

# EMD-SL-3V-400-N

## Electronic monitoring relay for voltage monitoring in three-phase networks with neutral conductor

### INTERFACE

Data sheet  
103232\_en\_01

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#### 1 Description

Increasingly higher demands are being placed on safety and system availability – across all sectors. Processes are becoming more and more complex, not only in mechanical engineering and the chemical industry, but also in plant and automation technology. Demands on power engineering are also increasing constantly.

Error-free and therefore cost-effective operation can only be achieved through continuous monitoring of important network and system parameters. Electronic monitoring relays in the EMD series are available for a wide range of monitoring tasks to avoid the consequences of errors or to keep them within limits.

The operating states are indicated using colored LEDs, errors that may occur can be sent to a control system via a floating contact or can shut down a part of the system. Some device versions are equipped with startup and response delays in order to briefly tolerate measured values outside the set monitoring range.

#### Features

- Window function
- Adjustable threshold values
- Adjustable response delay
- Power supply via power module can be selected



#### **WARNING: Risk of electric shock**

Never carry out work when voltage is present.



Make sure you always use the the latest documentation.  
It can be downloaded at [www.phoenixcontact.net/download](http://www.phoenixcontact.net/download).

## 2 Ordering data

| Description                                                                                       | Type            | Order No. | Pcs. / Pkt. |
|---------------------------------------------------------------------------------------------------|-----------------|-----------|-------------|
| Electronic monitoring relay for voltage monitoring in three-phase networks with neutral conductor | EMD-SL-3V-400-N | 2885278   | 1           |

| Accessories                                                                     | Type            | Order No. | Pcs. / Pkt. |
|---------------------------------------------------------------------------------|-----------------|-----------|-------------|
| Power modules, pluggable, for EMD-SL-..., supply voltage: 20 V DC ... 30 V DC   | EMD-SL-PS- 24DC | 2885359   | 1           |
| Power modules, pluggable, for EMD-SL-..., supply voltage: 20.2...26.4 V AC      | EMD-SL-PS- 24AC | 2866103   | 1           |
| Power modules, pluggable, for EMD-SL-..., supply voltage: 88...121 V AC         | EMD-SL-PS-110AC | 2866116   | 1           |
| Power modules, pluggable, for EMD-SL-..., supply voltage: 108 V AC ... 132 V AC | EMD-SL-PS-120AC | 2885731   | 1           |
| Power modules, pluggable, for EMD-SL-..., supply voltage: 195...264 V AC        | EMD-SL-PS-230AC | 2866129   | 1           |

## 3 Technical data

| Input data                                        |                                 |
|---------------------------------------------------|---------------------------------|
| Input name                                        | Measuring input                 |
| Measured value                                    | AC sine (48 Hz ... 63 Hz)       |
| Nominal input voltage $U_N$                       | (3 N ~ 400/230 V)               |
| Maximum input voltage                             | (3 N ~ 600/346 V)               |
| Input resistance of voltage input                 | 1 M $\Omega$                    |
| Maximum temperature coefficient                   | < 0.1 %/K                       |
| Setting range for response delay                  | 0.2 s ... 10 s                  |
| Min. setting range                                | -30 % ... 20 % (From $U_N$ )    |
| Max. setting range                                | -20 % ... 30 % (From $U_N$ )    |
| 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 ... 520 V AC           |
| Function                                          | Window                          |
| Basic accuracy                                    | $\pm 5$ % (of scale end value)  |
| Setting accuracy                                  | $\leq 5$ % (of scale end value) |
| Repeat accuracy                                   | $\leq 2$ %                      |
| Voltage influence                                 | $\leq 0.5$ %                    |
| Recovery time                                     | 500 ms                          |

| Output data                           |                                                                                                                               |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Contact type                          | 1 floating PDT                                                                                                                |
| Nominal insulation voltage            | 250 V AC (in acc. with IEC 60664-1)                                                                                           |
| Interrupting rating (ohmic load) max. | 750 VA (3 A/250 V AC, module aligned, $\leq 5$ mm spacing)<br>1250 VA (5 A/250 V AC, module not aligned, $\geq 5$ mm spacing) |
| Output fuse                           | 5 A (fast-blow)                                                                                                               |

| Supply                    |                                                                         |
|---------------------------|-------------------------------------------------------------------------|
| Range of supply voltages  | 24 V AC ... 230 V AC (see Power modules)<br>24 V DC (see Power modules) |
| Frequency range           | 50 Hz ... 60 Hz                                                         |
| Nominal power consumption | 2 VA (1.5 W)                                                            |

