

F1. Switching Mode Power Supplies

Switching mode power supplies are electronic power supplies which convert electrical power efficiently using a switching regulator.

F1-1	DIN-Rail Mount	SPB Series	DIN-Rail Mount Switching Mode Power Supplies
		SP Series	DIN-Rail Mount Switching Mode Power Supplies
F1-2	Panel Mount	SPA Series	Panel Mount Switching Mode Power Supplies
		SPA-400-24 Series	Panel Mount Switching Mode Power Supplies

DIN-Rail Mount
Switching Mode
Power Supplies

SPB Series



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)

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)		

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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%
	240VAC〜	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 LISTED EAC			CE cULus LISTED EAC		
Unit weight (Package)		≈ 274 g (≈ 347 g)			≈ 466 g (≈ 570 g)		

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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 c UL us LISTED EAC		CE c UL us LISTED 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/s^2 (≈ 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'.

DIN-Rail Mount
Switching Mode Power Supplies

SP Series



Features

- Compact size
- Built-in overcurrent protection circuit
- DIN rail mount and screw mount methods
- Power supply: 100 - 240 VAC~
- Output voltage: 5 VDC⎓, 12 VDC⎓, 24 VDC⎓
- Output power: 3 W

Specifications

Model	SP-0305	SP-0312	SP-0324
Output power	3 W		
Input condition			
Voltage	100 - 240 VAC~		
Permissible voltage range	85 - 264 VAC~		
Frequency	50 / 60 Hz		
Efficiency (typical)	67 to 74%		
Current consumption (typical)	≤ 0.15 A		
Output characteristics			
Voltage	5 VDC⎓	12 VDC⎓	24 VDC⎓
Current	0.6 A	0.25 A	0.13 A
Voltage adjustment range	≤ ±5%		
Ripple noise	≤ 5%		
Voltage variation	≤ 0.5% (at 85 - 264 VAC~ 100% load)		
Protection			
Over-current protection	≥ 110%		
Approval	EAC		
Unit weight (Package)	≈ 100 g		
Indicator	Output indicator (red)		
Insulation resistance	≥ 100 MΩ (500 VDC⎓ megger)		
Dielectric strength	2,000 VAC~ 50 / 60 Hz for 1 min		
Vibration	0.75 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 2 hours		
Vibration (malfunction)	0.5 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 10 minutes		
Shock	300 m/s^2 (≈ 30 G) X, Y, Z direction for 3 times		
Shock (malfunction)	100 m/s^2 (≈ 10 G) X, Y, Z direction for 3 times		
Ambient temperature	-10 to 50 °C, storage: -20 to 70 °C (no freezing or condensation)		
Ambient humidity	35 to 85%RH (no freezing or condensation)		

View product detail

Panel Mount
Switching Mode Power Supplies

SPA Series



Features

- Stable power supply with minimal noise and ripple
- Built-in overcurrent protection circuit, output short-circuit protection circuit, overheat protection circuit, and overvoltage protection circuits
  (overvoltage protection: SPA-075 / 100 only)
- EN 60950 (Safety of information technology equipment) compliant
- EN 50178 (Electronic equipment for use in power installations) compliant
- EN 61000-6-2 (EMC: immunity for industrial environments) compliant
- EN 61000-6-4 (EMC: emission standard for industrial environments) compliant
- Output voltage: 5 VDC⎓, 12 VDC⎓, 24 VDC⎓
- Output power: 30 W, 50 W, 75 W, 100 W

