

# VAL-MS-T1/T2 1000DC-PV/2+V-FM - Lightning/surge arrester type 1/2



2801161

<https://www.phoenixcontact.com/us/products/2801161>

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Lightning current arrester / surge protective device for 2-pos. isolated and grounded 1,000 V DC PV voltage systems, for DIN rail mounting, 3-pos. base element with remote indication contact, three pluggable temperature-monitored protective elements, status message at each plug.

## Your advantages

- Quality proven millions of times over in the widest range of applications
- Rapid installation with bridges, thanks to industry-standard overall width of 1 HP
- Easy testing and insulation measurement, thanks to pluggable protection modules

## Commercial data

|                                      |               |
|--------------------------------------|---------------|
| Item number                          | 2801161       |
| Packing unit                         | 1 pc          |
| Minimum order quantity               | 1 pc          |
| Sales key                            | CL01          |
| Product key                          | CL1152        |
| GTIN                                 | 4046356714327 |
| Weight per piece (including packing) | 408.5 g       |
| Weight per piece (excluding packing) | 384.96 g      |
| Customs tariff number                | 85363030      |
| Country of origin                    | TR            |

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## Technical data

### Notes

#### General

|      |   |
|------|---|
| Note | The device is intended for touch proof installation in a housing. Ensure that there is a gap of at least 8 mm between the active and grounded parts in the connection area. |
|------|---|

### Product properties

|  |   |
|--|---|
| Product type                                   | PV arrester                             |
| Product family                                 | VALVETRAB MS                            |
| IEC test classification                        | PV I / II<br>PV T1 / T2                 |
| EN type  | T1 / T2                                 |
| IEC power supply system                        | DC                                      |
| Type   | DIN rail module, two-section, divisible |
| Distance between live and grounded parts       | 8 mm                                    |
| Installation location                          | Indoor                                  |
| Installation location of the disconnect device | Internal                                |
| Accessibility                                  | Accessible                              |
| Connection configuration                       | Y configuration                         |
| End-of-life mode                               | OCFM (Open-Circuit Failure Mode)        |
| Surge protection fault message                 | Optical, remote indicator contact       |

#### Insulation characteristics

|                      |     |
|----------------------|-----|
| Overvoltage category | III |
| Pollution degree     | 2   |

### Electrical properties

#### Indicator/remote signaling

|                    |                                |
|--------------------|--------------------------------|
| Connection name    | Remote fault indicator contact |
| Switching function | Changeover contact             |
| Operating voltage  | 5 V AC ... 250 V AC<br>30 V DC |
| Operating current  | 5 mA AC ... 1.5 A AC<br>1 A DC |

### Connection data

|                   |   |
|-------------------|---|
| Connection method | Screw connection  |
| Screw thread      | M5  |
| Tightening torque | 3 Nm (1.5 mm <sup>2</sup> ... 16 mm <sup>2</sup> )<br>4.5 Nm (25 mm <sup>2</sup> ... 35 mm <sup>2</sup> ) |

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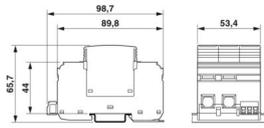
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|                                  |  |
|----------------------------------|--|
| Stripping length                 | 16 mm                                      |
| Conductor cross section flexible | 1.5 mm <sup>2</sup> ... 25 mm <sup>2</sup> |
| Conductor cross section rigid    | 1.5 mm <sup>2</sup> ... 35 mm <sup>2</sup> |
| Conductor cross section AWG      | 15 ... 2                                   |
| Connection method                | Fork-type cable lug                        |
| Conductor cross section flexible | 1.5 mm <sup>2</sup> ... 16 mm <sup>2</sup> |

## Remote fault indicator contact

|                                  |  |
|----------------------------------|--|
| Connection method                | Plug-in/screw connection via COMBICON        |
| Screw thread                     | M2   |
| Tightening torque                | 0.25 Nm                                      |
| Stripping length                 | 7 mm   |
| Conductor cross section flexible | 0.14 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> |
| Conductor cross section rigid    | 0.14 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> |
| Conductor cross section AWG      | 28 ... 16                                    |

