

DIN-Rail Mount SMPS

SPB-A Series
INSTRUCTION MANUAL

TCD230001AG

Autonics

Thank you for choosing our Autonics product.

Be sure to read and fully understand the instruction manual and other manuals before using the product.

For your safety, read and follow the safety precautions, warnings, cautions, and handling instructions listed in the instruction manual, other manuals, and the Autonics website.

Keep this document in a location where it can be easily accessed.



Visit the Autonics website (www.autonics.com or QR code) for the latest information. Manuals, CAD files, certifications, software, etc. are available. The dimensions, specifications, certifications, etc. are subject to change without notice for product improvement. Certain models may be discontinued without notice.

Safety Precautions

- ‘Safety Precautions’ are provided to ensure safe and proper use of the product and to prevent accidents or hazards. Please make sure to follow them carefully.
- ⚠ symbol indicates a caution, warning of potential hazards under certain conditions.

⚠ **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 or store 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. **Connect the ground completely to the PE terminal.**
Failure to follow this instruction may result in electric shock or malfunction.
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, electric shock or product damage.
06. **Do not disassemble or modify the unit.**
Failure to follow this instruction may result in fire, electric shock or product damage.

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

01. **When connecting the terminal, tighten the terminal screw with a tightening torque of 0.3 to 0.5 N·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 the device within the output derating curve according to ambient temperature.**
Failure to follow this instruction may result in product damage or shortening the life cycle of the product.
04. **Use a 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.
05. **Keep the product away from metal chip, dust, and wire residue which flows into the unit.**
Failure to follow this instruction may result in fire or product damage.
06. **Do not touch the product during operation or immediately after disconnection until the product has cooled.**
Failure to follow this instruction may result in burns.
07. **Upon occurrence of an error, disconnect the power source.**
Failure to follow this instruction may result in fire or product damage.
08. **All strands of multi-strand wire should be inserted / secured into the terminal block and / or wire ferrules should be used.**
Failure to follow this instruction may result in fire or product damage.
09. **Do not use the inverter output as the voltage input.**
Failure to follow this instruction may result in fire due to rapid switching.
10. **Do not use the device in conditions where inrush current or overload occurs frequently.**
If short circuit or overcurrent condition is continued, it may result in fire or product damage.
11. **Use an external diode when using it to operate a motor, etc.**
If the voltage output exceeds the rated output voltage range, it may result in malfunction or product damage.
12. **Use an external diode for series / parallel operation.**
Failure to follow this instruction may result in fire or product damage due to the reverse voltage generated inside the SMPS when the load is short-circuited.
13. **In case of series / parallel operation, make sure that the current over the rated current does not flow to the SMPS.**
Failure to follow this instruction may result in product damage.

Cautions During Use

- Follow instructions in ‘Cautions during Use’. Otherwise, it may cause unexpected accidents.
- In the case of models with 120 / 240 / 480 W output, noise may occur when power is applied until the internal circuit stabilizes.

- When connecting the output terminal, cable length should be less than 30 m.
- If large current flows, use multiple terminal blocks.
- Up to two power supplies of the same output may be connected in parallel / series.
- Install the device in a well-ventilated area. Install a cooling fan additionally in a poorly ventilated environment.
- There is a noise filter inside the device, but in an environment where a lot of noise occurs, install an additional external noise filter.
- Install the device perpendicular to the ground.
- Incorrect mounting may cause deterioration or damage to internal parts, and may affect specifications.
- Connected devices with frequent inrush currents or overloads may deteriorate or damage internal components.
- Short-circuit or over-current conditions must not continue during operation.
- Internal parts may deteriorate or be damaged.
- Do not turn the output voltage adjustment adjuster (V.Adjust) with excessive force.
- It may result in damage.
- 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, the actual product does not support all combinations. For selecting the specified model, follow the Autonics website.

SPB - A ① - ②

- ① **Power**
Number: Power (unit: W)
- ② **Output voltage**
Number: Output voltage (unit: VDC≐)

Product Components

- Product × 1
- Instruction manual × 1

Sold Separately

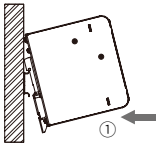
- Bracket: BK-SPB-F01 (SPB-A015 / 030 / 060-□), BK-SPB-F02 (SPB-A120 / 240 / 480-□)

Mounting

- It can be mounted on a 35 mm DIN rail conforming to EN 60715 standards.
- Depending on the installation environment, screw installation is available using the bracket (sold separately).

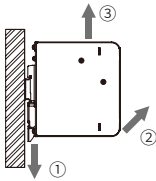
■ Mounting with DIN Rail

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



■ Removing with DIN Rail

Push the latch to the direction ① with a tool and pull the bottom of the device in the direction ②. Lift it in direction ③.