Specifications

Output range		30 to 50 W					
Model		**SPA-030-05**	**SPA-050-05**	**SPA-030-12**	**SPA-050-12**	**SPA-030-24**	**SPA-050-24**
Output power		30 W	50 W	30 W	50 W	30 W	50 W
Input condition							
Voltage [01]		100 - 240 VAC~					
Permissible voltage range		85 - 264 VAC~					
Frequency		50 / 60 Hz					
Efficiency [02] (typical)		≥ 60%	≥ 67%	≥ 74%		≥ 80%	
Current consumption [02] (typical)		≤ 1.2 A	≤ 1.6 A	≤ 1.0 A	≤ 1.4 A	≤ 0.8 A	≤ 1.1 A
Inrush current protection (typical)	100 VAC~	≤ 30 A		≤ 20 A		≤ 20 A	
	240 VAC~	≤ 40 A		-		-	
Output characteristics							
Voltage		5 VDC⎓		12 VDC⎓		24 VDC⎓	
Current		6 A	10 A	2.5 A	4.2 A	1.5 A	2.1 A
Voltage adjustment range [03]		≤ ±5%		≤ ±5%		≤ ±5%	
Input variation [04]		≤ ±0.5%		≤ ±0.5%		≤ ±0.5%	
Load variation [02]		≤ ±2%		≤ ±1%		≤ ±1%	
Ripple noise [02]		≤ ±1%		≤ ±1%		≤ ±1%	
Start-up time [02] (typical)		≤ 200 ms		≤ 150 ms		≤ 150 ms	
Hold time [02] (typical)		≥ 10 ms		≥ 10 ms		≥ 10 ms	
Protection							
Over-current protection [05]		≥ 110%		≥ 110%		≥ 110%	
Over-voltage protection [03]		-		-		-	
Output short-circuit protection		≤ 5 ms		≤ 5 ms		≤ 5 ms	
Approval		CE EAC		CE EAC		CE EAC	
Unit weight		≈ 350 g		≈ 350 g		≈ 350 g	

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Output range		75 to 100 W					
Model		**SPA-075-05**	**SPA-100-05**	**SPA-075-12**	**SPA-100-12**	**SPA-075-24**	**SPA-100-24**
Output power		75 W	100 W	75 W	100 W	75 W	100 W
Input condition							
Voltage [01]		100 - 120 / 200 - 240 VAC～ (permissible voltage: 85 - 264 VAC～) switching type					
Frequency		50 / 60 Hz					
Efficiency [02] (typical)		≥ 70%		≥ 78%	≥ 72%	≥ 78%	≥ 80%
Current consumption [02] (typical)		≤ 3.0 A		≤ 2.0 A	≤ 3.0 A	≤ 2.0 A	≤ 2.5 A
Inrush current protection (typical)	100 VAC～	≤ 45 A		≤ 35 A	≤ 45 A	≤ 35 A	
	240 VAC～	≤ 50 A		≤ 40 A	≤ 50 A	≤ 40 A	
Output characteristics							
Voltage		5 VDC⎓		12 VDC⎓		24 VDC⎓	
Current		15 A	20 A	6.3 A	8.5 A	3.2 A	4.2 A
Voltage adjustment range [03]		≤ ±5%		≤ ±5%		≤ ±5%	
Input variation [04]		≤ ±0.5%		≤ ±0.5%		≤ ±0.5%	
Load variation [02]		≤ ±2%		≤ ±1%		≤ ±1%	
Ripple noise [02]		≤ ±1%		≤ ±1%		≤ ±1%	
Start-up time [02] (typical)		≤ 250 ms		≤ 250 ms		≤ 250 ms	
Hold time [02] (typical)		≥ 5 ms		≥ 10 ms	≥ 5 ms	≥ 10 ms	
Protection							
Over-current protection [05]		≥ 110%	≥ 105%	≥ 110%		≥ 110%	
Over-voltage protection [03]		6.5 V ±10%		16.0 V ±10%		30.0 V ±10%	
Output short-circuit protection		≤ 10 ms		≤ 5 ms	≤ 10 ms	≤ 5 ms	
Approval		CE EAC		CE EAC		CE EAC	
Unit weight		≈ 400 g		≈ 400 g		≈ 400 g	

