(P)Switching Power Supply

Product overview — P-1
SP Series(DIN rail mounting type) — P-2
SPA Series(General purpose type) — P-6

SP03-05/12/24

SPA-075-5/12/24
SPA-100-5/12/24

SPA-030-5/12/24
SPA-050-5/12/24

Product Overview

Type		Small size switching power supply		
Model		**SP-0305**	**SP-0312**	**SP-0324**
Appearances & Dimensions		[W37.5×H85×L65mm]		
Capacity		3W		
Input	Power supply	100-240VAC 50/60Hz		
	Allowable output frequency range	47 to 450Hz		
	Current consumption	Max. 0.15A		
	Efficiency	67 to 74%		
Output	Voltage	5VDC	12VDC	24VDC
	Voltage variable range	Max. ±5%		
	Current	0.6A	0.25A	0.13A
	Ripple	Max. 5%		
	Voltage fluctuation ratio	Max. 0.5%(at 85-264VAC 100% load)		
	Overcurrent protection	Max. 110%		
Reference		**P-2 to 5**		

Type		Switching mode power supply(SMPS)											
Model		**SPA-030-05**	**SPA-050-05**	**SPA-030-12**	**SPA-050-12**	**SPA-030-24**	**SPA-050-24**	**SPA-075-05**	**SPA-100-05**	**SPA-075-12**	**SPA-100-12**	**SPA-075-24**	**SPA-100-24**
Appearances & Dimensions		CE (Except for 5V) [W97×H40×L120mm]						[W97×H40×L160mm]					
Capacity		30W	50W	30W	50W	30W	50W	75W	100W	75W	100W	75W	100W
Input	Power supply	100-240VAC(85-264VAC)						100-120/200-240VAC(85-132/170-264VAC)					
	Frequency	50/60Hz											
	Current consumption	Max. 1.2A	Max. 1.6A	Max. 1.0A	Max. 1.4A	Max. 0.8A	Max. 1.1A	Max. 3.0A		Max. 2.0A	Max. 3.0A	Max. 2.0A	Max. 2.5A
	Efficiency	Min. 60%	Min. 67%	Min. 74%		Min. 80%		Min. 70%		Min. 78%	Min. 72%	Min. 78%	Min. 80%
Output	Voltage	5VDC		12VDC		24VDC		5VDC		12VDC		24VDC	
	Voltage adjustment range	±5%											
	Current	6A	10A	2.5A	4.2A	1.5A	2.1A	15A	20A	6.3A	8.5A	3.2A	4.2A
	Ripple	Max. ±1%											
	Input fluctuation	Max. ±0.5%											
	Load fluctuation	Max. ±2%		Max. ±1%				Max. ±2%		Max. ±1%			
	Starting time	Max. 200ms		Max. 150ms				Max. 250ms					
	Holding time	Min. 10ms						Max. 5ms		Min. 10ms	Min. 5ms	Max. 10ms	
Protect function	Inrush current protection	Max. 30A (100VAC) /Max. 40A (240VAC)		Max. 20A (100VAC)				Max. 45A (100VAC) /Max. 50A (240VAC)		Max. 35A (100VAC) /Max. 40A (240VAC)	Max. 45A (100VAC) /Max. 50A (240VAC)	Max. 35A (100VAC) /Max. 40A (240VAC)	
	Overcurrent protection	Min. 110%							Min. 105%	Min. 110%			
	Overvoltage protection	———						6.5V ±10%		16V ±10%		30V ±10%	
	Short protection	Max. 5ms						Max. 10ms		Max. 5ms	Min. 10ms	Max. 5ms	
Reference		**P-6 to 9**											

DIN rail mounting type switching power supply

▣Features

- Compact size, high quality, cost-effective
- Universal input power
- Able to drive various controllers
- Includes overcurrent protection circuit
- DIN rail mounting and mountable without the rail

⚠ **Please read "Caution for your safety" in operation manual before using.**

▣Ordering information

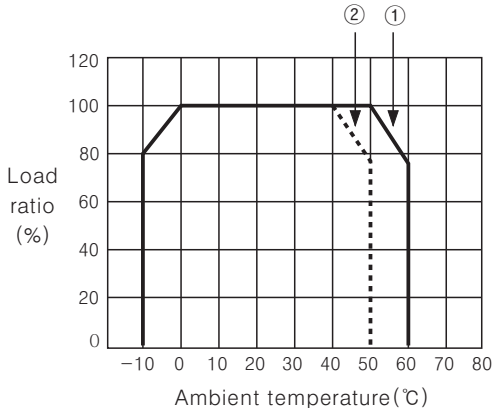
SP – **03** **24**

Output voltage	05	5VDC
	12	12VDC
	24	24VDC
Output power	03	3W
Item	SP	Switching Power Supply

