EMD-BL-V-230(-PT)

Electronic monitoring relay for undervoltage monitoring of direct and alternating voltages in single-phase networks

Data sheet 105671 en 01

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1 Description

Safety and system availability requirements are constantly on the increase – across all industries. Processes are becoming _ more and more complex, not only in machine building and the chemical industry but also in building technology. The demands placed on energy technology are also constantly on the rise.

It is only by continuously monitoring key network and system parameters that error-free and therefore cost-effective operation can be achieved. Electronic monitoring relays from the EMD series are available for a wide range of monitoring tasks so that the consequences of errors can be avoided or kept within limits.

The operating states are signaled via color LEDs and any errors that occur can be sent to a controller via a floating contact or can shut down a section of the system. All device versions are equipped with response delays so that measured values outside the set monitoring range can be briefly tolerated.

Features

- Undervoltage monitoring
- Adjustable threshold values
- Adjustable hysteresis
- Adjustable response delay
 - Window function
- Supply voltage from the measuring circuit
 - One PDT

\triangle

WARNING: Risk of electric shock

Never carry out work when voltage is present.



Make sure you always use the latest documentation. It can be downloaded from the product at phoenixcontact.net/products.





2 Ordering data

| Description | Туре | Order No. | Pcs./Pkt. |
|---|-----------------|-----------|-----------|
| Electronic monitoring relay for undervoltage monitoring of direct and alternating voltages in single-phase networks | EMD-BL-V-230-PT | 2903524 | 1 |
| Electronic monitoring relay for undervoltage monitoring of direct and alternating voltages in single-phase networks | EMD-BL-V-230 | 2903523 | 1 |
| 3 Technical data | | | |

