

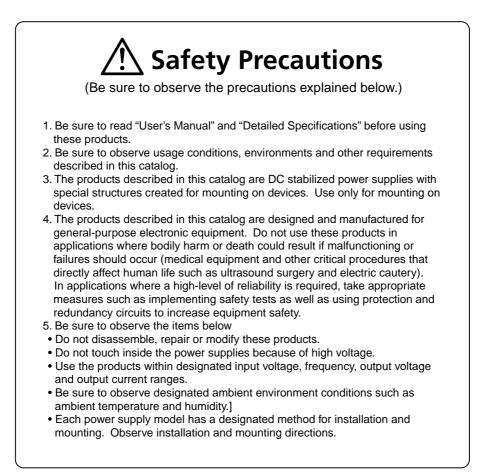
SANKEN SWITCHING POWER SUPPLIES

STANDARD SWITCHING POWER SUPPLIES CATALOG

SANKEN ELECTRIC CO., LTD.

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SANKEN SWITCHING POWER SUPPLIES

Sanken Switching Power Supplies, Leading the Times with Total Technology

Confidence built with technology.

With Sanken's long history as the original domestic maker of switching power supplies and our continuing efforts to constantly improve technology, we have received tremendous support from out customers.

Three technologies have been integrated to create Sanken's total technology:

- [1] Circuit design technology, as a base for product development strength,
- [2] Manufacturing technology, with quality that is proven by our semi-conductor parts, and
- [3] Assessment technology, to objectively evaluate these technologies.

Since we have a high standard of technical elements and a system that organically combines these elements, we are confident that Sanken has an undeniable position as the major domestic switching power supply maker. In that particularly power supply technology innovation came about from the technological innovation of semi-conductors, by using our own semi-conductors for power supply, Sanken continues to maintain its dominance in technology innovation.

In the future as well, Sanken will fully demonstrate this total technology and aim to create products that lead the times and satisfy our customers.

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XXX	17

Output	Input Voltage (V)	Series Name	Output Power (W)	(3.3V		ut Vo 12V	ltage 15V		Page
	100	CSJ	10, 15		٠				17
	100	CSH	25, 50, 100, 150						23
	100	SSG	30, 50, 100, 150						33
	100	SSH	25, 50, 100			•	Except 100 W		43
t	100, wide input/input switching	SLS	60, 100, 150						53
Single Output	Wide	CWA	15, 30, 50						61
O O	vvide	GVVA	75, 100, 150						66
) gle	Wide	SWA	15, 30, 50, 100, 150						73
Si	Wide	SWC	50, 100						85
	Wide	SWD	60, 100, 150, 240						91
	Wide	HWA	50						101
	Wide	ПУУА	100, 150, 300, 600						104
	Wide/auto switching (60 W)	HWB	15, 30, 60			30,60W		60W	109
Multi Output (2 channels)	Wide	HWB	15, 30				• ±output		114
Multi Output (2 channels)	Wide	SWE	100, 150						121
put			400			8 V sing			
Multi Output 9 cells 6 cells 5 cells	Wide	PCU	600	and	14 ch	els (two annels		els),	127
Mult 9 cells			900		(two models) are combined as necessary.				

About Switching Power Supplies

What are switching power supplies?

Switching power supplies are a type of stabilized DC power supply that are controlled by a switching method. When a commercial power source or DC power source is input to a switching power supply unit, semiconductor-based high-speed switching is used to convert the power to an inaudible range of high-frequency power, which is controlled and rectified to yield the desired DC power.This makes for small, lightweight switching power supplies that are well-suited for use in IT hardware, communications devices, and most of other electronic equipment.

Types of Switching Power Supplies

Today, switching power supplies are used in such a wide range of devices that require a DC power supply that there are only a few types of electronic equipment left that do not use switching power supplies.

• Application fields for switching power supplies

Industrial equipment

Computer hardware	Mainframe computers, servers, workstations, personal computers, other computer devices, and computer peripheral devices such as storage devices, monitors, printers, ATMs, and POS terminals
Communications equipment	Digital electronic switching equipment, transmission equipment, land-line communications devices including premises equipment, mobile communications devices, transceivers, wireless communications devices, telemeters, and other communications devices
Controllers	Factory automation controllers, robots, NC machines, power controllers, semiconductor manufacturing equipment, and other controllers
Measuring instruments	Analyzers, oscilloscopes, chip testers, and other measuring instruments
Medical equipment	CT, MRI, ultrasound diagnostic devices, blood analysis devices, electrocardiogram equipment, and other medical equipment
Office equipment	Word processing systems, photocopiers, facsimile devices, and other office equipment
Other	Automotive devices, LED display devices, testing equipment, etc.

Consumer products

Audio-video equipment	TVs, video equipment, videogame systems, karaoke machines, digital audio equipment, disc players, and electronic musical instructions
Other	Power supplies for power adapters, household appliances, etc.

Basic Terminology of Switching Power Supplies

1. Input-Related Terms

Rated input voltage	. RMS (Root Mean Square) value of line-to-line voltage applied to input terminals
Allowable input voltage range	RMS value of line-to-line voltage in the allowed range for ensuring performance and applied to input terminals
Rated frequency	Frequency of AC voltage applied to input terminals (commercial frequencies are 50 Hz and 60 Hz)
Allowable frequency range	Frequency in the allowed range for ensuring performance of power supply device
Power factor	. Active input voltage divided by the apparent power
Efficiency	Output power (total rated output power) divided by active input power
Inrush current	 Maximum instantaneous carrying current (0 to peak) that flows after input voltage has been stopped for a specified time, until normal input current has been restored

2. Output-Related Terms

Rated output voltage	. DC voltage occurring at output terminal									
Output voltage variation	Range in which output voltage can be adjusted from an external source under conditions for guaranteed constant voltage accuracy									
Rated output current	DC current that can be supplied to a load from	C current that can be supplied to a load from an output terminal								
Ripple	A component that is synchronous with the inpublic between output terminals	component that is synchronous with the input frequency and switching frequency occurring etween output terminals								
Noise	High-frequency noise components (other than	High-frequency noise components (other than ripple) that occur between output terminals								
Ripple noise	Combined value of ripple and other noise occu	urring between output terminals (see Figure 1)								
Constant voltage accuracy	Amount of variation in output voltage (or the a voltage) when any of the following phenomena (g) below, can also occur in combinations.	, , ,								
	(a) Static input variation	(e) Elapsed drift								
	(b) Static load variation (f) Dynamic input variation									
	(c) Ambient temperature variation	(g) Dynamic load variation								
	(d) Initial drift									

3. Auxiliary Functions

Overcurrent protection	A protection feature of switching power supplies whereby a current limiting function is used to protect the switching power supply and power load when the current exceeds a specified setting	
Overvoltage protection	A protection feature of switching power supplies whereby a power cut-off or shorting function is used when the output voltage exceeds a specified setting in relation to an overvoltage between output terminals	
Remote control	A function that uses an external signal to turn a switching power supply's output voltage ON or OFF	
Remote sensing	A function that compensates for voltage drops that occur in the distance between an output terminal and a load	

4. General Conditions

Operating temperature range	Allowable ambient temperature range for switching power supplies under continuous use and within rated conditions. As ambient temperature, this temperature is measured at a location that is not affected by the switching power supply's own generated heat.
Storage temperature range	Allowable ambient temperature range for switching power supplies under long-term storage (non-operating) conditions, without causing loss of performance
Operating humidity range	Allowable ambient humidity range for switching power supplies under continuous use and within rated conditions.
Storage humidity range	Allowable ambient humidity range for switching power supplies under long-term storage (non-operating) conditions, without causing loss of performance
Insulation withstand voltage	The limit voltage value that must be withstood after a specified voltage has been applied for a specified time (for insulation withstand voltage) so that the insulating strength between two specified points is satisfied
Insulation resistance	DC resistance value that indicates insulation strength between two specified points
Vibration resistance	Vibration resistance is tested by a type of environmental test for which conditions such as vibration type, frequency range, amplitude, and vibration application method have been specified.
Shock resistance	An impact is applied to the item to measure shock resistance as a type of stress factor in environmental testing
Leakage current	Current that leaks from a power supply input line via the product case to the ground
Conducted emission	High-frequency noise voltage that occurs at a switching power supply's power input terminal
Safety standards	Technical standards established for various products, parts, materials, and systems to help ensure the safety of switching power supplies in terms of design and use that does not pose a risk of bodily injury or property damage (see Figure 3)

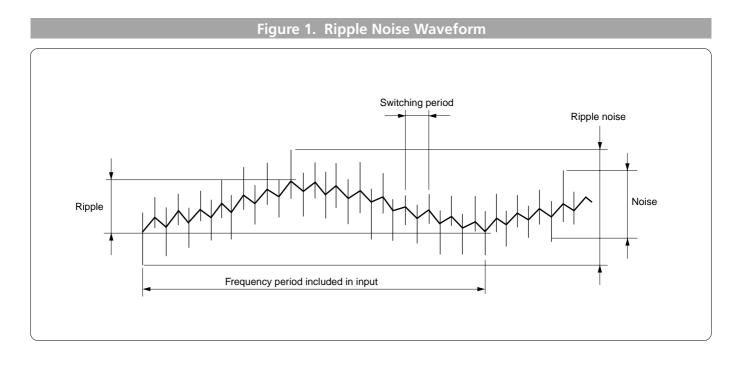
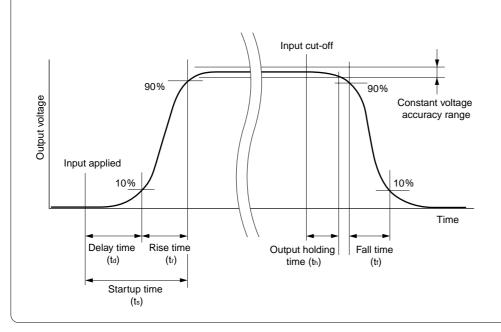


Figure 2. Rise/Fall Waveform



Startup time

This is the time from when an input is applied until 90% of output voltage is reached. (Startup time = delay time + rise time)

Output holding time

This is the time, after when an input is cut off, during which the output voltage is held within a specified constant voltage accuracy range and a specified voltage range. Stable output voltage can be supplied even when momentary power outages occur. The output hold function is used to save data to memory or prevent faults in mechanical operations when power outages occur. The output hold time is largely determined based on the following four factors. Input voltage
 Capacitance of input smoothing capacitor

[3] Minimum regulation voltage [4] Output current

Hold time cannot be lengthened by adding more output capacitors, so to do this either by increasing the minimum input voltage or perform derating of the output current. If neither of these methods works adequately, increase the input smoothing capacitor's capacitance or a minor change is required to externally add an input smoothing capacitor.

Figure 3. Safety Standards















C-UL certified product UL certified product UL and C-UL (complies with CSA standard) certified product CSA certified product

TÜV certified product CE certified product VDE certification

Correct Use of Switching Power Supply

Input

Switching power supply possesses superb small-type, lightweight and high efficiency capabilities. When used correctly, it will help you to improve the reliability of your electronic devices.

1.1 Input voltage

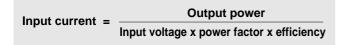
There are many types of switching power supplies, commonly used in every country of the world as well as in Japan, for both AC and DC applications. Check the voltage in the region where it is used, whether it is using AC or DC, the allowable voltage range, the input switching method and other conditions when using switching power supply.

Damage may occur to the power supply when power is applied that differs from the one specified.

Note that it may not operate normally even when within the specified input voltage range due to input voltage waveform distortion.

1.2 Input current

The AC input for standard switching power supply is directly rectified. In this event, the rectification method employs a capacitor in most. Reactive current flows through the smoothing capacitor. As a result, the input current is determined by output power, input voltage, power factor and efficiency.



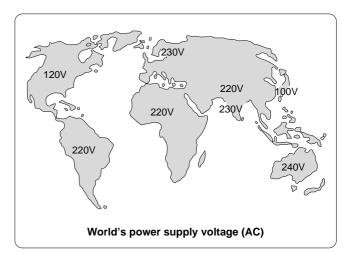
The switching power supply has a power factor of about 0.4 to 0.6 generally. One way to improve the power factor is by adding an inductance or an active filter to the input side. Increasing the inductance on the input side will raise the power factor to about 0.6 to 0.9, and adding an active filter will increase it to at least 0.9.

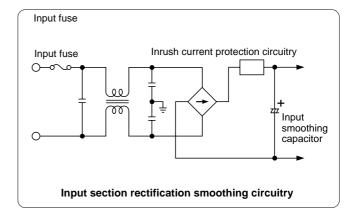
1.3 Inrush current

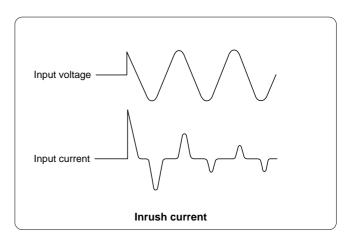
A peak current flows for charging the input smoothing capacitor when power is applied to the switching power supply. This current is called inrush current. While the value for inrush current varies depending on the input timing and inrush current protection circuitry, the value increases several to many times over in comparison to stationary input current. When using multiple switching power supplies, inrush currents are totaled. Pay close attention when selecting a fuse and switches that are added to the input line.

1.4 Input fuse

Faults occur in the internal circuitry in the event that the fuse builtin to the switching power supply is fused. Just replacing the fuse will not repair it. At that time, consult with the manufacturer.







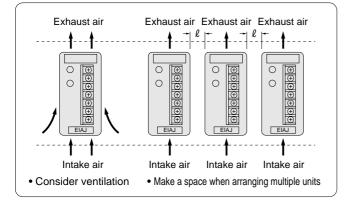
2 Mounting/Wiring/Connections

The superb features of switching power supply will not be apparent if a mistake is made in mounting, wiring or connection. Use by observing the methods specified by the manufacturer.

2.1 Mounting

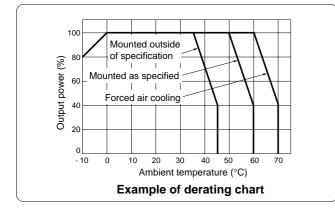
(1) Radiation

- a. Consider ventilation.
- b. Observe mounting direction.
- c. Consider heat conduction.
- d. Make a ℓ space (specified by the manufacturer) when arranging multiple units.
- e. A better condition will result when conducting forced air cooling.



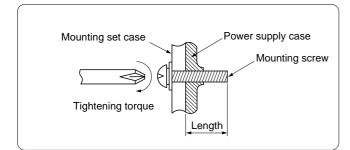
(2) Output derating

The output power is dependent on the operating temperatures. Use by referring to the derating chart.



(3) Mounting screws

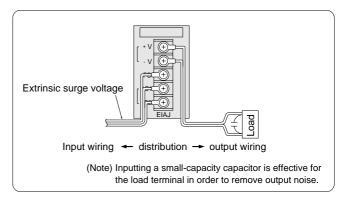
When mounting a power supply to the mounting set case, observe the specified screw length and tightening torque while considering the insulation and tightening strength.



2.2 Wiring and connections

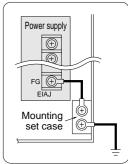
(1) Input/output wiring

- a. Separate and bundle input and output wiring so as not to mix up the input line extrinsic surge voltage with the output nor add conducted emission.
- b. Consider the current for output wiring and wire with "thick and short."

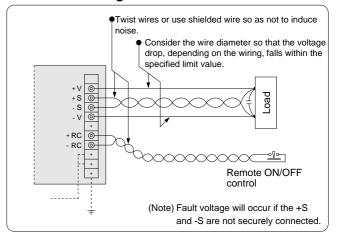


(2) Grounding connection

Ensure safety and noise prevention for the grounding terminal for the switching power supply and ensure securely connection to the mounting set case.



(3) Wiring when using remote ON/OFF control and remote sensing



(4) Correct terminals connection

Use compatible terminal screw diameter, crimp-style terminal, electrical wiring and tools when wiring for the switching power supply.

Safety

Switching power supply is generally the DC stabilized power supply with a special structure created for mounting on devices. Use only for mounting on devices. Also, do not touch a switching power supply that is operating, since it can generate both high voltage and high temperature.

3.1 Input voltage

The input voltage range is set for switching power supply. There is a great danger of internal damage when voltage outside of the specified range is applied. Use within the specified input voltage range.

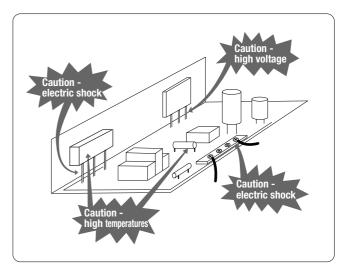
3.2 Leakage current

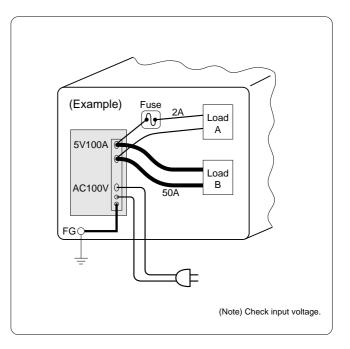
The switching power supply will have leakage current flowing within the value set by the safety standards of each country due to the internal noise filter. Pay close attention to electric shock as currents are totaled when using multiple units. Consider electric shock prevention due to grounding wires, etc.

3.3 Wire materials

Wire with thick wires suitable for the output current capacity of switching power supply to prevent heat and fire from being generated by the wiring materials due to an abnormal load. Pay particular attention when distributing current to multiple loads.

Over-current protection (OCP) may not operate even at a load short-circuit when the thin line is used as a branch line. Thus, it's important to consider insertion of the fuse to the wiring, etc. Also, consider rated voltage for electrical wiring used.







The safety standards are set for each country depending on application of switching power supply for mounting on device. Check with the manufacturer's data when used.

스 EMI

While switching power supply is created in consideration of EMI, its performance may not be demonstrated sufficiently due to wiring for power supply and load or grounding wire, etc. Note the following items.

4.1 Wiring separation

The conducted emission increases when the distance between wiring at the input and output narrows. In addition, radiation noise from devices (noise electric field strength) generally increases when the input conducted emission increases.

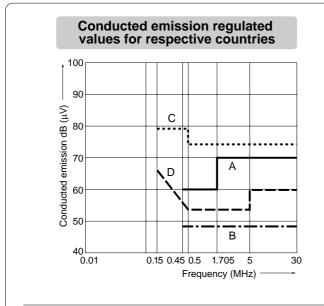
Separate wiring, as an increase in conducted emission is caused when the input wiring and the device's internal wiring (especially digital circuitry) is approached while also causing device operation errors due to external noise.

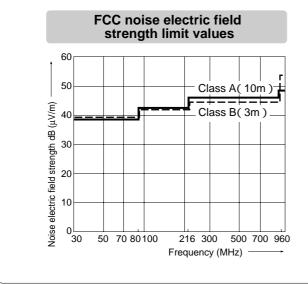
4.2 Thick and short

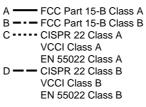
Wire the input wiring and output wiring within the device with "thick and short", which are also the two respective parallel wires, or with twisted wires. In addition, looping of the wiring causes degraded noise performance.

4.3 Grounding wire

Make a short connection for the wiring to the device case securely with the thick wire.



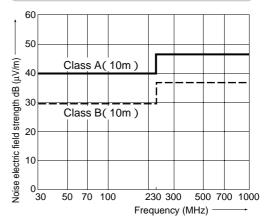




In FCC Part 15, Subpart J has been replaced by Subpart B (Unintentional Radiator).

Although there are other European standards such as VDE, here the EN standard is used as a representative standard that is unified among EU countries.

CISPR 22 Classes A and B are still being studied (as of January 2001) for frequencies of 0.15 MHz or less. In the technical standards of the Electric Appliance and Material Safety Law, values are specified for certain models under "Appended Table 8, 1. Common items, (5) Noise strength", but only a limited range of models is included, so this is omitted here.



CISPR, VCCI, and EN55022 noise electric field strength limit values

Request

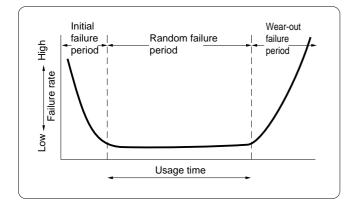
Consider the above-mentioned details when manufacturing a device using EMI standards of the respective country. In addition, refer to the manufacturer's data for details.



5.1 Life cycle and failures

The level of reliability for the switching power supply has already been validated in home electronic appliance products and industrial products with satisfactory results received. This fact is the reason why switching power supply has received high evaluation.

The diagram below is called a failure ratio curve (bathtub curve) and is typically used to show a product's life cycle.



(1) Initial failure period

The manufacturer performs screening at the parts stage and an aging test after product completion and then ships the product in order to eliminate initial failures. Therefore, the switching power supply is already within the random failure period once the user has received it.

(2) Random failure period

The switching power supply is operated in stable condition based on each mean time between failures (MTBF) reliability, thus the probability for failures is basically very low. However, failures that occur within this period depend greatly on mounting operating conditions by the user (ambient temperature, mounting method, derating, ventilation, vibration, shock and other conditions).

(3) Wear-out failure period

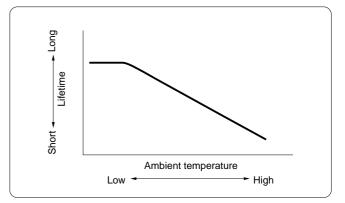
Switching power supply will also head into the wear-out failure period before long.

5.2 Ambient temperatures and lifetime

The switching power supply is made very compact through improvements in high efficiency switching at high frequencies, parts improvements and improvements in mounting technology. Thus, the mounting density is improved and parts are mounted closely together.

The lifetime of these individual parts used in the switching power supply changes extremely due to ambient temperatures.

A chemical reaction is conducted in the interior of the aluminum electrolytic capacitor used as a smoothing filter part, thus it is very sensitive to changes at ambient temperatures. Generally, the aluminum electrolytic capacitor follows "Arrhenius's Law", the 2 × principal at 10 , which possesses characteristics whereby the lifetime is doubled when the ambient temperature drops by 10 while the lifetime is cut in half when the ambient temperature goes up by 10 .



The relationship between the ambient temperatures for the switching power supply and lifetime are shown in the diagram above. The aluminum electrolytic capacitor may already plunge into the wear-out failure period even when the other parts are still within the random failure period if the switching power supply is used at high temperatures. In this case, the aluminum electrolytic capacitor must be replaced and an overhaul must be performed for long use.

5.3 Overhaul

Continuous operating systems are steadily increasing with progress in current electronics. Thus, the lifetime of switching power supply is extending. However, switching power supply is not something that can be used forever. Therefore, we recommend an overhaul in order to use this more safely.

The timing of overhaul varies greatly depending on operating conditions and operating temperatures of the product. Thus, the thing to be most careful of is continuous operations over long periods. The overhaul standard when there are continuous operations is as follows.

Ta = 40	or more and less than 45	3 years
Ta = 35	or more and less than 40	4 years
Ta = 30	or more and less than 35	5 years
(Ta is the	ambient temperatures for p	ower supply)

These values vary depending on the switching power supply. Consult with the respective manufacturer for further details on overhauls and lifetime.

Document reference: "Current Status and Trends for Switching Power Supplies", by the Switching Power Supply Subcommittee of the JEITA (Japan Electronics and Information Technology Association).

Selection Guide

[Based on input voltage]

	Input		Output Power		Outp	out Volt	age		Main Features	Safety	See
	Voltage (V)	Series Name	(W)	3.3V	5V	12V	15V	24V	Main Applications	Standards	page
	100	CSJ	10, 15		•	•	•	•	Low cost, PCB type Office equipment, information equipment	UL and CSA certified product	17
	100	CSH	25, 50, 100, 150		•	•	•	•	Low cost, PCB type, resonant-mode, compact, high efficiency, low noise Office equipment, information equipment	UL and CSA certified product	23
	100	SSG	30, 50, 100, 150		•	•	•	•	Thin, open frame, compact Office equipment, information equipment	UL and CSA certified product	33
	100	SSH	25, 50, 100		•	•	(Except100W)	•	Resonant-mode, open frame, high efficiency, low noise, compact Office equipment, information equipment	UL and CSA certified product	43
	100 / wide-range switching	SLS	60, 100, 150 (switching)					•	Peak load support, open frame Mechatronics products (motors,	UL, CSA, TÜV certified products	53
t			15, 30, 50		•	•		•	solenoids, etc.), compact printer drivers Low cost, PCB type, includes power factor correction circuit (75 W to 150 W)		
outpu	Wide	CWA	75, 100, 150			•	+	•	Computer-related equipment and office equipment	UL, C-UL, TÜV certified products	61
Single output	Wide	SWA	15, 30, 50, 100, 150		•	•	•	•	Power factor correction circuit (100 W and 150 W), harmonic current control Information and communications	UL, CSA, TÜV certified products	73
	Wide	SWC	50, 100	•	•	•		•	equipment, gauge controllers Ultra-compact general-purpose switching power supplies, power factor correction circuit (100 W) Computer-related equipment and industrial equipment	UL, C-UL, TÜV certified products	85
	Wide	SWD	60, 100, 150, 240					٠	Peak load support, built-in power factor correction circuit, harmonic current control Mechatronics products (motors, solenoids, etc.), compact printer drivers	UL, C-UL, SEMKO certified products	91
	Wide	HWA	50 100, 150, 300, 600		•	•		•	Compact, long life, high reliability, harmonic current control, resonant-mode, case cover included Factory automation controllers, power and plant controllers, industrial equipment such	UL, CSA, VDE certified products	101
	Wide/auto switching (60 W)	HWB	15, 30, 60		•	(30,60W)	•	(60W)	as semiconductor manufacturing devices Resonant-mode, ultra low-noise equivalent to dropper power supply Measuring instruments, semiconductor manufacturing and testing equipment, controllers, medical equipment, equipment with dropper power supply	UL, C-UL, TÜV certified products	109
Multi output (2 channels)	Wide	HWB	15, 30				(±output)		Resonant-mode, ultra low-noise equivalent to dropper power supply Measuring instruments, semiconductor manufacturing and testing equipment, controllers, medical equipment, equipment with dropper power supply	UL, C-UL, TÜV certified products	114
Multi output	Wide	SWE	100, 150		•			•	Peak current support, active filter (PFC) adopted Mechatronics products adopting motors, solenoids, etc., devices applying and mounting thermal head	UL, C-UL, SEMKO certified products	121
ells			400		I		1	I	Power factor correction circuit, complies with harmonic current control regulations, output can be configured freely when combined		
Multi output lls 6 cells 5 c	Wide	PCU	600	2 c 4 c	hannels	48 V sii s (two m s (two m ation as	odels) o odels)	r	with a DC cell module, microprocessor-based sequence control, and various alarm functions	UL, C-UL, TÜV certified products	127
9 cells			900						Semiconductor manufacturing and testing equipment, factory automation controllers, computer peripherals, photographic laboratory system, medical equipment (CT, MRI, etc.)		

Selection Guide Based on Output Voltage

			Sin	gle Output Power Sເ	upplies		
Output Voltage (V)	Output Power (W)	Output Current (A)	Input Voltage (V)	Model	External Dimensions (W×D×H) (mm)	See page	Remarks
2.2	50.0	10.0	Wide	SWC050-3R3	136 × 80 × 29	86	
3.3	100.0	20.0	Wide	SWC100-3R3	166 × 93 × 34	87	
	10.0	2.0	100	CSJ010-05	94 × 49 × 17	18	
-	15.0	3.0	100	CSJ015-05	115 × 50 × 17	10	
	15.0	3.0	Wide	SWA015-05	35 × 99 × 97	74	
-	15.0	3.0	Wide	HWB015S-05	34 ×110 × 92	110	
	15.0	3.0	Wide	CWA015-05	125 × 50 × 22	62	
	25.0	5.0	100	CSH025-05	115 × 50 × 23	24	
-	25.0	5.0	100	SSH025-05	90 × 68 × 25	44	
	30.0	6.0	100	SSG030-05	75 × 120 × 25	34	
-	30.0	6.0	Wide	SWA030-05	35 × 116 × 97	75	
-	30.0 30.0	6.0	Wide Wide	HWB030S-05	34 × 136 × 92 133 × 55 × 27	111 63	
-	50.0	6.0 10.0	100	CWA030-05 CSH050-05	150 × 50 × 25	25	
·	50.0	10.0	100	SSG050-05	90 × 135 × 25	35	
5	50.0	10.0	100	SSH050-05	110 × 75 × 29	45	
J	50.0	10.0	Wide	SWA050-05	37 ×159 × 97	76	
-	50.0	10.0	Wide	HWA050-05-C	40 × 127 × 85	102	
	50.0	10.0	100/200	HWB060S-05	38 ×170 × 92	112	Auto switching
	50.0	10.0	Wide	CWA050-05	195 × 55 × 27	64	
	50.0	10.0	Wide	SWC050-05	125 × 80 × 29	86	
	100.0	20.0	100	CSH100-05	222 × 62 × 32	26	
	100.0	20.0	100	SSG100-05	93 ×160 × 40	36	
	100.0	20.0	100	SSH100-05	135 × 93 × 33	46	18 A when cover is included
-	100.0	20.0	Wide	SWA100-05	50 × 180 × 93	77	
-	100.0	20.0	Wide	SWC100-05	150 × 93 × 34	87 27	
-	150.0 150.0	30.0 30.0	100 100	CSH150-05 SSG150-05	222 × 75 × 36 93 × 177 × 57	37	
	150.0	30.0	Wide	SWA150-05	65 × 200 × 93	80	
	10.2	0.9	100	CSJ010-12	94 × 49 × 17	18	
	15.0	1.3	100	CSJ015-12	115 × 50 × 17	19	
	15.6 15.6	1.3 1.3	Wide Wide	SWA015-12 CWA015-12	35 × 99 × 97 125 × 50 × 22	74 62	
-	25.2	2.1	100	CWA015-12 CSH025-12	125 × 50 × 22 115 × 50 × 23	24	
	25.2	2.1	100	SSH025-12	90 × 68 × 25	44	
-	30.0	2.5	100	SSG030-12	75 × 120 × 25	34	
-	30.0	2.5	Wide	SWA030-12	35 × 116 × 97	75	
	30.0	2.5	Wide	CWA030-12	133 × 55 × 27	63	
	36.0	3.0	Wide	HWB030S-12	34 ×136 × 92	111	
	50.4	4.2	100	CSH050-12	150 × 50 × 25	25	
	50.4	4.2	100	SSG050-12	90 ×135 × 25	35	
	50.4	4.2	100	SSH050-12	110 × 75 × 29	45	
	50.4	4.2	Wide	SWA050-12	37 ×159 × 97	76	
12	50.4	4.2	Wide	HWA050-12-C	40 × 127 × 85	102	
-	50.4	4.2	Wide	SWC050-12	125 × 80 × 29	86	
-	51.6	4.3	Wide	CWA050-12	195 × 55 × 27	64	Auto autobio a
	62.4 75.6	5.2	100/200 Wide	HWB060S-12	38 × 170 × 92 222 × 55 × 37	112 66	Auto switching
	102.0	6.3 8.5	100	CWA075-12 CSH100-12	222 × 55 × 57 222 × 62 × 32	26	Peak: 8.1A
	102.0	8.5	100	SSG100-12	93 × 160 × 40	36	
	102.0	8.5	100	SSH100-12	135 × 93 × 33	46	
	102.0	8.5	Wide	SWA100-12	50 × 180 × 93	77	
	102.0	8.5	Wide	CWA100-12	222 × 62 × 37	67	Peak: 11.0A
	102.0	8.5	Wide	SWC100-12	150 × 93 × 34	87	
	150.0	12.5	100	CSH150-12	222 × 75 × 36	27	
	150.0	12.5	Wide	CWA050-12	222 × 75 × 42	68	Peak: 16.2A
	156.0	13.0	100	SSG150-12	93 ×177 × 57	37	
	156.0	13.0	Wide	SWA050-12	65 ×200 × 93	76	

Selection Guide Based on Output Voltage

			Sin	gle Output Power S	upplies		
Output Voltage (V)	Output Power (W)	Output Current (A)	Input Voltage (V)	Model	External Dimensions (W×D×H) (mm)	See page	Remarks
	10.5	0.7	100	CSJ010-15	94 × 49 × 17	18	
	15.0	1.0	100	CSJ015-15	115 × 50 × 17	19	
	15.0	1.0	Wide	SWA015-15	35 × 99 × 97	74	
	19.5	1.3	Wide	HWB015S-15	34 ×110 × 92	110	
	25.5	1.7	100	CSH025-15	115 × 50 × 23	24	
	25.5	1.7	100	SSH025-15	90 × 68 × 25	44	
	30.0 30.0	2.0 2.0	100 Wide	SSG030-15 SWA030-15	75 × 120 × 25 35 × 116 × 97	34 75	
	39.0	2.0	Wide	HWB030S-15	34 ×136 × 92	111	
15	51.0	3.4	100	CSH050-15	150 × 50 × 25	25	
	51.0	3.4	100	SSG050-15	90 × 135 × 25	35	
-	51.0	3.4	100	SSH050-15	110 × 75 × 29	45	
	51.0	3.4	Wide	SWA050-15	37 ×159 × 97	76	
	78.0	5.2	100/200	HWB060S-15	38 ×170 × 92	112	Auto switching
-	105.0	7.0	100	CSH100-15	222 × 62 × 32	26	
	105.0	7.0	100	SSG100-15	93 ×160 × 40	36	
	105.0	7.0	Wide	SWA100-15	50 × 180 × 93	77	
	150.0	10.0	100	CSH150-15	222 × 75 × 36	27	
	150.0	10.0	100	SSG150-15	93 ×177 × 57	37	
	150.0	10.0	Wide	SWA150-15	65 ×200 × 93	80	
	10.8	0.5	100	CSJ010-24	94 × 49 × 17	18	
	15.6	0.65	100	CSJ015-24	115 × 50 × 17	19	
	16.8	0.7	Wide	SWA015-24	35 × 99 × 97	74	
-	16.8 26.4	0.7	Wide 100	CWA015-24 CSH025-24	125 × 50 × 22 115 × 50 × 23	62 24	
	26.4	1.1	100	SSH025-24	90 × 68 × 25	44	
	31.2	1.1	100	SSG030-24	75 × 120 × 25	34	
	31.2	1.3	Wide	SWA030-24	35 × 116 × 97	75	
	31.2	1.3	Wide	CWA030-24	133 × 55 × 27	63	
	50.4	2.1	100	CSH050-24	150 × 50 × 25	25	
	50.4	2.1	100	SSG050-24	90 ×135 × 25	35	
	50.4	2.1	100	SSH050-24	110 × 75 × 29	45	
	50.4	2.1	Wide	SWA050-24	37 ×159 × 97	76	
	50.4	2.1	Wide	HWA050-24-C	40 × 127 × 85	102	
	50.4	2.1	Wide	CWA050-24	195 × 55 × 27	64	
	60.0	2.5	100	SLS060P	160 × 80 × 40	54	Peak: 6A
	60.0	2.5	200	SLS060PH	160 × 80 × 40	54	Peak: 6A
	60.0	2.5	Wide	SWD060P-24	160 × 80 × 40	92	Peak: 6A
24	76.8	3.2	Wide	CWA075-24	222 × 55 × 37 38 × 170 × 92	66	Peak: 4.1A
	84.0 96.0	3.5 4.0	Wide 100	HWB060S-24 SLS100P	160 × 98 × 40	112 56	Auto switching Peak: 10A
	96.0	4.0	200	SLS100PH	160 × 98 × 40	56	Peak: 10A
	96.0	4.0	Wide	SWD100P-24	160 × 98 × 40	93	Peak: 10A
	100.8	4.2	Wide	HWA100-24-C	50 × 145 × 92	104	
	103.2	4.3	100	CSH100-24	222 × 62 × 32	26	Peak: 5.5A
	103.2	4.3	Wide	CWA100-24	222 × 62 × 37	67	
	108.0	4.5	100	SSG100-24	93 ×160 × 40	36	
	108.0	4.5	100	SSH100-24	135 × 93 × 33	46	
	108.0	4.5	Wide	SWA100-24	50 × 180 × 93	77	Peak: 15A
	144.0	6.0	100/200	SLS150PW	220 × 98 × 52	56	Peak: 15A
	144.0	6.0	Wide	SWD150P-24	220 × 98 × 52	94	Dook: 0.44
	151.2	6.3	100	CSH150-24	222 × 75 × 36	27	Peak: 8.1A
	151.2	6.3	Wide 100	CWA150-24	222 × 75 × 42 93 × 177 × 57	68 37	
	156.0	6.5 6.5	Wide	SSG150-24 SWA150-24	65 × 200 × 93	80	
	156.0	6.5	Wide	HWA150-24-C	50 × 163 × 92	96	Peak: 20.0A
	240.0	10.0	Wide	SWD240P-24	220 × 110 × 65	90	
	336.0	14.0	Wide	HWA300-24-C	110 × 175 × 92	106	
	648.0	27.0	Wide	HWA600-24-C	170 ×179 × 92	106	

Selection Guide Based on Output Voltage

	Multi Output Power Supplies								
Output Voltage (V)	Output Current (A)	Output	Input	Model	External Dimensions	See page	Remarks		
ch1	ch2	Power (W)	Voltage (V)	Woder	(W×D×H) (mm)	See page	Kelliarks		
+ 15 / 0.65	+ 15 / 0.65	19.5	Wide	HWB015D-15	34 ×110 × 92	114			
+ 15 / 1.3	+ 15 / 1.3	39.0	Wide	HWB030D-15	34 ×136 × 92	115			
+ 5 / 3.0	+ 24 / 4.0	111.0	Wide	SWE100P-2405	220 × 98 × 52	122	Peak: 24V 10A		
+ 5 / 6.0	+ 24 / 6.0	174.0	Wide	SWE150P-2405	240 ×110 × 65	123	Peak: 24V 15A		

Semi-custom Power Supplies

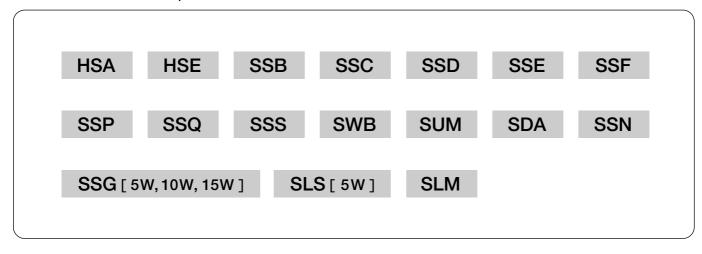
Main Unit						
Output Power (W)	No. of Mounted DC Cell Modules		Model	External Dimensions (W × D × H) (mm)	See page	Remarks
400	5	Wide	PCU400- * * * *	124 ×280 × 64	128	
600	6	Wide	PCU600- * * * *	148 ×280 × 64	129	
900	9	Wide	PCU900- * * * *	220 ×280 × 64	130	

DC Cell Modules

No. of Outputs	Output Power (W)	Output Voltage (V)	Output Current (A)	Symbol	Remarks
	48	2.0	24	Н	
	79.2	3.3	24	A	
	120	5.0	24	В	
	120	6.0	20	J	
Single Output	120	12.0	10	С	
Carpar	120	15.0	8	D	
	120	24.0	5	E	
	120	36.0	36	F	
	120	48.0	2.5	G	
Double	40	5V / 4A,	5V / 4A	W11	
Output	96	12V / 4A,	12V / 4A	W22	
Quadruple	38	+ 5V / 3A, + 12V / 1A,	- 5V / 1A - 12V / 5A	Q1	
Output	42.5		- 5V / 1A - 15V / 0.5A	Q2	

Discontinued products

The series below are the products that have been discontinued.





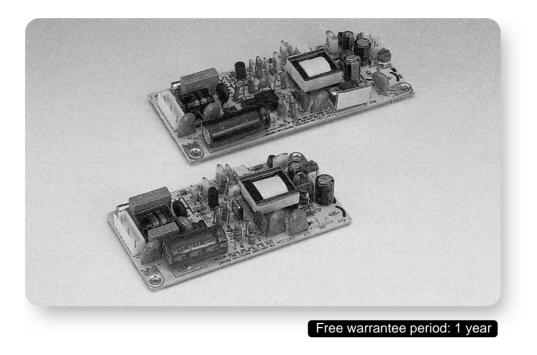
Single output

Single printed circuit board

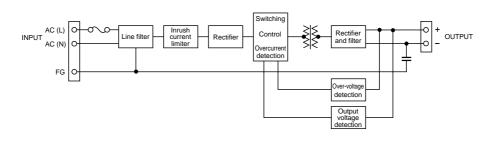




- Lower cost due to simple PCB type
- Small-capacity, single output, 10 or 15 W
- Acquired UL and CSA safety standards



[CSJ Series Circuit Diagram]





			Specificatio	ns and Standards				
	Мо	dal		1	0W			
	IVIO	dei	CSJ010-05	CSJ010-12	CSJ010-15	CSJ010-24		
	Rated Input	Voltage		AC100	//AC120V			
	Allowable I	nput Voltage Range	AC85 to 132V					
su	Input Curre	nt (typ)	0.3A					
Input Conditions	Rated Freq	uency		50	/60Hz			
Ind	Allowable F	requency Range		47 to	440Hz			
ٽ ت	Efficiency (72%	73%	75%	77%		
		ent (max) Notes		30 A (max	i) (at cold start)			
	Leakage Cu	irrent (max)		().3mA			
	Rated Outp	ut Voltage	5V	12V	12V	24V		
9	Output Volt	age Variation		Rated outpu	t voltage ±10%			
Kote	Rated Outp	ut Current	2.0A	0.85A	0.85A	0.45A		
ous	L	utput Current Range		0 to	100%			
Output Conditions 🚥	Rated Outp		10.0W	10.2W	10.2W	10.8W		
Son		oltage Accuracy		<u> </u>	-3%	1		
	Ripple Nois	C Note2	120mVp-p	150mVp-p	150mVp-p	200mVp-p		
	Output Hole	ding Time (min)		17	msec			
	Startup Tim	e (typ)		20msec				
	Overcurren	t Protection	Dete	ction above 105% of rat	ed current (automatic reco	overy)		
Additional Functions	Overvoltage Protection		Detection above 115% of rated voltage (output cutoff)					
litic	Remote ON	/OFF Control	Not provided					
Adc Fun	Remote Ser	nsing		Not p	rovided			
	Operations	Display	Not provided					
	Operating Te	emperature Range Note 4						
	Storage Ter	nperature Range	-25 to +85					
	<u> </u>	lumidity Range	30 to 90% (no condensation)					
tal		midity Range	30 to 90% (no condensation)					
Environmental Conditions	Cooling Re	quirements			air cooling			
Environme		No. of vibrations			o 55Hz			
nvir ond	Vibration	Sweep time			inutes			
шй	Resistance	Acceleration rate			/s2 (2G)			
		Vibration direction			Y, Z			
	Installation	Vibration time			of three directions			
	Installation	Conditions		Derating may be required				
	Insulation	Between input and output	2000 V AC	for 1 minute or 2400 V A	C for 1 second (leakage cu	rrent: 15 mA)		
uo	Withstand	Between input and FG				,		
Insulation	Voltage	Between output and FG	500 V AC	for 1 minute or 600 V AC	for 1 second (leakage cur	rent: 15 mA)		
nsu	Insulation	Between input and output		(00 M (
_	Resistance			100 M (measured	with 500 V DC Megger)			
		Between output and FG						
7	External Appearance				ed circuit board			
ture	Input Type				nector			
truc	Output Typ				nector			
al S ards	External Di	mensions			^D x 17 ^H mm			
External Structure/ Standards	Weight				55g	d Matariala O Statul		
Sta	Safety Stan			-	eet Electrical Appliance ar			
	Conducted	Emission	Designa	ted to meet FCC Class B	(100-120 V AC) and VCC	I Class B		

Note At cold start. (More current than above noted value may flow at restart.)

Note2 Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Output characteristics are measured at the output connector. Ripple noise is measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor connected to that point.

It may be necessary to derate the output current depending on the operating conditions. Refer to the derated output current for the installation conditions and ambient temperature.

* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage, rated

18 output current, and rated frequency, at an ambient temperature of 25 with 60% humidity.

