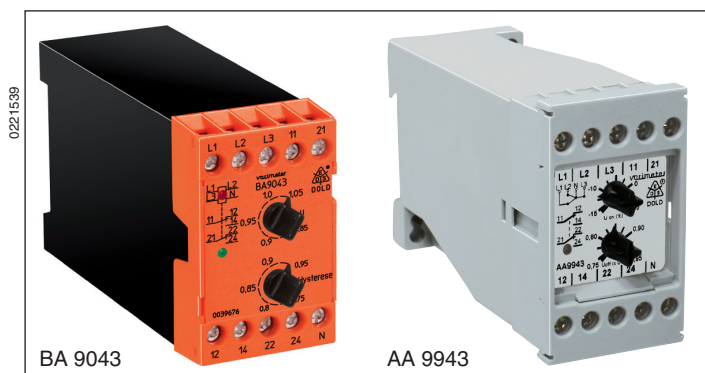
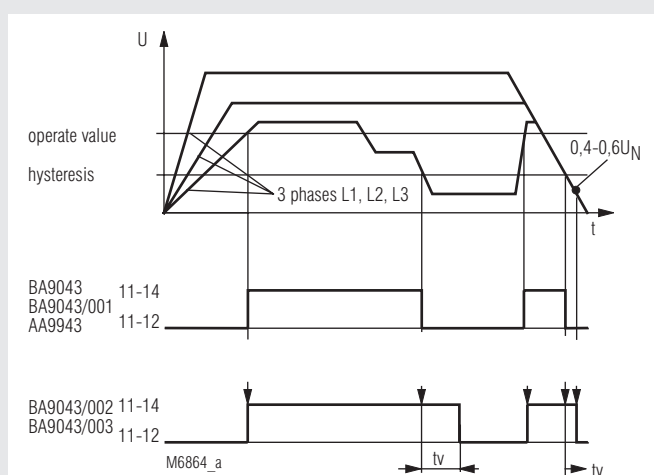


VARIMETER Undervoltage Relay BA 9043, AA 9943



- According to IEC 255, EN 60 255, VDE 0435 part 303
- 3-phase
- For nominal voltage of 3 AC 100 / 57 to 690 / 400 V
- Measures arithmetic mean value
- Adjustable operate and release value
- For 3p3w or 3p4w systems
- BA 9043 optionally with adjustable time delay
- Closed circuit operation
- LED indicator for operation and state of contact
- Insensitive to harmonics
- Frequency up to 400 Hz
- Width 45 mm

Function Diagram



Approvals and Marking



Application

Undervoltage detection in 3 phase systems

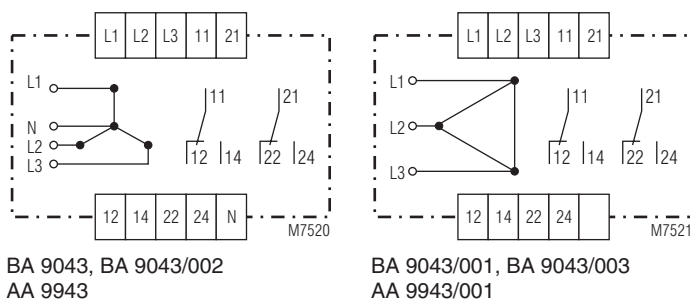
Indicators

upper LED: (only BA 9043)	on, when voltage connected
lower LED:	on, when output contact activated

Notes

For determination of the arithmetic mean value of the voltage the 3 phases are measured against N.
The variants without N (/001 and /003) measure L1 and L2 against L3.
delay the delay is only active at $U \geq 0,6 U_N$. At $< 0,4 U_N$ the relay switches off without delay.