| Input nameMeasuring inputMeasured valueCA Casine (48 Hz 63 Hz)Measured valueCA Casine (48 Hz 63 Hz)Input voltage rangeCV CC 24 V AC (connection terminal blocks: U2 and GND) OV AC 24 V AC (connection terminal blocks: U2 and GND) OV AC 24 V AC (connection terminal blocks: U2 and GND) OV AC 24 V AC (connection terminal blocks: U2 and GND) OV AC 24 V AC (connection terminal blocks: U2 and GND) OV AC 24 V AC (connection terminal blocks: U2 and GND) OV AC 24 V AC (connection terminal blocks: U2 and GND) OV AC 24 V AC (connection terminal blocks: U2 and GND) OV AC 24 V AC (connection terminal blocks: U2 and GND) OV AC 24 V AC (connection terminal blocks: U2 and GND) OV AC 24 V AC (connection terminal blocks: U2 and GND) OV AC 24 V AC (connection terminal blocks: U2 and GND) OV AC 24 V AC (connection terminal blocks: U2 and GND) OV AC 24 V AC (connection terminal blocks: U2 and GND) OV AC 24 V AC (connection terminal blocks: U2 and GND) OV AC 24 V AC (connection terminal blocks: U2 and GND) OV AC 24 V AC (connection terminal blocks: U2 and GNDSetting grange for response delay01 subrovitage, windowBasia accuracy25 % (of scale end value)Setting grang for response delay25 % of scale end value)Setting grang dovitage25 % (of scale end value)Recovery time250 MSMeasurage25 % (of scale end value)Output tas150 V AC (na acc. with EC 60664-1)Interrupting rating (ohmic load) max.150 V AC (na acc. with EC 60664-1)Output tas55 % (scale end value)Setting rating (ohmic load) max.150 V AC (na acc. with EC 60664-1)N | Input data | |
|--|---------------------------------------|---|
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| VACVVA | Measured value | DC, AC sine (48 Hz 63 Hz) |
| Max: setting range80 % 120 % (From Un)Maximum temperature coefficient<0.05 % | Input voltage range | 0 V AC 24 V AC (connection terminal blocks: U2 and GND) |
| Maximum tamperature coefficient \$ 0.05 % Setting range for response delay 0.1 s 10 s Function Undervoltage, window Basic accuracy \$ 5 % (of scale end value) Setting accuracy \$ 5 % (of scale end value) Recovery time \$ 5 % (of scale end value) Recovery time \$ 5 % (of scale end value) Curpt data \$ 5 % (of scale end value) Contact type \$ 1 floating PDT Maximum switching voltage 260 V AC (in acc. with IEC 60664-1) Interrupting rating (ohmic load) max. 1250 V A (5 A/250 V AC) Output fuse \$ A (tast-blow) Supply voltage \$ 6 (ast-blow) Supply voltage \$ 5 % + 20 % (= measuring voltage) Frequency range 48 Hz 63 Hz Nominal power consumption 10 VA (At 230 V AC (0.6 W)) Ceneral data Service IED Mains type 1-phase Operating voltage display Green LED Satus display Yelow LED Mechanical service If6 1 x 10 ⁶ cycles Service Ife, electrical 1 x 10 ⁶ cycles | Min. setting range | 75 % 115 % (From U _N) |
| Setting range for response delay0.1 s 10 sFunctionUndervoltage, windowBasic accuracy≤ 5 % (of scale end value)Basic accuracy≤ 5 % (of scale end value)Repeat accuracy≤ 2 %Recovery time> 500 msOutput dataContact typeContact type1 floating PDTMaximu switching voltage250 V AC (in acc. with IEC 60664-1)Interrupting rating (ohmic load) max.250 V AC (in acc. with IEC 60664-1)Output data250 V AC (in acc. with IEC 60664-1)Supply250 V AC (in acc. with IEC 60664-1)Output fue50 V AC (in acc. with IEC 60664-1)Output fue50 V AC (in acc. with IEC 60664-1)Interrupting rating (ohmic load) max.250 V AC (in acc. with IEC 60664-1)Output fue50 V AC (in acc. with IEC 60664-1)Interrupting rating (ohmic load) max.25 % +20 % (= measuring voltage)Frequency range48 Hz 63 HzNominal power consumption10 V A (A1230 V AC (0.6 W))Centeral data1 v Io % colsMains type1-phaseOperating voltage displayGreen LEDStaus displayYellow LEDIndicationRed LEDMichatioal service life1 x 10 % cyclesService life, electrical1 x 10 % cyclesOperating mode </td <td>Max. setting range</td> <td>80 % 120 % (From U_N)</td> | Max. setting range | 80 % 120 % (From U _N) |
| FunctionUndervoltage, windowBasic accuracy<5 % (of scale end value) | Maximum temperature coefficient | ≤ 0.05 % |
| Basic accuracy ≤ % (of scale end value) Setting accuracy ± 5% (of scale end value) Repeat accuracy ≤ 2% Recovery time > 50 ms Output data Contact type 1 floating PDT Maximum switching voltage 250 V AC (in acc. with IEC 60664-1) Interrupting rating (ohmic load) max. 1250 VA (5 A/250 V AC) Output fuse 5 Å (fast-blow) Supply 5 Å (fast-blow) Supply voltage -25 % + 20 % (= measuring voltage) Frequency range 48 Hz 63 Hz Nominal power consumption 10 A(230 V AC (0.6 W)) Ceneral data -25 % + 20 % (= measuring voltage) Frequency range 48 Hz 63 Hz Nominal power consumption 10 A(230 V AC (0.6 W)) Concard data -25 % + 20 % (= measuring voltage) Second data -25 % + 20 % (= measuring voltage) Second data -25 % + 20 % (= measuring voltage) Second data -25 % + 20 % (= measuring voltage) Second data -25 % + 20 % (= measuring voltage) Second data -54 Mc - 63 Hz | Setting range for response delay | 0.1 s 10 s |
| Setting accuracy± 5 % (of scale end value)Repeat accuracy≤ 2 %Recovery time> 500 msOutput dataContact type1 floating PDTMaximum switching voltage250 V AC (in acc. with IEC 60664-1)Interrupting rating (ohmic load) max.1250 V AC (in acc. with IEC 60664-1)Output fuse5 A (fast-blow)Supply150 V AC (in acc. with IEC 60664-1)Supply voltage5 A (fast-blow)Supply voltage-25 % +20 % (= measuring voltage)Frequency range48 Hz 63 HzNominal power consumption10 VA (At 230 V AC (0.6 W))Ceneral dataGreen LEDMains type1-phaseOperating voltage displayGreen LEDStatus displayYellow LEDIndicationRed LEDMechanical service life15 x 10 ⁶ cyclesService life, electrical1 x 10 ⁵ cyclesSwitching frequency≤ 6 (per minute at 1250 VA ohmic load)Operating mode100% operating factorDegree of protectionIP40 (housing) / IP20 (connection terminal blocks)Degree of protectionIP40 (housing) / IP30 (connection terminal blocks)Degree of polution2 (DIN EN 60947-5-1)Overvoltage categoryIII, 300 V basic insulation (DIN EN 60947-5-1)Rated insulation voltage3000 V (Supply circuit/measuring circuit (DIN EN 60947-5-1)) | Function | Undervoltage, window |
