Noise Filter

S8V-NF (Single-phase 250 V 3 A / 6 A Type)

DIN Rail Mounting Type Ideal for Control Panels
Featuring a Slim Design that Saves Space
Push-In Connections for Safe and Easy Wiring

- 150 kHz to 1 MHz high attenuation
- Operation possible at ambient temperatures from -40 to 85°C
- Complies with RoHS directives
- Certification for 3,000 m altitude (UL/EN 60939)
- Five years Warranty *1

*1. Refer to Period and Terms of Warranty on page 9 for details.

Model Number Structure

Model Number Legend

Note: Not all combinations are possible. Refer to List of Model number in Ordering Information, below.

S8V-NF S 2  T  2  3

1. Input type
   S: Single-phase AC/DC
2. Rated voltage
   2: 250 VAC/250 VDC
3. Rated current
   03: 3 A
   06: 6 A

Ordering Information

Note: For details on normal stock models, contact your nearest OMRON representative.

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>Rated current</th>
<th>Model number</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 VAC</td>
<td>3 A</td>
<td>S8V-NFS203</td>
</tr>
<tr>
<td>250 VDC</td>
<td>6 A</td>
<td>S8V-NFS206</td>
</tr>
</tbody>
</table>

Refer to Safety Precautions on page 6.
S8V-NF

Ratings and Characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>3 A</th>
<th>6 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated current</td>
<td>1.0 mA max. (250 VAC/60 Hz)</td>
<td>1.0 mA max. (250 VAC/60 Hz)</td>
</tr>
<tr>
<td>Rated voltage</td>
<td>Single-phase 250 VAC 50/60 Hz 1, 250 VDC</td>
<td>Single-phase 250 VAC 50/60 Hz 1, 250 VDC</td>
</tr>
</tbody>
</table>

I/O characteristics

- Leakage current: 1.0 mA max.
- DC resistance: 110 mΩ max.
- Attenuation: 25 dB min. (Common Mode: 0.1 to 10 MHz, Normal Mode: 0.2 to 30 MHz)
- Withstand voltage: 2.5 kVAC for 1 min. (between line and ground), current cutoff 10 mA
- Insulation resistance: 100 MΩ min. (500 VDC, 1 min.)

Environment

- Ambient operating temperature: -40 to 85°C (Derating is required. Refer to Engineering Data) (with no condensation or icing)
- Derating start temperature: +85°C +60°C
- Storage temperature: -40 to 85°C (with no condensation or icing)
- Ambient operating humidity: 95% (Storage humidity: 95% max.)
- Vibration resistance: 10 to 55 Hz, maximum 5 G, 0.42 mm half amplitude for 2 h each in X, Y, and Z directions
- Shock resistance: 150 m/s², 3 times each in ±X, ±Y, ±Z directions
- Withstand voltage: 2.5 kVAC for 1 min. (between line and ground), current cutoff 10 mA
- Insulation resistance: 100 MΩ min. (500 VDC, 1 min.)

Construction

- Weight: 140 g max.
- Degree of protection: IP20 by EN/IEC 60529

Standards

- Safety standards:
  - UL 60939 (Recognition) OVC III (≤3000 m) Pol2
  - CSA C22.2 No.8
  - EN 60939 OVC III (≤3000 m) Pol2
  - ENEC #2
  - EAC (TR CU 004 / 2011)

Connections

Circuit Diagram

Construction and Nomenclature

Nomenclature

<table>
<thead>
<tr>
<th>No.</th>
<th>Terminal name</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L1</td>
<td>Line terminals</td>
<td>Connect the input lines to these terminals. *1</td>
</tr>
<tr>
<td>2</td>
<td>L2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>N1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>N2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>NC</td>
<td>No connection</td>
<td>Do not wire.</td>
</tr>
<tr>
<td>6</td>
<td>L'1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>L'2</td>
<td>Load terminals</td>
<td>Connect the output lines to these terminals. *1</td>
</tr>
<tr>
<td>8</td>
<td>N'1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>N'2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>PE</td>
<td>Protective Earth terminal (PE)</td>
<td>Connect the ground line to this terminal. *2</td>
</tr>
</tbody>
</table>

*1. Wiring is generally laid out so that the line terminal is connected to the input side and the load terminal is connected to the output side, though use in the opposite direction is also possible. Note that if the input and output are wired in reverse, the appropriate attenuation characteristics may not be obtained.

