

# Ac Power Relays

## EVR Series

40 A • 277 V ac



## Description

The EVR Series printed circuit board (PCB) two-pole (2P) ac power relay is designed to switch EV charging applications on and off. Its extended contact gap of greater than 3 mm provides better isolation and allows for usage in higher elevation environments. The very compact form factor has a low temperature rise and heavy-duty power switching current up to 40 A/277 V ac. This relay family enables compliance with all EV charging infrastructure standards such as IEC 62955, IEC 62752 and UL 2231.

## Features & Benefits

| FEATURES                                                                                                                     | BENEFITS                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Low contact resistance</b>                                                                                                | Low temperature rise at rated current                                                                                                               |
| <b>Contact rating up to 40 A</b>                                                                                             | Suitable for Mode 2 and Mode 3 EV charging defined by IEC 61851-1 and Ac Level 2 EV charging defined by SAE J1772                                   |
| <b>Meets requirements in IEC 62752, IEC 62955, and UL 2231*</b>                                                              | Single form factor supports global standards and simplifies inventory                                                                               |
| <b>Certified to IEC 61810-1:<br/>Contact load category CC 2<br/>50,000 cycles @ 85 °C (185 °F) for 35 A load</b>             | Enables compliance to IEC 61851-1 for switching of main current path                                                                                |
| <b>Mirror contact mechanism according to IEC 60947-4-1</b>                                                                   | Enables detection of power contacts welding                                                                                                         |
| <b>Contact gap &gt; 3 mm</b>                                                                                                 | Meets overvoltage category III requirement and provides enhanced protection against shock and vibration for added safety and longevity              |
| <b>Load switching endurance:<br/>40 A load: 10,000 cycles @ 85 °C (185 °F)<br/>35 A load: 50,000 cycles @ 85 °C (185 °F)</b> | Provides longer lifetime expectancy                                                                                                                 |
| <b>PCB terminals</b>                                                                                                         | Offers easy installation onto PCBs, enabling high-speed assembly and replacement of DIN rail-mounted ac contactors and associated wiring & assembly |
| <b>Compact size</b>                                                                                                          | Smaller footprint than two single-pole relays for similar current rating adding design flexibility                                                  |

\*Can be easily paired with residual current monitoring (RCM) solutions from Western Automation, now part of Littelfuse

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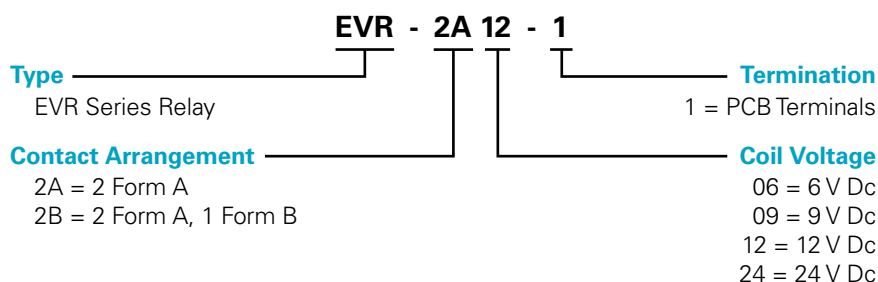
### Applications

- EV charging station (charging pile)
- Ac wallbox
- In-Cable Control Box (ICCB)

### Certification & Compliance

|                |                                |
|----------------|--------------------------------|
| <b>TUV</b>     | File No. R 50621288            |
| <b>CQC</b>     | Certificate No. CQC24002424257 |
| <b>cURus</b>   | File No. E536699               |
| <b>RoHS</b>    | Directive 2011/65/EU           |
| <b>REACH</b>   | Regulation (EC) 1907/2006      |
| <b>Pb free</b> | Yes                            |

### Part Numbering System



### Contact Specifications

| PARAMETER           |                    | SPECIFICATION                                                |
|---------------------|--------------------|--------------------------------------------------------------|
| Contact Arrangement |                    | 2 Form A (2A) or 2 Form A, 1 Form B (2A1B)                   |
| Form A              | Contact Material   | AgSnO <sub>2</sub>                                           |
|                     | Contact Resistance | 10 mΩ max @ 6 V dc, 1 A<br>2 mΩ initial typical @ 6 V dc, 1A |
|                     | Contact Rating     | 40 A @ 277 V ac resistive                                    |
| Form B              | Contact Material   | AgNi                                                         |
|                     | Contact Resistance | 100 mΩ max @ 6 V dc, 1 A                                     |
|                     | Contact Rating     | 1 A @ 277 V ac or 30 V dc                                    |