Specifications and Standards 15W Model CSJ015-12 CSJ015-15 CSJ015-05 CSJ015-24 Rated Input Voltage AC100V/AC120V Allowable Input Voltage Range AC85 to 132V Input Current (typ) 0.4A **Rated Frequency** 50/60Hz Allowable Frequency Range 47 to 440 Hz (rated frequency: 50/60 Hz) Efficiency (typ) 72% 73% 75% 77% Inrush Current (max) Note1 30 A (max) (at cold start) Leakage Current (max) 0.3mA Rated Output Voltage 5V 12V 15V 24V Rated output voltage $\pm 10\%$ Output Voltage Variation Note 3 3.0A 0.65A **Rated Output Current** 1.25A 1.0A Allowable Output Current Range 0 to 100% **Rated Output Power** 15.0W 15.0W 15.0W 15.6W ±3% C off **Constant Voltage Accuracy** Ripple Noise Note2 120mVp-p 150mVp-p 150mVp-p 200mVp-p 16msec **Output Holding Time (min)** Startup Time (typ) 20msec **Overcurrent Protection** Detection above 105% of rated current (automatic recovery) **Overvoltage Protection** Detection above 115% of rated voltage (output cutoff) **Remote ON/OFF Control** Not provided Remote Sensing Not provided **Operations Display** Not provided **Operating Temperature Range** -10 to 60°C (70% load at 60°C) Storage Temperature Range -25 to +85°C **Operating Humidity Range** 30 to 90% (no condensation) Storage Humidity Range 30 to 90% (no condensation) ironmental **Cooling Requirements** Natural air cooling tions No. of vibrations 10 to 55Hz Sweep time 3 minutes Envii Conc Vibration 19.6m/s² (2G) Acceleration rate Resistance Vibration direction X, Y, Z Vibration time One hour in each of three directions Installation Conditions Derating may be required due to mounting direction Insulation Between input and output 2000 V AC for 1 minute or 2400 V AC for 1 second (leakage current: 15 mA) Withstand Between input and FG Voltage Between output and FG 500 V AC for 1 minute or 600 V AC for 1 second (leakage current: 15 mA) Between input and output Insulation Resistance Between input and FG $100M\Omega$ (measured with 500 V DC Megger) Between output and FG **External Appearance** Single printed circuit board Input Type Connector **Output Type** Connector **External Dimensions** $115^{W} \ge 50^{D} \ge 17^{H} \text{ mm}$ Weight 70g UL1950, CSA No. 950 certified, designated to meet Electrical Appliance and Materials Control Law Safety Standards Ξ÷ Conducted Emission Designated to meet FCC Class B (100-120 V AC) and VCCI Class B

Moter At cold start. (More current than above noted value may flow at restart.)

Note2 Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Note: Output characteristics are measured at the output connector. Ripple noise is measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor connected to that point.

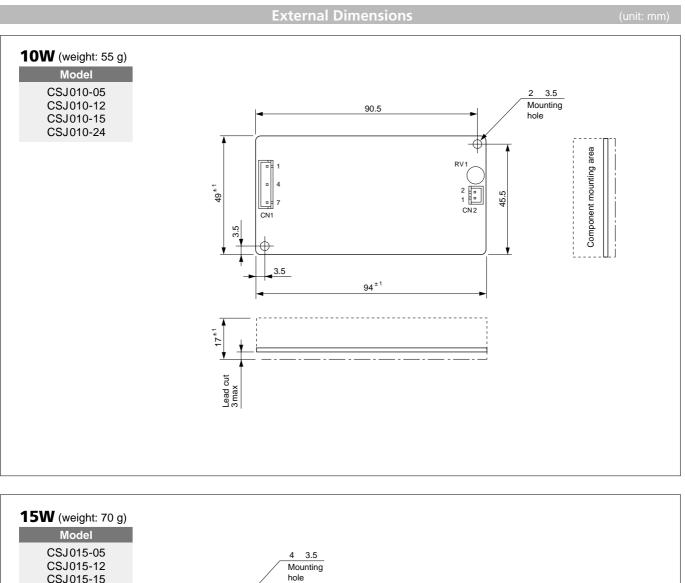
t may be necessary to derate the output current depending on the operating conditions. Refer to the derated output current for the installation conditions and ambient temperature.

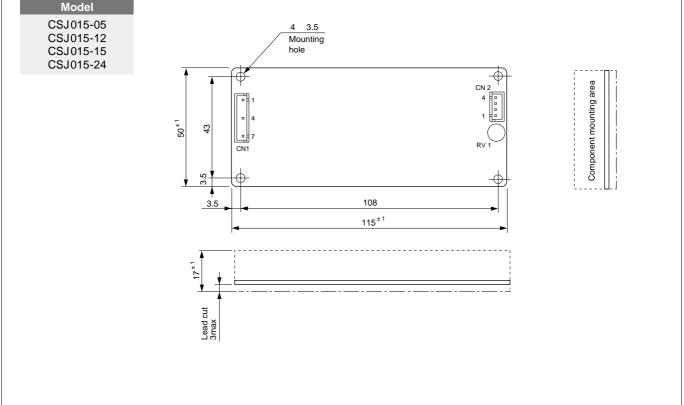
* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage,

rated output current, and rated frequency, at an ambient temperature of 25°C with 60% humidity.

SJ Series

CSJ Series







Operating Instruction

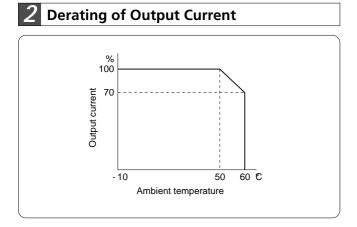
Terminal Connection

CSJ010 connector type

Symbol	Pin No.	Function	Connector	Corresponding connector	Corresponding contact
	1	AC (L)			
	2	NC		XHP-7 (JST)	
	3	NC			SXH-001T-P0.6
CN1	4	AC (N)	B3 (7.5) B-XH-A (JST)		(JST)
	5	NC	(001)		or
	6	NC			BXH-001T-P0.6
	7	FG			(JST)
CN2	1	-	B2B-XH-A	XHP-2	
UNZ	2	+	(JST)	(JST)	

CSJ015 connector type

Symbol	Pin No.	Function	Connector	Corresponding connector	Corresponding contact
	1	AC (L)		(JST)	
	2	NC			
CN1	3	NC			SXH-001T-P0.6
	4	AC (N)	B3 (7.5) B-XH-A (JST)		(JST)
	5	NC	()		or
	6	NC			BXH-001T-P0.6
	7	FG			(JST)
CN2	1 to 2	-	B4B-XH-A	XHP-4	
0112	3 to 4	+	(JST)	(JST)	

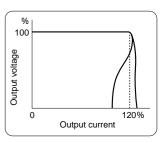


3 Setting Output Voltage

Output voltage may be adjusted using the adjustment knob found near the output connector. Turning the knob clockwise increases output voltage, while turning it counterclockwise decreases output voltage. Use the power supply with the output voltage within its adjustable range and with the output capacity within the rated output power.

4 Overcurrent Protection

When the output load becomes excessive, the output current is restricted as shown at right. After the source of the excess load is removed, the normal output voltage is recovered automatically.



The overcurrent protection function is set to operate

when the output current exceeds 105% of the rated current value (120% of the standard output value).

NOTE: Never operate the target equipment with an excessive load for long periods, since this can result in degradation of the power supply unit.

5 Overvoltage Protection

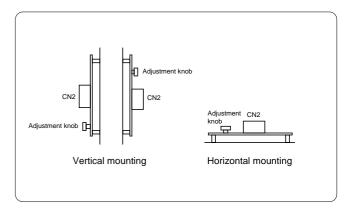
If the output voltage increases for some reason, the overvoltage condition is detected and the output is shut off. Once the overvoltage protection is activated, the output will remain cut off as long as the input supply is energized. To reset the overvoltage protection, turn off the power and wait about a minute before turning the power on again.

Take care when applying power again, as there may still be a problem with the output voltage (if there is, the overvoltage protection will shut down the output again).

6 Mounting

To use the power supply with natural cooling, mount the supply so that both sides and the top are open, and there is sufficient air flow.

The power supply can be mounted in two directions as shown below. When a metal case is used, mount the power supply considering insulation distance. Please contact Sanken for more information.

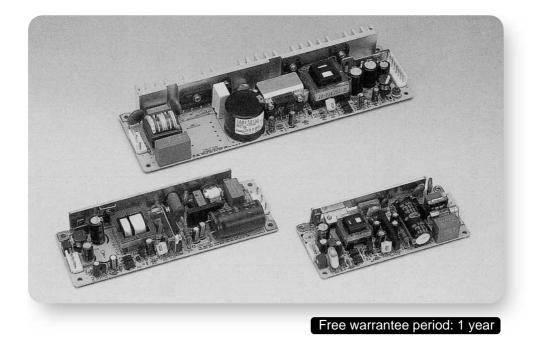


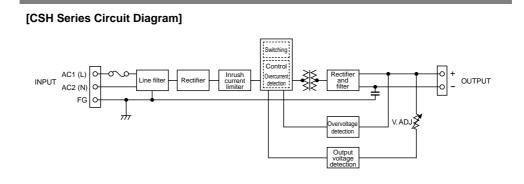
For safety's sake, be sure to connect FG to the grounding terminal of the target device. Otherwise, conducted emission, radiation noise and ripple noise will increase.

Employs resonant-mode hybrid ICs. Compact, high efficiency, low noise unit realized.



- Resonant-mode features low noise and high efficiency
- Low cost due to very simple printed circuit board type
- Wide-ranging lineup (single output: 25 W to 150 W) to meet any requirements
- Proprietary power hybrid IC realizes compact, light unit
- Acquired UL and CSA safety standards







			Specificatio	ns and Standards			
	Ma	امام		2!	5W		
	IVIO	del	CSH025-05	CSH025-12	CSH025-15	CSH025-24	
	Rated Input	Voltage		AC100\	//AC120V		
		nput Voltage Range		AC85	to 132V		
રા	Input Curre	nt (typ)		0.6/	V0.5A		
tion	Rated Freq	uency	50/60Hz				
Input Conditions	Allowable F	requency Range		47 to 440 Hz (rated	frequency: 50/60 Hz)		
ů <u> </u>	Efficiency (typ)		81%	83%	84%	86%	
	Inrush Curr	ent (max) Note1		30 A (max)	(at cold start)		
	Leakage Cu	ırrent (max)		0.	5mA		
	Rated Outp	ut Voltage	5V	12V	15V	24V	
		age Variation		Rated outpu	voltage ±10%		
Note 3	Rated Outp	-	5.0A	2.1A	1.7A	1.1A	
suo		utput Current Range			100%	1	
ditio	Rated Outp	•	25.0W	25.2W	25.5W	26.4W	
Output Conditic	Constant V	oltage Accuracy		±	3%		
00	Ripple Nois	C Note 2	80mVp-p	100mVp-p	100mVp-p	100mVp-p	
	Output Hole	ding Time (min)		16r	nsec		
	Startup Tim	ie (typ)		400	msec		
	Overcurren	t Protection	ſ	Detection above 105% of	rated current (output cuto	ff)	
Additional Functions		e Protection	Detection above 105% of rated current (output cutoff) Detection above 115% of rated voltage (output cutoff)				
litional		/OFF Control		Not provided			
un.	Remote Se	nsing	Not provided				
< ╙	Operations	Display	Not provided				
	Operating Te	emperature Range Note4	-10 to +60°C				
		mperature Range	-10 t0 +60 C -25 to +85°C				
	-	lumidity Range	-25 t0 +65 C 30 to 90% (no condensation)				
a		midity Range		· · · · ·	o condensation)		
Environmental Conditions	Cooling Re			· · · ·	air cooling		
ion		No. of vibrations		10 to	55Hz		
Environme Conditions		Sweep time		3 m	nutes		
Co	Vibration Resistance	Acceleration rate		19.6m	/s²(2G)		
		Vibration direction		Х,	Y, Z		
		Vibration time		One hour in each	of three directions		
	Installation	Conditions		Derating may be required	due to mounting direction	n	
	Insulation	Between input and output					
ç	Withstand	Between input and FG		2000 V AC for 1 minute	(leakage current: 15 mA)		
Insulation	Voltage	Between output and FG		500 V AC for 1 minute	(leakage current: 15 mA)		
sula	Inculation	Between input and output					
<u> </u>	Insulation Resistance	Between input and FG		100 M Ω (measured v	vith 500 V DC Megger)		
		Between output and FG					
	External Appearance Input Type Output Type External Dimensions Weight Safety Standards			Single printe	d circuit board		
ure/					nector		
uct					nector		
l Str ds	External Di	mensions		115 ^W x 50	^D x 23 ^H mm		
erna	Weight			8	5g		
Exte Star	Safety Stan	dards	UL1950, CSA No. 950 certified, designated to meet Electrical Appliance and Materials Control Law				
	Conducted	Emission		Designated to meet FCC	Class B and VCCI Class	В	
A 4 -		a aurrant than about a	noted value may flow at re	otort)			

Note: At cold start. (More current than above noted value may flow at restart.)

Note2 Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Construction Output characteristics are measured at the output connector. Ripple noise is measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor connected to that point.

It may be necessary to derate the output current depending on the operating conditions. Refer to the derated output current for the installation conditions and ambient temperature.

* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage,

rated output current, and rated frequency, at an ambient temperature of 25°C with 60% humidity.

CSH Series 25W,50W,100W,150W

			Specificatio	ns and Standard	S			
	Мо	امام		5	0W			
	IVIO	aei	CSH050-05	CSH050-12	CSH050-15	CSH050-24		
	Rated Input	Voltage		AC100	V/AC120V			
	Allowable I	nput Voltage Range	AC85 to 132V					
us	Input Curre	nt (typ)			1.0A			
Input Conditions	Rated Freq	uency	50/60Hz					
pud		requency Range		47 to 440 Hz (rate	d frequency: 50/60 Hz)	-		
<u>్</u> చ	Efficiency (81%	81% 86% 87% 90%				
		ent (max) Note1		30 A (max) (at cold start)			
	Leakage Cu	irrent (max)		0).5mA			
	Rated Outp	ut Voltage	5V	12V	15V	24V		
_	-	age Variation			ut voltage ±10%			
Kote3	Rated Outp	-	10.0A	4.2A	3.4A	2.1A		
sug	<u> </u>	utput Current Range		O to	o 100%			
Output Conditions	Rated Outp		50.0W	50.4W	51.1W	50.4W		
one	Constant V	oltage Accuracy			±3%	•		
00	Ripple Nois	C Note2	80mVp-p	100mVp-p	100mVp-p	100mVp-p		
	Output Hole	ding Time (min)		16	6msec			
	Startup Tim	ie (typ)		400	Omsec			
	Overcurren	t Protection	Г	Detection above 105% o	f rated current (output cuto	ff)		
Additional Functions		e Protection	Detection above 105% of rated current (output cutoff) Detection above 115% of rated voltage (output cutoff)					
tio		/OFF Control	Not provided					
ddi	Remote Ser		Not provided					
A IT	Operations	-			provided			
	Operating Te	emperature Range	-10 to +60°C					
		nperature Range	-10 t0 +00 C -25 to +85°C					
	-	Iumidity Range	30 to 90% (no condensation)					
a		midity Range			no condensation)			
Environmental Conditions	Cooling Re	quirements			l air cooling			
Environme		No. of vibrations		10 t	to 55Hz			
virc ndi	Vibration	Sweep time		3 n	ninutes			
C E	Resistance	Acceleration rate		19.6r	m/s² (2G)			
		Vibration direction		Х	, Y, Z			
		Vibration time		One hour in eac	ch of three directions			
	Installation	Conditions		Derating may be require	ed due to mounting directio	n		
	Insulation	Between input and output						
Ę	Withstand	Between input and FG		2000 V AC for 1 minute	e (leakage current: 15 mA)			
Insulation	Voltage	Between output and FG		500 V AC for 1 minute	e (leakage current: 15 mA)			
suls	Inculation	Between input and output						
<u> </u>	Insulation Resistance	Between input and FG		100 M Ω (measured	with 500 V DC Megger)			
		Between output and FG						
	External Ap	pearance		Single print	ed circuit board			
nre/				• ·	nnector			
uct					nnector			
l Str ds	External Di				0 ^D x 25 ^H mm			
ernal	Weight				150g			
External Structure/ Standards	Safety Stan	dards	UL1950, CSA No. 950 certified, designated to meet Electrical Appliance and Materials Control Law					
	Conducted	Emission		Designated to meet FCC	C Class B and VCCI Class	В		
			noted value may flow at re					

At cold start. (More current than above noted value may flow at restart.)

Note: Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Construction Output characteristics are measured at the output connector. Ripple noise is measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor connected to that point.

It may be necessary to derate the output current depending on the operating conditions. Refer to the derated output current for the installation conditions and ambient temperature.

* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage,

rated output current, and rated frequency, at an ambient temperature of 25°C with 60% humidity.



			Specificatio	ns and Standards				
	Ma	del		10	ow			
	IVIC	aei	CSH100-05	CSH100-12	CSH100-15	CSH100-24		
	Rated Input	t Voltage		AC100V	/AC120V			
		nput Voltage Range			to 132V			
ຽ	ୁଥ Input Current (typ)			2	2A			
itions	Rated Freq	uency	50/60Hz					
Input Condi	Allowable F	Frequency Range		47 to 440 Hz (rated	frequency: 50/60 Hz)			
آ و	Efficiency (typ)	82%	87%	90%	90%		
	Inrush Curi	ent (max) Note1		25A	(max)			
	Leakage Cu	urrent (max)	0.3mA					
	Rated Outp	ut Voltage	5V	12V	15V	24V		
		age Variation	50		voltage ±10%	240		
Note 3	Rated Output		20.0A	8.5A	7.0A	4.3A		
su		utput Current Range	20.07		100%	7.0/1		
Output Conditions	Rated Outp	• •	100.0W	102.0W	105.0W	103.2W		
Output Conditi		oltage Accuracy	100.000		3%	100.211		
ōŭ	Ripple Nois	<u> </u>	120mVp-p	150mVp-p	150mVp-p	200mVp-p		
	- · ·	ding Time (min)			nsec			
	Startup Tin				nsec			
s al		t Protection		Detection above 105% of rated current (output cutoff)				
ion		e Protection	Detection above 115% of rated voltage (output cutoff)					
Additional Functions		/OFF Control	Not provided					
Ad Fu	Remote Se	U	Not provided					
	Operations	Display	Not provided					
	Operating To	emperature Range Noted	-10 to +60°C					
	Storage Te	mperature Range	-25 to +85°C					
	Operating I	lumidity Range		30 to 90% (no condensation)				
tal	-	midity Range		30 to 90% (no	condensation)			
Environmental Conditions	Cooling Re	quirements		Natural a	air cooling			
Environme Conditions		No. of vibrations		10 to	55Hz			
vir	Vibration	Sweep time		• ····	nutes			
ыс	Resistance	Acceleration rate		19.6m	/s (2G)			
		Vibration direction		Χ,	Y, Z			
		Vibration time		One hour in each	of three directions			
	Installation	Conditions		Derating may be required	due to mounting direction	n		
	Insulation	Between input and output						
Ę		Between input and FG		2000 V AC for 1 minute	(leakage current: 15 mA)			
Insulation	Voltage	Between output and FG		500 V AC for 1 minute (leakage current: 15 mA)			
sula	Inculation	Between input and output						
Ë	Insulation Resistance	Between input and FG		100 M Ω (measured w	ith 500 V DC Megger)			
		Between output and FG						
	External Ar	pearance		Single printer	d circuit board			
lre/	External Appearance Input Type				nector			
nctu	Output Type	e			nector			
Stru Is	External Di				^D x 32 ^H mm			
rnal darc	Weight				80g			
External Structure/ Standards	Safety Stan	dards	UL1950, CSA No. 950 d		eet Electrical Appliance ar	nd Materials Control Law		
-шω	Conducted				Class B and VCCI Class			
			noted value may flow at re	-				

At cold start. (More current than above noted value may flow at restart.)

Note2 Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Construction Output characteristics are measured at the output connector. Ripple noise is measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor connected to that point.

It may be necessary to derate the output current depending on the operating conditions. Refer to the derated output current for the installation conditions and ambient temperature.

* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage, rrated ated output current, and rated frequency, at an ambient temperature of 25°C with 60% humidity.

CSH Series 25W,50W,100W,150W

			Specificatio	ns and Standard	S		
	Мо	dal		15	50W		
		aei	CSH150-05	CSH150-12	CSH150-15	CSH150-24	
	Rated Input	Voltage		AC100	V/AC120V		
	Allowable I	nput Voltage Range	AC85 to 132V				
Input Conditions	Input Curre		3.5A				
t litio	Rated Freq	•)/60Hz		
ouc		requency Range			d frequency: 50/60 Hz)	1	
ن -	Efficiency (78%	84%	86%	87%	
		ent (max) Note1			A (max)		
	Leakage Cu	irrent (max)		0	.3mA		
	Rated Outp	ut Voltage	5V	12V	15V	24V	
Ø	Output Volt	age Variation		Rated outpu	ut voltage ±10%		
Note	Rated Outp	ut Current	30.0A	12.5A	10.0A	6.3A	
ons	Allowable O	utput Current Range		0 te	o 100%		
Output Conditions 1288	Rated Outp	ut Power	100.0W	102.0W	105.0W	103.2W	
Con		oltage Accuracy			±3%		
	Ripple Nois		120mVp-p	150mVp-p	150mVp-p	200mVp-p	
		ding Time (min)		1	7msec		
	Startup Tim	e (typ)		60	Omsec		
	Overcurren	t Protection	Γ	Detection above 105% o	f rated current (output cuto	ff)	
Additional Functions	Overvoltage	e Protection	Detection above 115% of rated voltage (output cutoff)				
litio	Remote ON	/OFF Control	Not provided				
Add Tun	Remote Ser	nsing		Not	provided		
	Operations	Display	Not provided				
	Operating Te	emperature Range Note 4	-10 to +60°C				
		nperature Range	-10 t0 +80 C -25 to +85°C				
		lumidity Range	30 to 90% (no condensation)				
al	_ · · · ·	midity Range		· · · · · · · · · · · · · · · · · · ·	no condensation)		
Environmental Conditions	Cooling Re	quirements			l air cooling		
tion		No. of vibrations		10 t	o 55Hz		
virc ndi	Vibration	Sweep time		3 n	ninutes		
Con	Resistance	Acceleration rate		19.6r	m/s² (2G)		
		Vibration direction		Х	, Y, Z		
		Vibration time			h of three directions		
	Installation	Conditions		Derating may be require	ed due to mounting directio	n	
	Insulation	Between input and output			()		
Ę	Withstand	Between input and FG		2000 V AC for 1 minute	e (leakage current: 15 mA)		
Insulation	Voltage	Between output and FG		500 V AC for 1 minute	(leakage current: 15 mA)		
sul	Insulation	Between input and output					
느	Resistance	Between input and FG		100 M Ω (measured	with 500 V DC Megger)		
		Between output and FG					
	External Appearance			Single print	ed circuit board		
ure/	Input Type	-			nnector		
.ucti	Output Typ	e		Co	nnector		
ll Sti ds	External Di	mensions		222 ^W x 7	5 ^D x 36 ^H mm		
erna	Weight			Ę	520g		
External Structure/ Standards	Safety Stan	dards	UL1950, CSA No. 950 certified, designated to meet Electrical Appliance and Materials Control Law				
	Conducted	Emission		Designated to meet FCC	C Class B and VCCI Class	В	
			oted value may flow at re				

Note: At cold start. (More current than above noted value may flow at restart.)

Note2 Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

More Output characteristics are measured at the output connector. Ripple noise is measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor connected to that point.

It may be necessary to derate the output current depending on the operating conditions. Refer to the derated output current for the installation conditions and ambient temperature.

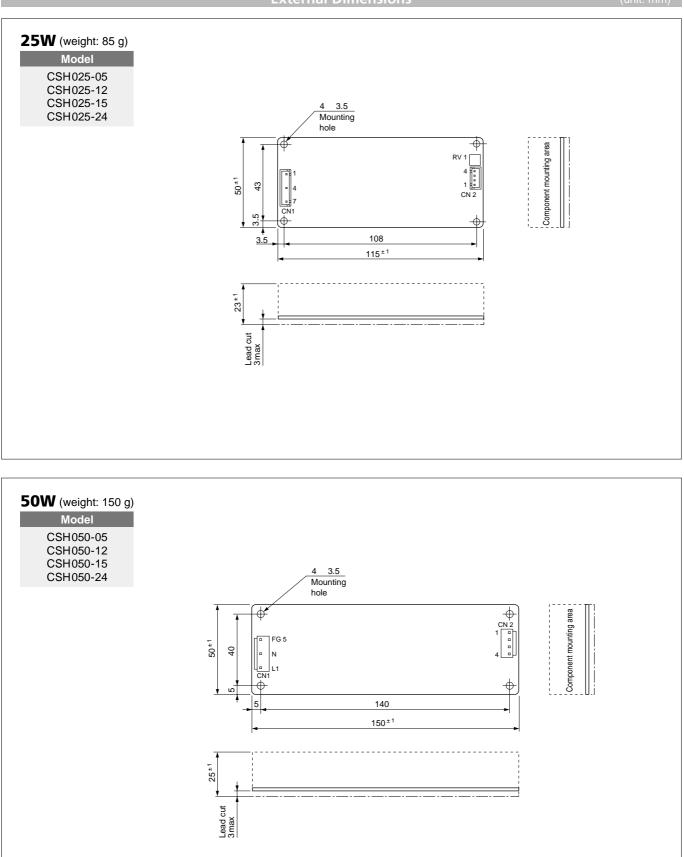
* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage,

rated output current, and rated frequency, at an ambient temperature of 25°C with 60% humidity.



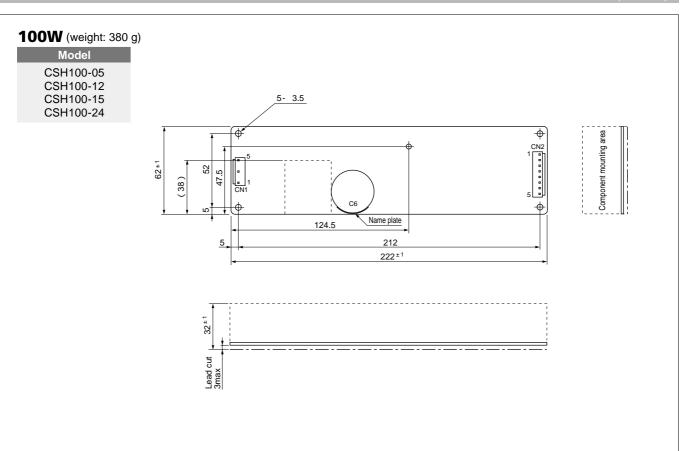
External Dimensions

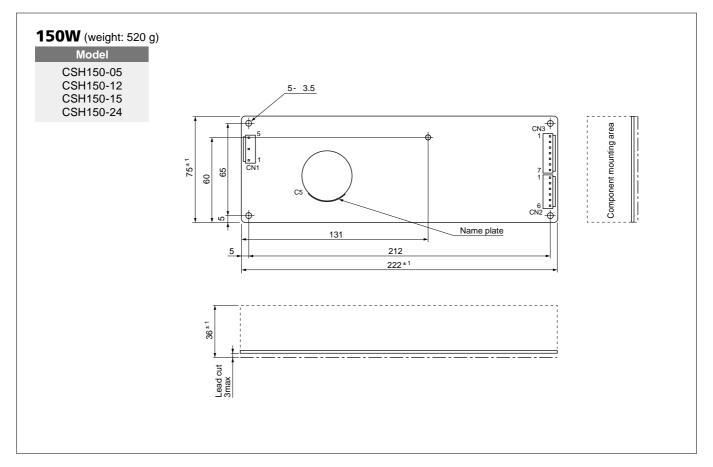
(unit: mm)



CSH Series 25W,50W,100W,150W

External Dimensions







Operating Instruction

Terminal connection

CSH025 connector type

Symbol	Pin No.	Terminal name	Corresponding connector	Corresponding contact		
	1	AC (L)				
	2	NC				
	3	NC				
CN1	4	AC (N)	XHP-7 (JST)	SXH-001T-P0.6 or BXT-001T-P0.6 (JST)		
	5	NC	(551)			
	6	NC				
	7	FG				
CNI2	1 to 2	-	XHP-4			
CN2	3 to 4	+	(JST)			

CSH050, CSH100, CSH150 connector types

	Model	Symbol	Pin No.	Terminal name	Corresponding connector	Corresponding contact	
			1	AC (L)			
			2	NC		SVH-21T-P1.1	
Input	Common	CN1	3	AC (N)	VHR-5N (JST)	SVH-211-P1.1 (JST)	
			4	NC	()		
			5	FG	1		
	CSH050) CN2	1 to 2	-	VHR-4N		
	050000		3 to 4	+	(JST)		
	001100	CN2	1 to 4	-	VHR-8N		
Output	CSH100	GNZ	5 to 8	+	(JST)	SVH-21T-P1.1 (JST)	
		CN2	1 to 6	+	VHR-6N (JST)	(331)	
	CSH150	CN3	1 to 7	-	VHR-7N (JST)		

% 100 CSH025, 050 70 Output current 0 - 10 0 50 60 C Ambient temperature % 100 **CSH100** 70 Output current 0 60 C - 10 0 50 Ambient temperature % 100 **CSH150** 70 Output current 60

Installation condition and output current derating for ambient temperature

2

3 Setting output voltage

Output voltage may be adjusted using the adjustment knob found near the output connector. Turning the knob clockwise increases output voltage, while turning it counterclockwise decreases output voltage. Use the power supply with the output voltage within its adjustable range and with the output capacity within the rated output power.

0

-10 0

25

Ambient temperature

60 C

50



4 Overcurrent protection

When the output is overloaded, the power supply's built-in overcurrent protection will shut off the output. The overcurrent protection is set to function when the output current exceeds 105% of the rated current value (about 130% of a standard output value).

To reset the overcurrent protection, remove the source of the overload, turn off the power, and wait about a minute before turning the power on again.

5 Overvoltage Protection

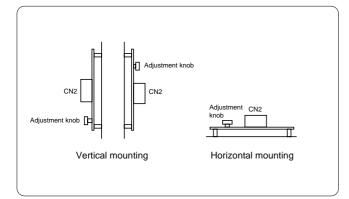
If the output voltage increases for some reason, the overvoltage condition is detected and the output is shut off. Once the overvoltage protection is activated, the output will remain cut off as long as the input supply is energized. To reset the overvoltage protection, turn off the power and wait about a minute before turning the power on again.

Take care when applying power again, as there may still be a problem with the output voltage (if there is, the overvoltage protection will shut down the output again).

6 Mounting

To use the power supply with natural cooling, mount the supply so that both sides and the top are open, and there is sufficient air flow.

The power supply can be mounted in two directions as shown below. When a metal case is used, mount the power supply considering insulation distance. Please contact Sanken for more information.



Be sure to connect FG to the grounding terminal of the target device. Otherwise, conducted emission, radiation noise and ripple noise will increase.

A high efficiency, thin and compact unit

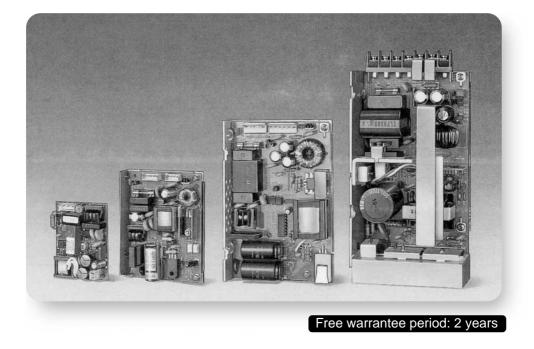


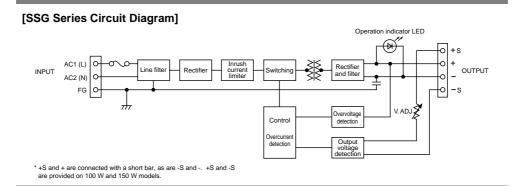
Single output With chassis (30 to 150 W)



The SSG Series employs a higher switching frequency, unique mixed-mounting technology and innovative parts such as barrier-less transformers to create reliable, compact, high-performance switching power supplies through integrating Sanken's technologies. Sanken is proud to provide this product to meet the power supply needs for the next generation.

- New barrier-less transformer
- Mixed-mounting technology
- Thin, compact models
- 4 to 5% higher efficiency than our existing products
- Acquired UL and CSA safety standards
- Conducted emission conforms to FCC class B







: Please contact Sanken for delivery time in advance.

Specifications and Standards

Specifications and Standards						
Model -			30W			
Model		SSG030-05	SSG030-12	SSG030-15	SSG030-24	
Input Conditions	Rated Input Voltage		AC100V/AC120V			
	Allowable Input Voltage Range		AC85 to 132V			
	Input Current (typ)		0.7A			
	Rated Frequency		50/60Hz			
put	Allowable Frequency Range		47 to 440Hz			
ن ک ۲	Efficiency (typ)		75%	78%	78%	80%
	Inrush Current (max) 🔤		30A (max)			
	Leakage Current (max)		0.4mA			
Output Conditions 1000	Rated Output Voltage		5V	12V	15V	24V
	Output Voltage Variation			Rated output	voltage ±10%	
	Rated Output Current		6.0A	2.5A	2.0A	1.3A
	Allowable Output Current Range			0 to	100%	
	Rated Output Power		30.0W	30.0W	30.0W	31.2W
	Constant Voltage Accuracy				3%	
	Ripple Noise Note2		120mVp-p	150mVp-p	150mVp-p	200mVp-p
	Output Holding Time (min)		16msec			
	Startup Time (typ)		400msec			
Additional Functions	Overcurrent Protection		Detection above 105% of rated current			
	Overvoltage Protection		Detection from 115 to 135% of rated voltage			
	Remote ON/OFF Control		Not provided			
	Remote Sensing		Not provided			
	Operations Display		Red LED indicator			
Environmental Conditions	Operating Temperature Range		0 to +50°C (0 to +40°C with cover)			
	Storage Temperature Range		-25 to +85°C			
	Operating Humidity Range		30 to 90% (no condensation)			
	Storage Humidity Range		30 to 90% (no condensation)			
	Cooling Requirements		Natural air cooling			
		No. of vibrations	10 to 55Hz			
	Vibration Resistance	Sweep time	1.5 minutes			
		Acceleration rate	19.6m/s²(2G)			
		Vibration direction	X, Y, Z			
	Installation	Vibration time Conditions	One hour in each of three directions Derating may be required due to mounting direction			
Insulation	Insulation Between input and output		2000 V AC for 1 minute			
	Withstand Voltage	Between input and FG				
	voitage	Between output and FG Between input and output	500 V AC for 1 minute			
	Insulation	Between input and FG		100 MO (measured w	(ith 500 V DC Megger)	
	Resistance	Between output and FG	100 M Ω (measured with 500 V DC Megger)			
External Structure/ Standards	External Appearance		With chassis (cover is optional)			
	Input Type		Connector (terminal stand is optional)			
	Output Type External Dimensions		Connector (terminal stand is optional) 75 ^w x 120 ^D x 25 ^H mm			
	Weight		250g			
	Safety Standards		UL1950, CSA EB1402C certified			
	Conducted Emission		Designated to meet FCC Class B			
10	Terminal Stand		- - -			
Options	Chassis		Provided Provided as standard			
			Provided as standard			
	Cover		Provided			

Note: At cold start. (More current than above noted value may flow at restart.)

Note2 Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Output characteristics are measured at the output connector. Ripple noise is measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor connected to that point.

* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage, rated output voltage, rated output current, and rated frequency, at an ambient temperature of 25°C with 60% humidity

30W, 50W, 100W, 150W

SSG Series

: Please contact Sanken for delivery time in advance.

			Specificatio	ns and Standards	;		
	Ma	del		5	0W		
	IVIO	aei	SSG050-05	SSG050-12	SSG050-15	SSG050-24	
	Rated Input	t Voltage	AC100V/AC120V				
		nput Voltage Range			to 132V		
ns	Input Curre	nt (typ)		1	.3A		
t litions	Rated Freq	uency		50.	/60Hz		
Input Condi		Frequency Range		47 to	440Hz		
చ్ స	Efficiency (75%	77%	79%	81%	
		rent (max) Note1		30/	(max)		
	Leakage Cu	urrent (max)	0.4mA				
	Rated Outp	ut Voltage	5V	12V	15V	24V	
Note 3	Output Volt	age Variation		Rated outpu	t voltage ±10%		
put ditions	Rated Outp	ut Current	10.0A	4.2A	3.4A	2.1A	
		utput Current Range		0 tc	100%	1	
	Rated Outp		50.0W	50.4W	51.0W	50.4W	
Sout Court		oltage Accuracy	4001/		=3%	0001/	
	Ripple Nois		120mVp-p	150mVp-p	150mVp-p	200mVp-p	
		ding Time (min)			msec		
	Startup Time (typ)			400	11360		
Additional Functions	Overcurrent Protection		Detection above 105% of rated current				
	Overvoltage Protection Remote ON/OFF Control		Detection from 115 to 135% of rated voltage				
			Not provided Not provided				
	Remote Sensing Operations Display		Red LED indicator				
	· · · ·						
	Operating Temperature Range			1	+40°C with cover)		
	Storage Temperature Range Operating Humidity Range		-25 to +85°C 30 to 90% (no condensation)				
a	Storage Humidity Range				,		
Environmenta Conditions	Cooling Requirements		30 to 90% (no condensation) Natural air cooling				
Environme Conditions		No. of vibrations	10 to 55Hz				
iro Idit		Sweep time	1.5 minutes				
Sor	Vibration Resistance	Acceleration rate		19.6	m/s² (2G)		
	Resistance	Vibration direction		Χ,	Y, Z		
		Vibration time		One hour in eac	n of three directions		
	Installation	Conditions		Derating may be require	d due to mounting directio	n	
	Insulation	Between input and output					
n	Withstand	Between input and FG		2000 V AC	for 1 minute		
Insulation	Voltage	Between output and FG		500 V AC	for 1 minute		
sul	Insulation	Between input and output					
<u> </u>	Resistance	Between input and FG		100 M Ω (measured v	vith 500 V DC Megger)		
		Between output and FG					
7	External Ap	opearance		With chassis (cover is optional)		
ture	Input Type			Connector (termin	nal stand is optional)		
truc	Output Typ				nal stand is optional)		
External Structure/ Standards	External Di	mensions			5 ^D x 25 ^H mm		
tern	Weight				00g		
Sta	Safety Stan				EB1402C certified		
	Conducted	Emission		Designated to r	neet FCC Class B		
sue	Terminal St	and		Pro	ovided		
Options	Chassis				as standard		
0	Cover			Pro	ovided		

Note2 Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Come Output characteristics are measured at the output connector. Ripple noise is measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor connected to that point.

* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage, rated output current, and rated frequency, at an ambient temperature of 25°C with 60% humidity.



: Please contact Sanken for delivery time in advance.

Specifications and Standards								
	Мо	del		10	OW			
	INIC	luer	SSG100-05	SSG100-12	SSG100-15	SSG100-24		
	Rated Input	t Voltage	AC100V/AC120V					
	Allowable I	nput Voltage Range		AC85	to 132V			
su	Input Curre	nt (typ)		2	.0A			
itio	Rated Freq	uency		50/	60Hz			
Input Conditions	Allowable Frequency Range			47 to	440Hz			
_= ŏ	Efficiency (79%	83%	84%	86%		
		ent (max) Note1		20A	(max)			
	Leakage Cu	urrent (max)		0.4	4mA			
	Rated Outp		5V	12V	15V	24V		
dote 3		age Variation			t voltage ±10%			
าร เ	Rated Outp		20.0A	8.5A	7.0A	4.5A		
t		utput Current Range	(00.011)		100%	(22 2) 4		
Output Conditions 🚥	Rated Outp		100.0W	102.0W	105.0W	108.0W		
Col		oltage Accuracy	120m)/n n		3%	240m)/n n		
	Ripple Nois		120mVp-p	180mVp-p	180mVp-p msec	240mVp-p		
	Output Holding Time (min) Startup Time (typ)							
		t Protection		300msec				
Additional Functions			Detection above 105% of rated current					
tio	Overvoltage Protection Remote ON/OFF Control		Detection from 115 to 135% of rated voltage Not provided					
ddi	Remote Sensing		Available					
ΑĒ	Operations	-	Red LED indicator					
	-		0 to +50°C (0 to +40°C with cover)					
	Operating Temperature Range Storage Temperature Range			· · · · ·	/			
		lumidity Range	-25 to +85°C 30 to 90% (no condensation)					
ସ		midity Range	30 to 90% (no condensation)					
Environmental Conditions		quirements	Natural air cooling					
vironme nditions	J	No. of vibrations	10 to 55Hz					
/iro		Sweep time		1.5 m	ninutes			
Cor	Vibration Resistance	Acceleration rate		19.6r	n/s² (2G)			
	Resistance	Vibration direction		Х,	Y, Z			
		Vibration time		One hour in each	of three directions			
	Installation	Conditions	Derating may be required due to mounting direction					
	Insulation	Between input and output		0000.1/ 10				
E	Withstand	Between input and FG		2000 V AC	for 1 minute			
Insulation	Voltage	Between output and FG		500 V AC	for 1 minute			
sul	Insulation	Between input and output						
<u> </u>	Resistance	Between input and FG		100 M Ω (measured v	vith 500 V DC Megger)			
		Between output and FG						
2	External Ap	opearance		With chassis (c	cover is optional)			
ture	Input Type			Termir	nal stand			
truc	Output Typ				nal stand			
External Structure/ Standards	External Di	mensions			^D x 40 ^H mm			
ern	Weight				70g			
Ext Sta	Safety Stan				No. 234 certified			
	Conducted	Emission		Designated to n	neet FCC Class A			
ions	Chassis			Provided	as standard			
Cover			Pro	vided				

Note: At cold start. (More current than above noted value may flow at restart.)

Note2 Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Notes Output characteristics are measured at the output connector. Ripple noise is measured at a point 5 cm from the output connector, with a 63-V, $47-\mu F$ electrolytic capacitor connected to that point.

* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage,

rated output current, and rated frequency, at an ambient temperature of 25°C with 60% humidity

36

SSG Series 30W,50W,100W,150W

: Please contact Sanken for delivery time in advance.

	84-	-1-1		15	OW		
	IVIO	del	SSG150-05	SSG150-12	SSG150-15	SSG150-24	
	Rated Input	t Voltage	AC100V/AC120V				
		nput Voltage Range			to 132V		
SU	Input Curre				5A		
tio	Rated Freq			50/	60Hz		
lnput Condi	Allowable Frequency Range			47 to	440Hz		
ے S	Efficiency (typ)		79%	83%	84%	86%	
	Inrush Curr	rent (max) Noted		20A	(max)		
	Leakage Cu	urrent (max)			1mA		
	Rated Outp	ut Voltage	5V	12V	15V	24V	
8		tage Variation		Rated output	voltage ±10%		
Note 3	Rated Outp	-	30.0A	13.0A	10.0A	6.5A	
suo		output Current Range		0 to	100%		
diti	Rated Outp	out Power	150.0W	156.0W	150.0W	156.0W	
Outpu Condi		oltage Accuracy		±	3%		
00	Ripple Nois	Se Note 2	120mVp-p	180mVp-p	180mVp-p	240mVp-p	
	Output Holding Time (min)			20	msec		
	Startup Tim	ne (typ)		300	msec		
le s	Overcurrent Protection		Detection above 105% of rated current				
Additional Functions	Overvoltage Protection		Detection from 115 to 135% of rated voltage				
ditio	Remote ON/OFF Control		Not provided				
Pd Fui	Remote Sensing		Available				
	Operations Display		Red LED indicator				
		Femperature Range		0 to +50°C (0 to	+40°C with cover)		
	Storage Temperature Range			-25 to	+85°C		
_	Operating Humidity Range		30 to 90% (no condensation)				
ntal		midity Range	30 to 90% (no condensation)				
Environmental Conditions	Cooling Re		Natural air cooling				
on litic		No. of vibrations	10 to 55Hz				
nvir Dnd	Vibration	Sweep time			ninutes		
шŏ	Resistance	Acceleration rate			n/s² (2G)		
		Vibration direction			Y, Z		
	Installation	Vibration time Conditions			of three directions	-	
	Installation	conditions		Derating may be required	a due to mounting directio	11	
	Insulation	Between input and output		2000 V AC	for 1 minute		
uo		Between input and FG					
Insulation	Voltage	Between output and FG		500 V AC	for 1 minute		
nsı	Insulation	Between input and output					
<u> </u>	Resistance	Between input and FG		100 M Ω (measured w	vith 500 V DC Megger)		
		Between output and FG					
e/	External Ap	opearance		With chassis (c	over is optional)		
tur	Input Type			Termir	al stand		
trud	Output Typ				al stand		
al S Irds	External Dimensions				^D x 57 ^H mm		
	Weight		830g				
iern	-		UL1950, CSA No. 234 certified				
External Structure/ Standards	Safety Stan						
Exterr Stand	-				No. 234 certified neet FCC Class A		
tions Stand	Safety Stan			Designated to n Provided			

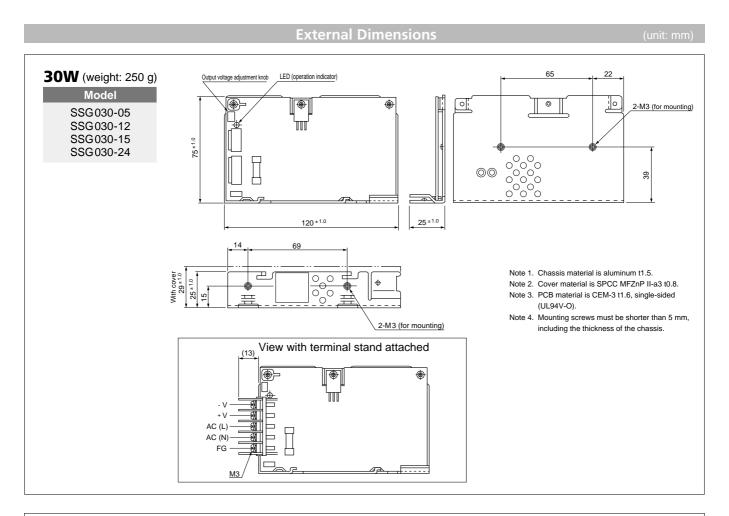
Note: At cold start. (More current than above noted value may flow at restart.)

