

# EMD-BL-3V-400(-PT)

## Electronic monitoring relay for voltage monitoring in three-phase networks

Data sheet  
105672\_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

- Window function
- Phase sequence monitoring, can be enabled
- Adjustable threshold values
- Adjustable response delay
- Supply voltage from the measuring circuit
- One PDT



#### **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](http://phoenixcontact.net/products).

## 2 Ordering data

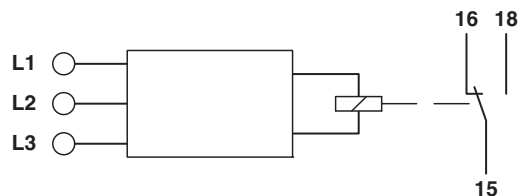
| Description                                                                | Type             | Order No. | Pcs./Pkt. |
|----------------------------------------------------------------------------|------------------|-----------|-----------|
| Electronic monitoring relay for voltage monitoring in three-phase networks | EMD-BL-3V-400-PT | 2903526   | 1         |
| Electronic monitoring relay for voltage monitoring in three-phase networks | EMD-BL-3V-400    | 2903525   | 1         |

## 3 Technical data

| Input data                                        |                                     |
|---------------------------------------------------|-------------------------------------|
| Input name                                        | Measuring input                     |
| Measured value                                    | AC sine (48 Hz ... 63 Hz)           |
| Nominal input voltage $U_N$                       | $\pm 30\%$ (3~ 400/230 V)           |
| Min. setting range                                | 70 % ... 120 % (From $U_N$ )        |
| Max. setting range                                | 80 % ... 130 % (From $U_N$ )        |
| Maximum temperature coefficient                   | $\leq 0.05\%$                       |
| Setting range for response delay                  | 0.1 s ... 10 s                      |
| Min setting range of the voltage threshold value  | 280 V AC ... 480 V AC               |
| Max. setting range of the voltage threshold value | 320 V AC ... 519 V AC               |
| Function                                          | Window, phase sequence              |
| Basic accuracy                                    | $\leq 5\%$ (of the nominal value)   |
| Setting accuracy                                  | $\pm 5\%$ (of scale end value)      |
| Repeat accuracy                                   | $\leq 2\%$                          |
| Recovery time                                     | > 500 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 A (fast-blow)                     |
| Supply                                            |                                     |
| Supply voltage                                    | $\pm 30\%$ (= measuring voltage)    |
| Frequency range                                   | 48 Hz ... 63 Hz                     |
| Nominal power consumption                         | 10 VA (1 W)                         |

| General data                                                                                                            |                                                                                          |                     |
|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|---------------------|
| Mains type                                                                                                              | 3-phase                                                                                  |                     |
| Status display                                                                                                          | Yellow LED                                                                               |                     |
| Indication                                                                                                              | Red LED                                                                                  |                     |
| Mechanical service life                                                                                                 | 15 x 10 <sup>6</sup> cycles                                                              |                     |
| Service life, electrical                                                                                                | 1 x 10 <sup>5</sup> cycles                                                               |                     |
| Switching frequency                                                                                                     | ≤ 6 (per minute at 1250 VA ohmic load)                                                   |                     |
| Operating mode                                                                                                          | 100% operating factor                                                                    |                     |
| Degree of protection                                                                                                    | IP40 (housing) / IP20 (connection terminal blocks)                                       |                     |
| Degree of pollution                                                                                                     | 2 (DIN EN 60947-5-1)                                                                     |                     |
| Overvoltage category                                                                                                    | III, 300 V basic insulation (DIN EN 60947-5-1)                                           |                     |
| Rated insulation voltage                                                                                                | 519 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-extinguishing                                                       |                     |
| Color                                                                                                                   | gray                                                                                     |                     |
| Connection data                                                                                                         | Push-in connection                                                                       | Screw connection    |
| Conductor cross section, solid                                                                                          | 0.14 mm² ... 2.5 mm²                                                                     | 0.5 mm² ... 2.5 mm² |
| Conductor cross section, flexible                                                                                       | 0.14 mm² ... 2.5 mm²                                                                     | 0.5 mm² ... 2.5 mm² |
| 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                                                                         |                     |
| Permissible humidity (operation)                                                                                        | 15 % ... 85 %                                                                            |                     |
| Climatic class                                                                                                          | 3K3 (in acc. with EN 60721)                                                              |                     |
| Conformance / approvals                                                                                                 |                                                                                          |                     |
| Conformance                                                                                                             | CE-compliant                                                                             |                     |
| UL, USA / Canada                                                                                                        |  ENEC |                     |
| UL, USA / Canada                                                                                                        | UL/C-UL listed UL 508                                                                    |                     |
| Conformance with EMC Directive 2004/108/EC (valid until April 19, 2016) / 2014/30/EU (valid from April 20, 2016)        |                                                                                          |                     |
| Noise immunity according to                                                                                             | EN 61000-6-2                                                                             |                     |
| Noise emission according to                                                                                             | EN 61000-6-3                                                                             |                     |
| Conformance with Low Voltage Directive 2006/95/EC (valid until April 19, 2016) / 2014/35/EU (valid from April 20, 2016) |                                                                                          |                     |
| Low voltage switchgear according to                                                                                     | EN 60947-5-1                                                                             |                     |

