CN232 and CN233 arresters (surge protective devices) for low voltage circuit

■ Description

Arresters (surge protective devices) protect devices connected to power supplies from lightning damage by absorbing inductive lightning surges from power supply.

■ Features

• Normal-mode surges and common-mode surges can be absorbed using only one arrester.
• Coordinated operation of 2 types of varistor enables extremely fast response to surges and a high level of surge absorption.
• Built-in thermal fuses prevent problems such as short-circuit due to deterioration of elements.
• Indicators for easy confirmation of device status (i.e., normal or malfunction)
• Integrated terminal construction reduces space and wiring requirements for easier handling of the arrester.
• Mount to rails, using screws, or to brackets for standardized distribution boards.
• Standard-feature terminal cover to protect against electrical shock

■ Specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>CN232211</th>
<th>CN232212</th>
<th>CN232232</th>
<th>CN23224E</th>
<th>CN23224L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable circuit and rated voltage</td>
<td>Single-phase, 2-wire, 120V</td>
<td>Single-phase, 2-wire, 240V</td>
<td>Single-phase, 3-wire, 100/200V</td>
<td>3-phase, 3-wire, 240V</td>
<td>3-phase, 3-wire, 440V (voltage to ground)</td>
</tr>
<tr>
<td>(max. continuous operating voltage)</td>
<td>Uc (50/60Hz)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Test class (JIS C 5381-1)</td>
<td>Class II</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. discharge current Ima x (8/20µs)</td>
<td>Voltage to ground</td>
<td>10kA</td>
<td>10kA</td>
<td>10kA</td>
<td>10kA</td>
</tr>
<tr>
<td>Between wires</td>
<td>5kA</td>
<td>5kA</td>
<td>5kA</td>
<td>–</td>
<td>5kA</td>
</tr>
<tr>
<td>Nominal discharge current In (8/20µs)</td>
<td>Voltage to ground</td>
<td>5kA</td>
<td>5kA</td>
<td>5kA</td>
<td>5kA</td>
</tr>
<tr>
<td>Between wires</td>
<td>1.5kA</td>
<td>1.5kA</td>
<td>1.5kA</td>
<td>–</td>
<td>1.5kA</td>
</tr>
<tr>
<td>Discharge start voltage (V 1mA)</td>
<td>Voltage to ground</td>
<td>420 to 520V</td>
<td>610 to 750V</td>
<td>610 to 750V</td>
<td>990 to 1,210V</td>
</tr>
<tr>
<td>Between wires</td>
<td>240 to 310V</td>
<td>420 to 520V</td>
<td>420 to 520V</td>
<td>–</td>
<td>800 to 1,100V</td>
</tr>
<tr>
<td>Voltage protection level (Up)</td>
<td>Voltage to ground</td>
<td>1,100V max.</td>
<td>1,500V max.</td>
<td>1,500V max.</td>
<td>2,500V max.</td>
</tr>
<tr>
<td>Between wires</td>
<td>700V max.</td>
<td>1,100V max.</td>
<td>1,100V max.</td>
<td>–</td>
<td>2,000V max.</td>
</tr>
<tr>
<td>Operating environment</td>
<td>Temperature: –20 to 60°C, Humidity: 95% max. RH (no icing or condensation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection terminals/connection wires</td>
<td>Screw terminal connection: M5 (with protective cover for charged parts)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applicable connection wire: 2 to 14mm, Max. round crimp terminal width: 12.4mm (nominal size: JIS C 2805 R14-S), Tightening torque: 2.0 to 2.5 N·m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (L x W x H)</td>
<td>95 x 50 x 60 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