## Dimensions

|                     |  |
|---------------------|--|
| Dimensional drawing |  |
| Width               | 53.4 mm  |
| Height              | 98.7 mm  |
| Depth               | 65.7 mm (incl. DIN rail 7.5 mm)  |
| Horizontal pitch    | 3 Div.   |

## Material specifications

|  |                     |
|--|---------------------|
| Color                                  | black (RAL 9005)    |
| Flammability rating according to UL 94 | V-0                 |
| CTI value of material                  | 600                 |
| Insulating material                    | PA 6.6-FR<br>PBT-FR |
| Material group                         | I                   |
| Housing material                       | PA 6.6-FR<br>PBT-FR |

## Mechanical properties

### Mechanical data

|                 |    |
|-----------------|----|
| Open side panel | No |
|-----------------|----|

## Protective circuit

|                    |               |
|--------------------|---------------|
| Mode of protection | (DC+) - (DC-) |
|--------------------|---------------|

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|   |                                   |
|---|-----------------------------------|
|   | (DC+/DC-) - PE                    |
| Direction of action   | (L+)-PE & (L-)-PE & (L+)-(L-)     |
| Rated load current $I_L$  | 80 A                              |
| Protective conductor current $I_{PE}$                                   | $\leq 20 \mu\text{A DC}$          |
|   | $\leq 350 \mu\text{A AC}$         |
| Standby power consumption $P_C$   | $\leq 25 \text{ mVA}$             |
| Nominal discharge current $I_n$ (8/20) $\mu\text{s}$                    | 15 kA                             |
| Maximum discharge current $I_{max}$ (8/20) $\mu\text{s}$                | 40 kA                             |
| Impulse discharge current (10/350) $\mu\text{s}$ , charge               | 2.5 As                            |
| Impulse discharge current (10/350) $\mu\text{s}$ , specific energy      | 6.25 kJ/ $\Omega$                 |
| Impulse discharge current (10/350) $\mu\text{s}$ , peak value $I_{imp}$ | 5 kA                              |
| Total discharge current $I_{Total}$ (8/20) $\mu\text{s}$                | 40 kA                             |
| Total discharge current $I_{Total}$ (10/350) $\mu\text{s}$              | 5 kA                              |
| Voltage protection level $U_p$  | $\leq 3.5 \text{ kV}$             |
| Residual voltage $U_{res}$  | $\leq 3.5 \text{ kV}$ (at $I_n$ ) |
|   | $\leq 2.9 \text{ kV}$ (at 5 kA)   |
|   | $\leq 3.2 \text{ kV}$ (at 10 kA)  |
|   | $\leq 3.7 \text{ kV}$ (at 20 kA)  |
|   | $\leq 4.1 \text{ kV}$ (at 30 kA)  |
|   | $\leq 4.6 \text{ kV}$ (at 40 kA)  |
| Response time $t_A$   | $\leq 25 \text{ ns}$              |

## PV protective circuit

|                          |                                  |
|--------------------------|----------------------------------|
| Connection configuration | Y configuration                  |
| End-of-life mode         | OCFM (Open-Circuit Failure Mode) |