▣Specifications

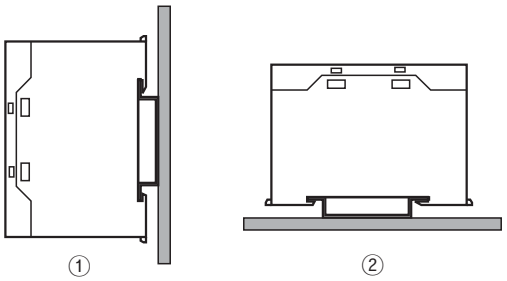
Model		SP-0305	SP-0312	SP-0324
Capacity		3W		
Input	Power supply	100-240VAC 50/60Hz		
	Frequency	47 to 450Hz		
	Current consumption	Max. 0.15A		
	Efficiency	67 to 74%		
Output	Voltage	5VDC	12VDC	24VDC
	Allowable voltage range	Max. ±5%		
	Current	0.6A	0.25A	0.13A
	Ripple	Max. 5%		
	Voltage fluctuation ratio	Max. 0.5%(at 85-264VAC 100% Load)		
	Overcurrent protection	Max. 110%		
Series / Parallel operation		Not available		
Output indicator		Red LED		
Insulation resistance		100MΩ(at 500VDC megger)		
Dielectric strength		2000VAC 50/60Hz for 1 minute		
Vibration		0.75mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours		
Shock		300m/s² (30G) in X, Y, Z directions for 3 times		
Ambient temperature		-10 to 50℃, Storage : -20 to 70℃		
Ambient humidity		35 to 85%RH		
Unit weight		Approx. 100g		

▣Output feature data

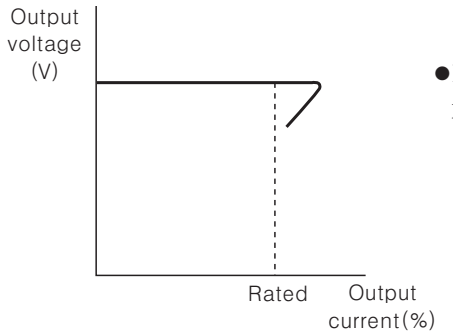


<Output feature for the ambient temperature influence >

- Please be sure when installing as the efficiency is decreased by ambient temperature.
- Please refer to output feature beside when installing as the efficiency is affected by mounting status.