## 4 Block diagram



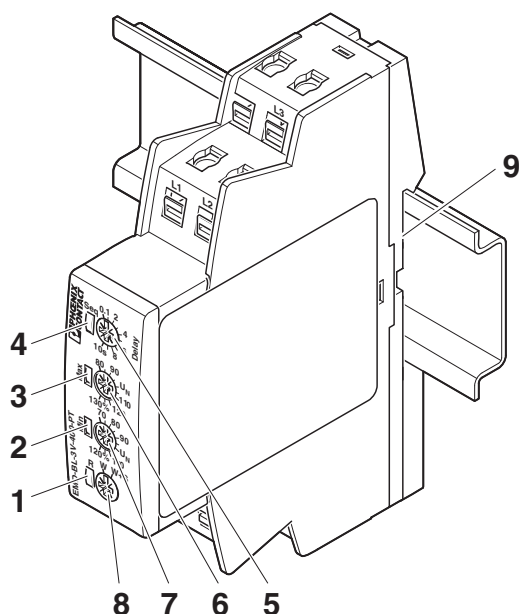
## 5 Safety notes



### **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: phase sequence (Seq)
- 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



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

An integrated wide-range power supply unit enables the connection of a supply voltage in the range from 24 V AC/DC to 240 V AC/DC.

## 8 Diagnostics

The LEDs indicate the following error states:

### "MIN" and "MAX" LEDs (Red)

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

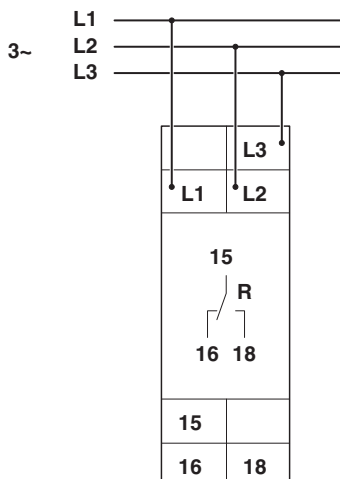
### "SEQ" LED (Red)

- LED ON: Phases connected incorrectly. LED lights up immediately, relay drops out without delay.

### "R" LED (yellow)

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

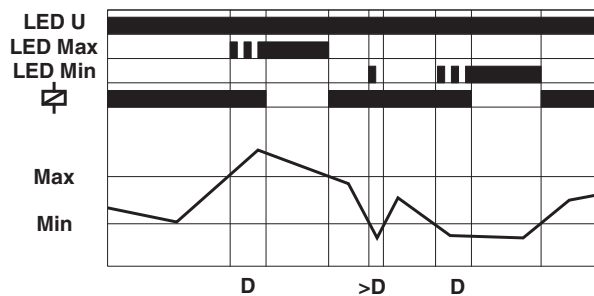
## 9 Connection examples



## 10 Function

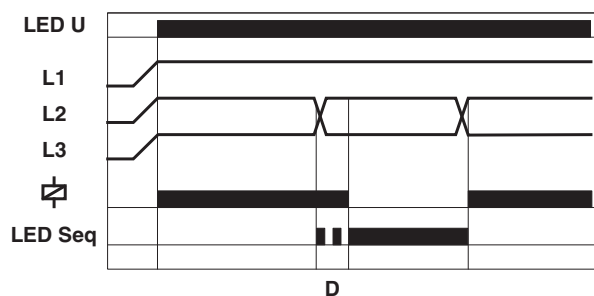
The "FUNCTION" rotary switch is used to set the desired function:

- W = Monitoring of the area between thresholds MIN and MAX (window function) (WIN)
- WIN+SEQ: monitoring the range between the minimum and maximum thresholds and monitoring of the phase sequence



### Window Function (WIN and WIN + SEQ)

Output relay "R" picks up (yellow "R" LED is ON) if the measured voltage (mean value of the linked voltages) exceeds the value set at the "MIN" controller. If the measured voltage exceeds the value set at the "MAX" controller, the set response delay ( $D = \text{DELAY}$ ) 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 ( $D = \text{DELAY}$ ) 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).