## Protective circuit DC voltage side (DC)

|   |                                     |
|---|-------------------------------------|
| Open circuit voltage $U_{OCSTC}$  | $\leq 975 \text{ V DC}$             |
| Maximum discharge current $I_{max}$ (8/20) $\mu\text{s}$                | 40 kA                               |
| Response time $t_A$   | $\leq 25 \text{ ns}$                |
| Impulse discharge current (10/350) $\mu\text{s}$ , charge               | 2.5 As                              |
| Impulse discharge current (10/350) $\mu\text{s}$ , specific energy      | 6.25 kJ/ $\Omega$                   |
| Impulse discharge current (10/350) $\mu\text{s}$ , peak value $I_{imp}$ | 5 kA                                |
| Total discharge current $I_{Total}$ (8/20) $\mu\text{s}$                | 40 kA                               |
| Total discharge current $I_{Total}$ (10/350) $\mu\text{s}$              | 5 kA                                |
| Insulation resistance $R_{iso}$   | $> 5 \text{ G}\Omega$ (at 500 V DC) |
| Nominal discharge current $I_n$ (8/20) $\mu\text{s}$                    | 15 kA                               |
| Rated load current $I_L$  | 80 A                                |
| Continuous operating current $I_{CPV}$                                  | $< 20 \mu\text{A}$                  |
| Maximum continuous operating voltage $U_{CPV}$                          | 1170 V DC                           |
| Short-circuit current rating $I_{SCPV}$                                 | 2000 A                              |
| Residual voltage $U_{res}$  | $\leq 3.5 \text{ kV}$ (at $I_n$ )   |
|   | $\leq 2.9 \text{ kV}$ (at 5 kA)     |

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|                                       |                     |
|---------------------------------------|---------------------|
|                                       | ≤ 3.2 kV (at 10 kA) |
|                                       | ≤ 3.7 kV (at 20 kA) |
|                                       | ≤ 4.1 kV (at 30 kA) |
|                                       | ≤ 4.6 kV (at 40 kA) |
| Protective conductor current $I_{PE}$ | ≤ 20 $\mu$ A DC     |
|                                       | ≤ 350 $\mu$ A AC    |
| Voltage protection level $U_p$        | ≤ 3.5 kV            |
| Standby power consumption $P_C$       | ≤ 25 mVA            |

## Environmental and real-life conditions

### Ambient conditions

|   |  |
|---|--|
| Degree of protection                    | IP20 (only when all terminal points are used)          |
| Ambient temperature (operation)         | -40 °C ... 80 °C                                       |
| Ambient temperature (storage/transport) | -40 °C ... 80 °C                                       |
| Altitude                                | ≤ 2000 m (amsl)  |
| Permissible humidity (operation)        | 5 % ... 95 %   |
| Shock (operation)                       | 60g (Half-sine / 11 ms / 3x $\pm$ X, $\pm$ Y, $\pm$ Z) |
| Vibration (operation)                   | 7.5g (5-500 Hz/2.5 h/XYZ)                              |

## Approvals

### UL specifications

|   |                                     |
|---|-------------------------------------|
| Maximum continuous operating voltage MCOV | 1170 V DC                           |
| Short-circuit current rating (SCCR)       | 50 kA                               |
| Voltage protection rating VPR             | 3 kV                                |
| Nominal discharge current $I_n$           | 10 kA                               |
| Mode of protection                        | (L+) - (L-)<br>(L+) - G<br>(L-) - G |
| Nominal voltage                           | 1170 V DC                           |
| Power distribution system                 | DC PV                               |
| SPD Type                                  | 1CA                                 |

### UL indicator/remote signaling

|                      |          |
|----------------------|----------|
| Operating voltage    | 125 V AC |
| AC operating current | 1 A AC   |

### UL connection data

|                             |                         |
|-----------------------------|-------------------------|
| Tightening torque           | 30 lb <sub>f</sub> -in. |
| Conductor cross section AWG | 14 ... 2                |

## Standards and regulations

|                          |             |
|--------------------------|-------------|
| Standards/specifications | EN 61643-31 |
| Note                     | 2019        |

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|                          |              |
|--------------------------|--------------|
| Standards/specifications | IEC 61643-31 |
| Note                     | 2018         |

## Mounting

|               |                 |
|---------------|-----------------|
| Mounting type | DIN rail: 35 mm |
|---------------|-----------------|

