



— klein GmbH —

Safety regulations and Connection regulations

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GENERAL SAFETY REGULATIONS



During the operation of the system certain components are under dangerous voltage!
 Failure to observe the safety instructions can lead to death, serious personal injury
 and property damage."

Please observe the applicable standards as well as national and / or accident prevention regulations.

DANGER!

Only qualified personnel shall carry out work on transport, installation and commissioning

The below safety regulations must be followed:

The set - up, commissioning, troubleshooting and repair of the system may only be carried out by
 qualified personnel familiar with the appropriate operating instructions.

The equipment must be installed in accordance with applicable standards, state and local regulations.

Proper grounding and conductor dimensioning as well as proper short circuit protection
 must be ensured.

These measures are designed to ensure the safety of the installation and the operators.

Before carrying out safety checks, maintenance and repair work,
 that all power supplies are switched off, secured against re-activation and correspondingly
 Marked are.

For the performance of measurements are only technically perfect and suitable for the respective measurement
 Test equipment!

The instructions given in the relevant operating instructions must be followed exactly!
 Danger, warning, and safety instructions must be observed!

During operation, all doors and covers must be kept closed.

If refrigerators are installed in the system, proper operation of these systems must be ensured.

This also includes the regular cleaning of the filters, if any."

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GENERAL CONNECTION REGULATIONS



NOTE!

With conductor end sleeves for the terminals in each case a smaller nominal cross-section of the connecting cable is to choose!

When using bolt clamps the cable lugs to be purchased and processed by the customer.
It must be ensured when using aluminum conductors the cable lug is a bi-metal lug!

Connecting aluminum wires

Screw connection terminal blocks allow you to connect round solid or sector-shaped solid aluminum wires to one or both sides. Right after the stripping

process, a thin, nonconductive oxide layer forms on the surface of aluminum wires. This layer must be removed in order to establish a conductive, gas-tight connection. For this reason, it is necessary to perform the following measures in order to guarantee a safe contact: 1. Use a scraper to rid the wire end of

the oxidized layer. Then immediately submerge it in Vaseline (a neutral, acid-free and alkaline-free substance) and quickly connect to the terminal block. 2. The installation site must be kept as free from

humidity or aggressive atmospheres as possible. 3. The screw in the clamping part of the screw

terminal block must be closed with the maximum permissible tightening torque of the respective modular terminal block. Retighten the connection after a few days in order to ensure that it is still secure. 4.

Repeat this preparation process when you need to connect a new wire

Connection of lightning current and surge arresters

To ensure the function of the lightning current and surge arresters, the following minimum cross sections according to DIN VDE 0100-430 and DIN VDE 0100-534 must be

observed: Lightning current

arrester (Type 1): At least 16 mm² or conductive equivalent with integration

in lightning protection system Surge

Arrester (Type 2): Cross-section of the outer conductor $\geq 4 \text{ mm}^2$ at least ≥ 4

mm² or conductivity-equivalent Cross section of the outer conductor $< 4 \text{ mm}^2$ minimum cross-section of the outer conductor

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WIRING REGULATIONS

(Short character according to IEC 60757)

WIRING COLORS

Main current AC	L	Black (BK)
	N	Blue (BU)
Main current DC	L+ / L-	Black (BK)
Control circuit AC	L	Red (RD)
	N	Blue-White (BUWH)
Control circuit DC	L+	Grey (GY)
	L-	White-Blue (WHBU)
Protective wire		Green-Yellow (GNYE)
External voltage		Orange (OG)
Measuring lines		Purple (VT)
Current transformer		Brown (BN) / Black (BK)
Interlock circuit		Orange (OG)
Digital / Analogue signals		white (WH) / green (GN) / yellow (YE) / violet (VT)

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There is an direct danger to life!

High voltages are present at the live parts.

KAC40 collector up to 400V AC

KAC48 collector up to 480V AC

KAC69 collector up to 690V AC

KAC80 collector up to 800V AC

KSU10 collector up to 1000V DC

KSU15 collector up to 1500V DC

DCB10 collector up to 1000V DC

DCB15 collector up to 1500V DC



Make sure that the collector is switched off and that it is free of dangerous voltage (from the generator side and from the inverter side).

Work on live components may only be carried out by qualified electricians.

Observe the country-specific regulations for working on live components.

When working on live components, always use suitable tools and aids that eliminate the risk of electric arcs and electric shocks.



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Accessories and replacing parts

Some of the components in the collectors can be replaced in case of damage.

Before you make a replacement, we recommend that you contact us to clarify any questions you may have.

Fuse replacement

Make sure that the collector is switched off and that it is free of dangerous voltage (from generator side and from the inverter side).

Make sure that no current flows through the string before removing fuses. Never remove fuses under load.

Only use fuses supplied by Klein GmbH.

Only use fuses of the same type as those used in other fuse holders of the collector (same model and same value).

Replacement of overvoltage protection or overvoltage modules

In modular surge arresters, the contacts in the bases of the surge arresters are live. The collector must be switched off for this work.

Do not reach into the sockets when the arrester is removed.

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Format A4		Maintenance and service			
Checklist for the annual inspection					
Housings					
Temperature exposure on the outside can affect the seals.		Check the seals of the housing for tightness and good condition.			
Seals that are porous or kinked affect the IP degree of protection.		Check for dust or other dry impurities in the housing.			
Moisture in the housing can cause damage and corrosion.		Check the cable glands, seals and condensate drain of the housing.			
		Check that there is no sign of corrosion, moisture or water.			
Fixed wall mounts or base mounts are important for fault-free operation.		Check the wall or base mounting for proper fit and tightness.			
Ventilation grille / air ventilation / heating					
Ventilation grilles that are damaged affect the IP degree of protection.		Check that there is no damage to the mounting or the ventilation grille itself.			
Dirty filters in the ventilation grilles prevent air circulation.		Check filter and replace if necessary.			
		Filters for ventilation grilles should be replaced annually to ensure fault-free operation and IP protection.			
The built-in fans are absolutely necessary for active ventilation.		Check the function and running behaviour of the fans. Replace the fan if necessary.			
The built-in heater is used to prevent the temperature from getting too low.		Check the function of the heating.			
Thermostats are used to control ventilation and/or heating.		Check the function of the thermostat, if they do not switch, the thermostat must be replaced			
Fuses and fuse holder					
Tripped fuses reduce the efficiency of the collector		Check the condition of the fuses.			
Burn marks on the fuse holder		Check that there are no burns on the fuse holder terminals or on the fuse holders.			
Correct mounting of the fuse holders		Check that the fuse holder is correctly mounted on the DIN rail or on the busbar.			
Surge protection arresters					
The inspection windows of the surge arresters or surge arrester modules should be green.		Replace all surge arresters or surge arrester modules whose inspection window is red.			
Switch / pushbutton					
Circuit breakers and load break switches are necessary for the safety of the unit.		Check the switching function and disconnecting function of the switches. Circuit-breakers and switch-disconnectors should be switched once a year.			
Measuring systems					
Measuring systems are optional for monitoring the equipment and the plant.		Check the function of the measuring systems.			
General					
Torques are all indicated by markings, if the positions of the markings have not changed compared to the previous inspection, the torque has not changed.		Check whether a marking on the bolts and nuts has changed. If a change has occurred, retighten the torque on these bolts and nuts.			
		Check that there are no burn marks on installed devices and assemblies or on the fuse holders.			
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