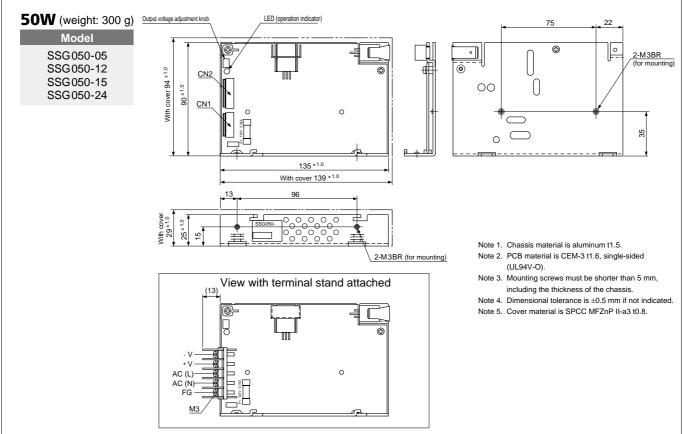
Note2 Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage,

Constructed to the output connector. Ripple noise is measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor connected to that point.



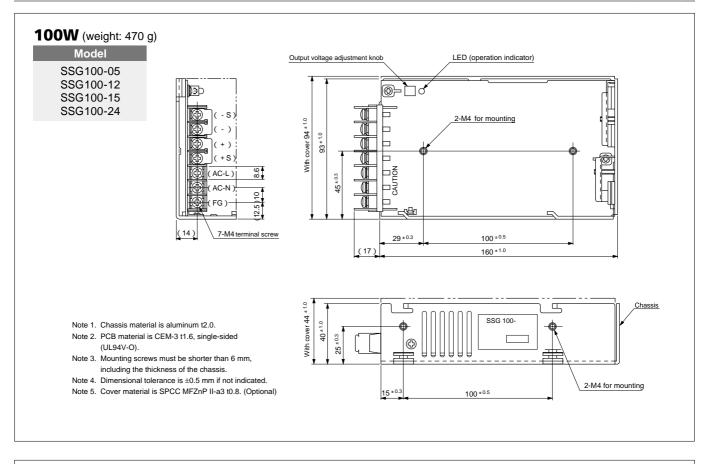


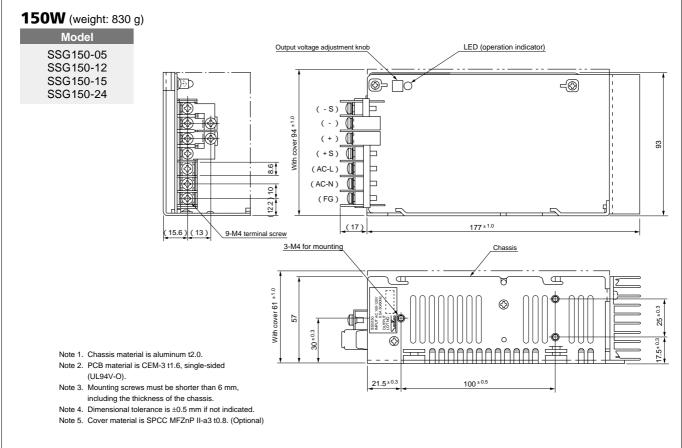


SSG Series 30W,50W,100W,150W

External Dimensions

(unit: mm)



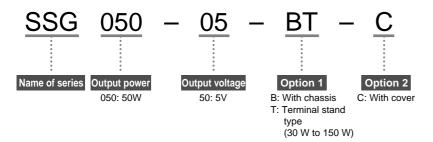


SSG Series 30W,50W,100W,150W

Option

Symbol at end of product name	Description	Application	
В	Connector type with chassis	30W, 50W	
B-C	Connector type with chassis and cover	30W, 50W	
BT	Terminal stand type with chassis	30W, 50W, 100W, 150W	
BT-C	Terminal stand type with chassis and cover	30W, 50W, 100W, 150W	

Description of model name





Operating Instruction

Terminal connection

Connectors (for models SSG030 and SSG050)

Model	Connector	Pin	Name	Corresponding connector	Corresponding contact			
		1	FG					
		2	NC					
Input (for all models	CN1	3	AC (N)	VHR-5N (JST)	SVH-21T-P1.1 (JST)			
listed above)		4	NC					
		5	AC (L)					
	CN2	1, 2	+ V	VHR-4N (JST)	SVH-21T-P1.1			
SSG030 type		3, 4	0V		(JST)			
	CN3	1	FG	#250 Fas	ten receptacle			
	CNID	1 to 3	+ V	VHR-6N	SVH-21T-P1.1			
SSG050 type	CN2	4 to 6	0V	(JST)	(JST)			
	CN3	1	FG	#250 Fas	ten receptacle			

Terminal Stand (for models SSG030, 050, 100, and 150)

Model	Pin	Name	Corresponding crimp terminal
	1	FG	
	2	AC (N)	
SSG030 type SSG050 type	3	AC (L)	V1.25-3 (JST) or equivalent
000000 type	4	+ V	
	5	0V	
	1	FG	
	2	AC (N)	
	3	AC (L)	
SSG100 type SSG150 type	4	+ S	V2-4 (JST) or equivalent
33G130 type	5	+ V	
	6	0V	
	7	- S	

Note: Check the diagram for each model to verify terminal arrangement.

Terminal name and function

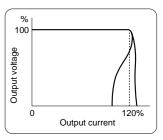
	Terminal name	Function		
	AC (L)	AC input terminals. Connect the grounding line		
Input	AC (N)	to AC (N). AC (L) has an input fuse.		
	FG	Ground terminal (Connect it to a ground line.)		
	+ V	DC output terminal. Use these terminals for		
Outrout	0V	connection to the load.		
Output	+ S	Remote sensing terminals. For remote sensing,		
	- S	connect these terminals to the sensing point.		

2 Setting output voltage

Output voltage may be adjusted using the adjustment knob found near the output connector or terminal stand. Turning the knob clockwise increases output voltage, while turning it counterclockwise decreases output voltage. Use the power supply with the output voltage within its adjustable range and with the output capacity within the rated output power.

3 Overcurrent protection

When the output load becomes excessive, the output current is restricted as shown at right. After the source of the excess load is removed, the normal output voltage is recovered automatically.



The overcurrent protection function is set to operate

when the output current exceeds 105% of the rated current value (120% of the standard output value).

Note: Never operate the target equipment with an excessive load for long periods, since this can result in degradation of the power supply unit.

4 Overvoltage protection

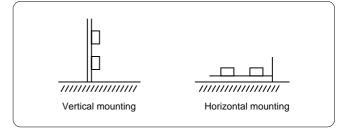
If the output voltage increases for some reason, the overvoltage condition is detected and the output is shut off. Once the overvoltage protection is activated, the output will remain cut off as long as the input supply is energized. To reset the overvoltage protection, turn off the power and wait about three minutes before turning the power on again.

Take care when applying power again, as there may still be a problem with the output voltage (if there is, the overvoltage protection will shut down the output again).

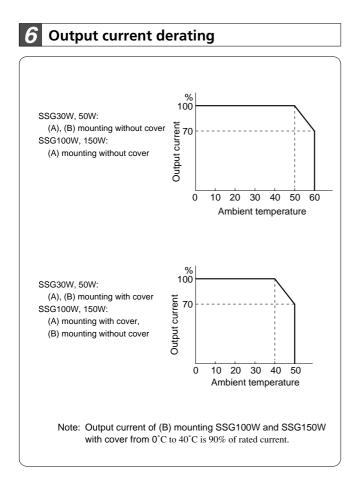
5 Mounting

To use the power supply with natural cooling, mount the supply so that both sides and the top are open, and there is sufficient air flow.

SSG series can be mounted in two directions as shown below. Output current derating is needed according to the model. Please refer to item $\boldsymbol{6}$.







Leakage current

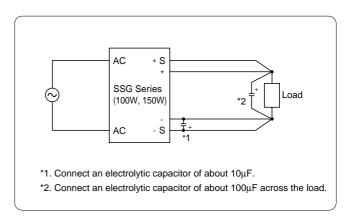
Leakage current is 0.5 mA or less (differs according to model, approx. 0.2 mA) per unit. Take care when using multiple supplies simultaneously.

Inrush current limiting

The power supply is equipped with an inrush current limiting circuit to restrict the amount of current that flows when the power is turned on. Since the 30 W to 50 W models use a power thermistor, current greater than that listed in the specifications may flow when restarting the supply, or due to ambient temperature conditions. The 100 W and 150 W models may also allow more current than that listed in the specifications if restarting after a short period of time. Take adequate precautions.

9 Remote sensing

The SSG100W and 150W models are equipped with a remote sensing feature to guard against output line drop. The guaranteed output voltage range, including line drop effects, is 5% of rated output voltage. Limit line drop on the minus side to 125 mV or less



10 Others

The SSG series (except 5W model) can be connected in series and used as minus output. However, they cannot be connected in parallel to increase output capacity, Please return malfanctioning units via the channel through which the unit was purchased.

11 When there is not output

- Check that all terminals are connected correctly as described in item **1**.
- Output will be cut off when over voltage protection is active. Check the supply as described in item 4. Overvoltage protection may be activated if the output voltage is set too high. Verify that the output voltage adjustment knob is set towards the middle of its range. Overvoltage protection may be activated if the remote sensing terminals are not properly connected. Check their connections.
- The overcurrent protection will be activated and the output will decrease if there is an overload condition.

8

Employs resonant-mode hybrid IC. Realizes high efficiency with low noise, small, lightweight.

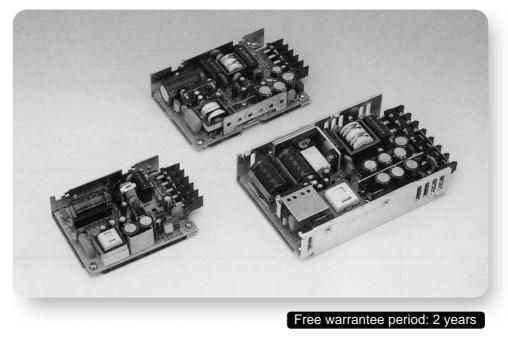


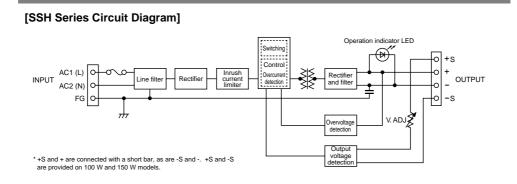
Single output With chassis type



The SSH Series features Sanken's proprietary resonant-mode power hybrid IC and transformer. Along with high efficiency and low noise that can only be realized with a resonant-mode supply, these models provide a smaller size and are more economical than previously possible with conventional resonant-mode power supplies. With this series, Sanken delivers the next generation of power supplies to the market today.

- High 81 to 90% efficiency
- Low noise
- Small and lightweight, occupying only 2/3 of the volume of Sanken's equivalent FCC power supplies.







: Please contact Sanken for delivery time of connector type product in advance.

Specifications and Standards

			Specificatio	ns and Standards			
	Мо		25W				
		SSH025-05	SSH025-12	SSH025-15	SSH025-24		
	Rated Input	Voltage	AC100V/AC120V				
	Allowable I	nput Voltage Range		AC85	to 132V		
Input Conditions	Input Curre	nt (typ)		0.64	V0.5A		
itio	Rated Frequ	uency		50/	60Hz		
put	Allowable F	Frequency Range		47 to	440Hz		
<u>ت</u> = ک	Efficiency (80%	83%	84%	85%	
		rent (max) Note1		30A	(max)		
	Leakage Cu	irrent (max)		0.3	3mA		
	Rated Outp	ut Voltage	5V	12V	15V	24V	
		age Variation	-	Rated outpu	t voltage ±10%		
Note 3	Rated Outp		5.0A	2.1A	1.7A	1.1A	
suo	Allowable O	utput Current Range		0 to	100%		
out diti	Rated Outp	ut Power	25W	25.2W	25.5W	26.4W	
Output Conditions	Constant V	oltage Accuracy		±	3%		
00	Ripple Nois		80mVp-p	100mVp-p	100mVp-p	100mVp-p	
		ding Time (min)		16	msec		
	Startup Tim	ne (typ)		400	msec		
Additional Functions	Overcurren	t Protection]	Detection above 105% of	rated current (output cutof	f)	
	Overvoltage	e Protection	Detection above 115% of rated voltage (output cutoff)				
	Remote ON	/OFF Control	Not provided				
pb√	Remote Ser	nsing	Not provided				
	Operations	Display	Red LED indicator				
	Operating Te	emperature Range Note 4		0 to	+60°C		
		mperature Range			+85°C		
		lumidity Range			o condensation)		
a	Storage Humidity Range		30 to 90% (no condensation)				
Environmental Conditions	Cooling Re		Natural air cooling				
tior		No. of vibrations	10 to 55Hz				
/iro ndii	Vibration	Sweep time	3 minutes				
C D	Resistance	Acceleration rate		19.6r	m/s² (2G)		
	literetario	Vibration direction		Х,	Y, Z		
		Vibration time			n of three directions		
	Installation	Conditions		Derating may be require	d due to mounting direction	l	
	Insulation	Between input and output	00)	
E	Withstand	Between input and FG	20	00 V AC for 1 minute (lea	akage current: 15 mA or le	SS)	
Insulation	Voltage	Between output and FG	50	00 V AC for 1 minute (lea	kage current: 15 mA or les	s)	
sul	Insulation	Between input and output					
드	Resistance	Between input and FG		100 M Ω (measured v	vith 500 V DC Megger)		
		Between output and FG					
_	External Ap	pearance		With chassis (cover is optional)		
External Structure/ Standards	Input Type			1	onnector is optional)		
ruci	Output Typ			``````````````````````````````````````	onnector is optional)		
al St rds	External Di	mensions		90 ^W x 68	^D x 25 ^H mm		
erna ndai	Weight				70g		
Exte	Safety Stan				No. 950 certified		
	Conducted	Emission		Designated to meet	FCC Class B (120 V AC)		
SL	Remote ON	/OFF Control		Not p	provided		
Options	I/O Connect			· ·	ovided		
ő	Cover			Pro	ovided		

Note: At cold start. (More current than above noted value may flow at restart.)

Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Output characteristics are measured at the output connector. Ripple noise is measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor connected to that point.

th may be necessary to derate the output current depending on the operating conditions. Refer to the derated output current for the installation conditions and ambient temperature.

* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage,



: Please contact Sanken for delivery time of connector type product in advance.

Specifications and Standards

	Specifications and Standards							
	Model -			5	ow			
			SSH050-05	SSH050-12	SSH050-15	SSH050-24		
	Rated Input	Voltage	AC100V/AC120V					
	Allowable I	nput Voltage Range		AC85	5 to 132V			
ns	Input Curre			1.0	A/0.9A			
itio	Rated Freq	uency		50)/60Hz			
Input Conditions		Frequency Range		47 te	o 440Hz			
ن <u>۽</u>	Efficiency (81%	86%	87%	90%		
	<u> </u>	ent (max) Note1		30.	A (max)			
	Leakage Current (max)			0	.3mA			
	Rated Outp	ut Voltage	5V	12V	15V	24V		
8		age Variation		Rated outpu	ut voltage ±10%			
C Kote	Rated Outp	ut Current	10A	4.2A	3.4A	2.1A		
ions	Allowable O	utput Current Range		0 te	o 100%			
put diti	Rated Outp		50W	50.4W	51W	50.4W		
Output Conditions		oltage Accuracy			±3%			
	Ripple Nois		80mVp-p	100mVp-p	100mVp-p	100mVp-p		
		ding Time (min)			6msec			
	Startup Time (typ)		400msec					
Additional Functions		t Protection		Detection above 105% o	f rated current (output cutof	F)		
	Overvoltage Protection		Detection above 115% of rated voltage (output cutoff)					
		/OFF Control	Not provided					
Ado Fur	Remote Ser	•	Not provided					
	Operations Display			Red LE	D indicator			
	Operating Te	emperature Range		0 to	o +60°C			
	Storage Temperature Range		-25 to +85°C					
	Operating Humidity Range		30 to 90% (no condensation)					
Environmental Conditions	Storage Humidity Range		30 to 90% (no condensation)					
ner	Cooling Requirements		Natural air cooling					
oni litio		No. of vibrations			to 55Hz			
nvir ond	Vibration	Sweep time			ninutes			
шõ	Resistance				5m/s² (2G)			
		Vibration direction Vibration time	X, Y, Z					
	Installation	Conditions	One hour in each of three directions Derating may be required due to mounting direction					
				beraung may be require				
		Between input and output	2	000 V AC for 1 minute (le	eakage current: 15 mA or les	ss)		
ion	Withstand Voltage	Between input and FG			5			
Insulation	voltage	Between output and FG		DUD V AC FOR 1 MINUTE (lea	akage current: 15 mA or les	s)		
Insu	Insulation	Between input and output Between input and FG		100 MO (mossured	with 500 V DC Megger)			
	Resistance	Between output and FG		100 1022 (1116450160	with 500 v DC Megger)			
	Frank 1.5	•			/ · · · ·			
re/	External Ap	opearance			(cover is optional)			
lctu	Input Type Output Typ	9		,	connector is optional)			
External Structure/ Standards	External Di			,	^{connector is optional)} 5 ^D x 29 ^H mm			
nal lard	Weight				220g			
xter tanc	Safety Stan	dards			No. 950 certified			
ы м	Conducted				FCC Class B (120 V AC)			
Options		/OFF Control			provided ovided			
Opti	I/O Connec Cover				ovided			
0	Cover			PI	UNICEU			

Note: At cold start. (More current than above noted value may flow at restart.)

Note2 Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

It may be necessary to derate the output current depending on the operating conditions. Refer to the derated output current for the installation conditions and ambient temperature.

* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage,

Output characteristics are measured at the output connector. Ripple noise is measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor connected to that point.



			Specifications a	nd Standards			
	Мо	del		100W			
			SSH100-05	SSH100-12	SSH100-24		
	Rated Input	Voltage		AC100V/AC120V			
	Allowable I	nput Voltage Range		AC85 to 132V			
suo	Input Curre			2.0A/1.8A			
Input Conditions	Rated Freq			50/60Hz			
	Allowable Frequency Range			47 to 440Hz			
= ບັ	Efficiency (82%	87%	90%		
		ent (max) Notes		30A (max)			
	Leakage Cu	irrent (max)		0.3mA			
	Rated Outp	ut Voltage	5V	12V	24V		
Note 3	Output Volt	age Variation		Rated output voltage ±10%			
2	Rated Outp		20A (18A) Note 4	8.5A	4.5A		
		utput Current Range		0 to 100%			
ndit Idit	Rated Outp		100W	102W	108W		
Cont		oltage Accuracy		±3%			
	Ripple Nois		80mVp-p	100mVp-p	100mVp-p		
	Output Holding Time (min)			16msec			
	Startup Tim			280msec			
Additional Functions		t Protection	Detection above 105% of rated current (output cutoff)				
	-	e Protection /OFF Control	Detection above 115% of rated voltage (output cutoff)				
	Remote ON		Not provided Provided				
		•		Red LED indicator			
	Operations Display						
	Operating Temperature Range			0 to +60°C			
	Storage Temperature Range			-25 to +85°C			
-	Operating Humidity Range			30 to 90% (no condensation)			
shta	Storage Humidity Range Cooling Requirements		30 to 90% (no condensation) Natural air cooling				
Environmental Conditions		No. of vibrations	10 to 55Hz				
diti		Sweep time	3 minutes				
	Vibration	Acceleration rate		19.6m/s² (2G)			
	Resistance	Vibration direction		X, Y, Z			
		Vibration time		One hour in each of three directions			
	Installation	Conditions	Derating may be required due to mounting direction				
		Between input and output	2000 V A	C for 1 minute (leakage current: 15 mA	or less)		
Insulation	Withstand Voltage	Between input and FG Between output and FG	500 V A	C for 1 minute (leakage current: 15 mA			
iula		Between input and output					
lns	Insulation	Between input and FG	10	0 M Ω (measured with 500 V DC Megge	er)		
	Resistance	Between output and FG			,		
_	External Ap	pearance		With chassis (cover is optional)			
External Structure/ Standards	Input Type	•		Terminal stand			
Luc.	Output Typ	e		Terminal stand			
l St ds	External Di	mensions		135 ^W x 93 ^D x 33 ^H mm			
erna ndar	Weight			420g			
Exte Star	Safety Stan			UL1950, CSA No. 950 certified			
	Conducted	Emission	De	esignated to meet FCC Class B (120 V	AC)		
su	Remote ON	/OFF Control		Not provided			
Remote ON/OFF Control		tor		Not provided			
<u> </u>	Cover			Provided			

Note: At cold start. (More current than above noted value may flow at restart.)

Note2 Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

 Note:
 Output characteristics are measured at the output connector.
 Ripple noise is measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor connected to that point.

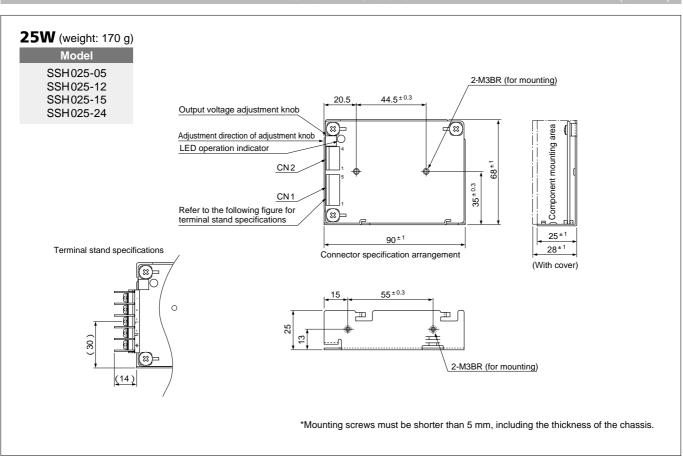
Note 4 Rated output current is 18 A for models with cover.

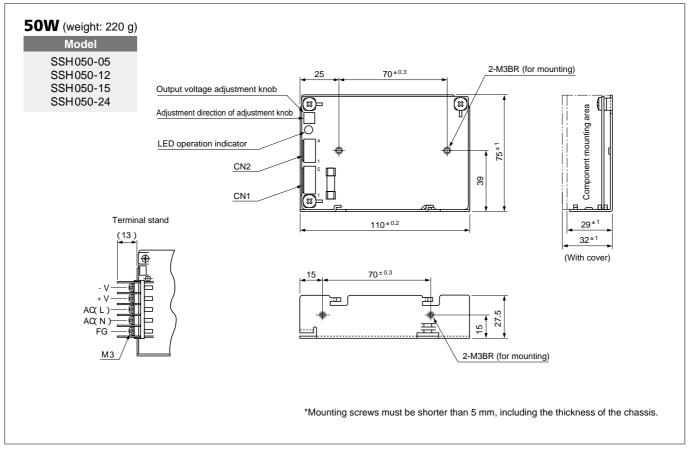
to derate the output current depending on the operating conditions. Refer to the derated output current for the installation conditions and ambient temperature.

* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage,

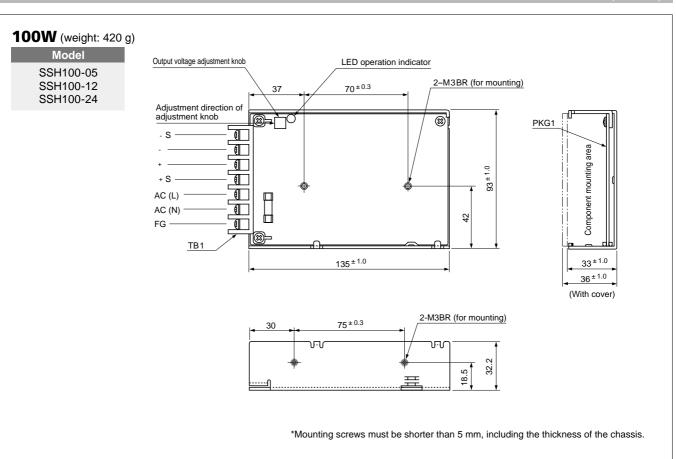
SSH Series 25W,50W,100W

External Dimensions









(unit: mm)



Option

Symbol at end of product name	Description	Application	
None	Terminal stand type without cover	All models	
-CN	Connector type without cover	SSH025, SSH050	
-C	Terminal stand type with cover	All models	
-CN-C	Connector type with cover	SSH025, SSH050	

: Please contact Sanken for delivery time of connector type product in advance.



Operating Instruction

1 Terminal connection

SSH025/SSH050 connector type

Symbol	Pin No.	Terminal name	Corresponding connector	Corresponding contact			
	1	FG					
CN1	2	NC		SVH-21T-P1.1 (JST)			
	3	AC (N)	VHR-5N (JST)				
	4	NC	(001)				
	5	AC (L)					
CNID	1, 2	+	VHR-4N	SVH-21T-P1.1			
CN2	3, 4	-	(JST)	(JST)			

SSH025/SSH050 stand type

Symbol	Terminal symbol	Terminal name	Corresponding crimp terminal				
	-	-					
	+	+					
TB1	~ L	AC(L)	V1.25-3 (JST) or equivalent				
	~ N	AC(N)					
	G	FG					

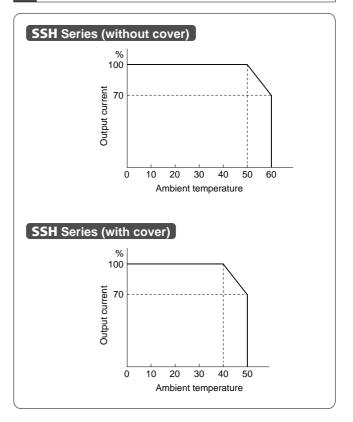
SSH100 stand type (terminal stand type only)

Symbol	Terminal symbol	Terminal name	Corresponding crimp terminal
	- S	- S	
	-	-	
	+	+	
TB1	+ S	+ S	V2-4 (JST) or equivalent
	~ L	AC (L)	
	~ N	AC (N)	
	G	FG	

Terminal name and function

	Terminal name	Function	
	AC (L)	AC input terminal. Fuse insertion side.	
Input	AC (N)	AC input terminal.	
	FG	Frame grounding. Grounding terminal.	
	+	DC output terminal. + side	
Outrout	-	DC output terminal side	
Output	+ S	Remote sensing terminal. + side (100W model only)	
	- S	Remote sensing terminal side (100W model only)	
	NC	No connection	

2 Derating of output current



3 Setting output voltage

Output voltage may be adjusted using the adjustment knob found near the output connector or terminal stand. Turning the knob clockwise increases output voltage, while turning it counterclockwise decreases output voltage. Use the power supply with the output voltage within its adjustable range and with the output capacity within the rated output power.

4 Overcurrent protection

When the output is overloaded, the power supply's built-in overcurrent protection will shut off the output. The overcurrent protection is set to function when the output current exceeds 105% of the rated current value (about 130% of a standard output value).

To reset the overcurrent protection, remove the source of the overload, turn off the power, and wait about a minute before turning the power on again.

5 Overvoltage Protection

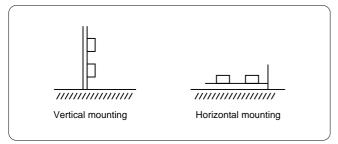
If the output voltage increases for some reason, the overvoltage condition is detected and the output is shut off. Once the overvoltage protection is activated, the output will remain cut off as long as the input supply is energized. To reset the overvoltage protection, turn off the power and wait about a minute before turning the power on again.

Take care when applying power again, as there may still be a problem with the output voltage (if there is, the overvoltage protection will shut down the output again).

6 Mounting

To use the power supply with natural cooling, mount the supply so that both sides and the top are open, and there is sufficient air flow.

The power supply can be mounted in two directions as shown below. Use mounting screws that are 5 mm long or less, including the thickness of the chassis.



Leakage current

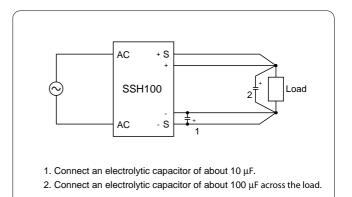
Leakage current is 0.3 mA or less per unit. Take care when using multiple supplies simultaneously.

8 Inrush current limiting

The power supply is equipped with an inrush current limiting circuit to restrict the amount of current that flows when the power is turned on. Since the 25 W and 50 W models use a power thermistor, current greater than that listed in the specifications may flow when restarting the supply, or due to ambient temperature conditions. The 100 W model may also allow more current than that listed in the specifications if restarting after a short period of time. Take adequate precautions.

9 Remote sensing

The SSH100 model is equipped with a remote sensing feature to guard against output line drop. The guaranteed output voltage range, including line drop effects, is 5% of rated output voltage. Limit line drop on the minus side to 125 mV or less



10 Serial and parallel connection

The SSH series cannot be connected in series or in parallel to increase output capacity.

11 When there is not output

- Check that all terminals are connected correctly as described in item 1.
- Output will be cut off when overcurrent protection is active. Check the supply as described in item 5.
 Overvoltage protection may be activated if the output voltage is set too high. Verify that the output voltage adjustment knob is set towards the middle of its range.
 Overvoltage protection may be activated if the remote sensing terminals are not properly connected. Check their connections.
- The overcurrent protection will be activated and the output will decrease if there is an overload condition.

Supports peak power

SLS Peak Power Series

60W 100W 150W

Single output, compatible with specific applications

With chassis

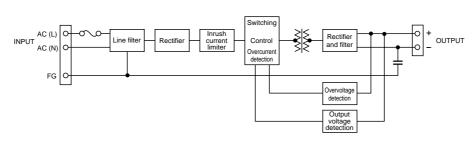
SLS060P, 100P, and 150P are single output switching power supplies that are designed for specific applications. They offer prompt delivery of general-purpose products and the special functions of customized products to meet a variety of customer needs. Please check the specifications when evaluating or employing this series.



- Standard products for specific applications
- Supports peak loads: 2.5 times the rated current (within 15 seconds)
- Input voltage switching method (100 V/200 V) (for 150 W unit)
 * Different models are provided for 60 W and 100 W depending on the input voltage.
- Meets safety standards of each country



[SLS Series Circuit Diagram]





60W,100W,150W

Please contact Sanken for delivery time in advance.

		Specifications and Standards				
	Model	60	W			
	model	SLS060P	SLS060PH			
	Rated Input Voltage	AC100V/AC120V	AC200V/AC240V			
	Allowable Input Voltage Rang	AC85 to 132V	AC170 to 264V			
su	Input Current (typ)	1.2A	0.8A			
Input Conditions	Rated Frequency	50/60Hz				
ndu	Allowable Frequency Range	47 to				
ن ن	Efficiency (typ)	73				
	Inrush Current (max)	30A	40A			
	Leakage Current (max)	0.5mA	0.75mA			
	Rated Output Voltage	5V	24V			
Note 3	Output Voltage Variation	Fix				
S	Rated Output Current	2.5				
tior	Maximum Peak Current	6A (withi				
Output Conditi	Allowable Output Current Rang	e 0 to 60				
Outl	Rated Output Power Constant Voltage Accuracy					
	Ripple Noise	300m				
	Output Holding Time (min)	20m				
	Overcurrent Protection Overvoltage Protection	Detection above 105% of peal				
Additional Functions	Overheating Protection	115 to 145% (output cutoff) Not pro	110 to 145% (output cutoff)			
ditio	Remote ON/OFF Control					
Add	Remote Sensing	Not provided Not provided				
	Operations Display	Not provided				
	Operating Temperature Range					
	Operating Humidity Range	-25 to +80°C 30 to 90% (no condensation)				
ធ	Storage Humidity Range	30 to 90% (no condensation)				
Environmental Conditions	Cooling Requirements	Natural air cooling				
Environme Conditions	No. of vibrations	5 to 100Hz	10 to 55Hz			
viro	Vibration Sweep time	3 minutes	1.5 minutes			
Co E	Resistance Acceleration rate	14.7m/s ² (1.5G)	19.6m/s² (2G)			
	Vibration direction		·			
	Vibration time	One hour in each				
	Installation Conditions	10 G (3 times each in the X, Y, Z directions)				
	Installation Conditions	Derating may be required due to mounting direction				
	Insulation Between input and output		or 1 minute			
ion	Withstand Between input and F	3				
Insulation	Voltage Between output and F		600 V AC for 1 second			
nsı	Insulation Between input and output					
	Resistance Between input and For		(in SOU V DC Megger)			
	· · · · · · · · · · · · · · · · · · ·					
	External Appearance	With c				
re/	Input Type Output Type	Connector				
uctu	External Dimensions	160 ^w x 80 ^c				
Stru Is	Weight	400				
External Structure/ Standards	Safety Standards	Designated to meet UL1950 D3, CSA EB 1402C	TÜV (EN60950) certified			
<u></u> б б	Conducted Emission	Designated to meet FCC Class B and VCCI Class B	Designated to meet CISPR22 Class B			
S	Romoto ON/OFE Control	Natas	vided			
ption	Remote ON/OFF Control Cover	Not provided				
0		Not provided				

Note: At cold start. (More inrush current than above noted value may flow at restart.)

2 The constant voltage accuracy is measured within the input voltage variable range of 85 to 132 V AC, within the output current variable range, with a time drift of 10 minutes to eight hours and an ambient temperature range from 0 to +50°C.

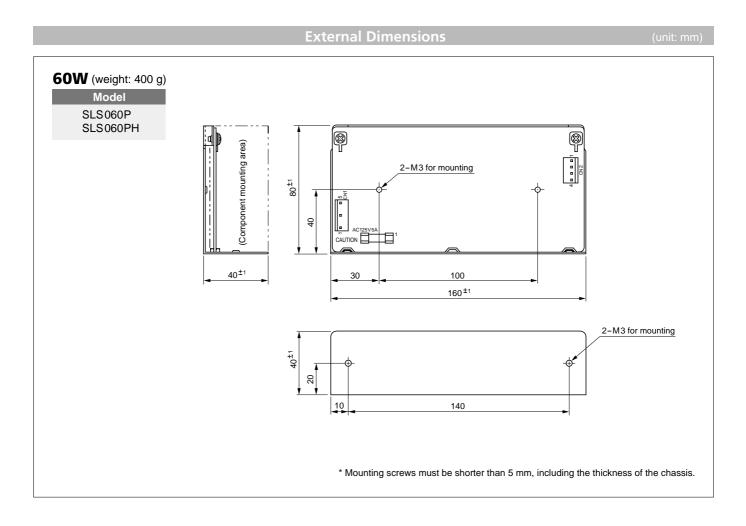
Res Although the SLS060P has a thermal shutdown function to prevent overheating (SLS100P does not have this function), because it is a simple system, the device must not be continuously operated when the output current exceeds the rated current. Note: The maximum rated values for the remote ON/OFF control pins (pins 1 & 2 of CN2) are 15 V and 15 mA.

* Measurements are made at a point 5 cm from the output connector for all output characteristics, with a 63-V, 47-µF electrolytic capacitor

connected to that point. (Use a 1:1 probe.) * Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage, rated output current, and rated frequency, at an ambient temperature of 25°C with 60% humidity.

SLS Peak Power Series

60W,100W,150W





60W,100W,150W

			Specification	ns and Standards				
	Mc	odel	10	W	150W			
	IVIC		SLS100P	SLS100PH	SLS150PW			
	Rated Inpu	t Voltage	AC100V/AC120V	AC200V/AC240V	AC100V/AC200V			
	Allowable I	nput Voltage Range	AC85 to 132V	AC170 to 264V	AC85 to 132V/AC170 to 265V			
suc	Input Curre		2.3A	1.2A	4.2A			
li tio	Rated Freq		50/60Hz					
nd		Frequency Range	47 to 63Hz					
ٽ ≟	Efficiency (0%			
		rent (max) Moto	30A	40A	20A/50A			
	Leakage Cu	urrent (max)	0.5mA	0.75mA	0.5mA/0.75mA			
	Rated Outp	out Voltage	24V					
Note 3	Output Vol	tage Variation		Fi	ked			
S S	Rated Outp	out Current	4/	4	6A			
ion	Maximum F	Peak Current	10 A (with	n 15 sec)	15 A (within 15 sec)			
put diti		Output Current Range			0.1 to 15A			
Output Conditi	Rated Outp		96		144W			
		oltage Accuracy Meet		±5	5%			
	Ripple Nois		250mVp-p		400mVp-p			
	Output Holding Time (min)			20n	nsec			
	Overcurren	t Protection	Dete	ction above 105% of pea	k current (automatic recovery)			
s al	Overvoltag	e Protection	115 to 145% (output cutoff)	110 to 145% (output cutoff)	110 to 145% (output cutoff)			
tion	Overheatin	g Protection		Not pr	ovided			
Additional Functions	Remote ON	I/OFF Control	Not provided Provided Not					
ΡĹ	Remote Se		Not provided					
	Operations	Display	Not provided					
	Operating To	emperature Range	0 to +50°C					
		nperature Range	-25 to +80°C					
	Operating I	Humidity Range	30 to 90% (no condensation)					
ital	Storage Hu	midity Range	30 to 90% (no condensation)					
Environmental Conditions	Cooling Re	quirements	Natural air cooling					
itio		No. of vibrations	5 to 100Hz 10 to 55Hz 5 to 10		5 to 100Hz			
vir	Vibration	Sweep time	3 minutes		1.5 minutes			
ыs	Resistance		14.7m/s² (1.5G)		19.6m/s (2G)			
		Vibration direction		X, Y, Z				
	Installation	Vibration time Conditions	One hour in each of three directions					
		Conditions	10 G (3 times each in the X, Y, Z directions) Derating may be required due to mounting direction					
				berating may be required				
		Between input and output	1500 V AC f	or 1 minute	2000 V AC for 1 minute or 2400 V AC for 1 second			
Insulation		Between input and FG						
llat	Voltage	Between output and FG		500 V AC for 1 minute c	or 600 V AC for 1 second			
ISU	Insulation	Between input and output		400 MO (
_	Resistance		1	100 MΩ (measured w	ith 500 V DC Megger)			
		Between output and FG						
	External Ap	opearance			chassis			
e	Input Type		Conr	ector	Terminal stand			
ctri	Output Typ		4.00W 00F					
Stru s	External Di Weight	mensions	160 [₩] x 98 [□] 50		220 ^w x 98 ^D x 52 ^H mm 850g			
External Structure/ Standards	Safety Star	ndards	UL1950 D3, CSA EB 1402C certified	TÜV (EN60950) certified	UL1950, CSA No. 950, TÜV (EN60950) certified			
С ⁵ Ш	Conducted	Emission	Designated to meet FCC (Part 15-J) Class A and VCCI Class A	Designated to meet CISPR22 Class A	Designated to meet FCC (Part 15-J) Class A and VCCI Class A			
su	Remote ON	I/OFF Control	Not pr	ovided	Provided as standard			
ption	Cover				rovided			
			1	101 pi				

Note: At cold start. (More inrush current than above noted value may flow at restart.)

The constant voltage accuracy is measured within the input voltage variable range of 85 to 132 V AC, within the output current variable range, with a time drift of 10 minutes to eight hours and an ambient temperature range from 0 to +50°C.

Although the SLS060P has a thermal shutdown function to prevent overheating (SLS100P does not have this function), because it is a simple system, the device must not be continuously operated when the output current exceeds the rated current.
 The maximum rated values for the remote ON/OFF control pins (pins 1 & 2 of CN2) are 15 V and 15 mA.

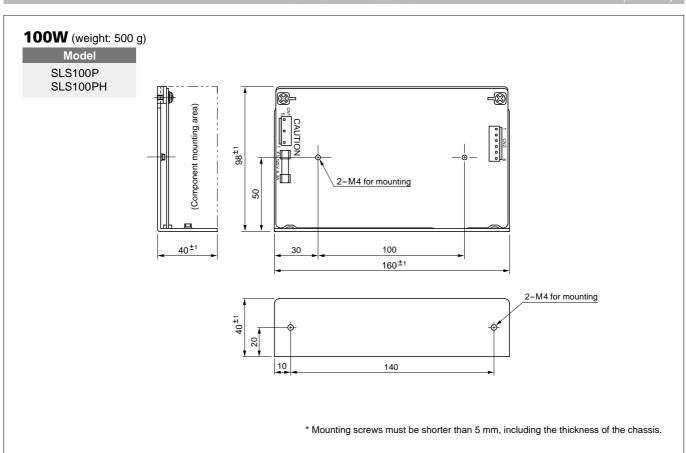
* Measurements are made at a point 5 cm from the output connector for all output characteristics, with a 63-V, 47-μF electrolytic capacitor connected to that point. (Use a 1:1 probe.)

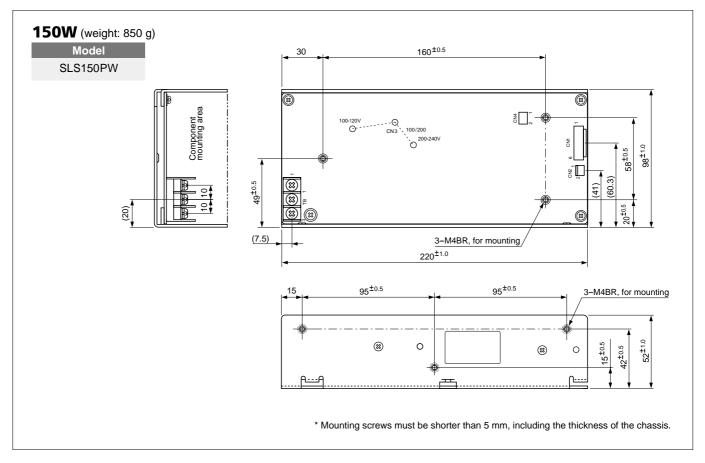
* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage, rated output voltage, rated output current, and rated frequency, at an ambient temperature of 25°C with 60% humidity.

SLS Peak Power Series

60W,100W,150W

External Dimensions





JLJSeries 60W,100W,150W

Operating Instruction

1 Terminal connection

SLS060P(H), SLS100P(H)

\geq																						
	Model	Connector	Pin arr	angement	Corresponding housing	Corresponding contact																
			1	AC (L)																		
	SLS 060P		2	(NC)																		
Input	060PH 100P	CN1	3	AC (N)	VHR-5N (JST)	SHV-21T-P1.1																
-	100PH		4	(NC)	()																	
			5	FG																		
	SLS 060P	S060P CN2	1	+ 24V	+ 241/	+ 241/	+ 241/	+ 241/	+ 241/	1.241/	- 241/	- 241/	- 241/	- 241/	1.241/	1.241/	- 241/	- 241/	1.241/	1.241/		(JST)
			2		VHR-4N (JST)																	
Output	060PH	CINZ	3	0V																		
O	Oni		4	00																		
	SLS 100P	CN2	1 to 3	+ 24V	VHR-6N																	
	100PH		4 to 6	0V	(JST)																	

Peak Power

SLS150PW

Symbol	Pin No.	Terminal name	Corresponding connector
	1	AC (N)	
TB1	2	AC (L)	M4 terminal
	3	FG	
CN1	1 to 3	+ 24V	VHR-6N
CINT	4 to 6	SG	SVH-21T-P1.1 (JST)
CN2	1	RC +	H2P-SHF-AA
	2	RC -	SHF-001T-0.8SS (JST)

2 Setting output voltage

The output voltage is preset at factory shipping, and cannot be adjusted.

3 Overcurrent protection

When the output is overloaded, the output current will be limited, which characteristics as shown in the graph. When the cause of the overload is removed, the output will automatically return to its normal voltage. The overcurrent detection is set to function when the

100%		
e		
Output voltage		
it vo		
rtbr		
õ	/:	
() Peak value	
	Output current	J

output current exceeds 105% of the peak current. This product cannot be used over the specified time with overload of more than the rated current value.

4 Overvoltage protection

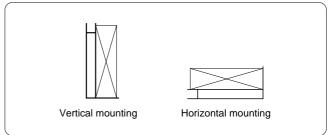
If the output voltage increases for some reason, the overvoltage condition is detected and the output is shut off. Once the overvoltage protection is activated, the output will remain cut off until the input supply is cut off.

To apply power again, turn off the power and wait about three minutes before turning the power on again.

Check that the output voltage is normal without load for protection.

5 Mounting

The power supply can be mounted in two directions, without any output derating.



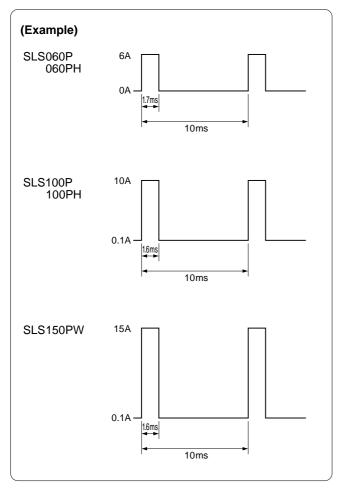
Mount the supply so that both sides and the top are open, to obtain sufficient air flow.



60W,100W,150W

6 Dynamic load

This series can be used with dynamic load. In this case, use the supply with an effective value less than the rated output current.



Inrush current

SLS060P/PH use a power thermistor to limit inrush current. Therefore, current higher than the specifications may flow due to the ambient temperature conditions and reinput after energizing (momentary input cutoff, etc.). Take proper precautions.