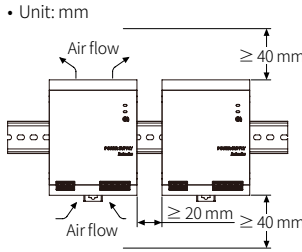


Cautions during Installation

⚠ **High Temperature Caution**
While supplying power to the load or right after turning off the power of the load, do not touch the body.
Failure to follow this instruction may result in a burn due to the high temperature.

■ Mount space

- When installing adjacently to multiple SMPS or heating devices, keep space between power controllers for heat radiation.
Horizontal: ≥ 20 mm, Vertical: ≥ 40 mm



Unit Descriptions



1. Output indicator (DC OK, green)

- : Turns ON during normal operation after power input.
- Flashes when overcurrent protection function operates.

2. Output low voltage indicator (DC Low, red)

- : Turns ON when output voltage is lower than reference value.

Output voltage [VDC≐]	5	12	24	48
Output low voltage indication [VDC≐]	4.2 (± 10%)	9.6 (± 10%)	20.0 (± 10%)	43.0 (± 10%)

3. Output voltage adjuster (V.Adjust)

- : Adjust this within voltage variable range. It is not guaranteed when using outside the variable range.

Specifications

Indicator	Output indicator (green), output low voltage indicator (red)				
Over-current protection	≥ 121 %				
Over-voltage protection ^(a)	≈ 130 %				
Output short-circuit protection	Built-in				
Overheat protection	Built-in				
Parallel operation ^(a)	Available				
Insulation resistance	Among all input terminals, all output terminals and PE: ≥ 100 MΩ (500 VDC≐ megger)				
Dielectric strength	Among all input terminals and all output terminals: 3 kVAC~, Cutoff current = 20 mA Among all input terminals and PE: 2 kVAC~, Cutoff current = 20 mA Among all output terminals and PE: 1 kVAC~, Cutoff current = 20 mA				
SELV	EN62368-1				
PELV	EN60204-1				
Vibration ^(a)	10 to 55 Hz, 0.75 mm double amplitude, in each X, Y, Z direction for 2 hours				
Shock	150 m/s ² (≈ 15 G) in each X, Y, Z direction for 3 times				
EMS	Conforms to EN61000-6-2				
EMI	Conforms to EN61000-6-4				
Ambient temperature ^(a)	-20 to 70 °C, storage: -25 to 80 °C (no freezing or condensation)				
Ambient humidity	20 to 90 %RH, storage: 20 to 90 %RH (no freezing or condensation)				
Life expectancy ^(a)	10 years				
Protection structure	IP20 (IEC standard)				
SEMI F47 ^(a)	Compliant with SEMI F47-0706 (voltage sag immunity test), Input voltage: 130 to 240 VAC~				
Certification ^(a)	CE, ENEC, UL, VDE, TUV				

- 01) To reset the overvoltage protection, shut off input power for at least 5 minutes and then restart.
- 02) For more information, refer the product manuals.
- 03) Applies when the device is installed vertically to the ground. For non-vertical installation, secure the product to withstand vibration and shock.
- 04) UL approved ambient temperature 40 °C, refer to the ‘Derating Curve’.
- 05) Based on the following conditions: rated voltage applied, ambient temperature ≤ 40 °C, average load factor ≤ 50%, and compliance with the ‘Mounting’ and ‘Cautions during Installation’ sections.
- 06) It is for SPB-A□-24 model.
- 07) It is for 100 - 240 VAC~ / VDC≐ power input only.

Model	SPB-A015-05	SPB-A015-12	SPB-A015-24	SPB-A030-05	SPB-A030-12	SPB-A030-24
Input	100 - 240 VAC~ / 90 - 350 VDC≐ (allowable voltage: 85 - 264 VAC~)					
Current ^(a) (Typical)	115 VAC~ 230 VAC~	0.32 A 0.21 A	0.29 A 0.19 A	0.31 A 0.2 A	0.54 A 0.33 A	0.57 A 0.36 A
Frequency	50 / 60 Hz (allowable frequency: 47 - 63 Hz)					
Efficiency ^(a) (Typical)	115 VAC~ 230 VAC~	0.72 0.70	0.78 0.74	0.75 0.75	0.73 0.71	0.82 0.82
Power factor ^(a) (Typical)	115 VAC~ 230 VAC~	0.56 0.44	0.56 0.47	0.57 0.45	0.5 0.44	0.51 0.43
Power factor correction circuit (PFC)	Not available					
Inrush current ^(a) (Typical)	115 VAC~ 230 VAC~	16 A 32 A				
Leakage current (Typical)	115 VAC~ 230 VAC~	0.21 mA 0.28 mA			0.16 mA 0.25 mA	