*2. This is the protective earth terminal specified in the safety standards. Always ground this terminal.
Engineering Data

Derating Curves
S8V-NFS203

![Derating Curve for S8V-NFS203](Image)

**Note:** If using at an altitude of 2000 m to 3000 m, multiply the above derating curve by 0.8 to reduce the load. (Does not apply for face-up mounting)

S8V-NFS206

![Derating Curve for S8V-NFS206](Image)

**Note:** If using at an altitude of 2000 m to 3000 m, multiply the above derating curve by 0.8 to reduce the load. (Does not apply for face-up mounting)

Attenuation Frequency Characteristics (Typical example)
S8V-NFS203

![Attenuation Frequency Characteristics for S8V-NFS203](Image)

The above characteristics are data acquired by the following measurement circuits.

**Common mode**

**Normal mode**

![Common mode Measurement Circuit](Image)

![Normal mode Measurement Circuit](Image)

**Note:** The noise filter attenuation characteristics are measured under a constant I/O impedance of 50 Ω. When used attached to actual equipment, the power line impedance varies depending on the wiring method. Therefore, attenuation characteristics may not match those listed in the catalog.
### Mounting Brackets

<table>
<thead>
<tr>
<th>Name</th>
<th>Model number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front-mounting bracket</td>
<td>S82Y-VS10F</td>
</tr>
<tr>
<td>Side-mounting bracket</td>
<td>S82Y-VS10S</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Model number</th>
<th>Dimensions</th>
<th>Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front-mounting bracket</td>
<td>S82Y-VS10F</td>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Image" /></td>
</tr>
<tr>
<td>Side-mounting bracket</td>
<td>S82Y-VS10S</td>
<td><img src="image3" alt="Diagram" /></td>
<td><img src="image4" alt="Image" /></td>
</tr>
</tbody>
</table>
DIN Rails (Order Separately)  
(Unit: mm)

Mounting Rail (Material: Aluminum)
PFP-100N
PFP-50N

PFP-100N2

End Plate
PFP-M

Note: If there is a possibility that the Unit will be subject to vibration or shock, use a steel DIN Rail. Otherwise, metallic filings may result from aluminum abrasion.
Safety Precautions

Warning Indications

| WARNING | Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally, there may be significant property damage. |
| CAUTION | Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage. |

Precautions for Safe Use

Supplementary comments on what to do or avoid doing, to use the product safely.

Precautions for Correct Use

Supplementary comments on what to do or avoid doing, to prevent failure to operate, malfunction or undesirable effect on product performance.

Meaning of Product Safety Symbols

- Used to warn of the risk of electric shock under specific conditions.
- Used to warn of the risk of minor injury caused by high temperatures.
- Used to indicate prohibition when there is a risk of minor injury from electrical shock or other source if the product is disassembled.
- Used for general mandatory action precautions for which there is no specified symbol.

The electrical wire may come out and an electric shock may be caused. Insert the solid wire or ferrule straight into the terminal block until the end touches the terminal block.

**WARNING**

![Image](image1)

**CAUTION**

- Minor electric shock, fire, or product failure may occasionally occur. Do not disassemble, modify, or repair the product or touch the interior of the product.
- Minor burns may occasionally occur. Do not touch the product while power is being supplied or immediately after power is turned OFF.
- Minor injury due to electric shock may occasionally occur. Do not touch the terminals while power is being supplied.
- Minor electric shock, fire, or product failure may occasionally occur. Do not allow any pieces of metal, conductors, or cuttings from installation work to enter the product.
- Fire or product failure may occasionally occur. Do not use on the secondary side (output side) of inverters, etc.

**Installation Environment**

- Do not use the product in locations subject to shocks or vibrations. In particular, install the product as far away as possible from contactors or other devices that are a vibration source.
- Install the product well away from any sources of strong, high-frequency noise and surge.

**Ambient Operating and Storage Environments**

- Store the product at a temperature of -40 to 85°C and a humidity of 95% or less.
- Do not use the product in areas outside the derating curve otherwise, internal parts may occasionally deteriorate or be damaged.
- Use the product at a humidity of 95% max.
- Do not use the product in locations subject to direct sunlight.
- Do not use locations where liquids, foreign matter, or corrosive gases may enter the interior of the product.

**Mounting**

- Take adequate measures to ensure proper heat dissipation to increase the long-term reliability of the product. Be sure to allow convection in the atmosphere around devices when mounting. Do not use in locations where the ambient temperature exceeds the range of the derating curve.
- When cutting out holes for mounting, make sure that cuttings do not enter the interior of the product.