Circuit Diagram



Technical Data

Input

Nominal voltage U_N

BA 9043, BA 9043/002	3/N AC 100/57 V; 220/127 V; 400/230 V
AA 9943:	415/240 V; 440/254 V; 500/290 V
BA 9043, BA 9043/002:	3 AC 690/400 V

BA 9043/001, BA 9043/003	3 AC 100 V; 220 V; 400 V; 415 V, 440 V; 500 V
AA 9943/001:	3 AC 690 V

Max. overload

BA 9043:	1.2 U_N continuously
AA 9943:	1.1 U_N continuously

Nominal consumption:

AC 4 VA

Nominal frequency:

50 ... 400 Hz

Frequency range:

$\pm 5 \%$

Temperature influence:

$< 0,05 \% / K$

Setting Ranges

Response value:	0.85 ... 1.05 U_N , infinite variable with upper potentiometer
Hysteresis:	0.75 ... 0.95 of operate value
Setting accuracy:	$\leq \pm 10 \%$
Switching delay t_M:	see diagram switching delay
Time delay t_V:	infinite variable from 0.5 ... 10 sec for BA 9043/002, BA 9043/003 Between 0.4 and 0.6 U_N the contacts fall back according to the diagram without additional delay

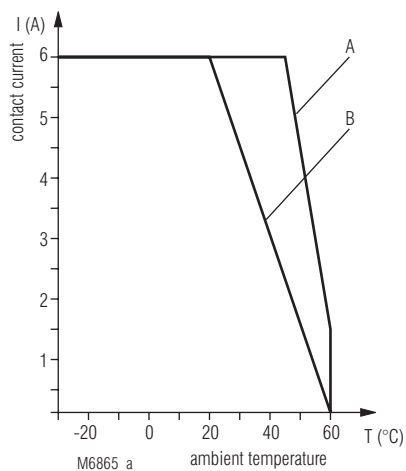
Technical Data	
Output	
Contacts	
BA 9043:	2 changeover contacts
AA 9943.11:	1 changeover contact
AA 9943.12:	2 changeover contacts
Thermal current I_{th}:	6 A; see diagramm
	Continuous current limit curve
Switching capacity	
to AC 15	
NO contact:	3 A / AC 230 V IEC/EN 60 947-5-1
NC contact:	1 A / AC 230 V IEC/EN 60 947-5-1
to DC 13	
NO contact:	1 A / DC 24 V IEC/EN 60 947-5-1
NC contact:	1 A / DC 24 V IEC/EN 60 947-5-1
Electrical life	IEC/EN 60 947-5-1
to AC 15 at 3 A, AC 230 V:	3 x 10 ⁵ switching cycles
Short circuit strength	
max. fuse rating:	4 A gL IEC/EN 60 947-5-1
Mechanical life:	> 30 x 10 ⁶ switching cycles
General Data	
Operating mode:	
Continuous operation	
Temperature range:	
- 20 ... + 60°C	
Clearance and creepage distances	
rated impuls voltage /	
pollution degree:	
4 kV / 2	IEC 60 664-1
EMC	
Electrostatic discharge:	
8 kV (air)	IEC/EN 61 000-4-2
HF irradiation:	
10 V/m	IEC/EN 61 000-4-3
Fast transients:	
2 kV	IEC/EN 61 000-4-4
Surge voltages	
between	
wires for power supply:	
1 kV	IEC/EN 61 000-4-5
between wire and ground:	
2 kV	IEC/EN 61 000-4-5
HF wire guided:	
10 V	IEC/EN 61 000-4-6
Interference suppression:	
Limit value class B	EN 55 011
Degree of protection	
Housing:	
IP 40	IEC/EN 60 529
Terminals:	
IP 20	IEC/EN 60 529
Housing:	
Thermoplastic with V0 behaviour	
according to UL subject 94	
Vibration resistance:	
Amplitude 0.35 mm IEC/EN 60 068-2-6	
frequency 10 ... 55 Hz	
Climate resistance:	
20 / 060 / 04 IEC/EN 60 068-1	
Terminal designation:	
DIN EN 50 005	
Wire connection:	
2 x 2.5 mm ² solid or	
2 x 1.5 mm ² stranded wire with sleeve	
DIN 46 228-1/-2/-3/-4	
Wire fixing:	
Flat terminals with self-lifting	
clamping piece IEC/EN 60 999-1	
Mounting:	
DIN rail IEC/EN 60 715	
Weight	
BA 9043:	310 g
AA 9943:	300 g
Dimensions	

