SPB Series

DIN Rail Mount Switching Mode Power Supply

▣ Features

- DIN rail type mount and screw mount methods
- Efficient power conversion
  : high conversion efficiency up to 92% with LLC circuit (SPB-240)
  : stable power supply with minimal noise and ripple
- Space efficient design
  : slim and compact size for maximum space efficiency
  : uniform depth size (except SPB-015/030) for neat and tidy installation
- Safety and user-friendly features
  : terminal protection cover (SPB-060/120/180/240)
  : easy wiring with rising clamp terminal (SPB-015/030)
  : inrush current prevention, output overcurrent prevention, output overvoltage prevention, output short-circuit protection, circuit overheating protection
  : low output voltage indicator (red LED), output indicator (green LED)
- Output power: 15W, 30W, 60W, 120W, 180W, 240W

Line-up

SPB-015/030 Series   SPB-060 Series   SPB-120 Series   SPB-180 Series   SPB-240 Series

⚠ Please read "Safety Considerations" in operation manual before using.

CE   c(UL)us LISTED

▣ Ordering Information

SPB — 120 — 24

5	5VDC
12	12VDC
24	24VDC
48	48VDC

Output voltage

015	15W	120	120W
030	30W	180	180W
060	60W	240	240W

Output power

SPB	Switching Mode Power Supply

Item

▣ Specifications

Model	SPB-015-05	SPB-015-12	SPB-015-24	SPB-030-05	SPB-030-12	SPB-030-24	SPB-060-12	SPB-060-24	SPB-060-48	SPB-120-12	SPB-120-24	SPB-120-48	SPB-180-24	SPB-180-48	SPB-240-12	SPB-240-24	SPB-240-48
Output power	15W	15.6W	15.6W	25W	30W	31.2W	60W	60W	62.4W	96W	120W	120W	180W	182.4W	240W	240W	240W
Voltage	100-240VAC∼ (permissible voltage: 85-264VAC∼/120-370VDC⎓)																
Frequency	50/60Hz																
Efficiency[1] (typical) 100VAC∼	77%	80%	83%	77%	82%	84%	81%	84%	85%	82%	85%	85%	89%	89%	87%	89%	89%
Efficiency[1] (typical) 240VAC∼	76%	79%	82%	78%	83%	85%	83%	86%	87%	85%	88%	88%	92%	92%	90%	92%	92%
Power factor[1]	—	—	—	—	—	—	—	—	—	Min. 0.9	Min. 0.9	Min. 0.9	Min. 0.9	Min. 0.9	Min. 0.9	Min. 0.9	Min. 0.9
Max. current consumption[1]	0.4A	0.4A	0.4A	0.8A	0.8A	0.8A	1.6A	1.6A	1.6A	1.9A	1.9A	1.9A	3.0 A	3.0 A	3.8A	3.8A	3.8A
Current consumption[1] (typical) 100VAC∼	0.35A	0.35A	0.34A	0.56A	0.63A	0.63A	1.24A	1.21A	1.19A	1.19A	1.49A	1.43A	2.03A	2.04A	2.76A	2.71A	2.73A
Current consumption[1] (typical) 240VAC∼	0.19A	0.19A	0.19A	0.30A	0.35A	0.35A	0.66A	0.65A	0.64A	0.52A	0.61A	0.61A	0.83A	0.84A	1.14A	1.12A	1.13A
Power factor correction circuit	—	—	—	—	—	—	—	—	—	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in
Voltage	5VDC⎓	12VDC⎓	24VDC⎓	5VDC⎓	12VDC⎓	24VDC⎓	12VDC⎓	24VDC⎓	48VDC⎓	12VDC⎓	24VDC⎓	48VDC⎓	24VDC⎓	48VDC⎓	12VDC⎓	24VDC⎓	48VDC⎓
Current	3A	1.3A	0.65A	5A	2.5A	1.3A	5A	2.5A	1.3A	8A	5A	2.5A	7.5A	3.8A	20A	10A	5A
Voltage adjustment range[2]	Max. ±10%	Max. ±10%	Max. ±10%	Max. ±10%	Max. ±10%	Max. ±10%	Max. ±5%	Max. ±5%	Max. ±5%	Max. ±5%	Max. ±5%	Max. ±5%	Max. ±5%	Max. ±5%	Max. ±5%	Max. ±5%	Max. ±5%
Input variation[3]	Max. ±0.5%	Max. ±0.5%	Max. ±0.5%	Max. ±0.5%	Max. ±0.5%	Max. ±0.5%	Max. ±0.5%	Max. ±0.5%	Max. ±0.5%	Max. ±0.5%	Max. ±0.5%	Max. ±0.5%	Max. ±0.5%	Max. ±0.5%	Max. ±0.5%	Max. ±0.5%	Max. ±0.5%
Load variation	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%
Ripple & Ripple noise[1][4]	Max. ±1.5%	Max. ±1%	Max. ±1%	Max. ±1.5%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1%	Max. ±1.5%	Max. ±1%	Max. ±1%
Start-up time[1] (typical) 100VAC∼	500ms	550ms	650ms	600ms	550ms	550ms	520ms	550ms	1200ms	1200ms	1200ms	1200ms	87ms	75ms	75ms	87ms	75ms
Start-up time[1] (typical) 240VAC∼	550ms	550ms	650ms	600ms	550ms	550ms	530ms	550ms	400ms	400ms	400ms	400ms	56ms	45ms	45ms	56ms	45ms
Hold time[1] (typical) 100VAC∼	24ms	25ms	25ms	20ms	15ms	15ms	15ms	14ms	15ms	98ms	75ms	87ms	36ms	25ms	33ms	36ms	25ms
Hold time[1] (typical) 240VAC∼	190ms	190ms	190ms	130ms	110ms	110ms	100ms	110ms	108ms	97ms	43ms	86ms	36ms	25ms	33ms	36ms	25ms

