Autonics

DIN-Rail Mount SMPS

SPB Series

PRODUCT MANUAL

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Major Features

- 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 over-current prevention, output over-voltage prevention, output short-circuit protection, circuit over-heating protection
  - Low output voltage indicator (red LED), output indicator (green LED)

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

⚠ Warning Failure to follow instructions may result in serious injury or death.

01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)
Failure to follow this instruction may result in personal injury, economic loss or fire.

02. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.
Failure to follow this instruction may result in explosion or fire.

03. Install on the DIN rail, and ground to the F.G. terminal separately.
Failure to follow this instruction may result in fire or electric shock.

04. Do not connect, repair, or inspect the unit while connected to a power source.
Failure to follow this instruction may result in fire or electric shock.

05. Check 'Wiring Diagram' before wiring.
Failure to follow this instruction may result in fire.

06. Do not disassemble or modify the unit.
Failure to follow this instruction may result in fire or electric shock.

⚠ Caution Failure to follow instructions may result in injury or product damage.

01. When connecting the F.G. terminal, use AWG 14 (2.1mm^2) cable or over and tighten the terminal screw with a tightening torque of 0.7 to 0.9N·m. When connecting the F.G. terminal of SPB-015/030 model, tighten the terminal screw with a tightening torque of 0.3 to 0.5N·m.
Failure to follow this instruction may result in fire or malfunction due to contact failure.

02. Use the unit within the rated specifications.
Failure to follow this instruction may result in fire, product damage or shortening the life cycle of the product.

03. Use dry cloth to clean the unit, and do not use water or organic solvent.
Failure to follow this instruction may result in fire or electric shock.

04. Keep the product away from metal chip, dust, and wire residue which flow into the unit.
Failure to follow this instruction may result in fire or product damage.

05. Do not touch the product during operation or for a certain period of time after stopping.
Failure to follow this instruction may result in burns.

06. Upon occurrence of an error, disconnect the power source.
Failure to follow this instruction may result in fire or product damage.

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- Do not connect the output voltage neither in serial nor in parallel.
- Since SPB-015/030/060 models have no harmonic suppression or power factor correction circuit, install the circuit separately if necessary.
- Since SPB-015/030/060 models use the condenser input method, power factor is in the range of 0.4 to 0.6. When using distribution board or transformer, check the capacity of the input voltage.
  Input apparent power[VA] = $\frac{\text{Output active power[W]}}{\text{Power factor} \times \text{Efficiency}}$
- Even though a noise filter is installed inside the product, the product can be affected by noise depending on the installation location or wiring.
- If the internal fuse is damaged, please contact our A/S center.

- To ensure the reliability of the product, install the product on the panel or metal surface vertically to the ground.
- Install the unit in the well ventilated place.
- Do not use near the equipment which generates strong magnetic force or high frequency noise.
- This unit may be used in the following environments.
  - Indoors (in the environment condition rated in 'Specifications')
  - Altitude max. 2,000m
  - Pollution degree 2
  - Installation category II

Ordering Information

This is only for reference.
For selecting the specific model, follow the Autonics web site.

SPB - ❶ - ❷

❶ Output power
Number: Output power (unit: W)

❷ Output voltage
Number: Output voltage (unit: VDC⎓)

