Chapter 1
Safety Advice

Contents

This chapter informs you about

- Definition of the symbols used.
- Basic advice as to the safe handling of the compressor.
- Advice regarding accidents.

Important advice!
It must be clearly understood that the safety advice given in this manual should only be used as an additional aid to the national safety accident prevention rules and laws currently in force.

Existing accident prevention rules and regulations must be retained and adhered to at all times.

Survey

This chapter relates to the following subjects:

1.1 Symbol

Contents

Symbol definitions

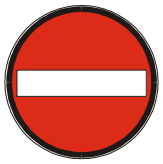
Danger!

This symbol relates to the danger of life and health of people

Dangers to life will be particularly related to by using the expression: **danger for life.**

Danger!

This symbol relates to danger for life and health of people due to electric voltage.



Attention!

This symbol is a sign of danger for machine, material or the environment

Advice!

This symbol is to indicate important advice and information which contribute to your own safety, as well as to the better understanding of the compressor operation.

Disposal!

This symbol indicates advice as to the disposal of machinery parts and operating materials.

1.2 Basic safety advice

Contents

Hereafter you will find basic safety advice for the safe handling of the compressor.

Danger!

To minimise risk of personal injury, damage to equipment or property, strictly follow the remedial actions stated below.

Possible danger	Remedial action
Remaining dangers The screw compressor has been designed and built according to latest technical standards and according to recognized safety regulations and is equipped with corresponding safeguarding equipment. However, remaining risks cannot be excluded. These dangers will be explained in this chapter. Endangerment of people due to lack of qualification and/or operational faults of the service personnel. **Explanation:** Operational faults may cause personal injury, or damage to equipment and property.	You should only operate this equipment ● Having the qualification necessary ● Having received complete instructions from the Operating Company ● Having completely read and understood this MANUAL ● Before any maintenance or service work is carried out the **RED STOP** button must be pressed. The incoming electrical supply to the compressor must also be switched off and isolated.

Protective gloves and protective goggles must be worn during some of the maintenance work. Please observe the corresponding advice

1.2 Basic safety advice (continuation)

Danger!

Please strictly follow the under mentioned safety advice to avoid the danger of electrical shock or personal injury.

Possible danger	Remedial actions
Danger of life Danger to people by an electric shock. **Explanation:** The machine operates (as standard) at a voltage of 400 V with an adequately high amperage. As voltages of more than 44 mA can be fatal, corresponding precautions are required.	• Do not touch live cables or connections. • In case of damaged cables report immediately to the maintenance personnel. • Ensure all doors to electrical installations are closed securely. • Always isolate electrical supply before starting any maintenance work on the compressor. • Only trained personnel must carry out maintenance and service work. • Wear rubber soled safety shoes when working on the compressor electrical circuit. • Make sure that during maintenance or service work no third party may switch on the circuit breaker

There are no open flames and no sparks allowed at the site of operation.

1.2 Basic safety advice (continuation)

Attention!

To minimise risk of personal injury, damage to equipment or property, strictly follow the remedial actions stated below.

Possible damage	Measures for prevention
Physical injury of the personnel and damage to the compressor due to removal or evasion of protective devices	• Do not remove or make inoperative any safety device • Rectify defects immediately they are recognised • Electrical work/repairs must be carried out by a qualified electrician only
Damage to the compressor due to overloading	• Do not exceed the technical limit values stipulated
Burns through hot compressor parts	• Do not touch compressor parts immediately after having opened the doors of the canopy
Burns through hot lubrication oil when topping up or changing oil	• Turn the oil filler cap slowly anticlockwise during the first 5 rotations until a tangible “snap-point”. Thus the remaining pressure will be slowly relieved (see also chapter 5.7: Changing Oil)
Possible eye and skin burn due to hot condensate spurt	• Let the compressor sufficiently cool down and handle with great care before disconnecting it from the c.a. system. **Wear protective goggles**
Danger through compressed air **Danger of life** Compressed air may severely injure human and domestic animals	• Do not bring compressed air to bear on any creature

1.3 Accident Conduct

Contents

Hereafter you will get to know which measures must be taken at accidents or disasters (e.g. fire or explosion)

Preparations for appropriate help at accidents

Please undertake the following measures at regular time intervals so as to be prepared in case of an accident:

- Take part on regular basis in First - Aid courses in order to brush up your knowledge.
- Get yourself regularly informed about the possibilities which are at your disposal in regards to rescue facilities for First Aid in your company
- Safe-guard a list at your work place containing the telephone numbers required as well as the contact person.

