

# **rofin**

LASER MARKING

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**Bedienungsanleitung**



**Operating Instructions**



**Instructions de Service**

**RS Nr. 120114309**

**RS Nr. 120114310**

**RS Nr. 120114311**

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## **Operating Instructions**

RS Nr. 120110730

RS Nr. 120110985

RS Nr. 120110986

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## 1.0 Foreword (WW)

This operating manual is designed to familiarize the user with the machine/unit and its designated use.

This manual contains important notes which are to be observed during the installation, operation and maintenance of the unit, in order to guarantee safe, proper and economical use of the system.

Observing the instructions helps to avoid dangers, to reduce repair cost and downtime, and to increase the reliability of the machine / unit.

The operating manual must always be available wherever the machine/unit is in use.

This operating manual must be read and applied by any person in charge of carrying out work with and on the machine/unit, such as

- **operation** including setting up, troubleshooting in the course of work, evacuation of production waste, care and disposal of fuels and consumables.
- **Installation, set-up, wiring**
- **maintenance** (servicing, inspection, repair)
- **transport**

In addition to the operating manual and to the mandatory rules and regulations for accident prevention and environmental protection in the country and place of use of the machine/unit, the generally recognized technical rules for safe and proper working must also be observed.

**Attention:**  
**The markings for transport and stocking indicated on the packaging have to be observed under all circumstances.**



**Note:**  
**Please check the type of manual (see Annex A, Type List) against the label on your device.**



## 1.1 Abbreviations used in this Operating Manual

L	Air
RK	Recolor
W	Water

### Commentary to the chiller:

WW = RS Nr. 120110730 = 19" 6HE  
Wasser/Wasser System mit 3-2-Wegeventil

WLb= RS Nr. 120110985 = 19" 6HE  
Kompressor / Luft K hlssystem mit Hei gas-Bypassventil

WLb= RS Nr. 120110986 = 19" 6HE  
Kompressor / Luft K hlssystem mit Hei gas-Bypassventil

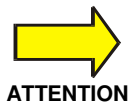
## 2.0 Warning notes and symbols (WLb,WW)

### 2.1 Symbols (WLb,WW)



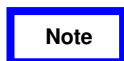
#### **Warning:**

This heading is used whenever the ignorance or inaccurate obeying of factory rules, working rules, laid down work routines, etc. can lead to the death, injury to or an accident of a person.



#### **Attention:**

This heading is used whenever the ignorance or inaccurate obeying of factory rules, working rules, laid down work routines, etc. can lead to damage to the system.



#### **Note:**

This heading is used when an exceptional feature should be taken notice of.



#### **DO**

This heading is used when technical rules or regulations require that a course of action be observed.

# Operating Instructions

## 2.2 Warning notices and symbols used (WLb,WW)

The following warning notices and symbols are used in this operating manual:



## 2.3 Safety / Prevention of accidents (WLb,WW)

### 2.3.1 General notes (WLb,WW)

This operating manual contains basic notes to be observed for startup, operation and maintenance. Read it before starting the unit without fail.

**The manufacturer declines any responsibility for damage and breakdowns resulting from a failure to observe this operating manual.**

### 2.3.2 Qualification and training of personnel (WLb,WW)

The personnel for operation, maintenance, inspection and assembly must be adequately qualified for the work concerned. The user must clearly specify the sphere of responsibility, competence, and supervision of the personnel.

## 2.3.3 Dangers when the notes on safety are ignored (WLb,WW)

Ignoring the safety regulations can have a harmful effect on persons or cause damage to the system or environment. Ignoring the safety regulations may cause a loss of claim for damages.

## 2.3.4 Safety-conscious working (WLb,WW)

Observe the notes on safety given in the operating manual, the national rules for the prevention of accidents in force, as well as any internal instructions by the user for working, operation and safety.

## 2.3.5 Notes on safety for the user / operator (WLb,WW)

Any guard preventing accidental contact of moving parts must not be removed when the machine / unit is running. Take appropriate steps to preclude any hazard by electric power. (For relevant details see the rules of the VDE and the local energy supply companies)



### **WARNING**

**Mechanical, pneumatic, hydraulic or electrical components of the unit must in no case be overridden or changed.**

The employer shall instruct the insured persons on:

- the dangers when handling refrigerating plants and cooling units
- the safety regulations, and
- the conduct in the case of accidents and failures and the steps to be taken in such cases

before they start their work for the first time and at reasonable intervals, however, at least once a year. (see VBG 20 §19)

## 2.3.6 Notes on safety for maintenance, inspection, and assembly work (WLb,WW)

On principle, cleaning and maintenance of the machine / unit must be carried out with the machine / unit at standstill only. The procedure for shutdown of the unit given in the operating manual must be observed without fail. Immediately after completing the work all safety and guarding devices must be replaced and/or put into service again.

## 2.3.7 Unauthorized modification or use of spare parts (WLb,WW)

Modification of or changes to the machine / unit are only permitted after previous consultation of the manufacturer. Original spare parts and accessories authorized by the manufacturer serve for ensuring safety. The use of any other parts may make the liability for the ensuing consequences invalid.

## 2.3.8 Improper operating modes (WLb,WW)

The operating safety of the delivered machine / unit is only guaranteed with **proper use**. The limits stated in the **technical data** must never be exceeded.

### **WARNING**

**The unit is not suitable for use in an explosible atmosphere.  
The unit must not be used for cooling flammable or explosible substances.**



## 2.3.9 Handling of refrigerants (WLb)

The refrigerant has some kind of irritant effect on skin and mucous membranes. Liquid refrigerants on the skin may cause frostbite. Refrigerants may decompose and form toxic decomposition products (e.g. hydrogen chloride, phosgene) in the presence of naked flames or hot surfaces. The refrigerant volatilizes when it escapes in gaseous form to the air. Intentionally blowing off and/or discharging the refrigerant is not permitted. Transport and/or install refrigerating plants in such a way that they cannot be damaged by in-house transportation or traffic.

### **WARNING**

**When refrigerant is escaping the unit, you must never smoke in the vicinity of the unit / machine  
The gases will decompose to cauterizing acids in the burning cigarette that will damage your lungs.**



### **ATTENTION**

**Repairing the cooling circuit may be by an expert firm only.**



## 2.3.10 Plant log (WLb,WW)

The user is obliged to keep a plant log up to date in accordance with ES 378-2 paragraph 11.5.

The following data shall be entered into the log:

- Details of all maintenance and repair work
- Amount and kind of (new, re-used or recycled) of the refrigerant filled up, for each filling-up
- Amount of refrigerant drained of the plant, for each draining
- If there is an analysis of the re-used refrigerant, the results shall also be recorded in the log
- Origin of the re-used refrigerant
- Changes to and replacement of components of the plant
- Results of all periodic routine checks
- Prolonged periods of downtime



## 3.0 General description of the unit (WLb,WW)

### 3.1 Usage to the intended purpose (WLb,WW)

The unit serves for cooling the water or refrigerant required for the working or finishing process.

The unit is designed as stand-alone or integrated device, depending on the configuration concerned.



**WARNING:**

- **Unauthorized modifications of and changes to the unit**  
- **Use for any other purpose**  
**are forbidden for safety reasons.**

### 3.2 Description of operation of compressor-cooled systems (WLb)

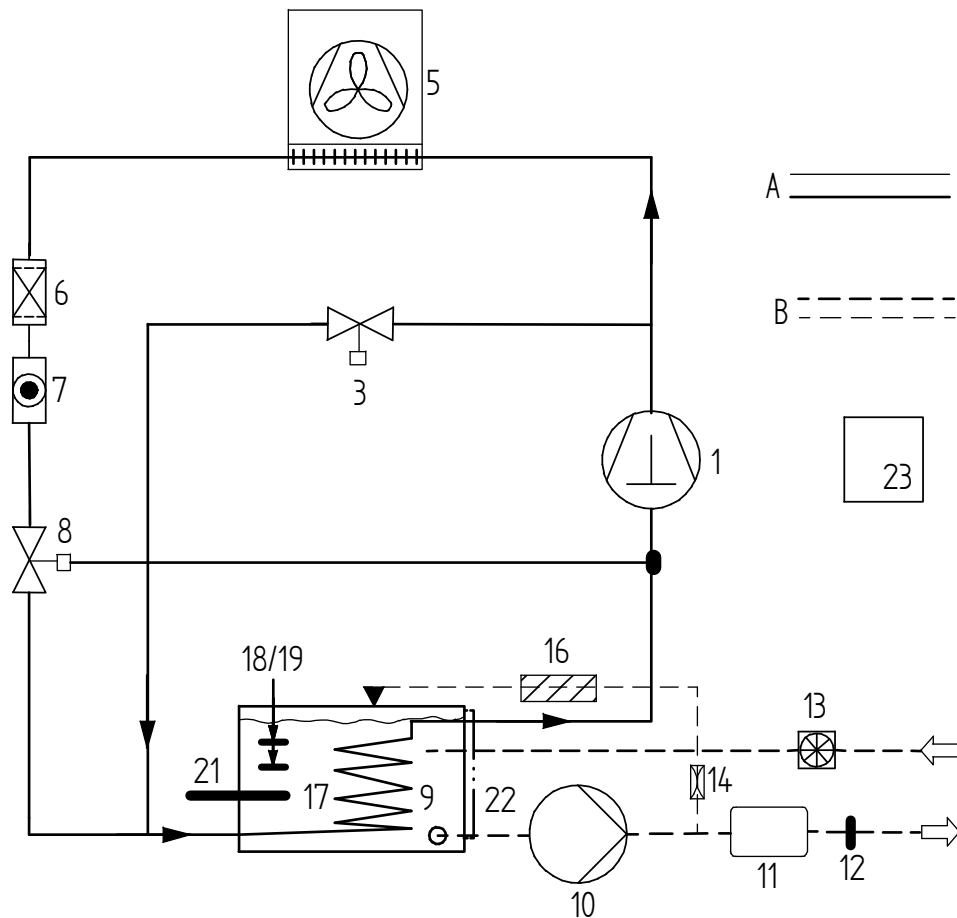
The process water (DI-water) is supplied to the consumer (laser) and back by the circulating pump (10). The flow controller (13) mounted in the water circuit monitoring the flow and breaking at too low flow. The absorbed heat is dissipated via the cooling circuit to the ambient air. A sensor (19) mounted in the storage tank protects the circulating pump against running dry with breaking the system. Another sensor (18) monitors the level and advice goes to low medium.

**Refrigerating Operation:** Absorbed heat is dissipated to the refrigerant gas by the evaporator (9). Any refrigerant that evaporates during this process is drawn in and compressed by the compressor (1). The compressed refrigerant (hot gas) is then cooled and liquefied in the condenser (5). The heat released during this process is dissipated to the ambient air. Liquefied refrigerant is again injected into the evaporator via the expansion valve (8) and absorbs heat during this process.

Hot gas bypass operation (WLb): A 2/2 way valve (3) mounted in the cooling circuit controls the required cooling capacity as a function of the measured process water temperature via the temperature sensor (12) and the controller / maincontroller (23) through breaking the bypass.

**Functional diagram see following page =>**

WLs / RS Nr. 120110985  
RS Nr. 120110986



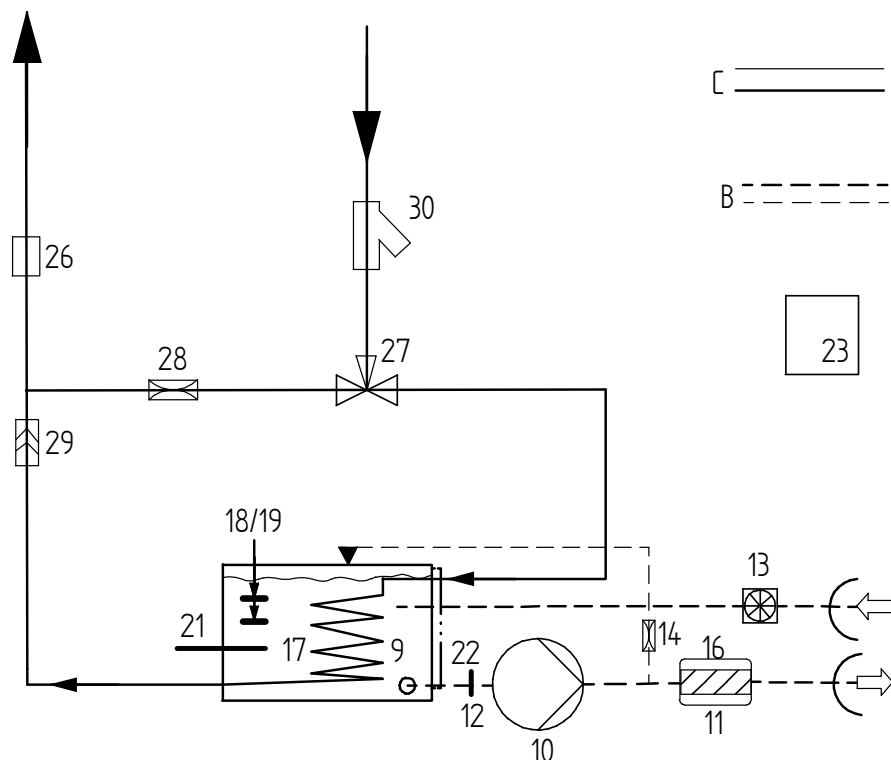
## Description of Figure

- |                                 |                                     |
|---------------------------------|-------------------------------------|
| A: Pipe with refrigerant medium | 11 Filter                           |
| B: Pipe with DI-water           | 12 Temperature sensor               |
| 01 Kompressor                   | 13 Flow rate sensor                 |
| 03 2/2 way valve "cooling"      | 14 Ventilation bypass with aperture |
| 05 Condenser with fan           | 16 DI-cartridge                     |
| 06 Refrigerant medium drier     | 17 Tank                             |
| 07 Inspection glass             | 18 Level sensor 1                   |
| 08 Thermostatic expansion valve | 19 Level sensor 2                   |
| 09 Evaporator                   | 21 Heating element                  |
| 10 Pump                         | 22 Level indicator                  |
|                                 | 23 Control / Main controller        |

## 3.3 Description of operation of water/water-cooled systems (WW) WW RS Nr. 120110730

The process water (DI-water) is supplied to the consumer (laser) and back by the circulating pump (10). The flow controller (13) mounted in the water circuit monitoring the flow and breaking at to low flow. The absorbed heat is dissipated via the cooling circuit to the ambient air. A sensor (19) mounted in the storage tank protects the circulating pump against running dry with breaking the system. Another sensor (18) monitors the level and advice to low medium.

