

SANKEN SWITCHING POWER SUPPLIES

STANDARD SWITCHING POWER SUPPLIES CATALOG

SANKEN ELECTRIC CO., LTD.

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



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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Output Voltage 3.3V 5V 12V 15V 24V Output Input Voltage (V) **Output Power (W)** Series Name Page 100 CSJ 10, 15 17 100 CSH 25, 50, 100, 150 23 SSG 100 30, 50, 100, 150 33 SSH 100 25, 50, 100 43 SLS 60, 100, 150 53 100, wide input/input switching Single Output 15, 30, 50 61 **CWA** Wide 75, 100, 150 66 **SWA** 15, 30, 50, 100, 150 Wide 73 SWC Wide 50, 100 85 SWD Wide 60, 100, 150, 240 91 50 101 **HWA** Wide 100, 150, 300, 600 104 HWB 60W Wide/auto switching (60 W) 30.60W 15, 30, 60 109 Multi Output (2 channels) HWB 15, 30 Wide 114 100, 150 Wide SWE 121 9 cells 6 cells 5 cells Multi Output 2 V to 48 V single output, 2 channels (two models), 400 PCU Wide 600 and 4 channels (two models) are 127 900 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	ted 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 uaranteed constant voltage accuracy								
Rated output current	C current that can be supplied to a load from an output terminal								
Ripple	A component that is synchronous with the input frequency and switching frequency occurring between output terminals								
Noise	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 amount of variation divided by the rated output voltage) when any of the following phenomena occurs. These phenomena, listed as (a) to (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.





A ----- FCC Part 15-B Class A B ----- FCC Part 15-B Class B C ------ CISPR 22 Class A VCCI Class A EN 55022 Class A D ----- CISPR 22 Class B VCCI Class B EN 55022 Class B

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 \times 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 power 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	a	Output Power	Output Voltage		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	СЅН	25, 50, 100, 150		•	•	•	•	Low cost, PCB type, resonant-mode, compact, high efficiency, low noise	UL and CSA certified product	23
	100	SSG	30, 50, 100, 150		•	•	•	•	Thin, open frame, compact	UL and CSA certified product	33
	100	SSH	25, 50, 100		•	•	(Except100W	•	Resonant-mode, open frame, high efficiency, low noise, compact	UL and CSA certified product	43
	100 / wide-range switching	SLS	60, 100, 150 (switching)					•	Peak load support, open frame Mechatronics products (motors, solenoids, etc.), compact printer drivers	UL, CSA, TÜV certified products	53
out	Wide	CWA	15, 30, 50		•	•		•	Low cost, PCB type, includes power factor correction circuit (75 W to 150 W)	UL, C-UL, TÜV	61
outp			75, 100, 150			•		•	Computer-related equipment and office equipment	centilied products	
single o	Wide	SWA 15, 30, 50, 100, 150			•	•	•	•	Power factor correction circuit (100 W and 150 W), harmonic current control	UL, CSA, TÜV certified products	73
									equipment, gauge controllers		
	Wide	SWC	50, 100	•	•	•		•	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					•	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 		•	•		•	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 manuracturing 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
(2 channels)	Wide	HWB	15, 30		•		(±output)		Resonant-mode, ultra low-noise equivalent to dropper power supply Measuing 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
out 5 cells			400		·			·	Power factor correction circuit, complies with harmonic current control regulations, output can be configured freely when combined		
llti out 6 cells	Wide	PCU	600	Us 2 c 4 c in 0	e 2 V to channels channels combina	9 48 V sin s (two m s (two m ation as i	ngle out odels) o odels) necessa	put, ir ary	with a DC cell module, microprocessor-based sequence control, and various alarm functions Semiconductor manufacturing and	UL, C-UL, TÜV certified products	127
9 cells			900		In combination as necessary				testing equipment, factory automation controllers, computer peripherals, photographic laboratory system, medical equipment (CT, MRI, etc.)		

Selection Guide Based on Output Voltage

	Single Output Power Supplies									
Output Voltage (V)	Output Power (W)	Output Current (A)	Input Voltage (V)	Model	External Dimensions (W × D × H) (mm)	See page	Remarks			
33	50.0	10.0	Wide	SWC050-3R3	136 × 80 × 29	86				
0.0	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	19				
	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	VVide	SWA030-05	35 × 116 × 97	/5				
	30.0	6.0	Wide	HWB0305-05	34 × 136 × 92	62				
	50.0	10.0	100	CWA030-05	150 x 50 x 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				
Ŭ	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				
	150.0	30.0	100	CSH150-05	222 × 75 × 36	27				
	150.0	30.0	100	SSG150-05	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	1.3	Wide	SWA015-12	35 × 99 × 97	74				
	15.6	1.3	Wide	CWA015-12	125 × 50 × 22	62				
	25.2	2.1	100	CSH025-12	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 × 9/	/ 5 60				
	36.0	2.5	Wide	LWB0305-12	34 4 136 4 02	111				
	50.0	4.2	100	CSH050-12	150 x 50 x 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				
	62.4	5.2	100/200	HWB060S-12	38 ×170 × 92	112	Auto switching			
	75.6	6.3	Wide	CWA075-12	222 × 55 × 37	66	Peak: 8.1A			
	102.0	8.5	100	CSH100-12	222 × 62 × 32	26				
	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	VVide	SWA100-12	50 × 180 × 93	11	Deale 44.04			
	102.0	8.5	Wide	CWA100-12	222 × 62 × 3/	6/	Peak: 11.0A			
	102.0	0.0	100	SWC100-12	100 × 93 × 34	0/				
	150.0	12.5	Wide	CW/A050 12	222 × 10 × 30	68	Peak: 16 24			
	156.0	13.0	100	SSG150-12	93 × 177 × 57	37	1 Can. 10.2A			
	156.0	13.0	Wide	SWA050-12	65 × 200 × 93	76				

Selection Guide Based on Output Voltage

Single Output Power Supplies									
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./	100	CSH025-15	115 × 50 × 23	24			
	20.0	1./	100	55H025-15	90 × 68 × 25	44			
	30.0	2.0	Wide	SWA030-15	75 × 120 × 25	75			
	39.0	2.0	Wide	HWR030S-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	0.7	Wide	CWA015-24	125 × 50 × 22	62			
	26.4	1.1	100	CSH025-24	115 × 50 × 23	24			
	26.4	1.1	100	SSH025-24	90 × 68 × 25	44			
	31.2	1.3	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	55G050-24	90 × 135 × 25	35			
	50.4	2.1	Wide	SSH030-24	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	66	Peak: 4.1A		
27	84.0	3.5	Wide	HWB060S-24	38 ×170 × 92	112	Auto switching		
	96.0	4.0	100	SLS100P	160 × 98 × 40	56	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	D 1 5 5 4		
	103.2	4.3	100	CSH100-24	222 × 62 × 32	26	Peak: 5.5A		
	103.2	4.3	100	CWA100-24	222 × 62 × 37	0/			
	108.0	4.5	100	SSG100-24	125 x 02 x 22	30			
	108.0	4.5	Wide	SWA100-24	50 × 180 × 93	77	Peak: 15A		
	144.0	6.0	100/200	SI S150PW	220 × 98 × 52	56	Peak: 15A		
	144.0	6.0	Wide	SWD150P-24	220 × 98 × 52	94			
	151.2	6.3	100	CSH150-24	222 × 75 × 36	27	Peak: 8.1A		
	151.2	6.3	Wide	CWA150-24	222 × 75 × 42	68			
	156.0	6.5	100	SSG150-24	93 ×177 × 57	37			
	156.0	6.5	Wide	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	95			
	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	Madal	External Dimensions	C	Dementer			
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	Input Voltage (V)	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	
	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 / 3A, + 15V / 1A,	- 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]





	Specifications and Standards							
	54-	4-1		10	0W			
	IVIC	del	CSJ010-05	CSJ 010-12	CSJ010-15	CSJ010-24		
	Rated Input	t Voltage		AC100\	//AC120V			
	Allowable I	nput Voltage Range		AC85	to 132V			
us	Input Curre	ent (typ)		C).3A			
itio	Rated Freq	uency	50/60Hz					
put	Allowable F	Frequency Range		47 to	o 440Hz			
് ല്	Efficiency (typ)	72%	73%	75%	77%		
	Inrush Curr	rent (max) Note1		30 A (max	i) (at cold start)			
	Leakage Cu	urrent (max)		().3mA			
	Rated Outp	ut Voltage	5V	12V	12V	24V		
	Output Volt	age Variation		Rated output	t voltage ±10%			
Note:	Rated Outp	ut Current	2.0A	0.85A	0.85A	0.45A		
suo	Allowable O	utput Current Range		0 to	100%			
put diti	Rated Outp	ut Power	10.0W	10.2W	10.2W	10.8W		
Con	Constant V	oltage Accuracy		±	-3%			
	Ripple Nois	C Note2	120mVp-p	150mVp-p	150mVp-p	200mVp-p		
	Output Hole	ding Time (min)		17	msec			
	Startup Tim	ne (typ)	20msec					
	Overcurren	t Protection	Dete	ction above 105% of rate	ed current (automatic reco	overy)		
ons	Overvoltag	e Protection	D	etection above 115% of	rated voltage (output cuto	off)		
ditio	Remote ON/OFF Control			Not p	rovided			
Fun	Remote Se	nsing		Not p	rovided			
	Operations	Display		Not p	rovided			
	Operating To	emperature Range Note 4		-10 to 60 (70	0% load at 60)			
	Storage Temperature Range		-25 to +85					
	Operating I	lumidity Range	30 to 90% (no condensation)					
ital	Storage Hu	midity Range	30 to 90% (no condensation)					
nen ns	Cooling Re	quirements	Natural air cooling					
onr itio		No. of vibrations	10 to 55Hz					
ond n	Vibration	Sweep time		3 mi	inutes			
ūΰ	Resistance	Acceleration rate		19.6m	/s2 (2G)			
		Vibration direction			Y, Z			
	Installation	Conditions			due to mounting direction	<u> </u>		
	mstanation	Conditions		Derating may be required		1		
	Insulation	Between input and output	2000 V AC 1	for 1 minute or 2400 V A	C for 1 second (leakage cu	urrent: 15 mA)		
on	Withstand	Between input and FG			· · · · · · · · · · · · · · · · · · ·			
Ilati	vollage	Between output and FG	500 V AC 1	for 1 minute or 600 V AC	for 1 second (leakage cur	rent: 15 mA)		
ารน	Insulation	Between input and output		100 M (manuradu	with EOO \/ DC Maggar)			
	Resistance	Between input and FG		TOO IM (ITIEASUIEU)	with 500 v DC Megger)			
		Between output and FG						
7	External Ap	opearance		Single printe	ed circuit board			
ctur	Input Type			Con	nector			
otruc	Output Typ	e						
ards	External Di	mensions		94** x 49	= x 17" mm			
xterr and	Safety Stan	dards	UI 1950 CSA No. 950	certified designated to m	eet Electrical Appliance a	nd Materials Control Law		
ш х	Conducted	Emission	Designat	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.)

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 volta

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 0.65A 3.0A **Rated Output Current** 1.25A 1.0A Allowable Output Current Range 0 to 100% 15.0W 15.0W 15.0W 15.6W **Rated Output Power** ±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 Safety Standards UL1950, CSA No. 950 certified, designated to meet Electrical Appliance and Materials Control Law Ξ÷

Conducted Emission Designated to meet FCC Class B (100-120 V AC) and VCCI Class B

Mee 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.

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			
CN1	3	NC		XHP-7 (JST)	SXH-001T-P0 6
	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	
C/N2	2	+	(JST)	(JST)	

CSJ015 connector type

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







	Specifications and Standards							
	N/ -	ماما		25	5W			
	IVIO	aei	CSH025-05	CSH025-12	CSH025-15	CSH025-24		
	Rated Input	Voltage		AC100	//AC120V			
	Allowable I	nput Voltage Range		AC85	to 132V			
s	Input Curre	nt (typ)		0.64	V0.5A			
tior	Rated Freq	uency		50/	60Hz			
put	Allowable F	Frequency 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	5\/	121/	15\/	24\/		
	Output Volt	age Variation		Rated output	voltage +10%	241		
Note 3	Rated Outp	ut Current	5.0A	2.1A	1.7A	1.1A		
su	Allowable O	utput Current Range		0 to	100%			
litio	Rated Outp	ut Power	25.0W	25.2W	25.5W	26.4W		
utp ond	Constant V	oltage Accuracy		±	3%			
00	Ripple Nois	CE Note2	80mVp-p	100mVp-p	100mVp-p	100mVp-p		
	Output Hole	ding Time (min)		16n	nsec	1		
	Startup Tim	ie (typ)		400	nsec			
	Overcurren	t Protection	Detection above 105% of rated current (output cutoff)					
nal ns	Overvoltage Protection			Detection above 115% of	rated voltage (output cuto	off)		
itio	Remote ON/OFF Control			Not p	rovided	,,,,		
Fund	Remote Ser	nsing		Not p	rovided			
⋖╙	Operations	Display		Not p	rovided			
	Operating Tr	mporaturo Bango		10.1-				
	Storage Temperature Range			-10 to	+60 C			
	Operating H	lumidity Range	30 to 90% (no condensation)					
_	Storage Hu	midity Range	30 to 90% (no condensation)					
enta	Cooling Re	auirements	Natural air cooling					
ion	J	No. of vibrations	10 to 55Hz					
∕iro Adit		Sweep time	3 minutes					
Cor	Vibration	Acceleration rate		19.6m	/s²(2G)			
	Resistance	Vibration direction		Χ,	Y, Z			
		Vibration time		One hour in each	of three directions			
	Installation	Conditions		Derating may be required	I due to mounting directio	n		
	Insulation	Between input and output						
c	Withstand	Between input and FG		2000 V AC for 1 minute	(leakage current: 15 mA)			
atio	Voltage	Between output and FG		500 V AC for 1 minute	leakage current: 15 mA)			
sula		Between input and output			<u> </u>			
<u>ü</u>	Insulation Resistance	Between input and FG		100 M Ω (measured v	vith 500 V DC Megger)			
	Resistance	Between output and FG						
	External An	pearance		Single printo	d circuit board			
re/	Input Type	pearance						
rctu	Output Typ	e		Con	nector			
Stru Is	External Di	mensions		115 ^W x 50	^D x 23 ^H mm			
rnal daro	Weight			8	5g			
Exte	Safety Stan	dards	UL1950, CSA No. 950 (certified, designated to me	eet Electrical Appliance a	nd Materials Control Law		
-ш о	Conducted	Emission		Designated to meet FCC	Class B and VCCI Class	В		

Note1 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.

Kotes 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.

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

	Specifications and Standards							
	Mo	del		50	w			
	1010		CSH050-05	CSH050-12	CSH050-15	CSH050-24		
	Rated Input	Voltage		AC100\	//AC120V			
	Allowable I	nput Voltage Range		AC85	to 132V			
su	Input Curre	nt (typ)		1	.0A			
itio	Rated Freq	uency		50/	60Hz			
Indi	Allowable F	requency Range		47 to 440 Hz (rated	frequency: 50/60 Hz)	1		
్ చ	Efficiency (typ)	81%	86%	87%	90%		
	Inrush Curr	ent (max) Notes		30 A (max)	(at cold start)			
	Leakage Cu	irrent (max)	0.5mA					
	Rated Outp	ut Voltage	5V	12V	15V	24V		
8	Output Voltage Variati			Rated output	t voltage ±10%			
ki V	Rated Outp	ut Current	10.0A	4.2A	3.4A	2.1A		
ion	Allowable O	utput Current Range		0 to	100%			
tput 1dit	Rated Outp	ut Power	50.0W	50.4W	51.1W	50.4W		
Cort	Constant V	oltage Accuracy	00.00	±	3%	400		
	Ripple Nois		80mVp-p	100mVp-p	100mVp-p	100mVp-p		
	Stortup Tim	aing Time (min)		16msec				
	Startup Till	le (typ)	400msec					
s a	Overcurrent Protection		D	Detection above 105% of	rated current (output cuto	ff)		
ion	Remote ON/OFF Control		D	etection above 115% of	rated voltage (output cuto	ff)		
Addit Funct	Remote Sensing			Not p				
	Chorations	Display		Not p	rovided			
	operations	Display						
	Operating Te	emperature Range Note 4		-10 to) +60°C			
	Storage Ter	nperature Range	-25 to +85°C					
_	Operating F	lumidity Range	30 to 90% (no condensation)					
nta	Storage Hu	midity Range	30 to 90% (no condensation)					
ons	Cooling Re	No. of vibrations	Natural air cooling					
diti		Sween time	3 minutes					
Son	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	d due to mounting direction	n		
	Insulation	Between input and output						
c	Withstand	Between input and FG		2000 V AC for 1 minute	(leakage current: 15 mA)			
atio	Voltage	Between output and FG		500 V AC for 1 minute	(leakage current: 15 mA)			
sula	Inculation	Between input and output						
Ë	Resistance	Between input and FG		100 M Ω (measured v	vith 500 V DC Megger)			
	litoolotanoo	Between output and FG						
	External Ap	pearance		Single printe	d circuit board			
ure/	Input Type	-		Con	nector			
ruct	Output Typ	e		Con	nector			
al St rds	External Di	mensions		150 ^w x 50	^D x 25 ^H mm			
erna ndai	Weight			1:	50g			
Ext Stai	Safety Stan	dards	UL1950, CSA No. 950 c	ertified, designated to m	eet Electrical Appliance ar	nd Materials Control Law		
	Conducted	Emission	[Designated to meet FCC	Class B and VCCI Class	В		

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.

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.

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.



	Specifications and Standards							
	Mo	del		10	0W			
		uei	CSH100-05	CSH100-12	CSH100-15	CSH100-24		
	Rated Input	Voltage		AC100V	/AC120V			
	Allowable I	nput Voltage Range		AC85 t	o 132V			
SL	Input Curre	nt (typ)		2.	2A			
itio	Rated Freq	uency		50/6	60Hz			
put	Allowable F	requency Range		47 to 440 Hz (rated f	requency: 50/60 Hz)			
ن <u>ا</u>	Efficiency (typ)	82%	87%	90%	90%		
	Inrush Curr	ent (max) Note1		25A	(max)			
	Leakage Cu	irrent (max)	0.3mA					
	Rated Outp	ut Voltage	5V	12V	15V	24V		
a	Output Volt	age Variation		Rated output	voltage ±10%	·		
Note	Rated Outp	ut Current	20.0A	8.5A	7.0A	4.3A		
ions	Allowable O	utput Current Range		0 to 7	100%			
put	Rated Outp	ut Power	100.0W	102.0W	105.0W	103.2W		
Con	Constant V	oltage Accuracy		±3	8%			
	Ripple Nois	C Note 2	120mVp-p	150mVp-p	150mVp-p	200mVp-p		
	Output Hole	ding Time (min)		17n	nsec			
	Startup Tim	ie (typ)	500msec					
	Overcurren	t Protection	Ľ	Detection above 105% of r	ated current (output cuto	ff)		
ona ons	Overvoltage Protection		C	Detection above 115% of r	ated voltage (output cuto	ff)		
ditio	Remote ON/OFF Control			Not pr	ovided			
Add Fun	Remote Ser	nsing		Not pr	ovided			
	Operations	Display		Not pr	ovided			
	Operating Temperature Range Noted			-10 to	+60°C			
	Storage Ter	nperature Range	-25 to +85°C					
	Operating H	lumidity Range	30 to 90% (no condensation)					
Ital	Storage Hu	midity Range	30 to 90% (no condensation)					
ner	Cooling Re	quirements	Natural air cooling					
oni		No. of vibrations	10 to 55Hz					
nvir ond	Vibration	Sweep time	3 minutes					
шŏ	Resistance	Acceleration rate		19.6m/	s (2G)			
		Vibration direction		X, 1 One heurin eesh	$f, \boldsymbol{\angle}$			
	Installation	Conditions		Derating may be required	due to mounting direction	<u> </u>		
	Instantion	Contaitions		Derating may be required		1		
	Insulation	Between input and output		2000 V AC for 1 minute	leakage current: 15 mA)			
ion	Withstand	Between input and FG						
ılati	vollage	Between output and FG		500 V AC for 1 minute (eakage current: 15 mA)			
Insu	Insulation	Between input and output		100 MO (
	Resistance	Between input and FG		100 M Ω (measured w	th 500 V DC Megger)			
		Between output and FG						
10	External Ap	pearance		Single printed	l circuit board			
cture	Input Type	_		Conn	ector			
struc	Output Typ	e						
ards	External Di	nensions		222™ x 62 ^L	r x 32''mm			
terr and	Safety Ston	darde	111 1050 CSA No. 050 c	38 Sertified designated to ma	uy At Electrical Appliance or	d Materials Control Low		
с б ш	Conducted	Emission	UL1950, USA NU. 950 C	Designated to meet ECC (R		
	Jonaucieu	2111331011	L					