Specifications

Output range		15 to 31.2 W					
Model		SPB-015-05	SPB-015-12	SPB-015-24	SPB-030-05	SPB-030-12	SPB-030-24
Output power		15 W	15.6 W	15.6 W	25 W	30 W	31.2 W
Input condition							
Voltage [01]		100 - 240 VAC~ (permissible voltage: 85 - 264 VAC~ / 120 - 370 VDC⎓)					
Frequency		50 / 60 Hz					
Efficiency [02] (Typical)	100 VAC~	77%	80%	83%	77%	82%	84%
	240 VAC~	76%	79%	82%	78%	83%	85%
Power factor [02]		-			-		
Max. current consumption [02]		0.4 A			0.8 A		
Current consumption [02] (Typical)	100 VAC~	0.35 A	0.35 A	0.34 A	0.56 A	0.63 A	0.63 A
	240 VAC~	0.19 A	0.19 A	0.19 A	0.30 A	0.35 A	0.35 A
Output characteristics							
Voltage		5 VDC⎓	12 VDC⎓	24 VDC⎓	5 VDC⎓	12 VDC⎓	24 VDC⎓
Current		3 A	1.3 A	0.65 A	5 A	2.5 A	1.3 A
Voltage adjustment range		≤ ±10%			≤ ±10%		
Input variation [03]		≤ ±0.5%			≤ ±0.5%		
Load variation		≤ ±1%			≤ ±1%		
Ripple noise [02], [04]		≤ ±1.5%	≤ ±1%	≤ ±1%	≤ ±1.5%	≤ ±1%	≤ ±1%
Start-up time [02] (Typical)	100 VAC~	500 ms	550 ms	650 ms	600 ms	550 ms	550 ms
	240 VAC~	550 ms	550 ms	650 ms	600 ms	550 ms	550 ms
Hold time [02] (Typical)	100 VAC~	24 ms	25 ms	25 ms	20 ms	15 ms	15 ms
	240 VAC~	190 ms	190 ms	190 ms	130 ms	110 ms	110 ms
Protection							
Inrush current protection (Typical)	100 VAC~	7 A	7 A	7 A	7 A	7 A	6 A
	240 VAC~	32 A	30 A	31 A	29 A	31 A	29 A
Over-current protection [04] [05]		105 to 160%			105 to 160%		
Over-voltage protection [05]		-			-		
Output low-voltage indicate		4.2V ±10%	9.6V ±10%	20.0V ±10%	4.2V ±10%	9.6V ±10%	20.0V ±10%
Power factor correction circuit		-			-		
Approval [06]		CE cULus EAC			CE cULus EAC		
Unit weight (Package)		≈ 129 g (≈ 202 g)			≈ 176 g (≈ 249 g)		

Output range		60 to 120 W					
Model		SPB-060-12	SPB-060-24	SPB-060-48	SPB-120-12	SPB-120-24	SPB-120-48
Output power		60 W	60 W	62.4 W	96 W	120 W	120 W
Input condition							
Voltage [01]		100 - 240 VAC~ (permissible voltage: 85 - 264 VAC~ / 120 - 370 VDC⎓)					
Frequency		50 / 60 Hz					
Efficiency [02] (Typical)	100 VAC~	81%	84%	85%	82%	85%	85%
	240 VAC~	83%	86%	87%	85%	88%	88%
Power factor [02]		-			≥ 0.9		
Max. current consumption [02]		1.6 A			1.9 A		
Current consumption [02] (Typical)	100 VAC~	1.24 A	1.21 A	1.19 A	1.19 A	1.49 A	1.43 A
	240 VAC~	0.66 A	0.65 A	0.64 A	0.52 A	0.61 A	0.61 A
Output characteristics							
Voltage		12 VDC⎓	24 VDC⎓	48 VDC⎓	12 VDC⎓	24 VDC⎓	48 VDC⎓
Current		5 A	2.5 A	1.3 A	8 A	5 A	2.5 A
Voltage adjustment range		≤ ±5%			≤ ±5%		
Input variation [03]		≤ ±0.5%			≤ ±0.5%		
Load variation		≤ ±1%			≤ ±1%		
Ripple noise [02], [04]		≤ ±1%			≤ ±1%		
Start-up time [02] (Typical)	100 VAC~	520 ms	550 ms	1200 ms	1200 ms	1200 ms	1200 ms
	240 VAC~	530 ms	550 ms	400 ms	400 ms	400 ms	400 ms
Hold time [02] (Typical)	100 VAC~	15 ms	14 ms	15 ms	98 ms	75 ms	87 ms
	240 VAC~	100 ms	110 ms	108 ms	97 ms	43 ms	86 ms
Protection							
Inrush current protection (Typical)	100 VAC~	13 A	14 A	10 A	9 A	11 A	10 A
	240 VAC~	19 A	17 A	37 A	37 A	36 A	37 A
Over-current protection [04] [05]		105 to 160%			105 to 160%		
Over-voltage protection [05]		-			16.0 V ±10%	30.0 V ±10%	58.0 V ±10%
Output low-voltage indicate		9.6 V ±10%	20.0 V ±10%	43.0 V ±10%	9.6 V ±10%	20.0 V ±10%	43.0 V ±10%
Power factor correction circuit		-			Built-in		
Approval [06]		CE cULus EAC			CE cULus EAC		
Unit weight (Package)		≈ 274 g (≈ 347 g)			≈ 466 g (≈ 570 g)		

