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

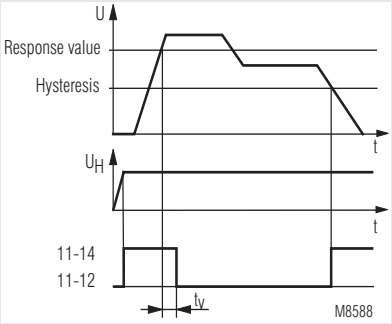
Translation of the original instructions

DOLD

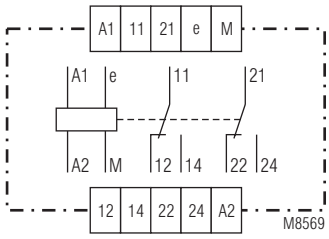
0243311

BA 9054

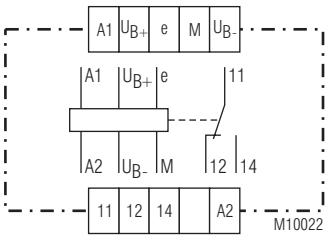
Function Diagram



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	1st Changeover contact
21, 22, 24	2nd Changeover contact

- According to IEC/EN 60255-1
- 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

Approvals and Markings

A025518 [1)]

[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:	≤ ± 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:		
BA9054/331:	2 changeover contacts	
BA9054/332:	1 changeover contacts	
Contact material:	AgNi + 5 µm Au	
Switching of low loads:	≥ 100 mV	
(contact with 5 µ Au)	≥ 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 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 frequency 10 ... 55 Hz	IEC/EN 60068-2-6
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_s):	DC 10 ... 60 V	

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

Standard Types

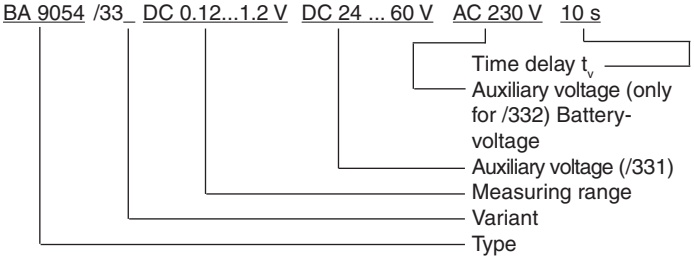
BA 9054/331 DC 0.12 ... 1.2 V DC 24 ... 60 V 10 s
Article number: 0056172
- Measuring range: DC 0.12 ... 1.2 V
- Auxiliary voltage: DC 24 ... 60 V
- Time delay: 10 s
- Width: 45 mm

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

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



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

U1= ½ battery voltage
Adjust U2 with tuning and fine tuning potentiometer to 0V

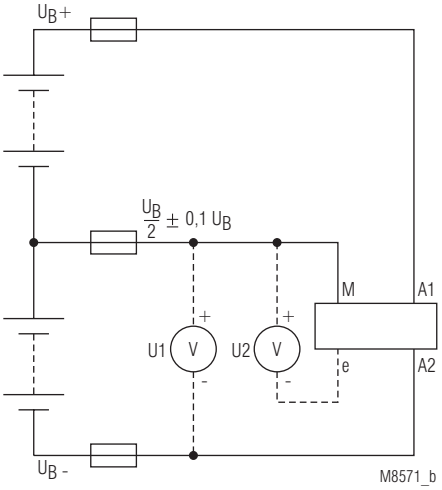
Example 2
60 V battery set, combination of 12 V Block batteries

U1 = 36 V
Adjust U2 with tuning and fine tuning potentiometer to 0V

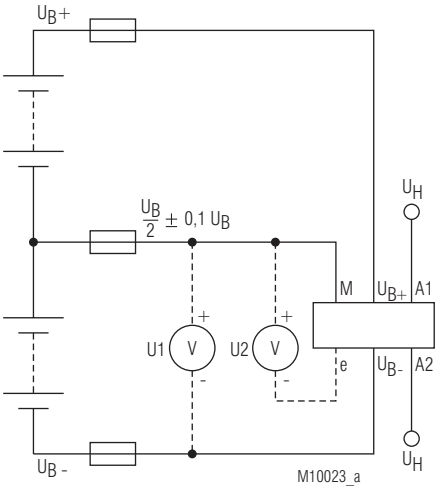
Example 3
Non symmetric battery (compensation of battery tolerances)

U1 = ½ battery voltage + 200 mV
Adjust U2 with tuning and fine tuning potentiometer to 200 mV

Application Example



BA 9054/331



BA 9054/332