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, 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 Standards			
	Ma		150W				
	IVIO	dei	CSH150-05	CSH150-12	CSH150-15	CSH150-24	
	Rated Input	Voltage		AC100V	/AC120V		
	Allowable I	nput Voltage Range		AC85	to 132V		
SL	Input Curre	nt (typ)		3.	5A		
tior	Rated Freq	uency		50/	60Hz		
put	Allowable F	requency Range		47 to 440 Hz (rated	frequency: 50/60 Hz)		
ů <u>–</u>	Efficiency (typ)	78%	84%	86%	87%	
	Inrush Curr	ent (max) Note1		25A	(max)	•	
	Leakage Cu	ırrent (max)		0.3	BmA		
	Rated Outp	ut Voltage	5\/	12\/	151/	24\/	
	Output Volt	ane Variation	51	Rated output	voltage +10%	271	
Note 3	Rated Outp	ut Current	30 0A	12 5A		6.3A	
ns	Allowable O	utput Current Range	00.07	0 to	100%	0.071	
litio	Rated Outp	ut Power	100.0W	102.0W	105.0W	103.2W	
utp ond	Constant V	oltage Accuracy		±;	3%		
ŌŬ	Ripple Nois	C Note2	120mVp-p	150mVp-p	150mVp-p	200mVp-p	
	Output Hole	ding Time (min)		17r	nsec		
	Startup Tim	e (typ)		600r	nsec		
Overcurrent Brotection			Detection above 1050(of rated surrent (submit substit)				
lal IS	Overvoltage Protection			Detection above 105% of	rated current (output cuto	(1) (ff)	
tion	Remote ON/OFF Control		L	Not pr	raied vollage (output cuto	ni)	
Func	Remote Sensing			Not pr	ovided		
	Operations	Display		Not pi	ovided		
		· · ·					
	Operating Te		- 10 10 +00 C				
	Storage Tel	nperature Range	-25 t0 +85 U 30 to 90% (no condensation)				
_	Operating r	midity Range	30 to 90% (no condensation)				
inta	Cooling Po	multy Kange	30 to 90% (no condensation)				
ons	Cooling Re	No. of vibrations	Natural air cooling				
iror diti		Sween time					
invi Son	Vibration	Acceleration rate		19 6m	(s ² (2G)		
	Resistance	Vibration direction		X	Y 7		
		Vibration time		One hour in each	of three directions		
	Installation	Conditions		Derating may be required	due to mounting direction	n	
		Defusion innut and and			0		
	Insulation	Between input and output		2000 V AC for 1 minute	(leakage current: 15 mA)		
tion	Voltage	Between input and FG		EOO V AC for 1 minute (lookago ourront: 15 mA)		
ulat	· •····g•	Between output and FG		500 V AC IOI T MINULE (leakage current. 15 mA)		
Insi	Insulation	Between input and EG		100 MO (mossured w	ith 500 V/ DC Maggar)		
	Resistance	Between output and FG		100 Misz (measured w	Ith 500 v DC Megger)		
		Sourcen carpar and I G					
e/	External Ap	pearance		Single printed	d circuit board		
ctur	Input Type			Conr	nector		
Stru	Externel D	t monoiono					
าal S ards	Weight	nensions		ZZZ'' X /5			
kterr and	Safety Stan	dards	111 1950 CSA No 050 /	22 Pertified designated to ma	.vy Net Electrical Appliance of	nd Materials Control Low	
δũ	Conducted	Emission	0E1300, COA NO. 300 (Designated to meet FCC		R	
	Jonaucieu	Linission					

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		
CN1	1	AC (L)				
	2	NC				
	3	NC				
	4	AC (N)	XHP-7	SXH-001T-P0.6 or BXT-001T-P0.6 (JST)		
	5	NC	(331)			
	6	NC				
	7	FG				
010	1 to 2	-	XHP-4			
CINZ	3 to 4	+	(JST)			

CSH050, CSH100, CSH150 connector types

	Model	Symbol	Pin No.	Terminal name	Corresponding connector	Corresponding contact	
			1	AC (L)			
			2	NC			
Input	Common	CN1	3	AC (N)	VHR-5N SVH-21T-P1 (JST) (JST)	SVH-21T-P1.1 (JST)	
			4	NC			
			5	FG			
	CSH050	CNID	1 to 2	-	VHR-4N (JST)		
			3 to 4	+			
	001400	CN2	1 to 4	-	VHR-8N (JST) SVH-211		
Output	CSH100	CSH100 CINZ	5 to 8	+		SVH-21T-P1.1	
	CSH150	CN2	1 to 6	+	VHR-6N (JST)	(331)	
		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						
				30	W		
	Мо	del	SSG030-05	SSG030-12	SSG030-15	SSG030-24	
	Rated Input	Voltage		AC100V	AC120V		
	Allowable I	nput Voltage Range		AC85 1	o 132V		
SL	Input Curre	nt (typ)		0.1	7A		
tio	Rated Frequ	uency		50/6	60Hz		
out ndi	Allowable F	requency Range		47 to -	440Hz		
S II	Efficiency (typ)	75%	78%	78%	80%	
	Inrush Curr	ent (max) Note1		30A	(max)		
	Leakage Cu	irrent (max)		0.4	mA		
	Rated Outp	ut Voltage	51/	12\/	15\/	24\/	
	Output Volt	age Variation	01	Rated output	voltage +10%	240	
Note	Rated Outp	ut Current	6.0A	2.5A	2.0A	1.3A	
suc	Allowable Output Current Range		0.07.1	0 to 1	100%		
litic	Rated Outp	ut Power	30.0W	30.0W	30.0W	31.2W	
utp onc	Constant V	oltage Accuracy		±3	3%		
ŌŬ	Ripple Nois	e Note 2	120mVp-p	150mVp-p	150mVp-p	200mVp-p	
	Output Hole	ding Time (min)		16n	nsec		
Startup Time (typ)			400msec				
	Overcurren	t Protection		Detection above 10	15% of rated current		
nal ns	Overvoltage Protection		Detection from 115 to 135% of rated voltage				
itio	Remote ON	/OFF Control		Not pr	ovided		
qqi	Remote Ser	nsing		Not pr	ovided		
⋖╙	Operations	Display		Red LED	indicator		
	Operating T	omporatura Banga		0.4- · 50°O (0.4-	40°O		
	Storage Ter	emperature Range		0 to +50 C (0 to -			
	Operating Humidity Pange		30 to 90% (no condensation)				
a	Storage Hu	midity Pange	30 to 90% (no condensation)				
ent:	Cooling Re	muity Kange	Natural air cooling				
ion	ocomig rec	No. of vibrations	10 to 55Hz				
iror diti		Sweep time	1.5 minutes				
N N	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	1	
	Inculation	Between input and output					
c	Withstand	Between input and EG		2000 V AC	for 1 minute		
tio	Voltage	Between output and FG		500 V AC f	or 1 minute		
inla		Between input and output					
lns	Insulation	Between input and FG		100 MQ (measured w	ith 500 V DC Meager)		
	Resistance	Between output and FG					
	Extornal An	noaranco		With choosis (or	aver is optional)		
Ire/	Innut Type	pearance					
nctt		e		Connector (terming	al stand is optional)		
Stri Is	External Di	mensions		75 ^W x 120 ^L	x 25 ^H mm		
nal lard	Weight			25	0a		
xter tanc	Safety Stan	dards		UL1950. CSA F	B1402C certified		
шw	Conducted	Emission		Designated to m	eet FCC Class B		
	Terminal Of						
suo	Changinal St	and		Prov			
Optie	Cover			Provided a	is standard		

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.

Specifications and Standards								
Model			50	W				
	1010		SSG050-05	SSG050-12	SSG050-15	SSG050-24		
	Rated Input	Voltage	AC100V/AC120V					
	Allowable I	nput Voltage Range	AC85 to 132V					
ns	Input Curre	nt (typ)	1.3A					
itio	Rated Freq	uency		50/6	60Hz			
pud	Allowable F	requency Range	47 to 440Hz					
lnp Cor	Efficiency (typ)	75%	77%	79%	81%		
	Inrush Curr	ent (max) 🔤	30A (max)					
	Leakage Cu	irrent (max)		0.4	mA			
	Rated Outp	ut Voltage	5V	12V	15V	24V		
E.	Output Volt	age Variation		Rated output	voltage ±10%			
ĭ N	Rated Outp	ut Current	10.0A	4.2A	3.4A	2.1A		
ion	Allowable O	utput Current Range		0 to	100%			
put	Rated Outp	ut Power	50.0W	50.4W	51.0W	50.4W		
Cort	Constant V	oltage Accuracy	(00.)/	±(3%			
	Ripple Nois		120mVp-p	150mVp-p	150mVp-p	200mVp-p		
	Startup Time (tvp)		16msec					
		t Protoction						
ns	Overvoltage Protection		Detection above 105% of rated current					
tior	Bomoto ON/OFE Control		Detection from 115 to 135% of rated voltage					
ddi	Remote Sensing		Not provided					
ΑĒ	Operations Display		Red LED indicator					
	On a retin a T	ammanatura Damma						
	Storage Temperature Range		-25 to +86°C					
	Operating Humidity Pange		30 to 90% (no condensation)					
a	Storage Hu	midity Range	30 to 90% (no condensation)					
ent s	Cooling Re	quirements	Natural air cooling					
nm ion	J	No. of vibrations	10 to 55Hz					
'iro ndit		Sweep time	1.5 minutes					
Cor	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					
	Insulation	Between input and output		2000 V AC	for 1 minute			
ion	Withstand	Between input and FG		500.1/10/				
ulat	voltage	Between output and FG		500 V AC f	or 1 minute			
ารน	Insulation	Between input and output		400 MO (
_	Resistance	Between input and FG		100 MI22 (measured w	ith 500 V DC Megger)			
		Between output and FG						
/e/	External Ap	pearance		With chassis (c	over is optional)			
Ictu				Connector (termina	al stand is optional)			
Stru	External Di	mensions			ai stand is optional)			
nal Jard	Weight			30 × 133	0a			
xter tanc	Safety Stan	dards		UL1950. CSA F	-s B1402C certified			
ы́	Conducted	Emission		Designated to m	eet FCC Class B			
6	Terminal St	and			iidad			
ion:	Chaseie			Provided a	nueu as standard			
Opt	Cover				/ided			
	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.

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 100W Model SSG100-05 SSG100-12 SSG100-15 SSG100-24 **Rated Input Voltage** AC100V/AC120V Allowable Input Voltage Range AC85 to 132V Input Current (typ) 2.0A **Rated Frequency** 50/60Hz **Allowable Frequency Range** 47 to 440Hz Efficiency (typ) 79% 83% 84% 86% Inrush Current (max) Notes 20A (max) Leakage Current (max) 0.4mA **Rated Output Voltage** 5V 12V 15V 24V **Output Voltage Variation** Rated output voltage ±10% Note 3 **Rated Output Current** 20.0A 4.5A 8.5A 7.0A Allowable Output Current Range 0 to 100% Output Conditi **Rated Output Power** 108.0W 100.0W 102.0W 105.0W +3% **Constant Voltage Accuracy** 120mVp-p 180mVp-p 240mVp-p Ripple Noise Note2 180mVp-p **Output Holding Time (min)** 20msec Startup Time (typ) 300msec **Overcurrent Protection** Detection above 105% of rated current **Aditiona Overvoltage Protection** Detection from 115 to 135% of rated voltage **Remote ON/OFF Control** Not provided **Remote Sensing** Available **Operations Display** Red LED indicator **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** Environmental 30 to 90% (no condensation) **Cooling Requirements** Natural air cooling No. of vibrations 10 to 55Hz Sweep time 1.5 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 Insulation 2000 V AC for 1 minute Withstand Between input and FG Voltage Between output and FG 500 V AC for 1 minute Between input and output Insulation Resistance Between input and FG 100 MΩ (measured with 500 V DC Megger) Between output and FG **External Appearance** With chassis (cover is optional) Structure Input Type Terminal stand **Output Type** Terminal stand **External Dimensions** 93^W x 160^D x 40^H mm Weight 470g Safety Standards UL1950, CSA No. 234 certified Жų **Conducted Emission** Designated to meet FCC Class A Chassis Provided as standard Cover Provided

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

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.

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

: Please contact Sanken for delivery time in advance.

Specifications and Standards								
Model			15	ow	_			
	inic		SSG150-05	SSG150-12	SSG150-15	SSG150-24		
	Rated Input	t Voltage	AC100V/AC120V					
	Allowable I	nput Voltage Range	AC85 to 1201					
SL	Input Curre	nt (typ)	3.5A					
tion	Rated Freg	uency	50/60Hz					
out	Allowable F	Frequency Range	47 to 440Hz					
S P	Efficiency (typ)		79%	83%	84%	86%		
	Inrush Curr	ent (max) Noted	20A (max)					
	Leakage Current (max)			0.4	1mA			
	Rated Outp	ut Voltage	5V 12V 15V 24V					
R	Output Volt	age Variation		Rated output	voltage ±10%			
Ko	Rated Outp	ut Current	30.0A	13.0A	10.0A	6.5A		
ons	Allowable O	utput Current Range		0 to	100%			
out	Rated Outp	ut Power	150.0W	156.0W	150.0W	156.0W		
onth	Constant V	oltage Accuracy		±	3%			
00	Ripple Nois	Ce Note 2	120mVp-p	180mVp-p	180mVp-p	240mVp-p		
	Output Holding Time (min)			201	msec			
	Startup Time (typ)			300	msec			
0	Overcurren	t Protection		Detection above 1	05% of rated current			
ons	Overvoltag	e Protection	Detection from 115 to 135% of rated voltage					
ditio	Remote ON	/OFF Control	Not provided					
Fur	Remote Sensing		Available					
	Operations Display		Red LED indicator					
	Operating Temperature Range		0 to +50°C (0 to +40°C with cover)					
	Storage Temperature Range		-25 to +85°C					
	Operating H	lumidity Range	30 to 90% (no condensation)					
ıtal	Storage Hu	midity Range	30 to 90% (no condensation)					
ner ns	Cooling Re	quirements	Natural air cooling					
onr itio		No. of vibrations		10 to	55Hz			
vire	Vibration	Sweep time	1.5 minutes					
С Щ	Resistance	Acceleration rate	19.6m/s² (2G)					
		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						
uo	Withstand	Between input and FG		2000 V AC				
ati	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 w	vith 500 V DC Megger)			
		Between output and FG						
e/	External Ap	opearance		With chassis (c	over is optional)			
tur	Input Type			Termin	al stand			
truc	Output Typ	e		Termin	al stand			
al S ards	External Di	mensions		93 ^w x 177	^D x 57 ^H mm			
tern Inda	Weight	dan da		83	30g			
Sta	Sarety Stan	aaras Emission		UL1950, CSA	NO. 234 Certified			
Ś	Chassie							
otion	Chassis			Provided a	as standard			
ö	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.

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

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.







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

External Dimensions

(unit: mm)





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

Option

Symbol at end of 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 (JST)	
SSG030 type		3, 4	0V			
	CN3	1	FG	#250 Fasten receptacle		
	CNI2	1 to 3	+ V	VHR-6N	SVH-21T-P1.1	
SSG050 type	CNZ	4 to 6	0V	(JST)	(JST)	
	CN3	1	FG	#250 Fas	sten receptacle	

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

Model	Pin	Name	Corresponding crimp terminal	
	1	FG		
	2	AC (N)		
SSG030 type	3	AC (L)	V1.25-3 (JST) or equivalent	
SSG050 type	4	+ V		
	5	0V		
	1	FG		
	2	AC (N)		
	3	AC (L)		
SSG100 type	4	+ S	V2-4 (JST) or equivalent	
330 130 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.)		
Output	+ V	DC output terminal. Use these terminals for		
	0V	connection to the load.		
	+ 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

	Specifications and Standards							
Model		25W						
	Model		SSH025-05	SSH025-12	SSH025-15	SSH025-24		
	Rated Input Voltage			AC100V	AC120V			
	Allowable li	nput Voltage Range		AC85 t	o 132V			
JS	Input Curre	nt (typ)		0.6A/	0.5A			
tio	Rated Frequ	uency		50/6	0Hz			
but	Allowable F	requency Range		47 to 4	140Hz			
Input Cond	Efficiency (tvp)	80%	83%	84%	85%		
	Inrush Curr	ent (max) Note1		30A	(max)			
	Leakage Current (max)			0.3	mA			
	Rated Outp	ut Voltage	5\/	12\/	15\/	24\/		
	Output Volt	age Variation		Rated output	voltare +10%	240		
Note :	Rated Outn	ut Current	5 0A	2 1 A	1 7A	1 1 A		
su		utput Current Range	0.07		100%			
litio	Rated Outp	ut Power	25W	25.2W	25.5W	26.4W		
utp	Constant V		2011	+3	%	20.111		
ဝိပိ	Ripple Nois		80mVp-p	100mVp-p	100mVp-p	100mVp-p		
	Output Holding Time (min)			16n	ISEC	100111111		
	Startup Time (typ)			400n	isec			
	Overeurren	t Protoction						
lal IS	Overcurrent Protection		Detection above 105% of rated current (output cutoff)					
tion	Overvoitage Protection		Detection above 115% of rated voltage (output cutoff)					
ldit	Remote ON/OFF Control		Not provided					
ΡĹ	Operations	Display	Red I ED indicator					
	Operating Temperature Range		0 to +60°C					
	Storage Ter	nperature Range	-25 to +85°C					
_	Operating Humidity Range		30 to 90% (no condensation)					
nta	Storage Hu	midity Range	30 to 90% (no condensation)					
me	Cooling Re	quirements	Natural air cooling					
on		No. of vibrations	10 to 55Hz					
nvir Dnd	Vibration	Sweep time		3 mir	nutes			
шŏ	Resistance	Acceleration rate	19.6m/s² (2G)					
		Vibration direction	X, Y, Z					
	lu stallation	Vibration time	One hour in each of three directions					
	Installation	Conditions	Derating may be required due to mounting direction					
	Insulation	Between input and output	20	00 V AC for 1 minute (leal	kage current: 15 mA or le	ss)		
ion	Withstand	Between input and FG))))))))))))))))))))))))))))))))))))))		,		
ulat	voltage	Between output and FG	51	0 V AC for 1 minute (leak	age current: 15 mA or les	is)		
nsu	Insulation	Between input and output		100 MO (
	Resistance	Between Input and FG		100 MO2 (measured wi	th 500 V DC Megger)			
		Between output and FG						
e/	External Ap	pearance		With chassis (co	over is optional)			
stur	Input Type			Terminal stand (co	nnector is optional)			
truc	Output Typ	8		Terminal stand (co	nnector is optional)			
al S ards	External Di	mensions		90 ^w x 68 ^D	x 25 ^H mm			
ern Inda	Weight			17	Ug			
Sta	Safety Stan	dards		UL1950, CSA N	IO. 950 certified			
	Conducted	Emission		Designated to meet F	UC Class B (120 V AC)			
su	Remote ON	/OFF Control		Not pr	ovided			
ptio	I/O Connect	tor		Prov	rided			
d	Cover			Prov	rided			

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.

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,

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.



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

Specifications and Standards

	Specifications and Standards							
Model		50W						
	Model Rated Input Voltage		SSH050-05	SSH050-12	SSH050-15	SSH050-24		
	Rated Input Voltage		AC100\//AC120\/					
	Allowable li	nput Voltage Range	AC85 to 1321/					
JS	Input Curre	nt (typ)		1.0A/	0.9A			
tior	Rated Frequ	uency	50/60H7					
dit	Allowable F	requency Range	47 to ///0Hz					
Inp Con	Efficiency (tvp)	81%	86%	87%	90%		
	Inrush Curr	ent (max) Non	30% 00% 01%					
	Leakage Cu	irrent (max)	0.3mA					
	Rated Outp	ut Voltage	5V	12V	15V	24V		
	Output Volt	age Variation		Rated output	voltage +10%			
Note	Rated Outp	ut Current	10A	4.2A	3.4A	2.1A		
suc	Allowable O	utput Current Range		0 to 1	100%			
Output Conditio	Rated Outp	ut Power	50W	50.4W	51W	50.4W		
	Constant V	oltage Accuracy		±3	%			
	Ripple Nois	e Note 2	80mVp-p	100mVp-p	100mVp-p	100mVp-p		
	Output Holding Time (min)			16m	isec			
	Startup Time (typ)		400msec					
	Overcurren	t Protection	Detection above 105% of roted current (output outoff)					
nal ns	Overvoltage Protection		Detection above 105% of rated voltage (output cutoff)					
tio	Remote ON	OFF Control	Not provided					
ddi	Remote Ser	nsing	Not provided					
ΑĒ	Operations Display		Red LED indicator					
	eperanene							
	Operating Te	emperature Range	0 to +60 C					
	Storage Temperature Range		-25 to +85°C					
	Operating Humidity Range		30 to 90% (no condensation)					
nta	Storage Hu	midity Range	30 to 90% (no condensation)					
me	Cooling Re	quirements	Natural air cooling					
on		No. of vibrations						
nvir Dnd	Vibration	Sweep time	3 minutes					
ыõ	Resistance	Acceleration rate	19.6m/s² (2G)					
		Vibration direction	X, Y, Z					
	Installation	Vibration time	One hour in each of three directions					
	mətanation	Conditions		Derating may be required		l		
_	Insulation	Between input and output	20	00 V AC for 1 minute (leal	age current: 15 mA or le	ss)		
tion	Withstand	Between input and FG	E	0 V AC for 1 minute (look	and ourrents 15 mA or los			
llat	voltage	Between output and FG	50	JU V AC IOF I MINUte (leak	age current: 15 mA or les	55)		
ารน	Insulation	Between input and output		100 MO (
_	Resistance	Between input and FG		$100 \text{ M}\Omega$ (measured wi	th 500 V DC Megger)			
		Between output and FG						
e/	External Ap	pearance		With chassis (co	over is optional)			
tur	Input Type			Terminal stand (cor	nnector is optional)			
truc	Output Typ	e		Terminal stand (cor	nnector is optional)			
al S Irds	External Di	mensions		110 ^W x 75 ^D	x 29 ^H mm			
erna	Weight			220	Og			
Ext Sta	Safety Stan	dards		UL1950, CSA N	Io. 950 certified			
	Conducted	Emission		Designated to meet Fo	CC Class B (120 V AC)			
su	Remote ON	/OFF Control		Not pr	ovided			
ptio	I/O Connect	tor		Prov	ided			
ō	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.

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,

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.