Width x height x depth	
BA 9043:	45 x 73 x 132 mm
AA 9943:	45 x 77 x 127 mm

Standard Type	
BA 9043 3/N AC 400 / 230 V	50 ... 400 Hz
Article number:	0039676 stock item
- for 3p4w systems - Nominal voltage U_N: - Output: - Width:	
3/N AC 400 / 230 V	
2 changeover contacts	
45 mm	

Variants	
AA 9943/001:	without neutral
AA 9943/175:	for nuclear power plants
BA 9043/001:	without neutral
BA 9043/002:	with neutral, adjustable time delay
	$t_v = 0.5 \dots 10 \text{ sec}$
BA 9043/003:	without neutral, adjustable time delay
	$t_v = 0.5 \dots 10 \text{ sec}$
Ordering example for variants	
BA 9043	/ _ _ _ 3/N AC 400/230 V 50 ... 400 Hz
	Nominal frequency
	Nominal voltage
	Variant, if required
	Type
AA 9943	.11 / _ _ _ 3/N AC 400/230 V 50 ... 400 Hz
	Nominal frequency
	Nominal voltage
	Variant, if required
	Contact
	Type
Accessories	
AA 9943:	
K 70-34	Cover

Characteristics



Continuous current limit curve

A = Devices mounted with 2 cm distance

B = Devices mounted without distance

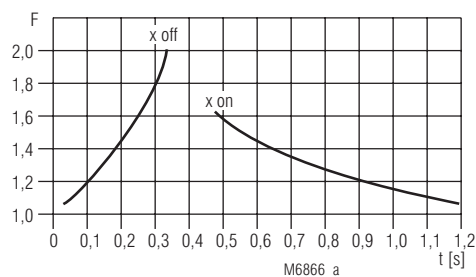


Diagram switching delay

Switching delay t_M :

When the voltage changes fast on the measuring input, the arithmetic mean value can only adjust after a short delay.

Example:

$$F = \frac{U_{\text{applied}}}{U_{\text{setting}}} \quad F = \frac{240 \text{ V}}{190 \text{ V}} = 1.26$$

$U_{\text{setting}} = 190 \text{ V}$

$U_{\text{applied}} = 240 \text{ V}$

according to diagram:

$t_{M,\text{on}} = \text{approx. } 800 \text{ ms}$

$t_{M,\text{off}} = \text{approx. } 100 \text{ ms}$

Specification for Tender for BA 9043

Undervoltage relay according to IEC 255, VDE 0435 for nominal voltage of 3 AC 100/57 to 500/290 V. Adjustable operate and release value, for 3p4w systems

Width 45 mm

Type BA 9043

Manufactured by E. DOLD & SÖHNE KG

Undervoltage relay according to IEC 255, VDE 0435 for nominal voltage of 3 AC 100/57 to 500/290 V. Adjustable operate and release value, for 3p4w systems, adjustable time delay up to 10 s.

Width 45 mm

Type BA 9043/002

Manufactured by E. DOLD & SÖHNE KG

Undervoltage relay according to IEC 255, VDE 0435 for nominal voltage of 3 AC 100/57 to 500/290 V. Adjustable operate and release value, for 3p3w systems

Width 45 mm

Type BA 9043/001

Manufactured by E. DOLD & SÖHNE KG

Undervoltage relay according to IEC 255, VDE 0435 for nominal voltage of 3 AC 100/57 to 500/290 V. Adjustable operate and release value, for 3p3w systems, adjustable time delay up to 10 s.

Width 45 mm

Type BA 9043/003

Manufactured by E. DOLD & SÖHNE KG

