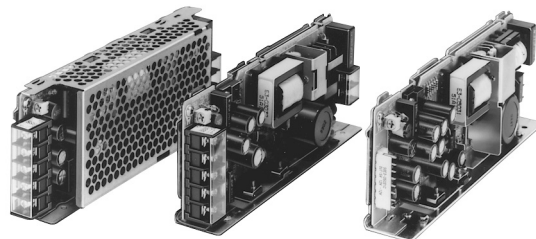


# Switching Power Supply

## S8E3

### Compact and Economical Power Supply with 3-Point Switching Capacity

- 30- or 50-watt models
- Open-frame and covered types available
- UL and CSA approval
- 3-year warranty



## Ordering Information

### ■ SWITCHING POWER SUPPLIES

| Description     |               |               |                        |            |             | Part number                                                                           |                                                                                       |
|-----------------|---------------|---------------|------------------------|------------|-------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Configuration   | Input voltage | Power ratings | Output voltage/Current |            |             | Front terminals                                                                       | Top terminals                                                                         |
|                 |               |               | V1                     | V2         | V3          |                                                                                       |                                                                                       |
| Open-frame type | 120 VAC       | 30 W          | 5 V/3 A                | 12 V/1.2 A | -12 V/0.3 A |  |  |
|                 |               |               | 5 V/3 A                | 15 V/1 A   | -15 V/0.3 A |                                                                                       |                                                                                       |
|                 |               | 50 W          | 5 V/5 A                | 12 V/1.5 A | -12 V/0.5 A |                                                                                       |                                                                                       |
|                 |               |               | 5 V/5 A                | 15 V/1.2 A | -15 V/0.5 A |                                                                                       |                                                                                       |
| Covered-type    | 120 VAC       | 30 W          | 5 V/3 A                | 12 V/1.2 A | -12 V/0.3 A |  |  |
|                 |               |               | 5 V/3 A                | 15 V/1 A   | -15 V/0.3 A |                                                                                       |                                                                                       |
|                 |               | 50 W          | 5 V/5 A                | 12 V/1.5 A | -12 V/0.5 A |                                                                                       |                                                                                       |
|                 |               |               | 5 V/5 A                | 15 V/1.2 A | -15 V/0.5 A |                                                                                       |                                                                                       |

### ■ MODEL NUMBER LEGEND

S8E3-            

1                      2                      3

#### 1. Power Ratings

030: 30 W  
050: 50 W

#### 2. Output Voltage

31: 5 V, 12 V, -12 V  
32: 5 V, 15 V, -15 V

#### 3. Configuration

A: Open-frame type, front terminals  
B: Open-frame type, top terminals  
D: Covered-type, front terminals  
E: Covered-type, top terminals