Accident conduct

At an accident, proceed in the following sequence:

Action	If	Then
1	there are injured people	administer first aid if you are a trained first aider?
2	there are injuries to people and damage to property	**inform the rescue team of the severity of injuries and type of damage to property.**
3	the disaster (fire) has happened	● leave the machine immediately ● use the marked emergency exists and escape facilities. ● do not use elevators/lifts!
4	there are injuries to people, damage to equipment or buildings	inform your supervisor immediately or another person from the list of company first aiders or safety officers. This list should be clearly visible in the working area.

Chapter 2
Machine description

Content

This chapter covers the following:

- definition of the safe access points for operating the compressor,
- overview of the compressor and its control instrumentation, and
- technical data.

Overview

This chapter is subdivided as follows:

2.1 Authorised access points

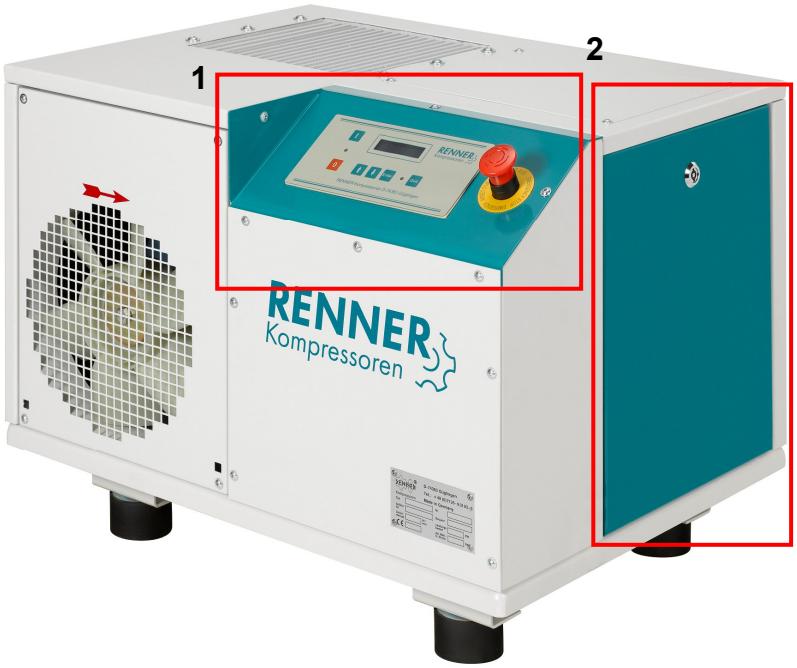
Content

This section defines the safe access points for operating the compressor and for carrying out minor inspection and maintenance work.

Important Note!

Other access points are not intended for operating the compressor and are therefore not permitted as operator stations! Safe operation can only be guaranteed from the operator terminals specified. Work on the switch box and electrical installations may only be carried out by qualified electricians.

Figure Access points



Continued overleaf

2.1 Authorised access points (cont.)

Description of the access points

The following access points only are provided for the operation of the machine:

