

# SPB Series

## DIN Rail Mount Switching Mode Power Supply

Line-up

### 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



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.



### Ordering Information

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

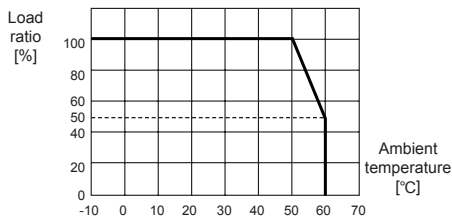
Model		SPB -015 -05	SPB -015 -12	SPB -015 -24	SPB -030 -05	SPB -030 -12	SPB -030 -24	SPB -060 -12	SPB -060 -24	SPB -060 -48	SPB -120 -12	SPB -120 -24	SPB -120 -48	SPB -180 -24	SPB -180 -48	SPB -240 -12	SPB -240 -24	SPB -240 -48	
Protection	Inrush current protection (typical)	100VAC~ 7A	7A	7A	7A	7A	6A	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/s <sup>2</sup> (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																		
Environment	Ambient temp.※5	-10 to 50°C, storage: -25 to 65°C (surrounding air temp.: max. 40°C)																	
	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 <small>UL LISTED</small>			CE <small>UL LISTED</small>			CE <small>UL LISTED</small>			CE <small>UL LISTED</small>			CE <small>UL LISTED</small>			CE <small>UL LISTED</small>			
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

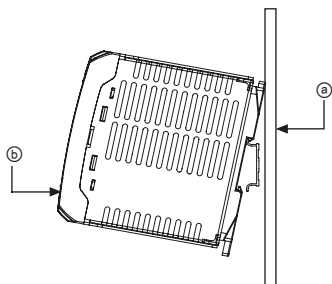
If the inner temperature of the switching element is around 140°C by overheat, it stops switching operation and becomes open state. Output voltage is not output.

## Installation

### ○ DIN rail mounting

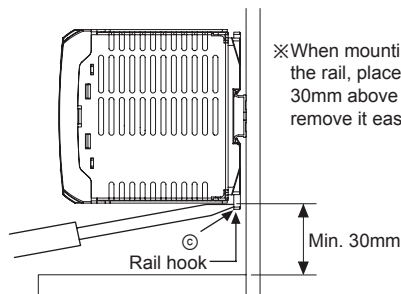
#### ● Mounting to DIN rail

Put the unit on the part ㉑ of the rail before press it to the direction ㉒.



#### ● Removing from DIN rail

Put a screw driver into the part ㉓ before push it downward.

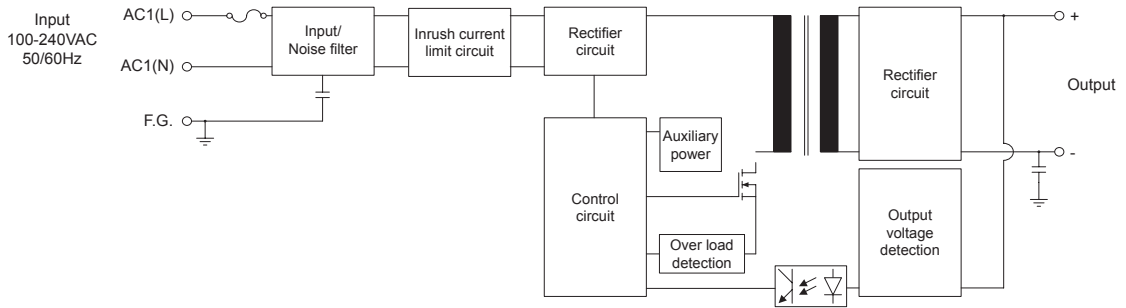


- (A) Photoelectric Sensors
- (B) Fiber Optic Sensors
- (C) Door/Area Sensors
- (D) Proximity Sensors
- (E) Pressure Sensors
- (F) Rotary Encoders
- (G) Connectors/ Connector Cables/ Sensor Distribution Boxes/Sockets
- (H) Temperature Controllers
- (I) SSRs / Power Controllers
- (J) Counters
- (K) Timers
- (L) Panel Meters
- (M) Tacho / Speed / Pulse Meters
- (N) Display Units
- (O) Sensor Controllers
- (P) Switching Mode Power Supplies
- (Q) Stepper Motors & Drivers & Controllers
- (R) Graphic/ Logic Panels
- (S) Field Network Devices
- (T) Software