SLS100P/PH and SLS150PW use a resistor and thyristor to limit inrush current. Current higher than the specifications may flow due to the short reinput time.

8 Remote ON/OFF control (SLS150PW)

SLS150PW can perform remote ON/OFF control. When 3.5 to 5.5 V (current 5 mA recommend) is applied to between RC+ and RC- (pins 1 and 2 of connector CN2), the output goes ON. When 0.8 V or less is applied or open between RC+ and RC-, the output goes OFF.

When remote ON/OFF control is not used, the output can go ON regardless of CN2 by short-circuiting pins 1 and 2 of CN4.

9 Switching input voltage (SLS150PW)

SLS150PW can use 100 V AC power supply or 200 V AC power by switching the connector. For 100-120 V AC input, connect CN3 to the 100-120 V side. For 200 V-240 V AC input, connect CN3 to 200-240 V side.

At factory shipping, the connector is set to the 100-120 V side. When using SLS150PW with 200-240 V AC, be sure to switch CN3.

10 Precautions along with safety standards (SLS150PW)

SLS150PW acquired UL, CSA and TÜV safety standards. A built-in fuse may need to be replaced according to applicable safety standards. Replace the built-in fuse with attached fuse for TÜV.

	Rating	Standards	Manufacturer	At factory shipping
UL, CSA	250V 12A	No. 31412	Retail fuse	Built-in
TÜV	250V 6.3A	No. 215 6.3	Retail fuse	Attached

Single output, open frame PCB type, low-cost, general-purpose switching power supply



Single printed circuit board

 Wide input range for world-wide support Input voltages from 85 V to 264 V AC can be continuously input in this model that is ready for use in all markets world-wide.

Lineup

	Outp	ut voltage		Circuit type
power	5V	12V	24V Circuit type	
15W				RCC type
30W				Flyback type
50W				Flyback type
75W				Resonant-mode (active PFC)
100W				Resonant-mode (active PFC)
150W				Resonant-mode (active PFC)
	power 15W 30W 50W 75W 100W	power 5v 15W 30W 50W 75W 100W 100W	power 5V 12V 15W	15W 30W 30W 50W 75W 100W

* Circuit type information noted in parentheses indicates PFC type

- Employs the circuit type that suited to the output power
- Employs the circuit type that suits the output capacity regarding load and target application
- Compact size meets standards and does not require design changes
- Uses harmonic current control (PFC) Active filter type PFC (Power Factor Correction) is used in 75 to 150 W and 12 V or 24 V models
- Supports peak current suited to L load Supports approximately 130% of rated peak current for 12 V or 24 V output when output power is 75 W or above.

- Includes CE mark for LVD (Low Voltage Directive). Meets safety standards of each country.
- Reduced conducted emission Class B compliant (VCCI, FCC, and CISPR)

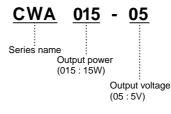
Applications

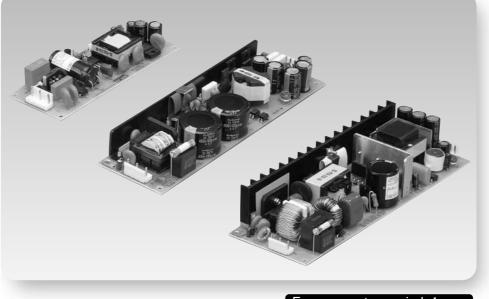
Computer-related equipment

Printers and other peripherals, ATMs, POS equipment, MO devices, etc.

Communications terminal equipment Routers, hubs, modems, game devices, factory automation and controllers

Description of model name





Free warrantee period: 1 year

CWA Series

15W,30W,50W,75W,100W,150W

		Specifications and Standards					
	Model	15W					
	Model	CWA015-05 CWA015-12 CWA015-24					
	Rated Input Voltage	AC100V/AC240V					
	Allowable Input Voltage Rang	AC85 to 264V					
suc	Input Current (typ) 🔤	0.4A (VIN = 100V)					
Input Conditions	Rated Frequency	50/60Hz					
ndu	Allowable Frequency Range	47 to 440Hz					
ٽ ن	Efficiency (typ) Notes	72% 76% 79%					
	Inrush Current (max) 10002	$15A (V_{IN} = 100V) / 30A (V_{IN} = 240V) (at cold start)$					
	Leakage Current (max) Month	0.75mA					
	Rated Output Voltage	5V 12V 24V					
Note 3	Output Voltage Variation	Rated output voltage ±10%					
	Rated Output Current	3.0A 1.3A 0.7A					
Output Conditions	Allowable Output Current Rang	ge 0 to 100%					
but	Rated Output Power	15W 15.6W 16.8W					
Outpu Condit	Constant Voltage Accuracy						
	Ripple Noise Note1						
	Startup time	20msec (V _{IN} = 100V)					
	Overcurrent Protection	Detection above approx. 105% of rated current (drooping automatic recovery)					
al Is	Overvoltage Protection Note7	Detection above 115% of rated voltage (output cutoff)					
Additional Functions	Overheating Protection	Not provided					
adi	Remote ON/OFF Control	Not provided					
ΡΓ Έ	Remote Sensing	Not provided					
	Operations Display	Not provided					
	Operating Temperature Range	-10 to +60°C					
	Storage Temperature Range	-25 to +85°C					
	Operating Humidity Range	30 to 90% (no condensation)					
	Storage Humidity Range	30 to 90% (no condensation)					
<u>ज</u>	Cooling Requirements	Natural air cooling					
ent	No. of vibrations	10 to 55Hz					
ion T	Vibration Sweep time	3 minutes					
iro	Resistance Acceleration rate						
Environmental Conditions	Vibration direction						
	Vibration time	One hour in each of three directions					
	Shock Resistance	98m/s ² (10G) Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more.					
		Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 sides.					
	Installation Conditions	Derating may be required due to mounting direction					
8	Insulation Between input and outp	ut 3000 V AC for 1 minute (leakage current: 15 mA or less)					
Note 8	Withstand Between input and F	G 2000 V AC for 1 minute (leakage current: 15 mA or less)					
Insulation	Voltage Between output and F						
nlat	Insulation Between input and outp						
Insi	Resistance Between input and F						
	Between output and F	G					
1	External Appearance	Single printed circuit board					
External Structure/ Standards	Input Type	Connector					
truc	Output Type	Connector					
al Si rds	External Dimensions	125 ^W x 50 ^D x 22 ^H mm					
erna	Weight						
Ext Sta	Safety Standards	UL60950, CSA No. 60950-00, and TÜV (EN60950) certified, designated to meet Electrical Appliance and Material Control Law					
	Conducted Emission	Designated to meet FCC Class B (120 V), CISPR22 Class B (230 V AC), and VCCI Class B (100 V AC)					
ions	Remote ON/OFF Control	Not provided					
Opt	Cover	Not provided					
Sec.	cified under rated input/output co	nditions at an ambient temperature of 25°C.					

Specified under rated input/output conditions at an ambient temperature of 25°C.

More current above noted values may flow at restart (power thermistor used).

Construct Control Cont

Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Output voltage can be changed within the maximum output power and rated output current.

The constant voltage accuracy is measured with a static input range of 85 to 246 V AC, a static load range of 0 to 100%, a time drift of 10 minutes to eight hours and an ambient temperature range of -10 to 60°C.

Reset is performed by reapplying input voltage. Insulation conditions are specified at normal temperature and humidity.

15W,30W,50W,75W,100W,150W

CWA Series

Model 30W Reted Input Voltage Annop Input Current (vp) 33 Reted Input Voltage Range Input Current (vp) 33 Reted Input Voltage Range Input Current (vp) 33 Reted Input Voltage Range Input Current (vp) 33 Reted Input Voltage Range Efficiency (vp) 33 Reted Input Voltage Range Efficiency (vp) 33 Reted Voltage Voltage Voltage Stratege Current (max) 33 Reted Output Voltage Voltage Voltage Stratege The Voltage Voltage Voltage Stratege The Voltage Volt				Specifications an	nd Standards				
CWA030-05 CWA030-12 CWA030-24 Allowable Input Voltage Arage Input Current (typ) (2) Allowable Frequency Range Frequency Range Efficiency (typ) (2) Allowable Frequency		Ma	dal		30W				
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Withstand Voltage Between input and FG 2000 V AC for 1 minute (leakage current: 15 mA or less) Between output and FG 500 V AC for 1 minute (leakage current: 15 mA or less) Insulation Resistance Between input and output Between output and FG 100 MΩ (measured with 500 V DC Megger) External Appearance 100 MΩ (measured with 500 V DC Megger) Input Type Connector Output Type Connector External Dimensions 133 ^W x 55 ^D x 27 ^H mm Weight 170g Safety Standards UL1950, CSA No. 950, and TÜV (EN60950) certified, designated to meet Electrical Appliance and Material Control Law Conducted Emission Designated to meet FCC Class B (120 V), CISPR22 Class B (230 V AC) and VCCI Class B (100 V AC Remote ON/OFF Control Not provided		Installation	Conditions	Deratin	ng may be required due to mounting d	lirection			
Withstand Voltage Between input and FG 2000 V AC for 1 minute (leakage current: 15 mA or less) Between output and FG 500 V AC for 1 minute (leakage current: 15 mA or less) Insulation Resistance Between input and output Between output and FG Between output and FG Fexternal Appearance 100 MΩ (measured with 500 V DC Megger) Input Type Connector Output Type Connector External Dimensions 133 ^W x 55 ^D x 27 ^H mm Weight UL1950, CSA No. 950, and TÜV (EN60950) certified, designated to meet Electrical Appliance and Material Control Law Conducted Emission Onducted Emission Designated to meet FCC Class B (120 V), CISPR22 Class B (230 V AC) and VCCI Class B (100 V AC Remote ON/OFF Control Not provided	E Contraction de la contractio	Insulation	Between input and output	3000 V A	C for 1 minute (leakage current: 15 m	nA or less)			
Between output and FG Between output and FG External Appearance Single printed circuit board Input Type Connector Output Type Connector External Dimensions 133 ^W x 55 ^D x 27 ^H mm Weight 170g Safety Standards UL1950, CSA No. 950, and TÜV (EN60950) certified, designated to meet Electrical Appliance and Material Control Law Conducted Emission Designated to meet FCC Class B (120 V), CISPR22 Class B (230 V AC) and VCCI Class B (100 V AC Remote ON/OFF Control Not provided			Between input and FG	2000 V A	C for 1 minute (leakage current: 15 m	nA or less)			
Between output and FG Between output and FG External Appearance Single printed circuit board Input Type Connector Output Type Connector External Dimensions 133 ^W x 55 ^D x 27 ^H mm Weight 170g Safety Standards UL1950, CSA No. 950, and TÜV (EN60950) certified, designated to meet Electrical Appliance and Material Control Law Conducted Emission Designated to meet FCC Class B (120 V), CISPR22 Class B (230 V AC) and VCCI Class B (100 V AC Remote ON/OFF Control Not provided	ion	Voltage	Between output and FG	500 V AC	C for 1 minute (leakage current: 15 m	A or less)			
Between output and FG Between output and FG External Appearance Single printed circuit board Input Type Connector Output Type Connector External Dimensions 133 ^W x 55 ^D x 27 ^H mm Weight 170g Safety Standards UL1950, CSA No. 950, and TÜV (EN60950) certified, designated to meet Electrical Appliance and Material Control Law Conducted Emission Designated to meet FCC Class B (120 V), CISPR22 Class B (230 V AC) and VCCI Class B (100 V AC Remote ON/OFF Control Not provided	nlat	Insulation		-					
External Appearance Single printed circuit board Input Type Connector Output Type Connector External Dimensions 133 ^W x 55 ^D x 27 ^H mm Weight 170g Safety Standards UL1950, CSA No. 950, and TÜV (EN60950) certified, designated to meet Electrical Appliance and Material Control Law Conducted Emission Designated to meet FCC Class B (120 V), CISPR22 Class B (230 V AC) and VCCI Class B (100 V AC Signate ON/OFF Control Not provided	Insi		•	,) M Ω (measured with 500 V DC Megg	ger)			
Input Type Connector Output Type Connector External Dimensions 133 ^W x 55 ^D x 27 ^H mm Weight 170g Safety Standards UL1950, CSA No. 950, and TÜV (EN60950) certified, designated to meet Electrical Appliance and Material Control Law Conducted Emission Designated to meet FCC Class B (120 V), CISPR22 Class B (230 V AC) and VCCI Class B (100 V AC Set Remote ON/OFF Control Not provided			Between output and FG						
Conducted Emission Designated to meet FCC Class B (120 V), CISPR22 Class B (230 V AC) and VCCI Class B (100 V AC Remote ON/OFF Control Not provided	e/		opearance						
Conducted Emission Designated to meet FCC Class B (120 V), CISPR22 Class B (230 V AC) and VCCI Class B (100 V AC Remote ON/OFF Control Not provided	ctur		_						
Conducted Emission Designated to meet FCC Class B (120 V), CISPR22 Class B (230 V AC) and VCCI Class B (100 V AC Remote ON/OFF Control Not provided	Stru								
Conducted Emission Designated to meet FCC Class B (120 V), CISPR22 Class B (230 V AC) and VCCI Class B (100 V AC Remote ON/OFF Control Not provided	ards		mensions						
Conducted Emission Designated to meet FCC Class B (120 V), CISPR22 Class B (230 V AC) and VCCI Class B (100 V AC Remote ON/OFF Control Not provided	tern and		dards	UI 1950 CSA No 950 and TÜV (EN		al Appliance and Material Control Law			
Remote ON/OFF Control Not provided	δ û								
	su								
	Optio								
www.specified under rated input/output conditions at an ambient temperature of 25°C.			ated input/output cond	itions at an ambient temperature	· · · ·				

More current above noted values may flow at restart (power thermistor used).

Output characteristics such as ripple noise and constant voltage accuracy are measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor connected to that point.
 Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Output voltage can be changed within the maximum output power and rated output current.

The constant voltage accuracy is measured with a static input range of 85 to 246 V AC, a static load range of 0 to 100%, a time drift of 10 minutes to eight hours and an ambient temperature range of -10 to $60^\circ C$.

(1007) Reset is performed by reapplying input voltage. (1007) Insulation conditions are specified at normal temperature and humidity.

CWA Series

15W,30W,50W,75W,100W,150W

Model 50W CWA050-05 CWA050-12 CWA050-24 Rated Input Voltage AC100V to AC240V Allowable Input Voltage Range Allowable Input Voltage Range AC85 to 264V 1.2A (VIN = 100V) Rated Frequency 50/60Hz 47 to 440Hz Allowable Frequency Range 47 to 440Hz 83%				
CWA050-05 CWA050-12 CWA050-24 Rated Input Voltage AC100V to AC240V Allowable Input Voltage Range AC85 to 264V				
Allowable Input Voltage Range AC85 to 264V				
Input Current (typ) 1.2A (ViN = 100V) Rated Frequency 50/60Hz Allowable Frequency Range 440Hz	-			
Rated Frequency 50/60Hz Allowable Frequency Range 47 to 440Hz				
Inrush Current (max) 1002 30A (VIN = 100V) /60A (VIN = 240V) (at cold start)				
Leakage Current (max) 0.75mA				
Rated Output Voltage 5V 12V 24V				
Output Voltage Variation Rated output voltage ±10%				
Kated Output Current Range 10.0A 4.0A 2.1A Allowable Output Current Range 0 to 100% 10.0A 10.0A				
Rated Output Power 50W 51.6W 50.4W Constant Voltage Accuracy [303] [305] ±3%				
O O Ripple Noise Image: March 120mVp-p 150mVp-p 200mVp-p				
Output Holding Time (min) Keet 20msec				
Startup time Non1 700msec (VIN = 100V)				
Overcurrent Protection Detection above approx. 105% of rated current (drooping automatic recovery)				
Overvoltage Protection Overvoltage Protection Overvoltage Protection Detection above 115% of rated voltage (output cutoff) Overheating Protection Not provided Remote ON/OFF Control Not provided Remote Sensing Not provided				
Remote ON/OFF Control Not provided				
Remote Sensing Not provided	Not provided			
Operations Display Not provided				
	-10 to +60°C			
Storage Temperature Range -25 to +85°C	-25 to +85°C 30 to 90% (no condensation)			
Storage Humidity Range 30 to 90% (no condensation) Gooling Requirements Natural air cooling	Natural air cooling			
	10 to 55Hz			
Sweep time 3 minutes				
Vibration Acceleration rate 19.6m/s ² (2G)				
Resistance Vibration direction X, Y, Z				
Vibration time One hour in each of three directions				
98m/s² (10G)				
Shock Resistance Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more.				
Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 s	des.			
Installation Conditions Derating may be required due to mounting direction. See page 71.				
Insulation Between input and output 3000 V AC for 1 minute (leakage current: 15 mA or less)				
Withstand Voltage Between input and Guput Construction Insulation Resistance Between input and FG 2000 V AC for 1 minute (leakage current: 15 mA or less) Between input and FG 500 V AC for 1 minute (leakage current: 15 mA or less) Insulation Resistance Between input and FG 100 MΩ (measured with 500 V DC Megger)				
Figure 1 Detween number and FG 500 V AC for 1 minute (leakage current: 15 mA or less)				
Between input and output				
Insulation Between input and FG 100 MΩ (measured with 500 V DC Megger)				
Resistance Between nutration FG				
External Appearance Single printed circuit board				
External Appearance Single printed circuit board Input Type Connector				
Output Type Connector				
Input Type Connector Output Type Connector External Dimensions 195 ^w x 55 ^D x 27 ^H mm Weight 170g Safety Standards UL1950, CSA No. 950, and TÜV (EN60950) certified, designated to meet Electrical Appliance and Material Content of the provide of				
Weight 170g				
Safety Standards UL1950, CSA No. 950, and TÜV (EN60950) certified, designated to meet Electrical Appliance and Material Col	trol Law			
Conducted Emission Designated to meet FCC Class B (120 V), CISPR22 Class B (230 V AC) and VCCI Class B (100 V).				
Remote ON/OFF Control Not provided				
B Cover Not provided				

Specified under rated input/output conditions at an ambient temperature of 25°C.

More current above noted values may flow at restart (power thermistor used).

Output characteristics such as ripple noise and constant voltage accuracy are measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor connected to that point.

Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Output voltage can be changed within the maximum output power and rated output current.

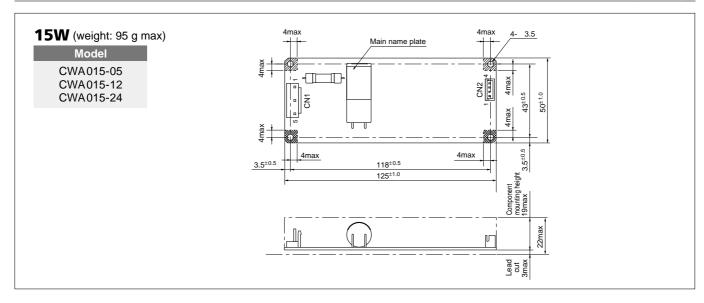
the constant voltage accuracy is measured with a static input range of 85 to 246 V AC, a static load range of 0 to 100%, a time drift of 10 minutes to eight hours and an ambient temperature range of -10 to 60°C.

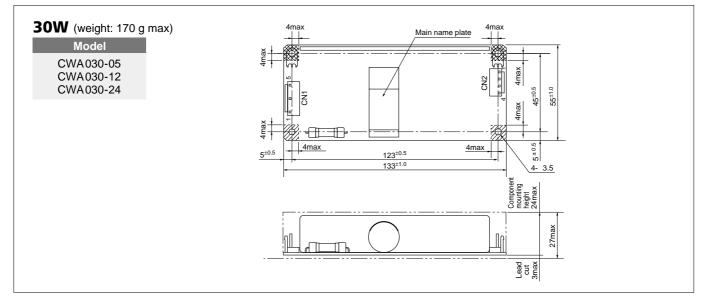
Reset is performed by reapplying input voltage. Insulation conditions are specified at normal temperature and humidity.

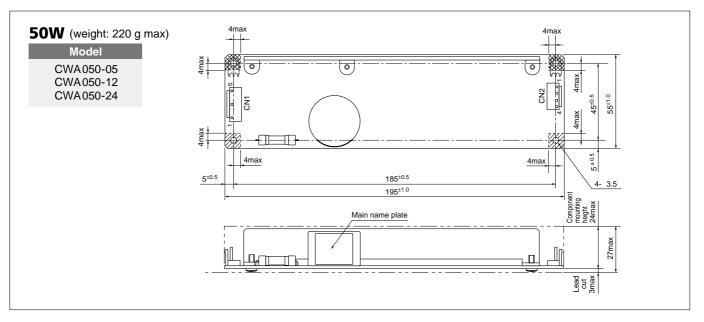
CWA Series 15W,30W,50W,75W,100W,150W

External Dimensions

(unit: mm)







CWA Series

15W,30W,50W,75W,100W,150W

Specifications and Standards

	Specifications and Standards				
			75	N/	
	Ma	del	/5	VV	
			CWA075-12	CWA075-24	
	Rated Input		AC100V to		
		nput Voltage Range	AC85 to		
suo	Input Curre		1.1A (Vin	,	
di i	Rated Freq		50/6		
du	Power Fact	Frequency Range	47 to (0.99A (V _{IN} = 100V)/		
-0	Efficiency (0.99A (VIN = 100V)/ 80%	82%	
		rent (max) Mee	30A (V _{IN} = 100V)/60A (V		
		urrent (max) Not	0.75mA		
		· / _			
_	Rated Outp		12V	24V	
Note 3	Output Voltage Variation Rated Output Current		Rated output v	0	
S	· · · ·	Peak Current	6.3A	3.2A	
itio			8.1 A (10 sec) 0 to 1	4.1 A (10 sec)	
Output Conditi	Rated Outp	Output Current Range	75.6W	76.8W	
ဝိပိ		Itage Accuracy Notes Notes	+3.0W		
	Ripple Nois		150mVp-p	200mVp-p	
		ding Time (min)	20m		
	Startup tim		1500msec (
		t Protection			
		e Protection	Detection above approx. 105% of peak		
ons		g Protection	Detection above 115% of rated voltage (output cutoff) Not provided		
Additional Functions		I/OFF Control	Not provided		
	Remote Sensing		Not provided		
	Operations Display		Not provided		
	Operating Temperature Range Storage Temperature Range		-10 to +60°C -25 to +85°C		
	-	Humidity Range	-25 to - 30 to 90% (no		
		midity Range	30 to 90% (no	,	
_		quirements	Natural ai		
Environmental Conditions		No. of vibrations	10 to 55Hz		
me		Sweep time	3 minutes		
liti	Vibration Resistance	Acceleration rate	19.6m/s ² (2G)		
nvi	Resistance	Vibration direction	Х, Ү	, Z	
шо		Vibration time	One hour in each o	of three directions	
			98m/s² (10G)		
	Shock Resi	istance	Conduct this test on an oak board with a flat s		
	Installatio	Condition -	Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each		
	Installation	Conditions	Derating may be required	uue to mounting airection	
8	Insulation	Between input and output	3000 V AC for 1 minute (leak	,	
Note 8	Withstand	Between input and FG	2000 V AC for 1 minute (leak		
tio	Voltage	Between output and FG	500 V AC for 1 minute (leaka	age current: 15 mA or less)	
Insulation	Insulation	Between input and output			
lns	Resistance	Between input and FG	100 MΩ (measured wit	in 500 V DC Megger)	
		Between output and FG			
	External Ap	opearance	Single printed	circuit board	
External Structure/ Standards	Input Type		Conne		
Lici	Output Typ		Conne		
al St ds	External Di	mensions	222 ^w x 55 ^D		
erna	Weight	darda	330	5	
Exte	Safety Stan		UL1950, CSA No. 950, and TÜV (EN60950) certified, design Designated to meet FCC Class B (120 V), CISPR22		
	Conducted Harmonic C		Designated to meet FCC Class B (120 V), CISPR22 Designated to meet IEC6100		
(0)					
tions		I/OFF Control	Not pro		
ð	Cover		Not pro	ovided	

Specified under rated input/output conditions at an ambient temperature of 25°C.

More current above noted values may flow at restart (power thermistor used).

Output characteristics such as ripple noise and constant voltage accuracy are measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor connected to that point.

Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Output voltage can be changed within the maximum output power and rated output current.

the constant voltage accuracy is measured with a static input range of 85 to 246 V AC, a static load range of 0 to 100%, a time drift of 10 minutes to eight hours and an ambient temperature range of -10 to 60°C.

Reset is performed by reapplying input voltage. Insulation conditions are specified at normal temperature and humidity.

15W,30W,50W,75W,100W,150W

CWA Series

Shocitications	and Standards
Specifications	anu stanuarus

	Specifications and Standards				
	84-	4-1	100	W	
	Мо	del	CWA100-12	CWA100-24	
	Rated Input	Voltage	AC100V to	AC240V	
	· ·	nput Voltage Range	AC1007 10		
Š	Input Curre	<u> </u>	1.4A (V _{IN} =		
Input Conditions	Rated Freq		50/60		
git	·	Frequency Range	47 to 6		
Input Condi	Power Fact		0.99A (V _{IN} = 100V)/0		
	Efficiency (81%	84%	
		rent (max) Note 2	30A (VIN = 100V)/60A (VIN		
		urrent (max) Me	0.75n		
_	Rated Outp	-	12V	24V	
Note 3	<u> </u>	age Variation	Rated output ve		
S	Rated Outp		8.5A	4.3A	
tio		Peak Current	11.0 A (10 sec)	5.5 A (10 sec)	
ndi ndi		utput Current Range	0 to 10		
Output Conditions 1000	Rated Outp		102W	103.2W	
		tage Accuracy Note 5 Note 6	±39		
	Ripple Nois		150mVp-p	200mVp-p	
		ding Time (min)	20ms		
	Startup time	C Note 1	1500msec (V	IN = 100V)	
	Overcurren	t Protection	Detection above approx. 105% of peak	current (drooping automatic recovery)	
ns ns		e Protection Note 7	Detection above 115% of rat	ted voltage (output cutoff)	
tio		g Protection	Not provided		
Additional Functions		/OFF Control	Not provided		
	Remote Sensing		Not provided		
	Operations	Display	Not provided		
	Operating Temperature Range		-10 to +	60°C	
	Storage Ten	nperature Range	-25 to +	85°C	
	Operating H	lumidity Range	30 to 90% (no o	condensation)	
	Storage Hu	midity Range	30 to 90% (no c	condensation)	
_	Cooling Re	quirements	Natural air	cooling	
s at		No. of vibrations	10 to 5	5Hz	
й й	Vibration	Sweep time	3 minutes		
li i i	Resistance	Acceleration rate	19.6m/s	s²(2G)	
Environmental Conditions		Vibration direction	X, Y,	Z	
		Vibration time	One hour in each of three directions		
			98m/s² (10G)		
	Shock Resi	stance	Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more. Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 sides.		
		O a malifi a ma			
	Installation	Conditions	Derating may be required due to m	ounting direction. See page 71.	
	Insulation	Between input and output	3000 V AC for 1 minute (leaka	age current: 15 mA or less)	
Note 8	Withstand	Between input and FG	2000 V AC for 1 minute (leaka		
ion	Voltage	Between output and FG	500 V AC for 1 minute (leaka	ge current: 15 mA or less)	
Insulation	Insulation	Between input and output			
nsu	Resistance	Between input and FG	100 M Ω (measured with	n 500 V DC Megger)	
		Between output and FG			
	External Ap	pearance	Single printed of	circuit board	
lre/	Input Type		Conne	ctor	
External Structure/ Standards	Output Typ	e	Conne		
Stri Stri	External Di	mensions	222 ^W x 62 ^D >	k 37 ^H mm	
nal Jaro	Weight		4000	g	
xter tand	Safety Stan	dards	UL1950, CSA No. 950, and TÜV (EN60950) certified, designation	ated to meet Electrical Appliance and Material Control Law	
шŏ	Conducted	Emission	Designated to meet FCC Class B (120 V), CISPR22 (Class B (230 V AC) and VCCI Class B (100 V AC)	
	Harmonic C	Current	Designated to meet IEC6100	0-3-2 (active filter method)	
suc	Remote ON	/OFF Control	Not prov	vided	
Optic	Cover		Not prov		
			tions at an ambient temperature of 25°C		

Specified under rated input/output conditions at an ambient temperature of 25°C.

Note2 More current above noted values may flow at restart (power thermistor used).

Output characteristics such as ripple noise and constant voltage accuracy are measured at a point 5 cm from the output connector, with a 63-V, 47-μF electrolytic capacitor connected to that point.
 Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Nors Output voltage can be changed within the maximum output power and rated output current.

The constant voltage accuracy is measured with a static input range of 85 to 246 V AC, a static load range of 0 to 100%, a time drift of 10 minutes to eight hours and an ambient temperature range of -10 to 60°C.

Note 7 Reset is performed by reapplying input voltage.

Note B Insulation conditions are specified at normal temperature and humidity.

CWA Series

15W,30W,50W,75W,100W,150W

			Specifications and Standards		
	84-		150	W	
	INIC	odel	CWA150-12	CWA150-24	
	Rated Input Voltage		AC100V to	0 AC240V	
		nput Voltage Range	AC85 to		
su	Input Curre	ent (typ) Note1	2.0A (VIN	= 100V)	
litio	Rated Freq	-	50/6		
Input Conditions		Frequency Range	47 to		
ت = ت	Power Fact		0.99A (V _{IN} = 100V)/		
	Efficiency (80%	82%	
		rent (max) Note2 urrent (max) Note1	30A (VIN = 100V)/60A (V 0.75		
	Rated Outp		12V	24V	
Note 3		tage Variation	Rated output		
su	Rated Outp		12.5A	6.3A	
itio		Peak Current Output Current Range	16.2 A (10 sec) 0 to 1	8.1 A (10 sec)	
Output Condit	Rated Outp		150W	151.2W	
ဝီပိ		Itage Accuracy Note 5 Note 6	±3		
	Ripple Nois		150mVp-p	200mVp-p	
		ding Time (min) Note1	20m		
	Startup tim	e Note 1	1500msec (V _{IN} = 100V)	
	Overcurren	t Protection	Detection above approx. 105% of peak	current (drooping automatic recovery)	
s al	Overvoltag	e Protection Note 7	Detection above 115% of rated voltage (output cutoff)		
ion	Overheatin	g Protection	Not provided		
Additional Functions	Remote ON/OFF Control		Not provided		
Ρu	Remote Sensing		Not pro	ovided	
	Operations	Display	Not provided		
	Operating Te	emperature Range	-10 to -	+60°C	
	Storage Ter	nperature Range	-25 to +85°C		
	Operating Humidity Range		30 to 90% (no	condensation)	
		midity Range	-	condensation)	
Environmental Conditions	Cooling Re		Natural a	-	
nen ns		No. of vibrations Sweep time	10 to 55Hz 3 minutes		
itio	Vibration	Acceleration rate		/s² (2G)	
vir	Resistance	Vibration direction	X, Y		
шй		Vibration time	One hour in each		
			98m/s	² (10G)	
	Shock Resi	istance	Conduct this test on an oak board with a flat		
	-		Lift one side of installation surface of the unit 50 mm and		
	Installation	Conditions	Derating may be required due to r	nounting direction. See page 71.	
	Insulation	Between input and output	3000 V AC for 1 minute (leal		
Note 8	Withstand	Between input and FG	2000 V AC for 1 minute (leal	,	
Insulation	Voltage	Between output and FG	500 V AC for 1 minute (leak	age current: 15 mA or less)	
ula	Insulation	Between input and output			
lus	Resistance		100 MΩ (measured wi	th 500 V DC Megger)	
	_	Between output and FG			
-	External Ap	opearance	Single printed		
External Structure/ Standards	Input Type	•	Conn		
truc	Output Typ External Di		Conn 222 ^w x 75 ^D		
al S ards	Weight		540		
tern anda	Safety Stan	Idards	UL1950, CSA No. 950, and TÜV (EN60950) certified, desigr		
St E	Conducted		Designated to meet FCC Class B (120 V), CISPR22		
	Harmonic C	Current	Designated to meet IEC610		
suo	Remote ON	I/OFF Control	Not pro	ovided	
Optio	Cover		Not pro		

Specified under rated input/output conditions at an ambient temperature of 25°C.

More current above noted values may flow at restart (power thermistor used).

V 47-μF electrolytic capacitor connected to that point.

Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Output voltage can be changed within the maximum output power and rated output current.

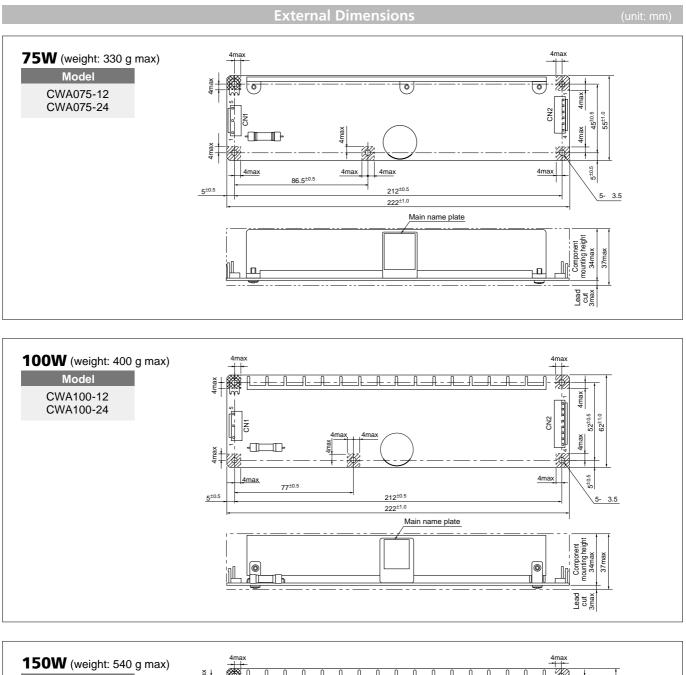
The constant voltage accuracy is measured with a static input range of 85 to 246 V AC, a static load range of 0 to 100%, a time drift of 10 minutes to eight hours and an ambient temperature range of -10 to 60°C.

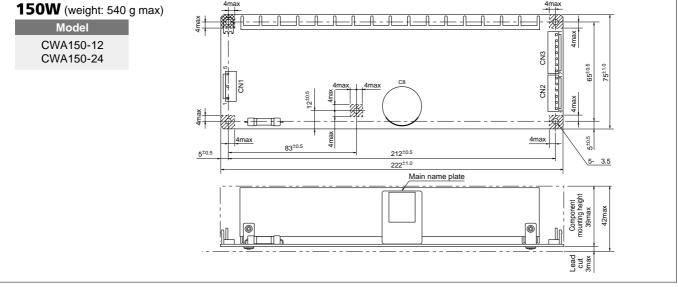
Note7 Reset is performed by reapplying input voltage.

NoteB Insulation conditions are specified at normal temperature and humidity.

CWA Series

15W,30W,50W,75W,100W,150W





CWA Series 15W,30W,50W,75W,100W,150W

Operating Instruction

Terminal connection

CWA015 series

	Pin No.	Connector	Corresponding connector	Corresponding contact
	1 : AC			
	(LIVE)	B3P5-VH (JST)	VHR-5N (JST)	SVH-21T-P1.1
CN1	3 : AC			(JST)
	(NEUTRAL)			
	5 : FG			
CN2	1 to 2 : - V	B4B-XH-A	XHP-4	SXH-001T-P0.6
	3 to 4 : + V	(JST)	(JST)	(JST)

CWA030 series

	Pin No.	Connector	Corresponding connector	Corresponding contact
	1 : AC			
	(LIVE)	B3P5-VH	VHR-5N	
CN1	3 : AC	(JST)	(JST)	SVH-21T-P1.1 (JST)
	(NEUTRAL)			
	5 : FG			(331)
CN2	1 to 2 : - V	B4P-VH	XHR-4N	
	3 to 4 : + V	(JST)	(JST)	бT)

CWA050 series

	Pin No.	Connector	Corresponding connector	Corresponding contact
	1 : AC			
	(LIVE)	B3P5-VH	VHR-5N	
CN1	3 : AC	(JST)	(JST)	SVH-21T-P1.1 (JST)
	(NEUTRAL)			
	5 : FG			(301)
CN2	1 to 2 : - V	B4P-VH	XHR-4N	
GINZ	3 to 4 : + V	(JST)	(JST)	

CWA075 series

	Pin No.	Connector	Corresponding connector	Corresponding contact
	1 : AC			
	(LIVE)	B3P5-VH	VHR-5N	
CN1	3 : AC	(JST)	(JST)	
	(NEUTRAL)	(001)	(001)	SVH-21T-P1.1 (JST)
	5 : FG			(301)
CN2	1 to 3 : - V	B6P-VH	XHR-6N	
GNZ	4 to 6 : + V	(JST)	(JST)	

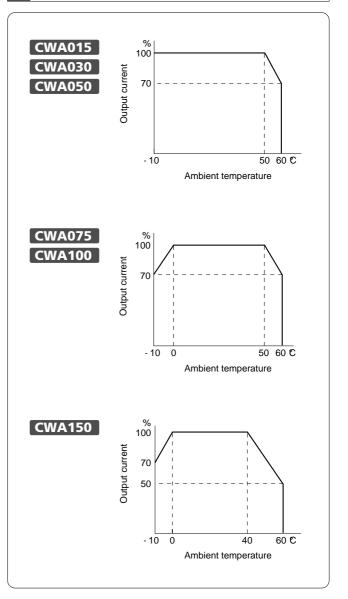
CWA100 series

	Pin No.	Connector	Corresponding connector	Corresponding contact
	1 : AC			
	(LIVE)			
CN1	3 : AC	B3P5-VH (JST)	VHR-5N (JST)	SVH-21T-P1.1 (JST)
	(NEUTRAL)			
	5 : FG			(331)
CN2	1 to 4 : - V	B8P-VH	XHR-6N	
	5 to 8 : + V	(JST)	(JST)	

CWA150 series

	Pin No.	Connector	Corresponding connector	Corresponding contact
	1 : AC			
	(LIVE)	B3P5-VH	VHR-5N (JST)	
CN1	3 : AC	(JST)		SVH-21T-P1.1
	(NEUTRAL)			
	5 : FG			
CN2	1 to 6 : + V	B4B-XH-A	XHR-4	(JST)
	1 to 7: - V	(JST)	(JST)	

2 Derating of output current



70

CWA Series 15W,30W,50W,75W,100W,150W

3 Mounting

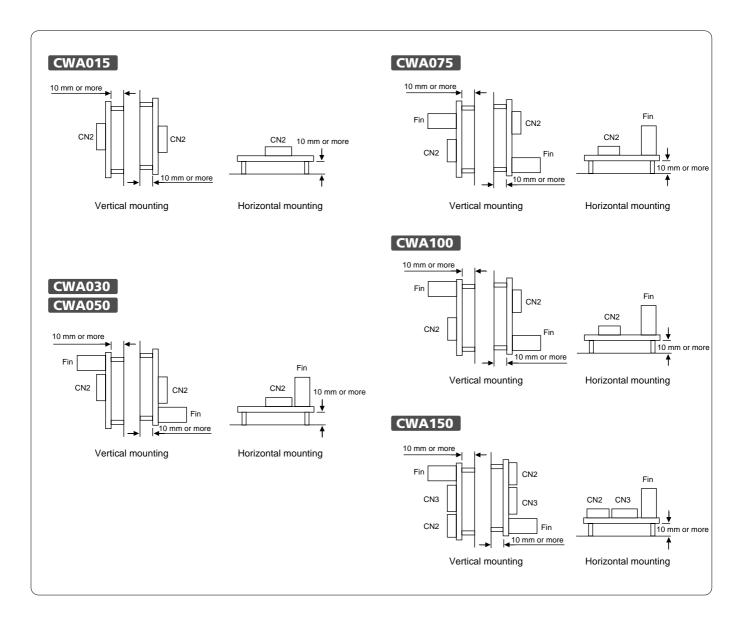
For safety's sake, be sure to connect the FG (frame ground) terminal to the target equipment's grounding terminal. Failure to make this ground connection may result in greater conducted emission, radiant noise, and ripple noise.

To use the power supply with natural air cooling, mount the

supply so that both sides and the top are open, and there is sufficient air flow.

When using a metal case, take insulation distance into account when mounting.

Please contact Sanken if there are any questions about this.

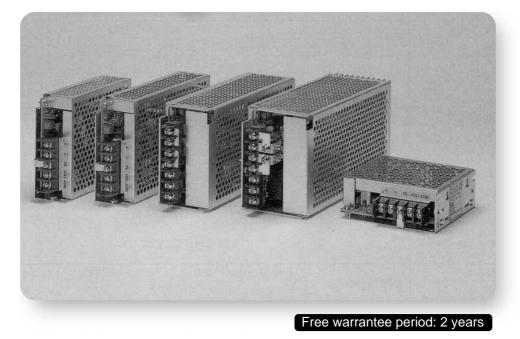


World-wide continuous input range. Advanced design with power factor correction.

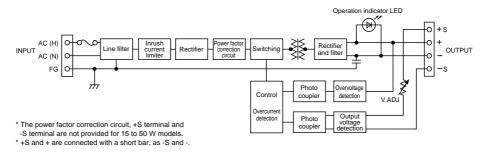


The SWA series employs a continuous input method so that input voltages from 85 V to 264 V can be supported without the need for manual switching. This series has been designed to be easily used anywhere in the world. This series has five single-output models ranging from 15 to 150 W. The 100 and 150 W models are equipped with powerfactor-correction circuits for realizing harmonic current control. These are advance power supplies which take into account international regulations on harmonic currents.

- World-wide, continuous input system (85 to 264 V)
- DC input possible (90 to 165 V)
- Conforms to harmonic current regulations IEC61000-3-2 (100 W/150 W models)
- Attains a high power factor of 0.95 with dedicated power factor correction IC (100 W/150 W models)
- Compact unit due to employing proprietary barrierless transformer
- Employs MOS FET-based main switching circuit for achieving high efficiency



[SWA Series Circuit Diagram]



SWA Series

15W,30W,50W,100W,150W

			Chacificatio	Please contact Sank	en for delivery time of conne	ector type product in advance	
_	_		specificatio				
	Mo	del		15	W		
			SWA015-05	SWA015-12	SWA015-15	SWA015-24	
	Rated Input	t Voltage	100 V AC to 240 V AC or 110 V DC 🔤				
	Allowable I	nput Voltage Range	85 V AC to 264 V AC or 90 V DC to 165 V DC				
su	Input Curre		0.4A/0.23A				
t litio	Rated Freq		50/60Hz				
Input Condit		requency Range	47 to 440Hz				
<u>ت</u> =	Efficiency (typ)		72%	75%	75%	77%	
		rent (max) Meet	25A/50A				
	Leakage Ci	urrent (max)		0.5mA/	0.75mA		
	Rated Outp	ut Voltage	5V	12V	15V	24V	
Note 3	· ·	age Variation		Rated output	voltage ±10%		
	<u> </u>	ut Current Note 4	3.0A (2.4A)	1.3A (1.0A)	1.0A (0.8A)	0.7A (0.5A)	
put ditions		utput Current Range		0 to 1			
ipur	Rated Outp		15W	15.6W	15W	16.8W	
Output Conditi		Itage Accuracy	400	±3		040-14	
	Ripple Nois		120mVp-p	180mVp-p	180mVp-p	240mVp-p	
	Output Holding Time (min) Startup time (typ)			10m			
			20msec				
		t Protection	Detection above 105% of rated current				
Additional Functions		e Protection	Detection from 115 to 145% of rated voltage (output cutoff)				
itio		g Protection		Not pro			
pp		/OFF Control	Not provided Not provided				
⋖╙	Remote Ser Operations	-	Red LED indicator				
	-			Red LED	Indicator		
		emperature Range	0 to +50°C				
	_	nperature Range	-25 to +85°C				
_		lumidity Range	30 to 90% (no condensation) 30 to 90% (no condensation)				
Environmental Conditions	Cooling Re	midity Range	Natural air cooling				
Environme Conditions	Cooling Re	No. of vibrations	10 to 55Hz				
ir or diti		Sweep time	3 minutes				
in vi	Vibration	Acceleration rate	3 minutes 19.6m/s² (2G)				
	Resistance	Vibration direction	X, Y, Z				
		Vibration time	One hour in each of three directions				
	Installation	Conditions	Derating may be required due to mounting direction				
	Insulation	Between input and output					
_		Between input and FG		2000 V AC f	or 1 minute		
Insulation	Voltage	Between output and FG		500 V AC fo	or 1 minute		
sula	Insulation	Between input and output					
lns	Resistance	Between input and FG		100 M Ω (measured wi	th 500 V DC Megger)		
		Between output and FG					
	External Ap	pearance		With c	nassis		
ure/	Input Type	-		Termina			
ruct	Output Typ	e		Termina	al stand		
ll Sti ds	External Di	mensions		35 ^w x 99 ^D			
erna	Weight			27	0		
External Structure/ Standards	Safety Stan			UL1950, CSA No. 950, an	· · ·		
	Conducted	Emission	De	esignated to meet CISPR2	2 Class A and FCC Class	s B	
ions	Remote ON	/OFF Control		Not pro	ovided		
Opt	Cover			Prov	ided		

Note: At cold start. (More current than above noted value may flow at restart.)

Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Note3 All output characteristics are measured at the output connector.

Safety standards do not apply during DC input. Use the SWA Series with 80% of the input current or less during DC input.

* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage,

74 rated output current, and rated frequency, at an ambient temperature of 25°C with 60% humidity.

15W,30W,50W,100W,150W

SWA Series

Please contact Sanken for delivery time of connector type product in advance.

citication	- and Stan	
	s and Stan	

			Specificatio	ons and Standard	ls			
				3	BOW			
	Mo	del	SWA030-05	SWA030-12	SWA030-15	SWA030-24		
	Rated Input	t Voltage	100 V AC to 240 V AC or 110 V DC 1001					
		nput Voltage Range	85 V AC to 264 V AC or 90 V DC to 165 V DC					
Input Conditions	Input Curre	ent (typ)	0.7A/0.46A					
tio	Rated Freq		50/60Hz					
put ndi	Allowable F	Frequency Range	47 to 440Hz					
S II	Efficiency (typ)	72%	75%	75%	77%		
	Inrush Curi	rent (max) Note1	25A/50A					
	Leakage Cu	urrent (max)		0.5m	nA/0.75mA			
	Rated Outp	ut Voltage	5V	12V	15V	24V		
P	Output Voltage Variation				out voltage ±10%	2.10		
Note 3	- ·		6.0A (4.8A)	2.5A (2.0A)	2.0A (1.6A)	1.3A (1.0A)		
suc		Output Current Range		. ,	to 100%			
litio	Rated Outp		30W	30W	30W	31.2W		
Output Conditions		Itage Accuracy			±3%			
οŭ	Ripple Nois		120mVp-p	180mVp-p	180mVp-p	240mVp-p		
	Output Hol	ding Time (min)		1	0msec			
	Startup tim		20msec					
	Overcurrent Protection							
- s		e Protection	Detection above 105% of rated current Detection from 115 to 145% of rated voltage (output cutoff)					
ona		g Protection	Not provided					
Additional Functions		/OFF Control			provided			
Pul	Remote Se	nsing			provided			
	Operations	-	Red LED indicator					
	-		0 to 15000					
		emperature Range nperature Range			to +50°C			
		Humidity Range	-25 to +85°C 30 to 90% (no condensation)					
a		midity Range	30 to 90% (no condensation)					
Environmental Conditions		quirements	Natural air cooling					
un di		No. of vibrations	10 to 55Hz					
diti		Sweep time	3 minutes					
N N	Vibration	Acceleration rate			6m/s ² (2G)			
	Resistance	Vibration direction		X, Y, Z				
		Vibration time	One hour in each of three directions					
	Installation	Conditions	Derating may be required due to mounting direction					
	Inculation	Between input and output						
	Insulation Withstand	Between input and FG		2000 V A	C for 1 minute			
Insulation	Voltage	Between output and FG		500 V A	C for 1 minute			
ula		Between input and output						
lns	Insulation	Botwoon input and EG		100 M Ω (measured	l with 500 V DC Megger)			
	Resistance	Between output and FG		, , , , , , , , , , , , , , , , , , ,	00 ,			
	External Ap	· · · · · ·		\\/i+	h chassis			
Ire/	Input Type	/pourune			n chassis			
External Structure/ Standards	Output Type	e			ninal stand			
Stru	External Di				16 ^D x 97 ^H mm			
nal lard	Weight				370g			
xter tanc	Safety Stan	dards			and TÜV (EN60950) certifi	ed		
шŏ	Conducted		C		R22 Class A and FCC Clas			
				5				
ption	Cover	/OFF Control			provided rovided			
		o ourroot there also	ated value recording of					
Note 1 At C	ola start. (Mol	e current than above n	oted value may flow at	restart.)				

Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Note 3 All output characteristics are measured at the output connector.

Safety standards do not apply during DC input. Use the SWA Series with 80% of the input current or less during DC input.

* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage, rated output current, and rated frequency, at an ambient temperature of 25°C with 60% humidity.

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SWA Series

15W,30W,50W,100W,150W

			Specificatio	Please contact Sar ns and Standards	iken for delivery time of conne	ector type product in advance	
					w		
	Мо	del	SWA050-05	SWA050-12	SWA050-15	SWA050-24	
	Rated Input	t Voltage	100 V AC to 240 V AC or 110 V DC 🔤				
	Allowable I	nput Voltage Range		85 V AC to 264 V AC	or 90 V DC to 165 V DC 🛽	ote 4	
ons	Input Curre	nt (typ)	1.2A/0.7A				
itio	Rated Freq	uency	50/60Hz				
Input Condi	Allowable F	Frequency Range		47 to	440Hz		
ن ہے۔ ان	Efficiency (typ)	72%	75%	75%	77%	
	Inrush Current (max) 🔤			25 <i>A</i>	/50A		
	Leakage Cu	urrent (max)	0.5mA/0.75mA				
	Rated Outp	ut Voltage	5V	12V	15V	24V	
Note 3		age Variation		Rated output	voltage ±10%	I	
			10A (8A)	4.2A (3.3A)	3.4A (2.7A)	2.1A (1.6A)	
suo		utput Current Range	. /	, ,	100%		
out diti	Rated Outp	ut Power	50W	50.4W	51W	50.4W	
Output Conditi		Itage Accuracy		±	3%		
00	Ripple Nois	C Note 2	120mVp-p	180mVp-p	180mVp-p	240mVp-p	
	Output Holding Time (min)			10r	nsec		
	Startup time	e (typ)	20msec				
	Overcurren	t Protection	Detection above 105% of rated current				
ns ns		e Protection	Detection from 115 to 145% of rated voltage (output cutoff)				
tio		g Protection	Not provided				
Additional Functions		/OFF Control			rovided		
άĽ	Remote Ser	-			rovided		
	Operations	Display		Red LEI	D indicator		
	Operating Te	emperature Range	0 to +50°C				
	-	nperature Range	-25 to +85°C				
	Operating Humidity Range		30 to 90% (no condensation)				
nta		midity Range	30 to 90% (no condensation)				
Environmental Conditions	Cooling Re		Natural air cooling				
Environme Conditions		No. of vibrations	10 to 55Hz 3 minutes				
nvir	Vibration	Sweep time					
шö	Resistance	Acceleration rate Vibration direction	19.6m/s² (2G)				
		Vibration time	X, Y, Z				
	Installation	Conditions	One hour in each of three directions Derating may be required due to mounting direction				
	Insulation Withstand	Between input and output		2000 V AC	for 1 minute		
Insulation	Voltage	Between input and FG Between output and FG		500 V AC	for 1 minute		
ulat	Tonago	Between input and output		300 V AO			
nsu	Insulation	Botwoon input and EG		100 MQ (measured v	vith 500 V DC Megger)		
	Resistance	Between output and FG					
	External Ap	•		۱۸/٬۰۰۲	chassis		
Ire/	Input Type	/poaranoe			nal stand		
External Structure/ Standards	Output Typ	e			al stand		
Stru 5	External Di				^D x 97 ^H mm		
nal darc	Weight				10g		
xter tand	Safety Stan	dards			nd TÜV (EN60950) certifie	d	
-ш _о	Conducted		De	esignated to meet CISPR	22 Class A and FCC Class	s B	
suc	Remote ON	/OFF Control		Not p	rovided		
Optic	Cover				vided		
		e current than above n	oted value may flow at re				

Note: At cold start. (More current than above noted value may flow at restart.)

Note2 Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Note3 All output characteristics are measured at the output connector.

Safety standards do not apply during DC input. Use the SWA Series with 80% of the input current or less during DC input.

* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage,

rated output current, and rated frequency, at an ambient temperature of 25°C with 60% humidity.

15W,30W,50W,100W,150W

SWA Series

			Specificatio	ns and Standards				
				10	0W			
	Мо	del	SWA100-05	SWA100-12	SWA100-15	SWA100-24		
	Rated Input	t Voltage	100 V AC to 240 V AC or 110 V DC 1004					
		nput Voltage Range	85 V AC to 264 V AC or 90 V DC to 165 V DC					
ns	Input Curre	nt (typ)	1.6A/0.7A					
itio	Rated Freq	uency	50/60Hz					
put		Frequency Range	47 to 63Hz					
ن <u>ا</u>	Power Fact	or (typ)		0.99	9/0.92	1		
	Efficiency (74%	76%	76%	77%		
		ent (max) Note1	20A/40A					
	Leakage Cu	urrent (max)		0.5mA	/0.75mA			
	Rated Outp	ut Voltage	5V	12V	15V	24V		
Note 3	Output Volt	age Variation		Rated output	voltage ±10%			
2 0	Rated Outp	ut Current Note 4	20A (16A)	8.5A (6.8A)	7.0A (5.6A)	4.5A (3.6A)		
ion		utput Current Range		0 to	100%			
put diti	Rated Outp		100W	102W	105W	108W		
Output Condit		Itage Accuracy		1	3%	1		
	Ripple Nois		120mVp-p	180mVp-p	180mVp-p	240mVp-p		
	Output Holding Time (min)				nsec			
	Startup tim	e (typ)		1000/6	00msec			
	Overcurren	t Protection	Detection approx. 120% of rated current					
ns Ns	Overvoltage Protection		Detection from 115 to 145% of rated voltage (output cutoff)					
Additional Functions	Overheating Protection		Not provided					
ddif	Remote ON/OFF Control		Not provided					
ĂĔ	Remote Sensing		Not provided					
	Operations	Display		Red LED) indicator			
	Operating Te	emperature Range	0 to +50°C					
	Storage Temperature Range		-25 to +85°C					
	Operating Humidity Range		30 to 90% (no condensation)					
Environmental Conditions	Storage Humidity Range		30 to 90% (no condensation)					
mei	Cooling Requirements		Natural air cooling					
on litic		No. of vibrations	10 to 55Hz					
nvir onc	Vibration	Sweep time		-	nutes			
шo	Resistance	Acceleration rate Vibration direction	19.6m/s² (2G)					
		Vibration time	X, Y, Z					
	Installation Conditions		One hour in each of three directions Derating may be required due to mounting direction					
					Ŭ			
	Insulation	Between input and output		2000 V AC	for 1 minute			
Insulation	Withstand Voltage	Between input and FG Between output and FG		500 \/ AC	for 1 minute			
ılat	Tonage	Between input and output		300 V AC				
ISU	Insulation	Potwoon input and EC		100 MQ (measured w	vith 500 V DC Megger)			
	Resistance	Between output and FG						
	External Ap	•		10/:46	chassis			
re/	Input Type	pearance			al stand			
lotu	Output Type	۵			al stand			
External Structure/ Standards	External Di				^D x 93 ^H mm			
'nal dard	Weight				50g			
xter tane	Safety Stan	dards			nd TÜV (EN60950) certifi	ed		
<u>м</u> м	Conducted		Designated to mee	et CISPR22 Class A (200-	240 V AC) and FCC Clas	ss A (100-120 V AC)		
su	Remote ON	/OFF Control		Not n	rovided			
Optio	Cover			•	vided			
			noted value may flow at					

 $\ensuremath{\,^{\mbox{Motel}}}$ At cold start. (More current than above noted value may flow at restart.)

Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

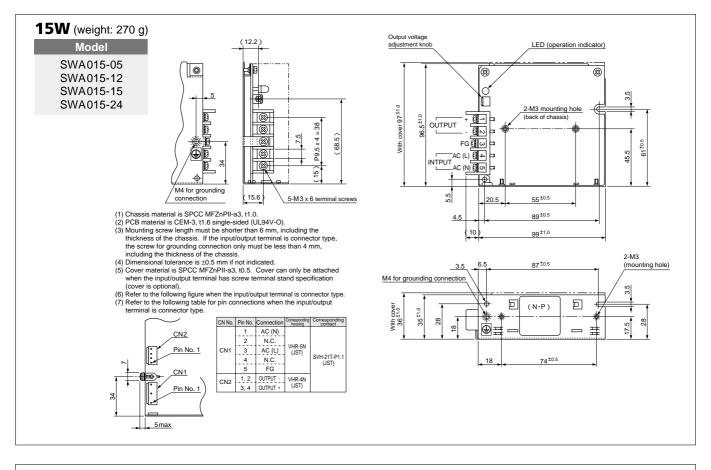
 $\ensuremath{\texttt{Note3}}$ All output characteristics are measured at the output connector.

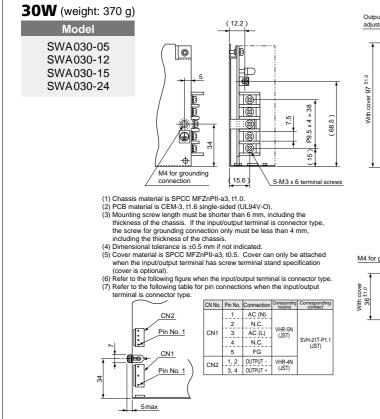
Safety standards do not apply during DC input. Use the SWA Series with 80% of the input current or less during DC input.

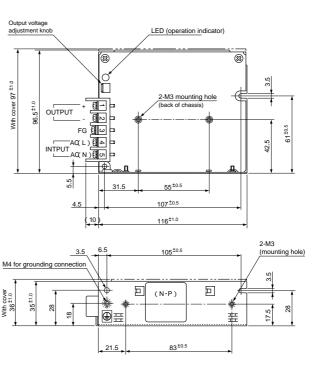
* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage,

rated output current, and rated frequency, at an ambient temperature of 25°C with 60% humidity.





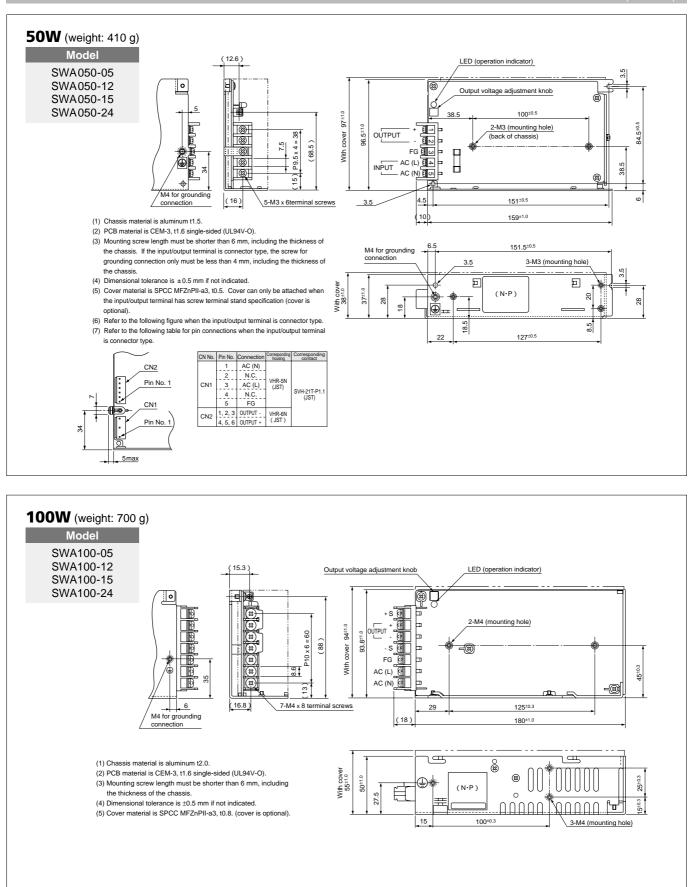




SWA Series 15W,30W,50W,100W,150W

External Dimensions

unit: mm)



SWA Series

15W,30W,50W,100W,150W

			Specificatio	ns and Standards			
				15	0W		
	Мо	del	SWA150-05	SWA150-12	SWA150-15	SWA150-24	
	Rated Input	Voltage	100 V AC to 240 V AC or 110 V DC 1004				
	· ·	nput Voltage Range	85 V AC to 264 V AC or 90 V DC to 165 V DC Noted				
su	Input Curre		2.4A/1.7A				
itions	Rated Freq	uency	50/60Hz				
put		requency Range	47 to 63Hz				
ن <u>ا</u>	Power Fact			0.99	9/0.95	1	
	Efficiency (75%	77%	78%	79%	
		ent (max) Note1	20A/40A 0.5mA/0.75mA				
	Leakage Cu	irrent (max)		0.5mA	/0.75mA		
	Rated Outp	ut Voltage	5V	12V	15V	24V	
Note 3		age Variation		Rated output	voltage ±10%		
N N		ut Current Note 4	30A (24A)	13A (10A)	10A (8A)	6.5A (5.2A)	
t		utput Current Range			100%		
Output Conditi	Rated Outp		150W	156W	150W	156W	
Col		tage Accuracy	400 \/		3%	040.14	
	Ripple Nois		120mVp-p	180mVp-p	180mVp-p	240mVp-p	
	Output Holding Time (min) Startup time (typ)				nsec 00msec		
				1000/0	oomsec		
		t Protection	Detection approx. 120% of rated current				
nal	Overvoltage Protection		Detection from 115 to 145% of rated voltage (output cutoff)				
Additional Functions	Overheating Protection		Not provided Not provided				
Pdd Tun ⁼	Remote ON/OFF Control Remote Sensing		provided				
	Operations Display		Red LED indicator				
	-						
	Operating Temperature Range		0 to +50°C				
	Storage Temperature Range		-25 to +85°C 30 to 90% (no condensation)				
ធ	Operating Humidity Range Storage Humidity Range		30 to 90% (no condensation) 30 to 90% (no condensation)				
Environmental Conditions	Cooling Re		Natural air cooling				
Environme Conditions		No. of vibrations	10 to 55Hz				
/iro	Vibratian	Sweep time	3 minutes				
Col	Vibration Resistance	Acceleration rate	19.6m/s ² (2G)				
		Vibration direction		Х,	Y, Z		
		Vibration time	One hour in each of three directions				
	Installation	Conditions		Derating may be required	I due to mounting direction	٦	
	Insulation	Between input and output		2000 \/ 40	for 1 minute		
u		Between input and FG					
Insulation	Voltage	Between output and FG		500 V AC	for 1 minute		
nsı	Insulation	Between input and output		(
-	Resistance			100 M Ω (measured w	vith 500 V DC Megger)		
		Between output and FG					
e/	External Ap	pearance			chassis		
ctur	Input Type	_			al stand		
External Structure/ Standards	Output Typ				al stand ^D x 93 ^H mm		
ards	External Di Weight	mensions			50g		
terr and	Safety Stan	dards			nd TÜV (EN60950) certifie	ed	
ũ từ	Conducted				22 Class A and FCC Clas		
s		/OFF Control					
ption	Cover				rovided vided		
		ore ourrent then charge	noted value may flow at	· · · · · ·			

Note: At cold start. (More current than above noted value may flow at restart.)

Note: Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Note3 All output characteristics are measured at the output connector.

Safety standards do not apply during DC input. Use the SWA Series with 80% of the input current or less during DC input.

* Rated input/output conditions means that the switching power supply is operated within the rated input voltage, rated output voltage,

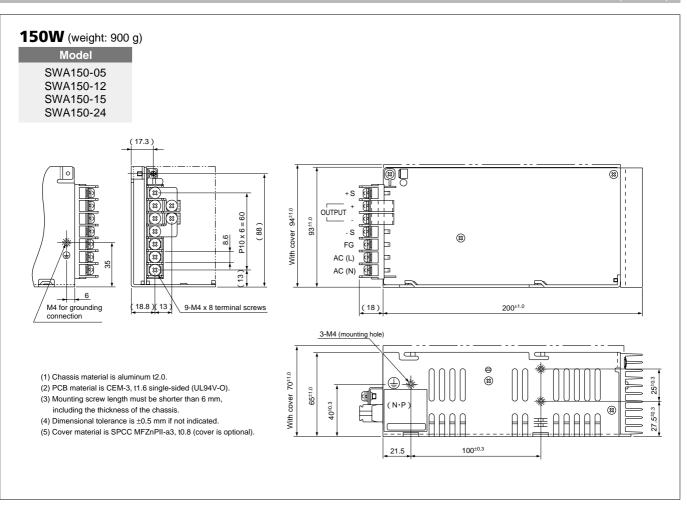
80 rated output current, and rated frequency, at an ambient temperature of 25°C with 60% humidity.

15W,30W,50W,100W,150W

SWA Series

External Dimensions

(unit: mm)





Option

Symbol at end of product name	Description	Application
None	Terminal stand type, without cover	All models
-C	Terminal stand type, with cover	All models
-CN	Connector type, without cover	15W, 30W, 50W, 100W, 150W

Please contact Sanken for delivery time of connector type product in advance.



Operating Instruction

Terminal connection

b æn		Adjustment knob	Output voltage adjustment knob	Knob for changing output voltage
Adju	ustment knob)	LED	Operation indicator LED (red)	Lights when output voltage is ON
+ S		+ S	+ side output sensing terminal	Remove short bar and connect to + side of load when remote sensing
∰_ +		+	+ side output terminal	Connect to + side of load
») -		-	- side output terminal	Connect to - side of load
≋)s ≋)Fg		- S	- side output sensing terminal	Remove short bar and connect to - side of load when remote sensing
3) AC	(L)	FG	Frame grounding	Connect to grounding
) AC	(N)	~ L	AC input terminal	Connect to AC input (built-in fuse side)
щ Щ	E	~ N	Connect to AC input	Connect to AC input

Refer to the external diagram for terminal arrangement.

Input

You can use this power supply with input voltage of from 85 to 264 V without switching because of the wide input.

The 100W and 150W models are also equipped with a power-factor-correction circuit for wide input and small input current.

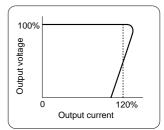
Avoid using this power supply in environments where large input changes occur frequently.

3 Setting output voltage

Output voltage may be adjusted using the output voltage adjustment knob. Turning the knob clockwise increases output voltage, while turning it counterclockwise decreases output voltage. Use the power supply with the output voltage within its adjustable range and with the output capacity within the rated output power.

Overcurrent protection

The SWA series has an overcurrent protection function with drooping back characteristics. When the cause of the overload is removed, the output will automatically return to its normal voltage. Overcurrent is detected when the output current exceeds 105% of the



rated current value (120% of the standard output value). Avoid continuous operation with overload because it deteriorates the power supply and causes failure.

Overvoltage protection 5

If the output voltage increases for some reason, the output is shut off. To reset the overvoltage protection, turn off the power and wait about five minutes before turning the power on again.

This function may be activated when the voltage adjustment knob has turned clockwise up to the limit or sensing terminal are not connected securely (100W and 150W models). Take adequate precautions.

SWA Series 15W,30W,50W,100W,150W

6 Mounting

Mount the power supply with space around so that there is sufficient air flow.

Derating is needed according to whether there is a cover or not as well as installation direction. Check before use.

(1) Vertical mounting without cover:

Ambient temperature 0 to +50°C /Output 100% (15 to 150 W)

(2) Vertical mounting with cover: Ambient temperature 0 to +40°C

- /Output 100% (15 to 150 W)
- (3) Horizontal mounting without cover:

Ambient temperature 0 to +50°C

/Output 100% (15 to 150 W)

(4) Horizontal mounting with cover:

Ambient temperature 0 to +40°C /Output 100% (15 to 150 W)

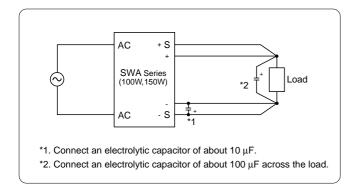
Inrush current limiting

The power supply is equipped with an inrush current limiting circuit. Since the 15W to 50W models use a power thermistor, current greater than that listed in the specifications may flow when restarting the supply, or due to ambient temperature conditions. Take adequate precautions.

The 100W and 150W models are equipped with a limit resistor and a triac. They may also allow more current than that listed in the specifications at ON/OFF for a short period of time such as momentary power failure. Take adequate precautions.

8 Remote sensing

The SWA100W and 150W models are equipped with a remote sensing feature to guard against output load line drop. Use them with a line drop of 250 mV or less.



9 Dynamic load variation

When using the supply with dynamic load variation, keep the minimum current about 1% of rated current.

10 Others

When an abnormality such as no output occurs, remove the load and check if screws are tight at the sensing part for turning adjustment knob. Then restart the power supply.

Ultra-compact general-purpose switching power supplies





Single output With chassis



SWC series are general-purpose switching power supplies that include Sanken Electric's original transformer and feature an optimum layout of heat sources to achieve an ultracompact and ultra-light product.

As such, SWC Series switching power supplies contribute to the further miniaturization of computers and various other equipment.

Main applications

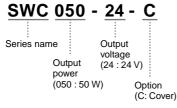
Computer-related equipment

Printer peripherals, terminals, ATMs, POS equipment, filing systems

Industrial equipment

Semiconductor manufacturing equipment, measuring instruments, test equipment, analytical tools, broadcasting equipment



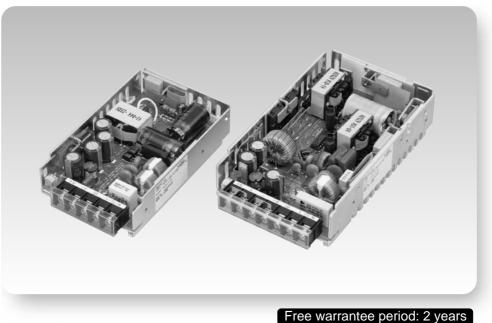


• The industry's top ultra-compact series

This is the industry's smallest and lightest series - roughly half the size of Sanken's existing models. You can now get 100 W of power from units as small as conventional 50-W models.

- World-wide input Supports global markets with a wide-range continuous input method from 85 to 264 V AC.
- Features active filter (PFC) (100W model) The 100 W model features an active filter (PFC: Power Factor Correction circuit) for harmonic current control (complies with IEC61000-3-2).
- Conducted emission Complies with Class B standards under VCCI, FCC and EN55022.
- Acquired CE mark for LVD (Low Voltage Directive) Complies with CE mark standards set by the EU.
- Acquired safety standards of a variety of countries

Complies with safety standards of a variety of countries, including UL60950, CSA60950-00 (C-UL), and TÜV (EN60950:2000).





Model

Specifications and Standards						
	50W					
	SWC050-3R3	SWC050-05	SWC050-12			
		AC100V to	2 AC240V			

SWC050-24

	Deted Innut	Valtara		10400144	100101		
	Rated Input Voltage Allowable Input Voltage Range		AC100V to AC240V				
Input Conditions	Input Current (typ) Note		AC85 to 264V				
			1.2A – 0.6A 50/60Hz				
	Rated Frequ		47 to 440Hz				
		requency Range		47 IU 440HZ			
<u>n n</u>	Power Factor (typ)						
	Efficiency (typ)		73%	76%	80%	83%	
	Inrush Current (max) Note1 Note2			30A/60A (a	1		
	Leakage Cu	irrent (max) 🔤		0.5mA (V _{IN} = 120V)/	0.75mA (V _{IN} = 240V)		
	Rated Output Voltage		3.3V	5V	12V	24V	
Output Conditions 🚥	Output Voltage Variation		0.01	-	voltage ±10%	2	
	Rated Outp	-	10A	10A	4.2A	2.1A	
		eak Current					
		utput Current Range		0 to 2	00%		
ji rt	Rated Outp	•	33W 50W 50.4W 50.4W				
on c		tage Accuracy Note6		±3			
οõ	Ripple Nois		80mVp-p	 100mVp-p	100mVp-p	150mVp-p	
		ding Time (min) 🔤	contrp p		nsec	1001117 P	
	Startup time	• · · ·			nsec		
				2001			
		t Protection	Detection	above 105% of rated cu	rent (drooping automatic	recovery)	
ns ns	Overvoltage	e Protection Note7	D	etection above 115% of r	ated voltage (output cuto	ff)	
ţi ji	Overheating	g Protection	Not provided				
Additional Functions	Remote ON	OFF Control	Not provided				
ΡŪ	Remote Ser	nsing	Not provided				
	Operations Display		Green LED indicator				
	Operating To	mporaturo Bango me	-10°C to +60°C				
	Operating Temperature Range Notes		-10 C to +80 C -20°C to +85°C				
	Storage Temperature Range		-20°C t0 +85°C 30 to 90%				
	Operating Humidity Range		30 to 90%				
	Storage Humidity Range Cooling Requirements						
Environmental Conditions	Cooling Re	No. of vibrations	Natural air cooling 10 to 55Hz				
me			3 minutes				
itic	Vibration	Sweep time					
ond N	Resistance	Acceleration rate Vibration direction	19.6m/s² (2G)				
шй			X, Y, Z				
		Vibration time	One hour in each of three directions				
	Shock Resistance		98m/s ² (10G) Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more. Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 sides.				
	Installation	Conditions	Derating may be required due to mounting direction				
		Between input and output	200	OOVAC for 1 minute (leas	age current: 15 mA ar la	(22)	
Note 9		Between input and FG	3000 V AC for 1 minute (leakage current: 15 mA or less) 2000 V AC for 1 minute (leakage current: 15 mA or less)				
ion	Voltage	Between output and FG		0 V AC for 1 minute (leak	•	,	
latic		Between input and output	50		ago current. To mA ULIES		
n	Insulation	Between input and FG		100 M Ω (measured w	th 500 V DC Meager)		
lus	Resistance	Between output and FG		100 M32 (measured w	in see v De Megger)		
		-					
	External Ap	pearance	With chassis				
inre	Input Type		Terminal stand (connector is optional)				
Inct	Output Type			Terminal stand (co	• •		
ds Sti	External Di	nensions		125 [₩] x 80 [□]	x 29 ^H mm		
External Structure/ Standards	Weight			270g			
tan	Safety Stan			and TÜV (EN60950:2000) certified	· · ·		
ш v	Conducted		Designated to meet FCC	Class B (120 V AC), EN550		VCCI Class B (100 V AC)	
	Harmonic C	urrent		Immunity: Designated to	meet IEC61000-4-2, 5		
	Remote ON	/OFF Control		Not pr	ovided		
s	Chassis			I	s standard		
ion	Cover				rided		
Options		Terminal stand			is standard		
	Connection Connector		Provided				

Specified under rated input/output conditions at an ambient temperature of 25°C.

Note2 More current above noted values may flow at restart.

Course Output characteristics are measured at a point 5 cm from the output connector, with a 63-V, 47-μF electrolytic capacitor and 0.1-μF film capacitor connected to that point.
 Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe Specified under rated input/output conditions. 86 The constant voltage accuracy is measured within static input range, within static load range, with time drift and within ambient temperature range.

Note 5 Output voltage can be changed within the maximum output power and

Note7 Reset is performed by reapplying input voltage.

rated output current.

Core Derating for ambient temperature applies. Core Insulation conditions are specified at normal temperature and humidity.

SWC Series 50W,100W

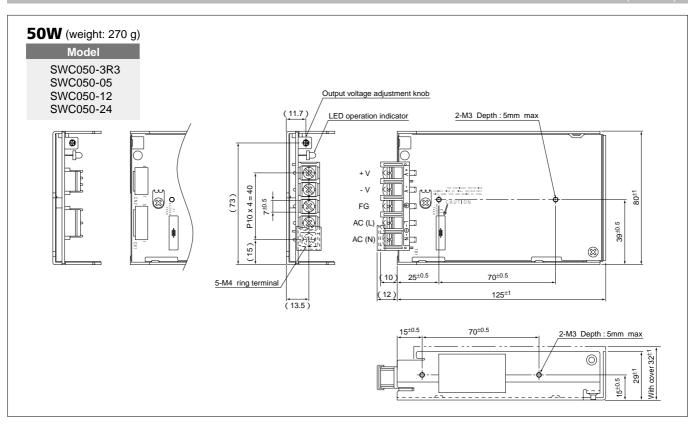
Rated Input Voltage AC100V to AC240 Allowable Input Voltage Range AC85 to 264V Input Current (typ) (III) 1.6A – 0.6A Rated Frequency 50/60Hz Allowable Frequency Range 47 to 63Hz Power Factor (typ) 0.99/0.95 Efficiency (typ) (III) 72% Inrush Current (max) (IIII) 0.5mA (VIN = 120V)/0.75mA Rated Output Voltage 3.3V V 5V Output Voltage Variation (IIII) Rated output voltage Rated Output Current 20A Maximum Peak Current 100%max Allowable Output Current Range 0 to 100% Rated Output Power 66W Constant Voltage Accuracy (III) 20msec Startup time (typ) (III) 80mVp-p Overvoltage Protection Detection above 105% of rated current (dro Overvoltage Protection Detection above 105% of rated voltad Overleating Protection Detection above 105% of rated voltad Overleating Protection Not provided	81% 82% art)					
SWC100-3R3 SWC100-05 SW Rated Input Voltage AC100V to AC240 Allowable Input Voltage Range AC85 to 264V Input Current (typ) (III) 1.6A - 0.6A Rated Frequency 50/60Hz Allowable Frequency Range 47 to 63Hz Power Factor (typ) 0.99/0.95 Efficiency (typ) (III) 72% Inrush Current (max) (IIII) 30A/60A (at cold state) Leakage Current (max) (IIII) 0.5mA (VIN = 120V)/0.75mA Rated Output Voltage 3.3V 5V Output Voltage Variation (IIII) Rated output voltage 3.3V Rated Output Voltage 3.3V 5V 100%max Allowable Output Current 20A 20A 100%max Allowable Output Current Range 0 to 100% 100W 100W Constant Voltage Accuracy (IIII) 80mVp-p 100mVp-p 1 Output Holding Time (min) 80mVp-p 500msec 500msec	NV 81% 82% art)					
Allowable Input Voltage Range AC85 to 264V Input Current (typ) (III) 1.6A – 0.6A Rated Frequency 50/60Hz Allowable Frequency Range 47 to 63Hz Power Factor (typ) 0.99/0.95 Efficiency (typ) (III) 72% Inrush Current (max) (IIII) 30A/60A (at cold str. Leakage Current (max) (IIII) 0.5mA (VIN = 120V)/0.75mA Maximum Peak Current 20A Maximum Peak Current 20A Allowable Output Current Range 0 to 100% Rated Output Power 66W Allowable Output Power 66W Output Holding Time (min) (IIII) 20mvp-p Output Holding Time (min) (IIII) 20mvp-p Overcurrent Protection Detection above 105% of rated current (dr.	81% 82% art)					
Input Current (typ) (III) 1.6A-0.6A Rated Frequency 50/60Hz Allowable Frequency Range 47 to 63Hz Power Factor (typ) 0.99/0.95 Efficiency (typ) (III) 72% Inrush Current (max) (IIII) 30A/60A (at cold state) Leakage Current (max) (IIII) 0.5mA (VIN = 120V)/0.75mA Rated Output Voltage 3.3V 5V Output Voltage Variation (IIII) 20A 20A Maximum Peak Current 20A 20A Allowable Output Current Range 0 to 100% 4.100%/max Allowable Output Power 66W 100W 4.3% Rated Output Power 66W 100W 4.3% Constant Voltage Accuracy (IIII) 80mVp-p 100mVp-p 1 Output Holding Time (min) 20msec 500msec Startup time (typ) (III) Detection above 105% of rated current (droptic) 500msec	art)					
Rated Frequency 50/60Hz Allowable Frequency Range 47 to 63Hz Power Factor (typ) 0.99/0.95 Efficiency (typ) 72% Inrush Current (max) 72% Leakage Current (max) 30A/60A (at cold state) Leakage Current (max) 0.5mA (ViN = 120V)/0.75mA Rated Output Voltage 3.3V 5V Output Voltage Variation Rated output voltage Rated Output Current 20A 20A Maximum Peak Current 100%max Allowable Output Current Range 0 to 100% Rated Output Power 66W 100W Constant Voltage Accuracy 80mVp-p 100mVp-p Output Holding Time (min) 80mVp-p 500msec Startup time (typ) 500msec 500msec	art)					
Inrush Current (max) Image 12.78 17.78 Inrush Current (max) Image 30A/60A (at cold states) Leakage Current (max) Image 0.5mA (ViN = 120V)/0.75mA Rated Output Voltage 3.3V Output Voltage Variation Image Rated output voltage Rated Output Current 20A Maximum Peak Current 100%max Allowable Output Current Range 0 to 100% Rated Output Power 66W Constant Voltage Accuracy Image ±3% Ripple Noise Image 80mVp-p Output Holding Time (min) Image 20msec Startup time (typ) Image 500msec	art)					
Inrush Current (max) Image 12.78 17.78 Inrush Current (max) Image 30A/60A (at cold states) Leakage Current (max) Image 0.5mA (ViN = 120V)/0.75mA Rated Output Voltage 3.3V Output Voltage Variation Image Rated output voltage Rated Output Current 20A Maximum Peak Current 100%max Allowable Output Current Range 0 to 100% Rated Output Power 66W Constant Voltage Accuracy Image ±3% Ripple Noise Image 80mVp-p Output Holding Time (min) Image 20msec Startup time (typ) Image 500msec	art)					
Inrush Current (max) (max) (max) 30A/60A (at cold states) Inrush Current (max) (max) (max) (max) 30A/60A (at cold states) Leakage Current (max) (max) (max) 0.5mA (V _{IN} = 120V)/0.75mA Rated Output Voltage 3.3V Output Voltage Variation (max) SV Rated Output Voltage Variation (max) Rated output voltage states) Rated Output Current 20A Maximum Peak Current 100%max Allowable Output Current Range 0 to 100% Rated Output Power 66W Constant Voltage Accuracy (max) ±3% Ripple Noise (max) (max) 80mVp-p 100mVp-p Output Holding Time (min) 20msec Startup time (typ) (max) 500msec	art)					
Leakage Current (max) (max) 0.5mA (V _{IN} = 120V)/0.75mA Rated Output Voltage 3.3V 5V Output Voltage Variation (max) Rated output voltage : Rated output voltage : Rated Output Voltage Variation (max) 0.5mA (V _{IN} = 120V)/0.75mA Maximum Peak Current 20A 20A Allowable Output Current Range 0 to 100% Rated Output Power 66W 100W Constant Voltage Accuracy (max) ±3% Ripple Noise (max) (max) 80mVp-p 100mVp-p Output Holding Time (min) (max) 500msec Startup time (typ) (max) 500msec	*					
Output Voltage Variation Image Rated output voltage Rated Output Current 20A 20A Maximum Peak Current 20A 20A Allowable Output Current Range 0 to 100% Rated Output Power 66W 100W Constant Voltage Accuracy Image ±3% Ripple Noise Image 80mVp-p 100mVp-p 1 Output Holding Time (min) Image 500msec 500msec Startup time (typ) Image Detection above 105% of rated current (dropped)						
Rated Output Current 20A 20A Maximum Peak Current 100%max Allowable Output Current Range 0 to 100% Rated Output Power 66W 100W Constant Voltage Accuracy IIII ±3% Ripple Noise IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	12V 24V					
Maximum Peak Current 100%max Allowable Output Current Range 0 to 100% Rated Output Power 66W 100W Constant Voltage Accuracy Image ±3% Ripple Noise 80mVp-p 100mVp-p Output Holding Time (min) 20msec Startup time (typ) 500msec						
Allowable Output Current Range 0 to 100% Rated Output Power 66W 100W Constant Voltage Accuracy IIII ±3% Ripple Noise IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII						
Rated Output Power 66W 100W Constant Voltage Accuracy (Integration of the second of t						
Ripple Noise (cod) (cod) 80mVp-p 100mVp-p 1 Output Holding Time (min) (cod) 20msec Startup time (typ) (cod) 500msec	102W 108W					
Output Holding Time (min) 20msec Startup time (typ) 500msec Overcurrent Protection Detection above 105% of rated current (dropped)	00m)/p p 100m)/p z					
Startup time (typ) Image 500msec Overcurrent Protection Detection above 105% of rated current (dropped)	00mVp-p 100mVp-p					
Overvoltage Protection Detection above 115% of rated volta Overheating Protection Not provided Remote ON/OFF Control Not provided	poping automatic recovery)					
Overheating Protection Not provided Remote ON/OFF Control Not provided	ge (output cutoff)					
Periode Several Control						
Remote Sensing provided	provided					
Operations Display Green LED indicat	Green LED indicator					
Operating Temperature Range Temperature -10°C to +60°C						
Storage Temperature Range -20°C to +85°C	-20°C to +85°C 30 to 90%					
Operating Humidity Range 30 to 90% Storage Humidity Range 30 to 90%						
	g					
Cooling Requirements Natural air cooling Vibration No. of vibrations 10 to 55Hz Sweep time 3 minutes Acceleration rate 19.6m/s² (2G) Vibration direction x, Y, Z						
Sweep time 3 minutes Vibration Acceleration rate 19.6m/s² (2G)	19.6m/s² (2G) X, Y, Z					
Vibration direction X, Y, Z						
Vibration time One hour in each of three	One hour in each of three directions 98m/s ² (10G)					
Shock Resistance Conduct this test on an oak board with a flat surface a	Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more.					
	Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 sides.					
Installation Conditions Derating may be required due to n	Derating may be required due to mounting direction					
	,					
Voltage Between output and FG 500 V AC for 1 minute (leakage curr Insulation Between input and output Between input and FG 100 MΩ (measured with 500 V	<u>,</u>					
Resistance Between input and FG 100 MΩ (measured with 500 V Between output and FG	DC Megger)					
External Appearance With chassis						
Output Type Terminal stand External Dimensions 150 ^W x 93 ^D x 34 ^H m						
External Dimensions150 ^w x 93 ^D x 34 ^H mWeight500g (typ)	.m					
Safety Standards UL60950, CSA60950-00 (C-UL), and TÜV (EN60950:2000) certified, designate	ed to meet Electrical Appliance and Material Control Law					
Input Type Terminal stand Output Type Terminal stand Output Type Terminal stand External Dimensions 150 ^w x 93 ^D x 34 ^H m Weight 500g (typ) Safety Standards UL60950, CSA60950-00 (C-UL), and TÜV (EN60950:2000) certified, designate Conducted Emission Designated to meet FCC Class B (120 V AC), EN55022 Class Harmonic current: Designated to meet FCC Class B (120 V AC), EN55022 Class						
Harmonic Current Immunity: Designated to meet If						
Remote ON/OFF Control Not provided						
	ard					
Chassis Provided as standard provided Cover provided Input/Output Terminal stand Provided as standard provided	ard					
Connection Connector Not provided						
 Specified under rated input/output conditions at an ambient temperature of 25°C. More current above noted values may flow at restart. More Current above noted values may flow at restart. Connector, with a 63-V, 47-μF electrolytic capacitor connected to that point. 						

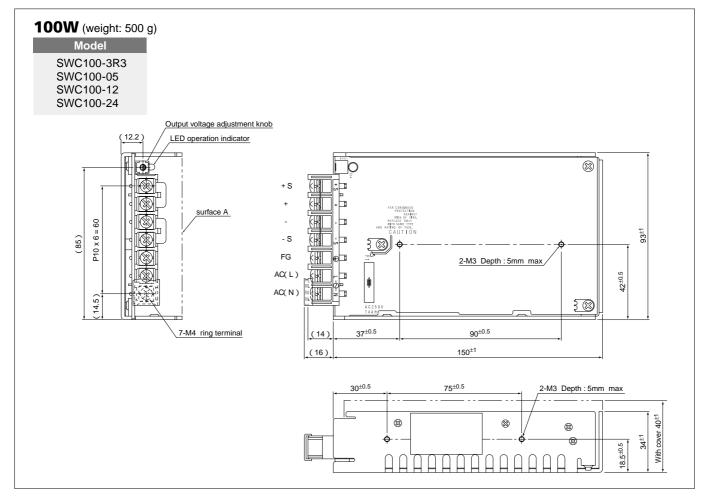
capacitor connected to that point. Repet Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe. Specified under rated input/output conditions. Derating for ambient temperature applies. Repet Insulation conditions are specified at normal temperature and humidity.

SWC Series

External Dimensions

(unit: mm)





SWC Series 50W,100W

Operating Instruction

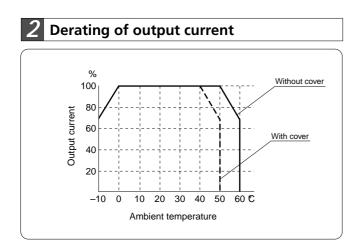
1 Terminal connection

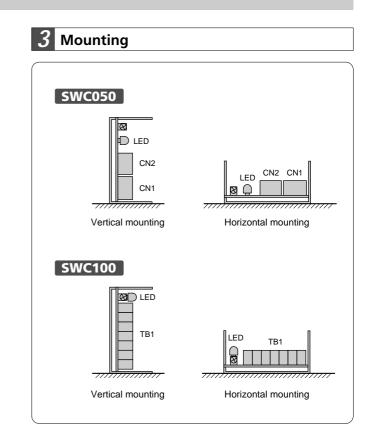
SWC050

Symbol		Pin No.	Function	Connector	Corresponding connector	Corresponding contact
		1	AC (N)			
Connector		2	NC	0005141		
	CN1	3	AC (L)	B3P5-VH (JST)	VHR-5N (JST)	SVH-21T-P1.1 (JST)
		4	NC			(331)
Cor		5	FG			
	CN2	1 to 2	-	B4P-VH	VHR-4N	SVH-21T-P1.1
		3 to 4	+	(JST)	(JST)	(JST)
рс		AC (N)	AC (N)			
star		AC (L)	AC (L)			
nal	TB1	≟ or G	FG			
Terminal stand		-	-			
₽		+	+			

SWC100

_				
Symbol		Pin	Function	
		+ S	+ S side output sensing (+ remote sensing)	
p		+	+ output	
stand		-	- output	
nal	TB1	- S	- S side output sensing (- remote sensing)	
Terminal		FG		
μΨ		AC (L)	AC (L)	
		AC (N)	AC (N)	





Features world-wide input and active filter (PFC) Supports peak current

SWD Series

60W (100W) (150W) (240W)

Single output

With chassis

Supports 2.5x peak current

Supports top-class peak current: 2.5 times the rated current (within 15 seconds)*. This helps save space and lower costs for power supplies in equipment sets.