	Specifications and Standards							
	84 -	alal		100W				
	IVIO	dei	SSH100-05	SSH100-12	SSH100-24			
	Rated Input	Voltage						
	Allowable I	nput Voltage Range		AC85 to 132V				
su	Input Curre	nt (typ)		2.0A/1.8A				
tion	Rated Frequ	uency		50/60Hz				
put	Allowable Frequency Range			47 to 440Hz				
Cor	Efficiency (typ)	82%	87%	90%			
	Inrush Curr	ent (max) 🔤		30A (max)				
	Leakage Current (max)			0.3mA				
	Rated Outp	ut Voltage	5V	12V	24V			
Se S	Output Volt	age Variation		Rated output voltage ±10%				
s	Rated Outp	ut Current	20A (18A) Note 4	8.5A	4.5A			
tior	Allowable O	utput Current Range		0 to 100%				
tpu	Rated Outp	ut Power	100W	102W	108W			
C C C	Constant V	oltage Accuracy		±3%	100m)/n n			
	Ripple Nois		80түр-р	100mvp-p	TOOMvp-p			
	Startup Time (typ)			280msec				
		t Protection						
ns ns	Overvoltage	Protection	Detection above 105% or rated current (output cutoff)					
tio	Remote ON	OFF Control						
Addi Func	Remote Sensing		Provided					
	Operations Display		Red LED indicator					
	Operating Temperature Range 1999		0 to +60°C					
	Storage Temperature Range		-25 to +85°C					
	Operating F	lumidity Range	30 to 90% (no condensation)					
tal	Storage Hu	midity Range	30 to 90% (no condensation)					
nen 1s	Cooling Re	quirements	Natural air cooling					
tioi		No. of vibrations	10 to 55Hz					
vire	Vibration	Sweep time		3 minutes				
се	Resistance	Acceleration rate		19.6m/s² (2G)				
		Vibration direction	X, Y, Z					
	Installation	Vibration time		One hour in each of three direction	S			
	Installation	Conditions	Derating may be required due to mounting direction					
_	Insulation Withstand	Between input and output	2000 V AC for 1 minute (leakage current: 15 mA or less)					
tion	Voltage	Between output and FG	500 V AC	for 1 minute (leakage current: 15 m	A or less)			
sula		Between input and output						
lns	Insulation	Between input and FG	100	M Ω (measured with 500 V DC Meg	jger)			
	Resistance	Between output and FG						
7	External Appearance		With chassis (cover is optional)					
ture	Input Type			Terminal stand				
truc	Output Typ	e		Terminal stand				
al S Irds	External Di	mensions		135 ^w x 93 ^D x 33 ^H mm				
tern Inda	Weight	danda		420g				
Sta	Safety Stan	aards Emission	D 1	UL1950, USA No. 950 certified	V(AC)			
	Conducted	EIIIISSIUII	Desi	Ignated to meet FUC Class B (120	V AG)			
suo	Remote ON	OFF Control		Not provided				
Dptic	I/O Connect	tor		Not provided				
0	Cover			Provided				

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.

 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.

Note4 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











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	
CN1	1	FG		SVH-21T-P1.1 (JST)	
	2	NC			
	3	AC (N)	VHR-5N (JST)		
	4	NC	(001)		
	5	AC (L)			
CN2	1, 2	+	VHR-4N	SVH-21T-P1.1	
	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								
	84-	-1-1	60	W				
	IVIO	del	SLS060P	SLS060PH				
	Rated Input	Voltage	AC100\//AC120\/	AC2001//AC2401/				
		nput Voltage Range	AC 85 to 132V	AC170 to 264V				
s	Input Curre	nt (typ)	1 2A 0.84					
ion	Rated Frequency		50/6	0Hz				
git rt		Frequency Range	47 to	63Hz				
du	Efficiency (tvn)	47 10 03 172					
	Inrush Curr	cyp/	304 404					
			0.5mA	40A				
	Leakage Current (max)		0.511A	0.7511A				
	Rated Outp	ut Voltage	5V	24V				
	Output Volt	age Variation	Fix	ed				
2 v	Rated Outp	ut Current	2.5	5A				
on	Maximum F	Peak Current	6A (within	n 15 sec)				
diti	Allowable O	utput Current Range	0 to	2.5A				
ont	Rated Outp	ut Power	60	W				
00	Constant V	oltage Accuracy Note 2	±5	%				
	Ripple Nois	ie	300m	Vp-p				
	Output Hole	ding Time (min)	20m	sec				
	Overcurren	t Protection	Detection above 105% of peal	k current (automatic recovery)				
lal 1s	Overvoltage	e Protection	115 to 145% (output cutoff)	110 to 145% (output cutoff)				
tion	Overheatin	g Protection	Not provided					
ldid	Remote ON	OFF Control	Not provided					
Ac	Remote Sensing		Not provided					
Operations Display		Display	Not pro	Not provided				
Operating Temperature Range Miles		emperature Range Note4	0 to +50°C					
Storage Temperature Range		nperature Range	-25 to +80°C					
	Operating Humidity Range		30 to 90% (no condensation)					
a	Storage Humidity Range		30 to 90% (no condensation)					
s	Cooling Requirements		Natural air cooling					
un n	No of vibrations		5 to 100Hz 10 to 55Hz					
diti		Sweep time	3 minutes	1.5 minutes				
	Vibration	Acceleration rate	14.7m/s ² (1.5G)	19.6m/s² (2G)				
шО	Resistance	Vibration direction	<u> </u>					
		Vibration time	One hour in each of three directions					
	Installation	Conditions	10 G (3 times each in t	the X, Y, Z directions)				
	Installation	Conditions	Derating may be required due to mounting direction					
		Detween innut and and the		5				
	Insulation	Between input and output	1500 V AC f	or 1 minute				
tio	Voltage	Between input and FG	EOO V AC for 1 minute of	600 V AC for 1 second				
nlat I	Vollage	Between output and FG	500 V AC IOI T ITIITULE OI	800 V AC IOI I Second				
nsı	Insulation	Between input and output						
	Resistance	Between input and FG	100 M22 (measured wi	th 500 V DC Megger)				
		Between output and FG						
External Appearance		opearance	With c	hassis				
7	Input Type		Conn	ector				
tur	Output Typ	e	Conn	ector				
truc	External Di	mensions	160 ^W x 80 ^D	x 40 ^H mm				
al St rds	Weight		400	Ŋġ				
Externa	Safety Stan	dards	Designated to meet UL1950 D3, CSA EB 1402C	TÜV (EN60950) certified				
<u>ш</u> 07	Conducted	Emission	Designated to meet FCC Class B and VCCI Class B	Designated to meet CISPR22 Class B				
su	Remote ON	/OFF Control	Not pro	bvided				
Optio	Cover		Not pro	ovided				

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.

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

	Specifications and Standards							
	Mo	del	10	0W	150W			
			SLS100P	SLS100PH	SLS150PW			
	Rated Input	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	nt (typ)	2.3A	1.2A	4.2A			
litic t	Rated Freq	uency		50/6	60Hz			
ndr	Allowable Frequency Range		47 to 63Hz					
- O	Efficiency (typ)	201	80%				
	Inrush Current (max)		30A	40A	20A/50A			
Leakage Current (max)								
	Rated Outp	ut Voltage		24	4V			
lote 3	Output Volt	age Variation		Fix	ked			
su	Rated Outp	ut Current	4.		6A 15 A (within 15 and)			
itio		reak Current			0.1 to 150			
ndipu	Rated Outp	ut Power	96	W	144W			
ဝိ ပိ	Constant V	oltage Accuracy Mee		+4	5%			
	Ripple Nois	ie	250mVp-p		400mVp-p			
	Output Hole	ding Time (min)		20n	nsec			
	Overcurren	t Protection	Detection above 105% of peak current (automatic recovery)					
<u>s</u> a	Overvoltage	e Protection	115 to 145% (output cutoff)	110 to 145% (output cutoff)	110 to 145% (output cutoff)			
Addition Function	Overheating	g Protection		Not pr	ovided			
	Remote ON	/OFF Control	Not p	rovided	Provided Note 4			
	Remote Sensing		Not provided					
	Operations Display		Not provided					
	Operating Temperature Range		0 to +50°C					
	Storage Temperature Range		-25 to +80°C					
	Operating Humidity Range		30 to 90% (no condensation)					
ntal	Storage Hu	midity Range	30 to 90% (no condensation)					
me	Cooling Re	quirements	Natural air cooling					
ditio		No. of vibrations	5 to 100Hz	10 to 55HZ	1.5 minutes			
invi	Vibration	Acceleration rate	14 7m/s ² (1 5G)		19 6m/s (2G)			
шО	Resistance	Vibration direction		X.`	Y. Z			
		Vibration time		One hour in each	of three directions			
	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	4500.1/10	fan 4 mainte				
5	Withstand	Between input and FG	1500 V AC	for 1 minute	2000 V AC for 1 minute or 2400 V AC for 1 second			
latic	Voltage	Between output and FG		500 V AC for 1 minute o	r 600 V AC for 1 second			
nsu	Insulation	Between input and output						
<u> </u>	Resistance	Between input and FG		100 M Ω (measured w	ith 500 V DC Megger)			
		Between output and FG						
	External Ap	pearance		With c	hassis			
le/	Input Type		Conr	nector	Terminal stand			
Ictu	Extornal Di	e	160W × 08	Conr x 40 ^H mm				
Stru	Weight		50	0a	850a			
ternal andarc	Safety Stan	dards	UL1950 D3, CSA EB 1402C certified	TÜV (EN60950) certified	UL1950, CSA No. 950, TÜV (EN60950) certified			
ά ដ	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			
suc	Remote ON	/OFF Control	Not pr	ovided	Provided as standard			
Opti	Cover		•	Not pr	ovided			

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

SLSPeak Power Series

60W,100W,150W

External Dimensions





SLSPeak Power 60W,100W,150W

Operating Instruction

1 Terminal connection

SLS060P(H), SLS100P(H)

	Model	Connector	Pin arr	angement	Corresponding housing	Corresponding contact
			1	AC (L)		
	SLS 060P 060PH 100P 100PH		2	(NC)		- SHV-21T-P1.1 (JST)
put		CN1	3	AC (N)	VHR-5N (JST)	
-		100PH	4	(NC)	()	
			5	FG		
		0P 0PH CN2	1	+ 24V		
	SLS 060P		2		VHR-4N	
put	Output Output		3	0)((JST)	
Out			4	00		
	SLS 100P	CNI2	1 to 3	+ 24V	VHR-6N	
	100PH	CINZ	4 to 6	0V	(JST)	

SLS150PW

Symbol	Pin No.	Terminal name	Corresponding connector
	1	AC (N)	
TB1	2	AC (L)	M4 terminal
	3	FG	
014	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



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

Model	Output	Output voltage		Itage	Circuit type
Wouer	power	5V	12V	24V	Circuit type
WA015	15W				RCC type
WA030	30W				Flyback type
WA050	50W				Flyback type
WA075	75W	\nearrow			Resonant-mode (active PFC)
WA100	100W				Resonant-mode (active PFC)
WA150	150W	\nearrow			Resonant-mode (active PFC)
	Model WA015 WA030 WA050 WA075 WA100 WA150	Model Output power XWA015 15W XWA030 30W XWA050 50W XWA075 75W XWA100 100W XWA150 150W	Model Down Support System SWA015 15W 5W 5W <td>Model Output vol power SV 12V SWA015 15W 15W 15W SWA030 30W SWA050 SOW SWA075 75W SWA100 100W SWA150 150W SWA150 SOW</td> <td>Model Output Output<!--</td--></td>	Model Output vol power SV 12V SWA015 15W 15W 15W SWA030 30W SWA050 SOW SWA075 75W SWA100 100W SWA150 150W SWA150 SOW	Model Output Output </td

* 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							
	Ma	dol		15W				
		buei	CWA015-05	CWA015-12	CWA015-24			
	Rated Inpu	t Voltage	AC100V/AC240V					
	Allowable I	nput Voltage Range	AC85 to 264V					
Input Conditions	Input Curre	ent (typ) Noted	0.4A (V _{IN} = 100V)					
	Rated Freq	uency		50/60Hz				
	Allowable I	Frequency Range	47 to 440Hz					
	Efficiency (typ) Note1	72%	76%	79%			
	Inrush Current (max) 10002		15A (V	$_{IN} = 100V) / 30A (V_{IN} = 240V) (at co$	old start)			
	Leakage Current (max) Rated Output Voltage		0.75mA					
	Rated Outp	ut Voltage	5V	12V	24V			
Note 3	Output Vol	tage Variation		Rated output voltage ±10%				
SL	Rated Outp	out Current	3.0A	1.3A	0.7A			
Ęit	Allowable C	output Current Range	4.510/	0 to 100%	16.0\\			
ndi	Rated Outp		1500	13.600	10.877			
ဝီပိ	Ripple Nois		100m\/n-n	120m\/p-p	150m\/n-n			
	Output Hol	ding Time (min) Novi		20msec				
	Startup tim	e Note1		20msec (V _{IN} = 100V)				
	Overcurren	t Protection	Detection above app	rox. 105% of rated current (droopir	ng automatic recovery)			
ns	Overvoltag	e Protection Note7	Detectio	n above 115% of rated voltage (ou	tput cutoff)			
tio	Overheatin	g Protection	Not provided					
ddi	Remote ON	I/OFF Control	Not provided					
A Ē	Remote Sensing		Not provided					
	Operations Display		Not provided					
	Operating Temperature Range Storage Temperature Range			-10 to +60°C				
			-25 to +85°C					
	Operating Humidity Range			30 to 90% (no condensation)				
	Storage Humidity Range		30 to 90% (no condensation)					
tal	Cooling Re	quirements	Natural air cooling					
nen ns		No. of vibrations	10 to 55Hz					
onn	Vibration	Sweep time						
vire	Resistance	Vibration direction	X Y 7					
ыs		Vibration time	Δ, Y, Δ					
		Vibration and	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	Deratinç	g may be required due to mounting	direction			
	Insulation	Between input and output	3000 V AC	for 1 minute (leakage current: 15	mA or less)			
Note	Withstand	Between input and FG	2000 V AC	for 1 minute (leakage current: 15	mA or less)			
ion	Voltage	Between output and FG	500 V AC	for 1 minute (leakage current: 15 r	nA or less)			
ulat	Insulation	Between input and output	-					
Insi	Resistance	Between input and FG	100	$M\Omega$ (measured with 500 V DC Me	gger)			
		Between output and FG						
76	External Ap	opearance		Single printed circuit board				
ture	Input Type			Connector				
truc	Output Typ	e .		Connector				
al S ards	External Di	mensions		125 ^{vv} x 50 ^D x 22 ^H mm				
tern Inda	Weight	darda		95g	atrical Appliance and Material Central Law			
Sta	Conductor	Emission	Designated to mast FCC Class P	(120.)() CISPR22 Class P (220.)(Chical Appliance and Material Control Law			
	Conducted	LIIISSIUII	Designated to meet FCC Class B	(120 V), CISERZZ CIASS B (230 V A				
tions	Remote ON	I/OFF Control		Not provided				
do	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).

Construction 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

			Specifications and	Standards			
	Mc	del		30W			
	IIIC		CWA030-05	CWA030-12	CWA030-24		
	Rated Inpu	t Voltage		AC100V to AC240V			
Input Conditions	Allowable Input Voltage Range		AC85 to 76240V				
	Input Current (typ) Notes			0.8A (V _{IN} = 100V)			
	Rated Freq	uency		50/60Hz			
	Allowable I	Frequency Range		47 to 440Hz			
	Efficiency (typ) Note1	70% 77% 79%				
	Inrush Cur	rent (max) Note2	30A (V _{II}	$N = 100V)/60A (V_{IN} = 240V) (at col$	d start)		
	Leakage Cu	urrent (max) Note1	0.75mA				
	Rated Outp	out Voltage	5V	12V	24V		
	Output Vol	tage Variation		Rated output voltage ±10%			
U S	Rated Outp	out Current	6.0A	2.5A	1.3A		
ÖÜ	Allowable C	utput Current Range		0 to 100%			
diti	Rated Outp	out Power	30W	30W	31.2W		
on	Constant Vo	Itage Accuracy Note 5 Note 6		±3%			
00	Ripple Nois	SC Note 1 Note 4	120mVp-p	150mVp-p	200mVp-p		
	Output Hol	ding Time (min) 🔤		20msec			
	Startup time Note 1			800msec (V _{IN} = 100V)			
	Overcurren	t Protection	Detection above 105% of rated current (drooping automatic recovery)				
s a	Overvoltag	e Protection Note7	Detection above 115% of rated voltage (output cutoff)				
ion	Overheatin	g Protection	Not provided				
lditi	Remote ON	I/OFF Control	Not provided				
Pd Fu	Remote Se	nsing	Not provided				
	Operations Display		Not provided				
	Operating Temperature Bange			-10 to +60°C			
	Storage Temperature Pange			25 to 185°C			
				-25 10 + 85 C			
	Storage Humidity Pange		30 to 90% (no condensation)				
_	Cooling Requirements		Natural air cooling				
nta	J -	No. of vibrations	10 to 55Hz				
me		Sweep time	3 minutes				
liti	Vibration	Acceleration rate		19.6m/s² (2G)			
onci	Resistance	Vibration direction	on X, Y. Z				
шС		Vibration time	One hour in each of three directions				
			98m/s² (10G)				
	Shock Res	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		
	Insulation	Between input and output	3000 V AC	for 1 minute (leakage current: 15 r	mA or less)		
Note	Withstand	Between input and FG	2000 V AC	for 1 minute (leakage current: 15 r	mA or less)		
ion	Voltage	Between output and FG	500 V AC f	or 1 minute (leakage current: 15 m	nA or less)		
Ilat	Insulation	Between input and output					
nsı	Resistance	Between input and FG	100 N	$M\Omega$ (measured with 500 V DC Meg	gger)		
_		Between output and FG					
	External Ap	opearance		Single printed circuit board			
nre	Input Type			Connector			
ucti	Output Typ	e		Connector			
l Str ds	External Di	mensions		133 ^w x 55 ^D x 27 ^H mm			
rnal dar	Weight			170g			
Exte	Safety Star	ndards	UL1950, CSA No. 950, and TÜV (EN60	950) certified, designated to meet Electri	cal Appliance and Material Control Law		
	Conducted	Emission	Designated to meet FCC Class B ((120 V), CISPR22 Class B (230 V A	C) and VCCI Class B (100 V AC)		
su	Remote ON	I/OFF Control		Not provided			
Optio	Cover			Not provided			

Note: 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 $60^\circ C$.

(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

	Specifications and Standards						
	Мо	dol		50W			
Model			CWA050-05	CWA050-12	CWA050-24		
	Rated Innu	t Voltage		AC1001/ to AC2401/			
	Allowable I	nput Voltage Range		AC 100 V 10 AC 240 V			
Input Conditions	Input Curre	ont (typ)		$1.24 (V_{IN} = 100V)$			
	Rated Fred	uency	1.2A (VIN = 100V)				
		Frequency Range	47 to 440Hz				
	Efficiency	typ) Mail	74%	83%	83%		
	Inrush Curr	ent (max) Mag	304 (V	= -100 V (60A (V/m = 240V) (at co	ld start)		
	Leakage Cu	urrent (max) Notes	00/((0.75mA			
				12)/	241/		
_	Quitput Volt		57	Potod output voltage ±10%	24V		
Note	Bated Outp	ut Current	10.00		2.14		
us	Allowable C	ut Current Pango	10.0A	4.5A	2.18		
iți i	Rated Outp	ut Power	50\//	51.6W	50 <i>4</i> W/		
nd	Constant Vo		3000	+3%	30.411		
ರ ಲಿ	Ripple Nois		120m\/n-n	150m\/n-n	200m\/n-n		
	Output Hole	ding Time (min) Mil		20msec	2001110 p		
	Startup time			700msec (ViN = 100V)			
		t Ducto etilo u					
- s	Overvoltag	e Protection	Detection above app	rox. 105% of rated current (drooping) above 115% of rated voltage (out	ng automatic recovery)		
ona	Overheatin	a Protection	Not provided				
diti	Remote ON	I/OFF Control	Not provided				
Fur	Remote Se	nsina	Not provided				
	Operations Display		Not provided				
			10 to 160°C				
	Storage Temperature Range		-10 to +60°C				
			-25 to +85°C				
	Operating Humidity Range		30 to 90% (no condensation)				
	Storage Hu	midity Range	30 to 90% (no condensation)				
ıtal	Cooling Re	Ne ef vibratione	INatural air cooling				
nel		Sween time	3 minutes				
litio	Vibration	Acceleration rate		10 6m/s ² (2C)			
vir ond	Resistance	Vibration direction	19.6m/S ² (2G)				
шŏ		Vibration time	<u> </u>				
		Vibration time					
	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	e required due to mounting directio	n. See page 71.		
_	Insulation	Between input and output	3000 V AC	for 1 minute (leakage current: 15	mA or less)		
Note	Withstand	Between input and FG	2000 V AC	for 1 minute (leakage current: 15	mA or less)		
uo	Voltage	Between output and FG	500 V AC	for 1 minute (leakage current: 15 r	nA or less)		
lati	Inculation	Between input and output					
nsu	Resistance	Between input and FG	100	M Ω (measured with 500 V DC Me	gger)		
-		Between output and FG					
	External Ar	opearance		Single printed circuit board			
ure/	Input Type			Connector			
uct	Output Typ	e		Connector			
ds I Str	External Di	mensions		195 ^w x 55 ^D x 27 ^H mm			
rna dar	Weight			170g			
tan	Safety Stan	dards	UL1950, CSA No. 950, and TÜV (EN6	0950) certified, designated to meet Electr	ical Appliance and Material Control Law		
-ш-о	Conducted	Emission	Designated to meet FCC Class B	(120 V), CISPR22 Class B (230 V	AC) and VCCI Class B (100 V AC)		
su	Remote ON	/OFF Control		Not provided			
Optic	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