**Note:**

(A) Standard (Vertical) mounting
(B) Face-up mounting
(C) Front, Side-by-side mounting

![Image](image2)

*1. Convection of air
*2. Vertical separation: 25 mm or more

<table>
<thead>
<tr>
<th>Horizontal separation</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A), (B): 15 mm or more</td>
</tr>
<tr>
<td>(C): 0 mm or more and 15 mm or less.</td>
</tr>
</tbody>
</table>
Wiring

- Connect the ground completely. A protective earthing terminal stipulated in safety standards is used. Electric shock or malfunction may occur if the ground is not connected completely.
- When you insert wires or insert a screwdriver into a release hole, do not press down on the terminal block with a force of 40 N or greater.
- Do not wire anything to the release holes.
- Do not tilt or twist a flat-blade screwdriver while it is inserted into a release hole on the terminal block. The terminal block may be damaged.
- Insert a flat-blade screwdriver into the release holes at an angle. The terminal block may be damaged if you insert the screwdriver straight in.
- Do not allow the flat-blade screwdriver to fall out while it is inserted into a release hole.
- Do not bend a wire past its natural bending radius or pull on it with excessive force. This may cause a wire to be broken.
- Do not insert more than one wire into each terminal insertion hole.
- Do not pre-solder the ends of the wires. Doing so will inhibit proper connection.
- Be sure to remove the sheet covering the product for machining before power-ON so that it does not interfere with heat dissipation.
- If there is a possibility of vibration or shock, please use wires and stranded wires with ferrules.
- To prevent wiring materials from ignition or smoking, confirm wire ratings and use the wiring materials given in the following table.

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Model number</th>
<th>Recommended wire gauge (mm²)</th>
<th>(AWG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O terminals</td>
<td>S8V-NFS203</td>
<td>0.5 to 2.5</td>
<td>20 to 14</td>
</tr>
<tr>
<td></td>
<td>S8V-NFS206</td>
<td>0.75 to 2.5</td>
<td>18 to 14</td>
</tr>
<tr>
<td>PE (protective earth) terminal</td>
<td>S8V-NFS203</td>
<td>2 to 2.5</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>S8V-NFS206</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Crossover wiring can be used for this product.
- However, do not allow the total steady-state current to terminals to exceed 10 A.
- The above table gives the recommended wires for one product.
- When using crossover wiring, select wiring materials suitable for the total current that will flow to terminals.

Stripping length

<table>
<thead>
<tr>
<th>Recommended Wire</th>
<th>Stripping length (Ferrules not used)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.34 to 1.5 mm²/AWG20 to 16</td>
<td>8 mm</td>
</tr>
<tr>
<td>2 to 2.5 mm²/AWG14</td>
<td>10 mm</td>
</tr>
</tbody>
</table>

Connecting Wires to the Push-In Plus Terminal Block

Part Names of the Terminal Block

Connecting Wires with Ferrules and Solid Wires

Insert the solid wire or ferrule straight into the terminal block until the end touches the terminal block.

Connecting Stranded Wires

Use the following procedure to connect the wires to the terminal block.

1. Hold a flat-blade screwdriver at an angle and insert it into the release hole. The angle should be between 10° and 15°. If the flat-blade screwdriver is inserted correctly, you will feel the spring in the release hole.
2. With the flat-blade screwdriver still inserted into the release hole, insert the wire into the terminal hole until it strikes the terminal block.
3. Remove the flat-blade screwdriver from the release hole.

Precautions for Correct Use

DIN Rail Mounting

To mount the Block on a DIN Rail, hook portion (A) of the Block onto the rail and press the Block in direction (B).

To dismount the Block, pull down portion (C) with a flat-blade screwdriver and pull out the Block.
Checking Connections
- After the insertion, pull gently on the wire to make sure that it will not come off and the wire is securely fastened to the terminal block.
- If you use a ferrule with a conductor length of 10 mm, part of the conductor may be visible after the ferrule is inserted into the terminal block, but the product insulation distance will still be satisfied.

Removing Wires from the Push-In Plus Terminal Block
Use the following procedure to remove wires from the terminal block.
The same method is used to remove stranded wires, solid wires, and ferrules.
1. Hold a flat-blade screwdriver at an angle and insert it into the release hole.
2. With the flat-blade screwdriver still inserted into the release hole, remove the wire from the terminal insertion hole.
3. Remove the flat-blade screwdriver from the release hole.

Recommended Ferrules and Crimping Tools

Recommended Ferrules

<table>
<thead>
<tr>
<th>Applicable wire (mm²)</th>
<th>Ferrule Conducto length (mm)</th>
<th>Stripping length (mm)</th>
<th>Recommended ferrules</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(Ferrules used)</td>
<td>Manufactured by Phoenix Contact</td>
</tr>
<tr>
<td>0.50</td>
<td>8</td>
<td>A1 0,5-8</td>
<td>H0.5/14</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>A1 0,5-10</td>
<td>H0.5/16</td>
</tr>
<tr>
<td>0.75</td>
<td>8</td>
<td>A1 0,75-8</td>
<td>H0.75/14</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>A1 0,75-10</td>
<td>H0.75/16</td>
</tr>
<tr>
<td>1/1.25</td>
<td>8</td>
<td>A1 1-8</td>
<td>H1.0/14</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>A1 1-10</td>
<td>H1.0/16</td>
</tr>
<tr>
<td>1.25/1.5</td>
<td>8</td>
<td>A1 1,5-8</td>
<td>H1.5/14</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>A1 1,5-10</td>
<td>H1.5/16</td>
</tr>
<tr>
<td>2.5</td>
<td>10</td>
<td>A1 2,5-10</td>
<td>H2.5/16DS</td>
</tr>
</tbody>
</table>