* (2.0 times in 240 W model).

- World-wide input Supports global markets with a wide-range continuous input method from 85 to 264 V AC.
- Full-fledged lineup With four models for up to 240 W of output power, the SWD Series provides a full lineup to meet a wide range of needs.
- Features active filter (PFC) SWD series features an active filter (PFC: Power Factor Correction circuit) for harmonic current control (complies with IEC-61000-3-2).
- Conducted emission Complies with Class B standards under VCCI, FCC, and EN55022.
- Acquired CE mark for LVD (Low Voltage Directive)

Complies with CE mark standards set by the EU. Acquired safety standards of a

variety of countries

Complies with safety standards of a variety of countries, including UL1950, CSA950 (C-UL), and EN60950.

applications

Mechatronics products (motors, solenoids, etc.)

Equipment that uses thermal heads

Examples: Ticket dispensers, card readers, POS terminals, ATMs, change machines, bill and coin counters, scales, printers, printing press, and other industrial equipment

ired UL. CSA (C-UL

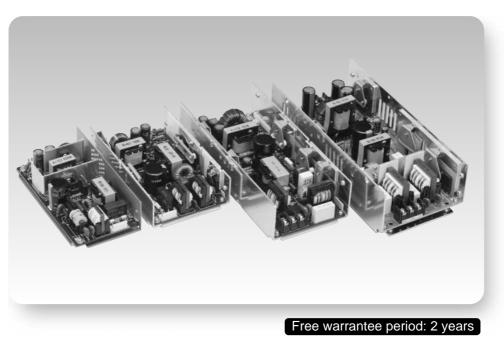
Options

Cover (with derating) **Remote ON/OFF control** (available for 150 and 240 W models)

Description of model name

SWD 150P - 24 - R- C

Series name	Output voltage (24: 24 V)	Option (C: With cover)
		on With remote /OFF control)





60W, 100W, 150W, 240W

			Specifications and Standards
	Мо	dal	60W
		uer	SWD060P-24
	Rated Input	Voltage	AC100V to AC240V
	Allowable Input Voltage Range		AC85 to 264V
S	Input Curre		0.9A (V _{IN} = 100V)
Input Conditions	Rated Freq		50/60Hz
diti		Frequency Range	47 to 63Hz
ond	Power Fact		$0.95 (V_{IN} = 100V)/0.90 (V_{IN} = 240V)$
- O	Efficiency (80%
	Inrush Current (max)		$15A (V_{IN} = 100V)/30A (V_{IN} = 240V)$
	Leakage Current (max) Notes		0.75mA (V _{IN} = 240V)
	Rated Outp	ut Voltage	24V
	Output Volt	age Variation	Fixed
	Rated Outp	ut Current	2.5A
Note 3		Peak Current Note 8	6.0 A (within 15 sec)
us		utput Current Range	0 to 6.0A
Output Conditions	Rated Outp	•	60W
ndi ndi		tage Accuracy Mes	±5%
Cont			
	Ripple Nois		240mVp-p
		ding Time (min) 🔤	60msec
	Startup time	e (typ)	1000msec
	Overcurren	t Protection	Detection above 105% of maximum peak current (drooping automatic recovery)
Additional Functions	Overvoltage	e Protection Note 6	Detection above 115% of rated voltage (output cutoff)
;;; i:		g Protection	Not provided
ip d	Remote Ser		Not provided
АЦ	Operations	•	Not provided
			Not provided
	Operating Te	emperature Range	-10°C to +60°C
	Storage Ten	nperature Range	-25°C to +85°C
	Operating Humidity Range		30 to 90%
	Storage Humidity Range		30 to 90%
<u>a</u>	Cooling Re	quirements	Natural air cooling
Environmental Conditions		No. of vibrations	10 to 55Hz
Ĕ		Sweep time	3 minutes
liti o	Vibration	Acceleration rate	19.6m/s² (2G)
o vi	Resistance	Vibration direction	X, Y, Z
ШÖ		Vibration time	One hour in each of three directions
		vibration time	
	Shock Resi	stanco	98m/s² (10G) Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more.
	Ollock Resi	Stance	Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 sides.
	Installation	Conditions	
	misialiation	Conditions	Derating may be required due to mounting direction (normal installation directions are vertical and horizontal: with mounting holes down)
6	Insulation	Between input and output	3000 V AC for 1 minute (leakage current: 15 mA or less)
Note 7	Withstand	Between input and FG	2000 V AC for 1 minute (leakage current: 15 mA or less)
Б	Voltage	Between output and FG	500 V AC for 1 minute (leakage current: 15 mA or less)
nsulation		Between input and output	
sul	Insulation	Between input and FG	100 M Ω (measured with 500 V DC Megger)
<u> </u>	Resistance	Between output and FG	
		•	
	External Ap	pearance	With chassis
e/	Input Type		Connector
etu	Output Typ	e	Connector
tra	External Di	mensions	160 ^w x 80 ^D x 40 ^H mm
al S rds	Weight		500g
arna	Safety Stan	dards	UL60950, CSA No. 60950, and SEMKO (EN60950) certified, designated to meet Electrical Appliance and Material Control Law
External Structure/ Standards	Conducted		Designated to meet FCC Class B (120 V AC), EN55022 Class B (230 V AC) and VCCI Class B (100 V AC)
ш о			Harmonic current: Designated to meet IEC61000-3-2
	Harmonic C	Current	Immunity: Designated to meet IEC61000-4-2, 5
Options		OFF Control	Not provided
- purchas	Cover		Provided

Note: Specified under rated input/output conditions at an ambient temperature of $25^{\circ}C$.

Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

The constant voltage accuracy is measured within static input range, within static load range, with time drift and within ambient temperature range.

Note 6 Reset is performed by reapplying input voltage.

(too) Insulation conditions are specified at normal temperature and humidity.

Comparison of the second seco that point.

Specifications and Standards 100W Model SWD100P-24 Rated Input Voltage AC100V to AC240V Allowable Input Voltage Range AC85 to 264V Input Current (typ) Note1 $1.5A (V_{IN} = 100V)$ Rated Frequency 50/60Hz Allowable Frequency Range 47 to 63Hz Power Factor (typ) 0.95 (VIN = 100V)/0.90 (VIN = 240V) Efficiency (typ) 80% Inrush Current (max) 10002 15A (V_{IN} = 100V)/30A (V_{IN} = 240V) Leakage Current (max) Notes 0.75mA (V_{IN} = 240V) Rated Output Voltage 24V **Output Voltage Variation** Fixed **Rated Output Current** lote 3 4.0A Maximum Peak Current Note 8 10.0 A (within 15 sec) Allowable Output Current Range 0 to 10.0A **Rated Output Power** 96W ort Sort Constant Voltage Accuracy ±5% Ripple Noise Note1 Note4 240mVp-p Output Holding Time (min) 60msec 1000msec Startup time (typ) **Overcurrent Protection** Detection above 105% of maximum peak current (drooping automatic recovery) Overvoltage Protection Note 6 Detection above 115% of rated voltage (output cutoff) **Overheating Protection** Not provided **Remote Sensing** Not provided **Operations Display** Not provided **Operating Temperature Range** -10°C to +60°C Storage Temperature Range -25°C to +85°C **Operating Humidity Range** 30 to 90% Storage Humidity Range 30 to 90% **Cooling Requirements** Natural air cooling No. of vibrations Note 9 10 to 55Hz Sweep time 3 minutes Vibration Acceleration rate 19.6m/s2 (2G) Resistance ы С Ш Vibration direction X, Y, Z Vibration time One hour in each of three directions 98m/s2 (10G) Shock Resistance Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more. Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 sides. Installation Conditions Derating may be required due to mounting direction (normal installation directions are vertical and horizontal: with mounting holes down) Insulation Between input and output 3000 V AC for 1 minute (leakage current: 15 mA or less) Note 7 Withstand Between input and FG 2000 V AC for 1 minute (leakage current: 15 mA or less) Voltage Between output and FG 500 V AC for 1 minute (leakage current: 15 mA or less) Between input and output Insulation Resistance Between input and FG 100 M Ω (measured with 500 V DC Megger) Between output and FG **External Appearance** With chassis Input Type Connector **Output Type** Connector 160^w x 98^D x 40^H mm **External Dimensions** Weight 650g UL60950, CSA No. 60950, and SEMKO (EN60950) certified, designated to meet Electrical Appliance and Material Control Law Safety Standards **Conducted Emission** Designated to meet FCC Class B (120 V AC), EN55022 Class B (230 V AC) and VCCI Class B (100 V AC) in à Harmonic current: Designated to meet IEC61000-3-2 Harmonic Current Immunity: Designated to meet IEC61000-4-2, 5 **Remote ON/OFF Control** Not provided Options Cover Provided

Note: Specified under rated input/output conditions at an ambient temperature of 25°C.

Note2 More current above noted values may flow at restart.

More Support Connected to that point.

Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

The constant voltage accuracy is measured within static input range, within static load range, with time drift and within ambient temperature range.

Note 6 Reset is performed by reapplying input voltage.

Note 7 Insulation conditions are specified at normal temperature and humidity.

Note 8 Up to rated output current at startup.

When mounted on mounting surface B, the No. of vibrations is from 10 to 25 Hz (refer to External Dimensions).

D Series

60W,100W,150W,240W

SWD Series 60W,100W,150W,240W

			Specifications and Standards
	NA -	4.1	150W
	Мо	del	SWD150P-24
	Rated Input	t Voltage	AC100V to AC240V
	Allowable Input Voltage Range		AC85 to AC264V
Ś	Input Curre	nt (typ) Noted	1.9A (V _{IN} = 100V)
out nditions	Rated Freq	uency	50/60Hz
dit	Allowable F	Frequency Range	47 to 63Hz
d L D	Power Fact	or (typ) Note1	0.95 (V _{IN} = 100V)/0.90 (V _{IN} = 240V)
	Efficiency (typ) Note1	80%
	Inrush Curr	ent (max) 🔤	20A (V _{IN} = 100V)/40A (V _{IN} = 240V)
	Leakage Current (max) Note		0.75mA (V _{IN} = 240V)
	Rated Outp	ut Voltage	24V
		age Variation	Fixed
	Rated Outp	-	6.0A
Kote 3	· · · · ·	Peak Current Moss	15.0 A (within 15 sec)
suc		utput Current Range	0 to 15.0A
it ic	Rated Outp	· · ·	144W
Output Condition		Itage Accuracy Note 5	±5%
ōŭ	Ripple Nois	C Note 1 Note 4	400mVp-p
	Output Hole	ding Time (min) 🔤	60msec
	Startup time	e (typ)	1000msec
	Overcurren	t Protection	Detection above 105% of maximum peak current (drooping automatic recovery)
Additional Functions		e Protection Note6	Detection above 105% of maximum peak current (drooping automatic receively)
ți ți		g Protection	Not provided
ddi	Remote Ser	•	Not provided
A Ē	Operations	0	Not provided
	On enertinen Te	P	
		emperature Range	-10°C to +60°C
		lumidity Range	-25°C to +85°C 30 to 90%
		midity Range	30 to 90%
_	Cooling Re		Natural air cooling
Environmental Conditions	cooling ite	No. of vibrations	10 to 55Hz
me		Sweep time	3 minutes
liti o	Vibration	Acceleration rate	19.6m/s² (2G)
onc	Resistance	Vibration direction	X, Y, Z
ШÖ		Vibration time	One hour in each of three directions
		I	98m/s² (10G)
	Shock Resi	stance	Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more.
			Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 sides.
	Installation	Conditions	Derating may be required due to mounting direction (normal installation directions are vertical and horizontal: with mounting holes down)
	Insulation	Between input and output	3000 V AC for 1 minute (leakage current: 15 mA or less)
Note 7	Withstand	Between input and FG	2000 V AC for 1 minute (leakage current: 15 mA or less)
on	Voltage	Between output and FG	500 V AC for 1 minute (leakage current: 15 mA or less)
Insulation	Insulation	Between input and output	
nsı	Resistance	Between input and FG	100 M Ω (measured with 500 V DC Megger)
_	ricolotanoo	Between output and FG	
	External Ap	pearance	With chassis
7	Input Type	•	Terminal stand
External Structure/ Standards	Output Typ	e	Connector
truc	External Di		220 ^w x 98 ^D x 52 ^H mm
al S rds	Weight		950g
erni nda	Safety Stan	dards	UL60950, CSA No. 60950, and SEMKO (EN60950) certified, designated to meet Electrical Appliance and Material Control Law
Ext	Conducted	Emission	Designated to meet FCC Class B (120 V AC), EN55022 Class B (230 V AC) and VCCI Class B (100 V AC)
	Harmonic C	Current	Harmonic current: Designated to meet IEC61000-3-2
			Immunity: Designated to meet IEC61000-4-2, 5
Ontion	Remote ON	/OFF Control	Provided
Options	Cover		Provided

Note: Specified under rated input/output conditions at an ambient temperature of 25°C.

More current above noted values may flow at restart. Compose Output characteristics are measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor and 0.1-µF film capacitor connected to that point.

The constant voltage accuracy is measured within static input range, within static load range, with time drift and within ambient temperature range.

Note 6 Reset is performed by reapplying input voltage.

Note7 Insulation conditions are specified at normal temperature and humidity.

Note B Up to rated output current at startup.

SWD Series 60W,100W,150W,240W

			Specifications and Standards
	Mo	del	240W
			SWD240P-24
	Rated Input Voltage		AC100V to AC240V
	Allowable Input Voltage Range Input Current (typ) Con Rated Frequency Allowable Frequency Range Power Factor (typ) Con		AC85 to 264V
JS			4.0A (V _{IN} = 100V)
ţi			50/60Hz
put			47 to 63Hz
ਿ ਜੋ			0.95 (V _{IN} = 100V)/0.90 (V _{IN} = 240V)
	Efficiency (80%
		rent (max) Note 2	20A (V _{IN} = 100V)/40A (V _{IN} = 240V)
	Leakage Cu	urrent (max) 🔤	0.75mA (V _{IN} = 240V)
	Rated Outp	ut Voltage	24V
Note 3	Output Volt	tage Variation	Fixed
	Rated Outp	out Current	10.0A
suo	Maximum F	Peak Current Notes	20.0 A (within 15 sec)
but diti	Allowable O	output Current Range	0 to 20.0A
Output Conditi	Rated Outp		240W
00		Itage Accuracy Note 5	±5%
	Ripple Nois	Se Note 1 Note 4	400mVp-p
	-	ding Time (min) 🔤	60msec
	Startup time	e (typ)	1000msec
	Overcurren	t Protection	Detection above 105% of maximum peak current (drooping automatic recovery)
Additional Functions		e Protection Note 6	Detection above 115% of rated voltage (output cutoff)
itio Stio	-	g Protection	Not provided
qq	Remote Ser	nsing	Not provided
⋖╙	Operations	Display	Not provided
		emperature Range	-10°C to +60°C
		nperature Range	
		Humidity Range	-25°C to +85°C 30 to 90%
		midity Range	30 to 90%
_		quirements	Natural air cooling
nta		No. of vibrations	10 to 55Hz
me		Sweep time	3 minutes
litic	Vibration	Acceleration rate	19.6m/s² (2G)
Environmental Conditions	Resistance	Vibration direction	X,Y,Z
ШO		Vibration time	One hour in each of three directions
			98m/s² (10G)
	Shock Resi	istance	Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more.
			Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 sides.
	Installation	Conditions	Derating may be required due to mounting direction (normal installation directions are vertical and horizontal: with mounting holes down)
-	Insulation	Between input and output	3000 V AC for 1 minute (leakage current: 15 mA or less)
Note 7		Between input and FG	2000 V AC for 1 minute (leakage current: 15 mA or less)
	Voltage	Between output and FG	500 V AC for 1 minute (leakage current: 15 mA or less)
Insulation	-	Between input and output	
nsı	Insulation Resistance	Between input and FG	100 M Ω (measured with 500 V DC Megger)
<u> </u>	Resistance	Between output and FG	
	External Ap	·	With chassis
~	Input Type		Terminal stand
External Structure/ Standards	Output Typ	e	Terminal stand
Luc	External Di		240 ^w x 110 ^D x 65 ^H mm
nl St rds	Weight		1200g
erna	Safety Stan	dards	UL60950, CSA No. 60950, and SEMKO (EN60950) certified, designated to meet Electrical Appliance and Material Control Law
Exte	Conducted		Designated to meet FCC Class B (120 V AC), EN55022 Class B (230 V AC) and VCCI Class B (100 V AC)
	Harmonic	Surront	Harmonic current: Designated to meet IEC61000-3-2
	Harmonic C	Juneni	Immunity: Designated to meet IEC61000-4-2, 5
	Remote ON	I/OFF Control	Provided
Options	Cover		Provided
			at an ambient temperature of 25°C.

Note: Specified under rated input/output conditions at an ambient temperature of 25°C.

More current above noted values may flow at restart. More Output characteristics are measured at a point 5 cm from the output connector, with a 63-V, 47-μF electrolytic capacitor and 0.1-μF film capacitor connected to that point. Not Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.

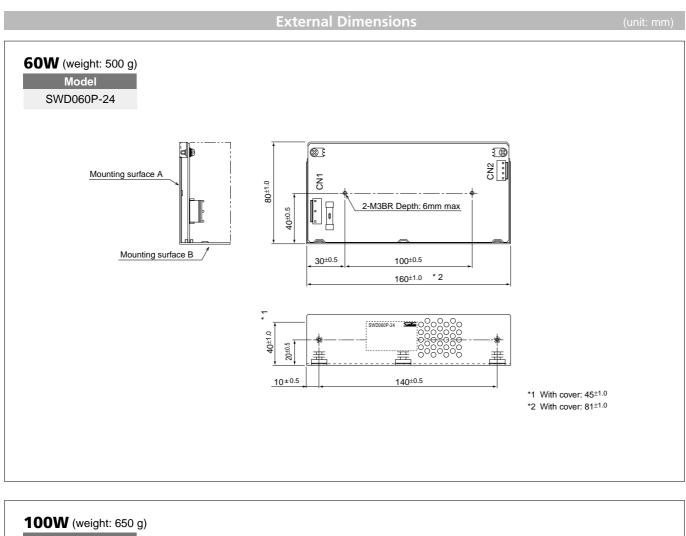
The constant voltage accuracy is measured within static input range, within static load range, with time drift and within ambient temperature range.

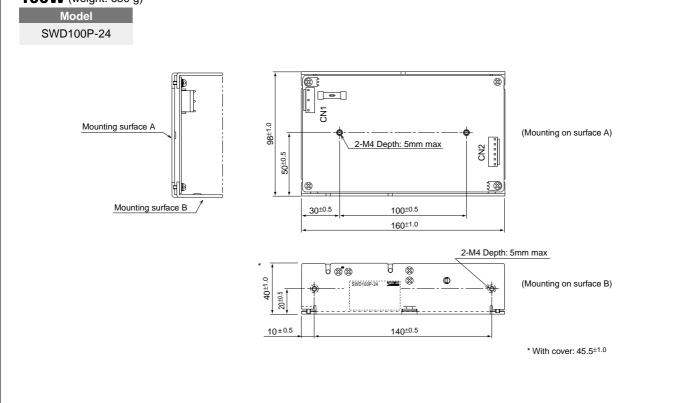
Note 6 Reset is performed by reapplying input voltage.

Note7 Insulation conditions are specified at normal temperature and humidity.

Note B Up to rated output current at startup.

SWD Series 60W,100W,150W,240W

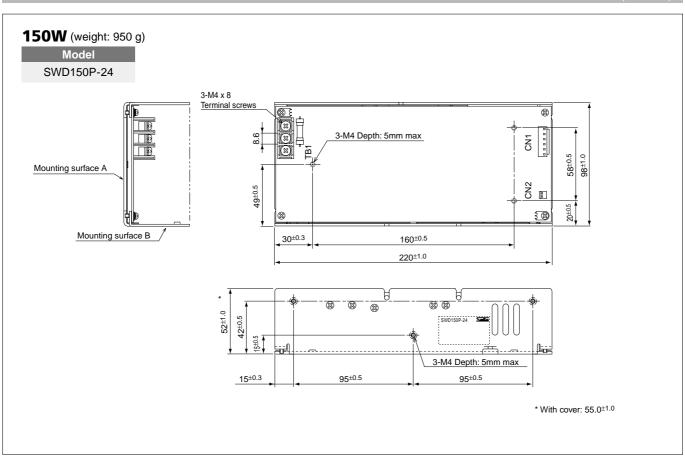


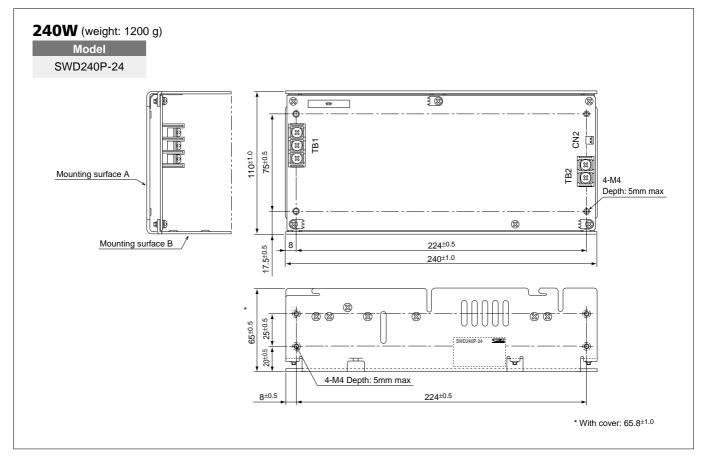


SWD Series 60W, 100W, 150W, 240W

External Dimensions

(unit: mm)







Operating Instruction

1

Terminal connection

Input/output connectors

SWD060P-24

Symbol	Pin No.	Connector	Corresponding connector	Corresponding contact	
	1: AC (LIVE)		VHR-5N (JST)		
	2: NC				
CN1	3: AC (NEUTRAL)	B3P5-VH (JST)		SVH-21T-P1.1 (JST)	
	4: NC	(001)			
	5: FG				
	1: +				
CN2	2: +	B4P-VH	VHR-4N (JST)	SVH-21T-P1.1 (JST)	
	3: -	(JST)			
	4: -				

SWD100P-24

Symbol	Pin No.	Connector	Corresponding connector	Corresponding contact
	1: AC (LIVE)			
	2: NC			
CN1	3: AC (NEUTRAL)	B3P5-VH (JST)	VHR-5N (JST)	SVH-21T-P1.1 (JST)
	4: NC	(001)	(001)	(001)
	5: FG			
	1: +			
	2: +		VHR-6N	SVH-21T-P1.1 (JST)
CN2	3: +	B6P-VH		
CIN2	4: -	(JST)	(JST)	
	5: -			
	6: -			

SWD150P-24

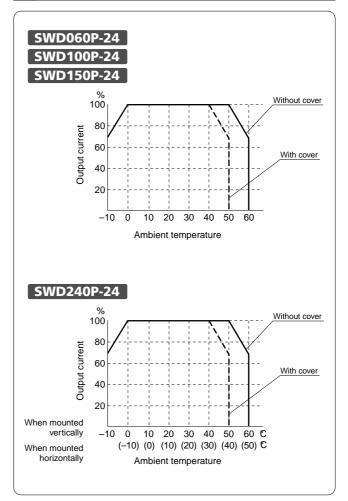
Symbol	Pin No.	Connector	Corresponding connector	Corresponding contact
	1: AC (LIVE)	M110D-3C	M4 terminals	
TB1	2: AC (NEUTRAL)	(Morimatsu)		
	3: FG	or equivalent		
	1: +			
	2: +	B6P-VH	VHR-6N (JST)	SVH-21T-P1.1 (JST)
CN1	3: +			
CINT	4: -	(JST)		
	5: -			
	6: -			
CN2	1: RC +	B2P-SHF-1AA	H2P-SHF-AA	SHF-001T-0.8SS (JST)
GNZ	2: RC -	(JST)	(JST)	
	CN2 is open on standard mode			

SWD060P-24

-					
Symbol	Pin No.	Connector	Corresponding connector	Corresponding contact	
	1: AC (LIVE)	M110D-3C			
TB1	2: AC (NEUTRAL)	(Morimatsu)	M4 terminals		
	3: FG	or equivalent			
TB2	1: +	M110D-2C			
1D2	2: -	(Morimatsu) or equivalent	IVI4 ter	minals	
CN2	1: RC +	B2P-SHF-1AA	H2P-SHF-AA	SHF-001T-0.8SS	
GNZ	2: RC -	(JST)	(JST)	(JST)	

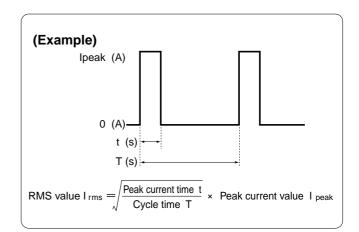
CN2 is open on standard model

2 Derating of output current



3 Dynamic load

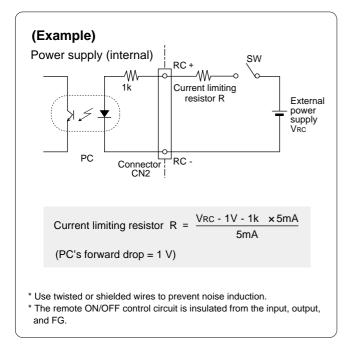
The peak current load occurs within 15 seconds. This series can also be used with dynamic (pulse) load. During dynamic operation, use the supply with the output current's RMS value equal to or less than the rated current.





4 Remote ON/OFF control (optional) SWD150P SWD240P

The SWD150P and SWD240P models enable remote ON/OFF control. However, this function requires the use of a DC power supply external to the SWD series power supply. Output goes ON when a voltage from 4.5 to 5.5 V (recommended current is 5 mA) is applied between the RC+ and RC- connectors (connector CN2's pins 1 and 2) for remote ON/OFF control. Output goes OFF when the voltage drops below 0.8 V or is discharged. If the external power supply's voltage is too high, insert a current limiting resistor.



Ultra-compact, long life, high reliability, harmonic current control, resonant-mode switching power supply



Single output With chassis and cover

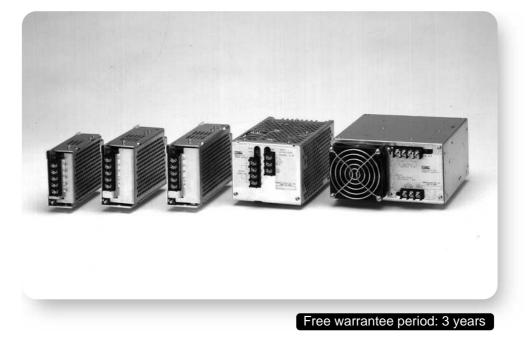


The HWA Series is an ultra-compact and reliable power supply with high efficiency, low noise and long life using proprietary Softswitching Multi-resonant Zero-cross (SMZ) type resonant-mode circuits; resonant-mode power IC and resonant-mode transformer.

Applications

Industrial equipment such as factory automation controllers, power/plant controllers and semiconductor manufacturing equipment

- World-wide input range (85 to 264 V AC)
- Long life and high reliability
- CE mark compatible
- Conforms to harmonic current regulations (EN61000-3-2)
- Conforms to EMI regulations (electrical field emissions, conducted emission EN5081-1, FCC Class B)
- Complies with immunity regulations (EN61000-4 related)
- Complies with Machinery Directive (VDE0160, UL508)
- Natural air cooling (50 W to 300 W models)
- Ultra-compact model (Up to 42% smaller than our existing products)
- Parallel operation Possible by adjusting overcurrent protection (OCP) setting knob (HWA300W, 600W)
- DIN rail



50W,100W,150W,300W,600W

			Specifications and	d Standards		
	Ma	del		50W		
			HWA050-05-C	HWA050-12-C	HWA050-24-C	
	Rated Input	t Voltage		AC100V to AC240V		
	Allowable I	nput Voltage Range	AC85 to 264V			
S	Input Curre	nt (typ) Note1	0.9A/0.45A			
ion	Rated Freq	-	50/60Hz			
Input Conditions		Frequency Range	47 to 63Hz			
Sor	Power Fact			0.95 (V _{IN} = 100V, Load = 100%)		
Ŭ	Efficiency (83%	84%	84%	
		ent (max) Note1		25A/50A (at 25°C cold start)		
	Leakage Cu	urrent (max) Note1		0.5mA/1.0mA		
	Rated Outp	ut Voltage	5V	12V	24V	
	Output Volt	age Variation		-5% to +10%		
su	Rated Outp		10A	4.2A	2.1A	
itio		utput Current Range		0 to 100%		
Output Conditions	Rated Outp		50W	50.4W	50.4W	
ဝိပိ	Ripple Nois		100mVp-p	240mVp-p	480mVp-p	
		ding Time (min)		20msec		
	Startup Tim	ne (max)		1000msec		
	Overcurren	t Protection Note2		Provided		
ial IS	<u>م</u> overvoltag	e Protection	Provided			
Additional Functions		g Protection	Not provided			
ddit	Remote ON	/OFF Control	Not provided			
Ъ,	Remote Ser	0	Not provided			
	Operations	Display	Green LED indicator			
	Operating Te	emperature Range	-10 to +55°C			
		nperature Range	-25 to +65°C			
	Operating H	lumidity Range	25 to 85%			
ital	Storage Hu	midity Range		25 to 85%		
Environmental Conditions	Cooling Re	quirements		Natural air cooling		
Environme Conditions		No. of vibrations		10 to 55Hz		
wir	Vibration	Sweep time		3 minutes		
ы	Resistance	Acceleration rate		Single-sided amplitude: 0.75 mm		
		Vibration direction	X, Y, Z			
	Installation	Vibration time Conditions		ght minutes in each of three direction		
	Installation	Conditions	Deraunų	g may be required due to mounting	allection	
	Insulation	Between input and output		3000 V AC for 1 minute		
on		Between input and FG		2200 V AC for 1 minute		
Insulation	Voltage	Between output and FG		1000 V AC for 1 minute		
nsu	Insulation	Between input and output				
_	Resistance			10 M Ω or above		
		Between output and FG				
_	External Ap	opearance		With chassis and cover		
ure	Input Type			Terminal stand		
External Structure/ Standards	Output Typ					
il St ds	External Di	mensions		40 ^W x 127 ^D x 85 ^H mm		
erna	Weight	danda 🖚		420g		
Exte	Safety Stan			08, CSA No. 950, VDE (EN60950), a		
	Conducted EMC	Emission	U	ated to meet FCC Class B and EN		
				o meet EN55022, EN61000-4 and		
Options		/OFF Control		Not provided		
	Cover			Provided as standard		

Note1 Regulated at rated input voltage (100/200 V AC), 100% load.

Detection above 105% (101 to 105% for 300W only) for overcurrent protection, and automatic recovery from drooping. For 600W type, output is shut off when overcurrent continues for more than 5 seconds.

CE Marking: The CE mark is indicated in accordance with certification to low voltage directive (EN60950) and EMC directive (EN55022, EN61000-4, EN61000-3-2).

102

50W, 100W, 150W, 300W, 600W

xternal Dimensions

50W (weight: 420g) Model HWA050-05-C HWA050-12-C jĞ 高速意 HOT SURFACE HWA050-24-C ٦ 0 8 8 117^{±0.35} DIN rail Without DIN rail 3.5 đ ø e e e +v −v ⊕ L-0-N 85^{±0.35} 72±0.35 16 HWA050-** POWER SUPPLY INPUT AC110-2 1 (46.2) 4 0 7±0.3 . 5^{±0.3} 1.6 3.5 7±0.3 20^{±1.0} Without DIN rail 127 With DIN rail 136.1^{±1.0} (Side view when the DIN rail is attached.) 3 - M3(Depth: 6mm max) 117^{±0.35} ±0.3 Note 1) 3.5 5 Without cover 39^{±0.5} الا With cover 40^{±0.5} റ്റ 16 28 24 Ð, Note 1) The height of a screw head for installation should be 4.5 mm max. 2) The screw head for connecting I/O pin is M4 x 8 (with square screw nut and spring washer) 3) The figures in parentheses show reference sizes. 5±0.3 (11.4) 1.6 100^{±0.35} 12.5

50W,100W,150W,300W,600W

	Specifications and Standards			
	100W	150W		
Model	HWA100-24-C	HWA150-24-C		
Rated Input Voltage	AC100V 1	o AC240V		
Allowable Input Voltage Ran	ge AC85	to 264V		
nput Current (typ) Note1	1.8A/0.9A	2.7A/1.4A		
Rated Frequency	50/0	60Hz		
Rated Frequency Allowable Frequency Range Power Factor (typ)		63Hz		
Power Factor (typ)		V, Load = 100%)		
Efficiency (typ) Mars		4%		
Inrush Current (max) Leakage Current (max) Interview		25°C cold start)		
	0.5/11/4	/1.0mA		
Rated Output Voltage	2	4V		
Output Voltage Variation		0 +10%		
Rated Output Current	4.2A	6.5A		
Allowable Output Current Ran	ge 0 to 100.8W	100% 156W		
Rated Output Current Allowable Output Current Ran Rated Output Power Ripple Noise		nVp-p		
Output Holding Time (min)		msec		
Startup Time (max)		msec		
· · · ·				
Overcurrent Protection \overline{m} <u>o</u> \overline{m} <u>o</u>		/ided		
Overheating Protection		Provided Not provided		
Remote ON/OFF Control	Not provided			
Overvoltage Protection Overheating Protection Remote ON/OFF Control Remote Sensing	Not provided			
Operations Display	Green LED indicator			
Operating Temperature Range	-10 to +55°C			
Storage Temperature Range	-25 to +65°C			
Operating Humidity Range	25 to 85%			
Storage Humidity Range	25 to	9 85%		
Storage Humidity Range Cooling Requirements No. of vibrations Sweep time Acceleration rate		air cooling		
Cooling Requirements No. of vibrations Sweep time Vibration Resistance		55Hz		
Vibration Sweep time		nutes		
Resistance Acceleration rate Vibration directi	enigie ciaca an	nplitude: 0.75 mm		
Vibration direct		Y, Z ch of three directions		
Installation Conditions		due to mounting direction		
Insulation Between input and out		for 1 minute		
		for 1 minute		
Withstand Between input and Voltage Between output and Insulation Between input and out Between input and out Between input and out		for 1 minute		
Between input and out				
Resistance Between input and	-G 10 MΩ 0	or above		
Between output and	FG			
External Appearance	With chass	is and cover		
Input Type	Termin	al stand		
Output Type		al stand		
External Dimensions	50 ^W x 145 ^D x 92 ^H mm	50 ^W x 163 ^D x 92 ^H mm		
Input Type Output Type External Dimensions Weight Safety Standards	600g	900g		
Safety Standards Conducted Emission		VDE (EN60950), and VDE0160 certified Class B and EN50081-1		
EMC		, EN61000-4 and EN61000-3-2		
Options Remote ON/OFF Control	•	rovided		
Cover	Provided a	as standard		

Note1 Regulated at rated input voltage (100/200 V AC), 100% load.

Detection above 105% (101 to 105% for 300W only) for overcurrent protection, and automatic recovery from drooping. For 600W type, output is shut off when overcurrent continues for more than 5 seconds.

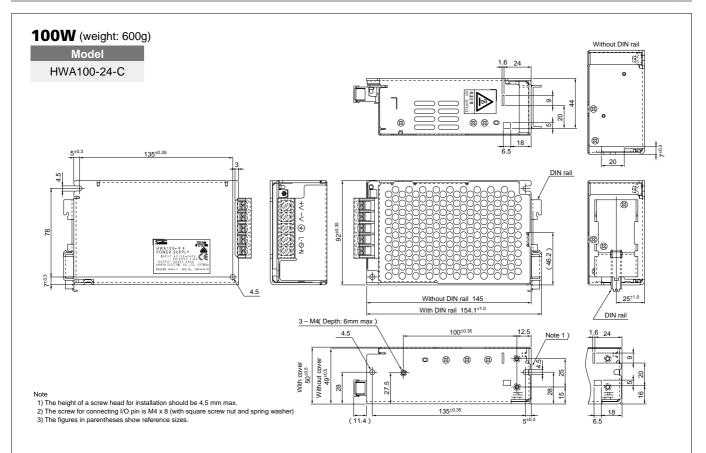
CE Marking: The CE mark is indicated in accordance with certification to low voltage directive (EN60950) and EMC directive (EN55022, EN61000-4, EN61000-3-2).

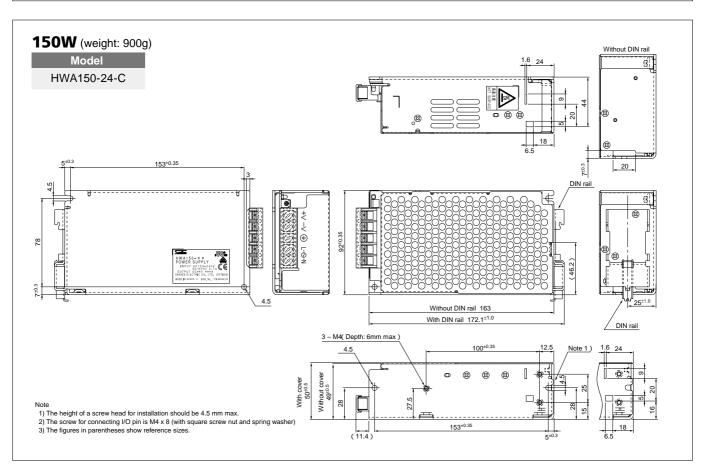
104

HWA Series 50W, 100W, 150W, 300W, 600W

External Dimensions

(unit: mm)





50W,100W,150W,300W,600W

_	_		Specifications and Standards		
	Мос		300W	600W	
	IN OC		HWA300-24-C	HWA600-24-C	
	Rated Input	Voltage	AC100V t	o AC240V	
	Allowable Input Voltage Range		AC85 t	to 264V	
w	Input Curren		5.4A/2.7A	10A/5A	
ion	Rated Frequ			60Hz	
Input Conditions		equency Range	1	63Hz	
lnp Cor	Power Facto			V, Load = 100%)	
	Efficiency (t		83%	83%	
		ent (max) Note1 rrent (max) Note1		5°C cold start) /1.0mA	
	-		0.5111A	71.0IIIA	
	Rated Outpu	-		4V	
		ige Variation		0 +10%	
ons	Rated Outpu		14A	27A	
put diti	Allowable Ou Rated Outpu	tput Current Range	0 to 1 336W	100% 648W	
Output Conditions	Ripple Noise			nVp-p	
00	<u> </u>	; ing Time (min)		nvp-p msec	
	Startup Time			msec	
=	Overcurrent Overvoltage			/ided /ided	
ons	Overvoltage		Not provided	Provided	
ditio	Remote ON/		Not provided Not provided		
Additional Functions	Remote Sen		Not provided		
	Operations I	0	Green LED indicator		
		nperature Range	-10 to	+55°C	
		perature Range	-10 to +55°C -25 to +65°C		
	-	umidity Range	25 to 85%		
ta	Storage Hun		25 tc	9 85%	
Environmental Conditions	Cooling Req		Natural a	air cooling	
itioi		No. of vibrations	10 to	55Hz	
Environmeı Conditions	Vibration –	Sweep time		nutes	
မ် မိ	Resistance	Acceleration rate		nplitude: 0.75 mm	
	-	Vibration direction		Y, Z	
	Installation (Vibration time	0	ch of three directions	
	installation	Solutions	Derating may be required	due to mounting direction	
		Between input and output		for 1 minute	
ion	L b	Between input and FG		for 1 minute	
Insulation		Between output and FG	1000 V AC	for 1 minute	
ารน	Insulation	Between input and output Between input and FG	40.140	ar above	
		Between output and FG	10 M22 C	or above	
		•			
e/	External App	bearance		is and cover	
ctur	Input Type Output Type			al standal standal stand	
External Structure/ Standards	External Din		110 ^W x 175 ^D x 92 ^H mm	170 ^W x 179 ^D x 92 ^H mm	
ards	Weight		2200g	3500g	
terr and	Safety Stand	lards Note3	UL1950, UL1012, UL508, CSA No. 950,	5	
щų	Conducted I			Class B and EN50081-1	
	EMC		Designated to meet EN55022,	EN61000-4 and EN61000-3-2	
	Pomoto ON/	OFF Control	Not or	ovided	
Options					

Note1 Regulated at rated input voltage (100/200 V AC), 100% load.

Detection above 105% (101 to 105% for 300W only) for overcurrent protection, and automatic recovery from drooping. For 600W type, output is shut off when overcurrent continues for more than 5 seconds.

CE Marking: The CE mark is indicated in accordance with certification to low voltage directive (EN60950) and EMC directive (EN55022, EN61000-4, EN61000-3-2).

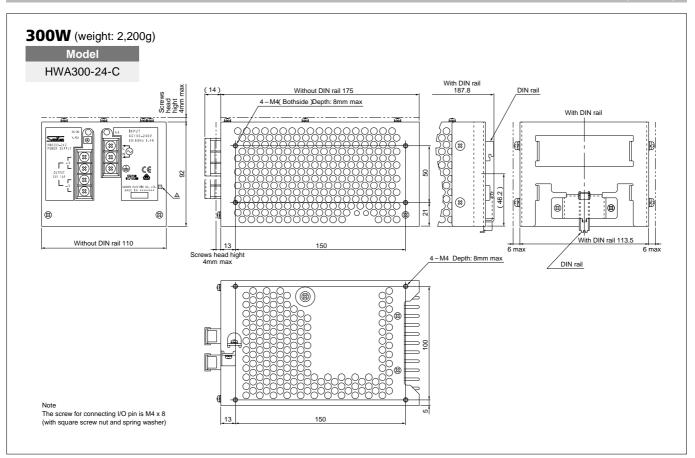
106

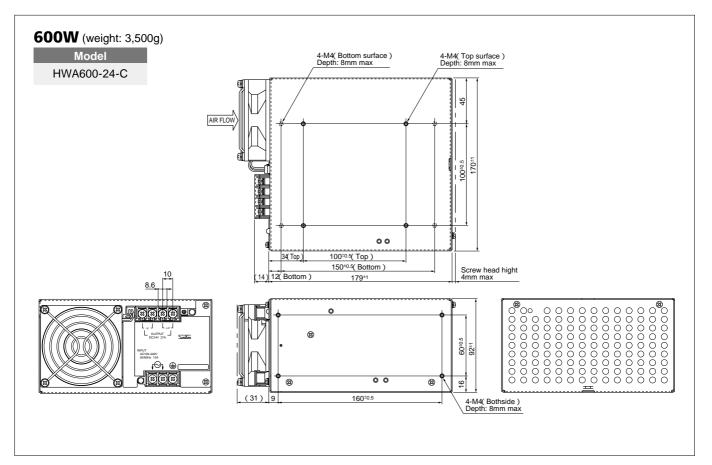
HWA Series

50W, 100W, 150W, 300W, 600W

External Dimensions

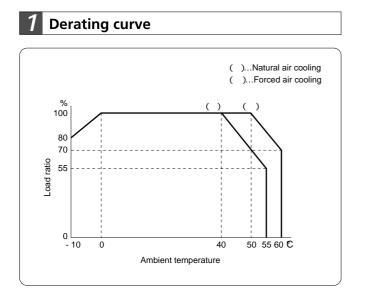
(unit: mm)







Operating Instruction



2 Parallel operation

Parallel operation can be performed only with the HWA300W and 600W models. Please contact Sanken if you intend to perform parallel operation. Sanken provides this product as optional. During parallel operation, each unit must be operated within 90% of rated current.

Employs proprietary SMZ type resonant-mode circuits. Realizes compact, low price, ultra-low noise like dropper power supply.



Single 15W 30W 60W Single output

(output voltages: each 5 V,

Double output (output voltage: Å}15 V)

12 V (30 W or 60 W), 15 V, 24 V (60 W))





The HWB Series uses proprietary Softswitched Multiresonant Zerocross (SMZ) type resonant-mode circuits to achieve large noise reduction of the inverter unit. Moreover, this is a switching power supply which has realized ultra-low noise (ripple voltage, conducted emission, noise electric field strength) like dropper power supply, employing a proprietary resonant-mode

Applications

hybrid IC and transformer.

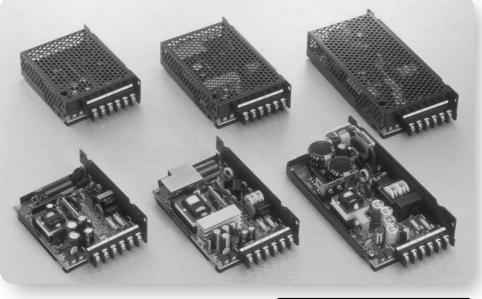
Measuring instruments, semiconductor manufacturing equipment, controllers, medical equipment, etc.