■ Applications

• Electronic devices, such as computers, measurement devices, and communications devices
• Inverters
• Electronic devices inside distribution boards (e.g., power distribution boards and lighting distribution boards)
### Specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>CN23311</th>
<th>CN23312</th>
<th>CN23332</th>
<th>CN2334E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable circuit and rated voltage (max. continuous operating voltage) Uc (50/60Hz)</td>
<td>Single-phase, 2-wire, 120V</td>
<td>Single-phase, 2-wire, 240V</td>
<td>Single-phase, 3-wire, 100/200V</td>
<td>3-phase, 3-wire, 240V</td>
</tr>
<tr>
<td>Test class (JIS C 5381-1)</td>
<td>Class II</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. discharge current Ima x (8/20μs)</td>
<td>20kA</td>
<td>20kA</td>
<td>20kA</td>
<td>20kA</td>
</tr>
<tr>
<td>Between wires</td>
<td>5kA</td>
<td>5kA</td>
<td>5kA</td>
<td>–</td>
</tr>
<tr>
<td>Nominal discharge current In (80μs)</td>
<td>5kA</td>
<td>5kA</td>
<td>5kA</td>
<td>5kA</td>
</tr>
<tr>
<td>Between wires</td>
<td>1.5kA</td>
<td>1.5kA</td>
<td>1.5kA</td>
<td>–</td>
</tr>
<tr>
<td>Discharge start voltage (V 1mA)</td>
<td>420 to 520V</td>
<td>610 to 750V</td>
<td>850 to 1,100V</td>
<td>–</td>
</tr>
<tr>
<td>Between wires</td>
<td>240 to 310V</td>
<td>420 to 520V</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Voltage protection level (Up)</td>
<td>1,100V max.</td>
<td>1,500V max.</td>
<td>2,500V max.</td>
<td>–</td>
</tr>
<tr>
<td>Between wires</td>
<td>700V max.</td>
<td>1,100V max.</td>
<td>1,100V max.</td>
<td>–</td>
</tr>
<tr>
<td>Operating environment</td>
<td>Temperature: –20 to 60°C, Humidity: 95% max. RH (no icing or condensation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection terminals/connection wires</td>
<td>Screw terminal connection: M5 (with protective cover for charged parts)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applicable connection wire: 2 to 14mm, Max. round crimp terminal width: 12.4mm (nominal size: JIS C 2805 R14-5), Tightening torque: 2.0 to 2.5 N·m</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (L x W x H)</td>
<td>95 x 50 x 83 mm</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

### Selection table for power supply arresters and arrester shunts

<table>
<thead>
<tr>
<th>Arrester shunt</th>
<th>Plug fuse</th>
<th>Circuit breaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. discharge current</td>
<td>10kA</td>
<td>20kA</td>
</tr>
<tr>
<td>Type</td>
<td>AFaC-30X x 3 (rail mounting)*</td>
<td>AFaC-60 x 3</td>
</tr>
<tr>
<td>Interrupting capacity</td>
<td>600V AC 100kA</td>
<td>220V AC 2.5kA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>440V AC 1.5kA</td>
</tr>
<tr>
<td>Arrester shunt</td>
<td>Circuit breaker</td>
<td></td>
</tr>
<tr>
<td>Max. discharge current</td>
<td>20kA</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>EA53AC/50</td>
<td>EA53C/50</td>
</tr>
<tr>
<td>Interrupting capacity</td>
<td>220V AC 2.5kA</td>
<td>220V AC 5kA</td>
</tr>
<tr>
<td></td>
<td>440V AC 1.5kA</td>
<td>440V AC 7.5kA</td>
</tr>
</tbody>
</table>

* If required, separately order a protective cover for charged parts (30A). (Type number: CG-30)

### Type number nomenclature

<table>
<thead>
<tr>
<th>CN23</th>
<th>12</th>
<th>4L</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>32: 3-phase 3-wire, 240V</td>
<td>Single-phase 3-wire, 100/200V</td>
</tr>
<tr>
<td></td>
<td>4E: 3-phase 3-wire, 440V (for common-mode surges)</td>
<td>4L: 3-phase 3-wire, 440V (for normal-mode surges)</td>
</tr>
<tr>
<td>Discharge current (ground)</td>
<td>2: 10kA</td>
<td>3: 20kA</td>
</tr>
</tbody>
</table>

### Ambient conditions

- Ambient operating temperature: –20 to 50°C (No condensation)
- Relative operating humidity: 45 to 85% (No condensation)
- For indoor use

### Ordering information

Specify the following:
1. Type number or ordering code

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**Fuji Electric FA Components & Systems Co., Ltd./D & C Catalog**

*Information subject to change without notice*
Internal circuit diagrams

**CN23211, CN23212**
**CN23311, CN23312**

**CN23232**
**CN23332**

**CN2324E**
**CN2334E**

**CN2324L**

<table>
<thead>
<tr>
<th>F:</th>
<th>Thermal fuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>L:</td>
<td>Indicator</td>
</tr>
<tr>
<td>Z₁, Z₂: Components for surge protective devices</td>
<td></td>
</tr>
</tbody>
</table>

**Application examples**

**Single-phase 2-wire, 120V, 240V AC**

**Single-phase 3-wire, 100/200V AC**

**3-phase 3-wire, 240V AC**

**3-phase 3-wire, 440V AC**

**Dimensions, mm**

**CN232**

**CN233**

**Panel drilling**
CN226 series arresters (surge protective devices) for signal line and control circuit

- Highly effective surge suppression using protection method combining gas discharge tube, varistor, and avalanche diode.
- Large surge discharge current
- Fast response to surges reduces influence on device.
- A comprehensive lineup to suit all kinds of signal line applications (e.g., transducers, remote terminals, and sensors).
- Simple mounting to IEC rail.
- The arrester mounts to the terminal block using a plug-in connection for simple inspection and replacement. Signal lines are not opened even if the arrester is removed.