**Refrigerating Operation:** A 3/2 way valve (27) arranged in the urban water – in-house water circuit controls the amount of urban water this flow trough the cooling coil in the tank and thus the required refrigerating capacity in dependence on the measured process water temperature via the temperature sensor (12). A flow restrictor mounted in the return line reduce the flow to exact 6ltr/min.



**Description of Figure / water-water cooled system (WW)**

10	circulating pump	28	orifice plate
11	particle filter	29	non-return valve
12	temperature sensor	30	dirt arrester
13	flow controller		
14	air-bypass with orifice plate		
16	Di- cartridge		
17	tank		
18	low level sensor		
19	high level sensor		
21	heating		
22	level indication		
23	Maincontroller		
26	flow restrictor		
27	3/2 way-valve		

**Note**

**Note:**

The machine performance of water-cooled recoolers depends on the water temperature. The lower the water temperature, the higher the overall performance of the unit.

## 3.4 Heating Operation (WLb,WW)

After prolonged periods of standstill or under certain operating conditions it may become necessary to heat the cooling water by means of a heating element to reach the process temperature faster or to maintain it. The unit controller will cut the heating element in if required.

## 4.0 Transport (WLb,WW)

The machine / unit may be transported in the original packing only until the first startup. Notify the manufacturer immediately if you detect any damage. When the machine / unit is given another place in a plant, all connections of the machine / unit must be disconnected. Any dislocating of the machine / unit must be done in such a way that damage is excluded. Should there be a damage despite these notes, have the machine / unit inspected and/or repaired, if required, by an expert before you start it again.

### **WARNING**

**The machine / unit has a weight of (see appendix A, Technical Data)  
Use appropriate means for transporting it.  
Observe all relevant safety regulations without fail.**

**As a rule, work on the electrical system must be carried out by expert personnel; the valid wiring diagram and the VDE guidelines must be observed.**



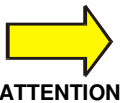
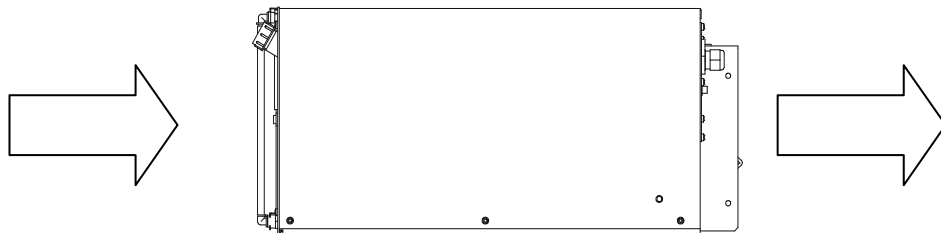
## 5.0 Installation / Startup (WLb,WW)

### 5.1 Installation (WLb,WW)

The location of the unit should be selected in such a way that it will always be easily accessible for the operating personnel and that it is not subjected to extreme heat, e.g. near a heating Protect the unit against humidity. If the unit is to be installed in areas where there is danger of frost, it must be specially equipped for such an installation.

The unit has been specially designed for mounting in 19" racks. Place the unit into the bay in the direction of the arrow and mount it. The direction of installation (direction of the arrow) marks the flow of the cooling air, too. Free flow must be ensured.

Fig. 2

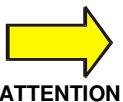


ATTENTION

#### ATTENTION

Contact manufacturer before you install the device in damp locations and before you operate the device in the wet . Operating the device beyond the ambient temperatures stated in the technical data sheet will result in damage to the device.

For air-cooled versions the following applies especially: (WLb)



ATTENTION

#### ATTENTION

The user must provide adequate ventilation for dissipating the waste heat. Consult manufacturer before you install any air guiding systems.



WARNING

#### WARNING

As a rule, work on the electrical system must be carried out by expert personnel; the valid wiring diagram and the VDE guidelines must be observed.

Compare the mains voltage at site with the nameplate of the unit.

## 5.2 Start-up (WLb,WW)

### **WARNING**

Before startup, read the operating manual, especially the section containing the notes on safety without fail.



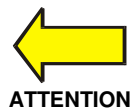
### **ATTENTION**

Check whether the provided supply lines (pipes/hoses for supply and return flow line) are connected properly and whether there are any leaks. In the case of plants with a tank, make sure that the tank is filled with the proper medium. (see # Filling the Tank) In the case of units without a tank of their own, make sure that the entire plant system is completely filled with medium before start-up.



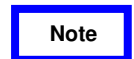
### **ATTENTION**

If parts of the lines or other connected elements are mounted at a higher level than the intended level of the liquid, prevent the medium from flowing back when the plant is at standstill by suitable devices.



### **Note**

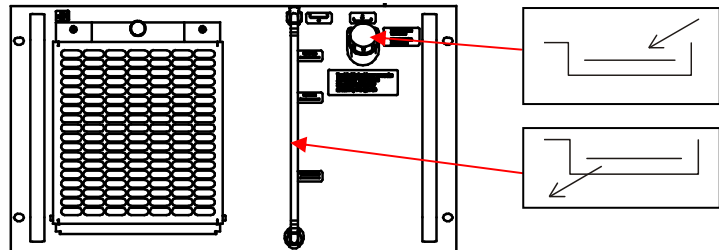
The unpacked unit has to be left in operating position for some 24 hours prior to startup so that the cooling oil may collect after transport.



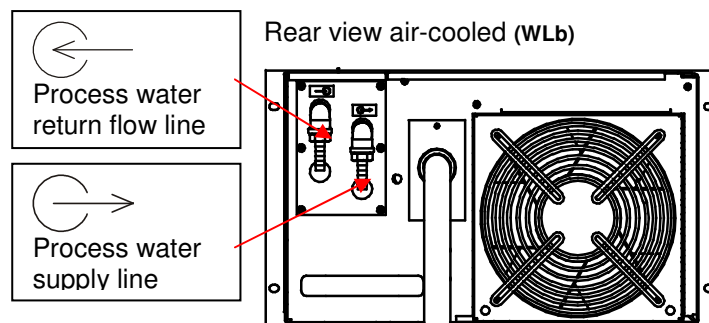
## 5.2.1 Connections of air-cooled and water cooled Devices

The devices may have customer-specific connection configurations. If there is a difference, pay attention to the symbology of the connections.

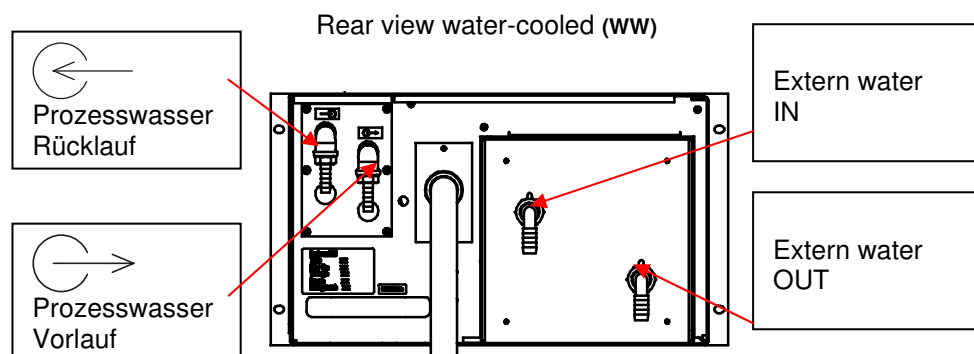
Front view air-cooled and water cooled (,WLb,WW)



Figur 5



Figur 6



Figur 7



## 5.2.2 Filling of tank (WLb,WW)

### Note

#### Note

**Use only the specified cooling medium!! Observe the manufacturer's notes!**

For filling, unscrew the tank cover and fill in the medium until it reaches the marking (maximum level). Make sure no dirt gets into the tank during filling.

### Note

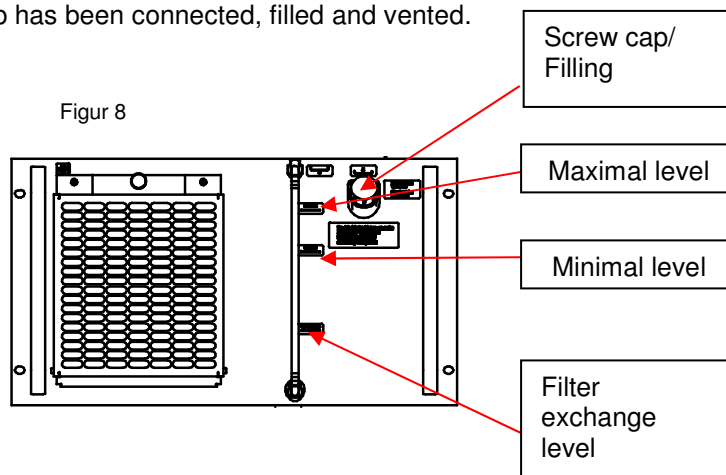
#### Note

**Use only clean medium. Make sure no dirt gets into the tank.**

#### Check whether:

- hoses have been run properly and have been mounted as per the identification,
- the unit has been filled and vented
- water level max., (omitted with automatic metered addition)
- the domestic water pipe is connected and open in case of automatic re-dosing (solenoid valve or float valve)
- connection to the mains is available,
- circulating pump has been connected, filled and vented.

Figur 8



## 5.2.3 Evacuating the circulating pump (WLb,WW)

In the case of units that have a separate tank, evacuating the pump separately is not required. Make sure that the pump will not run dry. The level in the tank should always be between min and max (see Start-Up). When the entire system is filled for the first time, repeated topping-up of the water supply may be required.

In the case of units without a tank of their own, make sure that the supplying line system is completely filled with medium.

## 6.0 Operation (WLb,WW)

### 6.1 Switching On / Switching Off

Is via the maincontroller

### 6.2 Adjusting the set point

Is via the maincontroller

#### **ATTENTION**

**Risk of freezing !**

**At water temperatures below +8 °C, the plant  
may only be operated with anti-freeze (-20 °C)!**

**Consult the manufacturer should you intend to use the unit for any other  
fields of application.**



**ATTENTION**

# Operating Instructions

## 7.0 Service and maintenance (WLb,WW)

### 7.1 Inspection

When the mechanical parts are running irregularly or when there are strange noises, switch off the machine / unit.



WARNING

#### WARNING

Make the unit dead by means of the master switch and/or the protective motor switches when carrying out maintenance and secure against inadvertent switching-on.



WARNING

#### WARNING

There are hot components behind the covers.

When the covers are removed for maintenance or repair work, make sure not to touch these components !



DO

#### DO

Wear protective gloves when you reach into this area.



WARNING

#### Warning:

Do not reach within the range of rotation of the fan blade. Danger of injuries when the fan blade starts to rotate. Before you open the front cover, the plant must be switched off by means of the master switch and must be secured against inadvertent switching on.

### 7.2 Maintenance schedule

WHEN?	WHAT?	WHERE?	!
Weekly	check	Water level	# 7.3
Monthly	check	Fins of condenser	# 7.5
Monthly	check	Air filter Particle collector Deionising cartridge	# 7.4
Yearly	check	Electric system, safety	
Customer-specific	replace	Air filter	# 7.4

## 7.3 Topping up the cooling water (check water level weekly) (WLb,WW)

Check the water level in the tank weekly. A low level of the liquid will be indicated via the device control/main controller.

## 7.4 Replacing the air filter (check the air filter once a month) (WLb)

Make sure that the filter mat upstream of the condenser remains sufficiently pervious to ensure the required heat exchange. Replace the filter mat at intervals that you determine yourself considering the service conditions concerned.

### WARNING

**Make the unit dead by means of the master switch and/or the protective motor switches when carrying out maintenance and secure against inadvertent switching-on.**



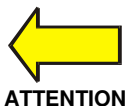
### ATTENTION

**A soiled filter mat will cause the refrigerating capacity of the unit to decrease. As a result of the additionally increasing power consumption of the compressor, the efficiency of the plant / machine will drop considerably.**



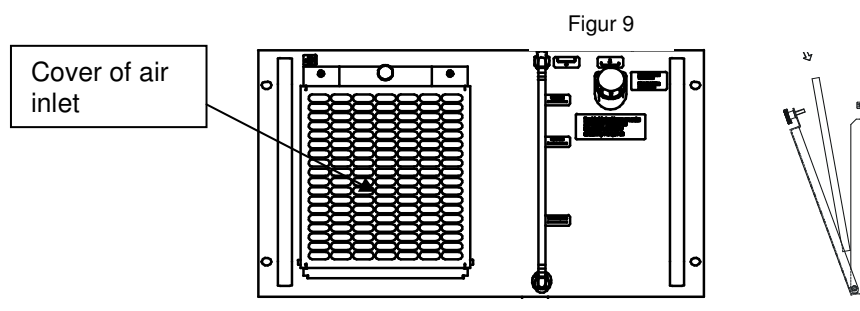
### ATTENTION

**The filter mat may be replaced by instructed personnel only.**



### WARNING

**There are hot components behind the covers.  
When the covers are removed for maintenance or repair work, make sure not to touch these components !**



When replacing the filter mat, pay attention to its structure and/or the direction of air flow. Observe the relevant guidelines for disposal when you dispose of the soiled filter mat.

Proceed as follows:

- Dismount cover
- Replace filter by new one
- Mount cover

Figur 10

## 7.5 Cleaning the condenser (check the fins once a month) (WLb)

Make sure with air-cooled units that the fins of the compressor are always clean to ensure the required heat exchange. Clean the fins of the condenser of dust and fluffing by means of compressed air. Determine the intervals for cleaning yourself taking the service conditions into consideration.



### ATTENTION

Cleaning may be done by instructed personnel only.