### Phase Sequence Monitoring (SEQ)

Phase sequence monitoring can be enabled for all functions. If the phase direction changes (red "SEQ" LED is ON), output relay "R" drops out without delay (yellow "R" LED is OFF).



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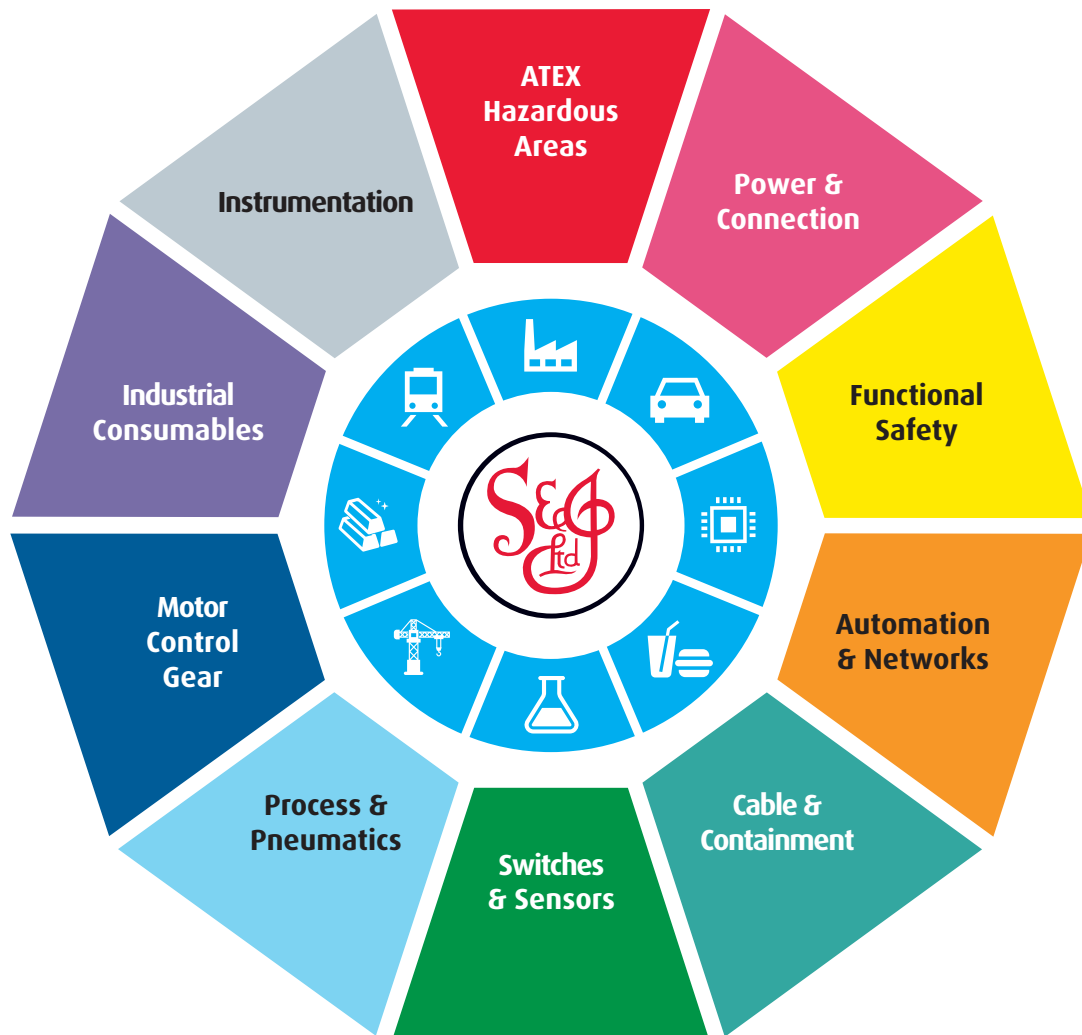
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