**Specifications**

- **For signal line circuit**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>4-20mA</td>
<td>10-50mA</td>
<td>Thermocouple</td>
<td>Resistance thermometer</td>
<td>Potentiometer</td>
<td>Slow pulse</td>
<td>24V DC</td>
<td>48V DC</td>
<td>100V DC</td>
</tr>
<tr>
<td>Rated voltage</td>
<td>24V DC</td>
<td>48V DC</td>
<td>5V DC</td>
<td>8V DC</td>
<td>5V DC</td>
<td>12V DC</td>
<td>24V DC</td>
<td>48V DC</td>
<td>100V DC</td>
</tr>
<tr>
<td>Rated current</td>
<td>100mA</td>
<td>200mA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leakage current</td>
<td>5µA max.</td>
<td>10µA max.</td>
<td>2µA max.</td>
<td>10µA max.</td>
<td>5µA max.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation start voltage (V1mA)</td>
<td>30V min.</td>
<td>61V min.</td>
<td>6.7V min.</td>
<td>11V min.</td>
<td>6.7V min.</td>
<td>14V min.</td>
<td>30V min.</td>
<td>60V min.</td>
<td>150V min.</td>
</tr>
<tr>
<td>Clamping voltage (Vp)</td>
<td>Between wires</td>
<td>40V max.</td>
<td>100V max.</td>
<td>14V max.</td>
<td>22V max.</td>
<td>14V max.</td>
<td>25V max.</td>
<td>55 max.</td>
<td>130 max.</td>
</tr>
<tr>
<td>Voltage to ground</td>
<td>150V min.</td>
<td>180V min.</td>
<td>300V max.</td>
<td>800V max.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal resistance</td>
<td>10Ω 10% (Single)</td>
<td>2Ω 10% (Single)</td>
<td>1Ω 10% (Single)</td>
<td>1Ω 10% (Single)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of ports</td>
<td>2-port, combination type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response time</td>
<td>0.1µs max.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. discharge current (8/20µs)</td>
<td>Between wires</td>
<td>5,000A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage to ground</td>
<td>10,000A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **For control power supply circuit**

<table>
<thead>
<tr>
<th>Type</th>
<th>CN226-24A</th>
<th>CN226-48A</th>
<th>CN226-100B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>24V AC/DC</td>
<td>48V AC/DC</td>
<td>100V AC/DC</td>
</tr>
<tr>
<td>Rated voltage</td>
<td>24V AC/DC</td>
<td>48V AC/DC</td>
<td>100V AC/DC</td>
</tr>
<tr>
<td>Rated current</td>
<td>2A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leakage current</td>
<td>10A max.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation start voltage (V1mA)</td>
<td>Between wires</td>
<td>40V min.</td>
<td>84V min.</td>
</tr>
<tr>
<td>Voltage to ground</td>
<td>300V min.</td>
<td>400V min.</td>
<td></td>
</tr>
<tr>
<td>Clamping voltage (Vp)</td>
<td>Between wires</td>
<td>250V max.</td>
<td>400V max.</td>
</tr>
<tr>
<td>Voltage to ground</td>
<td>400V max.</td>
<td>1,000V max.</td>
<td></td>
</tr>
<tr>
<td>Internal resistance</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>No. of ports</td>
<td>1-port, combination type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response time</td>
<td>0.1µs max.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. discharge current (8/20µs)</td>
<td>Between wires</td>
<td>2,000A</td>
<td>5,000A</td>
</tr>
<tr>
<td>Voltage to ground</td>
<td>2,000A</td>
<td>5,000A</td>
<td></td>
</tr>
</tbody>
</table>

- **UL-approved type (Applicable standard: UL 497B File No. E253735)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Signal circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>4-20mA</td>
</tr>
</tbody>
</table>

* Refer to the table above or rated specifications, prices, and shipment.