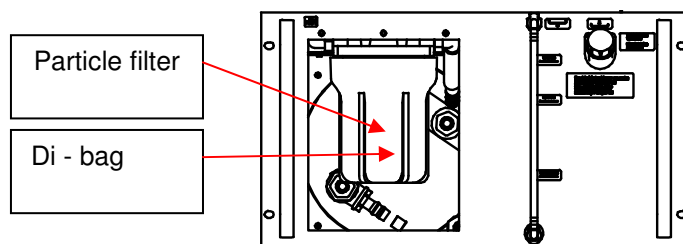
### DO

Wear protective gloves when you reach into this area. (Sharp fins – danger of injury!)

## 7.6 Replacing the Particle Collector / Deionising Cartridge (WLs,WLb,WW)

Check the particle collector for soiling at regular intervals (also see maintenance schedule). Replace the filter cartridge in time, before the flow volume is reduced.

Fig. 11



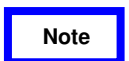
### ATTENTION

This maintenance job may be done by instructed personnel only.



### WARNING

There are hot components behind the covers.  
When the covers are removed for maintenance or repair work, make sure not to touch these components !



### Note

For units with flushing device see # 10.4.

Proceed as follows:

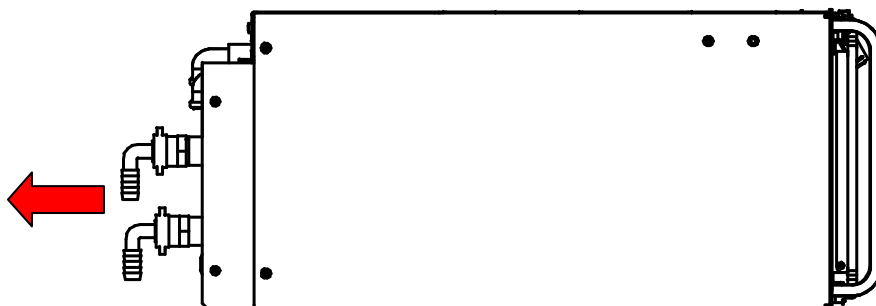
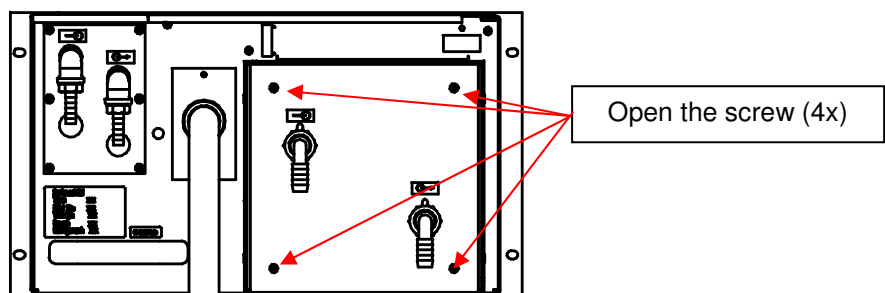
- Switch the unit off and secure it against being switched on
- Drain the tank (see 9.2.2)
- Remove filter mat
- Remove the filter frame
- Unscrew the filter case (transparent bottom part)
- Pull the filter cartridge off to the bottom
- Mount new filter cartridge
- Clean filter case
- Mount filter case
- Fill the tank
- Deaerate the unit (# Start-Up 5.2)
- Install the filter frame
- Insert the filter mat

## 7.7 Replacing the dirt arrester (WW)

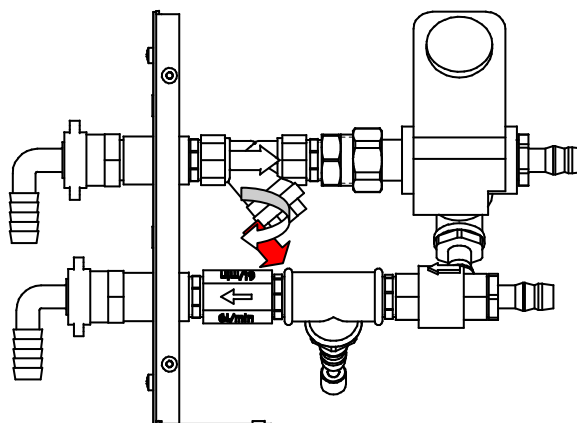
procedure:

- Close the Water extern
- Loosen the screw
- Sheet opening
- Open the Srew on the dirt arrester
- Clean the Dirt arrester
- Close the screw
- Insert the sheet
- Close the srew on the sheet
- Open the Water extern

Figur 12



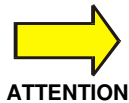
Figur 13



Figur 14

## 8.0 Repair (WLb,WW)

### 8.1 Repair and elimination of failures (WLb,WW)



#### **ATTENTION**

Repairing the refrigerant circuit may be by an expert firm only. Should there be any problems, please contact the manufacturer.

Make sure there is adequate venting.



#### **WARNING**

As a rule, work on the electrical system must be carried out by expert personnel; the valid wiring diagram and the VDE guidelines must be observed.

Compare the mains voltage at site with the nameplate of the unit.

### 8.2 Failures compressor-cooled systems (WLb)

#### 8.2.1 Lack of refrigerant (WLb)

You will notice a lack of refrigerant by a marked drop in the refrigerating capacity. If this is the case, there is a leak in the cooling circuit. You will see a lot of gas bubbles in the sight glass.



#### **ATTENTION**

Repairing the cooling circuit may be by an expert firm only.



#### **WARNING**

When refrigerant is escaping the unit, you must never smoke in the vicinity of the unit / machine

The gases will decompose to cauterizing acids in the burning cigarette that will damage your lungs.

Never use a naked flame when checking for leaks!

#### 8.2.2 Compressor overloaded – High-pressure cut-out triggers (WLs,WLb)

- high ambient temperature (>+42 °C)
- failure to observe required intervals (=>Installation 5.1)
- defective fan
- soiled fan/fins/filter (=> change filter)
- high water supply line temperature (=> range of usability – Technical data)

## **8.2.3 Compressor constantly switching on and off – Low pressure cut-out triggers (option) (WLb)**

A possible cause for constant switching on and off is:

- Excess refrigerating capacity of the chilling unit  
(=>range of usability – Technical data)
- Loss of refrigerant

## **8.2.4 High water supply line temperature(WLb)**

During operation, the cooling unit is running into a reliable condition. The refrigerating unit keeps the water supply line temperature at the set point adjusted. Possible causes for a deviation are:

- Heat input > the refrigerating capacity at this operating point (=>range of usability – Technical data)
- high ambient temperatures > 42 °C (=>range of usability – Technical data)
- failure to observe the required intervals (=>Installation 5.1)
- defective fan
- soiled condenser
- lack of refrigerant
- low water level in tank

## **8.3 Failures water-cooled systems (WW)**

### **8.3.1 High water supply line temperature (WW)**

During operation, the cooling unit is running into a reliable condition. The refrigerating unit keeps the water supply line temperature at the set point adjusted. Possible causes for a deviation are:

- Heat input > the refrigerating capacity at this operating point (=> Annex A, range of usability – Technical data)
- high cooling water temperature (=> external cooling circuit – Annex A, Technical Data)
- no or too under external cooling water, water pressure may be too low (=> check connections – Annex A, Technical Data)
- no or too under external cooling water possibly contaminated with dirt trap (=> Clean filter cf. 7.7)
- 3/2 way valve clogged (=> clean valve, place a filter ahead, if required)



## 8.4 General failures (WLb,WW)

### 8.4.1 Overload current

All electrical drive mechanisms of the refrigerating plant are protected by protective switch. The protective switch may trigger in the following cases:

- one phase missing
- overloading of the plant
- wrong mains voltage
- wrong frequency
- motor defective
- defective supply lead of motor concerned
- excess temperature in control cabinet
- For installations WLb, WW is customer-specific devices. The hedge is in the customer's laser system.

**Note:**

**For installations WLb, WW is customer-specific devices.  
The hedge is in the customer's Lasercontroller**

### 8.4.2 No pump power (WLs,WLb,WW)

This fault may be due to the following causes:

- Pump rotating in the wrong direction
- Pump not vented (=> Start-up)
- Water level in tank below minimum
- Operating Mode Flushing (#10.4)

## 9.0 Dismounting (WLb,WW)

### 9.1 Electric connection (WLb,WW)

#### **WARNING**

As a rule, work on the electrical system must be carried out by expert personnel; the valid wiring diagram and the VDE guidelines must be observed.  
Make the unit dead.



### 9.2 Scrapping (WLb,WW)

#### **ATTENTION**

All components of the unit must be disposed of according to the applicable rules and regulations.



Scrapping and disposal of refrigerators and heat-pumps is regulated by standard EN 378-4 : 2000-09.

#### 9.2.1 Refrigerant (WLb)

#### **ATTENTION**

The refrigerant may only be drained by a specialised firm for refrigeration and air-condition engineering and must then be disposed of in accordance with the relevant rules and regulations.

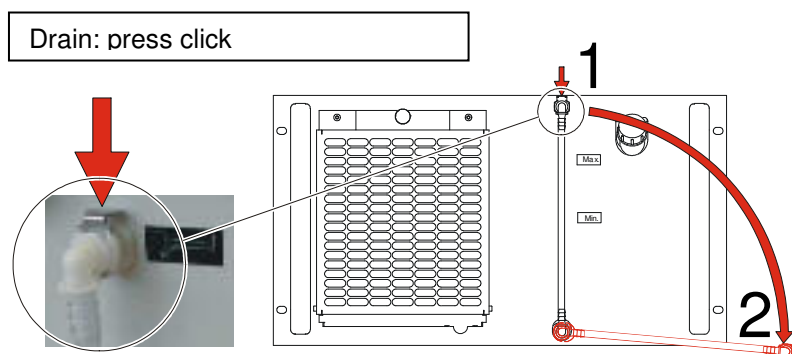


Recycling-organisations for halocarbon refrigerant have to be corresponding to standard ISO/DIS 11650 or a equivalent standard.

#### 9.2.2 Process water (WLb,WW)

#### **ATTENTION**

The process water must be disposed of in accordance with the relevant rules and regulations.



Figur 15

## **10.0 Technical Data:**

**10.1 Technical Data RS Nr. 31.610.01**

**10.2 Technical Data RS Nr. 10.006.00**

**10.3 Technical Data RS Nr. 31.700.00**

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## **Technical Data**

**RKH/W-00700-W-HC-06E-2-DI**

**Art. Nr. / Part No. 120110730**

**Water-water cooled systems with 3/2 valve 0-10V (CAN)**

European commodity index:	841 989 10
Device designation:	RKH/W-00700-W-HC-06E-2-DI
Mat. No. / Part No.:	RSM 120110730
Operating voltage:	198-253V1PH50/60Hz
Current consumption:	5A (max. 6,5A)
Rated cooling capacity:	500W based on 25 °C coolant temperature 40 °C ambient 20 °C temperature extern water >5l/min flow (extern water)  600W based on 25 °C coolant temperature 35 °C ambient 19 °C temperature extern water >5l/min flow (extern water)
Operating temperature:	+21 °C - +28 °C
Ambient temperature:	+ 5 °C - +42 °C
Water extern:	max. 6bar / 15-20 °C tw1 / >5l/min
Cooling medium:	De- ionized Water <5µS/cm
Tank capacity:	6 ltrs
Heating:	Heating cartridge in the tank 700W
Flow controller:	SIKA VTH Hallsensor 360p/l/min Measuring range: 2...20l/min
Pump:	immersion pump Y2051.0130 Operating point 9l/min bei 30m
controller:	Can Controller
Control accuracy:	+/- 0,1K
Partikle filter:	Partikle filter: 20µm DI water bag put into the filter
Electrical connection:	rubber connector/ interface RJ45

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Hydraulic connection:	2x 12mm hose connection
Hydraulic connection (Extern Water):	2x 3/4" AG
Dimensions:	19" 6HE
Paint:	Front RAL 7035 light grey frame blue chromated
<b>Other components:</b>	
3/2 valve:	0 bis 10V über Mikro
Flow delimiter:	6ltrs/min in the Bypass

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**Ersatzteilliste**  
**spare parts list**  
**liste de pièces de rechange**

**WKH/W-00700-W-HC-06E-2-DI**  
**120110730 - CaWa**

<b>Bezeichnung description désignation</b>	<b>Artikelnummer item number Numéro d'article</b>
<b>Kältebauteile cooling components Réfrigérant composants</b>	
Ventilator Fan Ventilateur	-
Temperatursensor für Lüftersteuerung Temperature sensor for fan control Capteur de température pour le contrôle du ventilateur	-
<b>Bauteile für Hauswasseranschluss Components for externwater supply Composants pour l'approvisionnement en eau des ménages</b>	
3/2-Wege Wasserventil 3/2-way valve water eau vanne 3/2-way	140700086
3/2-Wege Wasserventil Anschlussgehäuse 3/2-way valve water connection housing eau vanne 3/2-way le boîtier de raccordement	140700087
Schmutzfänger Dirt arrester pare-boue	141200196
Durchflussbegrenzer Flow controller limiteur	140700085
<b>Bauteile für DI-Wasserkreis Components for DI-water system Composants pour système de l'eau déminéralisée</b>	
Pumpe Pump pompe	141300615

Heizung Heating Chauffage	120103187
Durchflussmesser ohne Temperatursensor Flow meter without temperature sensor Débitmètre sans sonde de température	141100261
Temperatursensor Temperature sensor Sonde de température	141100060
Schwimmerschalter Float switch Interrupteur à flotteur	141100265
Verschlusskappe Tank Tank cap bouchon du réservoir	110800729
Entleerungsschlauch / Füllstandsanzeige Draining / level indicator Niveau et vidange	150200109
Filtergehäuse Filter case Filtre carter	141200358
Dichtung für Filtergehäuse Seal for filter housing Joint pour boîtier de filtre	110801785
<b>Elektrische Bauteile</b> <b>Electrical equipment</b> <b>Appareillage électrique</b>	
Stecker Anschluss CAN Bus CAN bus connector connecteur de bus CAN	101106724
<b>Verschleissteile</b> <b>Wear parts</b> <b>Consommation parts</b>	
DI-Beutel DI-bag DI-sac	141200188
Filtereinsatz für DI-Wasser Filter for DI-water Filtre pour eau déminéralisée	141200190
Filtermatte für Abluft Filter mat for air outlet Filtre passe-partout pour les fuites d'air	141200182

