

# COMBIVERT



BETRIEBSANLEITUNG  
Gleichrichter

INSTRUCTION MANUAL  
Rectifier

### Vorbemerkung

Bevor Sie mit der Installation des R5-Gleichrichters beginnen, lesen Sie diese Anleitung bitte sorgfältig und beachten Sie unbedingt die darin enthaltenen Hinweise und Vorschläge.

Diese Betriebsanleitung muß jedem Anwender zugänglich gemacht werden.

Vor jeglichen Arbeiten muß sich der Anwender mit dem Gerät vertraut machen. Darunter fällt insbesondere die Kenntnis und Beachtung der Sicherheits- und Warnhinweise. Lesen Sie deshalb unbedingt die „Technische Dokumentation Teil 1“.

Sicherheitsrelevante Texte sind kursiv ausgezeichnet.

Die im Kapitel „Sicherheitshinweise“ aufgeführten Hinweise sollten aus folgenden Gründen unbedingt beachtet werden:

- Sicherheit für Mensch und Maschine
- Funktion und Störanfälligkeit
- TÜV-Abnahmen und Zertifizierung
- Garantie und Gewährleistung

Die in dieser Betriebsanleitung verwendeten Piktogramme haben folgende Bedeutung:



**Gefahr!**  
**Warnung!**  
**Vorsicht!**



**Achtung!**  
**Unbedingt**  
**beachten!**



**Information!**  
**Hilfe!**  
**Tip!**

### Remark

Before you start with the installation of the R5-rectifier, please read this manual carefully and pay special attention to the notes and suggestions.

This manual must be made available to every user.

Before working with the unit the user must become familiar with it. This especially applies to the knowledge and observance of the following safety and warning indications. Make sure to read "Technical Documentation Part 1".

Safety indication text is written in italic type.

The instructions in this chapter must be absolutely observed for the following reasons:

- Safety for people and machines
- Function and susceptibility to faults
- Guarantee and warranties

The pictograms used here have the following meaning:



**Danger!**  
**Warning!**  
**Caution!**



**Attention!**  
**Essential**  
**Measure !**



**Information!**  
**Comment!**  
**Tip!**

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## 1. Safety Instructions

### General



Danger to life

*R5-rectifiers contain dangerous voltages which can cause death or serious injury. Care should be taken to ensure correct and safe operation to minimise the risk to personnel and equipment.*

*All work from the transport, to installation and start-up as well as maintenance may only be done by qualified personnel (IEC 364 and/or CENELEC HD 384 and IEC-Report 664 and note national safety regulations). According to this manual qualified staff means:*

- those who are able to recognize and judge the possible dangers based on their technical training and experience
- those with knowledge of the relevant standards and who are familiar with the field of power transmission (VDE 0100, EN 50178, EN 60204 as well as the appropriate regulations for your area).

### Use as directed



Only  
Qualified  
Electro-  
Personnel

*R5-rectifiers are designed for the supply of frequency inverters with DC-input, respectively. Use for other purpose is not recommended and may lead to equipment damage.*

*The R5-rectifiers must not be started until it is determined that the installation complies with 89/392/EEC (machine directive) as well as the EMC-directive (89/336/EEC)(note EN60204).*



Observe  
Standards

*The R5-rectifiers meet the requirements of the Low-Voltage Directive 73/231/EEC. The harmonized standards of the series EN 50178 in connection with EN 60439-1 and EN 60146 were used.*

### Transport, Storage and Installation



Protect  
Against  
Accidental  
Contact

*R5-rectifiers must be stored in the original packing and protected against dampness and excessive coldness or warmth. The transportation over large distances must be done in the original packing and it must be secured against blows and shocks. Observe the marking on the outer packing! After removing the packing place the R5-rectifiers securely on a stable base to proceed with the installation.*

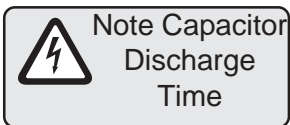
## Safety Instructions

*R5-rectifiers must be protected against physical damage during transport, installation and use. Components and covers must not be bent or moved as this may affect insulation distances. The equipment must not be switched on if it is damaged as it may no longer comply with mandatory standards.*

*This equipment contains electrostatic sensitive devices which may be damaged by careless handling.*

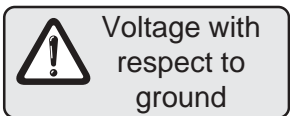
*Make sure that during installation there is enough minimum clearance and enough cooling. Climatic conditions must be observed in accordance with EN 50178.*

### **Electrical Connection**

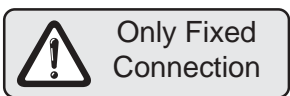


*Before any installation and connection work, the system must be switched off and secured.*

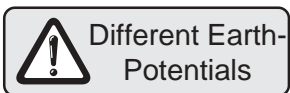
*The R5-rectifier has a discharge-resistor at the output side. After clearing the R5-rectifier*



