 5 m (16.4 ft), more than one bend, filter cartridges, screens, etc.), please contact your technical adviser.

CompAir screw compressors are rated for ambient temperatures and cooling temperatures of +1°C (33.8 °F) to +45°C (113 °F). In the case of temperatures other than the above limiting values, please consult your technical adviser.

#### Note

In order to ensure a good heat dissipation, auxiliary fans should be rated to process approximately 15 to 20% more air volume than the total cooling air quantity required by the compressors installed in the compressed air station.

The figures below show the recommended ventilation sections arrangement:

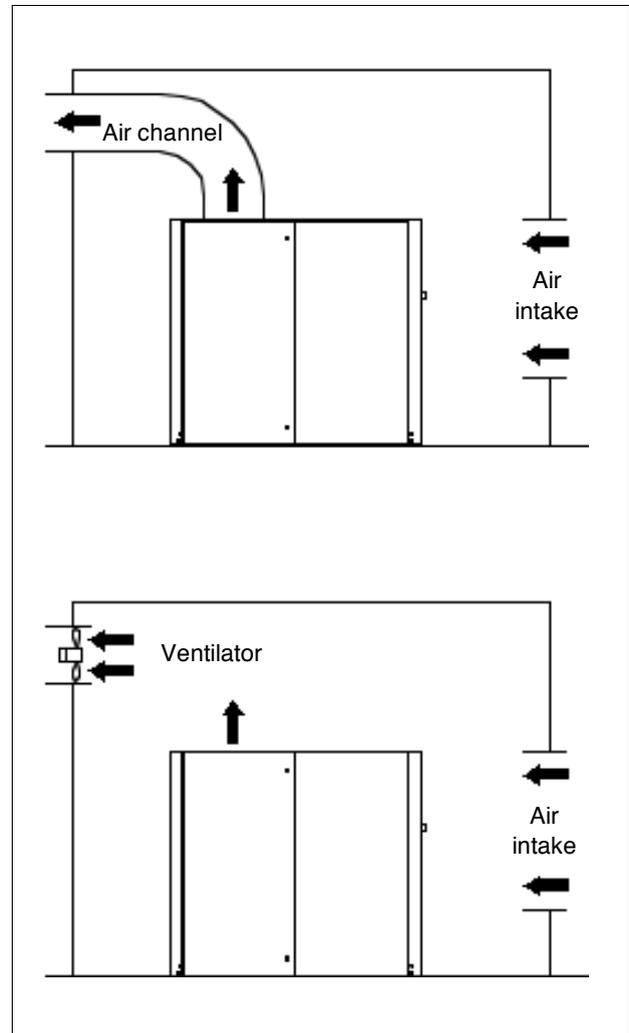


Fig. 9 a

## 6. Preparations for commissioning

### 6.2 Compressed air connection

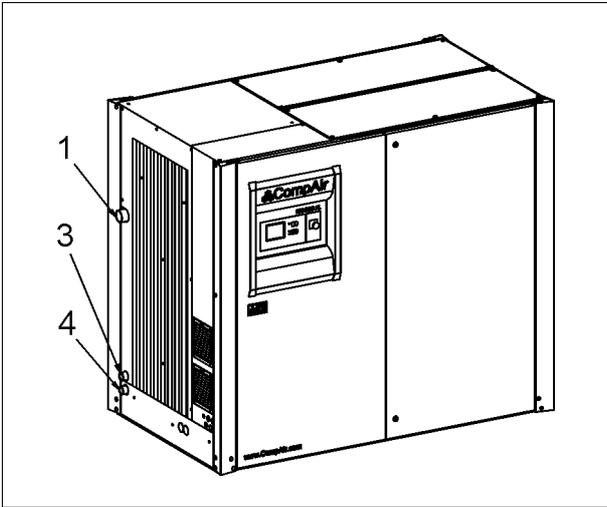


Fig. 10

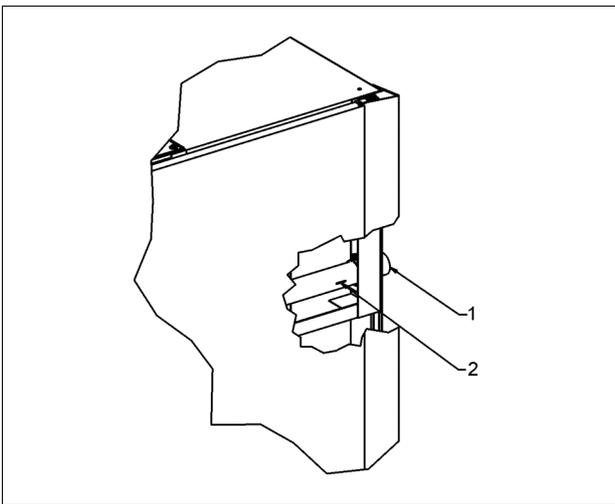


Fig. 11

- 1 Compressed air connection
- 2 Thread identification compressed air connection
- 3 Cooling water inlet
- 4 Cooling water outlet

The compressed air line system is connected at the compressed air supply of the screw compressor (- 1 - Fig. 10).

For this you should use a flexible connection (e.g. compressed air hose, compensator).

Europe-Version: EN10226 R 2 1/2  
(DIN 2999 – R 2 1/2)

USA / CANADA-Version: 2 1/2" – 8 NPT

### Warning

When connecting the compressor on the mains side to the compressed air system available at the customer's end, check the operating temperatures and operating pressures required and examine the required connecting flange or the connection thread for proper type, size and functioning.

In the case of connections by means of connecting hoses, take appropriate measures to prevent whipping of the loose end in the event that the hose connection tears off (see Fig. 11).

### 6.3 Cooling water connection (only Lxx W – water-cooled units)

#### Warning

If open cooling towers are used in the cooling water circuit, it is possible for legionella (*Legionella pneumophila*) and other bacteria to grow and spread. The growth and spread of bacteria must be prevented by corresponding service and water treatment methods.

#### Important

During danger of frost or extended periods of standstill of the screw compressor unit, the cooling water must be drained.

Maintenance and repair work must be carried out carefully.

Dismantled bundles of pipes have to be checked for integrity before being reinstalled. In the case of even the slightest damage, replace the pipe bundle. Always use new seals when carrying out assembly work.

#### Note

When operating water-cooled screw compressor units, the following must be taken into account:

- As a result of leakage in oil/water coolers, some oil may get into the cooling water circuit.
- Cooling water must not be drained in an uncontrolled manner into public sewage systems. Uncontrolled overflowing of the oil separation reservoir into public sewage systems must be ruled out.

Strictly observe the relevant waste water regulations.

## 6. Preparations for commissioning

The cooling water circuit in the screw compressor unit is completely assembled.

For water connections see Fig. 10.

### Water inlet and water outlet:

EUROPE version: EN 10226-1 Rp 1 1/4  
USA / CANADA version: 1 1/4 – 11 1/2 NPT

### Permissible cooling water data:

Maximum cooling water pressure 10 bar  
Minimum cooling water inlet temp. 5 °C (41 °F)  
Maximum cooling water inlet temp. 35 °C (95 °F)  
Maximum cooling water outlet temp. 55 °C (131 °F)

### Cooling water requirement at max. operating pressure:

L90 W 90 l/min (@ ΔT=17K, Δp = 0.8 bar)  
24 gal/min (@ ΔT=31 °F, Δp = 12 psi)  
L90RS W 125 l/min (@ ΔT=14K, Δp = 1.4 bar)  
33 gal/min (@ ΔT=25 °F, Δp = 21 psi)  
L110(RS) W 125 l/min (@ ΔT=14K, Δp = 1.4 bar)  
33 gal/min (@ ΔT=25 °F, Δp = 21 psi)  
L132(RS) W 170 l/min (@ ΔT=12K, Δp = 2.1 bar)  
45 gal/min (@ ΔT=22 °F, Δp = 31 psi)  
L140 W 170 l/min (@ ΔT=12K, Δp = 2.1 bar)  
45 gal/min (@ ΔT=22 °F, Δp = 31 psi)

### ΔT:

Cooling water outlet temperature =  
cooling water inlet temperature + ΔT

### Δp:

Cooling water outlet pressure =  
cooling water inlet pressure + Δp

The values refer to fresh water quality without additives (e.g. anti-freeze). Should the cooling water data differ, please consult CompAir.

Adjust the cooling water flow for the air cooler during commissioning using a manual regulating valve.

Compressed air outlet temperature = cooling water inlet temperature + (7 to 9 °C) (13 to 16 °F).

### Note

If possible, the cooling water outlet temperature should be lower than 50 °C to avoid an increased precipitation of lime.

### 6.3.1 Limit values of the constituent elements in water

#### Note

The information set out below is intended for guidance and may differ under certain conditions of operation. The total composition and the operating temperature are always decisive. Warranty claims may not be derived from this..

Constituent elements of water / characteristic values		Circulating water	Pass-through water
pH value (at 25 °C / 77 °C)		6 – 9	6 – 9
Carbonate hardness	CaCO <sub>3</sub>	< 100 mg/l (5.6 °dH)	< 50 mg/l (2.8 °dH)
Total hardness		< 2 mmol/l < 200 ppm < 11.5 °dH < 20 °FH	< 0.5 mmol/l < 50 ppm < 2.8 °dH < 5 °FH
Chloride	Cl <sup>-</sup>	< 200 mg/l	< 50 mg/l
Sulphate	SO <sub>4</sub> <sup>2-</sup>	< 200 mg/l	< 50 mg/l
Nitrate	NO <sub>3</sub> <sup>-</sup>	< 100 mg/l	< 100 mg/l
Organic substances (KMnO <sub>4</sub> absorption)		< 25 mg/l	< 10 mg/l
free aggressive carbonic acid	CO <sub>2</sub>	< 20 mg/l	< 20 mg/l
Silicium oxide	SiO <sub>2</sub>	< 10 mg/l	< 10 mg/l
free chloride	Cl <sub>2</sub>	< 4 mg/l	< 2 mg/l
Oxygen	O <sub>2</sub>	< 2 mg/l	< 2 mg/l
Ammonium	NH <sub>4</sub> <sup>+</sup>	< 1mg/l	< 1mg/l
Iron	Fe	< 0.2 mg/l	< 0.2 mg/l
Manganese	Mn	<0.1 mg/l	<0.1 mg/l
Sulphide	S <sup>2-</sup>	0	0
Ammoniac	NH <sub>3</sub>	0	0
Conductivity		> 50. < 800 μS/cm	> 50. < 200 μS/cm

## 6. Preparations for commissioning

### 6.4 Electrical connection (EUROPE- Version only)

Compressor units are finished in the factory according to standard EN60204 (industrial machinery). Please observe the following important notes:

#### Warning

The power supply to the compressor side has to be fitted for industrial equipment and fulfilling the requirements of EN60204-1/IEC60204-1. To avoid strong damages and fire on the power electric components, any kind of operation outside of the stated limits of EN60204-1/IEC60204-1 is inadmissible.

#### Important

The customer has to connect a main switch in the incoming line of the compressor unit (unless factory-mounted as special accessories) (DIN EN 1012 - 1).

If this switch does not provide short-circuit and overload protection for the system, suitable back-up fuses have to be installed according to EN 60269-1 (low voltage directive ) (see table).

The main switch must meet the requirements of the safety standard EN 60 204-1 (electrical equipment of machinery) as well as of EN 60947-2 (low-voltage switchgear and control gear (circuit-breakers)).

The electrical connection and protective measures have to be installed in accordance with VDE, BS or local regulations. As a rule, additional instructions of the relevant power supplier have also to be adhered to.

The electrical connections must be made by an authorized specialist.

**Attention: Interference voltage!**

If external electric circuits, which cannot be cut out via the main switch, are connected to the control, these have to be identified according to EN60204. Warning signs have to be fixed near the main switch and near these electric circuits. In addition, these conductors have to be laid separately and/or identified by colors. Work on control cabinets may only be carried out by electrotechnical specialists. If the installation conditions of the system differ from the conditions described in EN60204, please contact your technical adviser.

To establish an electrical connection, proceed as follows:

Route the supply cable through the cable gland (-1 - Fig. 12) on the control cabinet and tighten screws.

Connect the supply line to the connecting terminals as shown in the circuit diagram.

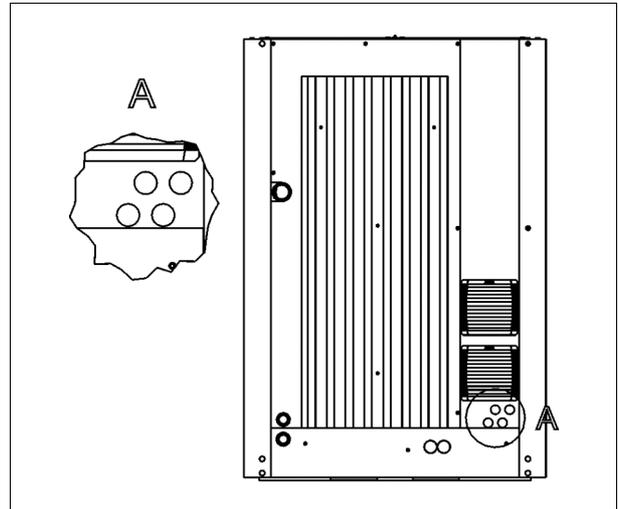


Fig. 12

#### Important

If local regulations are stricter than the values specified below, observe the stricter regulations.