# Specifications

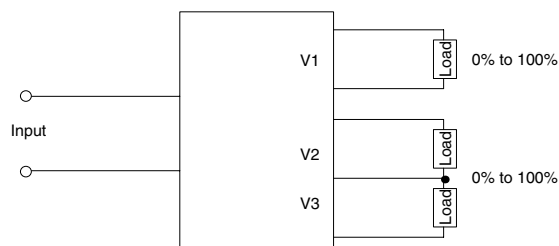
|                                 |                                                                                                               |                                                                |
|---------------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| Item                            | 30 W                                                                                                          | 50 W                                                           |
| Efficiency (typical)            | 73%                                                                                                           |                                                                |
| Input                           |                                                                                                               |                                                                |
| Voltage                         | 120 VAC (85 to 132 VAC)                                                                                       |                                                                |
| Frequency                       | 47 to 450 Hz                                                                                                  |                                                                |
| Current (See Note 2.)           | 1.2 A max.                                                                                                    | 1.6 A max.                                                     |
| Leakage current (See Note 2.)   | 0.3 mA max. (at 100 VAC)                                                                                      |                                                                |
| Inrush current (See Note 2.)    | 25 A max. (25°C, cold start, at 100 VAC)                                                                      |                                                                |
| Noise filter                    | Yes                                                                                                           |                                                                |
| Output (See Note 1.)            |                                                                                                               |                                                                |
| Voltage adjustment range        | 0% to 5% (V1 only)                                                                                            |                                                                |
| Ripple (See Note 2.)            | 2% (p-p) max.                                                                                                 |                                                                |
| Input variation influence       | 0.4% max.                                                                                                     |                                                                |
| Load variation influence        | V1: 0.8% max.; V2, V3: 2.5% max.                                                                              |                                                                |
| Temperature variation influence | 0.05%/°C max. (with rated input and output)                                                                   |                                                                |
| Rise time                       | 100 ms max.                                                                                                   |                                                                |
| Hold time (See Note 2.)         | 20 ms min. (at 100 VAC)                                                                                       |                                                                |
| Additional function             |                                                                                                               |                                                                |
| Overload protection             | V1: inverted drop type, automatic reset; V2, V3: short-circuit protection                                     |                                                                |
| Overvoltage protection          | Yes (V1 only)                                                                                                 |                                                                |
| Characteristics                 |                                                                                                               |                                                                |
| Ambient temperature             | Operating                                                                                                     | See the derating curve in the <i>Engineering Data</i> section. |
| Ambient temperature             | Storage                                                                                                       | –25°C to 65°C (–13°F to 145°F) with no condensation and icing  |
| Dielectric strength             | 2,000 VAC, 50/60 Hz for 1 min (between all inputs and all outputs/GR terminals)                               |                                                                |
| Insulation resistance           | 100 MΩ min. (between all outputs and all inputs/GR terminals at 500 VDC)                                      |                                                                |
| Vibration resistance            | 10 to 55 Hz, 0.75-mm double amplitude (44.1 m/s <sup>2</sup> (4.5G)) for 2 hrs each in X, Y, and Z directions |                                                                |
| Shock resistance                | 294 m/s <sup>2</sup> (30G), 3 times each in ±X, ±Y, and ±Z directions                                         |                                                                |
| Electromagnetic interference    | Conforms to FCC class B, VCCI 2nd category, EN55011 Gr1 class B: EN50081-2                                    |                                                                |
| Approved standards              | UL1950, CSA C22.2 No. 234                                                                                     |                                                                |
| Output indicator                | Yes (green)                                                                                                   |                                                                |
| Life expectancy                 | 8 yrs min. (used at 40°C at the rated input with a 50% load)                                                  |                                                                |
| Weight (covered-type)           | 450 g max.                                                                                                    | 570 g max.                                                     |

Note: 1. The specification is defined at the power supply output terminals.  
 2. At 100% load for rated input voltage (100 VAC).

# Engineering Data

## ■ MINIMUM CURRENTS FOR V<sub>1</sub>, V<sub>2</sub>, AND V<sub>3</sub>

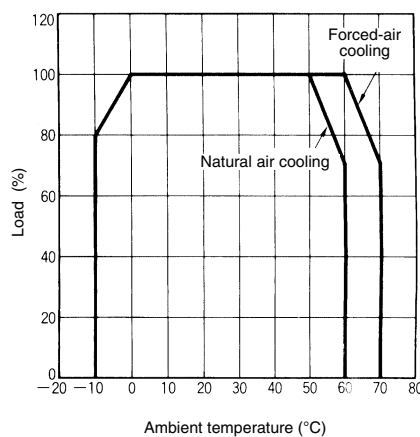
V<sub>1</sub>, V<sub>2</sub>, and V<sub>3</sub> can be used at 0% loads.



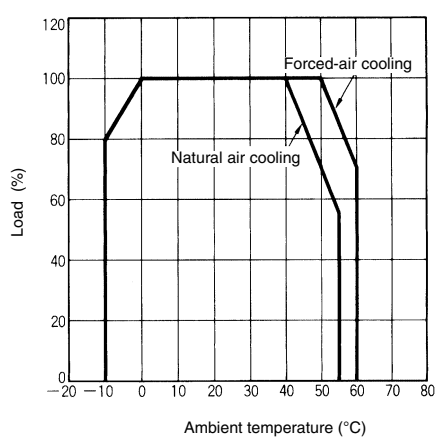
## ■ DERATING CURVE (STANDARD INSTALLATION)

- Note: 1. The derating curve depends on the mounting position of the Power Supply.  
 2. The above ambient temperature curves for forced air-cooling were obtained with an air capacity of 1 m<sup>3</sup> per minute.