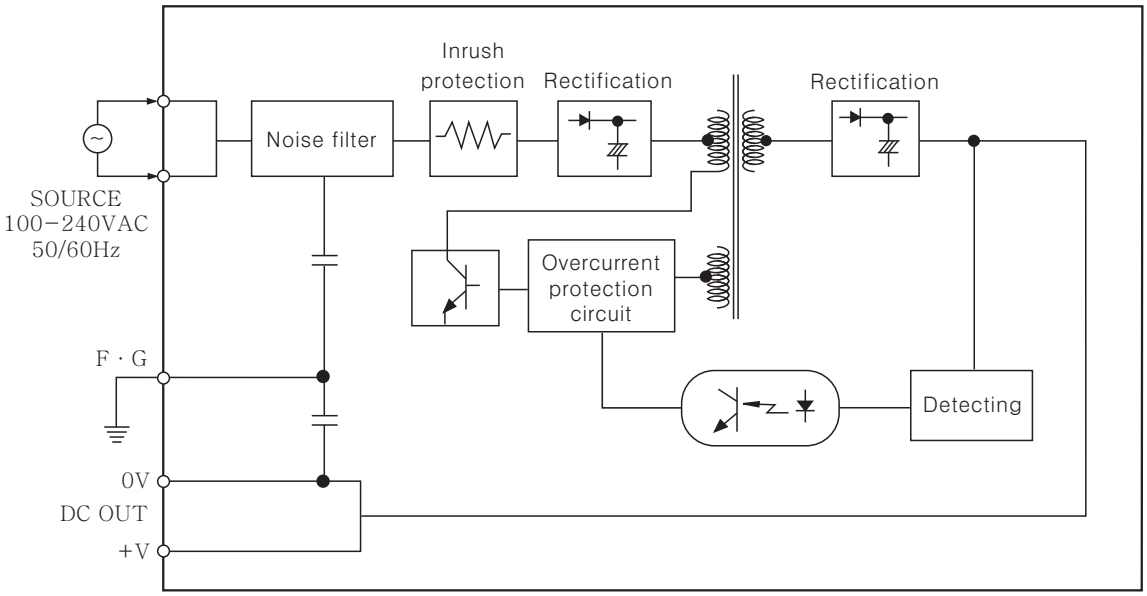


▣Feature data of overcurrent protection

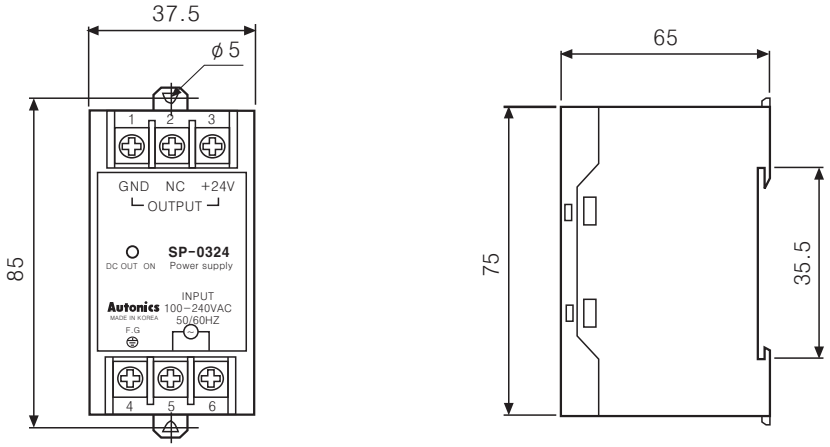


- It is able to protect overcurrent by load with built in overcurrent protection circuit. When the over rated current is flowed, the circuit is operated(Output voltage is fallen.) and it is released when the load current is under the rated current.
(It is returned to the rated output voltage.)

▣Block diagram

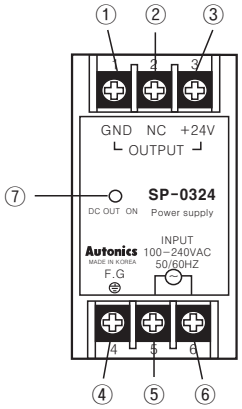


■Dimensions



(Unit:mm)

■Front part identification



① GND

② NC terminal

③ +V

DC OUTPUT terminal (5VDC, 12VDC, 24VDC)

④ F · G(Field Ground) terminal

⑤

⑥

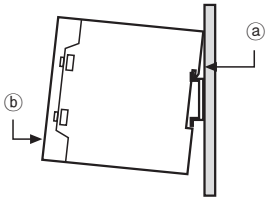
SOURCE 100-240VAC 50/60Hz

⑦ Output indicator-DC output is ON, then LED ON

■Rail mounting method

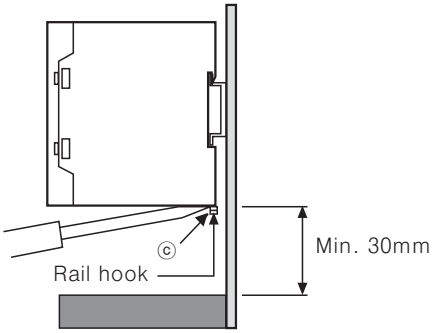
●To mount the power supply on the rail

First put the power supply on the part ⓐ of the rail and then press it for the direction ⓑ.



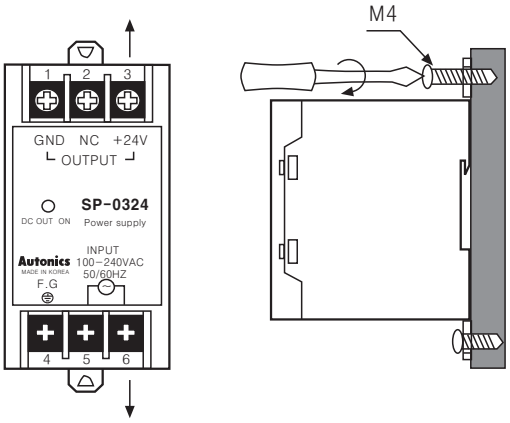
●To remove the power supply from the rail

Firstly put a screw driver into the part ⓒ and push it downward.