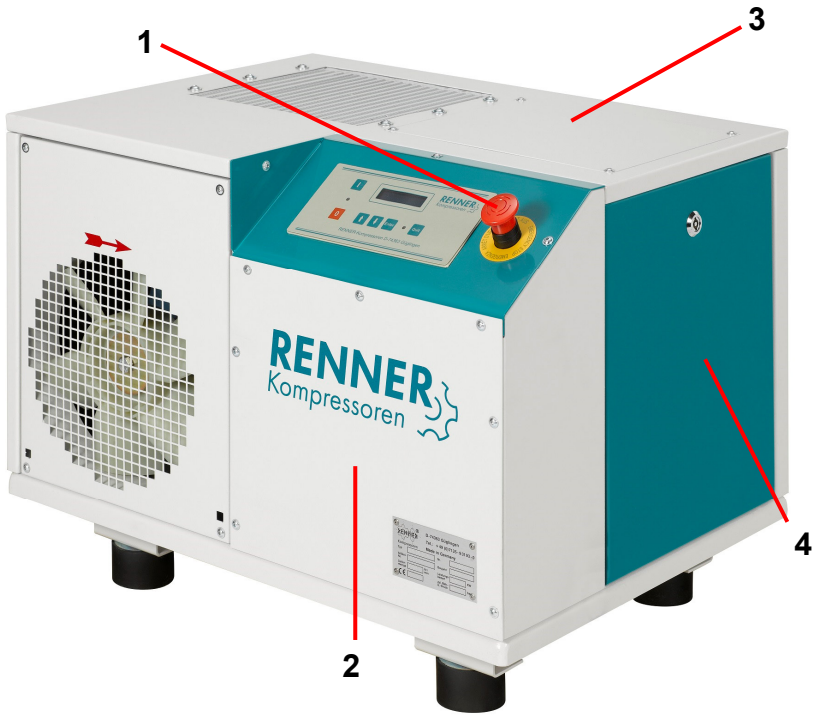
No.	Operation ...	Actions permitted
1	... of the control panel	● Check working pressure ● Check oil and operating temperature ● Read operating hours ● Switch compressor on ● Emergency stop or shut-down of compressor
2	... of the safety devices	● Carry out inspection and minor maintenance work

2.2 Safety devices

Content

This section provides an overview of the major compressor elements and their functions.

Figure safety devices



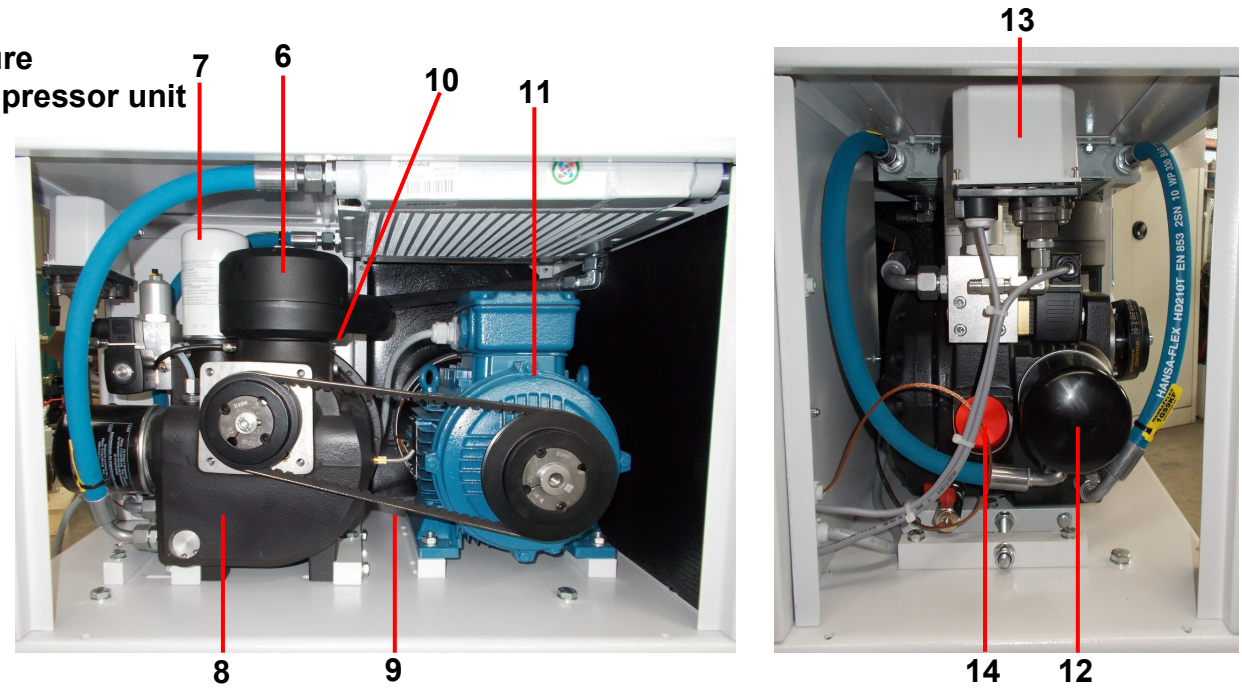
Description of the safety devices

The following safety devices are fitted to the outside of the compressor:

Item	Description	Function
1	Emergency stop	Stops compressor immediately in emergency
2	Electric panel door	Guard door on control box to be opened by qualified electricians only **CAUTION: Danger to life! Electrical voltage!**
3	Top lid	Access to air filter and oil trap cartridge
4	Side panels	Access to motor, drive belt, oil filter, oil filler neck, pressure switch and control valve

2.3 Compressor unit

Figure compressor unit



Description of the compressor unit

After removing the front walls of the compressor, you will see the most important components of the unit:

Item	Description	Function
6	**Suction air filter cartridge**	Is used to filter suction air
7	**Separator cartridge**	Filters the finest residue oil from the compressed air after pre-separation
8	**Air end**	Generate air pressure
9	**V-belt**	Power transfer
10	**Safety valve**	Pressure limitation
11	**Electro-motor**	Drive
12	**Oil filter**	Purifies the compressor oil
13	**Pressure switch**	Controls the switch-on and switch-off pressure
14	**Oil filter neck**	Oil level control and refill

2.3 Compressor unit (cont.)

Description aggregate components

Air end (item 8)
The direction of rotation of the air end is to the left (anti-clockwise) when looking from the front-side on to the shaft (see picture). Pay attention to the directional arrow on the side of the air end with the sign D.

Suction air filter (item 6)
The suction air filter is directly mounted on to the suction stud of the suction regulator.
The dry micro-filter with a rating of 10 µm filters the intake air.

Pressure switch (electric)
The pressure switch is directly connected to the outlet of the machine. It controls the suction regulator. The values for p_{max} and p_{min} are set at this switch.
p_{max}: is the upper service pressure at which the unit normally stops pumping
P_{min}: is the lower service pressure at which the unit normally starts pumping again.

The pressure switch has been correctly set in the factory. Authorised personnel must only carry out adjustments to the pressure switch.

Suction regulator
The suction regulator is directly connected to the air end. It controls the air volume sucked in by the compressor via the air suction filter.
Function of the suction regulator:
The suction regulator comprises of one main valve. This operates as a control valve and at the same time as a hermetically sealed isolator valve. At full load the suction cross-section is fully opened.
When the machine stops this valve closes quickly and thus the suction cross section is locked altogether.
The multi-functions of the regulator are ensured by just one flange mounted control unit.

Minimum pressure valve
The minimum pressure valve is situated at the outlet of the compressor unit just before the air-after cooler.
It performs two tasks:

1) As a minimum pressure valve it prevents a loss of pressure (in the air end) when no counter pressure in the air-mains is available. A minimum pressure is necessary in order to safeguard lubrication of the air end.

2.3 Compressor unit (continuation)

Description unit components (contd.)

2) As a “non return valve“ it prevents at the same time the reverse flow of compressed air from the air mains or the air vessel, back into the compressor unit. Due to this function the compressor unit is totally pressure relieved once it is stopped.

The valve operates automatically. The setting of the minimum pressure valve must only be done by persons authorised by the manufacturer.

Oil separator cartridge (Item 7)
The oil separator cartridge is not only designed for filtering the oil from the compressed air, but serves at the same time to reclaim the residual oil after pre-separation as drops, formerly micro-distributed in the system. This cartridge is a spin on/off type and – by means of the connection nipple – is screwed on to the filter support of the oil re-claimer (see illustration below)

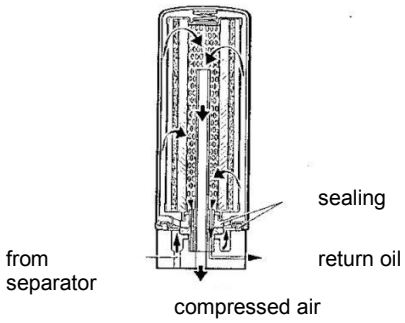


Illustration: oil separator cartridge

Oil return scavenge window / oil return scavenge non-return valve
The oil return window (fitted to some air ends) is situated near to the oil separator cartridge and shows the scavenged oil coming from the a.m. cartridge.