Output	5 VDC≐	12 VDC≐	24 VDC≐	5 VDC≐	12 VDC≐	24 VDC≐
Voltage	5 VDC≐	12 VDC≐	24 VDC≐	5 VDC≐	12 VDC≐	24 VDC≐
Current	3 A	1.2 A	0.65 A	5 A	2.5 A	1.3 A
Power	15 W	14.4 W	15.6 W	25 W	30 W	31.2 W
Power boost ^(a)	120 % of rated current					
Voltage adjustment range	-10 to 15 % (with V.Adjust)					
Ripple ^(a) ^(b)	170 mV _{p-p} (Typical)	150 mV _{p-p}	110 mV _{p-p}	110 mV _{p-p}	80 mV _{p-p}	100 mV _{p-p}
Input variation ^(a)	≤ 0.5 %					
Load variation ^(a)	≤ 3.0 %					
Temperature variation	≤ 0.05 % / °C					
Start-up time ^(a) (Typical)	115 VAC~ 230 VAC~	720 ms 330 ms	810 ms 400 ms	820 ms 650 ms	580 ms 670 ms	650 ms 510 ms
Hold time ^(a) (Typical)	115 VAC~ 230 VAC~	32 ms 136 ms	33 ms 146 ms	43 ms 140 ms	33 ms 149 ms	29 ms 131 ms
Output low voltage indication	4.2 V (± 10 %)	9.6 V (± 10 %)	20.0 V (± 10 %)	4.2 V (± 10 %)	9.6 V (± 10 %)	20.0 V (± 10 %)
Unit weight (Package)	≈ 135 g (≈ 230 g)			≈ 170 g (≈ 265 g)		

Model	SPB-A060-12	SPB-A060-24	SPB-A120-12	SPB-A120-24
Input	100 - 240 VAC~ / 90 - 350 VDC≐ (allowable voltage: 85 - 264 VAC~)			
Voltage ^(a)	100 - 240 VAC~ / 90 - 350 VDC≐ (allowable voltage: 85 - 264 VAC~)			
Current ^(a) (Typical)	115 VAC~ 230 VAC~	1.05 A 0.6 A	1.1 A 0.7 A	1.3 A 0.7 A
Frequency	50 / 60 Hz (allowable frequency: 47 - 63 Hz)			
Efficiency ^(a) (Typical)	115 VAC~ 230 VAC~	0.81 0.82	0.85 0.87	0.82 0.84
Power factor ^(a) (Typical)	115 VAC~ 230 VAC~	0.54 0.46	0.54 0.46	0.99 0.91
Power factor correction circuit (PFC)	Not available			
Inrush current ^(a) (Typical)	115 VAC~ 230 VAC~	16 A 32 A		
Leakage current (Typical)	115 VAC~ 230 VAC~	0.16 mA 0.3 mA	0.3 mA	0.38 mA

Output	12 VDC≐	24 VDC≐	12 VDC≐	24 VDC≐
Voltage	12 VDC≐	24 VDC≐	12 VDC≐	24 VDC≐
Current	4.5 A	2.5 A	10 A	5 A
Power	54 W	60 W	120 W	
Power boost ^(a)	120 % of rated current			
Voltage adjustment range	-10 to 15 % (with V.Adjust)			
Ripple ^(a) ^(b)	210 mV _{p-p} (Typical)	100 mV _{p-p}	150 mV _{p-p}	120 mV _{p-p}
Input variation ^(a)	≤ 0.5 %			
Load variation ^(a)	≤ 2.0 %			
Temperature variation	≤ 0.05 % / °C			
Start-up time ^(a) (Typical)	115 VAC~ 230 VAC~	635 ms 655 ms	830 ms 770 ms	740 ms 710 ms
Hold time ^(a) (Typical)	115 VAC~ 230 VAC~	23 ms 106 ms	22 ms 103 ms	32 ms 31 ms
Output low voltage indication	9.6 V (± 10 %)	20.0 V (± 10 %)	9.6 V (± 10 %)	20.0 V (± 10 %)
Unit weight (Package)	≈ 230 g (≈ 325 g)		≈ 565 g (≈ 725 g)	