- **Ambient conditions**

- Ambient operating temperature: -20 to 50°C (No condensation)
- Relative operating humidity: 45% to 85% (No condensation)
- For indoor use

- **Type number nomenclature**

- **Basic type**

- **Ordering information**

Specify the following:
1. Type number or ordering code

Fuji Electric FA Components & Systems Co., Ltd./D & C Catalog
Information subject to change without notice
**Arresters CN226 series**

### Internal wiring

- **CN226 series**

  - **Resistance thermometer**
    - Type: PT
    - CONNECTION: 4 to 20mA, 10 to 50mA
    - Connector: M3.5 terminal screw

- **Thermocouple**
  - Type: TC
  - CONNECTION: 4 to 20mA, 10 to 50mA

- **Potentiometer and slow pulse**
  - Type: PM, SP
  - CONNECTION: 4 to 20mA, 10 to 50mA

- **Discharge element**
  - CONNECTION: 4 to 20mA, 10 to 50mA

- **Resistance thermometer**
  - Type: PT
  - CONNECTION: 4 to 20mA, 10 to 50mA

### Application circuit example

- **Protected device**

- **Plug fuse (AFaC-30X)**

- **Socket**

- **Indicator 24A, 48A, 100B only**

- **Terminal cover**

- **Surge side**

- **Protection side**

- **M3.5 terminal screw**

- **Arrester**

- **Socket**

- **35mm wide rail**

### Dimensions, mm

- **Protection side**

- **Surge side**

### Operating precautions

- Install the arrester as close as possible to the protected device.
- Be sure to securely connect the grounding terminal (E terminal) to the grounding terminal of the panel. Consecutively ground the protected device and the arrester at the shortest distance using a grounding wire of 2mm² min. with grounding on the arrester side.
- Use an arrester that is appropriate for the operating voltage and application. Incorrect application may result in failure or loss of protection.
- Remove the arrester from the socket before performing a withstand test or insulation resistance test on the device. Incorrect testing may damage the arrester or result in measurement value errors.
- Use a DC power supply with the following specifications to connect to the signal arrester. Using a large-capacity power supply may result in damage or fire due to inability to interrupt the short-circuit current that flows when the arrester operates.

### Applicable types:

- DC power supply: CN226-24: 24V DC, 40W max., 1.7A max., CN226-48: 48V DC, 30W max., 0.6A max., CN226-100: 100V DC, 40W max., 0.4A max.
Arresters
CN227 series

Features

The arrester protects network circuits from lightning surges.
• Communications networks are supported (e.g., 10Base-5, 100Base-TX, RS-485, PLC T-Link).
• Ideal design for applications with high-performance in protection against lightning surges.
• Support for CN227-EBT
High-speed communications (100Mbps min.) enables high-performance response to surges.
Compact, lightweight, and easy to connect (RJ-45 modular connector).
• CN227-EB5
Extremely small signal loss enables high-performance response.
Easy installation and replacement (mounting bracket and grounding wire included).
• CN227-RS42, RS44
The body is slim (22.5mm wide) and European-style terminal blocks are used.
Types are available to support 2-wire (RS42) or 4-wire (RS44).
The arrester provides a long service life and high surge resistance (10kA, 8/20µs) and protection characteristics that satisfied categories C2 and D1 of the JIS C 5381-21 standard.

Ratings, specifications, models, product codes, prices (excluding tax), and shipment

<table>
<thead>
<tr>
<th>Type</th>
<th>CN227-EBT</th>
<th>CN227-EB5</th>
<th>CN227-RS42</th>
<th>CN227-RS44</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>Ethernet 10Base-T 100Base-TX</td>
<td>Internet 10Base-5 RS-485, PLC (T link), remote terminals, 60V DC max. signal circuits 2-wire 4-wire</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. continuous operating voltage (Uc)</td>
<td>52V DC</td>
<td>3.5V DC</td>
<td>60V DC</td>
<td></td>
</tr>
<tr>
<td>Rated current</td>
<td>100mA</td>
<td>100mA</td>
<td>500mA</td>
<td></td>
</tr>
<tr>
<td>Transmission frequency bandwidth</td>
<td>DC 0 to 100MHz</td>
<td>DC 0 to 20MHz</td>
<td>DC 0 to 2MHz</td>
<td></td>
</tr>
<tr>
<td>Insertion loss</td>
<td>2dB max.</td>
<td>0.5dB max.</td>
<td>1dB max.</td>
<td></td>
</tr>
<tr>
<td>Transmission speed/DC resistance</td>
<td>100Mbps</td>
<td>10Mbps</td>
<td>DC resistance: 0.1Ω max.</td>
<td></td>
</tr>
<tr>
<td>DC operating voltage (V 1mA)/DC discharge start voltage (100V/s)</td>
<td>Between wires 4.5V±15% (100V/s)</td>
<td>Between wires 4.5V±15% (100V/s)</td>
<td>DC82V±10% (V1mA)</td>
<td></td>
</tr>
<tr>
<td>Voltage to ground</td>
<td>DC65V±15% (100V/s)</td>
<td>DC50V±25% (100V/s)</td>
<td>DC90V±20% (100V/s)</td>
<td></td>
</tr>
<tr>
<td>Voltage protection level (impulse limit voltage) (Up)</td>
<td>Between wires 150V max.</td>
<td>Between wires 150V max.</td>
<td>400V max.</td>
<td></td>
</tr>
<tr>
<td>Voltage to ground</td>
<td>40V max.</td>
<td>350V max.</td>
<td>400V max.</td>
<td></td>
</tr>
<tr>
<td>Impulse withstand*2</td>
<td>Category C2 (8/20µs) 500A 10kA</td>
<td>Category C2 (8/20µs) 500A 10kA</td>
<td>10kA</td>
<td></td>
</tr>
<tr>
<td>Category D1 (8/350µs) – – 2.5kA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>Temperature: −20 to 60°C, Humidity: 95% max. RH (no icing or condensation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface and applicable connection wire</td>
<td>Modular (RJ-45)</td>
<td>Modular (RJ-45)</td>
<td>Screw terminal connection method</td>
<td></td>
</tr>
<tr>
<td>Mechanical durability</td>
<td>Vibration resistance (durability) – – Frequency: 10 to 55Hz, Double amplitude: 0.75mm (4.5G max.), 2 hours in each direction for a total of 6 hours</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (L x W x H)</td>
<td>(Thickness: Oval) 35 x 40 x (length) 81 mm</td>
<td>28 x 67 x 119 mm</td>
<td>90 x 22.5 x 70 mm</td>
<td></td>
</tr>
</tbody>
</table>