## 6. Preparations for commissioning

### Recommended supply cable cross-sections and fuses

Compressor type	Supply voltage [V]	Installed nominal motor power [kW]	Fuse protection (slow-blow fuse) [AgL]	Line cross section at 30°C [mm <sup>2</sup> ]
<b>50-Hz-Compressors</b>				
L90	220V 380V 400V	90	2x3x250 250 200	2x3x95PE50 3x95PE50 3x70PE35
L110	220V 380V 400V	110	2x3x315 250 250	2x3x150PE70 3x95PE50 3x95PE50
L132 - 140	220V 380V 400V	132	2x3x315 2x3x200 2x3x200	2x3x150PE70 2x3x70PE35 2x3x70PE35
L90RS	380V 400V	90	250 250	3x95PE50 3x95PE50
L110RS	380V 400V	110	250 250	3x95PE50 3x95PE50
L132RS	380V 400V	132	300 300	3x150PE95 3x150PE95
<b>60-Hz-Compressors</b>				
L90	230V 380V 460V	90	2x3x250 250 200	2x3x95PE50 3x95PE50 3x70PE35
L110	230V 380V 460V	110	2x3x315 2x3x160 250	2x3x150PE70 2x3x70PE35 3x95PE50
L132 - 140	230V 380V 460V	132	2x3x315 2x3x200 2x3x160	2x3x150PE70 2x3x70PE35 2x3x70PE35
L90RS	380V 460V	90	250 200	3x95PE50 3x70PE35
L110RS	380V 460V	110	250 224	3x95PE50 3x95PE50
L132RS	380V 460V	132	300 250	3x150PE95 3x95PE50

Notes on the table:

We do not know the cable type used by you, its length and the installation conditions (temperatures, grouping). The table above can therefore only be regarded as a guideline.

The supply cable cross-sections given in the table comply with VDE 0298, part 4 - table 13, column 7. (Rubber hose line at 30 °C (86 °F) and max. line length of 50 m). In the case of differing conditions (line length, temperature and grouping), establish the cross sections in accordance with DIN VDE 0298, part 4 or BS7671 taking into account the cable type.

#### 6.4.1 Check setting of the fan protection switch (L90RS-L132RS only)

Check the setting of the motor protection switch in accordance with the enclosed circuit diagram for the compressor.

Set the protection switch to the value stated in the table corresponding to the mains voltage and frequency (see circuit diagram).

## 6. Preparations for commissioning

### 6.4.2 Checking the control transformer setting

#### Warning

##### **Danger of electric shock!**

**When carrying out adjustment work on the control power transformer, the unit must be electrically isolated and locked off.**

**Work on the control cabinet may only be carried out by electrotechnical specialist personnel.**

**Only L90RS-L132RS: Danger of electric shock from loaded condensers!**

**Please always first disconnect the system from the power supply and wait another 10 minutes before touching the electrical components. The power condensers require this time in order to discharge!**

#### **Important**

**Making incorrect settings to the control transformer poses a risk to the trouble-free operating of the system.**

**In the case of an ungrounded 3-phase power supply (IT-Net), please note the relevant instructions in the documentation of the inverter supplied with the drive.**

**If a Residual Current Detector (RCD) is used as a system ground fault monitor, only Type B (value and delay adjustable) devices should be used to avoid nuisance tripping.**

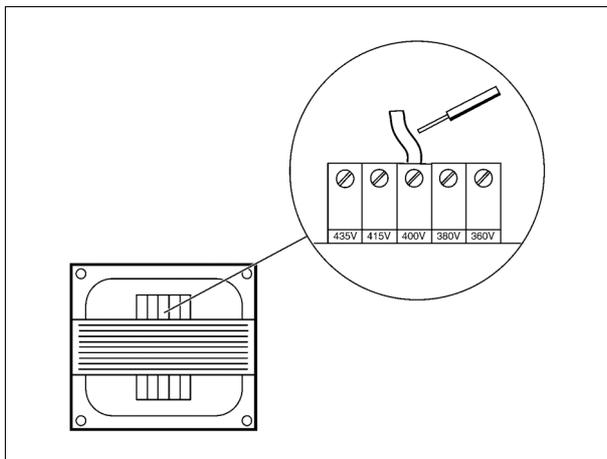


Fig. 13

The control transformer is preset for the rated voltage at the factory. Experience shows that in practice the actual supply voltage can differ.

Before first commissioning set the measured supply voltage on the control transformer. Fig. 13 shows an example.

Following first commissioning the setting of the control transformer must be inspected while operating under load and corrected where necessary (see section 9.9).

## 6. Preparations for commissioning

### 6.5 Oil level check

#### Warning

**Only check the oil level when the screw compressor unit is out of operation and depressurized!**

**The pressure reservoir can be under pressure and the oil hot. Warning: Danger of scalding!**

#### Important

**Do not spill oil! Check for leakage!**

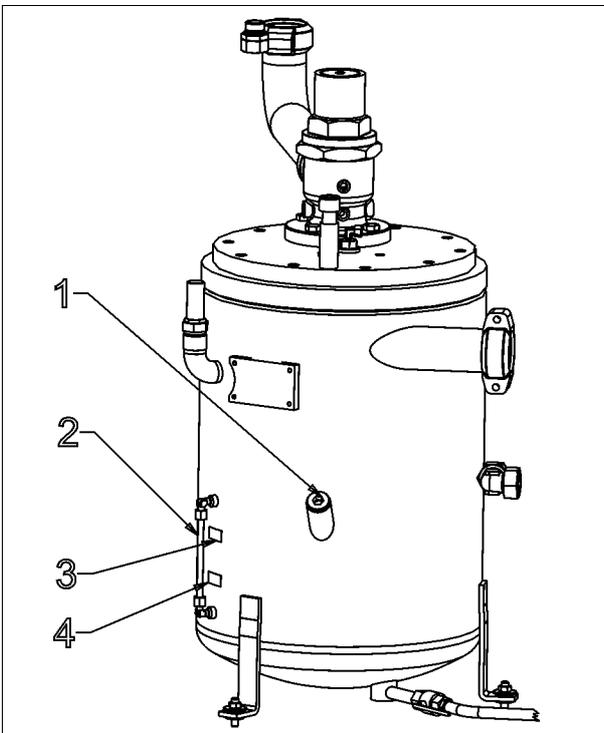


Fig. 14

- 1 Oil filler cap R1"
- 2 Oil-level indicator
- 3 Maximum oil level
- 4 Minimum oil level

#### Important

**Do not mix oils of different specifications.**

**Machines which are delivered without oil must first be filled to the max. mark in the pressure reservoir sight glass (see also chapters 9.4 and 9.15)**

**Check the oil level as follows:**

- Stop the compressor, with the stop button.
- Wait at least 5 minutes for the oil to settle and for the air to disperse
- The oil level is checked with the help of the transparent plastic tube at the pressure reservoir (- 2 - Fig. 14) after every stop and at regular intervals. If required, top up oil
- The oil level must be between the maximum level (- 3 - Fig. 14) and minimum level (- 4 - Fig. 14) marked on the oil reservoir.

Also see chapter 9 "Service and maintenance"

### 6.6 Sound pressure level

Sound pressure level measured in dB(A) according to ISO 2151 under full load at a distance of 1 m (tolerance:  $\pm 3$  dB(A)):

50-Hz-compressors	dB(A)
L90	73
L110	75
L132	76
L140	73
L90RS	74
L110RS	76
L132RS	77

60-Hz-compressors	dB(A)
L90	75
L110	77
L132	78
L140	76
L90RS	75
L110RS	77
L132RS	78

Subject to technical revision.

## 7. Commissioning

### 7.1 First commissioning

#### Warning

**Make sure before commissioning that nobody is in the danger zone of the screw compressor.**

#### Important

**Only operate the screw compressor with closed access panels.**

#### Important

**Although every CompAir screw compressor has been subjected to a test run at the factory and has again been thoroughly inspected before shipment, damage during shipment cannot be excluded. For this reason, every screw compressor should be checked once again for damage before being commissioned. In addition, it should be observed during the first operating hours.**

**If the screw compressor is newly connected to a power supply, check the direction of rotation of the drive motor!**

The screw compressor unit is completely factory-assembled. It can be directly connected to the compressed air mains by means of a flexible connection.

**First commissioning is carried out as follows:**

- Remove transport guards, if fitted.
- Fill oil in the pressure vessel up to "maximum oil level" mark. (This applies to compressor systems which are delivered without having been filled with oil). (Refer to Chapter 9.4 and 9.15 for information on filling oil).
- Check the oil level in the pressure reservoir (see also chapter 6.5). (Fig. 14)
- Check settings of the fan motor protection switch (L90RS - L132RS only) (see also chapter 6.4.1)
- Check the setting of the control-power transformer (see also chapter 6.4.2).
- Check and re-tighten all connecting terminals of the electrical control.
- Open isolator valves between the screw compressor, reservoir and pipe.
- Ensure cooling water supply in accordance with Chapter 6.3. (only Lxx W – water-cooled units).
- Operate main power supply switch.

- After the power supply was switched on, all LEDs on the compressor control DELCOS XL light up for a display test. The fault shown on the display [power supply fault] must be acknowledged in the fault memory menu item prior to starting the unit. (The display language can be set in the start screen using the "globe icon".)
- The factory setting of the setpoint value for the network pressure (upper and lower switching point) is saved in the compressor control DELCOS XL and depends on the relevant pressure variant of the compressor (see nameplate fig. 1, stage pressures = maximum operating pressure). These settings can be checked or changed in the compressor control DELCOS XL menu [Settings; Pressure range, p1] (further information can be found in section 5 of the compressor control DELCOS XL operating manual).
- Only L90-L140: Temporarily remove the panel in order to check the direction of rotation. See (-1- Fig. 15) for the prescribed direction of rotation of the drive motor of the geared compressor. See (-1 Fig. 15 a) for the prescribed direction of rotation of the drive motor with direct drive. For the prescribed direction of rotation of the fan, see direction of rotation arrow on the fan (-3- Fig. 15 b and c).

#### Important

**With a wrong direction of rotation, shut down the unit immediately by pressing the emergency STOP button (-7- Fig. 16) (not the [O]), otherwise the compressor may be seriously damaged, even during short periods of operation.**

**The access panels may temporarily be opened for checking the direction of rotation (wear ear protectors).**

#### Warning

**Beware of rotating parts! Rotating parts can lead to injuries. Stay at a safe distance away from rotating machine parts!**

- Press the START button [ I ] (- 2 - Fig. 16) and **immediately** check the direction of rotation. With a wrong direction of rotation, **immediately press the emergency STOP button** (-7- Fig. 16) and correct the direction of rotation.
- Next check the control transformer output voltages while operating under load (see section 9.9).

#### Note

*For switching the compressor off "normally", use only the stop push-button (- 3 - Fig. 16), but not the EMERGENCY STOP push-button (- 7 - Fig. 16). After shutdown the compressor has a run on time of 30-50 seconds (soft-stop).*

## 7. Commissioning

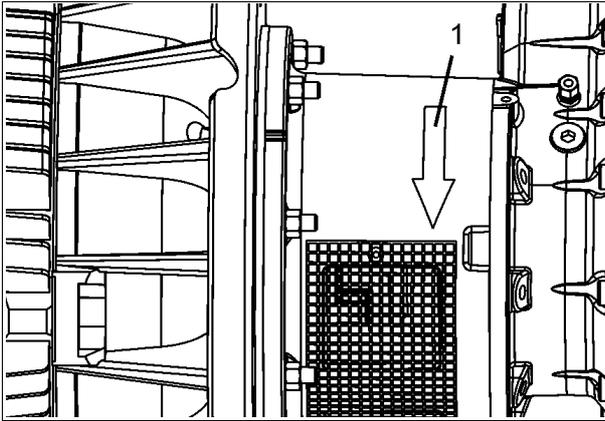


Fig. 15

- 1 Drive motor's direction of rotation for geared compressor

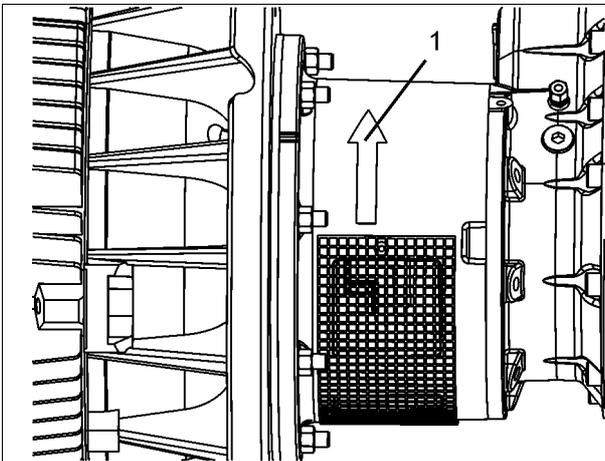


Fig. 15 a

- 1 Drive motor's direction of rotation in the case of direct drive

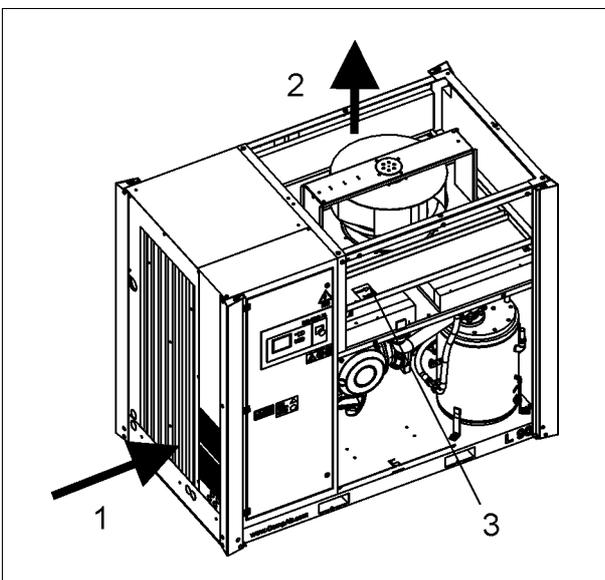


Fig. 15 b – Air-cooled units

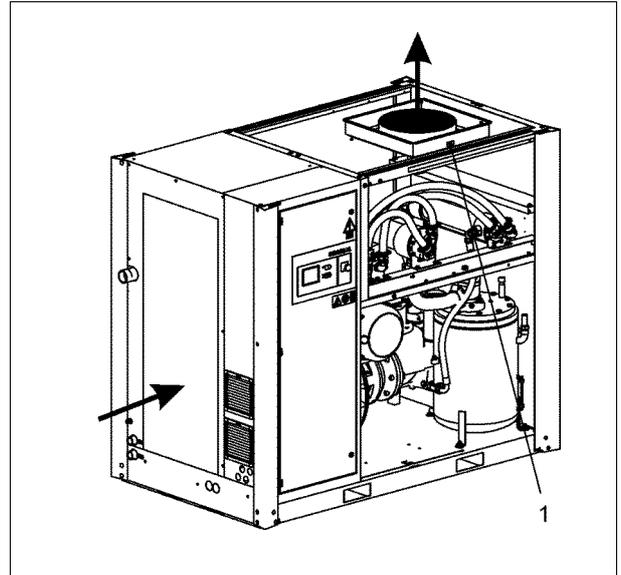


Fig. 15 c – Water-cooled units

- 1 Arrow "direction of rotation for compressor" (direction of rotation may deviate from this representation)

### Temperature start-up protection

The screw compressor unit will not start up if the ambient temperature is lower than + 1 °C (33.8 °F).