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## **Technical Data**

### **RKH/W 500 L/PID 19" 6HE**

### **Art. Nr. / Part No. 120110985**

### **compressor-air cooled systems with hotgas-Bypass (CAN)**

European commodity index:	841 989 10
Device designation:	RKH/W 500 L/PID 19" 6HE
Mat. No. / Part No.:	1201110985
Operating voltage:	198-254V1PH50/60HZ
Current consumption:	4,5A (max. 9A)
Rated cooling capacity:	500W based on max. 25°C coolant temperature max. 32°C ambient > 5l/min flow (intern water)  350W based on max. 25°C coolant temperature max. 40°C ambient >5l/min flow (intern water)
Operating temperature:	+21 °C - +28 °C
Ambient temperature:	+5 °C bis +40 °C
condenser:	air cooled
Refrigerant:	R134a / 400gr.
Cooling medium:	De- ionized Water <5µS/cm
Tank capacity:	6ltrs Heating cartridge in the tank 700W
Flow controller	SIKA VTH15 Hallsensor 360p/l/min Measuring range 2...20ltrs/min
Pump:	immersion pump Y2051.0130 Operating point 9l/min at 30m
controller:	CAN Controller
Control accuracy:	+/-0,1K
Partikle filter:	partikle filter 20µm DI water bag put into the filter



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Electrical connection:	line filter with fuse / RJ45
Hydraulic connection:	2x 12mm hose connection
Air direction:	air intake from the front, air outlet back
Maximum air flow:	800m <sup>3</sup> /h 50 Hz 900m <sup>3</sup> /h 60 Hz
Air intake filter:	Air intake filter in front
Dimensions:	19" 6HE
Wight:	45kg
Paint:	Front RAL 7035 lightgrey Chassis blue chromated

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**Ersatzteilliste**  
**spare parts list**  
**liste de pièces de rechange**

**RKH/W 500 L / HC 6HE**  
**120110985 – CaBy6-2**

<b>Bezeichnung description désignation</b>	<b>Artikelnummer item number Numéro d'article</b>
<b>Kältebauteile cooling components Réfrigérant composants</b>	
Ventilator Fan Ventilateur	120110220
Temperatursensor für Lüftersteuerung Temperature sensor for fan control Capteur de température pour le contrôle du ventilateur	141100264
<b>Bauteile für Hauswasseranschluss Components for externwater supply Composants pour l'approvisionnement en eau des ménages</b>	
3/2-Wege Wasserventil 3/2-way valve water eau vanne 3/2-way	-
3/2-Wege Wasserventil Anschlussgehäuse 3/2-way valve water connection housing eau vanne 3/2-way le boîtier de raccordement	-
Schmutzfänger Dirt arrester pare-boue	-
Durchflussbegrenzer Flow controller limiteur	-
<b>Bauteile für DI-Wasserkreis Components for DI-water system Composants pour système de l'eau déminéralisée</b>	
Pumpe Pump pompe	141300295

Heizung Heating Chauffage	120103187
Durchflussmesser ohne Temperatursensor Flow meter without temperature sensor Débitmètre sans sonde de température	141100261
Temperatursensor Temperature sensor Sonde de température	141100060
Schwimmerschalter Float switch Interrupteur à flotteur	141100265
Verschlusskappe Tank Tank cap bouchon du réservoir	110800729
Entleerungsschlauch / Füllstandsanzeige Draining / level indicator Niveau et vidange	150200109
Filtergehäuse Filter case Filtre carter	141200358
Dichtung für Filtergehäuse Seal for filter housing Joint pour boîtier de filtre	110801785
<b>Elektrische Bauteile</b> <b>Electrical equipment</b> <b>Appareillage électrique</b>	
Stecker Anschluss CAN Bus CAN bus connector connecteur de bus CAN	101106724
<b>Verschleissteile</b> <b>Wear parts</b> <b>Consommation parts</b>	
DI-Beutel DI-bag DI-sac	141200188
Filtereinsatz für DI-Wasser Filter for DI-water Filtre pour eau déminéralisée	141200190
Filtermatte für Abluft Filter mat for air outlet Filtre passe-partout pour les fuites d'air	141200182

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## **Technical Data**

**RKH/W-01000-L-HC-07E-2-DI**

**Art. Nr. / Part No. 120110986**

**compressor- air cooled systems with CAN Interface**

European commodity index:	841 989 10
Device designation:	RKH/W-01000-L-HC-07E-2-DI
Mat. No. / Part No.:	120110986
Operating voltage:	198-254V1PH50/60HZ
Current consumption:	7.5A / max. 9.5 (Fuse 10A)
Rated cooling capacity:	700W based on max. 25 °C coolant temperature max. 32 °C ambient > 5l/min flow (intern water)  500W based on max. 25 °C coolant temperature max. 40 °C ambient >5l/min flow(intern water)
Operating temperature:	+21 °C - +28 °C
Ambient temperature:	+5 °C bis +40 °C
Maximum ambient temperature:	42 °C
condenser:	air cooled
Refrigerant:	R134a / 400gr.
Cooling medium:	De- ionized Water <5µS/cm
Tank capacity:	6ltrs Heating cartridge in the tank 700W
Flow controller	VTH15 K5 Measuring range 1...20ltrs/min
Pump:	immersion pump Y2051.0130 Operating point 9l/min bei 30m

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controller:	external
Control accuracy:	+/-0,1K
Partikle filter:	partikle filter 20µm DI water bag put into the filter
Electrical connection:	rubber connector / 5 pol.
Hydraulic connection:	2x 12mm hose connection
Air direction:	air intake from the front, air outlet over the back
Maximum air flow:	600m³/h 50 Hz 850m³/h 60 Hz
Air intake filter:	Air intake filter in front
Dimensions:	19" 6HE
Wight:	48kg
Paint:	chassis blue chromated Front RAL 9002 greywhite

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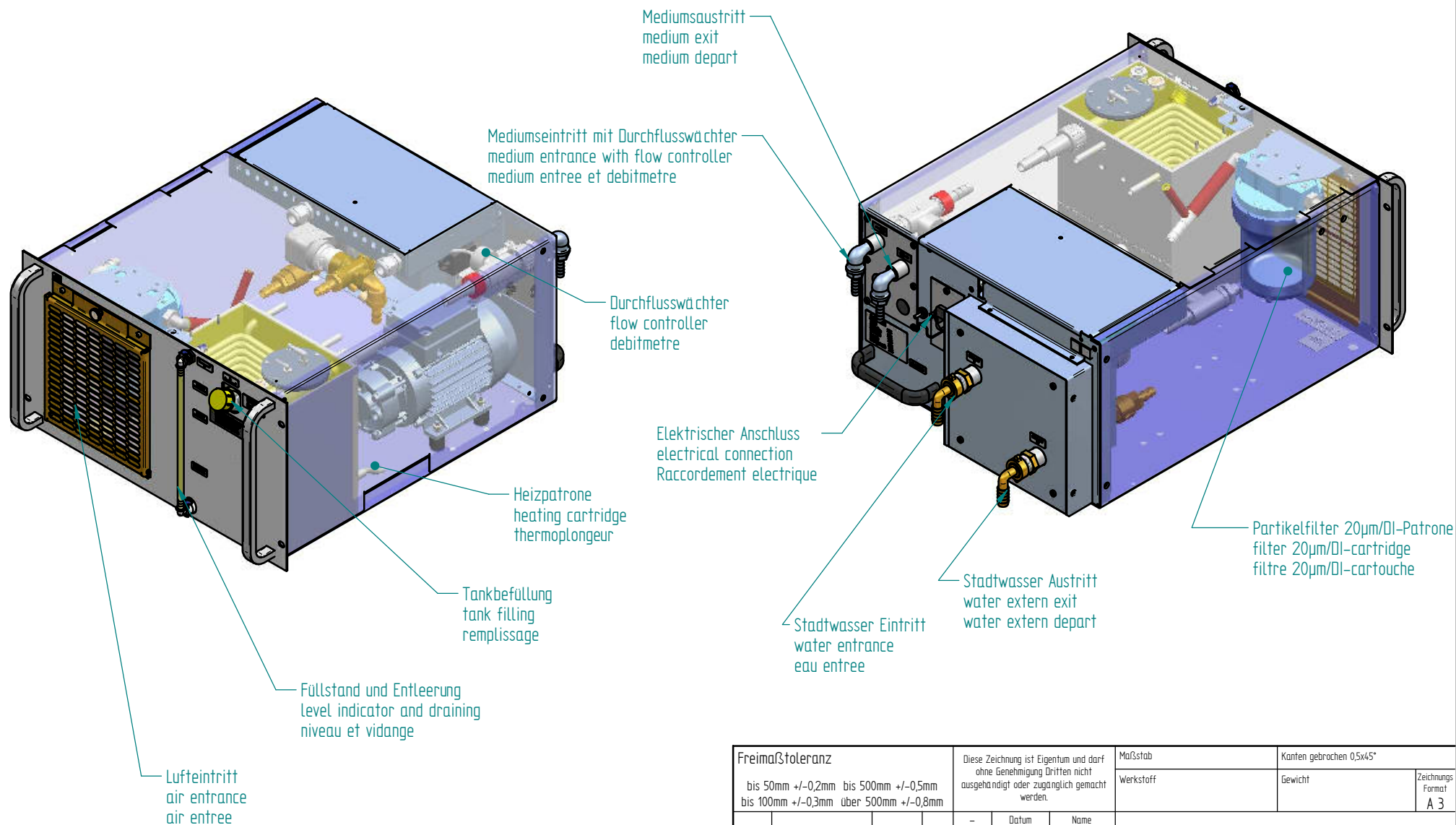
**Ersatzteilliste**  
**spare parts list**  
**liste de pièces de rechange**

**RKH/W-01000-L-HC-07E-2-DI**  
**120110986 – CaBy7-2**

<b>Bezeichnung description désignation</b>	<b>Artikelnummer item number Numéro d'article</b>
<b>Kältebauteile cooling components Réfrigérant composants</b>	
Ventilator Fan Ventilateur	120110217
Temperatursensor für Lüftersteuerung Temperature sensor for fan control Capteur de température pour le contrôle du ventilateur	141100264
<b>Bauteile für Hauswasseranschluss Components for externwater supply Composants pour l'approvisionnement en eau des ménages</b>	
3/2-Wege Wasserventil 3/2-way valve water eau vanne 3/2-way	-
3/2-Wege Wasserventil Anschlussgehäuse 3/2-way valve water connection housing eau vanne 3/2-way le boîtier de raccordement	-
Schmutzfänger Dirt arrester pare-boue	-
Durchflussbegrenzer Flow controller limiteur	-
<b>Bauteile für DI-Wasserkreis Components for DI-water system Composants pour système de l'eau déminéralisée</b>	
Pumpe Pump pompe	141300295

Heizung Heating Chauffage	120103187
Durchflussmesser ohne Temperatursensor Flow meter without temperature sensor Débitmètre sans sonde de température	141100261
Temperatursensor Temperature sensor Sonde de température	141100060
Schwimmerschalter Float switch Interrupteur à flotteur	141100265
Verschlusskappe Tank Tank cap bouchon du réservoir	110800729
Entleerungsschlauch / Füllstandsanzeige Draining / level indicator Niveau et vidange	150200109
Filtergehäuse Filter case Filtre carter	141200358
Dichtung für Filtergehäuse Seal for filter housing Joint pour boîtier de filtre	110801785
<b>Elektrische Bauteile</b> <b>Electrical equipment</b> <b>Appareillage électrique</b>	
Stecker Anschluss CAN Bus CAN bus connector connecteur de bus CAN	101106724
<b>Verschleissteile</b> <b>Wear parts</b> <b>Consommation parts</b>	
DI-Beutel DI-bag DI-sac	141200188
Filtereinsatz für DI-Wasser Filter for DI-water Filtre pour eau déminéralisée	141200190
Filtermatte für Abluft Filter mat for air outlet Filtre passe-partout pour les fuites d'air	141200182

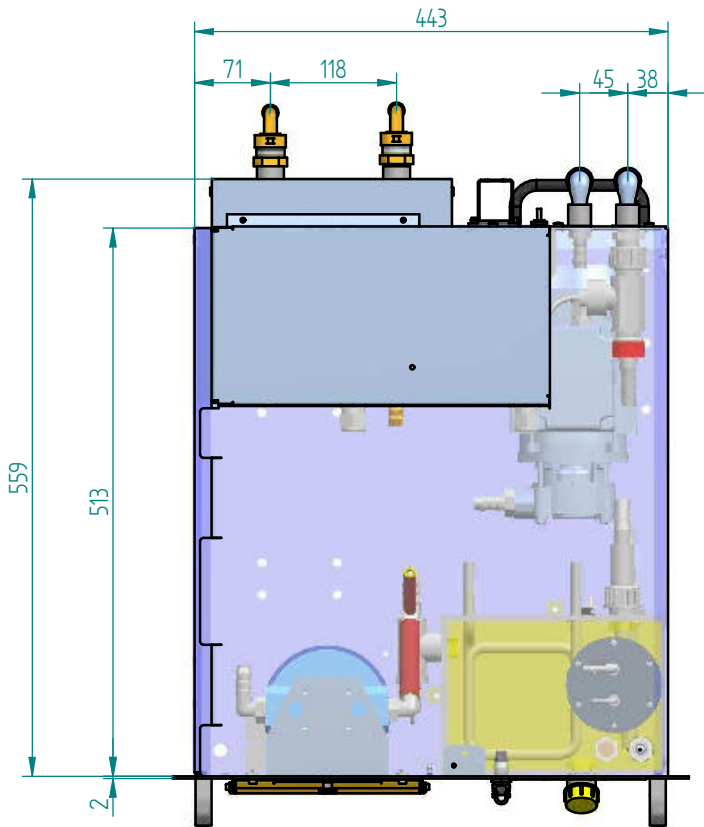
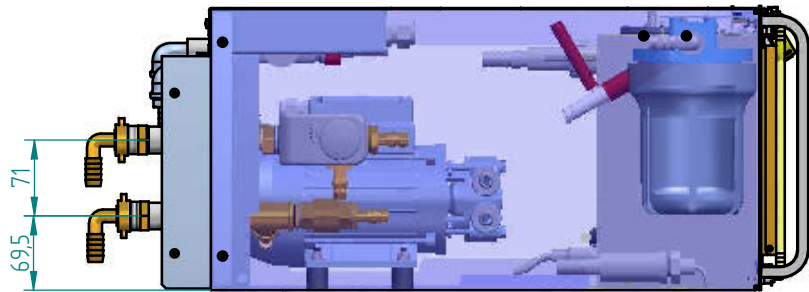
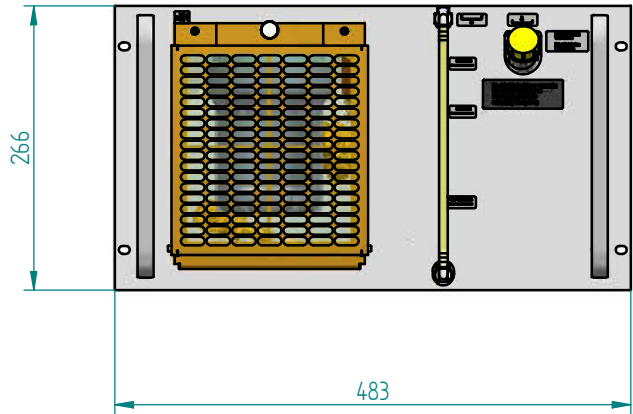
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12.02.2010	B/mb	Kaltgerätestecker geändert (AM 395)	



