



33 43310A03

### POWER COLLECTION

#### Single-phase overexcitation rectifier

The single-phase overexcitation rectifiers specified below are designed to increase the attractive force, to reduce the attraction time of actuating solenoids, to reduce the coupling and disconnection times of clutches and brakes and to reduce the power consumption of clutches, brakes and actuating solenoids. All work must only be carried out by suitably qualified personnel. Make sure that no voltage is applied during connection. The specifications on the rating plate and the information provided in the circuit diagram or in the datasheet must be strictly observed.

### Technical specifications

Type 33 433..	10A03	11A03
Rectifier type	full wave rectifier synchronous switched	
Input voltage	230 / 115 VAC $\pm$ 10%	
Frequency	40 – 60 Hz	
<b>Output voltage:</b>		
Overexcitation	205/102 VDC	
Holding voltage adjustable at 50 Hz	20 – 115 VDC bei 230 VAC 10 – 55 VDC bei 115 VAC	
<b>Maximum output current:</b>		
with overexcitation	4 ADC	8 ADC
holding current	2 ADC	4 ADC
Overexcitation time adjustable	0.15 – 3 s	
Min. recovery time	400 ms	
Required relay output for powerless switching	15 mA / 115 / 230 VAC potential separated	
Fuse: Fine wire fuse 5 x 20 as per DIN 41571	T2 E/250 V	M6,3 D/250 V
Connection	16-pole plug in screw terminals, 2,5 mm <sup>2</sup> fine wire	
Ambient temperature	0 – 70 °C	
Protection as per EN 60529	IP 00	

**Specification subject to change without notice.  
Please observe ordering data!**

### CE

#### EMC Directive 2004/108/EEC:

Compliance with the following standards is confirmed:  
 EN 50081-2 (Emission):  
 EN 55011 (VDE 0875, part 11, 1992)  
 Group 1, Class A conducted interference  
 Group 1, Class B radiated interference  
 EN 61000-6-2 (Immunity):  
 EN 61000-4-3 (1997) severity level 3  
 EN 61000-4-4 (1996) severity level 3  
 EN 61000-4-5 (1996) severity level 3

#### Low Voltage Directive 2006/95/EEC:

Compliance with the following standards is confirmed:  
 HD 625.1S1 (1996), (VDE 0110) insulation coordination, EN 60529 (1991) IP 54 external mounting

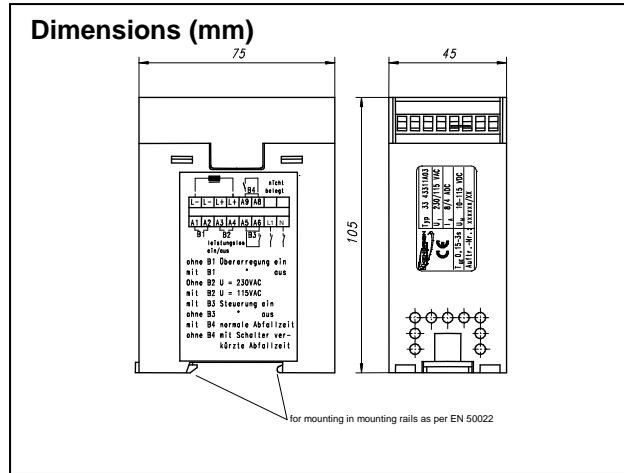
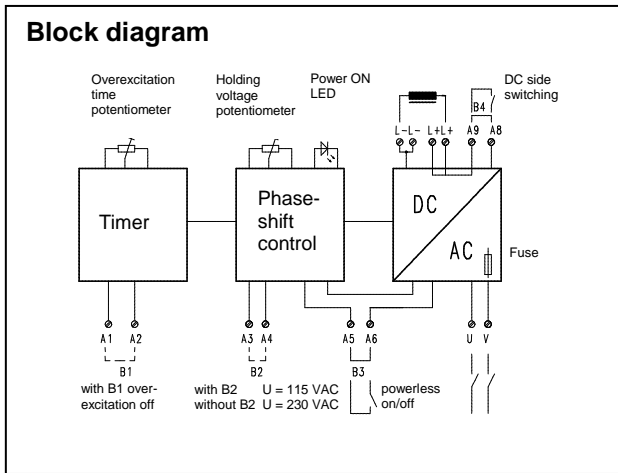
In order to increase the attractive force of actuating solenoids, the coil is overexcited during the overexcitation time applying a full wave rectified voltage. Afterwards, the rectifier changes over to the selected holding voltage, that shouldn't be higher than the specified nominal voltage of the solenoid. To lower the power consumption the nominal voltage of the solenoid should be not lower than the overexcitation voltage to achieve the nominal attractive force. The holding voltage can be adjusted depending of the dimensioning of the solenoid to a lower value than nominal. Owing to this power saving effect the switch off time will be reduced without the necessity of DC-side switching due to the lower magnetic energy. An integrated protective circuit allows DC side switching, thus reducing fall times, coupling times and disconnection times. The integrated compensation of input voltage changes provides a better stabilized output voltage. The rectifier is designed for powerless switching on and off. Overexcitation can be disabled, to use this device as variable DC-voltage supply for different applications. Due to their compact plastic housing, these rectifiers can be mounted on top-hat rails in switch cabinets. Plug-in screw terminals ensure simple installation.