When starting the compressor the scavenge window is filled with oil due to its accumulation during standstill. After a few minutes a mixture of oil and air can be observed. Separation of oil in the cartridge takes place.
If after a longer period of operating time no oil can be observed in the scavenge window, a disturbance may have happened e.g. a clogged borehole. As a consequence the oil separated will be carried over in the compressed air into the air mains/vessel.

Only personnel authorised by the manufacturer are allowed to rectify such problems.

2.3.2 Compression unit (continuation)

Description: Compression unit components (continuation)

Oil scavenge window / oil scavenge non-return valve
The oil scavenge non-return valve prevents the oil separator cartridge from flooding by scavenging oil from the air end.

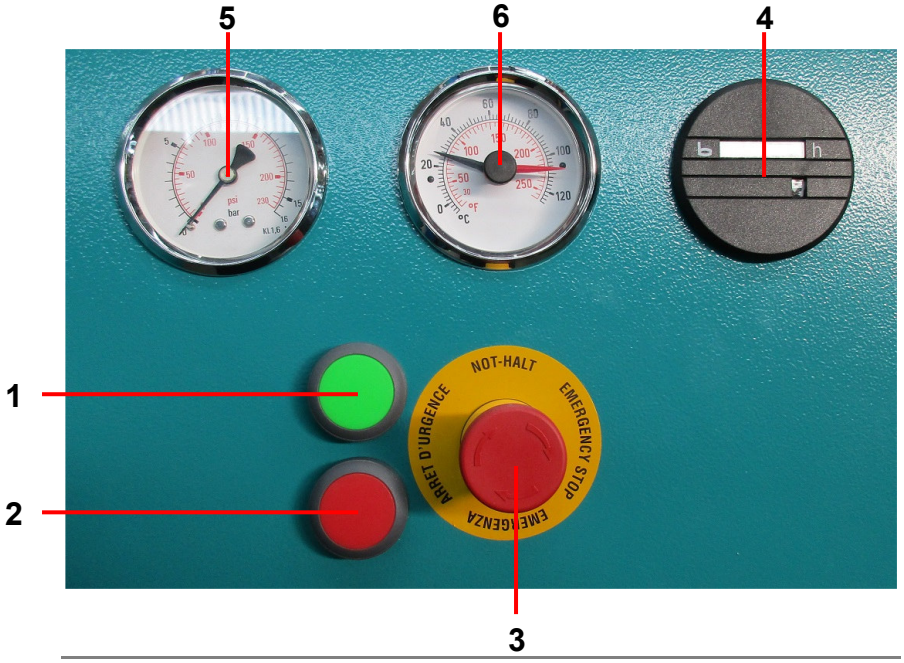
Oil filter (item 12)
The oil filter (cartridge) cleans the compressor oil from impurities. The cartridge is screwed on to the scavenge stud by hand. The efficiency of the filter is about 25 µm.

Combistat
The Combistat is a temperature indicator and control unit.
It is built into the instrument panel. It monitors the maximum permissible service temperature of the unit, which is set at 110°C (red mark).
When this temperature is reached the electric circuit is disconnected and the unit stops automatically.
Do not bend the connecting line between the compressor and the Combistat, otherwise the electric circuit is interrupted.

Safety valve (item 10)
The safety valve is mounted on the oil re-claimer before the oil separator cartridge. It is set 1-2 bar above the max. gauged pressure. The safety valve blows off in case the final pressure is exceeded due to a fault somewhere in the system.