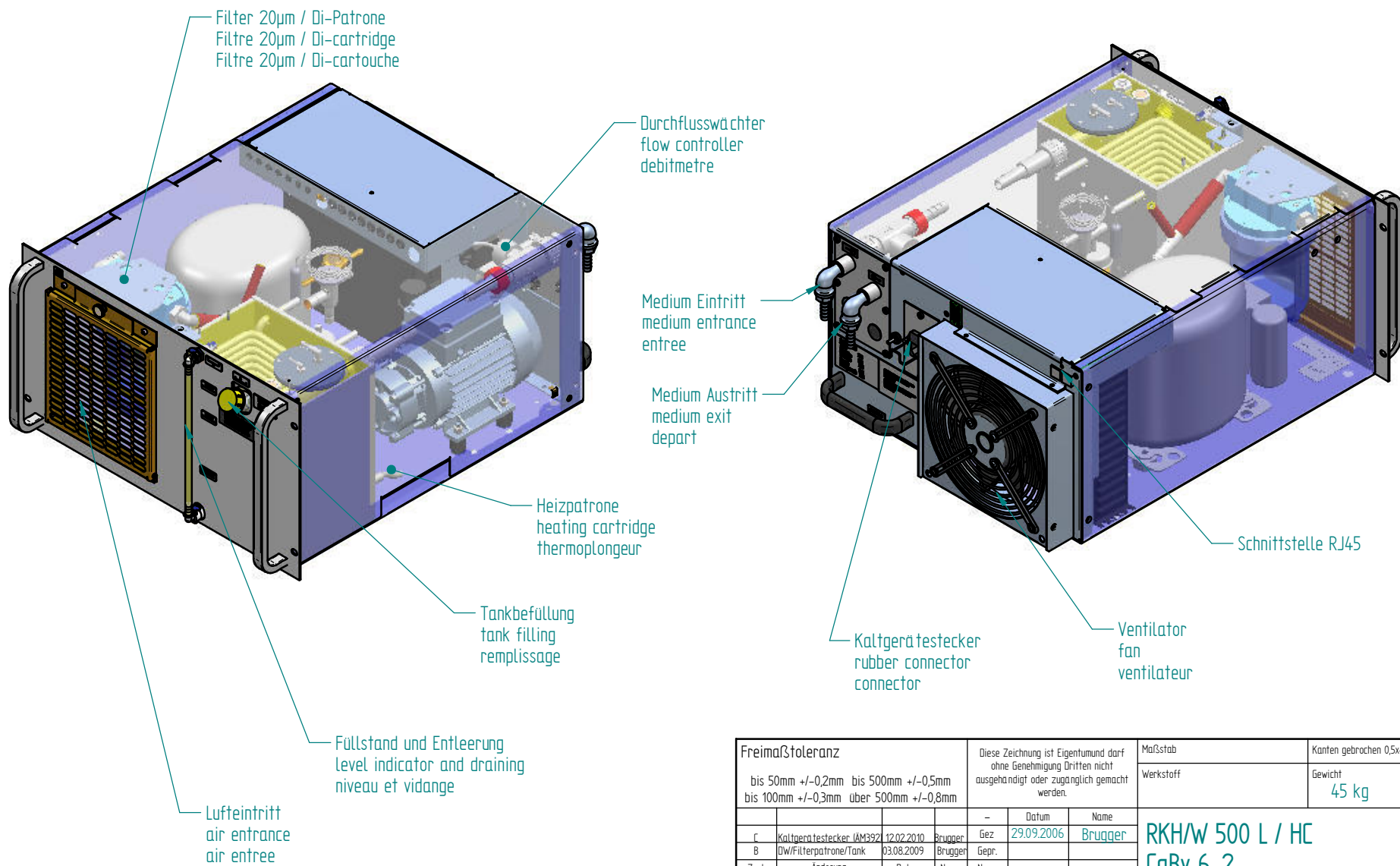
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bis 50mm +/-0,2mm bis 500mm +/-0,5mm bis 100mm +/-0,3mm über 500mm +/-0,8mm							Werkstoff		Gewicht		Zeichnungs Format A 3	
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				Gepr.								
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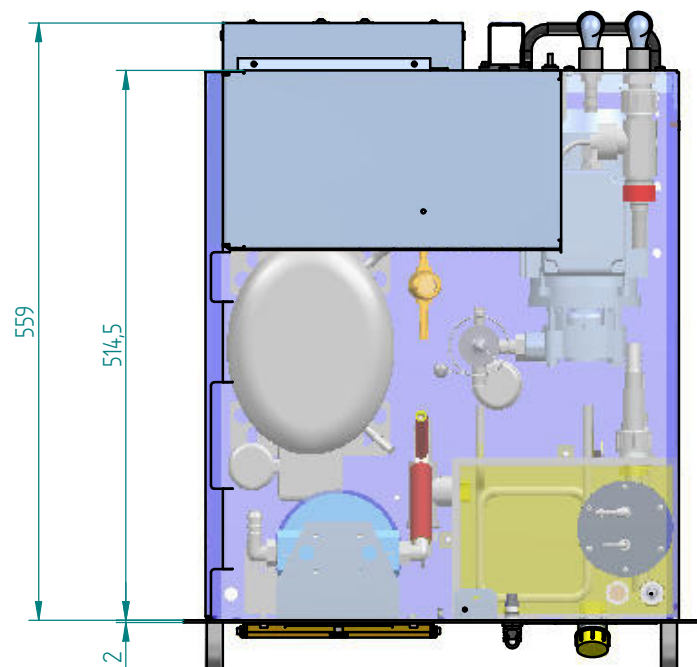
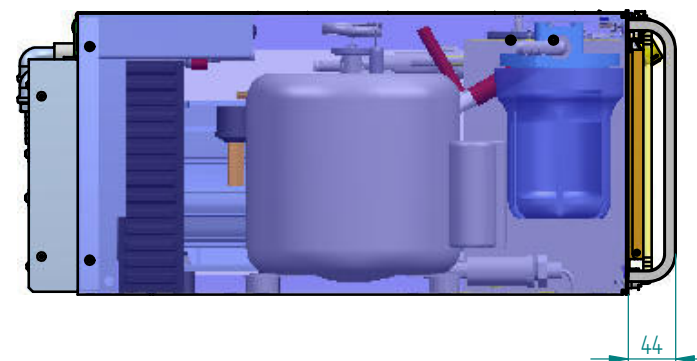
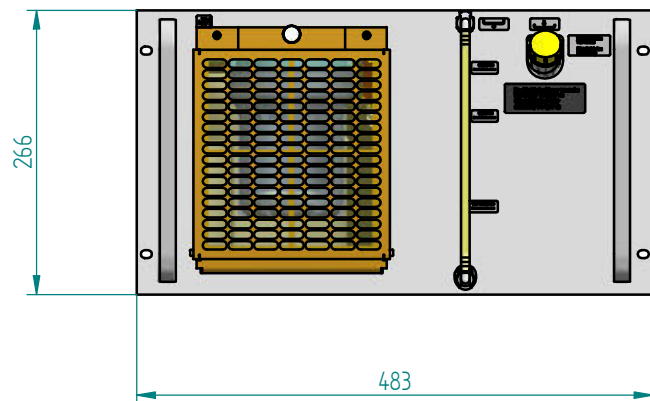
Änderungstabelle		
Datum	Stand	Änderung
19.10.2009	A/mb	Am Stadtwasseranschluss wird ein Schmutzfänger eingesetzt.(AM 256)
12.02.2010	B/mb	Kaltgerätestecker geändert (AM 395)



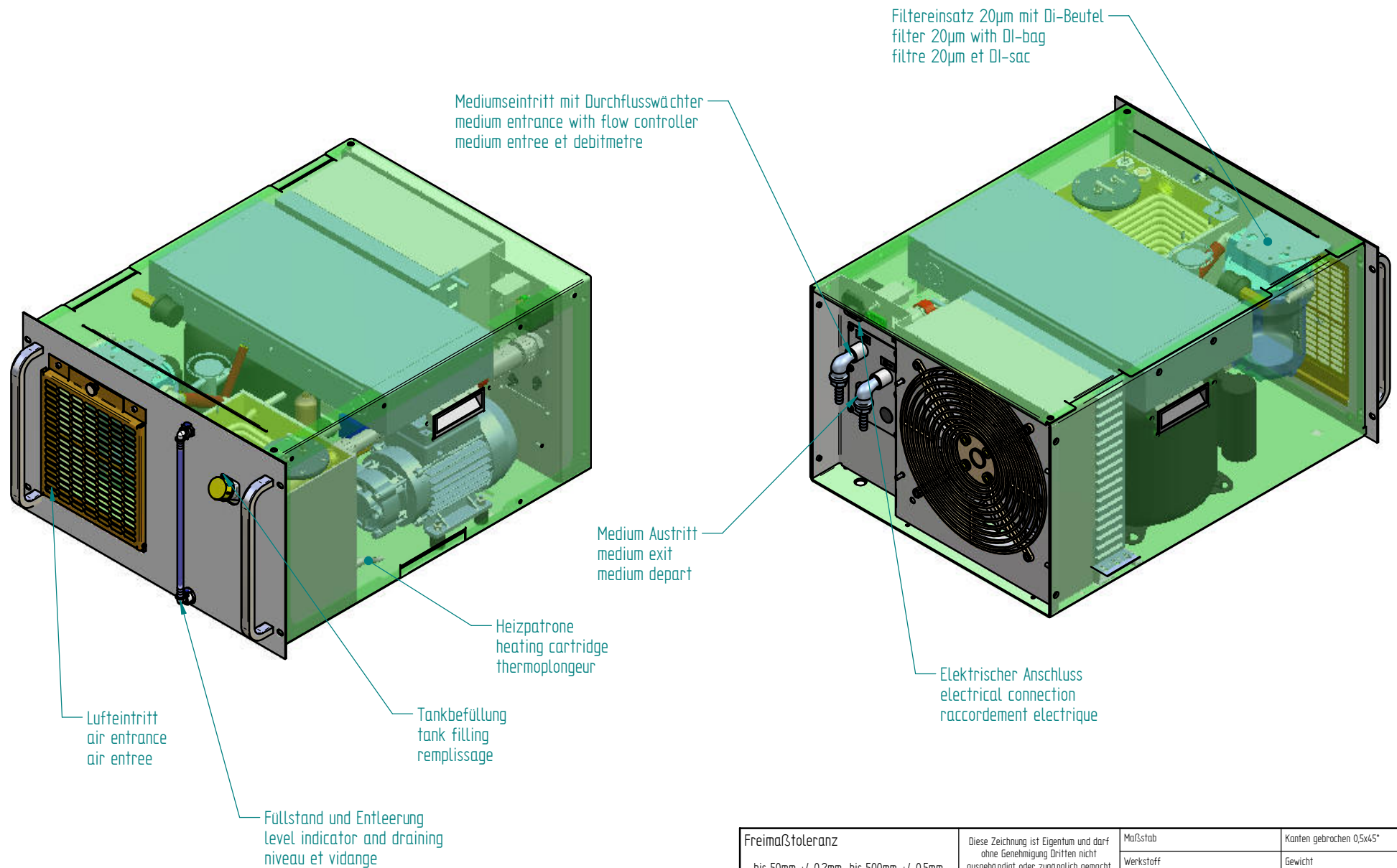
Freimaßtoleranz				Diese Zeichnung ist Eigentum und darf ohne Genehmigung Dritten nicht ausgehandigt oder zugänglich gemacht werden.			Maßstab	Kanten gebrochen 0,5x45°	
bis 50mm +/-0,2mm bis 500mm +/-0,5mm bis 100mm +/-0,3mm über 500mm +/-0,8mm							Werkstoff	Gewicht	Zeichnungs Format A 3
				-	Datum	Name	RKH/W-00700-W-HC-06E-2-DI CaWa		
				Gez	22.07.2009	Brugger			
				Gepr.					
Zust	Änderung	Datum	Name	Norm			Zeichnungs-Nr.		
							120110730		Blatt 2
							3 BL		
Datei Zeich				31.610.01 Maßblatt 0.dff			Datei Bauteil 31.610.01.asm		



