

## VARIMETER

### Battery Symmetry Monitor BA 9054/331, BA 9054/332



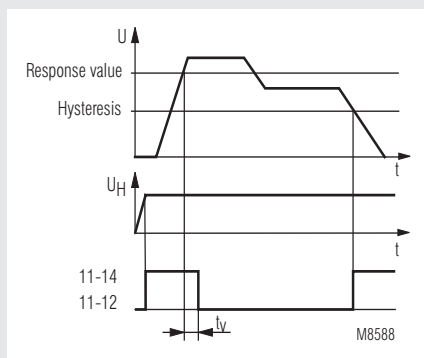
#### BA 9054/331

- According to IEC/EN 60 255
- To monitor for battery systems (emergency power supply)
- Measuring rang DC 0.12 ... 1.2 V or 0.2 ... 2 V
- Without separately auxiliary voltage
- High overload possible
- With time delay 10 s
- LED indicators for operation and contact position
- Width: 45 mm

#### BA 9054/332

- as BA 9054/331 but with
- battery voltages up to 500 V
  - separately auxiliary voltage

### Function Diagram



### Approvals and Marking



### Applications

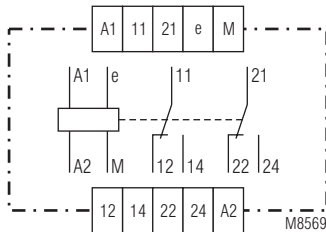
Monitoring of battery systems to find voltage inversions of single cells, internal short circuits and sulphating

### Function

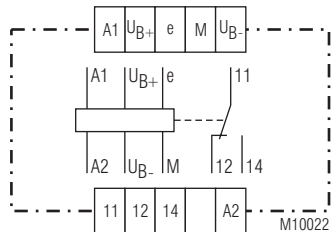
The middle connection of a Battery system is connected to terminal "M" of the BA 9054/331. If the two parts of the voltage differ more then the adjusted value for 10 s, the output relay trips. It trips also on broken wire on terminal "M".

The test button allows a test of the unit. It has to be pressed for at least 10 sec.

### Circuit Diagram



BA 9054/331



BA 9054/332

### Indicators

- |                   |                                     |
|-------------------|-------------------------------------|
| green upper LED:  | on, when auxiliary supply connected |
| yellow lower LED: | on, when output relay acitvated     |

### Remark

**Attention:** New batteries are not symmetric in the beginning. The battery monitor has to be readjusted after some time of operation. (see setting). The adjustment has to be verifi



## Technical Data

### Input

<b>Sensitivity of tripping:</b> (Measuring range):	DC 0.12 ... 1.2 V absolute scale or DC 0.2 ... 2 V absolute scale
<b>Resetting value:</b>	98% of operate value, fixed
<b>Repeat accuracy:</b>	≤ ± 0.5 %
<b>Time delay <math>t_v</math>:</b>	10 s
<b>Current middle connection</b> (terminal M):	max 12 µA (bei 60 V bzw. 220 V)
<b>Principe de mesure:</b>	arithmetic mean value
<b>Temperature influence:</b>	< 0.05 % / K

### Auxiliary Circuit

<b>BA 9054/331:</b>	
<b>Battery voltage = auxiliary voltage:</b>	DC 24 ... 60 V / DC 110 ... 220 V
<b>Voltage range:</b>	DC 19 ... 80 V / DC 60 ... 300 V
<b>BA 9054/332:</b>	
<b>Battery voltage (<math>U_B</math>):</b>	DC 200 ... 500 V
<b>Auxiliary voltage (A1/A2):</b>	AC 230 V
<b>Voltage range:</b>	0.8 ... 1.1 $U_H$
<b>Nominal consumption:</b>	approx. 2.5 VA
<b>Nominal frequency:</b>	50 / 60 Hz
<b>Frequency range:</b>	± 5 %

### Output

<b>Contacts:</b>	2 changeover contacts with 5µm gold contacts max. DC 60 V / 300 mA	
<b>Switching capacity</b> to AC 15:		
NO contact:	3 A / AC 230 V	IEC/EN 60 947-5-1
NC contact:	1 A / AC 230 V	IEC/EN 60 947-5-1
to DC:	8 A / DC 24 V or 0.3 A / DC 220 V	
<b>Electrical life</b>		IEC/EN 60 947-5-1
to AC 15 at 3 A, AC 230 V:	5 x 10 <sup>5</sup> switching cycles	
<b>Short-circuit strength</b> <b>max. fuse rating:</b>	6 AgL	IEC/EN 60 947-5-1
<b>Mechanical life:</b>	50 x 10 <sup>6</sup> switching cycles	