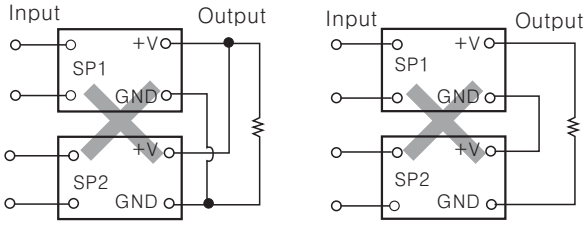
※When mounting the power supply on the rail, place the item at least 30mm above from the floor to remove easily.

●If there is no rail, it is able to mount by screwing a bolt at the hook on the body as following figure.



▣Proper usage

◎Serial and parallel operation

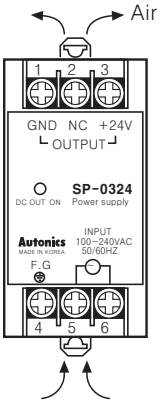


[Parallel connection] [Serial connection]

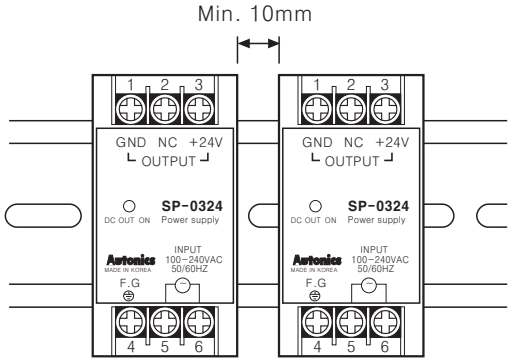
※The power supply shouldn't be used in serial and parallel connection in any case.
Please use it individually always.

◎Caution for mounting

●Please install it at ventilating place in order to dissipate the heat effectively then it is able to improve the reliability for a long time.



●When installing two or more power supplies side by side, please keep the interval at least 10mm so that the heat is dissipated effectively.



◎Caution for using

●Please wire input power(AC) to the input power terminal properly. If wiring it to other terminal the inner circuit will be broken.

●It is working with 2000VAC between the terminal and case for a minute, but it will be broken if the overvoltage is supplied for several minutes

●The power supply has 100MΩ of insulation resistance between the terminal and case.
Please use D.C insulation tester with 500VDC for the insulation resistance of the power supply.

●Please check as below when problem is happened.
1. Short of DC output terminal
(When overcurrent is supplied the overcurrent protection circuit is operated and when the load current is under the rated current it is stopped.)
2. Wiring of AC input and DC output terminal properly.
3. AC input voltage in rated voltage.

Switching power supply with minimized noise and ripple

▣Features

- Includes overcurrent protection, output short-circuit protection, overheating and overvoltage protection circuits(SPA-075/100)
- Standard on safety IEC 60950, IEC 50178
- EMS(Electromagnetic susceptibility) EN61000-6-2
- EMI(Electromagnetic interference) EN61000-6-4
- Output voltage : 5VDC, 12VDC, 24VDC
- Output current : 30W, 50W, 75W, 100W