Open-frame Type

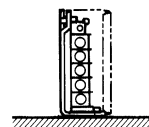


Covered-type

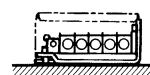


Mounting Position For Standard Installation

Vertical –  
Front Terminal  
Model

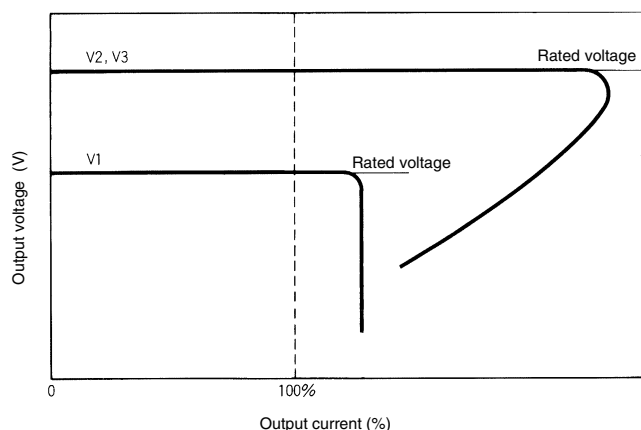


Horizontal –  
Top Terminal  
Model



## OVERLOAD PROTECTION

The S8E3 is provided with an overload protection function that protects the load and the S8E3 from possible damage by overcurrent. The following graph shows the overload detection and reset operation of the S8E3.

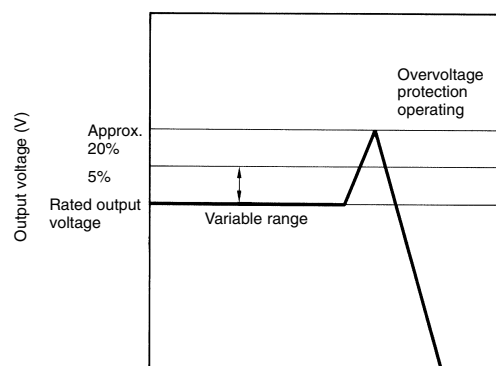


| Type   | Operating method         | Detection                       | Reset                                                          |
|--------|--------------------------|---------------------------------|----------------------------------------------------------------|
| V1     | Inverted drop            | 105% min. of rated load current | Automatically resets when the output current returns to normal |
| V2, V3 | Short-circuit protection | ---                             | Automatically resets when the output current returns to normal |

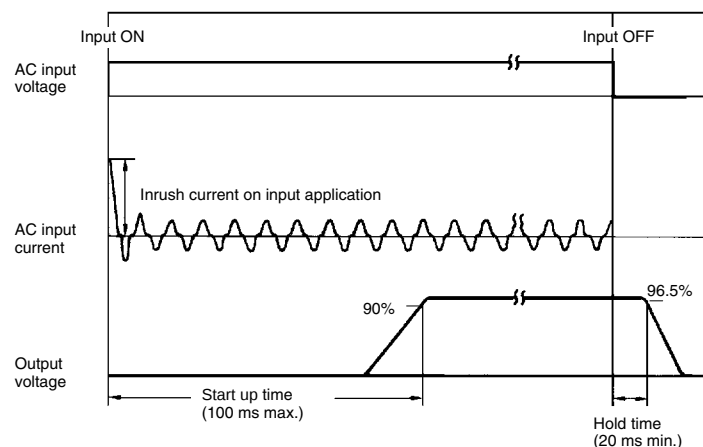
- Note: 1. The overload protection function of output  $V_1$  is triggered when the total output of  $V_1$ ,  $V_2$ , and  $V_3$  exceeds the permissible output capacity of the S8E3 (total overcurrent protection). If outputs  $V_2$  and  $V_3$  are within their rated currents, overload protection for  $V_1$  operates with its output current is 105% or more of the rated output current. Caution is required, however, because operation depends on the output status of outputs  $V_2$  and  $V_3$ .
2.  $V_2$  and  $V_3$  have an independent short-circuit protection function.
3. Do not continue operating the S8E3 if an output terminal is short-circuited or overloaded, or the S8E3 may incur output voltage fluctuation, internal element deterioration, or damage.

