Installation, Operation & Maintenance Manual

SCROLLline

RENNER® Kompressoren

oil-free Made in Germany

Please read carefully before commissioning and follow instructions.
Keep in a safe place for future use.

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Table of contents

Table of contents (continuation)

Chapter 4
Operation

Chapter 5
Maintenance

Table of contents (continuation)

Chapter 6
Decommissioning and disposal

Appendixes

Chapter 0
General Information

Contents

Hereunder you will find general information relating to the following subjects:

- Utilisation of the INSTALLATION, OPERATION & MAINTENANCE MANUAL
- Compressor Operation and Usage
- Requirements of staff qualification

Survey

This chapter relates to the following subjects:

0.1 General Information

Contents

General information regarding this manual

Validity

This manual is applicable to the following compressor:

Compressor Detail	Classification
Type	SCROLL compressor
Year of construction	
Serial number	
Model	
Location	

Manufacturer

RENNER Kompressoren
Emil-Weber-Strasse 32
D-74363 Gueglingen

Date of issue

July 2009 – updated January 2010

Safe-keeping and completeness

- This manual should be kept in a clean safe condition and should be readily available to authorised personnel at all times.
- Do not remove any pages from this manual.
  Any lost or mislaid pages should be replaced especially if they relate to health and safety matters.

Continuation next page

0.1 General Information (Continuation)

Copyright

Modification of the compressor

For safety reasons any modification or alteration may be permitted only after having received the agreement of the manufacturer.
If modifications are made it is likely that the MANUFACTURER'S and/or CONFORMITY[1)] DECLARATION will become invalid; even the permission to operate the compressor, as well as warranty conditions will be invalidated if not agreed upon in writing by RENNER GmbH.

[1)] In such a case the proceedings in regard the validation of conformity according to 2006/42/EC u.U. must be carried through a new considering all elements required.

Supplier's documents *

The following suppliers documents are part of this manual and must be kept save and related to:

Documents for	manufacturer
Operating manual Compressed air drier RKT	RENNER GmbH D-74363 Güglingen

*) *in case the compressor is equipped with this option*

0.2 Structure and use of this manual

Contents

The following information relates to the structure and use of this manual.

Chapter

This manual contains the following chapters:

Chapter	Summary
0	● General Information regarding: – the manual, – its usage – requirement of staff qualification
1	● Definition of the symbols used ● Basic safety instructions
2	● Description and function of the compressor
3	● Operating the compressor
4	● Maintenance hints
A(xy)	● Appendix (es)

Numbering of pages

The pages have been consecutively numbered according to the chapter:
Example: 3-2
Signifies: Chapter 3, *Page 2*
Example: AS-1
Signifies: Appendix and „KT“ for air dryer

0.3 Intended usage / misuse

Contents

The intended usage of the compressor is described

Definition: Authorized persons

Persons are regarded as authorized, when they have received adequate training/instruction and is then charged with defined work on or with the compressor ... Keys to the protective hood must only be made accessible to authorized persons.

Intended usage

The compressor should only be used according to the manufacturer recommendations in conjunction with the following bullet points.

- The compressor must be used only for the compression of technically clean air without any detrimental or explosive additives or impurities.
  Ambient temperature must be below 40°C.*
- Authorized persons only are allowed to work on the compressor
- The machine must only be operated with the safety devices installed
- The safety and operating advices contained in this manual must be observed
- Any instructions given by the operating company must be observed
- The legal accident prevention rules must be respected

Misuse

Misuse is regarded as:

- Operation by non-authorized persons
- Operation by disregarding rules and regulations
- Operation without corresponding treatment /cleansing of the compressed air in the field of foodstuffs and breathing air
- Operation with defective safety-devices or those deactivated or modified

* please consult your dealer or the manufacturer with details in case the ambient temperature is higher in your compressor room.

0.4 Requirement of the user

Contents

Hereafter the duties and obligations of the user are outlined when operating the machines

Safety of the plant

The user has to particularly ensure that

- the compressor must be used only according to Manufacturer recommendations in conjunction with all current health and safety regulations
- the compressor must be operated only when in faultless condition and fully functional
- the integrated safety devices are regularly serviced and are fully functional
- only adequately qualified and authorized personnel operate, service, and repair the compressor

Protection of staff

The operating company must ensure that the personal protective equipment required is available for

- the operating personnel,
- the service and maintenance personnel
- the maintenance and repair personnel

and that it is emploied accordingly

.

Briefing and training

The operating company must ensure:

- that prior to start up all personnel who will maintain, service or operate the compressor are fully aware of the current personal and environmental safety regulations and procedures.
  Annual personnel update of safety procedures would be recomended
- the complete manual must always be available at the site of the compressor in a readable condition
- that personnel are aware of the location of the manual, the content and particularly the safety chapters.
- the safety and warning advices mounted are not taken away or made illegible

0.5 Personnel responsibilities

Contents

The requirements in regard to staff qualification are as follows.

Duty of operating personal

The personnel must carry out the following duties:

- to control and inspect the compressor as to its faultless and safe function.
- to operate the compressor according to the operating points previewed. (see chapter 2.1)
- to recognize and delete or report respectively disturbances and irregularities.

Responsibilities of operating personnel

In order to carry through the requisitions the service personal must accomplish the following requirements

- The operator (of the compressor) must have received instructions from the operating company as to the labor protection law.
- The operator must have a clear understanding of the instructions given by the operating company and must carry them out.

Duties of the maintenance personnel

The service and maintenance personnel must comply with the following duties:

- carry through regular inspection and maintenance work
- up-keep of the compressor
- carry through test runs of the machine
- check the integrated safety devices

Requirement of staff qualification

The following qualifications are required in regard to maintenance personnel:

- The maintenance personnel must have successfully passed a test as skilled (machinery) labour - or equivalent. In order to carry through the LARGE MAINTENANCE a special training course at RENNER GMBH has to be attended.
- The personnel must comply with the maintenance instructions.

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.

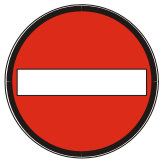
Danger!

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 of life.**

Danger!

This symbol relates to danger of 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 SCROLL 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 up to 400 V with an adequately high amperage. As voltages of more than 44mA 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 must be neither open flames nor flying sparks where the compressor is installed.

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 protective hood
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

Contents

This chapter covers the following:

- Definition of the safe access points for operating the compressor
- Overview of the compressor and its control instrumentation

Overview

This chapter is subdivided as follows:

2.0 Service conditions

The Scroll compressor must be installed on a levelled base in a cool, frost-protected and well ventilated room.
The admissible ambient temperatures are from 0°C to 40°C.
The ideal service temperature of a Scroll compressor of models SL 1,5 and SL 2,2 is up to 160°C.
For multi-bloc machines and models SL 3,7 to 4,5 up to 220°C and SL 5,5 up to 230°C.

2.1 Authorised access points

Contents

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

Important remark

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 electrical switch box and electrical installations may only be carried out by qualified electricians.

Illustration: Access points

Approximate illustration

Continued overleaf

2.1 Authorised access points (contd.)

Description
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 operating temperature • Read number of hours of operation • Switch on compressor • Emergency stop or close-down of compressor
2	... of the safety devices	• Carry out inspection and minor maintenance work

2.2 Safety devices

Contents

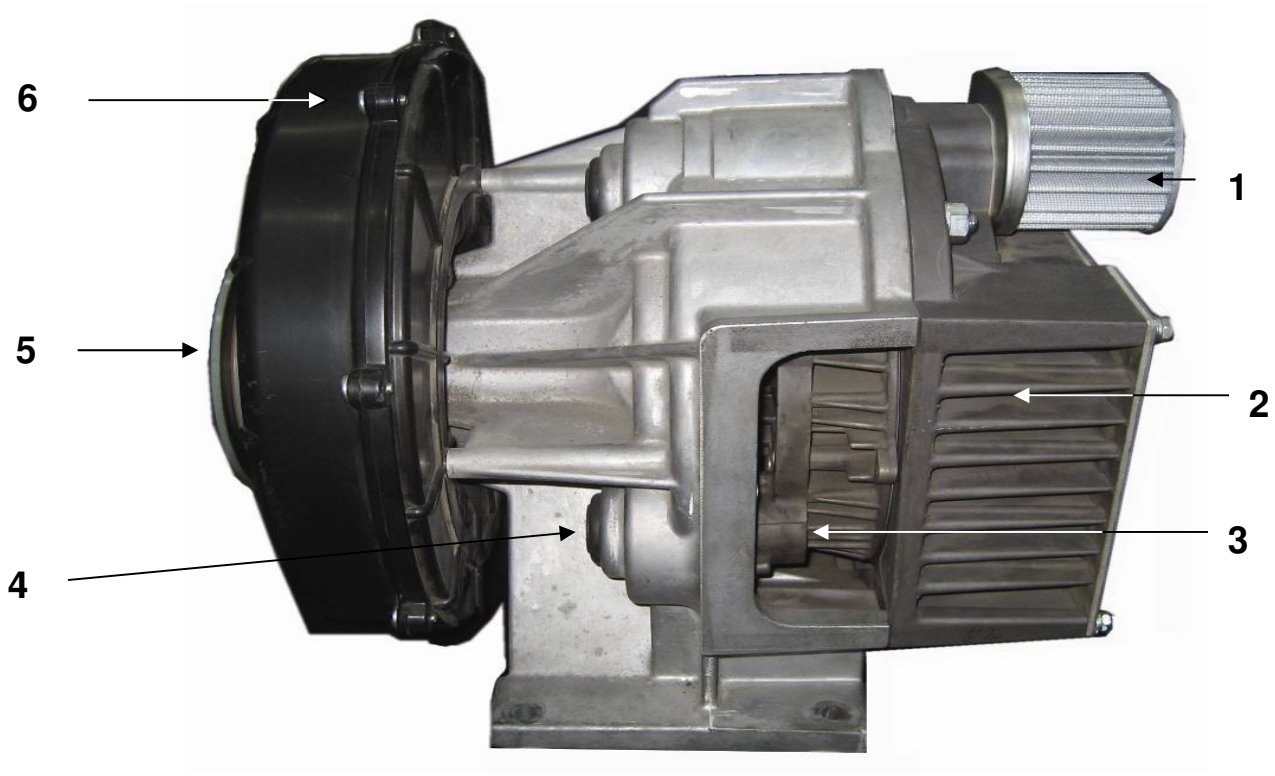
This section provides an overview of the major compressor elements and their functions.

Illustration:
Safety devices

Description
Safety devices

Item	Description	Function
1	STOP button	Stops compressor immediately in case of emergency
2	Door electric control cabinet	Guard door to electric cabinet containing amongst others the pressure switch and further electrical components. To be opened by qualified electricians only **CAUTION: Danger for life! Voltage!**
3	Control panel	Start-Stop push-button, indicator of service temperature, service pressure and hour meter
4	Protective hood	Access to air filter, motor, V-belt and solenoid valve

2.3 Overview SCROLL compressor block



POS	Description	Function
1	Suction filter (2 off for model SRL 5,5)	serves to filter the suction air
2	Exit of cooling air	cooling of the Scroll elements
3	Orbiting Scroll spiral	compressed air delivery
4	Port for “maintenance rack”	maintenance
5	Pulley	power transmission
6	Cooling fan (inside)	sucks in cooling air

2.3 Overview compressor unit (contd.)

Description: compressor unit components (contd.)

Compressor unit (see illustration)
Renner Scroll machines are operating oil-free. They are stationary and electrically driven.
The core component and - so to speak - the principle of the Scroll system is a double-spiral with no metallic contact. The air is continuously compressed through the interaction of a fixed and an orbiting spiral compression element. This endlessly repetitive compression process guarantees a vibration-free stream of oil-free air which is compressed up to 10 bar (142psig)

Control air hose

Illustration: control air hose at air receiver

The control air - required for the Scroll models SL 1,5 to SL 4,5 - must be taken directly at the cooler installed.
The control air hose with model SL 5,5 (star-delta-start is standard) must be connected to an air receiver.
In case the unit is supplied without air receiver this must be carried through at the site of installation.

Suction filter (Pos. 1)
The suction filter filters the (ambient) air required from coarse dirt particles. Best suction air quality is decisive for a long working life.

Exit of cooling air (Pos. 2)
The air sucked in from the exit of the cooling air streams trough the after cooler and thus cools the compressed air.
Please make sure that the cooling fins are cleaned regularly and are free of dust, dirt etc.

2.3 Overview compressor unit (contd.)

Orbiting Scroll spiral (Pos.3)
The revolving Scroll spiral produces a constant air flow

Opening for the maintenance rack (Pos. 4)
It shows one of three openings (with a cover) for the maintenance rack (special tool), the latter of which is required to change the tip seals (maintenance after 5000 hours for 10 bar units and 10.000 hours for the 8 bar machines)

Drive pulley (Pos.5)
Power transmission from the electric motor to the compression unit designed for the corresponding pressure with one or two v-belts.

Cooling fan (Pos.6)
The cooling fan sucks in the air required to cool the compression unit and the compressed air and is channelled through the compression unit and the cooler.

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.