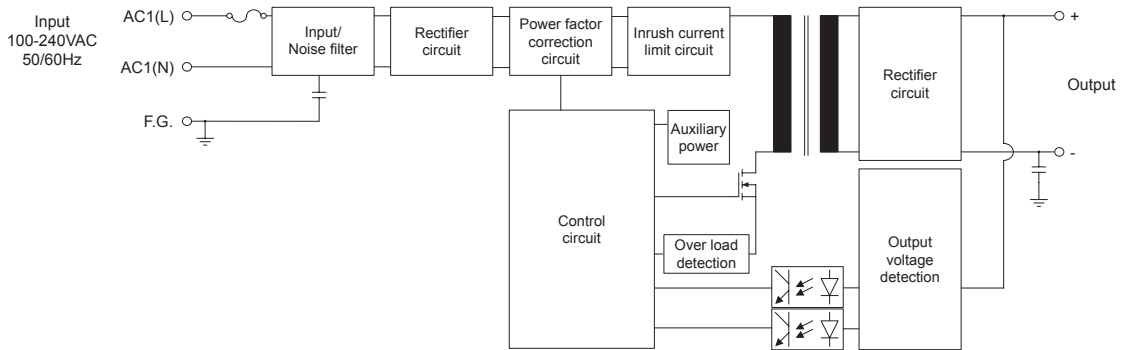
# SPB Series

## Block Diagram

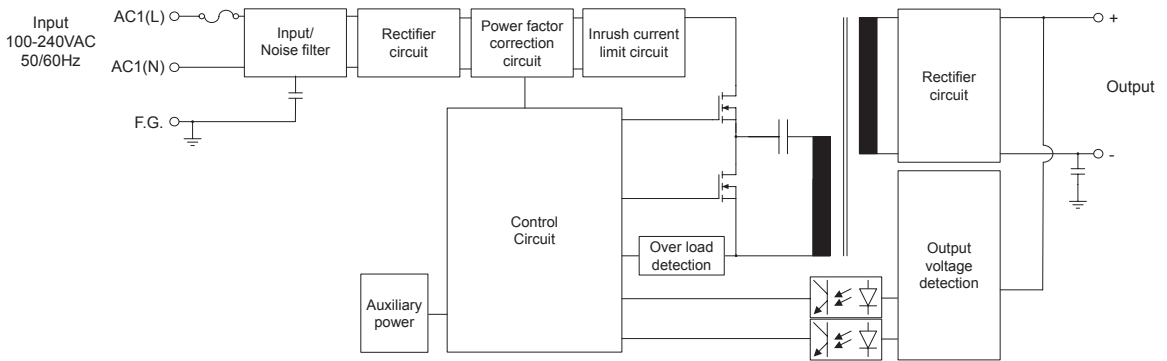
### ● SPB-015/030/060 Series



### ● SPB-120 Series

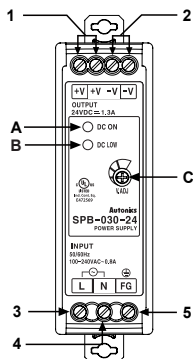


### ● SPB-180/240 Series



## Wiring Diagram/Unit Description

### ● SPB-015/030 Series



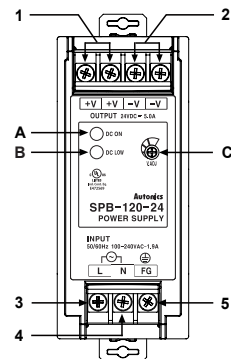
#### ● Wiring Diagram

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-060/120/180/240 Series

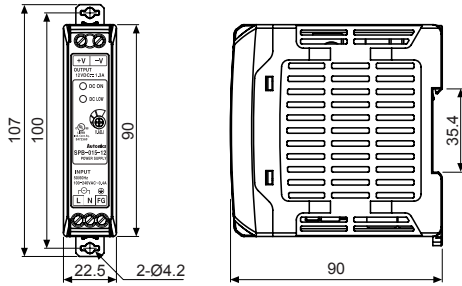


※SPB-015/060 Series has an output power [+V] terminal (1) and an output power [-V] terminal (2).