Note *1: This gives the value when lightning surge voltage is applied between wires with one wire grounded.
*2: This gives the total value for voltage to ground for each wire. Category C2 indicates the current value with power applied 5 times each for positive and negative polarities at a current waveform of 8/20µs, and category D1 indicates the current value with power applied one time each for positive and negative polarities at a current waveform of 10/350µs.
**Internal wiring**

- **CN227-EBT**
  - Modular jack (in/out)
  - Surge protection components
  - Grounding (M4)

- **CN227-EB5**
  - Coaxial tap
  - 10Base5 cable
  - BNC connector (jack)
  - BNC connector (plug)
  - Arrester

- **CN227-RS42**
  - Modular jack (in/out)
  - IN (surge side)
  - OUT (protection side)

- **CN227-RS44**
  - Modular jack (in/out)
  - IN (surge side)
  - OUT (protection side)

- **CN227-RS42, -RS44**
  - Internal wiring
  - Dimensions, mm

**Dimensions, mm**

- **CN227-EBT**
  - Modular in/out (RJ-45 8-core, shielded)
  - Arrester
  - Grounding wire (2mm², 30cm) included
  - Grounding terminal (M3)

- **CN227-EB5**
  - Coaxial tap
  - BNC connector (jack)
  - BNC connector (plug)
  - Arrester

- **CN227-RS42, -RS44**
  - 35mm wide rail
  - Grounding wire (2mm², 3m) included

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Information subject to change without notice
Arresters
CN227 series

- Application circuit example

CN227-EBT

- Wiring method

Device side
DA DB

Surge inrush side
RS42 signal wire

Device side
SDB RDA SDA RDB

RS42
RS44

Device side
SG SG FG (E) FG (E)

Surge inrush side
RS42, RS44

地線 (E) wire/ SG wire

Device side
DA DB

RS42, RS44

- Grounding wiring

CN227-EB5

3m max.
10Base5 cable
Transceiver
Coaxial tap
D-sub connector
Transceiver case

Drag terminal (M4)

If the power supply outlet is not grounded, perform grounding using a separate grounding wire.

If installed modular cable

Included modular cable

Included grounding wire (2mm²)

Already installed modular cable

Protected device

Grounding terminal (M3)

Thunder Blocker

If the power supply outlet is not grounded, perform grounding using a separate grounding wire.

If installed modular cable

Included modular cable

Included grounding wire (2mm²)

Already installed modular cable

Protected device

Grounding terminal (M3)
The arrester protects network circuits from lightning surges.

**CN227-RS44A**

**Application**
- Devices are protected from lightning surges that may enter instrument cables or control cables of RS-485, 24V DC-max. signal circuits.

**Features**
- Entrance of high-frequency noise from arrester grounding circuits is prevented.
- Protection characteristics satisfy categories C2 and D1 of the JIS C5381-21 standard.
- Use of screwless connection terminals eliminates the need for crimp terminals.
- IEC rail mounting.

**CN227-350S**

**Application**
- Broadcasting equipment is protected from lightning surges that may enter broadcasting speaker circuits or 100/200V-AC contact signal circuits.

**Features**
- Protection characteristics satisfy categories C2 and D1 of the JIS C5381-21 standard.
- Use of screwless connection terminals eliminates the need for crimp terminals.
- IEC rail mounting.