## OVERVOLTAGE PROTECTION (V1 OUTPUT ONLY)

The Power Supply is provided with an overvoltage protection function that protects the load and the Power Supply from possible damage by overvoltage. When the output voltage rises above a set value (120% of the rated output voltage), the protection function is triggered, shutting off all of the output voltage. If this occurs, reset the Power Supply by turning it off for 1 minute min. and then turning it on again.



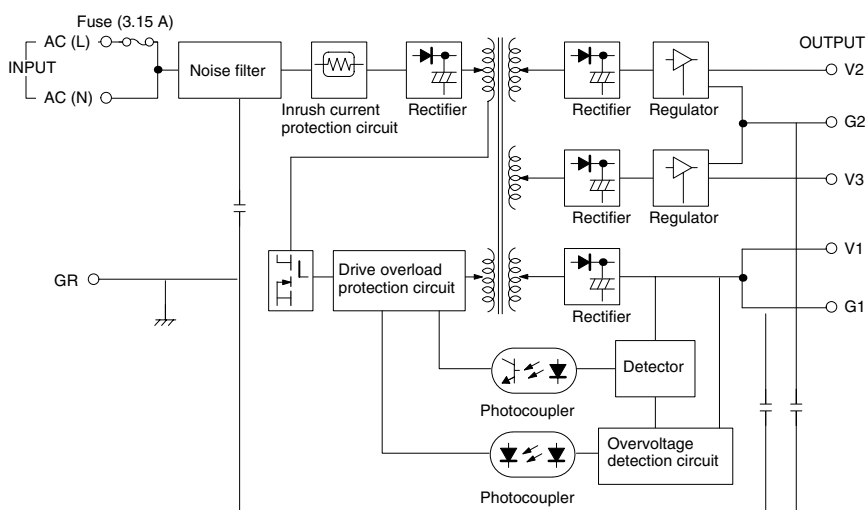
## INRUSH CURRENT, START UP TIME, HOLD TIME



# Operation

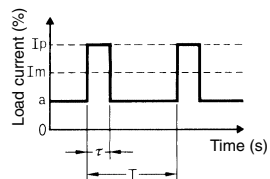
## ■ BLOCK DIAGRAM

### 30-W, 50-W Models



## ■ PEAK LOAD CURRENT (S8E3-05031□ ONLY)

The rated current of the S8E3-05031□ is 1.5 A at 12 V. The peak load current of the S8E3-05031□ is available at 12 V under the following conditions, in which case the waveform of the load current must satisfy the following formula.



$$I_{av} \square I_m = \frac{(I_p - a)\tau}{T} + a \text{ (see note)}$$

|            |                                         |     |
|------------|-----------------------------------------|-----|
| $I_p$ :    | Peak current (2 A max.)                 | (A) |
| $I_{av}$ : | Rated output current (1.5 A)            | (A) |
| $I_m$ :    | Mean load current                       | (A) |
| $\tau$ :   | Pulse width of peak current (30 s max.) | (S) |
| $T$ :      | Frequency                               | (S) |
| $a$ :      | Continuous load current                 | (A) |

Note: When the output current rises above the peak current, the overload protection function is triggered and the output voltage will decrease.

## ■ SERIES OR PARALLEL OPERATION

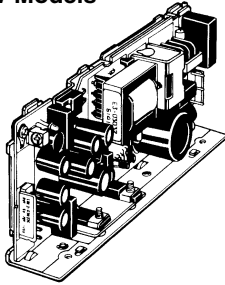
Model S8E3 cannot be used in series or parallel operation.

