

**Instruction manual**  
**Rectifier module SRM 1000**

E230 G12...82/12..30 BWrug

BAX 1324E

Rectifiers Division

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**communications**  
**JOVYATLAS**

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## Annex

Dimension drawing (horizontal version).....	G33 004 00.ZG3
Dimension drawing (suspended version).....	G33 005 00.ZG3
Block diagram.....	G33 004 00.BL3
Wiring diagram.....	G33 004 00.VP3

Note: The following units are identical, both in mechanical terms and also with regard to circuitry:  
24/48V version (G3300500) identical with  
48/60V version (G2501300)

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## 1 General technical data

### 1.1 Electrical/mechanical data

#### Mains inputs

Voltage.....: 230V  
Voltage tolerance.....:  $\pm 10\%$   
Frequency.....: 50Hz  $\pm 5\%$   
Input current .....: 5.8A  
Power factor at full load.....: 0.97 cap.

#### Output

Output power (maximum.....: 1kW \*)  
Voltage (maximum).....: 82V \*)  
Adjustment range (24/48V version).....: 12 .. 58V \*)  
(48/60V version).....: 35 .. 82V \*)

#### Tolerances

▪ static.....:  $\pm 0.5\%$   
▪ dynamic, 100% load change.....:  $\pm 10\%$   
Current (maximum) (24/48V version).....: 30A \*)  
(48/60V version).....: 21A \*)  
Ripple (40V and full load).....: 0.25V<sub>eff</sub>. (<0.5%)

\*) The maximum rating concerning voltage, current and power must not exceeded in anyway!

#### Signaling relay contact load:

Switching voltage (max.) .....: 220 Vac / 250 Vdc  
Switching current (max.) .....: 5 A  
Switching capacity (AC voltage; max.)...: 250 VA

#### General

Efficiency (half load) .....:  $\geq 82\%$   
(full load) .....:  $\geq 84\%$   
Short-circuit protection .....: electronic  
Operating mode .....: continuous  
operation  
Ambient temperature .....: 0°C ...+40°C  
Cooling type.....: convection  
Humidity class.....: F in accordance  
with DIN 40040, no  
condensation  
Type of protection.....: IP 20  
Dimensions (width x depth x height)....: 300 x 300 x 130mm  
Weight .....: approx. 8kg  
Standards .....: VDE, IEC, DIN

## 1.2            Module features

- On/off switch
- Fault signaling by red LED and potential-free contacts
- Option : undervoltage monitoring (with warning, U1 option)
- Option : undervoltage monitoring (with deactivation, U2 option)
- Option : current-dependent voltage changeover (Option I)
- Option : Remote control
- Option : Parallel switching capacity
- Option : Temperature compensation during battery charging
- Option : Manual charging
- Option : Maximum output current limiting

## 1.3            Fuses

Input circuit.....: 1 x 6.3A switching capacity H 5x20mm

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## 1.4 Individual data

NOTE: this data is entered by hand according to customer requirements.

Nominal voltage .....: \_\_\_\_\_ V

Maximum current .....: \_\_\_\_\_ A

Options:

	YES	NO	Time	
U1 ....: < >	< >	< >	_____	s
U2 ....: < >	< >	< >	_____	s

	CURRENT	Undervoltage	overvoltage	
I .....: < >	< >	_____ A	_____ V	_____ V

## 2 Description

### 2.1 General

By clocked technology, the rectifier converts a single-phase AC voltage to a DC voltage. In doing so, the output is electrically isolated from the input. The technology employed permits an extremely compact design. The unit is suitable for powering DC voltage loads and also for charging and boost-charging batteries.

The rectifier essentially consists of the following components:

- Input filter for RFI suppression,
- DC link (linked electrically to the input mains),
- MOS-FET output stage,
- high-frequency transformer with electrical isolation,
- output filtering circuitry
- output filter for RFI suppression.

The special features of this type of unit are:

- power factor control,
- capable of parallel connection via an interface line (optional),
- convection cooling,
- capable of withstanding short circuits,
- interface for remote signaling,
- low ripple,
- high efficiency,
- low noise level,
- extremely easy to operate,
- low voltage changes,
- requiring very little maintenance.