## 7.2 Putting a decommissioned compressor back into operation

Before commissioning the compressor all the electrical and electronic components and units should be checked for the ingress of water or condensation

If the electronic control system was removed during shut down, it must be re-installed.

Then proceed as described in chapter 7.1 'First commissioning'.

### Note

*For L90RS-L132RS only: If the compressor has been in storage for a substantial period of time (up to 2 years), the main switch must be switched on (ON) for at least one (1) hour prior to it being started. This ensures the operability of the capacitors and prevents any damage from occurring.*

*If the compressor has been in storage for longer than 2 years, please contact an authorised CompAir dealer prior to start-up.*

## 7. Commissioning

### 7.3 Display of the compressor control DELCOS XL

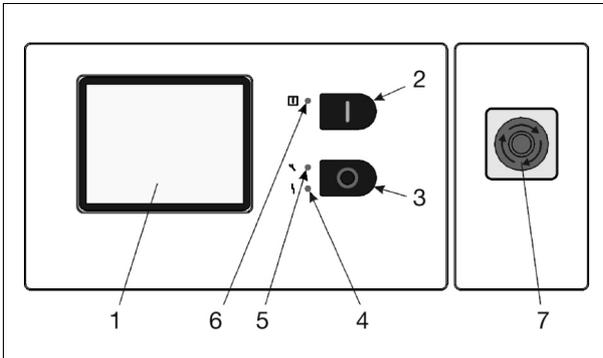


Fig. 16

1. Touchscreen Display
2. Start push-button [ I ]
3. Stop push-button [ O ]
4. red LED   Flashing slowly = Warning  
              Flashing rapidly = fault
5. yellow LED   Flashing slowly = Maintenance required
6. green LED   Lit up permanently = Unit in operation  
              Flashing slowly = Unit in standby mode
7. Emergency stop

#### **Warning**

**The compressor can be automatically started at any time when it is in standby mode, i.e. the green LED is flashing.**

### 7.4 Routine commissioning

#### **Warning**

**Make sure before commissioning that nobody is in the danger zone of the motor/screw compressor.**

**After completion of work: Verify that all safety devices have been refitted and that all tools have been removed.**

**Only operate the screw compressor unit with closed access panels.**

**For routine commissioning, proceed as follows:**

- Check oil level in the pressure reservoir (see also chapter 6.5).
- Open shut-off valves between the screw compressor, reservoir and pipe.
- Ensure cooling water supply in accordance with Chapter 6.3. (only Lxx W – water-cooled units).
- Switch on the power supply master switch.
- After the power supply was switched on, all LEDs on the compressor control DELCOS XL light up for a display test. The fault shown on the display [power supply fault] must be acknowledged in the fault memory menu item prior to starting the unit. (The display language can be set in the start screen using the "globe icon".)
- After the acknowledgement, the message [READY TO START] appears on the display, unless another fault is present.
- Press START button [ I ] (- 2 - Fig. 16).
- To switch off the compressor in the usual way use the STOP button (- 3- Fig. 16) and not the emergency STOP button (-7- Fig. 16). After shutdown the compressor has a run on time of 30-50 seconds (soft-stop). The time remaining is counted down on the display.

#### **Start-up protection of the electric motor**

The screw compressor unit will not start up if the final compression pressure is more than

0.8 bar (11.6 PSI) for L90-L140 or  
2.0 bar (29 PSI) for L90RS-L132RS.

#### **Temperature start-up protection**

The screw compressor unit will not start up if the ambient temperature is lower than + 1 °C (33.8 °F).

## 7. Commissioning

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### 7.5 Commissioning after malfunction

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#### **Important**

**Do not switch the screw compressor on repeatedly without having rectified the malfunction, since this may cause considerable damage to the machine.**

**Re-start after an automatic shutdown due to a malfunction as follows:**

- Faults are shown as text in the compressor control DELCOS XL "fault memory" display menu.
- Turn master switch off and secure it from being switched on again.
- Eliminate fault.
- Turn master switch on.
- Acknowledge the fault in the fault memory menu. After the acknowledgement, the message [READY TO START] appears on the display, unless another fault is present.
- Press START button [ I ] (- 2 - Fig. 16).

---

### 7.6 Shutoff

---

To switch off the compressor use the O key (-3- Fig. 16) and not the EMERGENCY STOP button. After shutdown the compressor has a run on time of 30-50 seconds (soft-stop).

#### **Note**

*The unit may only be shut down using the emergency off button in real emergencies. When shutting down normally, please use the O key.*

---

### 7.7 Emergency stop

---

The EMERGENCY STOP button is situated next to the DELCOS XL. It is used to immediately shut down the unit. Only use the EMERGENCY STOP button (-7- Fig. 16) to shut down the unit in emergencies. When shutting down normally, always use the [O] key.

## 8. Storage of compressors

### 8.1 Shutdown

All compressors are protected against corrosion at the factory for transport and for brief storage before commissioning.

If the compressors are to be stored for period exceeding six months, additional precautions must be taken.

Compressors which are to be shut down for a lengthy period must also be protected from corrosion.

Since corrosion occurs more quickly in damp atmospheres than in dry conditions, it is not possible to specify a maximum permissible standstill time which will apply in all cases.

#### Note

*The following aspects must be taken into account for storage of storing compressors.*

*The compressor should be stored in a dry building which should be heated if possible. This is particularly true during the months of winter.*

*The coolant is to be completely drained where there is a risk of frost ( $t < 1^{\circ}\text{C}$ ) (compressor stage, coolers, system containers, water filters, storage containers, RO unit, lines, valves).*

*If there is a risk that the temperature will fall or rise above the limits of  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ) to  $+65^{\circ}\text{C}$  ( $149^{\circ}\text{F}$ ), the electrical controller must be removed and stored in ambient temperatures of  $+5^{\circ}\text{C}$  ( $41^{\circ}\text{F}$ ) to  $+30^{\circ}\text{C}$  ( $86^{\circ}\text{F}$ ).*

## 9. Service and maintenance

### 9.1 Maintenance recommendations

#### Note

The screw compressor unit can only operate to your complete satisfaction when the maintenance work is carefully carried out at the specified intervals.

In order to facilitate this task, the scope of supply of the screw compressor unit comprises the "Maintenance and inspection manual for CompAir compressors", in which you can list your performed maintenance work at the specified intervals.

You can also have this maintenance work performed by our trained technicians. Please ask your CompAir distributor for a maintenance contract.

### 9.2 Maintenance electric motor

The maintenance of the electric motor is to be performed in line with the motor operating instructions.

#### 9.2.1 Motor lubrication system

The screw air compressor unit's drive motor is fitted with an automatic motor lubrication system.

##### Function of the motor lubrication system

The automatic motor lubrication system ensures that the motor mounting is lubricated at all times. The installed lubricators are powered (24 V DC) via the compressor control when the drive motor is running. The volume of grease set on the lubricator is dispensed over several cycles depending on the motor runtime measured.

An empty LC unit or a fault on the lubricator is indicated on the compressor control by means of a message [Warning: Mot.lubr. sys] (also refer to the operating instructions for the compressor control DELCOS XL).

#### 9.2.2 Structure of the lubricators (2x per drive motor)

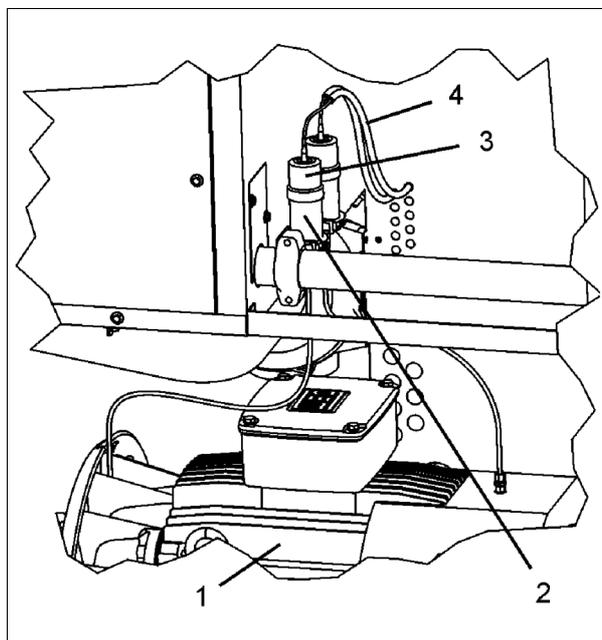


Fig. 17

- 1 Drive motor
- 2 LC (Lubrication Canister) unit MLS120 filled with grease. The LC unit is not intended to be refilled.
- 3 Drive with controller, display and cover (can be reused)
- 4 Cable with plug screw top (can be reused)

#### 9.2.3 Changing the LC unit

An empty LC unit or a fault on the lubricator is indicated on the compressor control by means of a message [Warning: Mot.lubr. sys] (also refer to the operating instructions for the compressor control DELCOS XL).

#### Important

**Regularly check the level of grease in the transparent LC unit.**

**The necessary replacement of the empty LC unit is indicated by the red LED lighting up and the "LC" message being displayed on the lubricator. This indication will only appear when the screw compressor unit's drive motor is running.**

**The drive system and control plate must be protected from dampness.**

## 9. Service and maintenance

### Procedure for changing the LC unit

- \* Unscrew the plug from the lubrication system and remove it.
- \* Unscrew lubricator (LC unit with drive and cover) from the lubrication point.
- \* Unscrew the drive from the LC unit and remove it.
- \* Check setting of regreasing interval.
- \* Place drive on new LC unit until the gears mesh.  
**Only use completely filled genuine CompAir MLS 120 LC units.**
- \* Screw down drive to LC unit (hand tight).
- \* Remove seal plug from LC unit.
- \* Screw lubricators into lubrication point (hand tight).
- \* Reconnect plug in drive and screw down.
- \* After a reset, the lubrication system starts the applicable pause time.
- \* Check function: A green LED indicates a continuous signal if the screw air compressor unit's drive motor is running.
- \* The lubricant in one LC unit MLS 120 is sufficient for approx. 4000 operating hours (this figure doesn't include compressor downtimes).

### 9.2.4 Special lubrication

If you press the SET button for 10 seconds, special lubrication is carried out, e.g. for prefilling or rinsing a dirty lubrication point.

### 9.2.5 Function display on lubricator

If you press the SET button for 10 seconds, special lubrication is carried out, e.g. for prefilling or rinsing a dirty lubrication point.

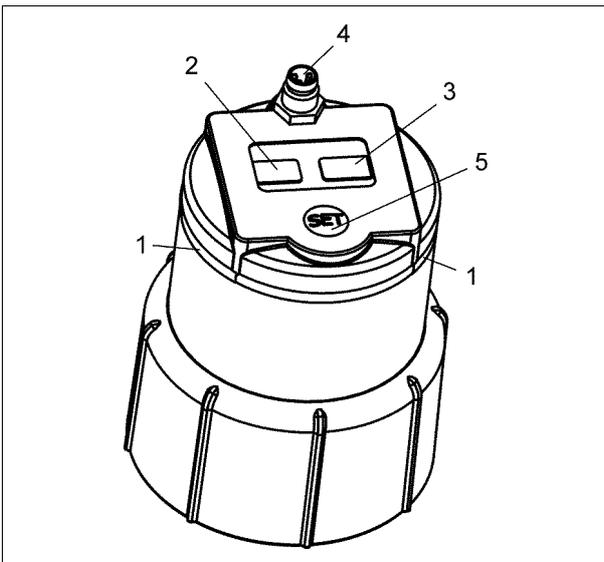


Fig. 18

- 1 Function display (LED)
- 2 Min. lubricating period from changing the container and the counting display of the last 100 operating hours of the lubricant vessel.

- 3 Lubricant quantity for 100 operating hours
- 4 Plug connection
- 5 "SET" button

The function display is only active if the screw air compressor unit's drive motor is running.

The lubricators are fitted with one red and one green LED. These LEDs signal the following operating modes or faults to the operator.

LED	Signal	Explanation
Green	Continuous signal	OK. "System running"
Green	Continuous signal <30 sec.	Dispensing process
Red	Continuous signal >30 sec. <sup>1)</sup>	Error/fault
Red	Continuous signal <sup>1)</sup>	LC unit empty, please change

1) When the lubricator issues this signal, the following message is output on the compressor control:

[Warning: Mot.lubr. sys] (also refer to the operating instructions for the compressor control DELCOS XL).

If the lubricant line becomes blocked, the drive unit increases the pressure to up to 6 bar. If the max. pressure is reached, the lubricator switches to a special program and attempts to open the lubrication channel with three further lubrications within 48 hours. If this proves unsuccessful, the unit reports an error.