※1: It is for 100% load.
※2: The output voltage adjuster (V.ADJ) should be used within voltage adjustment range.
※3: It is for the rated input voltage 100-240VAC (85-264VAC), and 100% load.
※4: It is for the rated input voltage 100-240VAC.

DIN Rail Mount Type Switching Mode Power Supply

▣ Specifications

Model			SPB-015-05	SPB-015-12	SPB-015-24	SPB-030-05	SPB-030-12	SPB-030-24	SPB-060-12	SPB-060-24	SPB-060-48	SPB-120-12	SPB-120-24	SPB-120-48	SPB-180-24	SPB-180-48	SPB-240-12	SPB-240-24	SPB-240-48
Protection	Inrush current protection (typical)	100VAC~	7A	7A	7A	7A	7A	6A	13A	14A	10A	9A	11A	10A	8A	8A	8A	8A	8A
		240VAC~	32A	30A	31A	29A	31A	29A	19A	17A	37A	37A	36A	37A	25A	26A	22A	25A	26A
	Over-current protection[4]		105 to 160%			105 to 160%			105 to 160%			105 to 160%			105 to 160%		105 to 160%		
	Over-voltage protection		—			—			—			16.0V ±10%	30.0V ±10%	58.0V ±10%	30.0V ±10%	58.0V ±10%	16.0V ±10%	30.0V ±10%	58.0V ±10%
	Output low-voltage indicate		4.2V ±10%	9.6V ±10%	20.0V ±10%	4.2V ±10%	9.6V ±10%	20.0V ±10%	9.6V ±10%	20.0V ±10%	43.0V ±10%	9.6V ±10%	20.0V ±10%	43.0V ±10%	20.0V ±10%	43.0V ±10%	10.0V ±10%	20.0V ±10%	43.0V ±10%
Indicator			Output indicator: green LED, output low-voltage indicator: red LED																
Insulation resistance			Over 100MΩ (at 500VDC megger between all input terminals and output terminals)																
Dielectric strength			3,000VAC 50/60Hz for 1 min (between all input terminals and output terminals)																
			1,500VAC 50/60Hz for 1 min (between all input terminals and F.G.)																
Vibration			0.75mm amplitude at frequency 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hour																
Shock			300m/s² (approx. 30G) in each X, Y, Z direction for 3 times																
EMS			Conforms to EN61000-6-2																
EMI			Conforms to EN61000-6-4																
Safety standards			EN60950, EN50178																
Environ-ment	Ambient temp.[5]		-10 to 50℃, storage: -25 to 65℃ (surrounding air temp.: max. 40℃)																
	Ambient humi.		25 to 85%RH, storage: 25 to 90%RH																
Input cable			AWG24 to 19 (material: Cu)			AWG24 to 19 (material: Cu)			AWG21 to 19 (material: Cu)			AWG21 to 19 (material: Cu)			AWG21 to 19 (material: Cu)		AWG18 to 16 (material: Cu)		
Terminal tightening torque			0.3 to 0.5N·m			0.3 to 0.5N·m			0.7 to 0.9N·m			0.7 to 0.9N·m			0.7 to 0.9N·m		0.7 to 0.9N·m		
Protection			IP20 (IEC standard)																
Approval			CE cURus LISTED			CE cURus LISTED			CE cURus LISTED			CE cURus LISTED			CE cURus LISTED		CE cURus LISTED		
Weight[6]			Approx. 202g (approx. 129g)			Approx. 249g (approx. 176g)			Approx. 347g (approx. 274g)			Approx. 570g (approx. 466g)			Approx. 609g (approx. 505g)		Approx. 866g (approx. 736g)		