**CN227-SD**

**Application**
- Communications equipment is protected from lightning surges that may enter telephone lines or other communications lines.

**Features**
- Protection characteristics satisfy categories C2 and D1 of the JIS C5381-21 standard.
- Use of screwless connection terminals eliminates the need for crimp terminals.
- IEC rail mounting.

**CN227-UCP**

**Application**
- Communications equipment is protected from lightning surges that may enter telephone lines or other communications lines.

**Features**
- Support for UCS (universal connection system).
- Modular plug-in for high-density wiring system.
- Equipped with failure display.

**CN227-TV**

**Application**
- Devices are protected from lightning surges that may enter coaxial cables for a satellite digital TV.

**Features**
- Composed with coaxial connectors and high-performance gas discharge tubes.
- Compact size with high impulse resistance.
- Excellent transmission performance (large frequency bandwidth and little insertion loss).

**CN227-NT**

**Application**
- Equipment is protected from lightning surges that may enter coaxial cables of ITV and monitor cameras or data transmission devices.

**Features**
- Ideal protection for ITV coaxial lines with weak withstand voltage.
- Transmission noise is absorbed with improved production characteristics by combining gas discharge tubes at noise filters.
- Protection characteristics satisfy categories C2 and D1 of the JIS C5381-21 standard.
- IEC rail mounting.
- Ideal for transmission lines on which a DC power supply (30V DC, 250mA max.) is superimposed on the coaxial.
Arresters
CN227 series

■ Ratings, specifications, types, prices (excluding tax), and shipment

<table>
<thead>
<tr>
<th>Type</th>
<th>CN227-RS44A</th>
<th>CN227-350S</th>
<th>CN227-SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>RS-485, remote terminals, 24V DC max. signal circuits</td>
<td>Broadcasting speaker circuits 100/200V AC contact signal circuits</td>
<td>General telephone lines</td>
</tr>
<tr>
<td>Max. continuous operating voltage (Uc)</td>
<td>27V DC</td>
<td>275V AC/350V DC</td>
<td>180V DC</td>
</tr>
<tr>
<td>Rated current</td>
<td>100mA</td>
<td>2A</td>
<td>120mA</td>
</tr>
<tr>
<td>Transmission frequency bandwidth</td>
<td>DC 0 to 500kHz</td>
<td>DC 0 to 100MHz</td>
<td>DC 0 to 5MHz</td>
</tr>
<tr>
<td>Insertion loss</td>
<td>1dB max.</td>
<td>1dB max.</td>
<td>1.5dB max.</td>
</tr>
<tr>
<td>Transmission speed/DC resistance</td>
<td>DC resistance: 5Ω±10% (1 wire)</td>
<td>DC resistance: 0.5Ω max.</td>
<td>DC resistance: 2Ω±10% (1 wire)</td>
</tr>
<tr>
<td>DC operating voltage (V1mA)/DC discharge start voltage (100V/s)</td>
<td>Between wires -</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Voltage to ground Between 1, 2, 3, 4-5, 8: DC 0 to 10MHz Between 5, 8-6, 7: 90V±20% DC 100V/s</td>
<td>Between A, B, C, D: 100V max.</td>
<td>Between B, C, D-E, H: 100V max.</td>
<td>400V max.</td>
</tr>
<tr>
<td>Impulse withstand *2</td>
<td>Category C2 (8/20µs) 10kA 2.5kA</td>
<td>Category D1 (8/350µs) 10kA 0.5kA</td>
<td>10kA 5kA</td>
</tr>
<tr>
<td>Environment</td>
<td>Temperature: −20 to 60°C, Humidity: 95% max. RH (no icing or condensation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface and applicable connection wire</td>
<td>Screw terminal connection method</td>
<td>Solid wire: 0.4 to 1.6mm dia., stranded wire: 0.14 to 2.5mm²</td>
<td></td>
</tr>
<tr>
<td>Mechanical durability</td>
<td>Vibration resistance (durability) Frequency: 10 to 55Hz, Double amplitude: 0.75mm (4.5G max.), 2 hours in each direction for a total of 6 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (L x W x H)</td>
<td>90 x 22.5 x 70 mm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>CN227-UCP</th>
<th>CN227-NT</th>
<th>CN227-TV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>General telephone lines (modular)</td>
<td>ITV and monitor cameras</td>
<td>Satellite digital TV</td>
</tr>
<tr>
<td>Max. continuous operating voltage (Uc)</td>
<td>170V DC</td>
<td>30V DC</td>
<td>60V DC</td>
</tr>
<tr>
<td>Rated current</td>
<td>130mA</td>
<td>250mA</td>
<td>500mA</td>
</tr>
<tr>
<td>Transmission frequency bandwidth</td>
<td>DC 0 to 10MHz</td>
<td>DC 0 to 10MHz</td>
<td>DC 0 to 2.2GHz</td>
</tr>
<tr>
<td>Insertion loss</td>
<td>1dB max.</td>
<td>1.5dB max.</td>
<td>0.5dB max.</td>
</tr>
<tr>
<td>Transmission speed/DC resistance</td>
<td>DC resistance: 13Ω max. (1 wire)</td>
<td>DC resistance: 4Ω max.</td>
<td>-</td>
</tr>
<tr>
<td>DC operating voltage (V1mA)/DC discharge start voltage (100V/s)</td>
<td>Between wires -</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Voltage to ground Between 175 to 275V DC (100V/s)</td>
<td>90V DC±20% (100V/s)</td>
<td>90V DC±20% (100V/s)</td>
<td></td>
</tr>
<tr>
<td>Voltage protection level (impulse limit voltage) (Up)</td>
<td>Between wires *1 300V max. 250V max.</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Impulse withstand *2</td>
<td>Category C2 (8/20µs) 10kA 2.5kA</td>
<td></td>
<td>10kA 2.5kA</td>
</tr>
<tr>
<td>Environment</td>
<td>Temperature: −20 to 60°C, Humidity: 95% max. RH (no icing or condensation)</td>
<td>Plug-in solid wire: 0.4 to 0.8 dia. BNC jack - BNC jack</td>
<td>F jack - F jack</td>
</tr>
<tr>
<td>Interface and applicable connection wire</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical durability</td>
<td>Vibration resistance (durability) Frequency: 10 to 55Hz, Double amplitude: 0.75mm (4.5G max.), 2 hours in each direction for a total of 6 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (L x W x H)</td>
<td>19 x 9.5 x 59.5 mm</td>
<td>60 x 32 x 91 mm</td>
<td>(Thickness) 28 x 30 x (length) 60 mm</td>
</tr>
</tbody>
</table>