Madal		اماه	75W				
	Model		CWA075-12	CWA075-24			
	D						
	Allowable I	t voltage					
s	Allowable I	nput voitage kange					
Input Condition	Rated Fred						
		Frequency Range	47 to	63Hz			
	Power Fact	or (typ)	$0.994 (V_{\rm IN} - 100V)/0.904 (V_{\rm IN} - 240V)$				
	Efficiency (80%	82%			
	Inrush Curi	rent (max) Non2	$30A (V_{IN} = 100V)/60A $	(IN = 240V) (at cold start)			
	Leakage Cu	urrent (max) Notes	0.75mA				
_	Rated Outp	out Voltage	12V	24V			
Note 3	Output Vol	tage variation	Rated output	voltage ±10%			
us	Rated Outp	out Current	0.3A	3.2A			
tio It		Peak Current	8.1 A (10 sec)	4.1 A (10 Sec)			
itpu	Allowable C	utput Current Range	75.6W	76.9\\/			
ဝီပိ	Constant Vo		75.800	70.800			
	Rinnle Nois	Noted Noted	150m\/p-p	200m\/p-p			
	Output Hole	ding Time (min) North	20m	2001179 p			
	Startup time		1500msec ($V_{\rm IN} = 100 V$			
		- <u> </u>					
	Overcurren	t Protection	Detection above approx. 105% of peak	current (drooping automatic recovery)			
nal	Overvoitag		Detection above 115% of rated voltage (output cutoff)				
ctic	Overneatin	g Protection	Not provided				
Addi Funo	Remote OK		Not pr	ovided			
	Operationa Diaplay		Not pr	ovided			
	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)			
tal	Cooling Requirements						
nen ns		No. of vibrations	10 to 55HZ				
tion	Vibration	Sweep time	3 mii				
virc ndi	Resistance	Acceleration rate	19.60	/ 7			
Co Eu		Vibration time	X, Y, ∠				
		VIDIATION TIME	98m/c² (10G)				
	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			
		Potwoon input and output	3000 V/AC for 1 minute (log	(ago ourrent: 15 mA or loss)			
lote 8	Withstand	Between input and output	2000 V AC for 1 minute (leal	kage current: 15 mA or less)			
u d	Voltage	Between output and FG	500 V AC for 1 minute (leak	age current: 15 mA or less)			
atic		Between input and output					
sul	Insulation	Between input and FG	100 M Ω (measured w	th 500 V DC Megger)			
<u> </u>	Resistance	Between output and FG					
			Cinete eviete				
e/		pearance		ector			
tur		•	Com	ector			
itru	External Di	mensions	222W v 55E	2 x 37 ^H mm			
ards	Weight		33	0a			
tern anda	Safety Stan	dards	UL1950, CSA No. 950, and TÜV (EN60950) certified. design	nated to meet Electrical Appliance and Material Control Law			
Sta	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 IEC610	00-3-2 (active filter method)			
2	Pomoto Ch	VOEE Control	K 1	ovided .			
ptior	Cover		Not pr				
0	55.61		not pr				

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

Shocii	fications	and Sta	andarde
JUECH	IICations	and Ju	anuarus

Specifications and Standards					
Model			100	W	
		del	CWA 100 12	CWA100 24	
			CWA100-12	CWA 100-24	
	Rated Input	t Voltage	AC100V to	o AC240V	
	Allowable I	nput Voltage Range	AC85 to 264V		
ns	Input Curre	nt (typ) Note1	1.4A (V _{IN}	_N = 100V)	
tio	Rated Freq	uency	50/6	60Hz	
ndi Dut	Allowable F	requency Range	47 to	63Hz	
<u><u> </u></u>	Power Fact	or (typ)	$0.99A (V_{IN} = 100V)$	$(0.90A (V_{IN} = 240V))$	
	Efficiency (tvp) Note1	81%	84%	
	Inrush Curr	rent (max) Nova	$30A (V_{IN} = 100V)/60A $	(1) = 240 V (at cold start)	
		urrent (max)	0.75	5mA	
			0.10		
	Rated Outp	ut Voltage	12V	24V	
	Output Volt	age Variation	Rated output	voltage ±10%	
6	Rated Outp	ut Current	8.5A	4.3A	
Suo	Maximum F	Peak Current	11.0 A (10 sec)	5.5 A (10 sec)	
diti	Allowable O	utput Current Range	0 to 2	100%	
one	Rated Outp	ut Power	102W	103.2W	
00	Constant Vo	tage Accuracy Note 5 Note 6	±3	3%	
	Ripple Nois	C Note 1 Note 4	150mVp-p	200mVp-p	
	Output Hole	ding Time (min) Note1	20m	nsec	
	Startup tim	e Note 1	1500msec (VIN = 100V)	
	-				
Overcurren हि 2 Overvoltage		t Protection	Detection above approx. 105% of peak current (drooping automatic recovery)		
		e Protection Note7	Detection above 115% of r	ated voltage (output cutoff)	
tio	Overheatin	g Protection	Not provided		
ddi	Remote ON	/OFF Control	Not pr	ovided	
< L Remote Sensing			Not provided		
Operations Display		Display	Not pr	ovided	
Operating Temperature Range Storage Temperature Range Operating Humidity Range		emperature Range	-10 to	+60°C	
		nperature Range	-25 to	+85°C	
		lumidity Range	30 to 90% (no	condensation)	
	Storage Hu	midity Range	30 to 90% (no	condensation)	
_	Cooling Re	quirements	Natural a	air cooling	
ntal	ocomig ite	No. of vibrations	10 to	55Hz	
nel		Sween time	3 mir		
onr itio	Vibration	Accoloration rate	19.6m/s²(2G)		
vird	Resistance	Vibration direction	19.01	/ 7	
Co E	Vibration direction			r, Z	
		vibration time	One nour in each		
	Cheek Deel	atanaa	98m/s ² (10G)		
	SHOCK 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	Denoting movies of the different diverse diversities diversities. Or a server 74		
	mstanation	Conditions	Derating may be required due to	mounting direction. See page 71.	
8	Insulation	Between input and output	3000 V AC for 1 minute (lea	kage current: 15 mA or less)	
P	Withstand	Between input and FG	2000 V AC for 1 minute (leal	kage current: 15 mA or less)	
ion	Voltage	Between output and FG	500 V AC for 1 minute (leak	age current: 15 mA or less)	
llat	Inculation	Between input and output			
ารเ	Resistance	Between input and FG	100 M Ω (measured w	ith 500 V DC Megger)	
-	Redictance	Between output and FG			
	External Ar	nearance	Single printer	t circuit board	
e/		pearance			
ctur		۵	Com		
itru	External Di	mensions		v 37 ^H mm	
al S Irds	Wojaht		222 · X 02-	0a	
ern: nda	Safaty Star	darde	40 111 1950 CSA No. 950 and TÜV (EN60950) certified design	vy nated to meet Electrical Appliance and Material Control Law	
Ext	Conductor	Emission	Designated to most ECC Class P (420 V). CICRDD	Close R (220) (AC) and) (CC) Close R (400) (AC)	
	Harmonic	Surront	Designated to meet FCC Class D (120 V), CISPR22	2 Class D (230 V AC) and VCCI Class D (100 V AC)	
	narmonic C	Juneni			
ions	Remote ON	OFF Control	Not pr	ovided	
Opt	Cover		Not pr	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). Composed 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. Note: 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				
Model		dal	150	W	
		uei	CWA150-12	CWA150-24	
Rated Input Voltage		Voltage	AC100\/ #	AC240V	
Allowable Input Voltage		nut Voltage Range	AC 100 V 10	0.264V	
Ñ	Input Curre	nt (typ)	2.04 (Vin	= 100 V	
<u>io</u>	Rated Freque		2.07 (VII		
ë t		Frequency Pange	50/0 47 to	63H7	
보이	Rower East	or (typ)	47 10	(0.904 (1/m - 240)/)	
-0	Efficiency (tvp)	0.99A (VIN = 100V)/	929/	
	Inruch Curr	cyp) cont cont (max) mai	300 ///////////////////////////////////	$\frac{62.76}{(m-240)/()}$ (at cold start)	
	Lookago Cu		30A (VIN = 100V)/80A (V	N = 240 V (at cold start)	
	Leakage Ot		0.78		
	Rated Outp	ut Voltage	12V	24V	
Die 3	Output Volt	age Variation	Rated output	voltage ±10%	
0	Rated Outp	ut Current	12.5A	6.3A	
<u>io</u>	Maximum F	eak Current	16.2 A (10 sec)	8.1 A (10 sec)	
put dit	Allowable O	utput Current Range	0 to 1	100%	
Sort	Rated Outp	ut Power	150W	151.2W	
	Constant Vo	tage Accuracy Note 5 Note 6	±3	%	
	Ripple Nois	e Note 1 Note 4	150mVp-p	200mVp-p	
	Output Hole	ding Time (min) Note1	20m	ISEC	
	Startup time	e Note 1	1500msec (V _{IN} = 100V)	
	Overcurren	t Protection	Detection above approx. 105% of peak	current (drooping automatic recovery)	
<u>2</u> 37	Overvoltage	e Protection Note 7	Detection above 115% of r	ated voltage (output cutoff)	
ion	Overheating	g Protection	Not provided		
Remote ON/OFF Control Remote Sensing		OFF Control	Not pro	ovided	
		nsing	Not pro	ovided	
	Operations	Display	Not pro	ovided	
	Operating Te	mperature Range	10 to	160°C	
	Storago Tor	noraturo Pango	-1010	+60°C	
	Operating Humidity Range		-25 t0	+85°C	
	Storage Humidity Range		30 to 90% (no		
	Cooling Re	quirements	So to so % (no	ir cooling	
ntal	No. of vibrations		10 to	55Hz	
nel		Sween time	3 mir		
onr	Vibration	Acceleration rate	19 fm	/s ² (2G)	
vir	Resistance	Vibration direction	X,Y.Z		
шΰ		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	I drop it on the board. Drop 3 times for each of 4 sides.	
	Installation	Conditions	Derating may be required due to mounting direction. See page 71.		
	Inculation	Between input and output	3000 V AC for 1 minute (lead	(age current: 15 mA or less)	
89	Withstand	Between input and output	2000 V AC for 1 minute (leal	kage current: 15 mA or less)	
u	Voltage	Between input and FG	500 V AC for 1 minute (leak	age current: 15 mA or less)	
atic	ge	Between input and output			
suls	Insulation	Between input and EG	100 MO (measured wi	th 500 V DC Megger)	
Ë	Resistance	Between output and FC			
External Appearance		pearance	Single printed	I circuit board	
ture	Input Type		Conn	ector	
nuc	Output Typ	e			
al St rds	External Di	mensions	222 ^w x 75 ^D	x 4∠'' mm	
erna	weight	dende	54	UY	
Exte	Sarety Stan	uards Emission	Designated to most ECC Class D (400 V). Clopped	Release R (220) (AC) and) (CC) Class R (400) (AC)	
	Hormonic	LINISSION	Designated to meet FUC Class B (120 V), CISPR22	2 Class B (230 V AC) and VCCI Class B (100 V AC)	
	Harmonic C	Junent			
tions	Remote ON	OFF Control	Not pr	ovided	
bi bi	Cover		Not pr	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.

Note 7 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)			
CN1	3 : AC	(JST)	(JST)	(JST)
	(NEUTRAL)			
	5 : FG			
CNI2	1 to 2 : - V	B4B-XH-A	XHP-4	SXH-001T-P0.6
GINZ	3 to 4 : + V	(JST)	(JST)	(JST)

CWA030 series

	Pin No.	Connector	Corresponding connector	Corresponding contact
	1 : AC			
	(LIVE)			
CN1	3 : AC	(JST)	(JST)	SVH-21T-P1.1
	(NEUTRAL)			
	5 : FG			(301)
CNI2	1 to 2 : - V	B4P-VH	XHR-4N	
CINZ	3 to 4 : + V	(JST)	(JST)	

CWA050 series

	Pin No.	Connector	Corresponding connector	Corresponding contact
	1 : AC			
	(LIVE)			
CN1	3 : AC	(JST)	(JST)	SVH-21T-P1.1 (JST)
	(NEUTRAL)			
	5 : FG			(301)
CNI2	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)			
CN1	3 : AC	(JST)	(JST)	SVH-21T-P1.1 (JST)
	(NEUTRAL)			
	5 : FG			(001)
CNI2	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	(JST)	(JST)	SVH-21T-P1.1
	(NEUTRAL)			
	5 : FG			(331)
CNI2	1 to 4 : - V	B8P-VH	XHR-6N	
GNZ	5 to 8 : + V	(JST)	(JST)	

CWA150 series

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

2 Derating of output current


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

				Please contact San	ken for delivery time of conne	ector type product in advance		
			Specificatio	ns and Standards				
				15	W			
Model								
			SWA015-05	SWA015-12	SWA015-15	SWA015-24		
	Rated Input	t Voltage		100 V AC to 240 V	AC or 110 V DC Note 4			
Input Conditions	Allowable Input Voltage Range			85 V AC to 264 V AC o	r 90 V DC to 165 V DC	ote 4		
	Input Curre	ent (typ)		0.4A/	0.23A			
	Rated Freq	uency		50/6	60Hz			
	Allowable F	requency Range	47 to 440Hz					
	Efficiency (typ)	72%	75%	75%	77%		
	Inrush Curi	rent (max) Note 1		25A	50A			
	Leakage Cu	urrent (max)		0.5mA/	0.75mA			
	Rated Outp	ut Voltage	5V	12V	15V	24V		
8	Output Vol	tage Variation	-	Rated output	voltage ±10%			
N	Rated Outp		3.0A (2.4A)	1.3A (1.0A)	1.0A (0.8A)	0.7A (0.5A)		
suc	Allowable C	utput Current Range		0 to ⁻	100%			
ditio	Rated Outp	out Power	15W	15.6W	15W	16.8W		
one	Constant Vo	Itage Accuracy		±3	9%			
ဝပ	Ripple Nois	Ce Note 2	120mVp-p	180mVp-p	180mVp-p	240mVp-p		
	Output Hol	ding Time (min)		10m	sec			
	Startup time (typ)			20m	sec			
	Overcurrent Protection			Detection above 10	5% of rated current			
s a	Overvoltage Protection		Detection from 115 to 145% of rated voltage (output cutoff)					
ion (Overheating Protection		Not provided					
diti	Remote ON/OFF Control		Not provided					
Ad Fui	Remote Sensing		Not provided					
	Operations Display		Red LED indicator					
	Operating Temperature Range		0 to +50°C					
	Storago Tomporature Range		-25 to +85°C					
	Operating Humidity Bange		-20 to 400°C 30 to 90% (no condensation)					
ਗ	Storage Hu	midity Range	30 to 90% (no condensation)					
ent s	Cooling Re	quirements	Natural air cooling					
ion		No. of vibrations	10 to 55Hz					
'iro Idit		Sweep time	3 minutes					
Sor	Vibration	Acceleration rate		19.6m	/s² (2G)			
	Resistance	Vibration direction		Х, Ү	Υ, Ζ			
		Vibration time		One hour in each	of three directions			
	Installation	Conditions		Derating may be required	due to mounting directior	ו		
	Inculation	Botwoon input and output						
_	Withstand	Between input and EG		2000 V AC	for 1 minute			
tior	Voltage	Between mput and FG		500 V AC f	or 1 minute			
ulai		Between input and output						
Insi	Insulation	Between input and FG		100 M Ω (measured w	th 500 V DC Meager)			
	Resistance	Between output and FG		(
				\\ <i>\</i> {:+	h :-			
re/	External Ap	pearance						
Ictu		٩		Termina				
Stru	External Di	mensions		35W y 00D	x 97 ^H mm			
nal (lard	Weight			27	0a			
tteri and	Safety Stan	dards		UL1950, CSA No. 950 an	- d TÜV (EN60950) certifie	ed		
ы Ш	Conducted	Emission	De	esignated to meet CISPR2	2 Class A and FCC Clas	s B		
s	Demote Ch							
otion	Cover	UFF Control		Not pr	idad			
	Lover			Prov	in peri l			

Note 1 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.

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,

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

SWA Series

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

Spoch	FICATIONC	and stand	
			12110
D D C C I			

			Specification					
	D.C.		30W					
	Mo	del	SWA030-05	SWA030-12	SWA030-15	SWA030-24		
	Rated Input	Voltage	100 V AC to 240 V AC or 110 V DC 1003					
Input Conditions	Allowable I	nput Voltage Range		85 V AC to 264 V AC c	or 90 V DC to 165 V DC 🛽	te 4		
	Input Curre	nt (typ)		0.7A/	0.46A			
	Rated Freq	uency		50/6	60Hz			
	Allowable F	requency Range	47 to 440Hz					
	Efficiency (typ)	72%	75%	75%	77%		
	Inrush Curr	ent (max) Meet		25A	/50A			
	Leakage Cu	irrent (max)		0.5mA/	0.75mA			
	Rated Outp	ut Voltage	5V	12\/	15\/	24\/		
	Output Volt	age Variation	01	Rated output	voltage +10%	277		
Note	Rated Outp		6 0A (4 8A)	2.5A (2.0A)	2 0A (1 6A)	1.3A (1.0A)		
suc		utput Current Range	0.07 (1.07 ()	0 to 1	100%	1.0/ (1.0/)		
litic	Rated Outp	ut Power	30W	30W	30W	31.2W		
utp	Constant Vo	tage Accuracy		±3	3%			
ōŭ	Ripple Nois	C Note 2	120mVp-p	180mVp-p	180mVp-p	240mVp-p		
	Output Hole	ding Time (min)		10m	ISEC			
	Startup tim	e (typ)		20m	sec			
_	Overcurren	t Protection		Detection above 10	5% of rated current			
na	Overvoitage	e Protection	Detection from 115 to 145% of rated voltage (output cutoff)					
litio	Dverneating		Not provided					
pb√ nu	Remote So							
	Operations	Dieplay	Red I FD indicator					
	Operations	Display						
	Operating Te	emperature Range		0 to -	-50°C			
	Storage Temperature Range		-25 to +85°C					
_	Operating H	lumidity Range	30 to 90% (no condensation)					
nta	Storage Hu	midity Range	30 to 90% (no condensation)					
me	Cooling Re	quirements	Natural air cooling					
on		No. of vibrations	10 to 55Hz					
nvir	Vibration	Sweep time		3 mii	nutes			
шõ	Resistance	Acceleration rate	19.6m/s ² (2G)					
		Vibration direction	X, Y, Z					
	Installation	Vibration time		One hour in each	of three directions			
	Installation	Conditions	L	Derating may be required	due to mounting direction			
	Insulation	Between input and output		2000 V AC	for 1 minute			
u	Withstand	Between input and FG		2000 1 //0				
lati	Voltage	Between output and FG		500 V AC f	or 1 minute			
nsı	Insulation	Between input and output						
<u> </u>	Resistance	Between input and FG		100 M Ω (measured w	ith 500 V DC Megger)			
		Between output and FG						
	External Ap	pearance		With c	hassis			
nre/	Input Type	-		Termina	al stand			
	Output Typ	e		Termina	al stand			
l Sti ds	External Di	mensions		35 ^W x 116 ^E	^o x 97 ^H mm			
erna Idar	Weight			37	Og			
Exte Stan	Safety Stan	dards	l	JL1950, CSA No. 950, ar	d TÜV (EN60950) certifie	d		
ш ()	Conducted	Emission	De	signated to meet CISPR2	2 Class A and FCC Class	B		
Sug	Remote ON	/OFF Control		Not pr	ovided			
Optio	Cover			Prov	rided			
Note1 At C	old start (Mor	e current than above n	oted value may flow at re	start)				

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,

SWA Series

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

			Specificatio	ns and Standards	internor derivery time of com				
_	_		Specificatio						
	Mo	امه		50)W				
	1410		SWA050-05	SWA050-12	SWA050-15	SWA050-24			
	Rated Input	Voltage	100 V AC to 240 V AC or 110 V DC MM						
Input Conditions	Allowable I	nput Voltage Range							
	Input Curre	nt (typ)		1.24	V0.7A				
	Rated Freq	uencv	50/60Hz						
	Allowable F	requency Range	47 to 440Hz						
	Efficiency (typ)	72%	75%	75%	77%			
	Inrush Curr	ent (max) Note1	25A/50A						
	Leakage Current (max)		0.5mA/0.75mA						
	Rated Outp	ut Voltage	5V	12V	15V	24V			
8	Output Volt	age Variation		Rated output	voltage ±10%				
2	Rated Outp		10A (8A)	4.2A (3.3A)	3.4A (2.7A)	2.1A (1.6A)			
suo	Allowable O	utput Current Range		0 to	100%				
out diti	Rated Outp	ut Power	50W	50.4W	51W	50.4W			
out	Constant Vo	Itage Accuracy		±	3%				
	Ripple Nois	C Note 2	120mVp-p	180mVp-p	180mVp-p	240mVp-p			
	Output Hole	ding Time (min)		10n	nsec				
	Startup tim	e (typ)		20n	ISEC				
	Overcurren	t Protection	Detection above 105% of rated current						
nal ns	Overvoltage	e Protection	Detection from 115 to 145% of rated voltage (output cutoff)						
itio ctic	Overheating Protection		Not provided						
pb∧ nu	Remote ON/OFF Control		Not provided						
	Operations	Display	Red LED indicator						
	On smalling T								
	Operating Temperature Range		-25 to +85°C						
	Operating k	Iuperature Kange	-25 t0 +85°C 30 to 90% (no condensation)						
<u> </u>	Storage Hu	midity Range	30 to 90% (no condensation)						
ent s	Cooling Re	quirements	Natural air cooling						
ion	g	No. of vibrations	10 to 55Hz						
viro ndit		Sweep time	3 minutes						
Cor	Vibration	Acceleration rate							
	Resistance	Vibration direction		Χ,	Y, Z				
		Vibration time		One hour in each	of three directions				
	Installation	Conditions		Derating may be required	I due to mounting direction	ิท			
	Insulation	Between input and output		2000 \/ 40	for 1 minuto				
Ę	Withstand	Between input and FG		2000 V AC	for i minute				
atio	Voltage	Between output and FG		500 V AC	for 1 minute				
suls	Insulation	Between input and output							
2	Resistance	Between input and FG		100 M Ω (measured w	vith 500 V DC Megger)				
		Between output and FG							
F	External Ap	opearance		With o	chassis				
ture	Input Type			Termin	al stand				
truc	Output Typ	e		Termin	al stand				
al S ards	External Di	mensions		37 ^w x 159	~ x 9/''mm				
tern anda	Safety Ston	dards		41 UI 1950 CSA No 950 au	nuy nd TÜV (EN60950) certifi	ied			
ς; μ	Conducted	Emission	De	esignated to meet CISPR	22 Class A and FCC Class	ss B			
s	Domete Oh			KI_(rovidod				
ption	Cover				vided				
0	00101			110	1404				

at Sankan for delivery time of connector type product in a

Note1 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.