Equipment that uses a dropper power supply (series regulator)

Options

- C: Cover
- R: Output remote ON/OFF control (external voltage control)
- M: Supports medical equipment ... Low leakage current: 50 μA or less (standard: 0.25 mA or less)

- Low ripple noise
 - 5 mV (p-p) or less * With a 100-MHz oscilloscope. Spike element excluded.
- Low conducted emission Approx. 20 dB margin for VCCI Class B, FCC Class B, and CISPR Class B standards
- Low noise electric field strength Complies with VCCI Class B, FCC Class B, and CISPR Class B standards
- World-wide input range 85 to 264 V AC continuous input or 85 to 132 V AC and 170 to 264 V AC automatic switching (HWB060S)
- **Compact, lightweight, low price** Volume and weight are approx. 1/4 of dropper type. Price is approx. 1/2.
- CE marking compatible Acquired CE mark for LVD
- Safety standards Acquired UL1950, CSA950, and EN60950 Acquired EN60601-1 and UL2601-1 (HWB030S) (Type with M option: supports medical equipment)
- Parallel operation Possible by adjusting overcurrent protection (OCP) setting knob (HWB060S)



Free warrantee period: 3 years

[Single output] 15W, 30W, 60W [Double output] 15W, 30W

			Specifications and Standar	ds	
	Model		15W [s	ingle output]	
	IVIC		HWB015S-05	HWB015S-15	
	Rated Input Voltage		AC10	DV to AC240V	
		nput Voltage Range	AC	85 to 264V	
put nditions	Input Current (typ) Notes		0.4A	0.5A	
diti		uency Frequency Range		50/60Hz 7 to 440Hz	
lnp Con	Efficiency (70%	75%	
		rent (max) Note2		(240VAC)max (at cold start)	
	Leakage Cu	urrent (max) 🔤	0.25mA (max)	Option M : 50µA (max)	
	Rated Outp	out Voltage	5V	15V	
		tage Variation	Rated outpu	t voltage +10%, -5%	
Note 3	Rated Outp		3.0A	1.3A	
S		tput Current Range		to 100%	
Ęţ	Rated Outp		15W	19.5W	
Output Conditions	Ripple 1004	Itage Accuracy Note 5 Note 6		±3% 5mVp-p	
ōŭ	Ripple Nois		1	0mVp-p	
		ding Time (min) 🔤	20 ms at ra	ted output of 15 W	
	Startup tim	e (typ) Note 1		1sec	
	Overcurren	t Protection	Detection above approx. 105% of r	ated current (drooping automatic recovery)	
= 0	Overvoltag	e Protection Note 9		of rated voltage (output cutoff)	
ona	Overheatin	g Protection	No	ot provided	
Additional Functions	Remote ON/OFF Control		Optional support (OFF at RC terminal open, ON when applying external voltage of 4.5 to 30 V between RC terminal and -V terminal)		
	Remote Sensing		Not provided		
	Operations Display		Green LED indicator		
	Operating Temperature Range Note 7		-10°	°C to +60°C	
	Storage Temperature Range			°C to +85°C	
	Operating Humidity Range		30 to 90% (no condensation) 30 to 90% (no condensation)		
	Storage Humidity Range Cooling Requirements		Natural air cooling		
Environmental Conditions		No. of vibrations	10 to 55Hz		
ime	Vibration	Sweep time	3	3 minutes	
iron diti	Resistance		19	9.6m/s² (2G)	
		Vibration direction		X, Y, Z	
		Vibration time		ach of three directions	
	Shock Resistance		98m/s ² (10G) Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more.		
			Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 sides.		
	Installation	Conditions	Derating may be required due to mounting direction		
e	Insulation	Between input and output	3000 V AC for 1 minute or 3600 V AC for 1 second (lea	akage current: 15 mA or less) Option M: 4000 V AC for 1 minute	
	Withstand	Between input and FG	1500 V AC for 1 minute or 1800 V AC	for 1 second (leakage current: 15 mA or less)	
Insulation	Voltage	Between output and FG	500 V AC for 1 minute or 600 V AC f	or 1 second (leakage current: 15 mA or less)	
sula	Insulation	Between input and output	100 MO (
lns	Resistance	Between input and FG Between output and FG	100 M22 (measure	d with 500 V DC Megger)	
	Extornal	• •	1	ith choosis	
/e/	External Ap	opearance		ith chassis minal stand	
rctu	Output Typ	e		minal stand	
stri	External Di		34 ^W x 110 ^D x 92 ^H mm (Excluding parts	for installing input terminal stand and chassis)	
External Structure/ Standards	Weight			350g	
Exte	Safety Star			Electrical Appliance and Material Control Law TÜV (EN60601) certified with option M	
	Conducted			ISPR Class B (230 V AC) and VCCI Class B (100 V AC)	
Options		I/OFF Control		Provided	
	Cover			Provided	
Note 2 More Note 3 Outp meas Note 4 Rippl	e current above no ut characteristics sured at the end o le and ripple nois	oted values may flow at resta such as ripple, ripple noise of output connector. e are measured with a 100-N	art (power thermistor used). current at -10 and constant voltage accuracy are described in the Notes Frequency com VHz oscilloscope using a 1:1 probe. are -55 dB or le	rature of 0 to 50°C is specified by rated load conditions. The load to 0°C and 50 to 60°C is specified by temperature derating curve attachment. ponent of 100 Hz to 1 kHz and ripple component of 100-Hz interval ss in total (ambient temperature of 25°C). ned by reapplying input voltage.	

Notes Reset is performed by reapplying input voltage.

and batch output is 4000 V AC for 1 minute.

Note 11 Prepare a separate power supply for remote ON/OFF control signal.

equipment-support model (option), insulation withstand voltage between batch input

Ripple and ripple noise are measured with a 100-MHz oscilloscope using a 1:1 probe. Output voltage can be changed within the maximum output power and rated output current. The constant voltage accuracy is measured with a static input range of 85 to 264 V AC, a static load range of 0 to 100%, a time drift of 10 minutes to eight hours and an ambient temporature range of -10 to 60°C. However, the load current at -10 to 6°C

ambient temperature range of -10 to 60° C. However, the load current at -10 to 0° C and 50 to 60° C is specified by temperature derating curve described in the attachment. **110**

[Single output] 15W, 30W, 60W [Double output] 15W, 30W

				d Standards	
	Мо	del		30W [Single output]	
			HWB030S-05	HWB030S-12	HWB030S-15
	Rated Input Voltage			AC100V to AC240V	
	Allowable Input Voltage Range			AC85 to 264V	
suo	Input Curre		0.7A	0.8A	0.9A
di ti	Rated Freq	uency Frequency Range		50/60Hz	
Input Conditions	Efficiency (75%	47 to 440Hz 77%	80%
		rent (max) Note2		100VAC)/60A (240VAC)max (at cold	
		urrent (max) Note1		0.25mA (max) Option M : 50μA (max	•
	Rated Outp	ut Voltage	5V	12V	15V
		tage Variation		Rated output voltage +10%, -5%	101
Note 3	Rated Outp	out Current	6.0A	3.0A	2.6A
		tput Current Range		0 to 100%	
ıt tions	Rated Outp		30W	36W	39W
Outpu Condit	Constant Vo			±3%	
ဝီ ပိ	Ripple Nois			5mVp-p 10mVp-p	
		ding Time (min)		20 ms at rated output of 30 W	
	Startup tim			1sec	
	Overcurren	t Protection	Detection above apr	prox. 105% of rated current (drooping	automatic recovery)
		e Protection Note 9		n above 115% of rated voltage (outp	
ons ons	Overheatin	g Protection		Not provided	,
Additional Functions	Remote ON/OFF Control		Optional support		
			(OFF at RC terminal open, ON when applying external voltage of 4.5 to 30 V between RC terminal and -V terminal)		
	Remote Sensing		Not provided		
	Operations Display		Green LED indicator		
	Operating Temperature Range Note?		-10°C to +60°C		
	Storage Temperature Range		-25°C to +85°C		
	Operating Humidity Range Storage Humidity Range		30 to 90% (no condensation) 30 to 90% (no condensation)		
	Cooling Requirements		Natural air cooling		
nta		No. of vibrations	10 to 55Hz		
ons	Vibration	Sweep time		3 minutes	
Environmental Conditions	Resistance	Acceleration rate		19.6m/s² (2G)	
		Vibration direction		X, Y, Z	
		Vibration time		One hour in each of three directions $O^{2}(100)$;
	Shock Resi	istance	98m/s ² (10G) Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more.		
			Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 sides.		
	Installation	Conditions	Derating may be required due to mounting direction		
6	Insulation	Between input and output	3000 V AC for 1 minute or 3600 V AC	C for 1 second (leakage current: 15 mA or lea	ss) Option M: 4000 V AC for 1 minut
Note 10	Withstand		1500 V AC for 1 minute	or 1800 V AC for 1 second (leakage	e current: 15 mA or less)
tion	Voltage	Between output and FG	500 V AC for 1 minute	or 600 V AC for 1 second (leakage	current: 15 mA or less)
Insulation	Insulation	Between input and output			
lus	Resistance	Between input and FG Between output and FG	100	$M\Omega$ (measured with 500 V DC Meg	ger)
_		•			
re/	External Ap	opearance		With chassis	
rctu	Output Type	e		Terminal stand Terminal stand	
str ds	External Di		34 ^w x 136 ^D x 92 ^H mm (E	xcluding parts for installing input terr	minal stand and chassis)
smal Idard	Weight			380g	,
External Structure/ Standards	Safety Star			ed, designated to meet Electrical Appliance and Material C	
	Conducted	Emission	Designated to meet FCC Class I	3 (120 V AC), CISPR Class B (230 V A	C) and VCCI Class B (100 V AC
ptions	Remote ON	I/OFF Control		Provided	
prioris	Cover			Provided	
e 2 More	current above no	oted values may flow at resta		Ambient temperature of 0 to 50°C is spec current at -10 to 0°C and 50 to 60°C is described in the attachment.	

Source S Output voltage can be changed within the maximum output power and rated output current.
The constant voltage accuracy is measured with a static input range of 85 to 264 V AC, a static load range of 0 to 100%, a time drift of 10 minutes to eight hours and an ambient temperature range of -10 to 60°C. However, the load current at -10 to 0°C and 50 to 60°C is specified by temperature derating curve described in the attachment.

Reset is performed by reapplying input voltage.
 Insulation conditions are specified at normal temperature and humidity. For medical equipment-support model (option), insulation withstand voltage between batch input and batch output is 4000 V AC for 1 minute.

Note 11 Prepare a separate power supply for remote ON/OFF control signal.

[Single output] 15W, 30W, 60W [Double output] 15W, 30W

			Specificatio	ns and Standards			
	84.0			60W [Sin	gle output]		
	MIC	odel	HWB060S-05	HWB060S-12	HWB060S-15	HWB060S-24	
	Rated Inpu	t Voltage		100 to 120/200 to 240 \	/ AC, automatic switching		
	Allowable Input Voltage Range				AC, automatic switching		
su	Input Curre	ent (typ) Note1	1.2A/0.7A	1.5A/0.9A	1.8A/1.0A	2.0A/1.0A	
itio	Rated Frequency Allowable Frequency Range Efficiency (typ) (2010) Inrush Current (max) (2010)			50/	60Hz		
Input Conditions					440Hz		
ن = ت			75%	80%	85%	85%	
					OVAC)max (at cold start)		
	Leakage Current (max)			0.25mA (max) Op	otion M : 50μA (max)		
	Rated Outp	out Voltage	5V	12V	15V	24V	
		tage Variation		1	oltage +10%, -5%		
Note 3	Rated Outp		10.0A	5.2A	5.2A	3.5A	
I SI		Itput Current Range			100%		
tior	Rated Outp		50W	62W	78W	84W	
Output Conditions		Itage Accuracy Note 5 Note 6			3%		
ပိုင်	Ripple Nois				יVp-p יVp-p		
		ding Time (min)	20	ms		NS Note 11	
	Startup tim		20		sec		
		t Protection			d current (drooping autor	37	
ial IS		e Protection Mass	L		rated voltage (output cuto rovided	אדר (אדר איז	
Additional Functions		-		•	Il support		
adit	Remote ON	I/OFF Control Note 12	(OFF at RC terminal open.			RC terminal and -V terminal)	
ĂЧ	Remote Sensing		(OFF at RC terminal open, ON when applying external voltage of 4.5 to 30 V between RC terminal and -V terminal) Not provided				
	Operations		Green LED indicator				
			-10°C to +60°C				
	Operating Temperature Range Storage Temperature Range		-25°C to +85°C				
	Operating Humidity Range				o condensation)		
		midity Range	30 to 90% (no condensation)				
_	Cooling Re	quirements	Natural air cooling				
Environmental Conditions		No. of vibrations	10 to 55Hz				
ы С	Vibration	Sweep time		3 m	inutes		
diti	Resistance	Acceleration rate			n/s² (2G)		
Son		Vibration direction			Y, Z		
	L	Vibration time			of three directions		
	Shock Resi	istance	Conduct this to		's² (10G) t surface and a thickness of 1	0 mm or more	
	Shock Kes	Istance	Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more. Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 sides.				
	Installation	Conditions	Derating may be required due to mounting direction				
Note 10	Insulation Withstand	Between input and output Between input and FG			ge current: 15 mA or less) Option 1 second (leakage current		
	Voltage	Between output and FG			I second (leakage current		
nsulation		Between input and output					
Ins	Insulation	Botwoon input and EG		100 M Ω (measured v	vith 500 V DC Megger)		
5	Resistance	Between output and FG					
	External Ap	opearance		\\/ith	chassis		
/e/	Input Type	spearance			nal stand		
lctu	Output Typ	e			nal stand		
External Structure/ Standards	External Di		38 [₩] x 170 ^D x 92 ⁺	mm (Excluding parts for	installing input terminal s	tand and chassis)	
'nal Jaro	Weight				50g		
ixter tand	Safety Star				trical Appliance and Material Control Law		
SШ	Conducted Emission Designated to meet FCC Class B (120 V AC), CISPR Class B (230 V AC) and VCCI Class B (10				VCCI Class B (100 V AC)		
Ontione	Remote ON	I/OFF Control		Pro	vided		
Options	Cover			Pro	vided		
Note 2 More Note 3 Outpu meas Note 4 Rippl	current above no ut characteristics sured at the end o le and ripple noise	oted values may flow at resta such as ripple, ripple noise of output connector. e are measured with a 100-M	ambient temperature of 25°C. ant (power thermistor used). and constant voltage accuracy MHz oscilloscope using a 1:1 pro- utput power and rated output curre	to 0°C and 50 to 60°C are Note: Frequency compon are -55 dB or less in be. Note: Reset is performed	t is specified by temperature derating ent of 100 Hz to 1 kHz and ripp total (ambient temperature of 2 by reapplying input voltage.	d conditions. The load current at -10 g curve described in the attachment. sle component of 100-Hz interva 5°C). rature and humidity. For medica	

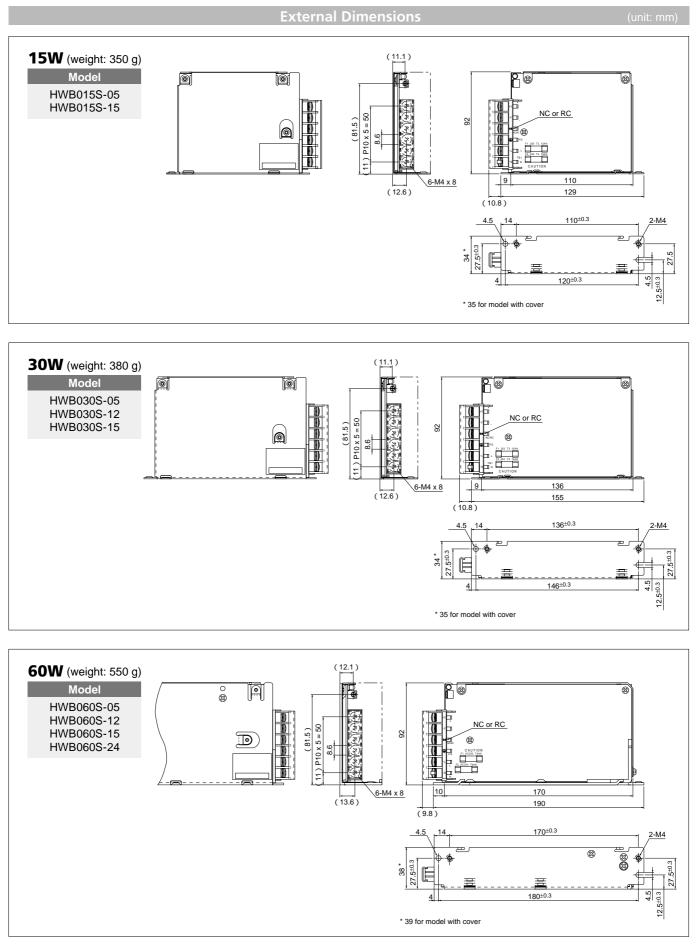
Note 6 The constant voltage accuracy is measured with a static input range of 85 to 264 V AC, a static load range of 0 to 100%, a time drift of 10 minutes to eight hours and an ambient temperature range of -10 to 60°C. However, the load current at -10 to 0°C and 50 to 60°C is specified by temperature derating curve described in the attachment.

and batch output is 4000 V AC for 1 minute. Note 11 Specified at a rated power of 60 W for HWB060S-15 and HWB060S-24.

equipment-support model (option), insulation withstand voltage between batch input

Note 12 Prepare a separate power supply for remote ON/OFF control signal.

[Single output] 15W, 30W, 60W [Double output] 15W, 30W



[Single output] 15W, 30W, 60W [Double output] 15W, 30W

			Specifications and Standards	
	Ma	طما	15W [Double output]	
	Model		HWB015D-15	
	Rated Input	t Voltago	100 to 240 V AC, continuous input	
		nput Voltage Range	85 to 264 V AC, continuous input	
S	Input Current (typ) Imp Rated Frequency Allowable Frequency Range Efficiency (typ) Imp Inrush Current (max) Imp Leakage Current (max) Imp		0.5A	
tior			50/60Hz	
put			47 to 440Hz	
မ ဂ္ဂ			75%	
			30A (100VAC)/60A (240VAC)max (at cold start)	
			0.25mA (max) Option M: 50µA (max)	
	Rated Output Voltage		±15V	
_	-	age Variation	Rated output voltage +10%, -5% (Double output model: Interlocked (voltage variation)	
Note 3	Rated Outp		0.65A	
su	Rated Outp	tput Current Range	0 to 100% 19.5W	
itio Itio		ge Accuracy Note 5 Note 6 Note 12	±5%	
Output Conditions	Ripple Noted	• •	5mVp-p	
° ou	Ripple Nois		10mVp-p	
		ding Time (min) 🔤	20 ms at rated output of 15 W	
	Startup time	e (typ) Note 1	1sec	
	Overcurren	t Protection	Detection above approx. 105% of rated current (drooping automatic recovery)	
is a		e Protection Note 9	Detection above 115% of rated voltage (output cutoff)	
tion	Overheating	g Protection		
Additional Functions	Remote ON/OFF Control		Optional support (OFF at RC terminal open, ON when applying external voltage of 4.5 to 30 V between RC terminal and -V terminal)	
⋖╙	Remote Sensing		Not provided	
	Operations Display		Green LED indicator	
	Operating Te	emperature Range Marz	-10°C to +60°C	
	Operating Temperature Range		-25°C to +85°C	
		lumidity Range	30 to 90% (no condensation)	
	Storage Humidity Range		30 to 90% (no condensation)	
ਯ	Cooling Requirements		Natural air cooling	
is is	No. of vibrations		10 to 55Hz	
tior	vibration	Sweep time Acceleration rate	3 minutes 19.6m/s² (2G)	
Environmental Conditions	Resistance	Vibration direction	X, Y, Z	
ыç		Vibration time	One hour in each of three directions	
	Shock Resistance		98m/s² (10G) Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more. Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 sides.	
	Installation	Conditions	Derating may be required due to mounting direction	
Note 10	Insulation Withstand	Between input and output Between input and FG	3000 V AC for 1 minute or 3600 V AC for 1 second (leakage current: 15 mA or less) Option M: 4000 V AC for 1 minute 1500 V AC for 1 minute or 1800 V AC for 1 second (leakage current: 15 mA or less)	
	Voltage	Between output and FG	500 V AC for 1 minute or 600 V AC for 1 second (leakage current: 15 mA or less)	
ulati	Insulation	Between input and output		
Insulation	Resistance	Between input and FG	100 M Ω (measured with 500 V DC Megger)	
		Between output and FG		
<	External Ap	pearance	With chassis	
ture	Input Type		Terminal stand	
truc	Output Typ		Terminal stand 34 ^w x 110 ^D x 92 ^H mm (Excluding parts for installing input terminal stand and chassis)	
External Structure/ Standards	External Di Weight	mensions	34 ¹¹ X 110 ² X 92 ¹¹ mm (Excluding parts for installing input terminal stand and chassis) 350g	
tern anda	Safety Stan	dards	UL1950, CSA No. 950, and TÜV (EN60950) certified, designated to meet Electrical Appliance and Material Control Law TÜV (EN60601) certified with option M	
ų v	Conducted Emission		Designated to meet FCC Class B (120 V AC), CISPR Class B (230 V AC) and VCCI Class B (100 V AC)	
0	Remote ON	/OFF Control	Provided	
Options	Cover		Provided	
ote 2 More ote 3 Outpu meas ote 4 Ripple ote 5 Outpu	current above no ut characteristics sured at the end o e and ripple noise ut voltage can be o	oted values may flow at resta such as ripple, ripple noise of output connector. e are measured with a 100-M hanged within the maximum c	ambient temperature of 25°C. temperature of 0 to 50°C is specified by rated load conditions. The load current at -10 to 0°C and 50 to 60°C is specified by temperature derating curve described in the attachment. and constant voltage accuracy are MLz oscilloscope using a 1:1 probe. The load current at -10 to 0°C is specified by temperature derating curve described in the attachment. uptut power and rated output current. The load current at performed by rated load conditions. The load current at are -55 dB or less in total (ambient temperature of 25°C). tastic input range of 85 to 264 V AC, The load current at performed by rated load conditions. The load current at no 0°C and 50 to 60°C is specified by temperature derating curve described in the attachment.	

Cores Output voltage can be changed within the maximum output power and rated output current.
Cores The constant voltage accuracy is measured with a static input range of 85 to 264 V AC, a static load range of 0 to 100%, a time drift of 10 minutes to eight hours and an ambient temperature range of -10 to 60°C. However, the load current at -10 to 0°C and 50 to 60°C is specified by temperature derating curve described in the attachment.

and batch output is 4000 V AC for 1 minute.

Cross-regulation has an accuracy of $\pm 7\%$ under the condition where load current of one side is less than 10%.

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[Single output] 15W, 30W, 60W [Double output] 15W, 30W

Specifications and Standards

			Specifications and Standards	
	Мо	del	30W [Double output]	
	Rated Input Voltage		HWB030D-15	
	Rated Input	t Voltage	100 to 240 V AC, continuous input	
	Allowable Input Voltage Range		85 to 264 V AC, continuous input	
ns	Input Current (typ) Notes		0.9A	
Input Conditions	Rated Frequency		50/60Hz	
pud		Frequency Range	47 to 440Hz	
్ చ	Efficiency (typ)		80%	
		rent (max) Note 2	30A (100VAC)/60A (240VAC)max (at cold start)	
	Leakage Current (max)		0.25mA (max) Option M: 50µA (max)	
	Rated Output Voltage		±15V	
	Output Volt	tage Variation	Rated output voltage +10%, -5% (Double output model: Interlocked (voltage variation)	
Note 3	Rated Outp		1.3A	
S		tput Current Range	0 to 100%	
ion	Rated Outp		39W	
ndii		Ige Accuracy Note 5 Note 6 Note 12	±5%	
Output Conditions			5mVp-p	
	Ripple Nois	se Note4 Note7 ding Time (min) Note1	10mVp-p 20 ms at rated output of 30 W	
	Startup tim		20 ms at rated output of 30 W 1sec	
		t Protection	Detection above approx. 105% of rated current (drooping automatic recovery)	
s al		e Protection Notes	Detection above 115% of rated voltage (output cutoff)	
Additional Functions	Overheating Protection			
lditi nct	Remote ON/OFF Control Man		Optional support (OFF at RC terminal open, ON when applying external voltage of 4.5 to 30 V between RC terminal and -V terminal)	
Fu	Remote Sensing		Not provided	
	Operations		Green LED indicator	
	Operating Temperature Range		-10°C to +60°C	
	Storage Temperature Range		-25°C to +85°C	
	Operating Humidity Range Storage Humidity Range		30 to 90% (no condensation) 30 to 90% (no condensation)	
	Cooling Re		Natural air cooling	
Environmental Conditions		No. of vibrations	10 to 55Hz	
ner		Sweep time	3 minutes	
itio	Vibration	Accoloration rate	19.6m/s² (2G)	
ond N	Resistance	Vibration direction	X,Y,Z	
шŏ		Vibration time	One hour in each of three directions	
			98m/s² (10G)	
	Shock Resi	istance	Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more.	
			Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 sides.	
	Installation	Conditions	Derating may be required due to mounting direction	
8	Insulation	Between input and output	3000 V AC for 1 minute or 3600 V AC for 1 second (leakage current: 15 mA or less) Option M: 4000 V AC for 1 minute	
Note 10	Withstand	Between input and FG	1500 V AC for 1 minute or 1800 V AC for 1 second (leakage current: 15 mA or less)	
Insulation	Voltage	Between output and FG	500 V AC for 1 minute or 600 V AC for 1 second (leakage current: 15 mA or less)	
nlat	Insulation	Between input and output		
usi	Resistance		100 M Ω (measured with 500 V DC Megger)	
		Between output and FG		
	External Ap	opearance	With chassis	
External Structure/ Standards	Input Type		Terminal stand	
uct	Output Typ		Terminal stand	
ds l	External Di	mensions	34 ^W x 136 ^D x 92 ^H mm (Excluding parts for installing input terminal stand and chassis)	
erna Idar	Weight			
Exte	Safety Stan		UL1950, CSA No. 950, and TÜV (EN60950) certified, designated to meet Electrical Appliance and Material Control Law TÜV (EN60601) certified with option M	
	Conducted	Emission	Designated to meet FCC Class B (120 V AC), CISPR Class B (230 V AC) and VCCI Class B (100 V AC)	
Options	Remote ON	I/OFF Control	Provided	
options	Cover		Provided	
		input/output conditions at ar oted values may flow at resta	ambient temperature of 25°C. Ambient temperature of 0 to 50°C is specified by rated load conditions. The load current at -10 to 0°C and 50 to 60°C is specified by temperature derating curve described in the attachment.	

Note3 Output characteristics such as ripple, ripple noise and constant voltage accuracy are measured at the end of output connector.

Noted Ripple and ripple noise are measured with a 100-MHz oscilloscope using a 1:1 probe. Notes Output voltage can be changed within the maximum output power and rated output current.

Note: The constant voltage accuracy is measured with a static input range of 85 to 264 V AC, a static load range of 0 to 100%, a time drift of 10 minutes to eight hours and an ambient temperature range of -10 to 60°C. However, the load current at -10 to 0°C and 50 to 60°C is specified by temperature derating curve described in the attachment.

NoteB Frequency component of 100 Hz to 1 kHz and ripple component of 100-Hz interval are -55 dB or less in total (ambient temperature of 25°C).

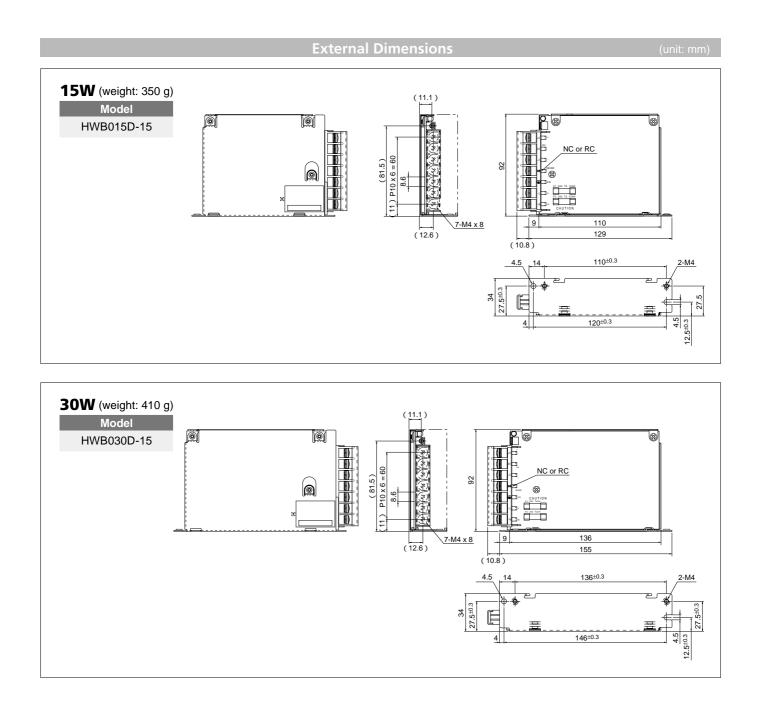
Note 9 Reset is performed by reapplying input voltage.

Insulation conditions are specified at normal temperature and humidity. For medical equipment-support model (option), insulation withstand voltage between batch input and batch output is 4000 V AC for 1 minute.

Note 11 Prepare a separate power supply for remote ON/OFF control signal.

Note12 Cross-regulation has an accuracy of $\pm 7\%$ under the condition where load current of one side is less than 10% 115

[Single output] 15W, 30W, 60W [Double output] 15W, 30W

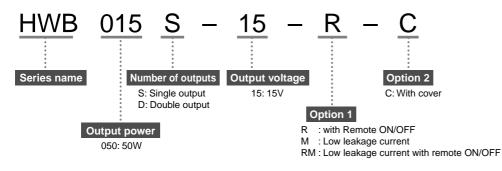


[Single output] 15W, 30W, 60W [Double output] 15W, 30W

Option

Symbol at end of product name	R: Remote ON/OFF	M: Medical equipment-support, low leakage current	C: With cover
None	-	-	-
-C	-	-	
-R		-	-
-R-C		-	
-M	-		-
-M-C	-		
-RM			-
-RM-C			

Example of model name



[Single output] 15W, 30W, 60W [Double output] 15W, 30W

Operating Instruction

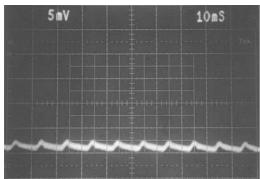
Terminal connection

Symbol		Pin No.		
Syn		Single output	Double output	
		1: AC (NEUTRAL)	1: AC (NEUTRAL)	
	TB1	2: AC	2: AC	
		3: FG	3: FG	
Terminal stand		4: NC (R: option)	4: NC (R: option)	
		5: - V	5: - V	
		6: +V	6: 0 V	
			7: +V	



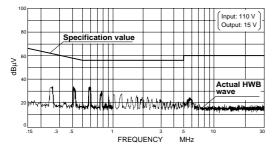
Noise characteristics HWB060S-15C

Output ripple noise data

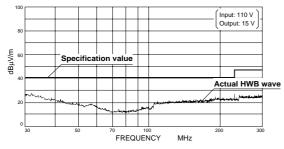


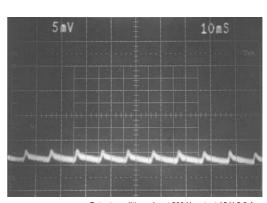
Output conditions: Input 100 V, output 15 V 5.2 A Ambient temperature: normal temperature Vertical axis: 5 mV/div, Horizontal axis: 10 msec/div

• Conducted emission

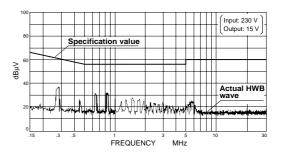


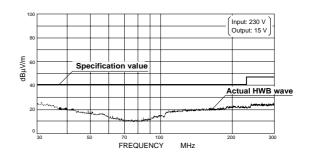
Noise electric field strength



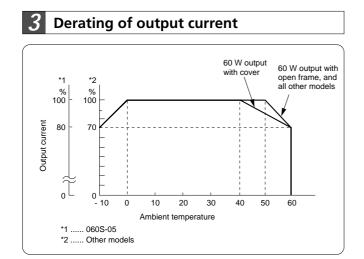


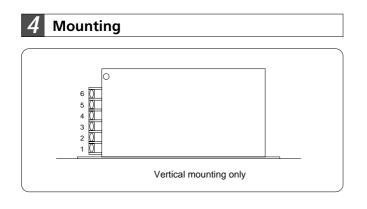
Output conditions: Input 200 V, output 15 V 5.2 A Ambient temperature: normal temperature Vertical axis: 5 mV/div, Horizontal axis: 10 msec/div





[Single output] 15W, 30W, 60W [Double output] 15W, 30W

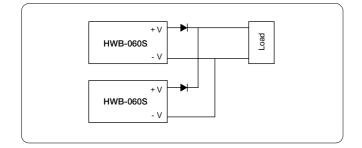




5 Parallel operation

Parallel operation can be performed only with the HWB060S model. Please contact Sanken if you intend to perform parallel operation. Sanken provides this product as optional. During parallel operation, each unit must be operated within 90% of rated current.

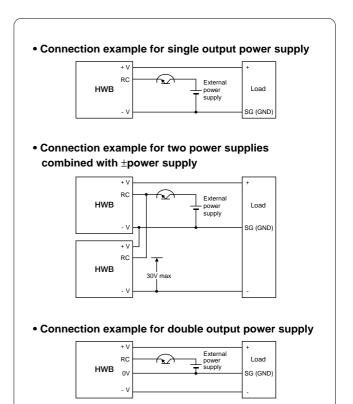
Connect schottky-barrier diodes to the units as shown in the diagram to balance output current of each unit during parallel operation (Sanken FMJ-2303, 30 V 30 A recommended). Select diodes whose withstand voltage is more than the rated output voltage and current is more than output current. Note that diodes need to release heat because they generate heat. This requirement should be thoroughly considered. Adjust and check output voltage of each power supply to ensure that the same voltage is reached. Use load wires with the same thicknesses and lengths to balance output power of each power supply.



6 Remote control

must be 30 V or less.

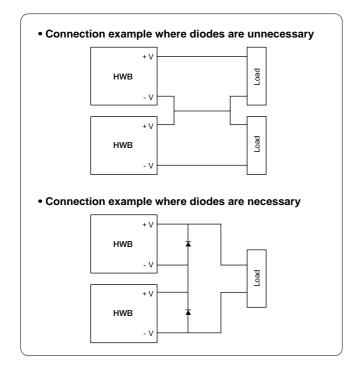
An external power supply (5 to 24 V) is needed for remote control. For remote control of single output power supply, connect RC terminal and -V terminal (GND) to + of the external power supply and SG (GND) of load, respectively. For double output power supply, connect the RC terminal and the 0 V terminal (GND) to the + of the external power supply and the SG (GND) of load, respectively. The remote control goes on by applying voltage. It goes off by releasing between RC terminal and -V terminal. The range of external voltage which can be applied on the RC terminal for remote control is from 4.5 to 30 V DC. The range of inflow current from the external power supply is from 1.5 to 5 mA (typ). Connection examples are as shown in the diagrams below. However, the voltage between RC terminal and -V terminal

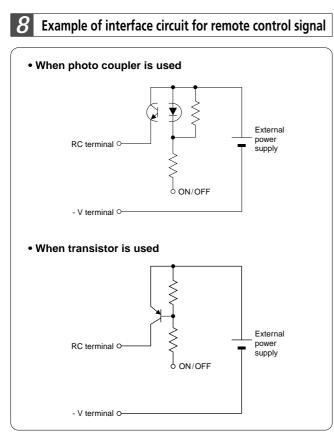


[Single output] 15W, 30W, 60W [Double output] 15W, 30W

7 Series operation

Connect diodes as shown in the diagram according to the way loads are connected for series operation. Select diodes through which rated output current can flow at rise of output voltage. Although current flows through diodes only at rise of output voltage, it does not flow at steady state.







Features world-wide input and active filter (PFC) **Double output supports peak current**

SWE_{Series}

100W (150W)

Double output

With chassis

- Supports 2.5x peak current Supports top-class peak current: 2.5 times the rated current (within 15 seconds)*. This helps save space and lower costs for power supplies in equipment sets.
- World-wide input Supports global markets with a wide-range continuous input method from 85 to 264 V AC.
- Features active filter (PFC) SWD series features an active filter (PFC: Power Factor Correction circuit) for harmonic current control (complies with IEC-61000-3-2).
- Conducted emission Complies with Class B standards under VCCI, FCC, and EN55022.
- Acquired CE mark for LVD (Low Voltage Directive) Complies with CE mark standards set by the EU.
- Acquired safety standards of a variety of countries

Complies with safety standards of a variety of countries, including UL1950, CSA950 (C-UL), and EN60950.

 Remote ON/OFF control Features remote ON/OFF control with 24 V output as standard.



Mechatronics products (motors, solenoids, etc.)

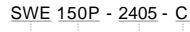
Equipment that uses thermal heads

Examples: Ticket dispensers, card readers, POS terminals, ATMs, change machines, bill and coin counters, scales, printers, printing press, semiconductor manufacturing equipment, and other industrial equipment

Options

Cover (with derating) **Terminal stand**

Description of model name



Output

voltage

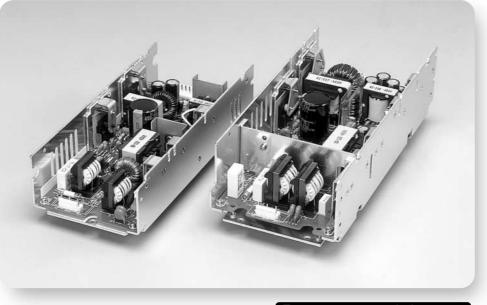
(24:24V 05:5V)

Series name

Option (C: With cover)

Output power (150:150W)

red UL, CSA (C-UL



Free warrantee period: 2 years



			Specifications and Standards		
			100	W	
	Мо	del	SWE100		
	Rated Input Voltage		AC100V tu	DAC240V	
	Allowable Input Voltage Range				
S	Input Curre	nt (typ) Noted	1.5A (Vi)	i = 100V)	
tior	Rated Freq		50/60Hz		
Input Conditions		Frequency Range		63Hz	
ိ =	Power Fact		0.95 (V _{IN} = 100V)		
	Efficiency (typ) 1000 Inrush Current (max) 10002			% /40A (V _{IN} = 240V)	
		urrent (max)	0.75mA (V	· · · · · ·	
	Rated Outp	age Variation	5V ±10%	24V ±10%	
	Rated Outp	-	3.0A	4.0A	
Note 3	· · · · ·	Peak Current Notes	0.011	10.0 A (within 15 sec)	
ons	Allowable O	utput Current Range	0 to 30.0A	0 to 10.0A	
aiti	Rated Outp	ut Power	15W	96W	
Output Conditions		Itage Accuracy Note 5	±3%	±5%	
	Ripple Nois		100mVp-p	240mVp-p	
		ding Time (min) Norm		nsec	
	Startup tim	,	300r	lisec	
		t Protection	3.15 A or more (drooping automatic recovery)	10.5 A or more (drooping automatic recovery)	
ons		e Protection Note6	Detection above 115% of rated voltage (output cutoff)		
Additional Functions	Overheating Protection Remote Sensing		Not provided Not provided		
Fun	Operations Display		Not provided		
	Remote ON	/OFF Control	Not provided	Provided	
	Operating Temperature Range		-10°C to +60°C		
	Storage Temperature Range		-25°C to +85°C		
	Operating Humidity Range		30 to 90%		
_		midity Range	30 to 90%		
Environmental Conditions	Cooling Re	-	Natural air cooling		
Suo		No. of vibrations Notes	10 to 55Hz 3 minutes		
iro	Vibration	Acceleration rate	19.6m/s ² (2G)		
Son	Resistance	Vibration direction	X, Y		
	Vibration time		One hour in each of three directions		
				² (10G)	
	Shock Resi	stance	Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more. Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 sides.		
	Installation	Conditions		ion directions are vertical and horizontal: with mounting holes down)	
_	Insulation	Between input and output	3000 V AC for 1 minute (leal	kage current: 15 mA or less)	
Note 7		Between input and FG	2000 V AC for 1 minute (lea	-	
<u>io</u>	Voltage	Between output and FG	500 V AC for 1 minute (leak	age current: 30 mA or less)	
llati	Insulation	Between input and output			
Insulation	Resistance		100 M Ω (measured w	th 500 V DC Megger)	
		Between output and FG			
	External Ap	opearance	With c		
ure/	Input Type			ector	
ncti	Output Typ		Conn 220 ^w x 98 ^r	ector	
Stri Stri	External Di Weight	mensions	220** × 98-		
nal lard	Safety Stan	dards	UL60950, CSA No. 60950, and SEMKO (EN60950) certified, de		
External Structure/ Standards	Conducted		Designated to meet FCC Class B (120 V AC), EN550		
ы қ	ЕМС		Harmonic current: Designa		
			Immunity: Designated to	o meet IEC61000-4-2, 5	
Ontions	I/O Termina	al Stand	Prov	rided	
()))dfalal~	Options Cover		Brow	vided	

Note: Specified under rated input/output conditions at an ambient temperature of 25°C.

Note2 More current above noted values may flow at restart.

Come Output characteristics are measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor and 0.1-µF film

capacitor connected to that point. Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe. The constant voltage accuracy is measured within static input range, within static load range, with time drift and within ambient temperature range. Note: Reset is performed by reapplying input voltage.

Note? Insulation conditions are specified at normal temperature and humidity.

Note B Up to rated output current at startup.

When mounted on mounting surface B, the No. of vibrations is from 10 to 25 Hz (refer to External Dimensions).

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100W,150W **Specifications and Standards**

SWE Series

Model		de l	150W		
	IVIO	aei	SWE150)P-2405	
	Rated Input	t Voltage	AC100V/t	AC240V	
	-	nput Voltage Range	AC100V to AC240V AC85 to AC264V		
Š	Input Current (typ) Notes		2.4A (Vin = 100V)		
t litions	Rated Frequency		2.4A (VIN = 100V) 50/60Hz		
git		Frequency Range	47 to 63Hz		
d D	Power Fact		0.98 (V _{IN} = 100V).		
	Efficiency (%	
	Inrush Current (max) 1002 Leakage Current (max) 1003		20A (V _{IN} = 100V)/40A (V _{IN} = 240V) 0.75mA (V _{IN} = 240V)		
	Rated Output Voltage			,	
	· · · ·	v	5V	24V	
_		age Variation	±10%	±10%	
Note 3	Rated Outp		6.0A	6.0A	
S		Peak Current Note 8		10.0 A (within 15 sec)	
tion t		utput Current Range	0 to 6.0A	0 to 15.0A	
ndi	Rated Outp		30W	144W	
Output Condit		Itage Accuracy Note 5	±3%	±5%	
	Ripple Nois		100mVp-p	240mVp-p	
		ding Time (min) 🔤		nsec	
	Startup tim	e (typ)	800r	nsec	
	Overcurren	t Protection	6.3 A or more (drooping automatic recovery)	15.75 A or more (drooping automatic recovery)	
la l	Overvoltag	e Protection Note 6	Detection above 115% of r		
E E	Overheatin	g Protection	Not pr	ovided	
Additional Functions	Remote Sensing		Not provided		
ĂЧ	Operations	Display	Not provided		
	Remote ON	/OFF Control	Not provided Provided		
	Operating Temperature Range		-10°C to +60°C -25°C to +85°C		
	Storage Temperature Range				
	Operating Humidity Range		30 to 90% 30 to 90%		
<u></u>	Storage Humidity Range Cooling Requirements		Natural air cooling		
Environmental Conditions	No. of vibrations		10 to 55Hz		
ŭ ŭ		Sweep time		nutes	
diti	Vibration	Acceleration rate		/s² (2G)	
N N	Resistance	Vibration direction	X, Y		
		Vibration time		of three directions	
		VIDIATION TIME			
	Shock Resi	stance	98m/s ² (10G) Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more. Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 sides.		
	Installation	Conditions		ion directions are vertical and horizontal: with mounting holes down)	
_	Insulation	Between input and output	3000 V AC for 1 minute (leal	(age current: 15 mA or less)	
Note 7		Between input and FG	2000 V AC for 1 minute (leal	, ,	
	Voltage	Between output and FG	500 V AC for 1 minute (leak		
Insulation		Between input and output			
sul	Insulation	Between input and EC	100 M Ω (measured w	th 500 V DC Meager)	
-	Resistance	Between output and FG			
	Externs 1.4				
	External Ap	pearance		hassis	
nre	Input Type	•		ector	
lict	Output Typ			ector	
External Structure/ Standards	External Di	mensions	240 ^w x 110		
al (ard)	Weight	dordo			
ern nda	Safety Stan		UL60950, CSA No. 60950, and SEMKO (EN60950) certified, de		
≣xt	Conducted	Emission	Designated to meet FCC Class B (120 V AC), EN550		
	EMC		Harmonic current: Designated to		
			·	o meet IEC61000-4-2, 5	
Options	I/O Termina	al Stand		rided	
options	Cover		Prov	rided	
-	aified under r	ated input/output cond	itions at an ambient temperature of 25°C.		

Note: Specified under rated input/output conditions at an ambient temperature of 25°C.

