Monitoring Technique

VARIMETER PRO
Phase Monitor
BD 9080

Translation of the original instructions

DOLD

- According to IEC/EN 60255-1
- Monitoring of
  - Under- and overvoltage
  - Asymmetry
  - Phase failure
  - Phase sequence
- Adjustable response delay between 0.1 ... 5 s
- One LED in each case for:
  - Auxiliary voltage A1/A2
  - Overvoltage $U_{max.}$
  - Undervoltage $U_{min.}$
  - Asymmetry / Phase sequence / Power failure
  - Contact position
- Closed circuit operation
- 2 changeover contacts
- As option available with open circuit operation
- Width 45 mm

Product Description

The Phase monitor BD 9080 of the VARIMETER PRO series monitors over and undervoltage, asymmetry, power failure as well as wrong phase sequence at three-phase networks . Early detection of impending failtures and preventive maintenance prevent costly damage and as a user you benefit from the operational safety and high availability of your system.

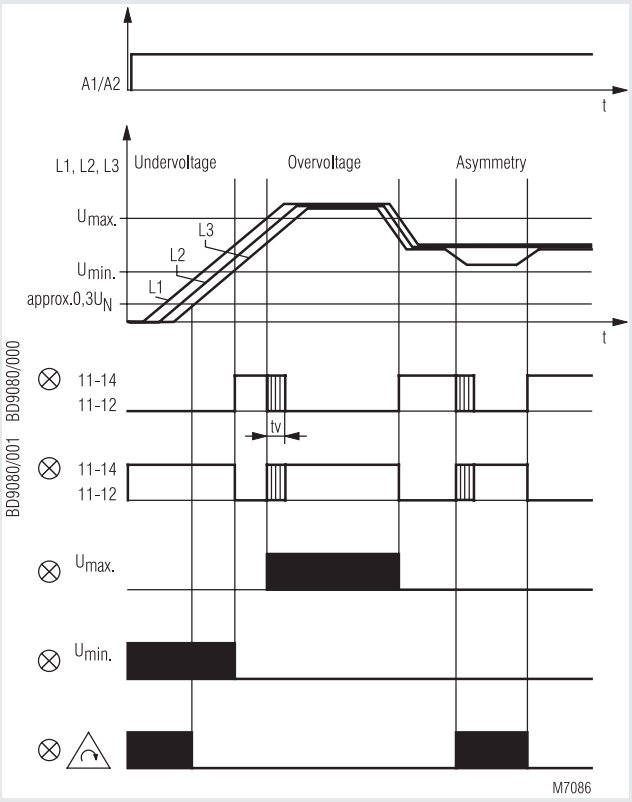
Approvals and Markings

Canada / USA

A025518

*) see variants

Function Diagram



Applications

For monitoring three-phase networks for undervoltage, overvoltage, phase sequence, asymmetry, power failure.

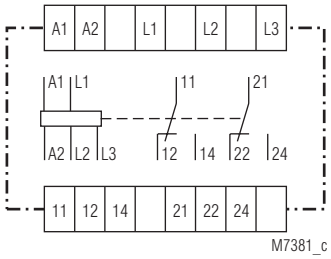
Indication

1. LED A1 / A2:	On, when operating voltage present
2. LED U_{max}:	On, in event of overvoltage
3. LED U_{min}:	On, in event of undervoltage
4. LED Δ:	On, in event of: - Asymmetry - Incorrect phase sequence - Power failure
5. LED:	On, when output relay activated

Notes

Measurement procedures: arithmetical mean value measurement over several half-waves of rectified phase voltages L1/L2 and L2/L3. Reference phase is L3. Networks with or without neutral can be monitored. The auxiliary voltage to be applied to A1/A2 can also be taken from the three-phase network which is to be monitored. This reduces to 0.8 - 1.1 U_H the permitted range of voltage of the network to be monitored.

Circuit Diagram



Connection Terminals

Terminal designation	Signal description
L1, L2, L3	Connection phase voltage (L1, L2, L3)
A1, A2	Auxiliary voltage
11, 12, 14	Indicator relay (1. C/O contact)
21, 22, 24	Indicator relay (2. C/O contact)

Technical Data

Input Circuit

Nominal voltage U_N

L1 / L2 / L3:	3 AC 230, 400, 690, 750 V (other voltages on request)	
Setting range:	0.7 ... 1.3 U_N *) *) 0.8 ... 1.1 U_N if auxiliary voltage is taken from the monitored net	
Overload capacity of U_N:	1.5 U_N / 2 U_N (10 s) max. 1 000 V	
Nominal frequency of U_N:	50 / 60 Hz	
Frequency range of U_N:	45 ... 65 Hz	
Accuracy:	≤ ± 0.5 % of U_N	
Power consumption with U_N:	L1 approx. 0.5 mA L2 approx. 0.5 mA L3 approx. 0.8 mA	
Hysteresis:	≤ 5 % x U_A (U_A = response value)	
Asymmetry detection		
Voltage:	U_A ± 8 ... 20 %	
Fault angle:	Approx. 120° ± 15°	
Temperature influence:	≤ 0.08 % / K	