### General Data

<b>Operating mode:</b>	Continuous operation	
<b>Temperature range:</b>	- 40 ... + 60°C	
<b>Clearance and creepage distances</b> rated impuls voltage/ pollution degree		
In-/output:	4 kV / 2	IEC 60 664-1
<b>EMC</b>		
Electrostatic discharge:	8 kV (air)	IEC/EN 61 000-4-2
HF irradiation:	10 V/m	IEC/EN 61 000-4-3
Fast transients:	4 kV	IEC/EN 61 000-4-4
Surge voltages between wires for power supply: between wire and ground:	2 kV 4 kV	IEC/EN 61 000-4-5 IEC/EN 61 000-4-5
Interference suppression:	Limit value class B	EN 55 011
<b>Degree of protection</b>		
Housing:	IP 40	IEC/EN 60 529
Terminals:	IP 20	IEC/EN 60 529
<b>Housing:</b>	Thermoplastic with V0 behaviour according to UL subject 94	
<b>Vibration resistance:</b>	Amplitude 0.35 mm IEC/EN 60 068-2-6 frequency 10 ... 55 Hz	
<b>Climate resistance:</b>	20 / 060 / 04 IEC/EN 60 068-1	
<b>Terminal designation:</b>	EN 50 005	
<b>Wire connection:</b>	2 x 2.5 mm <sup>2</sup> solid or 2 x 1.5 mm <sup>2</sup> stranded wire with sleeve DIN 46 228-1/-2/-3/-4	
<b>Wire fixing:</b>	flat terminals with self-lifting clamping piece IEC/EN 60 999-1	
<b>Mounting:</b>	DIN rail IEC/EN 60 715	
<b>Weight:</b>	200 g	

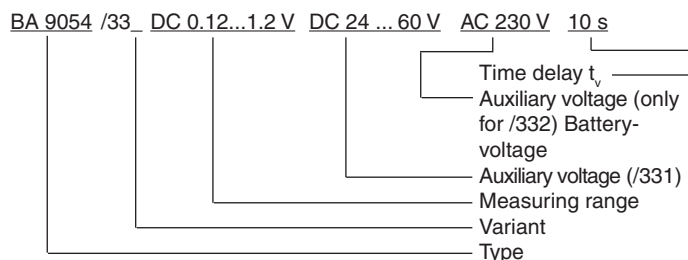
### Dimensions

<b>Width x height x depth:</b>	45 x 75 x 120 mm
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## Standard Types

<b>BA 9054/331</b>	DC 0.12 ... 1.2 V	DC 24 ... 60 V	10 s
Article number:	0056172		
• Measuring range:	DC 0.12 ... 1.2 V		
• Auxiliary voltage:	DC 24 ... 60 V		
• Time delay:	10 s		
• Width:	45 mm		
<b>BA 9054/331</b>	DC 0.12 ... 1.2 V	DC 110 ... 220 V	10 s
Article number:	0056204		
• Measuring range:	DC 0.12 ... 1.2 V		
• Auxiliary voltage:	DC 110 ... 220 V		
• Time delay:	10 s		
• Width:	45 mm		
<b>BA 9054/332</b>	DC 0.12 ... 1.2 V	DC 200 ... 500 V	10 s
Article number:	0062251		
• Measuring range:	DC 0.12 ... 1.2 V		
• Auxiliary voltage:	AC 230 V		
• Battery voltage:	DC 200 ... 500 V		
• Time delay:	10 s		
• Width:	45 mm		

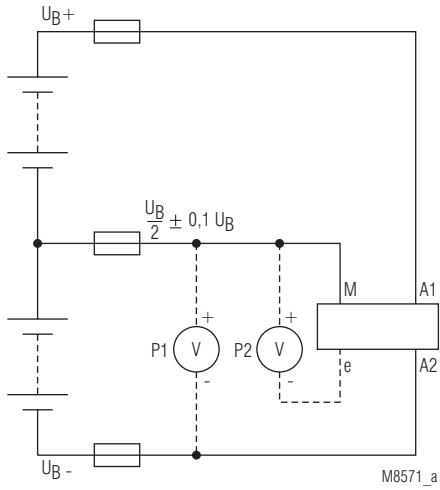
## Ordering example



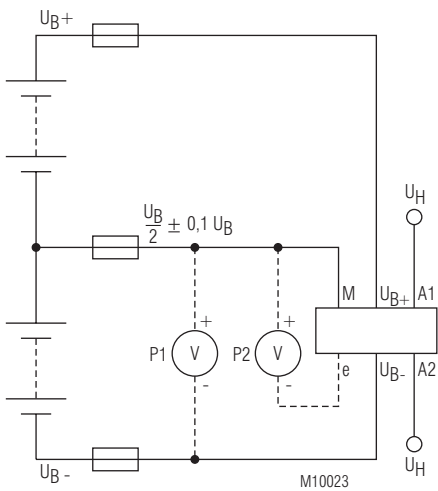
## Setting

- Connect the device as shown in application example
- Connect nominal voltage (battery voltage) to A1/A2 (/331 e.g.  $U_B$  /332).
- Set potentiometer for response value to min setting (0.12 V)
- Connect auxiliary  $U_H$  (/332) to A1, A2
- Find the middle of the battery voltage with the potentiometers for symmetry "grob" and "fein" (tuning and fine tuning). Differences of block batteries can be adjusted up to 12 V. The correct setting is indicated by a green LED.
- Adjust potentiometer for response value to the required value. The device is now ready to use.

## Application Example



BA 9054/331



BA 9054/332

## Set-up

### Example 1

Symmetric battery

$P1 = \frac{1}{2}$  battery voltage

Adjust P2 with tuning and fine tuning potentiometer to 0V

### Example 2

**60 V battery set, combination of 12 V Block batteries**

$P1 = 36 \text{ V}$

Adjust P2 with tuning and fine tuning potentiometer to 0V

### Example 3

**Non symmetric battery (compensation of battery tolerances)**

$P1 = \frac{1}{2}$  battery voltage + 200 mV

Adjust P2 with tuning and fine tuning potentiometer to 200 mV