⚠ **Please read "Caution for your safety" in operation manual before using.**

CE

▣Ordering information

SPA — **030** — **24**

Output voltage

05	5VDC
12	12VDC
24	24VDC

Output power

030	30W
050	50W
075	75W
100	100W

Item

SPA	Switching Mode Power Supply

▣Specifications

Model		SPA-030-05	SPA-050-05	SPA-030-12	SPA-050-12	SPA-030-24	SPA-050-24	SPA-075-05	SPA-100-05	SPA-075-12	SPA-100-12	SPA-075-24	SPA-100-24
Capacity		30W	50W	30W	50W	30W	50W	75W	100W	75W	100W	75W	100W
Input	Power supply (5)	100-240VAC(85-264VAC)						100-120/200-240VAC(85-132/170-264VAC)					
	Frequency	50/60Hz											
	Efficiency (1)	Min. 60%	Min. 67%	Min. 74%		Min. 80%		Min. 70%		Min. 78%	Min. 72%	Min. 78%	Min. 80%
	Current consumption(1)	Max. 1.2A	Max. 1.6A	Max. 1.0A	Max. 1.4A	Max. 0.8A	Max. 1.1A	Max. 3.0A		Max. 2.0A	Max. 3.0A	Max. 2.0A	Max. 2.5A
Output	Voltage	5VDC		12VDC		24VDC		5VDC		12VDC		24VDC	
	Current	6A	10A	2.5A	4.2A	1.5A	2.1A	15A	20A	6.3A	8.5A	3.2A	4.2A
	Votage fluctuation range(4)	±5%											
	Input fluctuation ratio(2)	Max. ±0.5%											
	Load fluctuation ratio(1)	Max. ±2%		Max. ±1%				Max. ±2%		Max. ±1%			
	Ripple (1)	Max. ±1%											
	Starting time (1)	Max. 200ms		Max. 150ms				Max. 250ms					
	Holding time (1)	Min. 10ms						Min. 5ms		Min. 10ms	Min. 5ms	Min. 10ms	
Protection	Inrush current protection	Max. 30A(100VAC) Max. 40A(200VAC)		Max. 20A(100VAC)				Max. 45A (100VAC) /Max. 50A (240VAC)		Max. 35A (100VAC) /Max. 40A (240VAC)	Max. 45A (100VAC) /Max. 50A (240VAC)	Max. 35A (100VAC) /Max. 40A (240VAC)	
	Output overcurrent protection (3)	Min. 110%							Min. 105%	Min. 110%			
	Output overvoltage protection	————						6.5V ±10%		16V ±10%		30V ±10%	
	Output short-circuit protection	Max. 5ms						Max. 10ms		Max. 5ms	Min. 10ms	Max. 5ms	
Output indicator		Green LED											
Insulation resistance		Min. 100MΩ (Between all input and output terminals with 500VDC)											
Dielectric strength		For 1 minute at 3.0kVAC 50/60Hz(Between all input and output terminals)											
		1 minute at 1.5kVAC 50/60Hz(Between all input terminals F.G)											
Vibration		0.75mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours											
Shock		300m/s² in X, Y, Z directions for 3 times											
Electromagnetic susceptibility		EN61000-6-2 Appropriate											
Electromagnetic interference		EN61000-6-4 Appropriate											
Protection		IEC60950, IEC50178 Standard											
Ambient temperature		-10 to 50℃	-10 to 40℃			-10 to 50℃							
Ambient humidity		25 to 85%RH											
Srorage temperature and humidity		-25 to 65℃ / 25 to 90%RH											
Approval		CE						————					
Unit weight		Approx. 350g						Approx. 400g					

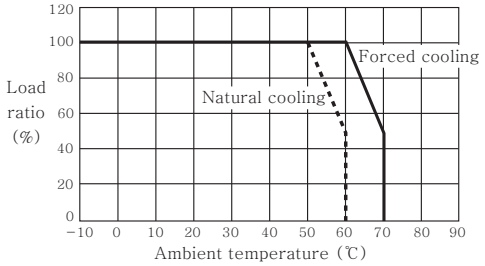
※(1)100% load for rated input voltage(100VAC).
※(2)Rated input voltage
- SPA-030/050 Series : 100-240VAC(85-264VAC)
- SPA-075/100 Series : 100-120/200-240(85-132/170-264VAC)

under 100% of load.

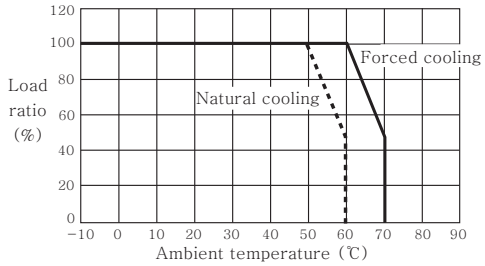
SPA-100-05 is under 100% of load for [100-120/200-240VAC(100-132/190-264VAC)].
※(3)Rated input voltage(100VAC). ※(4)Vary voltage by output voltage adjuster, it is changed over voltage variation range(±5%).
※(5)The rated input volatge of SPA-100-05 is 100-120/200-240VAC(100-132/190-264VAC).