| Repeat accuracy<2 %Recovery time>500 msOutput dataContact type1 floating PDTMaximum switching voltage250 V AC (in acc. with IEC 60664-1)Interrupting rating (ohmic load) max.1250 V AC (in acc. with IEC 60664-1)Output fuse5 A (fast-blow)SupplySupply voltageFrequency range-25 % +20 % (= measuring voltage)Frequency range48 Hz 63 HzNominal power consumption10 VA (At 230 V AC (0.6 W))Centeral dataMains type1-phaseOperating voltage displayGreen LEDStatus displayYellow LEDIndicationRed LEDMechanical service life15 x 10 ⁶ cyclesSwrice life, electrical1 x 10 ⁵ cyclesSwrice life quency6 (per minute at 1250 VA ohmic load)Operating mode10% operating factorDegree of protectionP400 (housing) / IP20 (connection terminal blocks)Degree of pollution2 (DIN EN 60947-5-1)Overvoltage categoryII, 300 V basic insulation (DIN EN 60947-5-1)Rated insulation voltage300 V (Supply circuit/measuring circuit (DIN EN 60947-5-1) | Basic accuracy | \leq 5 % (of scale end value) |
| Recovery time> 500 msOutput dataContact type1 floating PDTMaximum switching voltage250 V AC (in acc. with IEC 60664-1)Interrupting rating (ohmic load) max.1250 VA (5 A/250 V AC)Output fuse5 A (fast-blow)SupplySupplySupply voltage-25 % +20 % (= measuring voltage)Frequency range48 Hz 63 HzNominal power consumption10 VA (At 230 V AC (0.6 W))General dataMains type1-phaseOperating voltage displayGreen LEDStatus displayYellow LEDIndicationRed LEDMechanical service life15 x 10 ⁶ cyclesService life, electrical1 x 10 ⁵ cyclesSwitching frequency< 6 (per minute at 1250 VA ohmic load) | Setting accuracy | ± 5 % (of scale end value) |
| Output data Contact type 1 floating PDT Maximum switching voltage 250 V AC (in acc. with IEC 60664-1) Interrupting rating (ohmic load) max. 1250 VA (5 A/250 V AC) Output fuse 5 A (fast-blow) Supply 5 A (fast-blow) Supply voltage -25 % +20 % (= measuring voltage) Frequency range 48 Hz 63 Hz Nominal power consumption 10 VA (At 230 V AC (0.6 W)) Ceneral data | Repeat accuracy | ≤ 2 % |
| Contact type1 floating PDTMaximum switching voltage250 V AC (in acc. with IEC 60664-1)Interrupting rating (ohmic load) max.1250 VA (5 A/250 V AC)Output fuse5 A (flast-blow)SupplySupply voltageFrequency range-25 % +20 % (= measuring voltage)Prequency range48 Hz 63 HzNominal power consumption10 VA (At 230 V AC (0.6 W))Ceneral dataMains type1-phaseOperating voltage displayGreen LEDStatus displayYellow LEDIndicationRed LEDMechanical service life1 x 10 ⁵ cyclesSwitching frequency< 6 (per minute at 1250 V A dminc load) | Recovery time | > 500 ms |
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| Operating voltage displayGreen LEDStatus displayYellow LEDIndicationRed LEDMechanical service life15 x 10 ⁶ cyclesService life, electrical1 x 10 ⁵ cyclesSwitching frequency< 6 (per minute at 1250 VA ohmic load) | General data | |
| Status displayYellow LEDIndicationRed LEDMechanical service life15 x 10 ⁶ cyclesService life, electrical1 x 10 ⁵ cyclesSwitching frequency< 6 (per minute at 1250 VA ohmic load) | Mains type | 1-phase |
| IndicationRed LEDMechanical service life15 x 10 ⁶ cyclesService life, electrical1 x 10 ⁵ cyclesSwitching frequency≤ 6 (per minute at 1250 VA ohmic load)Operating mode100% operating factorDegree of protectionIP40 (housing) / IP20 (connection terminal blocks)Degree of pollution2 (DIN EN 60947-5-1)Overvoltage categoryIII, 300 V basic insulation (DIN EN 60947-5-1)Rated insulation voltage300 V (Supply circuit/measuring circuit (DIN EN 60947-5-1)) | Operating voltage display | Green LED |
| Mechanical service life 15×10^6 cyclesService life, electrical 1×10^5 cyclesSwitching frequency ≤ 6 (per minute at 1250 VA ohmic load)Operating mode100% operating factorDegree of protectionIP40 (housing) / IP20 (connection terminal blocks)Degree of pollution2 (DIN EN 60947-5-1)Overvoltage categoryIII, 300 V basic insulation (DIN EN 60947-5-1)Rated insulation voltage300 V (Supply circuit/measuring circuit (DIN EN 60947-5-1)) | Status display | Yellow LED |
| Service life, electrical1 x 105 cyclesSwitching frequency< 6 (per minute at 1250 VA ohmic load) | Indication | Red LED |
| Switching frequency< 6 (per minute at 1250 VA ohmic load)Operating mode100% operating factorDegree of protectionIP40 (housing) / IP20 (connection terminal blocks)Degree of pollution2 (DIN EN 60947-5-1)Overvoltage categoryIII, 300 V basic insulation (DIN EN 60947-5-1)Rated insulation voltage300 V (Supply circuit/measuring circuit (DIN EN 60947-5-1)) | Mechanical service life | 15 x 10 ⁶ cycles |
| Operating mode100% operating factorDegree of protectionIP40 (housing) / IP20 (connection terminal blocks)Degree of pollution2 (DIN EN 60947-5-1)Overvoltage categoryIII, 300 V basic insulation (DIN EN 60947-5-1)Rated insulation voltage300 V (Supply circuit/measuring circuit (DIN EN 60947-5-1)) | Service life, electrical | 1 x 10 ⁵ cycles |
| Degree of protectionIP40 (housing) / IP20 (connection terminal blocks)Degree of pollution2 (DIN EN 60947-5-1)Overvoltage categoryIII, 300 V basic insulation (DIN EN 60947-5-1)Rated insulation voltage300 V (Supply circuit/measuring circuit (DIN EN 60947-5-1)) | Switching frequency | ≤ 6 (per minute at 1250 VA ohmic load) |
| Degree of pollution2 (DIN EN 60947-5-1)Overvoltage categoryIII, 300 V basic insulation (DIN EN 60947-5-1)Rated insulation voltage300 V (Supply circuit/measuring circuit (DIN EN 60947-5-1)) | Operating mode | 100% operating factor |
| Overvoltage category III, 300 V basic insulation (DIN EN 60947-5-1) Rated insulation voltage 300 V (Supply circuit/measuring circuit (DIN EN 60947-5-1)) | Degree of protection | IP40 (housing) / IP20 (connection terminal blocks) |
| Rated insulation voltage 300 V (Supply circuit/measuring circuit (DIN EN 60947-5-1)) | Degree of pollution | 2 (DIN EN 60947-5-1) |
| | Overvoltage category | III, 300 V basic insulation (DIN EN 60947-5-1) |
| Mounting on standard DIN rail NS 35 in accordance with EN 60715 | Rated insulation voltage | 300 V (Supply circuit/measuring circuit (DIN EN 60947-5-1)) |
| | Mounting | on standard DIN rail NS 35 in accordance with EN 60715 |