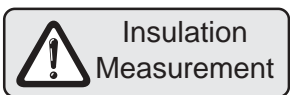
*Connection of the R5-rectifiers is only permissible on symmetrical networks with a maximum line voltage (L1, L2, L3) with respect to earth (N/PE) of 300V. An isolating transformer must be used for supply networks which exceed this value! The units may be damaged if this is not observed.*



*The R5-rectifier is only designed for a fixed connection, because when using filters a leakage current > 3.5mA can occur. Protective conductor cross section must be at least 10mm<sup>2</sup> copper or a 2nd conductor must be electrically parallel to the protective conductor on separate terminals. Ground point-to-point with the shortest connection possible to mains earth (avoid earth loops).*

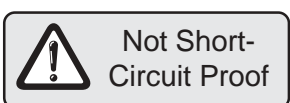


*When using components without isolated inputs/outputs, it is necessary that equipotential bonding exists between the components to be connected (e.g. through the equalizer). Disregard can cause destruction of the components by the equalizing currents.*



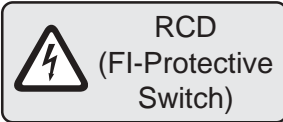
*A trouble-free and safe operation of the frequency inverter is only guaranteed when the connection instructions below are strictly followed. Incorrect operation or damage may result from incorrect installation.*

- Note mains voltage and rated motor voltage.
- Make sure the rectifier housing is well grounded. Remove paint finish where necessary.
- Ground the cabinet or the system earth star point with the shortest connection to mains earth (avoid earth loops).



*The R5-rectifier is not short-circuit proof!*

*A protection of the mains diodes is possible by using of fuses at the input, if  $I^2 t$  is adapted (see technical data).*



*If personnel protection is required during installation of the system the frequency inverters must be protected according to EN 50178 (VDE 0160):*

- *3-phase inverters by RCMA's with separation (used privileged) or RCD's type B (all-current sensitive FI's)*

*The tripping current should be 300mA or more, in order to avoid a premature triggering of the inverter by discharge currents (about 200mA).*

*Dependent on the load, the length of the motor cable and the use of a radio interference filter, substantially higher leakage current can occur.*

*The connection instructions from the manufacturer and the valid local requirements must be observed.*

*Dependent on the available mains form (TN, IT, TT) further protective measures are necessary in accordance with VDE Part 410 (Part 4; Chapter 41). For example, with TN-mains this protection is made with overcurrent protective devices. With IT-mains it is insulation monitoring with a pulse-code measuring method. A protective separation can be used with all mains forms as long as the required power and cable lengths permit this.*

#### **Operating Instructions**

*Before starting, all respective enclosures must be secured again, as well as the terminals and screws must be checked to see that they are securely fixed.*

## 2. Product Description

### 2.1 Technical data

<b>Inverter Size</b>		<b>23</b>
<b>Housing size</b>		<b>G</b>
Phases		3
Output nominal power	[kW]	100
Output nominal current	[A]	180
Max. short time current for 30 sec.	[A]	270
Nominal input current	[A]	160
Max. permissible fuse <sup>1)</sup>	[A]	200
Max. heat sink temperature TOH	[°C]	90
Cross section to inverter	[mm <sup>2</sup> ]	95
Tightening torque for terminals	[Nm]	15
Mains voltage	[V]	305...500 ±0 (400 V Nom. voltage)
Mains frequency	[Hz]	50 / 60 +/- 2
Output voltage	[V]	$U_{Mains} * \text{SQR}(2)$
internal fans		24V DC ± 10% / 0,6A
Storage temperature	[°C]	-25...70 °C
Operating temperature	[°C]	-10...45 °C
Model / protective system		IP20
Relative humidity		max. 95% without condensation
EMC tested according to		EN 61800-3
Climatic category		3K3 in accordance with EN 50178

<sup>1)</sup>  $I^2 t \text{ max} = 77000 \text{ A}^2\text{s}$

### 2.2 Dimensions

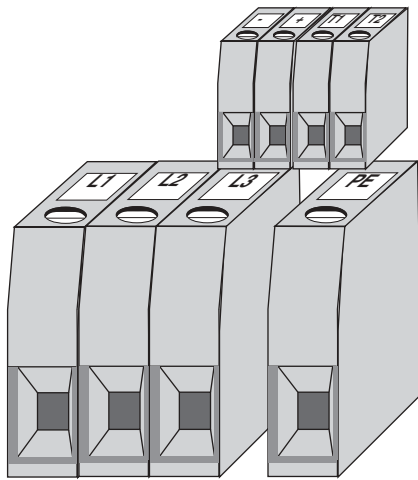
Housing	A	B	C	F	G	H	I
<b>G</b>	<b>170</b>	<b>340</b>	<b>255</b>	<b>7</b>	<b>150</b>	<b>330</b>	<b>385</b>