※5: Refer to '▣ Output Derating Curve by Ambient Temperature'.
※6: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

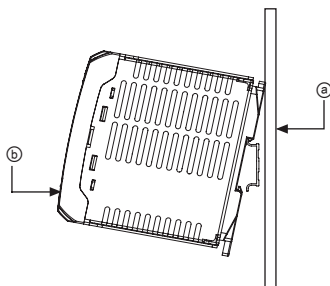## ▣ Output Derating Curve by Ambient Temperature
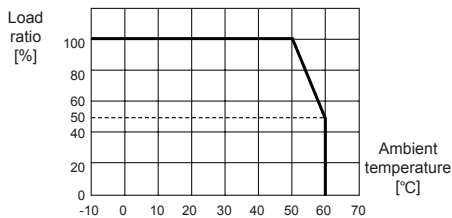
▣ Over-Heating Protection

If the inner temperature of the switching element is around 140℃ by overheat, it stops switching operation and becomes open state. Output voltage is not output.

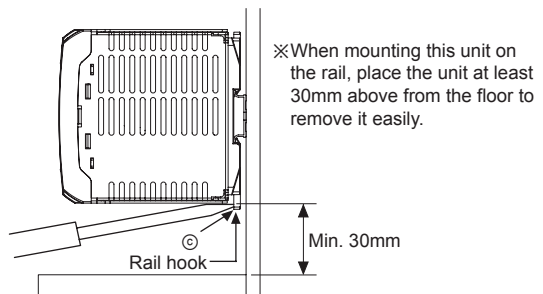## ▣ Installation
◎ DIN rail mounting
● Mounting to DIN rail
Put the unit on the part ⓐ of the rail before press it to the direction ⓑ.
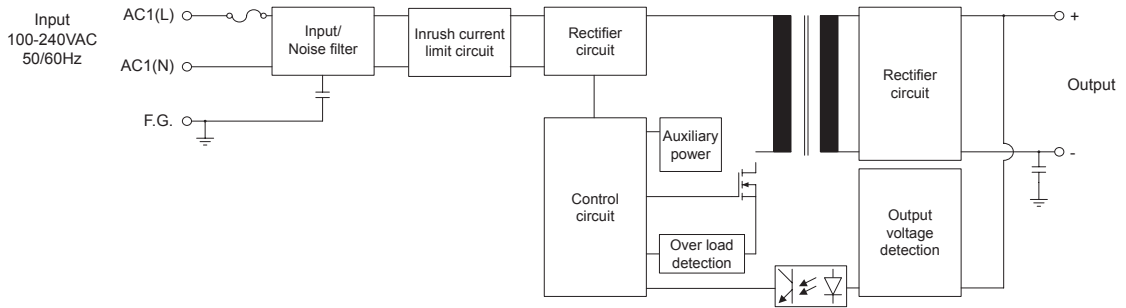