▣Output feature data for ambient temperature

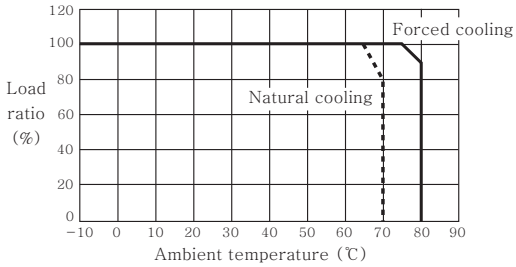
●SPA-030-05



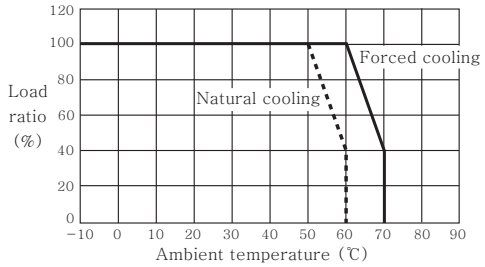
●SPA-075-05 ●SPA-100-05 ●SPA-100-12



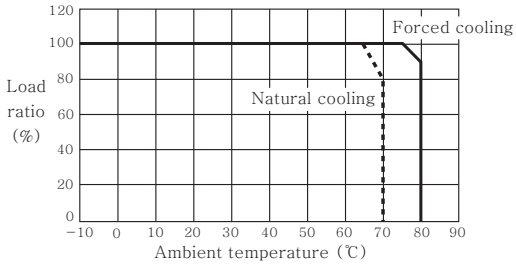
●SPA-030-12 ●SPA-050-12



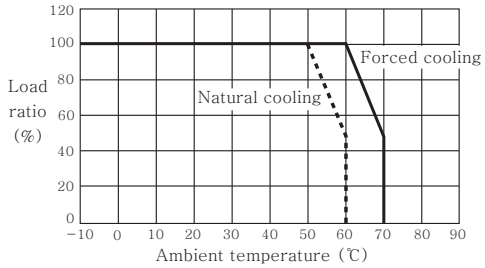
●SPA-075-12



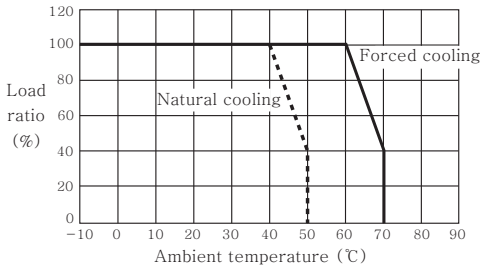
●SPA-030-24 ●SPA-050-24



●SPA-075-24 ●SPA-100-24

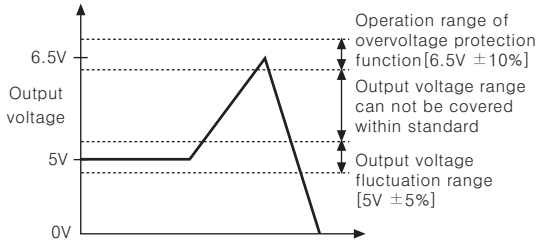


●SPA-050-05

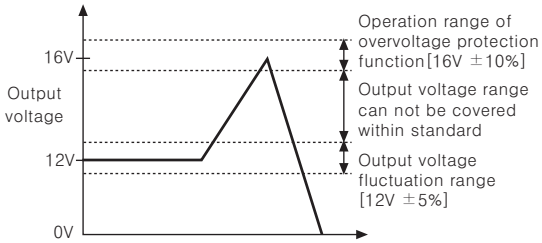


▣Feature data for output overvoltage protection

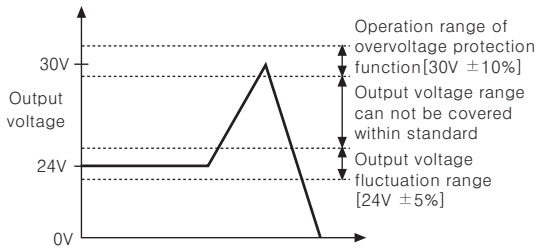