**General data**

|                          |                                                                                        |
|--------------------------|----------------------------------------------------------------------------------------|
| Mains type               | 3-phase                                                                                |
| Service life mechanical  | Approx. $2 \times 10^7$ cycles                                                         |
| Service life, electrical | $2 \times 10^5$ cycles at ohmic load, 1000 VA                                          |
| Switching frequency      | max. 60 (per minute at 100 VA ohmic load)<br>max. 6 (per minute at 1000 VA ohmic load) |
| Voltage drop             | > 30 % (Relative to the supply voltage)                                                |
| Operating mode           | 100% operating factor                                                                  |
| Degree of protection     | IP40 (housing) / IP20 (connection terminal blocks)                                     |
| Pollution degree         | 2 (according to EN 50178)                                                              |
| Surge voltage category   | III, basic insulation (as per EN 50178)                                                |
| Rated insulation voltage | 300 V (According to EN 50178)                                                          |
| Assembly                 | on TS 35 profile rail acc. to EN 60715                                                 |
| Mounting position        | Any                                                                                    |
| Width                    | 22.5 mm                                                                                |
| Height                   | 113 mm                                                                                 |
| Length                   | 90 mm                                                                                  |
| Type of housing          | Polyamide PA, self-extinguishing                                                       |
| Color                    | green                                                                                  |
| Weight                   | 160 g                                                                                  |

**Connection data**

|                                   |                                              |
|-----------------------------------|----------------------------------------------|
| Conductor cross section, solid    | 0.5 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>  |
| Conductor cross section, stranded | 0.25 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> |
| Stripping length                  | 8 mm                                         |
| Type of connection                | Screw connection                             |
| Tightening torque                 | 1 Nm                                         |

**Ambient conditions**

|                                         |                                                              |
|-----------------------------------------|--------------------------------------------------------------|
| Ambient temperature (operation)         | -25 °C ... 55 °C<br>-25 °C ... 40 °C (corresponds to UL 508) |
| Ambient temperature (storage/transport) | -25 °C ... 70 °C                                             |
| Permissible humidity (operation)        | 15 % ... 85 %                                                |
| Climatic class                          | 3K3 (in acc. with EN 60721)                                  |

**Conformance / approvals**

|                  |                       |
|------------------|-----------------------|
| Conformity       | CE compliant          |
| UL, USA / Canada | UL/C-UL listed UL 508 |

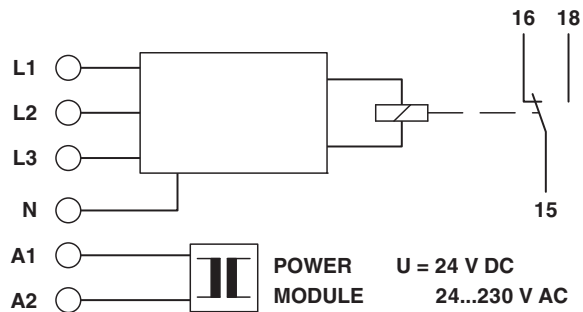
**Conformance with EMC directive 2004/108/EC**

|                                       |              |
|---------------------------------------|--------------|
| Immunity to interference according to | EN 61000-6-2 |
| Emitted interference according to     | EN 61000-6-3 |

**Conformance with LV directive 2006/95/EC**

|                                                                    |          |
|--------------------------------------------------------------------|----------|
| Electronic equipm. for electrical power installations according to | EN 50178 |
|--------------------------------------------------------------------|----------|

## 4 Block diagram



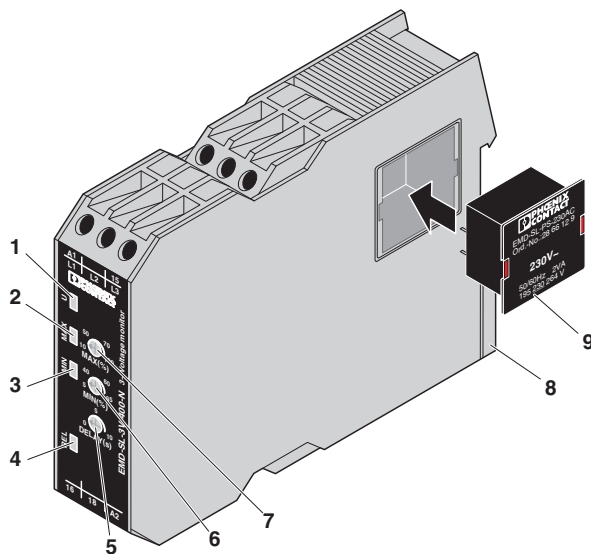
## 5 Safety notes



### WARNING: Risk of electric shock

Never carry out work when voltage is present.