### 9.2.6 Lubricator operating parameters

The following setting applies to the screw air compressor range L55-L140 / 50Hz + 60 Hz with a standard electric motor:

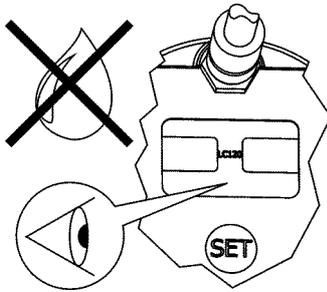
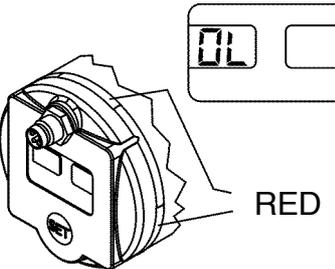
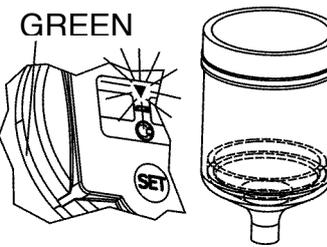
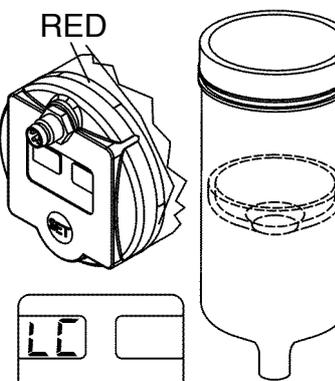
#### Lubricator operating parameters

Grease volume / 100 service hours	2.78 cm <sup>3</sup> (0.17 in <sup>3</sup> )
Pause time between two dispensing processes	approx. 9 operating hours
Runtime of LC unit MLS 120	approx. 4000 operating hours

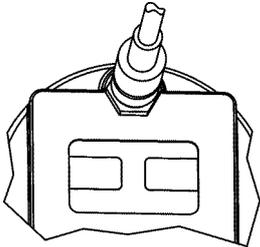
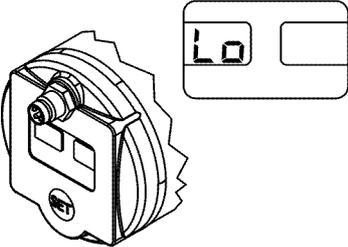
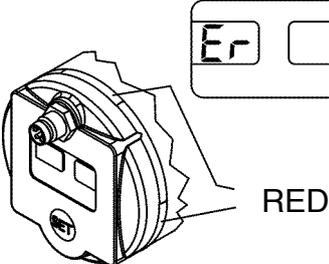
## 9. Service and maintenance

### 9.2.7 Troubleshooting and fault rectification for lubricator

If faults occur when operating the lubricator, please check the possible causes of error using the following table. If an error occurs that isn't listed in the table, please contact CompAir customer service.

Error function and error messages	Description of error	Cause of error	Error rectification
	Lubrication system is not functioning despite the voltage being applied.	<ul style="list-style-type: none"> <li>- Cable breakage</li> <li>- Incorrect wiring</li> </ul>	Check whether the plug icon is shown on the display
	Lubrication system is not functioning despite the voltage being applied. Plug icon is visible on the display.	Drive and LC not screwed down correctly.	Screw the drive and LC together until the white triangle can be fully seen on the drive.
	Lubrication system is in pressure cut-off.	Back pressure on lubrication point > 6 bar.	<ul style="list-style-type: none"> <li>- Rinse lubrication point (manually or special PURGE I).</li> <li>- If required, check pressure.</li> <li>- Acknowledge error by confirming with the SET button.</li> </ul>
	Lubricant cartridge empty, but an "LC" message is not displayed.	LC unit too small for the drive.	Use original LC unit MLS 120 from CompAir
	"LC" message although lubricant cartridge is not completely empty.	LC unit too big for the drive.	Use original LC unit MLS 120 from CompAir

## 9. Service and maintenance

Error function and error messages	Description of error	Cause of error	Error rectification
	Display not visible, despite voltage being applied.	Internal drive error.	Replace entire lubrication system
	"Lo" message on the display.	Weak drive back-up battery.	Replace back-up battery CR2450 (3V). Must only be replaced by trained personnel.
	"Er" message on the display.	Internal drive error.	Replace entire lubrication system

### 9.3 Maintenance and inspection schedule



#### Warning

**When performing control, adjusting and maintenance work, be careful with hot surfaces of machine parts.**

**Checks and maintenance work may only be carried out when the following points are observed:**

**Press the STOP button on the control panel and wait until the screw compressor unit has come to rest and the screw compressor unit is depressurized**

**The customer-installed main switch is set to "O" (OFF) and locked off.**

**Warning:**

**Electrical voltage: Only work on the screw compressor unit when it is disconnected.**

**Only L90RS-L132RS:**

**Danger of electric shock from loaded condensers! Please always first disconnect the system from the power supply and wait another 10 minutes before touching the electrical components. The power condensers require this time in order to discharge!**

#### Important

The pressure display does no longer indicate pressures < 0.3 bar (4.4 PSI).

Shortly after switching the screw compressor off, the system can contain a low residual pressure.

The screw compressor unit must therefore be depressurised prior to any maintenance work by slowly opening the lock (oil filler cap) with integral vents

#### Service packages

Package C	Oil filter cartridge, air filter cartridge
Package D	Oil separator element
Package E	Worn parts

Intervals are valid for normal industrial environments and operating conditions. When in doubt, check the oil change intervals by carrying out an oil analysis.

In the case of a very dirty atmosphere, the maintenance intervals have to be shortened as required.

For order numbers see the spare parts list.

## 9. Service and maintenance

Due at x service hours	Commissioning	2,000 h	4,000 h	6,000 h	8,000 h	10,000 h	12,000 h	14,000 h	16,000 h	18,000 h	20,000 h
		6 m	12 m	18 m	24 m	30 m	36 m	42 m	48 m	54 m	60 m
<b>At the latest after x months</b>											
Package C Oil filter cartridge, air filter cartridge		<input type="checkbox"/>									
Package D Oil separator element			<input type="checkbox"/>								
Package E Wearing parts				<input type="checkbox"/>				<input type="checkbox"/>			
<b>Maintenance every 2000 h, although at least every 6 months:</b>											
Replacement of air filter cartridge		<input type="checkbox"/>									
Replacement of oil filter cartridge		<input type="checkbox"/>									
Cleaning/replacement of cooling air inlet filter		<input type="checkbox"/>									
<b>Maintenance every 4000 h, although at least each year:</b>											
Checking/tightening of connecting terminals in the switch cabinet/ and checking of the "control transformer" setting		<input type="checkbox"/>									
Checking/tightening screw connections		<input type="checkbox"/>									
General maintenance/cleaning			<input type="checkbox"/>								
Oil change when using CompAir - 4000 hours oil (only European version)			<input type="checkbox"/>								
Oil change when using CompLube 4000 or CompLube 4000FG Food Grade (only USA version)			<input type="checkbox"/>								
Oil change when using CSS20 Food Grade oil (only Canadian version)			<input type="checkbox"/>								
Oil analysis when using CS6000XL, CompLube 8000 or CompLube 8000H1 oil			<input type="checkbox"/>								
Replacement of oil fine separator cartridge			<input type="checkbox"/>								
Safety valve / functional test at least once a year			<input type="checkbox"/>								
Replacement of lubrication cartridges			<input type="checkbox"/>								
L90RS-L132RS only: Replacement of control-cabinet cooling air filter mat			<input type="checkbox"/>								
Lxx W – water-cooled units only: Cleaning of dirt interceptor (In the case of dirty cooling-water, the cleaning intervals have to be shortened as required)			<input type="checkbox"/>								
<b>Maintenance every 6000 h, although at least every 18 months:</b>											
Oil change when using CS6000XL oil (only Canadian version)				<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>		
<b>Maintenance every 8000 h, although at least every 2nd year:</b>											
Oil change when using CompLube 8000 oil (only USA version)				<input type="checkbox"/>				<input type="checkbox"/>			
<b>Maintenance every 12000 h, although at least every 3rd year:</b>											
Oil change when using CompLube 8000H1 oil (only USA version)						<input type="checkbox"/>					
<b>Inspection every 4 years:</b>											
Inspection of the electrical installation by a qualified electrician								<input type="checkbox"/>			
<b>Inspection every 5 years:</b>											
Internal inspection of the pressure vessel by a qualified person										<input type="checkbox"/>	
<b>Inspection every 10 years:</b>											
Strength test of the pressure vessel by the appointed body											

These maintenance intervals must be observed!

For your own benefit, put a cross on the servicing schedule against maintenance work when performed.

9. Service and maintenance

	22,000 h 24,000 h	26,000 h 28,000 h	30,000 h 32,000 h	34,000 h 36,000 h	38,000 h 40,000 h	42,000 h 44,000 h	46,000 h 48,000 h	50,000 h 52,000 h	54,000 h 56,000 h	58,000 h 60,000 h	62,000 h 64,000 h	66,000 h 68,000 h	70,000 h 72,000 h	74,000 h 76,000 h	78,000 h 80,000 h
	66 m 72 m	78 m 84 m	90 m 96 m	102 m 108 m	114 m 120 m	126 m 132 m	138 m 144 m	150 m 156 m	162 m 168 m	174 m 180 m	186 m 192 m	198 m 204 m	210 m 216 m	222 m 228 m	234 m 240 m
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### 9.4 Oil change

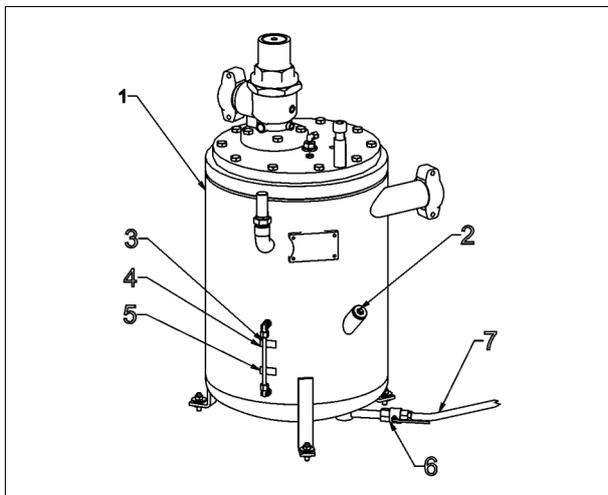


Fig. 19

- 1 Oil reservoir
- 2 Oil filler cap R1"
- 3 Oil-level indicator
- 4 Max. oil level
- 5 Min. oil level
- 6 Oil drain R1/2"
- 7 Drain hose

#### Warning

**Only change the oil when the screw compressor unit is out of operation, depressurized, and secured from being switched on again!**

**Be careful when draining hot oil:  
Danger of scalding!**

#### Important

**Remove oil residues and other deposits from unit parts and from the coolers of compressors, which are exposed to hot compressed air, according to the operating instructions.**

#### Note

*Collect the waste oil, do not allow it to seep into the ground!*

*Disposal in accordance with the regulations! Do not spill oil! Check for leakage!*

*With these compressors, the oil change intervals strongly depend on the degree of contamination of the circulating oil. It must therefore be taken care that no oil-deteriorating matter (dusts, vapours, gases) are transported through the air intake filter into the oil circuit of the compressor unit. Also a high content of humidity in the intake air and the formation of condensate within the machine affect the service life of the lubricant oil so that a reduction in the oil change intervals may become*

*necessary. The specified oil change intervals refer to an intake air from a normal environment without a high content of foreign matter (dusts, vapours, gases).*

*When changing the oil, the waste oil is to be drained completely, since used oil reduces the service life of the new oil fill considerably.*

*Do not mix lubricating oils of different makes. When changing over to a new oil type, the oil in the oil circuit must be drained completely.*

For the oil change intervals, see maintenance schedule.

#### When changing the oil, proceed as follows:

- Switch the screw compressor unit off and ensure that it is depressurized, electrically isolate and locked off.
- Slowly open the oil filler cap (- 2 - Fig. 19), to depressurize the screw compressor by releasing any residual pressure in the unit
- Remove the oil filler cap
- Open the oil drain (- 6 - Fig. 19) for the pressure reservoir and the oil cooler
- Drain oil at operating temperature through the drain hose (- 7 - Fig. 19)
- Close the oil drain
- Fill in oil up to the marking "maximum oil level" (- 4 - Fig. 19) (ca. 54 litres) (ca. 14.3 US-Gal.)
- Close the oil filler cap
- Let the screw compressor unit run for approx. 2 minutes
- Check for leakages
- Switch the screw compressor unit off
- Wait at least 5 minutes for the oil to settle and for the air to disperse
- Check oil level (see chapter 6.5)
- The oil level must be between the maximum level (- 4 - Fig. 19) and minimum level (- 5 - Fig. 19) marked on the oil reservoir.
- If required, top up oil

#### Changing intervals for lubricants

The operating conditions (e.g. coolant temperatures), the operating modes and the quality of the intake air (e.g. content of dust, content of gaseous foreign matter such as SO<sub>2</sub>, solvent vapours) have a strong influence on the oil change intervals.

In this case the oil must be analyzed to check the permissible length of time that the oil can be used (see also chapter 9.15). Under no circumstances should the oil be used beyond its design life.

### 9.5 Change of oil filter cartridge

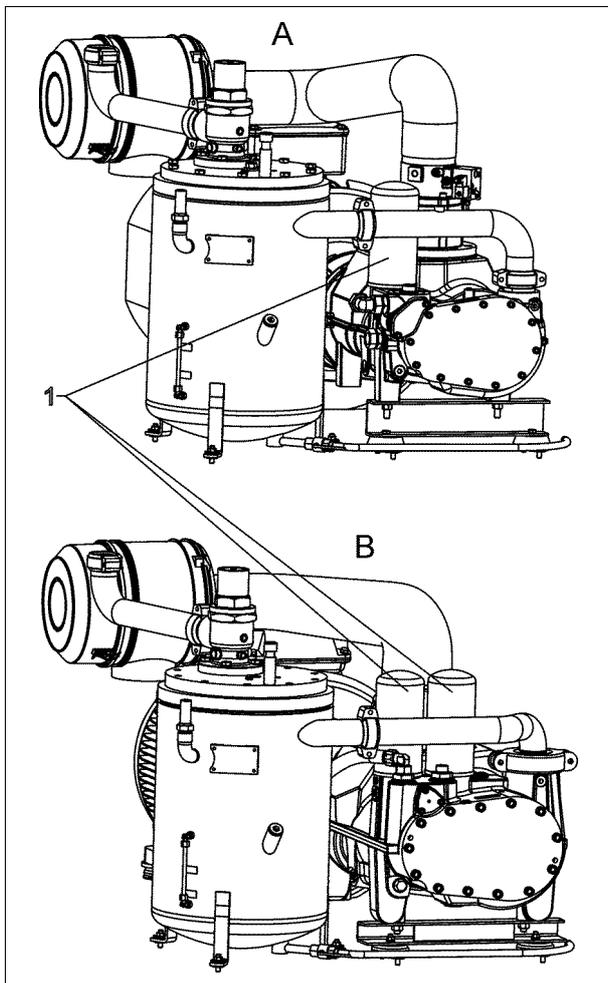


Fig. 20

1 Oil filter cartridge

A L90 – L132

B L140



#### Warning

**Only replace the oil filter cartridge when the screw compressor unit is out of operation, depressurized, and secured from being switched on again!**

**Be careful with hot oil: Danger of scalding!**

#### Important

**Do not spill oil!**

#### Note

*Dispose of the oil filter cartridge in line with the regulations - special waste ! Check for leakage!*

For the changing intervals, see the maintenance schedule.