Output range		180 to 240 W				
Model		SPB-180-24	SPB-180-48	SPB-240-12	SPB-240-24	SPB-240-48
Output power		180 W	182.4 W	240 W		
Input condition						
Voltage [01]		100 - 240 VAC~ (permissible voltage: 85 - 264 VAC~ / 120 - 370 VDC⎓)				
Frequency		50 / 60 Hz				
Efficiency [02] (Typical)	100 VAC~	89%	89%	87%	89%	89%
	240 VAC~	92%	92%	90%	92%	92%
Power factor [02]		≥ 0.9		≥ 0.9		
Max. current consumption [02]		3.0 A		3.8 A		
Current consumption [02] (Typical)	100 VAC~	2.03 A	2.04 A	2.76 A	2.71 A	2.73 A
	240 VAC~	0.83 A	0.84 A	1.14 A	1.12 A	1.13 A
Output characteristics						
Voltage		24 VDC⎓	48 VDC⎓	12 VDC⎓	24 VDC⎓	48 VDC⎓
Current		7.5 A	3.8 A	20 A	10 A	5 A
Voltage adjustment range		≤ ±5%		≤ ±5%		
Input variation [03]		≤ ±0.5%		≤ ±0.5%		
Load variation		≤ ±1%		≤ ±1%		
Ripple noise [02], [04]		≤ ±1%		≤ ±1.5%	≤ ±1%	≤ ±1%
Start-up time [02] (Typical)	100 VAC~	87 ms	75 ms	75 ms	87 ms	75 ms
	240 VAC~	56 ms	45 ms	45 ms	56 ms	45 ms
Hold time [02] (Typical)	100 VAC~	36 ms	25 ms	33 ms	36 ms	25 ms
	240 VAC~	36 ms	25 ms	33 ms	36 ms	25 ms
Protection						
Inrush current protection (Typical)	100 VAC~	8 A	8 A	8 A	8 A	8 A
	240 VAC~	25 A	26 A	22 A	25 A	26 A
Over-current protection [04] [05]		105 to 160%		105 to 160%		
Over-voltage protection [05]		30.0 V ±10%	58.0 V ±10%	16.0 V ±10%	30.0 V ±10%	58.0 V ±10%
Output low-voltage indicate		20.0 V ±10%	43.0 V ±10%	10.0 V ±10%	20.0 V ±10%	43.0 V ±10%
Power factor correction circuit		Built-in		Built-in		
Approval [06]		CE cULus EAC		CE cULus EAC		
Unit weight (Package)		≈ 505 g (≈ 609 g)		≈ 736 g (≈ 866 g)		

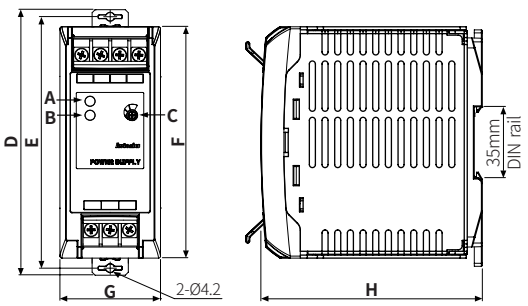
01) Since there is no separate input over-voltage protection for the voltage over the rated input voltage range, supplying over-voltage may result in product damage.
02) It is for 100% load condition.
03) It is in the rated input voltage 100-240VAC~ (85-264VAC~) with 100% load.
04) It is for the rated input voltage 100-240VAC~.
05) Refer to the catalog to check the related feature data.
06) It is for AC power input only.

Indicator	Output indicator (green), output low-voltage indicator (red)
Insulation resistance	≥ 100 MΩ (500 VDC⎓ megger, between all input and output terminals)
Dielectric strength	3,000 VAC~ 50/60 Hz for 1 min (between all input and output terminals) 1,500 VAC~ 50/60 Hz for 1 min (between all input terminals and F.G.)
Vibration	10 to 55 Hz (for 1 min) in each X, Y, Z direction for 2 hours
Shock	300 m/s² (≈ 30G) in each X, Y, Z direction for 3 times
EMS	Conforms to EN61000-6-2
EMI	Conforms to EN61000-6-4
Ambient temperature [01]	-10 to 50 °C, storage: -25 to 65 °C (no freezing or condensation)
Ambient humidity	25 to 85%RH, storage: 25 to 90%RH (no freezing or condensation)
Protection structure	IP20 (IEC standard)

01) UL approved ambient temperature is 40°C, refer to 'Output De-rating Curve by Ambient Temperature'.

