

VARIMETER

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



0243311

BA 9054

- According to IEC/EN 60 255-1
- To monitor for battery systems (emergency power supply)
- Measuring rang DC 0.12 ... 1.2 V or 0.2 ... 2 V
- Goldplated contacts to switch low loads
- High overload possible
- With time delay 10 s
- LED indicators for operation and contact position
- Width: 45 mm

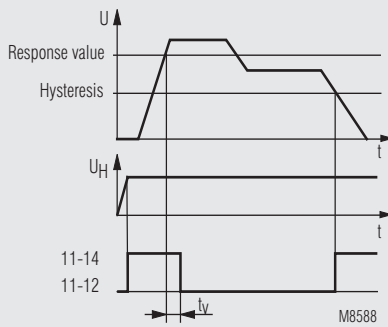
BA 9054/331

- For battery voltages up to 300 V
- Without separately auxiliary voltage
- 2 changeover contacts

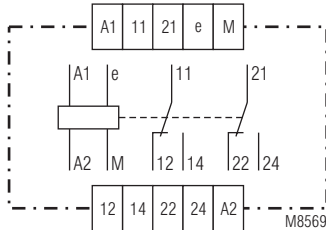
BA 9054/332

- For battery voltages up to 500 V
- With separately auxiliary voltage
- 1 changeover contact

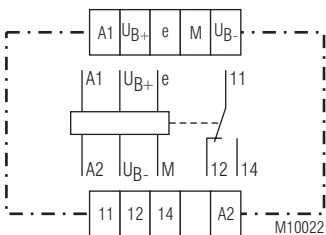
Function Diagram



Circuit Diagrams



BA 9054/331



BA 9054/332

Connection Terminals

| Terminal designation | Signal description |
|----------------------|------------------------------------|
| A1, A2 | Auxiliary voltage |
| U_{B+} , U_B | Batterie voltage |
| M | Middle tap of battery |
| e | Calibration reference |
| 11, 12, 14 | 1 st Changeover contact |
| 21, 22, 24 | 2 nd Changeover contact |

Approvals and Markings



¹⁾ Approval not for all variants

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.

Indicators

green upper LED: On, when auxiliary supply connected
yellow lower LED: On, when output relay acitvated

Notes

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.



The gold plated contacts of the BA 9054 mean that this module is also suitable for switching small loads of 1 mVA ... 7 VA, 1 mW ... 7 W in the range 0.1 - 60 V, 1 ... 300 mA. The contacts also permit the maximum switching current. However since the gold plating will be burnt off at this current level, the device is no longer suitable for switching small loads after this.

Technical Data

Input

| | |
|--|--|
| Sensitivity of tripping: (Measuring range): | DC 0,12 ... 1,2 V absolute scale or, DC 0,2 ... 2 V absolute scale or DC 1 ... 10 V absolute scale |
| Resetting value: | 98% of operate value, fixed |
| Repeat accuracy: | $\leq \pm 0.5 \%$ |
| Time delay t_v: | 10 s |
| Current middle connection (terminal M): | max 12 μ A (at 60 V or 220 V or 500 V) |
| Principe de mesure: | arithmetic mean value |
| Temperature influence: | $< 0.05 \%$ / K |

Auxiliary Circuit

| | |
|--|-----------------------------------|
| BA 9054/331: Battery voltage = auxiliary voltage: | DC 24 ... 60 V / DC 110 ... 220 V |
| Voltage range: | DC 19 ... 80 V / DC 60 ... 300 V |
| BA 9054/332: Battery voltage (U_B): | DC 10 ... 60 V, DC 200 ... 500 V |
| Auxiliary voltage (A1/A2): | DC 110 ... 220 V, AC 230 V |
| Voltage range: | 0,8 ... 1.1 U_H |
| Nominal consumption: | approx. 2,5 VA |
| Nominal frequency: | 50 / 60 Hz |
| Frequency range: | $\pm 5 \%$ |

Output

| | |
|---|---|
| Contacts: BA9054/331: | 2 changeover contacts |
| BA9054/332: | 1 changeover contacts |
| Contact material: | AgNi + 5 μ m Au |
| Switching of low loads: (contact with 5 μ m Au) | ≥ 100 mV ≥ 1 mA |
| Thermal current I_{th}: BA 9054/331: | 2 x 5 A |
| BA 9054/332: | 1 x 5 A |
| Switching capacity to AC 15: | |
| NO contact: | 2 A / AC 230 V IEC/EN 60947-5-1 |
| NC contact: | 1 A / AC 230 V IEC/EN 60947-5-1 |
| to DC 13: | 1 A / DC 24 V IEC/EN 60 947-5-1 |
| to DC: | 8 A / DC 24 V or 0.3 A / DC 220 V |
| Electrical life to 3 A, AC 230 V $\cos \varphi = 1$: | 2 x 10 ⁵ switching cycl.IEC/EN 60947-5-1 |
| Short-circuit strength max. fuse rating: | 6 A gG / gL IEC/EN 60947-5-1 |
| Mechanical life: | 50 x 10 ⁶ switching cycles |