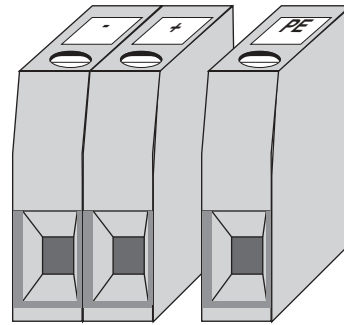
### 3. Connection of the R5-Rectifier

#### 3.1 Connection terminals

Input



Output



L1, L2, L3  
T1, T2

Mains connection rectifier  
Connection overtemperature

-, +

Supply fans

PE,

Connection screening/ earthing

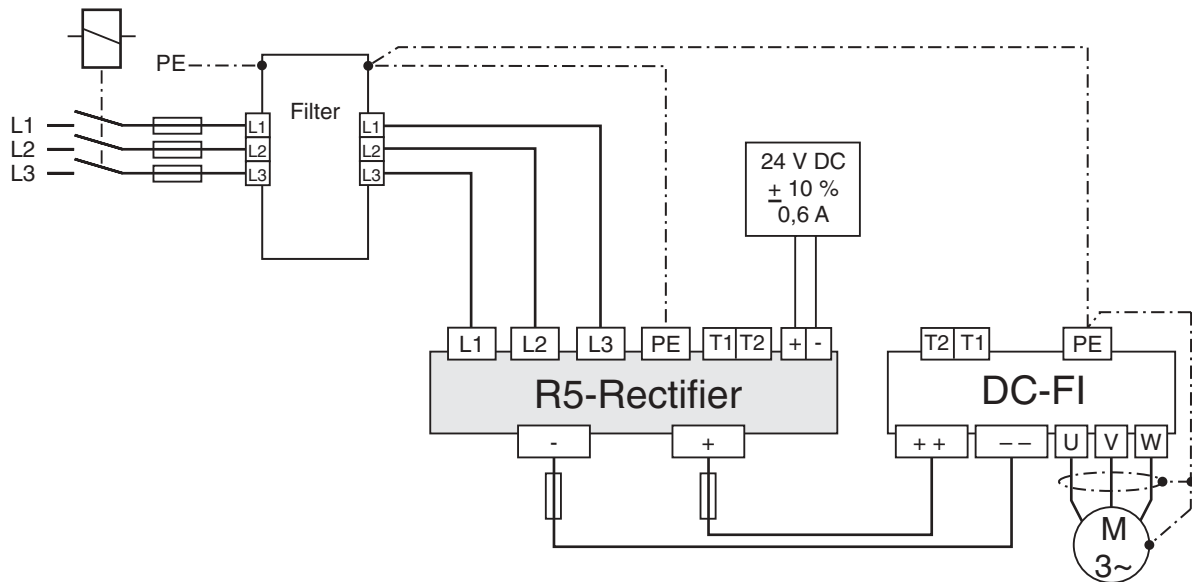
-, +

Connection inverter

PE,

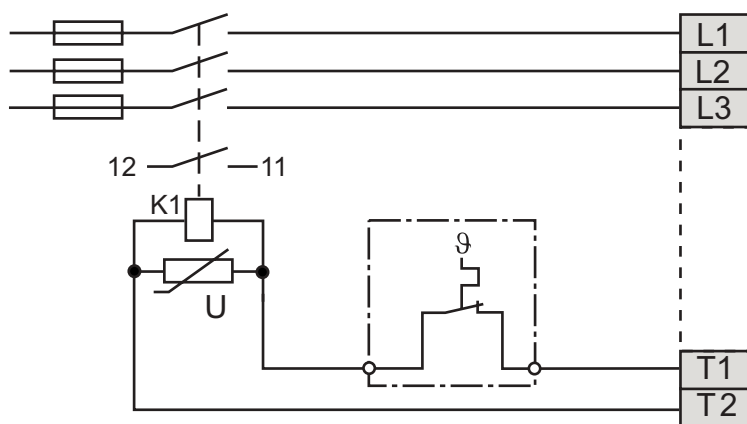
Connection screening/ earthing

## 3.2 Connection of an inverter to the R5-Rectifier



**Attention!** The minimum permissible current limiting resistor amounts to 2 Ohm. An undershooting may lead the equipment damage.

## 3.3 Connection of the temperature monitoring



The internal temperature monitoring has to be analysed and shut-down the machine, if the contact will be opened.



Vor der Auslieferung durchlaufen alle Produkte mehrfach eine Qualitäts- und Funktionskontrolle, so daß Fehler auszuschließen sind.

Bei Beachtung unserer Betriebsanleitung sind keine Störungen zu erwarten. Sollte sich trotzdem ein Grund zur Reklamation ergeben, setzen Sie sich bitte mit KEB in Verbindung!

Für Fehler, die aufgrund falscher Behandlung, falscher Lagerung oder sonstigen allgemeinen Irrtümern auftreten, übernehmen wir keine Verantwortung.

Prospekte, Kataloge und Angebote enthalten nur Richtwerte. Technische Änderungen jeder Art behalten wir uns vor. Alle Rechte vorbehalten.

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Prior to delivery all products pass several quality and performance inspections so that malfunctions can be ruled out.

When used in accordance with the operating instructions failure is most unlikely. However, if you have cause for complaint please contact KEB.

We do not accept the responsibility for failures due to misuse, wrong storage or similar causes.

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