### 2.2 Description of the rectifier

The power factor controller and the entire electronic control circuitry of the rectifier begin to operate when the AC input voltage is applied.

The rectifier can now be switched on with the main switch, which is located next to the interface.

In the event that the switch was already set to 'On', the rectifier starts up automatically.

In doing so, the rectified input voltage is chopped by the output stage, transferred via the power transformer and then rectified again.

The output voltage is then filtered by means of a low-pass filter of the second order.

The extensive internal monitoring signals are combined in an alarm which, by default, can be evaluated by means of electrically isolated relay contacts.

## 2.2.1 Signals (basic unit)

When using the standard unit, the alarm is additionally indicated by a red LED. This signal can only be reset by switching off the unit and by then switching it on again with the main switch.

### 'Fault' LED

This LED lights up in the following cases:

- heatsink temperature > 90°C,
- input voltage out of tolerance,
- short-circuit or overload at the output (option),
- overvoltage at the output,
- DC link overvoltage
- fault in the internal power supply.

## 2.2.2 Undervoltage monitoring option

- **Standard version:** undervoltage monitoring is off.
- **U1 version:** the undervoltage monitoring function indicates an undervoltage after a fixed time setting by means of the LED and group alarm contacts; the unit continues to operate.
- **U2 version:** the undervoltage monitoring function switches off the unit after a fixed time setting, signaling the fault by LED and group alarm contacts.

## 2.2.3 Current-dependent voltage switchover option

- **Standard version:** voltage switchover is not activated.
- **Version I:** the voltage is switched over depending on a fixed threshold setting.

## 3 Installation

The installation procedure described here applies to one single unit. If several rectifier modules are installed within one system, you must also follow the procedures described in this system manual.

The following criteria must be observed when setting up the unit:

- The unit must be connected in conformity with the assignments given in the wiring diagram.
- Set up and operate the unit in dry rooms only.
- Do not subject the unit to direct sunlight.
- Do not install the unit in the proximity of larger-scale heat sources.
- Keep cooling air paths free:
  - Horizontal version:
    - at least 2cm at the bottom
    - at least 2cm at the top
  - Suspended version:
    - at least 2cm at the front
    - at least 2cm at the rear

### 3.1 Precautions

W A R N I N G
Parts, cables or fuses must only be assembled or dismantled by specialized personal. The following rules must be observed with regard to work on this unit: <ul style="list-style-type: none"><li>▪ Never work on the unit on your own.</li><li>▪ Switch off the input voltage.</li><li>▪ Completely deenergize the unit.</li><li>▪ CAUTION: the battery voltage is applied to the terminals of the battery circuit fuses !!</li><li>▪ Make sure that a voltage is applied neither at the input nor at the output of the unit.</li></ul>

### 3.2 Procedure

If the unit is operated in parallel with a battery, make sure that the fuses of the battery circuit are removed beforehand ! All cable cross-sections must be adequately dimensioned ! (compare the unit's technical data).

Connect the mains voltage supply to the input terminals. It is also imperative to connect the earthing cable.

The voltage supply must be adequately fused.

Connect the load cable to the +/- output terminals, paying attention to the correct polarity.

Check the cabling (particularly the earthing) once again.

If necessary, provide additional protection against physical contact on the input/output terminals.



## IMPORTANT:

The battery circuit fuses must only be switched when the rectifier is on and is operating properly. Switching the fuses while the rectifier is off may result in the destruction of components.

- When commissioning the unit for the first time, neither loads nor batteries should be connected to the unit.
- The input voltage must be checked before connecting it to the unit's input terminals.
- When the unit's switch is already set to "ON", the unit starts up automatically after the mains voltage is applied.
- In the event that the unit's switch is set to "OFF", the LED will also light up after the voltage is applied. This is normal. The LED goes off when the unit is switched on.
- When the unit is switched on and the red LED goes off, check the output voltage. The batteries or loads can then be connected.

## IMPORTANT

When a battery is connected, the battery voltage must be less than or equal to the rectifier's output voltage. If the battery voltage is above the idle voltage, an inadmissible high charging current flows backwards into the rectifier and may result in the destruction of components.

This concludes commissioning.

