Monitoring Technique

VARIMETER PRO
Phase Monitor
BD 9080/003, BD 9080/004

Translation of the original instructions

0280060

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 . The measurement is very simple and can be carried out without much wiring effort, as no separate auxiliary voltage is required. 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.

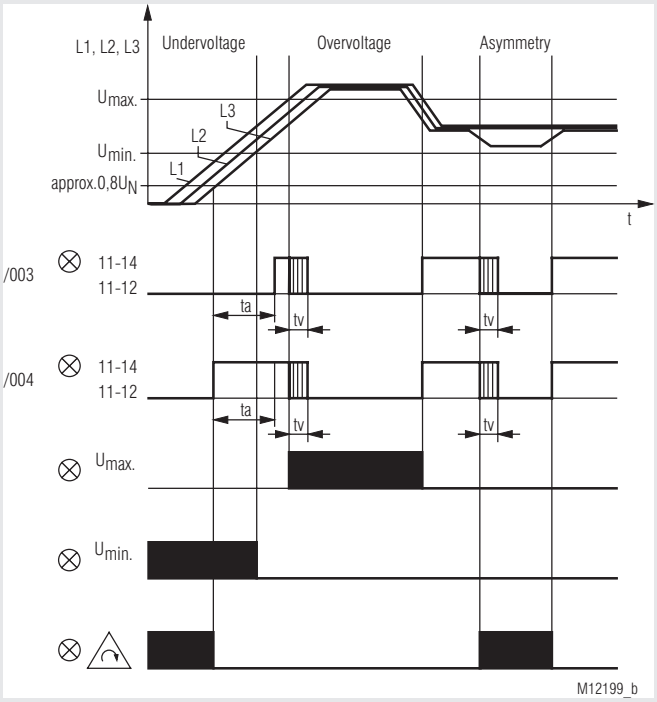
Your Advantages

- Monitoring of
  - Under- and overvoltage up to 3 AC 1000 V max.
  - Asymmetry
  - Phase failure
  - Phase sequence
- Preventive maintenance
- For better productivity
- Quicker fault locating
- Early detection of irregularities
- Precise and reliable

Features

- According to IEC/EN 60255-1
- Adjustable on delay or fixe
- Start up delay t_a fixe or adjustable
- Without separate auxiliary voltage
- One LED in each case for
  - Operating voltage L1/L3
  - Overvoltage $U_{max.}$
  - Undervoltage $U_{min.}$
  - Asymmetry / Phase sequence / Power failure
  - Contact position
- De-energized on trip
- 2 changeover contacts
- As option available with energized on trip
- Width: 45 mm

Function Diagram



Approvals and Markings

CE

Applications

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

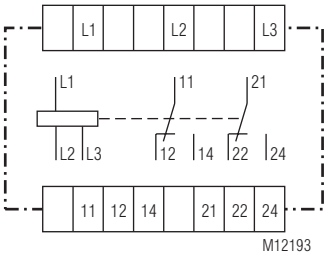
Indication

1. Green LED L1 / L3:	Perm. on	- On, when supply connected
	Flashes	- Start up delay t_a on process
2. Red LED U_{max}:	Perm. on	- On, in event of overvoltage
2. Red LED U_{min}:	Perm. on	- On, in event of undervoltage
2. Red LED Δ:	Perm. on	- On, in event of - Asymmetry - Incorrect phase sequence - Power failure
2. Yellow LED:	Perm. on	- On, when output relay activated
	Flashes	- On delay t_v on process

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 start up delay only acts once after applying the operating voltage to L1 / L3.

Circuit Diagram



Connection Terminals

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

All Technical Data in this list relate to the state at the moment of edition. We reserve the right for technical improvements and changes at any time.