#### Machinery Directive 2006/42/EC:

These products are considered components in the sense of Machinery Directive 2006/42/EC and must not be put into service until the machinery in which they are incorporated has been declared in conformity with the provisions of the EC Directives.

#### ROHS

We hereby declare that the above-mentioned products comply with the requirements of the RoHS Directive 2011/65/EU on the restriction of the usage of certain hazardous substances in electrical and electronic equipment, assigned to equipment category 11.



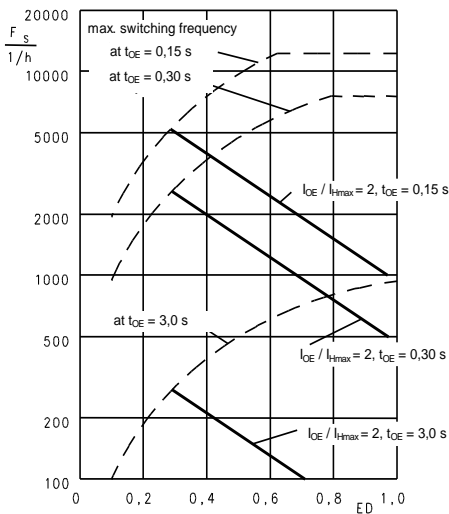
### Operating range

**Diagram 1: Permissible maximum switch frequency**  
Rectifiers installed in switch cabinets with a minimum distance of 30 mm to adjacent units.

**Formula 1: Permissible maximum switch frequency**

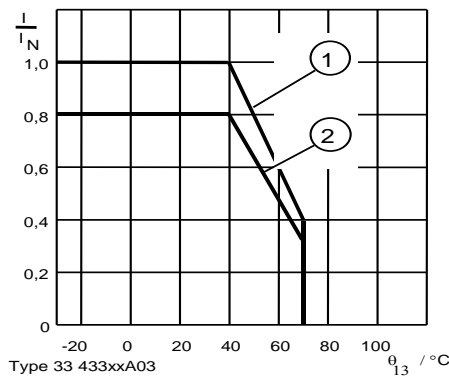
$f_s$ : max. switch frequency  
 $I_{Hmax}$ : max. holding current (see technical data)  
 $I_H$ : adjusted holding current  
 ED: Duty cycle  
 $I_{Ü}$ : Overexcitation current  
 $t_{Ü}$ : Overexcitation time

$$f_s = \frac{I_{Hmax}^2 - I_H^2 * ED}{(I_{Ü}^2 - I_{Hmax}^2) * t_{Ü}}$$



### Diagram 2: Admissible current load at ambient temperature

① distance between 2 devices minimum 30 mm  
 ② distance between 2 devices below 30 mm



### Factory settings

Type 33 433	Overexcitation time $t_{OE}$ [s]	Holding voltage V [VDC]
	Nominal value	Nominal value
10A03	1.2 ± 0.2	63 ± 3
11A03	1.7 ± 0.2	63 ± 3
11A13	0.6 ± 0.05	57.5 ± 2.5

### Application hints

The technical data apply to rectifiers installed in switch cabinets with a minimum distance of 30 mm to adjacent units. In case the distance to other components is less than 30 mm, the power consumption must be reduced by 20%. The rectifier operates as bridge rectifier during the selected overexcitation time and subsequently reduces the output voltage to the selected holding voltage by phase shift control. It is crucial to ensure that the total power consumption does not exceed the rated power of the connected unit. The rectifier must only be used within the limits shown in diagram 1 in order to avoid overloading. The maximum switching frequency can be determined on the basis of formula 1. The overexcitation time should be lower than 80% of the duty cycle. Ongoing DC-side switching when operating in overexcitation mode isn't allowed due to a possible damage of the protection circuit. The holding voltage adjustment should be done with connected load.

### Attention!

To use the powerless switching feature a potential free relays contact is necessary because the terminals are internal connected with the AC input.

Ordering example	Overexcitation rectifier
$U_B = 230/115$ VAC	33 433 . . A03
10 I = 4/2 ADC	
11 I = 8/4 ADC	
12 I = 16/8 ADC	
$U_B = 380/415$ VAC	33 433 . . A00
10 I = 6/3 ADC	

**Attention:** The several Types have different dimensions.

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