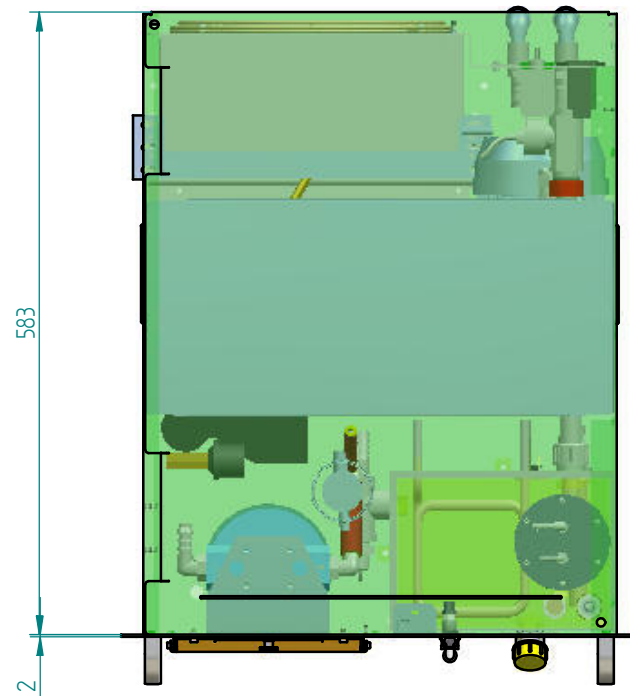
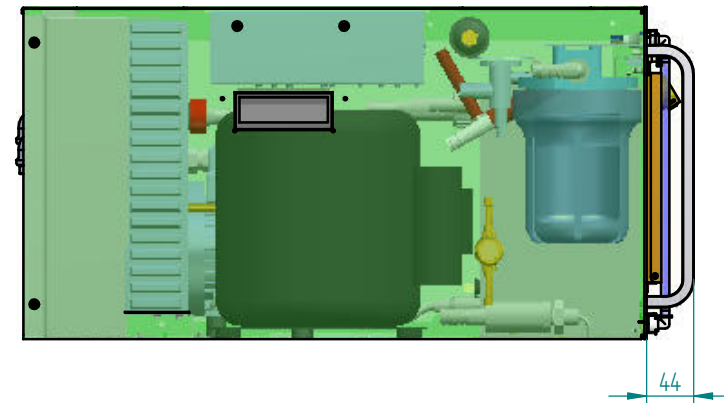
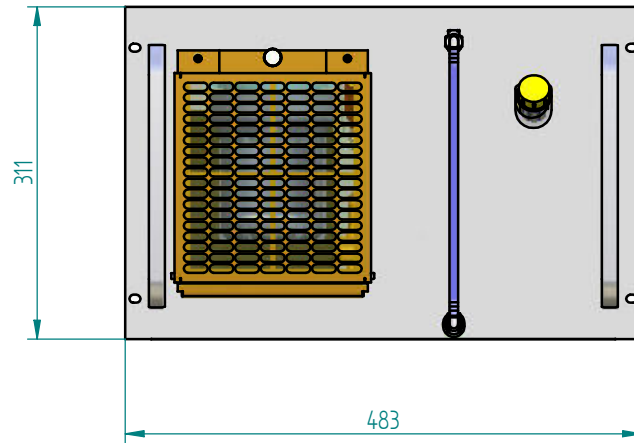
Freimaßtoleranz				Diese Zeichnung ist Eigentum und darf ohne Genehmigung Dritten nicht ausgehändigt oder zugänglich gemacht werden.			Maßstab	Kanten gebrochen 0,5x45°	
bis 50mm +/-0,2mm bis 500mm +/-0,5mm bis 100mm +/-0,3mm über 500mm +/-0,8mm							Werkstoff	Gewicht 45 kg	A 3
				-	Datum	Name	RKH/W 500 L / HC CaBy 6-2		
C	Kaltgerätestecker (AM392)	12.02.2010	Bruggen	Gez	29.09.2006	Bruggen			
B	DW/Filterpatrone/Tank	03.08.2009	Bruggen	Gepr.					
Zust	Anderung	Datum	Name	Norm					
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Datei Zeich 10-006-00.dft								Datei Bauteil 10-006-00.asm	



Freimaßtoleranz						Maßstab	Kanten gebrochen 0,5x45°	
bis 50mm +/-0,2mm bis 500mm +/-0,5mm bis 100mm +/-0,3mm über 500mm +/-0,8mm						Werkstoff	Gewicht 45 kg	A 3
				-	Datum	Name	RKH/W 500 L / HC CaBy 6-2	
C	Kaltgerätestecker (AM392)	12.02.2010	Bruggen	Gez	29.09.2006	Bruggen		
B	DW/Filterpatrone/Tank	03.08.2009	Bruggen	Gepr.				
Zust	Anderung	Datum	Name	Norm				
						Zeichnungs-Nr. 120110985	Blatt 2	12 Bl.
						Datei Zeich 10-006-00.dft	Datei Bauteil 10-006-00.asm	



Freimaßtoleranz				Diese Zeichnung ist Eigentum und darf ohne Genehmigung Dritten nicht ausgehandigt oder zugänglich gemacht werden.			Maßstab		Kanten gebrochen 0,5x45°	
bis 50mm +/-0,2mm bis 500mm +/-0,5mm bis 100mm +/-0,3mm über 500mm +/-0,8mm							Werkstoff		Gewicht 48 kg	A 3
				-	Datum	Name	RKH/w-1000-L-HC-2-DI CaBy7-2			
B	Kaltgerätestecker	12.02.2010	Brugger	Gez	17.08.2007	brugger				
A	Standardisierung	27.10.2009	Brugger	Gepr.						
Zust	Änderung	Datum	Name	Norm						
							Zeichnungs-Nr.		Blatt 1	
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							Datei Zeich 31700.00 Rofin.dft		Datei Bauteil 31700.00 Rofin.asm	



Freimaßtoleranz				Diese Zeichnung ist Eigentum und darf ohne Genehmigung Dritten nicht ausgehändigt oder zugänglich gemacht werden.			Maßstab	Kanten gebrochen 0,5x45°	
bis 50mm +/-0,2mm bis 500mm +/-0,5mm bis 100mm +/-0,3mm über 500mm +/-0,8mm							Werkstoff	Gewicht	A 3
							48 kg		
B	Kaltgerätestecker	12.02.2010	Brugger	Gez	17.08.2007	brugger	RKH/W-1000-L-HC-2-DI CaBy7-2		
A	Standardisierung	27.10.2009	Brugger	Gepr.					
Zust	Anderung	Datum	Name	Norm					
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							4	BL	
Datei Zeich 31700.00 Rofin.dft								Datei Bauteil 31700.00 Rofin.asm	

# rofin

## LASER MARKING

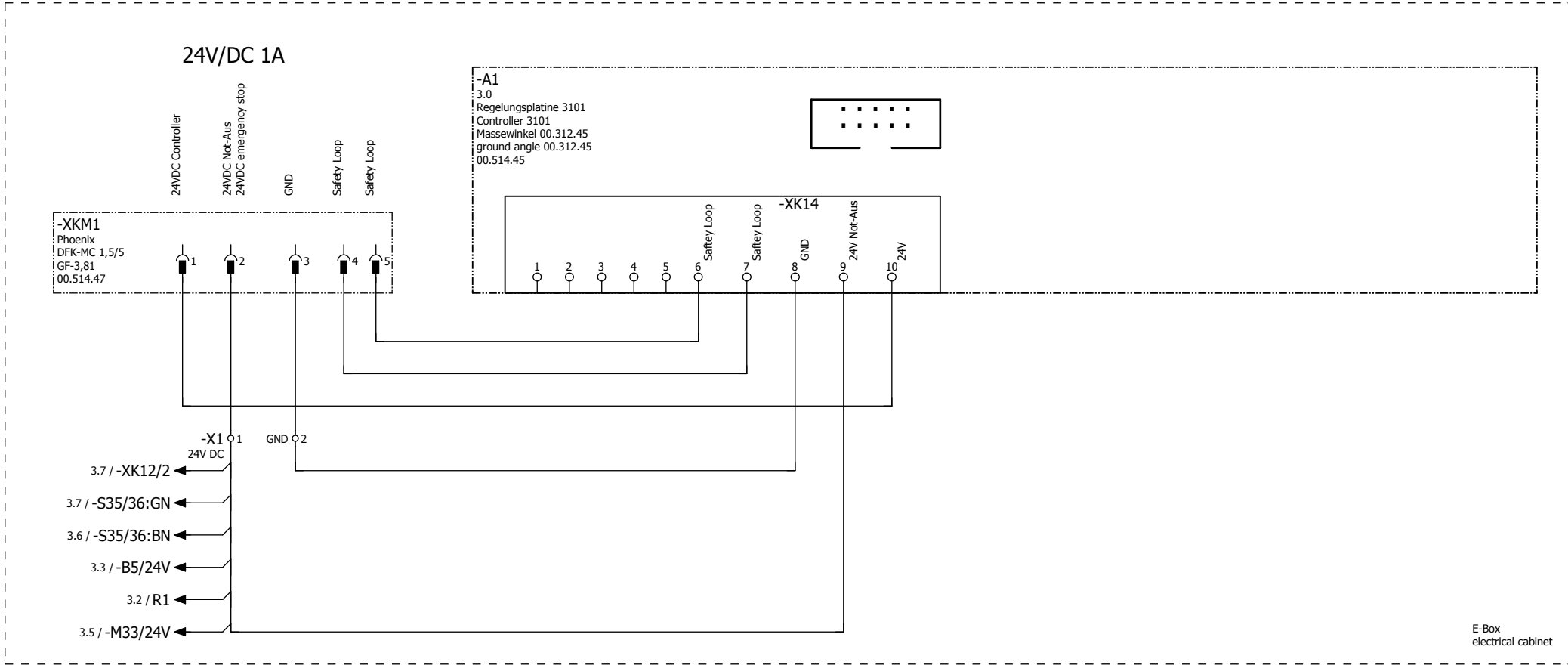
<p>Kunde: Customer:</p> <p>Anlagenbezeichnung 1: Machine identification 1:      WÄRMETAUSCHER-W;19";6HE;500W;WT=20°;CAWA</p> <p>Anlagenartikelnummer 1: Order number 1:                    120110730</p> <p>Anlagenbezeichnung 2: Machine identification 2:           ---</p> <p>Anlagenartikelnummer 2: Order number 2:                    ---</p> <p>Firma: Company:                              Rofin-Sinar Laser GmbH          Dieselstraße 15          D-85232 Bergkirchen</p>	<p><u>LASTSTROMKREIS</u> <u>LOAD CIRCUIT</u></p> <p>Spannung: Voltage:                                    230V +/-10% 1Ph.</p> <p>Frequenz: Frequency:                                50/60Hz</p> <p>Stromaufnahme maximal: Maximum current:                      6,5A</p> <p>Drehfeld: Rotating field:                         ---</p> <p>Leiterquerschnitt und -farbe: Wire gauge and colour:                1,5mm<sup>2</sup> in schwarz         1,5mm<sup>2</sup> in black</p> <p>Sonstiges/Bemerkung: Remark:                                    ---</p> <p><u>STEUERSTROMKREIS</u> <u>CONTROL CIRCUIT</u></p> <p>Spannung: Voltage:                                    24V DC</p> <p>Frequenz: Frequency:                                ---</p> <p>Stromaufnahme maximal: Maximum current:                      1A</p> <p>Leiterquerschnitt und -farbe: Wire gauge and colour:                0,75mm<sup>2</sup> in dunkelblau         0,75mm<sup>2</sup> in dark blue</p> <p>Leiterquerschnitt und -farbe externer Kreis:                            ---          Wire gauge and colour external circuit:</p> <p>Sonstiges/Bemerkung: Remark:                                    ---</p>
<p>Bauteilbeschriftung:                JA          Assembly labeling:                   YES</p> <p>Kabelbeschriftung:                   JA          Cable labeling:                        YES</p> <p>Adernbeschriftung:                   JA          Lead labeling:                         YES</p> <p>Bauortbeschriftung:                   JA          Place labeling:                        YES</p> <p>Sonstiges/Bemerkung: Remark:                                    ---</p>	
<p>Regler: Controller:                                Controller 3101</p> <p>Software: Software:                                 V1.05</p>	