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,

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

SWA Series

			Specificatio	ns and Standards				
				10	0W			
	Мо	del	SWA100-05	SWA100-12	SWA100-15	SWA100-24		
S	Rated Input	Voltage	100 V AC to 240 V AC or 110 V DC Moded					
	Allowable I	nput Voltage Range	85 V AC to 264 V AC or 90 V DC to 165 V DC.					
	Input Curre	nt (typ)	1.6A/0 7A					
tion	Rated Freq	uency		50/	60Hz			
put ndi	Allowable F	requency Range		47 to	o 63Hz			
Cor	Power Fact	or (typ)	0.99/0.92					
	Efficiency (typ)	74%	76%	76%	77%		
	Inrush Curr	ent (max) Note1		20A	/40A	·		
	Leakage Cu	irrent (max)		0.5mA	/0.75mA			
	Rated Outp	ut Voltage	5V	12V	15V	24V		
2	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)		
ons	Allowable O	utput Current Range		0 to	100%			
put diti	Rated Outp	ut Power	100W	102W	105W	108W		
Con	Constant Vo	tage Accuracy		±	3%			
	Ripple Nois	C Note 2	120mVp-p	180mVp-p	180mVp-p	240mVp-p		
	Output Hole	ding Time (min)		20n	isec			
	Startup time	e (typ)		1000/600msec				
	Overcurren	t Protection	Detection approx. 120% of rated current					
nal	Overvoltage	e Protection	Detection from 115 to 145% of rated voltage (output cutoff)					
itio	Overneating	g Protection	Not provided					
pb√	Remote ON	OFF Control	Not provided					
< E	Operations	Display	Red LED indicator					
	Operating Temperature Range							
	Operating L	lumidity Pange	-25 t0 +85°C 30 to 90% (no condensation)					
a	Storage Hu	midity Range	30 to 90% (no condensation)					
ent	Cooling Re	quirements	Natural air cooling					
ion		No. of vibrations	10 to 55Hz					
ir o idit		Sweep time	3 minutes					
Sor	Vibration	Acceleration rate		19.6n	n/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	on		
	Insulation	Between input and output		2000 \/ AC	for 1 minuto			
Ľ	Withstand	Between input and FG		2000 V AC				
atic	Voltage	Between output and FG		500 V AC 1	or 1 minute			
sul	Insulation	Between input and output						
<u> </u>	Resistance	Between input and FG		100 M Ω (measured w	rith 500 V DC Megger)			
		Between output and FG						
16	External Ap	pearance		With c	hassis			
sture	Input Type			Termin	al stand			
truc	Output Typ	e		Termin	al stand			
al S ards	External Di	mensions		50 ^w x 180	~ x 93''mm			
tern anda	Safety Ster	darde			ouy od TI'IV (ENIGODEO) oortii	fied		
Sta Sta	Conducted	Emission	Designated to me	et CISPR22 Class A (200-	240 V AC) and FCC Cla	uss A (100-120 V AC)		
(0	Jonaucieu							
tions	Remote ON	OFF Control		Not pi	ovided			
ð	Cover			Prov	lided			

 $\ensuremath{\mathbb{N}}$ 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.

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,









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		
			JWA 130-03		JWA150-15	JWA130-24		
suo	Rated Input	Voltage	100 V AC to 240 V AC or 110 V DC 1004					
	Allowable I	nput Voltage Range	85 V AC to 264 V AC or 90 V DC to 165 V DC					
	Input Curre	nt (typ)		2.4A	/1.7A			
ut diti	Rated Freq	uency		50/	60Hz			
npu	Allowable F	or (two)		47 to	0 63HZ			
- 0	Efficiency (turn)	750/	0.99	70.95	709/		
	Inrush Curr	ent (max)	75%	204	//00	/9%		
	Leakage Ci	urrent (max)	0.5mA/0.75mA					
	Leanage of			0.011/				
	Rated Outp	ut Voltage	5V	12V	15V	24V		
Note 3	Output Vol	age Variation	004 (044)	Rated output	voltage ±10%	0.54 (5.04)		
ls [Rated Outp		30A (24A)	13A (10A)	10A (8A)	6.5A (5.2A)		
tior	Allowable O	utput Current Range	45014	0 to	100%	45014		
tpu ndi	Rated Outp		15000	156VV	1507	15677		
ဝီပိ	Constant vo		120m\/n n	190m\/n n	190m\/n n	240m\/n n		
		ding Time (min)	12011vp-p	1001110p-p 20m		240πνρ-ρ		
	Startup tim	e (typ)		1000/6	00msec			
	Overcurren	t Protection	Detection approx. 120% of rated current					
nal	Overvoitage	e Protection	Detection from 115 to 145% of rated voltage (output cutoff)					
litio	Overneatin	g Protection		Not pr				
Add −un=	Remote UN/UFF Control		nrovided					
	Operations Display		Red LED indicator					
	Operating Temperature Range		U to +50°C					
	Storage Ter	nperature Range	-25 t0 +85°C 30 to 90% (no condensation)					
_	Operating r	numidity Range	30 to 90% (no condensation)					
enta	Cooling Re	multy Range	Natural air cooling					
Suc.	Cooling ite	No of vibrations	10 to 55Hz					
iron diti		Sweep time	3 minutes					
inv Son	Vibration	Acceleration rate		19.6m	n/s² (2G)			
	Resistance	Vibration direction		Χ, Ϋ	Y, Z			
		Vibration time	One hour in each of three directions					
	Installation	Conditions		Derating may be required	due to mounting direction	า		
	Inculation	Between input and output						
_	Withstand	Between input and FG		2000 V AC	for 1 minute			
atio	Voltage	Between output and FG		500 V AC 1	or 1 minute			
sula		Between input and output						
lns	Resistance	Between input and FG		100 M Ω (measured w	ith 500 V DC Megger)			
	Resistance	Between output and FG						
	External Ar	pearance		With c	hassis			
ure/	Input Type			Termin	al stand			
ncti	Output Typ	e		Termin	al stand			
Str ds	External Di	mensions		65 ^W x 200	^D x 93 ^H mm			
rnal dar	Weight			95	i0g			
Exte	Safety Stan	dards		UL1950, CSA No. 950, ar	nd TÜV (EN60950) certifie	d		
- ш ол	Conducted	Emission	De	esignated to meet CISPR	22 Class A and FCC Clas	s B		
suc	Remote ON	/OFF Control		Not pr	ovided			
Optic	Cover			prov	vided			

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.

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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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

	Adjustment knob	Output voltage adjustment knob	Knob for changing output voltage
Adjustment knob	LED	Operation indicator LED (red)	Lights when output voltage is ON
(X) + 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
8 - S	- S	- side output sensing terminal	Remove short bar and connect to - side of load when remote sensing
(X) AC (L)	FG	Frame grounding	Connect to grounding
(X) AC (N)	~ L	AC input terminal	Connect to AC input (built-in fuse side)
	~ N	Connect to AC input	Connect to AC input

• Refer to the external diagram for terminal arrangement.

2 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.

5 Overvoltage protection

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)

7 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.

0 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

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





Specifications and Standards

				50	W			
	Mo	del	SWC050-3R3	SWC050-05	SWC050-12	SWC050-24		
	Rated Input	Voltage		AC100V to	o AC240V			
put nditions	Allowable I	nput Voltage Range	AC85 to 264V					
	Input Curre	nt (typ) Note1	1.2A-0.6A					
	Rated Frequencies	uency		50/6	ioHz			
	Allowable F	or (tup)		47 to -	440Hz			
မီးမီ	Efficiency (typ)		73%	76%	80%	83%		
	Inrush Current (max) North North		1376	30A/60A (a	t cold start)	0378		
	Leakage Cu	Irrent (max) Note1		0.5mA (VIN = 120V)/	$0.75 \text{mA} (V_{IN} = 240 \text{V})$			
	Deted Oute		0.01/	 ,	40)/	2414		
	Output Volt	age Variation Met	3.3V	5V Bated output	12V	24V		
A	Rated Outp	ut Current	10A	10A	4.2A	2.1A		
2	Maximum P	eak Current						
ions	Allowable O	utput Current Range		0 to 2	100%			
put	Rated Outp	ut Power	33W	50W	50.4W	50.4W		
Sout	Constant Vo	tage Accuracy Note 6		±3	3%			
	Ripple Nois	C Note 3 Note 4	80mVp-p	100mVp-p	100mVp-p	150mVp-p		
	Output Hole	ding Time (min) 🔤		16r	nsec			
	Startup time	e (typ) Noted		200r	nsec			
	Overcurren	t Protection	Detection	above 105% of rated cur	rrent (drooping automatic	recovery)		
nal ns	Overvoltage	e Protection Mon 7	D	etection above 115% of r	ated voltage (output cutof	f)		
itio	Overheating	g Protection		Not pr	ovided			
pb du	Remote ON	OFF Control		Not pr	ovided			
~ E	Operations	Display		Green I El	Dindicator			
				Gieen LED Indicator				
	Operating Temperature Range Notes			-10°C to	o +60°C			
	Storage Len	nperature Range	-20°C 10 +85°C 30 to 90%					
	Storage Humidity Range			30 to	90%			
<u></u>	Cooling Requirements			Natural a	ir cooling			
ent: s	g	No. of vibrations		10 to	55Hz			
ion n	Vibratian	Sweep time	3 minutes					
/iro 7dit	Resistance	Acceleration rate	19.6m/s² (2G)					
Col		Vibration direction		X, Y	(, Z			
		Vibration time		One hour in each	of three directions			
	Shock Posi	stanco	Conduct this to	98m/s 98m/s st op op opk board with a flat	s ² (10G) surface and a thickness of 10	mm or moro		
	SHOCK Resi	Stance	Lift one side of installation	Lift one side of installation surface of the unit 50 mm and drop it on the board. Drop 3 times for each of 4 sid				
	Installation	Conditions	Derating may be required due to mounting direction					
	Inculation	Between input and output	30	00 V AC for 1 minute (leal	kage current: 15 mA or leg	26)		
Note 9	Withstand	Between input and FG	20	00 V AC for 1 minute (leal	kage current: 15 mA or les	ss)		
u	Voltage	Between output and FG	50	00 V AC for 1 minute (leak	age current: 15 mA or les	s)		
llati	Inculation	Between input and output						
nsu	Resistance	Between input and FG		100 M Ω (measured w	ith 500 V DC Megger)			
_		Between output and FG						
	External Ap	pearance		With c	hassis			
ure/	Input Type			Terminal stand (co	nnector is optional)			
uct	Output Typ	e		Terminal stand (co	nnector is optional)			
ll Sti ds	External Di	mensions		125 ^W x 80 ^E	^o x 29 ^H mm			
erna ndai	Veight Safoty Stan	darde		and TÜV (EN60050:2000) contified	(Typ) d. designated to most Electrical Ap	aliance and Material Control Law		
Exto Star	Conducted	Emission	Designated to meet FCC	Class B (120 V AC) EN550	22 Class B (230 V Δ C) and	VCCI Class B (100 V AC)		
	Harmonic C	Current	2 Joignated to meet 1 00 1	Immunity: Designated to	o meet IEC61000-4-2. 5			
	Remote ON	OFF Control		Notor	ovided			
Ś	Chassis			INUT Pr Provided a	us standard			
tion	Cover			Prov	vided			
Opi	Input/Output	Terminal stand		Provided a	is standard			
	Connection	Connector		Prov	vided			
Note 1 Spec	cified under rate	ed input/output condition	s at an ambient temperature	e of Note 5 Output voltage ca	an be changed within the n	naximum output power and		
25°C	current above	noted values may flow	at restart	rated output curre	nt.	thin static input range, within		
Note 3 Outp	out characteris	tics are measured at a	a point 5 cm from the out	put static load range,	with time drift and within amb	ient temperature range.		

connector, with a 63-V, 47- μ F electrolytic capacitor and 0.1- μ F film capacitor connected to that point. Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe. Specified under rated input/output conditions.

Read Reset is performed by reapplying input voltage.
 Read Reset is performed by reapplying input voltage.
 Read Derating for ambient temperature applies.
 Read Insulation conditions are specified at normal temperature and humidity.

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SWC Series 50W,100W

			Specificatio	ns and Standards				
Model				10	W			
Model		SWC100-3R3	SWC100-05	SWC100-12	SWC100-24			
	Rated Input	t Voltage		AC100\/ t	0 AC240V			
	Allowable Input Voltage Range			AC85 1	o 264V			
	Input Curre	ent (typ) Note1		1.6A	-0.6A			
ions	Rated Freq	uency		50/6	60Hz			
diti	Allowable F	requency Range		47 to	63Hz			
Sone	Power Fact	or (typ)		0.99	/0.95	1		
Ŭ	Efficiency (typ) Note1	72% 77% 81% 82%					
	Inrush Current (max) 1002		30A/60A (at cold start)					
				0.5ITA (VIN = 120V)/	0.75 mA (VIN = 240 V)			
	Rated Outp	ut Voltage	3.3V	5V	12V	24V		
_	Output Volt	age Variation Mess	204	Rated output	voltage ±10%	4.5.4		
Note	Rated Outp	Poak Current	20A	20A 100º	6.5A	4.5A		
suc		utput Current Range		0 to 1	100%			
ditio	Rated Outp	ut Power	66W	100W	102W	108W		
one	Constant Vo	Itage Accuracy Note6		±	3%			
00	Ripple Nois	e Note 3 Note 4	80mVp-p	100mVp-p	100mVp-p	100mVp-p		
	Output Hole	ding Time (min) 🔤		201	nsec			
	Startup tim	e (typ) Noted		500	nsec			
	Overcurren	t Protection	Detection	above 105% of rated cu	rrent (drooping automatic	recovery)		
la l	Overvoltage	e Protection Note7		Detection above 115% of r	ated voltage (output cutoff)			
tion	Overheatin	g Protection		Not pr	ovided			
ddi	Remote ON	/OFF Control		Not pr	ovided			
⋖≖	Remote Se	nsing		prov	rided			
	Operations	Display	Green LED indicator					
	Operating Temperature Range Note 3		-10°C to +60°C					
	Storage Ter	nperature Range	-20°C to +85°C					
	Operating Humidity Range		30 to 90%					
_	Storage Humidity Range			30 to	90%			
inta	Cooling Requirements		10 to 55Hz					
ans		Sweep time	3 minutes					
diti	Vibration	Acceleration rate	19.6m/s² (2G)					
	Resistance	Vibration direction	X, Y, Z					
		Vibration time	One hour in each of three directions					
			98m/s 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	Derating may be required due to mounting direction					
	mstanation	conditions						
8	Insulation	Between input and output	30	00 V AC for 1 minute (lea	kage current: 15 mA or le	ess)		
5	Voltage	Between input and FG	20	00 V AC for 1 minute (lea	kage current: 15 mA or le	iss)		
atic	Voltage	Between input and output	50	NOVACION I MINULE (lear	age current. 15 mA or le	55)		
Ins	Insulation	Between input and FG		100 M Ω (measured w	ith 500 V DC Megger)			
<u> </u>	Resistance	Between output and FG						
	External Ar	pearance		With c	hassis			
-	Input Type			Termin	al stand			
ture	Output Typ	e		Termin	al stand			
truc	External Di	mensions		150 ^w x 93 ^t	^o x 34 ^H mm			
al S ards	Weight			500g	(typ)			
tern	Safety Stan	dards	UL60950, CSA60950-00 (C-UL),	and TUV (EN60950:2000) certifie	d, designated to meet Electrical A	opliance and Material Control Law		
Sts EX	Conducted	Emission	Designated to meet FCC	Class B (120 V AC), EN550	22 Class B (230 V AC) and	VCCI Class B (100 V AC)		
	Harmonic C	Current	r t	Immunity: Designated to	neet IEC61000-4-2 5	<u>ک</u>		
	Pomoto ON	VOEE Control		NI-+	iovided			
S	Chassie			INOT PI Provided a	ovided			
ion	Cover			יוסאמפט א	vided			
Opt	Input/Output	Terminal stand		Provided a	as standard			
	Connection	Connector		Not pr	ovided			
Note 1 Spec	ified under rat	ed input/output condition	s at an ambient temperature	e of Note 5 Output voltage c	an be changed within the	maximum output power and		
25°C		and a set of the set of the		rated output curre	nt.			
Note 3 Outo	current above ut characteris	tics are measured at a	at restart.	put static load range	age accuracy is measured w with time drift and within am	imin static input range, withii pient temperature range		
conn	ector. with a	63-V. 47-uF electrolvi	tic capacitor and 0.1-uE	ilm Note7 Reset is performe	d by reapplying input voltage			

 connector, with a o3-v, 4τ-μ electrolytic capacitor and 0.1-μF tilm

 capacitor connected to that point.
 Image: Reset is performed by reapplying input voltage.

 capacitor connected to that point.
 Image: Reset is performed by reapplying input voltage.

 Ripple noise is measured with a 100-MHz oscilloscope using a 1:1 probe.
 Image: Reset is performed by reapplying input voltage.

 Specified under rated input/output conditions.
 Image: Reset is performed by reapplying input voltage.

SWC Series

External Dimensions

(unit: mm)





SWC Series 50W,100W

Operating Instruction

1 Terminal connection

SWC050

Sy	mbol	Pin No.	Function	Connector	Corresponding connector	Corresponding contact
		1	AC (N)			SVH-21T-P1.1 (JST)
		2	NC	B3P5-VH (JST)		
ctor	CN1	3	AC (L)		VHR-5N (JST)	
Connec		4	NC			
		5	FG			
	CN2	1 to 2	-	B4P-VH	VHR-4N	SVH-21T-P1.1
		3 to 4	+	(JST)	(JST)	(JST)
p		AC (N)	AC (N)			
star		AC (L)	AC (L)			
nal	TB1	≟ or G	FG			
rmi		-	-			
μ		+	+			

SWC100

Sy	mbol	Pin	Function
		+ S	+ S side output sensing (+ remote sensing)
stand		+	+ output
		-	- output
nal	TB1	- S	- S side output sensing (- remote sensing)
srmi		FG	
Це		AC (L)	AC (L)
		AC (N)	AC (N)





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Features world-wide input and active filter (PFC)

Supports peak current



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	Option
	voltage	(C: With cover)
	(24: 24 V)	
	Opti	ón
Output pow	er (R:V	Vith remote
(150: 150 W	/) ON/	OFF control)





60W, 100W, 150W, 240W

			Specifications and Standards
	Mo	del	60W
	NIC.		SWD060P-24
	Rated Input	t Voltage	
		nnut Voltago Bango	
	Allowable I		
suc	Input Curre		
i≓ _	Rated Freq	uency	50/60HZ
pu	Allowable F	-requency Range	47 to 63Hz
မ ပိ	Power Fact		0.95 (V _{IN} = 100V)/0.90 (V _{IN} = 240V)
	Efficiency (typ) Note1	80%
	Inrush Curr	rent (max) More 2	15A (V _{IN} = 100V)/30A (V _{IN} = 240V)
	Leakage Cu	urrent (max) 🔤	0.75mA (V _{IN} = 240V)
	Rated Outp	ut Voltage	241/
	Output Volt	tage Variation	Eived
_	Batad Outp		
Note 3	Maximum E	Pook Current	
S			
Ē, t	Allowable O		
nd ib	Rated Outp		
5 S	Constant vo		
	Ripple Nois	Se Note1 Note4	240mVp-p
	Output Hole	ding Time (min)	60msec
	Startup tim	e (typ)	1000msec
= 0	Overcurren	t Protection	Detection above 105% of maximum peak current (drooping automatic recovery)
suc	Overvoltage Protection Note		Detection above 115% of rated voltage (output cutoff)
cti III	Overheating Protection		Not provided
Add Fun	Remote Sensing		Not provided
	Operations Display		Not provided
	Operating Temperature Range		-10°C to +60°C
	Storage Temperature Range		
	Operating Humidity Pange		-25 C 10 + 65 C
	Storage Humidity Pange		
	Cooling Poquiromonts		30 10 90%
ıta	Cooling Requirements		Natural air cooling
nel	No. of vibrations		10 to 55HZ
onr itio	Vibration Sweep time		3 minutes
vir	Resistance	Acceleration rate	19.6m/s² (2G)
C E		Vibration direction	X, Y, Z
		Vibration time	One hour in each of three directions
	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 (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	Withstand	Between input and FG	2000 V AC for 1 minute (leakage current: 15 mA or less)
u	Voltage	Between output and FG	500 V AC for 1 minute (leakage current: 15 mA or less)
ati		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	opearance	With chassis
re/	Input Type		Connector
ctu	Output Typ	e	Connector
stru Stru	External Di	mensions	160 ^w x 80 ^D x 40 ^H mm
al S ards	Weight		500g
tern Inda	Safety Stan	dards	UL60950, CSA No. 60950, and SEMKO (EN60950) certified, designated to meet Electrical Appliance and Material Control Law
Ext Sta	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 (Current	Harmonic current: Designated to meet IEC61000-3-2
			Immunity: Designated to meet IEC61000-4-2, 5
Ontione	Remote ON	I/OFF Control	Not provided
options	Cover		Provided

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

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 6 Reset is performed by reapplying input voltage.