2.4 Instrumentation Panel RENNERlogic

Figure Instrumentation panel RENNERlogic



Description of the Instrumentation panel RENNERlogic

The following controls are found on the instrumentation panel:

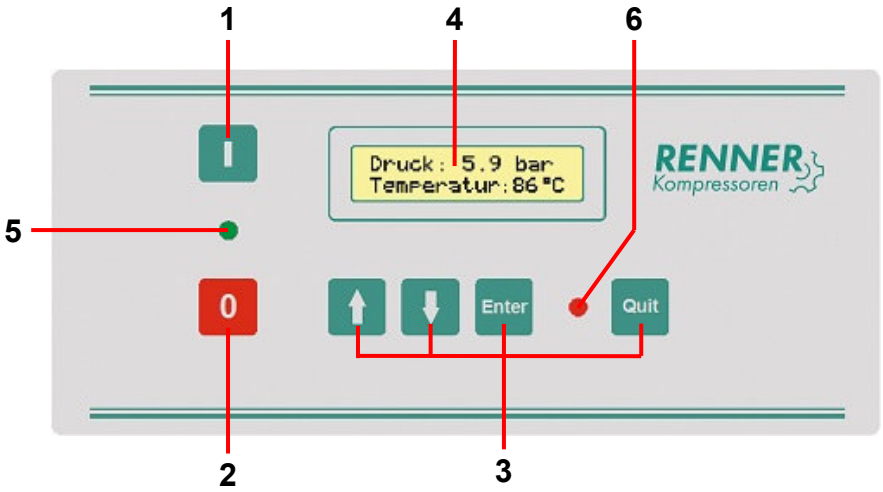
Item	Description	Function
1	**Start button**	Switches the compressor on
2	**Stop button**	Switches the compressor off
3	**Emergency stop**	Switches the compressor off in **case of emergency**
4	**Operating hour meter**	Counts the number of hours operated by the compressor
5	**Pressure gauge: Working pressure**	Indicates pressure ratios or excess pressure
6	**Combistat temperature indicator**	Indicates operating temperature and overheating

2.5 RENNERtronic Control (Optional)

Content

The “RENNERtronic” controls and monitors the entire workings of the compressor. It is possible to set or change a number of parameters and functions.=> please also note the enclosed instructions

Figure Control RENNERtronic



Instrumentation components: Control RENNERtronic

The "RENNERtronic" control features the following instrumentation controls:

Item	Description	Function
1	**Compressor ON**	Switches the compressor on
2	**Compressor OFF**	Switches the compressor off
3	**Multiple function keys**	Navigates in the menus, sets parameters, etc.
4	**Display**	Displays the parameters
5	**LED (green)**	Service LED
6	**LED (red)**	Fault / maintenance LED

Note!

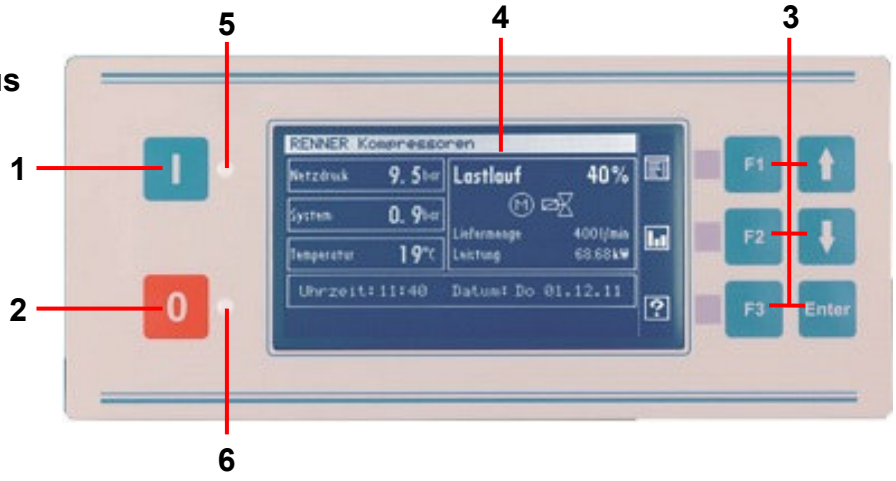
Please see the explanations in Chapter 4 and the instruction manual for the “RENNERtronic” control.