# Dimensions

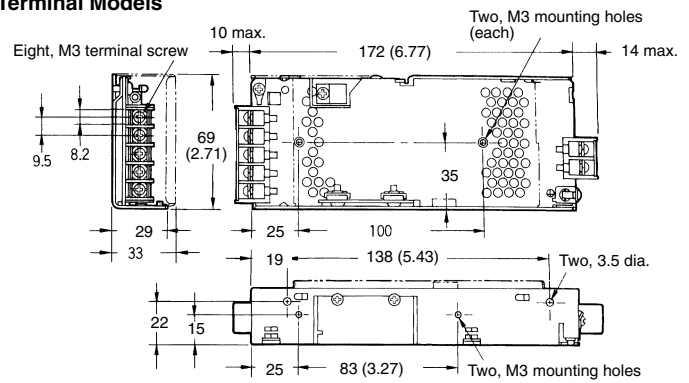
Unit: mm (inch)

## ■ SWITCHING POWER SUPPLIES

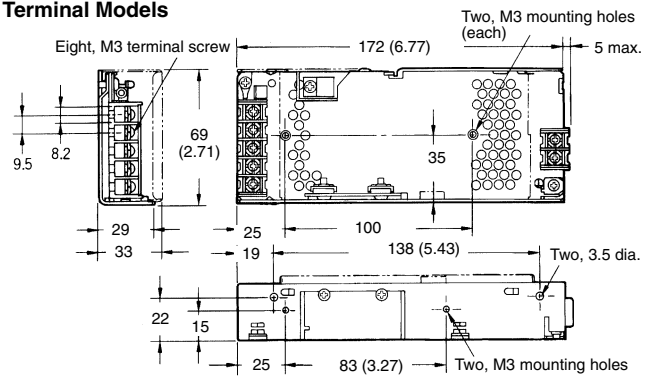
### 30-W Models



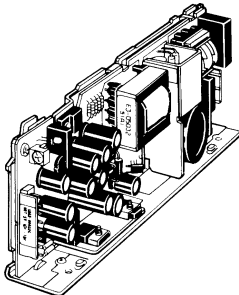
#### Front Terminal Models



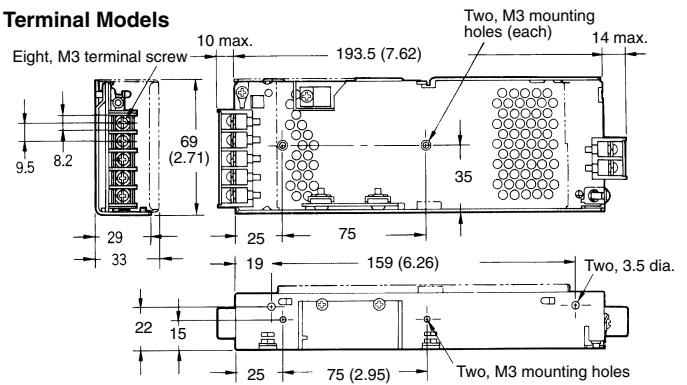
#### Top Terminal Models



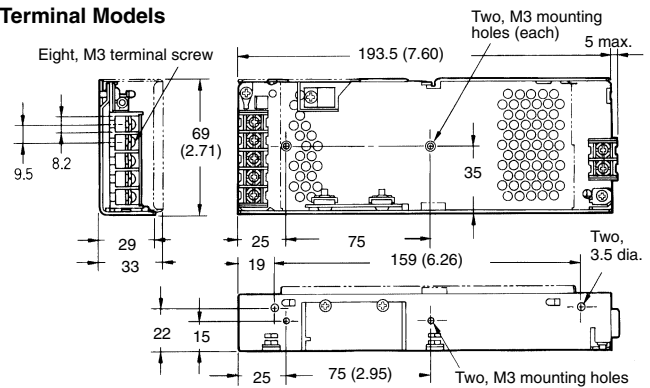
### 50-W Models



#### Front Terminal Models

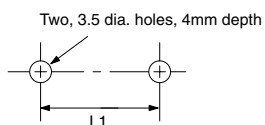


#### Top Terminal Models

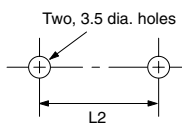


## ■ MOUNTING HOLES

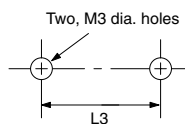
### Side Mounting



### Back Mounting



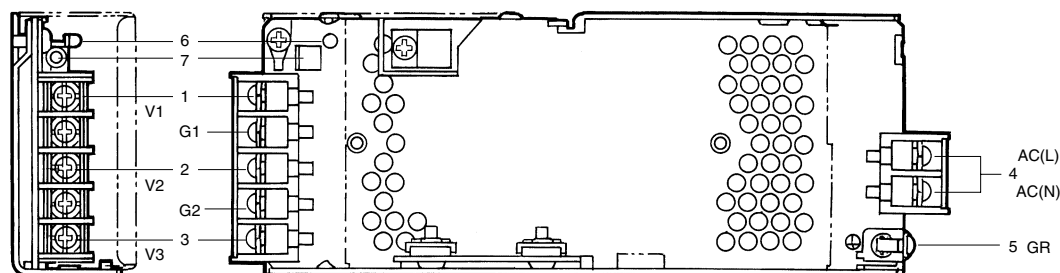
### Bottom Mounting



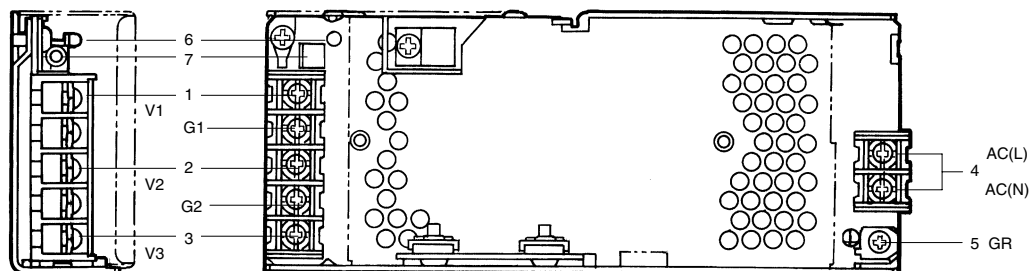
| Output | 30 W             | 50 W             |
|--------|------------------|------------------|
| L1     | 100 mm (3.94 in) | 75 mm (2.95 in)  |
| L2     | 83 mm (3.27 in)  | 75 mm (2.95 in)  |
| L3     | 138 mm (5.43 in) | 159 mm (6.26 in) |

## Nomenclature

### Front Terminal Models (30-/50-W)



### Top Terminal Models (30-/50-W)



1. **V1:** DC Output Terminals
2. **V2:** DC Output Terminals
3. **V3:** DC Output Terminals

Note: Connect the load lines to V1, V2, and V3.

4. **AC Input Terminals:** Connect input lines to these terminals.
5. **Ground Terminals:** Connect ground line to this terminal.
6. **Output Indicator:** Lights while direct current (DC) output is ON.
7. **V.ADJ Adjuster:** It is possible to increase or decrease the output voltage by 5%.