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, see 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
The safety valve is mounted on the air receiver of the SLD range of compressors (Scroll compressors on air receivers The safety valve blows off in case the final pressure is exceeded

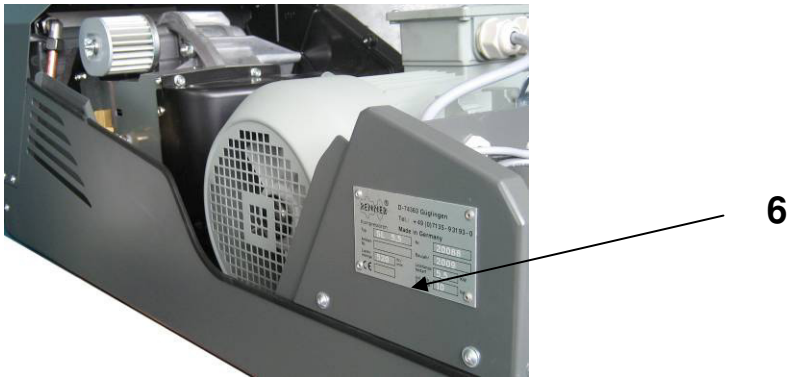
2.4 Overview operator panel

Illustration Operator panel

On the panel you will find the following service elements:

Description: Operator panel

Item	Description	Function
1	***STOP* push button**	stops the compressor
2	***START* push button**	starts the compressor
3	**Temper. indicator (Combistat)**	shows service temperature and in case of overheating
4	**Pressure gauge**	indicates gauged pressure
5	**Hour meter**	counts the service hours of the compressor
6	**Machine plate**	shows the main performance data, the compressor model and its serial number

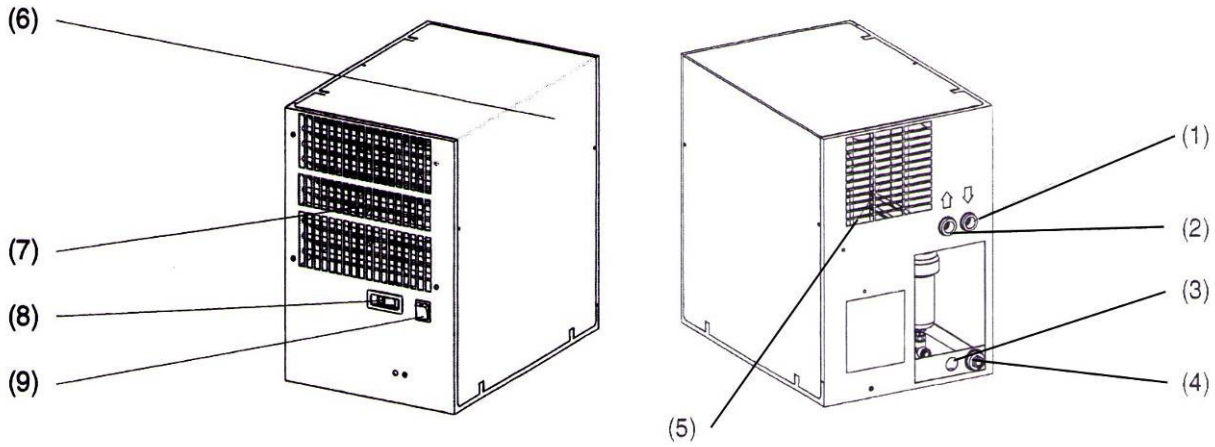


2.5 Overview refrigeration air dryer (optional)

Content

This chapter contains a short survey of the refrigeration air dryer optionally installed (5).

Illustration: refrigeration dryer



1.) Compressed air entry
2.) Compressed air exit
3.) Condensate drain
4.) Electrical connection
5.) Exit of cooling air
6.) Access for servicing
7.) Entry of cooling air
8.) Indication of dew-point
9.) Operating switch

Description: refrigeration dryer

The dryer has a refrigerating unit to cool the compressed air. At the same time the compressed air is dehumidified. The condensate resulting is drained off using a condensate separator.

Danger!

Observe the safety instructions in the separate operating manual for the refrigeration dryer. 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 dryer since ash from cigarettes, or any other naked flame (e.g. when welding) combines with refrigerant to produce poisonous vapours.

Attention!
For details please see the comments in chapter 4 and appendix KT as well as the Operating Manual for the refrigeration air dryer.

Chapter 3
Installation & putting into operation

Content

This chapter contains important information concerning the transportation, installation and storage of the compressor.

General information

The installation plan and technical data for these compressors can be found in the data sheet as annex AT.
The compressor is normally delivered on (Euro-) pallets and is packed in cardboard and plastic foil.

Danger of toppling!
The machine may topple over if tilted in excess of 10°! Use an appropriate means of transport such as fork-lift, lift-truck or wire harness. Support the sides of the unit.

No special procedures need to be taken when unpacking. Likewise, storing the unit (temporarily) within its original packaging poses no problems. Store the compressor on even, firm ground and prevent it from toppling over.

Dispose of the packaging material (cardboard/plastic foil) separately.

Survey

This chapter is divided into the following sub-sections:

3.1 Compressor installation

Content

This section contains important advice you need to follow in order to install the compressor safely whilst avoiding damage or malfunction.

CAUTION!

Observe safety instructions!

Always stay away from the danger zone of a load being lifted!

Compressor installation

Keyword	Instructions
Installation site	• Ground: even, horizontal, firm • Check load carrying capacity of floor. • Air as cool, clean and free of frost as possible, as low humidity as possible Temp.: +0°C (32°F) - +40°C (104°F) *) • Sufficient ventilation of compressor room • Air intake must be unobstructed • Place air intake opening in a position where loose objects cannot be drawn in. • Ensure installation site has sufficient lighting (for reading of instruments, carrying out maintenance, etc.)
Lifting work	• Secure all loose and swinging parts, before lifting the compressor. • Use an appropriate lifting vehicle (weight according to data sheet) • Always stay away from the danger zone of a load being lifted
Pipelines, pressure lines	• Before assembling pipelines, remove all protecting plugs, caps and sacks using a drying agent. • As the pressure system can expand from the compressor to the aftercooler or air system due to heat, we strongly recommend to connect to the rigid air system by means of a flexible hose.
Exhaust	• Exhaust ducts must have a diameter at least equal to that of the cooler surface and should be 3m in max. length with one bow of 90°; for longer ducts, use an additional fan with a capacity 20% greater than the compressor ventilator • When using several compressors, make sure that no machine can draw in the heated exhaust of another compressor.

*) in case the ambient temperature is higher, please consult your dealer or the manufacturer

3.2 Connections

Content

This section contains important advice you need to follow in order to connect the compressor safely to the compressed air system, and connect the power supply.

CAUTION
Before connecting the compressed air installation to the rigid air mains the pipe-unions and hose connection (within the c.a. installation) must be controlled and retightened if required

In compressor units fitted with pressure tanks, the air receiver must in most countries undergo an acceptance test carried out by an official surveyor prior to putting into operation.
Make a log book.

Compressed air connection

A) Compressed air connection

The unit's piping has been installed ready for operative use. You must follow the following advice when connecting the unit to the compressed air system:

Keyword	Instructions
Pressure	• Use fittings and pipe lines suitable for the operating pressure. • Do not operate the unit at a final pressure greater than that specified on the name plate • Connection of control air hose (SCROLL 5.5 only), please also see chapter 2.3 • A check valve between the unit and the compressed air system is not necessary as one has already been installed in the unit itself.
Connection	• Connect unit to the compressed air system stress-free, and free from vibration **(via a flexible hose for ex.)**
Shut-off valve	• We recommend you also install a shut-off valve to enable you to carry out maintenance work on the compressor without having to remove pressure from the compressed air system.
Condensate	• An automatic condensate drain can be installed after the aftercooler to remove condensation from the compressed air

3.2 Connections (Cont.)

B) Electrical connections

The unit has been wired so as to be ready for immediate use.
You only need to connect the unit to the mains.
The unit must only be connected by a qualified electrician.

Observe the following when connecting the unit to the mains:

Electrical connections

Keyword	Instructions
Voltage	• Only connect the unit to the supply voltage specified on the name plate of the motor.
Direction of rotation	• **Follow correct direction of rotation!** See corresponding arrows. (for single phase motors with plugs not required). • Checking the rotational direction see chap. 3.3/3.4
Fuses	• A primary fuse and master switch with EMERGENCY-STOP function must be installed. The switch must have a capacity at least 1.1 times the rated output of the motor and must be uniquely assigned to the unit. • Ensure that the current supply is sufficiently dimensioned (see data sheet)
Connection	• Lay the supply cable tension free and safely so that people cannot trip over it. • Lead the cable – according to local and national rules - with the different wires into the connection cabinet at the site.

3.3 Putting into operation (Commissioning)

Content

This section contains important advice you need to follow in order to put the compressor safely into operation.

General

Each module of the unit has been tested in the factory and has undergone an endurance test after final assembly. The tests demonstrate that the specified data is correct and that all modules are in perfect working order. The unit should be monitored during the first hours of operation to check for any malfunctions.

Important!

Operators must read and follow the specific instructions for any additional optional components (e.g. refrigeration dryer) installed in the unit.

Preparation

Before putting the unit into operation for the first time, you must observe the following:

Step	Activity
1	Have all bolted and terminal connections in the switch cabinet been checked for tightness by an electrician
2	The motor bearings of compressors, without permanent greased motor bearings, that are unused longer than 6 month have to be regreased before putting into operation
3	For units which are operated remotely, affix a sign to the unit and in a clearly visible location. The sign should have the following message: **CAUTION: This unit is controlled remotely and can start without warning.** When controlling the unit remotely, observe safety regulations which safeguard against the unit being started while being checked or maintained. **Main switch/isolator must be switched off.**

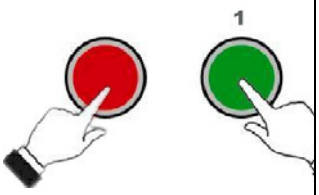
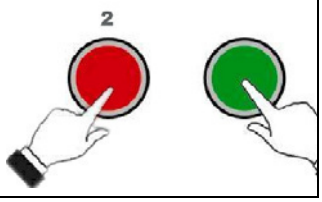
3.3 Putting into operation (Cont.)

Check the direction of rotation of the Scroll compressor when putting the unit into operation for the first time, and each time after the electric cabling is changed.
The direction of rotation is anticlockwise, viewed from the front of the compressor. The direction of rotation of the V-belt pulley must be the same as that indicated by the arrow. Reconnect the connection cables when necessary (electrician).

Fig: direction of rotation arrow

CAUTION
Danger of moving parts when protecting cover is open!!

Check the direction of rotation using the two handed method as follows:

Step	Activity:	Image
1	Open protecting cover and make sure that in cannot fall down; possibly take it off and put it aside	
2	Start compressor by tapping the green start button using one hand. Release button immediately after!	
3	Stop the compressor within 2 seconds by pressing the red stop button with the other hand.	

Chapter 4
Operation / normal use

Content

This chapter relates to the correct operation of the compressor

Survey

The chapter is detailed as follows:

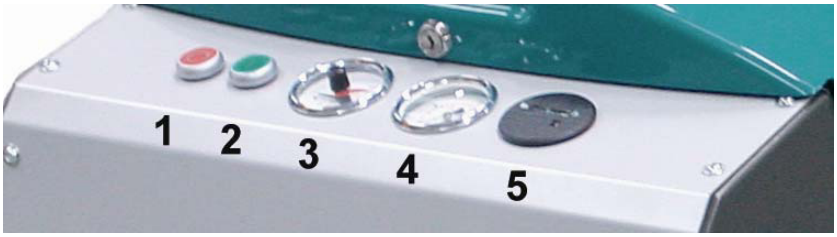
4.1 Control instrumentation

Content

Below are descriptions covering the operating elements

Function:
Components

The operating elements have the following functions:



Item	Description	Function / operation
1	Pushbutton (red) *STOP*	Stops compressor
2	Pushbutton (green) *START*	to start the compressor **Remark:** the main switch – provided and installed by the customer - must be switched on.*
3	Temperature indicator	Indicates the service temperature. Stops the compressor if maximum temperature is exceeded
4	Pressure gauge (g. service pressure)	Indicates the actual service pressure
5	Hour meter	Counts the hours the compressor has actually operated

4.2 Compressor start up / normal use

Content

The following explains how to start the compressor and where to pay attention to during operation / normal use.

Danger!
There are moving parts inside of the compressor housing which can cause serious injuries. Therefore never operate the compressor with the protection hood open or removed.

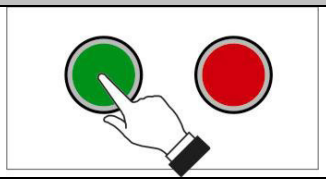
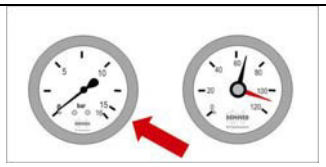
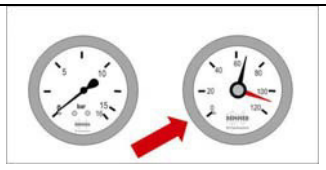
Before starting the compressor

Before starting the compressor please check the following:

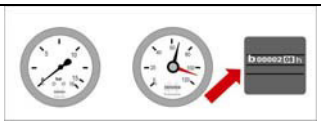
- Does the compressor rotate in the correct direction
- Has the circuit breaker been switched on?
- Are any existing shut-off valves opened?

To start compressor and monitor operation /normal use

Press the pushbutton *START* to start the compressor

Step	Operation	Picture / explanation
1	Press the (green) *START* pushbutton in order to start the compressor	
2	When operating please regularly monitor the following:	
2a	**Service pressure (g)** The service pressure (g) must not exceed the max. admitted value indicated on the compressor plate. Otherwise stop the compressor immediately.	
2b	**Operating temperature** The operating temperature with models SL 1,5-SL 2,2 must not exceed 160ºC with models SL 3,7 and SL 4,5 220°C (SL 5,5 230°C max) In case these temperatures are exceeded the compressor will automatically stop.	

Monitoring operation / normal use (continuation.)

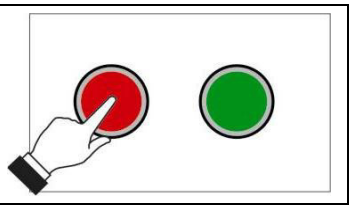
Step	Operation	Picture / explanation
Cont. 2b	**Important!** In case the compressor fails to stop automatically, you must immediately push the stop button manually.	
2c	**Hour meter** After a number of given service hours different maintenance work must be carried through. For the exact maintenance intervals together with the relevant service work please refer to the maintenance table (Appendix W1).	

4.3 To stop the compressor

Content How to stop the compressor (normal use) at the end of your work.

Stop compressor at normal use

In case you want to stop the compressor

1	Press the pushbutton *Stop*	

to completely stop

In case you want to completely stop the compressor at the end of a working day or for the weekend, switch off – in addition to the afore said – the main switch (isolator)

4.4 Failures during operation and remedying malfunctions

Content Advice regarding fault finding and corrective action.

Danger!

To minimise risk of personal injury, damage to equipment or property, only trained/qualified personnel should carry out any fault

Before starting any work

Before starting any sort of work:

- Stop the compressor and disconnect it at the main switch!
- Vent the compressor, mains and the air vessel respectively.