#### Change the oil filter cartridge as follows:

- Switch the screw compressor unit off and ensure that it is depressurized, electrically isolate and locked off.
- Wait at least 5 minutes for the oil to settle and for the air to disperse.
- Unscrew the oil filter cartridge ( - 1 - Fig. 20) using an appropriate tool
- Dispose of the oil filter cartridge according to the regulations
- Oil the gasket of the new oil filter cartridge slightly
- Screw on the new oil filter cartridge and tighten manually (take notice of the instructions on the oil filter cartridge)
- Let the screw compressor unit run for approx. 2 minutes
- Check for leakage
- Check oil level (see chapter 6.5)
- If required, top up oil.

#### Changing intervals for oil filter cartridge

The operating conditions (e.g. coolant temperatures), the operating modes and the quality of the intake air (e.g. content of dust, content of gaseous foreign matter such as SO<sub>2</sub>, solvent vapours, etc.) have a strong influence on the service life of the filters (air filters, oil filters, fine separators).

Where such conditions exist the filter element may require changing more frequently.

### 9.6 Change of the oil fine separator

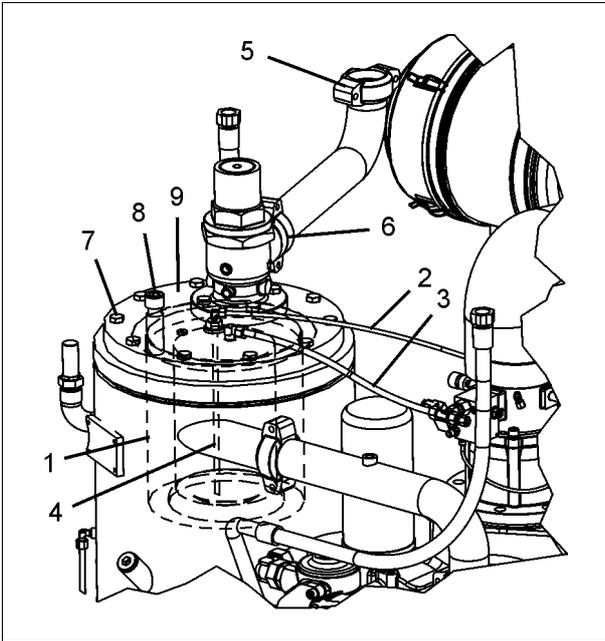


Fig. 21

- 1 Oil fine separator
- 2 Oil extraction plastic tube
- 3 Control air plastic tube
- 4 Oil extractor
- 5 Victaulic connection to the cooler
- 6 Victaulic connection to the pressure holding valve
- 7 Hexagon screw
- 8 Cheese heads screw for lifting the reservoir cover
- 9 Reservoir cover

#### Warning

**The pressure reservoir is under pressure!  
Only replace the oil sine separator when the  
screw compressor unit is out of operation,  
depressurized, and secured from being  
switched on again!**

**Be careful with hot oil: Danger of scalding!**

#### Important

**Do not spill oil!**

#### Note

*Dispose of the fine separator cartridge in line with the regulations - special waste! Check for leakage!*

For the changing intervals, see the maintenance schedule.

If the oil fine separator is monitored (option), too high a differential pressure is indicated on the keypad of the compressor control DELCOS XL. When the corresponding warning lights up, change the oil fine separator.

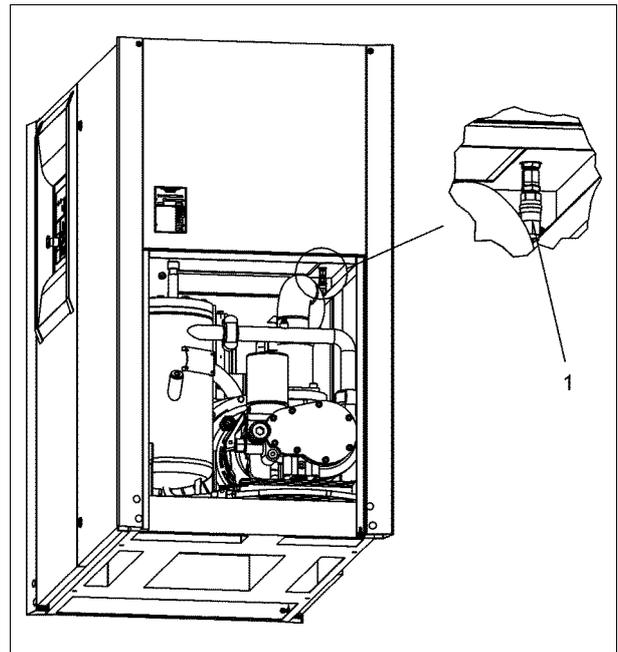


Fig. 22

#### Change the oil fine separator as follows:

- Switch the screw compressor unit off and ensure that it is depressurized, electrically isolate and locked off. For this, while the system is switched off carefully open the ballcock (- 1 - Fig. 22) on the downstream cooler until the system has been bled, then close the stopcock again.
- Loosen the plastic tube (- 2 - Fig. 21) of the oil extractor (- 4 - Fig. 21).
- Loosen the plastic tube of the control air line (- 3 - Fig. 21).
- Fully remove oil extraction with pressed in extraction tube (- 4 - Fig. 21).
- Loosen all hexagonal head screws from the pressure control valve.
- Loosen the two screws in the swivel direction of the pressure control valve and remove, then the valve can be swivelled inwards.
- Remove all hexagon screws (- 7 - Fig. 21) on the circumference of the pressure reservoir's cover.
- The cheese head screw for lifting the reservoir cover (- 8 - Fig. 21) must be screwed in clockwise until the cover is lifted off by some mm.
- Swivel the reservoir cover by 180° (- 1 - Fig. 21).
- Remove used oil fine separator (- 1 - Fig. 21).
- Clean sealing faces and, if required, remove and clean O-rings.
- Install new oil fine separator.

## 9. Service and maintenance

- Swivel reservoir cover back to the initial position
- Turn cheese head screw (- 8 - Fig. 21) counterclockwise until the reservoir cover is loosely lying on the pressure reservoir flange
- Screw down all hexagonal head screws, with exception of the two screws lying in the swivel area of the pressure control valve and tighten crosswise.
- Swivel the pressure control valve back to its starting position and assemble with the appropriate screws.
- Then fit the missing hexagonal head screws in the reservoir cover and tighten to a tightening torque of 214 Nm (screw strength class 8.8) or 95 Nm (screw strength class 5.6).
- Tighten (clockwise) cheese head screw for lifting the reservoir cover (- 8 - Fig. 21) to protect it against unwanted turning
- Reassemble all dismantled pipes to the pressure vessel and assemble oil suction again.
- Let the screw compressor unit run for approx. 2 minutes
- Check for leakages
- Check oil level (see chapter 6.5)
- If required, top up oil

### Changing intervals for oil fine separator

The operating conditions (e.g. coolant temperatures), the operating modes and the quality of the intake air (e.g. content of dust, content of gaseous foreign matter such as SO<sub>2</sub>, solvent vapours, etc.) have a strong influence on the service life of the filters (air filters, oil filters, fine separators).

Where such conditions exist the filter element may require changing more frequently.

### 9.7 Change of air intake filter

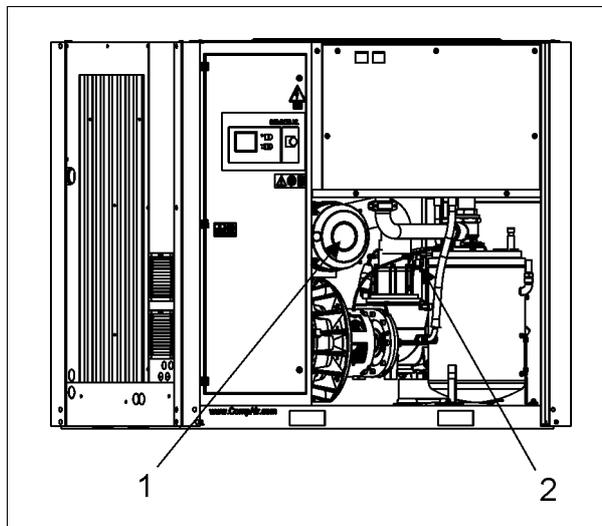


Fig. 23

- 1 Air intake filter
- 2 Intake filter monitor (visual)

#### **Warning**

**Only replace the air intake filter when the screw compressor unit is out of operation, depressurized, and secured from being switched on again!**

#### **Important**

**Never operate the screw compressor unit without the air filter (even a short operating time without this filter can result in considerable damage to the machine)!**

As a standard, the air filter is provided with a visual intake filter monitor (- 2 - Fig. 23), which indicates clogging of the air filter cartridge.

When the red service field of the intake filter monitor is visible and remains clicked into position while the screw compressor is out of operation, replace the air filter cartridge.

However, the air filter cartridge should be replaced at the latest as specified in chapter 9.3. Check air filter at least once a week or, if required, daily for the accumulator of dust. When carrying out maintenance work, make sure that no dirt gets to the clean air side of the air filter.

## 9. Service and maintenance

### Changing intervals for air filter cartridge

The operating conditions (e.g. coolant temperatures), the operating modes and the quality of the intake air (e.g. content of dust, content of gaseous foreign matter such as SO<sub>2</sub>, solvent vapours, etc.) have a strong influence on the service life of the filters (air filters, oil filters, fine separators).

Where such conditions exist the filter element may require changing more frequently.

### Change the air filter as follows:

- Switch the screw compressor unit off and ensure that it is depressurized, electrically isolate and locked off.
- Pull snap latch outward and remove housing base.
- Detach air filter cartridge while slightly turning it.
- Carefully insert new air filter cartridge in the housing.
- Close air filter with housing base. The snap latches must click into position.

### 9.8 Safety valve

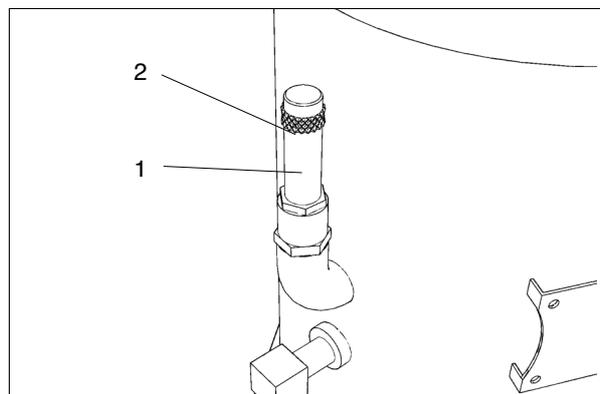


Fig. 24

- 1 Safety valve
- 2 Valve cap

### Testing the safety valve

The valve should be tested on a separate compressed air line in accordance with local legislation.

Operate the safety valve (- 1 - Fig. 24), depending on the type of valve:

- Slightly turn the valve cap (-2- Fig. 24) (1-2 turns), and then re-close it.
- Actuation of the bleeding lever/pulling ring

### **Warning**

**Never operate a screw compressor system with a defective safety valve or without safety valve!**

### 9.9 Connecting terminals in the switch cabinet/control transformer setting

#### **Danger**

##### **Danger of electric shock!**

Work on the control cabinet may only be carried out by electrotechnical specialist personnel.

When carrying out adjustment work on the control power transformer, the unit must be electrically isolated and locked off.

**L90RS-L132RS: Danger of electric shock from loaded condensers! Please always first disconnect the system from the power supply and wait another 10 minutes before touching the electrical components. The power condensers require this time in order to discharge!**

#### **Important**

A wrong setting of the control-power transformer jeopardizes the trouble-free operation of compressor units and can result in malfunction or damage.

The verification of the control-power transformer setting is a must during commissioning and periodic inspection/ maintenance, as the voltage supply conditions may vary.

The connecting terminals in the switch cabinet have to be checked and, if required, re-tightened during first commissioning and later on in line with the maintenance schedule.

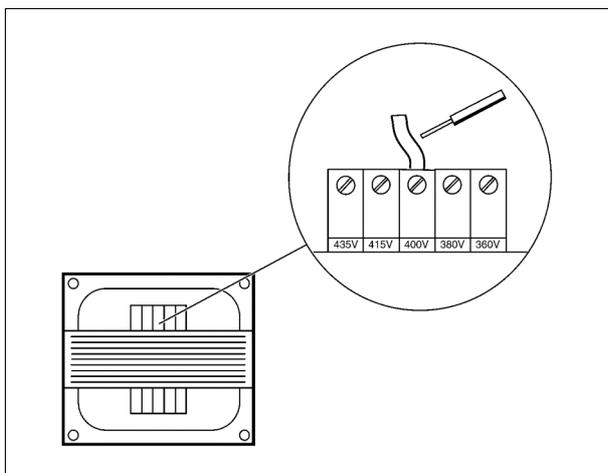


Fig. 25

#### **Check the control transformer setting as follows:**

- Switch the unit on as described in Chapter 7.4.
- Check the control transformer output voltages while operating under load. Several tapping points are provided for this purpose (see circuit diagram).
- Switch the unit off as described in Chapter 7.6.

#### **Change the control transformer setting as follows if the output voltage is not correct:**

- Set the main power switch to "O" (OFF) and secure it from being switched on again.
- L90RS-L132RS: Please wait another 10 minutes. The power condensers require this time in order to discharge!
- Change the control transformer setting accordingly. Fig. 25 illustrates an example.
- Then check the setting again.

### 9.10 Fittings

The fittings of the air, water and oil circuits have to be checked and, if required, re-tightened according to the maintenance schedule.

Check the hose and piping for unsealed areas.

### 9.11 General maintenance and cleaning

#### **Important**

Remove oil residues and other deposits from unit parts and from the coolers of compressors, which are exposed to hot compressed air, according to the operating instructions.