| Mounting position | any | | | |
|---|--|---|--|--|
| Width | 17.5 mm | | | |
| Height | 88 mm | | | |
| Depth | 65.5 mm | | | |
| Type of housing | Polyamide PA66, self-extinguish | Polyamide PA66, self-extinguishing | | |
| Color | gray | gray | | |
| Connection data | Push-in connection | Screw connection | | |
| Conductor cross section, solid | 0.14 mm ² 2.5 mm ² | 0.5 mm ² 2.5 mm ² | | |
| Conductor cross section, flexible | $0.14 \text{ mm}^2 \dots 2.5 \text{ mm}^2$ | $0.5 \text{ mm}^2 \dots 2.5 \text{ mm}^2$ | | |
| AWG | 26 14 | 20 14 | | |
| Stripping length | 8 mm | 8 mm | | |
| Tightening torque | | 1 Nm | | |
| Ambient conditions | | | | |
| Ambient temperature (operation) | -25 °C 55 °C | | | |
| Ambient temperature (storage/transport) | -25 °C 70 °C | -25 °C 70 °C | | |
| Permissible humidity (operation) | 15 % 85 % | | | |
| Climatic class | 3K3 (in acc. with EN 60721) | | | |
| Conformance / approvals | | | | |
| Conformance | CE-compliant | | | |
| UL, USA / Canada | -@sm [H] | | | |
| UL, USA / Canada | UL/C-UL listed UL 508 | | | |
| Conformance with EMC Directive 2004/10 | 8/EC | | | |
| Noise immunity according to | EN 61000-6-2 | | | |
| | | | | |