4.4 Failures during operation and remedying malfunctions (continuation)

Operating faults The followings faults may occur during operation:

Fault	Possible cause	Clearing of fault
Compressor does not start:	• No current	➢ Make current available
	• Loose cables or fuses	➢ Retighten cables and fuses
	• Motor protection switch stopped compressor	➢ Unlock motor-protection switch (in electric control panel)
	• *Combistat* stopped compressor / is defective	➢ Ensure correct cooling, change *Combista*t when defective
	• Connecting cables to *Combistat* are defective	➢ Ensure correctly lead connecting cables
Compressor struggles to start	• Too long or too short star-delta switch over time (in case of star-delta start)	➢ Check and reset time period, correct setting is 3-6 seconds on relay K1T
	• Compressor is under pressure	➢ Check/change solenoid valve / vent the compressor
	• Fluctuations in the power system	➢ Determine reason
	• Non-return valve at after-cooler defective (only with star-delta-start)	➢ Change non-return valve
compressor stops before reaching final pressure	• Motor overload has tripped	➢ Check overload setting and if necessary alter it. Check setting of pressure switch, if necessary, alter it. Check supply of all phases.
	• Combistat switches off due to high temperature	➢ Ensure correct cooling; change Combistat if necessary.

4.4 Failures during operation and remedying malfunctions (continuation)

Fault	Possible reason	How to clear fault
Thermal-motor overload stops the compressor	• Seized air end	➢ Remove reason for seizure
	• Loss of one or more phases	➢ Check supply
	• Motor overloaded	➢ Check setting of overload, alter if necessary, check/alter settings of pressure switch
	• Ambient temperature is too high	➢ Ventilate compressor room
Combistat operates due to high temperature	• Incorrect installation of compressor	➢ Check installation instructions
	• Faulty *Combistat* or incorrectly set	➢ Adjust or replace *Combistat*
Compressor does not stop operating	• Setting of pressure switch too high	➢ Adjust upper pressure limit

See next page

4.4 Failures during operation and remedying malfunctions (continuation)

Fault	Possible reason	How to clear fault
Reduced flow	• Wear of tip seals	➢ Maintenance according to maintenance plan (Appendix W1)
	• Suction filter clogged	➢ Clean filter
	Leakages in the system	➢ Find leakages
Unit continuously pressure relieves, reduced flow	• Defective solenoid valve • Electrical connection to solenoid broken	➢ Change solenoid valve ➢ Rectify electrical connection
Bumpy operation	• V-belt not correctly tensioned	➢ Check v-belt tension and tighten if necessary
	• V-belt sets not compatible (from model SL 3,7)	➢ Replace with matching V-belt sets
	• V-belt pulleys not aligned with each other	➢ Check alignment of pulleys and adjust if necessary
	• Screw connection loose on air end or motor	➢ Tighten screw connections
Air end runs backwards after stopping	• Non-return valve at outlet of air end defective	➢ Exchange non-return valve

Chapter 5
Maintenance

Content

This chapter contains information on the maintenance work required.

Overview

This chapter is subdivided as follows:

5.1 Essential points

Content

This section contains general information to be observed during servicing and maintenance work.

Personnel requirements

Servicing and maintenance work may only be carried out by duly qualified personnel. The “major or large maintenance” after 5.000 hours for the 10bar and 10.000 hours for the 8 bar machines must only be carried through by authorized engineers. (* the qualification to carry through the major maintenance work can be obtained by attending a corresponding training at RENNER GMBH)

The specific personnel requirements are set out in Chapter 0.

Danger!

It is essential to adhere to the following safety instructions in order to avoid all risks of personal injury or death:

Potential source of danger	Preventive measures
Crushing from moving parts	• Always maintain a safe distance from all moving parts when carrying out test runs
Electric shock	• Switch off all voltage sources before starting work. • Take measures to prevent power sources from being switched on again by accident
Inappropriate spare parts	• Always replace self-locking nuts and screws • Only use original parts included in our spare part list
Unauthorised/premature approval of unit for operation	• Do not release the unit for operation until the safety devices are fully functional. **The work is not finished until this is the case!**

5.1 Essential points (continued)

Before start of work

Please adhere to the following before you start your work:

- SCROLL models SL 1,5 to SL 4,5 are not equipped with a non-return valve at the compressed air outlet. Before maintenance work is commenced it is by all means necessary to shut off the entry into the air receiver or into the air mains.
  With SCROLL on air receiver, the air vessel must be completely discharged before any maintenance work is commenced.

- SCROLL models of the SL 5,5 type are equipped with a non-return valve. However, here again it is recommended to discharge the compressed air before any work is done.

- Prior to the "major" maintenance the SCROLL compressor must completely cool down before any sort of work is started (at least 12 hours)

End of operations

The following steps must be carried out after completing the work:

Step	Operation
1	Follow the maintenance schedule and complete the inspection sheets, activity logs, etc. (see Appendix W1 "Maintenance" and W3 "Maintenance Control Sheet").
2	Check that the safety devices are working correctly. Do not release the machine for operation if the safety devices are not in perfect working order.
3	Reinstall and secure any safety devices that have been removed.
4	Remove any tools, foreign objects and materials left lying around.
5	Carry out a test run and check the function of the serviced components.
6	Keep the keys safe and inaccessible to unauthorised persons.

Spare parts, accessories

Only genuine RENNER spare parts should be used when replacing components such as the air suction filter, V-belt, etc.

Repairs

Only allow authorised dealers to carry out repair work.
A list of other persons authorised by the manufacturer to carry out repairs can be obtained from the manufacturer on request.

Do not allow repairs to be carried out by any persons other than those authorised by the manufacturer!

Servicing is carried out as agreed with the authorised dealer.

General information

Take the standard safety precautions and proceed with great care when carrying out any servicing work.
The following points are of particular importance:

- Servicing work to be carried out by qualified personnel only.
- Correct tools only to be used for servicing work.
- Unit to be stopped and power supply to be cut-off before any servicing work is carried out. Measures to be taken to ensure that the unit cannot be switched on accidentally!
- Unit to be allowed to cool before carrying out servicing work to avoid risk of burns!
- Unit to be disconnected from all sources of pressure and all pressure removed before dismounting pressurised parts.
- Scrupulous standards of cleanliness to be maintained during servicing work; parts and exposed openings to be covered with a clean cloth, paper or masking tape.
- Motor, air filter, electrical components, control equipment, etc. to be protected from ingress of moisture, e.g. when being wiped.
- No tools, loose parts or rags to be left in or on the unit.
- Operating pressures, temperatures, time settings, control equipment and cut-out devices to be checked for perfect working order before unit is released for operation after servicing work.
- Protective hood on unit to be closed before switching on the machine (including for test run)!
- Sound-absorbing materials to be left in place and retained.

5.2 Rectifying faults

Content

This section covers general points on troubleshooting and contains references to relevant sources of information.

Danger!

- Always take measures to ensure that the machine can be shut off in an emergency by a second person.
- You may only rectify faults or carry out checks if you are duly qualified (specialist training in mechanical or electrical engineering).
- Adhere to the general safety instructions contained in this manual for handling the machine.
- Follow the instructions given in this chapter and all other maintenance instructions issued by the operator and pay due regard to the documentation relating to the components included in the unit (e.g. air receiver, refrigerant drier).

List of faults

The necessary action to be taken in the event of faults is outlined ...

... in Chapter 4.4. “Remedying malfunctions in normal operation” and
... in the operator’s internal servicing documents.

5.3 Cleaning work

Content

The following section contains information on cleaning the compressor and the air filter.

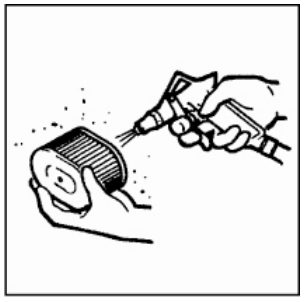
General points

In terms of general cleaning, vacuum the unit or wipe it with a damp cloth. Check the intake passage regularly, where necessary removing any leaves, dust, dirt or similar matter in the interests of an efficient air supply.

Never direct compressed air at living beings!
Misuse of the compressed air unit can cause serious tissue damage or even fatal injuries.

5.3.1 Cleaning the air filter

Cleaning the air filter



Step	Operation
1	Switch off the unit and take measures to prevent it from being restarted.
2	Open the protective hood and prevent it from falling down or take away the hood
3	Loosen butterfly nut of suction filter*
4	Take out air filter cartridge and air-clean carefully.
5	Insert filter cartridge in reversed order and tighten butterfly nut
6	Carry out test run and functional check.
7	The suction air filter must be completely changed every 2.500 hours or once a year

* **Both** air filters with SCROLL models SL 3,7 to 5,5 must be changed or cleaned respectively

5.3.2 Cleaning the cooler

Content

This section outlines the procedure for cleaning the cooler.

General points

If the cooler is not very dirty it can be left in the unit and blown clear with compressed air while the unit is switched off.
If the cooler is very dirty proceed as outlined below.

Cleaning the cooler

Step	Operation
1	Switch off the unit and take measures to prevent it from being restarted. Allow the unit to cool down
2	Remove the cooler
3	Steam clean the cooler.
4	Refit the cooler
5	Make a test run and check for leaks.

5.3.3 Cleaning the (cooling air) fan

Cleaning the fan

Step	Operation
1	Switch off the unit and take measures to prevent it from being restarted. Allow the unit to cool down.
2	Detach the side covers of the Scroll housing (see illustration “side cover”). Loosen both screws M6x12 by means of a socket wrench
3	Detach the V-belt
4	Loosen the screws of the fan cover and take it away (see illustration “fan cover”)
5	Check the fan and clean it if so required
6	Reassemble in reversed order
7	Make a test run and check functions

Ill:.screws fan cover

Ill:: fan / fan impeller

5.3.4. Cleaning the cooling fins

Content

This chapter informs you about the cleaning of the SCROLL cooling fins.

General

The cooling fins are an important factor of the cooling system of the compression block. The fins must be regularly checked and cleaned (see Appendix W1 - General Maintenance Plan)

Cleaning the cooling fins

Step	Operation
1	Switch off the unit and take measures to prevent it from being restarted. Allow the unit to cool down
2	Detach the copper pipes between compression block and cooler
3	Loosen the screws of the cooling fins cover and take away the cover (see illustration 3)
4	Loosen the lateral cover of the cooling fins (Illustration 4) from the compression block
5	Then carefully air-clean the cooling fins (Illustr. 4) or use a cloth for cleaning
6	Reassemble in reversed order
7	Make a test run and check functions

Illustration 3

Illustration 4

5.3.4. Cleaning the cooling fins (continuation)

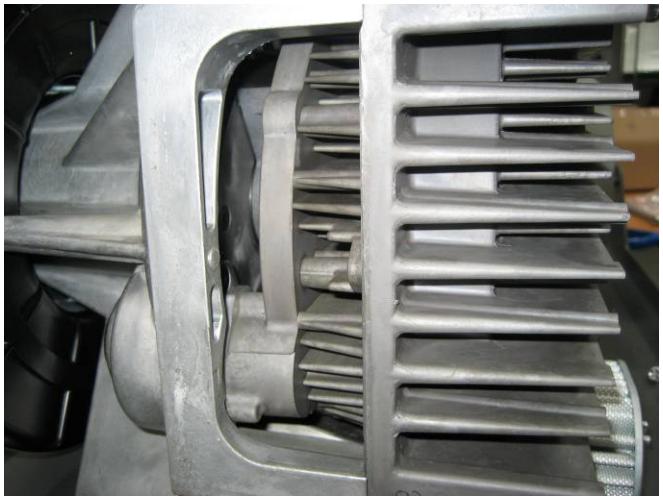


Illustration 5: cooling fins

5.4 Tensioning / changing the V-belts

Content

This section outlines the procedure for tensioning and/or changing the V-belt.

General points

The optimal tension of the V-belt has an essential influence on the operation characteristics and the noise level of the machine. Moreover the life time of the belt depends largely on its correct alignment. It is important that the replacement of V-belts is made by batches (sets) on machines having two belts.

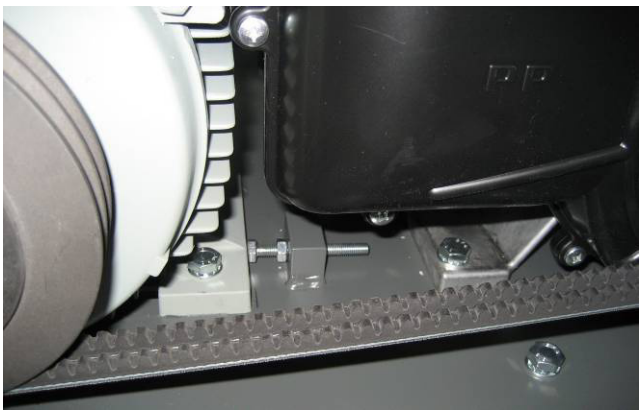


Illustration: adjusting screw

Tensioning of belts

Step	Operation
1	Switch off the unit, disconnect it from the power supply, and take measures to prevent it from being restarted. Allow the unit to cool down
2	Loosen the 4 screws at the motor
3	Adjust the motor and align it correctly
4	Fine-tune the correct tension* by means of the adjustment screw
5	Bolt motor screw and check again on the correct alignment of the V-belt
6	Make a test run and check functions

Step	Operation
1 +2	as “tensioning of belts”
3	Loosen adjustment screw, remove used belts and put new ones.
4	Tension belts – see above

Changing belts

The V-belt tension is correct, when the belt(s) in the middle, between both pulleys, is/are pushed down by 5-7mm using a weight of 2,5 kg

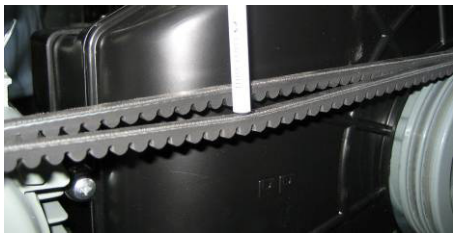


Illustration: check belt tension

Chapter 6
Decommissioning and disposal

Content

This chapter contains important advice for (temporarily) decommissioning or disposing of your compressor.

Overview

This chapter is divided into the following sub-sections:

6.1 Decommissioning of plant

Content

This section contains instructions you need to follow when decommissioning the compressor for an extended period of time, and when subsequently returning it to operation.