Dimensions

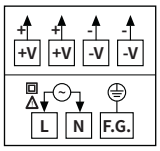
- Unit: mm, refer to the Autonics website for the details of the product.
- This is based on SPB-030 model.



	A	B	C	D	E	F	G	H
SPB-015	Output indicator: DC ON, Green	Output low voltage indicator: DC LOW, Red	Output voltage adjuster: V.ADJ [01]	107	100	90	22.5	90
SPB-030				107	100	90	30	90
SPB-060				117	110	100	36	110
SPB-120				132	125	115	50	110
SPB-180				132	125	115	50	110
SPB-240				132	125	115	80	110

01) Use within the voltage variable range. If the voltage exceeds the output voltage range, over-voltage protection function is activated and the output is cut off.

Connection



Mark	Function
+V	Output power (+)
-V	Output power (-)
L, N	Input power
F.G.	Frame ground

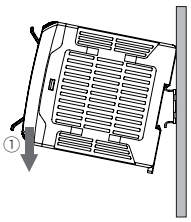
	Wire	Terminal	Torque
SPB-015 01)	AWG 24 to 19 (Material: Cu)	Flat-head	0.3 to 0.5 N·m
SPB-030			
SPB-060 01)	AWG 21 to 19 (Material: Cu)	5-M3.5	0.7 to 0.9 N·m
SPB-120		7-M3.5	
SPB-180			
SPB-240	AWG 18 to 16 (Material: Cu)	7-M3.5	0.7 to 0.9 N·m

01) It has one +V/-V terminal each.

Installation

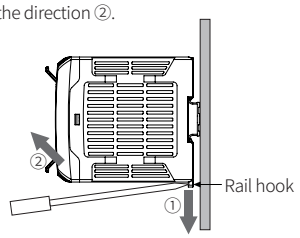
■ Mounting on DIN rail

Put the product on DIN rail and press it to the direction ①.

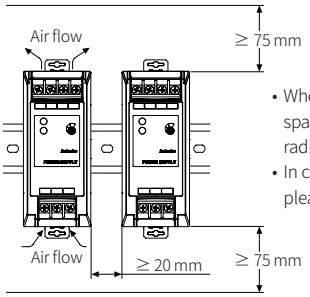


■ Removing from DIN rail

Put a screw driver into the rail hook, push it to the direction ①, and lift the product to the direction ②.



■ Installation interval

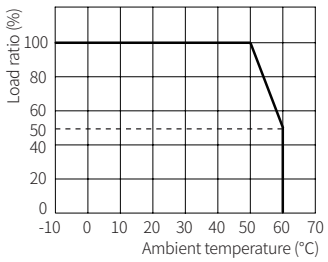


- When installing multiple SMPSs, please keep space at least 20 mm between SMPSs for heat radiation.
- In case of the top and bottom of the product, please keep space at least 75 mm.

Over-heating Protection

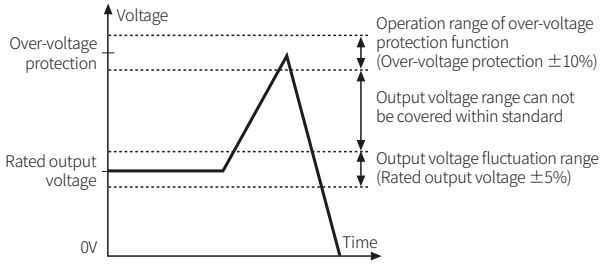
The over-heating protection function cuts off the output voltage when the temperature in an element increases due to over-heating.
When the over-heating protection function is activated, the product does not work properly. Please resupply power after cooling the product sufficiently.

Output De-rating Curve by Ambient Temperature



Feature Data of Over-voltage Protection

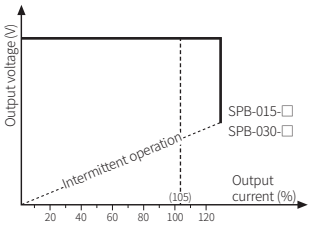
To protect the connected load, the output is disconnected when the over-voltage is detected.
When the output is disconnected, apply the power after waiting at least 3 minutes.
• Not all models support this function. Check the specification before using.