Blow off the screw compressor unit with compressed air at the specified intervals (never direct compressed air towards persons) paying particular attention to:

- Regulating elements
- Fittings
- Compressor block
- Cooler
- Electric motor

**9.12 Clean / change filter with cooling air inlet and control cabinet inlet**

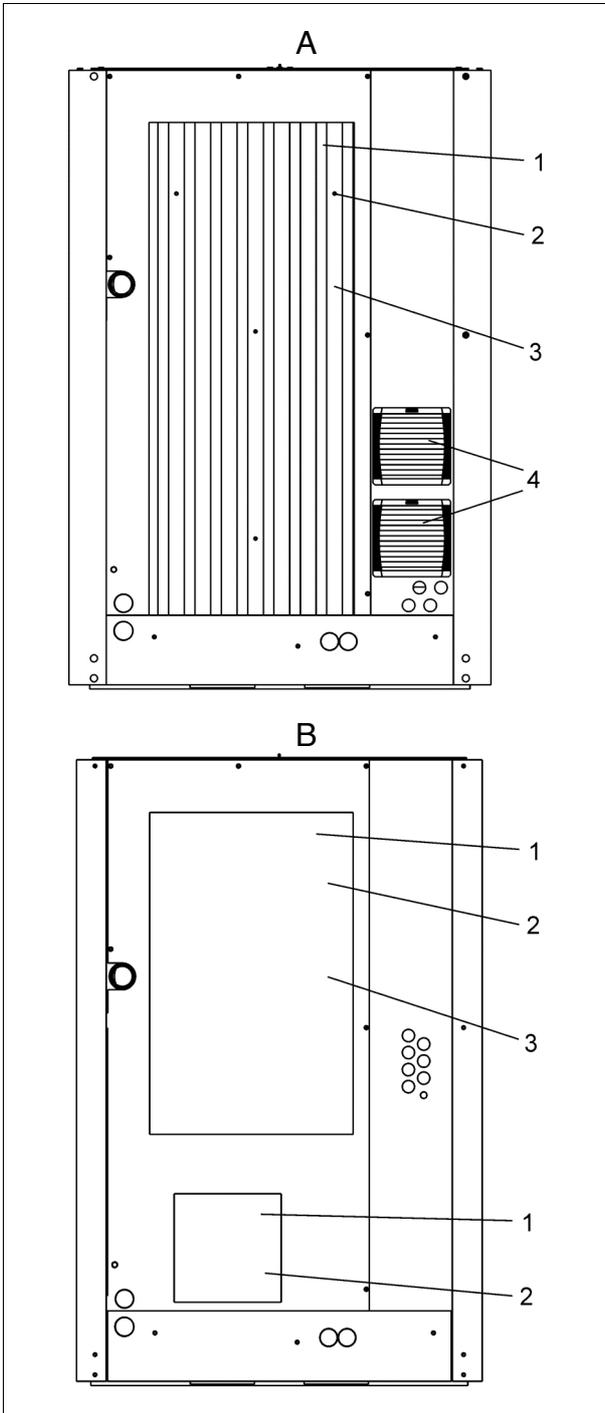


Fig. 26

- A L132 - L140
- B L140
- 1 Filter mat cooling air inlet
- 2 Mounting bolts
- 3 Sound-proofing element
- 4 Inlet filter (only L90RS - L132RS)

**Warning**

Only perform checks and carry out work on the screw compressor when the unit is out of operation, depressurized, and secured from being switched on again!

**Perform filter mat change as follows:**

a) Filter mat, cooling-air inlet

- Remove fixing screws (-2- Fig. 26).
- Remove filter mat (-1- Fig. 26) and clean, exchange if damaged. Clean the filter mat by brushing or washing.
- Re-insert filter mat in sound insulating panel (-3- Fig. 26).

**Important**

**Never install the filter mat in a wet or moist state!**

- Secure filter mat by means of fixing screws.

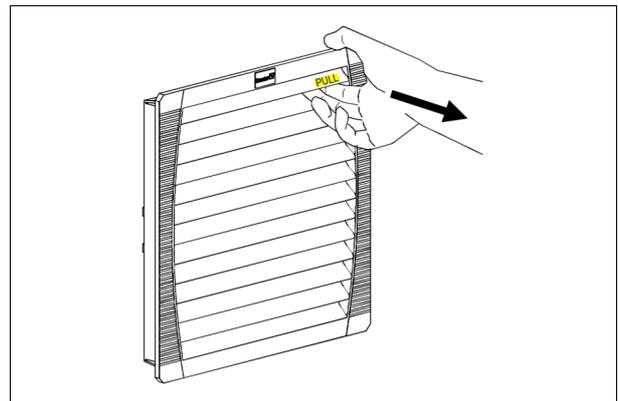


Fig. 27

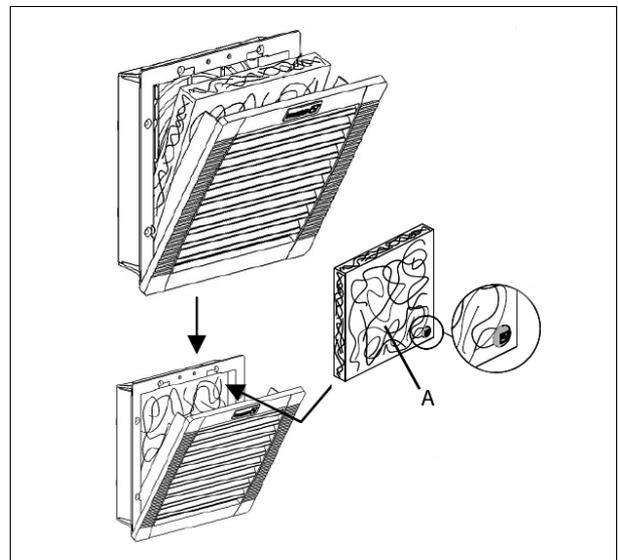


Fig. 28

## 9. Service and maintenance

### b) Control-cabinet inlet filter (L90RS - L132RS only)

- Open the louvred grilles of the inlet filter (Fig. 27).
- Remove the filter pad.
- Insert the new filter pad into the louvred grille. Ensure that the smooth side (-A- Fig. 28) of the filter pad faces the air inlet side.
- Place the louvred grille back onto the filter housing.

### Changing times for the filter mat

The operating modes and the quality of the suctioned air (e.g. dust content) has a strong influence on the filter service life.

The filter should be checked on a weekly basis, eventually daily basis, for dust build-up.

In these operational cases, shorter change intervals are possible.

### 9.13 Clean dirt interceptor (only for Lxx W – water-cooled units)

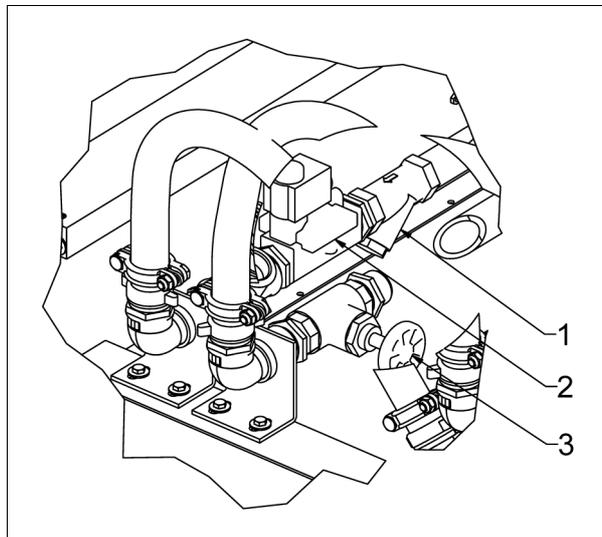


Fig. 29

- 1 Dirt interceptor
- 2 Cooling water solenoid valve
- 3 Manual regulating valve

#### **Warning**

**Only perform checks and carry out work on the screw compressor when the unit is out of operation, depressurized, and secured from being switched on again!**

Lock water inflow and water outflow on the compressor.

Provide a suitable container in order to catch any cooling agents draining from the system.

Carefully loosen the cover of the dirt interceptor. Catch any cooling agent draining from the system.

Remove cover and pull filter insert from the housing. Clean filter insert or replace with a new one.

Push filter insert into the dirt interceptor housing.

Screw cover into the housing. Ensure that the seal is correctly positioned and that there is no dirt on the sealing ring and the sealing areas.

Tighten cover with a suitable tool.

Check all connections for tightness.

Open water inflow and outflow at the compressor.

### 9.14 Inspection intervals for pressure vessels and electrical installations

#### Pressure vessels

As per the requirements of the 2014/68/EU Pressure Equipment Directive, a qualified person must inspect the pressure vessel from inside every five years.

As per the requirements of the 2014/68/EU Pressure Equipment Directive, an appointed body must perform a strength test on the pressure vessel after ten years.

#### Electrical installation

The electrical installation must be inspected by a qualified electrician after four years and also each time work has been performed on it.

Should stricter inspection intervals apply in your country, these must be observed.

### 9.15 Maintenance information and lubricant recommendations for stationary compressors

#### Lubricant recommendations

Please note that proper lubrication will considerably increase the service life of your compressor unit. According to regulations relating to the prevention of accidents, use lubricants the properties of which meet the requirements of the operating conditions on site. Do not mix lubricating oils of different makes. When changing over to a new oil type, drain the old oil completely from the system.

If final compression temperatures of more than 90 °C (195 °F) occur continually, the oil change intervals given in section 9.3 (maintenance schedule) are halved.

The oil change intervals should be calculated more accurately in accordance with the actual operating conditions by analyzing the oil.

#### Use the following oil type:

##### European version

CompAir „4000“

##### USA-version:

- a) CompLube 4000
- b) CompLube 4000FG Food Grade (Optional)
- c) CompLube 8000 (Optional)
- d) CompLube 8000H1 (Optional)

For further information, please contact your local CompAir Distributor or Gardner Denver-USA at (937) 498-2500.

##### CANADA-Version:

- a) CS6000XL
- b) CSS20 Food Grade (Optional)

For further information, please contact your local CompAir Distributor or Gardner Denver-Canada at (905) 847-0688.

## 10. Trouble-shooting

In the case of faults or warnings that are detected by the compressor control DELCOS XL, please refer to the chapter "Fault/warning table" in the operating instructions of the DELCOS XL.

Malfunction	Possible cause	Remedy
Unit cannot be started	1. No operating or control voltage	1. Check fuses, main switch and supply line
	2. Malfunction not acknowledged	2. Acknowledge fault message
	3. Pressure reservoir not depressurized	3. Wait until depressurized. Screw compressor does not start up, when reservoir pressure is > 0.8 bar (11.6 PSI) (L90-L140) or > 2.0 bar (29.0 PSI) (L90RS-L132RS)
	4. Electric motor defective	4. Check connections, winding, etc.
	5. Compressor defective	5. Turn the compressor manually; if required, replace
	6. Ambient temperature less than +1 °C (33.8 °F)	6. Make sure that the ambient temperature is not less than +1 °C (33.8 °F); install an auxiliary heater, if required
	7. Remote control/timer has been activated via terminal strip	7. Deactivate remote control/timer
	8. Mains pressure is above the lower switch set point (L90-L140) or the prescribed pressure (L90RS-L132RS)	8. Wait until the mains pressure has fallen below the lower switch set point/ prescribed pressure
Unit stops during the start-up phase	1. Intake regulator only closes partly, pressure builds up too quickly in the pressure reservoir	1. Fix intake regulator or, if required, replace; check solenoid valves
	2. Short-circuit in the unit	2. Determine and eliminate cause; replace defective fuses
	3. Connecting terminals in the switch cabinet are loose	3. Check and re-tighten
	4. Oil too viscous	4. Select the type of oil according to the ambient conditions or install an auxiliary heater
	5. Maximum motor switching cycles exceeded due to too frequent manual on and off-switching	5. Avoid frequent manual on and off-switching, let electric motor cool down
Unit does not reach the set mains pressure	1. Mains pressure sensor set too low	1. Check, re-set
	2. Intake regulator opens only partly	2. Fix intake regulator or, if required, replace; check solenoid valves
	3. Excessive air consumption	3. Reduce consumption or cut in a further compressor
	4. Fine separator clogged	4. Replace fine separator cartridge
	5. Air filter clogged	5. Replace air filter cartridge
	6. Heavy leakage in the compressor system	6. Check unit

## 10. Trouble-shooting

Malfunction	Possible cause	Remedy
Unit switches off	<ol style="list-style-type: none"> <li>1. Ambient temperature too high</li> <li>2. Electric motor defective</li> <li>3. Fan defective</li> <li>4. Sensor, connections or lines defective</li> <li>5. Cross section of the electric supply lines too small</li> <li>6. Power requirement too high</li> <li>7. Oil level too low</li> <li>8. Oil injection pressure too low</li> <li>9. Excessive oil temperature</li> </ol>	<ol style="list-style-type: none"> <li>1. Ventilate compressor room</li> <li>2. Check electric motor and thermistor</li> <li>3. Check/replace fan</li> <li>4. Check sensors, connections and lines</li> <li>5. Measure power requirement, if necessary, replace lines</li> <li>6. Oil fine separator clogged, replace, if necessary</li> <li>7. Top up oil in the pressure reservoir</li> <li>8. Replace oil filter cartridge, clean oil system</li> <li>9. Check oil cooler and fan/ Check oil thermostat Check cooling water circuit (only for Lxx W – water-cooled units)</li> </ol>
Excessive idling pressure	<ol style="list-style-type: none"> <li>1. Intake regulator does not close correctly</li> <li>2. System not unloaded</li> </ol>	<ol style="list-style-type: none"> <li>1. Check intake regulator Check solenoid valves</li> <li>2. Check solenoid valves</li> </ol>
Oil in the compressed air	<ol style="list-style-type: none"> <li>1. Oil fine separator defective</li> <li>2. Oil foams</li> <li>3. Oil level too high</li> <li>4. Minimum pressure valve defective</li> <li>5. Orifice of oil extractor clogged</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace oil fine separator cartridge</li> <li>2. Change oil</li> <li>3. Drain off oil</li> <li>4. Check minimum pressure valve</li> <li>5. Remove and clean orifice</li> </ol>
Oil in the air filter	<ol style="list-style-type: none"> <li>1. Intake regulator setback function defective</li> <li>2. Intake regulator does not close correctly</li> <li>3. Frequent emergency shutdown</li> </ol>	<ol style="list-style-type: none"> <li>1. Check intake regulator</li> <li>2. Check intake regulator Check solenoid valves</li> <li>3. The emergency shutdown may only be activated in the case of safety-relevant functional problems</li> </ol>
Safety valve opens	<ol style="list-style-type: none"> <li>1. Safety valve defective</li> <li>2. Oil fine separator clogged and final compression pressure sensor defective</li> <li>3. Intake regulator closes too slowly</li> <li>4. Mains pressure sensor defective</li> <li>5. Electronics defective</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace</li> <li>2. Replace oil fine separator cartridge and change final compression pressure sensor</li> <li>3. Check intake regulator and solenoid valves</li> <li>4. Replace mains pressure sensor</li> <li>5. Replace electronics</li> </ol>