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

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

			Specifications and Standards
	Mo	dol	100W
	IVIO	Juei	SWD100P-24
	Rated Input Voltage		AC100V to AC240V
IS	Allowable I	nput Voltage Range	AC85 to 264V
	Input Curre	ent (typ) Note1	1.5A (V _{IN} = 100V)
tior	Rated Freq	uency	50/60Hz
out	Allowable F	Frequency Range	47 to 63Hz
ۍ آ	Power Fact	or (typ) Neel	0.95 (V _{IN} = 100V)/0.90 (V _{IN} = 240V)
	Efficiency (typ) Note1	80%
	Inrush Curr	ent (max) Note 2	15A (V _{IN} = 100V)/30A (V _{IN} = 240V)
	Leakage Cu	urrent (max) Note1	0.75mA (V _{IN} = 240V)
	Rated Outp	ut Voltage	24V
	Output Volt	age Variation	Fixed
fote 3	Rated Outp	ut Current	4.0A
s	Maximum F	Peak Current Note B	10.0 A (within 15 sec)
tion	Allowable O	utput Current Range	0 to 10.0A
ndit	Rated Outp	ut Power	96W
S O	Constant Vo	Itage Accuracy Note 5	±5%
	Ripple Nois	Se Note 1 Note 4	240mVp-p
	Output Hole	ding Time (min)	60msec
	Startup tim	e (typ)	1000msec
Additional Functions	Overcurren	t Protection	Detection above 105% of maximum peak current (drooping automatic recovery)
	Overvoltage	e Protection Note 6	Detection above 115% of rated voltage (output cutoff)
	Overheatin	g Protection	Not provided
	Remote Sei	nsing	Not provided
	Operations	Display	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%
tal	Cooling Re	quirements	Natural air cooling
nen ns		No. of vibrations Note 9	10 to 55Hz
itio	Vibration	Sweep time	3 minutes
vir	Resistance	Acceleration rate	19.6m/s ² (2G)
မ် ဂ		Vibration direction	<u>Χ, Υ, Ζ</u>
		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 (normal installation directions are vertical and horizontal: with mounting holes down)
9	Insulation	Between input and output	3000 V AC for 1 minute (leakage current: 15 mA or less)
2	Withstand	Between input and FG	2000 V AC for 1 minute (leakage current: 15 mA or less)
tior	Voltage	Between output and FG	500 V AC for 1 minute (leakage current: 15 mA or less)
ula	Insulation	Between input and output	
Ins	Resistance	Between input and FG	100 M Ω (measured with 500 V DC Megger)
		Between output and FG	
	External Ap	opearance	With chassis
Ire/	Input Type	-	Connector
nct	Output Typ	e	
ls Str	External Di	mensions	650g
rnal dard	Safety Stan	dards	UI 60950_CSA No_60950_and SEMKO (EN60950) certified_designated to meet Electrical Appliance and Material Control Law
tan	Conducted	Emission	Designated to meet ECC 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
	Remote ON	OFF Control	Not provided
Options	Cover		Provided
	ified works	disput/output - ""	at an ambient temperature of 25%
Note 1 Spec	current above	noted values may flow at	at an amplent temperature of 25°C. restart.

Comparent terms of the second 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.

The constant voltage accuracy is measured when state inperiance, when state is performed by reapplying input voltage.
 (coord insulation conditions are specified at normal temperature and humidity.
 (coord located output current at startup.
 (coord when mounted on mounting surface B, the No. of vibrations is from 10 to 25 Hz (refer to External Dimensions).

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

			Specifications and Standards	
			150W	
	Мо	del	SWD150P-24	
			5110 1501 24	
	Rated Input	t Voltage	AC100V to AC240V	
	Allowable I	nput Voltage Range	AC85 to AC264V	
us	Input Curre	ent (typ) Note1	1.9A (V _{IN} = 100V)	
Input Conditio	Rated Frequency		50/60Hz	
	Allowable F	Frequency Range	47 to 63Hz	
	Power Fact	or (typ) Need	0.95 (V _{IN} = 100V)/0.90 (V _{IN} = 240V)	
	Efficiency (typ) Note1	80%	
	Leekere Current (max)		$204 (V_{\rm IN} = 100V)/404 (V_{\rm IN} = 240V)$	
	сеакаде Сс		0.75MA (VIN = 240V)	
	Rated Outp	out Voltage	24V	
	Output Volt	tage Variation	Fixed	
F	Rated Outp	out Current	6.0A	
2 0	Maximum F	Peak Current	15.0 A (within 15 sec)	
ion	Allowable O	utput Current Range	0 to 15.0A	
put	Rated Outp	ut Power	144W	
i de la	Constant Vo	Itage Accuracy Note 5	±5%	
	Ripple Nois	C Note 1 Note 4	400mVp-p	
	Output Hole	ding Time (min)	60msec	
	Startup tim	e (typ)	1000msec	
= 0	Overcurren	t Protection	Detection above 105% of maximum peak current (drooping automatic recovery)	
ons	Overvoltage	e Protection Note 6	Detection above 115% of rated voltage (output cutoff)	
Additic Functi	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%	
a	Cooling Requirements		Natural air cooling	
ent	No. of vibrations		10 to 55Hz	
nm	Vibration Sweep time		3 minutes	
/iro Jdit	Resistance	Acceleration rate	19.6m/s² (2G)	
En		Vibration direction	X, Y, Z	
		Vibration time	One hour in each of three directions	
	Shock Resi	istance	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 (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)	
ou	Voltage	Between output and FG	500 V AC for 1 minute (leakage current: 15 mA or less)	
lati	Inculation	Between input and output		
nsı	Resistance	Between input and FG	100 M Ω (measured with 500 V DC Megger)	
-	Resistance	Between output and FG		
	External Ar	pearance	With chassis	
~	Input Type		Terminal stand	
ture	Output Typ	e	Connector	
truc	External Di	mensions	220 ^W x 98 ^D x 52 ^H mm	
al St rds	Weight		950g	
erna ndai	Safety Stan	dards	UL60950, CSA No. 60950, and SEMKO (EN60950) certified, designated to meet Electrical Appliance and Material Control Law	
Exte	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	Surrent	Harmonic current: Designated to meet IEC61000-3-2	
	narmonic (Juneni	Immunity: Designated to meet IEC61000-4-2, 5	
0.11	Remote ON	I/OFF Control	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.

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.

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

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

			Specifications and Standards	
	_	_		
	Mo	dal	240W	
	IVIC		SWD240P-24	
	Deted Innut			
		nout Voltage Range		
6	Input Curre	nt (typ) Nor	$4 \text{ OA} (V_{\text{IN}} = 100\text{V})$	
suo	Rated Freq	uency	50/60Hz	
diti	Allowable F	Frequency Range	47 to 63Hz	
drug	Power Fact		$0.95 (V_{IN} = 100V)/0.90 (V_{IN} = 240V)$	
-0	Efficiency (typ) Note1	80%	
	Inrush Curr	rent (max) Note 2	20A (V _{IN} = 100V)/40A (V _{IN} = 240V)	
	Leakage Current (max)		0.75mA (VIN = 240V)	
	Deted Out			
	Output Vol	ago Variation	Z4V Fixed	
Note	Pated Outp	ut Current		
su	Maximum E		20.0 A (within 15 sec)	
iți 14				
nd tr	Rated Outp	ut Power	240W	
ວັບັ	Constant Vo		+5%	
	Rinnle Nois	e Note1 Note4	400mVn-p	
	Output Hole	ding Time (min) 🔤	60msec	
	Startup tim	e (typ)	1000msec	
Additional Functions	Overcurren	t Protection	Detection above 105% of maximum peak current (drooping automatic recovery)	
	Overvoitage		Detection above 115% of rated voltage (output cutoff)	
	Dverheating Protection		Not provided	
	Operations Display		Not provided	
	Operating Te	emperature 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%	
tal	Cooling Requirements		Natural air cooling	
len 1s	No. of vibrations		10 to 55Hz	
tion	Vibration Sweep time		3 minutes	
virc	Resistance	Acceleration rate	19.6m/s² (2G)	
S E		Vibration direction	<u>Χ, Υ, Ζ</u>	
		vibration time		
	Shock Resi	stanco	98M/S ² (10G) Conduct this test on an oak board with a flat surface and a thickness of 10 mm or more	
	onock resi	Stande	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)	
5	Insulation	Between input and output	3000 V AC for 1 minute (leakage current: 15 mA or less)	
	Voltago	Between input and FG	2000 V AC for 1 minute (leakage current: 15 mA of less)	
atio	Voltage	Between output and FG	500 V AC IOF I Minute (leakage current. 15 MA of less)	
sula	Insulation	Between input and output	100 MO (monoured with E00 V/ DC Maggar)	
<u> </u>	Resistance	Between input and FG		
		Between output and FG		
	External Ap	opearance	With chassis	
re/	Input Type		Terminal stand	
rctu	Output Typ	e	Terminal stand	
Stru	External Di	mensions	240 ^w x 110 ^o x 65 ⁿ mm	
nal lard	weight	dordo		
xter tang	Conductor	Emission	Decignated to most ECC Class R (120 V AC). ENERGING Class R (200 V AC) and VCCI Class R (100 V AC)	
ыw	Conducted	Emission	Harmonic current: Designated to most JEC61000.2.2	
	Harmonic C	Current	Immunity: Designated to meet IEC61000-4-2. 5	
	Domete Ch			
Options	Cover	UFF Control	Provided	
	Cover		FIUVIDED	

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. 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
CN1	1: AC (LIVE)		VHR-5N (JST)	SVH-21T-P1.1 (JST)
	2: NC			
	3: AC (NEUTRAL)	B3P5-VH (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)		VHR-5N (JST)	SVH-21T-P1.1 (JST)
	2: NC			
CN1	3: AC (NEUTRAL)	B3P5-VH		
	4: NC			
	5: FG			
	1: +		VHR-6N (JST)	SVH-21T-P1.1 (JST)
	2: +			
CNI2	3: +	B6P-VH		
CINZ	4: -	(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		
0.14	1: +			SVH-21T-P1.1 (JST)
	2: +	B6P-VH (JST)	VHR-6N (JST)	
	3: +			
CINT	4: -			
	5: -			
	6: -]		
CNI2	1: RC +	B2P-SHF-1AA	H2P-SHF-AA	SHF-001T-0.8SS (JST)
CNZ	2: RC -	(JST)	(JST)	
			CN2 is open or	n standard model

SWD060P-24

Symbol	Pin No.	Connector	Corresponding connector	Corresponding contact
TB1	1: AC (LIVE)	M110D-3C	M4 terminals	
	2: AC (NEUTRAL)	(Morimatsu)		
	3: FG	or equivalent		
TB2	1: +	M110D-2C	N44 terminele	
	2: -	or equivalent	M4 ter	minais
CN2	1: RC +	B2P-SHF-1AA (JST)	H2P-SHF-AA	SHF-001T-0.8SS
	2: RC -		(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 Standards					
	Mo	del		50W	
			HWA050-05-C	HWA050-12-C	HWA050-24-C
	Rated Input	Voltage		AC1001/ to AC2401/	
	Allowable	nput Voltage Range	AC100V 10 AC240V		
	Input Curre	nt (typ) Nort	0 9A/0 45A		
suc	Rated Freq	uency	50/60Hz		
ոթսէ onditic	Allowable F	requency Range	47 to 63Hz		
	Power Fact	or (typ)	$0.95 (V_{IN} = 100V 0.000)$		
<u></u> - చ	Efficiency (typ) Note		83%	83% 84% 84%	
				25A/50A (at 25°C cold start)	0.77
	Leakage Cu	urrent (max) Note1	0.5mA/1.0mA		
	Deted Oute		E\/	12)/	241/
		ut voltage	50	F9(to +109(24 V
Ś	Batad Outn		100	-5% 10 + 10%	210
iuo		ut Current Pango	104	0 to 100%	2.18
diti	Rated Outp	ut Power	50\\/	50.4W	50.4W
on	Rinnle Nois		100m\/p p	240m\/n n	180m\/n n
00	Output Hole	ding Time (min)	Тооптур-р	2401179-9	480mvp-p
	Startun Time (max)			1000msec	
	Overeurren	t Protoction		Drovided	
Additional Functions	Overvoltage Protection		Provided		
	Overheatin	a Protection	Not provided		
	Remote ON	/OFF Control	Not provided		
	Remote Se	nsina	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%	
a	Storage Humidity Range			25 to 85%	
ient	Cooling Requirements			Natural air cooling	
ion	No. of vibrations			10 to 55Hz	
/iro Jdit	Vikuatian	Sweep time	3 minutes		
En	Resistance	Acceleration rate	Single-sided amplitude: 0.75 mm		
	Resistance	Vibration direction	X, Y, Z		
		Vibration time	Eight minutes in each of three directions		ons
	Installation	Conditions	Derating may be required due to mounting direction		
	Insulation	Between input and output	3000 V AC for 1 minute		
Ę	Withstand	Between input and FG		2200 V AC for 1 minute	
atic	Voltage	Between output and FG		1000 V AC for 1 minute	
sula	Inculation	Between input and output			
Ê	Resistance	Between input and FG		10 M Ω or above	
		Between output and FG			
	External Ap	pearance	With chassis and cover		
ıre/	Input Type			Terminal stand	
ucti	Output Typ	e		Terminal stand	
Str Is	External Di	mensions		40 ^w x 127 ^D x 85 ^H mm	
rnal darc	Weight			420g	
xter tan	Safety Stan	dards Note 3	UL1950, UL1012, UL5	508, CSA No. 950, VDE (EN60950),	and VDE0160 certified
ш о	Conducted	Emission	Design	ated to meet FCC Class B and EN	50081-1
	EMC		Designated t	to meet EN55022, EN61000-4 and	EN61000-3-2
Ontione	Remote ON	/OFF Control		Not provided	
options	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).

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

External Dimensions

(unit: mm)



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

Specifications and Standards			
100W 150W			
Model HWA100-24-C HWA150-24-	<u>с</u>		
Rated Input Voltage AC100V to AC240V			
Allowable Input Voltage Range AC85 to 264V			
Input Current (typ) tool 1.8A/0.9A 2.7A/1.4A			
Rated Frequency 50/60Hz			
Allowable Frequency Range 4/ to 63Hz	4/ to 63Hz		
$= 0$ Power Factor (typ) $0.95 (V_{IN} = 100V, \text{ Load} = 100\%)$ Efficiency (typ)	0.95 (VIN = 100V, LOAd = 100%)		
Enciency (typ) and 64%			
Rated Output Voltage 24V			
Output Voltage Variation -5% to +10%			
Rated Output Current 4.2A 6.5A			
Allowable Output Current Range 0 to 100%	\ \ /		
Rated Output Power 100.800 150	vv		
O O Ripple Noise 480mVp-p			
Startun Time (mar)			
Overcurrent Protection 1002 Provided			
Overvoltage Protection Provided	Provided		
Overheating Protection Not provided	Not provided		
Remote ON/OFF Control Not provided	Not provided		
Remote Sensing Not provided	Not provided		
Green LED Indicator	Green LLD indicator		
Operating Temperature Range -10 to +55°C	-10 to +55°C		
Storage Temperature Range -25 to +65°C	-25 to +65°C		
Operating Humidity Range 25 to 85%			
Storage Humidity Range 25 to 85%	25 to 85%		
Cooling Requirements Natural air cooling	10 to 55Hz		
No. or vibrations 10 to 35H2			
Vibration Acceleration rate			
Vibration direction			
Vibration time Eight minutes in each of three directions			
Installation Conditions Derating may be required due to mounting direction	Derating may be required due to mounting direction		
Withstand Between input and EC 2200 V AC for 1 minute			
Voltage Between input and FG 1000 V AC for 1 minute			
Between input and output			
Ensulation Between input and EG			
Between output and FG			
External Appearance With chassis and cover Input Type Terminal stand	Terminal stand		
External Appearance With chassis and cover Input Type Terminal stand Output Type Terminal stand			
External Appearance With chassis and cover Input Type Terminal stand Output Type Terminal stand External Dimensions 50 ^W x 145 ^D x 92 ^H mm	n		
External Appearance With chassis and cover Input Type Terminal stand Output Type Terminal stand External Dimensions 50 ^w x 145 ^D x 92 ^H mm Weight 600q	n		
External Appearance With chassis and cover Input Type Terminal stand Output Type Terminal stand External Dimensions 50 ^W x 145 ^D x 92 ^H mm Weight 600g Safety Standards UL1950, UL1012, UL508, CSA No. 950, VDE (EN60950), and VDE0160 certility	n		
External Appearance With chassis and cover Input Type Terminal stand Output Type Terminal stand External Dimensions 50 ^W x 145 ^D x 92 ^H mm 50 ^W x 163 ^D x 92 ^H mm Weight 600g 900g Safety Standards UL1950, UL1012, UL508, CSA No. 950, VDE (EN60950), and VDE0160 certities Conducted Emission Designated to meet FCC Class B and EN50081-1	n		
External Appearance With chassis and cover Input Type Terminal stand Output Type Terminal stand External Dimensions 50 ^w x 145 ^D x 92 ^H mm Weight 600g Safety Standards UL1950, UL1012, UL508, CSA No. 950, VDE (EN60950), and VDE0160 certities Conducted Emission Designated to meet FCC Class B and EN50081-1 EMC Designated to meet EN55022, EN61000-4 and EN61000-3-2	n fied		
External Appearance With chassis and cover Input Type Terminal stand Output Type Terminal stand External Dimensions 50 ^w x 145 ^D x 92 ^H mm Weight 600g Safety Standards UL1950, UL1012, UL508, CSA No. 950, VDE (EN60950), and VDE0160 certition Conducted Emission Designated to meet FCC Class B and EN50081-1 EMC Designated to meet EN55022, EN61000-4 and EN61000-3-2	n fied		

Note: 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).

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

External Dimensions





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

	Specifications and Standards				
			300W	600W	
	Мо	del	HWA300-24-C	HWA600-24-C	
Rated Input Voltage		Voltage	AC100V to	D AC240V	
	Allowable Input Voltage Range		AC85 t	o 264V	
s	Input Curre	nt (typ) Note1	5.4A/2.7A	10A/5A	
tior	Rated Frequency		50/6	0Hz	
out	Allowable Frequency Range		47 to	63Hz	
S I	Power Factor (typ)		0.95 (V _{IN} = 100V	/, Load = 100%)	
	Efficiency (typ) Note1	83% 25A/50A (at 2)	83%	
	Lookago Cu				
	Leakaye Ol		U.5MA/1.UMA		
	Rated Outp	ut Voltage	24	łV	
	Output Volt	age Variation	-5% to	+10%	
suc	Rated Outp	ut Current	14A	27A	
ditio	Allowable O	utput Current Range	0 to 1	100%	
utp one	Rated Outp	ut Power	336W	648W	
ဝပ	Ripple Nois	e	480m	іVp-р	
	Output Holding Time (min)		20r	nsec	
	Startup IIm	ie (typ)	1500r	nsec	
	Overcurren	t Protection Note 2	Prov	ided	
ns ns	Overvoltage	e Protection	Prov	ided	
dditior unctio	Overheating	g Protection	Not provided	Provided	
	Remote ON	/OFF Control	Not provided		
⋖℡	Remote Sei	nsing	Not provided		
	Operations Display		Green LED Indicator		
Operating Temperature Range Storage Temperature Range		emperature Range	-10 to +55°C		
		nperature Range	-25 to	+65°C	
	Operating H	lumidity Range	25 to	85%	
ntal	Storage Hu	midity Range	25 to 85%		
mei	Cooling Re	quirements	Natural a	ir cooling	
on litic		No. of vibrations	10 to 55Hz		
nvii ond	Vibration	Sweep time	3 mir	nutes	
ШÖ	Resistance	Vibration direction	Single-sided am		
		Vibration time	Eight minutes in eac	$, \angle$	
	Installation	Conditions	Derating may be required due to mounting direction		
	Insulation	Between input and output	3000 V AC 1	tor 1 minute	
ion	Voltage	Between input and FG	2200 V AC 1		
ulat	vonage	Between output and FG	1000 V AC I	or i minute	
Insi	Insulation	Between input and output	10 MO a	r above	
	Resistance	Between output and FG			
		Detween output and 1 O			
7	External Appearance		With chassis	s and cover	
ture		0		ai stand	
truc	External Di	mensions	110 ^W x 175 ^D x 02 ^H mm	170 ^W x 170 ^D x 00 ^H mm	
al S Irds	Weight		2200g	3500g	
erna nda	Safety Stan	dards Note3	22009	VDE (EN60950) and VDE0160 certified	
Sta	Conducted	Emission	Designated to meet FCC	Class B and EN50081-1	
	EMC		Designated to meet EN55022, EN61000-4 and EN61000-3-2		
Options	Remote ON	UFF Control	Not pr	ovided	
Cover			Provided a	is 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).
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.



output 15W 30W Single output (output voltages: each 5 V, 12 V (30 W or 60 W), 15 V, 24 V (60 W))

Double output (output voltage: Å}15 V)

60W



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 hybrid IC and transformer.