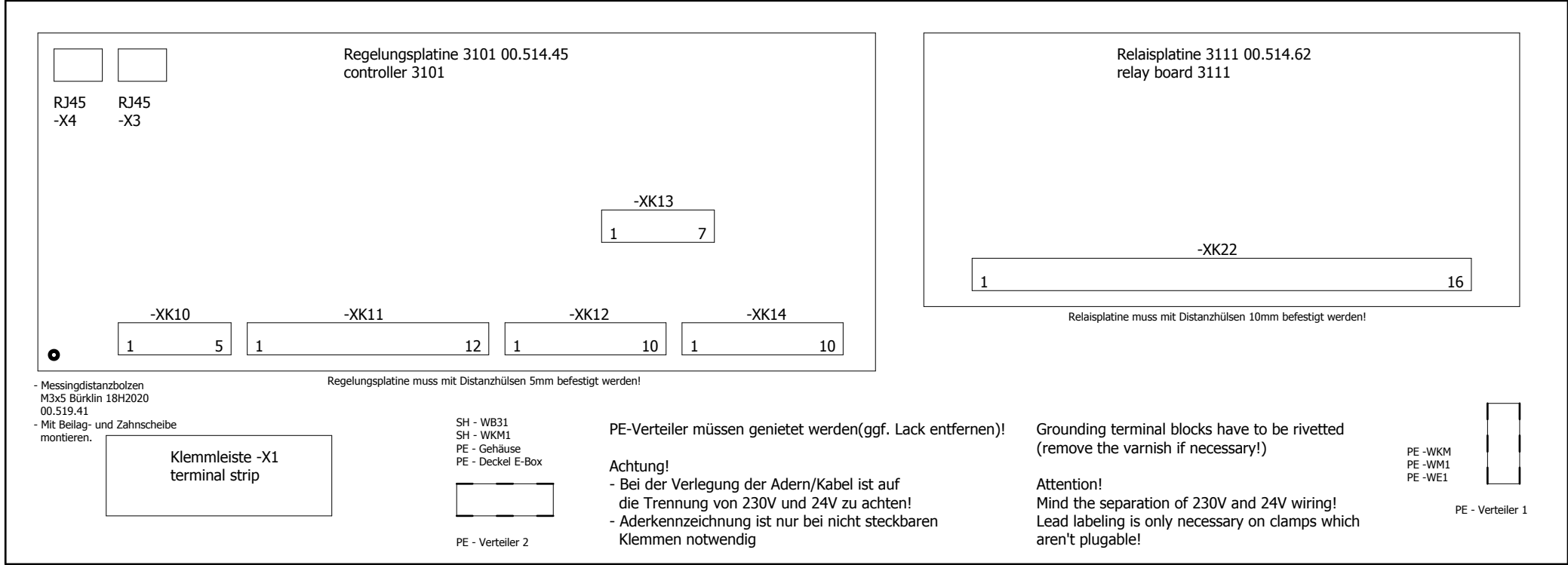












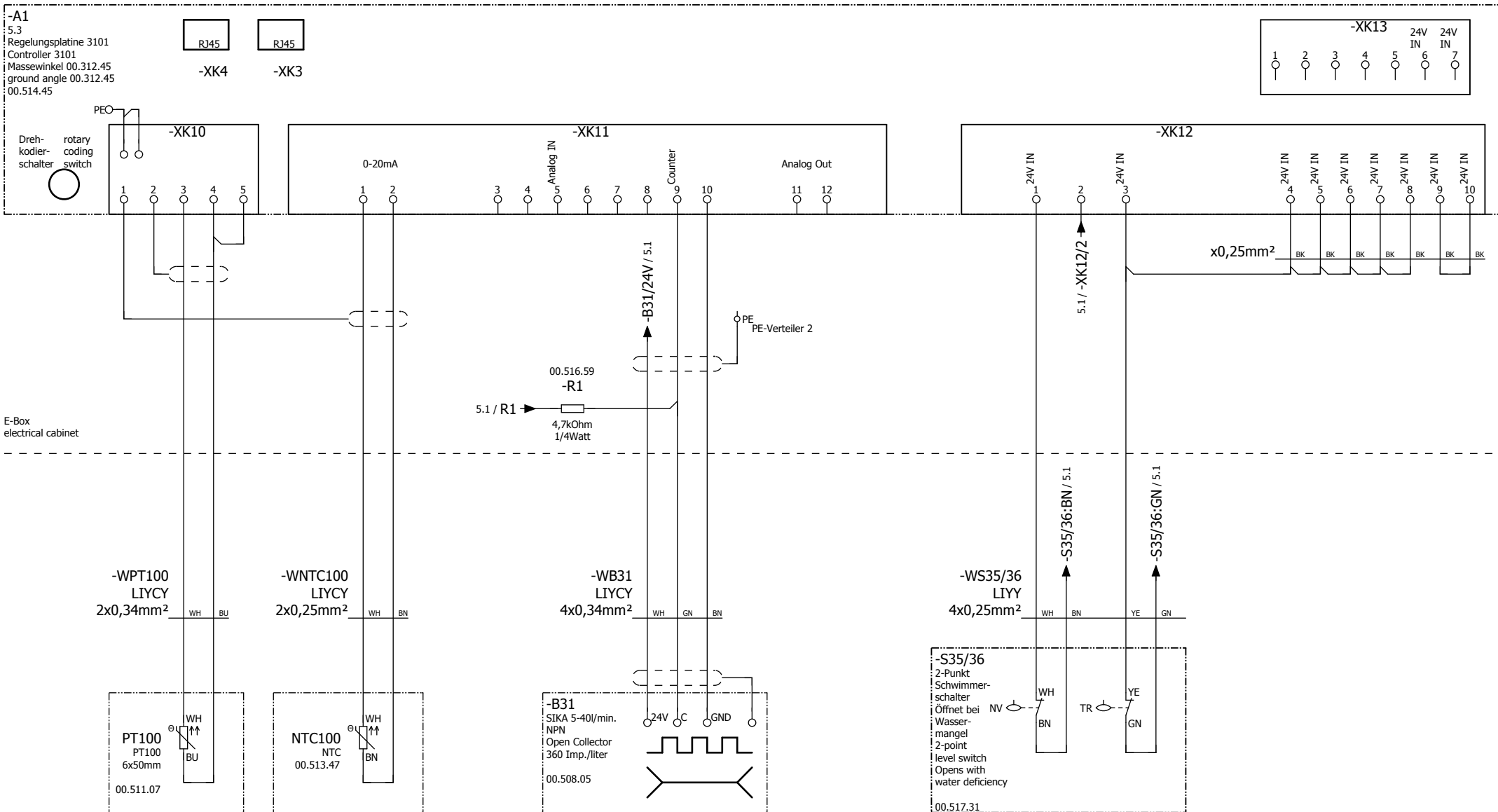
5


**H** **rofin**  
LASER MARKING

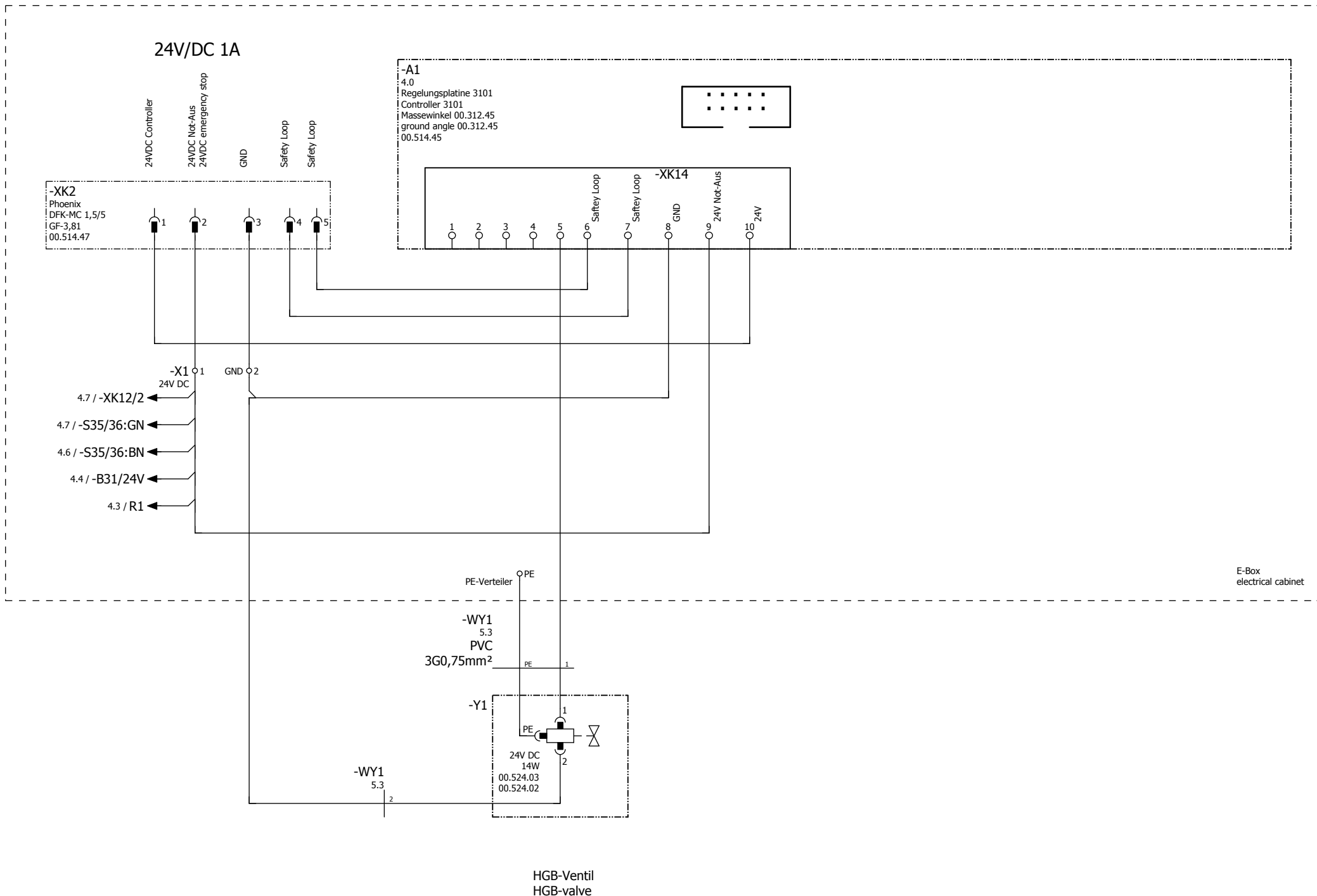




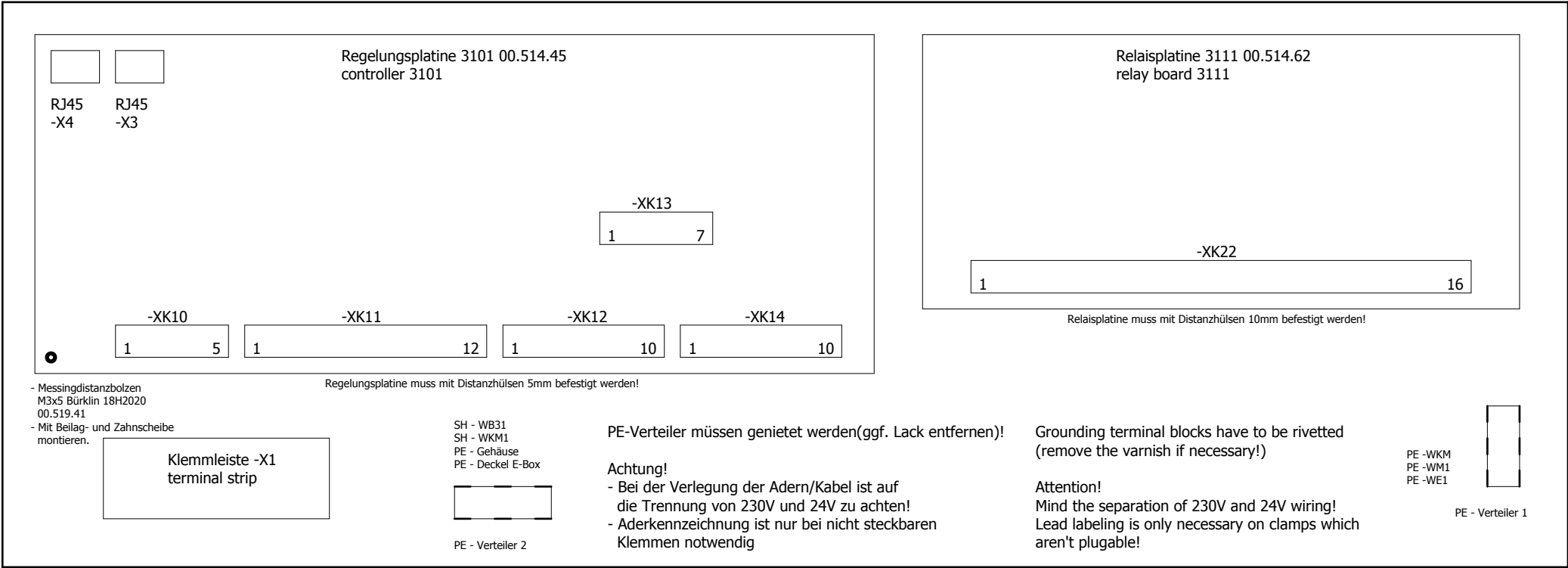




überarbeitet	10.02.2011	Müller	Datum	10.02.2011	WÄRMETAUSCHER-L;19"; 6HE;350W;RT=40°;CABY	230V +/-10% 1Ph. 50/60Hz max. 9A	Rofin-Sinar Laser GmbH Dieselstraße 15 D-85232 Bergkirchen		00.202.38S		Steuerstromkreis Control circuit		
Aufbau	30.11.2010	Müller	Bearb.	h.mueller					Stromlaufplan	120110985	Blatt	4	
B-31/über.	09.12.2009	Arbogast	Stand	A8							Blatt	7	
Änderung	Datum	Name	Gepr	Arbogast					Erstellt:	28.09.2005			