Recommended Crimp Tool
- CRIMPFOX6
- CRIMPFOX6T-F
- CRIMPFOX10S
- PZ6 roto
- Varicrimp4

Note: 1. Make sure that the outer diameter of the wire is smaller than the inner diameter of the insulating sleeve of the recommended ferrule.
2. Make sure that the ferrule processing dimensions conform to the following figure.

Recommended Flat-blade Screwdriver
Use a flat-blade screwdriver to connect and remove wires. Use the following flat-blade screwdriver.
The following table shows manufacturers and models as of 2015/Dec.

<table>
<thead>
<tr>
<th>Model number</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESD 0.40×2.5</td>
<td>Wera</td>
</tr>
<tr>
<td>SZS 0.4×2.5</td>
<td>Phoenix Contact</td>
</tr>
<tr>
<td>SZF 0.4×2.5</td>
<td>Phoenix Contact</td>
</tr>
<tr>
<td>0.4×2.5×75 302</td>
<td>Wiha</td>
</tr>
<tr>
<td>AEF 2.5×75</td>
<td>Facom</td>
</tr>
<tr>
<td>210-719</td>
<td>Wago</td>
</tr>
<tr>
<td>SDI 0.4×2.5×75</td>
<td>Weidmuller</td>
</tr>
</tbody>
</table>

*OMRON’s exclusive purchase model XW4Z-00B is available to order as SZF 0-0,4×2,5 (manufactured by Phoenix Contact).
Period and Terms of Warranty

Warranty Period
The product warranty is valid for a period of five years from the date of shipment from the factory.

Terms of Warranty
The warranty is valid only for the following operating conditions.
1. Average ambient operating temperature of the product: 40°C max. (See note.)
2. Average load rate of 80% max. (See note.)
3. Mounting method: Standard mounting
Note: The maximum ratings must be within the derating curve.

If the product fails for reasons attributable to OMRON within the above warranty period, OMRON will repair or replace the faulty part of the product at the place of purchase or the place where the product delivered without charge.

This warranty does not cover the following types of failures.

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Failures that result from handling or operation of the product under conditions or in environments that are not given in this document and not given in any other specifications exchanged between OMRON and the customer</td>
</tr>
<tr>
<td>(2) Failures that originate in causes other than the delivered product itself</td>
</tr>
<tr>
<td>(3) Failures caused by disassembly, modification, or repair of the product by anyone other than OMRON</td>
</tr>
<tr>
<td>(4) Failures caused by applications or uses for which the product was not originally intended.</td>
</tr>
<tr>
<td>(5) Failures caused by factors that could not be anticipated with the scientific or technical knowledge available when the product was shipped.</td>
</tr>
<tr>
<td>(6) Failures caused by other causes for which OMRON is not responsible, such as natural disasters and other acts of God.</td>
</tr>
</tbody>
</table>

This warranty is limited to the individual product that was delivered and does not cover any secondary, subsequent, or related damages.
Authorized Distributor:

Controllers & I/O
- Machine Automation Controllers (MAC) • Motion Controllers
- Programmable Logic Controllers (PLC) • Temperature Controllers • Remote I/O

Robotics
- Industrial Robots • Mobile Robots

Operator Interfaces
- Human Machine Interface (HMI)

Motion & Drives
- Machine Automation Controllers (MAC) • Motion Controllers • Servo Systems
- Frequency Inverters

Vision, Measurement & Identification
- Vision Sensors & Systems • Measurement Sensors • Auto Identification Systems

Sensing
- Photoelectric Sensors • Fiber-Optic Sensors • Proximity Sensors
- Rotary Encoders • Ultrasonic Sensors

Safety
- Safety Light Curtains • Safety Laser Scanners • Programmable Safety Systems
- Safety Mats and Edges • Safety Door Switches • Emergency Stop Devices
- Safety Switches & Operator Controls • Safety Monitoring/Force-guided Relays

Control Components
- Power Supplies • Timers • Counters • Programmable Relays
- Digital Panel Meters • Monitoring Products

Switches & Relays
- Limit Switches • Pushbutton Switches • Electromechanical Relays
- Solid State Relays

Software
- Programming & Configuration • Runtime

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