Model	SPB-A240-12	SPB-A240-24	SPB-A240-48	SPB-A480-24	SPB-A480-48
Input	100 - 240 VAC~ / 90 - 350 VDC≐ (allowable voltage: 85 - 264 VAC~)				
Voltage ^(a)	100 - 240 VAC~ / 90 - 350 VDC≐ (allowable voltage: 85 - 264 VAC~)				
Current ^(a) (Typical)	115 VAC~ 230 VAC~	2.5 A 1.3 A	4.8 A 2.4 A		
Frequency	50 / 60 Hz (allowable frequency: 47 - 63 Hz)				
Efficiency ^(a) (Typical)	115 VAC~ 230 VAC~	0.86 0.89	0.89 0.92	0.88 0.93	0.89 0.92
Power factor ^(a) (Typical)	115 VAC~ 230 VAC~	0.99 0.9		0.99 0.97	
Power factor correction circuit (PFC)	Available				
Inrush current ^(a) (Typical)	115 VAC~ 230 VAC~	16 A 32 A	40 A 55 A		
Leakage current (Typical)	115 VAC~ 230 VAC~	0.14 mA 0.25 mA	0.13 mA 0.24 mA		

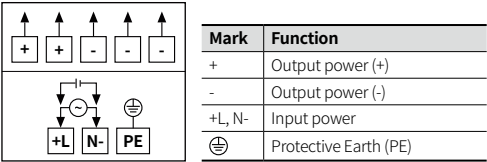
Output	12 VDC≐	24 VDC≐	48 VDC≐	24 VDC≐	48 VDC≐
Voltage	12 VDC≐	24 VDC≐	48 VDC≐	24 VDC≐	48 VDC≐
Current	20 A	10 A	5 A	20 A	10 A
Power	240 W			480 W	
Power boost ^(a)	120 % of rated current				
Voltage adjustment range	-10 to 15 % (with V.Adjust)				
Ripple ^(a) ^(b)	290 mV _{p-p} (Typical)	250 mV _{p-p}	270 mV _{p-p}	180 mV _{p-p}	200 mV _{p-p}
Input variation ^(a)	≤ 0.5 %				
Load variation ^(a)	≤ 2.0 %				
Temperature variation	≤ 0.05 % / °C				
Start-up time ^(a) (Typical)	115 VAC~ 230 VAC~	290 ms 250 ms	310 ms 250 ms	390 ms 290 ms	430 ms 300 ms
Hold time ^(a) (Typical)	115 VAC~ 230 VAC~	36 ms 39 ms	40 ms 38 ms	36 ms 36 ms	31 ms 30 ms
Output low voltage indication	9.6 V (± 10 %)	20.0 V (± 10 %)	43.0 V (± 10 %)	20.0 V (± 10 %)	43.0 V (± 10 %)
Unit weight (Package)	≈ 850 g (≈ 1,050 g)		≈ 1,350 g (≈ 1,570 g)		

- 01) For DC voltage input, install an external fuse to ensure safety.

Model	Fuse specification
SPB-A015 / 030-□	≥ 350 VDC≐, 4 A
SPB-A060 / 120-□	≥ 350 VDC≐, 6 A
SPB-A240 / 480-□	≥ 350 VDC≐, 12 A

- 02) Based on 100 % load
- 03) When cold start operation at 25 °C.
- 04) For more information, refer the product manuals.
- 05) Based on 20 MHz (Typ).
Data measured by connecting capacitors of 22 μF (Aluminum electrolytic capacitor) and 0.1 μF (Film capacitor) to 150 mm from the output terminal. Ripple specifications change when operating in Burst mode.
- 06) Based on 85 - 264 VAC~ input, 100 % load
- 07) Based on 0 to 100 % load

Connection



Model	Wire specification			Terminal	Torque
	Output	Input	PE		
SPB-A015-05 ⁽¹⁾	AWG 20 to 12	AWG 24 to 12	AWG 14 to 12	M2.5	0.3 to 0.5 N m
SPB-A015-12 ⁽¹⁾	AWG 22 to 12				
SPB-A015-24 ⁽¹⁾	AWG 24 to 12				
SPB-A030-05	AWG 18 to 12	AWG 24 to 12		M2.5	
SPB-A030-12	AWG 20 to 12				
SPB-A030-24	AWG 22 to 12				
SPB-A060-12	AWG 18 to 12	AWG 22 to 12			
SPB-A060-24	AWG 20 to 12				
SPB-A120-12	AWG 14 to 10	AWG 22 to 10	AWG 14 to 10	M3	
SPB-A120-24	AWG 18 to 10				
SPB-A240-12	AWG 12 to 10	AWG 20 to 10			
SPB-A240-24	AWG 14 to 10				
SPB-A240-48	AWG 18 to 10				
SPB-A480-24	AWG 12 to 10	AWG 16 to 10			
SPB-A480-48	AWG 14 to 10				