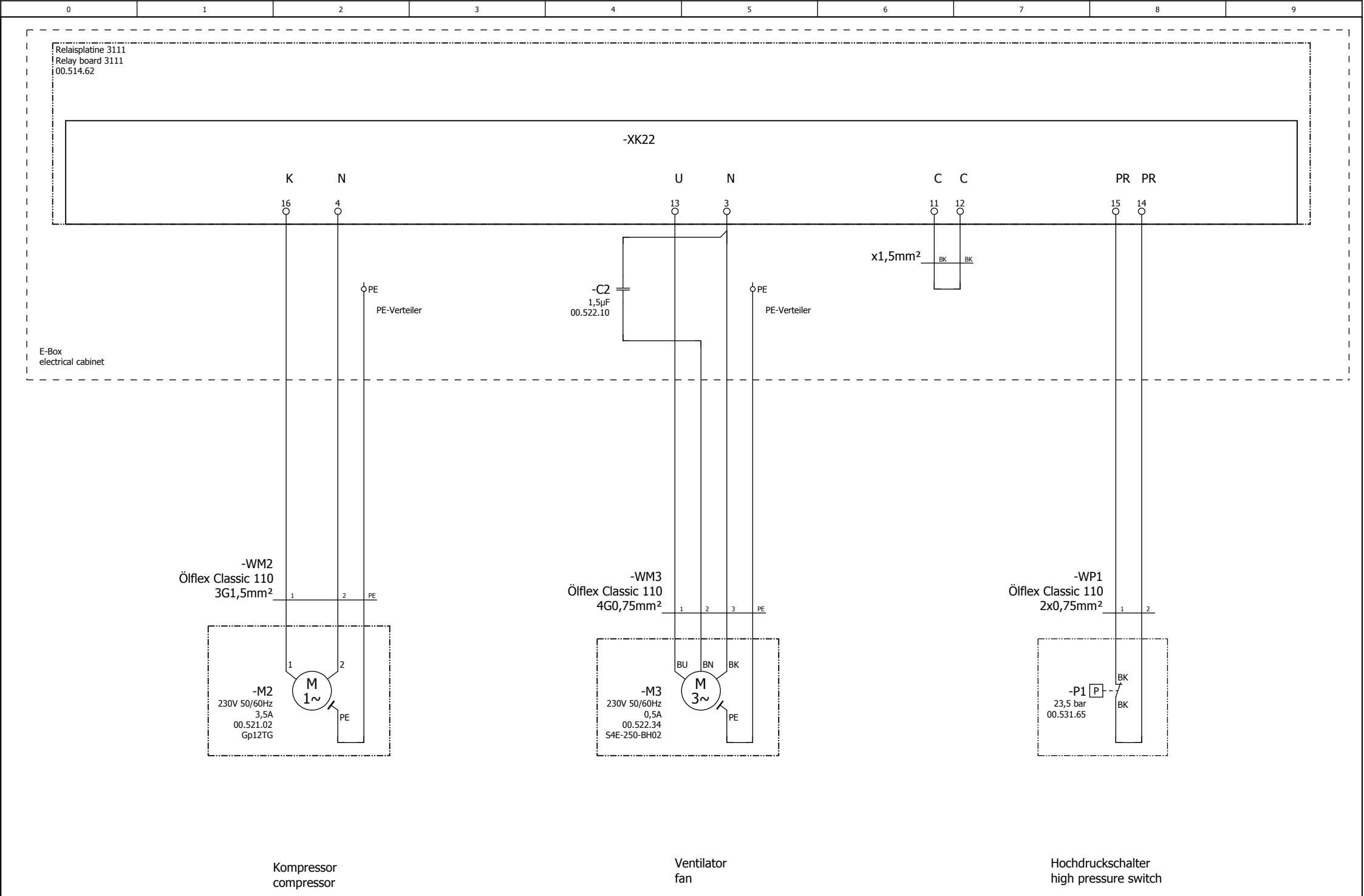



## Ersatzteilliste / spare parts list

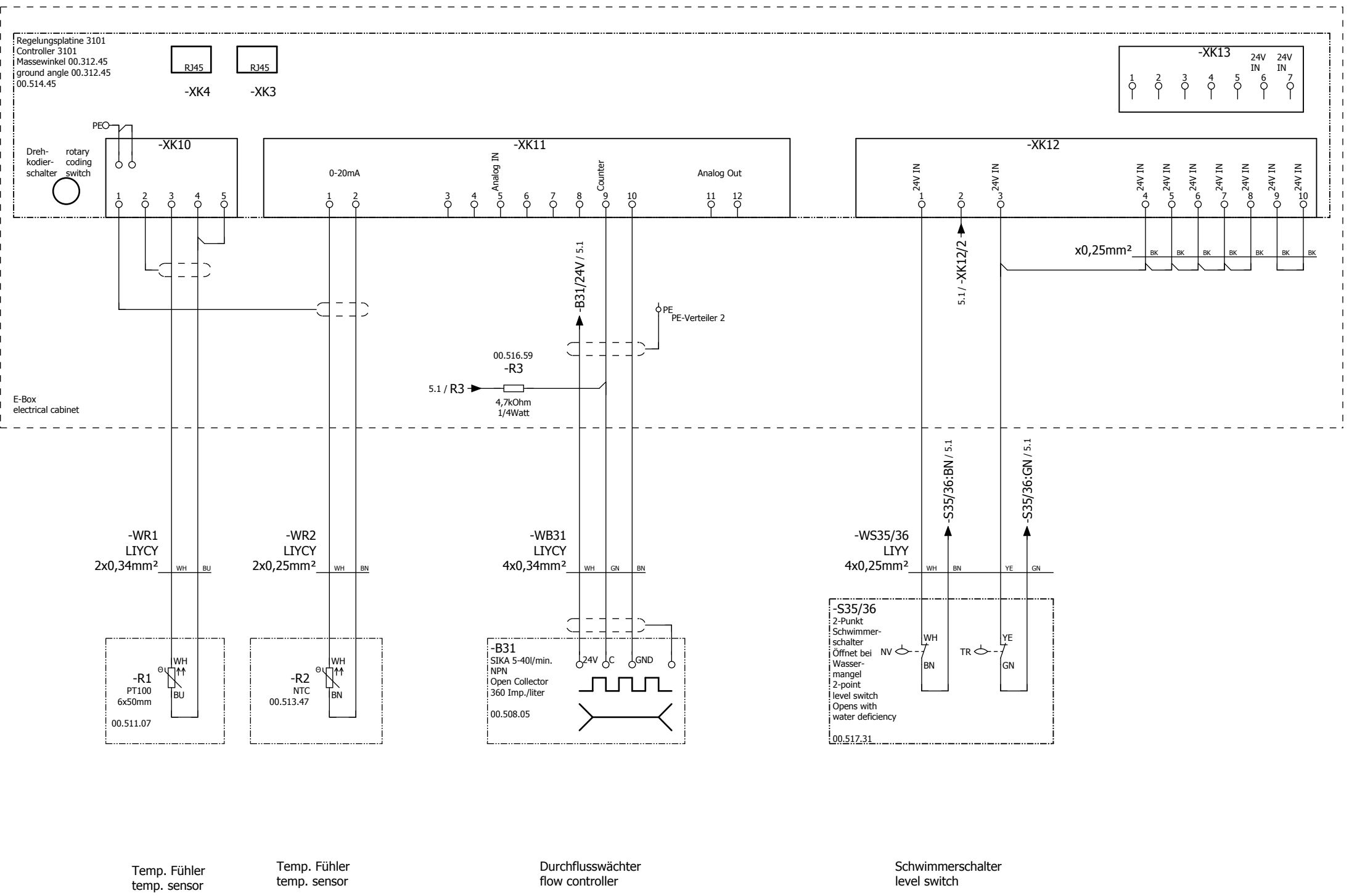
[illegible]

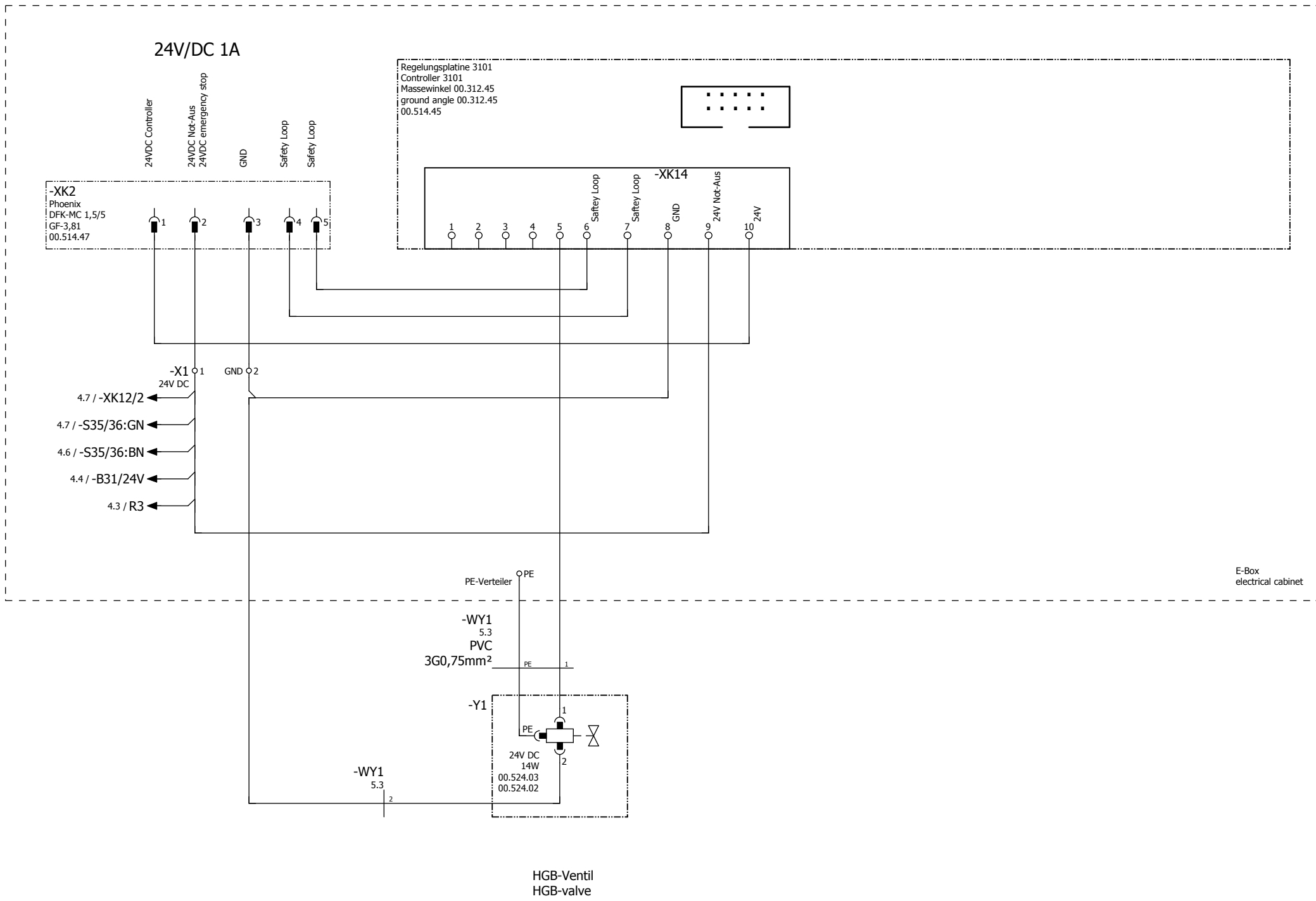


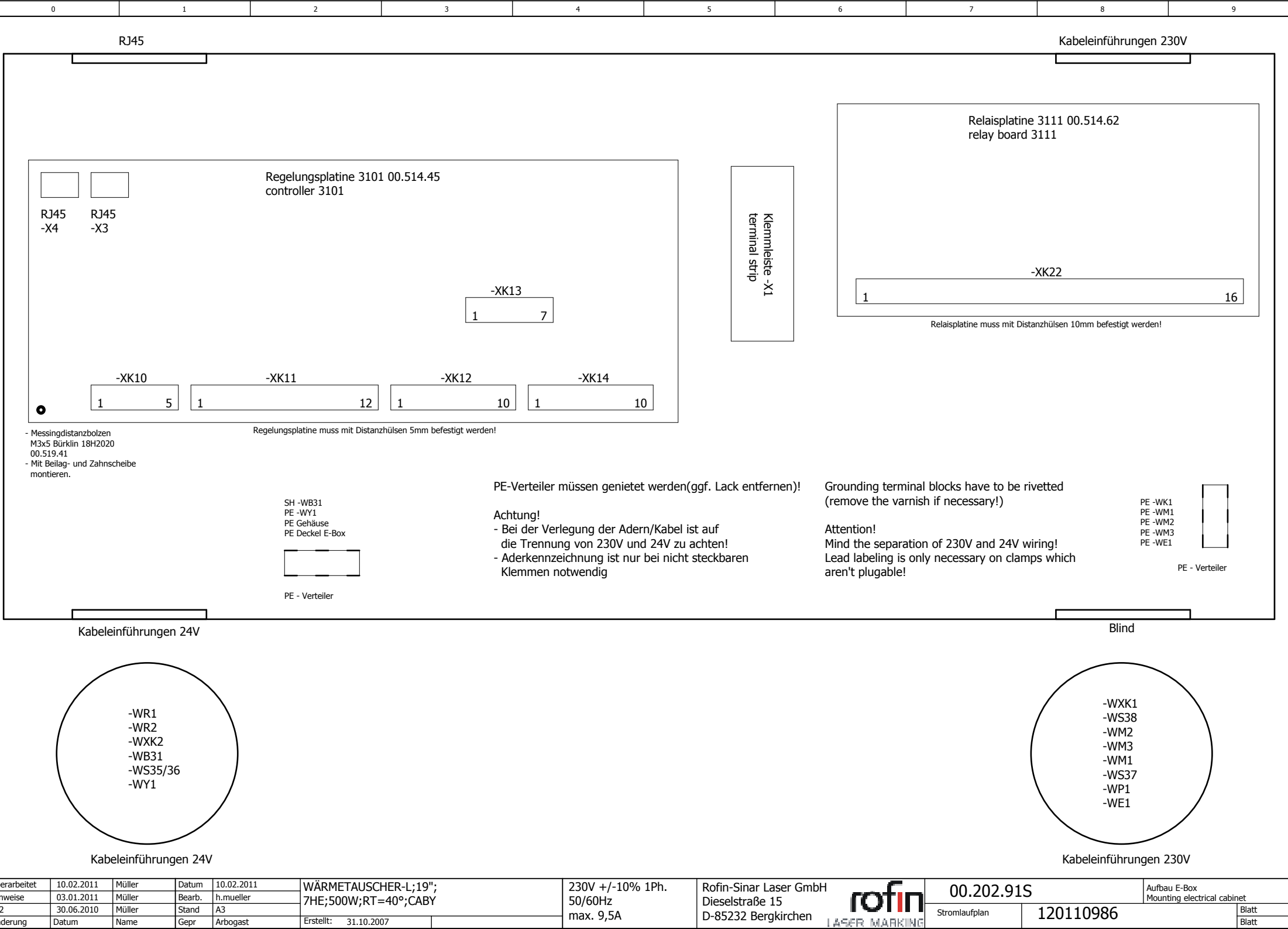




2													4	
Überarbeitet	10.02.2011	Müller	Datum	10.02.2011	WÄRMETAUSCHER-L;19"; 7HE;500W;RT=40°;CABY	230V +/-10% 1Ph. 50/60Hz max. 9,5A	Rofin-Sinar Laser GmbH Dieselstraße 15 D-85232 Bergkirchen		00.202.91S		Laststromkreis Load circuit			
Hinweise	03.01.2011	Müller	Bearb.	h.mueller					Stromlaufplan	120110986	Blatt	3		
-R2	30.06.2010	Müller	Stand	A3										
Änderung	Datum	Name	Gepr	Arbogast	Erstellt:	31.10.2007					Blatt		7	









## Ersatzteilliste / spare parts list

[illegible]