When decommissioning for an extended period of time, prepare the unit as follows:

Decomissioning of plant

Step	Activity
1	The compressor should be disconnected from the power supply and the isolator locked-off and/or the electric mains as to ensure that the unit can not be restarted by accident.
2	Slacken the V-belt (see Chapter 5.10 “Tensioning and changing of belt”).
3	Do not cover the unit with any material that is impermeable to air. Doing so intensifies the corrosion of individual parts.

6.2 Re-commissioning after storage

Re-commissioning after storage

Compressor units that have been switched off, decommissioned or stored away for longer than 3 months should not be put back into operation until the following measures have been carried out.

Follow the procedure outlined below to return the compressor to operation after being out of commission for 3 months or more.

Step	Activity
1	Turn the SCROLL compressor in the direction of rotation several times by hand.
2	Tension the V-belt (see chapter 5.10 “Tensioning & changing V-belts”
3	Connect unit: - see Chapter 3.2 “Connections”.
4	Take into operation (Chapter 3.3)

6.3 Shut-down and disposal

Content

This section describes what you need to consider when shutting down and disposing of the unit.

DANGER

- Observe the safety instructions outlined in this handbook, the instructions specified in the supplier's documentation as well as accident prevention guidelines.

Danger of life!

- Moving or lifting the compressor should only be undertaken in a safety conscious manner.
- Always ensure no one is within the danger zone when the compressor is being lifted.

DANGER

When carrying out the following disassembly work, be aware of sharp corners and edges which may cause cuts. For this reason always wear protective gloves.

Environment

- The following instructions must be observed properly to prevent any possible damage to the environment. The Operating Company must ensure that the regulations are adhered to correctly even where disposal is carried out by an authorized company of specialist.

Disassembly of the compressor

To dismantle the compressor, proceed as follows and observe the following points:

Step	Activity
1	Find out how each component (or the whole machine) needs to be disposed of. If unsure, consult your local environmental agency.
2	Depressurise all components and vent the unit
3	Remove all supply connections from the unit e.g. air hoses, electrical mains etv.

Materials Information

The following materials were predominately used in the construction of the unit:

Material	Where used
Batteries, NiCad-/Li	• Control
Copper	• Cables
Steel	• Machine frame • Side panels • Motor and components
Plastic, rubber, PVC	• Gaskets • Tubes • Cables
Tin	• Boards
Polyester	• Boards

Hazardous waste Information

The following parts, materials and fluids must be disposed of separately:

Denomination	Application
LCD displays **Note:** LCD displays contain highly poisonous fluids	• Display devices
Electronic scrap	• Electrical supply • Controls • Boards with electronic parts

The environment:

Dispose of all parts of the unit in a manner that prevents damage from being caused to other peoples' health or the environment.

Appendix T: Technical data

Typ	Free air delivery		Power	Control	Noise level	Motor nominal current	Voltage	Operat temperature	Cooling air required	C.A. connection	Recom HRC fuse	Section of electr cable	Dimensions in mm	Weight	Air-receiver
	m³/min		kW		db(A)	A	V	° C	m³/h	"	A	mm²	L x W x H	kg	litres
	8 bar	**10 bar**						**max.**							
SL 1,5	0,160	-	1,5	on/off	65	9,1	230	160	540	½"	16	3 x 1,5	827 x 430x 440	49	-
SL 2,2	0,238	0,195	2,2	on/off	67	4,6	400	160	540	½"	16	5 x 2,5	827 x 430x 440	52	-
SL 3,7	0,397	-	3,7	on/off	68	7,7	400	220	780	½"	16	5 x 2,5	986 x 520 x 440	90	-
SL 4,5	-	0,405	4,5	on/off	68	10,5	400	220	780	½"	16	5 x 2,5	986 x 520 x 440	105	-
SL 5,5	0,627	0,520	5,5	on/off	69	10,5	400	230	780	½"	16	5 x 2,5	986 x 520 x 440	105	-
SLD 1,5	0,160	-	1,5	on/off	65	9,1	230	160	540	½"	16	3 x 1,5	1060 x 440x 930	79	90 / 250*
SLD 2,2	0,238	0,195	2,2	on/off	67	4,6	400	160	540	½"	16	5 x 2,5	1060 x 440x 930	82	90 / 250*
SLD 3,7	0,397	-	3,7	on/off	68	7,7	400	220	780	½"	16	5 x 2,5	1480 x 570 x 1025	175	250 / 500*
SLD 4,5	-	0,405	4,5	on/off	68	10,5	400	220	780	½"	16	5 x 2,5	1480 x 570 x 1025	190	250 / 500*
SLD 5,5	0,627	0,520	5,5	on/off	69	10,5	400	230	780	½"	16	5 x 2,5	1480 x 570 x 1025	190	250 / 500*
SLDK 1,5	0,160	-	1,5	on/off	65	9,1	230	160	540	½"	16	3 x 1,5	1480 x 570 x 1160	159	250
SLDK 2,2	0,238	0,195	2,2	on/off	67	4,6	400	160	540	½"	16	5 x 2,5	1480 x 570 x 1160	162	250
SLDK 3,7	0,397	-	3,7	on/off	68	7,7	400	220	780	½"	16	5 x 2,5	1480 x 570 x 1160	200	250 / 500*
SLDK 4,5	-	0,405	4,5	on/off	68	10,5	400	220	780	½"	16	5 x 2,5	1480 x 570 x 1160	230	250 / 500*
SLDK 5,5	0,627	0,520	5,5	on/off	69	10,5	400	230	780	½"	16	5 x 2,5	1480 x 570 x 1160	230	250 / 500*

SLD - Compressor on air-receiver.

SLDK - Compressor and air dryer on air receiver.

Appendix T: Technical data

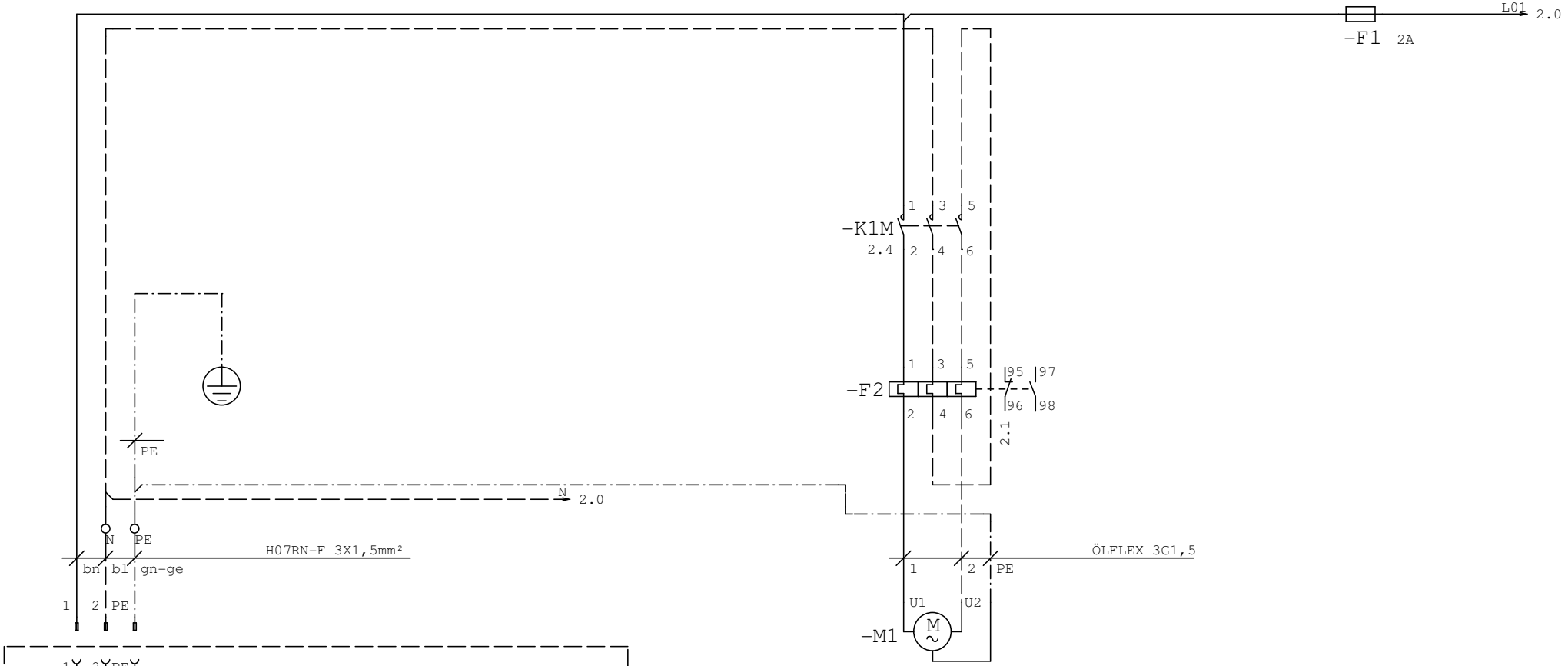
Typ	Free air delivery		Power	Control	Noise level	Motor nominal current	Voltage	Operat. temperature	Cooling air required	C.A. connection	Recom HRC fuse	Section of electr cable	Dimensions in mm	Weight	Air-receiver
	m³/min		kW		db(A)	A	V	° C	m³/h	"	A	mm²	L x B x H	kg	Litres
	8 bar	**10 bar**						**max.**							
SLDM 7,5	0,794	-	2 x 3,7	on/off	65	2 x 10,5	400	220	1080	½"	16	je 5 x 2,5	1970 x 986 x 1136	363	500
SLDM 9,0	-	0,810	2 x 4,5	on/off	67	2 x 10,5	400	220	1560	½"	16	je 5 x 2,5	1970 x 986 x 1136	369	500
SLDM 11,0	1,254	1,040	2 x 5,5	on/off	68	2 x 10,5	400	230	1560	½"	16	je 5 x 2,5	1970 x 986 x 1136	369	500
SLDM 13,5	-	1,215	3 x 4,5	on/off	68	3 x 10,5	400	220	2340	½"	16	je 5 x 2,5	1970 x 986 x 1136	501	500
SLDM 16,5	1,881	1,560	3 x 5,5	on/off	69	3 x 10,5	400	230	2340	½"	16	je 5 x 2,5	1970 x 986 x 1136	501	500

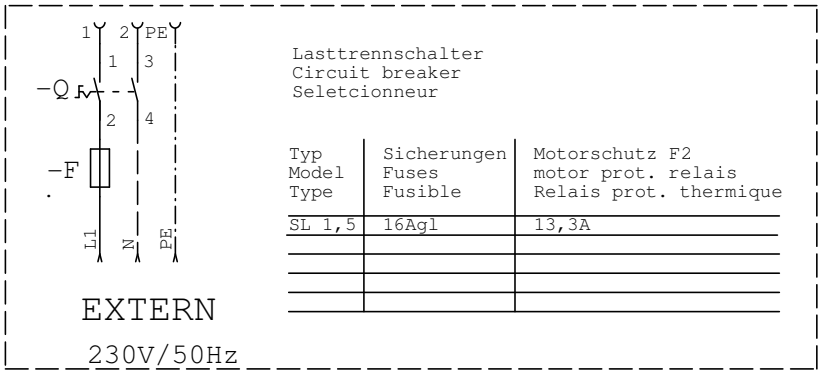
SLDM - Scroll multiple units on air receiver.

APPENDIX St
Electric wiring diagrams

RENNER Scroll compressors

Electric wiring diagrams





Lasttrennschalter
Circuit breaker
Seletcionneur

Typ Model Type	Sicherungen Fuses Fusible	Motorschutz F2 motor prot. relais Relais prot. thermique
SL 1,5	16Ag1	13,3A

Einspeisung
Power supply
Alimentetion

Kompressor - Motor
Compressor - motor
Compresseur - moteur

				Datum	27.10.2009	SL1,5	RENNER GmbH Emil-Weber-Str. 32 D-74363 Güglingen	29062009	=
				Bearb.	Echle				+
				Gepr.				062009	Blatt 1
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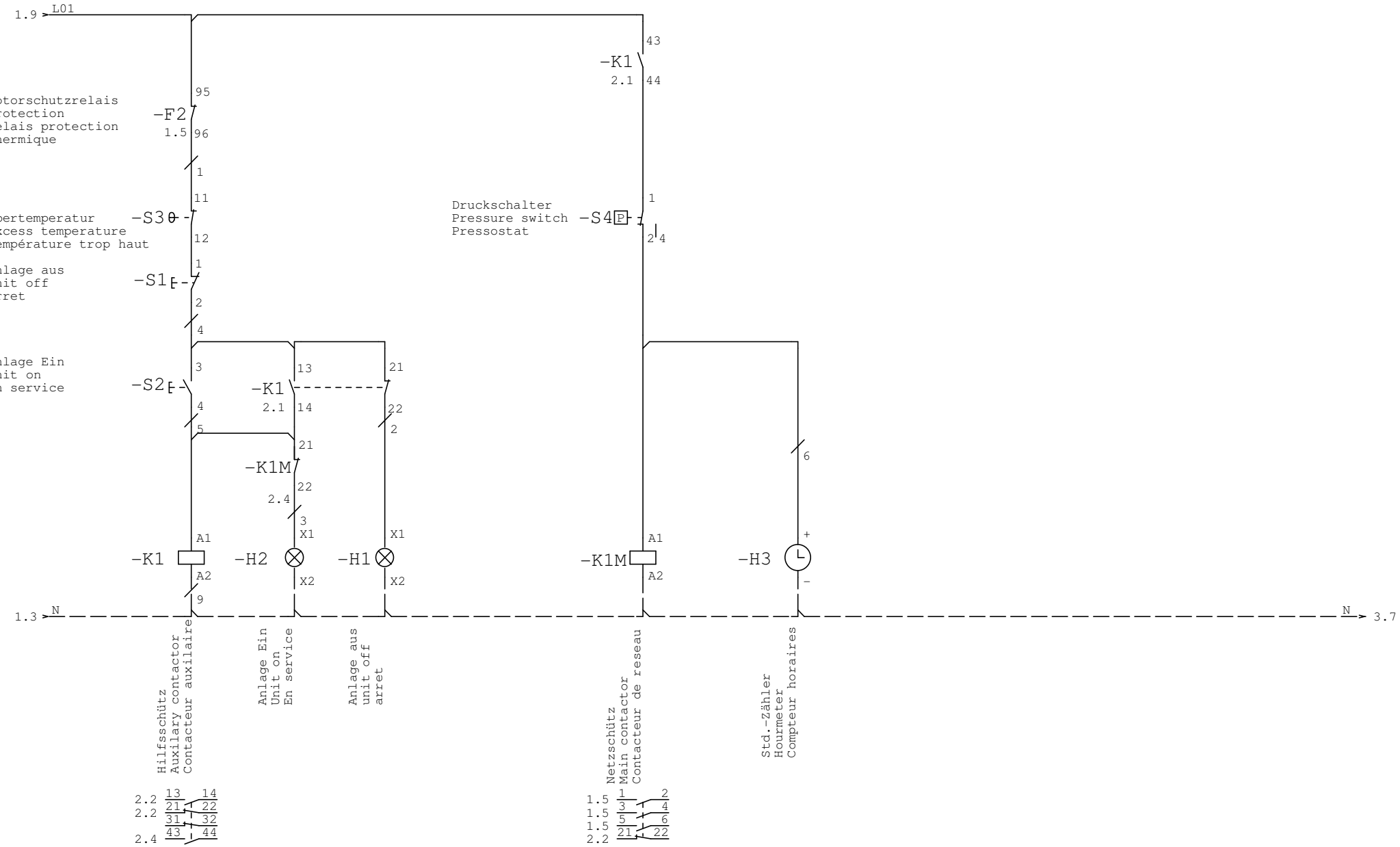