Applications

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 Standards					
	Mo	dol	15W [Sin	gle output]	
		Juei	HWB015S-05	HWB015S-15	
	Pated Input Voltage		AC100V/ t	AC2401/	
	Allowable Input Voltage Range		AC 1000 ti	0 264V	
s			0.4A	0.5A	
tior	Rated Freq	uencv	50/60Hz		
out ndit	Allowable F	Frequency Range	47 to 440Hz		
S II	Efficiency (typ) Note1	70% 75%		
	Inrush Current (max) Note2		30A (100VAC)/60A (240VAC)max (at cold start)		
Leakage Current (max)		urrent (max) Note1	0.25mA (max) Option M : 50µA (max)		
Pated Output Voltage		ut Voltago	ΕV	15\/	
Rated Output Voltage Output Voltage Variation		age Variation			
8	Rated Outp	ut Current	3 0A	1.3A	
Note	Allowable Ou	tout Current Range	0 to ²	100%	
suc	Rated Outp	ut Power	15W	19.5W	
litic	Constant Vo	Itage Accuracy Note 5 Note 6	±3	%	
onc		iote 7 Note 8	5m)	/р-р	
00	Ripple Nois	Se Note 4 Note 7	10m [\]	Vp-p	
	Output Hole	ding Time (min) 🔤	20 ms at rated	output of 15 W	
	Startup tim	e (typ) 🔤	1s	ec	
	Overcurren	t Protection	Detection above approx 105% of rate	current (drooping automatic recovery)	
	Overvoltag	e Protection None	Detection above 115% of r	ated voltage (output cutoff)	
nal	Overheatin	g Protection	Not provided		
ctic			Optional support		
pb∧ dun:	Remote ON/OFF Control Moteria		(OFF at RC terminal open, ON when applying external voltage of 4.5 to 30 V between RC terminal and -V terminal)		
- H	Remote Ser	nsing	Not provided		
	Operations	Display	Green LED indicator		
	Operating Temperature Range Note 7		-10°C to	o +60°C	
	Storage Temperature Range		-25°C to) +85°C	
	Operating H	Humidity Range	30 to 90% (no	condensation)	
	Storage Humidity Range		30 to 90% (no	condensation)	
a	Cooling Re	quirements	Natural a	ir cooling	
ent		No. of vibrations	10 to 55Hz		
ion ion	Vibration	Sweep time	3 mir		
viro ndit	Resistance	Acceleration rate	19.6m	/s² (2G)	
Env Col		Vibration time		, Z	
			98m/s	r^2 (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	
e	Insulation	Between input and output	3000 V AC for 1 minute or 3600 V AC for 1 second (leakage	e current: 15 mA or less) Option M: 4000 V AC for 1 minute	
Note 1	Withstand	Between input and FG	1500 V AC for 1 minute or 1800 V AC for	1 second (leakage current: 15 mA or less)	
ion	Voltage	Between output and FG	500 V AC for 1 minute or 600 V AC for 1	second (leakage current: 15 mA or less)	
ılat	Insulation	Between input and output			
nsı	Resistance	Between input and FG	100 M Ω (measured w	th 500 V DC Megger)	
		Between output and FG			
~	External Ap	opearance	With c	hassis	
ure	Input Type		Termina	al stand	
ruct	Output Typ	e	Termina	al stand	
ll St ds	External Di	mensions	34 ^W x 110 ^D x 92 ^H mm (Excluding parts for	nstalling input terminal stand and chassis)	
erna ndai	Weight	danda	35		
Ext	Safety Stan	dards	UL1950, USA NO. 950, and TUV (EN60950) certified, designated to meet Electr	cal Appliance and Material Control Law TUV (EN60601) certified with option M	
	Conducted	EIIIISSION	Designated to meet FCC Class B (120 V AC), CISPI	Class B (230 V AC) and VCCI Class B (100 V AC)	
Options	Remote ON	I/OFF Control	Prov	rided	
	Cover		Prov	vided	
Note 1 Speci	fied under rated	input/output conditions at ar	ambient temperature of 25°C. Note7 Ambient temperature	e of 0 to 50°C is specified by rated load conditions. The load	
Note 2 More	current above no	oted values may flow at rest	art (power thermistor used). current at -10 to 0°	C and 50 to 60°C is specified by temperature derating curve	
Uutpu	The output characteristics such as highly, highly holds and constant voltage accuracy are described in the attachment.				

 Moos Output characteristics such as ripple, ripple noise and constant voltage accuracy are measured at the end of output connector.
 Moos Ripple and ripple noise are measured with a 100-MHz oscilloscope using a 1:1 probe.

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are -55 dB or less in total (ambient temperature of 25°C). 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.

Note11 Prepare a separate power supply for remote ON/OFF control signal.

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

	Specifications and Standards					
	Ma	طما	30	W [Single output]		
	INIC	dei	HWB030S-05	HWB030S-12	HWB030S-15	
	Rated Input	t Voltage	AC100V to AC240V			
ú	Allowable Input Voltage Range		AC85 to 264V			
t litions	Rated Frequency		0.7A	0.8A	0.9A	
ort J	Allowable Frequency Range			47 to 440Hz		
S P	Efficiency (typ) Note		75%	77%	80%	
	Inrush Current (max) Note2		30A (100VA	C)/60A (240VAC)max (at co	ld start)	
	Leakage Current (max) Most		0.25m	A (max) Option M : 50μA (ma	x)	
	Rated Output Voltage		5V	12V	15V	
	Output Voltage Output Voltage Variation Rated Output Current		Rate	ed output voltage +10%, -5%	-	
0te 3			6.0A	3.0A	2.6A	
ls l	Allowable Ou	tput Current Range Note 7		0 to 100%		
tior	Rated Outp	ut Power	30W	36W	39W	
ndi	Constant Vo			5m\/n-n		
ဝိပိ	Ripple Nois	Ce Note 4 Note 7		10mVp-p		
	Output Hole	ding Time (min) 🔤	20	ms at rated output of 30 W		
	Startup tim	e (typ) Note1		1sec		
	Overcurren	t Protection	Detection above approx 1	05% of rated current (drooping	automatic recovery)	
	Overvoltag	e Protection Notes	Detection above	ve 115% of rated voltage (out	put cutoff)	
ons	Overheatin	g Protection	Not provided			
ditio	Remote ON		Optional support			
Ado Fur			(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 Note7			-10°C to +60°C		
	Storage Ter	nperature Range	-25°C to +85°C 30 to 90% (no condensation)			
	Storage Hu	midity Range	30 to 90% (no condensation)			
_	Storage Humidity Range		Natural air cooling			
nta	J	No. of vibrations	10 to 55Hz			
ons	Vibration	Sweep time	3 minutes			
ditio	Resistance	Acceleration rate	19.6m/s² (2G)			
in vi		Vibration direction		X, Y, Z		
		Vibration time	One hour in each of three directions		IS	
	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	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 s	econd (leakage current: 15 mA or I	ess) Option M: 4000 V AC for 1 minute	
Note 1	Withstand	Between input and FG	1500 V AC for 1 minute or 180	00 V AC for 1 second (leakag	e current: 15 mA or less)	
ion	Voltage	Between output and FG	500 V AC for 1 minute or 600	OVAC for 1 second (leakage	e current: 15 mA or less)	
nlat	Insulation	Between input and output				
lns	Resistance	Between input and FG	100 MΩ (ι	measured with 500 V DC Me	gger)	
		Between output and FG				
e/	External Ap	opearance		With chassis		
ctur	Input Type	•		Terminal stand		
Stru s	External Di	e mensions	34 ^W x 136 ^D x 92 ^H mm (Excludi	reminal stand	rminal stand and chassis)	
hal	Weight			380q		
xter tanc	Safety Stan	dards	UL1950, CSA No. 950, and TÜV (EN60950) certified, design	ated to meet Electrical Appliance and Material	Control Law TÜV (EN60601) certified with option M	
сщω	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		
Note 1 Speci	ified under rated current above no	input/output conditions at ar oted values may flow at resta	ambient temperature of 25°C. Note? Ambi art (power thermistor used). curre	ent temperature of 0 to 50°C is spent at -10 to 0°C and 50 to 60°C is	ecified by rated load conditions. The load s specified by temperature derating curve	

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

described in the attachment. Teres 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).

Insulation conditions are specified at normal temperature and humidity. For medical

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 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.

equipment-support model (option), insulation withstand voltage between batch input and batch output is 4000 V AC for 1 minute.

Note 9 Reset is performed by reapplying input voltage.

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

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

	Specifications and Standards						
	Mo	del		60W [Sin	gle output]		
	IVIC		HWB060S-05	HWB060S-12	HWB060S-15	HWB060S-24	
	Rated Input	t Voltage		100 to 120/200 to 240 V/AC, outomotic quitching			
	Allowable	nnut Voltage Range		85 to 122/170 to 264 V	AC, automatic switching		
put inditions	Input Curre	nt (typ)	1 24/0 74	1 54/0 94		2 04/1 04	
	Rated Frequency		1.2740.174	50/6	30Hz	2.0771.077	
	Allowable Frequency Range			47 to	440Hz		
d d	Efficiency (typ) Net	75%	80%	85%	85%	
	Inrush Current (max) Mote2		10/0	30A (100VAC)/60A (24))VAC)max (at cold start)	0070	
	Leakage Current (max)			0.25mA (max) Op	tion M: 50uA (max)		
	Rated Outp	ut voltage	5V	12V	15V	24V	
_	Output von	age variation	10.00	Rated output vo	Itage +10%, -5%	0.54	
Note 3	Rated Outp	ut Current	10.0A	5.2A	5.2A	3.5A	
su	Allowable Ou	tput Current Range	5014	0 to	7014	0.000	
ti t	Rated Outp	ut Power	5000	62W	787	84W	
ndi	Constant Vo	Itage Accuracy Notes Notes		±,	3%		
Co ri		lote 7 Note 8		5m 10m	Vp-p		
	Ripple Nois	C Note 4 Note 7		10m	vp-p		
	Output Hold	aing lime (min)	20	ms da	20m		
	Startup time (typ) Note1			18	sec		
	Overcurren	t Protection	Detection ab	ove approx. 105% of rate	d current (drooping autom	natic recovery)	
	Overvoltage	e Protection Note 9	E	Detection above 115% of	ated voltage (output cuto	ff)	
ona	Overheatin	g Protection	Not provided				
ditio	Remote ON	/OFF Control Note 12	Optional support (OFF at RC terminal open. ON when applying external voltage of 4.5 to 30 V between RC terminal and -V terminal)				
А́Ц	Remote Sensing		Not provided				
	Operations	Display	Green LED indicator				
	Operating Te	emperature Range Marz	-10°C to +60°C				
	Storage Temperature Range			-25°C t	0 +85°C		
	Operating I	lumidity Range		30 to 90% (no	condensation)		
	Storage Humidity Range			30 to 90% (no	condensation)		
	Cooling Re	quirements		Natural a	air cooling		
nta		No. of vibrations	10 to 55Hz				
me		Sweep time	3 minutes				
itic	Vibration	Acceleration rate	19.6m/s² (2G)				
livi Duc	Resistance	Vibration direction	X, Y, Z				
шõ		Vibration time		One hour in each of three directions			
				98m/s² (10G)			
	Shock Resistance		Conduct this to Lift one side of installation	est on an oak board with a flat	surface and a thickness of 10) mm or more. I times for each of 4 sides	
	Installation	Conditions	Derating may be required due to mounting direction				
	Inculation	Retween input and output	3000 V AC for 1 minute or 3	600 V AC for 1 second (leakage	e current: 15 mA or less) Ontio	n 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 curren	nt: 15 mA or less)	
u	Voltage	Between output and FG	500 V AC for 1	minute or 600 V AC for 1	second (leakage current:	: 15 mA or less)	
atic		Between input and output			g		
sul	Insulation	Between input and FG		100 M Ω (measured w	ith 500 V DC Meager)		
<u> </u>	Resistance	Between output and FG		, , , , , , , , , , , , , , , , , , ,	00 /		
	External Ar	nearance		With c	hassis		
re/	Input Type	pourunoo		Termin	al stand		
lctu	Output Tvp	e		Termin	al stand		
Stru	External Di	mensions	38 ^W x 170 ^D x 92 ^H	¹ mm (Excluding parts for	installing input terminal st	and and chassis)	
ard:	Weight			55	0g	- /	
teri and	Safety Stan	dards	UL1950, CSA No. 950, and TÜV (EN6	0950) certified, designated to meet Elect	ical Appliance and Material Control Law	TÜV (EN60601) certified with option M	
ŭ ŭ	Conducted	Emission	Designated to meet FCC	Class B (120 V AC), CISP	R Class B (230 V AC) and V	VCCI Class B (100 V AC)	
	Remote ON	OFF Control		Dros	vided .	. ,	
Options	Cover			PIO	vided		
	00101			F10			
Note 1 Speci	tied under rated	Input/output conditions at an	ambient temperature of 25°C.	Note 7 Ambient temperature of to 0°C and 50 to 60°C	of 0 to 50°C is specified by rated load is specified by temperature derating	t conditions. The load current at -10 curve described in the attachment	
Note 3 Outpu	ut characteristics	such as ripple, ripple noise	and constant voltage accuracy	are Notes Frequency compone	ent of 100 Hz to 1 kHz and ripp	le component of 100-Hz interval	
meas	measured at the end of output connector. are -55 dB or less in total (ambient temperature of 25°C).						

Note 9 Reset is performed by reapplying input voltage.

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 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. 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.

Specified at a rated power of 60 W for HWB060S-15 and HWB060S-24.

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				
			15W [Double output]		
IVIOdel		del	HWB015D-15		
	Allowable Input Voltage		100 to 240 V AC, continuous input		
put nditions	Allowable input voltage Range		85 to 264 V AC, continuous input		
	Input Current (typ) Note1		0.5A 50/60Hz		
		Frequency Range	47 to 440Hz		
Sor	Efficiency (tvp) Note1	75%		
	Inrush Curr	rent (max) Note 2	30A (100VAC)/60A (240VAC)max (at cold start)		
Leakage Current (max) Kost		urrent (max) Note1	0.25mA (max) Option M: 50µA (max)		
	Rated Outp	ut Voltage	+15\/		
	Output Volt	age Variation	Rated output voltage +10% -5% (Double output model: Interlocked (voltage variation)		
6	Rated Outp	out Current	0.65A		
Š.	Allowable Ou	tput Current Range	0 to 100%		
suo	Rated Outp	out Power	19.5W		
diti	Constant Volta	Ige Accuracy Note 5 Note 6 Note 12	±5%		
ont		lote 7 Note 8	5mVp-p		
	Ripple Nois	Se Note 4 Note 7	10mVp-p		
	Output Hole	ding Time (min)	20 ms at rated output of 15 W		
	Startup time	e (typ) 🔤	TSEC		
	Overcurren	t Protection	Detection above approx. 105% of rated current (drooping automatic recovery)		
al IS	Overvoltage	e Protection Notes	Detection above 115% of rated voltage (output cutoff)		
tion	Overheating	g Protection			
Addit Func	Remote ON/OFF Control		Optional support		
	Pomoto Sonsing		(OFF at RC terminal open, ON when applying external voltage of 4.5 to 50 V between RC terminal and -v terminal)		
	Operations Display		Green LED indicator		
	Storago Tomporature Range				
	Operating Humidity Range		30 to 90% (no condensation)		
	Storage Humidity Range		30 to 90% (no condensation)		
_	Cooling Requirements		Natural air cooling		
inta	Vibration Resistance	No. of vibrations	10 to 55Hz		
ans ons		Sweep time	3 minutes		
diti		Acceleration rate	19.6m/s² (2G)		
		Vibration direction	X, Y, Z		
		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		
se 10	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		
u a	Voltage	Between input and FG	500 V AC for 1 minute or 600 V AC for 1 second (leakage current: 15 mA or less)		
atic		Between input and output			
Insi	Insulation	Between input and FG	100 M Ω (measured with 500 V DC Megger)		
-	Resistance	Between output and FG			
	External An	opearance	With chassis		
Ire/	Input Type	•	Terminal stand		
nctt	Output Typ	e	Terminal stand		
ds IStr	External Di	mensions	34 ^W x 110 ^D x 92 ^H mm (Excluding parts for installing input terminal stand and chassis)		
arna Indar	Weight	day la	350g		
Exte	Safety Stan	Emission	UL1950, USA NO. 950, and TUV (EN60950) certified, designated to meet Electrical Appliance and Material Control Law TUV (EN60901) certified with option M		
	Sonducted		Designated to meet 1 00 blass D (120 V AC), DISER Class D (230 V AC) dhu VCOI Class D (100 V AC)		
Options	Remote ON	UFF Control	Provided		
Note 1 Speci Note 2 More Note 3 Outpu meas Note 4 Ripple	 More current above noted values may flow at restart (power thermistor used). Output characteristics such as ripple, ripple noise and constant voltage accuracy are measured at the end of output connector. Resource at the end of output connector. 				

 Note:
 Ripple and ripple noise are measured with a 100-MHz oscilloscope using a 1:1 probe.
 Note:
 Reset is performed by reapplying input voltage.

 Note:
 Output voltage can be changed within the maximum output power and rated output current.
 Note:
 Insulation conditions are specified at normal te equipment-support model (option), insulation voltage.

centre 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.

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

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 $60^\circ C$ is specified by temperature derating curve described in the attachment.

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

HWB Series

Specifications and Standards

			Specifications and Standards	
			30W [Double output]	
	Mo	del	HWB030D-15	
	Rated Input		100 to 240 V AC, continuous input	
(0	Allowable I	nput voltage Range	85 to 264 V AC, continuous input	
suc	Input Curre	nt (typ) Note1	0.9A	
put nditi	Rated Frequency		50/60Hz	
ndi	Allowable F	requency Range	47 to 440Hz	
్ చ	Efficiency (typ) Note 1	80%	
	Inrush Curr	ent (max) Note 2	30A (100VAC)/60A (240VAC)max (at cold start)	
	Leakage Cu	ırrent (max) 🔤	0.25mA (max) Option M:50μA (max)	
Deted Output		ut Voltago	+151/	
Rated Output Voltage			±13V	
_	Dutput Von		Rated output voltage +10%, -5% (Double output model: Interlocked (voltage variation)	
Note 3	Rated Outp	ut Current	1.3A	
SL	Allowable Ou	tput Current Range	0 to 100%	
tior	Rated Outp	ut Power	399	
ndi 1	Constant Volta	ge Accuracy Note 5 Note 6 Note 12	±5%	
Du Su	Ripple Note 4	ote 7 Note 8	5mVp-p	
	Ripple Nois	C Note 4 Note 7	10mVp-p	
	Output Hole	ding Time (min) Note1	20 ms at rated output of 30 W	
	Startup time (typ) Note1		1sec	
	Overcurren	t Protection	Detection above approx 105% of rated current (drooping automatic recovery)	
	Overvoltage	e Protection	Detection above 115% of rated voltage (output output)	
ial าร	Overheatin	a Protection		
tion	overneating	grioteetion		
Additi Funct	Remote ON/OFF Control Man		OPE at PC terminal open. ON when applying external voltage of 4.5 to 30.V between PC terminal and -V terminal)	
	Demote Concine		(Or Factor terminal open, Or when applying external voltage 04.5 to 50 V between to terminal and V terminal)	
	Constantions	Diamley		
	Operations	Display	Green LED Indicator	
	Operating Temperature Range Note 7		-10°C to +60°C	
	Storage Temperature Range		-25°C to +85°C	
	Operating H	lumidity Range	30 to 90% (no condensation)	
	Storage Humidity Range		30 to 90% (no condensation)	
_	Cooling Requirements		Natural air cooling	
nta	No. of vibrations		10 to 55Hz	
ne		Sweep time	3 minutes	
itio	Vibration	Acceleration rate	19.6m/s ² (2G)	
nd vir	Resistance	Vibration direction	× × 7	
ы С Ш		Vibration time	One hour in each of three directions	
		Vibration time		
	Shock Resi	stanco	Sonris (1005) Conduct this test on an oak hoard with a flat surface and a thickness of 10 mm or more	
	SHOCK 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	Dorating may be required due to mounting direction	
	motanation			
B	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	
Not	Withstand	Between input and FG	1500 V AC for 1 minute or 1800 V AC for 1 second (leakage current: 15 mA or less)	
ion	Voltage	Between output and FG	500 V AC for 1 minute or 600 V AC for 1 second (leakage current: 15 mA or less)	
Ilat	Inculation	Between input and output		
ารเ	Resistance	Between input and FG	100 M Ω (measured with 500 V DC Megger)	
-	litebletanee	Between output and FG		
	External Ar	nearance	With chassis	
e/		pearance	With chassis	
tur	Output Type	0		
tr	Extornal Di	moncione	reminal stand	
al St rds	External DI	mensions	34" x 130" x 92" mm (Excluding parts for installing input terminal stand and chassis)	
erne Ida		Janda	4 IUg	
Exte Star	Safety Stan	Gards	UL 1900, USA INU, SOU, AIIO TUV (ENGUSOU) CERTINED, DESIGNATED TO MEET ELECTRICAL Appliance and Material Control Law TUV (ENGUSOU) 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)	
Ontione	Remote ON	OFF Control	Provided	
options	Cover		Provided	
New Speci	fied under rated	input/output conditions at an	ambient temperature of 25°C	

ed 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). Note3 Output characteristics such as ripple, ripple noise and constant voltage accuracy are

cified by rated lo 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

Insulation conditions are specified at normal temperature and humidity. For medical

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

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

are -55 dB or less in total (ambient temperature of 25°C).

Note 9 Reset is performed by reapplying input voltage.

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

[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.		
		Single output	Double output	
	TB1	1: AC (NEUTRAL)	1: AC (NEUTRAL)	
		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 contribution 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.