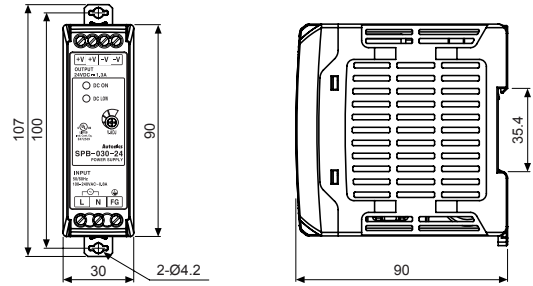
# DIN Rail Mount Type Switching Mode Power Supply

## ■ Dimensions

### ● SPB-015 Series

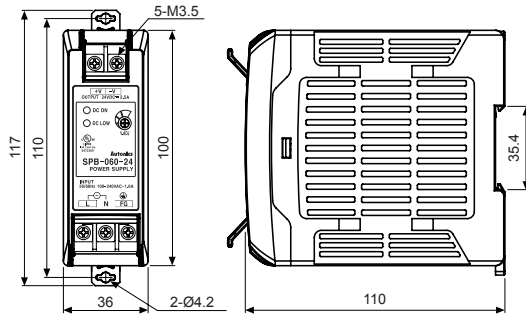


### ● SPB-030 Series

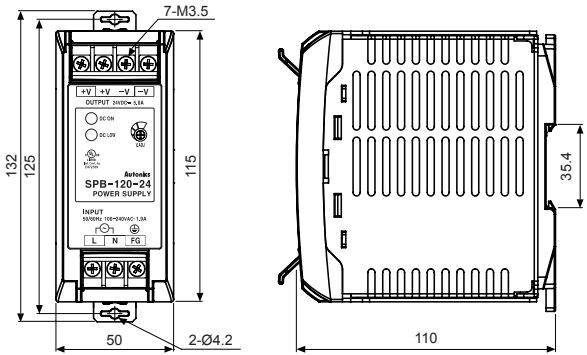


(unit: mm)

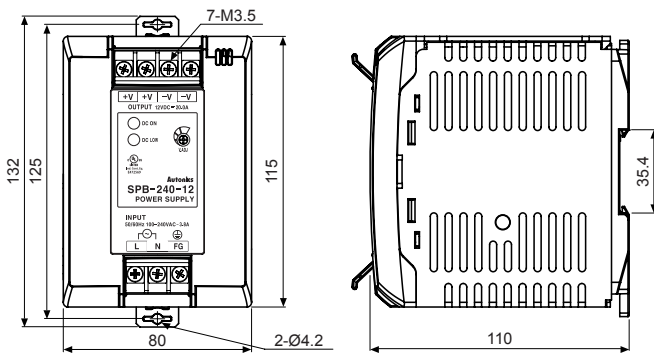
### ● SPB-060 Series



### ● SPB-120/180 Series



### ● SPB-240 Series



(A)	Photoelectric Sensors
(B)	Fiber Optic Sensors
(C)	Door/Area Sensors
(D)	Proximity Sensors
(E)	Pressure Sensors
(F)	Rotary Encoders
(G)	Connectors/ Connector Cables/ Sensor Distribution Boxes/Sockets
(H)	Temperature Controllers
(I)	SSRs / Power Controllers
(J)	Counters
(K)	Timers
(L)	Panel Meters
(M)	Tacho / Speed / Pulse Meters
(N)	Display Units
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(S)	Field Network Devices
(T)	Software

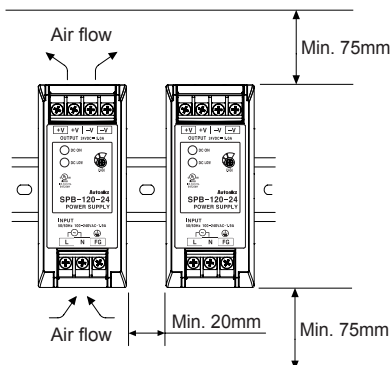
## ■ Proper Usage

- 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