●SPA-075-05 / SPA-100-05



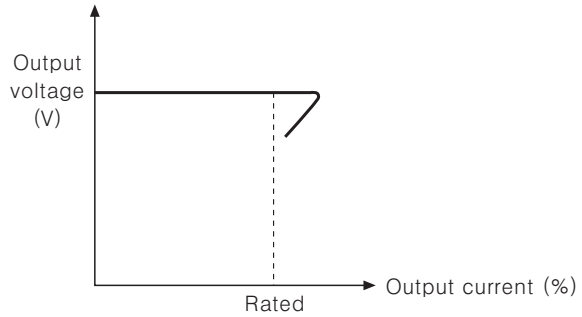
●SPA-075-12 / SPA-100-12



●SPA-075-24 / SPA-100-24

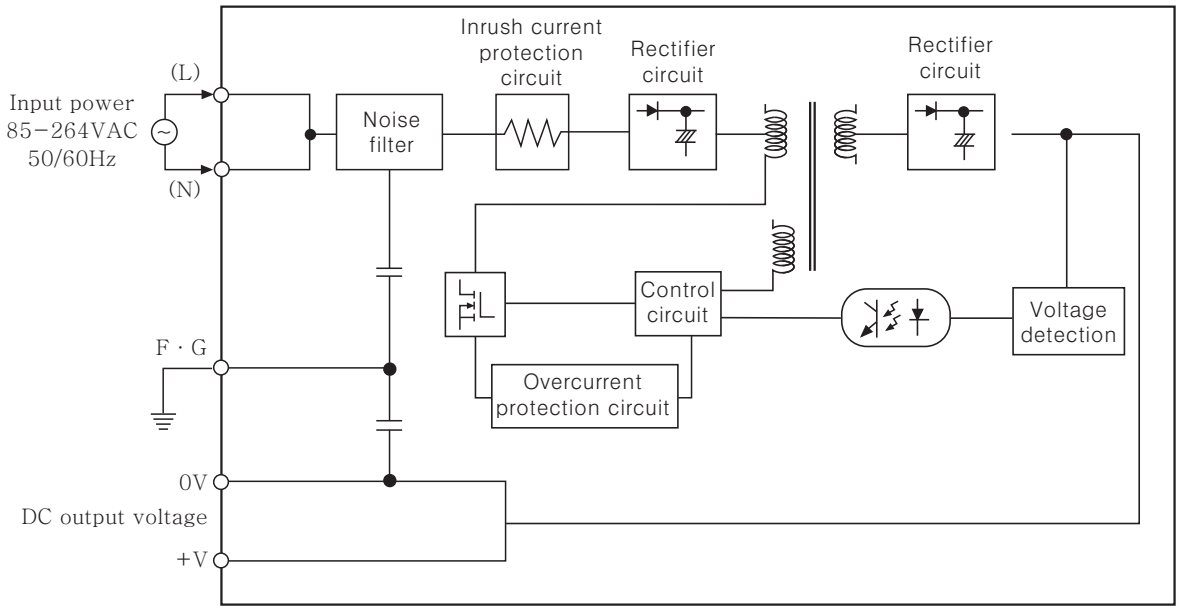


▣Feature data of overcurrent protection



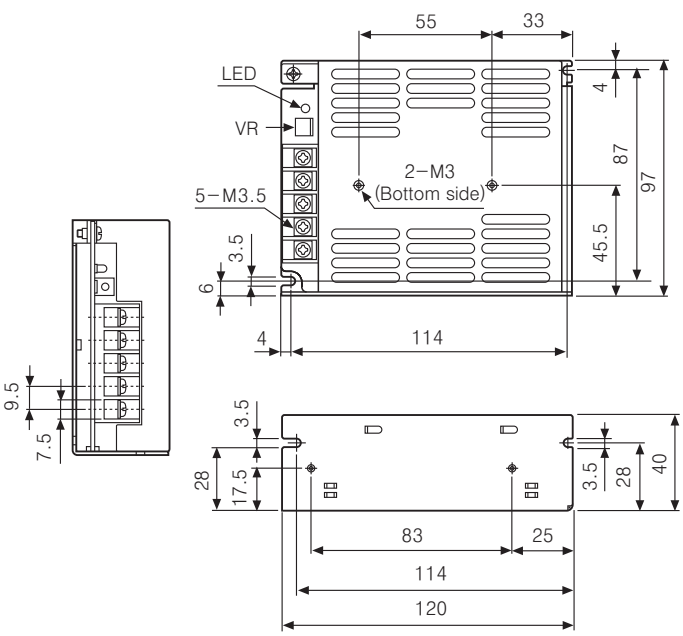
- ●It is when the rated input voltage is 100VAC, 100%.
- ●It is able to protect overcurrent by load with built-in overcurrent protection circuit.
  When the over rated current is flowed, the circuit is operated (Output voltage is fallen.) and it is cancelled when the load current is under the rated current.
  (It is returned to the rated output voltage.)