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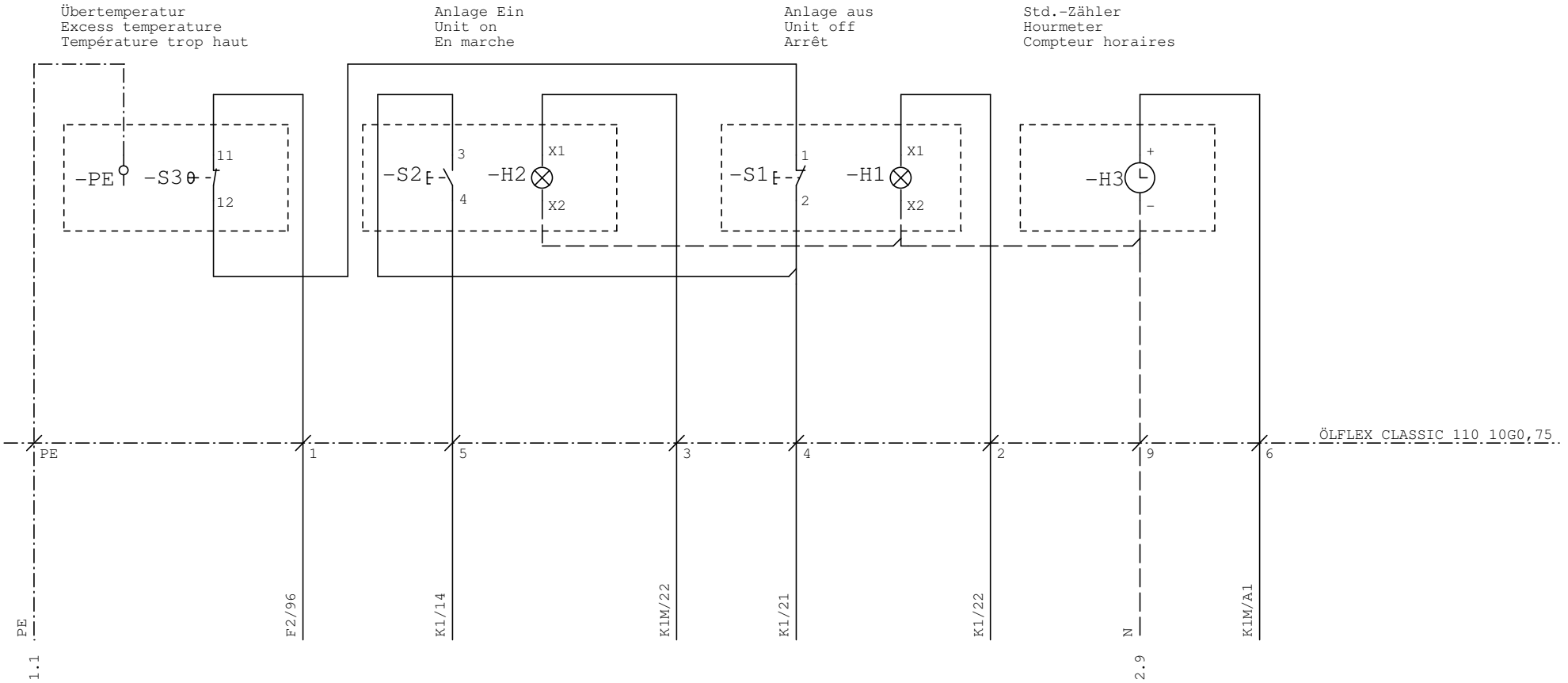

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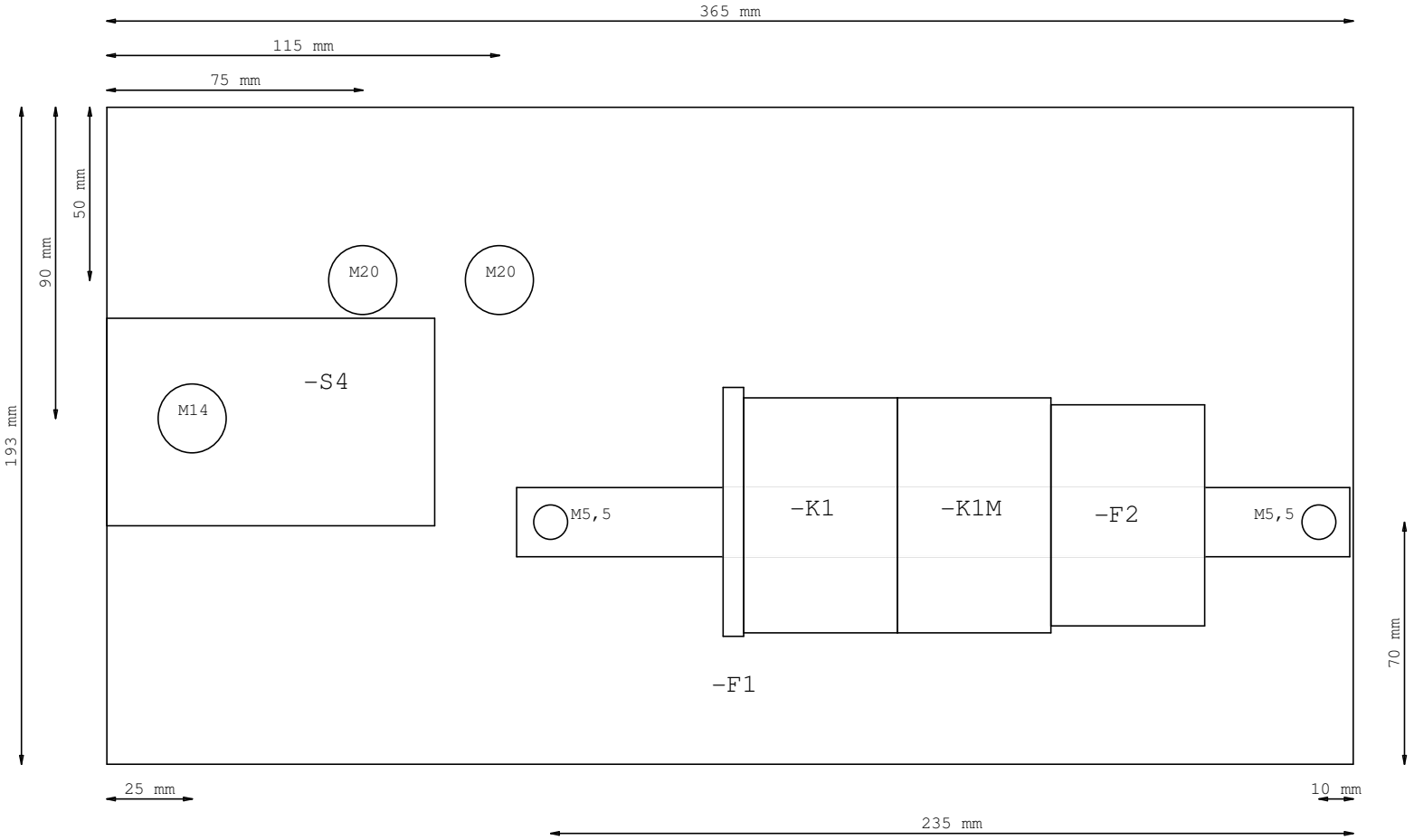

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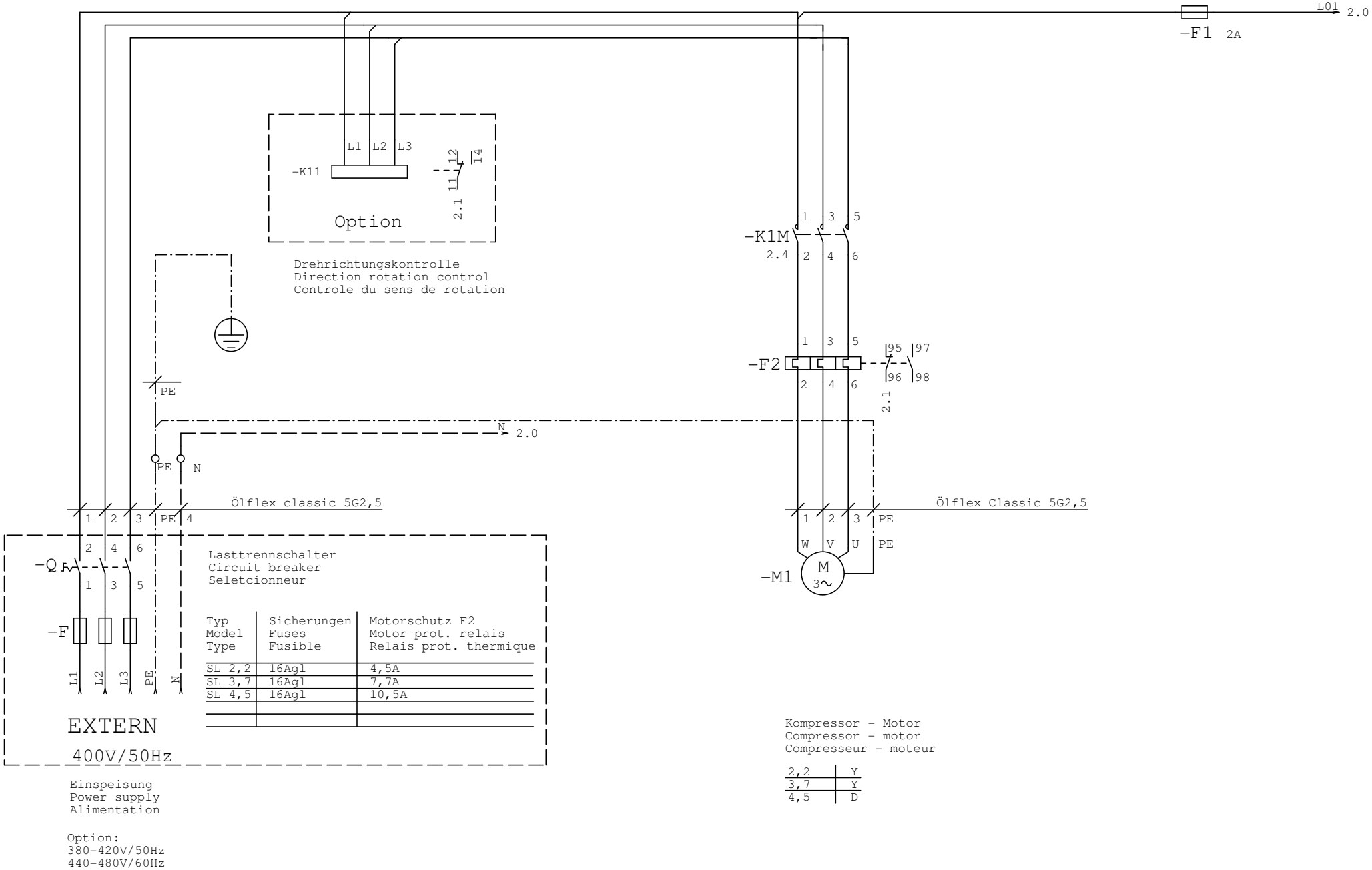

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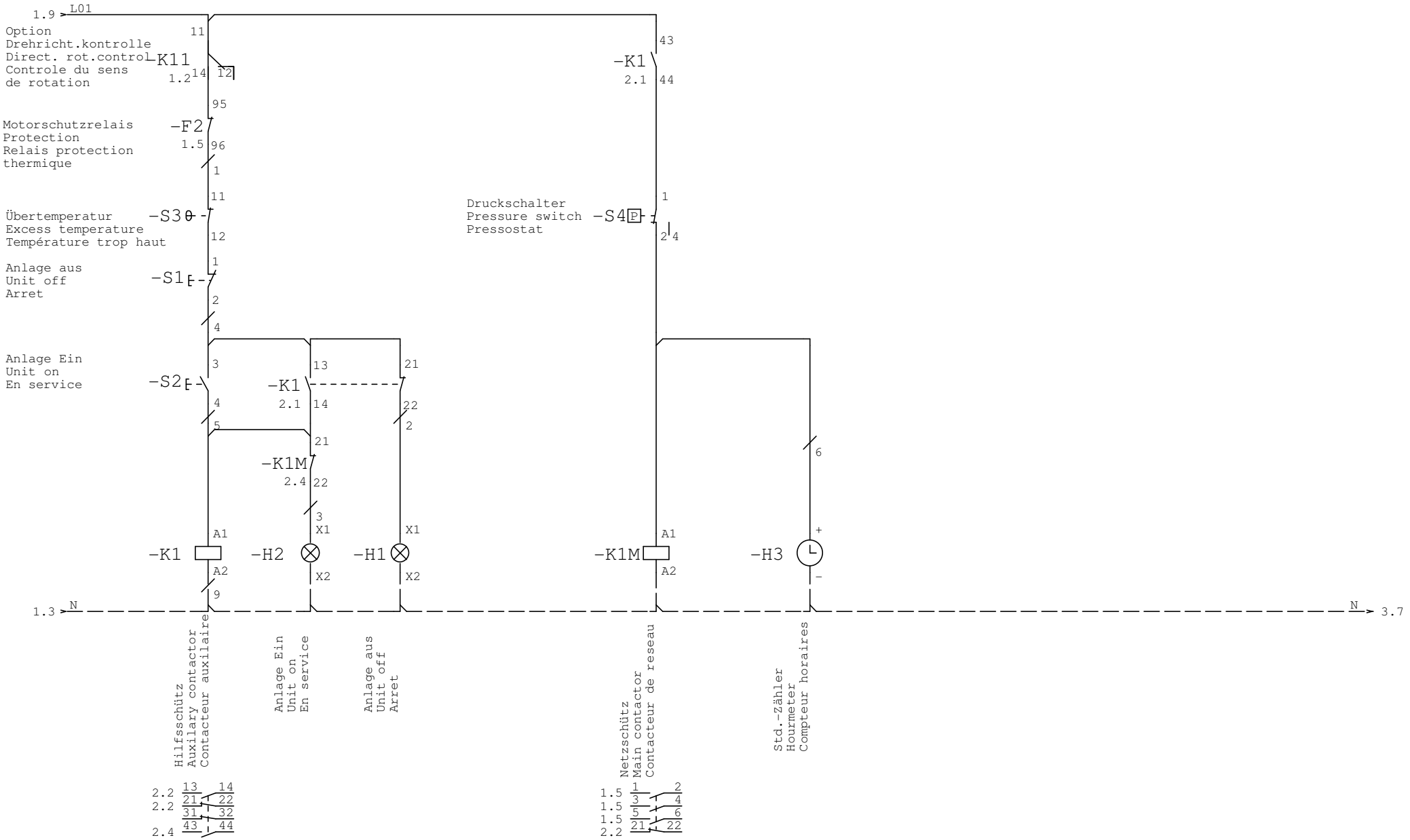