● Removing from DIN rail
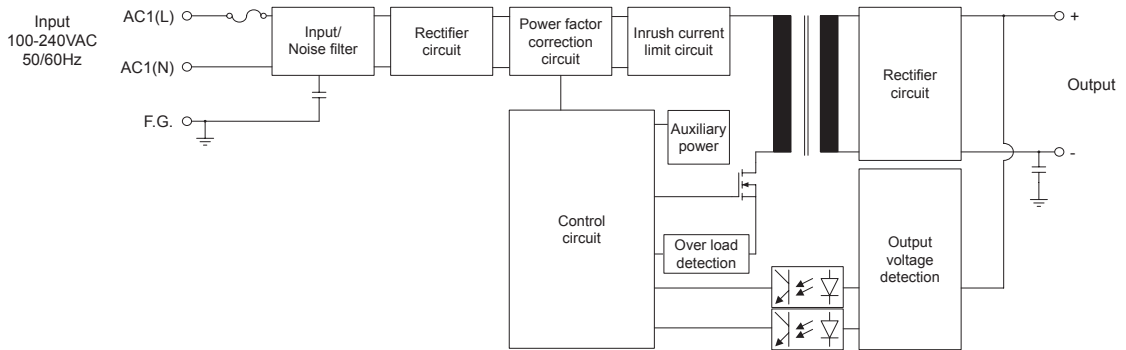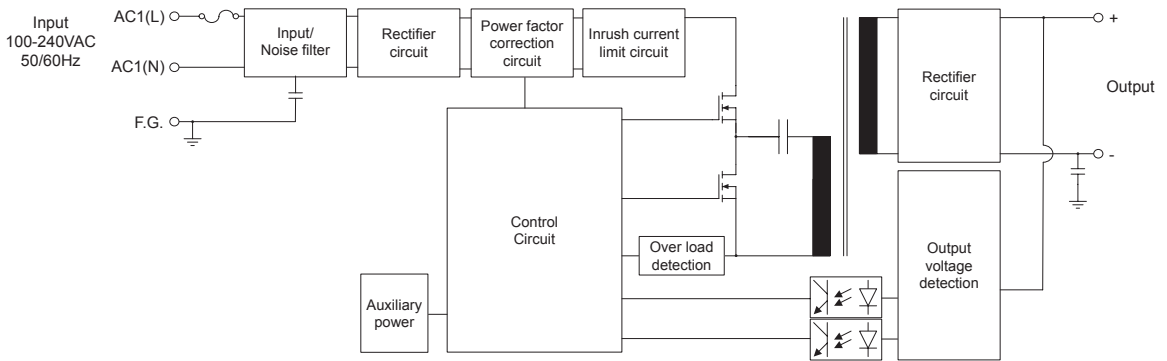Put a screw driver into the part ⓒ before push it downward.

※When mounting this unit on the rail, place the unit at least 30mm above from the floor to remove it easily.