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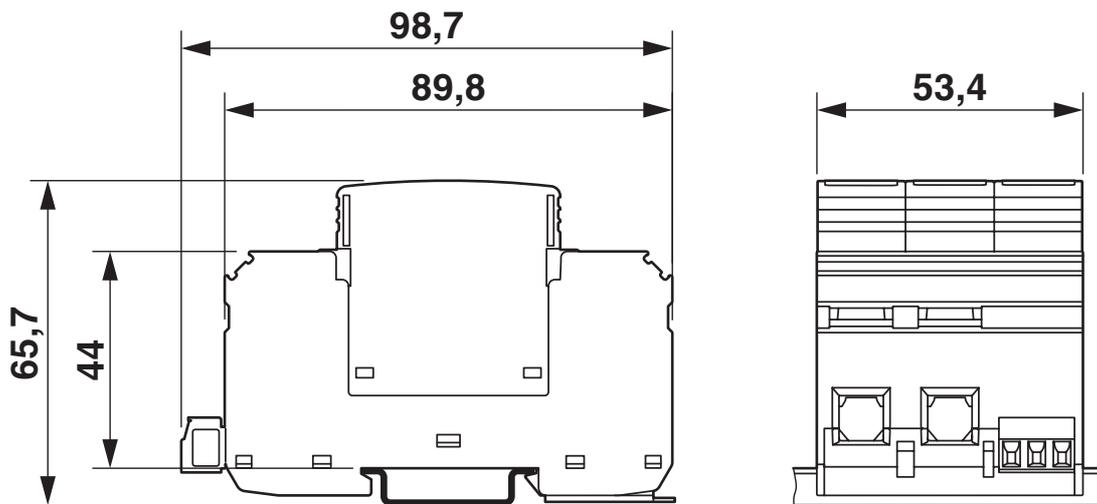


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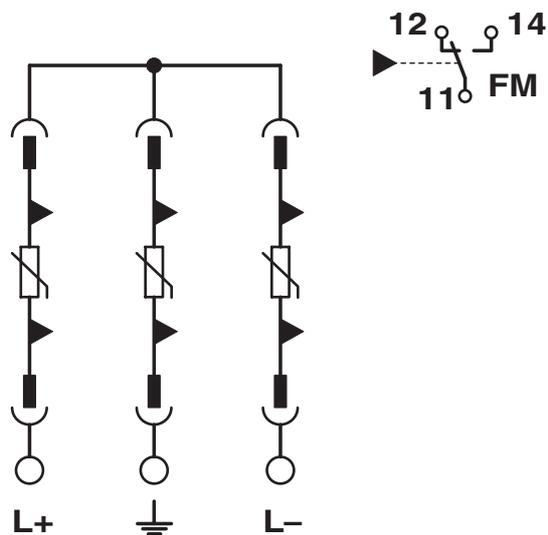
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## Drawings

Dimensional drawing



Circuit diagram



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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2801161>



**cUL Recognized**  
Approval ID: FILE E 330181



**UL Recognized**  
Approval ID: FILE E 330181



**KEMA-KEUR**  
Approval ID: 71-123544 REV.3



**IECEE CB Scheme**  
Approval ID: NL-81006/A1

**CCA**

Approval ID: NTR-NL 7937

**UAE-RoHS**

Approval ID: 23-10-88705

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## Classifications

### ECLASS

|             |          |
|-------------|----------|
| ECLASS-13.0 | 27171401 |
| ECLASS-15.0 | 27171401 |

### ETIM

|          |          |
|----------|----------|
| ETIM 9.0 | EC000381 |
|----------|----------|

### UNSPSC

|             |          |
|-------------|----------|
| UNSPSC 21.0 | 39121620 |
|-------------|----------|

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## Environmental product compliance

### EU RoHS

|   |                    |
|---|--------------------|
| Fulfills EU RoHS substance requirements | Yes, No exemptions |
|---|--------------------|

### China RoHS

|  |  |
|--|--|
| Environment friendly use period (EFUP) | EFUP-E                                   |
|  | No hazardous substances above the limits |

### EU REACH SVHC

|                                     |                            |
|-------------------------------------|----------------------------|
| REACH candidate substance (CAS No.) | No substance above 0.1 wt% |
|-------------------------------------|----------------------------|

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