### Coil Specifications @ 23 °C (73 °F)

| RATED COIL VOLTAGE | MAXIMUM OPERATE VOLTAGE | MINIMUM RELEASE VOLTAGE | COIL RESISTANCE (± 10%) | NOMINAL OPERATING POWER | HOLDING POWER |
|--------------------|-------------------------|-------------------------|-------------------------|-------------------------|---------------|
| 6 V dc             | 4.5 V dc                | 0.30 V dc               | 19.1 Ω                  | 1.88 W                  | 0.17 W        |
| 9 V dc             | 6.75 V dc               | 0.45 V dc               | 43.1 Ω                  |                         |               |
| 12 V dc            | 9 V dc                  | 0.60 V dc               | 76.6 Ω                  |                         |               |
| 24 V dc            | 18 V dc                 | 1.2 V dc                | 306.4 Ω                 |                         |               |

Insulation System

Class F, 155 °C (311 °F) maximum temperature

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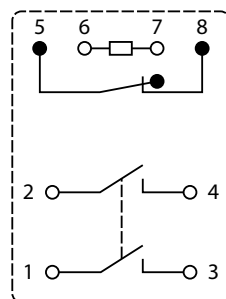
### General Specifications

| PARAMETER                             |                                    | SPECIFICATION                                                                                                                                                                    |
|---------------------------------------|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electrical Life                       |                                    | 10 x 10 <sup>3</sup> cycles – 40 A, 277 V ac resistive @ 85 °C (185 °F), 1s on, 9s off<br>50 x 10 <sup>3</sup> cycles – 35 A, 277 V ac resistive @ 85 °C (185 °F), 1s on, 9s off |
| Mechanical Life                       |                                    | 1 million cycles minimum                                                                                                                                                         |
| Insulation Resistance                 |                                    | 1000 mΩ min. (@ 500 V dc)                                                                                                                                                        |
| Short Circuit Capability <sup>1</sup> | Based on IEC 62752                 | Test condition: ≥ 1.50 kA; ≥ 6.0 kA <sup>2</sup> s; I <sub>nc</sub> = 1.5 kA                                                                                                     |
|                                       | Based on IEC 62955                 | Test condition: ≥ 2.05 kA; ≥ 5.0 kA <sup>2</sup> s; I <sub>nc</sub> = 4.5 kA                                                                                                     |
|                                       | Based on UL 2231                   | Test condition: ≥ 2.05 kA; ≥ 5.0 kA <sup>2</sup> s; I <sub>nc</sub> = 4.5 kA                                                                                                     |
| Dielectric Strength                   | Between Form A Contacts            | 2,000 V ac for 1 min (10 mA)                                                                                                                                                     |
|                                       | Between Form A Contacts & Coil     | 5,000 V ac for 1 min (10 mA)                                                                                                                                                     |
|                                       | Between Form A Contact Sets        | 5,000 V ac for 1 min (10 mA)                                                                                                                                                     |
|                                       | Between Open Form B Contacts       | 1,000 V ac for 1 min (10 mA)                                                                                                                                                     |
|                                       | Between Form B Contacts & Coil     | 2,000 V ac for 1 min (10 mA)                                                                                                                                                     |
|                                       | Between Form A and Form B Contacts | 5,000 V ac for 1 min (10 mA)                                                                                                                                                     |
| Surge Voltage                         | Between Form A Contact & Coil      | 10,000 V (1.2 x 50 μs)                                                                                                                                                           |
|                                       | Between Form B Contact & Coil      | 2,500 V (1.2 x 50 μs)                                                                                                                                                            |
| Shock Resistance                      | Functional                         | 98 m/s <sup>2</sup> (half-sine shock pulse: 11 ms, detection time: 10 μs)                                                                                                        |
|                                       | Destructive                        | 980 m/s <sup>2</sup> (half-sine shock pulse: 6 ms)                                                                                                                               |
| Vibration Resistance                  | Functional                         | 10 to 55 Hz (@ double amplitude of 1 mm, detection time: 10 μs)                                                                                                                  |
|                                       | Destructive                        | 10 to 55 Hz (@ double amplitude of 1.5 mm)                                                                                                                                       |
| Weight                                |                                    | 65 grams (2.29 ounces)                                                                                                                                                           |
| Country of Origin                     |                                    | China                                                                                                                                                                            |

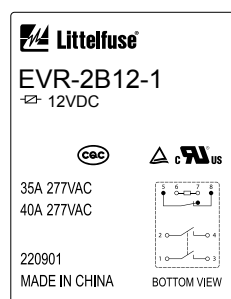
<sup>1</sup>Short circuit withstand compliance with IEC 62752, IEC 62955, and UL 2231 is a function of both relay design and PCB layout. Please contact your local Littelfuse support for important application notes and suggestions.

