

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

Translation
of the original instructions



Your advantages

- Preventive maintenance
- For better productivity
- High repeat accuracy
- Large battery voltage ranges up to DC 500 V

Features

- According to IEC/EN 60255-1
- To monitor for battery systems (emergency power supply)
- Measuring rang DC 0.12 ... 1.2 V, 0.2 ... 2 V or 1 ... 10 V
- Goldplated contacts to switch low loads
- 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

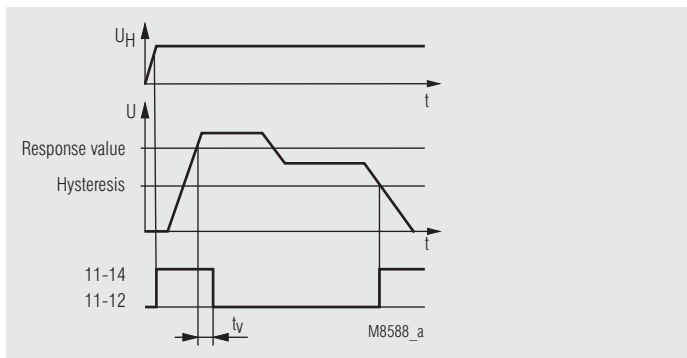
BA 9054/332

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

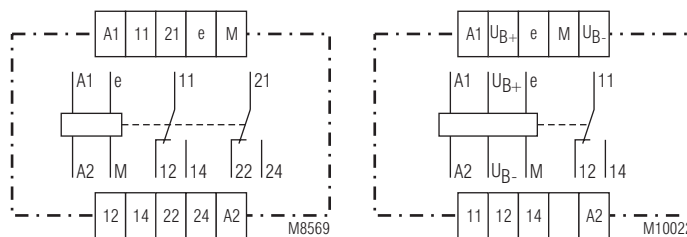
Product Description

The battery symmetry monitor BA 9054/331 and BA 9054/332 of the VARIMETER series monitors battery systems with centre tapping for faults. Early detection of impending failures and preventive maintenance prevent costly damage and as a user you benefit from the operational safety and high availability of your system.

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 activated

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 verified by measuring the two parts of the voltage.



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:	≤ ± 0.5 %
Time delay t_v:	10 s
Current middle connection (terminal M):	Max. 12 µA (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:	± 5 %

Output

Contacts:	2 changeover contacts
BA 9054/331:	2 changeover contacts
BA 9054/332:	1 changeover contacts
Contact material:	AgNi + 5 µm Au
Switching of low loads: (contact with 5 µm 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 60947-5-1
To DC:	8 A / DC 24 V or 0.3 A / DC 220 V
Electrical life to 3 A, AC 230 V cos φ = 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 50005

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 60947-5-1

To DC 13: 1 A / DC 24 V IEC/EN 60947-5-1

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

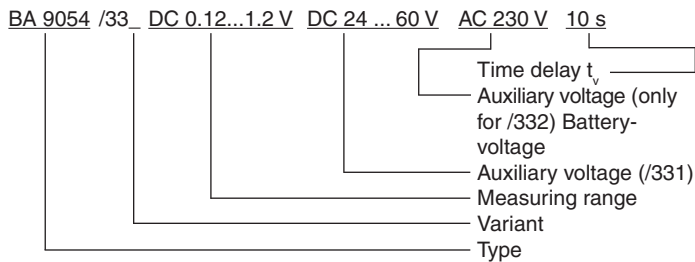
BA 9054/331 DC 0.12 ... 1.2 V DC 110 ... 220 V 10 s

- 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

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.

Set-up Procedure

Example 1

Symmetric battery

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

Adjust U_2 with tuning and fine tuning potentiometer to 0 V.

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 0 V.

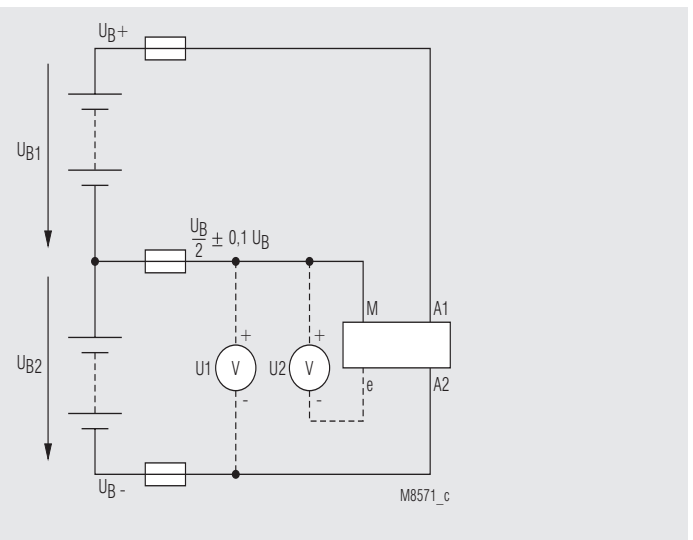
Example 3

Non symmetric battery (compensation of battery tolerances)

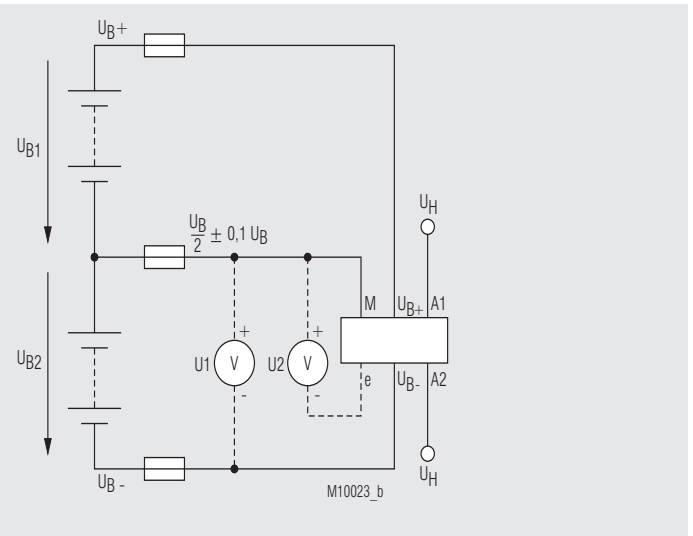
$U_1 = \frac{1}{2}$ battery voltage + 200 mV

Adjust U_2 with tuning and fine tuning potentiometer to 0 V.

Application Example



BA 9054/331



BA 9054/332