Note *1: This gives the value when lightning surge voltage is applied between wires with one wire grounded.
*2: This gives the total value for voltage to ground for each wire. Category C2 indicates the current value with power applied 5 times each for positive and negative polarities at a current waveform of 8/20µs, and category D1 indicates the current value with power applied one time each for positive and negative polarities at a current waveform of 8/350µs.
## Internal wiring

### CN227-RS44A

**Terminal number**
- Signal line terminal: 1/2/3/4
- Ground terminal: 5/8

**Protection of device with low withstand voltage**
- Surge side: A/B/C/D
- Protection side: E/H

Reducing electrostatic capacity between signal line and ground line
- Surge side: 1/2/3/4
- Protection side: 6/7

### CN227-350S

**Terminal number**
- Signal line terminal: 1/2/3/4
- Ground terminal: 5/8

**Protection of device with low withstand voltage**
- Surge side: A/B/C/D
- Protection side: E/H

### CN227-SD

**Terminal number**
- Signal line terminal: 1/2/3/4
- Ground terminal: 5/8

**Protection of device with low withstand voltage**
- Surge side: A/B/C/D
- Protection side: E/H

### CN227-NT

**Relay contact signal circuit**
- Signal line terminal: 1/2/3/4
- Common terminal: 5/8
- Ground terminal: 6/7

### CN227-TV

**Failure indicator**
- Input terminals and output terminals

## Dimensions, mm

### CN227-RS44A, -350S, -SD

- Width: 90 mm
- Depth: 22.5 mm
- Height: 70 mm

### CN227-UCP

- Width: 72.5 mm
- Depth: 25 mm
- Height: 67 mm

### CN227-NT

- Width: 67 mm
- Depth: 50 mm
- Height: 32 mm

### CN227-TV

- Width: 50 mm
- Depth: 60 mm
- Height: 28 mm

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Overview and features

- The AS-i arrester protects AS-interface modules connected to AS-i networks and networks from overvoltage due to inductive lightning surge and switching surge.
- Only the AS-i arrester is required to protect AS-i signal circuits and auxiliary power supply circuits.
- The construction, network connectivity, and protection level (IP67) of the AS-i arrester are the same as for waterproof connector slaves (slim type).
- The AS-i arrester does not require assigning addresses in the AS-interface network.
- A FM6B1-04FE or FM6B2-04FE slave base is required to connect the AS-interface cable (yellow) and auxiliary power supply cable (black).