General Data

| | |
|---|------------------------------|
| Operating mode: | Continuous operation |
| Temperature range: Operation: | - 40 ... + 60 °C |
| Storage: | - 40 ... + 70 °C |
| Altitude: | < 2000 m |
| Clearance and creepage distances rated impulse voltage/ pollution degree | |
| In-/output: | 4 kV / 2 IEC 60664-1 |
| EMC Electrostatic discharge: | 8 kV (air) IEC/EN 61000-4-2 |
| HF irradiation: 80 MHz ... 2,7 GHz: | 10 V / m IEC/EN 61000-4-3 |
| Fast transients: | 4 kV IEC/EN 61000-4-4 |
| Surge voltages between wires for power supply: | 2 kV IEC/EN 61000-4-5 |
| between wire and ground: | 4 kV IEC/EN 61000-4-5 |
| HF wire guided: | 10 V IEC/EN 61000-4-6 |
| Interference suppression: | Limit value class B EN 55011 |

Technical Data

Degree of protection

| | |
|------------|--------------------|
| Housing: | IP 40 IEC/EN 60529 |
| Terminals: | IP 20 IEC/EN 60529 |

Housing:

Thermoplastic with V0 behaviour according to UL subject 94

Vibration resistance:

Amplitude 0.35 mm IEC/EN 60068-2-6
frequency 10 ... 55 Hz

Climate resistance:

40 / 060 / 04 IEC/EN 60068-1

Terminal designation:

EN 50 005

Wire connection:

2 x 2.5 mm² solid or
2 x 1.5 mm² stranded wire with sleeve
DIN 46228-1/-2/-3/-4

Wire fixing:

Plus-minus terminal screws M 3,5
with self-lifting
clamping piece IEC/EN 60999-1

Insulation of wires or
sleeve length:

10 mm

Fixing torque:

0.8 Nm

Mounting:

DIN rail

IEC/EN 60715

Weight:

200 g

Dimensions

Width x height x depth: 45 x 75 x 120 mm

CCC-Daten

| | | |
|---|----------------|-------------------|
| Thermal current I_{th}: | 5 A | |
| Switching capacity to AC 15: | 2 A / AC 230 V | IEC/EN 60 947-5-1 |
| to DC 13: | 1 A / DC 24 V | IEC/EN 60 947-5-1 |

BA 9054/332:

Battery voltage (U_B): DC 10 ... 60 V



Technical data that is not stated in the CCC-Data, can be found in the technical data section..

Standard Types

BA 9054/331 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

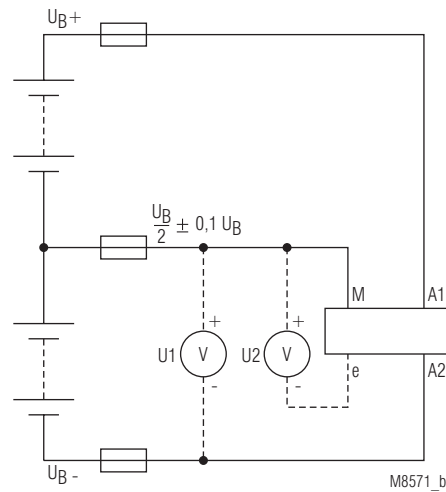
BA 9054/331 DC 0.12 ... 1.2 V DC 110 ... 220 V 10 s

- Article number: 0056204
- Measuring range: DC 0.12 ... 1.2 V
 - Auxiliary voltage: DC 110 ... 220 V
 - Time delay: 10 s
 - Width: 45 mm

BA 9054/332 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

Application Example



BA 9054/331

Ordering example

BA 9054 /33 DC 0.12...1.2 V DC 24 ... 60 V AC 230 V 10 s

- Time delay t_v
- Auxiliary voltage (only for /332) Battery-voltage
- Auxiliary voltage (/331)
- Measuring range
- Variant
- Type

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.

Set-up Procedure

Example 1

Symmetric battery

$U_1 = \frac{1}{2}$ battery voltage

Adjust U_2 with tuning and fine tuning potentiometer to 0V

Example 2

60 V battery set, combination of 12 V Block batteries

$U_1 = 36$ V

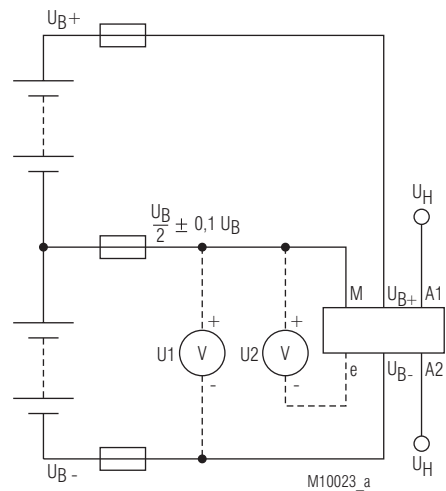
Adjust U_2 with tuning and fine tuning potentiometer to 0V

Example 3

Non symmetric battery (compensation of battery tolerances)

$U_1 = \frac{1}{2}$ battery voltage + 200 mV

Adjust U_2 with tuning and fine tuning potentiometer to 200 mV



BA 9054/332