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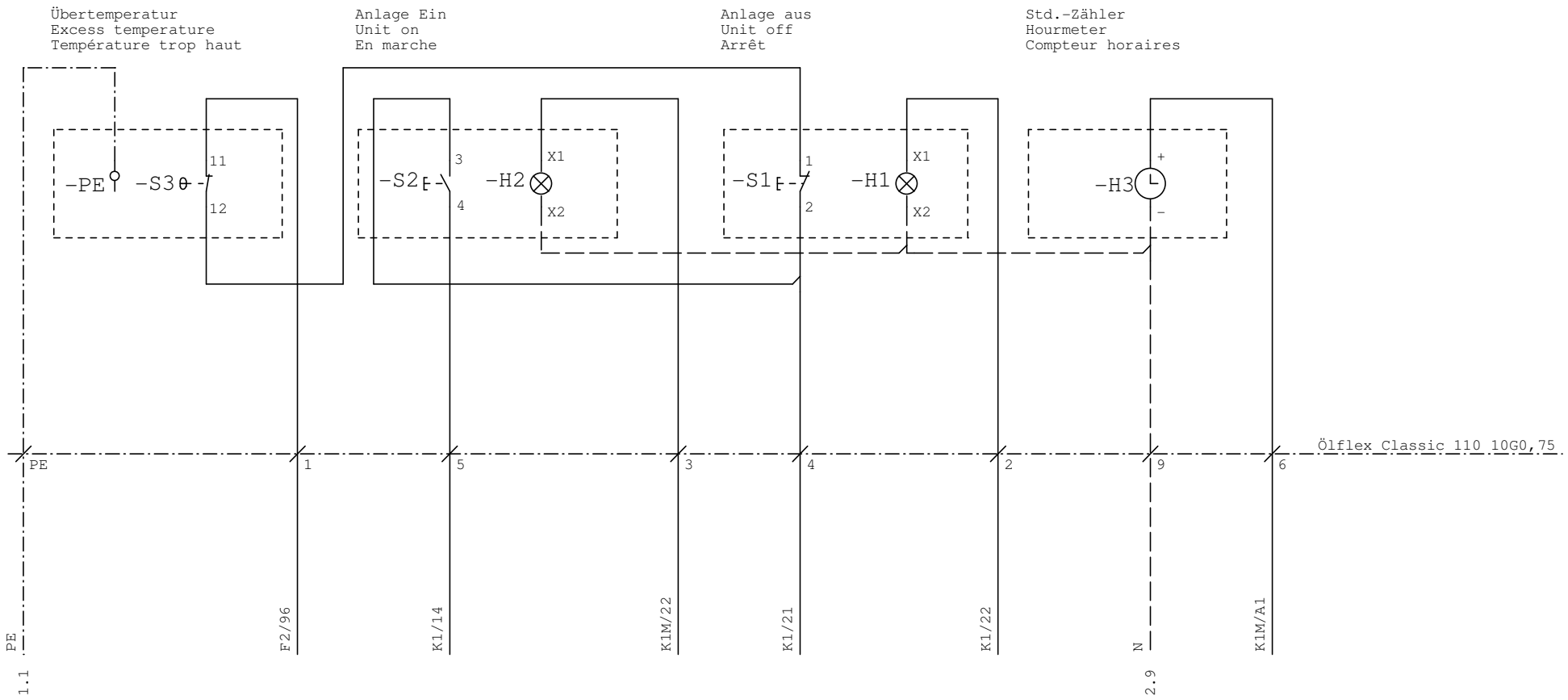

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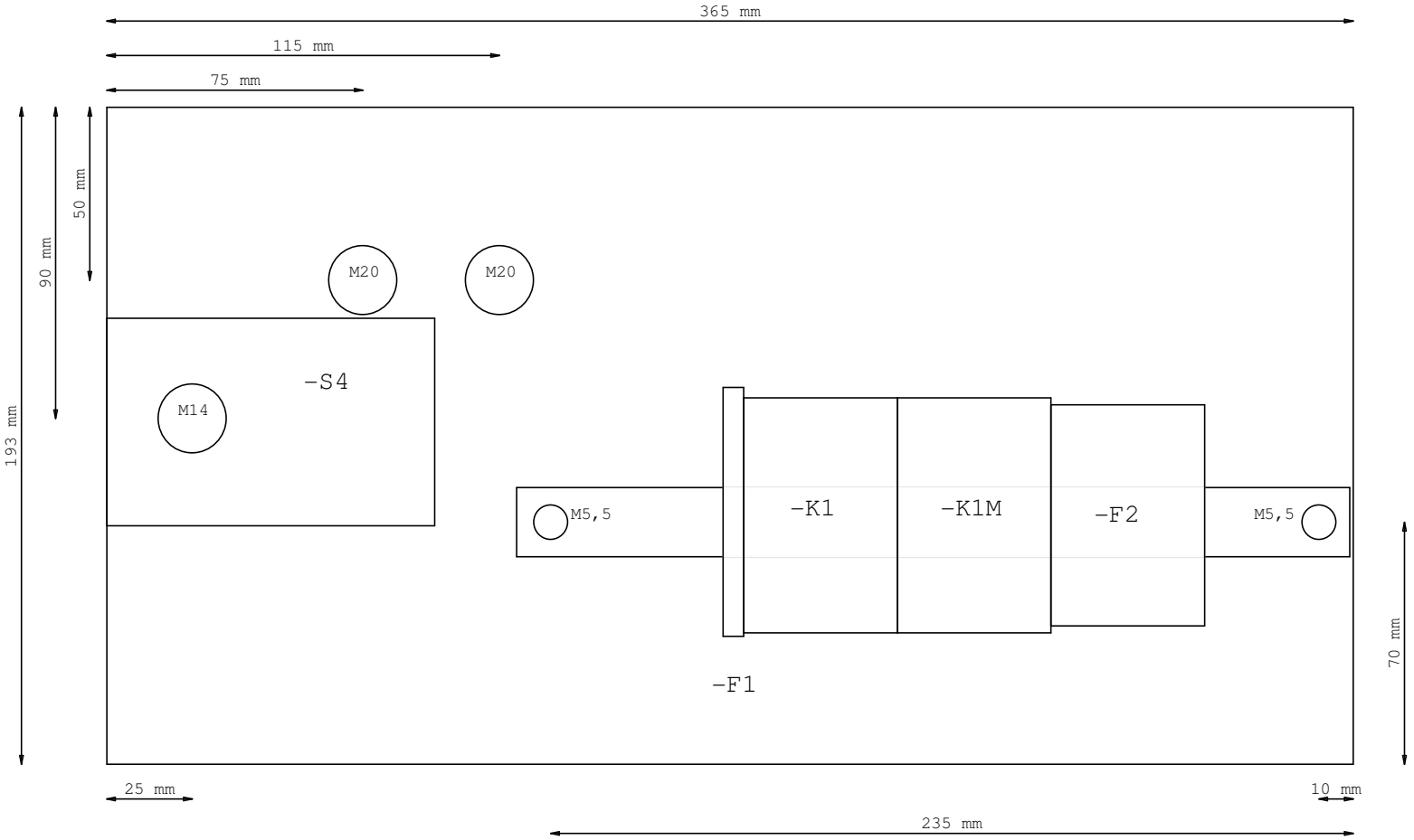

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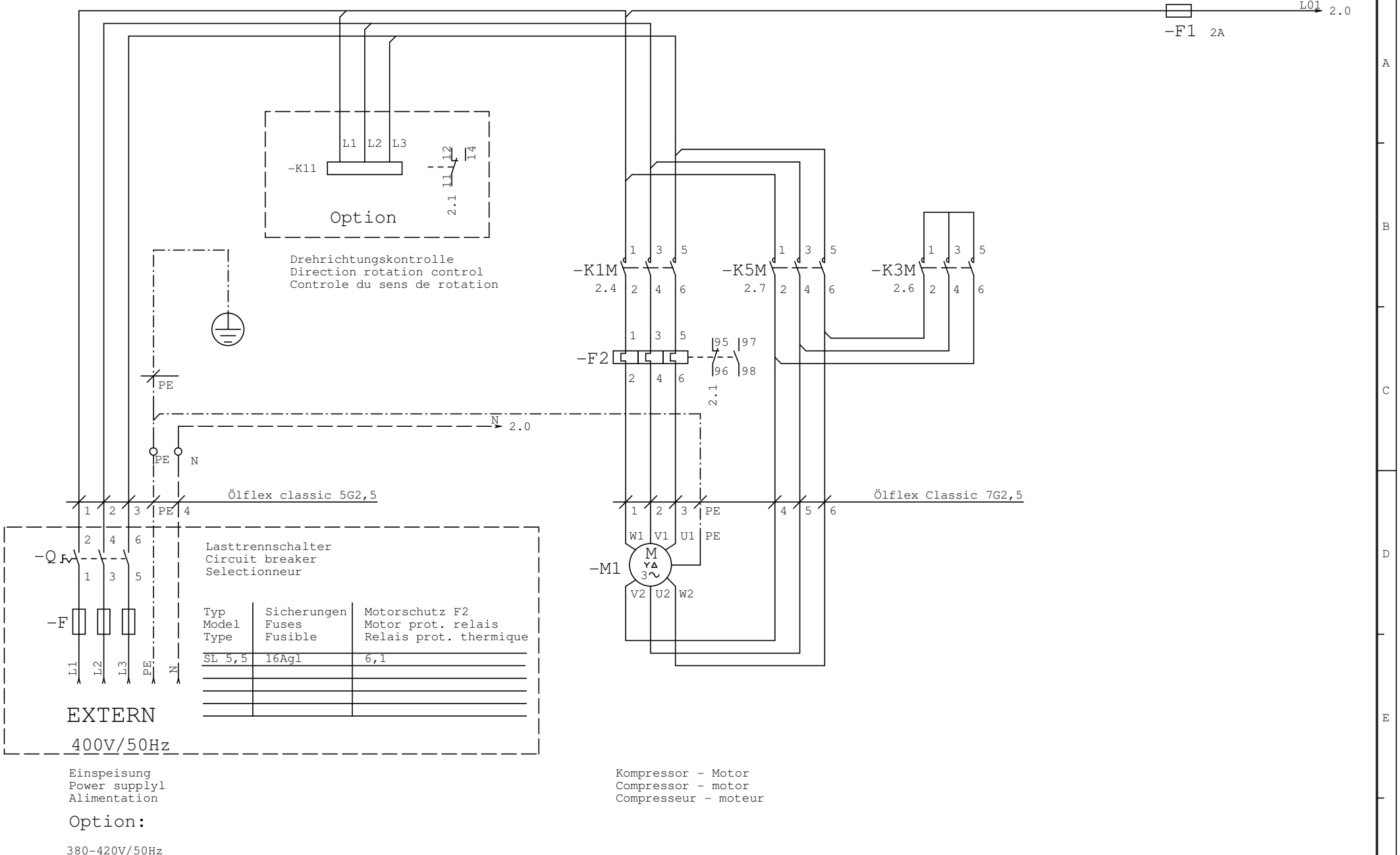