### Warning

**Never operate the screw compressor with defective safety valve!**

# 11. Annex

## 11.1 Technical Data

### 11.1.1 EUROPE version L90-L110 50 Hz A - air-cooled W - water-cooled

Technical data 50Hz		L90			L110		
		7.5	10	13	7.5	10	13
Maximum operating pressure	bar	7.5	10	13	7.5	10	13
Minimum operating pressure	bar	5					
Ambient temperature	°C	1...45					
Flow	m <sup>3</sup> /min	17.45	15.47	13.45	20.77	18.63	16.21
After-cooler outlet temperature above ambient temp.	A - °C	7	7	6	8	8	7
	W - C	9	8	7	9	8	7
Sound pressure level (to ISO 2151)	dB(A)	73			75		
Nominal motor rating	kW	90			110		
Full-load current max. IP55 (220V, 380V, 400V)	A	360 / 204 / 190			437 / 244 / 228		
Motor protection type	-	IP55 (IE2) , IEC 60034-2-1, ECA Qualifying					
Nominal speed	rpm	3000					
Nominal fan motor power	kW	A - 2.5 / W - 0.37(IP-54)					
Recommended cable cross-section at 75 °C (220V / 380V / 400V)	mm <sup>2</sup>	2x3x95 PE50 / 3x95 PE50 / 3x70 PE35			2x3x150 PE70 / 3x95 PE50/ 3x95 PE50		
Recommended fuse size (220V / 380V / 400V), slow-blowing	A	250 AgL / 250 AgL / 200 AgL			315 AgL / 250 AgL / 250 AgL		
Cooling air flow through ventilator	m <sup>3</sup> /min	A - 223 / W - 100			A - 227 / W - 100		
Cooling air outlet temperature above ambient temp.	°C	27			32		
Max. allowable pressure drop in duct at ambient 35°C / 45°C	Pa	110 / 80			80 / 40		
Cooling water quantity	l/min	90 @ΔT = 17K @Δp = 0.8 bar			125 @ΔT = 14K @Δp = 1.4 bar		
Cooling water inlet temperature	°C	min. 5 / max. 35					
Cooling water outlet temperature	°C	55					
Cooling water pressure	bar (g)	10					
Cooling water connection		EN10226-1 Rp 1 1/4 (DIN 2999-R 1 1/4)					
Compressed air delivery connections (male screwed thread)	-	EN 10226 R 2 1/2" (DIN 2999-R 2 1/2)					
Weight	kg	A - 2513 / W - 2377			A - 2614 / W -- 2478		
Dimensions L x W x H	mm	2337 x 1368 x 2039					

## 11. Annex

### 11.1.2 EUROPE version L90-L110 60 Hz A - air-cooled W - water-cooled

Technical data 60Hz		L90			L110		
		7.5	9	13	7.5	9	13
Maximum operating pressure	bar	7.5	9	13	7.5	9	13
Minimum operating pressure	bar	5					
Ambient temperature	°C	1...45					
Flow	m <sup>3</sup> /min	17.76	16.24	13.37	20.60	19.35	16.13
After-cooler outlet temperature above ambient temp.	A - °C	7	7	6	8	8	7
	W - °C	9	8	7	9	8	7
Sound pressure level (to ISO 2151)	dB(A)	75			77		
Nominal motor rating	kW	90			110		
Full-load current max. IP55 (220V, 380V, 460V)	A	359 / 203 / 168			454 / 254 / 212		
Motor protection type	-	IP55 (IE2), IEC60034-2-1, ECA Qualifying					
Nominal speed	rpm	3600					
Nominal fan motor power	kW	A - 2.6 / W - 0.66 (IP-54)			A - 6.3 / W - 0.66 (IP-54)		
Recommended cable cross-section at 75 °C (220V / 380V / 460V)	mm <sup>2</sup>	2x3x95 PE50 / 3x95 PE50 / 3x70 PE35			2x3x150 PE70 / 2x3x70 PE35 / 3x95 PE50		
Recommended fuse size (220V / 380V / 460V), slow-blowing	A	250 AgL / 250 AgL / 200 AgL			315 AgL / 160 AgL / 250 AgL		
Cooling air flow through ventilator	m <sup>3</sup> /min	A - 197 / W - 100			A - 248 / W - 100		
Cooling air outlet temperature above ambient temp.	°C	28			27		
Max. allowable pressure drop in duct at ambient 35°C / 45°C	Pa	90 / 70			90 / 60		
Cooling water quantity	l/min	90 @ΔT = 17K @Δp = 0.8 bar			125 @ΔT = 14K @Δp = 1.4 bar		
Cooling water inlet temperature	°C	min. 5 / max. 35					
Cooling water outlet temperature	°C	55					
Cooling water pressure	bar (g)	10					
Cooling water connection		EN10226-1 Rp 1 1/4 (DIN 2999-R 1 1/4)					
Total oil volume	l	54					
Compressed air delivery connections (male screwed thread)	-	EN 10226 R 2 1/2" (DIN 2999-R 2 1/2)					
Weight	kg	A - 2518 / W - 2382			A - 2658 / W - 2483		
Dimensions L x W x H	mm	2337 x 1368 x 2039					

## 11. Annex

### 11.1.3 EUROPE version L132 - L140 50 Hz A - air-cooled W - water-cooled

Technical data 50Hz		L132			L140	
		7.5	10	13	7.5	9
Maximum operating pressure	bar	7.5	10	13	7.5	10
Minimum operating pressure	bar	5				
Ambient temperature	°C	1...45				
Flow	m <sup>3</sup> / min	22.87	21.27	18.59	24.65	21.59
After-cooler outlet temperature above ambient temp.	A - °C	8	8	7	8	8
	W - °C	9	8	7	9	8
Sound pressure level (to ISO 2151)	dB(A)	76			73	
Nominal motor rating	kW	132				
Full-load current max. IP55 (220V, 380V, 400V)	A	513 / 297 / 282				
Motor protection type	-	IP55 (IE3), IEC 60034-2-1, ECA Qualifying				
Nominal speed	rpm	3000				
Nominal fan motor power	kW	A - 5.5 / W - 0.37 (IP-54)				
Recommended cable cross-section at 75 °C (220V / 380V / 400V)	mm <sup>2</sup>	2x3x150 PE70 / 2x3x70 PE35 / 2x3x70 PE35				
Recommended fuse size (220V / 380V / 400V), slow-blowing	A	315 AgL / 200 AgL / 200AgL				
Cooling air flow through ventilator	m <sup>3</sup> / min	A - 273 / W - 100				
Cooling air outlet temperature above ambient temp.	°C	29				
Max. allowable pressure drop in duct at ambient 35°C / 45°C	Pa	130 / 90				
Cooling water quantity	l/min	170 @ΔT = 12K @Δp = 2.1 bar				
Cooling water inlet temperature	°C	min. 5 / max. 35				
Cooling water outlet temperature	°C	55				
Cooling water pressure	bar (g)	10				
Cooling water connection		EN10226-1 Rp 1 1/4 (DIN 2999-R 1 1/4)				
Total oil volume	l	54				
Compressed air delivery connections (male screwed thread)	-	EN 10226 R 2 1/2 (DIN 2999-R 2 1/2)				
Weight	kg	A - 2778 / W - 2599			A - 3254 / W - 3075	
Dimensions L x W x H	mm	2337 x 1368 x 2039				

## 11. Annex

### 11.1.4 EUROPE version L132 - L140 60 Hz A - air-cooled W - water-cooled

Technical data 60Hz		L132			L140	
		7.5	9	13	7.5	9
Maximum operating pressure	bar	7.5	9	13	7.5	9
Minimum operating pressure	bar	5				
Ambient temperature	°C	1...45				
Flow	m <sup>3</sup> / min	22.63	21.32	18.36	24.78	23.44
After-cooler outlet temperature above ambient temp.	A - °C	8	8	7	8	8
	W - °C	9	8	7	9	8
Sound pressure level (to ISO 2151)	dB(A)	78			76	
Nominal motor rating	kW	132				
Full-load current max. IP55 (220V, 380V, 460V)	A	518 / 300 / 249				
Motor protection type	-	IP55 (IE3), IEC 60034-2-1, ECA Qualifying				
Nominal speed	rpm	3600				
Nominal fan motor power	kW	A - 6.3 / W- 0.66 (IP-54)				
Recommended cable cross-section at 75 °C (220V / 380V / 460V)	mm <sup>2</sup>	2x3x150 PE70 / 2x3x70 PE35 / 2x3x70 PE35				
Recommended fuse size (220V / 380V / 460V), slow-blowing	A	315 AgL / 200 AgL / 160AgL				
Cooling air flow through ventilator	m <sup>3</sup> / min	A - 248 / W - 100				
Cooling air outlet temperature above ambient temp.	°C	30				
Max. allowable pressure drop in duct at ambient 35°C / 45°C	Pa	70 / 40				
Cooling water quantity	l/min	170 @ΔT = 12K @Δp = 2.1 bar				
Cooling water inlet temperature	°C	min. 5 / max. 35				
Cooling water outlet temperature	°C	55				
Cooling water pressure	bar (g)	10				
Cooling water connection		EN10226-1 Rp 1 1/4 (DIN 2999-R 1 1/4)				
Total oil volume	l	54				
Compressed air delivery connections (male screwed thread)	-	EN 10226 R 2 1/2 (DIN 2999-R 2 1/2)				
Weight	kg	A - 2778 / W - 2602			A - 3254 / W - 3078	
Dimensions L x W x H	mm	2337 x 1368 x 2039				

## 11. Annex

### 11.1.5 EUROPE version L90RS A - air-cooled W - water-cooled

Technical data 50 / 50Hz			L90RS	
Maximum operating pressure		bar	13.0	
Minimum operating pressure		bar	5.0	
Ambient temperature		°C	1...45	
			<b>at min. speed</b>	<b>at max. speed</b>
7.5 bar	Flow	m <sup>3</sup> / min	4.76	17.6
9 bar	Flow	m <sup>3</sup> / min	4.72	16.19
10 bar	Flow	m <sup>3</sup> / min	4.69	15.24
13 bar	Flow	m <sup>3</sup> / min	6.21	12.76
After-cooler outlet temperature above ambient temp. (at full load)			°C A - 7 / W - 9	
Sound pressure level (to ISO 2151 at 70% load / at full load)			dB(A) 72 / 74	
Nominal motor rating			kW 90	
Voltage (frequency)			380V[+10%-5%];400V[+/-10%];460V[+/-10%] (50, 60Hz)	
Full-load current max. (380V / 400V / 460V)			A 224 / 213 / 185	
Motor protection type			- IP55, EFF1	
Nominal speed			rpm 650...2265	
Nominal fan motor power			A - kW	2.5 (50Hz) (IP54) ; 2.6 (60Hz) (IP54)
			W - kW	0.37 (50Hz) (IP54) ; 0.66 (60Hz) (IP54)
Recommended cable cross-section (380V/400V/460V)			mm <sup>2</sup> 3x95 PE50 / 3x95 PE50 / 3x95 PE50 / 3x70 PE35	
Recommended fuse size (380V/400V/460V), slow-blowing (type gG)			A 250 / 250 / 200	
Cooling air flow through ventilator			m <sup>3</sup> / min	A - 223 (50Hz) ; W - 197 (60Hz)
			m <sup>3</sup> / min	W - 100 (50 + 60Hz)
Cooling air outlet temperature above ambient temp.			°C 27 (50Hz) ; 28 (60Hz)	
Max. allowable pressure drop in duct at ambient 35°C / 45°C			Pa 110 / 80 (50Hz) ; 90 / 70 (60Hz)	
Cooling water quantity			l/min 90 @ ΔT = 17K @ Δp = 0.8 bar	
Cooling water inlet temperature			°C min. 5 / max. 35	
Cooling water outlet temperature			°C 55	
Cooling water pressure			bar (g) 10	
Cooling water connection			EN10226-1 Rp 1 1/4 (DIN 2999-R 1 1/4)	
Total oil volume			l 54	
Compressed air delivery connections (male screwed thread)			- EN 10226 R 2 1/2 (DIN 2999-R 2 1/2)	
Weight			kg A - 2768 / W - 2594	
Dimensions L x W x H			mm 2337 x 1368 x 2039	