EN 61000-6-3

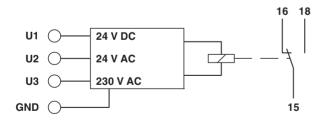
EN 60947-5-1

Noise emission according to

| Conformance with LV directive 2006/95/EC | |
|--|--|

Low voltage switchgear according to

4 Block diagram

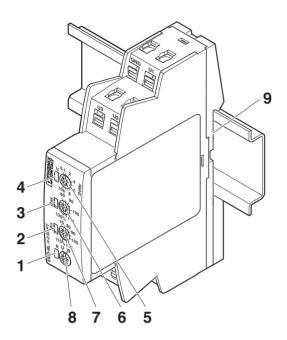


5 Safety notes

WARNING: Risk of electric shock

Never carry out work when voltage is present.

6 Structure



- 1 LED: output relay R
- 2 LED: minimum threshold value (Min)
- 3 LED: maximum threshold value (Max)
- 4 LED: supply U
- 5 "DELAY" potentiometer: Response delay
- 6 "MAX" potentiometer: Upper threshold value
- 7 "MIN" potentiometer: Lower threshold value
- 8 Rotary switch for function selection
- 9 Snap-on foot for DIN rail mounting

7 Installation



WARNING: Risk of electric shock

Never carry out work when voltage is present.

The module can be snapped onto all 35 mm DIN rails according to EN 60715.

8 Diagnostics

The LEDs indicate the following error states:

"U" LED (Green)

- LED ON: Supply voltage present

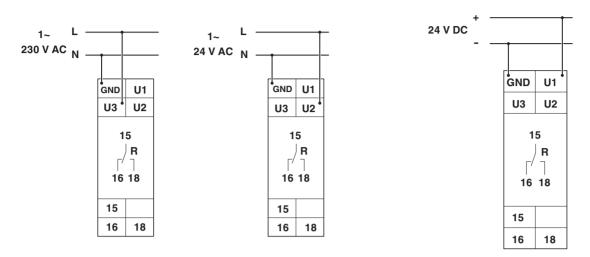
"MIN" and "MAX" LEDs (Red)

- LED flashing: indicates response delay for the corresponding threshold
- LED ON: indicates error for the corresponding threshold

"R" LED (yellow)

- LED ON: Output relay has picked up
- LED OFF: Output relay has dropped out

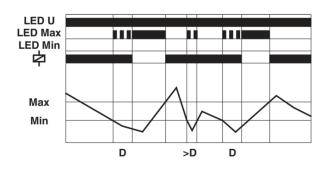
9 Connection examples



10 Function

The "FUNCTION" rotary switch is used to set the desired function:

- U = Undercurrent monitoring (UNDER)
- W = Monitoring of the area between thresholds MIN and MAX (window function) (WIN)

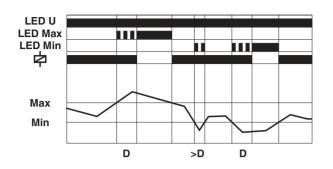


Undervoltage Monitoring (UNDER)

When supply voltage U is applied, output relay "R" picks up (yellow "R" LED is ON).

If the measured voltage falls below the value set at the "MIN" controller, the set response delay (D = DELAY) starts (red "MIN" LED flashes). After the delay time has elapsed (red "MIN" LED is ON), output relay "R" drops out (yellow "R" LED is OFF). If the measured voltage exceeds the value set at the "MAX" controller, output relay "R" picks up again (yellow "R" LED is ON).

The "MIN" and "MAX" LEDs flash alternately if the minimum value selected for the measured voltage is greater than the maximum value.



Window Function (WIN)

Output relay "R" picks up (yellow "R" LED is ON) if the measured voltage exceeds the value set at the "MIN" controller. If the measured voltage exceeds the value set at the "MAX" controller, the set response delay (D = DELAY) starts (red "MAX" LED flashes). After the delay time has elapsed (red "MAX" LED is ON), output relay "R" drops out (yellow "R" LED is OFF).

Output relay "R" picks up again (yellow "R" LED is ON) if the measured voltage falls below the maximum value again (red "MAX" LED is OFF). If the measured voltage falls below the value set at the "MIN" controller, the set response delay (D = DELAY) starts (red "MIN" LED flashes). After the delay time has elapsed (red "MIN" LED is ON), output relay "R" drops out (yellow "R" LED is OFF).