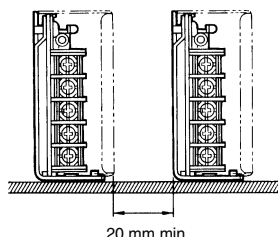
# Precautions

## ■ MOUNTING

- To improve and maintain the reliability of the Power Supply over a long period of time, mount the Power Supply so that air flow takes place around the Power Supply. The Power Supply is designed to dissipate heat through natural air-flow.
- Forced-air cooling is recommended.

### Two (or More) Power Supplies Mounted Side-by-Side

When mounting two or more Power Supplies side-by-side, allow at least 20 mm spacing between them, as shown in the following illustration.



### Mounting Screws

When tightening the mounting screws into the power supply, do not allow them to penetrate more than 4 mm into the power supply.

### Penetration of Metal Filings and Cuttings

If drilling and other work is carried out over the power supply, metal filings, cuttings, and other materials may fall onto the printed circuit boards inside the power supply, leading to internal shorts and damage. If it is necessary to work over top of the power supply, cover the power supply with a sheet or other suitable material to prevent the entry of foreign matter into the power supply. This step is necessary even if the power supply is equipped with a cover. After completing the above work and before supplying power, remove the sheet to avoid interference with appropriate cooling.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters into inches, divide by 25.4

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