## 11. Annex

### 11.1.6 EUROPE version L110RS A - air-cooled W - water-cooled

Technical data 50 / 60Hz			L110RS	
Maximum operating pressure		bar	13.0	
Minimum operating pressure		bar	5.0	
Ambient temperature		°C	1...45	
			<b>at min. speed</b>	<b>at max. speed</b>
7.5 bar	Flow	m <sup>3</sup> / min	4.76	20.68
9 bar	Flow	m <sup>3</sup> / min	4.72	19.24
10 bar	Flow	m <sup>3</sup> / min	4.69	18.22
13 bar	Flow	m <sup>3</sup> / min	5.74	15.62
After-cooler outlet temperature above ambient temp. (at full load)		°C	A- 8 / W - 9	
Sound pressure level (to ISO 2151 at 70% load / at full load)		dB(A)	72 / 76	
Nominal motor rating		kW	110	
Voltage (frequency)			380V[+10%-5%];400V[+/-10%];460V[+/-10%] (50, 60Hz)	
Full-load current max. (380V / 400V / 460V)		A	242 / 230 / 200	
Motor protection type		-	IP55, IE2	
Nominal speed		rpm	650...2690	
Nominal fan motor power		A - kW	2.5 (50Hz) (IP54) ; 6.3 (60Hz) (IP54)	
		W - kW	0.37 (50Hz) (IP54) ; 0.66 (60Hz) (IP54)	
Recommended cable cross-section at 75 °C (380V/400V/460V)		mm <sup>2</sup>	3x95PE50 / 3x95PE50 / 3x95PE50	
Recommended fuse size (380V/400V/460V), slow-blowing (type gG)		A	250 / 250 / 250	
Cooling air flow through ventilator		m <sup>3</sup> / min	A - 227 (50Hz) ; A - 248 (60Hz)	
		m <sup>3</sup> / min	W - 100 (50Hz / 60Hz)	
Cooling air outlet temperature above ambient temp.		°C	32 (50Hz) ; 27 (60Hz)	
Max. allowable pressure drop in duct at ambient 35°C / 45°C		Pa	80 / 40 (50Hz) ; 90 / 60 (60Hz)	
Cooling water quantity		l/min	125 @ΔT = 14K @Δp = 1.4 bar	
Cooling water inlet temperature		°C	min. 5 / max. 35	
Cooling water outlet temperature		°C	55	
Cooling water pressure		bar (g)	10	
Cooling water connection			EN10226-1 Rp 1 1/4 (DIN 2999-R 1 1/4)	
Total oil volume		l	54	
Compressed air delivery connections (male screwed thread)		-	EN 10226 R 2 1/2 (DIN 2999-R 2 1/2)	
Weight		kg	2786	
Dimensions L x W x H		mm	2337 x 1368 x 2039	

## 11. Annex

### 11.1.7 EUROPE version L132RS A - air-cooled W - water-cooled

Technical data 50 / 60Hz			L132RS	
Maximum operating pressure		bar	13.0	
Minimum operating pressure		bar	5.0	
Ambient temperature		°C	1...45	
			<b>at min. speed</b>	<b>at max. speed</b>
7.5 bar	Flow	m <sup>3</sup> / min	4.76	22.72
9 bar	Flow	m <sup>3</sup> / min	4.72	21.18
10 bar	Flow	m <sup>3</sup> / min	4.69	20.08
13 bar	Flow	m <sup>3</sup> / min	5.73	17.26
After-cooler outlet temperature above ambient temp. (at full load)		°C	A - 8 / W - 9	
Sound pressure level (to ISO 2151 at 70% load / at full load)		dB(A)	74 / 77	
Nominal motor rating		kW	132	
Voltage (frequency)			380V[+10%-5%];400V[+/-10%];460V[+/-10%] (50, 60Hz)	
Full-load current max. (380V / 400V / 460V)		A	297 / 283 / 246	
Motor protection type		-	IP55, EFF1	
Nominal speed		rpm	650...2980	
Nominal fan motor power		A - kW	5.5 (50Hz) (IP54) ; 6.3 (60Hz) (IP54)	
		W - kW	0.37 (50Hz) (IP54) ; 0.66 (60Hz) (IP54)	
Recommended cable cross-section at 75 °C (380V/400V/460V)		mm <sup>2</sup>	3x150PE95 / 3x150PE95 / 3x150PE95	
Recommended fuse size (380V/400V/460V), slow-blowing (type gG)		A	300 / 300 / 250	
Cooling air flow through ventilator		m <sup>3</sup> / min	A - 273 (50Hz) ; 248 (60Hz)	
		m <sup>3</sup> / min	W - 100 (50Hz / 60Hz)	
Cooling air outlet temperature above ambient temp.		°C	29 (50Hz) ; 30 (60Hz)	
Max. allowable pressure drop in duct at ambient 35°C / 45°C		Pa	130 / 90 (50Hz) ; 70 / 40 (60Hz)	
Cooling water quantity		l/min	170 @ΔT = 12K @Δp = 2.1 bar	
Cooling water inlet temperature		°C	min. 5 / max. 35	
Cooling water outlet temperature		°C	55	
Cooling water pressure		bar (g)	10	
Cooling water connection			EN10226-1 Rp 1 1/4 (DIN 2999-R 1 1/4)	
Total oil volume		l	54	
Compressed air delivery connections (male screwed thread)		-	EN 10226 R 2 1/2 (DIN 2999-R 2 1/2)	
Weight		kg	2786	
Dimensions L x W x H		mm	2337 x 1368 x 2039	

11.2 Layout plan

(all dimensions in mm)

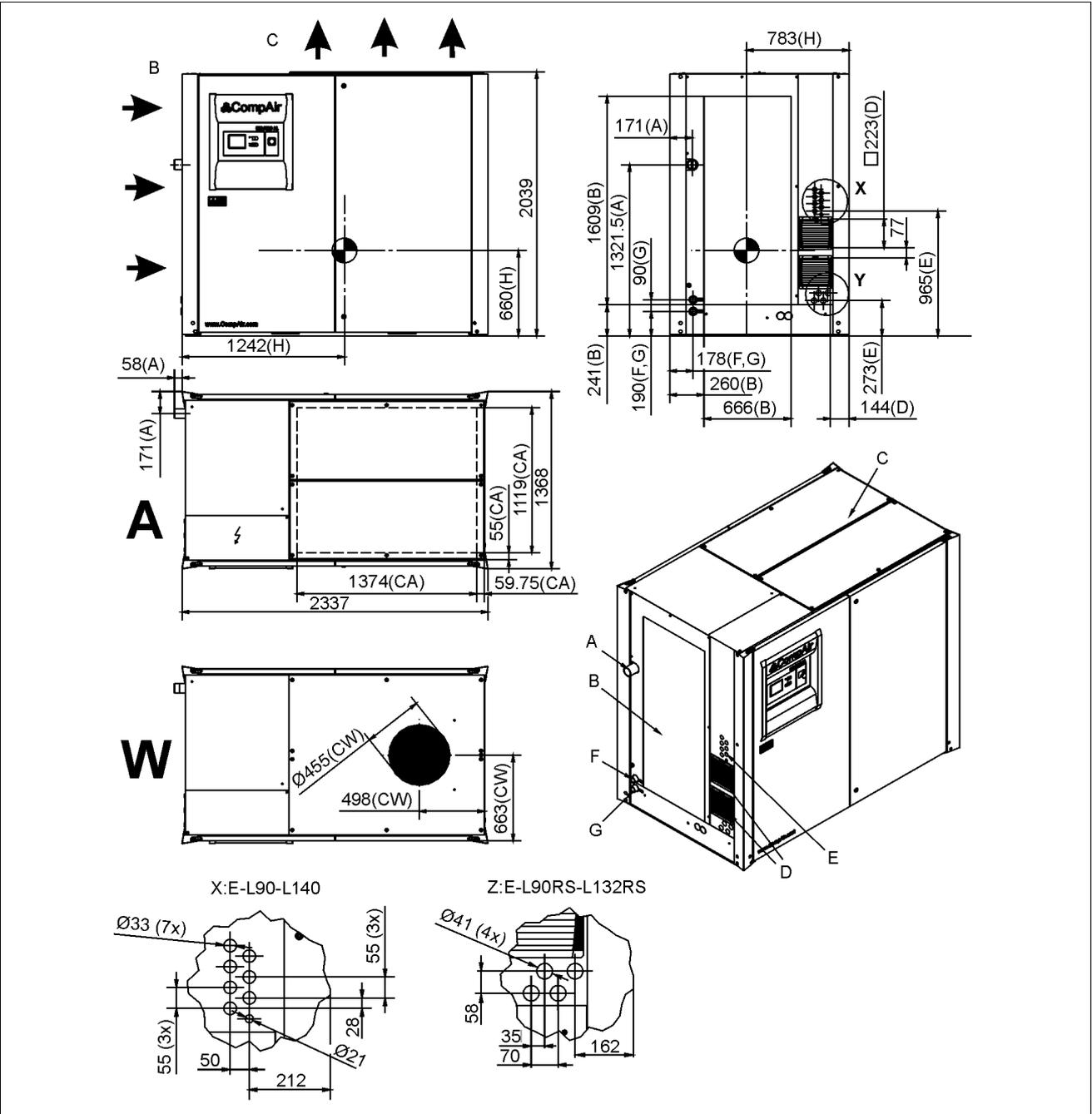


Fig. 30

- A Compressed air connection  
Europe version: male screwed thread R 1 1/2" DIN 2999  
Canada USA version: male screwed thread NPT 1 1/2 - 11-1/2
- B Cooling air inlet
- C Cooling air outlet
- D Cooling-air inlet, control cabinet (L90RS - L132RS only)
- E Openings for inlet cable
- F Cooling water inlet
- G Cooling water outlet
- H Center of gravity

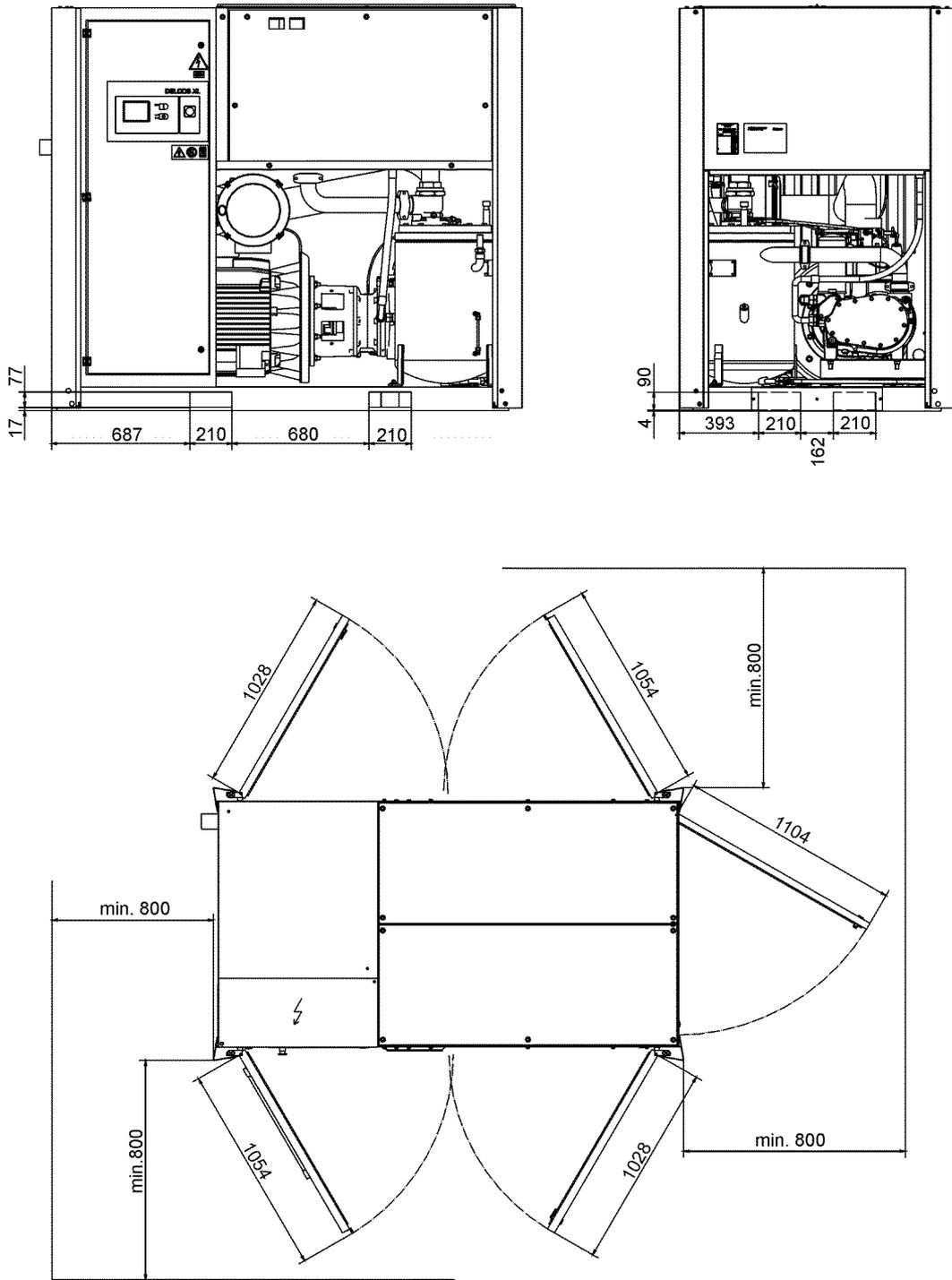


Fig. 31

## 11.3 Declaration of conformity

**1. EC Declaration of conformity**

in accordance with the EC Machinery Directive 2006/42/EC, Supplement II A

2. We, hereby declare

**Gardner Denver Deutschland GmbH**Argenthaler Str.11  
D-55469 Simmern

that the product:

**Kompressor**

type:

**L15; L18; L22; L23; L26; L29; L30; L37; L45; L50; L55; L75; L80;  
L90; L110; L132; L140; L160; L200; L250; L15RS; L18RS;  
L22RS; L23RS; L26RS; L29RS; L30RS; L37RS; L45RS; L55RS;  
L75RS; L90RS; L110RS; L132RS; L160RS; L200RS; L250RS;  
L15FS; L18FS; L22FS**

trade mark:

manufacturer no.:

in the form as shipped by us complies with the following relevant provisions:

2014/29/EU

2006/42/EG

2014/30/EU

2014/35/EU

This machine is exempt from the Pressure Equipment Directive 2014/68/EU. Please refer to Article 1, clauses 2.c, 2.f.i, 2.j.ii for information on this exemption.

3. If the machine is modified in a way not agreed upon with us, this statement will be void.

4. Harmonised standards applied, particularly

EN 1012-1

EN ISO 12100  
EN 29001EN 60034-1  
EN 60204-1EN 61000-6-4  
EN 61000-6-2

5. National engineering standards and specifications applied

AD-S1/2000

BetrSichV

DIN 3230

VDE 0298

6. Recording agency:

CompAir Drucklufttechnik -  
Zweigniederlassung der  
Gardner Denver Deutschland GmbH

Simmern,

Date

Signature







**Gardner Denver Deutschland GmbH  
Argenthaler Str. 11  
55469 Simmern  
Deutschland**

**Tel. ++49 (0)6761 832-0  
Fax ++49 (0)6761 832-409**

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