## 5 Operating the system

### **IMPORTANT**

The battery circuit fuses must only be switched when the rectifier is on and is operating properly. Switching the fuses while the rectifier is off may result in the destruction of components.

#### 5.1 Switching on the rectifier

Proceed in accordance with the commissioning instructions if it is intended to connect a battery.

The unit's electronic circuitry commences operation when the mains voltage is applied. The output voltage is switched on when the main switch on the unit is switched on.

#### 5.2 Switching off the rectifier

Set the front panel switch to 'Off'.

If a battery is permanently connected to the rectifier, it need not be isolated from the rectifier's output. In this case, however, the output circuit is connected to the battery and this leads to discharging. If the battery is isolated from the rectifier, follow the commissioning instructions when reactivating it.

If required, the mains voltage can also be deactivated.

## 6 Fault signals

### 6.1 Precautions

#### W A R N I N G

Parts, cables or fuses must only be assembled or dismantled by specialized personal. The following rules must be observed with regard to work on this unit:

- Never work on the unit on your own.
- Switch off the input voltage.
- Completely deenergize the unit.
- CAUTION: the battery voltage is applied to the terminals of the battery circuit fuses !!
- Make sure that a voltage is applied neither at the input nor at the output of the unit.

## 6.2 Signal processing

Every detected malfunction is indicated both by the red fault LED on the control board and also by the signaling relay.

### Signaling relay

The alarm relay is in the idle position in the event of a fault. Accordingly, it will also indicate a fault in the deactivated state.

The changeover contacts are as follows:

	Alarm relay	
	1-2	2-3
Alarm *)	0 Ohm	$\infty$ Ohm
No alarm	$\infty$ Ohm	0 Ohm

\*) or unit deenergized!

The unit issues an alarm in the event of the following faults:

- output voltage too high
- excess temperature in the MOS-FET stage,
- inner temperature of the unit higher than 90°,
- fault in the DC link voltage.
- input voltage out of tolerance
- excess temperature in the power factor controller stage

(Optional)

- Undervoltage

## 6.3 Clearing fault signals

After remedying a fault, switch the rectifier off and then on again. The fault signal disappears when the input voltage returns to the permitted tolerances.

U1 option (undervoltage monitoring):

The signal is reset automatically when the output voltage returns to within the specified range.

U2 option (undervoltage alarm with deactivation):

The unit is switched off. The fault signal must be reset manually.

## 6.4 Troubleshooting

Explanation of the symbols in the following fault handling descriptions:

# : Fault description  
!!: Possible cause  
>>: Remedy

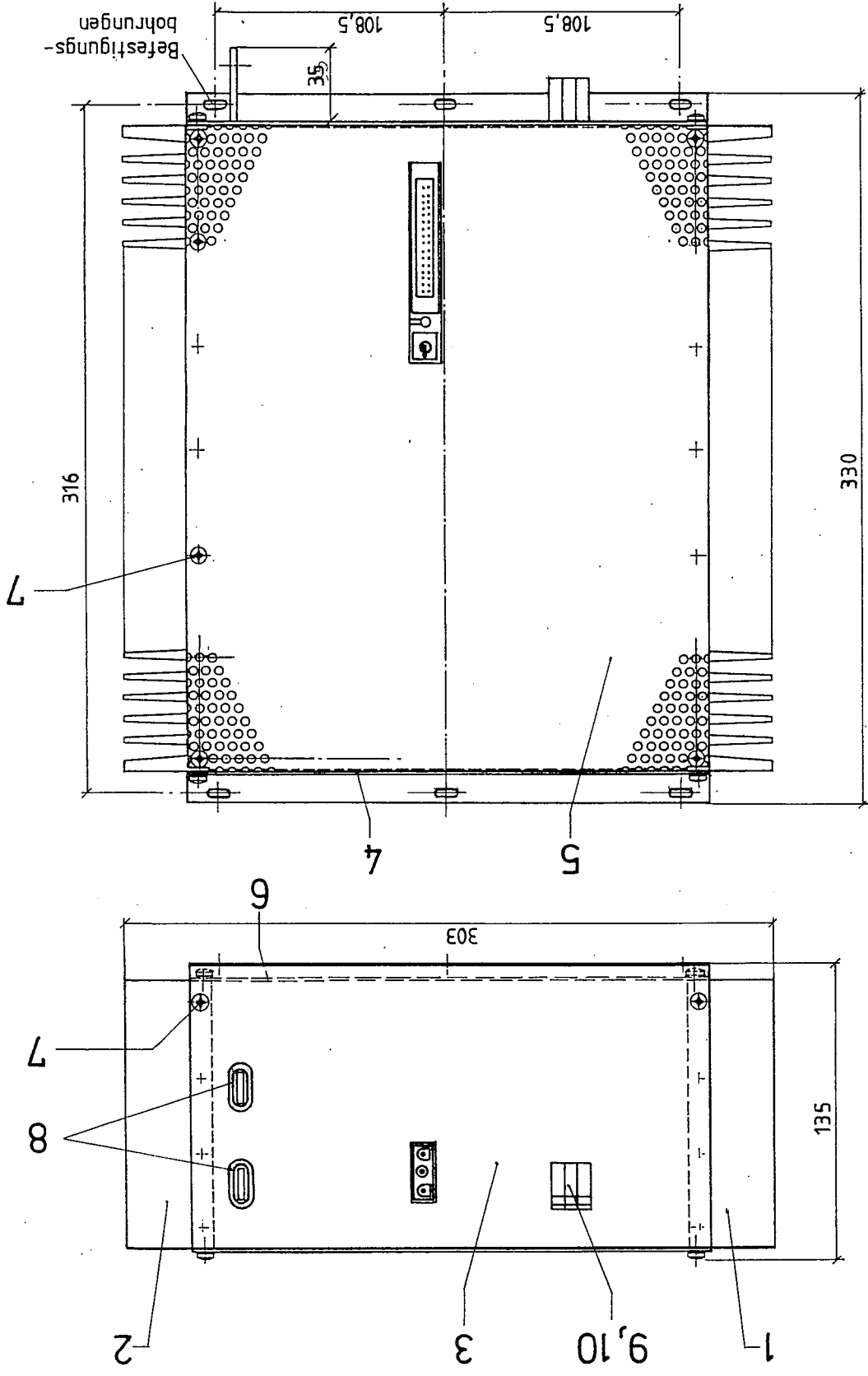
#: Fault LED on the module lights up, but the unit is operating. !!: the undervoltage monitoring function has responded (Option U1) >>: check the condition of the batteries and of loads.
--

#: The fault LED on the module lights up and the unit is not operating. !!: the undervoltage monitoring function has responded (Option U2) >>: check the condition of the batteries and of loads. Switch the unit off and then on again
---

#: The fault LED on the module lights up and the unit cannot be switched on. !!: Internal fault in the unit or fault in the power supply. >>: Check the power supply. Check loads and batteries. Briefly switch off the unit and then switch it on again.
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## 7 Maintenance

This unit generally requires no maintenance. Nevertheless, a few measures should be taken to be able to best exploit the useful life of the unit. Depending on dust accumulation, you should observe the unit to make sure that the heatsinks are able to dissipate heat without obstruction. You should also make sure that the openings on the module's perforated plate are not clogged.



Ansicht in dieser Richtung!