Ratings, specifications, types, prices (excluding tax), and shipment

<table>
<thead>
<tr>
<th>Type</th>
<th>CN227-ASI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>AS-i signal circuit, Auxiliary power supply circuit</td>
</tr>
<tr>
<td>Max. continuous operating voltage (Uc)</td>
<td>31.6V DC 30V DC</td>
</tr>
<tr>
<td>Rated current (In)</td>
<td>0.5A 5A</td>
</tr>
<tr>
<td>Insertion loss: DC 0 to 5MHz (110Ω)</td>
<td>0.2dB max.</td>
</tr>
<tr>
<td>Electrostatic capacity (100kHz) Between wires</td>
<td>100pF max.</td>
</tr>
<tr>
<td>Voltage protection level (Up) Between wires</td>
<td>100V max. 100V max.</td>
</tr>
<tr>
<td>Voltage to ground</td>
<td>700V max. 400V max.</td>
</tr>
<tr>
<td>Impulse withstand category C2</td>
<td>Between wires 8/20μs 400A, Voltage to ground 8/20μs 1000A</td>
</tr>
<tr>
<td>Impulse withstand current *2</td>
<td>Between wires 8/20μs 2000A</td>
</tr>
</tbody>
</table>

Note *1: Impulse withstand category C2 indicates the performance that is possible with power applied 5 times for positive and negative polarities at a current waveform of 8/20μs.

Note *2: Impulse withstand current indicates the performance possible with power applied for 1 time max. at a current wavelength of 8/20μs.

Internal wiring

- AS-i
- AUX
- DC24V
- 0V
- TF
- R
- ABD
- GDT
- MOV
- LED

Dimensions, mm

- Indicators (green LEDs)
  - ON for normal operation
- Grounding wire (green)
  - 2mm², length: 1m
- Slave base (sold separately)
  - FM6B1-04FE
  - IEC rail mounting or screw mounting
Application circuit example

Tree connection

Caution
The AS-i arrester cannot be used in locations where yellow-yellow AS-i cable is laid.

H branching
T branching

Master

Slave

Arrester

General-purpose 24V-DC power supply

Power supply

Communications

Arrester protection range

AS-i master

AS-i arrester

Slave

AS-i arrester

Slave

AS-i arrester

Communications cable (yellow)

Auxiliary power supply cable (black)
**Arresters**

**CN2340, CN2341**

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- **Features**

  Single-pole arrester with gas discharge tube. Is important to use the same equipotential bonding and ground when building systems to protect against lightning.

  Sometimes, however, various types of grounds are independently installed inside equipment, and grounding circuit arresters enable potential equalization between grounding polls.

  - **CN2340**: Used when the same ground cannot be used between power circuits.
    (For example, performing grounding with provisions based on electrical equipment technology standards, such as independent B-type grounding.)
  - **CN2341**: Used when the same ground cannot be used for power circuits and control circuits.
    (For example, performing independent grounding of devices to prevent noise from entering, such as with inverter grounding.)

  - With a rail mounting construction that is 18mm wide, the design is ideal for applications.

- **Ratings, specifications, types, prices (excluding tax), and shipment**

<table>
<thead>
<tr>
<th>Type</th>
<th>CN2340</th>
<th>CN2341</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>Between ground and grounded circuits</td>
<td>Between ground and grounded circuits</td>
</tr>
<tr>
<td>Test class</td>
<td>Class I/II</td>
<td>Class I/II</td>
</tr>
<tr>
<td>Voltage protection level (Up) (limit voltage)</td>
<td>1,500V max.</td>
<td>800V max.</td>
</tr>
<tr>
<td>Operation start voltage</td>
<td>490V DC±70V</td>
<td>90V DC±18V</td>
</tr>
<tr>
<td>Impulse current (I imp)</td>
<td>10/350μs 5kA</td>
<td>10/350μs 2.5kA</td>
</tr>
<tr>
<td>Nominal discharge current (I)</td>
<td>8/20μs 20kA</td>
<td>8/20μs 20kA</td>
</tr>
<tr>
<td>Max. discharge current (I max)</td>
<td>8/20μs 30kA</td>
<td>8/20μs 25kA</td>
</tr>
<tr>
<td>Connection terminals/connection wires</td>
<td>Screw terminal connection: M5 (for bare round crimp terminals)</td>
<td>Recommended connection wire (stranded wire: 3.5 to 14mm²)</td>
</tr>
<tr>
<td></td>
<td>Round crimp terminal size:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.5mm²: R3.5 to 5</td>
<td>8mm²: R8 to 5</td>
</tr>
<tr>
<td></td>
<td>5.5mm²: R5.5 to 5</td>
<td>14mm²: R14 to 5</td>
</tr>
<tr>
<td>Operating environment</td>
<td>Temperature: −20 to 60°C. Humidity: 95% max. (no condensation)</td>
<td></td>
</tr>
</tbody>
</table>

- **Internal wiring**

- **Application circuit example**

- **Dimensions, mm**

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