## 6 Structure



- 1 "U" LED: Supply voltage
- 2 "MAX" LED: Upper threshold value
- 3 "MIN" LED: Lower threshold value
- 4 "REL" LED: Output relay
- 5 "DELAY" potentiometer: Response delay
- 6 "MIN" potentiometer: Lower threshold value
- 7 "MAX" potentiometer: Upper threshold value
- 8 Universal snap-on foot for EN DIN rails
- 9 Power module

## 7 Power supply

The power module for power supply is supplied in a transport casing to prevent the connection legs from being bent.

To install the power module in the relay housing, remove the transport casing and position the power module in the recess in the side of the housing (ensure that it is the right way round). The red locking latches snap in with an audible click when the power module is securely positioned.

To remove the power module, press the two red locking latches together and pull out the power module.

## 8 Installation

**WARNING: Risk of electric shock**

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

## 9 Diagnostics

The LEDs indicate the following error states:

**"U" LED (Green)**

- LED ON: Supply voltage present

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

- LED flashes: Value outside the window area, set delay time is running
- LED ON: Value outside the window area, delay time has elapsed
- Both LEDs flash alternately: Lower set threshold value is greater than upper threshold value

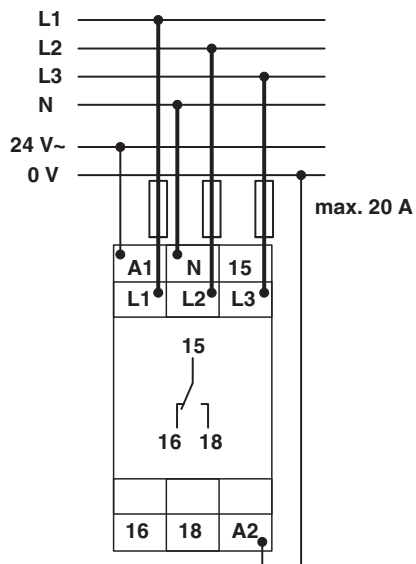
**"REL" LED (Yellow)**

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

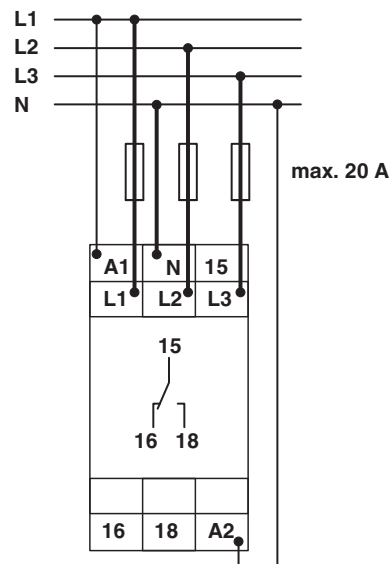
## 10 Connection examples



If a mains fault is present when the module is activated, the output relay remains dropped out and the LED for the corresponding threshold value lights up.

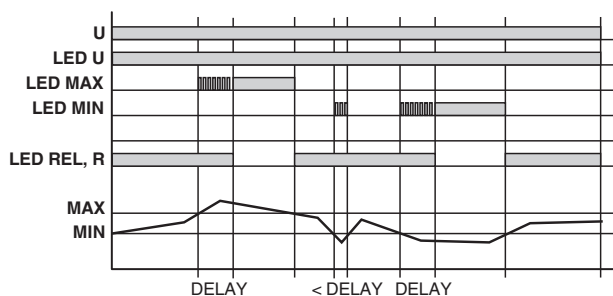


3(N) ~ 400 V/230 V measuring range with 24 V AC power module



3(N) ~ 400 V/230 V measuring range with 230 V AC power module

## 11 Function



### Window Function (WIN)

Output relay "R" picks up (yellow "REL" 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 ("DELAY") starts (red "MAX" LED flashes). After the delay time has elapsed (red "MAX" LED is ON), output relay "R" drops out (yellow "REL" LED is OFF).

Output relay "R" picks up again (yellow "REL" 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 ("DELAY") starts (red "MIN" LED flashes). After the delay time has elapsed (red "MIN" LED is ON), output relay "R" drops out (yellow "REL" LED is OFF).

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