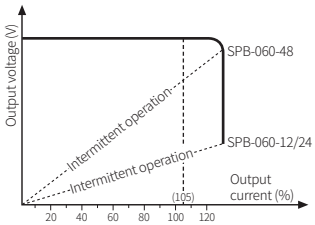
Feature Data of Over-current Protection

When the over rated current is flowed, the over-current protection circuit is operated to protect the product by reducing output voltage.
The protection circuit is released automatically when the load current is under the rated current.
• It is for the rated input voltage 100-240VAC∼.

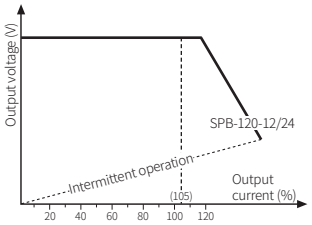
■ Output power 15 W / 30 W models

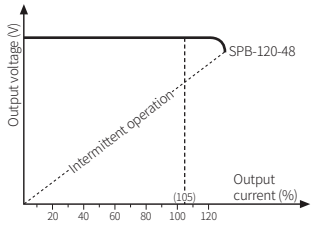


■ Output power 60 W model

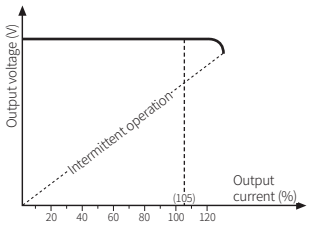


■ Output power 120 W model

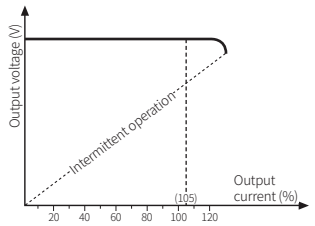




■ Output power 180 W model

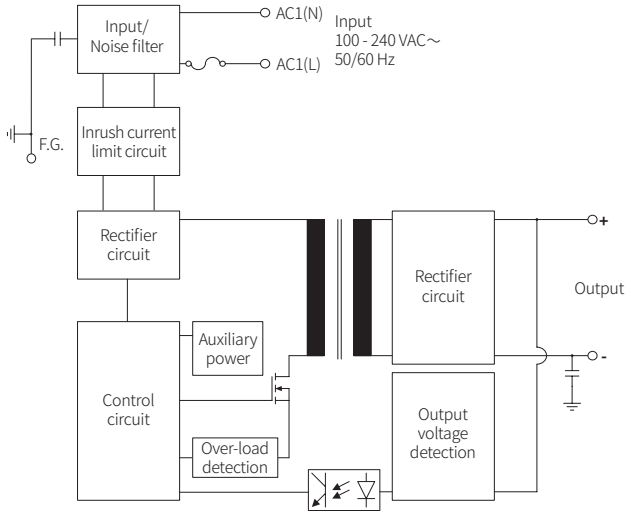


■ Output power 240 W model

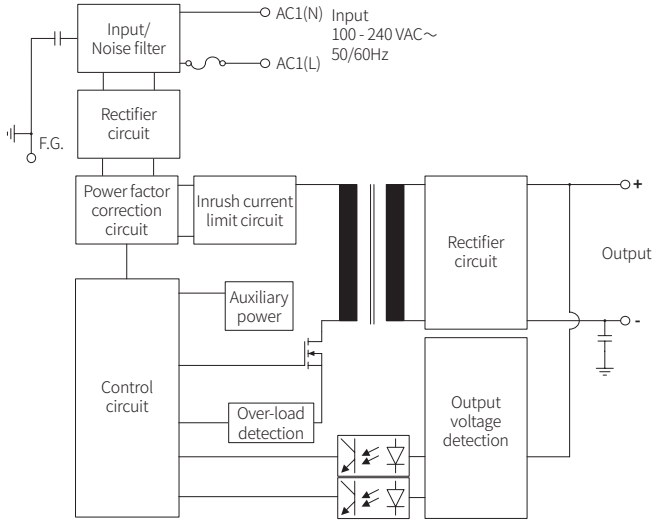


Block Diagram

■ **SPB-015 / 030 / 060 series**



■ **SPB-120 series**



■ **SPB-180 / 240 series**