Indicator	Output indicator (green)
Insulation resistance	≥ 100 MΩ (500 VDC⎓ megger, between all inputs and outputs)
Dielectric strength	3,000 VAC～ 50/60 Hz for 1 min (between all inputs and outputs) 1,500 VAC～ 50/60 Hz for 1 min (between all inputs and F.G.)
Vibration	10 to 55 Hz (for 1 min) amplitude at frequency 0.75 mm in each X, Y, Z direction for 2 hours
Shock	300 m/s^2 (≈ 30 G) in each X, Y, Z direction for 3 times
EMS	EN61000-6-2 conformation
EMI	EN61000-6-4 conformation
Safety standards	EN60950, EN50178
Ambient temperature	-10 to 50 °C (SPA-050-05, SPA-030-12, SPA-050-12: -10 to 40 °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)

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 in the rated input voltage 100 VAC～ with 100% load.
03) Use the output voltage adjusting volume within the voltage variable range. If the voltage exceeds the output voltage range, overvoltage protection function is activated and the output is cut off.
04) Rate input voltage
· SPA-030 / 050 series: 100 - 240 VAC～ (85 - 264 VACT) with 100% of load
· SPA-075 / 100 series: 100 - 120 / 200 - 240 (85 - 132 / 170 - 264 VAC～) with 100% of load
· SPA-100-05 model: 100 - 120 / 200 - 240 VAC～ (100 - 132 / 190 - 264 VAC～) with 100% of load
05) It is for rate input voltage 100 VAC～.

Panel Mount
Switching Mode Power Supplies

SPA-400-24 Series



Features

- Built-in over-current protection circuit, output short-circuit protection circuit, and over-voltage protection circuit
- EN 60950 (Safety of information technology equipment) compliant
- EN 50178 (Electronic equipment for use in power installations) compliant
- EN 61000-6-2 (EMC: immunity for industrial environments) compliant
- EN 61000-6-4 (EMC: emission standard for industrial environments) compliant
- Output voltage: 24 VDC⎓
- Output power: 400 W

Specifications

Model	SPA-400-24
Output power	400.8 W
Input condition	
Voltage [01]	200 - 240 VAC～ (permissible voltage: 190 - 264 VAC～)
Frequency	50 / 60 Hz
Efficiency [02] (typical)	≥ 85% (10 min after power ON)
Current consumption [02] (typical)	≤ 4.6 A
Leakage current [02] (typical)	≤ 1 mA
Inrush current protection [02] (typical)	40 A
Output characteristics	
Voltage	24 VDC⎓
Current	16.7 A
Voltage adjustment range [03]	≤ ±5%
Input variation	≤ ±0.5%
Load variation	≤ ±1%
Temperature drift	360 mV
Ripple noise	≤ 290 mV
Start-up time [02] (typical)	1,800 to 2,300 ms
Hold time [02] (typical)	≥ 17 ms
Protection	
Over-current protection	110 to 160% (recovers automatically after the cause for over current is removed)
Over-voltage protection [03]	27 - 33 VDC⎓
Temperature rising limit	Yes
Remote control	Yes (output voltage ON for shorting, output voltage OFF for open)
Product Components	• Product • Instruction manual
Approval	CE
Unit weight (package)	≈ 885 g (≈ 975 g)
Indicator	Output indicator (green)
Insulation resistance	≥ 100 MΩ (at 500VDC⎓ megger, between all input terminals and F.G.)
Dielectric strength	3,000 VAC～ 50/60 Hz for 1 min (between all input and output terminals) 2,000 VAC～ 50/60 Hz for 1 min (between all input terminals and F.G.)
Vibration	0.75 mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours
EMS	EN61000-6-2 compliant
EMI	EN61000-6-4 compliant
Safety standards	EN60950, EN50178
Ambient temperature	-10 to 50 °C, storage: -20 to 75 °C (no freezing or condensation)
Ambient humidity	20 to 90%RH, storage: 20 to 90%RH (no freezing or condensation)
Fan life cycle	70,000 hours (based on 40 °C of ambient temperature)

01) Since there is no separate input overvoltage protection for the voltage over the rated input voltage range, supplying overvoltage may result in product damage.
02) It is for 220 VAC～, 100% load.
03) Use the output voltage adjusting volume within the voltage variable range. If the voltage exceeds the output voltage range, overvoltage protection function is activated and the output is cut off.

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