Rail hook

Min. 30mm

SPB Series

▣ Block Diagram

● SPB-015/030/060 Series

Input
100-240VAC
50/60Hz

AC1(L)

AC1(N)

F.G.

| Input/ Noise filter | Inrush current limit circuit | Rectifier circuit |

Control circuit

Auxiliary power

Over load detection

Rectifier circuit

Output voltage detection

+

Output

-

● SPB-120 Series

Input
100-240VAC
50/60Hz

AC1(L)

AC1(N)

F.G.

| Input/ Noise filter | Rectifier circuit | Power factor correction circuit | Inrush current limit circuit |

Control circuit

Auxiliary power

Over load detection

Rectifier circuit

Output voltage detection

+

Output

-

● SPB-180/240 Series

Input
100-240VAC
50/60Hz

AC1(L)

AC1(N)

F.G.

| Input/ Noise filter | Rectifier circuit | Power factor correction circuit | Inrush current limit circuit |

Control Circuit

Over load detection

Auxiliary power

Rectifier circuit

Output voltage detection

+

Output

-

▣ Wiring Diagram/Unit Description

● SPB-015/030 Series

OUTPUT
24VDC=1.3A
+V +V -V -V

A — DC ON
B — DC LOW

C

Autonics
SPB-030-24
POWER SUPPLY

INPUT
50/60Hz
100-240VAC~0.8A

L N FG

● SPB-060/120/180/240 Series

OUTPUT 24VDC = 5.0A
+V +V -V -V

A — DC ON
B — DC LOW

C

Autonics
SPB-120-24
POWER SUPPLY

INPUT
50/60Hz 100-240VAC~1.5A

L N FG
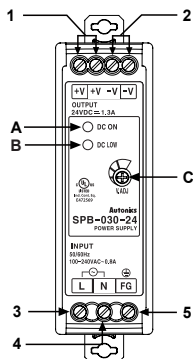
● **Wiring Diagram**
1. **Output power [+V] terminal**
2. **Output power [-V] terminal**
3. **Input power [L] terminal**
4. **Input power [N] terminal**
5. **Frame ground [F.G.] terminal**

● **Unit Description**
A. **Output (DC ON) indicator (green)**
B. **Output low voltage (DC LOW) indicator (red)**
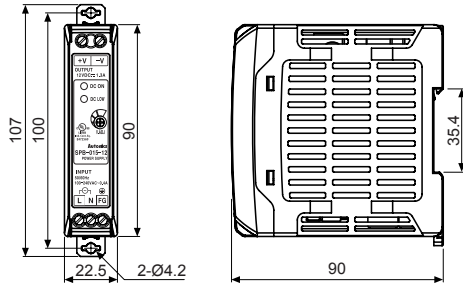C. **Output voltage adjuster (V.ADJ)**

※SPB-015/060 Series has an output power [+V] terminal (1) and an output power [-V] terminal (2).
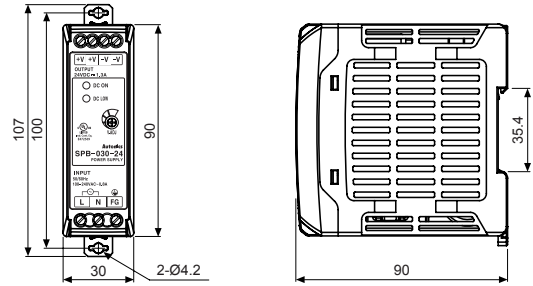
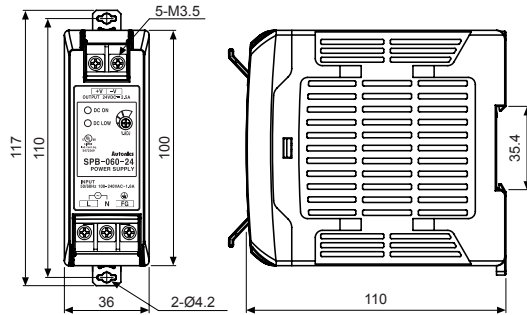# DIN Rail Mount Type Switching Mode Power Supply