Note2 More current above noted values may flow at restart.

Come Output characteristics are measured at a point 5 cm from the output connector, with a 63-V, 47-µF electrolytic capacitor and 0.1-µF film capacitor connected to that point.

The constant voltage accuracy is measured within static input range, within static load range, with time drift and within ambient temperature range. Note: Reset is performed by reapplying input voltage.

Insulation conditions are specified at normal temperature and humidity.

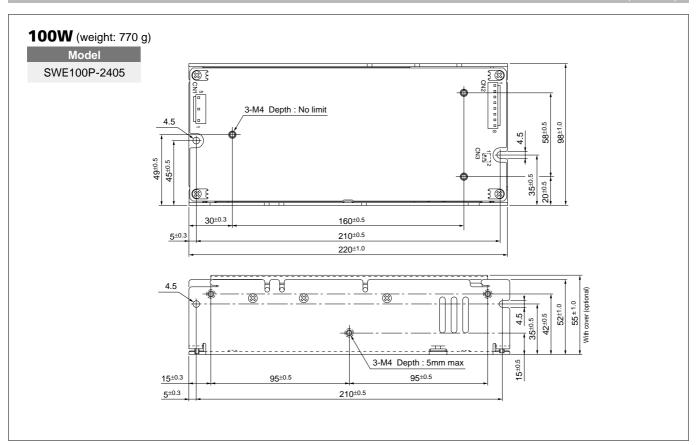
Note B Up to rated output current at startup.

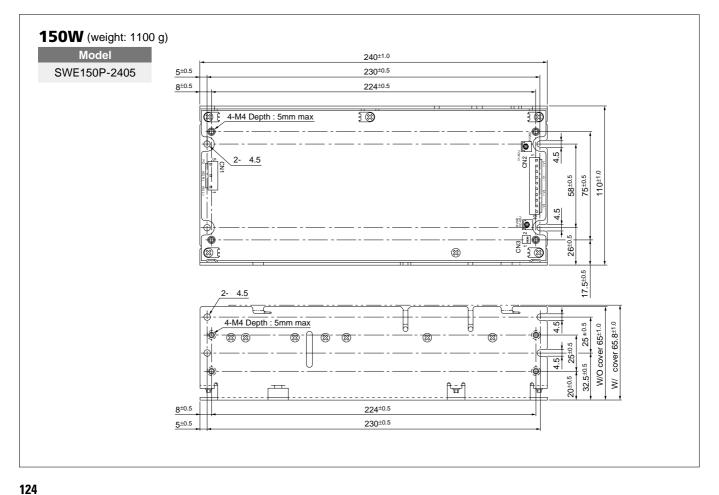
When mounted on mounting surface B, the No. of vibrations is from 10 to 25 Hz (refer to External Dimensions).



External Dimensions

(unit: mm)





Operating Instruction

Terminal connection

Input/output connectors

SWE100P-2405

Pin No.	Connector	Corresponding connector	Corresponding contact			
1: AC (LIVE)						
2: NC						
3: AC (NEUTRAL)		VHR-5N (JST)	SVH-21T-P1.1 (JST)			
4: NC	(001)					
5: FG						
1 to 3: +24V		VHR-8N (JST)	SVH-21T-P1.1 (JST)			
4 to 6: GND1	B8P-VH					
7: +5V	(JST)					
8: GND2						
1: RC +						
2: RC -	DZP-SHF-TAA	HZP-SHF-AA	SHF-001T-0.8SS			
	1: AC (LIVE) 2: NC 3: AC (NEUTRAL) 4: NC 5: FG 1 to 3: +24V 4 to 6: GND1 7: +5V 8: GND2 1: RC +	1: AC (LIVE) 2: NC 3: AC (NEUTRAL) 4: NC 5: FG 1 to 3: +24V 4 to 6: GND1 7: +5V 8: GND2 1: RC + B2P-SHF-1AA	PH No. Connector connector 1: AC (LIVE)			

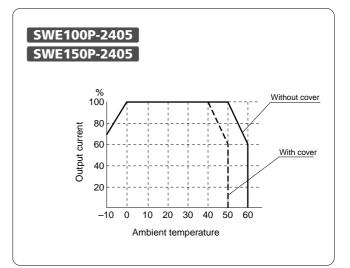
SWE150P-2405

Symbol	Pin No.	Connector	Corresponding connector	Corresponding contact
	1: AC (LIVE)			
	2: NC			
CN1	3: AC (NEUTRAL)	B3P5-VH	VHR-5N	SVH-21T-P1.1
	4: NC			
	5: FG			
	1 to 3: +24V		VHR-10N	SVH-21T-P1.1
CN2	4 to 6: GND1			
CINZ	7, 8: +5V	B10P-VH		
	9, 10: GND2]		
<u>ONIO</u>	1: RC +	B2P-SHF-1AA		SHF-001T-0.8SS
CN3	2: RC -	BZF-SITE-TAA	HZF-SHF-AA	507-0011-0.855

Terminal stands

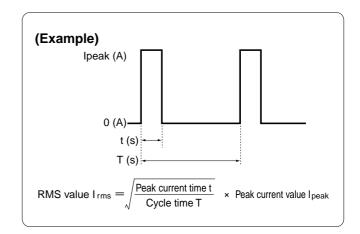
SWE1	100P-2405	SWE150P	-2405	
Symbol	Pin No.	Connector	Corresponding connector	Corresponding contact
	1: AC (LIVE)	M110D-3C		
TB1	2: AC (NEUTRAL)	(Morimatsu)		minals
	3: FG	or equivalent		
	1: +24V		M110D-3C (Morimatsu) M4 terminals or equivalent	
TB2	2: GND1			
I DZ	3: +5V			
	4: GND2	1		
CNI2	1: RC +			SHF-001T-0.8SS
CN3	2: RC -		TIZE-SHE-AA	

2 Derating of output current



3 Dynamic load

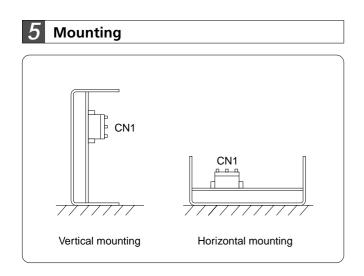
The peak current load occurs within 15 seconds. This series can also be used with dynamic (pulse) load. During dynamic operation, use the supply with the output current's RMS value equal to or less than the rated current.



4 Remote ON/OFF control

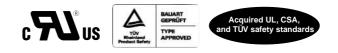
The 24 V output models enable remote ON/OFF control. Output goes ON when the RC+ and RC- connectors (connector CN3's pins 1 and 2) for remote ON/OFF control are open. When they are shorted, the output goes OFF.





Semi-custom power supply





Flexible multi-output power supply enables various combinations of DC cell modules

Prototype power supply units that meet the customer's specifications can be delivered 10 days after the customer's order is received.

Keep costs low by eliminating the need for design, evaluation, and safety standards certification.

Microprocessor-equipped cell control module provides versatile power management.

Certified under medical standards (PCU400M/600M)

- World-wide input range <85 to 264 V AC continuous input>
- Three types based on total output power: 400 W, 600 W, and 900 W
- Extensive lineup of DC cell modules* can be freely combined in multi-power supply configurations
- * 120-W single output DC cell, output voltages: nine types (2, 3.3, 5, 6, 12, 15, 24, 36, and 48 V) ① 40-W and ② 96-W double output DC cell, output voltages: two types (① 5/5 V, ② 12/12 V) 40-W four output DC cell, output voltages: two types (+5/-5/+12/-12, +5/-5/+15/-15 V) Configuration example: PCU900 (nine-cell configuration) ... 15 channels = single output x 7 + multi-output x 2)

• All module types are kept in stock to enable prototype power supply delivery within 10 days.

- Harmonic current control <complies with EN61000-3-2 standard>
- Complies with safety standards
- <certified under EN60950, UL1950, CSA950 (C-UL). CE marking compatible>

 Complies with noise standards
- -complies with EMS: IE61000-4, EMI: FCC Class B, EN55022 Class B, and VCCI Class B>
- Alarm signal output and AC power fail signal output are standard feature
- · Versatile power management using optional functions

 Versatile power management is realized by microprocessor-based control in cell control module Software processing controls management of operations when an alarm occurs, allocation of operations among cells, sequence operations, external remote operations, etc.
 Supports low power consumption

- <Option E: When using economy mode, all internal circuits are stopped. Equipped with internal +5 V STB power supply>
- Power consumption during economy mode: approximately 3.9 W (during 100 V AC input) $^\circ$ Complies with medical standards

Certified under EN60601-1 (PCU400M/600M)

Applications

Semiconductor manufacturing and inspection equipment

Factory automation controllers and robots Line printers, disks, ATMs, and computer peripherals

Medical equipment such as CT machines, MRI machines, and ultrasonic diagnostic equipment Photographic laboratory system, ETCs, and other induastrial equipment

Options

Alarm sequence (signal transmission and shutdown) AC power failure (extension of output hold time) Cell output sequence (startup sequence, etc.) External remote ON/OFF (up to three separate ON/OFF controls) Cell group control (up to three separate ON/OFF controls) Economy mode (standby mode for low power consumption) Support for medical equipment (low leakage current)





		Specifications and Standards
	Model	PCU400
Item	Total Output Power No. of DC Cell Modules	400W
		5 cells
	Rated Input Voltage	AC100 to 240V
	Allowable Input Voltage Range	AC85 to 264V
tions		6.5A/3A max (AC100V/AC240V)
ondit	Rated Frequency	50/60Hz
Input Conditions	Allowable Frequency Range	47 to 63Hz
lnp	Efficiency Notes	70% (typ)
	Inrush Current Note2	15A/35A max (AC100V/AC240V)
	Power Factor Notes	0.9 (min)
Others	Leakage Current 🚥	0.75 mA (max) Option M: 0.5 mA (max)
Oth	Output Holding Time	20ms (min)
	Operating Temperature Range	-10 to +60°C
ons	Storage Temperature Range	-20 to +85°C
Environmental Conditions	Operating Humidity Range	30 to 90% (no condensation)
al Co	Storage Humidity Range	30 to 90% (no condensation)
nent	Cooling Requirements	Forced air cooling by internal fan
ironr	Vibration Resistance	10 to 55 Hz, sweep time: 3 minutes, acceleration rate: 29.4 m/s2 (3G), one hour each in the X, Y, Z directions
Env	Shock Resistance	98m/s² (10G)
	Installation Conditions	Horizontal or vertical mounting direction
sulation	Insulation Withstand Voltage	Between input and output: 3000 V AC for 1 minute, between input and FG: 1500 V AC for 1 minute (leakage current: 30 mA or less each)
Insul	Insulation Resistance	Input - output, input - FG and output - FG: 100 M Ω or above (measured with 500 V DC Megger)
rnal ture dards	External Dimensions	124 ^w x 280 ^D x 64 ^H mm
External Structure /Standard	Weight Note	2300g
lards	Safety Standards	UL1950, CSA No. 60950, and TÜV (EN60950) certified, CE marking compatible TÜV (EN60601) certified with option M
Standards	Conducted Emission Note	Designated to meet FCC Class B, EN55022 Class B, and VCCI Class B

Specified under rated input/output conditions at an ambient temperature of 25°C. Input current and efficiency depend on implemented DC cell modules. More inrush current than above noted value may flow for approximately one second after restart.

www When the ambient temperature is in the range from 0 to 50°C, use the rated load conditions. When the ambient temperature is in either the range from -10 to 0°C or 50 to 60°C, derate the output current to 80% or less of the rated value.

Insulation conditions are specified at normal temperature and humidity. For medical equipment-support model (option M), insulation withstand voltage between batch input and batch output is 4000 V AC for 1 minute.

Note 5 For details, refer to the external view diagrams.

The weight is the estimated weight when single output type DC cell module has been fully mounted.

When the medical equipment-support model (option M) is used, this product complies with the FCC Class A, EN55022 Class A, and VCCI Class A standards.

仕様・規格 **PCU600** Model Item **Total Output Power** 600W No. of DC Cell Modules 6 cells **Rated Input Voltage** AC100 to 240V Allowable Input Voltage Range AC85 to 264V Input Current Notes 10A/5A max (AC100V/AC240V) 50/60Hz **Rated Frequency Allowable Frequency Range** 47 to 63Hz Input Efficiency Note1 70% (typ) Inrush Current Note 2 15A/35A max (AC100V/AC240V) Power Factor Note 0.9 (min) ers Leakage Current 0.75 mA (max) Option M: 0.5 mA (max) ð Output Holding Time 20ms (min) Operating Temperature Range Note3 -10 to +60°C Storage Temperature Range -20 to +85°C **Operating Humidity Range** 30 to 90% (no condensation) **Storage Humidity Range** 30 to 90% (no condensation) ental **Cooling Requirements** Forced air cooling by internal fan Vibration Resistance 10 to 55 Hz, sweep time: 3 minutes, acceleration rate: 29.4 m/s2 (3G), one hour each in the X, Y, Z directions Ы Shock Resistance 98m/s² (10G) Installation Conditions Horizontal or vertical mounting direction Insulation Withstand Voltage Noted Between input and output: 3000 V AC for 1 minute, between input and FG: 1500 V AC for 1 minute (leakage current: 30 mA or less each) Insulation Resistance Input - output, input - FG and output - FG: 100 MΩ or above (measured with 500 V DC Megger) $148^{W} \ge 280^{D} \ge 64^{H} \text{ mm}$ External Dimensions Weight Note 6 2600g Safety Standards UL1950, CSA No. 60950, and TÜV (EN60950) certified, CE marking compatible TÜV (EN60601) certified with option M Designated to meet FCC Class B, EN55022 Class B, and VCCI Class B Conducted Emission

Specified under rated input/output conditions at an ambient temperature of 25°C. Input current and efficiency depend on implemented DC cell modules.

More inrush current than above noted value may flow for approximately one second after restart. We when the ambient temperature is in the range from 0 to 50°C, use the rated load conditions. When the ambient temperature is in either the range

from -10 to 0°C or 50 to 60°C, derate the output current to 80% or less of the rated value.

usual Insulation conditions are specified at normal temperature and humidity. For medical equipment-support model (option M), insulation withstand voltage between batch input and batch output is 4000 V AC for 1 minute.

Notes For details, refer to the external view diagrams.

Note: The weight is the estimated weight when single output type DC cell module has been fully mounted.

When the medical equipment-support model (option M) is used, this product complies with the FCC Class A, EN55022 Class A, and VCCI Class A standards.

U Series

400W.**600W**.900W



	Specifications and Standards					
	Model	PCU900				
Item	Total Output Power	900W				
	No. of DC Cell Modules	9 cells				
	Rated Input Voltage	AC100 to 240V				
	Allowable Input Voltage Range	AC85 to 264V				
ons	Input Current 📾	15A/7.5A max (AC100V/AC240V)				
nditi	Rated Frequency	50/60Hz				
Input Conditions	Allowable Frequency Range	47 to 63Hz				
Inpi	Efficiency Real	70% (typ)				
	Inrush Current Note2	15A/35A max (AC100V/AC240V)				
	Power Factor Meet	0.9 (min)				
ers	Leakage Current 🚥	0.9mA (max)				
Othe	Output Holding Time	20ms (min)				
	Operating Temperature Range Internet	-10 to +60°C				
suo	Storage Temperature Range	-20 to +85°C				
Environmental Conditions	Operating Humidity Range	30 to 90% (no condensation)				
al Co	Storage Humidity Range	30 to 90% (no condensation)				
nent	Cooling Requirements	Forced air cooling by internal fan				
ironr	Vibration Resistance	10 to 55 Hz, sweep time: 3 minutes, acceleration rate: 29.4 m/s2 (3G), one hour each in the X, Y, Z directions				
Env	Shock Resistance	98m/s² (10G)				
	Installation Conditions	Horizontal or vertical mounting direction				
lation	Insulation Withstand Voltage	Between input and output: 3000 V AC for 1 minute, between input and FG: 1500 V AC for 1 minute (leakage current: 30 mA or less each)				
Insul	Insulation Resistance	Input - output, input - FG and output - FG: 100 M Ω or above (measured with 500 V DC Megger)				
rnal ture lards	External Dimensions	220 ^W x 280 ^D x 64 ^H mm				
External Structure /Standard	Weight 🔤	3900g				
ards	Safety Standards	UL1950, CSA No. 60950, and TÜV (EN60950) certified, CE marking compatible TÜV (EN60601) certified with option M				
Standards	Conducted Emission Note	Designated to meet FCC Class B, EN55022 Class B, and VCCI Class B				
		· · · · · · · · · · · · · · · · · · ·				

Specified under rated input/output conditions at an ambient temperature of 25°C. Input current and efficiency depend on implemented DC cell modules. More inrush current than above noted value may flow for approximately one second after restart.

www When the ambient temperature is in the range from 0 to 50°C, use the rated load conditions. When the ambient temperature is in either the range from -10 to 0°C or 50 to 60°C, derate the output current to 80% or less of the rated value.

Insulation conditions are specified at normal temperature and humidity. For medical equipment-support model (option M), insulation withstand voltage between batch input and batch output is 4000 V AC for 1 minute.

Note 5 For details, refer to the external view diagrams.

The weight is the estimated weight when single output type DC cell module has been fully mounted.

When the medical equipment-support model (option M) is used, this product complies with the FCC Class A, EN55022 Class A, and VCCI Class A standards.

PCU Series 400W,600W,900W

Output Specifications (DC cell module)

Single output type									
		SII	ngle o	utput	type				
DC Cell Module Symbol	Α	В	С	D	E	F	G	Н	J
Rated Output Voltage	3.3V	5V	12V	15V	24V	36V	48V	2V	6V
Output Voltage Variation Notes		I	Rated o	butput voltag	e ±10%	I		1.8 to 2.4V	Rated output voltage ±10%
Rated Output Current	24A	24A	10A	8A	5A	3.3A	2.5A	24A	20A
Allowable Output Current Range		0	to 100% (wit	hout exceed	ing maximur	n output pow	er and curre	nt)	
Rated Output Power	79.2W	120W	120W	120W	120W	118.8W	120W	48W	120W
Ripple Noise Note 2 Note 3	100mV	100mV	200mV	200mV	300mV	350mV	400mV	100mV	100mV
Constant Voltage Accuracy 1004					±3%				
Overcurrent Protection (min) Notes	26.4A	26.4A	11.0A	8.8A	5.5A	3.7A	2.8A	26.4A	22A
Overvoltage Protection	3.7 to 4.7V	5.6 to 7.0V	13.3 to 16.8V	16.6 to 22.5V	26.5 to 33.6V	39.7 to 50.4V	52.9 to 60.0V	2.6 to 3.2V	6.7 to 8.4V
Remote Sensing Note?					Provided				
Overheating Protection Mass					Provided				
Series Operation					Enabled				
Parallel Operation Image					Enabled				
Orations Display		Provided							
Output Terminal Type				Т	erminal stan	d			
Required Number of Cells					1 cell				

Multi-output type												
DC Cell Module Symbol		Q1(4ch)			Q2(4ch)		W11	(2ch)	W22	(2ch)
Rated Output Voltage	+5V	-5V	+12V	-12V	+5V	-5V	+15V	-15V	5V	5V	12V	12V
Output Voltage Variation		Fi	xed			Fiz	ked		Rated output	t voltage ±5%	Rated output	t voltage ±5%
Rated Output Current	ЗA	1A	1A	0.5A	ЗA	1A	1A	0.5A	4A	4A	4A	4A
Allowable Output Current Range		0 to	100%			0 to	100%		0 to	100%	0 to 7	100%
Rated Output Power	38W		42.5W			40	W	96W				
Ripple Noise Note2 Note3	100	mV	150)mV	100	mV	150	mV	100mV	100mV	200mV	200mV
Constant Voltage Accuracy Noted		±5%		±5%		±5%		±5%	±3	3%	±3	3%
Overcurrent Protection (min) Notes	3.3A	1.1A	1.1A	0.6A	3.3A	1.1A	1.1A	0.6A	4.4A	4.4A	4.4A	4.4A
Overvoltage Protection Notes	5.6 to 7.0V	-	13.3 to 16.8V	-	5.6 to 7.0V	-	16.6 to 22.5V	-	5.6 to 7.0V	5.6 to 7.0V	13.3 to 16.8V	13.3 to 16.8V
Remote Sensing Note?			-				-			-		-
Overheating Protection Notes		-		Provided		-		Provided	Prov	rided	Prov	/ided
Series Operation 1000		Dis	abled		Disabled		Enabled		Enabled			
Parallel Operation		Dis	abled		Disabled				Disa	bled	Disa	abled
Orations Display	Provided				Provided			Prov	vided	Prov	/ided	
Output Terminal Type		Con	nector		Connector			Connector		Connector		
Required Number of Cells		1	cell			1	cell		1 0	cell	1 0	cell

The rated output current and maximum output power are both specified even when the output voltage is variable.

Specified under rated input/output conditions at an ambient temperature of 25°C.

Ripple noise value was measured using a 1:1 probe and a 100-MHz oscilloscope, with measurements taken 5 cm from an output connector and with a connected 63-V, 47-μF electrolytic capacitor. Ripple noise is measured by a 100-MHz oscilloscope using a 1:1 probe at a point 5 cm from the output connector, with a 47-μF electrolytic capacitor connected to that point.

The constant voltage accuracy is measured with a static input range of 300 to 410 V DC, a static load range of 0 to 100%, a time drift of 10 minutes to eight hours and an ambient temperature range of 0 to +50°C.

(When the ambient temperature is in the range from -10 to 0° C or 50 to 60° C, the rating is based on 80% derating of the rated output current.)

The constant voltage accuracy for multi-output type with output voltage of either -12 V or -15 V is specified when total output power of either 6 or 7 W for other channel output. (When a -15 V output current is in the range from 0 to 0.1 A, the total output power for other channel output must be at least 1.5 W.)

Overcurrent protection uses the constant current drooping method (delayed shutdown method).

When the overvoltage protection function kicks in, output is shut down. This output shutdown remains active for as long as the control voltage (+VCC) is being supplied.

The remote sensing function should be set to correct for line drops of up to 250 mV. Use twisted pair or shielded wires as the sensing lines, and if the lines are long, insert capacitors between +S and +V and between -S and -V. The maximum output power is specified for the power supply's output voltage.

Overheating protection operates when an abnormal ambient temperature is detected.

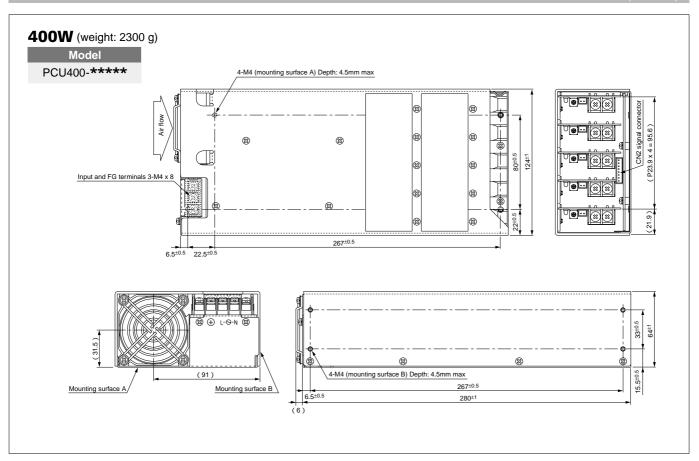
Please contact Sanken when using DC cell modules for series operation or parallel operation.

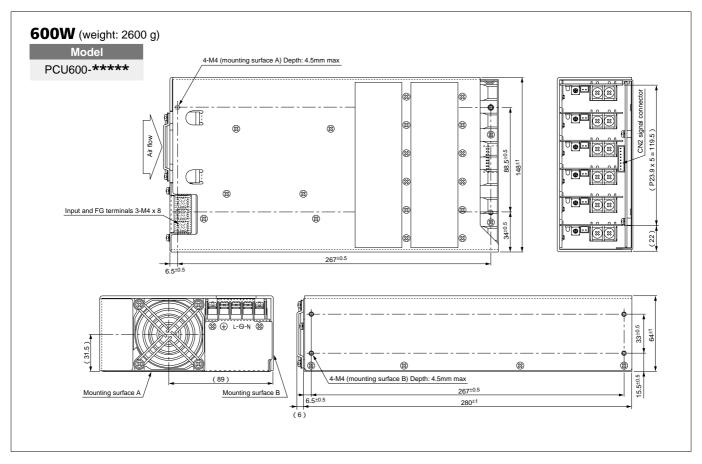
Terminal stand type is also supported for multi-output types W11, W22, Q1, and Q2. (Their DC cell module symbols are W11T, W22T, Q1T, and Q2T.)



External Dimensions

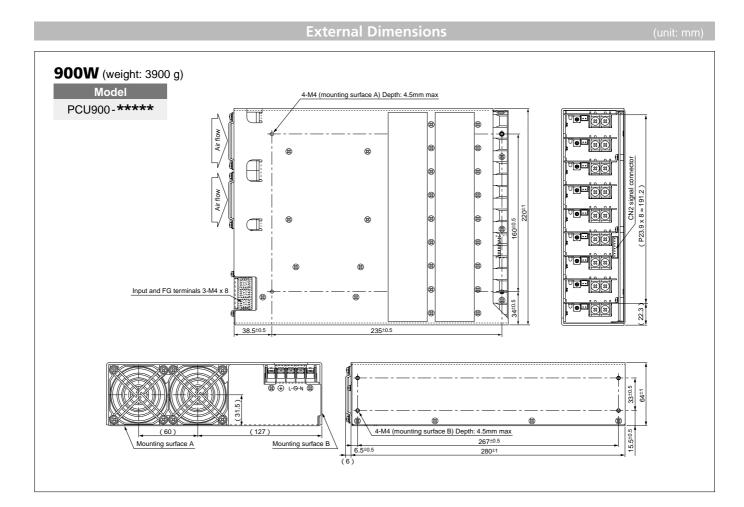
(unit: mm)





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PCU Series 400W,600W,900W





Description of Functions (main functions)

Signal output (standard equipped)

The PCU series includes standard-equipped signal output, which can be used as needed.

Alarm signals ... For undervoltage, overvoltage, fan malfunction, DC output fault, overheating protection, etc.

AC power fail signal ... For reduction or setup of AC input voltage

- * The fan alarm signal can be transmitted as an independent signal. For details, please contact Sanken.
- * When an alarm status continues for a certain amount of time, the DC cell module's output is turned off.
- * The timing for transmitting signals and turning off the DC cell module output is set based on standard values set by Sanken.

2 Protection functions

Each of the PCU Series DC cell modules contains independent protection circuitry (for overcurrent protection, overvoltage protection, and overheating protection).

3 Output voltage variation

The output voltage can be changed in each of the PCU Series DC cell modules (variation range: $\pm 10\%$ of rated voltage).

However, there is no output variation function for multioutput DC cell modules Q1 and Q2.

Remote sensing

Each of the PCU Series DC cell modules has a remote sensing function. The voltage correction value should be within 0.25 V.

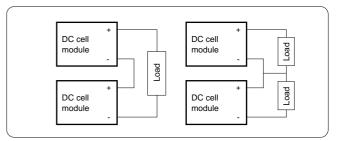
However, there is no remote sensing function for multioutput DC cell modules W11, W22, Q1, and Q2.

5 Series operation

The PCU Series DC cell modules can be used for series operation. When performing series operation, the specification for the DC cell module with the lower rated current applies.

However, multi-output DC cell modules Q1 and Q2 cannot be used for series operation.

For details, please contact Sanken.



6 Parallel operation

The PCU Series DC cell modules can be used for parallel operation. When DC cell modules are used for parallel operation, Sanken changes their internal settings and connects the output terminals of the parallel DC cell modules using a short bar.

The parallel DC cell modules operate using a load balancing function.

However, multi-output DC cell modules W11, W22, Q1, and Q2 cannot be used for parallel operation.

For details, please contact Sanken.

Example: When using a 24-V load at 10 A (240 W) Two DC cell E modules (rated at 24 V, 5 A, 120 W) are used for parallel operation, and their output is 10 A (240 W).

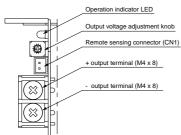
Negative power supply

Due to the structure of the PCU Series DC cell modules, the polarity (+ or -) of the DC output terminals cannot be changed.

When using them as a negative output power supply, use positive (+) terminals as SG and negative (-) terminals as negative output.

Output terminals and connectors

• Single output DC cell module



CN No.	Pin No.	Function	Compatible housing	Corresponding contact	
CN1	1	Remote sensing -	XHP-2	SXH-001T-P0.6	
CINT	2	Remote sensing +	(JST)	(JST)	
	1	+ 5V STB			
	2	SG			
	3	RMT2 ON/OFF		SXH-001T-P0.6 (JST)	
CN2	4	RMT3 ON/OFF	XHP-8		
GINZ	5	RMT4 ON/OFF	(JST)		
	6	RMT1 ON/OFF			
	7	Alarm			
	8	AC power fail			

* Recommended screw fastening torque

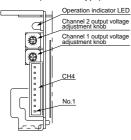
(1) Terminal screws: 118 N· cm (2) Mounting holes: 142 N· cm

CN4 Pin No

W11, W22

• Multi-output DC cell module

W11, W22 (connector type)



Q1, Q2 (connector type)

(

CN3

No.1

Operation indicator LED

Channel 1 output voltage adjustment knob ₩. ₩ No.1

Q1T, Q2T (terminal stand type)

Operation indicator LED

7

0

W11T, W22T (terminal stand type)

Operation indicator LED W11T, W22T Channel 2 output voltage adjustment knob al stand t 8.9 4 5V or 12V (CH1) 3 GND (CH1) 6, 7

Function

CN3 Pin No. Q1, Q2 Q1T, Q2T (connector type) (terminal stand type)		Function		, Q2 tor type)	Q1T, Q2T (terminal stand type) Corresponding wiring
1, 2	1	5V or 12V (CH2)			Sheath stripping length: 7 to 10 mm
3, 4	2	GND (CH2)			(TÜV) Sheath atrianing length:
5		NC	XHP-9 (JST)	SXH-001T-P0.6 (JST)	(UL, C-UL) Stranded wire AWG16 to 24

W11, W22

W11T, W22T

Single wire AWG16 to 26

Stranded wire AWG16 to 22

(UL C-UL TÜV)

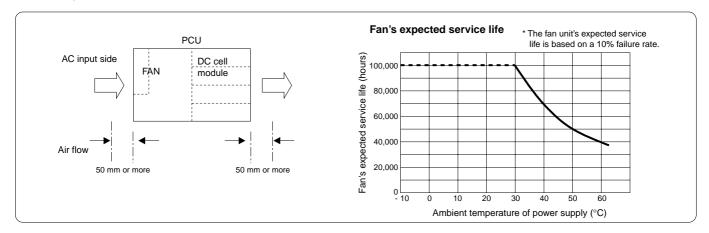
CN3 P	CN3 Pin No.			, Q2	Q1T, Q2T	
Q1, Q2 (connector type)	Q1T, Q2T (terminal stand type)	Function	, 	ctor type) Corresponding contact	(terminal stand type) Corresponding wiring	
11, 12	6	+ 5V			Single wire AWG16 to 26	
9 & 10	5	GND			(UL, C-UL, TÜV)	
7 & 8	4	- 5V	XHP-12	SXH-001T-P0.6	Stranded wire AWG16 to 22 (UL, C-UL, TÜV)	
5&6	3	+ 12V or + 15V	(JST)	(JST) (JST)	Stranded wire AWG24 only (TÜV)	
3 & 4	2	GND			Sheath stripping length: 7 to 10 mm	
1 & 2	1	- 12V or - 15V			7 10 10 mm	

9 **Cooling method**

The PCU Series uses an internal fan for forced air cooling. The fan is an intake fan mounted on the input terminal side. Leave at least 50 mm of space on the AC input terminal side or DC cell module output terminal side, where the fan is mounted.

If the internal fan has stopped, output may be shut off by the overheating protection circuit.

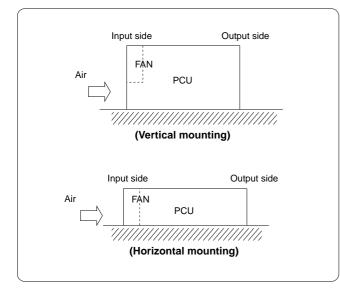
The fan's expected service life span may be affected by the power supply's use conditions, so the fan should be checked regularly. The fan must be replaced periodically because its service life is limited.





10 Mounting

Sanken recommends using the standard mounting method for its power supplies. This standard mounting method is illustrated below.



The length of the screws should take into account the insulation distance from the internal parts. Adjust the length so that the depth from the PCU case's surface is not greater than 4.5 mm.

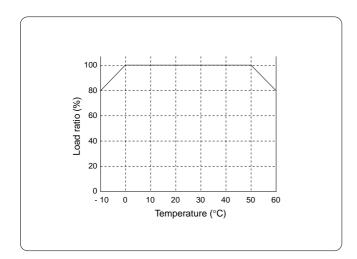
The recommended mounting screw fastening torque is 142 $\ensuremath{\mathsf{N}\xspace\ensuremath{\mathsf{o}}\xspace}$ recommended mounting screw fastening torque is 142 $\ensuremath{\mathsf{N}\xspace\ensuremath{\mathsf{o}$

Please contact Sanken if you intend to use any nonstandard mounting method.

11 Derating for ambient temperature

Sanken recommends using the standard mounting method to mount its power supplies.

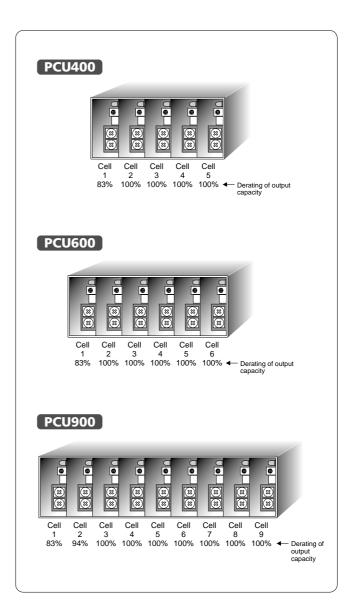
Use the output derating values shown below, based on the power supply's ambient temperature.



12 Derating based on mounting positions of DC cell modules

Derating based on the mounting positions of the DC cell modules is required for PCU Series power supply.

Derating values based on DC cell module position of various capacities are shown below. Refer to this when determining a configuration of DC cell modules for PCU Series power supplies.





Options

What are the optional functions in PCU Series devices?	 The cell control module provides a wealth of optional functions using microprocessor control. Microprocessor control means that various types of processing that had previously been handled by hardware (operation of relay circuits, delay circuits, etc.) are now performed as software processing. The desired operation mode can be easily selected via program settings. If specification changes are required during the customer's evaluation process, these can also be supported via simple changes in program settings, thus minimizing time loss.
• Alarm sequence	 When a fan malfunction or DC output fault is detected, the unit can be switched off at any specified time following transmission of the alarm signal. * The standard-equipped alarm signal turns off the DC cell module's output at a time (following transmission of the alarm signal) based on standard values set by Sanken. * If a DC output fault occurs, the corresponding output is shut off immediately. Shut-off times can be set for other output.
• AC power failure Option P	The AC input voltage is monitored, and an AC power fail signal is transmitted when the AC input voltage is set up or reduced. If a power failure (AC power failure) is detected, output can be shut off at any specified time following transmission of the power fail signal (varies depending on the load capacity and DC cell module used). The DC cell module's output hold time can be extended by stopping unnecessary DC output. * When a longer time setting is entered for the power supply's output hold time (which differs according to the specifications and setup conditions), the DC cell module's output is reduced before the set time has elapsed. For details, please contact Sanken. * The time for transmission of the standard-equipped AC power fail signal is fixed.
• Cell output sequence	The startup sequence can be set for each DC cell module. Up to nine levels can be set in the startup sequence (when the PCU900-9 cells are used). * The shut-off sequence can also be set in combination with other options.
• External remote ON/OFF	An external signal can be used to remotely turn the PCU Series DC cell modules ON or OFF (select among turning ON or OFF all DC cell modules at once, half of the cells, or one third of the cells).
• Cell group control	 DC cell modules can be grouped (and divided into three groups) and a separate startup sequence can be set for each group. * When this is done during economy mode (Option E), the shut-down sequence can also be set. * When this cell group control function (Option C) is selected, the external remote ON/OFF function (Option R) is included. However, it is not possible to use a group sequence after using the external remote ON/OFF function (Option R).
• Economy mode	Power consumption can be reduced during standby by shutting down the PCU Series cell models (PFC cells and DC cells) and stopping the internal fan (power consumption in economy mode is approximately 3.9 W during 100 V AC input). In this case as well, a +5 V STB power supply (CN2's pin 1, 5 V 50 mA, standard equipped) can be used.
Medical equipment support Option M	Medical equipment standard EN60601-1 (TÜV) certified (PCU400M/600M). The leakage current is 0.5 mA or less.



Options

Combining optional functions

Any combination of PCU Series device options can be used. The following are some examples for reference. For details, please contact Sanken.

• Example of combining cell output sequence Option S with external remote ON/OFF Option R

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Operation mode
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① External remote ON/OFF function (PCU ON) is used to enable operation of DC cell modules.
 ② Cell output sequence function is used to sequentially start DC cell modules.

Similarly, shut-down operations also can be set.

• Example of combining cell output sequence Option S with economy mode Option E

Operation mode

Economy mode function (PCU ON) is used to enable operation of PCU Series power supply.
 Cell output sequence function is used to sequentially start DC cell modules.
 Similarly, shut-down operations also can be set.

• Example of combining cell output sequence Option S with cell group control Option C

Operation mode

 Cell group control function (PCU 1G ON) is used to set up group No. 1 and enable operation of the group.

- 2 Cell output sequence function is used to sequentially start DC cell modules in group No. 1.
- 3 Operation modes 1 and 2 are repeated to sequentially start group Nos. 2 and 3.
- 4 Similarly, shut-down operations also can be set.

Examples of parameter setting ranges for optional functions	When optional functions have been selected for a PCU Series power supply, parameters can be set for each function. The setting ranges for some of these parameters are listed below for reference. Unless otherwise specified by the customer, Sanken's standard value is set. * Please contact Sanken concerning use of any other operation mode.
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Alarm signals

Item	Description	Setting range	Standard setting
Fan alarm	Sets time between fan stoppage and alarm signal output	2s to 25s	10s
DC output fault alarm	Sets time between DC output fault and alarm signal output	0s to 25s	3s
AC power fail signal	Sets time between AC power failure and AC power fail signal output	Within 25 ms (fixed)	Within 25 ms (fixed)
	Sets time between alarm signal output and shut-off of DC power	0s to 25s	0s
DC output OFF	Sets time between AC power fail signal output and shut-off of DC power	0 to 250ms	250ms

Sequences

Item	Description	Setting range	Standard setting
Enable operation of DC cells when AC power is ON	Sets time between AC power ON and setting of operation enabled status for DC cells	Within 500 ms	
Coll output coguonoo	Sets startup sequence for each DC cell	0 to 2500ms	0ms
Cell output sequence	Sets the shut-down sequence for each DC cell	0 10 2500ms	oms
	Sets time between external remote ON and setting of operation enabled status for DC cells	60 10 mg	
Enternal semate ON/OFF	Sets time between external remote OFF and stopping of DC cell operation	60±10ms	
External remote ON/OFF	Sets time between external remote ON and DC cell startup sequence	0.45.0500	0
	Sets time between external remote OFF and DC cell shut-down sequence	0 to 2500ms	0ms
	Sets time between external remote ON and setting of operation enabled status for DC cells	Within 500 ms	
	Sets each group's startup sequence	0.45.005	
Cell group control	Sets each group's shut-down sequence	0 to 60s	0s
	Sets startup sequence of DC cells in each group	0.1.0500	0
	Sets shut-down sequence of DC cells in each group	0 to 2500ms	0ms
Freedow	Sets time between economy mode ON and setting of operation enabled status for DC cells	260±10ms	
Economy mode	Sets time between economy mode OFF and stopping of DC cell operation	60±10ms	

Settings for standard-equipped alarm signals

Sanken's standard settings for alarm signals are listed below.

Item	Description	Standard setting
Fan alarm	Sets time between fan stoppage and alarm signal output	10s
DC output fault alarm	Sets time between DC output fault and alarm signal output	3s
DC output OFF	Sets time between alarm signal output and shut-off of DC power	3s

Note: When a DC output fault occurs for any output, the output is shut off immediately. Other output is shut off after a specified amount of time for "DC output OFF".

Interface

The logic and interface for the external remote control and alarm signals are described below.

CN2 Pin No.	Item	Logic (TTL level)	Interface			
3	RMT2 ON/OFF Turns all DC cell modules ON or OFF	L: ON H: OFF				
3, 4, 5	RMT2, 3, 4 ON/OFF Divides DC cell modules into three groups and turns grouped cells ON or OFF	L: ON H: OFF	CN2-3,4,5,6			
6	RMT1 ON/OFF Turns OFF PFC cell modules to set economy mode	L: ON H: OFF	PCU Sink current: 3.5 mA Max. open collector			

• Remote control <configured by four channels consist of CN2's pins 3 to 6>

• Alarm signals <configured by two channels consist of CN2's pins 7 and 8>

CN2 Pin No.	Item	Logic (TTL level)	Interface
7	Alarm Alarm signal is output when specified time has elapsed following alarm detection	L: Normal H: Abnormal	CN2-1 +5V STB CN2-7,8 Alarm AC power
8*	AC power failure Signal is output when input voltage reduction or setup occur	L: AC voltage is abnormal (60 to 75 V AC or below) H: AC voltage is normal (70 to 80 V AC or above)	PCU SG CN2-2 Source current: 3.5 mA

* The fan alarm signal can be transmitted separately instead of the AC power fail signal.

For details, please contact Sanken.



Product Names

• Product names: The name is set as shown below for PCU Series products.

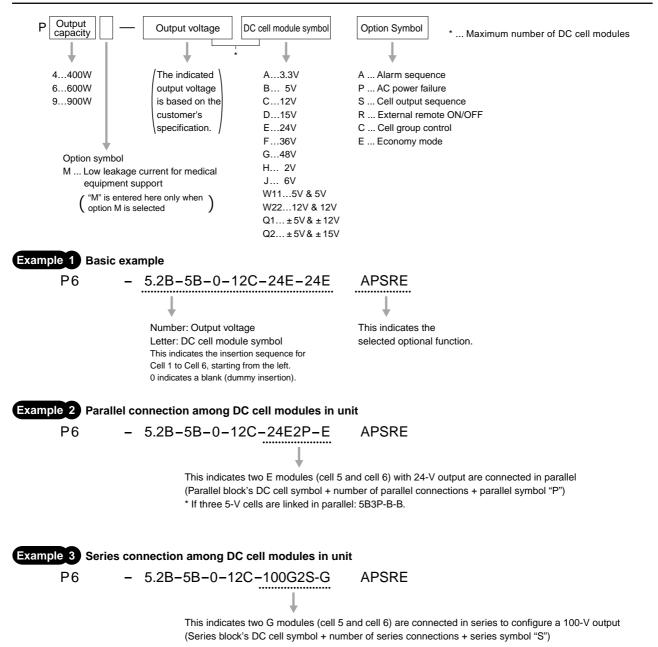


Example PCU600-10001

Registration number (five-digit numerical value)

Registration number is assigned to at Sanken for each of your ordering specifications.

• Product configuration names: The product configuration name is set as shown below to designate DC cell configurations and option configurations for PCU Series products.





Sample Order Sheet

From your company to Sanken

	Company name:	Address:					
	Division/Department:						
company	Contact person:						
-	Telephone number:	Email address:					
Your	Fax number:	Name of device or equipment used:					
	Application or purpose:						
	Other:						

	Input voltage			AC	ν (١	/~	V)		
	Output specifications	Cell 1	Cell 2	Cell 3	Cell 4	Cell 5	Cell 6	Cell 7	Cell 8	Cell 9
	Output voltage (V)									
	Output current (A)									
suc	Output capacity (W)									
catic	Total output capacity (W)		1							I
specifications	Optional functions	Alarm sequence		۲	Yes No		External remote ON/OFF		Yes	No
		AC power failure		١	Yes No		Cell group control		Yes	No
uest		Cell output sequence		١	Yes No		Economy mode		Yes	No
Request	Number of samples and requested delivery date Other									

From Sanken to your company

	Product name									
Proposal specifications	Product configuration name									
	Output specifications	Cell 1	Cell 2	Cell 3	Cell 4	Cell 5	Cell 6	Cell 7	Cell 8	Cell 9
	Output voltage (V)									
	Output current (A)									
	Output capacity (W)									
	Total output capacity (W)				1		I			1
-	Other									

MEMO

MEMO

MEMO

http://www.sanken-ele.co.jp/en/index.html

SANKEN ELECTRIC CO., LTD.

ISO9001/14001 certified

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Business product line-up: Switching power supplies,uninterruptible power supplies,motor control inverters, DC power units,high-intensity obstacle lights system,various types of power supply equipment,hybrid ICs,monolithic ICs,Hall ICs,transistors,MOS-FETs,thyristors, rectification diodes,Schottky barrier diodes,light-emitting diodes,and cold-cathode dischage tubes

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 For typographical reasons, the color tones of the products featured in this brochure may vary from those of the actual products.

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