Technical Data

Input Circuit

Nominal voltage U_N

L1 / L2 / L3:	3 AC 400 V Min. voltage: 3 AC 320 V Max. voltage: 3 AC 530 V 3 AC 750 V Min. voltage: 3 AC 600 V Max. voltage: 3 AC 1000 V (other voltages on request)	
Setting range:	0.8 ... 1.33 U_N	
Nominal frequency of U_N:	50 / 60 Hz	
Frequency range of U_N:	45 ... 65 Hz	
Power consumption with U_N:	L1 approx. 4.3 mA L2 approx. 0.3 mA L3 approx. 4.5 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	

Output Circuit

Contacts:	2 changeover contacts	
Response-/Release time:	Approx. 900 / 150 ms	
On delay t_v:	0.1 ... 30 s, fixe	
Start up delay t_a:	30 s fixe, $t_a = t_v$, t_a = 0,1 ... 30 s + (t_v = fixe)	
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:		
At 4 A, AC 230 V cos φ = 1:	5 x 10^5 switch. cycles	
Short circuit strength		
Max. fuse rating:	4 A gG / gL	IEC/EN 60947-5-1
Mechanical life:	10 x 10^6 switching cycles	

General Data

Operating mode:	Continuous operation	
Temperature range		
Operation:	- 25 ... + 60 °C	
Storage:	- 40 ... + 85 °C	
Altitude:	< 2000 m	
Clearance and creepage distances		
Rated impulse voltage / pollution degree		
Measuring input / contact:	8 kV / 2	IEC 60664-1
Contact / contact:	6 kV / 2	IEC 60664-1
Overvoltage category:	III	
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
Langsame gedämpft schwingende Wellen		
Gegentaktspannung:	1 kV	IEC/EN 61000-4-18
Gleichtaktspannung:	2.5 kV	IEC/EN 61000-4-18
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

Technical Data

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	

Standard Type

BD 9080.12/003 3 AC 750 V 0.1 ... 30 s 30 s

Article number:	0068847
• Output:	2 changeover contacts
• Nominal voltage U_N:	3 AC 750 V
• De-energized on trip	
• On delay t_v:	0.1 ... 30 s
• Start up delay t_a:	30 s fixe
• Width:	45 mm

BD 9080.12/003 3 AC 750 V 10 s 0.1 ... 30 s

Article number:	0070495
• Output:	2 changeover contacts
• Nominal voltage U_N:	3 AC 750 V
• De-energized on trip	
• On delay t_v:	10 s fixe
• Start up delay t_a:	0.1 ... 30 s
• Width:	45 mm

BD 9080.12/004 3 AC 400 V 0.1 ... 30 s $t_a = t_v$

Article number:	0068849
• Output:	2 changeover contacts
• Nominal voltage U_N:	3 AC 400 V
• De-energized on trip	
• Response delay t_v:	0.1 ... 30 s
• Start up delay t_a:	$t_a = t_v$
• Width:	45 mm

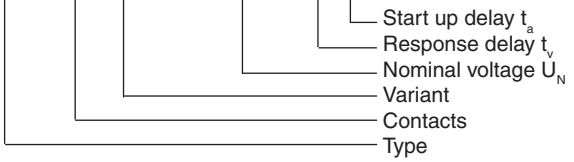
Notes

Risk of electrocution!
Danger to life or risk of serious injuries.

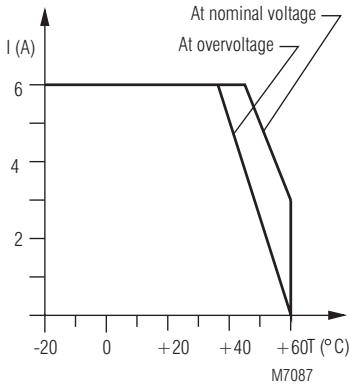
- Disconnect the system and device from the power supply and ensure they remain disconnected during electrical installation.
- The voltage of the monitored voltage system is connected to terminals L1/L2/L3 Please observe sufficient distance to terminals of neighbour devices and to the grounded metal cabinet or box (min 0.5 cm).

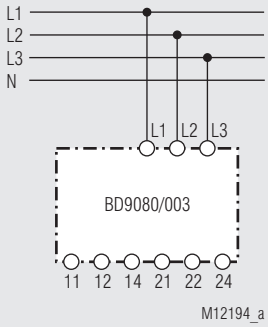
Ordering example

BD 9080 .12 /003 3 AC 750 V 0,1 ... 30 s 30 s



Characteristic



Continuous current limit curve

Connection Examples