◼ Dimensions

● **SPB-015 Series**
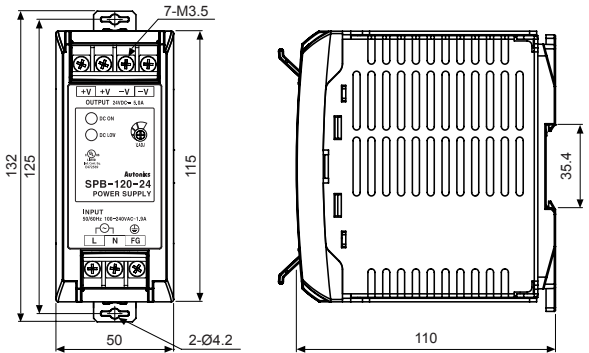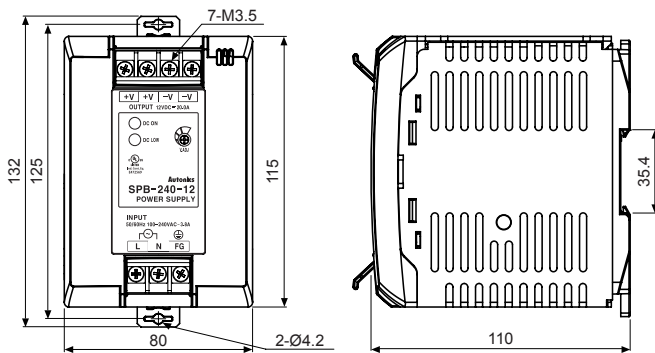
● **SPB-030 Series**

● **SPB-060 Series**

● **SPB-120/180 Series**

● **SPB-240 Series**

SPB Series

▣ Proper Usage

● Cautions for operating
• This product does not have the function for parallel or series operation.
• The output current must be used within the rated specification.
  If over-current is applied to the product, over-current protection is operating.
  It causes shorten the life cycle of the product.
• The output voltage must be used within the rated output specification.
• For the product, which has the control function for over-voltage, if making the output voltage adjuster (V.ADJ) to over rated voltage, the function starts to work.
• This product has the function of over-heating protection.
  The over-heating protection operates when the product has over-heating condition.
  The product normally operates if the load is removed for over 5 minutes.
• In case of the SPB-015/030/060, it does not have the harmonics suppression and power factor improvement circuit. To improve harmonics suppression and power factor, install the additional device.
• In case of the SPB-015/030/060, it uses condenser rectification, and power factor is within 0.4 to 0.6 range. To use a abinet panel or a electric transformer, select input power capacity of this product as below formula.

$$\text{Input apparent power [VA]} = \frac{\text{Output active power [W]}}{\text{Power factor} \times \text{Efficiency}}$$

• This product is provided with a noise filter, but noise is variable according to operating conditions such as installation environment and wiring.
• When the inner fuse is damaged, replace the fuse of same specification.

● Cautions for mounting
• Mount this product on the surface of metal panel vertically for the reliability.
• Please mount this product at a well-ventilated place in order to increase the heat radiation efficiency.
• Mounting
  When installing more than two power supplies, min. 20mm distance is required to radiate heat effectively.
  Assure min. 75mm distance of the upper or the lower product and mount the products as following figure.
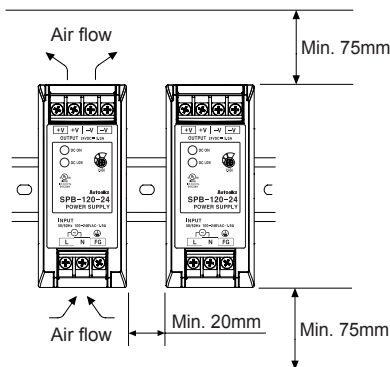
● Dielectric or insulation resistance test when this unit is installed in the control panel.
• Separate the unit completely from a control panel circuit.
• Short all terminals of the unit.
● Caution for connecting the input power terminal
Connect input line(AC) to the input terminal correctly.
When you connect this to the other terminal, it may cause damage to the power supply.
● Do not use the unit in the following environments.
• Environments with high vibration or shock.
• Environments with strong alkalis or acids.
• Environments with exposure to direct sunlight.
• Near machinery which produce strong magnetic force or electric noise.
● This unit may be used in the following environments.
• Indoors
• Max. altitude: 2,000m
• Pollution degree 2
• Installation category II