▣Block diagram

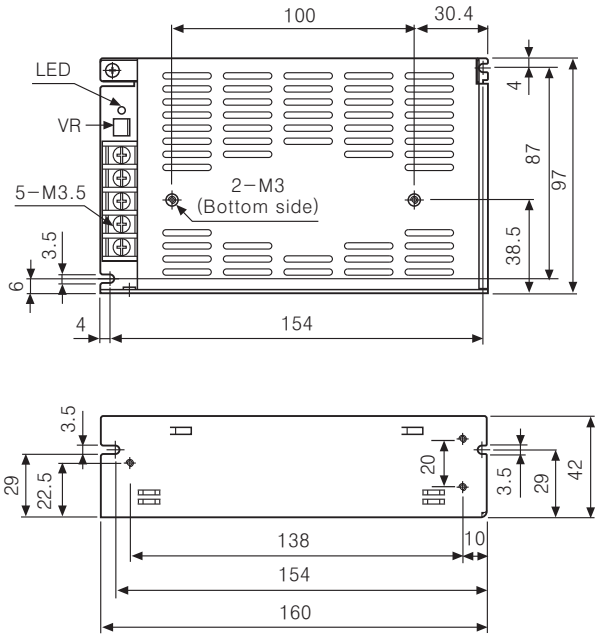


▣Dimensions

●SPA-030/050 Series



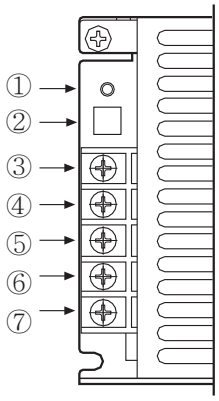
●SPA-075/100 Series



(Unit:mm)

(A) Photo electric sensor
(B) Fiber optic sensor
(C) Door/Area sensor
(D) Proximity sensor
(E) Pressure sensor
(F) Rotary encoder
(G) Connector/ Socket
(H) Temp. controller
(I) SSR/ Power controller
(J) Counter
(K) Timer
(L) Panel meter
(M) Tacho/ Speed/ Pulse meter
(N) Display unit
(O) Sensor controller
(P) Switching power supply
(Q) Stepping motor & Driver & Controller
(R) Graphic/ Logic panel
(S) Field network device
(T) Production stoppage models & replacement

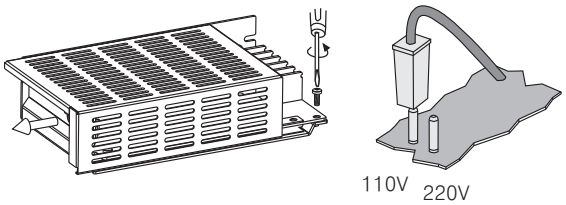
▣Front part identification



① Output display LED(Green)
② Output voltage adjuster
③ Output power [+] terminal
④ Output power [−] terminal
⑤ [F.G] terminal
⑥ Input power [N] terminal
⑦ Input power [L] terminal

▣Proper Usage

1. Technical information of operation
   For switch input voltage type, input voltage is 220V as factory default.
   To swich input voltage for 110V, remove the cover then select proper jumper switch as below figures.



2. Technical information of operation
   ①This product is not available to operate of output voltage as parallel and series.
   ②The output current should be used within the rated range. When it is operated in overcurrent status, the life span of product can be shortened.
   ③The output voltage should be used within the rated range. When the output overvoltage limit function is operated, the product operated normally with cancellation of input power for few minutes.
   ④The overvoltage limit function is operated when it is exceeded the rated output voltage range with an output voltage adjuster.
   ⑤This product has overheating protection function. It is operated normally when releasing the load connection for few minutes.
   ⑥The power factor is within 0.5 to 0.7 using condenser rectified method. Please use the below formula and check the input power capacity when using a cabinet panel or trans-former.

$$\text{Apparent power[VA]} = \frac{\text{Active Power [W]}}{\text{Power factor} \times \text{Efficiency}}$$

   ⑦This product does not have harmonics suppression and power factor correction circuit.
   Please mount the device for it.
   ⑧This product has a noise filter, it can be changed with the mounting place and connection.
   ⑨Please change as a same rated fuse when the inner fuse is broken.

3. Caution for mounting
   ①Please mount the device on metal panel for the reliability.
   ②Please mount the device in a ventilative place for high radiation of heat.

4. Please use the power line as below specification.

Input power line specification	AWG19 to 21	AWG16 to 18
Model	SPA−030−05 SPA−030−12 SPA−050−12 SPA−075−12 SPA−030−24 SPA−050−24 SPA−075−24 SPA−100−24	SPA−050−05 SPA−075−05 SPA−100−05 SPA−100−12