### Wiring Schematics

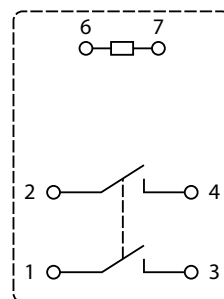
#### 2 Form A, 1 Form B



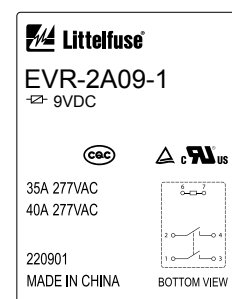
#### Product Markings



#### 2 Form A



#### Product Markings

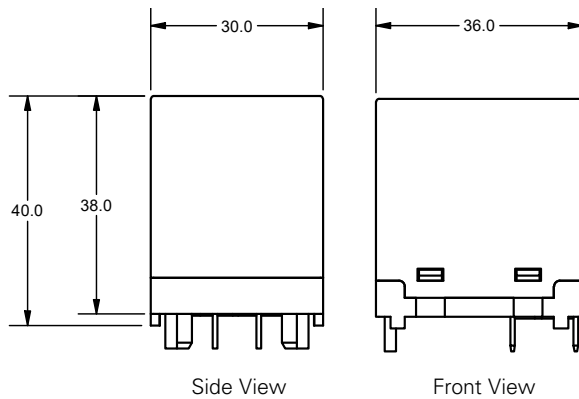


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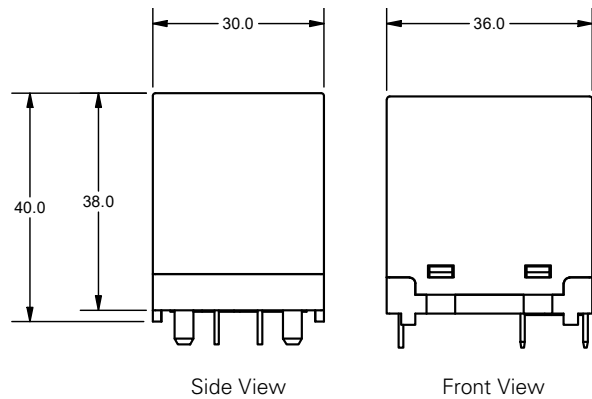
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### Dimensions in Millimeters

2 Form A, 1 Form B

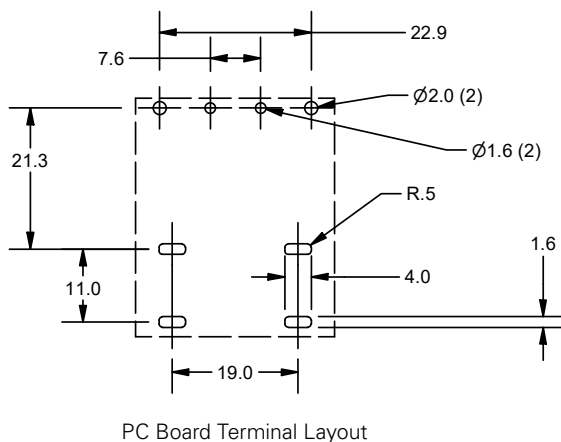


2 Form A

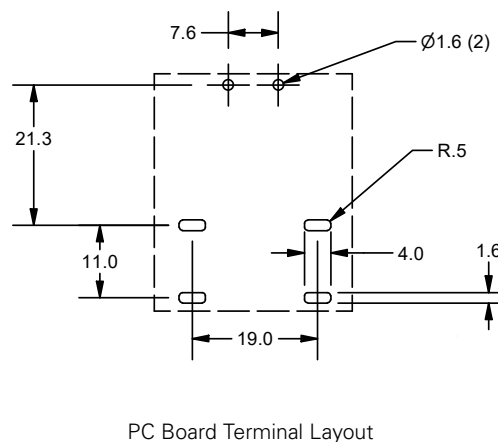


### PCB Recommended Footprint

2 Form A, 1 Form B



2 Form A



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