2.6 RENNERtronic plus Control (Optional)

Content

The “RENNERtronic plus” controls and monitors the entire workings of the compressor. It is possible to set or change a number of parameters and functions.=> please also note the enclosed instructions

Figure Control RENNERtronic plus



Instrumentation components: Control RENNERtronic plus

The "RENNERtronic plus" control features the following instrumentation controls:

Item	Description	Function
1	**Compressor ON**	Switches the compressor on
2	**Compressor OFF**	Switches the compressor off
3	**Multiple function keys**	Navigates in the menus, sets parameters, etc.
4	**Display**	Displays the parameters
5	**LED (green)**	Service LED
6	**LED (red)**	Fault / maintenance LED

Note!

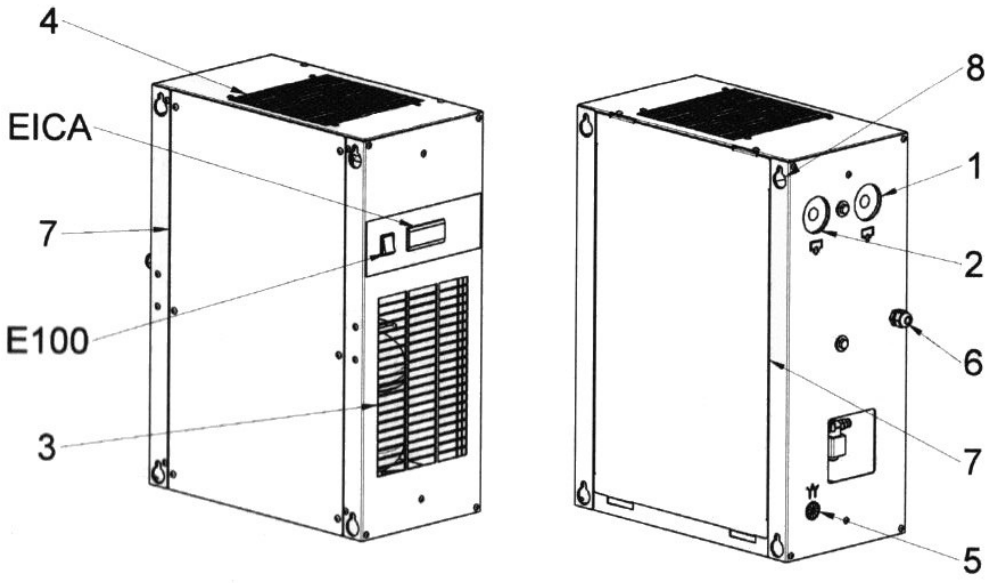
Please see the explanations in Chapter 4 and the instruction manual for the “RENNERtronic plus” control.

2.7 Refrigerant drier (optional)

Contents

This section provides a brief overview of the refrigeration drier, installed as an optional feature.

Diagrams of refrigerant drier



1.) Compressed air inlet
2.) Cpmpressed air outlet
3.) Refrigerant air intake
4.) Refrigerant air outlet
5.) Steam trap
6.) Electrical connections
7.) Maintenance access
8.) Mounting holes
E100.) On-off switch
EICA.) Electronic regulator

Hazard!

Observe the safety instructions in the separate operating manual for the refrigerant drier. It is especially dangerous to breathe in refrigerant vapour or come into contact with liquid refrigerant. Smoking is not permitted when working around the refrigerant drier since ash from cigarettes, or any other naked flame (e.g. when welding) combines with the refrigerant to produce poisonous vapours.

Description Refrigerant drier

The refrigerant drier also has a cooling unit to cool the compressed air. The unit also removes moisture from the compressed air. The resulting condensate is drained off using a condensate separator.

Attention!
Please see the explanations in chapter 4 and the KT Appendix as well as the manufacturer's instruction manual.

Please note

that the float of the steam trap is checked regularly and cleaned when necessary. Exact instructions regarding the procedure can be seen in the manufacturer's instruction manual in Point 5.1.3 Maintenance.