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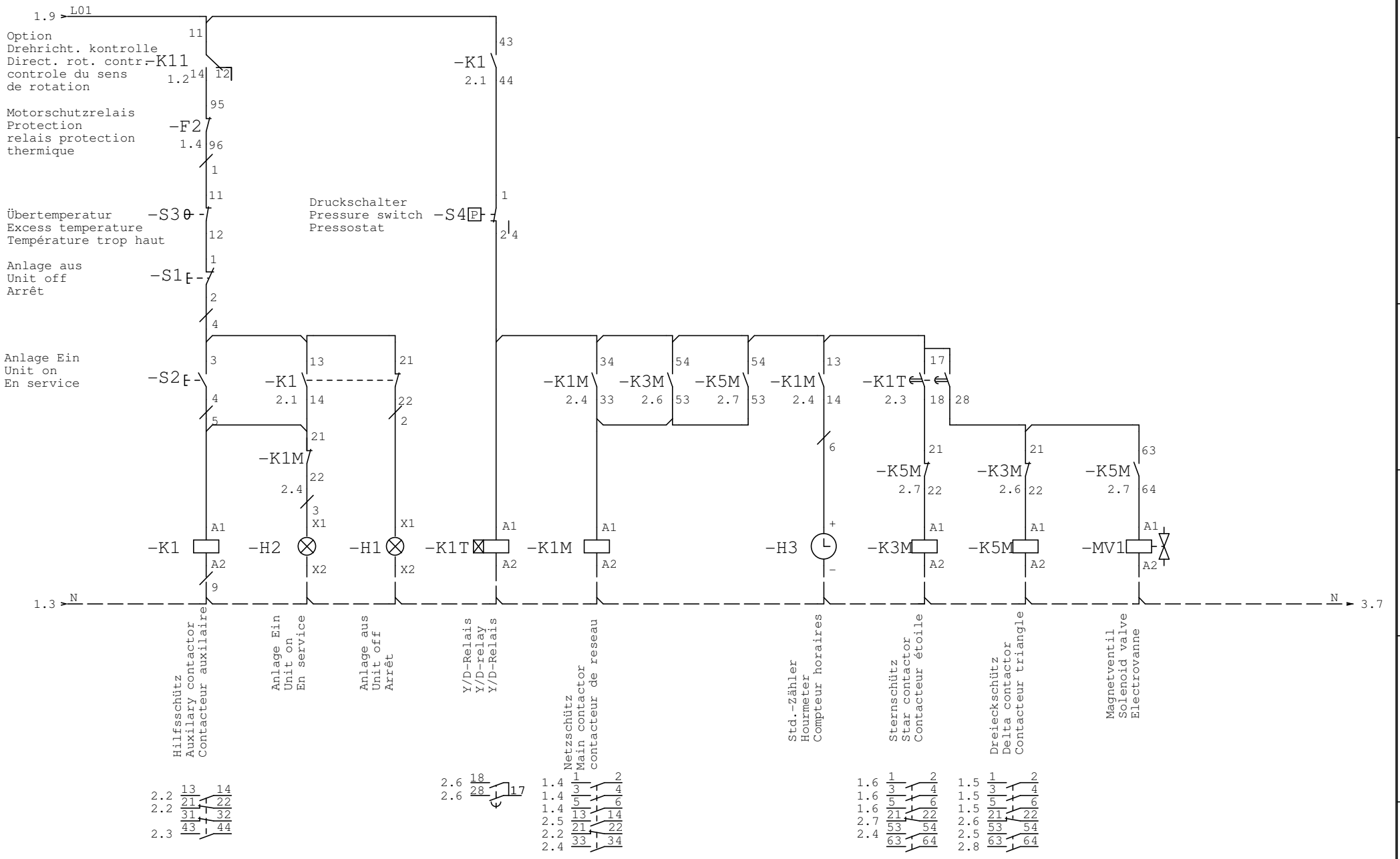

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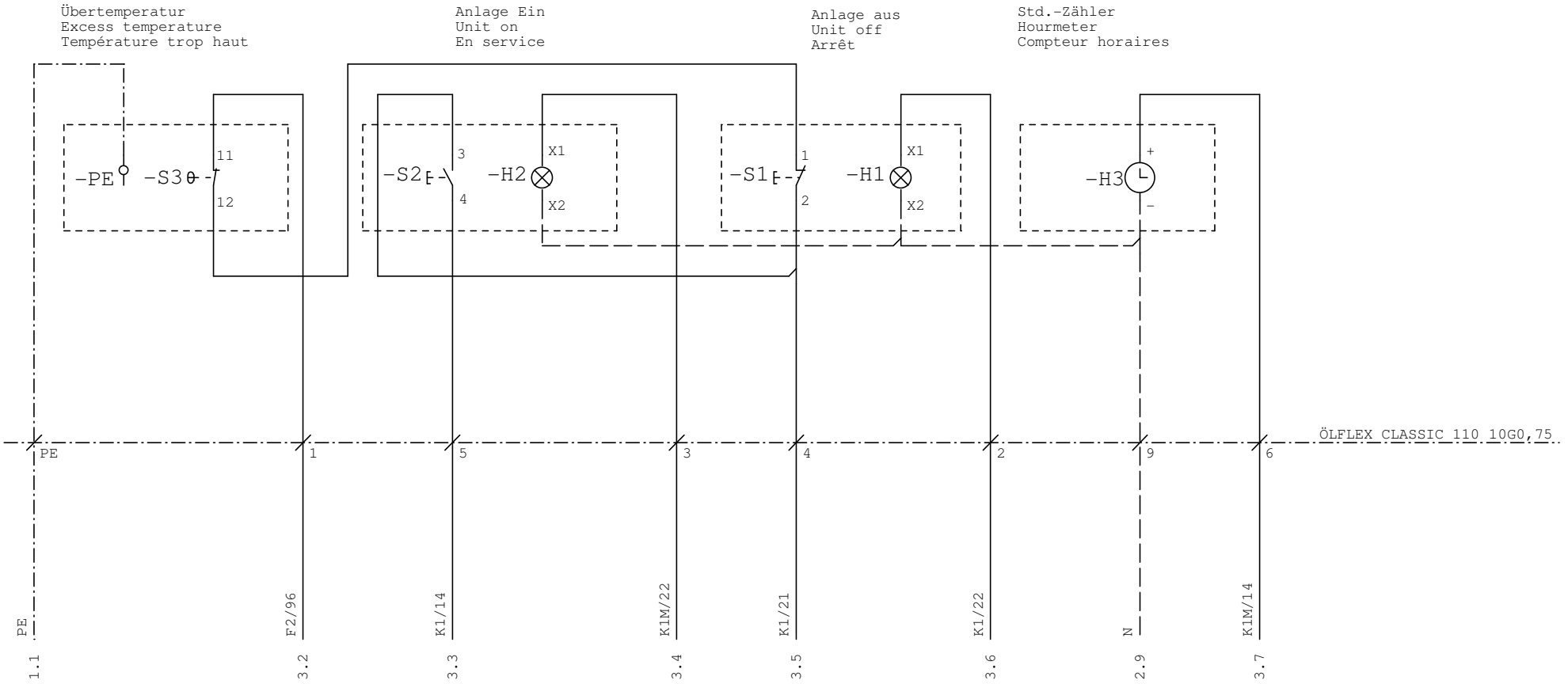

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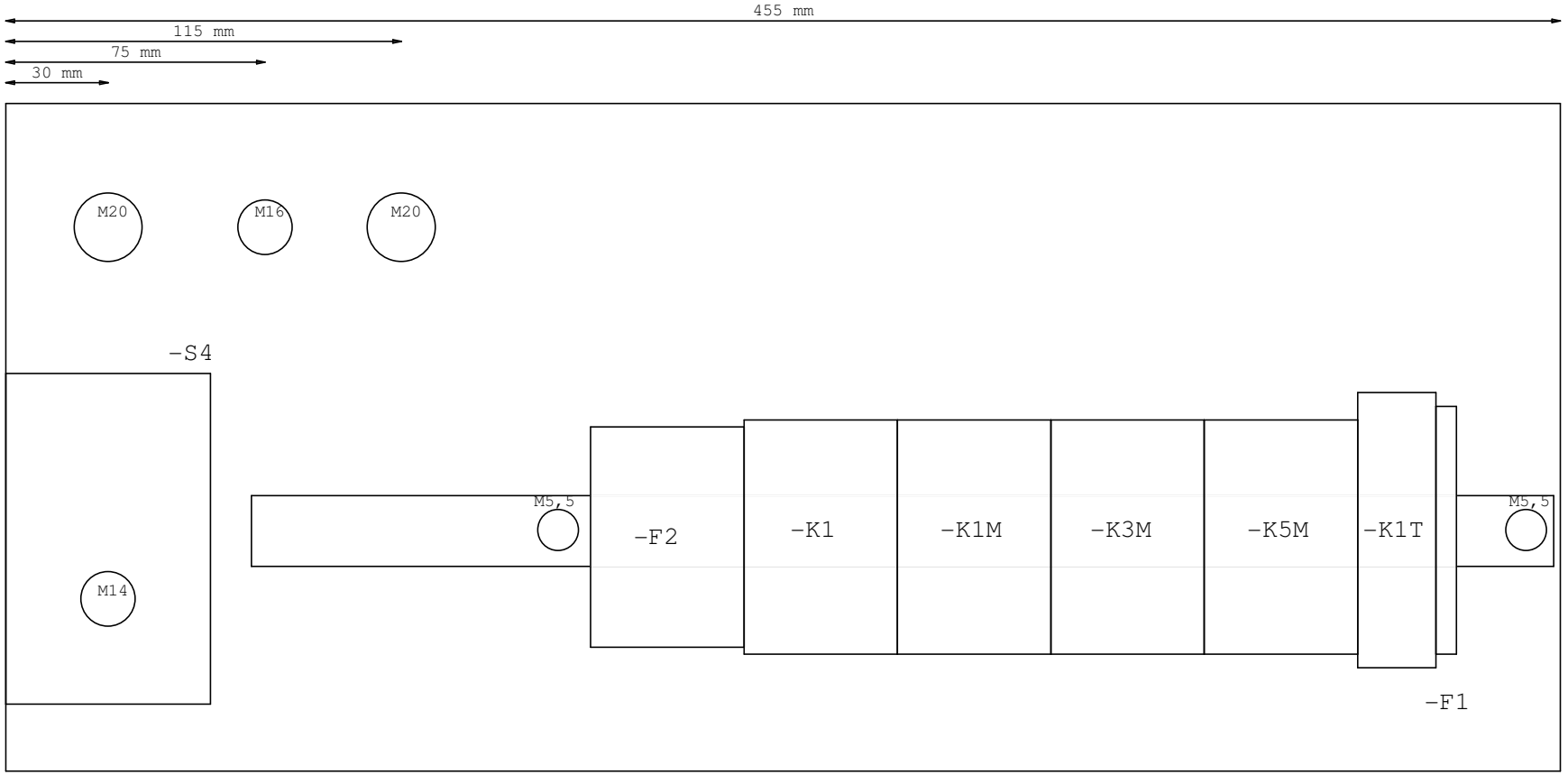

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Zust.	Änderung	Datum	Name	Norm		Urspr. / Ers. f.	Ers. d.		von 4Bl.

Appendix W - Maintenance check SCROLLs 8 +10 bar

When due	8 bar	10 bar	Maintenance Work	Parts required
Start-up	**x**	**x**	Tighten electric terminals	
			Control/tighten pipe/hose conections	
			Control direction of rotation	
			Check V-belt tension	
Daily regularly	**x**	**x**	Drain condensate on air storage vessel (if any)	
every **250 h** or monthly	**x**	**x**	Control/clean air intake filter	
every **1000 h** or once every 6 months	**x**	**x**	Check condition of hoses for leaks, cracks etc.	
after **2500 h** or once a year	**x**	**x**	Tighten electric terminals	
	x	**x**	Check V-belt for wear and replace if necessary	V-belt
	x	**x**	Check alignment of pulleys and tension and adjust if required	
	x	**x**	Check all pipes, if well fitted and tight	
	x	**x**	Change suction filter	Air suction filter
	x	**x**	Check correct setting of pressure switch and adjust if required	
after **5.000 h** or every **two** years	**x**	**x**	Clean suction fan	
	x	**x**	Clean cooling fins	
		x	Check Scroll bearings, re-grease if necessary	
		x*	Change tip seals etc. ("maintenance I a")	MK **I a** Gasket
		x	Change air end ("maintenance I b")	MK **I b** **Reconditioned Scroll**
after **10.000 h** or every **four** years	**x**		Clean suction fan	
	x		Clean cooling fins	
	x		Check Scroll bearings, re-grease if necessary	
	x*		Change tip seals etc. ("maintenance kit I a")*	MK **I a** Gasket
	x		Change air end ("maintenance kit I b")*	MK **I b** **Reconditioned Scroll**
		x**	Maintenance kit **II**	MK **II****
after **15.000 h**	**x**		Clean suction fan	
	x		Clean cooling fins	
after **20.000 h**	**x****		Maintenance kit **II**	MK **II****

*** Only authorized and certified dealers by RENNER are allowed to carry through a "major maintenance". Imperatively adhere to the separate maintenance instructions**

**** contact your dealer or the manufacturer for maintenance kit II**

Only original RENNER parts and components must be used.

Appendix AW 2
Motor bearings

All electric motors of RENNER SCROLL compressors are equipped with so-called permanently lubricated respectively closed motor bearings. The calculated life time – if the machine is horizontally operated – is between 10.000 and 20.000 operating hours (OH) These bearings can be exchanged when other major servicing and or maintenance work is to be carried out.
Please see the types of bearings in the chart hereunder.

To be considered without fail: High ambient temperatures, dusty and other detrimental ambient conditions derogate considerably the life-time of bearings and its grease. In this case we recommend shortening the maintenance intervals. Please pay attention to changing bearing noise and/or visual observations.

Here after details of the bearings mounted:

Type	power kW	D-end*	N-end
90L	1,5 / 2,2	6205	6204
112M	3,7 / 4,5	6307	6206
132S	5,5	6308	6207

* drive-end

Compressor model	
Serial number	
Date of acquisition	
Date of start-up	
Name of distributor:	

Operat hours	Date of maintenance	Next maintenance	Air suction filter		Cooling fan	Cooling fins	V-belt			SCROLL* tip seals	Motor bearing	Other maint.	Signature
			cleaned	replaced	Cleaned	Cleaned	Controlled	Tensioned	Replaced	Replaced	Replaced		

Please tick when work accomplished and sign for confirmation

* Only authorized and certified dealers by RENNER are allowed to carry through a "major maintenance".

EC Declaration of Conformity according to machine guideline 2006/42/EC Appendix II 1.A

The manufacturer / distributor

RENNER GmbH Kompressoren
Emil-Weber-Straße 32
74363 Güglingen

hereby declares that the following product

Product description:	**RENNER SCROLL Compressor**
Manufacturer:	**RENNER**
Serial no.:	
Series / type description:	**SL, SLD, SLDK, SLK**

Description:
SCROLL Compressor for generating compressed air of 8 and 10 bar

meets all relevant provisions of the above stated guideline and the other applied guidelines (to follow) - including the changes applicable at the time of the declaration.

The following further EC guidelines were applied:

EMC guideline 2004/108/EC

Low tension guideline 2006/95/EC

Guideline 2009/105/EC.