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, semiconductor manufacturing equipment, and other industrial equipment

Options

Cover (with derating) Terminal stand

Description of model name



Output

voltage

Series name Output pov

Option (C: With cover)

Output power (150:150W)



Free warrantee period: 2 years



	Specifications and Standards					
			10	DW		
	Мо	del	SWE100P-2405			
	Rated Input	t Voltage	AC100V to AC240V			
	Allowable I	nput Voltage Range	AC85 to 264V			
su	Input Curre	nt (typ) 🔤	1.5A (V _{IN} = 100V)			
j <u></u> :	Rated Freq	uency	50/60Hz			
but but	Allowable F	Frequency Range	47 to 63Hz			
<u>ں ج</u>	Power Fact	or (typ) Note1	0.95 (V _{IN} = 100V)	/0.90 (V _{IN} = 240V)		
	Efficiency (typ) More		79	9%		
	Inrush Curr	rent (max) Note 2	20A (V _{IN} = 100V)	/40A (V _{IN} = 240V)		
Leakage Current (max) Note		urrent (max)	0.75mA (\	$I_{IN} = 240V$)		
	Rated Outp	ut Voltage	5V	24V		
	Output Volt	age Variation	±10%	±10%		
	Rated Outp	ut Current	3.0A	4.0A		
ons w	Maximum F	Peak Current Note 8		10.0 A (within 15 sec)		
	Allowable O	utput Current Range	0 to 30.0A	0 to 10.0A		
diti	Rated Outp	ut Power	15W	96W		
o nt	Constant Vo	Itage Accuracy Notes	±3%	±5%		
00	Ripple Nois	e Note 1 Note 4	100mVp-p	240mVp-p		
	Output Holding Time (min)		60	nsec		
	Startup tim	e (typ)	300r	nsec		
	Overcurrent Protection		3 15 A or more (drooping automatic recovery)	10.5 A or more (drooping automatic recovery)		
= 0	Overvoltage Protection		Detection above 115% of r	rated voltage (output cutoff)		
iona	Overheatin	a Protection	Not incivided			
ditio	Remote Se	nsina	Not provided			
Adi Fur	Operations Display		Not provided			
	Remote ON/OFF Control		Not provided	Provided		
			40001			
	Operating Temperature Range		-10°C ti	0+60°C		
	Storage Ter	Inperature Range	-25°C 10 +65°C			
	Storago Hu	midity Pango	30 to 90%			
<u>9</u>	Storage Humidity Range		Natural air cooling			
ent s	Cooling Requirements		10 to 55Hz			
nm ion		Sweep time	3 minutes			
/iro	Vibration	Acceleration rate	19.6m/s² (2G)			
Sor	Resistance	Vibration direction	X Y 7			
		Vibration time	One hour in each of three directions			
		I	98m/s	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)			
_	Inculation	Between input and output	3000 V AC for 1 minute (lea	kage current: 15 mA or less)		
Note 7	Withstand	Between input and EG	2000 V AC for 1 minute (lea	kage current: 15 mA or less)		
uo	Voltage	Between output and FG	500 V AC for 1 minute (leal	(age current: 30 mA or less)		
ati		Between input and output				
sul	Insulation	Between input and FG	100 M Ω (measured w	ith 500 V DC Megger)		
<u> </u>	Resistance	Between output and FG				
	Externel Ar	, ,		h i -		
-		pearance	Will C			
inre		۵	Con	ector		
nct I	External Di	mensions	220 ^W x 98 ^I	2×52^{H} mm		
Str str	Weight		77	70g		
nal ard	Safety Stan	dards	UL60950, CSA No. 60950, and SEMKO (EN60950) certified d	esignated to meet Electrical Appliance and Material Control Law		
and	Conducted	Emission	Designated to meet FCC Class B (120 V AC) EN550	22 Class B (230 V AC) and VCCI Class B (100 V AC)		
Ste			Harmonic current: Design	ated to meet IEC61000-3-2		
	EMC		Immunity: Designated t	o meet IEC61000-4-2, 5		
	1/O Termine	al Stand		idod		
Options	Cover			vided		
	00101		I FIO	viucu		

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).

SWE Series 100W,150W

			Specifications and Standards			
	84 -	-1-1	150	W		
Model		aei	SWE150	P-2405		
	Rated Input	Voltage	AC100\/ #	AC240V		
		nut Voltage Range	AC 100 V to AC240V			
s	Input Curre	nt (typ)	2.4A (V _{IN} = 100V)			
ion	Rated Frequ	lency	50/60Hz			
dit	Allowable F	requency Range	47 to 63Hz			
Ъ.	Power Facto	or (typ) Mai	47100312 $0.98 (1/m - 100)/(0.95 (1/m - 240)/)$			
U	Efficiency (tvn) Mail	0.50 (VIN = 100V)/ 79	%		
	Inrush Current (max) Note3		$20A(V_{IN} = 100V)$	$40A(V_{1N} = 240V)$		
	Leakage Cu	Irrent (max) Note1	0.75mA (V	NN = 240V		
	Rated Outp	ut Voltage	5V	24V		
	Output Volt	age Variation	±10%	±10%		
8	Rated Outp	ut Current	6.0A	6.0A		
6	Maximum P	eak Current Notes		10.0 A (within 15 sec)		
üo	Allowable O	utput Current Range	0 to 6.0A	0 to 15.0A		
diti	Rated Outp	ut Power	30W	144W		
on	Constant Vol	tage Accuracy Note 5	±3%	±5%		
Ŭ	Ripple Nois	e Note 1 Note 4	100mVp-p	240mVp-p		
	Output Hold	ding Time (min) 🔤	60n	ISEC		
	Startup time	e (typ)	800n	isec		
	Overcurren	t Protection	6.3 A or more (drooping automatic recovery) 15.75 A or more (drooping automatic recover			
su	Overvoltage Protection Note 6		Detection above 115% of ra	ated voltage (output cutoff)		
Functio	Overheating Protection		Not pro	ovided		
	Remote Sensing		Not pro	ovided		
	Operations	Display	Not provided			
	Remote ON/OFF Control		Not provided	Descrided		
			Not provided	Provided		
	Operating Te	mperature Range	-10°C to	+60°C		
	Operating Te Storage Ten	emperature Range	-10°C to -25°C to	+60°C +85°C		
	Operating Te Storage Ten Operating H	mperature Range nperature Range Iumidity Range	-10°C tc -25°C tc -30 to	+60°C +85°C 90%		
	Operating Te Storage Ten Operating H Storage Hu	mperature Range nperature Range Iumidity Range midity Range	-10°C tc -25°C tc 30 to 30 to	+60°C +85°C 90% 90%		
	Operating Te Storage Ten Operating H Storage Hu Cooling Ree	mperature Range nperature Range lumidity Range midity Range quirements	-10°C tc -25°C tc 30 to 30 to Natural a	Provided +60°C +85°C 90% 90% ir cooling		
ns	Operating Te Storage Ten Operating H Storage Hu Cooling Ree	mperature Range nperature Range lumidity Range midity Range quirements No. of vibrations	-10°C tc -25°C tc 30 to 30 to 30 to Natural a 10 to	Provided +60°C +85°C 90% 90% ir cooling 55Hz		
itions	Operating Te Storage Ten Operating H Storage Hu Cooling Red	mperature Range nperature Range lumidity Range midity Range quirements No. of vibrations Sweep time	-10°C tc -25°C tc 30 to 30 to 30 to Natural a 10 to 3 mir	Provided +60°C +85°C 90% 90% ir cooling 55Hz uutes		
nditions	Operating Te Storage Ten Operating H Storage Hu Cooling Red Vibration Resistance	Imperature Range Imperature Range Iumidity Range Indity Range quirements No. of vibrations Sweep time Acceleration rate	-10°C tc -25°C tc 30 to 30 to 30 to Natural a 10 to 3 mir 19.6m.	Provided +60°C +85°C 90% 90% ir cooling 55Hz nutes (s² (2G)		
Conditions	Operating Te Storage Ten Operating H Storage Hu Cooling Red Vibration Resistance	Imperature Range Imperature Range Iumidity Range Indity Range quirements No. of vibrations Sweep time Acceleration rate Vibration direction	-10°C tc -25°C tc 30 to 30 to 30 to Natural a 10 to 3 mir 19.6m. X, Y	Provided +60°C +85°C 90% 90% ir cooling 55Hz putes (s² (2G) , Z		
Conditions	Operating Te Storage Ten Operating H Storage Hu Cooling Red Vibration Resistance	emperature Range nperature Range dumidity Range midity Range quirements No. of vibrations Sweep time Acceleration rate Vibration direction Vibration time	-10°C to -25°C to 30 to 30 to 30 to Natural a 10 to 3 mir 19.6m. X, Y One hour in each	Provided +60°C 90% 90% ir cooling 55Hz nutes /s² (2G) , Z of three directions		
Conditions	Operating Te Storage Ten Operating H Storage Hu Cooling Ree Vibration Resistance	emperature Range nperature Range lumidity Range midity Range quirements No. of vibrations Sweep time Acceleration rate Vibration direction Vibration time stance	-10°C to -25°C to -25°C to 30 to 30 to Natural a 10 to 3 mir 19.6m. X, Y One hour in each 98m/s Conduct this test on an oak board with a flat Lift one side of installation surface of the unit 50 mm and	Provided +60°C +455°C 90% 90% 90% ir cooling 55Hz iutes (s ² (2G) (, Z of three directions ² (10G) surface and a thickness of 10 mm or more. drop it on the board. Drop 3 times for each of 4 sides.		
Conditions	Operating Te Storage Ten Operating H Storage Hu Cooling Red Vibration Resistance Shock Resis	emperature Range nperature Range lumidity Range midity Range quirements No. of vibrations Sweep time Acceleration rate Vibration direction Vibration time stance Conditions	-10°C to -25°C to -25°C to 30 to 30 to Natural a 10 to 3 mir 19.6m. X, Y One hour in each 98m/s Conduct this test on an oak board with a flat Lift one side of installation surface of the unit 50 mm and Derating may be required due to mounting direction (normal installat	Provided +60°C +85°C 90% 90% 90% ir cooling 55Hz suites 52 52 54 55Hz 5		
Conditions	Operating Te Storage Ten Operating H Storage Hu Cooling Ree Vibration Resistance Shock Resi Installation	emperature Range nperature Range lumidity Range midity Range quirements No. of vibrations Sweep time Acceleration rate Vibration direction Vibration time stance Conditions Between input and output	-10°C to -25°C to -25°C to 30 to 30 to Natural a 10 to 3 mir 19.6m. X, Y One hour in each 88m/s Conduct this test on an oak board with a flat Lift one side of installation surface of the unit 50 mm and Derating may be required due to mounting direction (normal installat 3000 V AC for 1 minute (leak	Provided +60°C +85°C 90% 90% ir cooling 55Hz tutes (s ² (2G) (, Z of three directions ² (10G) surface and a thickness of 10 mm or more. drop it on the board. Drop 3 times for each of 4 sides. on directions are vertical and horizontal: with mounting holes down) rage current: 15 mA or less)		
Conditions	Operating Te Storage Ten Operating H Storage Hu Cooling Ree Vibration Resistance Shock Resi Installation Insulation Withstand	emperature Range nperature Range lumidity Range midity Range quirements No. of vibrations Sweep time Acceleration rate Vibration direction Vibration time stance Conditions Between input and output Between input and FG	-10°C to -25°C to 30 to 30 to 30 to Natural a 10 to 3 mir 19.6m. X, Y One hour in each 98m/s Conduct this test on an oak board with a flat Lift one side of installation surface of the unit 50 mm and Derating may be required due to mounting direction (normal installat 3000 V AC for 1 minute (leak 2000 V AC for 1 minute (leak	Provided +60°C +455°C 90% 90% 90% ir cooling 55Hz tutes (s ² (2G) (, Z of three directions ² (10G) surface and a thickness of 10 mm or more. drop it on the board. Drop 3 times for each of 4 sides. on directions are vertical and horizontal: with mounting holes down) tage current: 15 mA or less) tage current: 15 mA or less)		
Conditions	Operating Te Storage Ten Operating H Storage Hu Cooling Ree Vibration Resistance Shock Resi Installation Insulation Withstand Voltage	emperature Range nperature Range lumidity Range midity Range quirements No. of vibrations Sweep time Acceleration rate Vibration direction Vibration time stance Conditions Between input and output Between output and FG Between output and FG	-10°C tc -25°C tc 30 to 30 to 30 to Natural a 10 to 3 mir 19.6m. X, Y One hour in each 98m/s Conduct this test on an oak board with a flat Lift one side of installation surface of the unit 50 mm and Derating may be required due to mounting direction (normal installat 3000 V AC for 1 minute (leak 500 V AC for 1 minute (leak	Provided +60°C +455°C 90% 90% 90% ir cooling 55Hz tutes (s ² (2G) (, Z of three directions ² (10G) surface and a thickness of 10 mm or more. drop it on the board. Drop 3 times for each of 4 sides. on directions are vertical and horizontal: with mounting holes down) tage current: 15 mA or less) tage current: 15 mA or less) tage current: 30 mA or less)		
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I/O Terminal Stand Provided 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 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. 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.

Environmental Conditions

Note 7

External Structure/ Standards

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

Symbol	Pin No.	Connector	Corresponding connector	Corresponding contact
	1: AC (LIVE)			
CN1	2: NC			
	3: AC (NEUTRAL)	B3P5-VH (JST)	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)
CNID	4 to 6: GND1	B8P-VH		
CINZ	7: +5V	(JST)		
	8: GND2			
010	1: RC +		H2P-SHF-AA	SHF-001T-0.8SS
CN3	2: RC -	BZF-GITF-TAA		

SWE150P-2405

Symbol	Pin No.	Connector	Corresponding connector	Corresponding contact
	1: AC (LIVE)			SVH-21T-P1.1
	2: NC			
CN1	3: AC (NEUTRAL)	B3P5-VH	VHR-5N	
	4: NC			
	5: FG			
	1 to 3: +24V		VHR-10N	SVH-21T-P1.1
CNI2	4 to 6: GND1			
GINZ	7, 8: +5V	BIUP-VH		
	9, 10: GND2			
010	1: RC +		H2P-SHF-AA	SHF-001T-0.8SS
CN3	2: RC -	BZF-SITF-TAA		

Terminal stands

SWE1	SWE100P-2405 SWE150P-2405					
Symbol	Pin No.	Connector	Corresponding connector	Corresponding contact		
	1: AC (LIVE)	M110D-3C				
TB1	2: AC (NEUTRAL)	(Morimatsu)	M4 terminals			
	3: FG	or equivalent				
	1: +24V		M4 terminals			
TDO	2: GND1	M110D-3C				
I DZ	3: +5V	or equivalent				
	4: GND2					
0110	1: RC +			SHF-001T-0.8SS		
CN3	2: RC -	DZF-SITE-TAA	112F-30F-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, 20 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) ^o 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	400W
	No. of DC Cell Modules	5 cells
	Rated Input Voltage	AC100 to 240V
	Allowable Input Voltage Range	AC85 to 264V
ut Conditions	Input Current Motel	6.5A/3A max (AC100V/AC240V)
	Rated Frequency	50/60Hz
	Allowable Frequency Range	47 to 63Hz
Inpi	Efficiency 🚥	70% (typ)
	Inrush Current Note2	15A/35A max (AC100V/AC240V)
	Power Factor Mote	0.9 (min)
ers	Leakage Current	0.75 mA (max) Option M: 0.5 mA (max)
Oth	Output Holding Time 🚥	20ms (min)
	Operating Temperature Range Koos	-10 to +60°C
ons	Storage Temperature Range	-20 to +85°C
nditi	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
iron	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
ation	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
Exte Strud /Stand	Weight Nase	2300g
ards	Safety Standards	UL1950, CSA No. 60950, and TÜV (EN60950) certified, CE marking compatible TÜV (EN60601) certified with option M
Stand	Conducted Emission 10007	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.

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.

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.

U Series

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



	Specifications and Standards						
14	Model	PCU900					
Item	Total Output Power	900W					
	No. of DC Cell Modules	9 cens					
	Rated Input Voltage	AC100 to 240V					
	Allowable Input Voltage Range	AC85 to 264V					
onditions	Input Current 🔤	15A/7.5A max (AC100V/AC240V)					
	Rated Frequency	50/60Hz					
ut Co	Allowable Frequency Range	47 to 63Hz					
Inpi	Efficiency Note	70% (typ)					
	Inrush Current Note2	15A/35A max (AC100V/AC240V)					
	Power Factor 🚥	0.9 (min)					
ers	Leakage Current	0.9mA (max)					
Oth	Output Holding Time 🚥	20ms (min)					
	Operating Temperature Range	-10 to +60°C					
ons	Storage Temperature Range	-20 to +85°C					
nditi	Operating Humidity Range	30 to 90% (no condensation)					
al Co	Storage Humidity Range	30 to 90% (no condensation)					
ment	Cooling Requirements	Forced air cooling by internal fan					
iron	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					
ation	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 $M\Omega$ or above (measured with 500 V DC Megger)					
rnal ture dards	External Dimensions 🚥	220 ^W x 280 ^D x 64 ^H mm					
Exte Strud /Stand	Weight Note	3900g					
ards	Safety Standards	UL1950, CSA No. 60950, and TÜV (EN60950) certified, CE marking compatible TÜV (EN60601) certified with option M					
Stand	Conducted Emission	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.

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.

Notes 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									
DC Cell Module Symbol	Α	В	C	D	E	F	G	Н	J
Rated Output Voltage	3.3V	5V	12V	15V	24V	36V	48V	2V	6V
Output Voltage Variation Note			Rated of	output voltag	e ±10%			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 Need					±3%				
Overcurrent Protection (min) Notes	26.4A	26.4A	11.0A	8.8A	5.5A	3.7A	2.8A	26.4A	22A
Overvoltage Protection Note	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					Provided				
Overheating Protection					Provided				
Series Operation Notes					Enabled				
Parallel Operation	Enabled								
Orations Display		Provided							
Output Terminal Type North				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 Meet		Fiz	xed			Fix	ked		Rated output	voltage ±5%	Rated output	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			5W		40W		96	SW			
Ripple Noise Note 2 Note 3	100	mV	150	mV	100	mV	150	mV	100mV	100mV	200mV	200mV
Constant Voltage Accuracy Noted		±5%		±5%	±5% ±5%		±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 Note	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			-		-			-	-		-	
Overheating Protection Notes		-		Provided	- Provided		Prov	rided	Prov	vided		
Series Operation		Disa	abled		Disabled			Ena	bled	Ena	bled	
Parallel Operation	Disabled				Disabled				Disa	bled	Disa	bled
Orations Display	Provided				Provided			Prov	rided	Prov	vided	
Output Terminal Type Note10	Connector Connector				Conn	ector	Conr	nector				
Required Number of Cells		1	cell			1	cell		1 c	ell	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.)

Notes 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.

Note: Overheating protection operates when an abnormal ambient temperature is detected.

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.)

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



External Dimensions

(unit: mm)





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
CNI	1	Remote sensing -	XHP-2	SXH-001T-P0.6
CINT	2	Remote sensing +	(JST)	(JST)
	1	+ 5V STB		
	2	SG		
	3	RMT2 ON/OFF		
CN2	4	RMT3 ON/OFF	XHP-8	SXH-001T-P0.6
CINZ	5	RMT4 ON/OFF	(JST)	(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

CNI4 Din

Multi-output DC cell module

Operation indicator LED

W11, W22 (connector type)



Q1, Q2 (connector type)

(

CN3

No.1

Channel 2 output adjustment knob

Q1T, Q2T (terminal stand type)

0

Operation indicator LED

W11T, W22T (terminal stand type)

 Operation indicator LED
 W11, W22
 W11T, W22

 Channel 2 output voltage adjustment knob
 8, 9
 4

 6, 7
 3

0114111110.			•••••	, , , , , , , , , , , , , , , , , , , ,	W111, W221		
	W11, W22	W11T, W22T	Function	(connec	ctor type)	(terminal stand type)	
	(connector type)	(terminal stand type)		Corresponding housing	Corresponding contact	Corresponding wiring	
	8, 9	4	5V or 12V (CH1)			Single wire AWG16 to 26 (UL, C-UL, TÜV)	
	6, 7	3	GND (CH1)			Stranded wire AWG16 to 22	
	5		NC	XHP-9	SXH-001T-P0.6	(UL, C-UL)	
	3, 4	2	GND (CH2)	(301)	(301)	(TÜV)	
						Sheath stripping length:	
	1, 2	1	5V or 12V (CH2)			7 to 10 mm	

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

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

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

```
Operation mode
```

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

③ 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

① 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.

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

ltem	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	
Call output coguenee	Sets startup sequence for each DC cell	0 to 2500mg	0.55
Cell output sequence	Sets the shut-down sequence for each DC cell		UIIS
	Sets time between external remote ON and setting of operation enabled status for DC cells	60±10ma	
External remote ON/OEE	Sets time between external remote OFF and stopping of DC cell operation	60±10ms	
	Sets time between external remote ON and DC cell startup sequence	0 to 2500mg	0.55
	Sets time between external remote OFF and DC cell shut-down sequence	0 10 25001115	0115
	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 to 60o	00
Cell group control	Sets each group's shut-down sequence	0 10 605	US
	Sets startup sequence of DC cells in each group	0.1.0500	0.55
	Sets shut-down sequence of DC cells in each group	0 to 2500ms	oms
Economy mode	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.

ltem	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	<u>CN2-1</u> + 5V 		
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

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

	Input voltage			AC	ν (V ~	V)		
	Output specifications	Cell 1	Cell 2	Cell 3	Cell 4	Cell 5	5 Cell 6	Cell 7	Cell 8	Cell 9
	Output voltage (V)									
	Output current (A)									
specifications	Output capacity (W)									
	Total output capacity (W)		· · · ·						·	·
	Optional functions	Alarm seque	ence	Ŋ	Yes No		External remote ON/OFF		Yes	No
		AC power fa	ilure	Y	Yes No		Cell group control		Yes	No
uest		Cell output s	sequence		Yes No E		Economy mode		Yes	No
Req	Number of samples and requested delivery date									
	Other									

From Sanken to your company

suo	Product name									
	Product configuration name									
cati	Output specifications	Cell 1	Cell 2	Cell 3	Cell 4	Cell 5	Cell 6	Cell 7	Cell 8	Cell 9
^o roposal specifi	Output voltage (V)									
	Output current (A)									
	Output capacity (W)									
	Total output capacity (W)		-		1					
-	Other									

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MEMO

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

Sanken SANKEN ELECTRIC CO., LTD.

ISO9001/14001 certified

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