29. Nov. 1955

QC 01

M 1:2

**Konstruktionsänderungen  
vorbehalten.**

Für diese technische Überzüge behalten wir uns alle Rechte vor

1995		Datum		Name	
Bearb.	16. 08.	Fa. K.			
Gepr.					
Norm					

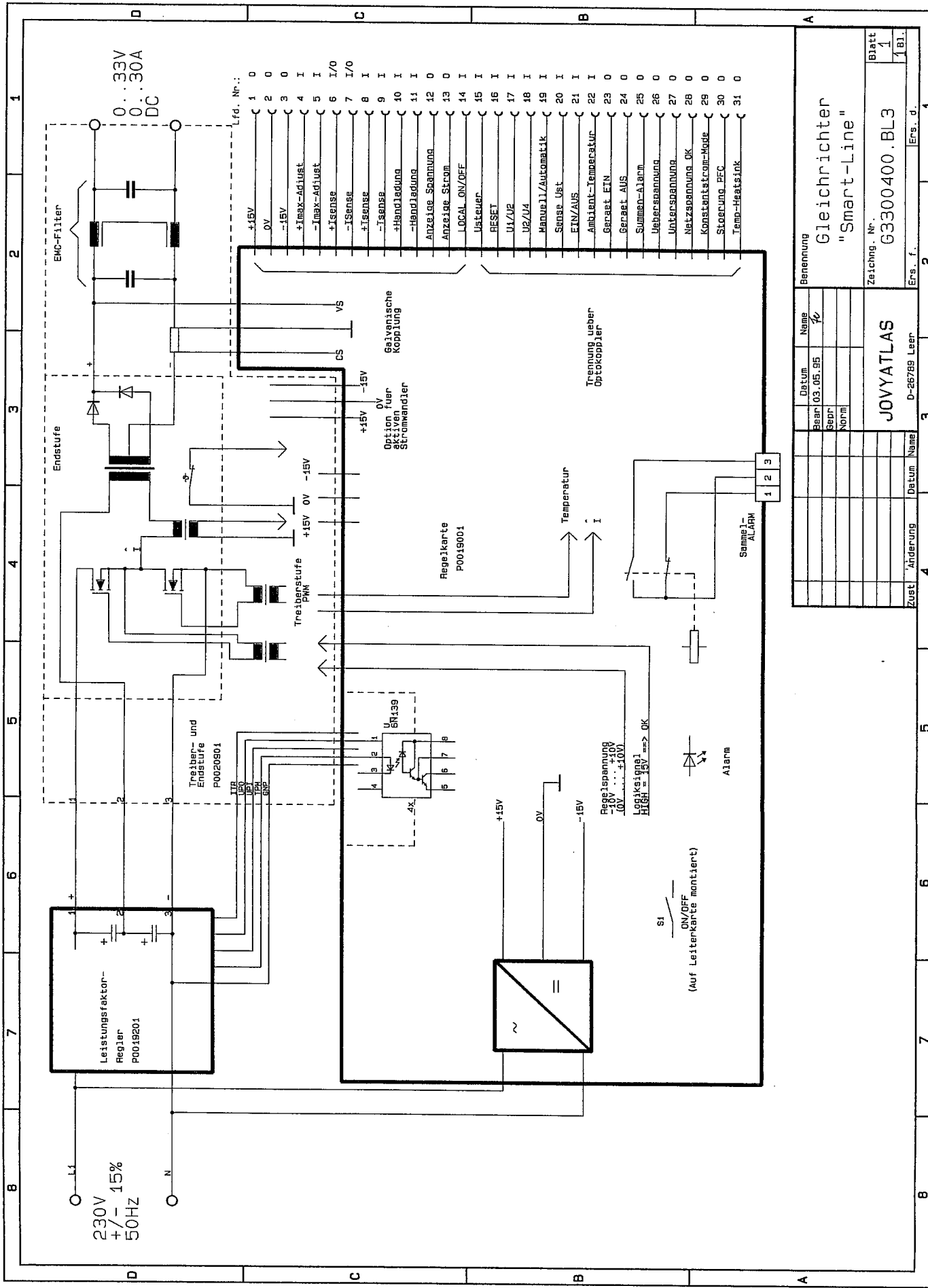
  

Zust.	Änderung	Datum	Name

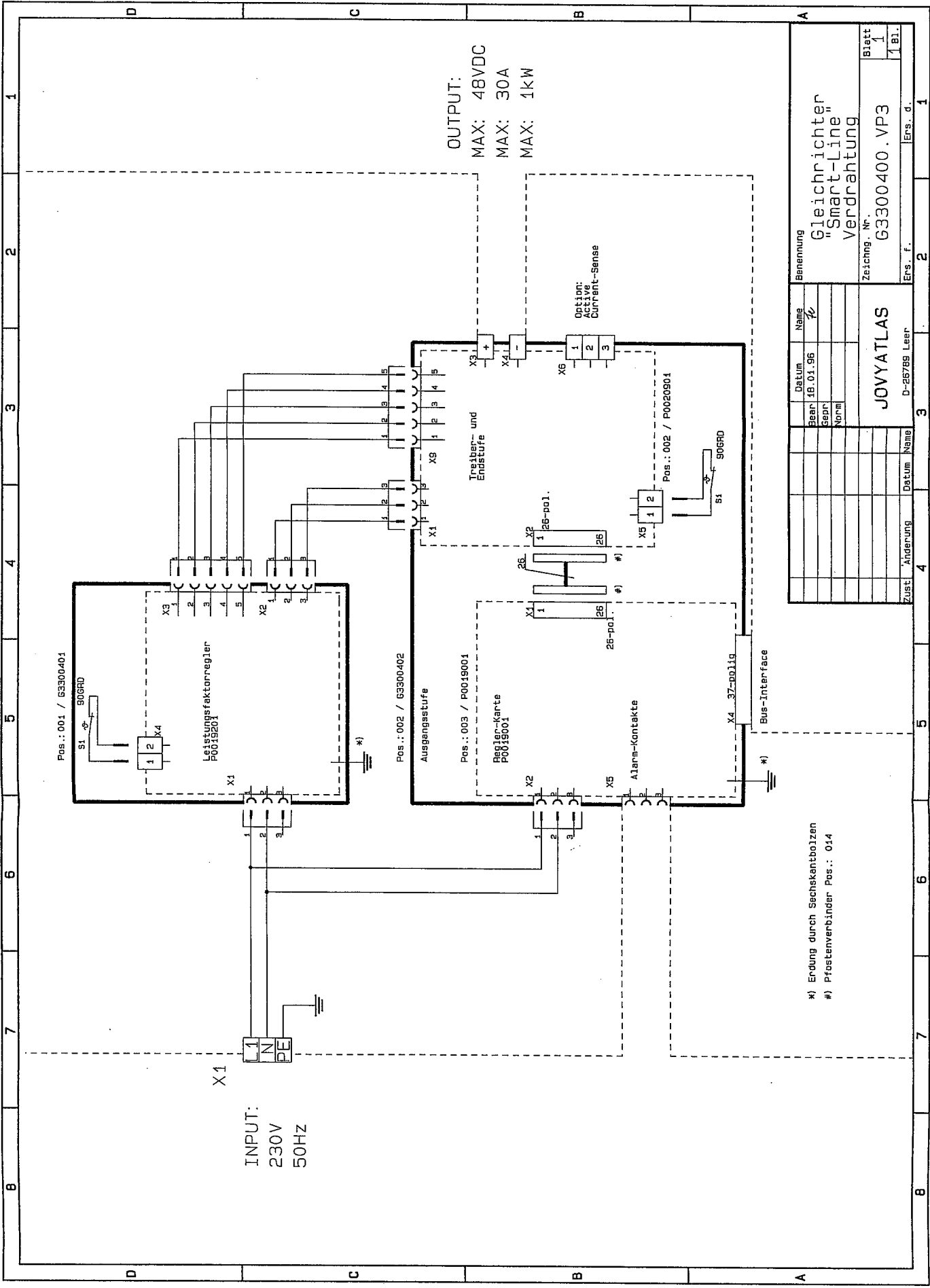
<b>Schaltnetzteil, kpl.</b> (liegend)	
Zeichnung Nr. <b>G33 004 00.ZG3</b>	Blatt 1 / 1
Erz. f. <b>JOVYATLAS</b> Elektrische Umformtechnik GmbH	Erz. d. 1





Benennung		Gleichrichter "Smart-Line"	
Zeichnung. Nr.		G3300400.BL3	
Blatt		1	
1 Bl.		1 Bl.	
JOVYATLAS		D-26789 Leer	
Datum		103.05.95	
Name		K	
Bearb.		Norm	
Zust.		Aenderung	
Datum		Name	
1		2	
3		4	
5		6	
7		8	

Ers. f. 2 Ers. d. 1



\*) Erdung durch Sechskentbolzen  
 #) Pfostenverbinder Pos.: 014

Benennung		Datum	
Gleichrichter "Smart-Line" Verdrahtung		Bearb.	19.01.96
Zeichn. Nr. G3300400.VP3		Gepr.	
Blatt 1		Norm	
Ers. f. 2		JOVYATLAS	
Ers. d. 1		D-26789 Leer	
Blatt 1 Bl. 1		D-26789 Leer	

1 2 3 4 5 6 7 8

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