The following harmonised standards were applied:

EN 1012-1:1996	Compressors and vacuum pumps - Safety requirements - Part 1: Compressors
EN 286-1:1998/A2:2005	Simple unfired pressure vessels designed to contain air or nitrogen - Part 1: Pressure vessels for general purposes
EN 60204-1:2006	Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2005 (modified))
EN ISO 12100-1:2003	Safety of machinery - Basic concepts - General principles for design - Part 1: General terminology, methodology (ISO 12100-1:2003)
EN ISO 12100-2:2003	Safety of machinery - Basic concepts - General principles for design - Part 2: Technical leading records (ISO 12100-2:2003)
EN ISO 13849-1:2008	Safety of machinery -Safety relevant parts of controls - Part 1: General principles for design (ISO 13849-1:2006)
EN ISO 13849-2:2008	Safety of machinery -Safety relevant parts of controls - Part 2: Validation (ISO 13849-2:2003)

Name and address of person who is authorised to compile the technical documentation:
Daniel Hallner
RENNER GmbH Kompressoren
Emil-Weber-Straße 32
74363 Güglingen

(Signature)
Managing Director

(Signature)
Contractor for documentation

Appendix KT
Operating instructions for the refrigerant drier

Content

In this chapter you receive a brief overview for the optionally installed refrigerant drier.

Please follow the refrigerant drier safety instructions found in the separate operating manual. It is particularly dangerous to breath-in the cooling steam or get in contact with the cooling agents. Smoking when working on the refrigerant drier is prohibited, since the cooling agent will developpoisonous vapours when getting in touch with the glowing end of a cigarette or other open flame (e.g. welding work).

Function

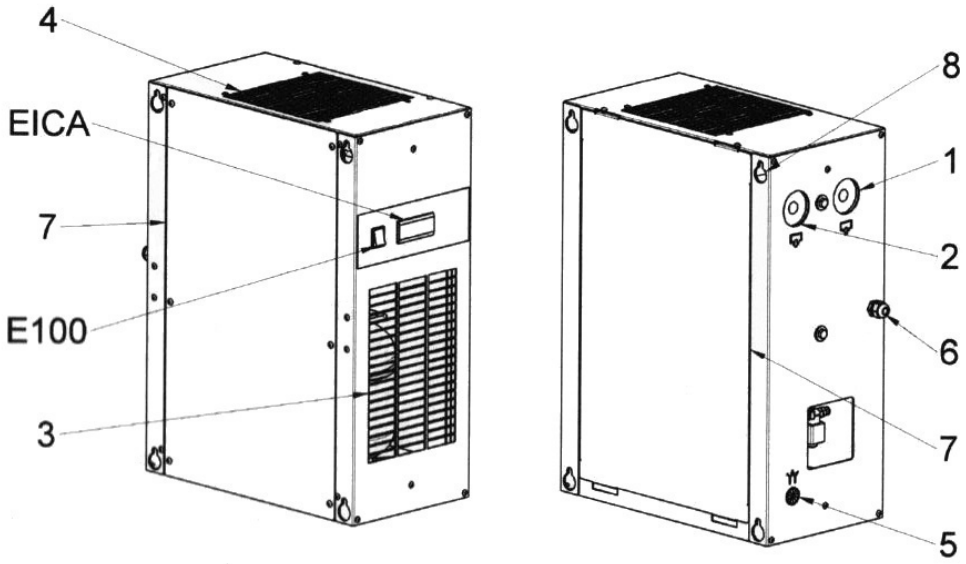
The refrigerant air drier contains a cooling system for cooling the compressed air. The compressed air is also de-humidified. The condensate created here is discharged through a condensate separator.

Make sure that the air inlet and outlet is never impaired or blocked. Adequate distance must be maintained between the ventilation grids and room walls.
Please follow the figure in Chapter 2.3 and the information in Chapter 2.3.1 of the Operating Manual of the refrigerant drier supplier.

After turning on the refrigerant drier, wait 5 minutes until the pressure has equalised. Only then, start the compressor.

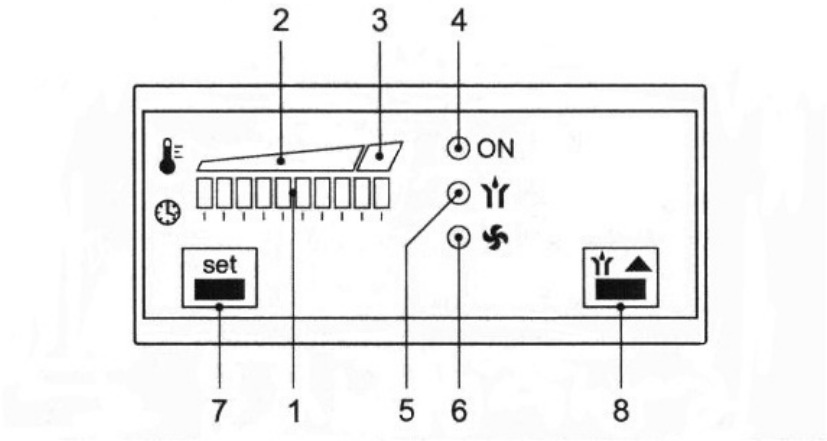
Appendix KT refrigerant drier (cont.)

Figure
Refrigerant drier



1.) Compressed air inlet
2.) Compressed air outlet
3.) Cooling air inlet
4.) Cooling air outlet
5.) Steam trap
6.) Electrical connections
7.) Maintenance access
8.) Fixing holes
E100.) Switch-on
EICA.) Electronic regulator

Figure
control panel



Appendix KT refrigerant drier (cont.)

Electronic Regulator

Item	Description	Function
1	**10x green LED**	Pressure dew point indicator
2	**Green area**	Pressure dew point normal
3	**Red area**	Pressure dew point is too high
4	**Green LED**	Compressed air drier is turned on In the setting mode the blinking LED shows which data will be displayed
5	**Yellow LED**	Condensate magnetic valve is active
6	**Yellow LED**	Ventilator is turned on
7	**Setting switch**	Multi-function key for editing the parameter. **Press the button for 2 seconds:** Switch from display to setting mode **Briefly press the button:** Switch between menues **Press button together with up key:** Current setting is changed
8	**Up key**	Up / deflector test Pressing the up key will exit the setting mode

Appendix KT refrigerant drier (cont.)

Maintenance

Before completing any maintenance work, please follow all safety provisions for electrical systems and electrical devices (see Chapter 1 of the original operating manual).

The compressed air refrigerant drier must be mainained at different intervals. The maintenance intervals heavily depend on the utilisation type and the conditions oft he installation site. The following maintenance work must be completed daily:

1. Check the function of the steam trap; check if water is drained; valve test (manual drain condensation):

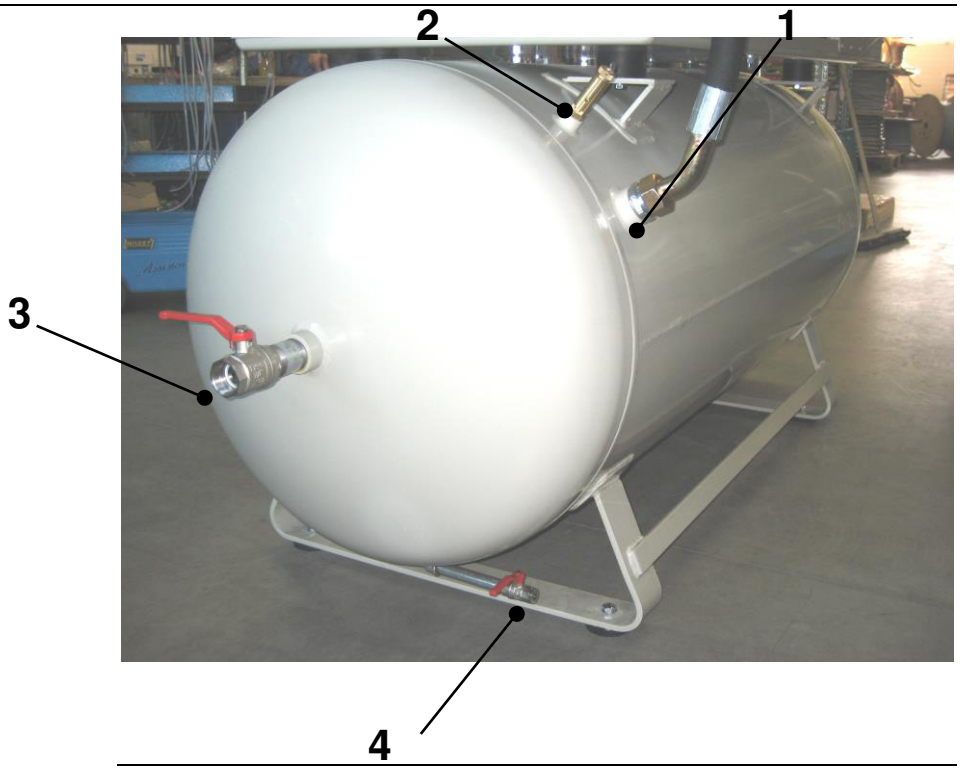
2. Check the pressure dew point display; for deviations from the normal range, see chapter 5.2.2 and 5.2.3 in the original operating manual

3. Check the compressor for contamination

Specific notes about other maintenance intervals and work can be found in the manufacturer original operating manual under Point 5 Maintenance.

Appendix AD
Compressed air receiver

Illustration: air receiver



Description of air receiver

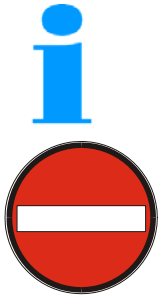
No.	Description	Function
1	**Connection from compressor**	Inlet of compressed air into the air receiver
2	**Safety valve**	Protects the air receiver against too high a pressure
3	**Compressed air outlet**	Outlet of compressed air to the c.a. system
4	**Condensate drain**	Drains the condensate for collection

- Please observe the regional laws and regulations for the control of air receivers
- Please take care for a condensate drain system
- Please take the necessary mesures as to discharge the condensate if no automatic system

Caution!
To grant the functionality of the air receivers, all flexible hoses of the receivers have to be changed after 2 years at the latest.
This affects especially the 2 x 90l air receivers. Both receivers have to be able to be discharged separately.

Appendix DS
Pressure switch

Content



You will get a brief overview regarding the function of the pressure switch

Attention !

The pressure switch is already set at the factory and its setting corresponds to the relating machine configuration. Possible modifications may create severe consequences to the life time of the unit. The legal warranty will cease in case of modifications of the setting not agreed to by RENNER GMBH.

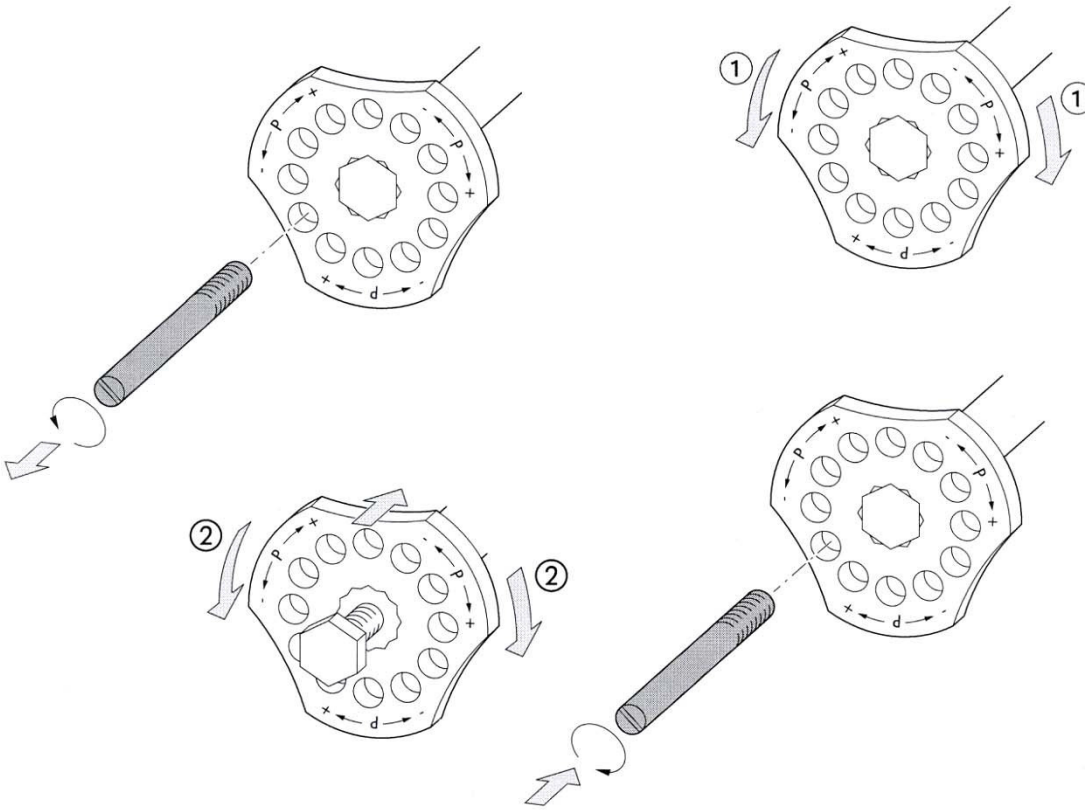
Function

The pressure switch controls the cut-in and cut-out pressure of the corresponding compressor unit. The difference (delta-p) between the cut-in and cout-out pressure is generally 1,5 bar. In case the cut-off pressure set at the factory is modified, the safety valve is activated in case the maximum pressure is exceeded.

Continuation next page

Appendix DS
Pressure switch (Cont.)

Schaltdruck nur unter Druck verändern!
Adjust switching pressure only under pressure!
Modification de la pression de fonctionnement uniquement sous pression !
Modificare la pressione di funzionamento solo sotto pressione!
¡Modificar la presión únicamente bajo presión!
Настройку давления включения производить только под давлением!
必须在受压的情况下改变压力



① Pmax. einstellen
Pmin. ändert sich mit

② Pmin. einstellen
Pmax. ändert sich nicht mit

① Set Pmax.
Pmin. is altered accordingly

② Set Pmin.
Pmax. does not alter

① Régler Pmax.
Pmin. se modifie

② Régler Pmin.
Pmax. ne se modifie pas

① Pmax.
Pmin.

② Pmin.
Pmax.

① Regolare Pmax.
Pmin. si modifica

② Regolare Pmin.
Pmax. non si modifica

① Ajustar Pmax.
Pmin. se modifica

② Ajustar Pmin.
Pmax. non se modifica

① Установить Pmax Pmin
изменяется также

② Установить Pmin Pmax не
изменяется

① 调整
改变按

② 调整
改变不按