Auxiliary Circuit

Auxiliary voltage U_H

A1 / A2:	AC 110, 230, 400 V AC/DC 24 ... 80 V, AC/DC 80 ... 230 V (other voltages on request)	
Voltage range of U_H:	0.8 ... 1.1 U_H	
Nominal frequency of U_H:	50 / 60 Hz	
Frequency range of U_H:	45 ... 500 Hz	
Nominal consumption:	2.4 VA	

Output Circuit

Contacts:	2 changeover contacts	
Response-/Release time:	Approx. 900 / 150 ms	
Response delay t_v:	0.1 ... 5 s	
Thermal current I_{th}:	6 A (see continuous current limit curve)	
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		
NO contact:	1 A / DC 24 V	IEC/EN 60947-5-1
NC contact:	1 A / DC 24 V	IEC/EN 60947-5-1
Electrical life:		IEC/EN 60947-5-1
To AC 15 at 1 A, AC 230 V:		
NO contact:	2.5 x 10^5 switching cycles	
Permissible switching frequency:	20 switching cycles / s	
Short circuit strength max. fuse rating:	4 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:	- 20 ... + 60 °C	
Storage:	- 20 ... + 60 °C	
Altitude:	≤ 2000 m	
Clearance and creepage distances		
Rated impulse voltage / pollution degree		
auxiliary voltage / measuring input:	6 kV / 2	IEC 60664-1
auxiliary voltage / contacts:	6 kV / 2	IEC 60664-1
measuring input / contacts:	6 kV / 2	IEC 60664-1
Contact / contact:	4 kV / 2	IEC 60664-1
Overvoltage category:	III up to 3AC 600 V II > 3AC 600 V	

Technical Data

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:	2 kV	IEC/EN 61000-4-4
Surge voltages		
Between wires for power supply:	1 kV	IEC/EN 61000-4-5
Between wire and ground:	2 kV	IEC/EN 61000-4-5
HF wire guided:	10 V	IEC/EN 61000-4-6
Interference suppression:	Limit value class B	EN 55011
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:	20 / 060 / 04	IEC/EN 60068-1
Wire connection:		DIN 46228-1/-2/-3/-4
Fixed screw terminals		
Cross section:	0.1 ... 4 mm² (AWG 28 - 12) solid or 0.1 ... 2.5 mm² (AWG 28 - 12) stranded wire with ferrules	
Stripping length:	10 mm	
Fixing torque:	0.8 Nm	
Wire fixing:	Cross-head screw / M3,5 box terminals	
Mounting:	DIN rail	IEC/EN 60715
Weight:	325 g	

Dimensions

Width x height x depth: 45 x 74 x 133 mm

Classification to DIN EN 50155

Vibration and shock resistance:	Category 1, Class B	IEC/EN 61373
Protective coating of the PCB:	No	

UL-Data

Switching capacity: Pilot duty B300

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

CCC-Data

Thermal current I_{th}: 5 A

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

Standard Type

BD 9080.12 3 AC 400 V AC 230 V

Article number:	0045382
• Output:	2 changeover contacts
• Nominal voltage U_N:	3 AC 400 V
• Auxiliary voltage U_H:	AC 230 V
• Closed circuit operation	
• Width:	45 mm

Variants

BD 9080.12/61:	With UL-approval on request
BD 9080:	With CCC-approval on request
BD 9080.12/001:	Open circuit operation
BD 9080.12/020:	Output relay indicates only under- and overvoltage
BD 9080.12/200:	With extended temperature range of - 40 ... + 70 °C

Remark

At an ambient temperature of + 70°C the device has to be mounted with 2 cm space to the neighbour units and the necessary air circulation must be provided.

The contact current must not be more then 2 A.

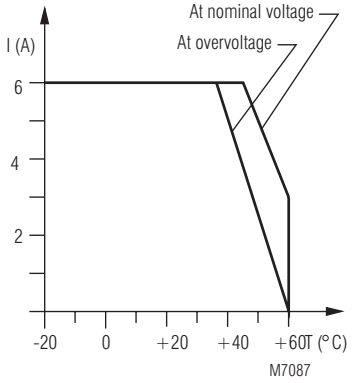
The life of the product may be reduced by the higher ambient temperature!

Ordering example for variant

BD 9080 .12 /_ _ _ 3 AC 400 V 50/60 Hz AC 230 V 50/60 Hz

- Nominal frequency of U_H
- Auxiliary voltage U_H
- Nominal frequency of U_N
- Nominal voltage U_N
- Variant, if required
- Contacts
- Type

Characteristic



Continuous current limit curve

Connection Examples